

FIRE ENGINEERING CONCEPT REPORT

Fourth Avenue & Gurner Avenue, Austral NSW 2179
Al Faisal School

Evolved Engineering

11 November 2020
Revision C
20018-FEC-001

MINERVA

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EXECUTIVE SUMMARY

Summary

This Fire Engineering Concept Report (FEC) has been prepared to support the Development Application of the new Al Faisal School at Fourth Avenue & Gurner Avenue, Austral NSW 2179.

The project consists of a Primary School and Secondary School site. The existing buildings on the primary school site will be retained and redeveloped to provide new teach and learning space. The primary school site will also feature a multi-purpose hall and new car parking facilities.

The Secondary School site will feature the development of a new 4-storey hub building featuring a large and open central atrium. The Hub is connected to two teaching and learning blocks by link bridges.

Fire Safety Design

The project will comply with the Performance Requirements of the Building Code of Australia (BCA) Amendment 01 through a combination of the Deemed-to-Satisfy Provisions and Performance Based Design.

An overview of the fire safety design requirements that shall be implemented is provided below:

- Performance-based perimeter vehicular access
- Reduced fire resistance levels (FRLs) supported via performance solution
- Accommodation of large student populations
- Inclusion of open egress and circulation stairs for security purposes
- Performance-based egress design (extended travel distances and aggregate egress widths)
- Fire hydrant booster locations supported via performance solution
- Omission of fire hose reels from all buildings, supported via performance solution
- Performance-based smoke exhaust design for HUB building atrium
- Performance-based fire separation between HUB building atrium and adjacent fire compartments

Conclusion

Subject to detailed Fire Engineering analysis, this report demonstrates that compliance with the relevant Performance Requirements of the BCA can be achieved through the development of Performance Solutions which are appropriately designed, installed, commissioned and maintained.

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1. INTRODUCTION

1.1 Report Purpose

This Fire Engineering Concept Report (FEC) has been prepared to support the Development Application of the new Al Faisal School at Fourth Avenue & Gurner Avenue, Austral NSW 2179

The purpose of this report is to outline the following:

- The scope of works and relevant project stakeholders
- The principle characteristics of the project and building occupants
- An overview of the building features that will not comply with the Deemed-to Satisfy (DtS) provisions of the Building Code of Australia (BCA)
- A summary of Performance Solutions that may be adopted to support the design
- Any applicable assumptions, dependencies or limitations

1.2 Project Scope

Minerva Group has been appointed by Evolved Engineering to develop the Fire Engineering Performance Solutions necessary to review non-compliances to the BCA Deemed-to-Satisfy (DtS) provisions for the primary and secondary school buildings as outlined in Section 5.

1.3 Relevant Project Stakeholders

The relevant project stakeholders are as follows:

Table 1 – Relevant Project Stakeholders

Role	Organisation	Name	Contact Details
Client	Evolved Engineering	Nick Crace	0403 530 168
Architect	PMDL	Craig Kerslake	0410 496 427
BCA Consultant	Steve Watson & Partners	Gary Rafferty	0409 758 877
Certifier – Fire Safety	Minerva Group	Eliot Reeves	0410 491 677

1.4 Fire Engineering Process

1.4.1 International Fire Engineering Guidelines (IFEG)

The IFEG outline the process by which Fire Engineering analysis is undertaken when assessing deviations from the DtS Provision of the BCA.

This step by step process enables fire safety professionals to undertake a consistent approach such that the inputs to the Performance Solution are transparent and the outcomes can be understood by the community. The methodology outlined in the IFEG has been adopted in this Concept Report.

2. BUILDING CHARACTERISTICS

2.1 Site Location

Al Faisal School will be located at Fourth Avenue & Gurner Avenue, Austral NSW 2179 as illustrated below:



Figure 1 – Building Location

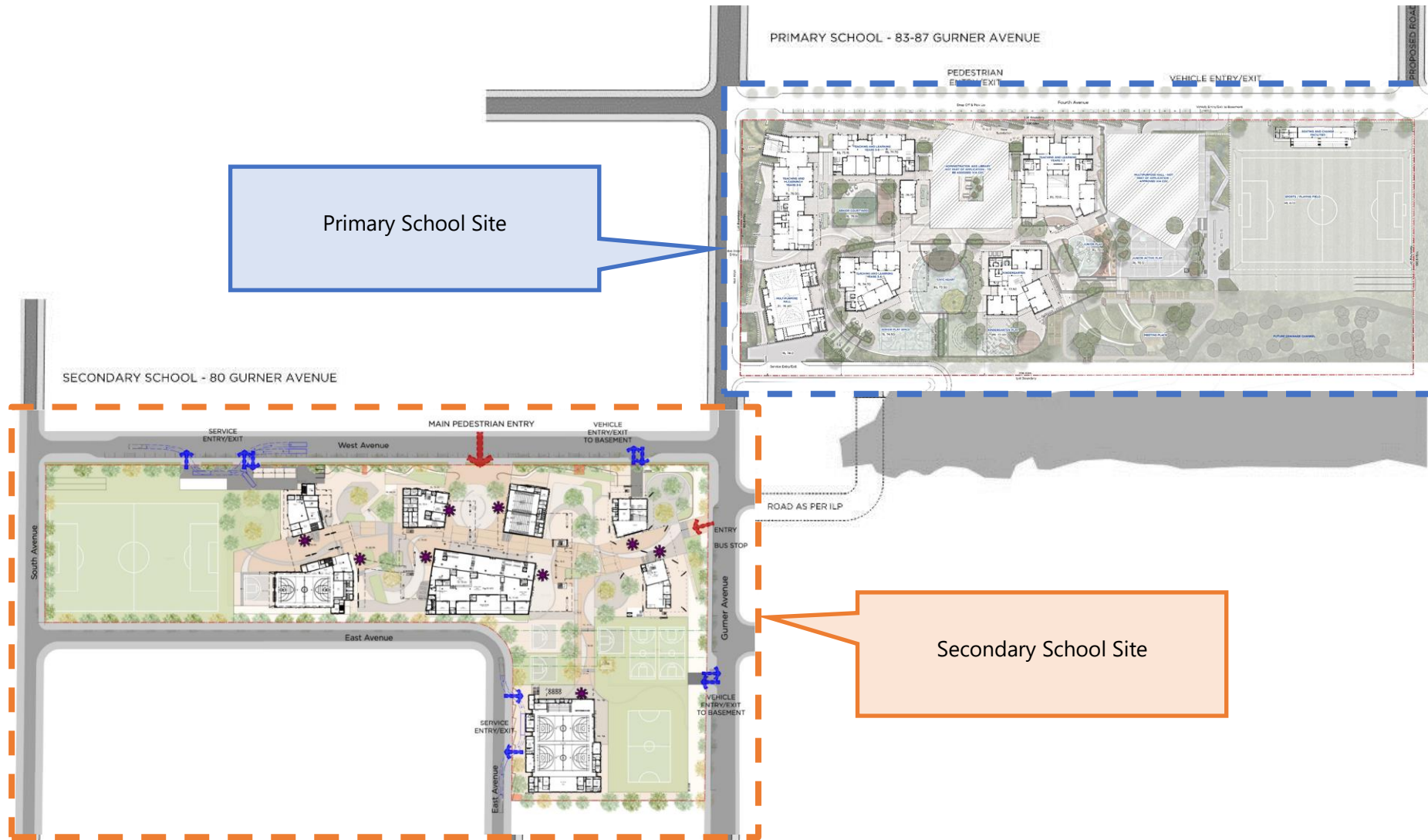


Figure 2 – Masterplan – Primary & Secondary School

2.2 Primary School Layout

The primary school site is illustrated below:

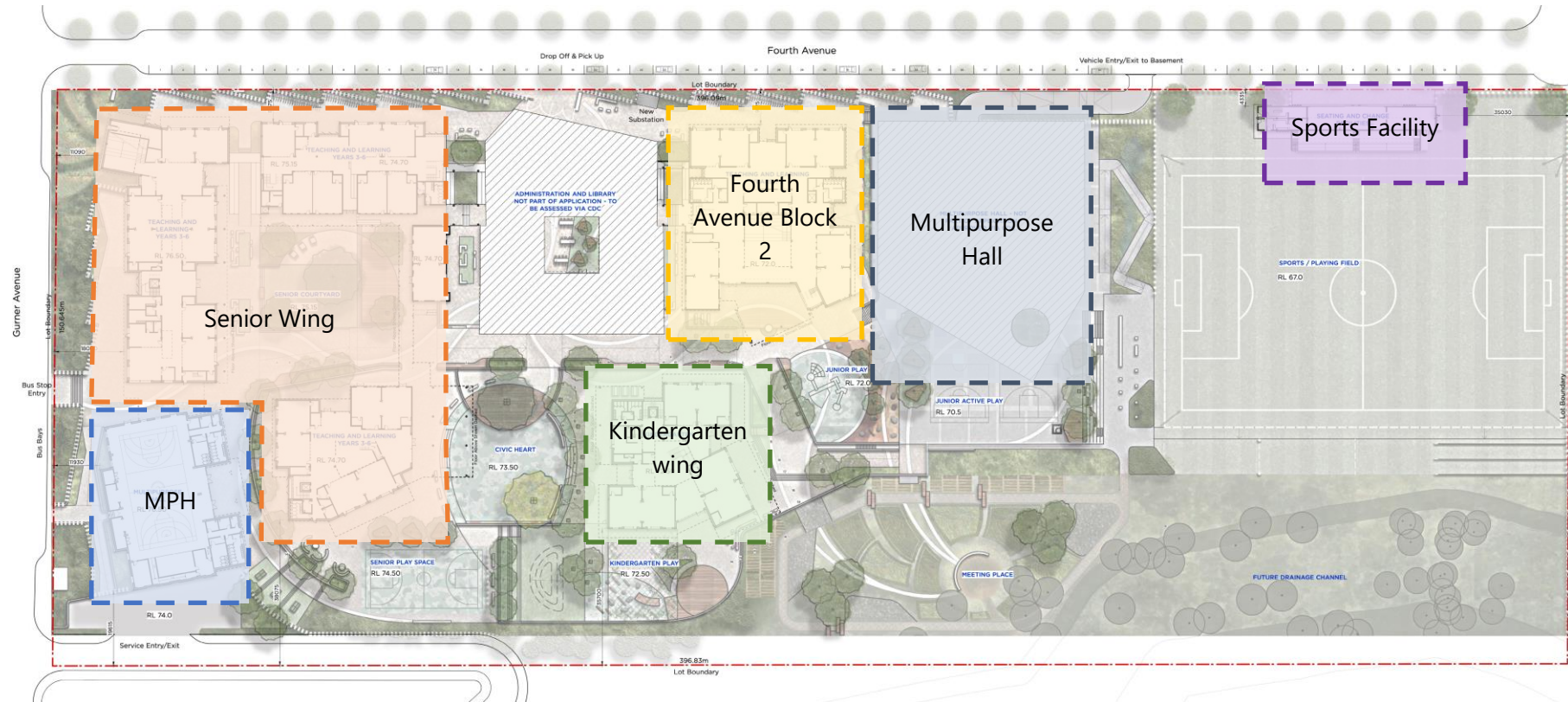


Figure 3 - Primary School Site

2.2.1 Basement

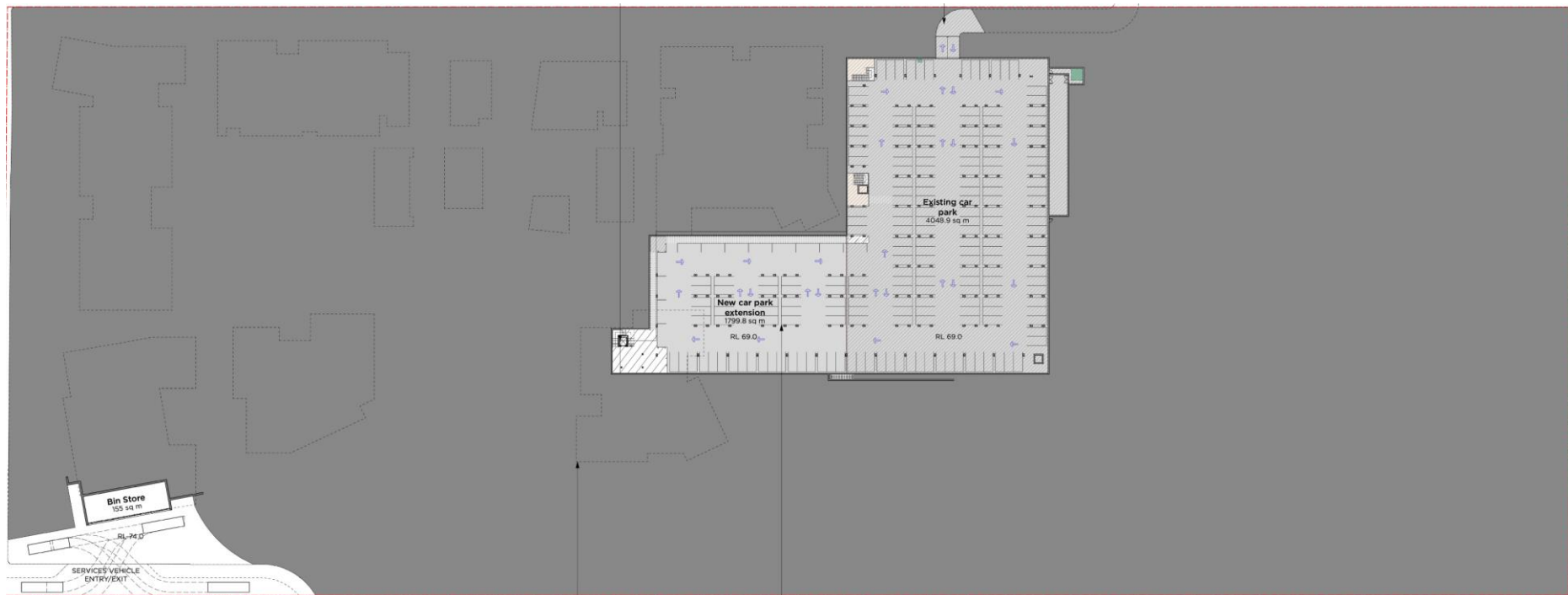


Figure 4 – Basement

2.2.2 Senior Wing

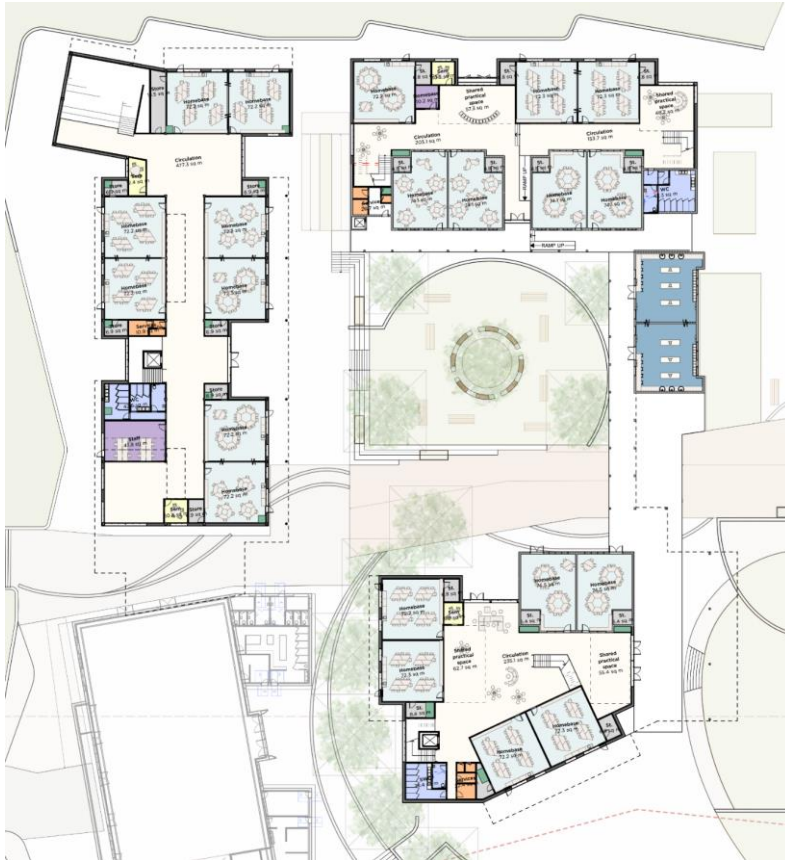


Figure 5 – Senior Wing Overall – L0



Figure 6 – Senior Wing Overall – L1



Figure 7 – Senior Wing Overall – L2

2.2.3 Fourth Avenue Block 2

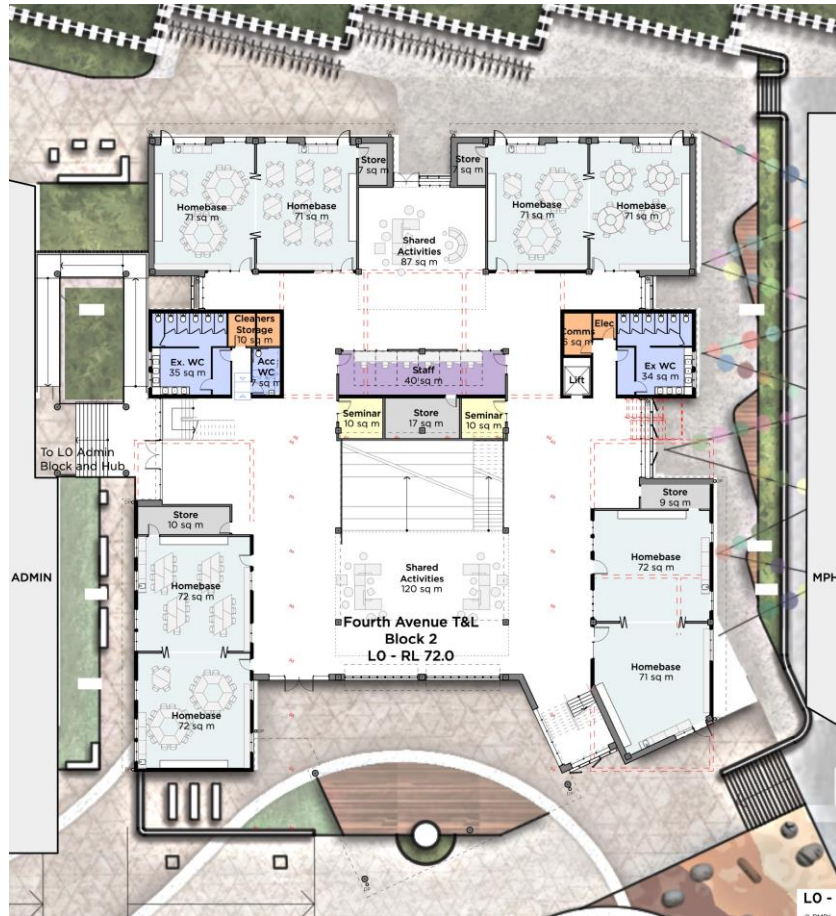


Figure 8 - Fourth Avenue Block 2 - L0



Figure 9 - Fourth Avenue Block 2 - L1



Figure 10 - Fourth Avenue Block 2 - L2

2.2.4 Kindergarten Wing



Figure 11 - Kindergarten Wing - L0



Figure 12 - Kindergarten Wing - L1

2.2.5 Multi-Purpose Hall (MPH)

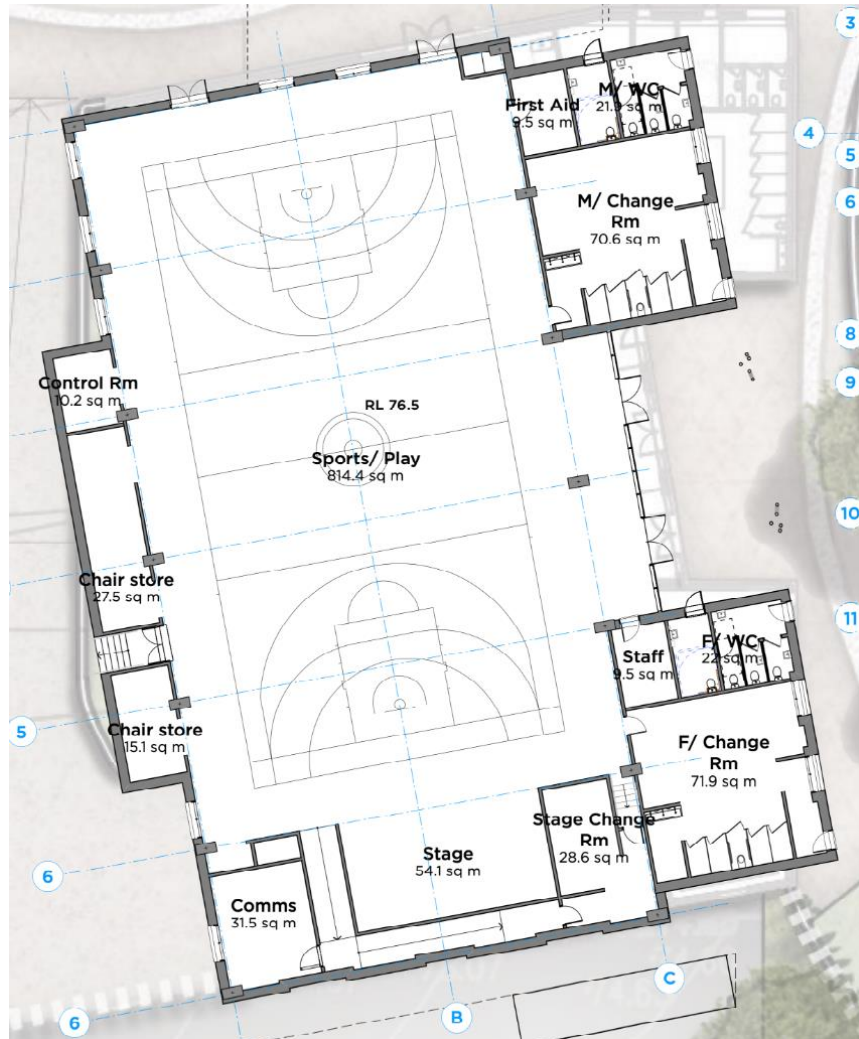


Figure 13 – MPH – L0

2.2.6 Sports Facility

It is noted that the Primary School site incorporates a sports facility as indicated in Figure 3. The construction and layout of the sports facility is understood to be similar to the tiered seating in the Secondary School site as indicated in Figure 28.

2.3 Secondary School Layout

The secondary school site is illustrated below:

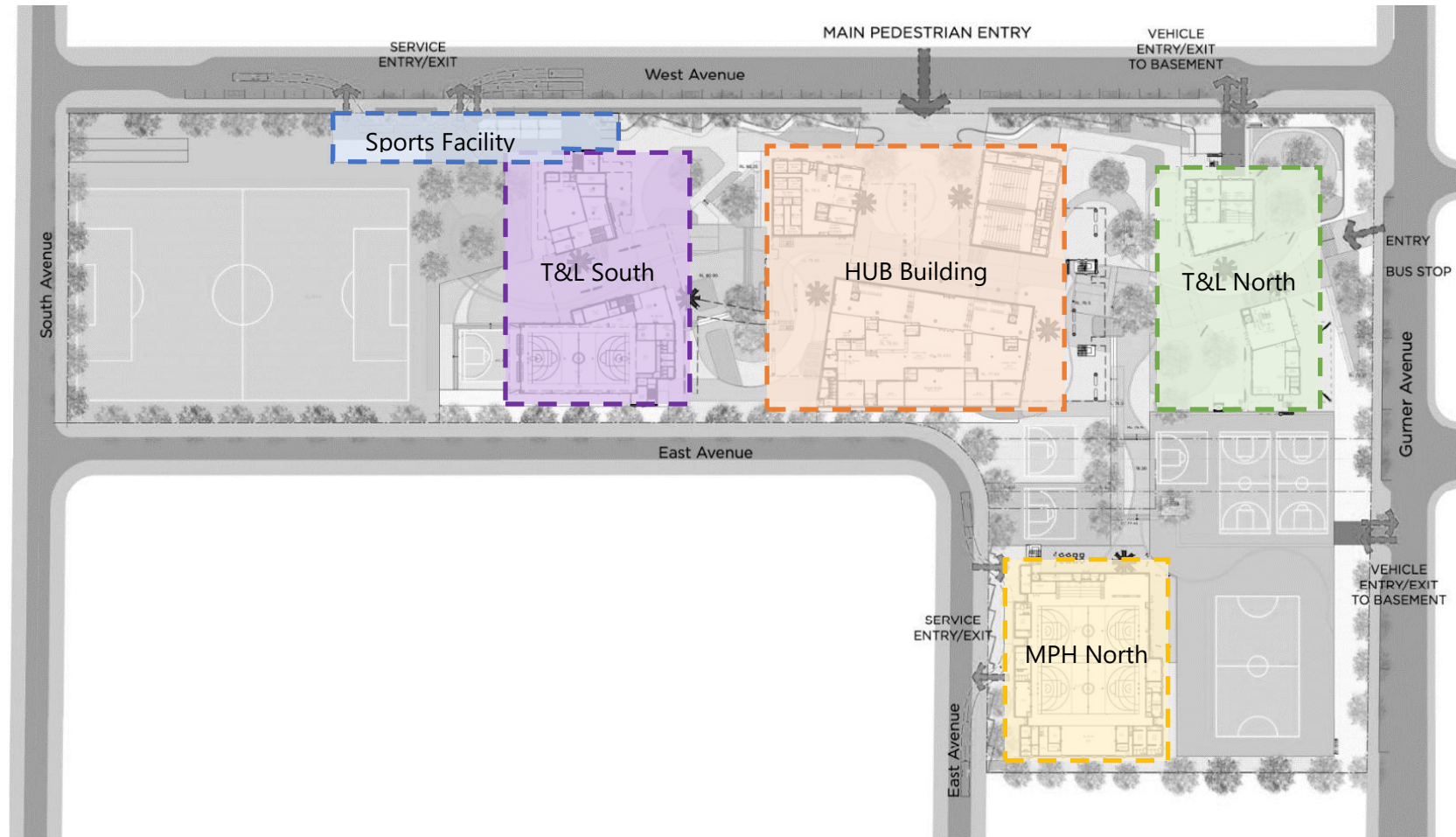


Figure 14 - Secondary School Site

2.3.1 HUB Building

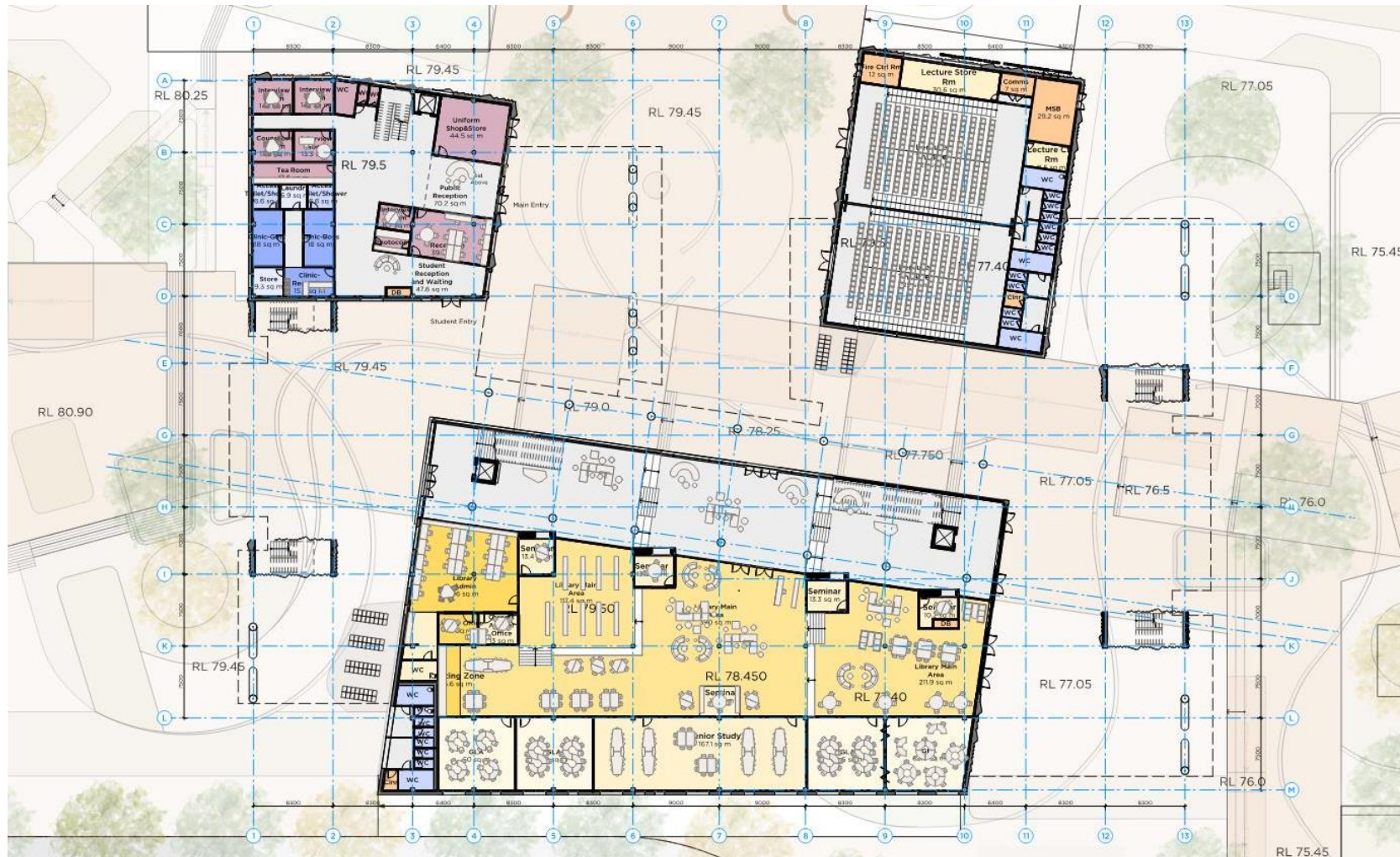


Figure 15 – HUB Building – L0

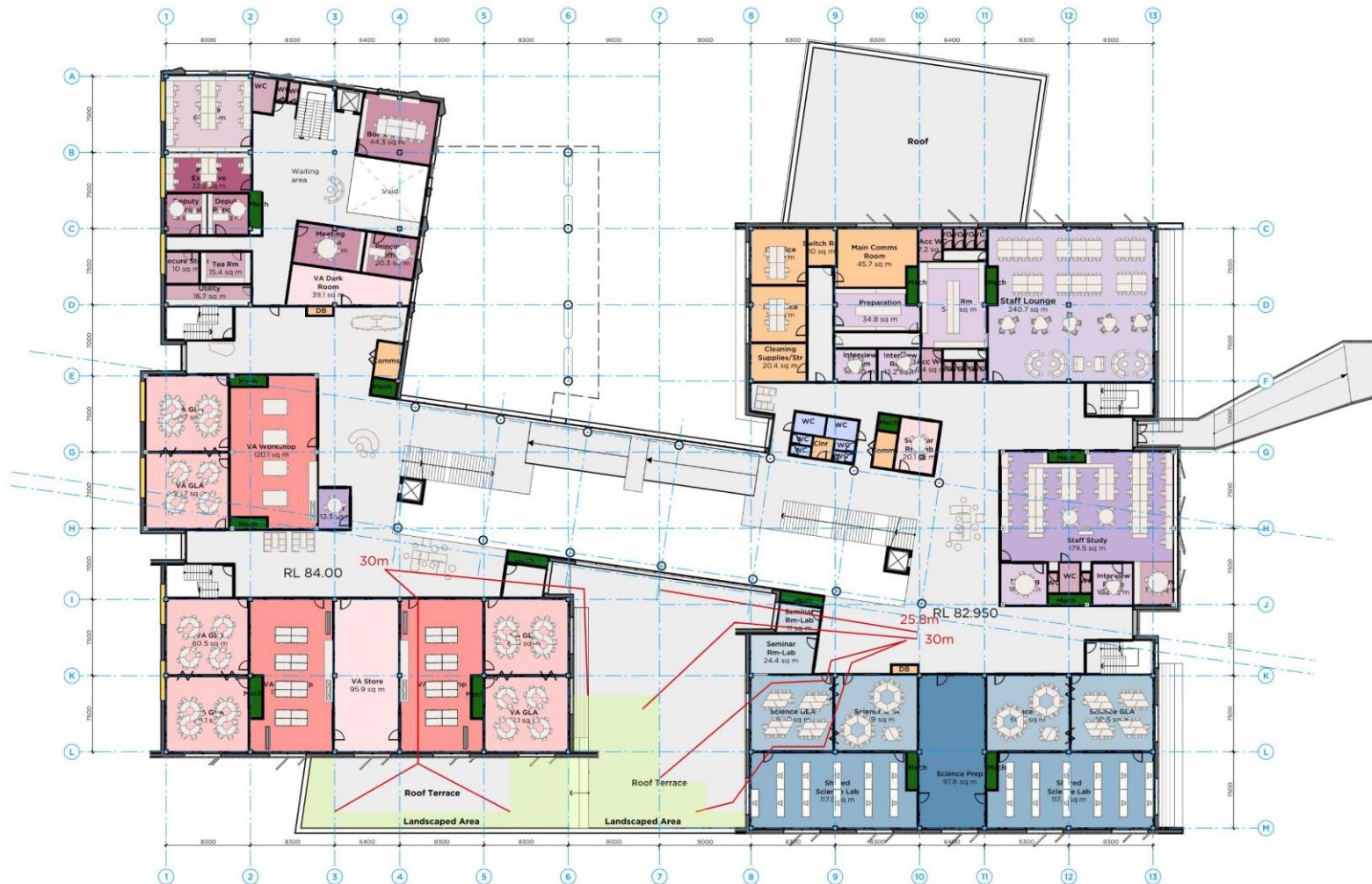


Figure 16 – HUB Building – L1



Figure 17 – HUB Building – L2



Figure 18 – HUB Building – L3



Figure 19 - HUB Building - Section 1

2.3.2 Multi-Purpose Hall (MPH) North

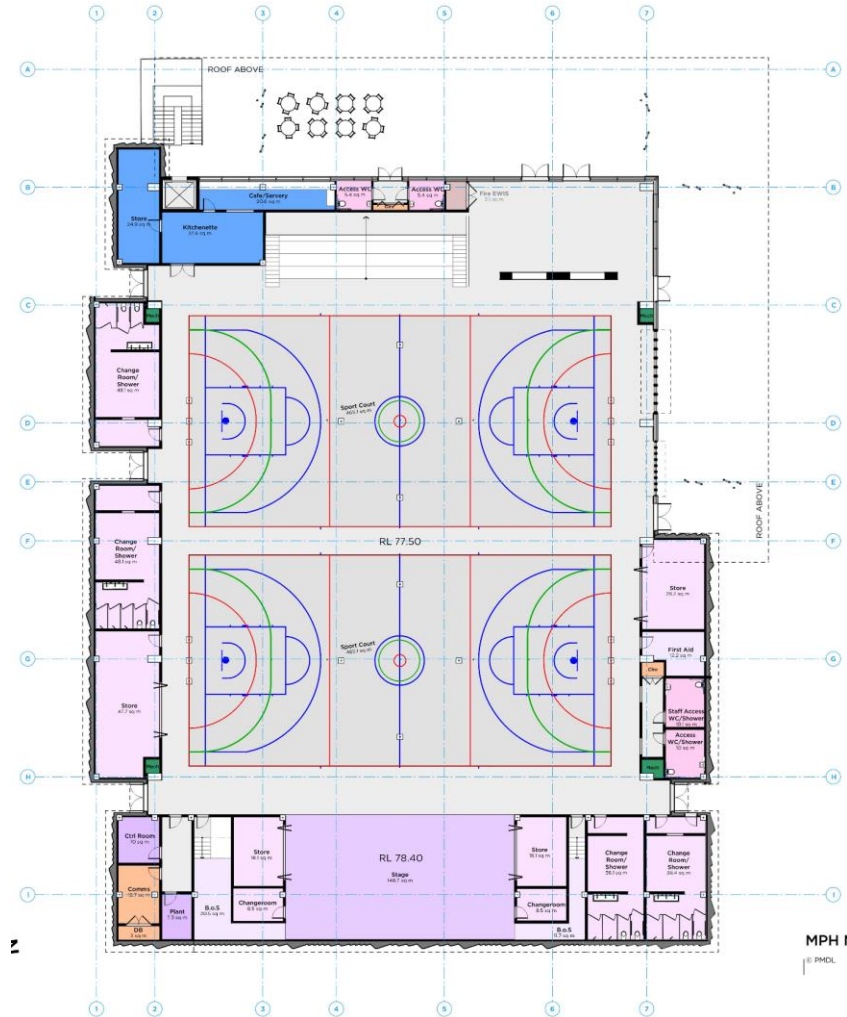


Figure 20 – MPH North – L0

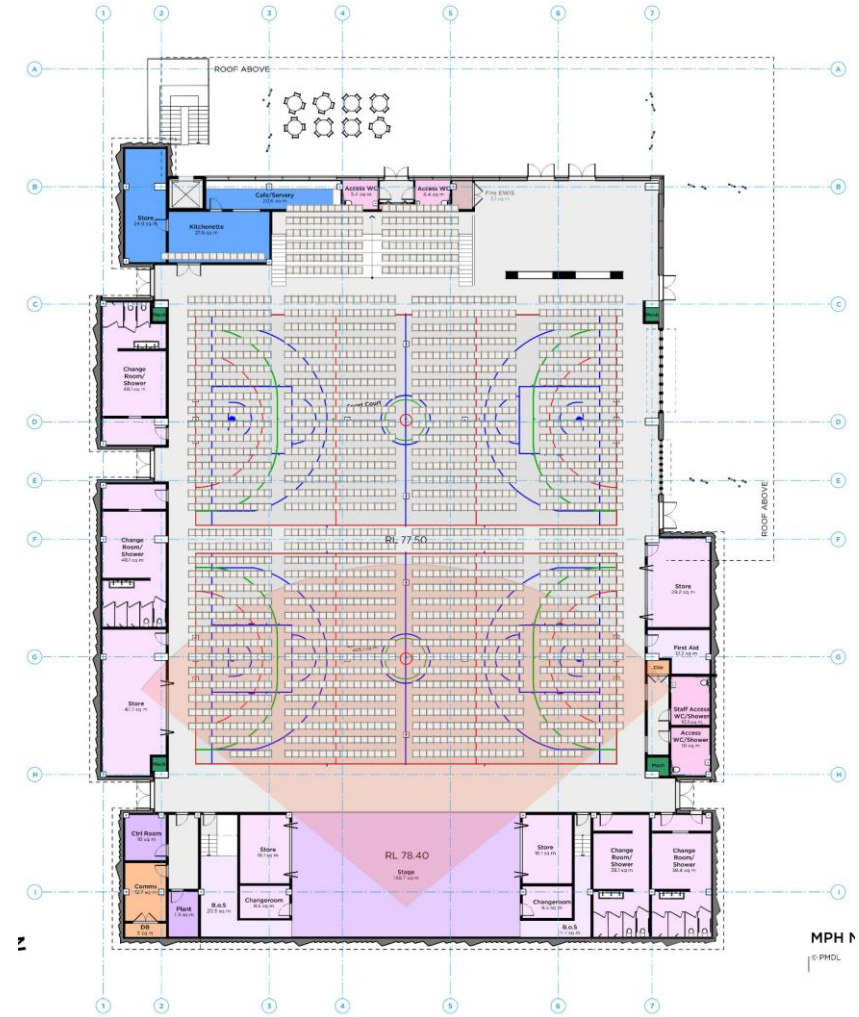


Figure 21 – MPH North – L0 (Seating Plan)

2.3.3 T&L South

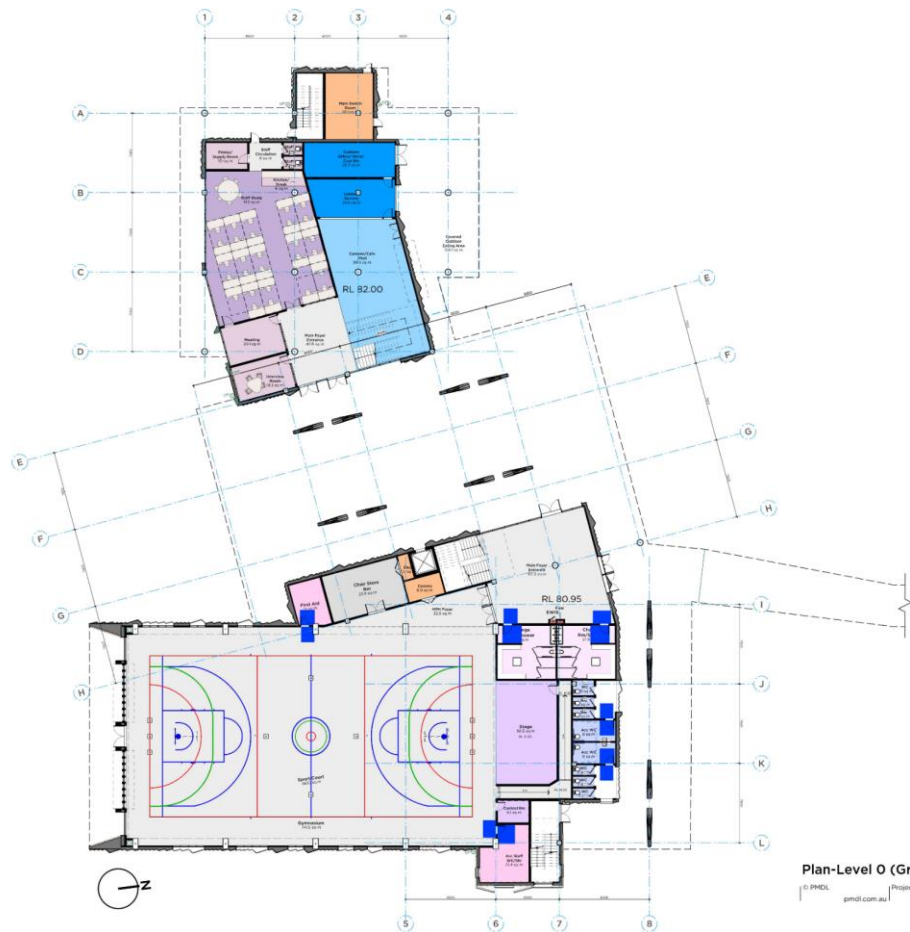


Figure 22 – T&L South – L0

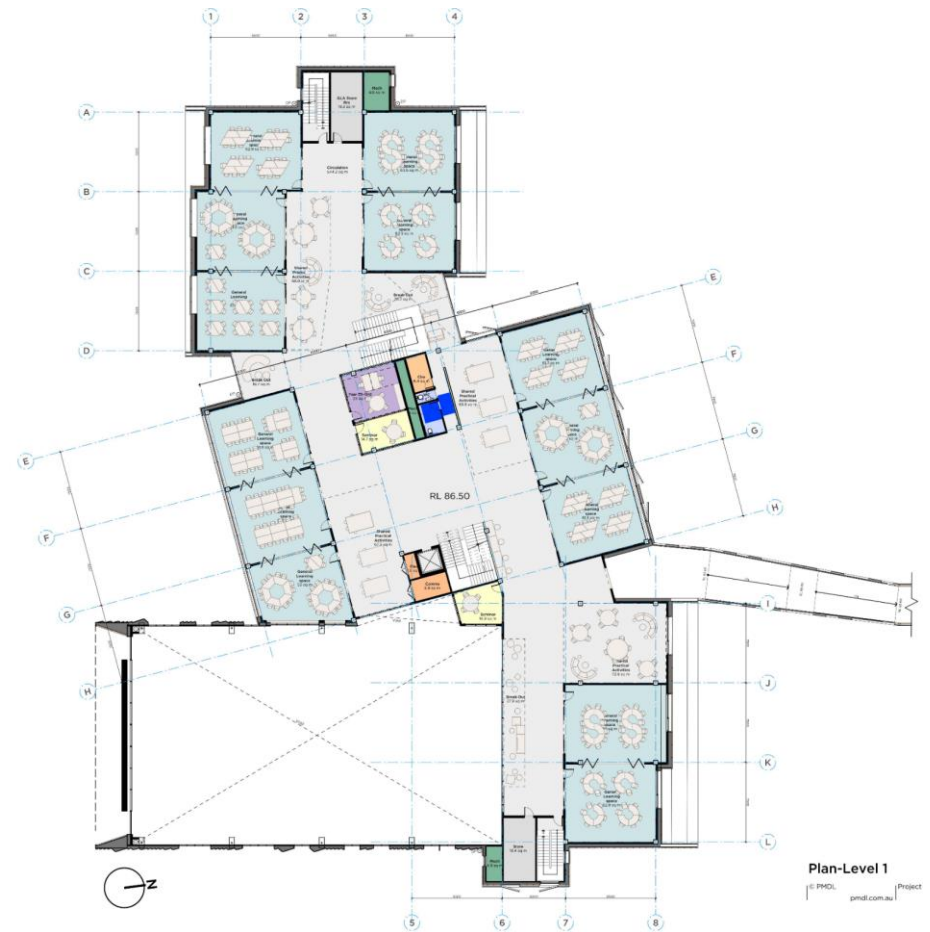


Figure 23 – T&L South – L1



Figure 24 – T&L South – L2

2.3.4 T&L North

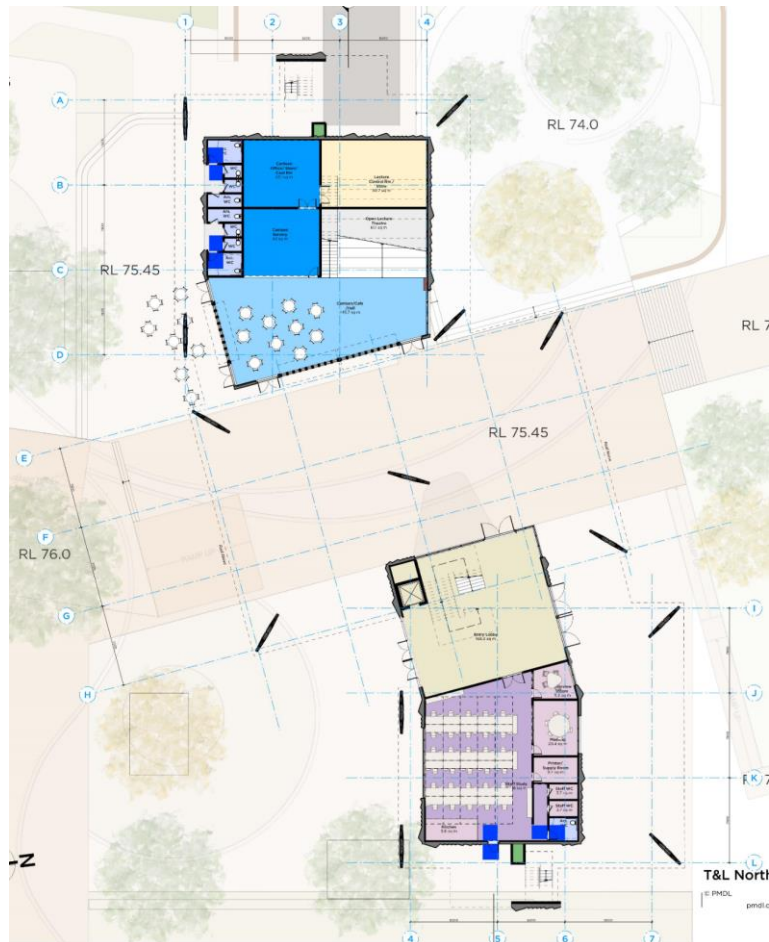


Figure 25 – T&L North – L0



Figure 26 – T&L North – L1



Figure 27 – T&L North – L2

2.3.5 Sports Facility

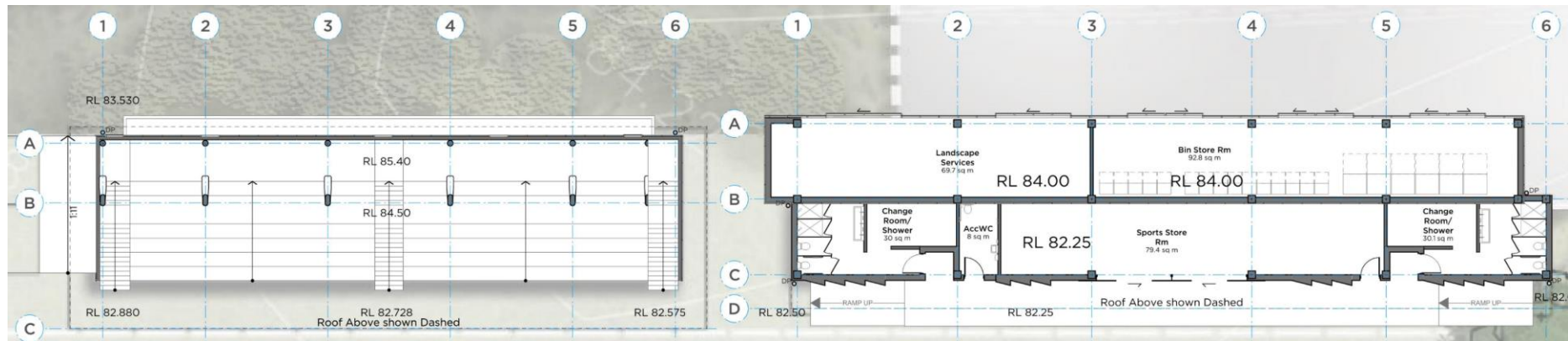


Figure 28 – Sports Facility – L0

2.4 BCA DtS Reference Criteria

The BCA DtS reference criteria for the buildings are summarised below.

2.4.1 Primary School

Table 2 – Primary School BCA DtS Reference Criteria [19]

BCA Clause	Item	Description or Requirements
A6.0	Classification	Class 7a – Carpark Class 9b including: - School - Early childhood centre - Multi-purpose hall
C1.1	Construction Type	Basement: TBA (details of superstructure above the basement to be provided) Senior Wing: Type A construction Fourth Avenue Block 2: Type A construction Kindergarten Wing: Type B construction Multi-Purpose Hall: Type C construction
C1.2	Rise in Storeys	Basement: TBA (details of superstructure above the basement to be provided) Senior Wing: Three (3) storeys Fourth Avenue Block 2: Three (3) storeys Kindergarten Wing: Two (2) storeys Multi-Purpose Hall: One (1) storey
Schedule 3	Effective Height	Basement: TBA (details of superstructure above the basement to be provided) Senior Wing: Less than 12m Fourth Avenue Block 2: Less than 12m Kindergarten Wing: Less than 12m Multi-Purpose Hall: Less than 12m

2.4.2 Secondary School

Table 3 – Secondary School BCA DtS Reference Criteria [20]

BCA Clause	Item	Description or Requirements
A6.0	Classification	Class 9b including: - School - Multi-purpose hall
C1.1	Construction Type	HUB: Type A construction Teaching & Learning North: Type A construction Teaching & Learning South: Type A construction Multi-purpose Hall North: Type C construction
C1.2	Rise in Storeys	HUB: Four (4) storeys Teaching & Learning North: Three (3) storeys Teaching & Learning South: Three (3) storeys Multi-purpose Hall North: One (1) storey
Schedule 3	Effective Height	HUB: Less than 25m Teaching & Learning North: Less than 12m Teaching & Learning South: Less than 12m Multi-purpose Hall North: Less than 12m

2.5 Fire Hazards and Preventative and Protective Measures

The table below examines the fire hazard and mitigation measures that are in place.

Table 4 – Fire Hazards and Protective and Preventative Measures

Item	Classroom	Atrium	Car Parking	Multi-purpose Hall
Fire hazards				
Ignition risks	– Electrical equipment – Heat and cooling equipment – Mechanical equipment – Office equipment e.g. printers	– Electrical equipment – Heat and cooling equipment – Mechanical equipment	– Cars – Air handling equipment – lighting –	– Electrical equipment – Heat and cooling equipment
Fuel loads	– Paper, chairs, tables – Books, folders, paper – Storage cabinets – Electrical appliances – Cleaning chemicals	– Displays and exhibitions – Green wall – Electrical appliances	– Cars – Storage	– Storage cabinets and cupboards – Furniture – Displays
Mitigation measures				
Preventative	– Staff and security – Housekeeping – Maintenance – Fire safety training – Management plans			
Protective	– Fire resisting construction – Fire compartmentation – Portable fire extinguishers – Fire hydrants – Fire hose reels – Automatic fire sprinklers – Automatic smoke detection – Smoke exhaust – Exit signage and emergency lighting			

3. OCCUPANT CHARACTERISTICS

3.1 Building Occupants

3.1.1 Distribution

It is expected that occupants will be distributed as per BCA Table D1.13 – Area per person according to use. The table below provides the floor space factors per person:

Table 5 – Building Occupancy Rates

Occupancy	Area per person (m ²)
School – general classroom	2
School – multi-purpose hall	1
School – staff room	10

3.1.2 Expected State, Attributes and Familiarity

The table below provides the expected condition of staff and occupants:

Table 6 – Occupant Attributes

Occupant Type	State	Physical and Mental Attributes	Building Familiarity and Emergency Training
Staff member or employee	Conscious and sober	Able-bodied and mentally alert.	Familiar with surroundings and appropriately fire safety trained to assist in occupant evacuation and first-aid firefighting.
Visitors	Conscious and sober	Able-bodied and mentally alert.	Unfamiliar with surroundings and not appropriately fire safety trained to assist in occupant evacuation and first-aid firefighting. Visitors will follow instructions of trained staff member or employee
Students	Conscious and sober	Able-bodied and mentally alert.	Familiar with surroundings, however not appropriate fire safety trained to assist in occupant evacuation and first-aid firefighting. Expected to receive direction from staff members in the event of evacuation. Students will follow instructions of trained staff members or employees.
Contractor (carrying out maintenance, etc)	Conscious and sober	Able-bodied and mentally alert	Contractor will complete detailed fire safety training as part of the building management system. Trained in emergency evacuation procedures.

3.1.3 Personal Emergency Evacuation Plans (PEEPs)

It is expected that building occupants requiring special evacuation assistance will be provided with a dedicated evacuation plan that will be executed in the event of an emergency. It is the responsibility of the tenants to co-ordinate this information.

4. FIRE SAFETY DESIGN

4.1 General

This section presents the Fire Safety Design that must be implemented to demonstrate that the building meets the Performance Requirements of the BCA. The Fire Safety Design is a checklist that can be used as a reference to identify the necessary fire safety systems and other requirements that will be included in the building design.

4.2 Application of the DtS Provisions

Any building feature that is not referred to or affected by this report will comply with the 'Deemed-to-Satisfy' provisions of the BCA, relevant Australian Standards, National, State and local legislation as applicable other than existing items not required to be upgraded.

Any changes to the building design or layout during the design or construction process will be assessed against the report. All future modifications, changes or layouts to the building will be reassessed against the Fire Engineering Report.

4.3 Fire Resistance and Compartmentation

4.3.1 All Buildings – Fire Resistance and Perimeter Vehicular Access

For all buildings, it is proposed to provide performance solutions to support the below:

- Some buildings exceed the maximum size of fire compartments for the construction type.
- Perimeter vehicular access will be performance-based
- There are openings in external walls between separate fire compartments located within 6m of each other, non-compliance with BCA Clause C3.2. The openings are not protected in accordance with BCA Clause C3.4.
- Walls opposite each other in separate fire compartments are located within 6m, non-compliant with BCA Clause C3.3.

4.3.2 Primary School – Fire Resistance and Compartmentation

Table 7 – Fire Resistance and Compartmentation [19]

Building	Description
Primary School	For all buildings, the proposed floor coverings and any proposed wall ceiling lining materials are to comply with Specification C1.10a.
Senior Wing	To comply with the BCA DtS provisions for Type A construction.
Fourth Avenue Block 2	To comply with the BCA DtS provisions for Type A construction.
Kindergarten Wing	To comply with the BCA DtS provisions for Type B construction.
Multi-Purpose Hall	To comply with the BCA DtS provisions for Type C construction.
Sports Facility	To comply with the BCA DtS provisions for Type C construction.

4.3.3 Secondary School – Fire Resistance and Compartmentation

Table 8 – Fire Resistance and Compartmentation [20]

Building	Description
Secondary School	- Buildings to comply with Construction Type as outlined below. - For all buildings, the proposed floor coverings and any proposed wall ceiling lining materials are to comply with Specification C1.10a. Performance solutions are proposed to support the below: - The HUB link bridges between fire compartments will incorporate performance-based fire separation
HUB Building	To comply with the BCA DtS provisions for Type A construction.
T&L South	
T&L North	
Multi-Purpose Hall North	To comply with the BCA DtS provisions for Type C construction.
Sports Facility	To comply with the BCA DtS provisions for Type C construction.

4.4 Egress

4.4.1 General

In general, the following extended travel distances will be supported throughout the development – with the exception of some of the travel distances outlined in Tables 11 and 12

- Point of choice – 30m, in lieu of 20m
- To and exit – 60m in lieu of 40m
- Between exits – 80m in lieu of 60m

As the design develops, travel distances will be reviewed on a case-by-case basis and addressed accordingly.

4.4.2 Primary School – Egress

There are BCA non-compliant egress provisions to be supported as outlined below and in Section 5.4.

Table 9 – Primary School – Egress

Building	Description
Basement	Additional exits are required at Basement Level – see figure below
Senior Wing	Ground Floor: Extended travel distance to a point of choice of 29m in lieu of 20m Level 1:

Building	Description
	- Extended travel distance to an exit of 65m in lieu of 40m - Extended travel distance between alternative exits of 111m in lieu of 60m Non-fire-isolated stairway discharge: - Non-fire-isolated stairway discharges to a point 29m from a doorway providing egress to open space in lieu of 20m on Ground Floor
Fourth Avenue Block 2	Level 1 & 2: - Extended travel distances to a point of choice of 28m in lieu of 20m Available egress width: - It is assumed that each room accommodates 35 people and there are 10 rooms on Level 2. Level 2 requires an aggregate egress width of 3.5m to accommodate 350 people and 3.1m egress width is provided. Non-fire-isolated stairway discharge: - Non-fire-isolated stairway discharges to a point at 21m from a doorway providing egress to open space in lieu of 20m on Ground Floor
Kindergarten Wing	Level 1: Extended travel distance to a point of choice of at least 25m in lieu of 20m
Multi-Purpose Hall	Currently noted to be compliant with the BCA DtS provisions for egress. Architectural plan showing the layout of the Indoor Basketball Centre to be provided.

Additional Exits Required

Additional exits are required as indicated in the diagram below



Figure 29 – Additional exits required

4.4.3 Secondary School – Egress

Table 10 – Secondary School – Egress

Building	Description
HUB Building	Number of exits: – The HUB building is served by two (2) non-fire-isolated stairways are required exits which connect more than 3 storeys Ground Floor: – Travel distance to a point of choice is at 21m in lieu of 20m on Ground Floor. – Travel distance to an exit is at 67m in lieu of 40m on Ground Floor. – Distance between alternative exits is at 62m in lieu of 60m on Ground Floor. – Distance between alternative exits is at 118m in lieu of 60m on Ground Floor. Level 1: – Distance to a point of choice is at 30m on Level 1 – Travel distance to an exit is at 48m on Level 1 – Distance between alternative exits at 94m in lieu of 60m on Level 1 Level 2: – Distance to a point of choice is at 29m in lieu of 20m on Level 2 – Travel distance to an exit is at 46m in lieu of 40m on Level 2 – Distance between alternative exits is at 99m in lieu of 60m on Level 2 Level 3: – Distance to a point of choice is at 29m in lieu of 20m on Level 3 – Travel distance to an exit is at 47m in lieu of 40m on Level 3 – Distance between alternative exits is at 99m in lieu of 60m on Level 3
MPH North	– Currently noted to be compliant with the BCA DtS provisions for egress.
T&L South	– Non-fire-isolated stairway connects Ground Floor, L1, L2 and Roof
T&L North	– Non-fire-isolated stairway connects Ground Floor, L1, L2 and Roof
Sports Facility	– Currently noted to be compliant with the BCA DtS provisions for egress.

4.4.4 Population Numbers

At present we have undertaken a preliminary review of the population numbers and extent of egress stair provided. Pending detailed Fire Engineering analysis additional stairs may be required to support the required number of building occupants.

4.5 Services and Equipment

4.5.1 Fire Hydrants

All buildings will be provided with a fire hydrant system in accordance with AS 2419.1-2005.

The location of the fire hydrant booster will not comply and will be addressed by a Performance Solution as detailed in Section 5.4.

4.5.2 Fire Hose Reels

Fire hose reels will not be provided to the buildings. This will be supported via performance solution as detailed in Section 5.4.

4.5.3 Automatic Fire Suppression

All buildings will be provided with a sprinkler system in accordance with AS 2118.1-2017. Enhanced sprinkler provisions (i.e. additional heads, increased response) may be required to support various performance solutions.

It is proposed to support the below via performance solutions:

- No sprinklers provided beneath Covered Outdoor Learning Areas (COLAs)
- No sprinklers provided beneath HUB link bridges

4.5.4 Portable Fire Extinguishers

All buildings will be provided with portable fire extinguishers in accordance with AS 2444-2001.

4.6 Smoke Hazard Management

4.6.1 Smoke Detection

Smoke detection will be provided in accordance with AS1670.1-2018 to all buildings.

4.6.2 Stair Pressurisation

Stair pressurisation will be provided to the egress stairs within the Hub building in accordance with AS1668.1-2015.

4.7 HUB Building – Atrium

The HUB building incorporates an atrium as illustrated below.

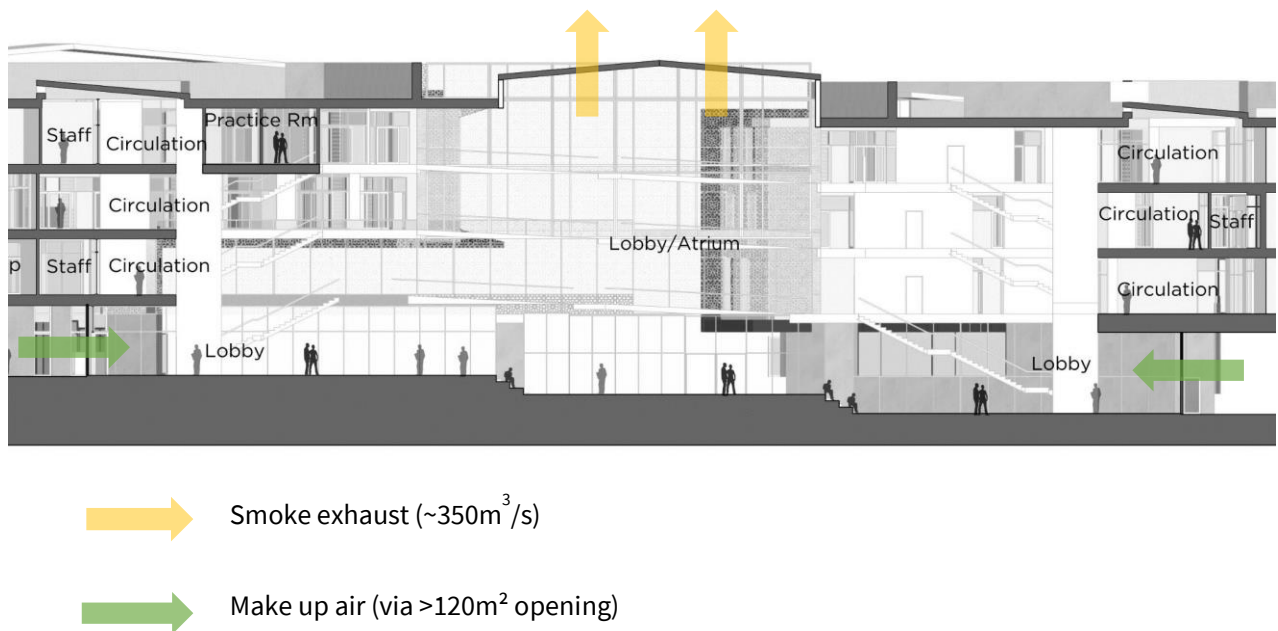


Figure 30 - HUB Building – Atrium

The Hub currently features a 4-storey atrium featuring an occupied area at the atrium base and green wall. The current arrangement will be required detailed fire engineering analysis to ensure that the fire and life safety requirements are met.

A smoke exhaust system will be provided to the atrium. An estimated upper limit of $350\text{m}^3/\text{s}$ smoke exhaust is required, subject to computational fire and smoke modelling. The smoke exhaust quantity is expected to change following completion of the computational fire and smoke modelling.

The atrium is not separated from the remainder of the building at each storey by bounding walls complying with G3.3 & G3.4. Performance-based fire separation may be required between the atrium and remainder of the building. This may include fire rated elements and drencher protected glazing to facilitate architectural aspirations.

4.8 Emergency Lighting and Exit Signage

All buildings will be provided with emergency lighting and exit signage in accordance with AS 2293.1-2018.

4.9 Building Management

- To support the requirements of the Performance Solutions, the Building Owner will be responsible for producing a fire safety management plan for all areas. This plan must include requirements for mitigating the risk of fire load build up along egress routes and regular inspections should be undertaken.
- All building employees to undergo building induction for evacuation procedures, exit locations and use of portable fire extinguishers.
- Fire load management to be implemented to limit storage and combustibles beneath COLAs
- Fire load management to be implemented to limit storage and combustibles beneath link bridges
- Fire load management to be implemented to limit storage in areas incorporating an extended travel distance supported to be supported via performance solution

4.10 Approval and Certification

4.10.1 Construction, Commissioning and Handover

For construction compliance the fire safety measures outlined in Section 4 should be appropriately designed, installed and commissioned prior to occupation. Minerva Group have been commissioned to undertake a visual inspection of the active and passive fire safety measures and witness testing of active systems. Certification will be required from all designers, installers and suppliers confirming compliance with the requirements of this report.

4.10.2 Ongoing Fire Safety Compliance

The building owner is responsible for maintaining all fire safety measures to the standard required by the Environmental Planning & Assessment Regulations Clause 177 and Clause 182.

Appropriate documentation shall be provided to Council in the form of an Annual Fire Safety Statement.

5. SUMMARY OF PERFORMANCE SOLUTIONS

5.1 General

This section presents the Fire Safety Design that must be implemented to demonstrate that the building meets the Performance Requirements of the BCA. The Fire Safety Design is a checklist that can be used as a reference to identify the necessary fire safety systems and other requirements that will be included in the building design.

5.2 Application of the DtS Provisions

Any building feature that is not referred to or affected by this report will comply with the 'Deemed-to-Satisfy' provisions of the BCA, relevant Australian Standards, National, State and local legislation as applicable other than existing items not required to be upgraded.

Any changes to the building design or layout during the design or construction process will be assessed against the report. All future modifications, changes or layouts to the building will be reassessed against the Fire Engineering Report.

5.3 Proposed Performance Solutions

The tables below outline the proposed performance solutions the outcomes of which will be incorporated into the building design to demonstrate compliance with the BCA. The information provided is subject to detailed Fire Engineering and may be subject to change pending the outcomes of the engineering analysis and stakeholder consultation.

5.4 All Buildings

The potential performance solutions below apply to all buildings in the site.

Table 11 – Primary School (Basement) – Performance Solutions

No	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
1.	C1.1 – Type of construction required	– Some buildings exceed the maximum size of fire compartments for the construction type.	The engineering analysis will demonstrate that:	– Reduced fire resistance level (FRL) requirements for buildings, subject to engineering analysis
2.	C2.2 – General floor area and volume limitations	– Perimeter vehicular access will be performance-based.	– a suitable fire resistance level is provided to the buildings	– Performance-based perimeter vehicular access, subject to consultation with Fire & Rescue NSW
3.	C2.3 – Large isolated buildings		– the perimeter vehicular access will facilitate fire brigade operations	
4.	C2.4 – Requirements for open spaces and vehicular access		– Suitable fire safety measures are in place to provide for the early detection and smoke and fire suppression.	
5.	C3.3- Separation of external walls and associated openings in different fire compartments	– There are openings in external walls between separate fire compartments located within 6m of each other, non-compliant with BCA Clause C3.2. The openings are not protected in accordance with BCA Clause C3.4	The engineering analysis will include assessment the openings on the case by case basis to demonstrate that there is minimal risk of fire spread due to the openings.	– Openings may be located as required. Provision of heat attenuating screens may be required, subject to engineering analysis.
6.	C3.4 – Acceptable methods of protection	– Walls opposite each other in separate fire compartments are located within 6m, non-compliant with BCA Clause C3.3.		

No	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
7.	E1.3 – Fire hydrants	The fire hydrant booster is positioned such that it is not within sight of the main entrance of the buildings.	The engineering analysis will demonstrate that the positioning of the fire hydrant booster will not interfere with Fire Brigade operations Consultation with Fire & Rescue NSW will be required to determine the location of the fire hydrant booster	– The Fire hydrant booster may be located as required. – Signage and strobe lighting will be provided to indicate the location of the Fire Hydrant Booster.
8.	E1.4 – Fire hose reels	Fire hose reels will not be provided to the buildings.	The engineering analysis will demonstrate the provision of extinguishers provides an equivalent level of occupant safety and ability to instigate first-aid fire fighting	– Hose reels need not be provided throughout the building. – All building employees to undergo building induction for evacuation procedures, exit locations and use of portable fire extinguishers.
9.	E1.5 - Sprinklers	Sprinklers will not be provided beneath covered outdoor learning areas (COLAs) or underneath link bridges	The engineering analysis will demonstrate that there is minimal risk of fire spread and development beneath the COLAs and link bridges	– Sprinklers need not be provided to COLAs or link bridges – Fire load management to be implemented to limit storage and combustibles beneath COLAs.

5.5 Primary School

5.5.1 Primary School – Basement

Table 12 – Primary School (Basement) – Performance Solutions

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
1.	D1.4 – Exit travel distances	- Extended travel distance to a point of choice of 30m in lieu of 20m - Extended travel distance to an exit of 60m in lieu of 40m	The engineering analysis will demonstrate that occupants are close enough to an exit to safely evacuate.	- Extended travel distances will be supported - Fire load management to be implemented to limit storage in the area - Sprinkler provisions may be upgraded to support the extended travel distances
2	D1.5 – Distance between alternative exits	Extended travel distance between alternative exits of 80m in lieu of 60m		All building employees to undergo building induction for evacuation procedures, exit locations and use of portable fire extinguishers.

5.5.2 Primary School – Senior Wing

Table 13 – Primary School (Senior Wing) – Performance Solutions

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
1.	D1.4 – Exit travel distances	- Travel distance to a point of choice is at 29m in lieu of 20m on the Ground Floor - Travel distance to an exit is at 65m in lieu of 40m on Level 1	The engineering analysis will demonstrate that occupants are close enough to an exit to safely evacuate.	- Extended travel distances will be supported - Management in use procedure to be implemented to limit storage in common areas - Installation of automatic smoke detection - All building employees to undergo building induction for evacuation procedures, exit locations and use of portable fire extinguishers
2	D1.5 – Distance between alternative exits	Travel distance between alternative exits is 111m in lieu of 60m on Level 1		

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
3.	D1.9 – Travel by non-fire-isolated stairways or ramps	Non-fire-isolated stairway discharges to a point 29m from a doorway providing egress to open space in lieu of 20m on Ground Floor	The engineering analysis will demonstrate that occupants are provided with a safe evacuation path.	- Extended distance to a doorway providing egress to open space will be supported - Management in use procedure to be implemented to limit storage in common areas - All building employees to undergo building induction for evacuation procedures, exit locations and use of portable fire extinguishers

5.5.3 Primary School – Junior School (Fourth Avenue Block 2)

Table 14 – Primary School (Junior School (Fourth Avenue Block 2)) – Performance Solutions

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
1.	D1.4 – Exit travel distances	- Travel distance to a point of choice is at 28m in lieu of 20m on Level 1 - Travel distance to a point of choice is at 28m in lieu of 20m on Level 2	The engineering analysis will demonstrate that occupants are close enough to an exit to safely evacuate.	- Extended travel distances will be supported - Management in use procedure to be implemented to limit storage in common areas - Installation of automatic smoke detection - All building employees to undergo building induction for evacuation procedures, exit locations and use of portable fire extinguishers
2	D1.6 – Dimension of exits and paths of travel to exits	It is assumed that each room accommodates 35 people and there are 10 rooms on Level 2. Level 2 requires an aggregate egress width of 3.5m to accommodate 350 people and 3.1m egress width is provided.	- People movement modelling (computational evacuation modelling) may be required. - It is noted there is a stair with an available width of ~650mm per side. This will be addressed qualitatively.	- Reduced aggregate egress width will be supported. - Management in use procedure to be implemented to limit maximum occupant count. - Note additional stairs may be required to support excessive occupancies

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
3.	D1.9 – Travel by non-fire-isolated stairways or ramps	– Non-fire-isolated stairway discharges to a point at 21m to a doorway providing egress to open space in lieu of 20m on Ground Floor	The engineering analysis will demonstrate that occupants are provided with a safe evacuation path.	– Extended distance to a doorway providing egress to open space will be supported – Management in use procedure to be implemented to limit storage in common areas – All building employees to undergo building induction for evacuation procedures, exit locations and use of portable fire extinguishers

5.5.4 Primary School – Kindergarten Wing

Table 15 – Primary School (Kindergarten wing) – Performance Solutions

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
1.	D1.4 – Exit travel distances	– Travel distance to a point of choice is at least 25m in lieu of 20m on Level 1	The engineering analysis will demonstrate that occupants are close enough to an exit to safely evacuate.	– Extended travel distances will be supported – Management in use procedure to be implemented to limit storage in common areas – Installation of automatic smoke detection – All building employees to undergo building induction for evacuation procedures, exit locations and use of fire hose reels and portable fire extinguishers

5.6 Secondary School

5.6.1 Secondary School – HUB Building

Table 16 – Secondary School (HUB Building) – Performance Solutions

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
1.	C1.1 – Type of construction required	The HUB link bridges between fire compartments will incorporate performance-based fire separation	The engineering analysis will demonstrate that the fire resistance level provided is appropriate for the fire hazards and risk of fire spread.	- Performance-based fire separation provided to reduce FRL requirements to allow for architectural provisions (e.g. exposed steel structural members), subject to engineering analysis - Fire load management to be implemented to limit storage and combustibles in the area - Sprinkler provisions may be upgraded subject to engineering analysis.
2.	D1.3 – When fire-isolated stairways and ramps are required	The HUB building is served by two (2) non-fire-isolated stairways are required exits which connect more than 3 storeys	The engineering analysis will demonstrate that occupants will be provided with safe egress in case of fire.	- Non-fire-isolated stairways will be supported as required exits. - Fire load management to be implemented to limit storage and combustibles near and beneath the stairways. - Installation of automatic smoke detection
3.	D1.4 – Exit travel distances	Ground Floor: - Travel distance to a point of choice is at 21m in lieu of 20m on Ground Floor. - Travel distance to an exit is at 67m in lieu of 40m on Ground Floor.	The engineering analysis will demonstrate that occupants are close enough to an exit to safely evacuate.	- Extended travel distances will be supported - Management in use procedure to be implemented to limit storage in common areas - Installation of automatic smoke detection - All building employees to undergo building induction for evacuation procedures, exit locations and use of fire hose reels and portable fire extinguishers

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
		Level 1: - Distance to a point of choice is at 30m on Level 1 - Travel distance to an exit is at 48m on Level 1 Level 2: - Distance to a point of choice is at 29m in lieu of 20m on Level 2 - Travel distance to an exit is at 46m in lieu of 40m on Level 2 Level 3: - Distance to a point of choice is at 29m in lieu of 20m on Level 3 - Travel distance to an exit is at 47m in lieu of 40m on Level 3		
4.	D1.5 – Distance between alternative exits	Ground Floor: - Distance between alternative exits is at 62m in lieu of 60m on Ground Floor. - Distance between alternative exits is at 118m in lieu of 60m on Ground Floor. Level 1: - Distance between alternative exits at 94m in lieu of 60m on Level 1	The engineering analysis will demonstrate that occupants are close enough to an exit to safely evacuate.	- Extended travel distances will be supported - Management in use procedure to be implemented to limit storage in common areas - Installation of automatic smoke detection - All building employees to undergo building induction for evacuation procedures, exit locations and use of fire hose reels and portable fire extinguishers

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
		Level 2: – Distance between alternative exits is at 99m in lieu of 60m on Level 2 Level 3: – Distance between alternative exits is at 99m in lieu of 60m on Level 3		
5.	D1.6 – Dimensions of exits and paths of travel to exits	Level 2 & 3: – It is assumed that each room accommodates 35 people and there are 28 rooms – Level 2 & 3 require an aggregate egress width of 8.5m to accommodate 980 people and 6.6m egress width is provided	– People movement modelling (computational evacuation modelling) may be required. – Reduced stair widths will be addressed qualitatively.	– Reduced aggregate egress width will be supported. – Management in use procedure to be implemented to limit maximum occupant count. – Note additional stairs may be required to support excessive occupancies
6.	E1.5 – Sprinklers	Sprinklers will not be provided underneath the HUB link bridges	The engineering analysis will demonstrate that there is minimal risk of fire spread and development beneath the link bridges	– Sprinklers need not be provided beneath HUB link bridges – Fire load management to be implemented to limit fire load and combustibles beneath link bridges
7.	E2.2 – General requirements	The HUB building contains an atrium void, which connects 4 storeys. The atrium is not separated from the remainder of the building at each storey by bounding walls complying with G3.3 & G3.4 and departure from Part G3 needs to be justified by a fire engineered performance solution.	– Computational fire and smoke modelling to rationalise smoke exhaust system. – The following systems will be addressed qualitatively: – Sprinkler provisions – Smoke detection system	– Smoke exhaust requirements to be rationalised. – An estimated upper limit of 350m ³ /s smoke exhaust is required, subject to computational fire and smoke modelling – Detailed evacuation modelling required – Additional enclosure of the atrium void may be required to provide for occupant life safety
8.	G3.3 – Separation of atrium by bounding walls			
9.	G3.4 – Construction by bounding walls			

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
			- Emergency Warning and Intercommunication System (EWIS) - Separation of atrium by bounding walls	

5.6.2 T&L South Building

Table 17 – Secondary School (T&L South Building) – Performance Solutions

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
1.	D1.3 – When fire-isolated stairways and ramps are required	– Non-fire-isolated stairway connects Ground Floor, L1, L2 and Roof	The engineering analysis will demonstrate that occupants will be provided with safe egress in case of fire.	– Non-fire-isolated stairways will be supported as required exits. – Fire load management to be implemented to limit storage and combustibles Installation of smoke detection

5.6.3 T&L North Building

Table 18 – Secondary School (T&L North Building) – Performance Solutions

Item	DtS Clause	Summary of Non-Compliance	Engineering Analysis	Design Outcome
1.	D1.3 – When fire-isolated stairways and ramps are required	– Non-fire-isolated stairway connects Ground Floor, L1, L2 and Roof	The engineering analysis will demonstrate that occupants will be provided with safe egress in case of fire.	– Non-fire-isolated stairways will be supported as required exits. – Fire load management to be implemented to limit storage and combustibles near and beneath the stairways. – Installation of smoke detection

6. CONCLUSION

This Fire Engineering Concept Report (FEC) has been prepared to support the development of the new Al Faisal School at Fourth Avenue & Gurner Avenue, Austral NSW 2179. The proposed fire safety design and Performance Solutions have been outlined.

This report demonstrates that compliance with the relevant Performance Requirements of the BCA can be achieved through the development of Performance Solutions which are appropriately designed, installed, commissioned and maintained.

7. LIABILITY AND LIMITATIONS

7.1 Liability

This report is applicable to the works for the Al Faisal School at Fourth Avenue & Gurner Avenue, Austral NSW 2179 only.

It should be recognised that this report does not provide a guarantee that a fire will not occur with potential to cause casualties or damage.

Minerva Group cannot be held liable for any loss or damage resulting from any defect of the building or its services or equipment or for any non-compliance of the building or its services or equipment with any legislative or operational requirement, whether or not such defect or non-compliance is referred to or reported upon in this report, unless such defect or non-compliance should have been apparent to a competent engineer undertaking the assessment of the type undertaken for the purpose of preparation of this report.

The fire safety assessment and recommendations has been based on the building architectural layouts and the information detailed Section 8 – Reference Information. Any change in this information to suit future building works or re-organisation will require further analysis to confirm compliance with the regulations and our reports.

7.2 Limitations

This report does not provide guidance in respect of areas, which are used for bulk storage, processing of flammable liquids, explosive materials, multiple fire ignitions or sabotage of existing fire safety systems.

Minerva Group has compiled this report based on the information listed in Section 8 – Reference Information. Note that this report is based upon information provided by the client – some of which may not have been verified.

Potential incendiary risks are limited in the scope of engineering design. Conventional building design can only provide limited protection against malicious attack; for example, large scale incendiary and multiple ignition sources can potentially overwhelm some fire safety systems.

Strategies such as security, housekeeping and other management procedures may be more effective than additional fire protection measures in addressing arson events.

8. REFERENCE INFORMATION

8.1 Regulatory Framework

The following New South Wales Legislation is applicable to the project:

- NSW Environmental Planning & Assessment Act 1979 and subsequent amendments
- NSW Environmental Planning & Assessment Regulation 2000 and subsequent amendments

8.2 Australian Codes and Standards

- [1] Volume One of the Building Code of Australia 2019 (BCA), Australian Building Codes Board, 2019
- [2] Guide to the BCA, Australian Building Codes Board, 2019
- [3] Standards Australia International Ltd 2017, Automatic fire sprinkler systems – General systems (AS 2118.1-2017), Standards Australia, Sydney
- [4] Standards Australia International Ltd 2010, Automatic fire sprinkler systems – Part 2: Drencher systems (AS 2118.2-2010), Standards Australia, Sydney
- [5] Standards Australia International Ltd 2015, Fire Detection, warning control and intercom systems – System design, installation and commissioning – Part 1: Fire (AS 1670.1-2015), Standards Australia, Sydney
- [6] Standards Australia International Ltd 2015, Fire Detection and Alarm – General requirements (AS 1670.4-2015), Standards Australia, Sydney
- [7] Standards Australia International Ltd 2005, Emergency escape lighting and exit signs – General requirements (AS 2293.1-2005), Standards Australia, Sydney
- [8] Standards Australia International Ltd 2015, The use of Ventilation and Air Conditioning in Buildings – General requirements (AS 1668.1-2015), Standards Australia, Sydney
- [9] Standards Australia International Ltd 2012, The use of Ventilation and Air Conditioning in Buildings – General requirements (AS 1668.2-2012), Standards Australia, Sydney
- [10] Standards Australia International Ltd 2005, Installation of Fire Hose Reels – General requirements (AS 2441-2005), Standards Australia, Sydney
- [11] Standards Australia International Ltd 2001, Portable Fire Extinguishers and Fire Blankets – General requirements (AS 2444-2001), Standards Australia, Sydney
- [12] Standards Australia International Ltd 2005, Fire Hydrants Installation – General requirements (AS 2419-2005), Standards Australia, Sydney
- [13] Standards Australia International Ltd 1994, Methods for fire tests on building materials, components and structures – Combustibility test for materials (AS 1530.1-1994), Standards Australia, Sydney

- [14] Standards Australia International Ltd 2014, Methods for fire tests on building materials, components and structures – Fire- resistance tests for elements of construction (AS 1530.4-2014), Standards Australia, Sydney

8.3 International Fire Engineering Documents and Other Documents

- [15] Chartered Institute of Building Services Engineers (CIBSE) Guide E – Fire Engineering
- [16] International Fire Engineering Guidelines, Australia Building Codes Board, 2005
- [17] SFPE Handbook of Fire Protection Engineering, 5th Edition, 2016

8.4 Building Design Information

The engineering analysis documented in this report is based upon the following information:

- [18] Email exchanges between Minerva Group and Evolved Engineering
- [19] Preliminary BCA and Certification Assessment for Al Faisal School Primary School by Steve Watson & Partners, Report. Ref REP-004, Version 3, Dated 11 September 2020
- [20] Preliminary BCA and Certification Assessment for Al Faisal School Secondary School by Steve Watson & Partners, Report. Ref REP-004, Version 3, Dated 11 September 2020
- [21] Architectural drawings outlined in the table below

Table 19 – Architectural drawings

Drawing Number	Drawing Title	Author	Revision	Issue Date (DD/MM/YYYY)
DA003	Overall Primary Masterplan	PMDL	P1	21/09/2020
DA100	Primary – Site Plan	PMDL	P3	12/10/2020
DA104	Plan – Primary – Basement	PMDL	P1	21/09/2020
DA107	Plan – T&L Yrs 3-6 + MPH – L0	PMDL	P1	21/09/2020
DA130	Detail Plan – T&L South + Sports Fields – L0	PMDL	P1	21/09/2020
SK001	Primary & Secondary School – Masterplan	PMDL	—	—/03/2020
SK100	HUB Building – L0	PMDL	—	—/01/2020
SK102	HUB Building – L1	PMDL	—	—/08/2020
SK103	HUB Building – L2	PMDL	—	—/08/2020
SK104	HUB Building – L3	PMDL	—	—/08/2020
SK201	HUB Building – Section 1	PMDL	—	—/08/2020
SK102	MPH North L0 Plan	PMDL	—	—/07/2020
SK105	MPH North L1 Plan	PMDL	—	—/07/2020
SK101	Plan-Level 0 (Ground) (T&L South)	PMDL	—	—/07/2020
SK102	Plan-Level 1 (T&L South)	PMDL	—	—/07/2020

Drawing Number	Drawing Title	Author	Revision	Issue Date (DD/MM/YYYY)
SK103	Plan-Level 2 (T&L South)	PMDL	—	—/07/2020
SK101	T&L North Plan – Level 0 (Ground)	PMDL	—	—/06/2020
SK102	T&L North Plan – Level 1	PMDL	—	—/06/2020
SK103	T&L North Plan – Level 2	PMDL	—	—/06/2020
SK113	Secondary School – L0	PMDL	—	—/05/2020
SK120.001	L0 – Senior Wing Overall	PMDL	—	—/07/2020
SK121.001	L1 – Senior Wing Overall	PMDL	—	—/07/2020
SK122.001	L2 – Senior Wing Overall	PMDL	—	—/07/2020
SK140	L0 – Fourth Avenue – Yr 1-2 Block	PMDL	—	—
SK142	L1 – Fourth Avenue – Yr 1-2 Block	PMDL	—	—
SK144	L1 – Fourth Avenue – Yr 1-2 Block	PMDL	—	—
SK160	L0 – Kindergarten Wing	PMDL	—	—/04/2020
SK161	L1 – Kindergarten Wing	PMDL	—	—/04/2020

9. APPENDIX A – BCA ASSESSMENT (PRIMARY SCHOOL) [19]



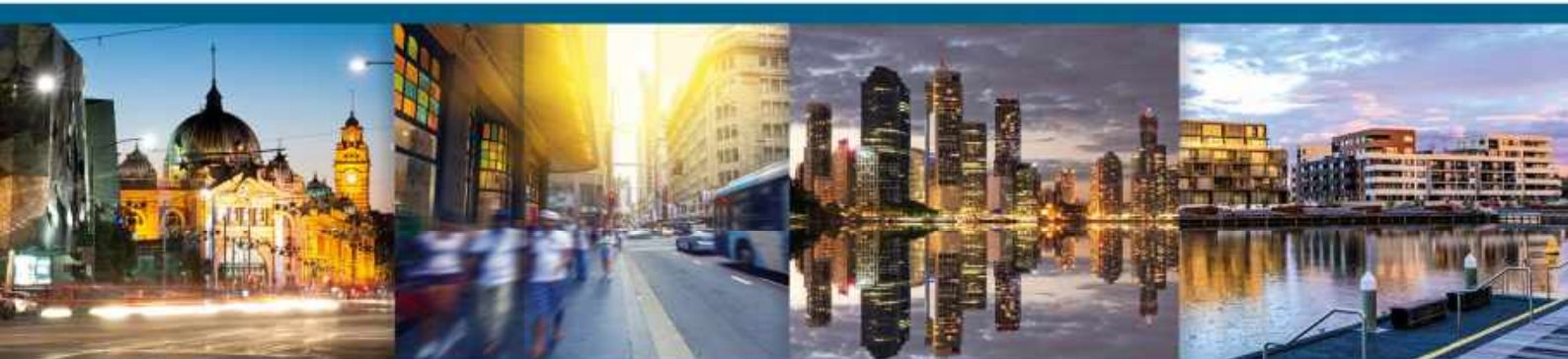
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Report Revision History

Revision History	
Revision Number:	3.0
Revision Details:	Preliminary BCA and Certification Assessment Report
Date:	Friday, 11 September 2020
Author:	Eddie Liu
Verifier:	Gary Rafferty



Introduction

This report presents the findings of a preliminary assessment of the proposed new **Al Faisal School Primary School** development of the against the Deemed-to-Satisfy (DtS) provisions of Building Code of Australia (BCA) 2019 Amendment 1.

It has been prepared by building regulations consultants and certifiers Steve Watson and Partners for Al Faisal College.

Purpose

The purpose of this report is to identify issues and omissions in the audited documentation that are required to be addressed to permit the lodgement and approval of an application for a Construction Certificate under Part 6 of the EP&A Act.

Scope

The scope of this assessment is limited to the design documentation referenced in Appendix A of this report.

Certification Work

This report is provided as part of SWP's contracted scope for this project, which is "Certification Work", as defined in the Building and Development Certifiers Regulation 2020. Due to the strict requirements and limits in terms of conflicts of interest imposed under that regulation, SWP cannot undertake any services other than Certification Services on this project.

Hence, the contents of this report, and any associated correspondence, are provided in the context of a preliminary certification assessment of plans, and is intended to identify any BCA or regulatory issues required to be addressed in the design. It may not be construed to constitute involvement in building design, the preparation of plans and specifications, the provision of advice on how to amend a plan or specification to ensure that the aspect will comply with legislative or code requirements, or to breach any other restriction or limitation imposed under the conflict of interest provisions of that or any other legislation.



Description of Proposed Development

Summary of Construction Determination																			
BCA Classification	Class 7a Carpark Class 9b including - School - Early Childhood Centre - Multi-Purpose Hall																		
Rise in Storey	Basement: TBA (details of superstructure above the basement to be provided) Senior Wing: Three (3) Storeys Fourth Avenue Block 2: Three (3) Storeys Kindergarten Wing: Two (2) Storeys Multi-Purpose Hall: One (1) Storey																		
Type of construction required	Basement: TBA (details of superstructure above the basement to be provided) Senior Wing: Type A Construction Fourth Avenue Block 2: Type A Construction Kindergarten Wing: Type B Construction Multi-Purpose Hall: Type C Construction <table><caption>Table C1.1 Type of construction required</caption><tr><th>Rise in storeys</th><th>Class of building</th><th>Class of building</th></tr><tr><td></td><td>2, 3, 9</td><td>5, 6, 7, 8</td></tr><tr><td>4 or more</td><td>A</td><td>A</td></tr><tr><td>3</td><td>A</td><td>B</td></tr><tr><td>2</td><td>B</td><td>C</td></tr><tr><td>1</td><td>C</td><td>C</td></tr></table>	Rise in storeys	Class of building	Class of building		2, 3, 9	5, 6, 7, 8	4 or more	A	A	3	A	B	2	B	C	1	C	C
Rise in storeys	Class of building	Class of building																	
	2, 3, 9	5, 6, 7, 8																	
4 or more	A	A																	
3	A	B																	
2	B	C																	
1	C	C																	
Maximum floor area volume limitations	<table><caption>Table C2.2 Maximum size of fire compartments or atria</caption><tr><th>Classification</th><th>Type A construction</th><th>Type B construction</th><th>Type C construction</th></tr><tr><td>5, 9b or 9c</td><td>Max <i>floor area</i>—8000 m² Max volume—48 000 m³</td><td>Max <i>floor area</i>—5500 m² Max volume—33 000 m³</td><td>Max <i>floor area</i>—3000 m² max volume—18 000 m³</td></tr><tr><td>6, 7, 8 or 9a (except for <i>patient care areas</i>)</td><td>Max <i>floor area</i>—5000 m² Max volume—30 000 m³</td><td>Max <i>floor area</i>—3500 m² Max volume—21 000 m³</td><td>Max <i>floor area</i>—2000 m² Max volume—12 000 m³</td></tr></table>	Classification	Type A construction	Type B construction	Type C construction	5, 9b or 9c	Max <i>floor area</i> —8000 m ² Max volume—48 000 m ³	Max <i>floor area</i> —5500 m ² Max volume—33 000 m ³	Max <i>floor area</i> —3000 m ² max volume—18 000 m ³	6, 7, 8 or 9a (except for <i>patient care areas</i>)	Max <i>floor area</i> —5000 m ² Max volume—30 000 m ³	Max <i>floor area</i> —3500 m ² Max volume—21 000 m ³	Max <i>floor area</i> —2000 m ² Max volume—12 000 m ³						
Classification	Type A construction	Type B construction	Type C construction																
5, 9b or 9c	Max <i>floor area</i> —8000 m ² Max volume—48 000 m ³	Max <i>floor area</i> —5500 m ² Max volume—33 000 m ³	Max <i>floor area</i> —3000 m ² max volume—18 000 m ³																
6, 7, 8 or 9a (except for <i>patient care areas</i>)	Max <i>floor area</i> —5000 m ² Max volume—30 000 m ³	Max <i>floor area</i> —3500 m ² Max volume—21 000 m ³	Max <i>floor area</i> —2000 m ² Max volume—12 000 m ³																
Effective height	Basement: TBA (details of superstructure above the basement to be provided) Senior Wing: Less than 12m Fourth Avenue Block 2: Less than 12m Kindergarten Wing: Less than 12m Multi-Purpose Hall: Less than 12m																		
Assumption	Sprinkler protection in accordance with AS2118.1-2017 is proposed to be installed throughout the building. Non-fire-isolated stairway could connect up to 3 storeys under D1.3 Vertical separation of openings in external walls is not require under C2.6 Each classroom accommodates 35 people. Further confirmation is required for occupant numbers including students and staff.																		



Assessment

The following is a summary of an assessment of the proposed design against the relevant Deemed-to-Satisfy provision of the BCA 2019 Amendment 1.

Section A: General Provisions

The proposed development involves:

- extension of the existing basement carpark
- construction of Senior Wing Block consisting of 3 storeys
- construction of Fourth Avenue Block 2 – consisting of 3 storeys
- construction of Kindergarten Wing Block consisting of 2 storeys
- construction of Multi-Purpose Hall consisting of 1 storey

Section B: Structure

The structural engineering design of the building will be required to comply with the structural provisions of Part B1 of the BCA. Structural Design Certification needs to be provided at Construction Certificate stage.

Section C: Fire Resistance

The Senior Wing Block is required to be Type A Construction.

The Fourth Avenue Block 2 is required to be Type A Construction.

The Kindergarten Wing Block is required to be Type B Construction.

The Multi-Purpose Hall is required to be Type C Construction.

Refer to fire resisting requirement for Type A, Type B and Type C Construction under Appendix B

Proposed floor coverings and any proposed wall and ceiling lining materials must comply with the fire hazard properties nominated in Specification C1.10a of the BCA.

Sprinkler protection throughout all building in accordance with AS2118.1-2017 is proposed to be provided, therefore compliance with BCA Clause C2.6 (Spandrels) is achieved.

Openings in the external walls between separate fire compartments are located within 6m, therefore compliance with BCA Clause C3.2 is not provided.

Walls opposite each other in separate fire compartments are located within 6m, therefore compliance with BCA Clause C3.3 is not provided.



Section D: Access and Egress

Egress from the buildings is not capable of complying with Clauses D1.4 and D1.5 of the BCA, fire engineered performance solution is required to justify departure from D1.4 and D1.5. Future fitouts will be subject the following maximum travel distance limitations:

- 20m to a single exit or point from which travel in different directions where 2 exits are available;
- 40m to the nearest exit where 2 or more exits are available;
- 60m between alternative exits;
- 30m to single exit serving a tenancy on the ground floor which discharges directly to open space.

Four Avenue Block 2 Level 2 has reduced egress width of 3.1 m in lieu of 3.5m and departure from D1.6 requires a fire engineered performance solution. Refer to Fire Engineering Alternative Solution table for details.

Any new electrical meters, distribution boards (telecommunications or electrical) in the path of travel must be contained within a non-combustible enclosure with the doorways fitted with smoke seals in accordance with Clause D2.7 of the BCA.

The construction of the new stairways including goings, risers and slip resistance classification is to comply with Clause D2.13 of the BCA. Landings at the top and bottom of the stairway is to comply with Clause D2.14 of the BCA.

Handrails are to be provided to the new stairs in accordance with Clause D2.17, D3.3 and Clause 11 and 12 of AS1428.1 – 2009.

Access for people with disabilities is to be provided in accordance with the provisions of Part D3 of the BCA and AS1428.1 – 2009. Certification from an Access Consultant is required to be provided at Construction Certificate stage.

Section E: Services and Equipment

The buildings are required to be served by a fire hydrant system complying with Clause E1.3 of the BCA and AS 2419.1 – 2005. Consideration is to be given to the location of the fire brigade booster assembly. Where located remotely from the buildings the booster assembly is required to be:

- At the boundary of the site and be within sight of the main entrance to the building;
- Adjacent to the principal vehicular access to the site;
- Located not less than 10m from the external wall of any building served.

The buildings are required to be served by fire hose reels complying with Clause E1.4 of the BCA and AS 2441 – 2005.

It is assumed a sprinkler system complying with AS 2118.1 2017 will be provided to all buildings.



The building will require portable fire extinguishers complying with Clause E1.6 of the BCA and AS 2444 – 2001.

The proposed lift will be required to be one of types identified in Table E3.6a, subject to the limitations on use specified in the Table. The lift also is required to incorporate the accessible features in accordance with Table E3.6b of the BCA.

The building will require emergency lighting in accordance with Clauses E4.2 & E4.4 of the BCA and AS 2293.1 – 2018.

The building will require exit signage in accordance with Clauses E4.5, E4.6 & E4.8 of the BCA and AS 2293.1 – 2018.

Section F: Health and Amenity

An accessible unisex sanitary compartment is required in all buildings accordance with Clause F2.4 of the BCA and AS 1428.1 – 2009. A male and female sanitary compartment suitable for a person with an ambulant disability is required in accordance with AS 1428.1 – 2009.

Minimum ceiling heights are to be 2.4m except where 2.1m is permitted in bathrooms, sanitary compartments, storerooms or the like. Ceiling heights are to be 2.7m for an assembly building or a corridor that serves an assembly building or part that accommodates more than 100 persons.

Artificial lighting is required to all rooms that are frequently occupied, all accessible spaces, all corridors and circulation spaces and path of egress in accordance with AS/NZS 1680.0 – 2009.

Ventilation will be required to all rooms occupied by a person for any purpose by means of natural ventilation complying with Clause F4.6 of the BCA or mechanical ventilation/air-conditioning complying with AS 1668.2 – 2012

Section G: Ancillary Provisions

The Fourth Avenue Block 2 contains a void that connects 3 storeys. Part G3 Atrium construction does not apply to this atrium provided the building is provided with a sprinkler system complying with AS 2118.1 2017:



Section J: Energy Efficiency

The buildings are to be designed to achieve compliance with the relevant provisions of Part J1 to J8 respectively.

Key compliance items include:

- Roof and ceiling construction will be required to achieve compliance with Clause J1.3;
- External wall construction will be required to achieve compliance with Clause J1.5;
- External glazing will be required to achieve compliance with Clause J1.5;
- Building sealing will be required to windows and doors in accordance with the relevant sections Part J3;
- Air-conditioning and mechanical ventilation systems will need to be designed in accordance with the relevant sections of Part J5;
- Artificial lighting and power will need to be designed in accordance with the relevant sections of Part J6;
- Heated water supply system for food preparation and sanitary facilities to be designed and installed in accordance with Part B2 of the Plumbing Code of Australia; and
- Facilities for energy monitoring in accordance with Clause J8.3.



Fire Engineering Alternative Solutions Required

Basement

Item	Non-Compliance	DTS Clause	Description
1.	Exit Travel Distances	D1.4	<u>Basement Carpark</u> Travel distance to a point of choice in the basement is at 47 in lieu of 20m: 
2.	Exit Travel Distances	D1.4	<u>Basement Carpark</u> Travel distance to an exit is at 102m in lieu of 40m: 

Item	Non-Compliance	DTS Clause	Description
3.	Distance between Alternative Exits	D1.5	<u>Basement Carpark</u> Distance between alternative exits in basement is 95m in lieu of 60m: 

Senior Wing

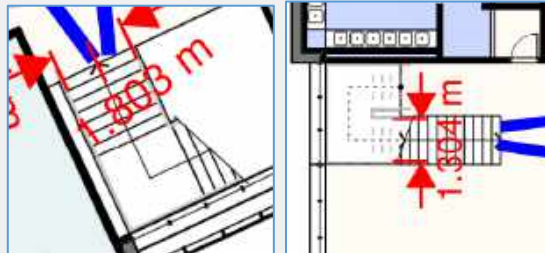
Item	Non-Compliance	DTS Clause	Description
1.	Exit Travel Distances	D1.4	<u>Senior Wing</u> Travel distance to a point of choice is at 28m in lieu of 20m on Ground Floor 

Item	Non-Compliance	DTS Clause	Description
2.	Exit Travel Distances	D1.4	<u>Senior Wing</u> Travel distance to a point of choice is at 29m in lieu of 20m on Ground Floor: 
3.	Exit Travel Distances	D1.4	<u>Senior Wing</u> Travel distance to an exit is at 65m in lieu of 40m on Level 1: 
4.	Distance between Alternative Exits	D1.5	<u>Senior Wing</u> Distance between alternative exits is 111m in lieu of 60m on Level 1: 

Item	Non-Compliance	DTS Clause	Description
5.	Travel by non-fire-isolated stairways or ramps	D1.9	<u>Senior Wing</u> Non-fire-isolated stairway discharges a point at 23m to a doorway proving egress to open space in lieu of 20m on Ground Floor 
6.	Travel by non-fire-isolated stairways or ramps	D1.9	<u>Senior Wing</u> Non-fire-isolated stairway discharges a point at 23m to a doorway proving egress to open space in lieu of 20m on Ground Floor 

Junior School (Fourth Avenue Block 2)

Item	Non-Compliance	DTS Clause	Description
1.	Exit Travel Distances	D1.4	<u>Fourth Avenue Block 2</u> Travel distance to a point of choice is at 28m in lieu of 20m on Level 1: 

Item	Non-Compliance	DTS Clause	Description
2.	Exit Travel Distances	D1.4	<u>Fourth Avenue Block 2</u> Travel distance to a point of choice is at 28m in lieu of 20m on Level 2: 
3.	Dimension of exits and paths of travel to exits	D1.6	<u>Fourth Avenue Block 2</u> It is assumed that each room accommodate 35 people and there are 10 rooms on Level 2. Level 2 requires an aggregate egress width of 3.5m to accommodate 350 people and 3.1m egress width is provided: 

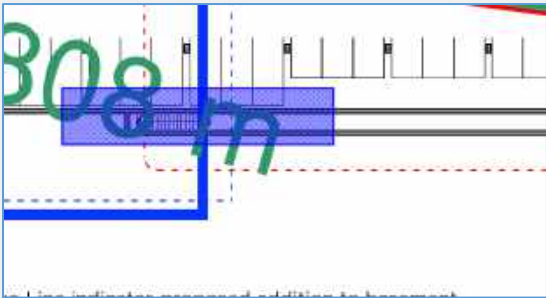


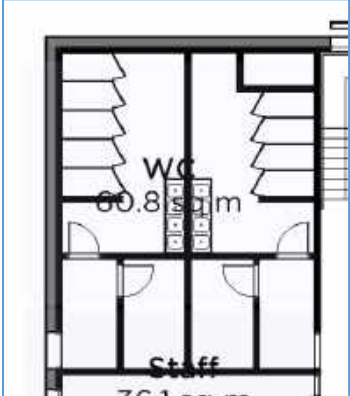
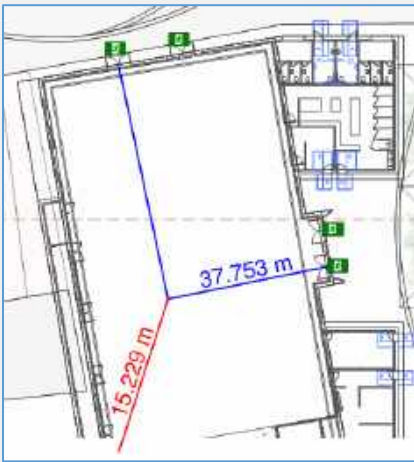
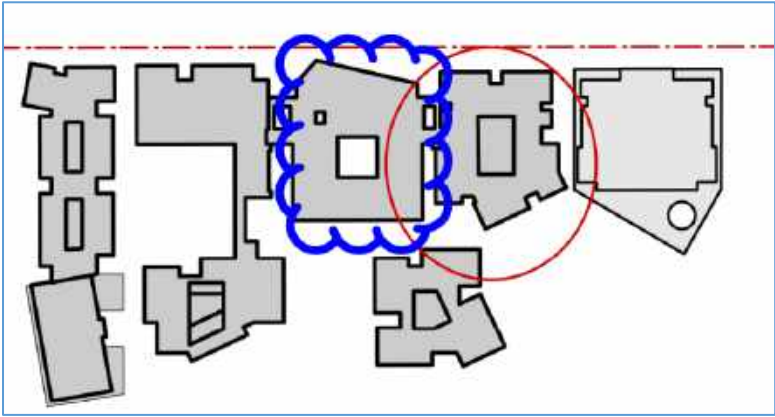
Item	Non-Compliance	DTS Clause	Description
4.	Travel by non-fire-isolated stairways or ramps	D1.9	<u>Fourth Avenue Block 2</u> Non-fire-isolated stairway discharges a point at 21m to a doorway providing egress to open space in lieu of 20m on Ground Floor 

Kindergarten Wing

Item	Non-Compliance	DTS Clause	Description
1.	Exit Travel Distances	D1.4	<u>Kindergarten Wing</u> Travel distance to a point of choice is at 25m in lieu of 20m on Level 1: 

Further Information Required

Item	Description
1.	<u>Basement Carpark</u> Detail of eastern stair needs to be provided. Further confirmation is required if this stair provides egress for the basement:  
2.	<u>Basement Carpark</u> Detail of superstructure above the basement carpark needs to be provided
3.	<u>Fourth Avenue Block 2</u> Details to be provided for room on the ground floor 

Item	Description
4.	<u>Kindergarten Wing</u> Access & egress path for toilet on ground floor to be provided 
5.	<u>Multi-Purpose Hall</u> Architectural plan showing the layout of the Indoor Basketball Centre needs to be provided: 
6.	Detail of building to be provided: 



Item	Description
7.	Detail of roof for all buildings to be provided. Confirmation is required regarding any non fire isolated stairway that connects more than 3 storeys
8.	Openings in the external walls between separate fire compartments are located within 6m and need to be protected in accordance with C3.4
9.	Walls opposite each other in separate fire compartments are located within 6m and need to be separated in accordance with C3.3

Conclusion

This report documents a preliminary audit of the proposed design against the BCA and the relevant legislative requirements for the issue of a Construction Certificate.

We confirm the proposed design, as shown on the drawings referenced in Appendix A, is capable of achieving compliance with the BCA. The proposed design will therefore be capable of being approved under a Construction Certificate, subject to the provision of further details regarding performance-based solutions and other documentation necessary to satisfy the relevant legislative requirements.



Appendix A – Referenced Documentation

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

Drawing No.	Title	Issue	Date	Drawn By
DA113	Basement	-	03 September 2020	PMDL
SK120	L0 – Senior Wing Plan	-	Jul 2020	
SK120.001	L0 – Senior Wing Overall	-	Jul 2020	Jul 2020
SK121.001	L1 – Senior Wing Overall	-	Jul 2020	PMDL
SK122.001	L2 – Senior Wing Overall	-	Jul 2020	PMDL
SK140	L0 – Fourth Avenue Block 2	-	Aug 2020	PMDL
SK142	L1 – Fourth Avenue Block 2	-	Aug 2020	PMDL
SK144	L2 – Fourth Avenue Block 2	-	Aug 2020	PMDL
SK160	L0 - Kindergarten Wing	-	Apr 2020	PMDL
SK161	L1 – Kindergarten Wing	-	Apr 2020	PMDL



Appendix B – Fire-resistance levels

The below table contain the fire-resistance levels (FRL) required under Specification C1.1 of the BCA.

Type A Construction: FRL of Building Elements				
Building element	Class of building - FRL: (in minutes)			
	Structural adequacy/Integrity/Insulation			
	2, 3 or 4 part	5, 9 or 7a	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated within it) or other external building element, where the distance from any fire-source feature to which it is exposed is-				
For loadbearing parts-				
less than 1.5m	90/90/90	120/120/120	180/180/180	240/240/240
1.5 TO LESS THAN 3 M	90/60/60	120/ 90/ 90	180/180/120	240/240/180
3 OR MORE	90/60/30	120/ 60/ 30	180/120/90	240/180/ 90
For non-loadbearing parts-				
less than 1.5 m	-/90/90	- /120/120	- /180/180	- /240/240
1.5 TO LESS THAN 3 M	-/60/60	- / 90/ 90	- /180/120	- /240/180
3 m or more	- / - / -	- / - / -	- / - / -	- / - / -
EXTERNAL COLUMN not incorporated in an external wall-				
For loadbearing columns	90/ - / -	120/ - / -	180/ - / -	240/ - / -
For non-loadbearing columns	- / - / -	- / - / -	- / - / -	- / - / -
COMMON WALLS and FIRE WALLS	90/90/90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS-				
Fire-resisting lift and stair shafts-				
Loadbearing	90/90/90	120/120/120	180/120/120	240/120/120
Non-loadbearing	- /90/90	- /120/120	- /120/120	- /120/120
Bounding public corridors, public lobbies and the like-				
Loadbearing	90/90/90	120/ - / -	180/ - / -	240/ - / -
Non-loadbearing	- /60/60	- / - / -	- / - / -	- / - / -
Between or bounding sole-occupancy units-				
Loadbearing	90/90/90	120/ - / -	180/ - / -	240/ - / -
Non-loadbearing	- /60/60	- / - / -	- / - / -	- / - / -
Ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of Combustion-				
Loadbearing	90/90/90	120/ 90/ 90	180/120/120	240/120/120
Non-loadbearing	- /90/90	- / 90/ 90	- /120/120	- /120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES AND COLUMNS				
	90/ - / -	120/ - / -	180/ - / -	240/ - / -
FLOORS	90/90/90	120/120/120	180/180/180	240/240/240
ROOFS	90/60/30	120/ 60/ 30	180/60/30	240/ 90/ 60



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



Type C Construction: FRL of Building Elements				
Building element	Class of building - FRL: (in minutes)			
	Structural adequacy/Integrity/Insulation			
	2, 3 or 4 part	5, 9 or 7a	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any fire-source feature to which it is exposed is-				
less than 1.5m	90/90/90	90/90/90	90/90/90	90/90/90
1.5 TO LESS THAN 3 M	-/-/-	60/60/60	60/60/60	60/60/60
3 M OR MORE	-/-/-	-/-/-	-/-/-	-/-/-
EXTERNAL COLUMN not incorporated in an external wall, where the distance from any fire-source feature to which it is exposed is-				
less than 1.5 m	90/-/-	90/-/-	90/-/-	90/-/-
1.5 or less than 3 m	-/-/-	60/-/-	60/-/-	60/-/-
3 m or more	-/-/-	-/-/-	-/-/-	-/-/-
COMMON WALLS and FIRE WALLS	90/90/90	90/90/90	90/90/90	90/90/90
INTERNAL WALLS-				
Bounding public corridors, public lobbies and the like-				
	60/60/60	-/-/-	-/-/-	-/-/-
Between or bounding sole-occupancy units-				
	60/60/60	-/-/-	-/-/-	-/-/-
Bounding a stair if required to be rated-				
	60/60/60	-/-/-	-/-/-	-/-/-
ROOFS	-/-/-	-/-/-	-/-/-	-/-/-

10. APPENDIX B – BCA ASSESSMENT (SECONDARY SCHOOL) [20]



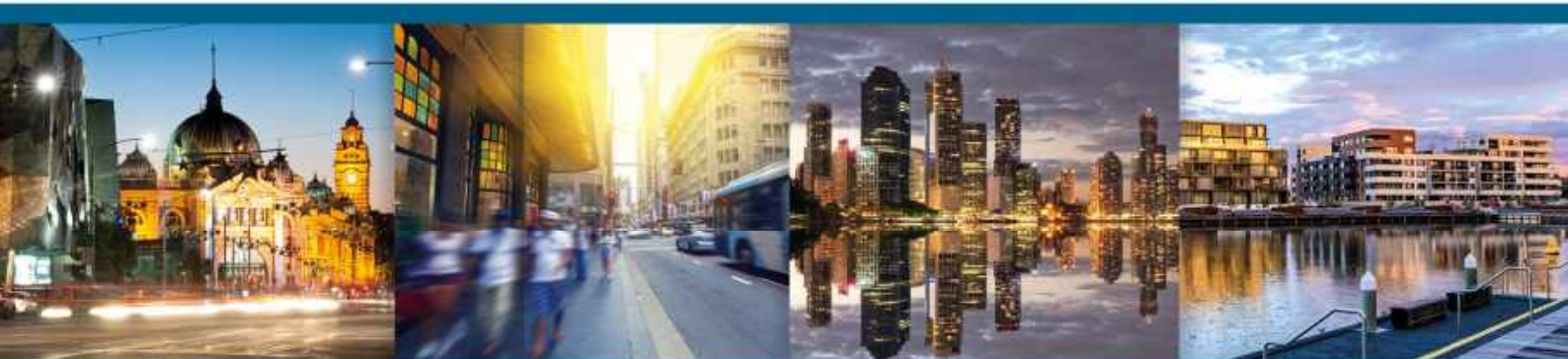
STEVE WATSON
& PARTNERS

BUILDING CODE CONSULTANTS
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Liverpool

Preliminary BCA and Certification Assessment



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Report Revision History

Revision History	
Revision Number:	3.0
Revision Details:	Preliminary BCA and Certification Assessment Report
Date:	Friday, 11 September 2020
Author:	Eddie Liu
Verifier:	Gary Rafferty



Introduction

This report presents the findings of a preliminary assessment of the proposed new **Al Faisal School Secondary School** development of the against the Deemed-to-Satisfy (DtS) provisions of Building Code of Australia (BCA) 2019 Amendment 1.

It has been prepared by building regulations consultants and certifiers Steve Watson and Partners for Al Faisal College.

Purpose

The purpose of this report is to identify issues and omissions in the audited documentation that are required to be addressed to permit the lodgement and approval of an application for a Construction Certificate under Part 6 of the EP&A Act.

Scope

The scope of this assessment is limited to the design documentation referenced in Appendix A of this report.

Certification Work

This report is provided as part of SWP's contracted scope for this project, which is "Certification Work", as defined in the Building and Development Certifiers Regulation 2020. Due to the strict requirements and limits in terms of conflicts of interest imposed under that regulation, SWP cannot undertake any services other than Certification Services on this project.

Hence, the contents of this report, and any associated correspondence, are provided in the context of a preliminary certification assessment of plans, and is intended to identify any BCA or regulatory issues required to be addressed in the design. It may not be construed to constitute involvement in building design, the preparation of plans and specifications, the provision of advice on how to amend a plan or specification to ensure that the aspect will comply with legislative or code requirements, or to breach any other restriction or limitation imposed under the conflict of interest provisions of that or any other legislation.

Description of Proposed Development

Summary of Construction Determination																						
BCA Classification	Class 9b including: - School - Multi-Purpose Hall																					
Rise in storeys	HUB – Four (4) Storeys Teaching & Learning North - Three (3) Storeys Teaching & Learning South - Three (3) Storeys Multi-Purpose Hall – One (1) Storey																					
Type construction required	HUB – Type A Construction Teaching & Learning North – Type A Construction Teaching & Learning South – Type A Construction Multi-Purpose Hall North – Type C Construction																					
	<table><tr><th colspan="3">Table C1.1 Type of construction required</th></tr><tr><th>Rise in storeys</th><th>Class of building</th><th>Class of building</th></tr><tr><td></td><td>2, 3, 9</td><td>5, 6, 7, 8</td></tr><tr><td>4 or more</td><td>A</td><td>A</td></tr><tr><td>3</td><td>A</td><td>B</td></tr><tr><td>2</td><td>B</td><td>C</td></tr><tr><td>1</td><td>C</td><td>C</td></tr></table>	Table C1.1 Type of construction required			Rise in storeys	Class of building	Class of building		2, 3, 9	5, 6, 7, 8	4 or more	A	A	3	A	B	2	B	C	1	C	C
Table C1.1 Type of construction required																						
Rise in storeys	Class of building	Class of building																				
	2, 3, 9	5, 6, 7, 8																				
4 or more	A	A																				
3	A	B																				
2	B	C																				
1	C	C																				
Maximum floor area volume limitations	Maximum Floor & Volume Compartments are to be as below																					
	<table><tr><th colspan="4">Table C2.2 Maximum size of fire compartments or atria</th></tr><tr><th>Classification</th><th>Type A construction</th><th>Type B construction</th><th>Type C construction</th></tr><tr><td>5, 9b or 9c</td><td>Max floor area—8 000 m² Max volume—48 000 m³</td><td>Max floor area—5 500 m² Max volume—33 000 m³</td><td>Max floor area—3 000 m² max volume—18 000 m³</td></tr><tr><td>6, 7, 8 or 9a (except for patient care areas)</td><td>Max floor area—5 000 m² Max volume—30 000 m³</td><td>Max floor area—3 500 m² Max volume—21 000 m³</td><td>Max floor area—2 000 m² Max volume—12 000 m³</td></tr></table>	Table C2.2 Maximum size of fire compartments or atria				Classification	Type A construction	Type B construction	Type C construction	5, 9b or 9c	Max floor area—8 000 m ² Max volume—48 000 m ³	Max floor area—5 500 m ² Max volume—33 000 m ³	Max floor area—3 000 m ² max volume—18 000 m ³	6, 7, 8 or 9a (except for patient care areas)	Max floor area—5 000 m ² Max volume—30 000 m ³	Max floor area—3 500 m ² Max volume—21 000 m ³	Max floor area—2 000 m ² Max volume—12 000 m ³					
Table C2.2 Maximum size of fire compartments or atria																						
Classification	Type A construction	Type B construction	Type C construction																			
5, 9b or 9c	Max floor area—8 000 m ² Max volume—48 000 m ³	Max floor area—5 500 m ² Max volume—33 000 m ³	Max floor area—3 000 m ² max volume—18 000 m ³																			
6, 7, 8 or 9a (except for patient care areas)	Max floor area—5 000 m ² Max volume—30 000 m ³	Max floor area—3 500 m ² Max volume—21 000 m ³	Max floor area—2 000 m ² Max volume—12 000 m ³																			
Assumption	Sprinkler protection in accordance with AS2118.1-2017 is proposed to be installed throughout the building. Non-fire-isolated stairway could connect up to 3 storeys under D1.3 Vertical separation of openings in external walls is not require under C2.6 Each classroom accommodates 35 people. Further confirmation is required for occupant numbers including students and staff. The HUB Building is served by two (2) non fire isolated stairways and two (2) fire isolated stairways as required exits: 																					



Assessment

The following is a summary of an assessment of the proposed design against the relevant Deemed-to-Satisfy provision of the BCA 2019 Amendment 1.

Section A: General Provisions

The proposed development involves:

- construction of HUB Building consisting of 4 storeys
- construction of North Teaching and Learning Building consisting of 3 storeys
- construction of South Teaching and Learning Building consisting of 3 storeys
- construction of Multi-Purpose Hall consisting of 1 storey

Section B: Structure

The structural engineering design of the building will be required to comply with the structural provisions of Part B1 of the BCA. Structural Design Certification needs to be provided at Construction Certificate stage.

Section C: Fire Resistance

The HUB Building is required to be Type A Construction.

The North Teaching and Learning Building is required to be Type A Construction.

The South Teaching and Learning Building is required to be Type A Construction.

The Multi-Purpose Hall is required to be Type C Construction.

Refer to fire resisting requirement for Type A, Type B and Type C Construction under Appendix B

Proposed floor coverings and any proposed wall and ceiling lining materials must comply with the fire hazard properties nominated in Specification C1.10a of the BCA.

Sprinkler protection throughout the whole building in accordance with AS2118.1-2017 is proposed to be provided, therefore compliance with BCA Clause C2.6 (Spandrels) is not required.

Openings in the external walls between separate fire compartments are located within 6m, therefore compliance with BCA Clause C3.2 is not provided.

Walls opposite each other in separate fire compartments are located within 6m, therefore compliance with BCA Clause C3.3 is not provided.

Section D: Access and Egress

Egress from the buildings is not capable of complying with Clauses D1.4 and D1.5 of the BCA, fire engineered performance solution is required to justify departure from D1.4 and D1.5. Future fitouts



will be subject the following maximum travel distance limitations:

- 20m to a single exit or point from which travel in different directions where 2 exits are available;
- 40m to the nearest exit where 2 or more exits are available;
- 60m between alternative exits;
- 30m to single exit serving a tenancy on the ground floor which discharges directly to open space.

In accordance with Clause D1.6 of the BCA, the available exits provided in the HUB Building are not capable of accommodating the population from each tenancy assuming each classroom accommodates 35 people. Departure from D1.6 needs to be justified by fire engineered performance solutions. Refer to Fire Engineering Alternative Solution table for details.

Any new electrical meters, distribution boards (telecommunications or electrical) in the path of travel must be contained within a non-combustible enclosure with the doorways fitted with smoke seals in accordance with Clause D2.7 of the BCA.

The construction of the new stairways including goings, risers and slip resistance classification is to comply with Clause D2.13 of the BCA. Landings at the top and bottom of the stairway is to comply with Clause D2.14 of the BCA.

Handrails are to be provided to the new stairs in accordance with Clause D2.17, D3.3 and Clause 11 and 12 of AS1428.1 – 2009.

Access for people with disabilities is to be provided in accordance with the provisions of Part D3 of the BCA and AS1428.1 – 2009. Certification from an Access Consultant is required to be provided at Construction Certificate stage.

Section E: Services and Equipment

The buildings are required to be served by a fire hydrant system complying with Clause E1.3 of the BCA and AS 2419.1 – 2005. Consideration is to be given to the location of the fire brigade booster assembly. Where located remotely from the buildings the booster assembly is required to be:

- At the boundary of the site and be within sight of the main entrance to the building;
- Adjacent to the principal vehicular access to the site;
- Located not less than 10m from the external wall of any building served.

The buildings are required to be served by fire hose reels complying with Clause E1.4 of the BCA and AS 2441 – 2005.

It is assumed a sprinkler system complying with AS 2118.1 2017 will be provided to all buildings.

The building will require portable fire extinguishers complying with Clause E1.6 of the BCA and AS 2444 – 2001.

The proposed lift will be required to be one of types identified in Table E3.6a, subject to the limitations on use specified in the Table. The lift also is required to incorporate the accessible features in accordance with Table E3.6b of the BCA.

The building will require emergency lighting in accordance with Clauses E4.2 & E4.4 of the BCA and AS 2293.1 – 2018.

The building will require exit signage in accordance with Clauses E4.5, E4.6 & E4.8 of the BCA and AS 2293.1 – 2018.

Section F: Health and Amenity

An accessible unisex sanitary compartment is required in all buildings accordance with Clause F2.4 of the BCA and AS 1428.1 – 2009. A male and female sanitary compartment suitable for a person with an ambulant disability is required in accordance with AS 1428.1 – 2009.

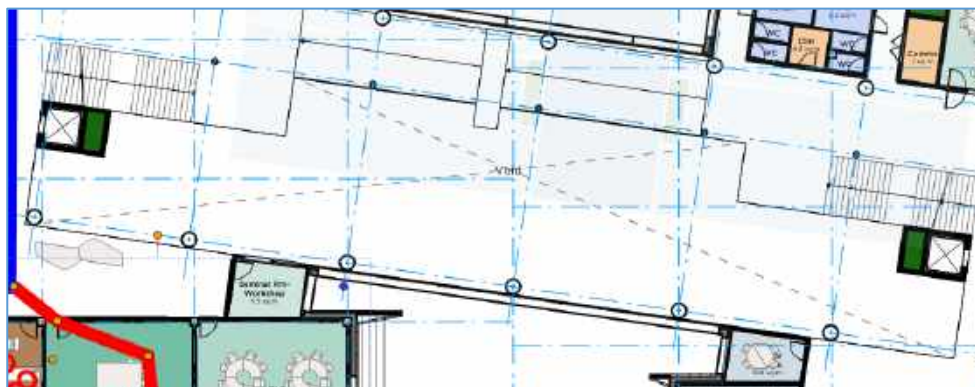
Minimum ceiling heights are to be 2.4m except where 2.1m is permitted in bathrooms, sanitary compartments, storerooms or the like. Ceiling heights are to be 2.7m for an assembly building or a corridor that serves an assembly building or part that accommodates more than 100 persons.

Artificial lighting is required to all rooms that are frequently occupied, all accessible spaces, all corridors and circulation spaces and path of egress in accordance with AS/NZS 1680.0 – 2009.

Ventilation will be required to all rooms occupied by a person for any purpose by means of natural ventilation complying with Clause F4.6 of the BCA or mechanical ventilation/air-conditioning complying with AS 1668.2 – 2012

Section G: Ancillary Provisions

The HUB building contains an atrium void, which connects 4 storeys. The atrium is not separated from the remainder of the building at each storey by bounding walls complying with G3.3 & G3.4 and departure from Part G3 needs to be justified by a fire engineered performance solution.





Section J: Energy Efficiency

The buildings are to be designed to achieve compliance with the relevant provisions of Part J1 to J8 respectively.

Key compliance items include:

- Roof and ceiling construction will be required to achieve compliance with Clause J1.3;
- External wall construction will be required to achieve compliance with Clause J1.5;
- External glazing will be required to achieve compliance with Clause J2.4;
- Building sealing will be required to windows and doors in accordance with the relevant sections Part J3;
- Air-conditioning and mechanical ventilation systems will need to be designed in accordance with the relevant sections of Part J5;
- Artificial lighting and power will need to be designed in accordance with the relevant sections of Part J6;
- Heated water supply system for food preparation and sanitary facilities to be designed and installed in accordance with Part B2 of the Plumbing Code of Australia; and
- Facilities for energy monitoring in accordance with Clause J8.3.

Fire Engineering Alternative Solutions required

Hub Building

Item	Non-Compliance	DTS Clause	Description
1.	When fire-isolated stairways and ramps are required	D1.3	<u>Hub Building</u> The HUB Building is served by two (2) non fire isolated stairways as required exits which connect more than 3 storeys: 
2.	Exit Travel Distances	D1.4	<u>Hub Building</u> Travel distance to a point of choice is at 21m in lieu of 20m on Ground Floor Travel distance to an exit is at 67m in lieu of 40m: 

Item	Non-Compliance	DTS Clause	Description
3.	Distance between alternative exits	D1.5	<u>Hub Building</u> Distance between alternative exits is at 62m in lieu of 60m on Ground Floor  Distance between alternative exits is at 118m in lieu of 60m on Ground Floor 

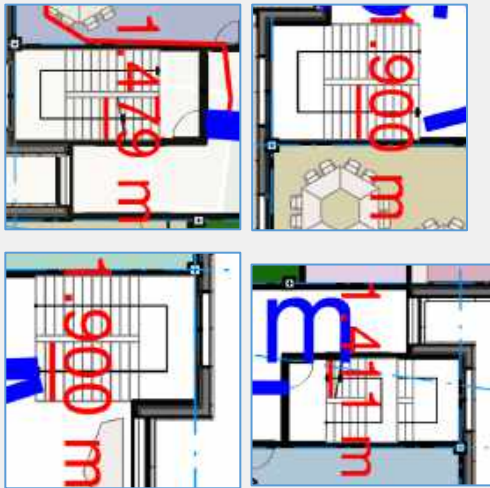
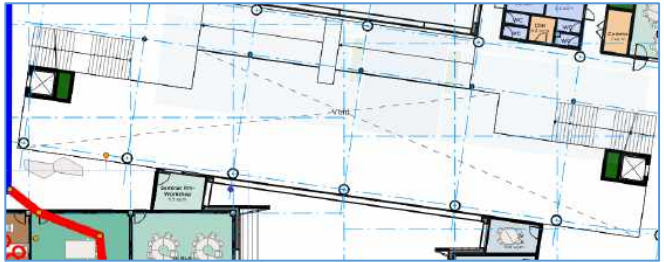
Item	Non-Compliance	DTS Clause	Description
4.	Exit Travel Distances	D1.4	<u>Hub Building</u> Distance to a point of choice is at 30m on Level 1  Travel distance to an exit is at 48m on Level 1: 
5.	Distance between alternative exits	D1.5	<u>Hub Building</u> Distance between alternative exits at 94m in lieu of 60m on Level 1 

Item	Non-Compliance	DTS Clause	Description
6.	Exit Travel Distances	D1.4	<u>Hub Building</u> Distance to a point of choice is at 29m in lieu of 20m on Level 2  Travel distance to an exit is at 46m in lieu of 40m on Level 2: 
7.	Distance between alternative exits	D1.5	<u>HUB Building</u> Distance between alternative exits on Level 2 is at 99m in lieu of 60m: 



Item	Non-Compliance	DTS Clause	Description
8.	Dimensions of exits and paths of travel to exits	D1.6	<u>HUB Building</u> It is assumed that each room accommodate 35 people and there are 28 rooms on Level 2. Level 2 requires an aggregate egress width of 8.5m to accommodate 980 people and 6.6m egress width is provided: 

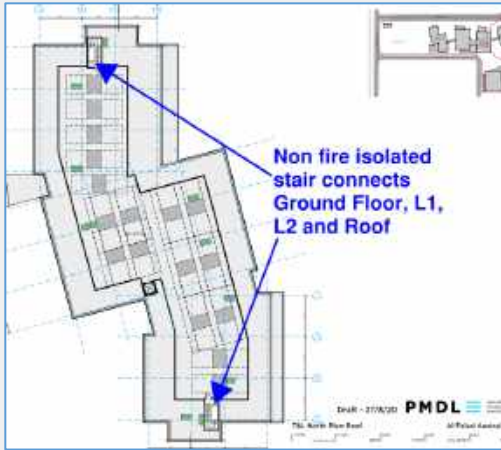
Item	Non-Compliance	DTS Clause	Description
9.	Exit Travel Distances	D1.4	<u>HUB Building</u> Distance to a point of choice is at 29m in lieu of 20m on Level 3  Travel distance to an exit is at 47m in lieu of 40m: 
10.	Distance between alternative exits	D1.5	<u>HUB Building</u> Distance between alternative exits on Level 3 is at 99m in lieu of 60m: 

Item	Non-Compliance	DTS Clause	Description
11.	Dimensions of exits and paths of travel to exits	D1.6	<u>HUB Building</u> It is assumed that each room accommodate 35 people and there are 28 rooms on Level 3. Level requires an aggregate egress width of 8.5m to accommodate 980 people and 6.6m egress width is provided: 
12.	Separation of atrium by bounding walls Construction of bounding walls	G3.3 G3.4	<u>HUB Building</u> The HUB building contains an atrium void, which connects 4 storeys. The atrium is not separated from the remainder of the building at each storey by bounding walls complying with G3.3 & G3.4 and departure from Part G3 needs to be justified by a fire engineered performance solution. 

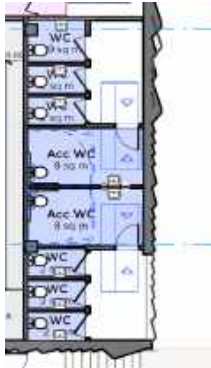
T&L South Building

Item	Non-Compliance	DTS Clause	Description
1.	When fire-isolated stairways and ramps are required	D1.3	<u>T&L South Building</u> Non fire isolated stairway connect Ground Floor, L1, L2 and Roof 

T&L North Building

Item	Non-Compliance	DTS Clause	Description
1.	When fire-isolated stairways and ramps are required	D1.3	<u>T&L North Building</u> Non fire isolated stairway connect Ground Floor, L1, L2 and Roof 

Further Information Required

Item	Description
1.	<u>The HUB Building</u> The linking bridge is not included in this assessment report. Detail of linking bridge needs to be provided
2.	<u>T&L South Building</u> Access and egress path for proposed sanity facilities to be provided: 
3.	Openings in the external walls between separate fire compartments are located within 6m and need to be protected in accordance with C3.4
4.	Walls opposite each other in separate fire compartments are located within 6m and need to be separated in accordance with C3.3

Conclusion

This report documents a preliminary audit of the proposed design against the BCA and the relevant legislative requirements for the issue of a Construction Certificate.

We confirm the proposed design, as shown on the drawings referenced in Appendix A, is capable of achieving compliance with the BCA. The proposed design will therefore be capable of being approved under a Construction Certificate, subject to the provision of further details regarding performance-based solutions and other documentation necessary to satisfy the relevant legislative requirements.



Appendix A – Referenced Documentation

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

Drawing No.	Title	Issue	Date	Drawn By
SK100	HUB Building – L0	-	27 Aug 2020	PMDL
SK102	HUB Building – L1	-	27 Aug 2020	PMDL
SK103	HUB Building – L2	-	27 Aug 2020	PMDL
SK104	HUB Building – L3	-	27 Aug 2020	PMDL
SK105	HUB Building – Roof	-	27 Aug 2020	PMDL
SK101	T&L North Plan – Level 0	-	27 Aug 2020	PMDL
SK102	T&L North Plan – Level 1	-	27 Aug 2020	PMDL
SK103	T&L North Plan – Level 2	-	27 Aug 2020	PMDL
SK104	T&L North Plan – Roof	-	27 Aug 2020	PMDL
SK100	T&L South – Level 0	-	27 Aug 2020	PMDL
SK101	T&L South – Level 1	-	27 Aug 2020	PMDL
SK102	T&L South – Level 2	-	27 Aug 2020	PMDL
SK103	T&L South – Roof	-	27 Aug 2020	PMDL
DA110	MPH North L0 Plan	-	27 Aug 2020	PMDL
DA111	MPH North L1 Plan	-	27 Aug 2020	PMDL
DA112	MPH North Roof Plan	-	27 Aug 2020	PMDL



Appendix B – Fire-resistance levels

The below table contain the fire-resistance levels (FRL) required under Specification C1.1 of the BCA.

Type A Construction: FRL of Building Elements				
Building element	Class of building - FRL: (in minutes)			
	Structural adequacy/Integrity/Insulation			
	2, 3 or 4 part	5, 9 or 7a	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated within it) or other external building element, where the distance from any fire-source feature to which it is exposed is-				
For loadbearing parts-				
less than 1.5m	90/90/90	120/120/120	180/180/180	240/240/240
1.5 TO LESS THAN 3 M	90/60/60	120/ 90/ 90	180/180/120	240/240/180
3 OR MORE	90/60/30	120/ 60/ 30	180/120/90	240/180/ 90
For non-loadbearing parts-				
less than 1.5 m	-/90/90	- /120/120	- /180/180	- /240/240
1.5 TO LESS THAN 3 M	-/60/60	- / 90/ 90	- /180/120	- /240/180
3 m or more	- / - / -	- / - / -	- / - / -	- / - / -
EXTERNAL COLUMN not incorporated in an external wall-				
For loadbearing columns	90/ - / -	120/ - / -	180/ - / -	240/ - / -
For non-loadbearing columns	- / - / -	- / - / -	- / - / -	- / - / -
COMMON WALLS and FIRE WALLS	90/90/90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS-				
Fire-resisting lift and stair shafts-				
Loadbearing	90/90/90	120/120/120	180/120/120	240/120/120
Non-loadbearing	- /90/90	- /120/120	- /120/120	- /120/120
Bounding public corridors, public lobbies and the like-				
Loadbearing	90/90/90	120/ - / -	180/ - / -	240/ - / -
Non-loadbearing	- /60/60	- / - / -	- / - / -	- / - / -
Between or bounding sole-occupancy units-				
Loadbearing	90/90/90	120/ - / -	180/ - / -	240/ - / -
Non-loadbearing	- /60/60	- / - / -	- / - / -	- / - / -
Ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of Combustion-				
Loadbearing	90/90/90	120/ 90/ 90	180/120/120	240/120/120
Non-loadbearing	- /90/90	- / 90/ 90	- /120/120	- /120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES AND COLUMNS				
	90/ - / -	120/ - / -	180/ - / -	240/ - / -
FLOORS	90/90/90	120/120/120	180/180/180	240/240/240
ROOFS	90/60/30	120/ 60/ 30	180/60/30	240/ 90/ 60



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



Type C Construction: FRL of Building Elements				
Building element	Class of building - FRL: (in minutes)			
	<i>Structural adequacy/Integrity/Insulation</i>			
	2, 3 or 4 part	5, 9 or 7a	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any fire-source feature to which it is exposed is-				
less than 1.5m	90/90/90	90/90/90	90/90/90	90/90/90
1.5 TO LESS THAN 3 M	-/-/-	60/60/60	60/60/60	60/60/60
3 M OR MORE	-/-/-	-/-/-	-/-/-	-/-/-
EXTERNAL COLUMN not incorporated in an external wall, where the distance from any fire-source feature to which it is exposed is-				
less than 1.5 m	90/ - / -	90/ - / -	90/ - / -	90/ - / -
1.5 or less than 3 m	- / - / -	60/ - / -	60/ - / -	60/ - / -
3 m or more	- / - / -	- / - / -	- / - / -	- / - / -
COMMON WALLS and FIRE WALLS	90/90/90	90/90/90	90/90/90	90/90/90
INTERNAL WALLS-				
Bounding public corridors, public lobbies and the like-				
	60/60/60	- / - / -	- / - / -	- / - / -
Between or bounding sole-occupancy units-				
	60/60/60	- / - / -	- / - / -	- / - / -
Bounding a stair if required to be rated-				
	60/60/60	- / - / -	- / - / -	- / - / -
ROOFS	- / - / -	- / - / -	- / - / -	- / - / -