DESIGN CONFIDENCE

Sydney Grammar School

BCA Design Assessment Report

Weigall Sports Complex
SSDA 10421

ACCESSIBILITY | BUILDING REGULATIONS | FIRE ENGINEERING | MANAGEMENT SERVICES

CONTENTS

Project: Weigall Sports Complex
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The following report register documents the development and issue of this and each subsequent report(s) undertaken by Design Confidence.

Revision History:

OUR REFERENCE	REMARKS	ISSUE DATE
P220_051-1 (BCA) LB	Report issued in DRAFT for review and comment	16 June 2020
P220_051-2 (BCA) LB	Report updated to incorporate client comments and reflect SSDA drawing package	11 September 2020

EXECUTIVE SUMMARY

This BCA Design Assessment report has been prepared by Design Confidence at the request of Jattca Property Solutions on behalf of Sydney Grammar School.

Based upon our detailed review of the proposed architectural drawings, it is the opinion of this office that the subject development is capable of complying with the performance provisions of the BCA. Compliance would be achieved via a mixture of adopting a performance based approach as well as complying with the relevant deemed-to-satisfy requirements as outlined within the BCA, compliance via the performance based approach could occur without significant changes to the proposed design.

In addition to undertaking a detailed assessment of the design against the perspective requirements of the BCA a preliminary performance-based assessment has also been undertaken. The purpose of the assessment was to look at the incorporation of a performance-based design may add value in-lieu of complying with the prescriptive (DtS) provisions.

Table 1 on the following page lists scenarios where we believe the adoption of a performance design may add value to development –

Table 1

NO.	DESIGN EFFICIENCIES	DTS CLAUSE	PERFORMANCE REQUIREMENT
FIRE SAFETY			
1.	**Extended Travel Distances** Our initial assessment has indicated extended travel distances in the following areas within the sports facility: i. Basement ▪ Travel distances of up to 44m to a single exit in lieu of 20m ii. Ground Floor ▪ Travel distance to an exit of up to 27m choice in lieu of 20m from spectator mezzanine	D1.4	DP4, EP2.2
2.	**Extended Distance Between Alternative Exits** Extended distances between alternative exits within the sports facility: ▪ Ground floor - of up to 73m in lieu of 60m; and ▪ First floor - of up to 70m in lieu of 60m on the first floor of the sports complex.	D1.5	DP4, EP2.2
3.	**Fire Hydrants** The fire hydrant booster will not be within site of the entrance to the carpark building	E1.3	EP1.3

Be advised that the adoption of performance solutions for fire safety matters may be subject to consultation with the NSW Fire Brigade as part of the Construction Certificate process under Clause 144 of the Environmental Planning & Assessment Regulation 2000.

1.0 INTRODUCTION

1.1 General

This BCA Design Assessment report has been prepared at the request of Jattca Property Solutions and relates to the new construction of a sports complex and associated open deck carpark located at Sydney Grammar School.

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 prescriptive provisions of the Building Code of Australia (BCA) Volume 1, edition 2019 Amendment 1.

1.3 Documentation Provided for Assessment

This assessment is based upon the Architectural documentation prepared by Allan Jack + Cottier Architects and listed within Appendix 1.

1.4 Report Exclusions

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

(i) Work Health & Safety Act and Regulations;

(ii) WorkCover Authority requirements;

(iii) Structural and Services Design Documentation;

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

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

(vi) The Accessibility Requirements of the BCA, as contained within D3, E3.6, F2.4 and F2.9 of the BCA;

(vii) The Energy Efficiency Provisions of the BCA, as contained with Section J of the BCA.

2.0 DEVELOPMENT DESCRIPTION

2.1 General

In accordance with the Building Code of Australia, the assessment undertaken relates to the construction of a new aquatic and leisure centre.

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

2.2 Building Description

Construction of the SGS Weigall Sports Complex comprising the following:

(a) Building 1 - Sports facilities building accommodating the following facilities:

(i) Ground floor: Main pool, programme pool, terrace/assembly facing Weigall, entry foyer, offices, change rooms, back of house, services and external car parking (5 spaces) and loading

(ii) Mezzanine floor: spectator terrace and services

(iii) First floor: Multipurpose sports hall 01 – basketball and volleyball, Multipurpose sports hall 02 –cardio, weights, taekwondo, fencing, PDHPE, change rooms, storage and services

(iv) Level 2: Multipurpose room 04; Multipurpose sports hall 03 –cardio, weights, taekwondo, fencing, PDHPE, storage and services

(v) Driveway entry from Neild Avenue (comprising relocation of the existing driveway southwards with existing driveway potential retained for maintenance access)

(b) Building 2 – Car park comprising an ancillary car park of one/two split levels accommodating 93 spaces with an additional 4 spaces on grade, accessed from an existing entry from Alma Street (located on the existing cricket nets site). The lower ground level includes the flexibility to be used as an extension of the existing playing fields

(c) Parking for a total of 102 cars comprising:

(i) Building 1: 5 spaces

(ii) Building 2: 97 car spaces (93 within the building and four at grade)

(d) Landscaping of the site including tree removal/retention/replacement, paths, fencing and lighting

(e) Building identification signage

(f) New kiosk substation.

Use of the completed building as an educational establishment with external/community use of the proposed facilities that coordinates with the programming of the SGS.

The proposal does not include any of the following:

- General learning areas (**GLA**)
- An increase in the existing student or staff population.

Table 3– Building Characteristics

DESCRIPTION OR REQUIREMENT		
Building Classification	Sports Facility Building	Class 9b
	Car park	Class 7a
Rise in Storeys	Sports Facility Building	Three (3)
	Car park	Two (2)
Construction Type	Sports Facility Building	Type A
	Car park	Type C
Effective Height	Sports Facility Building – 12.2m	
	Car park - <12m	
Climate Zone:	Climate Zone 5	

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

PART	APPROX. FLOOR AREA (M^2)	APPROX. VOLUME (M^3)	CALCULATED POPULATION
Basement	310m^2	TBC	-
Ground Floor + Spectator Terrace	2,875 m^2	TBC	68
First Floor	3,245m^2	TBC	148
Second Floor	1,017 m^2	TBC	35

Notes:

1. The above population has been based on numbers provided by the school within the utilisation schedules, this has been based off peak time being weekends summer.
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 carpark has not been listed above as it has been considered as an open deck carpark and therefore there are not compartment size restrictions and the population is ancillary to the sports complex.

2.3 BCA 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 plant areas, storage areas and office areas located within the sports complex are directly related to the operation of the centre, hence they are an ancillary use to the principal use being a Class 9b;

(ii) The spectator terrace has not been counted in the Rise in Storeys as is less than 200m^2;

(iii) It is understood that neither solid fuel burning stoves and open fire-places will not be provided;

(iv) It is understood that fuel gas cylinders are not proposed to be provided;

(v) Based off client direction the sporting complex will not be treated as a place of entertainment under the NSW variations;

(vi) For AS1670.1, AS1670.3 and AS1670.4; notwithstanding A4.0(5) of the BCA, until 1 May 2022 either the current edition or the previous editions of the documents listed in Table 1.8 of AS1670.1, AS1670.3 and AS1670.4 may be used to meet the requirements of AS1670.1, AS1670.3 and AS1670.4 as applicable.

3.0 BCA ASSESSMENT SUMMARY

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 '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 4.0 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 & volume limitations			✓
C2.6	Vertical separation			✓
C2.10	separation of lift shafts			✓
C2.11	stairways and lifts in one shaft			✓
C2.12	separation of equipment			✓
C2.13	electricity supply system			✓
C3.2	protection of openings			✓
C3.4	methods of protection			✓
C3.10	openings in fire-isolated lift shafts			✓
C3.12	openings in floors and ceilings			✓

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
C3.15	openings for service installation			✓
C3.16	construction joints			✓
C3.17	columns protected in lightweight construction			✓

3.4 Section D: Access & Egress

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
D1.2	number exits required		✓	
D1.3	fire-isolated exits			✓
D1.4	exit travel distances		✓	
D1.5	distance between alternative exits		✓	
D1.6	dimensions of exits and paths of travel to exits			✓
D1.9	travel by non-fire isolated stairways and ramps			✓
D1.10	discharge from exits			✓
D1.13	number of persons accommodated			✓
D1.16	Plant rooms			✓
D1.17	access to lift pits			✓
D2.3	non fire-isolated stairways and ramps			✓
D2.7	installations in exits and paths of travel			✓
D2.8	Enclosure of space under stairs			✓
D2.9	Stairway width			✓
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			✓
D2.23	signage			✓

3.5 Section E: Services & Equipment

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
E1.3	fire hydrants		✓	
E1.4	fire hose reels			✓
E1.5	fire sprinklers			✓
E1.6	portable fire extinguishers			✓
E2.2	general provisions			✓
E3.1	lift installations			✓
E3.3	warning against use of lifts			✓
E4.2	emergency lighting			✓
E4.5	exit signs			✓
E4.6	design and operation of exit signs			✓
E4.9	emergency and warning intercom system			✓

3.6 Section F: Health & Amenity

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
F1.1	storm water design			✓
F1.4	external above ground membranes			✓
F1.5	roof coverings			✓
F1.6	sarking			✓
F1.7	waterproofing of wet areas			✓
F1.9	damp-proofing			✓
F1.10	damp-proofing of floors on the ground			✓
F1.11	provision of floor wastes			✓
F1.13	glazing			✓
F2.3	sanitary facilities			✓
F2.5	construction of sanitary compartments			✓
F3.1	height of rooms and other spaces			✓
F4.4	artificial lighting			✓
F4.5	ventilation of rooms			✓
F4.8	position of water closets	✓		

3.7 Section G - Ancillary Provisions

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
G1.1	swimming pools			✓
G1.101	provision for cleaning windows			✓
G6.1	occupiable outdoor areas			✓

4.0 BCA DETAILED ASSESSMENT

4.1 General

With reference to the 'BCA Assessment Summary' contained within Part 3 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 must be greater than the most critical action effect determined by B1.2 & B1.4 of the BCA and AS/NZS 1170.0-2002.
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 - AS3700-2018 ❑ Concrete construction - AS3600-2018 ❑ Footings and slabs – AS2870-2011 ❑ Steel construction - AS4100-1998 or AS/NZS 4600-2005 ❑ Termite Risk Management - AS3660.1-2014 ❑ Piling - AS2159-2009 ❑ 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 2. In addition to the FRLs contained within the Appendix A2 the following information details the construction methodology and concessions available to the sporting complex. ❑ *General notes* (i) Any loadbearing internal wall and a loadbearing fire wall (including shafts) is required to be of concrete or masonry or fire-protected timber; (ii) A non-loadbearing internal wall required to achieve an FRL is required to be of non-combustible construction; (iii) A shaft which is not for the discharge of hot products of combustion and not load-bearing is required to be of non-combustible construction;

Cl. C1.1 *Cont'd*	(iv) The bottom of any shaft is required to be non-combustible and laid directly on the ground unless otherwise enclosed by construction having an FRL not less than that required for the walls; and (v) Building elements are required to achieve an FRL from both sides. ❑ *Concessions* (i) In the storey immediately below the roof, the internal walls and internal columns other than fire walls and shaft walls need not achieve an FRL; (ii) A floor need not have an FRL if it is laid directly on the ground. ❑ *Method of attachment not to reduce the fire-resistance of building elements* The method of attaching or installing a finish, lining, ancillary element or service installation to a building element must not reduce the fire-resistance of that element to below that required.
Cl. C1.8	Lightweight construction used in a wall system required to have an FRL or a lift, stairway or service shaft (refer to Spec. C1.1 above) must comply with this clause. If lightweight construction is used for the fire-resisting covering of any steel column/s (refer to BCA Spec C1.1 above), then any void must be filled solid, to a height of not less than 1.2m above the floor.
Cl. C1.9	The following building elements and their components must be non-combustible within the sports facility– (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. (iv) Loadbearing internal elements
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 maximum floor area and volume limitations of a fire compartment as nominated in the deemed to satisfy provisions are as follows:

CLASSIFICATION		TYPE OF CONSTRUCTION		
		A	B	C
5, 9b or 9c aged care building	Max floor area (m^2)	**8,000**	5,500	3,000
	Max volume (m^3)	**48,000**	33,000	18,000
6, 7, 8 or 9a (except for patient care areas)	Max floor area (m^2)	5,000	3,500	2,000
	Max volume (m^3)	30,000	21,000	12,000

The sporting complex (Class 9b) has been assessed as having a total compartment size of less than 8,00m^2, Confirmation from the architect is required to confirm the total volume of the building will be less than 48,000m^3.

The carpark has been assessed as an open deck carpark and therefore the provisions of this clause do not apply.

Cl. C2.12

If the lift motors or control panels are provided within a separate room, then the room is required to be separated from the remainder of the building by construction having an FRL of not less than 120/120/120 and have any doorway in that construction protected with a self-closing fire door having an FRL of not less than --/120/30.

Pump set/s for the fire hydrant system shall comply with AS2419.1-2005.

Cl. C2.13

If the main switchboard sustains emergency equipment operating in emergency mode, then the switchboard shall be separated with construction achieving an FRL of 120/120/120 or /120/120 (if non-loadbearing) and any access doorway shall be protected with a self-closing fire door having an FRL of -/120/30.

The emergency switchgear shall be separated from the nonemergency switchgear via a metal partition to minimise the spread of a fault from the non-emergency switchgear.

For the purposes of the above, emergency equipment includes pump(s) for sprinklers and fire hydrant booster pumps.

Cl. C3.2

The proposed building does not appear to be closer than 6m to any adjoining building, in addition to this there is no boundary that would be considered to be a fire source feature.

Therefore, there are no requirements for openings in external walls requiring protection in accordance with C3.4. Architect is to confirm boundary locations to ensure compliance.

Cl. C3.4	It is not foreseen that any openings in external walls requiring protection in accordance with the methods detailed within this clause. However, in the event that any openings in external walls require protection, they must be provided via any of the following methods - (i) External wall-wetting sprinklers used with windows that are automatically closing or permanently fixed in the closed position; or (ii) Fire windows having an FRL -/60/- that are automatically closing or permanently fixed in the closed position; or (iii) External wall-wetting sprinklers used with doors that are self-closing or automatic closing; or (iv) Self-closing fire door having an FRL of --/60/30; or (v) Fire shutter achieving an FRL of --/60/--;
Cl. C3.10	(i) The doorways providing access to the lift shaft shall be protected by --/60/-- fire doors complying with AS1735.11-1986 and remain closed except when discharging or receiving passengers or goods; and (ii) Any lift call button, indicator panel or other panel located within the wall of the fire-isolated lift shaft must be backed by construction having an FRL of --/60/60 if it exceeds 35,000mm^2 in area.
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 which has been constructed in accordance with BCA Spec C1.1 (listed above) or in accordance with C3.15 (see below).
Cl. C3.15	Any opening(s) for service(s) (electrical, mechanical, plumbing, etc) that penetrate a building element which is required to be of fire- resisting construction is required to be protected (i.e. fire seal).
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 AS1530.4-2005 to achieve the required FRL.
Cl. C3.17	Where a column protected by lightweight construction to achieve the required FRL defined by BCA Spec C1.1 (listed above) passes through a building element that is also required to have an FRL it must 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 basement is required to have a minimum number of two exits due to being more than 1.5m below the external ground level, currently, currently two exits are provided. The remainder of the sports complex is to be provided with two exits given the building is a school building. It is noted the terrace on the mezzanine level is only provided with a single exit, however it is understood less than 50 people would be accommodated and hence would achieve the concession under D1.2(d) (vi).
Cl. D1.3	Fire-isolated stairs are not required within the buildings given the there are no internal stairs connecting more than 3 consecutive storeys in a sprinklered building.
Cl. D1.4	The locations of the proposed exits demonstrate that the travel distances to exits and points of choice to alternative exits are not within the required limitations. The travel distances to exits should not exceed: <u>Class 5-9</u> (i) 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 (ii) exits shall be located to not be more than 60m apart and not closer than 9m Our initial assessment has indicated the following travel distances: <u>Sports Complex</u> iii. Basement ▪ Travel distances of up to 44m to a single exit in lieu of 20m iv. Ground Floor ▪ Travel distance to an exit of up to 27m choice in lieu of 20m from spectator area With respect to the above BCA DtS variation, the following options for resolution are provided – (i) Reconfigure floor plates to afford DTS travel distances; or (ii) Pursue a BCA Performance Solution / Fire Engineering Report which justifies that the current design complies with the relevant Performance Requirements.

Cl. D1.5

Exits shall be located to not be more than 60m apart and not closer than 9m.

Based off the preliminary floor plans, there are extended distances:

- Ground floor - of up to 73m in lieu of 60m; and
- First floor - of up to 70m in lieu of 60m on the first floor of the sports complex.

With respect to the above BCA DtS variation, the following options for resolution are provided –

(i) Reconfigure floor plate to afford DTS distance between alternative exits; or

(ii) Pursue a BCA Performance Solution / Fire Engineering Report which justifies that the current design complies with the relevant Performance Requirements.

Cl. D1.6

Based upon the projected population the aggregate exit width for each storey is as follows –

STOREY	POPULATION	AGGREGATE EXIT WIDTH REQUIRED	AGGREGATE EXIT WIDTH PROVIDED
Ground Floor	68	1m	>1m
First Floor	148	1.5m	4.0m
Second Floor	35	1m	3.0m

Table 1 – Exit widths

With respect to the above the following information is provided to assist with the ongoing development of the design, specifically the ground floor and level 1.

(i) Where used by the public the required exit or the path of travel to an exit must not be less than 1m or more than 3m;

(ii) Where used by the public the unobstructed width of each doorway must not be less than 1m or more than 3m (doors used by the public cannot be reduced by 250mm, hence 850mm clear is not acceptable in this instance);

Where one or more paths of travel merge, the width of the combined path of travel must be not less than the sum of the *required* widths of those paths of travel;

(iii) The required widths of the paths of travel connecting the exits from the building to a public road or open space must not diminish in combined width until such time they reach open space or a road.

(iv) At least half of the required number exits from each storey and at least half of the aggregate width of such exits must discharge through exits other than through the main entrance or the area immediately adjacent to the main entrance of the building.

Cl. D1.9	Based off our preliminary assessment all stairways within both buildings will be non-fire-isolated stairways. The distance from any point on the floor to a point of egress to a road or open space by way of a required non-fire-isolated stairway must not exceed 80m. Within the sports complex all stairways are to discharge within 20m of a doorway leading to open space, or within 40m to a door leading to open space if there are two in opposite directions. The preliminary review has revealed the stairways comply in this respect.
Cl. D1.10	For compliance to be determined with this clause, this office requires the proposed landscaping drawings which include provision of hard standing areas (pathways and the like). Once received, this office will provide advice relating to the – (i) Required widths of external pathways; an (ii) Which external pathways need to be accessible for the purpose of persons with a disability.
Cl. D1.13	Reference should be made to the projected / proposed occupant loads detailed within D1.6. The client is to confirm proposed population numbers, as the above have been calculated under D1.13 of the BCA. If the school has proposed population numbers we can utilise these numbers.
Cl. D1.17	Access into the lift pit must be through the lift landing doors provided on the lowest level.
Cl. D2.3	Stairways are required to be constructed in accordance with the following – (i) Reinforced or prestressed concrete; or (ii) Steel in no part less than 6m thick; or (iii) Timber that has a finished thickness of not less than 44mm, has an average density of not less than 800kg/m3 at a moisture content of 12% and 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	Gas or other fuel services must not be installed within the required exit. Any services or equipment (being electrical meters, distribution boards or the like) installed within the path of travel are to be 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	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 main stairway serving all levels and leading to the ovals is wider than 2m, however for the purpose of D1.6 has only been counted as 2m given there is no central handrail. There is no requirement for a central handrail given the proposed population numbers.
Cl. D2.13	The going, riser and steepness dimension of the stairways must 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

The risers and goings are to be constant throughout the flight and the stair treads must also have a surface or nosing strip achieving a slip-resistance classification of P3 in dry and P4 in the wet tested in accordance with AS4586-2013.

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. The surface or strip must achieve a slip-resistance classification of P3 in dry and P4 in wet tested in accordance with AS4586-2013.
Cl. D2.15	❑ *Internal Doorways* (i) 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. ❑ *External Doorways* (i) The threshold of the external doorways leading from the foyer on ground floor & lower ground floor must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf great than 50mm; and (ii) All other doorways can incorporate a step or ramp 190mm above the finished surface of the ground, this includes the balconies.

Cl. D2.16	Balustrades must be constructed as follow - (i) To a height not less than 865mm above the nosings of the stair treads or the floor of a ramp and to a height of 1000mm above the floor of any access path, balcony, landing or the like; (ii) Any opening does not permit a 125mm sphere to pass through it and for stairs, the space is measured above the nosings; (iii) For floors more than 4000mm above the surface beneath, any horizontal or near horizontal elements between 150mm and 760mm must not facilitate climbing; and (iv) For balustrades in fire isolated stairways used primarily for emergency purposes openings between balustrades can be up to 300mm; or where rails are used, the bottom rail must be a maximum of 150mm above the stair nosings line or from the landing floor and the opening between rails must not be more than 460mm.
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. D2.19	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. D2.21	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 detection system deemed suitable in accordance with AS1670.1-2018 installed throughout the building.

4.5 Section E – Services & Equipment

Cl. E1.3	A fire hydrant system complying with AS2419.1-2005 is required to serve the building. It is requested that the proposed location of the fire hydrant booster assembly be shown on the architectural drawings to assist in determining compliance with location / position.
Cl. E1.4	A hose reel system complying with AS2441-2005 is required to serve the building, including: (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; (iii) Additional hose reels can be installed along the path of travel where additional coverage is required.

Cl. E1.5	Whilst not required, we have been advised an AS2118.1 sprinkler system is proposed to be provided throughout the sporting complex. Having this system installed within the building affords a number of concessions, including non fire isolated stairways being permitted to connect 3 storeys and no requirement to address vertical separation between storeys.
Cl. E1.6	Portable extinguishers must be provided in accordance with Table E1.6 to cover risk classes throughout the building. Portable fire extinguishers complying with AS2444-2001 are required as follows: (i) To cover Class B (if more than 50L excluding vehicle fuel tanks is stored); and (ii) To cover Class AE or E fire risks associated with emergency service switchboards; and (iii) 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 6 of AS/NZS1668.1) on activation of smoke detectors complying with Clause 6 of Specification of E2.2a. The building is not required to be provided with any automatic smoke exhaust system or smoke and heat vents given the building is a sporting complex.
Cl. E3.1	The electric passenger lift installation or an electrohydraulic passenger lift installation shall comply with this clause.
Cl. E3.3	Warning signage "DO NOT USE LIFTS IF THERE IS A FIRE" will be required adjacent every lift call button with dimensions as detailed in this clause.
Cl. E4.2	Emergency lighting is required in accordance with AS2293.1-2005 throughout the building.
Cl. E4.5	Exit signage complying with AS2293.1-2018 are required installed above or adjacent to any doorways serving as required exits from the building and final doors from stairways.
Cl. E4.6	If an exit is not readily apparent to persons occupying or visiting the building, then exit signs complying with AS2293.1-2005 must be installed in appropriate positions in corridors, hallways, lobbies and the like, indicating the direction to a required exit.
Cl. E4.9	An emergency and warning intercom system for emergency purposes complying with AS1670.4-2018 is required to serve the building.

4.6 Section F – Health & Amenity

Cl. F1.0	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.
Cl. F1.1	Stormwater drainage must comply with AS/NZS3500.3-2003.
Cl. F1.4	Waterproofing membranes for external above ground use (i.e. balconies and roof) must comply with AS4654-2012.
Cl. F1.5	Metal roof sheeting must comply with AS1562.1-1992.
Cl. F1.6	Any Sarking-type materials used for weatherproofing of roofs and walls must comply with AS/NZS4200-1994.
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. F1.9	Damp-proof courses must consist of a material complying with AS/NZ2904-1995 or an impervious termite shield complying with AS3660.1-2000.
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	Refer to B1.4 (above) for glazing requirements.
Cl. F2.3	The number of sanitary facilities provided at each storey for the sports complex has been determined as being capable of complying based on the number of persons accommodated, determined in accordance with the utilisation schedules provided by the school. Further detailed design will be needed as the design progresses to provide separate facilities for the staff and patrons to the students.
Cl. F2.5	(i) The door to a full enclosed sanitary compartment must – ▪ Open outwards; or ▪ Slide; or ▪ Be readily removable from the outside of the sanitary compartment (i.e. lift-off hinges) Unless there is a clear space of at least 1.2m between the closet pan within the sanitary compartment and the hinge side edge of the doorway. (ii) The doors and partitions that separate adjacent sanitary compartments must extend 1.8m above the floor.

Cl. F3.1	Unobstructed ceiling heights are required as follows – (v) A bathroom, sanitary facilities, tea preparation room, store room, car parking areas or the like – 2.1m; (vi) A corridor, passageway or the like – 2.1m; (vii) Above a stairway, ramp, landing or the like – 2m; (viii) A corridor and part that serves / accommodates not more than 100 persons – 2.4m; (iii) A corridor and part that serves / accommodates more than 100 persons – 2.7m.
Cl. F4.4	Where complaint natural lighting is not provided, artificial lighting is to be installed in accordance with AS/NZS1680.0-2009.
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); or (ii) Mechanical ventilation complying with AS1668.2-2012.

4.8 Section G – Ancillary Provisions

Cl. G1.1	A water reticulation system in the swimming pool with a depth of water more than 300mm must comply with AS1926.3.
Cl. G6.1	The ground floor area surrounding the outdoor swimming pool open to the sky has been assessed as an occupiable outdoor area under this clause. Any occupiable outdoor area more than $10m^2$ is to be provided with the following applicable provisions as detailed in Part G6 – (i) The fire hazard properties of linings, materials or assemblies must comply with C1.10 as for an internal element, excluding properties identified in G6.2(b); (ii) Provision for escape, as for Part D1; (iii) Firefighting equipment, as for Part E1; (iv) Visibility in an emergency, exit signs and warning systems, as for Part E4; (v) Light and ventilation, as for F4.4, F4.8 and F4.9.

5.0 CONCLUSION

Based upon our detailed review of the proposed architectural drawings, it is the opinion of this office that the subject development is capable of complying with the performance provisions of the BCA. Compliance would be achieved via a mixture of adopting a performance based approach as well as complying with the relevant deemed-to-satisfy requirements as outlined within the BCA, compliance via the performance based approach could occur without significant changes to the proposed design.

The details of the proposed performance solutions are subject to the outcome of the fire engineering brief and analysis which will be carried out in accordance with the International Fire Engineering Guidelines.

The performance solutions for the building will be developed as part of the ongoing design and consultation with the design team.

Report By

Lindsay Beard
Associate | Building Regulations
For Design Confidence (Sydney) Pty Ltd

Verified By

Luke Sheehy
Principal
For Design Confidence (Sydney) Pty Ltd

APPENDIX 1

The BCA Design Assessment was based upon the architectural documentation prepared by Allen Jack + Cottier Architects, namely –

DESCRIPTION	DRAWING NUMBER	REVISION	DATE
Locality Plan	A1000	A	02.09.2020
Site Plan	A1001	A	02.09.2020
Demolition Plan	A1100	A	02.09.2020
General Arrangement - Basement	A2100	A	02.09.2020
General Arrangement – Ground	A2101	A	02.09.2020
General Arrangement – Mezzanine	A2102	A	02.09.2020
General Arrangement – First	A2103	A	02.09.2020
General Arrangement – Second	A2104	A	02.09.2020
General Arrangement - Roof	A2105	A	02.09.2020
Elevations	A3100	A	02.09.2020
Elevations	A3101	A	02.09.2020
Sections	A3200	A	02.09.2020
Sections	A3201	A	02.09.2020
General Arrangement – Carpark Lower Ground + Upper Ground	A2110	A	02.09.2020
General Arrangement – Carpark Lower First + Upper First	A2111	A	02.09.2020
General Arrangement – Carpark Upper First + Second	A2112	A	02.09.2020
Carpark Elevations	A3110	A	02.09.2020
Carpark Elevations	A3111	A	02.09.2020
Carpark Sections	A3210	A	02.09.2020
Carpark Sections	A3211	A	02.09.2020

DESIGN CONFIDENCE

APPENDIX 2

The Table below represents the Fire Resistance Levels (FRLs) required in accordance with BCA 2019 Amendment 1:

Sports Facility Building:

Table A1 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

Car park:

Table A3.1 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 1.5 m from a *fire-source feature* to which it is exposed:	
		Loadbearing	60/60/60
		Non-*loadbearing*	–/60/60
	(ii)	1.5 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b)	*internal wall*		–/–/–
(c)	*fire wall*		
	(i)	from the direction used as a *carpark*	60/60/60
	(ii)	from the direction not used as a *carpark*	90/90/90
Column			
(a)	steel column less than 1.5 m from a *fire-source feature*		60/–/– or 26 m^2/tonne
(b)	any other column less than 1.5 m from a *fire-source feature*		60/–/–
(c)	any other column not covered by (a) or (b)		–/–/–
Beam			
(a)	less than 1.5 m from a *fire-source feature*		
	(i)	steel floor beam in continuous contact with a concrete floor slab	60/–/– or 30 m^2/tonne
	(ii)	any other beam	60/–/–
(b)	1.5 m or more from a *fire-source feature*		–/–/–
Roof, floor slab and vehicle ramp			–/–/–
Note: ESA/M means the ratio of exposed surface area to mass per unit length.			

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
Sprinkler Protected Areas	1.2
Fire-Isolated Exits & Fire Control Rooms	1.2
Lift Cars	2.2
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, 2 or 3
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)

APPENDIX 4

The number of required sanitary facilities is set out below in Table A2 –

Table A2 – Required Sanitary Facilities

	Occupant Population Number			WC Required / Provided		Urinal Required / Provided		Basin Required / Provided	
Sports – Participants	**204**	Male	204	***11***	***27***	***21***	***32***	***21***	***27***
Sports – spectators or patrons	**140**	Male	70	***1***	*TBC*	***1***	*TBC*	***1***	*TBC*
		Female	70	***3***	*TBC*	-	-	***2***	*TBC*
Staff	**23**	Male	12	***1***	*TBC*	***1***	*TBC*	***1***	*TBC*
		Female	11	***1***	*TBC*	-	-	***1***	*TBC*
Showers for participants		Male	204	*21 Showers required and 34 shown*					

The above includes the following -

- It is acknowledged the school is a male school, during the peak population of 200 it will be 100% male occupants. On weekends however to accommodate for events facilities could be calculated 50/50 with signage having the ability to be switched to female for events. To accommodate for females pans, basins and showers will need to be allocated to females. This approach ensures that the complex has been designed to provide for any future community use.
- Staff and students cannot share facilities, staff and spectator facilities to be coordinated as the design progresses.
- A unisex accessible sanitary facility can be counted once for each sex
- Population numbers based off the peak period in weekends summer as outlined in the utilisation schedules provided by the school

Design Confidence (Sydney) Pty Limited
Shop 2, 35 Buckingham Street, Surry Hills NSW 2010
ABN: 72 896 582 485

T: 2 8399 3707
E: sydney@designconfidence.com
W: www.designconfidence.com