GROUPDLA

Building Code of Australia 2019

Report for BCA Compliance

PROJECT NAME: Sikh Grammar School Sydney (Rouse Hill Campus) – SSDA Submission

DATE: 3 May 2019

www.groupdla.com.au

Level 3 10 Bridge Street, Sydney NSW 2000 I Tel: 02 8355 3160, Fax: 02 8355 3169 I ABN: 99 159 812 843 / ACN 397 662 632 groupdla.com.au

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Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	21 Feb 2019	SSDA Submission	Shane Berry (Author) Brett Clabburn (Director)	
B	3 May 2019	SSDA Submission – Updated design.	Shane Berry (Author) Brett Clabburn (Director)	

Executive Summary

The report is for the assessment of the Sikh Grammar School Rouse Hill Campus to assess compliance with the Building Code of Australia 2019 Amendment 1 ("BCA"), prepared for PMDL. A summary of all relevant clauses of the BCA is attached under Appendix 1. Table 1 below identifies items that require further attention via design amendments or BCA Performance Solutions, at this stage of the design. The Legend below illustrates the status of these items in terms of resolution. Section 3.0 of the report provides a summary of the relevant parts of the BCA applicable to this building and identifies any shortfalls in this assessment where noted. Table 2 identifies the outstanding information require for Group DLA to complete this BCA assessment.

Whilst this report notes that there are outstanding items, these items have no bearing on planning matters and as such should not hinder the SSDA submission process.

Legend

	DTS non-compliant items requiring further consideration at the Detailed Design Development Stage
	DTS non-compliant items that have been resolved in principal, however require final close out at a later stage, i.e. finalisation of the Fire Engineered Report.

Item No.	DTS Non- Compliance	Nominated Resolution	BCA Clause	BCA Performance Requirements
1	School Complex – Basement Carpark - The opening to the pedestrian ramp area servicing the Basement Carpark is positioned within 6 m of the Primary School complex which is a separate fire compartment. The openings to the carpark may be difficult/impossible to treat.	The Fire Safety Engineer has confirmed the feasibility of a justifiable Performance Solution is feasible. Fire separation to the adjacent wall of the Primary School building may or may not need to be fire rated as part of this review.	C3.3, C3.4	CP2
2	Boarding House – The central exit stair contains the following non-compliances: a) Connects more than 3 storeys (actual: 5 Storeys) and is not fire isolated from the remainder of the building. b) Discharges internally to the building rather than direct to *openspace*. c) Lift and stair in the one shaft, rather than being fore separated form each other.	The Fire Safety Engineer to review and confirm if a justifiable Performance Solution is feasible.	D1.3, D1.7, C2.12	DP4, DP5, EP2.2, CP2
3	Boarding House – The eastern exit stair contains the following non-compliances: a) Discharges internally to the building rather than direct to *openspace*.	The Fire Safety Engineer to review and confirm if a justifiable Performance Solution is feasible.	D1.3	DP5, EP2.2

Item No.	DTS Non- Compliance	Nominated Resolution	BCA Clause	BCA Performance Requirements
4	Extended travel distances to various areas as noted in Table 7 below. This item will be ongoing WIP until the plans are finalised via the DD Stage.	The Fire Safety Engineer to review and confirm if a justifiable Performance Solution is feasible. Some items require (and have been nominated for) architectural design changes to achieve compliance.	D1.4, D1.5	DP4, EP2.2
5	School Complex – Undersized exit widths. See Table 8 below.	Design change required - additional exit doors to be illustrated. This can be readily achieved.	D1.6	DP4
6	School Complex – Level 3 exit stairs – Secondary Study, Staff Lounge, Mezzanine - Contain the following non-compliances: a) Discharge at level 2, rather than ground level. b) Cause a travel distance more than 80 m to the ground floor external exits (openspace).	The Fire Safety Engineer to review and confirm if a justifiable Performance Solution is feasible.	D1.9	DP4, EP2.2
7	School Complex – Level 2 & 3 - *Horizontal exit* doors – The following considerations have been noted: a) - b) - c) That the BCA deemed-to-satisfy provisions do not permit horizontal exits in a secondary or primary school building. d) The space on the opposite side of the door may contain shortfalls in terms of the number of permitted occupants – TBC by GDLA	a) - b) - c) Fire Safety Engineer to review and confirm the feasibility of a justifiable Performance Solution. d) GDLA to advise at the DD stage.	D1.11	DP2, DP4

Item No.	DTS Non- Compliance	Nominated Resolution	BCA Clause	BCA Performance Requirements
8	The following exit doors do not swing in the direction of egress: • Boarding House: LG northern external double door. • Northern Library horizontal doors on Level 2.	Plans to be updated to correct exit door swing. The northern horizontal Library doors on Level 2 require further egress review in relation to area served, number of occupants and direction of door swing, at the DD stage.	D2.20	DP2
9	School Complex – Tiered Seating - Although the plans are yet to detail handrails, it is likely that the pending design will not comply in this area. A common issue is that they usually do not extend the full distance of both sides of the stairway, rather stop and allow for access at the two landing levels. Or only contain a single handrail to the wall side.	Access Consultant to comment on the feasibility of a Performance Solution, once the design has progressed with handrails illustrated.	D3.3 inter alia AS 1428.-2009 Clause 11.2	DP2
10	Boarding House - The central fire stair exit (fire engineered not to be fire isolated) will not have a fire hydrant not located within it.	The Fire Safety Engineer to review and confirm if a justifiable Performance Solution is feasible.	E1.3	EP1.3
11	School Complex – Its understood that the requirement for smoke exhaust throughout the building will be considered for rationalisation by the Fire Safety Engineer, with the main trade off being a compliant sprinkler system.	The Fire Safety Engineer has confirmed the feasibility of a justifiable Performance Solution is feasible. It will be permitted omit smoke exhaust from the school, however it is required to the Basement Carpark and Gurdwara.	E2.2	EP2.2
12	School Complex – A small number of non-compliance that can be readily rectified have been identified in relation to certain sanitary facility layouts, refer Part F2 below	Design changes required to illustrate compliance.	Part F2	F2.1

Table 1 – Summary Issue

In order for Group DLA to confirm the design complies with the BCA the following items listed in Table 2 below are required to be clarified, submitted, illustrated, etc. as the case may be, **prior to finalisation of the DD Stage BCA Report**:

Item No.	Item	Comment	BCA Clause
A	FRL Compartmentation Plans.	The color-coded fire rating plans are required to be developed by the architect and are to include the following items to assist with our DD Stage BCA reviews: a) The BCA defined exits as noted within Appendix C of this Report. b) 1:20 detail of the fire wall to external wall junctions – Typical. c) To include fire rating of columns and floor/ceiling slabs/shafts, etc. d) Electrical engineer to confirm that there no rooms required to be fire rated due to Clause C2.12 type battery's or nominate such rooms. Architect to update plans. Fire Services Engineer to confirm FHR coverage to these rooms or otherwise, for further fire engineering consideration. e) All fire separated compartments, walls, columns, floors, stair enclosures, etc, to be illustrated. Note that the compartmentation is to be further reviewed in conjunction with the Fire Safety Engineer, to finalise horizontal exits, compartments and fire separation requirements. f) Each individual fire compartment to have its floor area and volumes nominated. g) Smoke separation is also required to be detailed to the corridor separating rooms in the Board House and School Complex where deemed necessary by the Fire Safety Engineer. Smoke separation may also need to be considered to the LG and Ground level of the Boarding House. h) Fire rated bounding construction separation to be illustrated to the Boarding House.	Various
B	Building Envelope Plans	At the DD Stage, provide color coded building envelope plans which illustrate the required external and internal R rating insulation lines throughout the building, inclusive of external walls, internal walls, roof and floor slabs.	Part J1
C	Boarding House - Acoustic Plans	At the DD Stage, provide color coded acoustic plans which illustrate the required sound transmission and insulation ratings of internal bounding walls, floors and ceilings. The plans are required to identify the areas that require discontinuous construction.	Part F5

Item No.	Item	Comment	BCA Clause
D	Performance Solutions – General	The various design team members are requested to advise of any/all known BCA related non-compliances that will require resolution via Performance Solutions, if known at this stage of the design.	BCA
E	Boarding House - Natural lighting provisions to rooms used for sleeping purposes.	Whilst compliance can be readily achieved, further assessment is required at the DD Stage. Provide the DD window schedule.	Part F4
F	Occupant Numbers – Accuracy	The occupant numbers in Table 9 have been derived via the use of BCA Table D1.13. The architect is to review and confirm if the numbers are accurate or whether more appropriate data can be used, i.e. client information, as permitted under Clause D1.13.	F2.3
G	Occupant Numbers – Sanitary Facilities	Assessment currently incomplete. The following is required: a) Occupant numbers by use area and level are required for further assessment of the number of sanitary facilities illustrated v's required. b) Staff numbers and gender ratio's are to be identified for each use area, as well as student numbers and gender ratio. c) All facilities are to be illustrated, i.e. pans, wash basins and urinals. d) All Male and Female facilities are required to be illustrated/nominated. This is currently not clear. e) Staff v's student facilities are required to be illustrated, as they cannot be shared.	F2.3
H	Travel Distance Assessment This item will be ongoing WIP until the plans are finalised via the DD Stage.	Currently incomplete. The following is required: a) Finalised fire compartmentation plans as per Item A above. b) Exit plans in Appendices C to be re-confirmed as accurate. c) Paths of travel to the site road to be illustrated from all exits. d) Indicative layouts to the kitchen and store areas are required to be illustrated for further assessment.	Part D1
I	Boarding House Level 4 Apartments – Facilities	Facilities within each sole-occupancy unit are required to be fully illustrated for further assessment, i.e. kitchen sink, bath or shower, separate laundry sink, etc.	F2.1
J	Boarding House – BASIX	A BASIX report and certificate is required for the Class 2 residential apartment portion of the building.	NSW Section J

Table 2 – Further Information Require

1.0 Introduction

The report is for the assessment of the Sikh Grammar School Rouse Hill Campus architectural plans to assess compliance with the Building Code of Australia 2019 ("BCA"). A summary of all relevant clauses of the BCA is attached under Appendix 1.

The report is prepared based on a review of the developed documentation and the information provided by the client and is intended for their use only.

Reporting Team

The information contained within this report was prepared by Shane Berry, Accredited Certifier Grade A1 (BPB0721) and reviewed by Brett Clabburn, Accredited Certifier A1 (BPB0064.)

Current Legislation

The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979.

The relevant version of the BCA for a project is determined in accordance with clause 98 of the Environmental Planning and Assessment Regulation 2000 and is based on the date on which a valid construction certificate is applied for.

The BCA is now updated every three years, the next updated will be BCA 2022 which will come into force on the 1st May 2022

To assist the design team who may be used to working under previous version of the BCA we have noted the material changes to BCA 2019 here. Consultants are to be aware that it is expected that this building will be a BCA 2019 compliant building. These changes have been listed within BCA 2019, starting form page 737.

Fire Brigade

Fire & Rescue NSW ("FRNSW"): The EP&A Regulations 2000, Clause 144, requires buildings the subject of Construction Certificate approval to be referred to FRNSW. Clause 144 refers to EP&A Regs defined Category 2 Fire Safety Provisions[2]. If any of these measures are required to be considered as an alternative solution due to DtS non-compliances identified within a design, and the floor area of a fire compartment exceeds 2000 m^2 or the floor area of the building exceeds 6000 m^2, the Clause 144 referral to the FRNSW is required**.** This design currently contains the following DtS non-compliance Category 2 Fire Safety Provisions or BCA Performance Requirements: EP2.2, EP1.3

The process involves initial input from FRNSW at the Fire Engineering Brief Questionnaire ("FEBQ) stage and then official Lodgement of the Performance Solution Report by the PCA or Crown Certifier.

Under recent changes to the legislation the brigade are required to respond within 10 days advising whether or not they will be proceeding with a review and providing the Initial Fire Safety Report. If so they have not more than 28 days form the initial to provide their report or the PCA can choose to invoke the provisions of Clause 144(6A)(c) and issue the Construction Certificate after 28 days of officially lodging the Clause 144 application; further consultation is required on this issue. This may see a requirement for a peer review by an independent C10 accredited fire safety engineer.

Limitations

- This report did not include assessment of the documentation against the provisions of the Disability Discrimination Act 1992 or (access to premises buildings) Standards 2010.
- This assessment is limited to the developed documentation at the date of this report and as referenced within the "Documentation Assessed" section of the Report.
- Any roof top plant or the like has been assessed as open to the sky.
- The travel distances have been assessed on an open plan basis with an allowance made for travel around pending fitout partitions. It cannot be taken as accurate when considering future fitout parameters.

[2] *Category 2 fire safety provision means the following provisions of the Building Code of Australia, namely, CP9, EP1.3, EP1.4, EP1.6, EP2.2 and EP3.2 in Volume One of that Code.*

2.0 Building Description

The Project

The development is a new Sikh School project consisting of a Primary and Secondary School, Early Learning Centre, Boarding House, Gurdwara / Langar / Multipurpose Hall which will also be used as a place of worship and an Administration Building. The building will be a staged project which when completed and will cost approximately more than $30 Million. Stage 1 will include a system of relocatable buildings which are scheduled for removal to the construction of Stage 4 in the year 2028.

Figure 1 – Proposed Development

Building Description – Boarding House & Residential Apartments

Building Use:	Residential Accommodation
Class of Occupancy:	Class 3, Class 2 & Class 7a
Type of Construction:	A
Floor Area of Building:	4,832 m^2
Volume of Building:	*14,000 m^3
Max Fire Compartment Size:	TBC m^2, TBC m^3
Rise in Storeys:	5
Levels Contained:	5
Effective Height:	<12 m (actual 11.8 m)
Climate Zone:	6

Note*: Approximates only, architect to confirm.

Levels of Concern	Use	Classification
Lower Ground	Quiet Study, Laundry, Bin Store, Carparking	3, 7a
Ground	Student Communal areas – common kitchen, dining, lounge, Cinema and Games room. Residential apartment – Masters Residence.	2, 3
Level 1	Student accommodation	3
Level 2	Student accommodation	3
Level 3	Residential units	

Table 3a – Levels of Concern

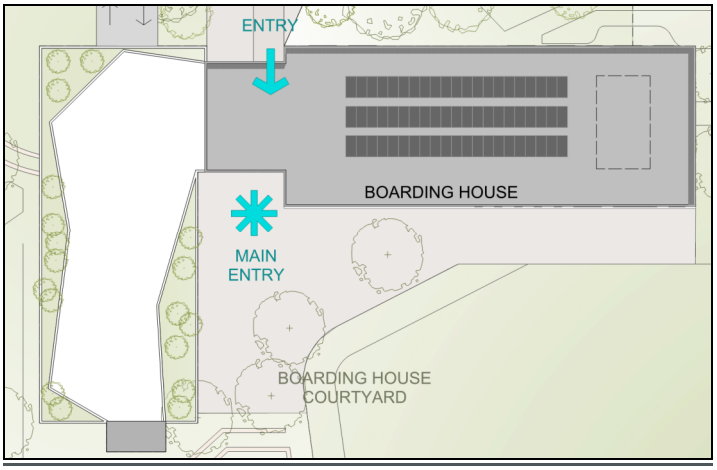

Figure 2a – Boarding House

Building Description – Early Learning Centre (ELC)

Building Use:	*Early childhood centre*
Class of Occupancy:	Class 9b *assembly building*
Type of Construction:	B
Floor Area of Building:	*1,515 m^2
Volume of Building:	*4,545 m^3
Max Fire Compartment Size:	*1,515 m^2, *4,545 m^3
Rise in Storeys:	2
Levels Contained:	2
Effective Height:	<12 m (actual 3.6 m)
Climate Zone:	6

Note*: Approximates only, architect to confirm.

Levels of Concern	Use	Classification
Ground	Early learning centre	9b assembly building
First Floor	Early learning centre	9b assembly building

Table 3b – Levels of Concern

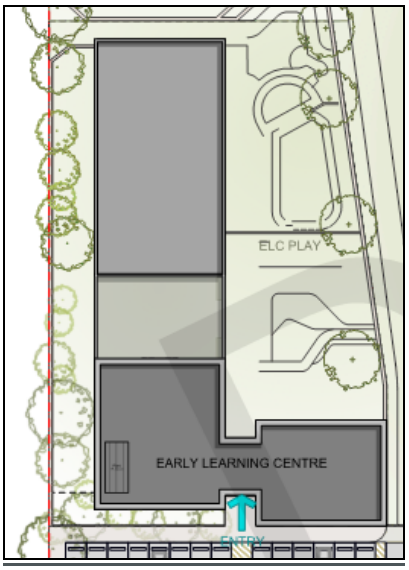

Figure 2b – Early Leaning Centre

Building Description – School Complex (One building consisting of a Secondary School, Primary School, Multipurpose Building /Gurdwara/Langar, Basement Carpark

Building Use:	*Primary and secondary school, sports/assembly Hall, Langar (community kitchen), Gurdwara (Place of worship), Carpark for 232 cars, Retail, office, Kitchen, occupiable outdoor space – terrace.*
Class of Occupancy:	Class 9b *assembly building, Class 7a carpark, Class 5 office,*
Type of Construction:	A
Floor Area of Building:	24,714 m^2
Volume of Building:	88,879.20 m^3
Max Fire Compartment Size:	Basement Carpark: 8,128 m^2, 23,571.2 m^3 Multipurpose: 5,105 m^2, 27,921 m^3
Rise in Storeys:	4
Levels Contained:	5
Effective Height:	<12 m (actual 10.3 m)
Climate Zone:	6

Note*: Approximates only, architect to confirm.

Levels of Concern	Use	Classification
Basement Level	Carpark	7a
Ground Level	Primary school, secondary school, Langar, entry foyer, retail, office	9b assembly building, 5 Office
Level 1	Primary school, secondary school, office	9b assembly building, 5 Office
Level 2	Primary school, secondary school, library, office, multipurpose hall, Gurdwara, office	9b assembly building
Level 3	Secondary school terrace, secondary school study, staff study, staff terrace, staff lounge, viewing area above Gurdwara and multipurpose hall	9b assembly building

Table 3c – Levels of Concern

Considerations:

- The foyer and Langar located “retail + Kitchen” area is less than 10% of the floor area of the School Complex Ground Level storey, and therefore is not separately classified.

- The Multipurpose Hall is not a sports stadium and therefore does not meet the NSW BCA definition of *entertainment venue.*
- The office on Level 2 is less than 10% the floor area of the storey and therefore is not separately classified.
- The area above Gurdwara and multipurpose hall on Level 3 is assumed a viewing area. If this is not the case a reassessment may be required.

Figure 2c – School Complex

Building Description – Sports Pavilion

Building Use:	Change room, minor sports facility
Class of Occupancy:	Class 9b *assembly building*
Type of Construction:	C
Floor Area of Building:	*160 m^2
Volume of Building:	*450 m^3
Max Fire Compartment Size:	*160 m^2, *450 m^3
Rise in Storeys:	1
Levels Contained:	1
Effective Height:	<12 m (actual 0.0 m)
Climate Zone:	6

- Note*: Approximates only, architect to confirm.

Levels of Concern	Use	Classification
Ground	Change room, minor sports facility support, i.e. sanitary facility, minor storage, etc.	9b assembly building

Table 3d – Levels of Concern

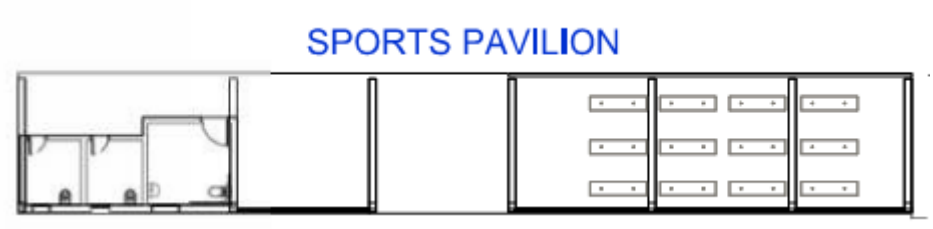

Figure 2d – Sports Pavilion

Building Description – Relocatable Buildings

Building Use:	School
Class of Occupancy:	Class 9b *assembly building*
Type of Construction:	C
Floor Area of Building:	*1,380 m^2
Volume of Building:	*4,140 m^3
Max Fire Compartment Size:	*1,380 m^2, *4,140 m^3
Rise in Storeys:	1
Levels Contained:	1
Effective Height:	<12 m (actual 0.0 m)
Climate Zone:	6

- Note*: Approximates only, architect to confirm.

Levels of Concern	Use	Classification
Ground	School	9b assembly building

Table 3e – Levels of Concern

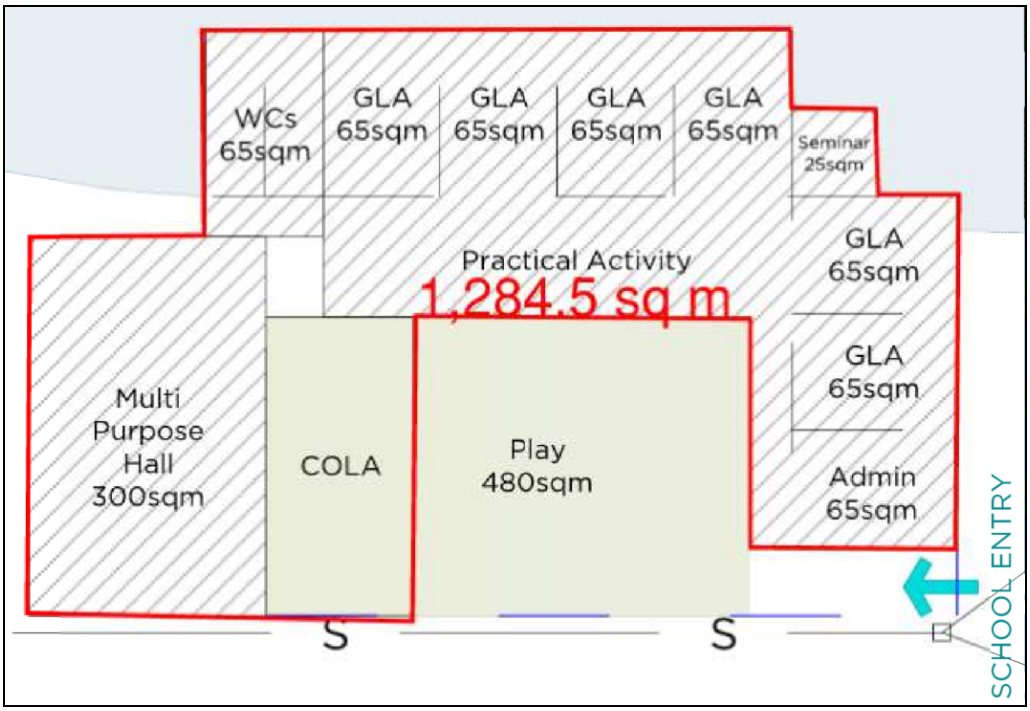

Figure 2e – Relocatables

Documentation Assessed

This report is based on the following plans prepared by PMDL, and other documents as noted below in Table 4.

Description	Drawing No.	Issue	Date
Site Plan	DA100	3	5/4/19
Site Plan Level 1 (Basement)	DA101	2	29/3/10
Site Plan Level 0 (Ground)	DA102	3	5/4/19
Plan – Admin, School & Gurdwara (Level 0)	DA110	3	5/4/19
Plan – Admin, School & Gurdwara (Level 1)	DA111	3	4/4/19
Plan – Admin, School & Gurdwara (Level 2)	DA112	3	4/4/19
Plan – Admin, School & Gurdwara (Level 3)	DA113	3	4/4/19
Plan – ELC & Boarding House	DA120	3	4/4/19
Plan – ELC & Boarding House	DA121	3	4/4/19
Site Elevations 1	DA201	2	18/4/19
Site Sections	DA301	-	Feb 2019

Table 4 – Documentation Assessed

3.0 BCA Requirements

The following assessment will provide an overview of compliance with the BCA and identify issues that require attention at this particular stage of the development.

B1 – Structural Provisions

The structural engineer is required to determine compliance with regard to the various components of construction as noted within this Part of the BCA.

Clause B1.6, Construction of buildings in flood hazard areas, requires the building to be designed in accordance with the ABCB Standard for Construction of Buildings in Flood Hazard Areas ("Standard".) Typically, this document requires the floor level of habitable areas to be built no less than 500 mm above the Council defined flood level, and for non-habitable areas to be positioned not more than 1.0 m below the Council designated flood level, see Figure 3 below. However, there are a number of prerequisites and varying provisions, so the actual levels will need to be determined by an appropriately qualified person after review of the Standard. Confirmation of such will be required prior to the issuance of the relevant Construction Certificate, which will be structure.

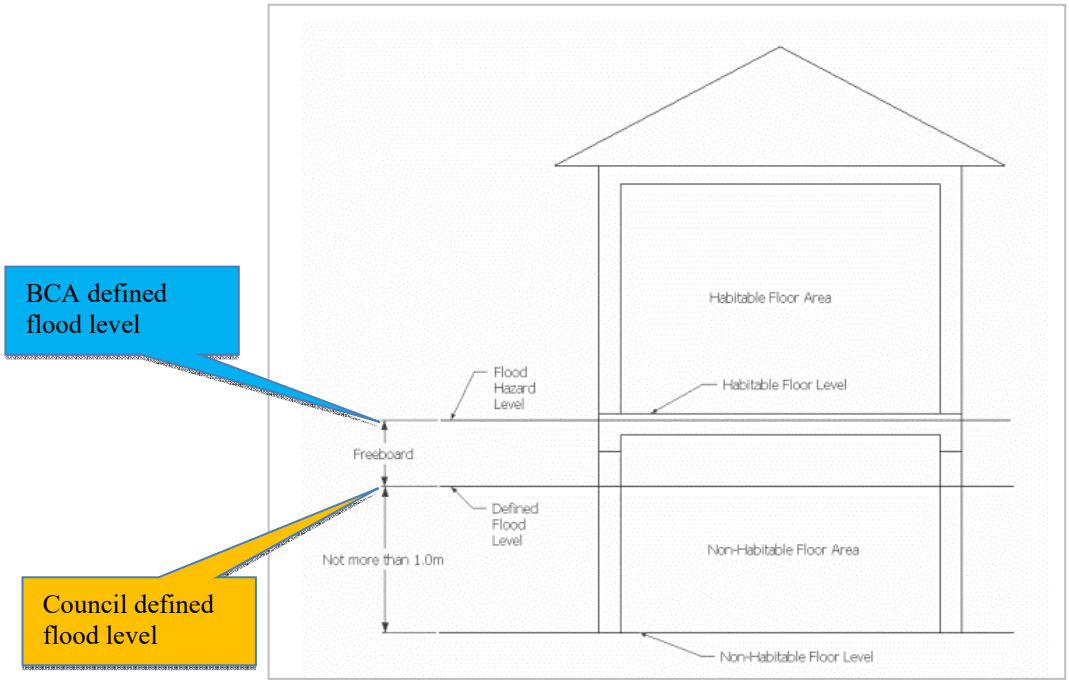

Figure 3 – Typical Flood Level Determination

C1 – Fire Resistance and Stability

The School Complex and Boarding House buildings are required to be constructed using Type A construction as per the requirements of Table 3 in Specification C1.1 of the BCA (refer Appendix B.)

The ELC building is required to be constructed using Type B construction as per the requirements of Table 4 in Specification C1.1 of the BCA (refer Appendix B.)

The Relocatable building is required to be constructed using Type C construction as per the requirements of Table 5 in Specification C1.1 of the BCA (refer Appendix B.)

Further assessment of the final FRL Compartmentation Plans is required for confirmation of compliance, refer Item A of Table 2 above.

Boarding House – All levels except LG have not currently been illustrated with the fire separation (bounding construction) between the common areas, i.e. open lounge, kitchen, Games Room etc. The FRL is to be 60 minutes for non-loadbearing walls and 90 minutes for loadbearing. However the architect has confirmed that the design will be DTS. Further review at DD stage required.

The Fire Hazard Properties of floor linings and floor coverings, wall and ceiling lining's, and other material as noted within Clause C1.10, must comply with the provisions of Specification C1.10 as noted in Table 5 below. It is recommended that the Fire Hazard Property Test Reports of the various linings and coverings are submitted to this office for a compliance check prior to installation. Notwithstanding this they will be required to be verified prior to the issuance of the OC which is often too late.

Item	Location	Requirement
Floor linings or coverings – Unsprinklered buildings	ELC, Relocatables	*CRF of no less than 2.2
Floor linings or coverings – Sprinklered buildings	Boarding House, School Complex	CRF of no less than 1.2
Floor linings or coverings	Fire isolated stairs	CRF of no less than 2.2
Wall and ceiling linings Sprinklered buildings	Boarding House	**Group Number 1, 2 or 3
Wall and ceiling linings Unsprinklered buildings	ELC, Relocatables – Public corridors only	Group Number 1
Wall and ceiling linings Unsprinklered buildings	ELC, Relocatables – Classrooms only	Group Number 1 or 2
Wall and ceiling linings Unsprinklered buildings	ELC, Relocatables – Other areas	Group Number 1, 2 or 3
Wall and ceiling linings Sprinklered Building	School Complex – School areas only	Group Number 1, 2 or 3
Wall and ceiling linings Sprinklered Building Public corridors	School Complex – Non-school areas – Public corridors only	Group Number 1 or 2
Wall and ceiling linings	Fire-isolated exits	Group Number 1
Occupiable out door space	ELC, School Complex	Group Number 1, 2 or 3

Table 5 – Fire Hazard Properties

Note*: CRF stands for critical radiant flux, which is a BCA defined term as follows – *"Critical radiant flux means the critical heat flux at extinguishment as determined by AS ISO 92391.1 – 2003."* And for buildings not fitted with a sprinkler system complying with Specification E1.5, must have a maximum smoke development rate of 750 percent-minutes.

Note**: Group Number is a BCA defined term as follows – *"Group number means the number of one of 4 groups of materials used in the regulation of fire hazard properties and applied to materials used as a finish, surface, lining, or attachment to a wall or ceiling."* The *group numbers* must be determined in accordance with AS 5637.1 - 2015 and for buildings not fitted with a sprinkler system complying with Specification E1.5, must have—

- a smoke growth rate index not more than 100; or
- an average specific extinction area less than 250 m 2/kg.

BCA Clause C1.9 & C1.14 illustrates the restrictions on using combustible wall cladding and external combustible walls. Such non-compliant products include but are not limited to certain Alucabonds, Apolic, Kingspan, timber, etc. Please advise of any locations where such products are to be used in the form of colour coded elevations, for further assessment.

Vapour barriers, insulation and the like are also required to be deemed non-combustible in accordance with AS 1530.1.

C2 – Compartment

The size of the fire compartment does NOT exceeds that stipulated for a Type A, B & C Buildings. The fire compartment sizes for this development are as per Table 6 below, along with the maximum permitted sizes under the BCA.

Building	Compartment Description	Compartment Size (m^2) Max DTS / Proposed	Compartment Size (m^3) Max DTS / Proposed	Complies with DtS	Complies with FER
Sports Pavilion	Whole building	3,000 / 160	12,000 / 450	✓	NA
ELC	Whole building	5,500 / 1,515	33,000 / 4,545	✓	NA
School	Basement Carpark	NA / 8,128	NA / 23,571.2	✓*	NA
	Primary School	8,000 / 6,350	48,000 / 20,320	✓	NA
	Secondary School	8,000 / 6,901	48,000 / 23,271.2	✓	NA
	Multi-purpose	8,000 / 5,105	48,000 / 27,921	✓	NA
Relocatable's	Whole building	3,000 / 1,290	12,000 / 3,870	✓	NA
Boarding House	Basement Carpark	NA / TBC	NA / TBC	✓	NA
	Remainder	NA / TBC	NA / TBC	✓	NA

Table 6 – Fire Compartment Sizes

Note - An assumption has been made that the Basement carpark is fire separated from the Ground Level.*

School Complex - Basement Carpark – The exits from the Basement Carpark into the primary and secondary buildings are required to be fire separate at either Basement or Ground level, to be completed the compartmentation separation. The plans are required to be updated to illustrate these details, including the pending FRL plans. This separation requirement is applicable to the Boarding House LG Level as well.

The following equipment, if provided, will need to be fire separated from the remainder of the building by construction having an FRL of no less than that stipulated below:

- Lift motors and control panels: 120/ - / -
- Emergency generators used to sustain emergency equipment operating in emergency mode including standby power systems: 120/120/120,.
- Central smoke control plant, boilers and batteries that have a voltage of more than 24V and a capacity exceeding 10 ampere hours: 240240/240
- Electricity sub-station: 180/180/180 (confirmation with the electricity supplier is required)
- Main switchboard located within the building which sustains emergency equipment in emergency mode: 120/120/120.

With regard to any installed batteries, the electrical consultant is to confirm whether the above fire rating provision is applicable when considering the limitations of BCA Clause C2.12, i.e. Batteries exceeding 24 Volts and a capacity exceeding 10 ampere hours.

Boarding House - BCA Clause C2.14 requires public corridors within the residential portion of this building to be divided at intervals of not more than 40 m with smoke proof walls. The fire compartmentation plans are required to be updated to illustrate compliance, however, the DA plans show that this can be readily achieved.

C3 – Protection of Openings

Openings located within close proximity to a *fire source feature*[3] require appropriate fire protection as nominated below in Clause 3.4. Close proximity is described as:

- 6 m from a far boundary of a road, river, lake or the like adjoining the allotment; or
- 3 m from the side or rear boundary of the allotment; or
- 6 m from an external wall of another building on the allotment which is not a class 10 building.

Protection of openings in accordance with C3.4 consists of:

(a) Where protection is required, doorways, windows and other openings must be protected as follows:

(i) Doorways—

(A) internal or external wall-wetting sprinklers as appropriate used with doors that are self-closing or automatic closing; or

(B) –/60/30 fire doors that are self-closing or automatic closing.

(ii) Windows—

(A) internal or external wall-wetting sprinklers as appropriate used with windows that are automatic closing or permanently fixed in the closed position; or

(B) –/60/– fire windows that are automatic closing or permanently fixed in the closed position; or

(C) –/60/– automatic closing fire shutters.

(iii) Other openings—

(A) excluding voids — internal or external wall-wetting sprinklers, as appropriate; or

(B) construction having an FRL not less than –/60/–.

(b) Fire doors, fire windows and fire shutters must comply with Specification C3.4

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[3] *Fire source feature means:*

(a) The far boundary of a road, river, lake or the like adjoining the allotment; or

(b) A side or rear boundary of the allotment; or

(c) An external wall of another building on the allotment which is not a class 10 building.

School Complex – Basement Carpark - The opening to the pedestrian ramp area servicing the Basement Carpark is positioned within 6 m of the Primary School complex which is a separate fire compartment. The openings to the carpark may be difficult/impossible to treat. The Fire Safety Engineer to review and confirm if a justifiable Performance Solution is feasible. Fire separation to the adjacent wall of the Primary School building may or may not need to be fire rated as part of this review. *Ref: BCA Clause C3.3, C3.4*.

Boarding House - BCA Clause C2.14 & C3.11 & C1.1 require bounding corridors within staff sleeping to contain a fire rating of no less than 90/90/90 or -/60/60 for non-loadbearing, and openings to be protected by -/60/30 self-closing fire doors.

Careful design consideration will need to be given to all penetrations, both services and structural, of the fire rated walls, floors and ceilings. Steel/timber columns, beams and members are not permitted to pass through the fire rated wall without fire rating the entire member and any member it is in touch with. This includes any steel bracing or other structural steel members. If steel structure passes through or above the fire compartment of bounding construction lines, a non-compliance may exist. Fire rating to a certain length along the steel rafter or purlin will not achieve DTS compliance.

D1 – Provision for Escape

BCA Clause D1.2 - For the purpose of the egress assessment, BCA defined *required exits* have been assumed as that noted in Appendix C, by the illustration of the running man symbol. The architect will need to confirm that the nominated exits are correct.

BCA Clause D1.3 – Fire isolated exits are required in sprinkler protected buildings where the stair connects more than 3 storeys. The following non-compliances have been identified for the Fire Safety Engineer to comment on the feasibility of a justifiable performance solution:

Boarding House – The central exit stair contains the following non-compliances:

a) Connects more than 3 storeys (actual: 5 Storeys) and is not fire isolated from the remainder of the building.
b) Discharges internally to the building rather than direct to *openspace*.
c) The eastern exit stair connects more than 3 storeys (actual: 4 Storeys) and is not fire isolated from the remainder of the building.

BCA Clause D1.4 / 1.5 - The BCA maximum permitted travel distances:

Boarding House Residential areas: The BCA maximum permitted travel distances are measured from the doorway of the apartment and must not be more than 6 m from an exit or from a point from which travel in different directions to 2 exits is available, or 20 m from a single exit serving the storey at the level of egress to a road or open space. Additionally, no point on the floor of a room which is not an apartment or sole-occupancy unit must be more than 20 m from an exit or from a point from which travel in different directions to 2 exits is available. The aforementioned 2 different exist must not be more than 45 m apart when measured back through the point of choice.

Other Areas: The BCA maximum permitted travel distances are 20 m to an exit, or to a point in which travel in two different directions to two different exits is available, 40 m to the nearest exit of the two measure back from the starting point and 60 m between alternative exits measure through the point of choice.

The following DTS non-compliant exit travel distances have been identified in Table 7 below (worst cases only) and either need to be addressed as part of the Fire Engineering Strategy by the fire safety engineers or design changes made to illustrate further compliance. Refer Appendix D for the Travel Distance Assessment plan mark-ups.

Location	DTS Travel Distance Requirement	Actual	Design Team Nominated Resolution
ELC – Level 1 outdoor area.	20/40/60	**22**/23/20	Fire Safety Engineer to review and advised if this issue is justifiable as a Performance

Location	DTS Travel Distance Requirement	Actual	Design Team Nominated Resolution
			Solution.
School Complex – Basement Carpark – Worst Case	20/40/60	**30/50/85**	Fire Safety Engineer to review and advised if this issue is justifiable as a Performance Solution.
School Complex – Secondary School - level 1 – Worst Case	20/40/60	**30/**35/46	Fire Safety Engineer to review and advised if this issue is justifiable as a Performance Solution.
School Complex – Primary School - level 1 – Worst Case	20/40/60	**25/**31/43	Fire Safety Engineer to review and advised if this issue is justifiable as a Performance Solution.
School Complex – Secondary School - level 2 – Worst Case	20/40/60	**27/**34/49	Fire Safety Engineer to review and advised if this issue is justifiable as a Performance Solution.
School Complex – Primary School - level 2	20/40/60	**27/**32/41	Fire Safety Engineer to review and advised if this issue is justifiable as a Performance Solution.
School Complex – Primary School - level 2 – Primary Library	20/40/60	11/34/**64**	Fire Safety Engineer to review and advised if this issue is justifiable as a Performance Solution.
School Complex – Secondary School – Seniors Terrace - level 3	20/40/60	**43**/-/-	Fire Safety Engineer to review and advised if this issue is justifiable as a Performance Solution.
School Complex – Staff Terrace – level 3	20/40/60	**30/49/74**	Fire Safety Engineer to review and advised if this issue is justifiable as a Performance Solution. However, design changes may be required.
Assessment incomplete. Refer Item A & H of Table 2, further information required.	TBC	**TBC**	TBC

Table 7 – Extended Travel Distances

BCA Clause D1.6: Paths of travel are to be no less than 1 m wide and not less than 2 m high. However, increased limits are required to areas for the purposes of access for persons with disabilities and health and amenity issues in relation to minimum ceiling heights, see Part D3 and F3 below accordingly.

Table 8 below illustrates the maximum number of persons permissible based on the available exit widths under BCA Clause D1.6. Compliance has not been achieved in a number of areas, design changes have been suggested accordingly.

Location	No. of Occupants	DTS required width (m)	Illustrated width (m)	Compliance achieved?
School Complex – Basement Carpark	200	2.0	7.0	✓
Boarding House – Basement Carpark	66	1.0	2.5	✓
ELC – Ground Level	189	2.0	7.0	✓
Boarding House – Ground Level	395	3.3	8.0	✓
Boarding House – Level 1	54	2.0	4.0	✓
Boarding House – Level 2	54	2.0	4.0	✓
Boarding House – Level 3	26	2.0	4.0	✓
School Complex – Primary School - Ground Level	264	2.5	16.0	✓
School Complex – Langar - Ground Level	658	5.9	7.0	✓
School Complex – Langar (Foyer) - Ground Level	126	2.0	4.0	✓
School Complex – Secondary School - Ground Level	442	3.7	26.0	✓
School Complex – Secondary School – Level 1	480	3.8	4.0	✓
School Complex – Primary School – Level 1 – Classrooms	192	2.0	4.0	✓
School Complex – Primary School – Level 1 – Office	36	1.0	1.2	✓
School Complex – Secondary School – Level 2	592	5.3	5.8	✓
School Complex – Library – Level 2	233	2.3	**1.0**	✗ Further review with the Fire Safety Engineer required on exit door orientation. Compliance can be readily achieved.

Location	No. of Occupants	DTS required width (m)	Illustrated width (m)	Compliance achieved?
School Complex – Primary School – Level 2	428	4.0	6.0	✓
School Complex – Multipurpose Hall / Gurdwara – Level 2	1,800	15.3	15.5	✓
School Complex – School Staff Portion - Level 3	94	2.0	3.5	✓
School Complex – Secondary Seniors Portion – Level 3 (seating area)	285	2.8	3.0	✓
School Complex – Mezzanine – Multipurpose Hall / Gurdwara – Level 3	57	2.0	3.0	✓

Table 8 – Occupant Numbers

Alternative paths of travel to exits are not permitted to converge within 6 m of each. With an allowance of 1 m for each path this can be read to restrict paths of travel not to be within 8 m of each other, i.e. 1 m path of travel + 6 m separation + 1 m alternative path of travel = 8m. Compliance appears to have been achieved at this stage of the design.

Clause D1.7 - When discharge from a fire isolated exit, the required external path of travel to the road must not pass back within 6 m of the building's openings. Where this occurs walls can for fire rated to 60/60/60 and windws/doors can be protected in accordance with Clause C3.4 as illustrated above. These provisions can be limited to no less than 3 m above the path leading to the road. Whilst compliance can be readily achieve with the application of C3.4, further consideration at the detailed design stage will need to be given in the following areas:

- Board House – discharge from the southern fire isolated exit.

Clause D1.9 stipulates the various requirements for required non-fire isolated stairs the following non-compliances have been identified for the Fire Safety Engineer to review and confirm the feasibility of a Performance Solution:

School Complex – Level 3 exit stairs including Mezzanine – Contain the following non-compliances:

a) Discharge at level 2, rather than ground level.
b) Cause a travel distance more than 80 m to the ground floor external exits (openspace).

Clause D1.10 - Bollards are to be illustrated to the external exits doors in the area of the exits in the Basement Carpark, to prevent vehicles blocking the exits.

Clause D1.11 stipulates the provisions in relation to using fire doors in fire walls as horizontal exits. The following non-compliances within the School Complex at Levels 2 & 3 have been identified for the Fire Safety Engineer to confirm the feasibility of a Performance Solution:

a) That the BCA deemed-to-satisfy provisions do not permit horizontal exits in a secondary or primary school building.
b) The space on the opposite side of the door may contain shortfalls in terms of the number of permitted occupants – TBC by GDLA

When calculating the number of occupants in accordance with BCA Clause D1.13, adequate exit widths will need to be confirmed, see example Table 9 below. An accurate method of determining the occupant numbers would be to have then supplied by the client along with any relevant justification data, as permitted by the BCA. In this regards we are awaiting further information, i.e. provide occupant numbers per each fire compartment.

Location	Area m²	Person Usage Factor %	Tenancy Person Usage Area m²	m²/persons	Calculation Method	Persons Accommodated
School Complex – Basement Carpark	7,500	80	6,000	30	Table D1.13	200
Boarding House – Basement -						
Carpark	390	80	312	30	Table D1.13	10.4
Quiet Study	123	80	98	2	Table D1.13	49
Maintenance, store, other	450	40	180	30	Table D1.13	6
Boarding House – Ground Level -						
BOH Kitchen	100	40	40	10	Table D1.13	10.4
Master Resident	30	100	30	-	Estimate	4
Dinning	250	40	100	1	Table D1.13	100
Games, Cinema	400	70	280	1	Table D1.13	280
Boarding House – Level 1	1155	70	810	15	Table D1.13	54
Boarding House – Level 2	1155	70	810	15	Table D1.13	54
Boarding House – Residential - Level 3	560	70	392	15	Table D1.13	26
ELC – Ground Level	1065	70	745	4	Table D1.13	186
ELC – First Floor	455	80	364	4	Table D1.13	91
School Complex – Primary School – Ground Level						
Classroom	600	80	480	2	Table D1.13	240
Admin	300	80	240	10	Table D1.13	24
School Complex – Langar – Ground Level						
Langar	800	80	640	1	Table D1.13	640
Kitchen	200	80	160	10	Table D1.13	16
Storage	130	40	52	30	Table D1.13	2
School Complex – Langar (Foyer) – Ground Level						
Retail	190	80	152	3	Table D1.13	50
Office	210	80	168	10	Table D1.13	76

Location	Area m²	Person Usage Factor %	Tenancy Person Usage Area m²	m²/persons	Calculation Method	Persons Accommodated
School Complex – Secondary School – Ground Level						
Café	60	80	152	3	Table D1.13	76
Classroom	914	80	732	2	Table D1.13	366
School Complex – Secondary School – Level 1	1200	80	960	2	Table D1.13	480
School Complex – Primary School – Level 1						
Classroom	856	80	384	2	Table D1.13	192
Admin	450	80	360	10	Table D1.13	36
School Complex – Secondary School – Level 2						
Classroom	1,480	80	1,184	2	Table D1.13	592
Library	775	60	465	2	Table D1.13	233
School Complex – Primary School – Level 2						
Classroom	784	80	627	2	Table D1.13	314
Library	350	60	210	2	Table D1.13	105
Office	175	80	140	10	Table D1.13	14
School Complex – Multipurpose Hall & Gurdwara – Level 2						
Hall	1,000	90	900	1	Table D1.13	900
Gurdwara	1,100	90	990	1	Table D1.13	990
School Complex – School Staff Portion - Level 3						
Staff Study	450	70	315	10	Table D1.13	32
Staff Lounge & Terrace	878	70	615	10	Table D1.13	62
School Complex – Secondary Seniors Portion – Level 3 (seating area)	814	70	570	2	Table D1.13	285
School Complex – Mezzanine – Multipurpose Hall / Gurdwara – Level 3	325	70	227.5	4	Table D1.13	57

Location	Area m²	Person Usage Factor %	Tenancy Person Usage Area m²	m²/persons	Calculation Method	Persons Accommodated
Sports Pavilion	120	80	96	1	Table D1.13	96

Table 9 – Occupant Numbers

D2 – Construction of Exits

Any required fire isolated stairs are required to be constructed of non-combustible materials. Ref: BCA Clause D2.2.

Clause D2.15 requires the threshold of exit doors which open to a road or open space to be level, or contain a step ramp or threshold ramp. This includes all of the required exit doors and the doors discharging from the building via the fire-isolated stairs and passageways. This is a new requirement as of 1 May 2013, see Figure 4 below:

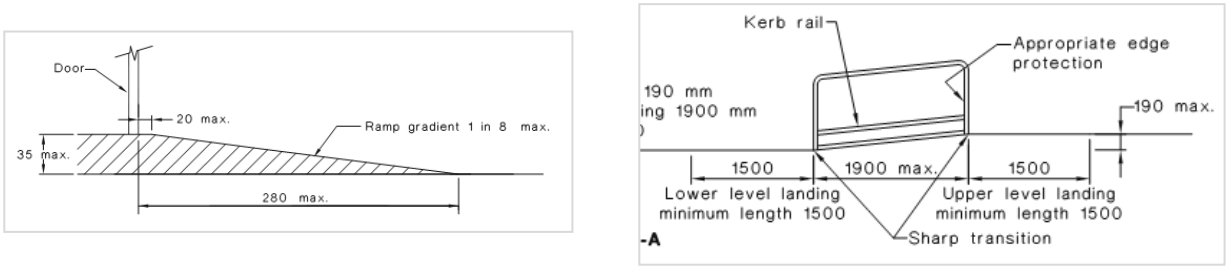


Figure 4 Threshold Ramp & Step Ramp.

As mentioned above in Part D1, Clause D2.10 requires any egress ramp to be no steeper than 1:8 and Clause D2.17 requires such ramps to contain a handrail. This applies to the external paths but the access consultant may want them to comply with the provisions of AS 1428.1-2009 also, I.e. handrails both sides, no steeper than 1:14, etc. Please liaise with the access consultant on this point.

Clause D2.13 restricts the number of steps throughout a stair in a Class 9b building to not more than 36 without a change in direction of 30°. Attention will need to be given to the Gurdwara stairs at the DD stage.

The BCA requires the external sliding doors to fail safe open on fire trip or power failure, and all locked internal and external doors throughout the building, to fail safe release on fire trip or power failure. Confirmation from the client should be obtained that this is acceptable, otherwise further discussions with the Fire Safety Engineer are required.

BCA Clause D2.20 – Exit doors are required to swing in the direction of egress. The following non-compliances have been identified:

a) Northern Library horizontal doors on Level 2. The northern horizontal Library doors on Level 2 require further egress review in relation to area served, number of occupants and direction of door swing, at the DD stage.

b) Boarding House- LG external double doors. Plans to be updated to illustrate compliance.

(BCA Clause D2.24) The windows located above the ground storey also act as required barriers. If they are openable windows they will need to:

- In general areas such as the apartments kitchens, lounges, common areas, not contain any gaps in excess of 125 mm within 865 mm from finished floor level. (Only applicable where the floor level below the window is 4 m or more above the surface beneath.)
- Not contain any climbable members immediately below the window between 150 mm to 760 mm.

- Advisory Note Only: Where the window is located in the bedroom and contains an opening less than 1.7 m above finished floor level, the openable portion of the window must be capable of restricting the window from opening not more than 125 mm or contain a screen (similar to a flyscreen but more robust) that can resist and outward horizontal action of not less than 250 N.
- Advisory Note Only: The restricting device or screen must have a child resistant release mechanism if the device or screen is removable. Child resistance could be achieved through the use of a tool, key or two hands.

Note: If the windows are restricted to open no more than 125 mm, the natural ventilation provisions of BCA Part F4 will need to be assessed and complied with if the relevant building areas do not contain compliant mechanical ventilation in accordance with BCA Clause F4.5. Generally speaking, natural ventilation must be provided to all habitable rooms via the actual window opening aggregate size to be no less than 5% of the floor area, as the rooms did not contain mechanical ventilation.

It is worth noting at this stage that if fire-isolated stairs are also to be used as communication stairs then additional design requirements will also need to be consider in line with BCA Clause D3.3 and Clause 11/12 of AS 1428.1-2009. Such requirements include but are not limited to:

- Tactile Ground Surface Indicators.
- Handrails to both sides of the stair flights.
- Fully accessible handrails.

Table 10 illustrates the various requirements for the various stair and ramp scenarios and related provisions for your convenience.

Stair	Access for person with Disabilities	Handrails	Balustrade	Slip Resistance	Treads, Risers, Widths, Other	TGSI	Common Issues
Fire Isolated Stair	**NO** - Only minor provisions made for egress.	**YES** - 1 handrail required which must resemble that required by the accessibility provisions, i.e. • 180º handrail turndown or return to wall, 300 mm past last riser. • 30 to 50 mm diameter with a 270º clearance around the top of the handrail, • 50 mm clearance to back of handrail, and to a height of 600 mm above the handrail. • Located between 865 mm and 1 m above nosing line. And must be at consistent height through the stairs and landings. *Note: Primary school – one additional handrail is required between the height of 665 mm to 750 mm.* • Continuous rail, no handhold breaks. • Clear area for 270º to the top of the handrail. *Ref: BCA D2.17, D3.3(a)(iii) & Cl 12 of AS 1428.1-2009.*	**YES** - No less than 865 mm above stair nosing lines, no less than 1 m above landings. No openings greater than 300 mm OR in the case of rails, top rail, mid rail and bottom rail required. No gaps greater than 150 mm above nosing line and 460 mm between rails. *Ref: BCA D2.16(g)(h)(i)*	**YES** - P3 rated slip resistance and highlighted nosing's to no less than 30% luminance contrast to the background. Nosing widths to be between 50 & 75 mm. Strip may be set back 15 mm from the front edge of the nosing but where it is not set back the luminance contrast must not extend down the riser by more than 10 mm. The lip between the tread and strip must not exceed 3 mm, or 5 mm where the edges are chamfered. *Ref: BCA D2.13, D2.14, D3.3(a)(iii) & Cl 11, 7.2, 7.3 of AS 1428.1-2009.*	**Tread -** 250 to 355 mm. **Riser** - 115 to 190 mm. **Quantity** - Must be between 550 to 700 when applying (2 x Riser + Tread.) **Open Riser** - Permitted to 125 mm. **Stair Width** - Minimum unobstructed width of 1000 mm, measured clear of handrails. Note: 1000 mm clear width will only allow for 100 persons, occupancy quantity review may be required. **Stair Height Clearance** - No less than 2 m. *Ref: BCA D2.13, D1.6*	**NO**	- Lip of the nosing strip excessive in height. - No site allowance for balustrade tolerances. - If separate handrail and balustrade is not used, this usually causes a conflict with the requirement to have the same heights throughout the landings and stairs. - Tread and riser dimensions not constructed uniform in dimension.
Fire Isolated Stair & Communication Stair	**YES**	**YES** - Fully accessible handrails required to both sides as follows: • 180º handrail turndown or return to wall, • 30 to 50 mm diameter with a 270º clearance around the top of the handrail, • 50 mm clearance to back of handrail, and to a height of 600 mm above the handrail. • Located between 865 mm and 1 m	**YES** - No Less than 865 mm above stair nosing line, no less tanh 1 m above landings. No openings greater than 125 mm. No climbable members between 150 and 760 mm where the floor level is 4 m or more above the surface beneath. *Ref: BCA D2.16(g)(h)(ii)*	**YES** - P3 rated slip resistance and highlighted nosing's to no less than 30% luminance contrast to the background. Nosing widths to be between 50 & 75 mm. Strip may be set back 15 mm from the front edge of the nosing but where it is not set back the luminance contrast must not extend down the riser by more	**Tread -** 250 to 355 mm. **Riser** - 115 to 190 mm. **Quantity** - Must be between 550 to 700 when applying (2 x Riser + Tread.) **Open Riser** - Not permitted, must be opaque. **Riser Splay back -** Be vertical or max 25 mm. **Stair Width** - Minimum unobstructed width of 1000 mm, measured clear of handrails. Note: 1000 mm clear width will	**YES -** Required to the top and bottom of landings. No requirement for the mid landing. Note: It is understood that BMPX are seeking an alternative solution to delete TGSI in this case. Access consultant to confirm. *Ref: BCA D3.8, AS/NZS 1428.4.1-2009*	- Lip of the nosing strip excessive in height. - Outer handrail not continuous due to allowing for fire hydrant equipment. - No site allowance for balustrade tolerances. - If separate handrail and balustrade is not used, this usually causes a conflict with the requirement to have the same heights throughout the landings and stairs. - TGSI are not desirable in most cases and therefore an Alternative Solution by an accredited access

Stair	Access for person with Disabilities	Handrails	Balustrade	Slip Resistance	Treads, Risers, Widths, Other	TGSI	Common Issues
		above nosing line. And must be at consistent height through the stairs and landings. *Note: Primary school – one additional handrail is required between the height of 665 mm to 750 mm.* • Continuous rail, no handhold breaks. • Clear area for 270º to the top of the handrail. *Ref: BCA D2.17, D3.3(a)(ii) & Cl 11 & 12 of AS 1428.1-2009.*		than 10 mm. The lip between the tread and strip must not exceed 3 mm, or 5 mm where the edges are chamfered. *Ref: BCA D2.13, D2.14, D3.3(a)(iii) & Cl 11, 7.2, 7.3 of AS 1428.1-2009.*	only allow for 100 persons, occupancy quantity review may be required. **Stair Height Clearance** - No less than 2 m. *Ref: BCA D2.13, D1.6*		consultant will be required, which usually required dome indicator buttons on the handrails. - Tread and riser dimensions not constructed uniform in dimension.
Non-fire Isolated required exit stair & Communication Stair	**YES**	**YES** - Fully accessible handrails required to both sides as follows: • 180º handrail turndown or return to wall, • 30 to 50 mm diameter with a 270º clearance around the top of the handrail, • 50 mm clearance to back of handrail, and to a height of 600 mm above the handrail. • Located between 865 mm and 1 m above nosing line. And must be at consistent height through the stairs and landings. *Note: Primary school – one additional handrail is required between the height of 665 mm to 750 mm.* • Continuous rail, no handhold breaks. • Clear area for 270º to the top of the handrail. *Ref: BCA D2.17, D3.3(a)(ii) & Cl 11 & 12 of AS 1428.1-2009.*	**YES** - No Less than 865 mm above stair nosing line, no less tanh 1 m above landings. No openings greater than 125 mm. No climbable members between 150 and 760 mm where the floor level is 4 m or more above the surface beneath. *Ref: BCA D2.16(g)(h)(ii)*	**YES** - P3 rated slip resistance and highlighted nosing's to no less than 30% luminance contrast to the background. Nosing widths to be between 50 & 75 mm. Strip may be set back 15 mm from the front edge of the nosing but where it is not set back the luminance contrast must not extend down the riser by more than 10 mm. The lip between the tread and strip must not exceed 3 mm, or 5 mm where the edges are chamfered. *Ref: BCA D2.13, D2.14, D3.3(a)(iii) & Cl 11, 7.2, 7.3 of AS 1428.1-2009.*	**Tread -** 250 to 355 mm. **Riser** - 115 to 190 mm. **Quantity** - Must be between 550 to 700 when applying (2 x Riser + Tread.) **Open Riser** - Not permitted, must be opaque. **Riser Splay back -** Be vertical or max 25 mm. **Stair Width** - Minimum unobstructed width of 1000 mm, measured clear of handrails. Note: 1000 mm clear width will only allow for 100 persons, occupancy quantity review may be required. **Stair Height Clearance** - No less than 2 m. *Ref: BCA D2.13, D1.6*	**YES -** Required to the top and bottom of landings. No requirement for the mid landing. Note: It is understood that BMPX are seeking an alternative solution to delete TGSI in this case. Access consultant to confirm. *Ref: BCA D3.8, AS/NZS 1428.4.1-2009*	- Lip of the nosing strip excessive in height. - Outer handrail not continuous due to allowing for fire hydrant equipment. - No site allowance for balustrade tolerances. - If separate handrail and balustrade is not used, this usually causes a conflict with the requirement to have the same heights throughout the landings and stairs. - TGSI are not desirable in most cases and therefore an Alternative Solution by an accredited access consultant will be required, which usually required dome indicator buttons on the handrails. - Tread and riser dimensions not constructed uniform in dimension.

Stair	Access for person with Disabilities	Handrails	Balustrade	Slip Resistance	Treads, Risers, Widths, Other	TGSI	Common Issues
Interconnecting Communication Stair (between tenancy levels not required as fire egress/exit)	**YES**	**YES** - Fully accessible handrails required to both sides as follows: • 180º handrail turndown or return to wall, • 30 to 50 mm diameter with a 270º clearance around the top of the handrail, • 50 mm clearance to back of handrail, and to a height of 600 mm above the handrail. • Located between 865 mm and 1 m above nosing line. And must be at consistent height through the stairs and landings. *Note: Primary school – one additional handrail is required between the height of 665 mm to 750 mm.* • Continuous rail, no handhold breaks. • Clear area for 270º to the top of the handrail. *Ref: BCA D2.17, D3.3(a)(ii) & Cl 11 & 12 of AS 1428.1-2009.*	**YES** - No Less than 865 mm above stair nosing line, no less tanh 1 m above landings. No openings greater than 125 mm. No climbable members between 150 and 760 mm where the floor level is 4 m or more above the surface beneath. *Ref: BCA D2.16(g)(h)(ii)*	**YES** - P3 rated slip resistance and highlighted nosing's to no less than 30% luminance contrast to the background. Nosing widths to be between 50 & 75 mm. Strip may be set back 15 mm from the front edge of the nosing but where it is not set back the luminance contrast must not extend down the riser by more than 10 mm. The lip between the tread and strip must not exceed 3 mm, or 5 mm where the edges are chamfered. *Ref: BCA D2.13, D2.14, D3.3(a)(iii) & Cl 11, 7.2, 7.3 of AS 1428.1-2009.*	**Tread -** 250 to 355 mm. (Public) **Tread** - 240 to 355 mm. (Private) **Riser** - 115 to 190 mm. **Quantity** - Must be between 550 to 700 when applying (2 x Riser + Tread.) **Open Riser** - Not permitted, must be opaque. **Riser** **Splay back -** Be vertical or max 25 mm. **Stair Width** - Minimum unobstructed width of 1000 mm, measured clear of handrails. Note: 1000 mm clear width will only allow for 100 persons, occupancy quantity review may be required. **Stair Height** - No less than 2 m. *Ref: BCA D2.13, D1.6*	**YES -** Required to the top and bottom of landings. And around base of stair stringer or stair when it can be considered as an overhead obstruction within 2 m from floor level. *Ref: BCA D3.8, AS/NZS 1428.4.1-2009*	- Lip of the nosing strip excessive in height. - No site allowance for balustrade tolerances. - If separate handrail and balustrade is not used, this usually causes a conflict with the requirement to have the same heights throughout the landings and stairs.

Table 10 – Stair and Ramp Provision

D3 – Access for People with Disabilities

Generally speaking, access for persons with disabilities is to be provided from the allotment boundary and any required accessible car space, via a pedestrian link to any other accessible building on the site and to and within all areas used by the occupants. Areas such as plant rooms and the like can be deemed inappropriate for persons with disabilities and therefore access is not required.

Further assessment by the access consultant is required. The following obvious high-level issue are noted below however this does not negate the requirement for an Access Consultant to review and comment:

a) There may be issues with level access to common balconies with regard to the requirements under the new Waterproofing Standard, which may require a threshold hob, see Figure 5 & Part F1 below for further comment.
b) No required ambulant disability facilities have been illustrated in some areas as noted in Part F2 below.
c) School Complex – Tiered Seating - Although the plans are yet to detail handrails, it is likely that the pending design will not comply in this area. A common issue is that they usually do not extend the full distance of both sides of the stairway, rather stop and allow for access at the two landing levels. Or only contain a single handrail to the wall side. Access Consultant to comment on the feasibility of a Performance Solution, once the design has progressed with handrails illustrated.

E1 – Fire Fighting Equipment

Boarding House

The following firefighting equipment is required to be installed in this building, including the any balconies which are now defined as *outdoor occupiable areas* under BCA 2019:

- Fire hydrants to Clause E1.3 and AS 2419.1-2005.
- Portable fire extinguishers to Clause E1.6(a)(b) and Table E1.6, AS 2444-2001 as limited by Table E1.6. Furthermore, 2.5kg or more Type ABE fire extinguishers are required to be located within 10 m of all apartment entry doors.
- Sprinkler System to Clause E1.5 and AS 2118.1-2017 or FPAA101D or FPAA101H. Due to the building having a *rise-in-storey* of more than 3. No that the AS 2118.1 or FPAA101H system may or may not require a water supply tank and pumps. Fire Services Engineer to confirm. The FPAA101D systems requires a domestic pump that can be accommodated.

The following issues have been noted at this stage of the design:

- Boarding House - The central fire stair exit (fire engineered not to be fire isolated) will not have a fire hydrant not located within it. The Fire Safety Engineer to review and confirm if a justifiable Performance Solution is feasible.

Further assessment of the fire services plans is required for confirmation of location and coverage compliance with regard to the fire sprinkler system, fire hydrant system, fire hose reel system and fire extinguishers.

ELC

The following firefighting equipment is required to be installed in this building, including the open terrace on Level 1 which is now defined as *outdoor occupiable areas* under BCA 2019:

- Fire hydrants to Clause E1.3 and AS 2419.1-2005.
- Fire hose reels to Clause E1.3 and AS 2441-2005.
- Portable fire extinguishers to Clause E1.6, Table E1.6 and AS 2444-2001, as limited by Table E1.6.

The following issues have been noted at this stage of the design:

- Nil

Relocatable' s

The following firefighting equipment is required to be installed in this building, including:

- Fire hydrants to Clause E1.3 and AS 2419.1-2005.
- Fire hose reels to Clause E1.3 and AS 2441-2005, except that they need not be provided to serve the classrooms and associated corridors.

- Portable fire extinguishers to Clause E1.6, Table E1.6 and AS 2444-2001, as limited by Table E1.6.

The following issues have been noted at this stage of the design:

Nil

Further assessment of the fire services plans is required for confirmation of location and coverage compliance with regard to the fire hydrant system, fire hose reel system and fire extinguishers.

School Complex Building

The following firefighting equipment is required to be installed in this building, including the Terraces which are now defined as *outdoor occupiable areas* under BCA 2019:

- Fire hydrants to Clause E1.3 and AS 2419.1-2005.
- Fire hose reels to Clause E1.3 and AS 2441-2005, except that they need not be provided to serve the classrooms and associated corridors.
- Portable fire extinguishers to Clause E1.6, Table E1.6 and AS 2444-2001, as limited by Table E1.6.
- Sprinkler System to Clause E1.5 and AS 2118.1-2017. Note: for the avoidance of doubt, the sprinkler system is required throughout the entire building, in support of the following collective scenarios:
    - Carpark fire compartment with more than 40 cars.
    - Open stairs connection – Fire engineering.
    - Excessive travel distance justification – Fire engineering.
- Fire Control Centre "Facility" (not room) to Clause E1.8. As the building has a total floor area more than 18,000 m^2, actual 24,714 m^2.

The following issues have been noted at this stage of the design:

- Nil

Further assessment of the fire services plans is required for confirmation of location and coverage compliance with regard to the fire sprinkler system, fire hydrant system, fire hose reel system and fire extinguishers.

School Complex Building

The following firefighting equipment is required to be installed in this building:

- Nil as less than 500 m^2, actual 160 m^2.

E2 – Smoke Hazard Management

Boarding House

The BCA requires the following Smoke Hazard Provisions to be implemented for this building:

- Automatic air pressurisation system for the fire-isolated exits in accordance with AS 1668.1-2015.
- Smoke detection and alarm system complying with Specification E2.2a Clause 4 & 5 and AS 1670.1-2018.
- Automatic shutdown of any air handling system which does not form part of the smoke hazard management system, (smoke detection to Clause 5 Specification E2.2a, including smoke dampers where the system penetrates fire compartment of apartment walls.
- System monitoring connected to a fire station dispatch centre in accordance with AS 1670.3-2018.

The following issues have been noted at this stage of the design:

- It is understood the above systems will be reviewed by the Fire Services Engineer, Mechanical Engineer and Fire Safety Engineer for possible deletion via any justifiable Performance Solutions.

ELC

The BCA requires the following Smoke Hazard Provisions to be implemented for this building:

- Nil

Relocatable' s

The BCA requires the following Smoke Hazard Provisions to be implemented for this building:

- Nil

Sports Pavilion

The BCA requires the following Smoke Hazard Provisions to be implemented for this building:

- Nil

School Complex Building

The BCA requires the following Smoke Hazard Provisions to be implemented for this building:

- Mechanical ventilation/extraction to the basement carpark to the provisions of BCA Table inter alia AS 1668.2 – 2012 and Clause 5.5 of AS 1668.1 -2015 except that fans with metal blades suitable for operation at normal temperature may not be used; and the electric power and control cabling need not be fire rated.
- Smoke detection and alarm system complying with Specification E2.2a Clause 6, and AS 1670.1-2018. Detectors are not required in areas where spurious signals area likely, however such areas can be interpretive and therefore we require a set of plans illustrating areas where detection is not proposed for further review and comment.
- Automatic shutdown of any air handling system which does not form part of the smoke hazard management system, including smoke dampers where the system penetrates fire compartment of apartment walls. Shut down is to be initiated by smoked detection in accordance with Clause 6 of Specification E2.2a.
- Stage (50m^2 to 150m^2) – Must be provided with a smoke exhaust system to Specification E2.2b; or roof mounted automatic smoke and heat vents to NSW H101.22. This provision is applicable to the Multipurpose Hall / Langar / Gurdwara fire compartment. The area of the stage is to be confirmed.
- A smoke exhaust system complying with Specification E2.2b, throughout the entire building except the exempt area's noted below. Note that the option for smoke detection or sprinklers to remove the requirement for smoke exhaust under the BCA is not relevant as the building has a rise-in-storey of more than 2. However, with the introduction of sprinklers it is understood that the Fire Safety Engineer will analyse the rationalisation of the smoke exhaust system.
  Exempt area's:
  - *Sporting complex's (including sports halls, gymnasiums, swimming pools, ice and roller rinks, and the like) other than indoor sports stadiums with total spectator seating for more than 1000 persons* – Exemption cannot be applied as the Multipurpose Hall is used for other purposes not listed here, and relates to a place used for religious purposes – Gurdwara.
  - *Churches and other places used solely for religious worship* – Exemption cannot be applied as the Gurdwara is connected to the Multipurpose Hall, so not solely in its own fire compartment.
  - *School Classrooms* – Exemption applicable, however only to the actual classrooms, not the area outside the classrooms such as large seating spaces, library, etc.
  - Compartments less than 2000 m^2
- System monitoring connected to a fire station dispatch centre in accordance with AS 1670.3-2018.
- EWIS in accordance with AS 1670.4-2018.

The following issues have been noted at this stage of the design:

- With regards to the provision for smoke exhaust, with the introduction of sprinklers, it is understood that the Fire Safety Engineer will analyse the rationalisation of the smoke exhaust system. To date the Fire Safety Engineer has confirmed that omission from the school use portions is feasible however it will be required to the Basement Carpark and Gurdwara. The architect confirmed that the fire compartments will be reviewed in an attempt to eliminate the requirement for smoke exhaust, by limiting their size to less than 2000 m^2. Smoke separation at the Foyer and fire separation between Ground and Level 2 were discussed at the workshop on the 27 March 2019 as potential inclusions in support of fire engineering analysis.

The fire services consultant is required to identify any areas that they believe smoke detection is not appropriate due to such detection causing spurious signals and provide details of how these areas will be provided for in terms of detection. Approval from this office is required before proceeding with the design.

E3 - Lift Installations

The BCA requires the following lift provisions to be implemented for this development:

- Warning signage, i.e. “Do not use lifts if there is a fire”
- Landings are to comply with the access and egress provision of Section D of the BCA. Compliance appears to have been achieved.
- The lifts must be a type of lift noted in Table E3.6(a) of the BCA.
- The lifts must have features in accordance with Table E3.6(b), i.e. handrails, certain dimensions, etc, as stipulated within this table.
- The lift car must have emergency lighting.
- Cooling of the lift shaft to ensure that the dry bulb air temperature in the lift shaft does not exceed 40^{o}C and if the cooling is by ventilated system, be provided with an air change rate determined using a temperature rise of no more than 5 K.
- Emergency access doors may be required for these single enclosed shafts, vertical transport consultant to advise when considering the multiple prerequisites of Specification E3.1 Clause 6.
- An electric passenger lift installation and an electrohydraulic passenger lift installation must comply with Specification E3.1.
- The Vertical Engineer will also need to confirm compliant access to lift pits is proposed in accordance with Clause D1.17.
- Lifts are now required to comply with certain provisions of Section J Energy Efficiency. The relevant Engineer is to review this requirement further.

E4 – Emergency Lighting, Exit Signs and Warning Systems

<u>Boarding House</u>

The BCA requires the following Emergency Lighting, Exit Signs and Warning Systems for this development:

- Emergency lighting and exit signs are required to be installed throughout the building in accordance with the provisions of the BCA and AS 2293.1 -2018.
- EWIS in accordance with AS 1670.4-2018.

Any exit signs installed at a height in excess of 2.7 m above floor level may require an alternative solution from the fire safety engineer. Further comment from the electrical consultant required.

<u>ELC</u>

The BCA requires the following Emergency Lighting, Exit Signs and Warning Systems for this development:

- Emergency lighting and exit signs are required to be installed throughout the building in accordance with the provisions of the BCA and AS 2293.1 -2018.

Any exit signs installed at a height in excess of 2.7 m above floor level may require an alternative solution from the fire safety engineer. Further comment from the electrical consultant required.

<u>Relocatable’ s</u>

The BCA requires the following Emergency Lighting, Exit Signs and Warning Systems for this development:

- Emergency lighting and exit signs are required to be installed throughout the building in accordance with the provisions of the BCA and AS 2293.1 -2018.

Any exit signs installed at a height in excess of 2.7 m above floor level may require an alternative solution from the fire safety engineer. Further comment from the electrical consultant required.

Sports Pavilion

The BCA requires the following Emergency Lighting, Exit Signs and Warning Systems for this development:

- Nil

School Complex Building

The BCA requires the following Emergency Lighting, Exit Signs and Warning Systems for this development:

- Emergency lighting and exit signs are required to be installed throughout the building in accordance with the provisions of the BCA and AS 2293.1 -2018.
- EWIS in accordance with AS 1670.4-2018.

Any exit signs installed at a height in excess of 2.7 m above floor level may require an alternative solution from the fire safety engineer. Further comment from the electrical consultant required.

F1 – Damp and Weatherproofing

Storm water drainage must comply with AS/NZS 3500.3-2003 and the NCC Plumbing Code of Australia.

Any external above ground membranes are required to comply with AS 4654-2012 Parts 1 & 2. This is a new requirement coming into effect as of 1 May 2014 and careful design consideration will need to be applied in the areas of the balconies and the like in this development.

There may be conflict with the accessible provisions of Part D3 of the BCA which will need to be comment on further by the access consultant, as this Standard may require hobs at the thresholds of balconies, see Figure 5 below. There is relief available as the Standard does allow for a gutter system at the threshold of the door sill, which is to be fitted with an AS1428.1-2009 approved grate, in lieu of a hop (*Ref: AS 4654.2-2012 Clause 2.8.3 Note 6*.) However such detail should only be determined in accordance with the hydraulic engineer and the access consultant. Note that the accessible Standard contains restrictions on heights differences between abutting surfaces, such as the flooring and door sill, and a review of Section 7 of AS 1428.1-2009 should be considered as part of the threshold designs.

Figure 5 below also illustrates the membrane termination heights which are given in Table A1 of Appendix of the Waterproofing Standard. Note that the heights are related to the determined wind class from AS 4055-2012 and should only be determined by the appropriate project engineer, i.e. structural, hydraulic or façade engineer.

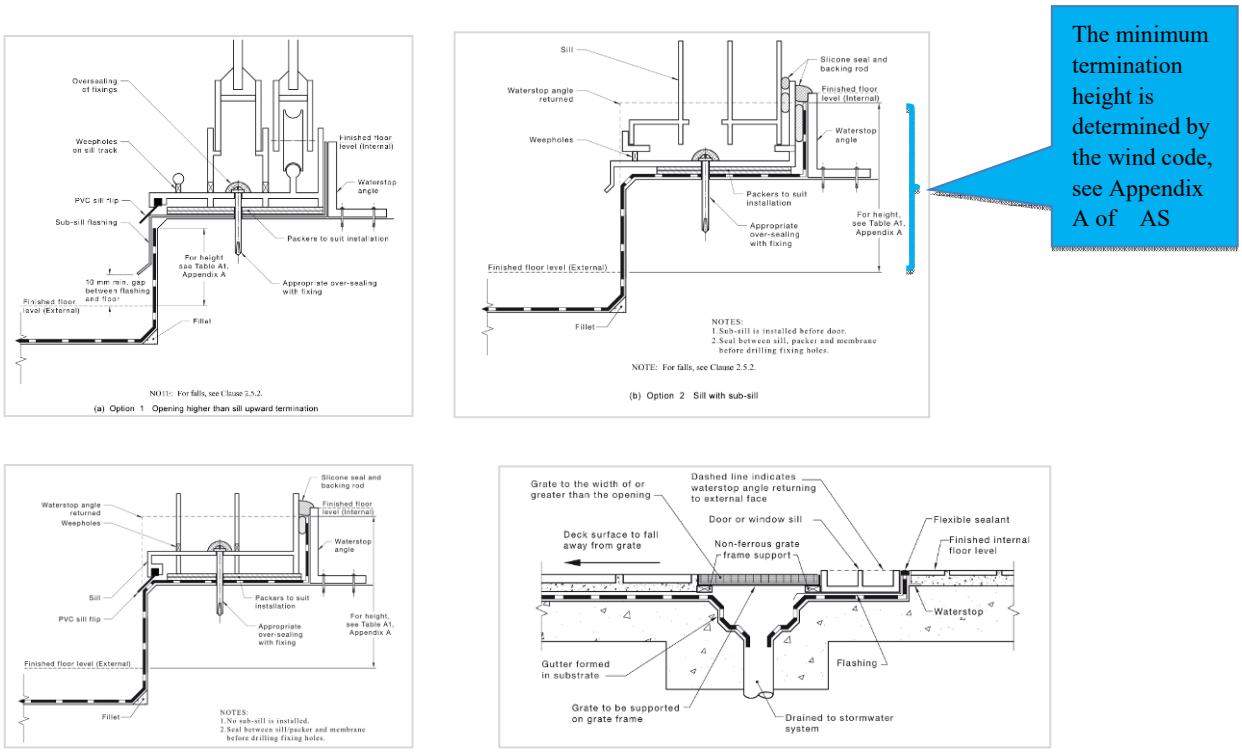


Figure 5 - Various waterproofing options at threshold and outlets.

Balcony surface water must drain to the drainage outlet via a finished floor fall of no flatter than 1:100.

The internal wet areas must comply with BCA Table F1.7and AS 3740-2010.

Moisture from the ground must be prevented from reaching the building elements such as the flooring, walls above DPC levels, etc. Vapour barriers must comply with AS 2870-2011.

F2 – Sanitary and Other Facilities

Adequate sanitary quantity in accordance with Table F2.3 of the BCA are yet to be confirmed. Awaiting further in formation to conduct this assess as per Item F in Table 2 above.

The following facilities are required for the Class 3 boarding use portion of the Boarding House building:

- A bath or shower; and a closet pan; and a washbasin, for each 10 residents for whom private facilities are not provided.

The following facilities are required for the Class 2 residential apartments use portion of the Boarding House building:

- Within each apartment provide a kitchen sink and facilities for the preparation and cooking of food; and a bath or shower; and a closet pan; and a washbasin .
- Laundry facilities consisting of:
    - In each apartment – clothes washing facilities, comprising of at least one washtub and space for a washing machine; and clothes drying facilities comprising of a clothes line or a hoist with not less than 7.5 m of line, or space for one heat operated drying cabinet or appliance in the same room as the clothes washing facilities; or
    - A separate laundry for each 4 apartments that must comprise or
        - Clothes washing facilities, comprising at least one washtub and a space for a washing machine; and clothes drying facilities comprising of a clothes line of hoist of not less than 7.5 m of line per apartment, or space for one hear operated drying cabinet.

Within the Boarding House, separate sanitary facilities (accessible wheel chair facility) must be provided for any staff. This has been illustrated.

In relation to the minimum number sanitary facilities required for the remainder of the development, adequate sanitary quantity in accordance with Table F2.3 of the BCA are yet to be confirmed. Awaiting further in formation to conduct this assess as per Item G in Table 2 above. Table 11 below is required to be completed which will identify any shortfalls with the design.

Populations	Male Pans	Male Urinals	Male Basins	Female Pans	Female Basins	Unisex Access Pans	Unisex Access Basins
Required							
8 Males 8 Females (Staff)	0.4	0.8	0.3	0.6	0.4	-	-
24 Males 24 Females (Conference Room Occupants)	1.2	1	1	1.6	1	-	-
Total Requires	2	2					-
Provided							
Ground Floor	4	2	4	5	4	-	-
Accessible Pans (All ready accounted for)	-	-	-	-	-	2	2

Table 11 – Sanitary Facility Quantities

Note* Adjusted for accessible facilities allowance under F2.2(c)

An accessible unisex facility is requited at no less than 50% of banks of toilets. At each bank of toilets which is required to contain an accessible sanitary facility, a sanitary compartment suitable suitable for a person with an ambulant disability in accordance with AS 1428.1-2009 must be provided for use by males and females.

Accessible and ambulant sanitary facilities are required to be designed and constructed in accordance with AS 1428.1-2009. Further assessment of plan and elevation details at 1:20 is required, for further assessment by the Access Consultant.

The following issues have been identified at this stage, these items can be readily rectified.

a) Some closet pans have been illustrated without washbasins, i.e. - Primary & Secondary School Level 2.
b) No required ambulant disability facilities have been illustrated in some cases, i.e, Primary School Level 2, Multipurpose Hall Level 2,
c) The AWC's in the Primary School on Level 1 are not screened from view.

F3 – Room Sizes

The ceiling height must be not less than—

- Generally, 2.4 m; and
- General passageways, corridor, or the like — 2.1 m; and
- School classroom or other assembly building or part that accommodates not more than 100 persons – 2.4; and

- Theatre, public hall, School classroom or other assembly building or part that accommodates more than 100 persons – 2.7; and
- A corridor that serves an assembly building or part that accommodates not more than 100 persons – 2.4 m; or
- A corridor that serves an assembly building or part that accommodates more than 100 persons – 2.7 m; or
- A habitable room excluding kitchen; and a corridor, passageway, or the like — 2.1 m; and
- a bathroom, shower room, sanitary compartment, airlock, tea preparation room, pantry, store room, garage, car parking area, or the like — 2.1 m; and
- a commercial kitchen — 2.4 m; and
- above a stairway, ramp, landing or the like — 2 m measured vertically above the nosing line of stairway treads or the floor surface of the ramp, landing or the like.

Further plan detail (section's) are required in order to confirm compliance with this provision. The current section are floor to floor height, therefore we are not able to confirm the clear ceiling heights. Level 2 and Level 3 are both illustrated with an RL of 58.20. Additional sections will be required for final confirmation, including sections of stairs.

F4 - Light and Ventilation

Natural lighting is required to all bedrooms and other room used for sleeping purposes at a rate of not less than 10% the floor area of the room. Further assessment of the door and window schedule is required for confirmation; however it appears that compliance can be readily achieved.

Artificial lighting must be provided to all rooms in accordance with AS/NZS 1680.0-2009.

Windows in the bedrooms or other sleeping areas required for natural light must be set back from the title boundary, or a wall on the same building or another building on the allotment by not less than the greater of 1 m or 50% the square root of the exterior height of the wall in which the window is located, measured in meters from its sill. Whilst compliance appears to have been achieved, further assessment is required of the updated plans and window schedule.

The mechanical ventilation system must comply with AS 1668.2-2012.

Any commercial cooking it must have a kitchen exhaust system complying with AS/NZS 1668.1-1998 & AS 1668.2-2012. Any duct work passing through fire compartments will need to be carefully considered in terms of fire separation of the duct as dampers are not permitted. Mechanical engineer to confirm.

F5 Sound Transmission and Insulation

This section is only applicable to the Boarding House.

Colour coded acoustic plans are required which detail the acoustic ratings and the required discontinuous construction. Discontinuous construction is required where a wall separates a bathroom, sanitary compartment , laundry or kitchen in one-sole occupancy unit from a habitable room (other than a kitchen) in an adjoining unit; or a sole-occupancy unit from a plant room or lift shaft.

Discontinuous construction in this Part means a wall having a minimum 20 mm cavity between 2 separate leaves, and for masonry walls the wall ties are the resilient type and for other than masonry walls there is no mechanical fixings between the walls other than at the bottom and/or top plates.

Section G – Ancillary Provisions

<u>NSW G1.101 Provision for Cleaning Windows</u>

A building must be provide for a safe manner of cleaning windows above 3 or more storeys. This provision is satisfied if the windows can be cleaned from the inside, or externally via a method complying with the Work Health and Safety Act 2011 and associated regulations. Design certification will be required from an appropriately qualified person prior to the issue of the Construction Certificate, and Installation Certification will be required prior to the issuances of the Occupation Certificate.

G1 – Minor Structures and Components

G1.2 – Refrigerated Chambers

The Langar Kitchen Cool Rooms and Freezer Room are required to comply with the various provisions of this part of the BCA such as:

- Have a door which is capable of being opened by hand from inside without a key, with clear width of not less than 600 mm and a clear height not less than 1.5 m ; and
- internal lighting controlled only by a switch which is located adjacent to the entrance doorway inside the rooms; and
- an indicator lamp positioned outside the rooms which is illuminated when the interior lights required by are switched on; and
- an alarm that is—
    - located outside but controllable only from within the room; and
    - able to achieve a sound pressure level outside the room or of 90 dB(A) when measured 3 m from the sounding device.

The materials used for the cool room panels is required to comply with industry best practice (PFPA TBG-003 Sandwich Panels and Associated Materials Version 2 – August 2004), FRNSW guidelines, including the labelling requirements of IPCA Ltd 003:2010 Code of Practice Version 3.0, see Figure 6 below.

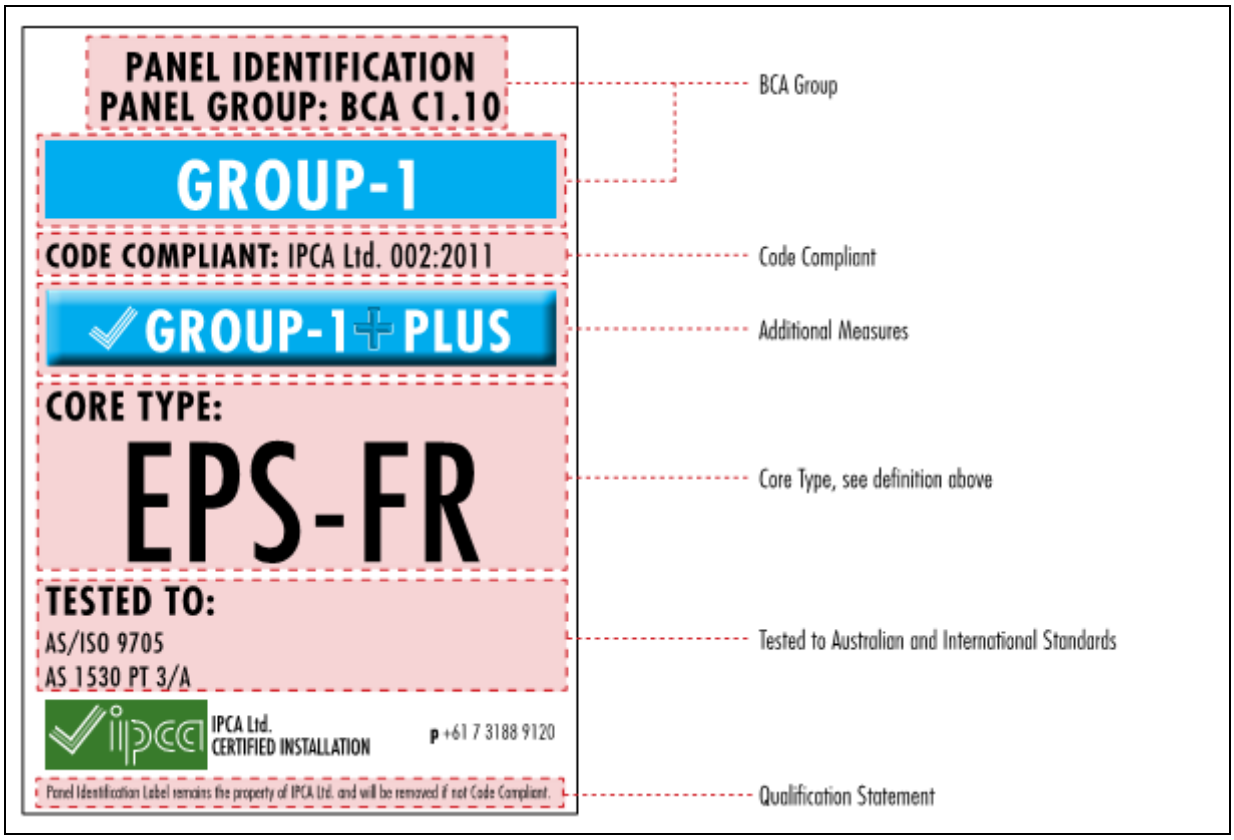


Figure 6 – Cool Room Panels Labelling

G2 – Boilers, Pressure Vessels, Heating Appliances, Fire laces, Chimneys and Flues

This Part is not applicable to this development.

G3 – Atrium Construction

School Complex - Part G3 atriums have not been illustrated in the latest architectural plans. A three-storey connection does exist however it is understood that the building will contain a compliant BCA Clause E1.5 sprinkler system throughout.

Boarding House – Currently illustrated with and atrium due to the four-storey connection in this sprinkler protected building. Further discussion amongst the design team is required at the DD stage. It is predicted that there maybe omission of some of

the the atrium provisions such as smoke exhaust, undersized atrium wells, bounding walls set back more than 3.5m, roof protection and possibly other BCA Specification G3.8 short falls. Mechanical and Fire Services Engineer to advise. The Fire Safety Engineer to review and confirm if a justifiable Performance Solution is feasible. Or alternatively the stair well reduced in size to eliminate it being interpreted as an atrium.

G4 – Construction in Alpine Areas

This Part is not applicable to this development.

G5 – Construction in Bushfire Prone Areas

Residential accommodation in the form of the Boarding House is proposed therefore this building is required to comply with the provisions of Part G5. The Bushfire Consultant has confirmed that the design complies.

G6 – Occupiable Outdoor Areas

This new Part G6 of the BCA is applicable to the ELC, Boarding House and School Complex balcony/terrace areas. This Part the BCA illustrates where we are to apply the other existing provisions of the BCA to *occupiable outdoor areas*[4]. This has been considered throughout this report, for example, fire hazard properties for the terrace floors, travels distances to exits, etc, etc.

Its important to note that there is no longer an exemption not to provide fire hydrant and fire hose real coverage to these areas regardless of what the relevant Australian Standards. Fire Services Engineer to note.

Section J - Energy Efficiency

The building is located within Climate Zone 6.

Compliance with Section J is required for this development as follows, other than for the Class 2 portion of the Boarding House, where A BASIX report and certificate is required:

- BCA Part J0 – Energy Efficiency – Noted, no action required.

  BCA Part J1 – Building Fabric – Glazing/wall – A *Total System U-Value* of wall -glazing construction in accordance with Clause J1.5 must not be exceeded. Submission of the system calculations will be required prior to the issuance of the relevant Construction Certificate.

  Color coded building envelope plans which illustrate the required external and internal R rating insulation lines throughout the building, inclusive of external walls, internal walls, roof and floor slabs, are required for review.

- BCA Part J2 – DELETED

- BCA Part J3 – Building Sealing – Details of compliance with this provision is required to be illustrated within the architectural documentation, i.e. where required, self-closing doors, window and doors seals to be illustrated within the schedules.

  Boarding House - An air-conditioning unit or system must when serving a sole-occupancy unit of a Class 3 building, not operate when any external door including a door opening to a balcony, patio, courtyard or the like is open for more than 1 minute.

- BCA Part J4 – DELETED.

- BCA Part J5 – Air-conditioning and Ventilation Systems – Certification from the mechanical consultant will be required.

- BCA Part J6 – Artificial Lighting and Power – Certification from the electrical consultant will be required.

[4] *Occupiable outdoor area means a space on a roof, balcony or similar part of a building –*
(a) That is open to the sky; and
(b) To which access is provided, other than acess only for maintenance; and
(c) *That is not open space or directly connected with open space.*

- BCA Part J7 - Hot Water Supply and Swimming Pool and Spa Plant – Installation and Commissioning Certification from the Plumbing Contractor will be required prior to the issuance of the Occupation Certificate. Compliance with the NCC Plumbing Code of Australia required.
- BCA Part J8 – Access for Maintenance and Facilities for Monitoring – Design Certification from the services consultant will be required in relation to BCA Clause J8.3, prior to the issuance of the Construction Certificate.

Important Note: The design team is to be aware that the provisions of Section J BCA 2019 contain material changes.

4.0 Essential Fire & Other Measures

Below is a list of essential fire safety services that are required for the building, and the relevant standards of performance for each measure to be designed/constructed to, SAMPLE ONLY. **This section is to be completed at the DD stage and will be subject to change as the design progress especially in the area of fire engineered alternative solutions.**

Fire Safety Measure	Standard	BCA Clause(s)
Access panels, doors & hoppers to fire resisting shafts	AS 1530.4 – 2005	C3.13
Automatic fail safe devices	-	C3.8, D2.21, Spec C3.4
Automatic fire detection & alarm systems	AS 1670.1 – 2004 AS 1668.1 – 1998	Spec E2.2a, G3.8
Automatic fire suppression systems		Spec E1.5, G3.8
Emergency lighting		E4.2, E4.4
Exit signs		E4.5, NSW E4.6 & E4.8
Fire alarm monitoring system	AS 1670.3 – 2004 AS 4428.6 – 1997	Spec E2.2, Spec E1.5, G3.8
Fire dampers	AS 1668.1 – 1998	Spec E2.2a
Fire doors	AS 1905.1 – 2005	Spec C3.4(fire doors), C3.10 (lift doors), C3.11
Fire hose reel systems	AS 2441 – 2005	E1.4
Fire hydrant systems	AS 2419.1 – 2005	E1.3
Fire seals (protecting openings in fire resisting components of the building)	AS 4072.1 – 2005 AS 1530.4 – 2005 AS 1038.15 – 1995	C3.12, C3.13, C3.15
Lightweight construction	-	C1.8, Spec C1.8
Mechanical air handling systems • Auto shutdown • Carpark Mech Ventilation	AS/NZS 1668.1 – 1998 AS 1668.2 –2012	E2.2, Spec E2.2a, Spec E2.2b
Portable fire extinguishers & fire blankets	AS 2444 – 2001	E1.6
Smoke dampers	AS 1668.1 – 1998	C3.15, E2.2, Spec G3.8
Smoke detectors & heat detectors (Residential)	AS 1670.1 – 2004 AS 3786 – 1993	Spec E2.2a Spec E2.2a
Smoke doors	-	Spec C3.4
Solid core doors	-	C3.11, NSWC3.11(d)(ii)
Sound systems and intercom systems for emergency procedures	AS 1670.4 – 2004 AS 4428.4 – 2004	Spec G3.8
Standby power systems	AS 1851-2005	Spec G3.8
Warning and operational signs	-	E3.3, D2.23, Speci G3.8 Cl 5.
Paths of Travel	-	D1.6
Alternative Solution, Report No. TBC,	-	*TBC*

Fire Safety Measure	Standard	BCA Clause(s)
issued by TBC, dated TBC • TBC • TBC		

Table 12 – Essential Safety Measures

Appendix A
BCA Provisions (Clause by Clause Assessment)

To be completed following a review of the Developed Design at the DD Stage.

Appendix B
Fire Rating Requirements

Specification C1.1, BCA Table No. 3 – Type A Construction: FRL of Building Elements

Item	Class 2, 3 or 4 part	Class 5, 7a or 9b	Class 6	Class 7b or 8
Loadbearing External Walls • Less than 1.5m to a fire source feature • 1.5 – less than 3m from a fire source feature; • 3m or more from a fire source feature	90/90/90 90/60/60 90/60/30	120/120/120 120/90/90 120/60/30	180/180/180 180/180/120 180/120/90	240/240/240 240/240/180 240/180/90
Non-Loadbearing External Walls • Less than 1.5m to a fire source feature • 1.5 – less than 3m from a fire source feature; • 3m or more from a fire source feature	-/90/90 -/60/60 -/-/-	-/120/120 -/90/90 -/-/-	-/180/180 -/180/120 -/-/-	-/240/240 -/240/180 -/-/-
External Columns • Loadbearing • Non-loadbearing	90/-/- -/-/-	120/-/- -/-/-	180/-/- -/-/-	240/-/- -/-/-
Common Walls & Fire Walls	90/90/90	120/120/120	180/180/180	240/240/240
Stair and Lift Shafts required to be fire-resisting • Loadbearing • Non-loadbearing	90/90/90 -/90/90	120/120/120 -/120/120	180/120/120 -/120/120	240/120/120 -/120/120
Internal walls bounding sole occupancy units • Loadbearing • Non-loadbearing	90/90/90 -/60/60	120/-/- -/-/-	180/-/- -/-/-	240/-/- -/-/-
Internal walls bounding public corridors, public lobbies and the like: • Loadbearing • Non-loadbearing	90/90/90 -/60/60	120/-/- -/-/-	180/-/- -/-/-	240/-/- -/-/-
Ventilating, pipe, garbage and like shafts: • Loadbearing • Non-loadbearing	90/90/90 -/90/90	120/90/90 -/90/90	180/120/120 -/120/120	240/120/120 -/120/120
Other loadbearing internal walls, 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

Note: See concessions in Spec C1.1 for concessions to these above tabulated requirements, as this may reduce or remove fire rating requirements subject to certain criteria and haven't been captured in this report.

Table 8 – Fire Resistance Levels (FRL's)

Specification C1.1, BCA Table No. 4 – Type B Construction: FRL of Building Elements

Item	Class 2, 3 or 4 part	Class 5, 7a or 9b	Class 6	Class 7b or 8
Loadbearing External Walls				
• Less than 1.5m to a fire source feature	90/90/90	120/120/120	180/180/180	240/240/240
• 1.5 - less 3m from fire source feature;	90/60/30	120/90/60	180/120/90	240/180/120
• 3 - less 9m from a fire source feature	90/30/30	120/30/30	180/90/60	240/90/60
• 9 - less 18m from a fire source feature	90/30/-	120/30/-	180/60/-	240/60/-
• 18m or more from a fire source feature	-/-/-	-/-/-	-/-/-	-/-/-
Non-Loadbearing External Walls				
• Less than 1.5m to a fire source feature	-/90/90	-/120/120	-/180/180	-/240/240
• 1.5 - less 3m from fire source feature;	-/60/30	-/90/60	-/180/120	-/180/120
• 3m or more from a fire source feature.	-/-/-	-/-/-	-/-/-	-/-/-
Loadbearing External Columns				
• Less than 18m	90/-/-	120/-/-	180/-/-	240/-/-
• 18m or more	-/-/-	-/-/-	-/-/-	-/-/-
Non-Loadbearing External Columns	-/-/-	-/-/-	-/-/-	-/-/-
Common Walls & Fire Walls	90/90/90	120/120/120	180/180/180	240/240/240
Stair and Lift Shafts required to be fire-resisting				
• Loadbearing Stair & Lift shaft	90/90/90	120/120/120	180/120/120	240/120/120
• Non-loadbearing Stair shaft only	-/90/90	-/120/120	-/120/120	-/120/120
Internal walls bounding sole occupancy units				
• Loadbearing	90/90/90	120/-/-	180/-/-	240/-/-
• Non-loadbearing	-/90/90	-/-/-	-/-/-	-/-/-
Internal walls bounding public corridors, public lobbies and the like:				
• Loadbearing	60/60/60	120/-/-	180/-/-	240/-/-
• Non-loadbearing	-/60/60	-/-/-	-/-/-	-/-/-

Item	Class 2, 3 or 4 part	Class 5, 7a or 9b	Class 6	Class 7b or 8
Other loadbearing internal walls and columns	60/-/-	120/-/-	180/-/-	240/-/-
Roofs	-/-/-	-/-/-	-/-/-	-/-/-

Note: See concessions in Spec C1.1 for concessions to these above tabulated requirements, as this may reduce or remove fire rating requirements subject to certain criteria, and haven't been captured in this report

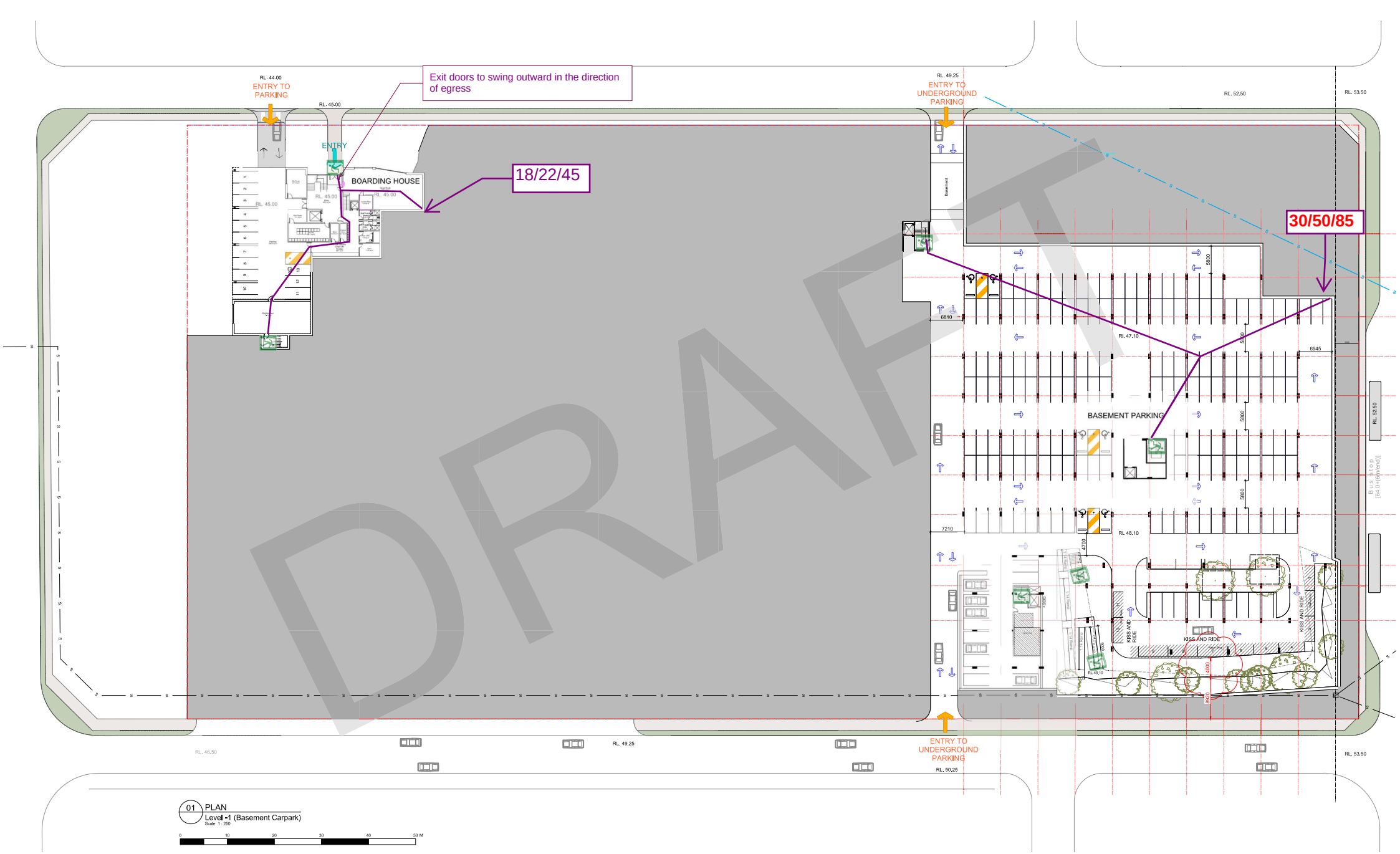
Table 8 – Fire Resistance Levels (FRL's)

Specification C1.1, BCA Table No. 5 – Type C Construction: FRL of Building Elements

Item	Class 2, 3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
External Walls • Less than 1.5m to a fire source feature • 1.5 – less 3m from fire source feature; • 3m or more from a fire source feature	90/90/90 -/-/- -/-/-	90/90/90 60/60/60 -/-/-	90/90/90 60/60/60 -/-/-	90/90/90 60/60/60 -/-/-
External Column not incorporated in an external wall • Less than 1.5m to a fire source feature • 1.5 – less 3m from fire source feature; • 3m or more from a fire source feature	90/-/- -/-/- -/-/-	90/-/- 60/-/- -/-/-	90/-/- 60/-/- -/-/-	90/-/- 60/-/- -/-/-
Common Walls and Fire Walls	90/90/90	90/90/90	90/90/90	90/90/90
Internal walls bounding sole occupancy units	60/60/60	-/-/-	-/-/-	-/-/-
Internal walls bounding public corridors, hallways and the like:	60/60/60	-/-/-	-/-/-	-/-/-
Internal walls bounding a stair if required to be fire rated	60/60/60	60/60/60	60/60/60	60/60/60

Note: See concessions in Spec C1.1 for concessions to these above tabulated requirements, as this may reduce or remove fire rating requirements subject to certain criteria and haven't been captured in this report.

Appendix C
BCA Defined Exit Plans & BCA Travel Distance Assessments – (worst case scenarios only)



01 PLAN
Level -1 (Basement Carpark)
Scale 1 : 250

0 10 20 30 40 50 M

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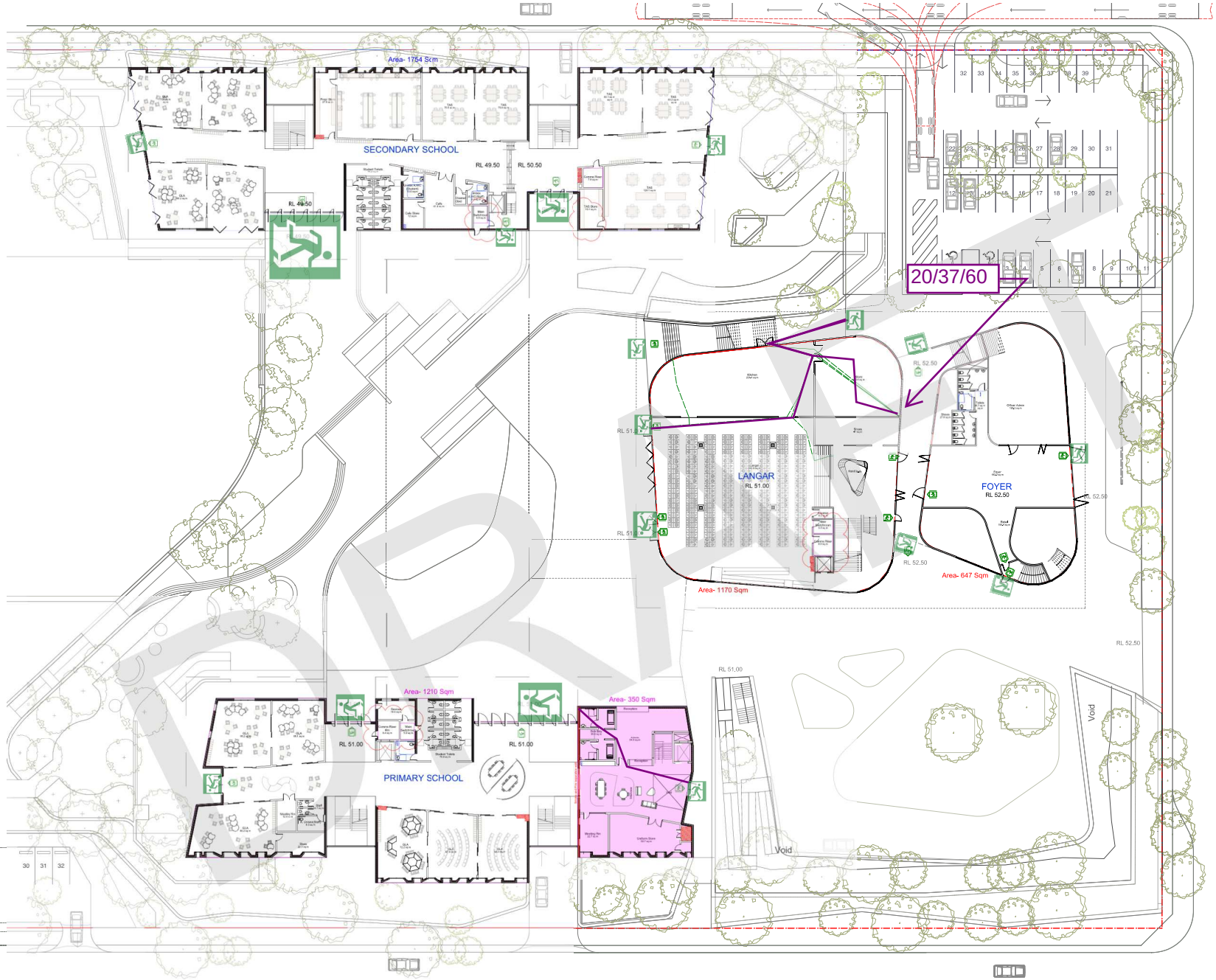
2	29/3/19	Access To4ds and car space updated
1	19/3/19	Consultant Coordantion

PROJECT	Sikh Grammar School
CLIENT	Sikh Grammar School Australia
TITLE	Site Plan- Level -1 (Basement)
IDENTIFIER / CONTACT	15+16 Talavera Road
PROJECT #	2757
DWG #	DA101
DATE	FEB 2019
SCALE	1:250 @A0
DRAWN	CH
CHECKED	YG
REVISION	2



01 PLAN
Level 0 (Ground)
Scale 1 : 200

0 10 20 30 40 50 M

3	5/4/19	Location of Comms Riser & MS Room updated
2	29/3/19	Access Toilets and car space updated

DO NOT SCALE FROM DRAWING, USE FIGURED DIMENSIONS ONLY.
CHECK ALL DIMENSIONS ON SITE BEFORE MANUFACTURE OR CONSTRUCTION.

PROJECT: Sikh Grammar School — PROJECT #: 2757
CLIENT: Sikh Grammar School Australia — DWG #: DA110
TITLE: Admin Plan- School & Gurdwara (Level 0)
IDENTIFIER / CONTACT: 15-16 Talavera Road — DATE: FEB 2019 — SCALE: 1:200 (A3) — DRAWN: YS — REVISION: 3

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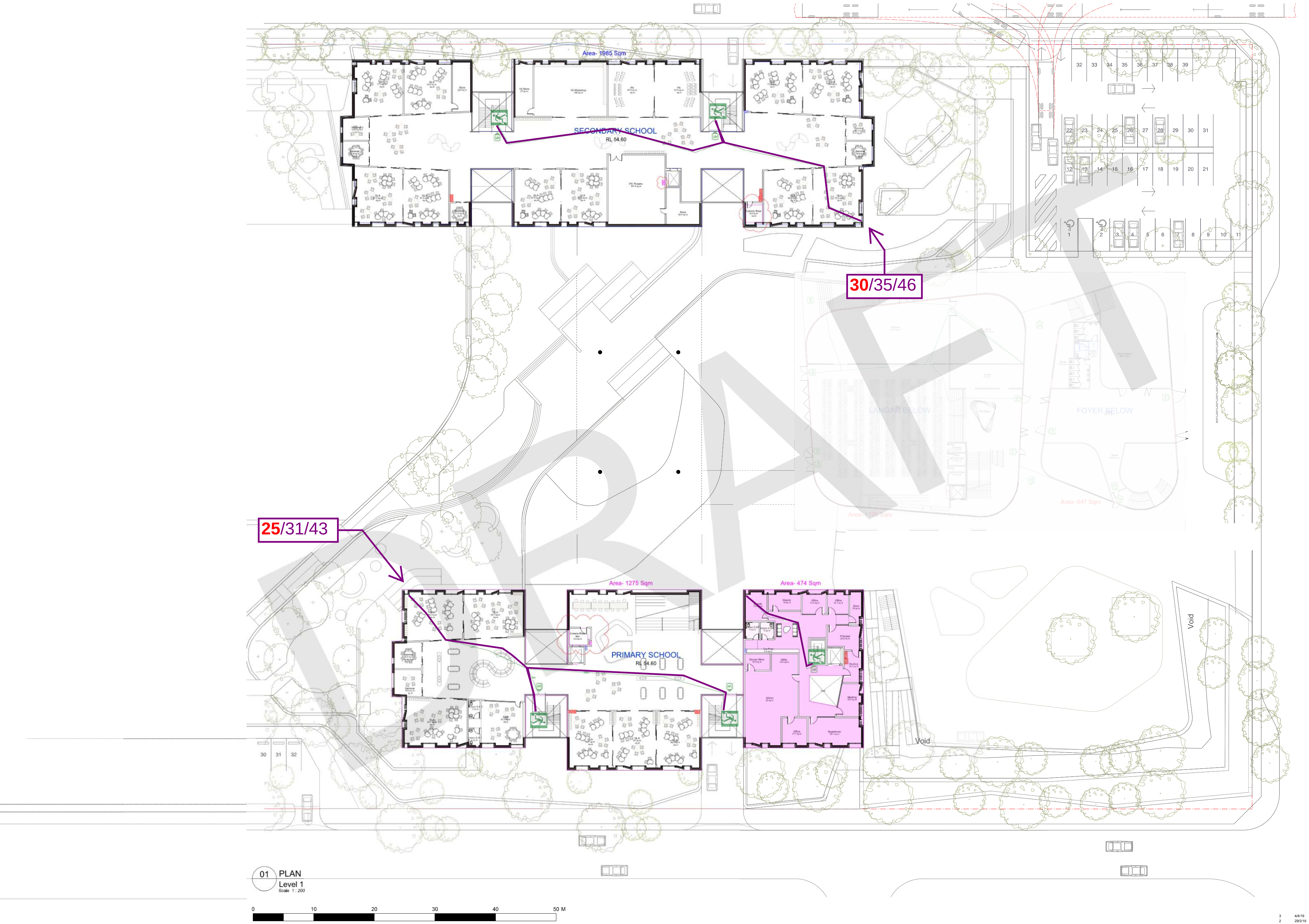

3	4/4/19	Location of Comms Riser & MS Room updated
2	29/3/19	Access Toilets and car space updated
ISSUE	DATE	REVISION

DO NOT SCALE FROM DRAWING. USE FIGURED DIMENSIONS ONLY. CHECK ALL DIMENSIONS ON SITE BEFORE MANUFACTURE OR CONSTRUCTION.

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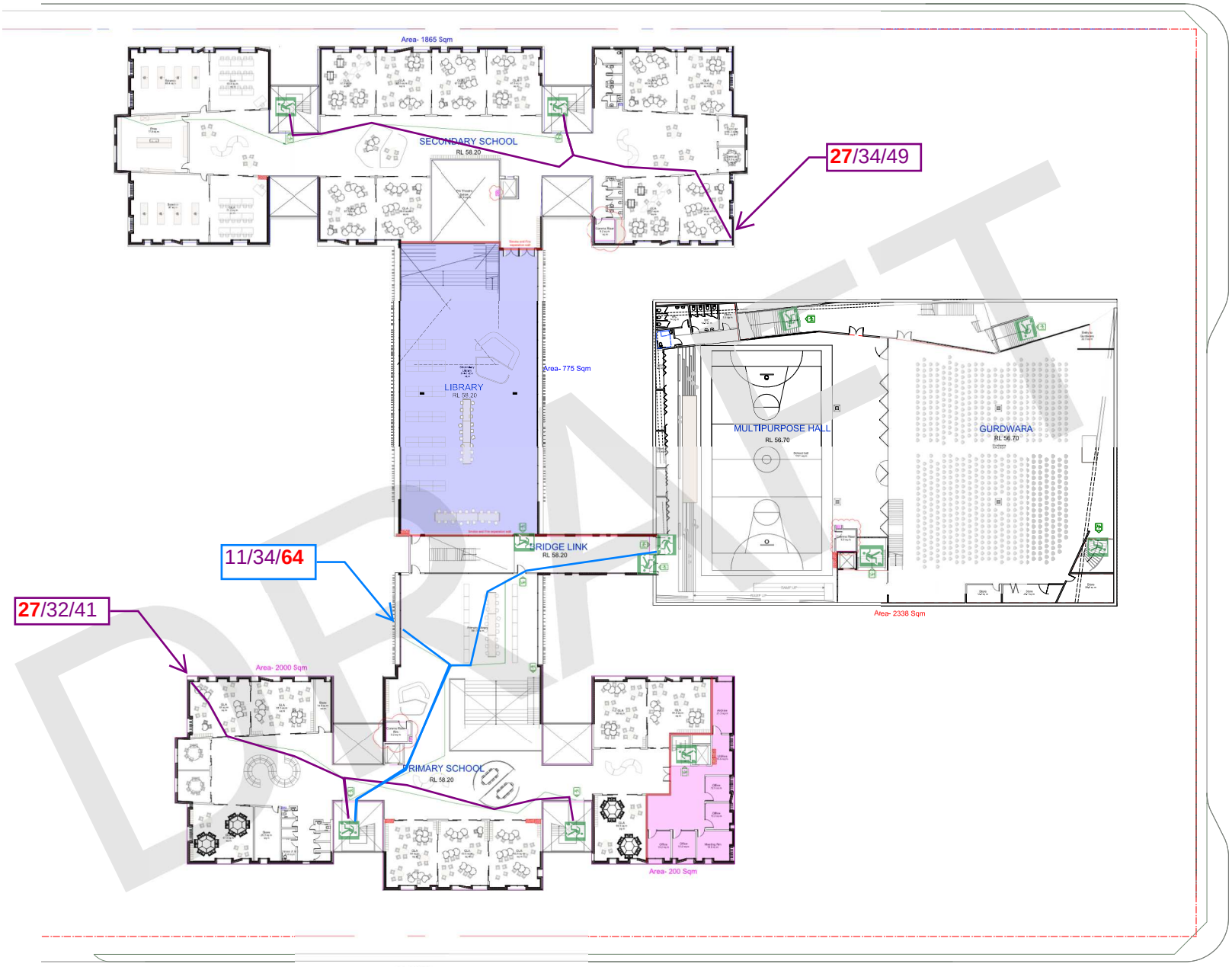
PROJECT: Sikh Grammar School — PROJECT # 2757

CLIENT: Sikh Grammar School Australia

DWG: Plan- School & Gurdwara (Level 1) Admin — DWG # DA111

151-161 Tallawong Road — DATE FEB 2019 — SCALE 1:200@A0 — REVISION 3



01 PLAN
Level 2
Scale 1 : 200

0 10 20 30 40 50 M

3	4/6/19	Location of Comms Riser & MS Room updated
2	29/3/19	Access Toilets and car space updated

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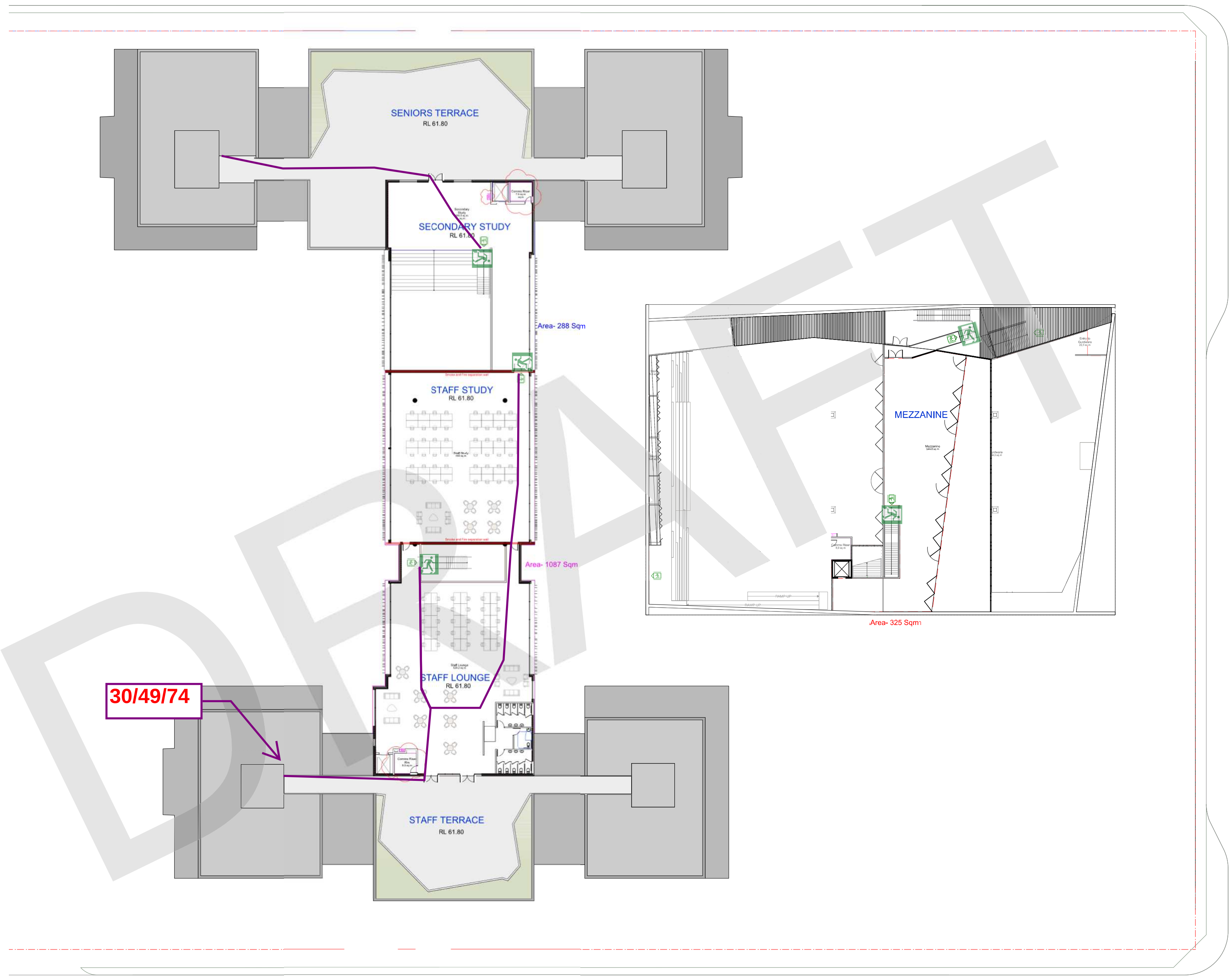
PROJECT: Sikh Grammar School — 2757
CLIENT: Sikh Grammar School Australia
TITLE: Admin: Plan- School & Gurdwara (Level 2) — DA112
IDENTIFIER / CONTACT: 15+16 Tallawong Road
DATE: FEB 2019 — DRAWN: YS — REVISION: 3
SCALE: 1:200 @A3 — CHKD: YS



01 PLAN
Level 3
Scale 1 : 200

0 10 20 30 40 50 M

ISSUE	DATE	REVISION
3	4/4/19	Location of Comms Riser & MS Room updated
2	29/3/19	Access Toilets and car space updated

0mm 50mm 100mm

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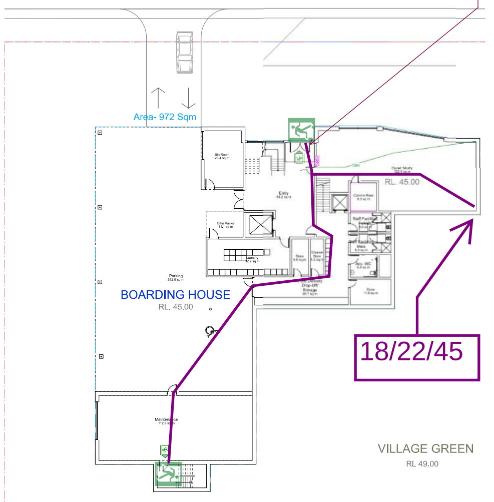
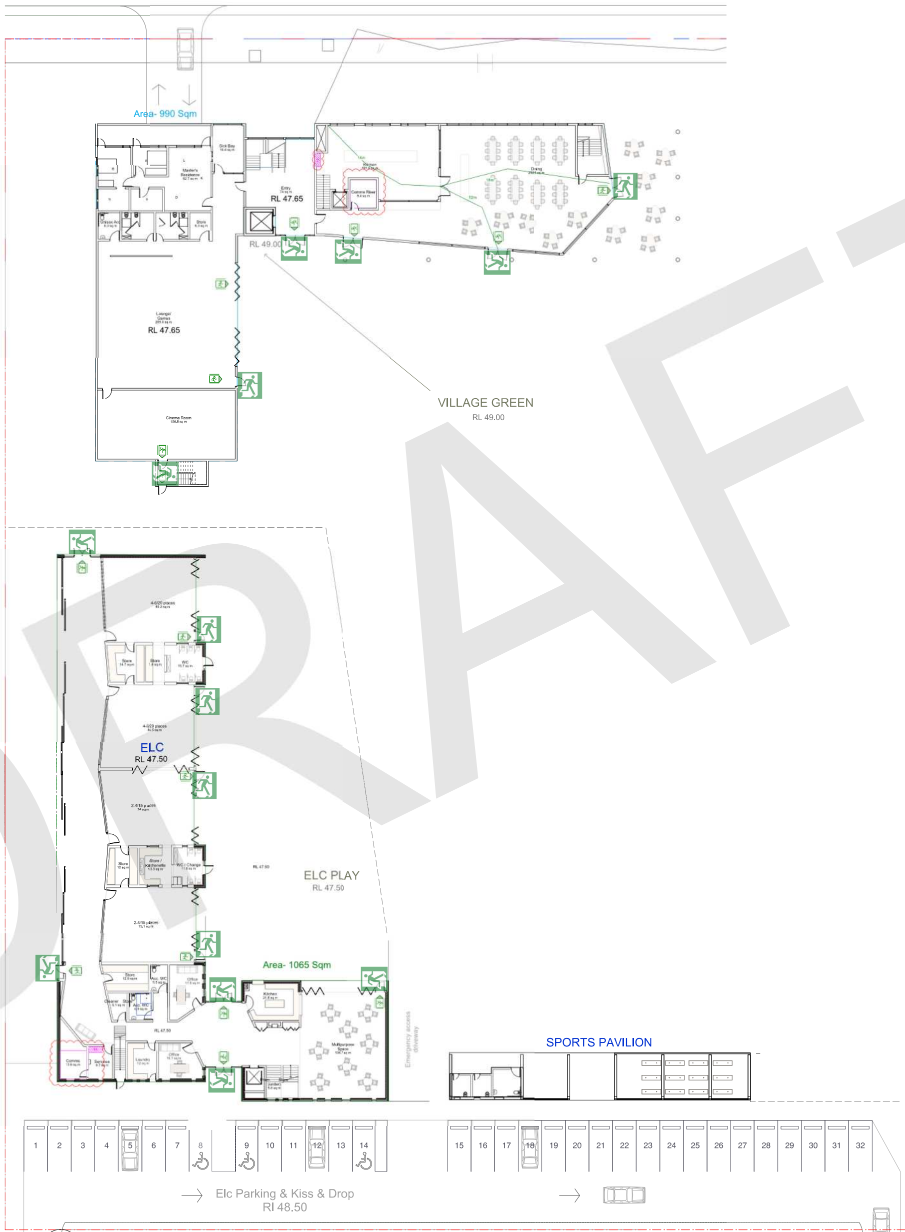
PROJECT	Sikh Grammar School	PROJECT #	2757
CLIENT	Sikh Grammar School Australia	DWG #	DA113
DWG	Admin, Plan- School & Gurdwara (Level 3)		
CLIENT REF & CONTACT	151-161 Tallawong Road	DATE	FEB 2019
DRAWN	??	SCALE	1:200@A0
CHKD	??	REVISION	3

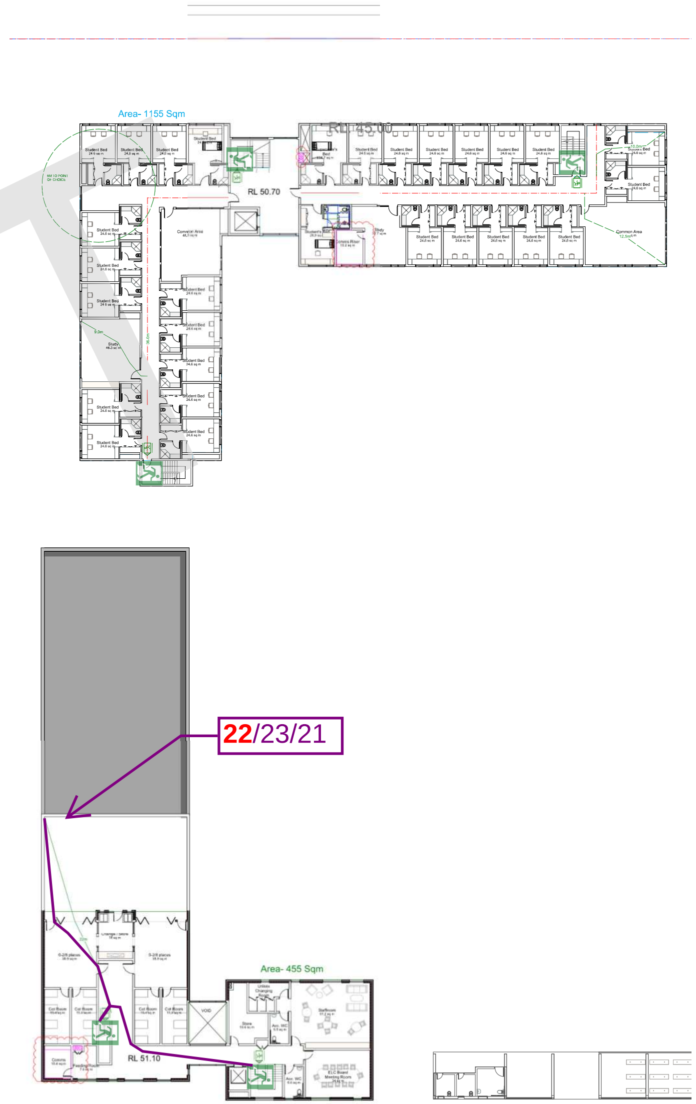
Exit doors to swing outward in the direction of egress.



01 PLAN- ELC and Boarding House
Level -1(Lower Ground)
Scale 1 : 200



02 PLAN- ELC and Boarding House
Level 0 (Ground)
Scale 1 : 200



03 PLAN- ELC and Boarding House
Level 1
Scale 1 : 200

0 10 20 30 40 50 M

DRAFT

3	4/4/19	Location of Comms Riser & MS Room updated
2	29/3/19	Access Toilets and car space updated
ISSUE	DATE	REVISION

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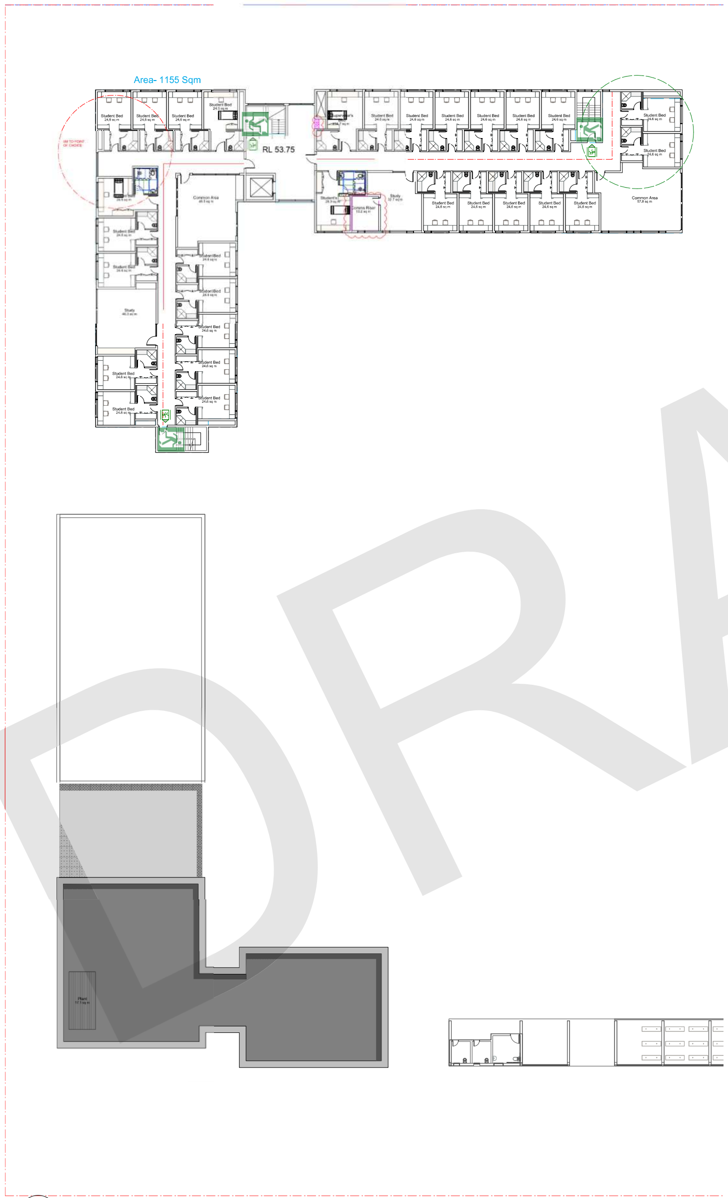
PROJECT: Sikh Grammar School — PROJECT # 2757
CLIENT: Sikh Grammar School Australia
DWG: Plan- ELC & Boarding House — DA120
151-161 Tallawong Road
DATE FEB 2019
SCALE 1:200@A0
REVISION 3



01 PLAN- ELC and Boarding House
Level 2
Scale 1 : 200

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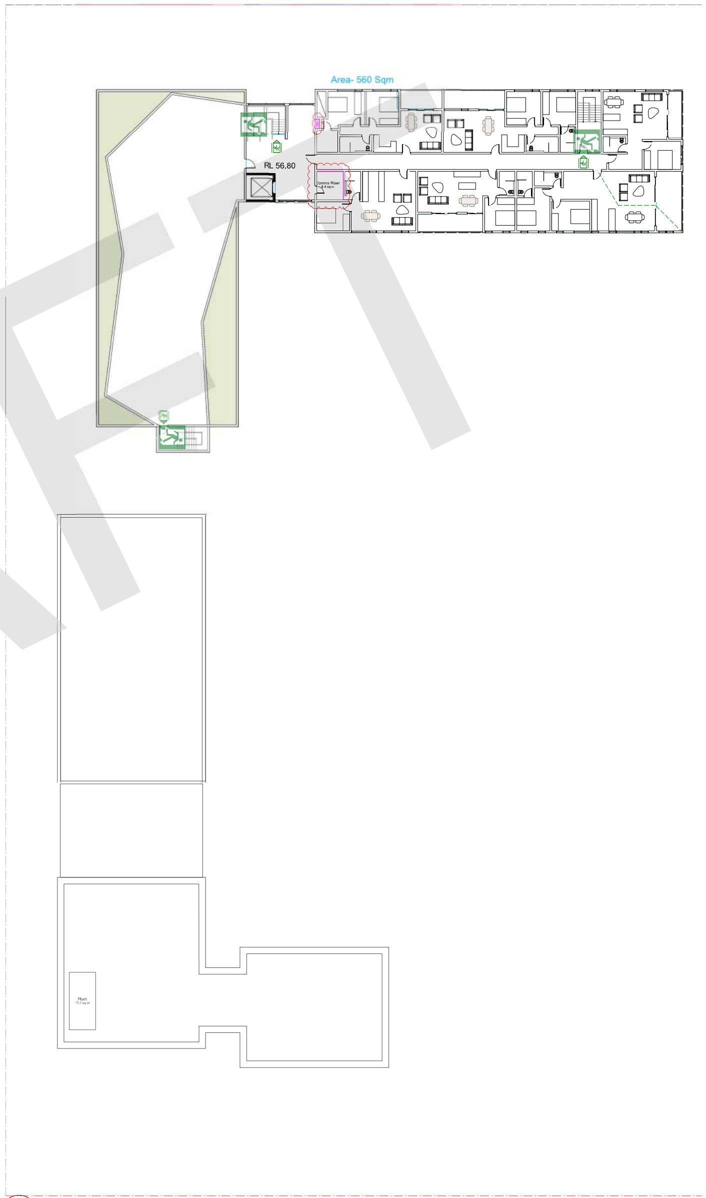

02 PLAN- ELC and Boarding House
Level 3
Scale 1 : 200

ISSUE	DATE	REVISION
3	4/4/19	Location of Comms Riser & MS Room updated
2	29/3/19	Access Toilets and car space updatedAccess Toilets and car space updated

0mm 50mm 100mm

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PMDL ARCHITECTURE + DESIGN PTY LTD ABN 56 062 961 317
NSW NOMINATED ARCHITECTS: ANDREW PENDER 5317 DAVID MORRIS 5865 VICKI VAN DIJK 9476

PROJECT: Sikh Grammar School	PROJECT #: 2757
CLIENT: Sikh Grammar School Australia	DWG #: DA121
DWG: Plan- ELC & Boarding House	
CLIENT REF & CONTACT: 151-161 Tallawong Road; DATE: FEB 2019; DRAWN: ??; SCALE: 1:200@A0; CHKD: ??	REVISION: 3