



BUILDING CODE OF AUSTRALIA REPORT

Revision: C – 8 June 2018

**Concord Repatriation General Hospital
Redevelopment
Hospital Road, Concord**

Prepared for: JOHNSTAFF

BCA ASSESSMENT REPORT

Concord Hospital Re-development (Stage 1) – Clinical Services Building (CSB)
Hospital Road, Concord

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Date	Rev No	No. of Pages	Issue or Description of Amendment	Assessed By	Approved By	Date Approved
20.03.18	A	52	Draft SSD report for comment	Vijay Perumal	Andrew Brohier	20.03.18
29.03.18	B	52	BCA report for SSD	Vijay Perumal	Andrew Brohier	29.03.18
08.06.18	C	52	Update with Town Planners comments	Vijay Perumal	Andrew Brohier	29.03.18

Executive Summary

The site

The site is located at 1H Hospital Road, Concord.

Development Overview (Concept + stage 1)

This SSDA report seeks consent for the proposed redevelopment of Concord Repatriation General Hospital to improve and replace outmoded facilities to meet the substantial growth in clinical service demand across the hospital's catchment:

- Concept approval is sought for the redevelopment indicatively comprising 82,000sqm GFA, to be undertaken in two (2) stages including:
 - Clinical Services Building (CSB) and multi storey carpark (Stage 1); and
 - Acute Services Building (ASB) and multistorey carpark (Stage 2).
- Detailed approval is sought for the Stage 1 construction of the proposed CSB (44,000sqm GFA) and the construction of a multi-storey car park located to the north of Hospital Road.

Detailed development approval for the proposed Stage 2 works will be completed at a later date and does not form part of this SSDA. The Concept redevelopment has an indicative delivery timeframe of 25 years. The Stage 1 Detailed works are estimated to be completed by end 2021.

The proposed Concept redevelopment is in accordance with the concept architectural package prepared by Jacobs.

The proposed Stage 1 detailed development (CSB and multistorey carpark) is in accordance with the architectural drawings prepared by Jacobs.

The areas in the below staging plans have been assessed and are included within this report.

It should be noted that whilst the SEAR's does not contain any items specific to the BCA this report is provided to support and inform the proposed SSD.

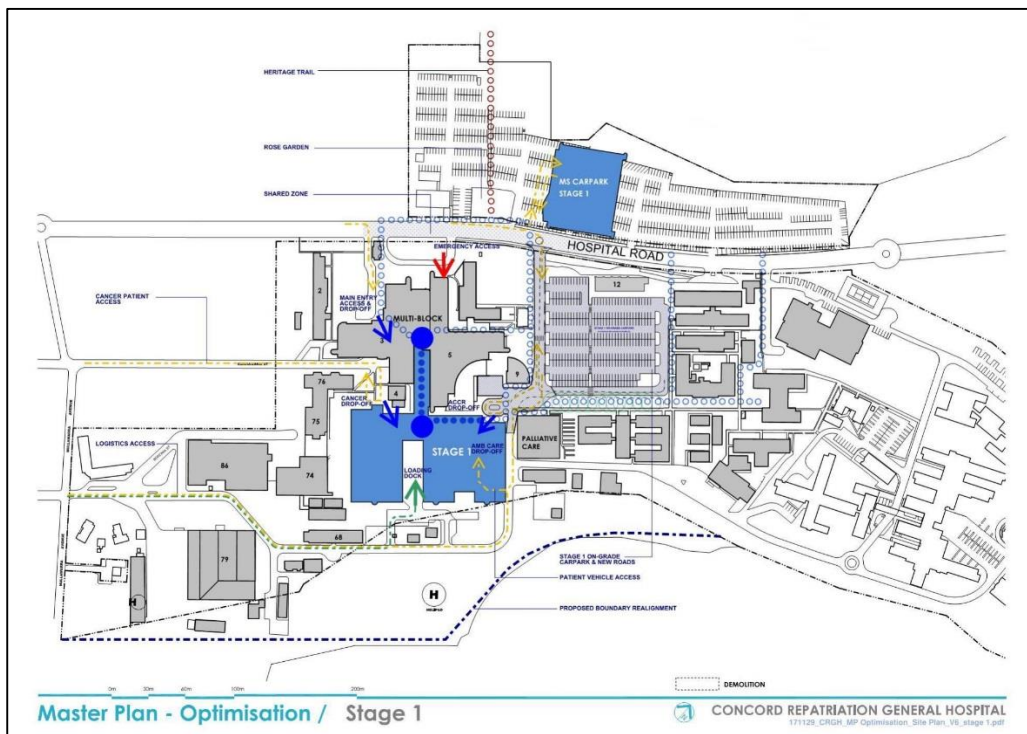


Figure 1. Extract of the CRGH Masterplan/ Concept Design Optimisation Report Stage 1 (December 2017)

Source: NSW Health Infrastructure/Capital Insight (2017)

Compliance Summary

As Accredited Certifiers, we have reviewed architectural design documents prepared by JACOBS (refer appendix A) for compliance with the Building Code of Australia 2016 (Amendment 1)

In this regard the following areas in particular require further review as the project develops:

No.	Items for review	Responsibility
1.	Please advise if there are any proposed alternative building solutions with regard to design of the building services for the project.	Services consultants
2.	Survey all of existing fire and compartmentation walls, forming part of new works to be provided, confirming respective fire resistance levels (FRL's)	Structural engineer
3.	Certification to be provided which confirms the adequacy of any existing elements which will be relied upon for any new/proposed works	Structural engineer
4.	Fire service drawings required to be submitted confirming locations of all proposed fire services infrastructure relevant to the enabling works scope (sprinklers, portable fire extinguishers, fire hydrants/ booster assemblies and hose reels etc.)	Fire services engineer
5.	Fire services engineer to provide confirmation that on the completion of building work, the fire protection of the subject buildings and life safety of occupants will not be reduced. Also ensuring that all new works will comply with the current standard of performance	Fire services engineer

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6.	Confirmation from electrical engineer required confirming all substations will be installed as per the relevant electricity utility provider specifications and relevant Australian Standard/s	Electrical engineer
7.	Confirmation to be provided that egress and access will be maintained throughout all relevant portions of the existing and proposed buildings, affected by the enabling works scope at all times, otherwise can't be used for egress. Existing buildings egress strategy required to be finalised and forwarded for review	Client / architect
8.	Intended use of 'non-patient care' areas to be advised for further review	Client / architect
9.	Please confirm if any lightweight fire-resistant construction is proposed to be utilized. Please submit relevant technical data sheets and test reports of proposed products to confirm compliance with the BCA	Architect
10.	All fire and smoke compartments to be reviewed to not exceed more than 10% than the deemed-to-satisfy provisions of the BCA	Architect
11.	Fire walls have a number of doors located throughout the proposed building with no indication of fire-rated doors in accordance with the BCA. Please provide additional plan notes confirming doors will be fire rated with compliant FRL's	Architect
12.	Services engineer required to mark-up floor plans confirming intended use of all services & plant rooms within the building. Where these areas are proposed not to be separated in accordance with C2.12 & C2.13 of the BCA, a fire engineered solution will be required to be obtained	Services engineers
13.	Scaled site plan required to be provided clearly depicting distances to other buildings on the allotment and distances to all boundaries on the allotment	Architect
14.	Final compartment drawings are required to be provided to confirm separation of openings in external walls and associated openings in different fire compartments in accordance with C3.3 of the BCA	Architect
15.	Slab edge and wall / curtain wall / glass details required to be provided to confirm adequate fire/smoke separation within the building	Architect
16.	Internal wall to external wall junction details required to be provided to confirm adequate fire/smoke separation within the building	Architect
17.	Staff and patient numbers to be provided to determine egress and sanitary facility requirements	Client
18.	All required egress paths exiting the building from the basement level through carpark and loading dock area to be permanently marked on ground with a minimum width of 1m. Plan notes to be provided	Architect
19.	All electrical distribution boards and the like to adequately fire and smoke separated. Plan notes to be provided on architectural details	Architect
20.	Stairs leading from discharge point of north-west exit on ground currently greater than 2m wide. This stairs are required to be provided with handrails in accordance with D2.9 of the BCA	Architect
21.	Confirmation to be provided confirming if roof egress passageways are proposed to be fire isolated in accordance with D2.11 of the BCA	Architect
22.	Final stair details required to be provided for review	Architect
23.	Balustrade and barrier details required to be provided for review	Architect

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24.	All sliding doors proposed within non-patient care areas to comply with fail-safe requirements as per D2.19 of the BCA. Plan notes to be provided on architectural details	Architect
25.	Confirmation to be provided that all doors within all fire-isolated stairways will not be able to be locked from the inside as per D2.22 of the BCA	Architect
26.	FIP locations within the existing and new portions of the building required to be details	Fire services engineer
27.	Clear ceiling height details required to be provided within theatre rooms confirming compliance with F3.1 of the BCA	Architect
28.	Section J Report or JV3 assessment report required to be submitted for review	ESD consultant

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

No.	Alternative Solution Description	DTS Clause	Performance Requirement
Fire Safety Items			
1.	<p>Rationalisation of fire resistance levels</p> <p>As the building is required to be constructed of Type A construction, all external walls are required to be constructed in accordance with Table 3.9 of Spec C1.1.</p> <p>Confirmation to be provided whether this will be achieved. Any rationalisation to the FRL's will be required to be addressed as part of the fire engineered solution for the proposal</p>	C1.1, Spec C1.1	CP1, CP2, CP3
2.	<p>Atrium roof fire resistance levels</p> <p>Where the atrium roof has not been constructed to achieve the required FRL's in accordance with Spec. C1.1 this will be required to be addressed as part of the fire engineered solution for the proposal</p>	C1.1, Spec C1.1	CP1, CP2
3.	<p>Link bridge fire resistance levels</p> <p>Where the link bridge has not been constructed to achieve the required FRL's in accordance with Spec. C1.1 this will be required to be addressed as part of the fire engineered solution for the proposal</p>	C1.1, Spec C1.1	CP1, CP2
4.	<p>Compartmentation and separation</p> <p>The proposed hospital street atrium will not be separated from the remainder of the building with Part G3 deemed-to-satisfy compliance.</p> <p>This will be required to be addressed as part of the fire engineered solution for the proposal</p>	C2.2	CP1, CP2, CP3, EP2.2

5.	Compartmentation of 9a buildings	C2.5	CP1, CP2, CP3, EP2.2
<p>There are multiple fire and smoke compartments within the building that are proposed to exceed the prescriptive requirements of clause C2.5. Refer to Section 3.2 of the report for further information.</p> <p>This will be required to be addressed as part of the fire engineered solution for the proposal</p>			
6.	Vertical separation of openings in external walls	C2.6	CP2, CP8
<p>As parts of the existing building is not provided with a sprinkler system in accordance with Spec. E1.5. Spandrel separation throughout the proposed building will be required to be addressed as part of the fire engineered solution for the proposal.</p>			
7.	Separation in fire walls	C2.7, Spec C1.1	CP1, CP2, CP3
<p>The proposed and existing fire walls, within the atrium space located from lower ground floor to level 3 are proposed to be constructed not in accordance with the prescriptive requirements.</p> <p>The required fire walls within this location currently form openings (within the existing building) which will not meet the required FRL's.</p> <p>This will be required to be addressed as part of the fire engineered solution for the proposal.</p>			
8.	Separation in fire walls	C2.7, Spec C1.1	CP1, CP2, CP3
<p>It is proposed to utilise a fire curtain on ground floor in lieu of a fire wall complying with C2.7. It is anticipated that the proposed fire curtain will not achieve the required FRL's as per the prescriptive requirements.</p> <p>This will be required to be addressed as part of the fire engineered solution for the proposal.</p>			
9.	Separation of classifications in the same storey	C2.8, Spec C1.1	CP1, CP2, CP3
<p>It is anticipated that a fire engineered solution will be proposed to reduce the required FRL of fire walls between the loading dock & drop off area (class 7a) from the hospital building on the basement level.</p>			
10.	Separation of classification in different storeys	C2.9, Spec C1.1	CP1, CP2
<p>It is anticipated that a fire engineered solution will be proposed to reduce the required horizontal FRL between the loading dock / drop off area on basement from the hospital on lower ground</p>			
11.	Separation of equipment	C2.12, C2.13	CP2, CP7

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Services engineer required to mark-up floor plans confirming intended use of all services & plant rooms within the building. Where these areas are proposed not to be separated in accordance with C2.12 & C2.13 of the BCA, this will be required to be addressed as part of the fire engineered solution for the proposal

12.	Separation of lift shafts As the glass lifts proposed within the atrium will pass through the atrium space and will not be afforded with the prescriptive FRL in accordance with Spec. C1.10, this will be required to be addressed as part of the fire engineered solution for the proposal.	C2.10	CP1, CP2, CP8
13.	Protection of Openings The following openings in the external walls are proposed to be addressed through a fire engineered solution: <ul style="list-style-type: none">• Distance between building 5 and portion of main works from basement to level 2, being less than 6m with unprotected openings• Distance between building 3 and portion of main works from lower ground to level 2, being less than 6m with unprotected openings	C3.2	CP1, CP2, CP3
14.	Separation of openings in different fire compartments Where the distance between parts of external walls and any openings within are in different fire compartments that have been separated by a fire wall and are not protected in accordance with C3.4, this will be required to be addressed as part of the fire engineered solution for the proposal	C3.3	CP1, CP2, CP3
15.	Acceptable methods of protection Where there are openings within the atrium space and these openings are not proposed to be protected in accordance with C3.4 of the BCA, this will be required to be addressed as part of the fire engineered solution for the proposal	C3.4	CP1, CP2, CP3
16.	Openings in fire-isolated exits A window in an external wall of a fire-isolated stairway, fire-isolated passageway or fire-isolated ramp must be protected in accordance with C3.4 if it is within 6 m – Architectural details currently indicate drenchers across openings within Fire Isolated Stair 3. Where it is proposed not to provide protection in accordance with C3.4, this will be required to be addressed as part of the fire engineered solution for the proposal.	C3.8	CP2, DP5, EP2.2
17.	Openings in fire-isolated lift shaft As the glass lifts proposed within the atrium will pass through the atrium space and the door openings will not achieve required FRL's, this will be required to be	C3.10	CP1, CP2

	addressed as part of the fire engineered solution for the proposal.		
18.	<p>Openings for service installation</p> <p>Services pipes (including gas) are proposed to connect more than 2 fire compartments.</p> <p>This will be required to be addressed as part of the fire engineered solution for the proposal</p>	C3.15, Spec C3.15	CP2, CP8
19.	<p>Construction joints</p> <p>Where the junction point between slab edge and wall / curtain wall / glass will not be provided with adequate fire and smoke separation. This will be required to be addressed as part of the fire engineered solution for the proposal</p> <p>Details required to be provided by the architect for review</p>	C3.16	CP1, CP2, CP8, EP2.2
20.	<p>Exit Travel Distance</p> <p>The following travel distances will be required to be addressed through a performance solution in the event that they are not reduced through design:</p> <p>Basement</p> <ul style="list-style-type: none"> ▪ BL_2 Fire compartment <ul style="list-style-type: none"> ○ Up to 22.2m to a point of choice ▪ BL_3 Fire Compartment <ul style="list-style-type: none"> ○ Exit doors to be indicated on plans ○ Up to 22m to a point of choice from Bunker in lieu of 12m ▪ BL_7 Fire Compartment <ul style="list-style-type: none"> ○ 69.4m to an exit <p>Lower Ground</p> <ul style="list-style-type: none"> ▪ General <ul style="list-style-type: none"> ○ Horizontal Exit door to be indicated between LG1 and LG2.2 ▪ LG_3 Fire <ul style="list-style-type: none"> ○ Up to 16.2m to a point of choice in lieu of 12m ▪ Public roof terrace <ul style="list-style-type: none"> ○ Up to 37m to a single exit in lieu of 20m ▪ LG_8 Fire Compartment <ul style="list-style-type: none"> ○ Up to 15.2m to a point of choice in lieu of 12m and total of 35.9m to the exit in lieu of 30m ▪ LG_7 Fire Compartment <ul style="list-style-type: none"> ○ Up to 37.2m to an exit in lieu of 30m ○ Up to 13m to a point of choice in lieu of 12m 	D1.4	DP4, EP2.2

Ground Floor

- BL_1 Fire Compartment
 - Utilisation of a fire curtain
 - Up to 21.6m to a point of choice in lieu of 20m

- GL_1 Fire Compartment
 - 15.9m to a point of choice in lieu of 12m and total of 36.8m to an exit in lieu of 30m
 - 19.2m to a point of choice in lieu of 12m
 - Up to 36.8m to an exit in lieu of 20m

- GL_1.2 Fire Compartment
 - 24.4m to a single exit in lieu of 20m

- GL_2 Fire Compartment
 - Up to 21.5m to a point of choice in lieu of 20m

- GL_3 Fire Compartment
 - 30.8m to an exit in lieu of 30m
 - 23.2m to a point of choice in lieu of 20m and 44.2m to an exit in lieu of 30m

- GL_4 Fire Compartment
 - 30.1m to an exit in lieu of 30m

Level 1

- L1_1.2 Fire Compartment
 - 20.8m to an exit in lieu of 20m

- L1_3 0 Fire Compartment
 - Up to 18.3m in lieu of 12m and total of 33.8m to an exit in lieu of 30m
 - Up to 18.3m to a point of choice in lieu of 12m and total of 35m to an exit in lieu of 30m
 - Up to 16.4m to a point of choice in lieu of 12m

Level 3

- L3_1 Fire Compartment
 - 69.1m to an exit in lieu of 40m
- L3_2 – Fire Compartment
 - Up to 37.2m to an exit in lieu of 30m
- L3_3 – Fire Compartment
 - Door to be indicated to plant room
 - Up to 17.3m to a point of choice in lieu of 12m

- L3_5 – Fire Compartment
 - Up to 16.7m to a point of choice in lieu of 12m

Level 4

- L4_1 – Fire Compartment

- Up to 69.1m to an exit in lieu of 40m
- L4_2 Fire Compartment
 - 13.5m to a point of choice in lieu of 12m and total of 40.4m to an exit in lieu of 30m
 -
- L4_3 Fire Compartment
 - Up to 17.7m to a point of choice in lieu of 12m and total of 33.7m to an exit in lieu of 30m
 -

Level 5

- L5_2 Fire Compartment
 - Up to 13.5m to a point of choice in lieu of 12m and total of 40.4m to an exit in lieu of 30m
- L5_1 – Fire Compartment
 - 36.7m to a single exit in lieu of 20m

Level 6

- L6_1 – Fire Compartment
 - 47m to a point of choice in lieu of 20m and total of 65.4m to an exit in lieu of 40m

20.	Distance between alternative exits The following distances between alternative exits will be required to be addressed through a performance solution in the event that they are not reduced through design:	D1.5	DP4, EP2.2
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Basement

- BL_4 – Fire Compartment
 - 82m between alternative exit in lieu of 60

Lower Ground

- LG_1 Fire Compartment
 - Up to 63m between alternative exits in lieu of 60m
- LG_7 Fire Compartment
 - Up to 67.6m between alternative exits in lieu of 45m

Ground Floor

- BL_1 Fire Compartment
 - Up to 76m between alternative exits in lieu of 60m
- GL_1 Fire Compartment
 - Up to 64.1m between alternative exits in lieu of 45m
- GL_3 Fire Compartment
 - 48.9m between alternative exits in lieu of 45m
- GL_4 Fire Compartment

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- 46.5m between alternative exits in lieu of 45m

Level 1

- BL_1 Fire Compartment
 - 71.6m between alternative exits in lieu of 60m

Level 2

- BL_1 Fire Compartment
 - Up to 71.6m between alternative exits in lieu of 60m

Level 3

- L3_1 Fire Compartment
 - Up to 81.8m between alternative exits in lieu of 60m
- L3_2 – Fire Compartment
 - 51.3m Between alternative exits in lieu of 45m

Level 4

- L4_1 – Fire Compartment
 - Up to 81.8m between alternative exits in lieu of 60m

Level 5

- L5_2 Fire Compartment
 - Up to 49m between alternative exits in lieu of 45m

Level 6

- L6_1 – Fire Compartment
 - 64.5m between alternative exits in lieu of 60m
 - 77.8m between alternative exits in lieu of 60m

21.	Unobstructed width of exits Where the unobstructed width of doorways within rooms of patient care areas (required to transport beds) cannot achieve a minimum width of 1200mm, this will be required to be addressed through a performance solution in the event that they are not reduced through design.	D1.6	DP2, DP4
22.	Travel via fire-isolated exits Egress stair 5 discharges and passes via multiple openings within the external wall of the main building, on the basement level. Where these openings will not be provided with the required FRL's and protected in accordance with C3.4, this will be required to be addressed through a performance solution.	D1.7	CP2, DP5, EP2.2
23.	Discharge from exits	D1.10	DP2, DP4

Access to the road which is at a different level to the discharge point has been proposed to be provided via stairs in lieu of a ramp as required for class 9a buildings located at discharge point from North West exit on ground floor.

This will be required to be addressed through a performance solution

24.	Horizontal exits	D1.11	DP4, EP2.2
<p>The following fire compartments are required to travel through multiple fire compartments prior to reaching a required exit:</p> <ul style="list-style-type: none"> ▪ Lower Ground Floor – LG_3, LG_1, LG_5 ▪ Ground Floor – GL_2, GL_5, <p>All fire compartments within the building have horizontal exits that comprise more than half the required exits. This will be required to be addressed through a performance solution</p>			
25.	Fire-isolated passageways	D2.11	DP4, DP5, CP2
<p>It is anticipated that a fire engineered solution will be obtained for the construction of the following fire-isolated passageways:</p> <ol style="list-style-type: none"> 1. Basement Level from Stair 4 2. Level 3 – Stair 3 3. Level 4 – Stair 3 4. Level 6 – Stair 1 & 2 <p>This will be required to be addressed through a performance solution</p>			
26.	Swinging doors	D2.20	DP4, EP2.2
<p>It is anticipated that a fire engineered performance solution has been proposed to support doors swinging in a single direction where required to swing in both directions for egress purposes.</p> <p>This will be required to be addressed through a performance solution</p>			
27.	Fire hydrants	E1.3	EP1.3
<p>Due to the nature of the building having multiple entrances a fire engineered performance solution will be required, as the booster assembly will not be located in sight of the main entrance to the building. This will be required to be addressed through a performance solution</p>			
28.	Fire hydrants	E1.3	EP1.3

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	Internal hydrants within fire isolated stairs will have elements of construction which are not completely fire rated. This will be required to be addressed through a performance solution		
29.	Fire hydrants In the instance that the fire hydrant booster assembly is within 10m to the building and not afforded with radiant heat protection in accordance with AS 2419.1 – 2005, this will be required to be addressed through a performance solution	E1.3	EP1.3
30.	Fire hydrants The fire pump room located on basement level, discharges into an undercover area in lieu of clause 6.4.2 of AS2419.1-2005. This will be required to be addressed through a performance solution	E1.3, D1.7	EP1.3
31.	Fire hose Reels It is anticipated that fire hoses will pass through fire and smoke doors in order to achieve coverage. This will be required to be addressed through a performance solution	E1.4	CP2 & EP1.1
32.	Fire hose Reels It is anticipated that fire hoses coverage will not be achieved throughout the link bridges. This will be required to be addressed through a performance solution	E1.4	EP1.1
33.	Fire hose reels It is anticipated that fire hoses will not be provided within 4m of an exit. This will be required to be addressed through a performance solution	E1.4	EP1.1
34.	Sprinklers Part of the exiting building is not protected with sprinklers complying with Spec. E1.5. The sprinklered and non-sprinklered parts must be fire-separated as per specific deemed-to-satisfy Provisions of the BCA. It is anticipated a fire engineered solution will be obtained to reduce the required FRL's	E1.5, Spec E1.5	CP2, CP3, EP1.4
35	Smoke hazard management Smoke hazard management throughout the whole building will be required to be addressed through a performance solution	E2.2, Spec E2.2a, Spec E2.2b	EP2.2
36.	Emergency lifts Emergency lifts will not service all storeys within the development and required to be addressed through a fire engineered solution	E3.4	EP3.2

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37.	Exit signs As the atriums internal floor to ceiling height is greater than 2.7m – the proposed emergency exit signage within this area will not be installed in accordance with AS 2293.1 – 2005 (Amd. 1 & Amd. 2).	E4.5	EP4.2
38.	Omission of Speakers (SSISEP) Speakers associated with the SSISEP will be omitted from the operating rooms and patient bedrooms in lieu of adjusting the alarm to minimum trauma.	E4.9	EP1.3 & EP4.3
39.	Atrium The construction of the atrium is required to be addressed through a fire engineered performance solution. As it is proposed not to comply with the DTS provisions as per G3 of the BCA	Spec. G3.8	CP1, CP2, CP3, EP2.2

Accessibility Items – as per Access report 74868 dated 14 March 2018

1.	Clinical and operational areas of the hospital will not provide compliant accessible paths of travel 'to and within all areas' for a staff member with a disability.	D3.1	DP1
2.	Male and female ambulant cubicles will not be provided at every bank of toilets for staff and patient use	F2.4	FP2.1

The fire engineered solution relating to EP1.3, EP1.4, EP2.2, EP3.2 will be subject to consultation with the NSW Fire Brigade as part of the Construction Certificate process under Clause 144 of the Environmental Planning & Assessment Regulation 2000.

The application for Construction Certificate shall be assessed under the relevant provisions of the Environmental Planning & Assessment Act 1979 (As Amended) and the Environmental Planning & Assessment Regulation 2000.

1.0 Introduction

This SSDA report seeks consent for the proposed redevelopment of Concord Repatriation General Hospital to improve and replace outmoded facilities to meet the substantial growth in clinical service demand across the hospital's catchment:

- Concept approval is sought for the redevelopment indicatively comprising 82,000sqm GFA, to be undertaken in two (2) stages including:
 - Clinical Services Building (CSB) and multi storey carpark (Stage 1); and
 - Acute Services Building (ASB) and multistorey carpark (Stage 2).
- Detailed approval is sought for the Stage 1 construction of the proposed CSB (44,000sqm GFA) and the construction of a multi-storey car park located to the north of Hospital Road.

Detailed development approval for the proposed Stage 2 works will be completed at a later date and does not form part of this SSDA. The Concept redevelopment has an indicative delivery timeframe of 25 years. The Stage 1 Detailed works are estimated to be completed by end 2021.

The proposed Concept redevelopment is in accordance with the concept architectural package prepared by Jacobs.

The proposed Stage 1 detailed development (CSB and multistorey carpark) is in accordance with the architectural drawings prepared by Jacobs.

The areas in the below staging plans have been assessed and are included within this report.

It should be noted that whilst the SEAR's does not contain any items specific to the BCA this report is provided to support and inform the proposed SSD.

Further analysis to be undertaken for subsequent stages of development at that time.



Figure 2. Indicative photomontage of proposed CSB when viewed to the North West

Source: NSW Health Infrastructure/Jacobs (2017)

This report is based upon the review of the design documentation listed in Appendix A of this Report

The report is intended as an overview of the relevant provisions of the Building Code of Australia for assistance only. Detailed drawings and associated review will still be required as the final design is developed.

1.1 Current Legislation

The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979. This Act requires that all new building works must be designed to comply with the BCA.

The version of the BCA applicable to the development, is version that in place at the time of the application to the Certifying authority for the Construction Certificate. For the purposes of this Report, BCA 2016 Amendment 1 has been utilised as the version of the BCA applicable at the time of preparation this Report.

1.2 Upgrade to Existing Buildings

The local authority when assessing the development application may require that the existing building be brought into partial on full compliance with the current provisions at the BCA. The trigger for upgrade includes:

- Where the building works, together with any other works completed or authorised within the previous 3 years, represents more than half the total volume of the building; or
- Council are not satisfied the measures contained in the building are not adequate for the safety of present using the building or prevention of special to adjacent buildings. .

Further investigations, including a site inspection will be required to ascertain the extent of the upgrade works required for the existing building to ensure that a suitable level of life safety, health and amenity for the occupants within the building is maintained. The upgrade works will be based upon using the current regulations as an applicable benchmark and our expertise to judge what is considered to be suitable.

Notwithstanding the above, where practical benefits and improvements to fire and life safety can be achieved without major cost or disruption, it is recommended that the relevant compliance parameters be upgraded to meet current requirements where possible.

1.3 Aluminium Composite Panels

Demonstrating Compliance with the BCA

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The development is subject to compliance with the Building Code of Australia. Compliance with the BCA Performance Requirements may be demonstrated through the following means:-

- a) Performance Solution; or
- b) Deemed-to-Satisfy Solution; or
- c) combination of (a) and (b)

Evidence of Suitability, as outlined under BCA CI A2.2, may be used to demonstrate that a material or product, form of construction meets a performance requirement of deemed-to-satisfy solution. Current Certificates of Conformity may be relied upon (BCA CI A2.2 (ii)).

BCA Performance Requirements

In relation to the use of ACPs as part of an external wall system / cladding system, the relevant BCA Performance Requirement is noted as CP2 and CP4; being

Performance Requirement CP2

(a) A building must have elements which will, to the degree necessary, avoid the spread of fire—

- (i) to 0; and*
- (ii) to sole-occupancy units and public corridors; and*
- (iii) between buildings; and*
- (iv) in a building.*

(b) Avoidance of the spread of fire referred to in (a) must be appropriate to—

- (i) the function or use of the building; and*
- (ii) the fire load; and*
- (iii) the potential fire intensity; and*
- (iv) the fire hazard; and*
- (v) the number of storeys in the building; and*
- (vi) its proximity to other property; and*
- (vii) any active fire safety systems installed in the building; and*
- (viii) the size of any fire compartment; and*
- (ix) fire brigade intervention; and*
- (x) other elements they support; and*
- (xi) the evacuation time.*

Performance Requirement CP4

To maintain tenable conditions during occupant evacuation, a material and an assembly must, to the degree necessary, resist the spread of fire and limit the generation of smoke and heat, and any toxic gases likely to be produced, appropriate to—

- (a) the evacuation time; and*
- (b) the number, mobility and other characteristics of occupants; and*
- (c) the function or use of the building; and*
- (d) any active fire safety systems installed in the building.*

Deemed-to-Satisfy provisions of the BCA

As the building is required to be of Type A Construction the following provisions are applicable to the external wall/cladding construction:-

1. the external walls must be non-combustible as determined by AS1530.1:1994 (BCA Specification C1.1, Clause 3.1(b)).
2. BCA Specification C1.1, Clause 2.4 requires that attachments to external walls (required to be fire resisting) may be combustible, subject to a number of provisions, including:

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- a) *the material is exempted under C1.10 or complies with the fire hazard properties prescribed in Specification C1.10; and*
- b) *it is not located near or directly above a required exit so as to make the exit unusable in a fire; and*
- c) *it does not otherwise constitute an undue risk of fire spread via the facade of the building.*
- d) *The attachment of a facing or finish, or the installation of ducting or any other service, to a part of a building required to have an FRL must not impair the required FRL of that part.*

Please ensure the above requirements have been taken into consideration and contact us, for any further information.

2.0 PRELIMINARIES

2.1 Building Assessment Data

Summary of Construction Determination: -

Part of Project	Whole Building
Classification	9a
Number of Storeys	12
Rise In Storeys	12
Type of Construction	A
Effective Height (m)	44.09m*

*Effective height taken RL 48090 of existing plant room – 4000 of the main works basement level

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

Part of Project	BCA Class	Approx. Floor Area (m ²)	Assumed Population
Basement	9a	5996.8m ² *	326*
Basement	7a	2629.5m ² *	(as above)
Lower Ground	9a	9180.1m ² *	710*
Ground	9a	7917.7m ² *	595*
Level 1	9a	5831.2m ² *	511*
Level 2	9a	5483.3m ² *	472*
Level 3	9a	4239m ² *	371*
Level 4	9a	4219.4m ² *	366*
Level 5	9a	3753.4m ² *	337*
Level 6	9a	1606.7m ² *	54*
	Total	50857.1m²*	3742*

Notes:

1. The above populations have been based on the floor areas and calculations in accordance with Table D1.13 of the BCA. Confirmation to be provided from the client confirming staff and patient numbers per storey
2. The floor areas are to be confirmed by the architect

Summary of the fire and smoke compartments where applicable as tabulated below: -

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Part of project	Fire compartments	Smoke compartments
Basement	BL_1.1: 452m2	BL_3.1: 1070m2
	BL_2 :749m2	BL_3.2: 823.5m2
	BL_3: 1899.5m2	
	BL_4.1: 1152m2	
	BL_5: 422.5m2	
	BL_6: 240.5m2	
	BL_7: 474m2	
Lower Ground	LG_1: 1183.5m2	Nil
	LG_2.1 599.5m2	
	LG_2.2: 637m2	
	LG_3: 1123.5m2	
	LG_4: 1474m2	
	LG_5: 78m2	
	LG_7: 1561.5m2	
	LG_8: 1730m2	
Ground	GL_1: 793.5m2	GL_1.2: 793.5m2
	GL_1.1: 1597.5m2	GL_1.2: 1119.5m2
	GL_1.2: 167.5m2	GL_4.1: 626.5m2
	GL_2: 599m2	GL_4.2: 569.5m2
	GL_3: 1452.5m2	
	GL_4: 1196m2	
GL_5: 609.5m2		
Level 1	L1_1.1: 268.5m2	L1_2.1: 433.5m2
	L1_1.2: 241.5m2	L1_2.2: 489.5m2
	L1_2: 923m2	
	L1_3: 668m2	
	L1_4: 591.5m2	
	L1_5: 648m2	
Level 2	L2_1: 269.5m2	L2_2.1: 410.5m2
	L2_2: 902m2	L2_2.2: 491.5m2
	L2_3: 668m2	
	L2_4: 574m2	
	L2_5: 669.5m2	
	L2_6: 574m2	
	L2_7: 668.5m2	
	L2_8: 697m2	
Level 3	L3_1: 817m2	L3_2.1: 313.5m2
	L3_2: 920m2	L3_2.2: 606.5m2
	L3_3: 652m2	
	L3_4: 592m2	
	L3_5: 652.5m2	

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Level 4	L4_1: 846.5m2	L4_2.1: 331.5m2
	L4_2: 893m2	L4_2.2: 561.5m2
	L4_3: 674m2	
	L4_4: 468.5m2	
	L4_5: 743.5m2	
Level 5	L5_1: 602m2	L5_2.1: 327.5m2
	L5_2: 900m2	L5_2.2: 572.5m2
	L5_3: 670m2	
	L5_4: 573m2	
	L5_5: 670m2	
Level 6	L6_1: 979m2	Nil

Notes:

1. The above compartment types and sizes are to be confirmed by the architect.

2.2 Structural Provisions (BCA B1)

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

Structural engineer to provide certification for the following:

- Survey of all of existing fire and compartmentation walls, forming part of new works to be provided, confirming respective fire resistance levels (FRL's)
- Confirming the structural adequacy of any existing elements which will be relied upon for any new/proposed works

Glazing is to comply with AS1288, and AS2047.

In accordance with Table B1.2a the Importance Level of the building shall be determined as Importance Level 4 'Buildings or structures that are essential to post-disaster recovery or associated with hazardous facilities'. Structural engineer to provide confirmation.

2.3 Development Approval

A Development Approval will be required from the Local Authority for the development. A copy of the Development Permit conditions and approved drawings will be required prior to the issuing of the Building Approval for that component of works.

The proposed development must not be inconsistent with the endorsed drawings and all relevant conditions will need to be satisfied and accurately reflect the construction issue drawings.

2.4 Copy of Certificate of Title:

A copy of the current Certificate of Title and Registered Plan / Plan of Subdivision is required. Where it is proposed to construct any part of the building work within an easement, the consent of the relevant authority and /or Council is required prior to the issue of the Construction Certificate.

3.0 FIRE PROTECTION

3.1 Fire Compartmentation (BCA C1.1)

The BCA stipulates three levels of fire resistant construction, which is based upon the rise in storeys and classification of the building. Each of these types of construction has maximum floor area and volume limitations as per BCA Table C2.2.

Based upon the rise in storeys and use of the Building, the building is required to be Type A Construction in accordance with Table 3 & 3.9 of Specification C1.1 of the Building Code of Australia 2016 Amendment 1.

The building has been assessed on the basis of the following fire separation/ compartmentation within the development;

- Separation between the loading dock / drop-off area and the patient care areas of 120 minutes,
- Separation between the existing hospital and the proposed extension of 120 minutes,
- Separation of patient care areas from the remainder of the building of 120 minutes,
- Separation of ward areas from patient care areas of 60 minutes,
- Separation of ancillary areas from the remainder of the patient care areas of 60 minutes,
- Fire compartmentation of the building at each floor level of 120 minutes,
- Lift shafts will be required to be separated from the remainder of the building by construction achieving an FRL of 120/120/120,

The following items are required to be assessed as part of the fire engineered solutions:

- Where the link bridge has not been constructed to achieve the required FRL's in accordance with Spec. C1.1 this is to be assessed as part of the performance solution to BCA Performance Requirement CP1, CP2 and CP3 by the accredited fire safety engineer.
- It is proposed to utilise a fire curtain on ground floor in lieu of a fire wall complying with C2.7. It is anticipated that the proposed fire curtain will not achieve the required FRL's as per the prescriptive requirements. This is to be assessed as part of the performance solution to BCA Performance Requirement CP1, CP2 and CP3 by the accredited fire safety engineer.
- It is anticipated a reduction will be proposed to the required vertical FRL of fire walls between the loading dock & drop off area (class 7a) from the hospital building on the basement level. This is to be assessed as part of the performance solution to BCA Performance Requirement CP1, CP2 and CP3 by the accredited fire safety engineer.
- It is anticipated that a reduction will be proposed to the required horizontal FRL between the loading dock / drop off area on basement from the hospital on lower ground. This is to be assessed as part of the performance solution to BCA Performance Requirement CP1, CP2 and CP3 by the accredited fire safety engineer.
- As the glass lifts proposed within the atrium will pass through the atrium space and will not be afforded with the prescriptive FRL in accordance with Spec. C1.10. This is to be assessed as part of the performance solution to BCA Performance Requirement CP1, CP2 and CP8 by the accredited fire safety engineer.

The maximum floor area and volume limitations of a fire compartment as nominated in the deemed to satisfy provisions are as follows:

Classification		Type of Construction		
		A	B	C
5, 9b or 9c aged care building	max floor area—	8 000 m ²	5 500 m ²	3 000 m ²
	max volume—	48 000 m ³	33 000 m ³	18 000 m ³
	max floor area—	5 000 m ²	3 500 m ²	2 000 m ²

6, 7, 8 or 9a (except for patient care areas)	max volume—	30 000 m ³	21 000 m ³	12 000 m ³
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3.2 Class 9a Fire and Smoke Compartmentation Provisions (BCA C2.5)

In addition to the above general fire compartmentation requirements, the BCA also contains additional prescriptive fire and smoke compartmentation provisions for Class 9a patient care areas. The deemed to satisfy requirements are as follows:

Patient Care Areas (including wards and treatment areas):-

- a) Are to have fire compartments no greater than 2000m², separated from the remainder of the building by construction achieving an FRL of 120/120/120.
- b) Ward areas:-
 - (i) fire compartments of 1000m² separated by construction achieving an FRL of 60/60/60, and
 - (ii) smoke compartments no greater than 500m² are to be provided, smoke walls are to achieve compliance with Specification C2.5 of the BCA.
 - (iii) where the floor area of a is not greater than 500m², the ward area is to be smoke separated from the remainder of the patient care area by smoke wall achieving compliance with Specification C2.5 of the BCA.
- c) Treatment areas
 - (i) fire compartments of 1000m² separated by construction achieving an FRL of 60/60/60, and
 - (ii) where the floor area of a is not greater than 1000m², the treatment area is to be smoke separated from the remainder of the patient care area by smoke wall achieving compliance with Specification C2.5 of the BCA.

Ancillary Areas:-

- a) Are to be separated from the remainder of the building by construction achieving an FRL of 60/60/60. Ancillary areas include:-
 - Areas containing high potential fire hazard equipment and materials;
 - Kitchens greater than 30m²;
 - Pressure chambers;
 - Medical records storage greater an 10m²;
 - Laundry with gas dryer or other high potential fire hazard equipment

The following compartments and areas currently indicate dimensions that exceed the above mentioned prescriptive requirements:

Ward Areas:

Level 1

- L1_3 fire compartment = 668m² (not proposed to be smoke separated not more than 500m²)
- L1_4 fire compartment = 591.5m² (not proposed to be smoke separated not more than 500m²)
- L1_5 fire compartment = 648m² (not proposed to be smoke separated not more than 500m²)
- L1_6 fire compartment = 608m² (not proposed to be smoke separated not more than 500m²)
- L1_7 fire compartment = 648m² (not proposed to be smoke separated not more than 500m²)

Level 2

- L2_3 fire compartment = 668m² (not proposed to be smoke separated not more than 500m²)
- L2_4 fire compartment = 540m² (not proposed to be smoke separated not more than 500m²)
- L2_5 fire compartment = 669.5m² (not proposed to be smoke separated not more than 500m²)
- L2_6 fire compartment = 574m² (not proposed to be smoke separated not more than 500m²)
- L2_7 fire compartment = 668.5m² (not proposed to be smoke separated not more than 500m²)

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Level 3

- L3_2 fire compartment = 920m² (proposed to be smoke separated at 606.5m² + 313.5m²)
- L3_3 fire compartment = 652m² (not proposed to be smoke separated not more than 500m²)
- L3_4 fire compartment = 592m² (not proposed to be smoke separated not more than 500m²)
- L3_5 = 652.5m² (not proposed to be smoke separated not more than 500m²)

Level 4

- L4_2 fire compartment = 893m² (proposed to be smoke separated at 561.5m² + 331.5m²)
- L4_3 fire compartment = 670m² (not proposed to be smoke separated not more than 500m²)
- L4_5 fire compartment = 743.5m² (not proposed to be smoke separated not more than 500m²)

Level 5

- L5_2 fire compartment = 900m² (proposed to be smoke separated at 572.5m² + 327.5m²)
- L5_3 fire compartment = 670m² (not proposed to be smoke separated not more than 500m²)
- L5_4 fire compartment = 573m² (not proposed to be smoke separated not more than 500m²)
- L5_5 fire compartment = 670m² (not proposed to be smoke separated not more than 500m²)

Treatment Areas

Basement

- BL_3 fire compartment = 2017m² (not proposed to be smoke separated)

Lower ground floor

- LG_3 fire compartment = 1123.5m² (not proposed to be smoke separated)

Ground floor

- GL_1 fire compartment = 1913m² (proposed to be smoke separated at 793.5m² & 1119.5m² – in lieu of 500m²)

Ancillary Areas:

Lower Ground floor

- LG_4 fire compartment - Plant room not separated
- LG_7 fire compartment – Plant room to be separated
- LG_8 fire compartment – Multiple ancillary uses indicated on floor plan (confirmation to be provided whether this area is deemed patient care)

Ground Floor

- GL_3 fire compartment – Kitchen area not separated

The above exceeded compartment sizes are to be assessed as part of the performance solution to BCA Performance Requirement CP1, CP2, CP3 & EP2.2 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

3.3 Atrium Provisions (BCA G3)

Part G3 of the BCA contains additional fire and smoke management provisions for buildings containing atriums, but only applies where the atrium connects –

- a) More than 2 storeys, or
- b) More than 3 storeys if each storey is protected with a sprinkler system and one of those storeys connected is situated at a level which has direct egress to a road or open space

The BCA deemed to satisfy provisions for atriums are outlined below:

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Dimensions of Atrium Well

The atrium well must have a width throughout that is able to contain a cylinder having a horizontal diameter of not less than 6m.

Separation of Atrium by Bounding Construction

The atrium must be separated from the remainder of the building at each storey by bounding walls set back not more than 3.5m from the perimeter of the atrium void.

The boundary walls must be constructed to achieve a 60/60/60 FRL and have any door openings protected with self closing -/60/30 fire doors; or

Be constructed of fixed toughened safety or wired glass in non-combustible frames with wall wetting sprinklers.

If a bounding wall separating the atrium is set back from the perimeter of the atrium wall, the balustrade around the atrium wall should be constructed of non-combustible material and be imperforate.

The proposed and existing fire walls, within the atrium space located from lower ground floor to level 3 are proposed not be constructed in accordance with the prescriptive requirements. The required fire walls within this location currently form openings (within the existing building) which will not meet the required FRL's. This is to be assessed as part of the performance solution to BCA Performance Requirement CP1, CP2 and CP3 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

Separation at Roof

The roof of the atrium will require either a FRL of 180 mins, or the roof structure and membrane must be protected by a sprinkler system

Where the atrium roof has not been constructed to achieve the required FRL's in accordance with Spec. C1.1, this is to be assessed as part of the performance solution to BCA Performance Requirement CP1, CP2 and CP3 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

The following fire services must be provided to the entire building in accordance with BCA Specification G3.8:

- Sprinkler system complying with AS2118.1-1999 and BCA Specification G3.8 Part 2;
- Specific smoke control requirements to any mechanical air handling systems serving the atrium, and dedicated smoke exhaust to the atrium itself complying with AS1668.1-1998 and BCA Specification G3.8 Part 3;
- Fire detection and alarm system complying with AS1670.1-2015 and BCA Specification G3.8 Part 4;
- Sound System and Intercom system for emergency purposes complying with AS1670.4-2015 and BCA Specification G3.8 Part 5;
- Where a required path of travel to an exit is within an atrium, a standby power supply system must be provided to operate required fire safety systems in the building (including sprinkler and hydrant pumps, air handling systems, alarms occupant warning and communication systems, etc). The standby power system must comply with BCA Specification G3.8 Part 7;

3.4 Fire Resistance (BCA C1.1)

The building should be constructed generally in accordance with the relevant provisions of Specification C1.1 of the BCA applicable to Type A Construction, Please refer to Appendix C which outlines the required fire rating to be achieved by the development.

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

- Lift Motor Rooms,
- Emergency Power Supply,
- Emergency Generators,
- Electricity Supply,
- Boilers or Batteries,
- Hydrant Pump Rooms,
- Sprinkler Pump Rooms,
- Fire Control Room

The above areas are to be separated from the remainder of the building by construction achieving a minimum fire resistance level of 120 minutes.

Services engineer required to mark-up floor plans confirming intended use of all services & plant rooms within the building. Where these areas are proposed not to be separated in accordance with C2.12 & C2.13 of the BCA, this is to be assessed as part of the performance solution to BCA Performance Requirement CP2 & CP7 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

3.5 Fire Hazard Properties (BCA C1.10 and BCA C1.12)

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

Sprinkler Protected Areas

- a) Floor Coverings – Critical radiant Flux not less than 2.2 kW/m²
- b) Wall and Ceiling Linings – Material Group No. 1
- c) Other Materials – Spread of Flame Index not exceeding (insert) and Smoke Developed Index not exceeding 2

Non-Sprinkler Protected Areas

- a) Floor Coverings – Critical radiant Flux not less than 1.2 kW/m² a maximum smoke development rate of 750 percent-minutes
- b) Wall and Ceiling Linings – Material Group No's 1, 2 and 3 (dependent on locations) and with a smoke growth rate index not more than 100, or an average specific extinction area less than 250m²/kg
- c) Other Materials – Spread of Flame Index not exceeding 9 and Smoke Developed Index not exceeding 8 (if Spread of Flame if >5)

Rigid and flexible air handling ductwork must comply with AS4254 parts 1 & 2 2012.

Floor linings and floor coverings used in lift cars must have a critical radiant flux not less than 2.2, and wall and ceiling linings must be a Material Group No. 1 or 2.

3.6 Vertical Separation of openings in external walls (BCA C2.6)

A building of Type A construction must be provided with spandrel separation between openings on different storeys unless the building is sprinkler protected throughout. Spandrels are required in accordance with BCA Clause C2.6, which stipulates a 900mm high spandrel; with 600mm of this spandrel being above the finished floor level. Alternatively, an 1100mm horizontal slab may be utilized. The spandrel material is required to achieve an FRL of 60/60/60.

It is noted that any penetrations in the spandrel construction e.g. for drainage, overflow etc. are to be protected.

As parts of the existing building is not provided with a sprinkler system in accordance with Spec. E1.5. Spandrel separation throughout the proposed building, this is to be assessed as part of the performance solution to BCA Performance Requirement CP2 & CP8 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

Detailed elevations will be required to enable a full check and assessment to be undertaken of the spandrels proposed.

3.7 Protection of Openings in External Walls (BCA C3.2 and BCA C3.3)

The prescriptive provisions of the BCA stipulate that any external opening within 3m of the fire source feature requires protection by -/60/- fire rated construction, or externally located wall wetting sprinklers.

The following openings in the external walls are proposed to be addressed through a fire engineered solution:

- Distance between building 5 and portion of main works from basement to level 2, being less than 6m with unprotected openings
- Distance between building 3 and portion of main works from lower ground to level 2, being less than 6m with unprotected openings

This is to be assessed as part of the performance solution to BCA Performance Requirement CP1, CP2 & CP3 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

Where there are openings within the atrium space are proposed not be protected in accordance with C3.4 of the BCA, this will also be required to be addressed as part of the fire engineered solution for the proposal to performance solution CP1, CP2 and CP3.

Where a building is separated into fire compartments, the distance between parts of external walls and openings within them must be not less than the table below unless those parts of each external wall has an FRL not less than 60/60/60 and openings are protected.

Angle Between Walls	Minimum Distance
0° (walls opposite)	6m
More than 0° to 45°	5m
More than 45° to 90°	4m
More than 90° to 135°	3m
More than 135° to 180°	2m
More than 180°	Nil

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Where the distance between parts of external walls and any openings within are in different fire compartments that have been separated by a fire wall and are not protected in accordance with C3.4, this is to be assessed as part of the performance solution to BCA Performance Requirement CP1, CP2 & CP3 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

Fire source feature is defined as;

- a) *The far boundary of a road, river, lake or the like adjoining an allotment,*
- b) *The side or rear boundary of the allotment,*
- c) *The external wall of another building on the allotment which is not a class 10 building.*

3.8 Protection of Openings in fire rated building elements (BCA C3.5 and BCA C3.10)

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

- a) Penetrations through fire rated floors to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a fire rated shaft achieving an FRL of -/120/120
- b) Any penetration through a wall or room required to have an FRL (e.g. substation, boiler room, apartment separating wall etc) is to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a shaft achieving an FRL of -/120/120 (or 120/120/120 where it is a room such as a substation);
- c) Self-closing -/60/30 fire doors to the doors opening to the fire isolated stairs (note that this also includes the access doors to the condenser units on the plant platforms).

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

As the glass lifts proposed within the atrium will pass through the atrium space and the door openings will not achieve required FRL's, this is to be assessed as part of the performance solution to BCA Performance Requirement CP1 & CP2 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

As the design develops, details will need to be included in relation to sealing of penetrations / construction of fire rated shafts.

3.9 Service installations and Construction Joints (BCA 3.15 and BCA 3.16)

Services pipes (including gas) are proposed to connect more than 2 fire compartments this is to be assessed as part of the performance solution to BCA Performance Requirement CP2 & CP8 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

Where the junction point between slab edge and wall / curtain wall / glass will not be provided with adequate fire and smoke separation this is to be assessed as part of the performance solution to BCA Performance Requirement CP1, CP2, CP8, EP2.2 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

Details required to be provided by the architect for review

4.0 EGRESS PROVISIONS

4.1 Provisions for Escape (BCA D1)

The egress provisions from the proposed building are provided by:

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

Access to the road which is at a different level to the discharge point has been proposed to be provided via stairs in lieu of a ramp as required for class 9a buildings located at discharge point from North West exit on ground floor. This is to be assessed as part of the performance solution to BCA Performance Requirement DP2 & DP4 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

The following fire compartments are required to travel through multiple fire compartments prior to reaching a required exit:

- Lower Ground Floor – LG_3, LG_1, LG_5
- Ground Floor – GL_2, GL_5,

All fire compartments within the building have horizontal exits that comprise more than half the required exits. This is to be assessed as part of the performance solution to BCA Performance Requirement DP4 & EP2.2 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

Other detailing issues that will need to be addressed include:

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

It is anticipated that a fire engineered performance solution has been proposed to support doors swinging in a single direction where required to swing in both directions for egress purposes. This is to be assessed as part of the performance solution to BCA Performance Requirement DP4 & EP2.2 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

4.2 Travel via Fire Isolated Exits (BCA D1.7)

The proposed exits are required to be fire isolated.

A window in an external wall of a fire-isolated stairway, fire-isolated passageway or fire-isolated ramp must be protected in accordance with C3.4 if it is within 6 m – Architectural details currently indicate drenchers across openings within Fire Isolated Stair 3. Where it is proposed not to provide protection in accordance with C3.4, this is to be assessed as part of the performance solution to BCA Performance Requirement CP2, DP5 & EP2.2 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

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The BCA requires each fire isolated stairway to provide independent egress from each storey served and discharge directly, or by way of its own fire isolated passageway to:

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

Additionally, where the path of travel from the point of discharge requires occupants to pass within 6m of any part of the external wall of the same building (measured horizontally), that external wall must have a 60/60/60 FRL and have any openings protected internally for a distance of 3m above or below the path of travel.

Egress stair 5 discharges and passes via multiple openings within the external wall of the main building, on the basement level. Where this openings will not be provided with the required FRL's and protected in accordance with C3.4, this is to be assessed as part of the performance solution to BCA Performance Requirement CP2, DP5, EP2.2 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

It is anticipated that a fire engineered solution will be obtained for the construction of the following fire-isolated passageways:

1. Basement Level from Stair 4
2. Level 3 – Stair 3
3. Level 4 – Stair 3
4. Level 6 – Stair 1 & 2

This is to be assessed as part of the performance solution to BCA Performance Requirement DP4, DP5 and CP2 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

Fire Stair Re-Entry

The doors of a fire isolated exit must not be locked from the inside so as to allow provision for fire stair re-entry in Class 9a buildings or parts, or within fire isolated exits serving any storey above any effective height of 25m.

The requirement for doors to remain unlocked do not apply to a door fitted with a failsafe device that automatically unlocks the door upon activation of a fire alarm and –

- a) On at least every fourth storey the doors are not able to be locked and a sign is fixed on such doors stating that re-entry is available; or
- b) An intercommunication system, or an audible or visual alarm system operated from within the enclosure is provided, and a sign is fixed adjacent to such doors explaining its purpose and method of operation

Confirmation to be provided that all doors within all fire-isolated stairways will not be able to be locked from the inside as per D2.22 of the BCA

4.3 Exit Travel Distances (BCA D1.4)

The locations of the proposed exits would appear to indicate that the deemed to satisfy requirements in terms of travel distances, distances between alternative exits and egress widths would be satisfied.

The travel distances to exits should not exceed:

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Class 5-9

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

Class 9a

- No point on the floor to be more than 12m from a point of choice
- Maximum distance of travel of 30m
- Alternative exits not more than 45m apart

The locations of the proposed exits indicate that the deemed to satisfy requirements in terms of travel distances would be satisfied, with the exception of the following:

Basement

- BL_2 Fire compartment
 - Up to 22.2m to a point of choice
- BL_3 Fire Compartment
 - Exit doors to be indicated on plans
 - Up to 22m to a point of choice from Bunker in lieu of 12m
- BL_7 Fire Compartment
 - 69.4m to an exit

Lower Ground

- General
 - Horizontal Exit door to be indicated between LG1 and LG2.2
- LG_3 Fire
 - Up to 16.2m to a point of choice in lieu of 12m
- Public roof terrace
 - Up to 37m to a single exit in lieu of 20m
- LG_8 Fire Compartment
 - Up to 15.2m to a point of choice in lieu of 12m and total of 35.9m to the exit in lieu of 30m
- LG_7 Fire Compartment
 - Up to 37.2m to an exit in lieu of 30m
 - Up to 13m to a point of choice in lieu of 12m

Ground Floor

- BL_1 Fire Compartment
 - Utilisation of a fire curtain
 - Up to 21.6m to a point of choice in lieu of 20m
- GL_1 Fire Compartment
 - 15.9m to a point of choice in lieu of 12m and total of 36.8m to an exit in lieu of 30m
 - 19.2m to a point of choice in lieu of 12m
 - Up to 36.8m to an exit in lieu of 20m
- GL_1.2 Fire Compartment
 - 24.4m to a single exit in lieu of 20m
- GL_2 Fire Compartment
 - Up to 21.5m to a point of choice in lieu of 20m
- GL_3 Fire Compartment
 - 30.8m to an exit in lieu of 30m

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- 23.2m to a point of choice in lieu of 20m and 44.2m to an exit in lieu of 30m

- GL_4 Fire Compartment
 - 30.1m to an exit in lieu of 30m

Level 1

- L1_1.2 Fire Compartment
 - 20.8m to an exit in lieu of 20m
- L1_3 0 Fire Compartment
 - Up to 18.3m in lieu of 12m and total of 33.8m to an exit in lieu of 30m
 - Up to 18.3m to a point of choice in lieu of 12m and total of 35m to an exit in lieu of 30m
 - Up to 16.4m to a point of choice in lieu of 12m

Level 3

- L3_1 Fire Compartment
 - 69.1m to an exit in lieu of 40m
- L3_2 – Fire Compartment
 - Up to 37.2m to an exit in lieu of 30m
- L3_3 – Fire Compartment
 - Door to be indicated to plant room
 - Up to 17.3m to a point of choice in lieu of 12m
- L3_5 – Fire Compartment
 - Up to 16.7m to a point of choice in lieu of 12m

Level 4

- L4_1 – Fire Compartment
 - Up to 69.1m to an exit in lieu of 40m
- L4_2 Fire Compartment
 - 13.5m to a point of choice in lieu of 12m and total of 40.4m to an exit in lieu of 30m
 -
- L4_3 Fire Compartment
 - Up to 17.7m to a point of choice in lieu of 12m and total of 33.7m to an exit in lieu of 30m
 -

Level 5

- L5_2 Fire Compartment
 - Up to 13.5m to a point of choice in lieu of 12m and total of 40.4m to an exit in lieu of 30m
- L5_1 – Fire Compartment
 - 36.7m to a single exit in lieu of 20m

Level 6

- L6_1 – Fire Compartment
 - 47m to a point of choice in lieu of 20m and total of 65.4m to an exit in lieu of 40m

Separation of exits does not fully comply in the following areas:

Basement

- BL_4 – Fire Compartment
 - 82m between alternative exit in lieu of 60

Lower Ground

- LG_1 Fire Compartment
 - Up to 63m between alternative exits in lieu of 60m

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- LG_7 Fire Compartment
 - Up to 67.6m between alternative exits in lieu of 45m

Ground Floor

- BL_1 Fire Compartment
 - Up to 76m between alternative exits in lieu of 60m
- GL_1 Fire Compartment
 - Up to 64.1m between alternative exits in lieu of 45m
- GL_3 Fire Compartment
 - 48.9m between alternative exits in lieu of 45m
- GL_4 Fire Compartment
 - 46.5m between alternative exits in lieu of 45m

Level 1

- BL_1 Fire Compartment
 - 71.6m between alternative exits in lieu of 60m

Level 2

- BL_1 Fire Compartment
 - Up to 71.6m between alternative exits in lieu of 60m

Level 3

- L3_1 Fire Compartment
 - Up to 81.8m between alternative exits in lieu of 60m
- L3_2 – Fire Compartment
 - 51.3m Between alternative exits in lieu of 45m

Level 4

- L4_1 – Fire Compartment
 - Up to 81.8m between alternative exits in lieu of 60m

Level 5

- L5_2 Fire Compartment
 - Up to 49m between alternative exits in lieu of 45m

Level 6

- L6_1 – Fire Compartment
 - 64.5m between alternative exits in lieu of 60m
 - 77.8m between alternative exits in lieu of 60m

4.4 Dimensions of Exits (BCA D1.6)

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

Staff and patient numbers required to be provided to confirm aggregate egress widths.

Doorways are permitted to contain a clear opening width of the required width of the exit minus 250mm, with a height of 1980mm as part of egress requirements. Access for persons with disabilities however requires a clear doorway opening width of 850mm (i.e minimum 920 mm doors).

Where the unobstructed width of doorways within rooms of patient care areas (required to transport beds) cannot achieve a minimum width of 1200mm, this is to be assessed as part of the performance solution to BCA Performance Requirement DP2 & DP4 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

4.5 Balustrading and Handrails (BCA D2.16 and BCA D2.17)

Generally

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

Where it is possible to fall more than 4m to the surface below, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing between 150 – 760mm above the floor. There should be no permanent climbable elements (that present a foothold) within the 150mm - 760mm zone, measured 1m away from the balustrade.

Handrails should generally be provided at a minimum height of 865mm alongside of all ramps and stairs.

The public stairs and ramps located along an accessible path of travel should be designed in accordance with the requirements of AS1428.1 for persons with disabilities. This requires a handrail on each side of the stair and ramp and for the handrail to extend approximately 550mm – 600mm past the last tread / end of ramp.

Intermediate rails located between 665mm and 7500mm should be provided within Class 9b Primary Schools.

4.6 Slip Resistance

The adoption of BCA 2014 introduced a requirement for slip resistance of stairway treads and ramp surfaces. The requirements are as follows:

Table D2.14 SLIP-RESISTANCE CLASSIFICATION

<u>Application</u>	<u>Surface conditions</u>	
	<i>Dry</i>	<i>Wet</i>
<i>Ramp steeper than 1:14</i>	<i>P4 or R11</i>	<i>P5 or R12</i>
<i>Ramp not steeper than 1:14</i>	<i>P3 or R10</i>	<i>P4 or R11</i>
<i>Tread or landing surface</i>	<i>P3 or R10</i>	<i>P4 or R11</i>
<i>Nosing or landing edge strip</i>	<i>P3</i>	<i>P4</i>

5.0 ACCESS FOR PEOPLE WITH DISABILITIES

5.1 General Building Access Requirements (BCA D3.1)

Access for people with disabilities shall be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2016 Amendment 1. Parts of the building required to be accessible shall comply with the requirements of:-

- AS1428.1-2009 General Requirements for Access – New Building Work;
- AS1428.4-2009 Tactile Ground Surface Indicators
- AS2890.6-2009 Car Parking for People with Disabilities

Please refer to Access report 74868 dated 14 March 2018 for a detailed review of accessibility throughout the development.

Access for persons with a disability is to be provided as follows:-

Car parks (Class 7a buildings)

To and within any level containing accessible car parking spaces.

Hospitals

To and within all areas normally used by the occupants.

5.2 Provision for Access to Buildings

The BCA prescribes access to be provided to and within the building as follows:

- Via the principle public entry and at least 50% of all other entrances
- From designated car parking spaces for the use of occupants with a disability.
- From another accessible building connected by a pedestrian link.
- All areas used by the public.

In buildings over 500m² in floor area, a non-accessible entrance must not be located more than 50m from an accessible entrance.

And where a pedestrian entry contains multiple doors, the following is required;

- Entrance containing not more than 3 doors, at least one of the door leaves must be accessible.
- Where an entrance contains more than 3 doors, not less than 50% of the door leaves must be accessible.

A door is considered to be accessible if it is automatic (open and closing) or is more than 850mm in clear opening width and contains the required door circulation space.

5.3 Provisions for Access within Buildings (BCA D3.3)

A building required to be accessible is required to be equipped with either a 1428.1 compliant lift or 1428.1 compliant ramp, (but the maximum vertical rise of a ramp must not exceed 3.6m).

An exemption to not provide either a lift or ramp exists for class 5, 6, 7b, or 8 buildings, where a building contains;

- a) Less than 3 storeys; and
- b) Floor area of each storey (excluding the entrance level) is not more than 200m².

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Within the building the following are required;

- Door circulation space as per AS1428.1 Clause 13.3 and as attached in appendix 1;
- Doorways must have a clear opening of 850mm;
- Passing spaces (1.8m wide passages) must be provided at maximum of 20m intervals
- Within 2.0m of end access ways/corridors, turning areas spaces are required to be provided.
- Carpet pile height of not more than 11mm to an adjacent surface
- Any glazed capable of being mistaken for a doorway or opening must be clearly marked (or contain chair rail, hand rail or transom as per AS 1288 requirements)

5.4 Car parking (BCA D3.5)

Accessible car parking spaces are required to comply with AS 2890.6-2009

A 'shared zone' of minimum 5400mm x 2400mm is required adjacent to accessible car parking spaces, protected with a bollard.

5.5 Tactile Indicators (BCA D3.8)

Tactile indicators are required to be provided to warn occupants of all stairs (except Fire Isolated stairs) and ramps regardless of public nature or private environment and where an overhead obstruction occurs less than 2.0m above the finished floor level.

Exemptions apply in Class 9c aged care facilities to include a down button to handrails in lieu of tactile indicators. This approach can also be applied to Class 9a health care buildings, by the provisions of a Performance Solution, satisfying Performance Requirement DP1.

5.8 Stairs (BCA D3.3 inter Alia AS1428.1)

Stairs shall be constructed as follows:

- a) Where the intersection is at the property boundary, the stair shall be set back by a minimum of 900mm so that the handrail TGSIs do not protrude into the transverse path of travel.
- b) Where the intersection is at an internal corridor, the stair shall be set back in 300mm, so the handrails do not protrude into transverse path of travel.
- c) Stairs shall have opaque risers.
- d) Stair nosing shall not project beyond the face of the riser and the riser may be vertical or have a splay backwards up to a maximum 25mm.
- e) Stair nosing profiles shall-
 - Have a sharp intersection;
 - Be rounded up to 5mm radius; or
 - Be chamfered up to 5mm x 5mm
- f) All stairs, including fire isolated stairs shall, at the nosing of each tread have a strip not less than 50mm and not more than 75mm deep across the full width of the path of travel. The strip may be set back a maximum of 15mm from the front of the nosing. The strip shall have a minimum luminance contrast of 30% to the background. Where the luminous contrasting strip is affixed to the surface of the tread, any change in level shall not exceed a difference of 5mm.

5.9 Provisions for Accessible Sanitary Facilities (BCA F2.4)

Unisex Accessible Sanitary Facilities

An accessible unisex sanitary facility must be located so that it can be entered without crossing an area reserved for one sex only and provided in accordance with AS 1428.1-2009 and must contain a closet pan, washbasin, shelf or bench top and adequate means of disposal of sanitary towels and as per following.

Building Type	Minimum accessible unisex sanitary compartments to be provided
Office, industrial, assembly building, schools, health care except for within a ward area of a Class 9a health-care building	a) 1 on every storey containing sanitary compartments; and b) Where a storey has more than 1 bank of sanitary compartments containing male and female sanitary compartments, at not less than 50% of those banks.

Ambulant Facilities

At each bank of toilets where there is one or more toilets in addition to an accessible unisex sanitary compartment, a sanitary compartment suitable for a person with an ambulant disability in accordance with AS 1428.1-2009 must be provided for use by males and females.

Where male sanitary facilities are provided at a separate location to female sanitary facilities, accessible unisex sanitary facilities are only required at one of those locations.

An accessible unisex sanitary compartment or an accessible unisex shower need not be provided on a storey or level that is not provided with a passenger lift or ramp complying with AS1428.1-2009

Accessible unisex showers

Accessible unisex showers must be provided in accordance with 1428.1

5.10 Signage (BCA D3.6)

As part of the detailed design package, specifications will need to be developed indicating:

- Sanitary Facility Identification Signs (note that they are to comply with BCA Specification D3.6 and include the use of Braille, Tactile, etc and be placed on the wall on the latch side of the facility);
- Directional / Way Finding signs to the Lifts, Sanitary Facilities, etc;
- Hearing Augmentation System;
- Identify each door required by BCA Clause E4.5 to be provided with an exit sign, stating 'EXIT' and 'Level' number

5.11 Lifts (BCA E3.6)

Lifts compliant to BCA E3.6 and BCA E3.7 must be provided, where required to be provided, with a minimum size of 1400 x 1600mm or 1100mm x 1400mm (whichever is appropriate) in size – with appropriate handrails and auditory commands.

6.0 FIRE SERVICES AND EQUIPMENT

The following section of this report describes the essential fire safety measures and the minimum performance requirements of those measures. A draft essential fire safety schedule can be found in Appendix B.

6.1 Fire Hydrants (BCA E1.3)

A system of Fire Hydrants is required to be provided in accordance with BCA Clause E1.3 and AS2419.1-2005 please provide pressure and flow calculations for review.

Pressure and flow information will be required to confirm the required pressures and flow to the system, depending on the type of hydrant to be utilized

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

The following items are required to be assessed as part of the fire engineered solutions:

- Due to the nature of the building having multiple entrances a Performance Solution will be required as the booster assembly will not be located in sight of the main entrance to the building. This will be required to be addressed through a performance solution
- Internal hydrants within fire isolated stairs will have elements of construction which are not completely fire rated. This will be required to be addressed through a performance solution
- In the instance that Fire hydrant booster assembly is within 10m to the building and not afforded with radiant heat protection in accordance with AS 2419.1 – 2005, this will be required to be addressed through a performance solution
- The fire pump room located on basement level, discharges into an undercover area in lieu of clause 6.4.2 of AS2419.1-2005. This will be required to be addressed through a performance solution

Details are required to be provided for review.

6.2 Fire Hose Reels (BCA E1.4)

A Fire Hose Reel System is required to BCA Clause E1.4 and AS2441-2005

Fire hose reels are to be located within 4m of exits and provide coverage within the building based on a 36m hose length. Where required, additional fire hose reels shall be located internally as required to provide coverage.

Fire Hose reel are not to extend through Fire and Smoke Walls.

The following items are required to be assessed as part of the fire engineered solutions:

- It is anticipated that fire hoses will pass through fire and smoke doors in order to achieve coverage. This will be required to be addressed through a performance solution
- It is anticipated that fire hoses coverage will not be achieved throughout the link bridges. This will be required to be addressed through a performance solution
- It is anticipated that fire hoses will not be provided within 4m of an exit. This will be required to be addressed through a performance solution

Details are required to be provided for review.

6.3 Fire Extinguishers (BCA E1.6)

The provision of portable fire extinguishers is required to BCA Clause E1.6 and AS2444-2001 to provide coverage as per the table below:

Table E.6 details when portable fire extinguishers are required:

Occupancy Class	Risk Class (as defined in AS 2444)
General provisions – Class 2 to 9 buildings (except within sole-occupancy units of a Class 9c building)	(a) To cover Class AE or E fire risks associated with emergency services switchboards. (Note 1) (b) To cover Class F fire risks involving cooking oils and fats in kitchens. (c) To cover Class B fire risks in locations where flammable liquids in excess of 50 litres are stored or used (not excluding that held in fuel tanks of vehicles). (d) To cover Class A fire risks in normally occupied fire compartments less than 500m ² not provided with fire hose reels (excluding open deck carparks). (e) To cover Class A fire risks in classrooms and associated schools not provided with fire hose reels. (f) To cover Class A fire risks associated with Class 2 or 3 building or class 4 part of building.
Specific provisions (in addition to general provisions) –	(a) Class 9a health care building To cover class A and E fire risks. (Note 2)

Fire extinguishers are to be located in accordance with AS 2444, often collocated with fire hydrants and/or fire hose reels.

Details are required to be provided for review.

6.4 Automatic Sprinkler Protection (BCA E1.5)

Automatic sprinkler protection is required to Specification E1.5 and AS2118.1-2017 to the following areas:

- Throughout the entire building where the effective height exceeds 25m;
- Throughout any fire compartment that exceeds 2,000m² in floor area or 12,000m³ in volume where occupancies of excessive hazard are proposed

Part of the exiting building is not protected with sprinklers complying with Spec. E1.5. The sprinklered and non-sprinklered parts must be fire-separated as per specific requirements of the Deemed-to-Satisfy Provisions of the BCA. It is anticipated a Fire Engineered solution will be obtained to reduce the required FRL's. This is to be assessed as part of the performance solution to BCA Performance Requirement CP2, CP3 & EP1.4 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

Location of pumps, tanks, FIP, control valves and booster assemblies will be subject to review.

An occupant warning system should be provided in accordance with BCA Specification E1.5.

6.5 Exit Signs and Emergency Lighting (BCA E4.2 and BCA E4.5)

Emergency Lighting and Exit Signs indicating exit location paths of travel to exits to be provided in accordance with AS2293.1-2005.

As the atriums internal floor to ceiling height is greater than 2.7m – the proposed emergency exit signage within this area will not be installed in accordance with AS 2293.1 – 2005 (Amd. 1 & Amd. 2). This is to be assessed as part of the performance solution to BCA Performance Requirement EP4.2 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

Details are required to be provided for review.

6.6 Sound Systems and Intercom Systems for Emergency Purposes (BCA E4.9)

A Sound System and Intercom System is required in accordance with AS1670.4-2015 and BCA Clause E4.9

Speakers associated with the SSISEP will be omitted from the operating rooms and patient bedrooms in lieu of adjusting the alarm to minimum trauma. This is to be assessed as part of the performance solution to BCA Performance Requirement EP1.3 & EP4.3 by the accredited fire safety engineer. The fire safety engineer will need to confirm the feasibility and parameters of the performance solution.

Details are to be provided for our review.

6.7 Fire Control Centre (BCA E1.8)

As the building contains a floor area of greater than 18,000m², a fire control centre is required in accordance with BCA Specification E1.8.

As the building has an effective height of greater than 25m, a fire control centre is required. Where the effective height of the building exceeds 50m, the fire control centre must be located within a dedicated room in accordance with the requirements of BCA Specification E1.8

Details are to be provided for our review.

6.8 Smoke Hazard Management (BCA E2.2)

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

- Zone Smoke Control in accordance with the requirements of AS/NZS 1668.1-2015;
- Automatic Shutdown of Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-2015;
- Automatic Smoke Exhaust System activated by Automatic Smoke Detection & Alarm System in accordance with the requirements of BCA Spec E2.2a and AS1670.1-2015
- Smoke and Heat Vents in accordance with the requirements of BCA Spec E2.2b
- Automatic Smoke Detection and Alarm System in accordance with the requirements of BCA Spec E2.2a and AS 1670.1-2004
- Automatic Pressurisation to Fire Isolated Exits in accordance with the requirements of AS/NZS 1668.1-2015

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

In addition to the above, the following additional smoke hazard management provisions are required due to the atrium in the building:

- The operation of mechanical air handling systems serving the atrium must be designed to operate in accordance with BCA Specification G3.8, Section 3
- The atrium must be provided with a smoke exhaust system in accordance with BCA Specification G3.8, Section 3.4
- A smoke detection system complying with AS1670.1-2004 and BCA Specification G3.8; Section 4 is to be installed throughout the building
- A break glass fire alarm system must be provided at each door to a fire isolated stairways

Smoke hazard management throughout the whole building will be required to be addressed through a performance solution. Details are to be provided for our review.

6.9 Lift Services (BCA E3.4 and BCA E3.6)

The passenger lifts to be installed are to be: -

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

Emergency lifts will not service all storeys within the development and required to be addressed through a fire engineered solution.

6.10 Fire Precautions During Construction (BCA E1.9)

After the building has reached an effective height of 12m, the following fire services are required to be operational:

- Required fire hydrants and fire hose reels on every storey covered by the roof/floor structure (except the 2 uppermost storeys); and
- Booster connections installed.

Due to the height of the building this will need to be considered and implemented during construction.

7.0 HEALTH AND AMENITY

7.1 Sanitary Facilities (BCA F2.2 and BCA F2.3)

Sanitary facilities are required to be provided throughout the building. Staff and population numbers required to be provided to determine required facilities.

Where bathrooms or rooms containing water closets have the WC within 1200mm of the doorway, the door shall be either sliding, open outwards, or be provided with removable hinges.

Details are to be provided for our review.

7.2 Floor Wastes (BCA F1.11)

Floor wastes to be provided within bathrooms and laundries where located above another sole occupancy unit. The floor shall be sloped towards these wastes.

Floor wastes are required to be provided where wall hung urinals are provided and the floor shall be sloped towards these wastes.

Details are to be provided for our review.

7.3 Light and Ventilation (BCA Part F4)

Class 5, 6, 7, 8 & 9

Natural Ventilation is required to be provided to rooms at a rate of 5% of the floor area in openings. Alternatively, mechanical ventilation is required in accordance with AS1668.2-2012. The architect is to provide calculations to verify compliance is achieved.

Artificial lighting complying with AS/NZS1680.0-2009 is to be incorporated with the final detailed design to be developed to confirm this.

A required window that faces a boundary of an adjoining allotment or a wall of the same building or another building on the allotment must not be less than a horizontal distance from that boundary or wall that is the greater of:

- i) generally — 1 m; and
- ii) in a patient care area or other room used for sleeping purposes in a Class 9a building — 3 m; and
- iii) 50% of the square root of the exterior height of the wall in which the window is located, measured in metres from its sill.

Details are to be provided for our review.

7.4 Weatherproofing of External Walls (BCA FP1.4)

Performance Requirement FP1.4 which relates to the prevention of the penetration of water through external walls, must be complied with. It is noted that there are no Deemed-to-Satisfy Provisions for this Performance Requirement in respect of external walls.

As such, a performance solution is to be prepared by a suitably qualified professional that demonstrates that the external walls of the proposed building complies with Performance Requirement FP1.4 which reads as follows:

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A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause—

- a) unhealthy or dangerous conditions, or loss of amenity for occupants; and*
- b) undue dampness or deterioration of building elements.*

8.0 ENERGY EFFICIENCY

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

1. The building can comply with the deemed-to-satisfy provisions of the BCA, relating to the following areas:
 - Building Fabric
 - Glazing
 - Building Sealing
 - Air Conditioning & Ventilation Systems
 - Artificial Lighting & Power
 - Hot Water Supply
2. The building can be verified against a reference building as per Verification Method JV3. This requires that the proposed building and its services be shown to have an annual energy consumption of equal or less than the reference building which has been modelled as per the requirements of Part J of the BCA.

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

Appendix A - Design Documentation

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

Title	Date	Drawn By
GA Plans Combined - Basement	14-03-18	JACOBS
GA Plans Combined – Lower Ground	14-03-18	JACOBS
GA Plans Combined – Level 1	14-03-18	JACOBS
GA Plans Combined – Level 2	14-03-18	JACOBS
GA Plans Combined – Level 3	14-03-18	JACOBS
GA Plans Combined – Level 4	14-03-18	JACOBS
GA Plans Combined – Level 5	14-03-18	JACOBS
GA Plans Combined – Level 6	14-03-18	JACOBS
GA Plans Combined – Level 7	14-03-18	JACOBS

Appendix B - Draft Fire Safety Schedule

Essential Fire Safety Measures		Standard of Performance
1.	Access Panels, Doors and Hoppers	BCA Clause C3.13
2.	Automatic Fail Safe Devices	BCA Clause D2.19 & D2.21
3.	Automatic Fire Detection and Alarm System	BCA Spec. E2.2a & AS 1670.1 – 2015, AS/NZS 1668.1 - 2015
4.	Automatic Fire Suppression System	BCA Spec. E1.5 & AS 2118.1 – 2017, AS 2118.4 – 2012 (Residential) AS 2118.6 – 2012 (Combined sprinkler & hydrant)
5.	Building Occupant Warning System	BCA Spec. E1.5, BCA Spec. E2.2a & AS 1670.1 – 2015 – Clause 3.22
6.	Emergency Lifts	BCA Clause E3.4 & AS 1735.2 – 2001
7.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2005 Amdt 1 & 2
8.	EWIS (Sound Systems and Intercom Systems for Emergency Purpose)	BCA Clause E4.9 & AS 1670.4 - 2015 & AS 4428.4-2004
9.	Emergency Evacuation Plan	AS 3745 – 2002
10.	Exit Signs	BCA Clauses E4.5, NSW E4.6 & E4.8 and AS/NZS 2293.1 – 2005 Amdt 1 & 2
11.	Fire Control Centres and Rooms	BCA Spec. E1.8
12.	Fire Blankets	AS 2444 – 2001
13.	Fire Dampers	BCA Clause C3.15, AS/NZS 1668.1 – 2015 & AS 1682.1&2 - 1990
14.	Fire Doors	BCA Clause C3.2, C3.4, C3.5, C3.6, C3.7 & C3.8, Spec C3.4 and AS 1905.1 – 2015
15.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005 Amdt 1
16.	Fire Hydrant System	BCA Clause E1.3 & AS 2419.1 – 2005 Amdt 1
17.	Fire Seals, Collars	BCA Clause C3.15, C3.16 & AS 1530.4 – 2014
18.	Fire Shutters	BCA Spec. C3.4 & AS 1905.2 – 2005
19.	Fire Windows	BCA Spec. C3.4
20.	Lightweight Construction	BCA Clause C1.8, C3.17 & AS 1530.3 – 1999
21.	Mechanical Air Handling System	BCA Clause E2.2, AS/NZS 1668.1 – 2015
22.	Paths of Travel	EP&A Reg 2000 Clause 186
23.	Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
24.	Pressurising Systems	BCA Clause E2.2 & AS/NZS 1668.1 – 2015
25.	Required Exit Doors (power operated)	BCA Clause D2.19
26.	Smoke and Heat Vents	BCA Spec. E2.2c, NSW Table E2.26 & AS 2665 – 2001

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	Essential Fire Safety Measures	Standard of Performance
27.	Smoke Hazard Management System	BCA Part E2 & AS/NZS 1668.1 – 2015
28.	Smoke Dampers	AS/NZS 1668.1 – 2015
29.	Smoke Detectors and Heat Detectors	BCA Spec E2.2a & AS 1670.1-2015, AS/NZS 1668.1-2015
30.	Smoke Doors	BCA Spec. C3.4
31.	Stand-by Power System	BCA Clause G3.8
32.	Wall-Wetting Sprinkler and Drencher Systems	BCA Clause C3.4 & AS 2118.2 – 2010
33.	Warning and Operational Signs	EP&A Reg 2000 Clause 183, BCA Clause C3.6, D2.23, E3.3 & H101.8

Appendix C- Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2016 Amendment 1:

Table 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS

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

Table 3.9 REQUIREMENTS FOR CARPARKS

Building element	FRL (not less than) Structural adequacy/Integrity/Insulation	ESA/M (not greater than)
Wall		
(a) external wall		
(i) less than 3 m from a <i>fire-source feature</i> to which it is exposed:		
<i>Loadbearing</i>	60/60/60	
<i>Non-loadbearing</i>	–/–/60	
(ii) 3 m or more from a <i>fire-source feature</i> to which it is exposed	–/–/–	
(b) internal wall		
(i) <i>loadbearing</i> , other than one supporting only the roof (not used for carparking)	60/–/–	
(ii) supporting only the roof (not used for carparking)	–/–/–	
(iii) <i>non-loadbearing</i>	–/–/–	
(c) fire wall		
(i) from the direction used as a <i>carpark</i>	60/60/60	
(ii) from the direction not used as a <i>carpark</i>	as required by Table 3	
Column		
(a) supporting only the roof (not used for carparking) and 3 m or more from a <i>fire-source feature</i> to which it is exposed	–/–/–	
(b) steel column, other than one covered by (a) and one that does not support a part of a building that is not used as a <i>carpark</i>	60/–/– or 26 m ² /tonne	
(c) any other column not covered by (a) or (b)	60/–/–	
Beam		
(a) steel floor beam in continuous contact with a concrete floor slab	60/–/– or 30 m ² /tonne	
(b) any other beam	60/–/–	
Fire-resisting lift and stair shaft (within the <i>carpark</i> only)	60/60/60	
Floor slab and vehicle ramp	60/60/60	
Roof (not used for carparking)	–/–/–	
Notes:	<ol style="list-style-type: none"> 1. ESA/M means the ratio of exposed surface area to mass per unit length. 2. Refer to Specification E1.5 for special requirements for a sprinkler system in a <i>carpark</i> complying with Table 3.9 and located within a multi-classified building. 	