



BCA ASSESSMENT REPORT

PROJECT: HKH STAGE 2

HEALTH INFRASTRUCTURE

October 2017

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REPORT STATUS				
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A. INTRODUCTION

A.1 BACKGROUND / PROPOSAL

Blackett Maguire + Goldsmith are engaged by Health infrastructure to undertake Building Code of Australia assessment services in relation to the proposed Stage 2 Redevelopment of the Hornsby Kuring-Gai Hospital campus.

The redevelopment of the entire campus is being undertaken in stages to ensure continued operation of the hospital and all its services with minimal disruption to the community. Stage 1 delivered the new STAR Building which included operating theatres, inpatient wards, Acute Assessment Unit and support services including pathology, sterilising services, kitchen, loading dock and environmental services.

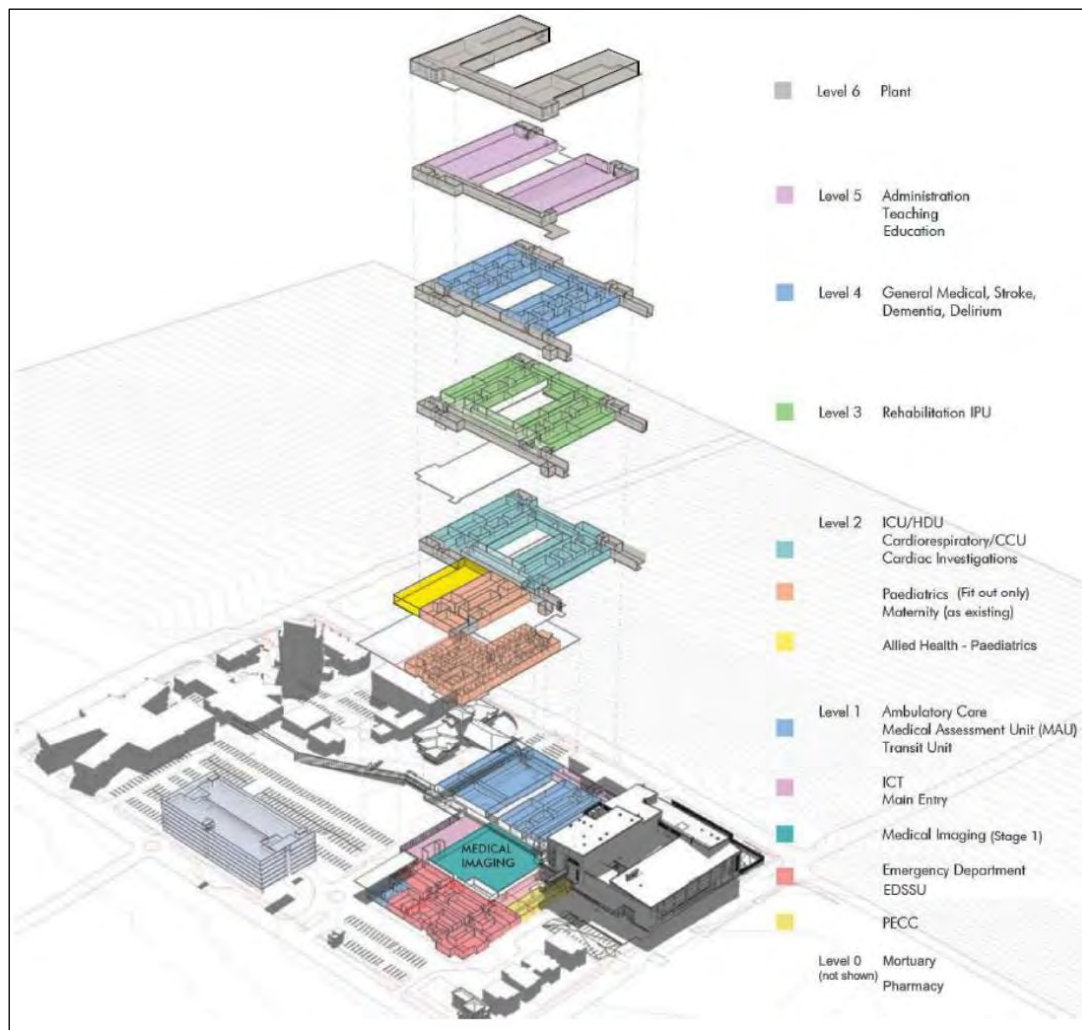
The final schematic design option has been developed for the Stage 2 works, which includes a development surrounding the new MI and Paeds building, and adjoining the STAR and HOPE buildings as follows:

- Level 0 – Non-patient care areas such as Mortuary and Pharmacy, plant spaces;
- Level 1 – Main entry including café (double height space); Ambulatory Care; Inpatient medical accommodation and sub-acute rehabilitation; Expansion of emergency department, including EMU Transit lounge associated with the Emergency; Existing PECC space, Medical Imaging;
- Level 2 – Coronary Care Unit, Cardio and ICU; Paediatrics IPU and ambulatory care outpatients;
- Level 3 – Rehabilitation wards areas; C & D;
- Level 4 – Ward IPU spaces;
- Level 5 – Administration and education area shell (future expansion allowed for).
- Level 6 – Plant rooms North and South
- Level 7 – Helipad and lift lobby only.

The interface between the existing buildings on site and the new Stage 2 (and Stage 1 Addendum) work will necessitate critical attention be provided to fire separation, egress provisions and the combination of fire services and non-fire building services. Staging programmes will be established to ensure that the health and safety of occupants of the existing operative buildings remains commensurate with the relevant building regulations, and also with the community's expectations.

This report also discusses:

- The temporary demountable for ED;
- The Fire Brigade Panel Room fronting Palmerston Road.
- The future proofing of the building in order to account for a Helipad design.



A.2 AIM

The aim of this report is to:

- + Undertake an assessment of the proposed new hospital building against the Deemed-to-Satisfy (DtS) Provisions of the BCA 2016.
- + Identify any BCA compliance issues that require attention/resolution for the proposed development.

A.3 PROJECT TEAM

The following BM+G Team Members have contributed to this Report:

- + Brian Maguire (Director)
- + David Blackett (Director)
- + Patrick Cameron (Building Surveyor)

A.4 DOCUMENTATION

The following documentation has been reviewed, referenced and/or relied upon in the preparation of this report:

- + BCA 2016
- + Guide to the BCA 2016.
- + Architectural Drawings Plans prepared by **Nettleton Tribe Architects**.



A.5 REGULATORY FRAMEWORK

Pursuant to Section 109R of the Environmental Planning & Assessment Act 1979 (Development by the Crown) the proposed development is subject to compliance with the relevant requirements of the BCA as in force at the time of the invitation for the tender of the project.

A.6 LIMITATIONS & EXCLUSIONS

The limitations and exclusions of this report are as follows:

- + The following assessment is based upon a review of the architectural documentation.
- + No assessment has been undertaken with respect to the Disability Discrimination Act (DDA) 1992. The building owner should be satisfied that their obligations under the DDA have been addressed.

Please note that whilst the BCA specifies a minimum standard of compliance with AS1428 (Parts 1-3) and Part D3 of the BCA for access and facilities for people with disabilities, compliance with such requirements may not necessarily preclude the possibility of a future complaint made under the DDA 1992. The DDA is a complaint based legislation and is presently not identified by the State Building Codes and Regulations. In this regard the building owner should be satisfied that their obligations under the DDA have been addressed.

- + The Report does not address matters in relation to the following:
 - i. Local Government Act and Regulations.
 - ii. NSW Public Health Act 1991 and Regulations.
 - iii. Occupational Health and Safety (OH&S) Act and Regulations.
 - iv. Work Cover Authority requirements.
 - v. Water, drainage, gas, telecommunications and electricity supply authority requirements.
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A.7 TERMINOLOGY

Alternative Solution

A Building Solution which complies with the Performance Requirements other than by reason of satisfying the DtS Provisions.

Building Code of Australia (BCA)

Document published on behalf of the Australian Building Codes Board. The BCA is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia and is adopted in New South Wales (NSW) under the provisions of the EPA Act and Regulation. Building regulatory legislation stipulates that compliance with the BCA Performance Requirements must be attained and hence this reveals BCA's performance based format.

Construction Type

The construction type is a measure of a buildings ability to resist a fire. The minimum type of fire-resisting construction of a building must be that specified in Table C1.1 and Specification C1.1, except as allowed for—

- (i) certain Class 2, 3 or 9c buildings in C1.5; and
- (ii) a Class 4 part of a building located on the top storey in C1.3(b); and
- (iii) open spectator stands and indoor sports stadiums in C1.7.

Note: Type A construction is the most fire-resistant and Type C the least fire-resistant of the types of construction.

Climatic Zone

Is an area defined in BCA Figure A1.1 and in Table A1.1 for specific locations, having energy efficiency provisions based on a range of similar climatic characteristics.



Deemed to Satisfy Provisions (DtS)

Provisions which are deemed to satisfy the Performance Requirements.

Effective Height

The vertical distance between the floor of the lowest storey included in the calculation of Rise in Storeys and the floor of the topmost storey (excluding the topmost storey if it contains only heating, ventilating, lift or other equipment, water tanks or similar service units).

Fire Resistance Level (FRL)

The grading periods in minutes for the following criteria-

- (a) structural adequacy; and
 - (b) integrity; and
 - (c) insulation,
- and expressed in that order.

Fire Source Feature (FSF)

The far boundary of a road which adjoins the allotment; or a side or rear boundary of the allotment; or an external wall of another building on the allotment which is not a Class 10 building.

National Construction Code Series (NCC)

The NCC was introduced 01 May 2011 by the Council of Australian Governments. The BCA Volume One (Class 2 to 9 Buildings) is now referenced as the National Construction Code Series Volume One — BCA.

Open Space

A space on the allotment, or a roof or other part of the building suitably protected from fire, open to the sky and connected directly with a public road.

Performance Requirements of the BCA

A Building Solution will comply with the BCA if it satisfies the Performance Requirements. A Performance requirement states the level of performance that a Building Solution must meet.

Compliance with the Performance Requirements can only be achieved by-

- (a) complying with the DtS Provisions; or
- (b) formulating an Alternative Solution which-
 - (i) complies with the Performance Requirements; or
 - (ii) is shown to be at least equivalent to the DtS Provisions; or
- (c) a combination of (a) and (b).

Sole Occupancy Unit (SOU)

A room or other part of a building for occupation by one or joint owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant, or other occupier and includes a dwelling.

Treatment area

Means an area within the patient care area such as an operating theatre and rooms used for recovery, minor procedures, resuscitation, intensive care and coronary care from which a patient may not be readily removed.

Ward Area

Means that part of a patient care area form resident patients and may contain areas for accommodation, sleeping, associated living and nursing facilities.



B. BUILDING CHARACTERISTICS

B.1 BUILDING CLASSIFICATION

The following table presents a summary of relevant building classification items of the proposed hospital building development:

▪ BCA Classification:	Class 9a (Health-care Building) – mixture of patient care and non-patient care areas.
▪ Rise in Storeys:	The building has a rise in storeys of six (6)*
▪ Effective Height:	Greater than 12m and less than 25m (Level 5 RL198.10 – Level 0 RL176.8 = 21.3m)
▪ Type of Construction:	Type A Construction
▪ Climate Zone:	Zone 5
▪ Maximum Floor Area/ Volume:	See below.

Note 1: The plant room does not constitute a rise in storey, as per the definition contained in clause C1.2 (for plant areas). Accordingly, the effective height relates to the height of the top most storey and the lowest storey that is calculated within the Rise in Storeys.

Note 2: The effective height assessment is not considering the future helipad located above the upper level plant room. When the Helipad is constructed the building will reach a height in excess of 25m in effective height.

B.2 FLOOR AREA / VOLUME

Maximum size of fire compartment is:

Classification		Type A
9a	Max floor area	2,000m ² for Patient care areas*
	Max volume	30,000m ³

**See Clause C2.5 in the body of the report for further compartmentation in patient care areas.*

B.3 FIRE SOURCE FEATURE

The distances from the nearest Fire Source Features are:

Boundary	Distance to Fire Source Feature
North (other buildings)	>6 m
South (HOPE/STAR building)	0 m
East (other buildings)	>6 m
West (HOPE Building)	0 m



C.1 SUMMARY OF KEY COMPLIANCE ISSUES

The following comprises a summary of the key compliance issues identified under the BCA assessment in Section D.

BCA CLAUSES		DESCRIPTION
1.	C2.5	Confirmation is to be provided for the inclusion of rooms for the storage of medical records >10m ² in floor area that are contained within a patient care area. A reservoir of minimum 400mm is required above each fire and smoke door (with the exception of the fire doors that lead to a fire isolated exit).
2.	C3.2 / C3.3	Openings in the external walls of the Stage 2 development which are exposed to Building 54, the STAR building and the HOPE building, at all levels where the corridors or passageways are connecting (at Level 1 through to 4) are to be fire rated to the degree necessary as per this clause, or alternatively this will need to be included in the Fire Engineered Performance Solution Report.
3.	D1.4 / D1.5	Paths of travel in at least 2 directions are required from each of the enclosed courtyards. Level 5 future fitout is to take into account maximum distance to a point where a choice of alternative exits is available of 20m. . Fire walls are to be introduced into Level 5 and also Level 6 to create additional exits to address extended distances to exits and extended distances between alternative exits.
4.	D2.14	Landings in the fire isolated exits are to ensure a stretcher of 2m in length and 600mm in width can be negotiated.
5.	D2.22	Confirmation is to be provided as to the method of providing re-entry within the fire isolated exits.
6.	E1.5	Unless fire separation of 120/120/120 can be achieved between the HOPE building and the new work, sprinkles throughout the HOPE building is required In this regard, Level 2 of the HOPE building will remain fire separated from the remainder of the building. Level 1 of the HOPE will be provided with sprinkler coverage as a result of the refurbishment of ED.
7.	F2.2, F2.3	Sanitary facilities for staff require a single male and a single female cubicle designed as Ambulant in accordance with AS1428.1-2009.



C.2 SUMMARY OF FIRE ENGINEERING ISSUES

The following comprises a summary of the key compliance issues identified under the BCA assessment in Section D of the report below that we understand will be addressed by the fire safety engineer with a fire engineered alternative solution:-

	DTS Clause	Fire Engineering Issue	Performance Requirement
1	C2.5	Size of smoke compartments in ward areas exceeds 500m ² in some areas. The size of 60/60/60 FRL compartments in ward areas exceed the maximum 1,000m ² .	CP3
2	Spec C2.5, Spec C3.4	A number of fire and smoke doors associated with fire & smoke compartmentation & separation swing against the required direction of egress	DP2
3	C3.2 / C3.3	Openings in the external walls of the Stage 2 development which are exposed to Building 54, the STAR building and the HOPE building, at all levels where the corridors or passageways are connecting (at Level 1 through to 4) are to be fire rated to the degree necessary as per this clause, or alternatively this will need to be included in the Fire Engineered Performance Solution Report.	CP2
4	C3.15	Pipework which contains combustible liquids and gas, (namely diesel and gas) is not proposed to be fire stopped where it penetrates fire rated elements.	CP8
5	Specification C1.1	Smoke stopping will be provided at all floor/wall junctions in lieu of fire stopping. Roof lights of Level 1 are closer than 3m to the external wall of a different fire compartment in Level 2 above.	CP2, CP8
6	D1.4	Extended travel distances to an exit, and extended distances to a point on the floor where alternative exits area available, occurs throughout the building. <i>Example – ICU exceeds 30m to an exit (35m). Example 2 – the roof top plant results in approximately 100m to an exit.</i>	DP4 and EP2.2
7	D1.5	Extended travel distance between alternative exits when measured back through the point of choice exceeds 45m in patient care areas and exceeds 60m in non-patient care areas: + Level 0 (Non-patient care area) – 82m between alternative exits throughout the pharmacy area (exceeds 60m). + Level 1 courtyard between STAR and MAU measures 60m between alternative exits (exceeds the maximum 45m in a Patient Care Area). + Level 1 courtyard between ACU and MAU results in 71m between alternative exits (noting that the external door leading to Compartment 5 constitutes the exit in this instance). + Level 1 ICU – 47m between alternative exits + Roof plant area – 150m between alternative exits (taking into account the uncovered roof plant area).	DP4 and EP2.2
8	D1.6	Paths of travel to an exit will narrow to less than the minimum 1.8m in width in some patient care areas adjacent to the fire stairs (approx. 1.6m). Paths of travel within the plant rooms will result in encroachments of equipment that reduce the exit width to less than 1m.	DP6



9	D1.7	Discharge from fire isolated exit serving the patient bed lift lobby and passageway requires occupants to pass back into the building from the Level 1 courtyard.	DP5
10	D1.11(b)	Horizontal Exits discharge within an adjoining fire compartment that does not have a fire isolated exit stair.	DP4
11	D1.12	The central non-fire isolated stair connecting 5 levels is not contained in a fire isolated shaft.	DP5
12	D2.19	Sliding doors are proposed in the patient care area of ICU level 2.	DP2
13	D2.20(b)	Doors within Horizontal Exits swing against the direction of egress. See C2.5 above for similar matter.	DP2
14	E1.4	Coverage from fire hose reels will not extend into specialist equipment rooms such as Comms, UPS	EP1.1
15	E2.2	Possible – omit detectors from ceiling void areas in some locations.	EP2.2
16	E4.9	SSISEP is to be discussed within the FER with respect to the proposed 5 minute delay. Speakers will not be provided to the wards (beds).	EP4.3
17	Spec G3.8	The proposed Atrium at the main entry will not comply with all the requirements of Spec G3.8 <i>The dimension of the Atrium Well does not achieve a cylindrical 6m in diameter;</i> <i>Atrium bounding walls will not be fire rated.</i> <i>Balconies within the Atrium will be glass, rather than non-combustible;</i> <i>The upper levels of the Atrium will only have access to a single exit;</i> <i>Smoke control / exhaust systems will depart from <u>some of the requirements of Clause 3 of Spec G3.8.</u></i>	EP2.2

Unless noted by the architect or fire services consultant to the contrary, we have assumed that design of the building and fire services will be in accordance with the DTS provisions of the BCA, with the exception of the matters listed above.



D. BCA ASSESSMENT

D.1 BCA DEEMED-TO-SATISFY COMPLIANCE ISSUES:

The following comments have been made in relation to the relevant BCA provisions relating to the compliance issues associated with the proposed multi storey redevelopment of the Hornsby Kuring-Gai Hospital, known as Stage 2.

SECTION A – CLASSIFICATION OF BUILDINGS & STRUCTURES

1. Clause A3.1 – Principles of Classification.

The classification of a building or part of a building is determined by the purpose for which it is designed, constructed or adapted to be used.

2. Clause A3.3 – Multiple Classification

Each part of a building must be classified separately and where these parts have different purposes – If not more than 10% of the floor area of a storey – being the minor use, is used for a purpose which is a different classification applying to the major use, may apply to the whole storey. Note: This provision does not apply to certain minor uses as set out in this clause.

Comments: *The building constitutes a class 9a health care building with no other applicable class. The upper level plant room assumes the classification of the building it resides in. The future Helipad also assumes the class 9a use.*

SECTION B – STRUCTURE

3. Part B1 – Structural Provisions

Structural engineering details prepared by an appropriately qualified structural engineer to be provided to demonstrate compliance with Part B1 in relation to the new structural elements of the building.

Comments: Details are to be provided confirming that the design achieves compliance with the following is required at the time of S109R Certification, inclusive of reference to the following Australian Standards (where relevant):

1. AS 1170.0 – 2002 General Principles
2. AS 1170.1 – 2002, including certification for balustrading (dead and live loads)
3. AS 1170.2 – 2002, Wind loads
4. AS 1170.4 – 2007, Earthquake loads
5. AS 3700 – 2001, Masonry code
6. AS 3600 – 2009, Concrete code
7. AS 4100 – 1998, Steel Structures and/or
8. AS 4600 – 2005, Cold formed steel.
9. AS 2047 – 1999, Windows in buildings.
10. AS 1288 – 2006, Glass in buildings.

SECTION C – FIRE RESISTANCE

PART C1 FIRE RESISTANCE AND STABILITY

4. Clause C1.1 – Type of Construction Required

The minimum type of fire-resisting construction of a building must be that specified in Table C1.1 and Specification C1.1 except as allowed for in this clause.

Comments: *The building is required to comply with the requirements of Type A Construction Accordingly, Appendix 1 is an extract from Table 3 in BCA Specification C1.1 for assistance in ensuring compliance.*

5. Clause C1.2 – Calculation of Rise in Storeys

The rise in storeys of a building is the sum of the greatest number of storeys at any part of the external walls of the building and any storeys within the roof space calculated in accordance with the requirements set out in this clause.

Comments: *The building has a rise of storeys of six (6).*



Note 1 – a storey is not counted if it is situated on top of the building and contains only heating ventilating or lift equipment, water tanks or similar service units or equipment. Further, and in this instance the Level 6 Plantroom structure does not constitute a rise in storeys by definition, and therefore in the calculation of Effective Height if it is not considered to be a rise in storeys.

Note 2: the future Helipad will result in a rise in storeys of eight (8), due to the lift lobby that will be associated with that level, and the concession associated with the plant room not to constitute a rise in storey no longer applicable.

6. Clause C1.8 – Lightweight Construction

Lightweight construction must comply with Specification C1.8 if used in a wall system in accordance with sub-clauses (a) & (b).

Comments: *This applies to the required fire rated walls throughout the building that will not be constructed of masonry. Compliance is to be noted on the referenced drawings with the S109R application.*

7. Clause C1.10 – Fire Hazard Properties

The fire hazard properties of the following linings, materials and assemblies in a Class 2 to 9 building must comply with Specification C1.10 and the additional requirements of the NSW Provisions of the Code.

Comments: *Material test reports will need to be submitted for further assessment to ensure compliance with the above. The ceiling lining to all public corridors and other areas is to comply with the Group number requirements contained within Specification C1.1*

PART C2 COMPARTMENTATION AND SEPARATION

8. Clause C2.5 – Class 9a & 9c Buildings

Proposed fire and smoke compartmentation floor plans for the class 9a patient care areas demonstrate that compliance is readily achievable with the maximum compartment sizes. In short, a Class 9a health care building must comply with the following:

- + Patient care areas **must be divided into fire compartments not exceeding 2,000m².**
- + Ward areas—
 - (A) where the floor area exceeds 1000 m², must be divided into floor areas not more than 1000 m² by walls with an FRL of not less than 60/60/60; and
 - (B) where the floor area exceeds 500 m², **must be divided into areas not more than 500 m² by smoke proof walls complying with Specification C2.5;** and
 - I where division of ward areas by fire-resisting walls is not required (i.e. if the patient care area was less than 1,000m²), any smoke-proof wall required under (B) above must have an FRL of not less than 60/60/60.
- + Treatment areas must be divided into floor areas not more than 1000 m² by smoke-proof walls complying with Specification C2.5.

A fire compartment must be separated from the remainder of the building by fire walls, i.e. in Type A construction (floors and roof or ceiling as required in Specification C1.1).

In addition to the above, all ancillary use areas located within a patient care area and containing equipment or materials that are a high potential fire hazard, must be separated from the remainder of the patient care area by walls with an FRL of not less than 60/60/60. These areas include, but are not limited to, the following:

- + A kitchen and related food preparation areas having a combined floor area of more than 30 m².
- + A room containing a hyperbaric facility (pressure chamber).
- + A room used predominantly for the storage of medical records having a floor area of more than 10 m².
- + A laundry, where items of equipment are of the type that are potential fire sources (e.g. gas fire dryers).



Walls required to have an FRL or be smoke proof and are by to be of non-combustible construction (i.e. not timber frame), and must extend to the underside of:

- + the floor above; or
- + a non-combustible roof covering; or
- + a ceiling having a resistance to the incipient spread of fire to the space above itself of not less than 60 minutes.

Doors, unless forming part of a smoke hazard management system, the doors are to be provided with a reservoir directly above of minimum 400mm in height.

Doors within a fire wall or a smoke wall are to swing in the direction of egress, or in both directions.

Comments: *The following comments pertain to the Stage 2 development:*

1. *The bounding walls of all compartments are proposed to be constructed from 120/120/120 FRL construction, i.e. created as separate fire compartments. The objective of this is to create areas of safety to assist in addressing the proposed egress strategy for the building which proposes utilising a series of Horizontal Exits.*

Note 1: the exception to this is a single smoke compartment within Medical Imaging.

Note 2: this will not be adopted for the proposed temporary demountable building associated with the Level 1 ED refurbishment, rather smoke and fire compartments will be created as per Clause C2.5 above. .

2. *Compartment sizes in ward areas in excess of 500m² have been proposed to be addressed as a **Fire Engineered Performance Solution**.*
3. *Doors in the fire and smoke walls generally swing in one direction only. A number of doors swing against the required direction of egress for reason of operational functionality – these doors will be subject to a **Fire Engineered Performance Solution**.*

9. Clause C2.6 – Vertical Separation of Openings in External Walls

If in a building of Type A construction, any part of a window or other opening in an external wall is above another opening in the storey next below and its vertical projection falls no further than 450 mm outside the lower opening (measured horizontally), the openings must be separated by and horizontal or vertical spandrel with an FRL of 60/60/60, and for the purposes of C2.6, window or other opening means that part of the external wall of a building that does not have an FRL of 60/60/60 or greater.

Comments: *An automatic fire suppression system is proposed in the Main Stage 2 Health Care building, and therefore spandrel protection is not required.*

Demountable: *The proposed 2 storey Demountable Building serving as patient care areas on both levels is required to be provided with vertical spandrel separation as per this clause.*

10. Clause C2.7 – Separation by Fire Walls

Comments:

Compliance is readily achievable for the fire walls provided to the patient care areas, noting the following requirements:

1. *Separation of Fire compartments (the fire walls to ensure the fire compartments within the patient care areas do not exceed 2,000m²) must be constructed in accordance with the following:*
 - + *FRL of 120/120/120 and extend to the underside of a floor with the same FRL, or to the underside of a non-combustible roof covering.*
 - + *Any openings in a fire wall must not reduce the integrity of the required FRL of the fire wall fire wall, except where permitted by the Deemed-to-Satisfy Provisions of Part C3 (i.e. fire doors; protection of services).*
 - + *Building elements, other than roof battens with dimensions of 75 mm x 50 mm or less or sarking-type material, must not pass through or cross the fire wall unless the required fire resisting performance of the fire wall is maintained.*



2. Separation of buildings (i.e. separation between the new building and the existing HOPE and STAR building). The fire wall separating the connection of the new building and the existing buildings is to be constructed in accordance with the following:

- + The fire wall extends through all storeys and spaces in the nature of storeys that are common to that part and any adjoining part of the building.
- + The fire wall is carried through to the underside of the roof covering.
- + Where the roof of one of the adjoining parts is lower than the roof of the other part, the fire wall extends to the underside of
 - o the covering of the higher roof, or not less than 6 m above the covering of the lower roof; or
 - o the lower roof if it has an FRL not less than that of the fire wall and no openings closer than 3 m to any wall above the lower roof; or
 - o the lower roof if its covering is non-combustible and the lower part has a sprinkler system complying with Specification E1.5.

The fire wall proposed between the HOPE building and the new MI and Paeds building is to achieve the requirements of the above. The other "fire compartment" throughout the building acting as Horizontal Exits are to achieve the requirements of point 1.

Note 1: Structural framing is not permitted to pass through the fire rated walls.

Note 2: Fire separation is to be achieved at the location of the intersecting external wall/corridor. See CI C3.2 below.

11. Clause C2.10 – Separation of Lift Shafts

Applies to all classes of buildings and specifies the protection requirements for openings for lift shafts and lift landing doors.

Comments: Compliance is readily achievable.

12. Clause C2.12 – Separation of Equipment

Comments:

Equipment as listed below must be separated from the remainder of the building with construction that achieves an FRL of 120/120/120 and doorways being self-closing -/120/30 fire doors:

- + Lift motors and lift control panels; or
- + Emergency generators used to sustain emergency equipment operating in the emergency mode; or
- + Central smoke control plant; or
- + Boilers; or
- + A battery or batteries installed in the building that have a voltage exceeding 24 volts and a capacity exceeding 10 ampere hours.

Separation of on-site fire pumps must comply with the requirements of AS 2419.1.

Comments: Any boiler room proposed within this development is to be suitably fire rated. A hydrant pump and fire valve room is proposed externally to the building however it is not accessed directly from the road (see Part E later in this report).

13. Clause C2.13 – Electricity Supply System

Comments: Confirmation is to be provided for respective fire ratings, and also for the design of the required electrical services. A design statement from the electrical designer with the information accompanying the application for S109R certification will be required confirming:

The following areas are to be fire separated from the remainder of the building by construction that achieves an FRL of 120/120/120:

- + An electricity substation located within a building.
- + A main switchboard which sustains emergency equipment operating in the emergency mode.



- + *If electrical conductors located within a building supply a substation (located within the building) which also supplies the main switchboard; or they supply the main switchboard itself must be fire separated by construction that achieves 120/120/120 or alternatively:*
 - o *Have a classification in accordance with AS/NZS 3013 of not less than –*
 - o *If located in a position that could be straight to damage by motor vehicles – WS53W; or*
 - o *Otherwise – WS52W.*
- + *Where emergency equipment is required in a building, all switchboards in the electrical installation, which sustain the electricity supply to the emergency equipment switchgear is separated from the non-emergency equipment switchgear by metal partitions designed to minimise the spread of fault from the non-emergency equipment switchgear, e.g.:*
 - o *Fire hydrant booster pumps.*
 - o *Pumps for automatic sprinkler systems, water spray, chemical fluid suppression systems or the like.*
 - o *Pumps for fire hose reels where such pumps and fire hose reels form the sole means of fire protection in the building.*
 - o *Air handling systems designed to exhaust and control the spread of fire and smoke.*
 - o *Emergency lifts.*
 - o *Control and indicating equipment.*
 - o *Sound systems and intercom systems for emergency purposes.*

PART C3 PROTECTION OF OPENINGS

14. Clause C3.2 – Protection of Openings in External Walls

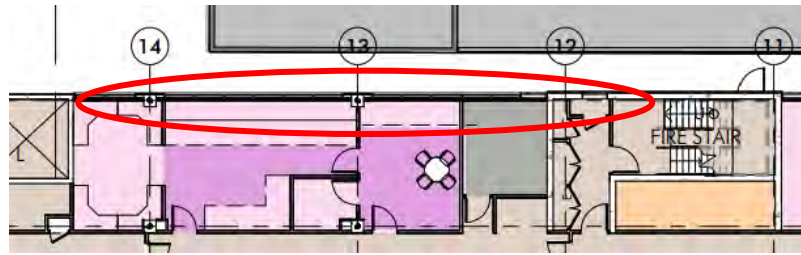
Openings in an external wall that is required to have an FRL must –

- (a) *If the distance between the opening and the fire-source feature to which it is exposed is less than –*
 - (i) *3 m from a side or rear boundary of the allotment; or*
 - (ii) *6 m from the far boundary of a road, river, lake or the like adjoining the allotment, if not located in a storey at or near ground level; or*
 - (iii) *6 m from another building on the allotment that is not a Class 10, be protected in accordance with C3.4 and if wall-wetting sprinklers are used, they are located externally; and*

be protected in accordance with C3.4 and if wall-wetting sprinklers are used, they are located externally; and
- (b) *If the required to be protected under (a), not occupy more than 1/3 of the area of the external wall of the storey in which it is located unless they are in a Class 9b building used as an open spectator stand.*

Comments: *This clause applies to the openings of the Stage 2 development with those of the STAR building and the HOPE building, at all levels where the corridors or passageways are connecting (at Level 1 through to 4). External walls are to be fire rated to the degree necessary as per this clause, or alternatively this will need to be included in the **Fire Engineered Performance Solution Report**.*

In addition to the above, the new Stage 2 development is located approximately 1.6m from the existing single storey building to the east known as Building 54 (Medical gas storage, maintenance facility).



This building does not have a fire rated substrate protecting its external walls, and accordingly the following is required to be addressed in the **Fire Engineered Alternative Solution**:

- + The external wall and openings of the new Stage 2 building that is exposed to an within 6m of (or 3m of if non-loadbearing) another building on the allotment;
- + The external walls of the existing Maintenance and Medical Gas building – currently with no FRL;
- + Openings in the external wall of both buildings.

15. Clause C3.3 – Separation of External Walls & Associated Openings in Different Fire Compartments

The distance between parts of external walls and any openings within them in different fire compartments separated by a fire wall must be not less than that set out in Table C3.3 unless-

- + Those parts of each wall have an FRL not less than 60/60/60; and
- + Any openings protected in accordance with C3.4.

Comments: This clause applies to those parts of the external walls of the building that are in different/adjoining fire compartments, bounded by the proposed 120/120/120 FRL walls that are dividing the patient care areas into zones for the purposes of creating Horizontal Exits, or into zones less than 2,000m². This applies to the following:

- + Level 0 – the external walls between the Campus Distributor Room and Corridor 3 of Fire Compartment 1.
- + Level 1 – both sides of the courtyard external walls that are within 4m of the intersecting compartment walls.
- + Level 2 – the external walls associated with compartment 2 and 4; between 3B and 5A; Between 5 and 6; between AH Paeds and compartment 5B (where the external walls are joining and perpendicular, and also if the external walls that are parallel are within 6m of each other, e.g. existing compartment 2 and compartment 5B).
- + Level 3 – between compartment 5, 6 and 3;
- + Level 4 – Between compartment 1B and 3; between compartment 3B and 4; between compartment 2B and 4

See Appendix 4 for diagrammatic clarification and additional generic descriptions

16. Clause C3.4 – Acceptable Methods of Protection

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

- Doorways –
 - (A) Internal or external wall- wetting sprinklers as appropriate used with doors that are self-closing or automatic closing; or
 - (B) -/60/30 fire doors that are self-closing or automatic closing.
- Windows –
 - (A) Internal or external wall-wetting sprinklers as appropriate used with windows that are automatic closing or permanently fixed in the closed position; or
 - (B) -/60/- automatic closing fire shutters.
- Other openings –
 - (A) Excluding voids – internal or external wall-wetting sprinklers, as appropriate; or
 - (B) Construction having FRL not less than -/60/-.



Comments: See above in C3.2 and C3.3 for the methods of protection of openings. It is expected that this will be a combination of DTS compliance and other methods to address the Performance Requirements of the BCA.

17. Clause C3.5 – Doorways in Fire Walls

Openings in fire walls, that are not part of a horizontal exit, must be protected in accordance with one of the methods set out in this clause.

Comments: Any new doors to be provided in fire walls must be fire rated to achieve the same rating as the fire wall itself, with the doors to be self-closing or auto closing on the activation of smoke detectors within 1.5-metres of either side of the doors, and also activation of any sprinkler or smoke detection system within the building.

18. Clause C3.7 – Protection of Doorways in Horizontal Exits

Requires that a horizontal exit must be protected by a single fire door which has an FRL as required by Specification C1.1 for the wall and specifies that the doors must be self-closing or automatic-closing and gives details of the deemed-to-satisfy methods of activation.

Comments: As per Clause C3.5 above. Further, it is confirmed that there is sufficient space for occupants as per D1.11.

19. Clause C3.8 – Openings in Fire-isolated Exits

Specifies that the doorways that open into fire-isolated exits must be protected by -/60/30 fire doors that are self-closing or automatic. This clause also details the deemed-to-satisfy methods of activation. This does not apply to doors opening to a road or open space. A window in the external walls of fire-isolated exits must be protected in accordance with C3.4 if it is within 6m of and exposed to an a window or other opening in a wall of the same building other than in the same fire-isolated enclosure.

Comments: Compliance is readily achievable.

20. Clause C3.9 – Service Penetrations in Fire-isolated Exits

Fire isolated exits must not be penetrated by any services other than electrical wiring as permitted by D2.7, ducting associated with a pressurisation system or water supply pipes for fire services.

Comments: Compliance is readily achievable.

21. Clause C3.13 – Openings in Shafts

In buildings of Type A Construction openings in shafts must be protected in accordance with the methods set out in sub-clauses (a) to (d).

Comments: Compliance is readily achievable.

22. Clause C3.15 – Openings for Service Installations

The clause details the requirements for protection of service openings in building elements that have an FRL, to prevent the spread of fire. Clause C3.15 only applies only to an element required to have an FRL with respect to integrity or insulation.

Specification C3.15 prescribes materials and methods of installation for services that penetrate walls, floors and ceilings required to have an FRL. Where the mechanical ventilation system penetrates floors or walls that require an FRL the installation is to comply with AS/NZS 1668.1.

Comments: Note: Most of the compartment walls (fire & smoke) are providing smoke compartmentation, and therefore all penetrations are to address fire stopping and also prevent the free passage of smoke. This may need to include the use of combined (or separate) fire & smoke dampers to all mechanical penetrations through the fire walls. Smoke dampers will only need to be provided to mechanical penetrations through the smoke walls (i.e. treatment areas & ward areas).

Note 1: The fire stopping of gas and diesel pipes containing combustible liquids will be subject of a **Fire Engineered Performance solution**.

SPECIFICATIONS

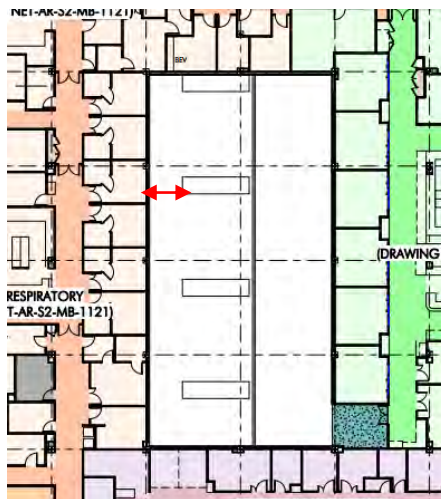


23. Specification C1.1 – Fire resisting construction

Comments: Loadbearing external walls are to achieve an FRL of 120/120/120; or -90/90 if non-loadbearing and within 3m of the fire source feature (see Appendix 2 for more details on all fire ratings).

Fire stopping is required to the perimeter edge of any floor intersection with external walls, to prevent spread of fire and smoke. In this instance this is proposed as a **Fire Engineered Performance solution**, to address smoke spread only.

Roof lights of Level 1 are closer than 3m to the Level 2 external wall, this being a different fire compartment (cl 3.6(b)(ii) of Spec C1.1). This will be addressed in the **Fire Engineered Performance solution**



Vertical rising shafts are to ensure encapsulation of the respective services contained within to avoid spread of fire between fire compartments: e.g.:

- Appropriately fire stopped at each floor, or
- Provide with fire rated shafts, protected by self-closing -/60/30 fire doors.

Note: Gas flues cannot be fire stopped at the floor or through fire rated walls, and therefore will require fire rated shafts to continue beyond the roof covering.

The roof top plant is appropriate for consideration of Clause 2.5 of Specification C1.1, i.e. non-combustible construction and not required to have an FRL. **Note: this is restricted to the following:**

- Lift motor equipment;
- Hot water or hot water tanks;
- Ventilating ductwork;
- Air-conditioning chillers;
- Window cleaning equipment;
- Other service units that are non-combustible and do not contain flammable or combustible liquids or gases.

24. Specification C3.4 – Fire Doors, Smoke Doors, Fire Windows and Shutters

This Specification sets out the requirements for the construction of fire doors, smoke doors, fire windows and Fire Shutters.

Comments: Smoke doors are required to swing in the direction of egress or in both directions. In this instance a **Fire Engineered Performance Solution** is to address the door swing throughout the building



SECTION D – ACCESS & EGRESS

PART D1 PROVISION FOR ESCAPE

25. Clause D1.2 – Number of Exits Required

This clause requires the provision of sufficient exits to enable safe egress in case of an emergency. D1.2 provides that all buildings must have at least one exit from each storey and sets out circumstances in which more than one exit may be required.

Comments: The Class 9a building must have at least 2 exits from every storey (in areas that contain patient care). In this instance the building design demonstrates that compliance has been achieved (noting that the exits are designed as Horizontal Exits). See comments in Clause D1.11 below.

26. Clause D1.3 – When Fire-isolated Stairways & Ramps are Required

This clause indicates when fire isolated stairways and ramps are required to enable safe egress from a building in the case of a fire, setting out the limits to which non-fire isolated exits can be used in Class 2, 3, 5, 6, 7, 8 and 9 buildings. Particular exceptions apply to Class 9a patient care and also class 9c aged care buildings.

Comments: Complies. See comments later in the report regarding the central non fire isolated access stair connecting all levels.

27. Clause D1.4 – Exit Travel Distances

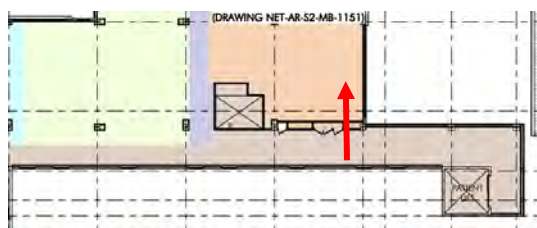
This clause specifies the permitted travel distances allowable from Class 2 to Class 9 buildings, specifying the maximum distances to be taken into account for the various uses in each Class of building.

In relation to a class 9a building the following applies:

- + In a non-patient care area:
 - o No point on the floor must be more than 20m to an exit, or a point from which travel in different directions to 2 exits is available, in which case the maximum distance to one of those exits must not exceed 40m;
- + In a patient care area:
 - o No point on the floor must be more than 12m from a point from which travel in different directions to 2 of the required exits is available; and
 - o The maximum distance to one of those exits must not be more than 30m from the starting point.

Comments: Compliance is generally achieved for distances to a point of choice where alternative exits are available (12m in patient care, 20m in non-PC), and the distance to an exit (30m in Patient Care Areas, 40m in non-PC) achieved as result of the design of a multitude of Horizontal Exits in the building. , with the exception of

- + Level 1 – Paediatric outpatient is provided with an alternative exit from Grid EE15, across the roofed zone, back into the Paeds IPU. Note that doors are to be unlocked and openable in fire mode to ensure unencumbered paths of travel, and there is to be no steps in door thresholds.
- + Level 5 – Administration/ education floor is to be provided with fire walls and horizontal exits. In addition, future fitout planning is to introduce a corridor or door at or around the point indicated below to ensure distances to a point where a choice between alternative exits is within 20m when travelling from the Patient Lift. Notwithstanding, an allowance of up to 26m to a point of choice is considered justifiable via the **Fire Engineered Performance Solution**.





- + Level 6 plant room. Fire Walls are to be introduced to reduce extended travel distances to exits – maximum is 40m. In this instance however there is a large portion of Level 6 which is open to the sky, and results in distinctive fire separation between the enclosed parts of the plantroom. Accordingly, this open roof plant area will be considered a path of travel to alternative exits from those within each side of the plantroom, resulting in distance of up to 100m to the closest exit.



The following (being addressed as a **Fire Engineered Performance Solution**).

- + Level 0 – 29m to a point where a choice between alternative exits is available (service Lift Lobby).
- + Level 1 ICU, exceeds 30m to an exit (35m).
- + Level 6 plant areas results in 100m travel to the nearest exit.

28. Clause D1.5 – Distances Between Alternative Exits

Exits required as alternative exits must be –

- (a) distributed as uniformly as practicable within or around the storey served and in positions where unobstructed access to at least 2 exits is readily available from all points on the floor including lift lobby areas; and
 - (i) not less than 9m apart; and
 - (ii) not more than –
 - in a Class 2 or 3 building – 45m apart; or
 - In a Class 9a health-care building, if such required exit serves a **patient care area** – 45m apart; or
 - In all other cases, i.e. the non-patient care areas – 60m apart.
- (b) Located so that the alternative paths of travel do not converge such that they become less than 6m apart.

Comments: Compliance is achieved as a result of the design of Horizontal Exits, with the exception of the following:

- + Level 0 (Non-patient care area) – 82m between alternative exits when measured through the point of choice in the pharmacy area (exceeds 60m).
- + Level 0 Corridor 3 (Non-patient care area) – 80m between alternative exits (exceeds 60m).
- + Level 1 courtyard between STAR and MAU measures 60m between alternative exits (exceeds the maximum 45m in a Patient Care Area).
- + Level 1 courtyard between ACU and MAU results in 71m between alternative exits (noting that the external door leading to Compartment 5 constitutes the exit in this instance).
- + Level 1 ICU, exceeds 45m between alternative exits (approx. 47m).
- + Roof plant area – 190m between alternative exits (taking into account the uncovered roof plant area).

29. Clause D1.6 – Dimensions of Exits

Sets out in detail the minimum dimensions such as height and width of paths of travel from Class 2 to 9 buildings. It also specifies the minimum dimensions of doorways from the various compartments and the width of exit doors from buildings depending on the uses and functions carried out within them.



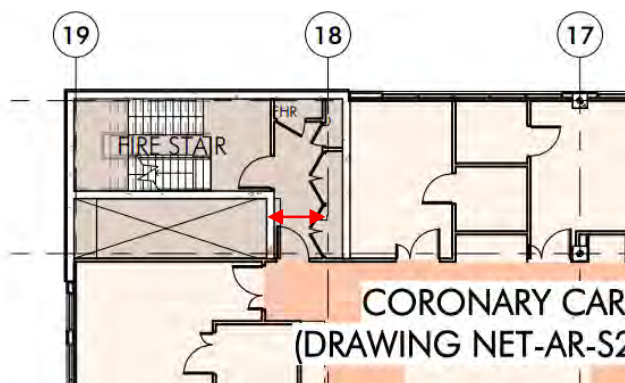
Doorways in the patient care areas are to have a minimum unobstructed opening of:

- + 1200mm if the doorway provided access to or from a corridor of width <2200mm,
- + 1070mm if the doorway provided access to or from a corridor of width >2200mm,
- + Horizontal Exits serving the patient care areas will have a minimum unobstructed width of 1250mm

Comments: Corridors are shown to be a width of >2200mm in the patient care corridors which satisfies the minimum requirements of a class 9a patient care area (i.e. 1800mm). Non-patient care areas need to achieve a minimum of 1m in width; however, additional circulation space will be required in various locations to address compliance with AS1428.1-2009.

Doors in fire walls are to be a minimum of 1250mm clear, and compliance is readily achievable where all doors in fire walls are double leaf doors.

However, the corridor leading to the fire stair narrows to be less than the minimum 1.8m, in the zone that is occupied by services cupboards and the like (approximately 3m in length). In this instance a **Fire Engineered Performance Solution** will be formulated to address this departure from D1.6, and will likely suggest that the door into the corridor be deleted to enable a superior thoroughfare. .



Also, where paths of travel within plantrooms reduces to less than the required 1m in width in areas of minor encroachment by equipment and plinths that are supporting equipment, these will also be included **within the FER**.

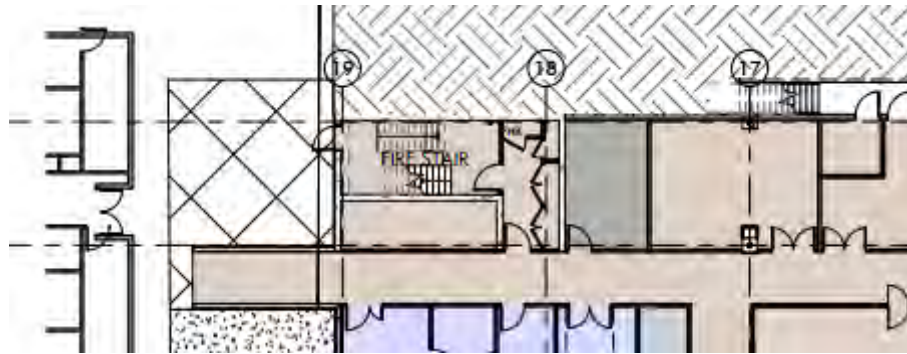
30. Clause D1.7 - Travel via Fire Isolated Exits

Sets out the requirements for safe discharge from various compartments and areas within a building, into a fire isolated stairway or passageway or ramp. Note: a ramp for changes of level in a fire isolated passageway is required in a Class 9 building.

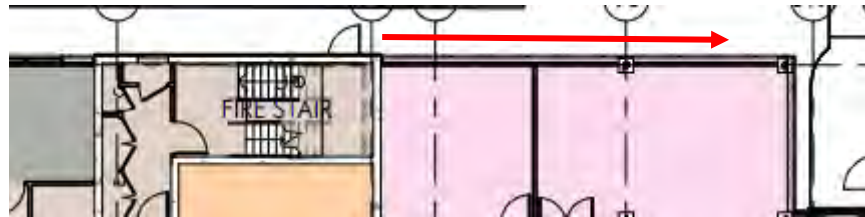
Where a path of travel from the point of discharge of a fire isolated exit necessitates passing within 6m of any part of an external wall of the same building, measured horizontally at right angles to the path of travel, that part of the wall must have –

- + an FRL of not less than 60/60/60; and
- + Any openings protected internally in accordance with BCA Clause C3.4,
- + For a distance of 3m above or below, as appropriate, the level of the path of travel, or for the height of the wall, whichever is the lesser.

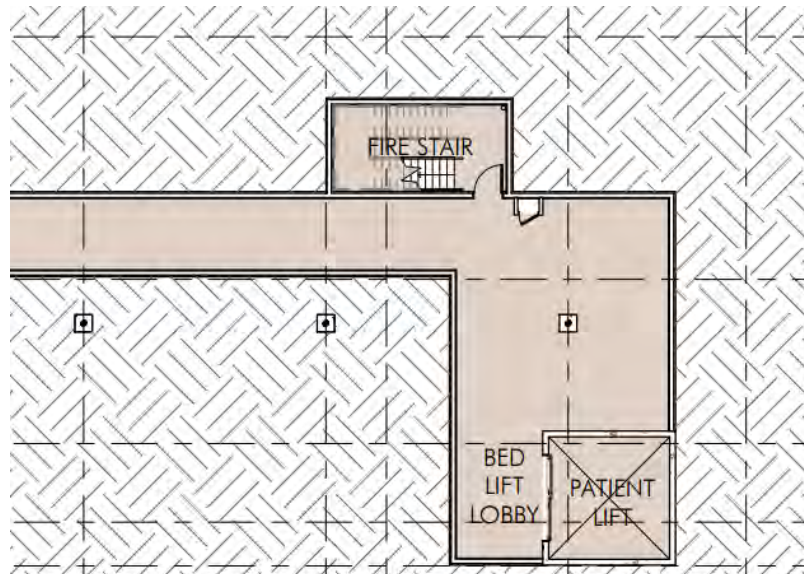
Comments: There are 2 x fire isolated exit stairs proposed for the Stage 2 development. The remainder of exits are via Horizontal Exits in fire walls, and also the design of the building utilises those existing fire isolated exit stairs within the STAR and also the HOPE building.



Discharge from Stair 1 complies with the above requirements for discharge. Its discharge remains a minimum of 6m away from this new building.



Stair 2 above. Exit door discharges into the space between the new building works and the adjoining Building 54. The wall of the new building work is to achieve an FRL of 120/120/120 for reasons of being closer than 3m to another building on the site. This will address the requirements for protection for occupants discharging from a fire isolated exit where the subject part of the building may be a risk to passing occupants.



Level 0. Exit stair from Patient Lift discharges into an enclosed courtyard at Level 1 above. This discharge is subject of the **Fire Engineered Performance Solution** given that it is required to discharge back into the building at Level 1.



31. Clause D1.8 – External Stair in lieu of a Fire Isolated Exit

D1.8(a) An external stairway or ramp may serve as a required exit in lieu of a fire-isolated exit serving a storey below an effective height of 25m provided that it is constructed in accordance with the requirements of sub-clauses (a) to (d). The provisions also set out the requirements of protection for external required exits.

Comments: Not applicable to this development. All exit stairs are fire isolated to the degree necessary.

32. Clause D1.9 – Travel via Non-Fire Isolated Stairs

Sub-clauses (a) to (f) set out the prescribed travel distances to be provided in required exits of Class 2 to 9 buildings and Class 4 parts of buildings. The sub-clauses set out the maximum distances to be taken into account for the various uses in each Class of building. A non-fire isolated exit must discharge at the level of egress to a road or open space, and a maximum total of 80m can be travelled for a class 5 – 9 building.

Comments: There are no stairs within the building designed as non-fire isolated exits.

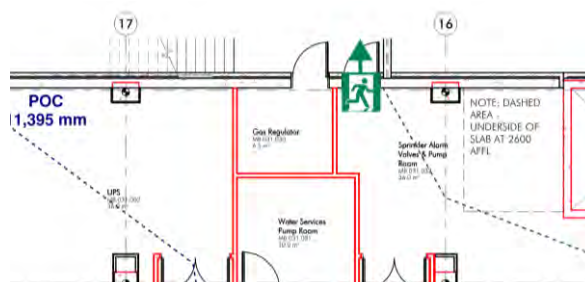
Note 1: See D1.12 below regarding the central stair.

Note 2: The general arrangement plan does not show the position of any ladders ascending to the plant room.

33. Clause D1.10 – Discharge From Exits

Requires that an exit must not be blocked at the point of discharge. Barriers such as bollards must be installed to prevent vehicles from blocking the discharge from exits.

Comments: Additional information required. Details of the discharge of the stair emanating from the sprinkler valve room with respect to its path of travel to the road.



34. Clause D1.11 – Horizontal Exits

Horizontal Exits must not be counted as required exits between sole-occupancy units or in an early childhood centre, primary or secondary school. Horizontal Exits may be counted as required exits in Class 9a-health care building or a Class 9c aged care building if the path of travel from a fire compartment leads by one or more Horizontal Exits directly into another fire compartment which has at least one required exit which is not a Horizontal exit.

In addition, Horizontal Exits must have a clear area on the side of the fire wall to which occupants are evacuating, to accommodate the total number of persons serviced by the Horizontal Exit of not less than 2.5m² per patient.

Comments: The egress strategy utilises Horizontal Exits to the existing building, and also proposes horizontal exits in throughout the fire compartments of the new building work.

In some instances, this strategy necessitates the path of travel from a fire compartment to the exit egressing through an adjoining compartment which does not provide direct access to a fire isolated stairway or exit discharging directly to open space as require by Clause D1.11(b). This will be addressed as a **Fire Engineered Performance solution**.

35. Clause D1.12 – Non-required Stairways, Ramps or Escalators

This clause sets out the requirements for the application of non-required exits and the circumstances under which they may be utilised. Clause D1.12 only applies to escalators, moving walkways and travelators, non-required non-fire-isolated stairways and non-required non fire-isolated ramps.



A non-required stairway cannot be used to connect patient care areas in a class 9a building or resident use areas in a class 9c building.

Comments: *Not applicable. See below comments in D2.2. The central stair contained within the Atrium is not a designated exit; however it does remain a departure from this clause. This will be a matter related to the overall egress strategy from the building, assessed as a **Fire Engineered Performance solution**.*

36. Clause D1.16 – Plant rooms, lift machines, and electricity network substations: Concession

A ladder may be used in lieu of a stairway to provide egress from

- A plant room with a floor area of not more than 100m²
- All but one point of egress from a plant room, a lift machine room or a class 8 Electricity network substation with a floor area of not more than 200m².

A ladder permitted above:

- May form part of an exit provided that in the case of a fire isolated stairway it is contained within the shaft; or
- May discharge within a storey in which case it must be considered as forming part of the path of travel; and
- For a plant room or a class 8 ENS, must comply with AS1657.

Comments: *Compliance is readily achieved.*

37. Clause D1.17 – Access to Lift Pits

This clause provides the requirements for access to lift pits not more than 3m deep and the requirements of construction of access for lift pits that are more than 3m deep. The requirement for signage to lift pits is also set out.

Comments: *Compliance is readily achievable.*

PART D2 CONSTRUCTION OF EXITS

38. Clause D2.2 – Fire-isolated Stairways & Ramps

A stairway or ramp, including landings that are required to be within a fire-resisting shaft must be constructed of non-combustible materials to protect the structural integrity of the shaft.

Comments: *Complies. The stairs designed as exits for this building are proposed as fire isolated structures, complete with a concrete roof.*

*Note - the internal stair serving the main entry lift is not a designated exit from the building. Rather, a **Fire Engineered Performance Solution** will be formulated to address egress strategies from all levels of the building, with the possible use of this stair for people to exit only as a redundancy.*

39. Clause D2.4 – Separation of Rising and Descending Stair Flights

A required fire isolated exit must not have direct connection between the flight rising from a storey below the lowest level of access to a road

Comments: *Not Applicable. The development does not include a basement level.*

40. Clause D2.7 – Installations in Exits & Paths of Travel

This clause restricts the installation of certain services in fire-isolated exits, non-fire-isolated exits and certain paths of travel to exits. It prescribes which services shall not be installed as well as the circumstances in which certain services may be installed in fire-isolated and non-fire-isolated exits.

If installed in a path of travel to an exit, Electrical distribution boards, Communication cupboards and the like containing motors, etc. are to be enclosed with non-combustible construction, and doors are to be provided with smoke seals to the perimeter.

Comments: *Compliance is readily achievable. Smoke seals and a non-combustible door lining is required to cupboards and rooms such as comms, distribution boards, and the like. Specifications for the material is to be provided with the S109R documentation.*



41. Clause D2.8 - Enclosure of Space Under Stairs & Ramps

A space below a required fire-isolated stairway or ramp in a fire-isolated shaft must not be enclosed to form a cupboard or other enclosed space. If the required stairway or ramp is non-fire-isolated, (including an external stairway) any cupboard underneath must have an FRL of 60/60/60, with a self-closing -60/30 door.

Comments: Not Applicable.

All stairs proposed for Stage 2 of this development are contained within fire isolated shafts with the exception of the internal stair connecting all levels at the Main Entry. That subject stair is contained within the Atrium void, and does not include any enclosures.

42. Clause D2.9 - Width of Required Stairways and Ramps

A required stairway or ramp that exceeds 2m in width is counted as having a width of only 2m unless it is divided by a handrail, balustrade or other barrier continuous between landings and each division has a width of not more than 2m

Comments: Complies.

43. Clause D2.10 - Pedestrian Ramps

A fire isolated ramp may be substituted for a fire isolated stairway if the construction complies.

A ramp serving as a required exit must have a gradient not steeper than 1:8, unless the ramp also serves as an Accessible ramp - 1:14.

The floor surface or a ramp must comply with the slip resistance levels in Table D2.14.

Comments: Not applicable. There are no fire isolated passageways proposed in this development

44. Clause D2.11 - Fire Isolated Passageways

Enclosing construction of a fire isolated passageway must have an FRL when tested from the outside, in certain circumstances

Comments: Not applicable. There are no fire isolated passageways proposed in this development.

45. Clause D2.12 - Roof as Open Space

If an exit discharges to a roof of the building, the roof must have an FRL of not less than 120/120/120; and not have any roof lights or other openings within 3m of the path of travel of persons using the exit to reach a road or open space.

Comments: Not applicable. Exits do not discharge to the roof in this development.

Further, in relation to the future Helipad above the plant room, the roof is used as a path of travel to the exit, being 1 or 2 fire isolated stairs.

46. Clause D2.13 - Goings & Risers

This clause sets out the detailed requirements for the construction and geometry of the goings and risers in required stairways. These details are set out in sub-clauses (a) to (c) and Table D2.13 Riser and Going Dimensions.

Comments: Compliance is readily achievable.

47. Clause D2.14 - Landings

The dimensions and gradients of landings in stairways are set out in this clause; the configuration will depend on the proposed use of a building. Sub-clause (b) details the layout for a Class9a building to allow for the movement of a stretcher.

Landings are to have the required slip resistance as per Table D2.14.

Comments: The landings in the fire isolated exits must be sufficient to move a stretcher, 2m long and 600mm wide, at a gradient not more than the gradient of stairs, with at least one end of the stretcher and the landing while changing direction between flights; or the stair must have a change of direction of 180 degrees and the landing a clear width of not less than 1.6m and a clear length of not less than 2.7m. The plans indicate that this has been achieved within the fire stairs.

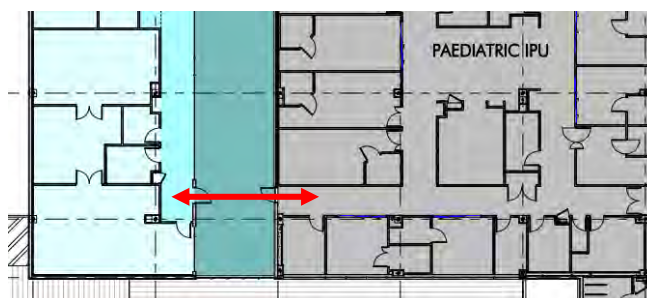


48. Clause D2.15 – Thresholds

The threshold of a doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf unless –

- (a) In patient care areas in a class 9a health-care building, the door sill is not more than 25mm above the finished floor level to which the doorway opens: or
- (b) In a Class 9c aged care building, a ramp is provided with a maximum gradient of 1:8 for a maximum height of 25mm over the threshold.

Comments: Compliance is readily achievable. Ensure the roof path of travel at Level 1 is free of steps in the thresholds of the doors in external walls.



49. Clause D2.16 – Barriers to Prevent Falls

This clause details where balustrades are required to be provided and sets out in specific detail the construction requirements. Typically the following will apply to a class **9a** building:

- + Barriers are required where the fall to the level below is more than 1m in height. The minimum height of a balustrade is 1m above the floor of the landing, walkway or the like; and 865mm above the floor of a stairway or a ramp.
- + Window Sill. For a fall of more than 1m to the surface level below, a window sill must be a minimum of 1m in height above the height of the floor surface.
- + Where the floor is more than 4m above the surface beneath the barrier any horizontal or near horizontal members between 150mm and 760mm above the floor must not could facilitate climbing.
- + Barriers must be constructed so as to not permit a sphere of 125mm diameter to pass through. The exception to this is within fire isolated exits within the building, or within a class 7 or 8 building, where the rails can be positioned a maximum of 460mm apart, so long as a bottom rail is located so a sphere of 150mm cannot pass through the opening between the nosing of the stair treads and the rail or between the floor of the landing, balcony or the like.

Comments: Compliance is readily achievable.

50. Clause D2.17 – Handrails

This Clause sets out the requirements regarding the location, spacing and extent of handrails required to be installed in buildings. A class 9a building must be provided with a handrail at least one side of every passageway or corridor used by patients and must be:

- + Fixed not less than 50mm clear of the wall; and
- + Where practicable, continuous for their full length.

Comments: Compliance is readily achievable. Details of proposed handrails are to be provided for assessment with the application for S109R detailing the above.

51. Clause D2.18 – Fixed Platforms, walkways, stairways and ladders

A fixed platform, walkway, stairway or ladder and any going and riser, landing, handrail, balustrade or other barrier attached thereto may comply with AS1657 in lieu of D2.13, D2.14, D2.16 and D2.17 if it only serves:

- + Machinery rooms, boiler houses, lift machine rooms, plant rooms and the like; or



- + Non-habitable rooms such as attics, storerooms and the like that are not used on a frequent or daily basis in the internal parts of a sole occupancy units in a class 2, 3 or class 4 part of a building

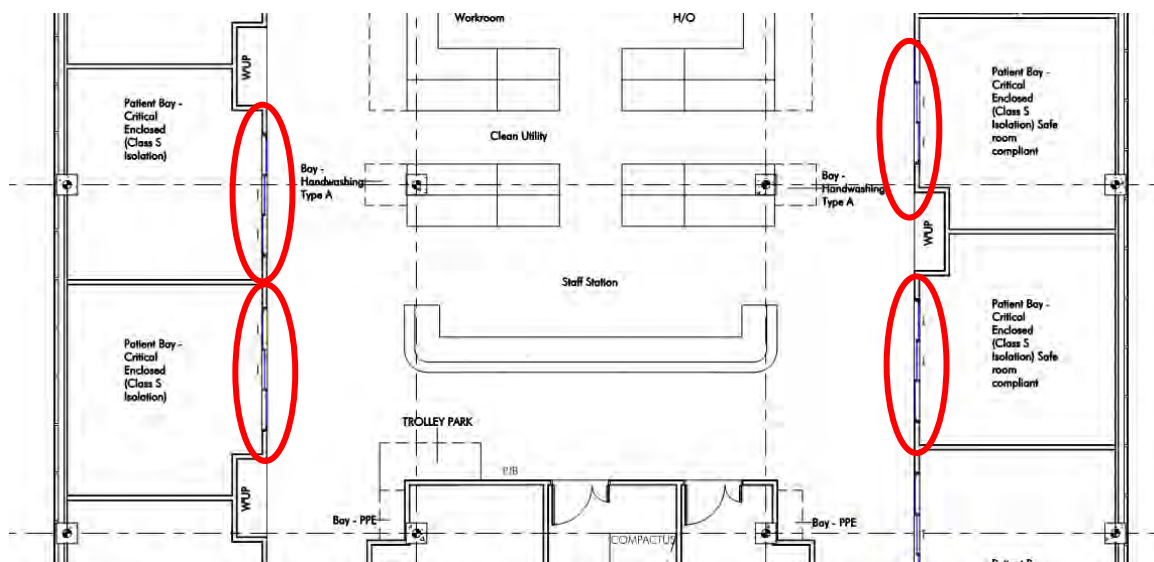
Comments: Plant room access is provided via 2 x fire isolated exits. .

52. Clause D2.19 - Doorways & Doors

This clause applies to all doorways and refers to the types of doors that cannot be used in buildings of prescribed uses, the use of power operated doors and the force required to operate sliding doors.

In a class 9a building, sliding doors are only permissible if it leads to a road or open space; and the door is able to be opened manually under a force of not more than 110N. If the door is also power operated, it must be opened manually under a force of not more than 110N if there is a malfunction or failure to the power source; or upon the activation of a fire or smoke alarm anywhere in the fire compartment served by the door.

Comments: Compliance with this clause is readily achievable, with the exception of the Level 2 ICU treatment area. This is a specific zone for one on one intensive staff interaction with patients and is readily justifiable via the **Fire Engineering** assessment to allow sliding doors within a patient care area that are not opening to a road or open space.



53. Clause D2.20 - Swinging Doors

A swinging door in a required exit or forming part of a required exit must swing in the direction of egress and must not otherwise impede egress. In addition, the door must not encroach at any part of its swing by more than 500mm on the required width of the exit (with the exception of airlocks and sanitary compartments, and with the exception of buildings or building parts that are less than 200m²). This clause does not apply to other doorways – see notes in the Guide to the BCA.

Comments: The current design indicates that several Horizontal Exit doors swing against the direction of egress. This will be addressed in the FEBQ and will need to be addressed in the **Fire Engineering Report**.

54. Clause D2.21 - Operation of Latch

A door in a required exit or forming part of a required exit and in a path of travel to a required exit must be readily openable without a key from the side that faces a person seeking egress, by a single downward action or pushing action on a single device which is located between 900mm & 1.1m from the floor. This clause prohibits the use of devices such as deadlocks and knobs (rather, lever latches are required). D2.21 also sets out exceptions in relation to buildings where special security arrangements are required in relation to the uses carried out.

Where fitted with a fail-safe device which automatically unlocks the door upon the activation of a sprinkler system or detection system, the above need not apply.

Comments: Compliance is readily achievable.



55. Clause D2.22 – Re-entry from Fire-isolated exits

Doors of a fire-isolated exit must not be locked from the inside in a Class 9a health-care building, a Class 9c aged care building and in a fire-isolated exit serving a storey above 25m effective height, throughout the exit.

This clause details the exceptions to the above requirements if the doors are fitted with an automatic failsafe device that automatically unlocks the door upon the activation of a fire alarm as follows:

- + 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
- + An intercommunication system, or an audible or visual alarm system, operated from within the enclosure is provided near the doors and a sign is fixed adjacent to such doors explaining its purpose and method of operation.

Comments: Compliance is readily achievable.

56. Clause D2.23 – Signs on Doors

This clause requires the use of signs to alert persons that the operation of smoke doors and fire doors and doors discharging from fire isolated exits, must not be impaired and must be installed where they can be readily seen.

Comments: Compliance is readily achievable.

Any new **self-closing** fire and/or smoke doors form part of a Horizontal Exit or smoke compartment are to be provided with signage as follows:



Any new **automatic closing** fire and/or smoke doors which are held on hold open devices that form part of a Horizontal Exit or smoke compartment are to be provided with signage as follows:



57. Clause D2.24 – Protection of openable window

This clause relates to the protection of openable windows in a class 9b early childhood centre, or openable windows in a bedroom in a class 2 or 3 building or a class 4 part of a building, where the floor level is more than 2m above the surface level beneath. The intent of this clause is to limit the risk of a person (especially a young child) falling through an openable window, however it does not apply to such a window where the lowest level of its window opening is less than 1.7m above the floor. Details for protection include the following:

- Openable portion of the window must have a device to restrict the window opening; or
- Be fitted with a screen with secure fittings;
- Not permit a sphere of 125mm to pass through;
- Resist outward horizontal action of 250N;
- Have a child resistant release mechanism if the screen or device is able to be removed, unlocked or overridden.

In addition to the above, and for floors that are more than 4m above the surface level below, a barrier with a height not less than 1m above the floor is required for all openable windows. The barrier must permit a sphere of 125mm to pass through, and must not have any horizontal or near horizontal elements between 150mm and 760mm above the floor that facilitate climbing.

Comment: Not applicable to this development. Notwithstanding, all windows will be fixed closed.



PART D3 ACCESS FOR PEOPLE WITH A DISABILITY

58. Clause D3.2 - General Building Access Requirements for People with Disabilities

This part requires accessways to be provided to accessible buildings from the main points of pedestrian entry at the allotment boundary and any accessible car parking space or accessible associated buildings connected by a pedestrian link.

Comments: Compliance is achievable.

59. Clause D3.3 - Parts of the Building to be Accessible

This part specifies the requirements for accessways within buildings which must be accessible.

Access for persons with disabilities must be provided, at a minimum, to and within all areas normally used by the occupants. This includes to and within all SOUs, throughout all patient care areas, staff areas and communal areas.

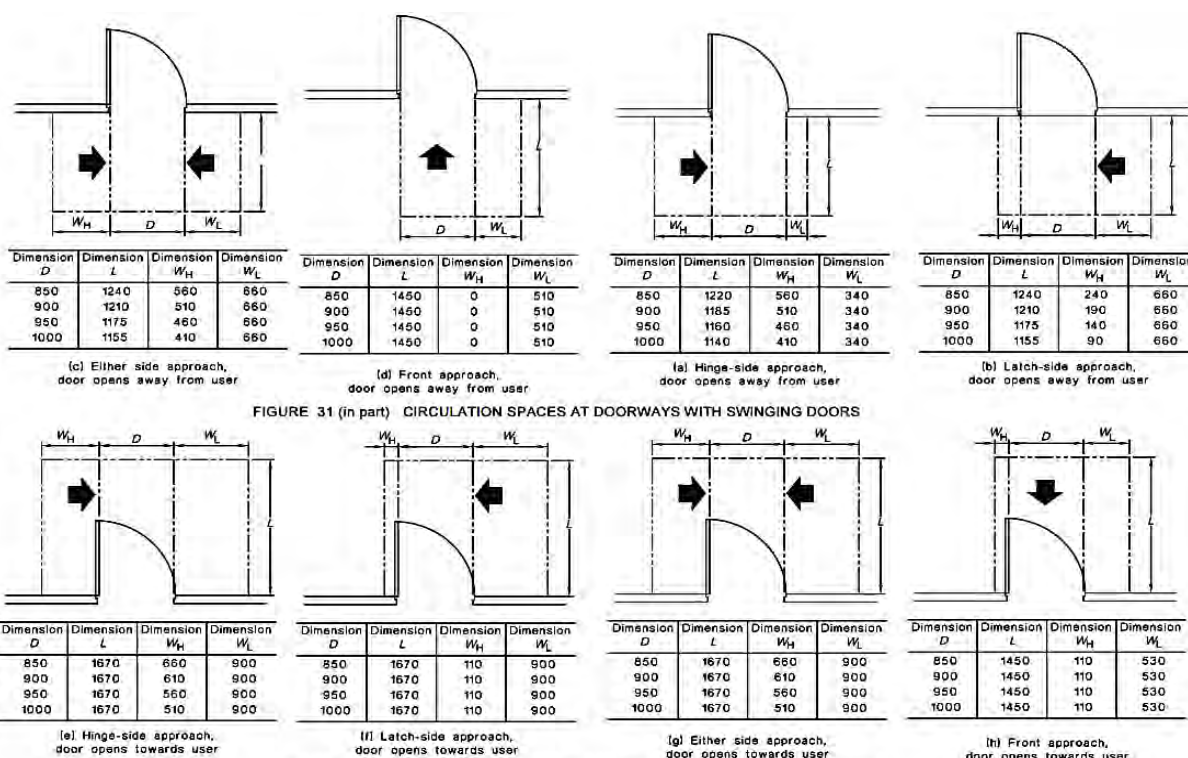
Access need not be provided to:

- (a) An area where access would be inappropriate because of the particular purpose for which the area is used.
- (b) An area that would pose a health or safety risk for people with a disability.
- (c) Any path of travel providing access only to an area exempted by (a) or (b).

The minimum width of an accessible doorway must have a clear opening width of **not less than 850mm** (also refer to Clause D1.6 above for minimum door widths to sole occupancy units wards) in accordance with AS1428.1. Note: Please refer to Clause D1.6 above having regard to the clear width of doorways where patient transportation in beds is required.

All new doorways shall have a minimum luminance contrast of 30% provided between: door leaf and door jamb; or door leaf and adjacent wall; or architrave and wall; or door leaf and architrave; or door jamb and adjacent wall. The minimum width of the area of luminance contrast shall be 50 mm.

Circulation spaces to the new doorways that are required to be accessible are to comply with Section 13 of AS1428.1-2009, including as follows:





Comments: There are areas on Level 1 which will need attention with respect to the circulation space requirements listed above, namely the staff areas / hot desk area.

60. Clause D3.4 – Exemptions

This part provides exemptions to the Deemed-to-Satisfy provisions for access by people with a disability. This part provides details on buildings or parts of buildings not required to be accessible under the BCA where providing access would be inappropriate because of the nature of the area or the tasks undertaken.

Comments: The dirty utilities area, clean utilities areas, switch room, plant areas, fire services pump room, and the like can gain such an exemption.

61. Clause D3.5 – Assess Carparking

This part provides details of the number of accessible carparking spaces required in a carpark depending on the classification of the building.

Comments: There are no carparking areas proposed with this development. A Multi Deck carpark is proposed as a separate development for the Stage 2 Hospital site.

62. Clause D3.6 – Signage

Braille and tactile signage must be provided to required accessible sanitary facilities, spaces with hearing augmentation, ambulant sanitary facilities, pedestrian entrances that are not accessible, and to each door required by Clause E4.5 to be provided with an exit sign. The latter is to state EXIT and LEVEL....

Comments: Compliance is readily achievable. Design certification is to be provided with the application for S109R certification.

63. Clause D3.7 – Hearing Augmentation

This part provides requirements for provision of hearing augmentation in accessible buildings, i.e. to be provided where an in-built amplification system (other than one used for emergencies), is installed:

- + In a room in a class 9b building;
- + In an auditorium, conference room, meeting room, or room for judiciary purposes.
- + At any ticket office, teller's booth, reception area or the like where the public is screened from the service provider.

Comments: Confirmation is to be provided to confirm whether conference or meeting rooms are proposed to have inbuilt amplification; or whether the reception area is screened from view.

64. Clause D3.8 – Tactile Indicators

This clause provides for the installation of tactile indicators in buildings required to be accessible and must be provided to warn people who are blind or have a vision impairment that they are approaching a stairway, escalator, passenger conveyor, ramp, overhead obstruction or an accessway meeting a vehicular way, except for areas exempted by D3.4.

Comments: For a class 9a building, Tactile Ground Surface Indicators in accordance with AS1428.4.1 are required at the interface between the pedestrian way and the vehicular way. Tactile Ground Surface Indicators are not required to the remainder of the Class 9a building. Instead, handrails to stairways and ramps that are not associated with a fire isolated exits are to have raised tactile warning, in the form of a domed button 4-5mm in height and 10-12mm in diameter, and shall be provided on the top of each handrail, 150mm, from the end of the handrail.



65. Clause D3.12 – Glazing on an Accessway

This part requires the provision of a contrasting strip, chair rail, handrail or transom across all frameless or fully glazed doorways and surrounding glazing capable of being mistaken for an opening.

Comments: *Compliance readily achievable.*



SECTION E – SERVICES AND EQUIPMENT

PART E1 FIRE FIGHTING EQUIPMENT

66. Clause E1.3 - Fire hydrants

A fire hydrant system must be provided to serve a building having a total floor area greater than 500m² and where a fire brigade is available to attend a building fire, installed in accordance with the provisions of AS2419.

The hydrant booster assembly and any external fire hydrants are required to be located greater than 10 metres from an external wall of the building, or affixed to the external wall and protected by a radiant heat shield that has an FRL of 90/90/90 located 2 metres either side and 3 metres above the outlets.

Any gas meter must be located a minimum of 10-metres from the hydrant booster outlet.

A required fire services pump room is required to be accessible directly from the road or open space, or from a door opening from a fire isolated exit.

Comments: Compliance is readily achievable for fire hydrant landing valve locations. Internal hydrants are to be located within fire-isolated stairways; where additional hydrants are required for coverage, the landing valves are to be located within 4m of the horizontal exits provided throughout the floors as part of the Egress strategy developed within the Fire Engineered Performance Solution.

67. Clause E1.4 - Fire hose reels

A fire hose reel system must be provided to serve a building where one or more internal fire hydrants are installed or in a building with a floor area greater than 500m² and for the purposes of this clause, a sole-occupancy unit in a Class 2, 3 building or a Class 4 part is considered to be a fire compartment.

Fire Hose Reels are to be located within 4m of an exit, or located adjacent to an internal hydrant (other than one within a fire isolated exit). Where system coverage is not achieved by the above, additional FHR may be located in paths of travel to an exit.

Fire Hose reels are to be located so that the fire hose will not need to pass through doorways fitted with fire or smoke doors (except those doors that lead to fire separated ancillary use areas; doors mentioned in Clause C2.12 and C2.13 and C3.13, doorways in class 2 or 3 bounding construction). Accordingly, Fire hose reels are to be provided within every smoke compartment of a class 9a building.

Comments: Compliance is readily achievable. Fire Hose Reels are required throughout all parts of the floors and are to be located so that they do not pass through fire or smoke doors. Accordingly, some comms and UPS rooms will not be provided with Hose Reel coverage, and this will be the subject of a **Fire Engineered Performance Solution**.

68. Clause E1.5 - Sprinklers

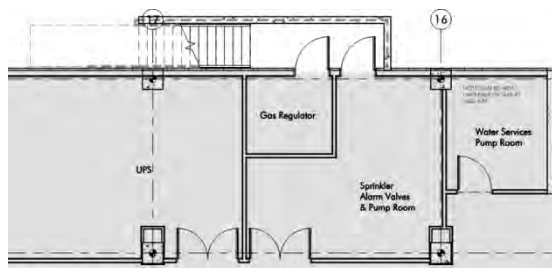
A sprinkler system must be installed in a building or part of a building when required by Table E1.5 and comply with Specification E1.5.

In a class 9a building that has a rise in storeys of more than 2 (and is less than 25m effective height), a sprinkler system is required, or alternatively a zone smoke control system is required throughout.

Sprinkler alarm valves must be located in a secure room or enclosure which has direct egress to a road or open space.

Comments: We note that sprinklers are proposed to be installed in the building.

The Level 1 (Ground Floor) of HOPE will be refurbished and provided with sprinkler coverage however the Level 2 Maternity Section will not. This section will remain as a FRL 120/120/120 fire separated section of the building.



The location of the sprinkler valve is required by BCA Spec E1.5 to provide fire fighting personnel with direct egress to/from the road or open space. The location highlights that compliance is achieved.

69. Clause E1.6 – Portable fire extinguishers

Portable fire extinguishers must be provided as listed in Table E1.6 and must be selected, located and distributed in accordance with Sections 1, 2, 3 and 4 of AS 2444.

Comments: Compliance is readily achievable. Note NSW Health requires for specific types of extinguishers to be used in the building (i.e. no ABE powder type).

70. Clause E1.8 – Fire control centres

A fire control centre facility in accordance with Specification E1.8 must be provided for a building having an effective height of more than 25m and in a Class 6, 7, 8 or 9 building with a total floor area of more than 18,000m². Specification E1.8 describes the construction and content of required fire control centres or rooms.

Comments: The building in its entirety exceeds 18,000m² and therefore a specific FCC will be required. In this instance it is noted that the Fire Control Centre is currently located within an independent building on the site, and will be demolished/relocated as part of the proposed new Multi Deck Carpark works fronting Palmerston Road under a separate prior package of works. BCA Compliance will be achieved for a .25m effective height building, in order to future proof as part of any proposed Helipad.

71. Clause E1.9 – Fire precautions during construction

In buildings under construction at least one fire extinguisher to suit Class A, B and C fires and electrical fires must be provided at all times on each storey adjacent to a required exit and if the building has reached an effective height of 12m the required hydrant and hose reel systems must be installed, as set out in (b)(ii) and be operational and any required booster connections must be installed.

Comments: Head contractor to note during construction.

72. Clause E1.10 – Provisions for Special Hazards

Suitable provision must be made if special problems of fire fighting could arise because of;

- (a) The nature or quantity of materials stored, displayed or used in a building on the allotment; or
- (b) The location of the building in relation to a water supply for fire fighting purposes.

Comments: This relates to areas of flammable storage if proposed within the building.

PART E2 SMOKE HAZARD MANAGEMENT

73. Clause E2.2 – General Requirements

Class 2 to 9 buildings must comply with the provisions of this Clause to remove smoke during a fire, to control the operation of air handling systems and to prevent the spread of smoke between compartments.

Buildings must comply with the provisions of Table E2.2a, as applicable to Class 2 to 9 buildings and Table E2.2b as applicable to Class 6 and 9b buildings. It deals with the design and construction of air handling systems that are part of a smoke hazard management system and air handling system that are not part of a smoke hazard management system.

Comments: A smoke detection and alarm system is to be provided throughout the building, and also automatic shutdown of any air-handling system which does not form part of a zone smoke control system is to be provided.



Photoelectric smoke detectors will be required in patient care areas and along the paths of travel of the Class 9a parts in accordance with BCA Spec E2.2.

Manual Call points are to be distributed along corridors/evacuation routes so that no point of the floor is more than 30m from a manual call point.

The building occupant warning system must be arranged to provide a warning for occupants; and in a ward area, may have its alarm adjusted in volume and content to minimise trauma consistent with the type and condition of the patients.

Some ceiling voids may be the subject of a **Fire Engineered Performance Solution** with respect to deleting detectors in lieu of sprinklers.

Pressurisation to all fire isolated exits is required (Class 9a building with a rise in storeys of more than 2). See below in Part G3 for additional smoke hazard management issues.

PART E3 LIFT INSTALLATIONS

74. Clause E3.2 – Stretcher Facility in Lifts

Stretcher facilities, complying with this clause, must be provided in lifts in at least one emergency lift as required by E3.4 or in a storey above an effective height of 12m.

A stretcher facility must accommodate a raised stretcher with a patient lying on it horizontally by providing a clear space not less than 600mm wide x 2000mm long x 1400mm high above the floor level.

Comments: See below comments in relation to Emergency Lifts, i.e. a stretcher facility requirement is superseded by the EL.

75. Clause E3.4 – Emergency Lifts

An emergency lift (complying with AS1735.2 or Appendix A of AS1735.1) must be installed in:

- + A building exceeds 25m in effective height; and
- + **A class 9a building which has patient care areas located on a level that does not have direct egress to a road or open space.**

The emergency lift must be connected to a standby power supply system where installed; be contained within a fire resisting shaft; and have the following minimum internal dimensions (measured clear of all obstructions including handrails):

- + Depth of car – 2280mm
- + Width of car – 1600mm
- + Floor to ceiling height – 2300mm
- + Door height – 2100mm
- + Door width – 1300mm

Comments: Applies to this proposal, and it also applies to the 2 storey temporary demountable building associated with the HOPE refurbishment. Compliance is readily achievable.

76. Clause E3.6 – Passenger Lifts

In an accessible building, every passenger lift must be one of the types identified in Table E3.6a, have accessible features in accordance with Table E3.6b and not rely on a constant pressure device for its operation if the lift car is fully enclosed.

Comments: Compliance is readily achievable.

77. Clause E3.7 – Fire Service Controls

In passenger lifts designed in accordance with AS 1735 Parts 1 and 2, all lift cars serving any storey above an effective height of 12m must be provided with fire service controls.

Comments: Compliance is readily achievable. The responsible consultant is to furnish a Design Statement of Compliance with the documentation submitted with an application for S109r Certification.

78. Clause E3.9 – Fire Service recall operation switch

Each group of lifts must be provided with one fire service control switch (required by Clause E3.7 above) that activates the fire service recall operation. This clause details the switch, the labelling, the key and operation procedures for a fire service recall operation.



Comments: Compliance is readily achievable.

79. Clause E3.10 – Lift car fire service drive control switch

The lift car fire service drive control switch required by E3.7 must be activated from within the lift car. This clause details the switch, the initiation, the labelling and operation for the fire service drive control switch.

Comments: Compliance is readily achievable.

PART E4 EMERGENCY LIGHTING, EXIT SIGNS AND WARNING SYSTEMS

80. Clause E4.2 – Emergency Lighting Requirements

This clause details when emergency lighting must be installed in Class 2 to 9 buildings. The requirements for buildings and parts of buildings are detailed in sub-clauses (a) to (i) and each sub-clause must be considered as more than one may apply to any single building.

In a class 9a building, emergency lighting is required in every passageway, corridor, hallway or the like serving a treatment area or a ward area; and in every room having a floor area of more than 120m² in a patient care area.

Comments: Compliance is assumed. Design statement is to be provided for assessment.

81. Clause E4.5 / E4.6 / E4.8 – Exit Signs

An exit sign must be clearly visible to persons approaching the exit and must be installed on, above or adjacent to each door providing egress from a building. Sub-clauses (a) to (d) set out the situations where exit signs are required to be installed.

Comments: Compliance is assumed. Design statement is to be provided for assessment.

82. Clause E4.9 – Sound Systems & Intercom Systems for Emergency Purposes

This clause sets out the types of buildings requiring the installation of a sound system and intercom system to assist with the emergency evacuation of occupants. This clause specifies that sound and intercom systems must comply with AS 1670.4 and is to be provided within certain class 3, class 9a and class 9b buildings, and also is to be installed in every building with an effective height greater than 25m.

Comments: Compliance is assumed, however the proposed cascading system and delayed audible alarm is to be included in the **Fire Engineering Report**. Discussion with respect to a 5 minute time delay to facilitate staff investigation is to be included/discussed in the in the FER (whether in the trial design, or in the philosophy of the evacuation procedures). Extract from AS1670.4-2015

“Unless otherwise specified in the building emergency management plan, the alert signal duration shall be set to 0 s such that only the evacuation signal shall be produced.

Where the alert signal is used, it shall continue to operate until manual control of the system is taken or, if not responded to in a prescribed time from initiation, shall be automatically replaced by an evacuation signal. The prescribed time shall be established to suit the building in question but shall not exceed 10 min.”

In addition, it is not proposed to have SSISEP speakers at the bed of the ward areas (in order to minimise trauma to patients).



SECTION F – HEALTH & AMENITY

PART F1 - DAMP AND WEATHERPROOFING.

83. Clause F1.1 – Stormwater drainage

Stormwater drainage must comply with AS/NZ 3500.3.

Comments: Design statement to be provided with the S109R application.

84. Clause F1.5 – Roof Coverings

A roof must be covered with any of the six (6) examples indicated in this clause, namely:

- Concrete roof tiles (AS2049 or AS2050 as appropriate);
- Terra cotta roof tiles;
- Cellulose cement corrugated sheeting (AS2908.1);
- Metal sheet roofing complying with AS1562.1;
- Plastic sheet roofing; or
- Asphalt shingles complying with ASTM D3018-90, Class A

Comments: Compliance is readily achievable.

85. Clause F1.7 – Waterproofing of Wet Areas

This clause requires that wet areas in Class 2 to 9 buildings must be waterproofed. It prescribes the standards to which the work must be carried on the construction of rooms containing urinals and their installation.

Comments: Compliance is readily achievable.

86. Clause F1.13 – Glazed Assemblies

Glazed assemblies in an external wall must comply with AS2047 requirements for resistance to water penetration for windows, sliding doors with a frame, adjustable louvres, shop fronts and windows with one piece framing

Comments: Compliance is readily achievable.

PART F2 SANITARY AND OTHER FACILITIES

87. Clause F2.2 / F2.3 – Calculation of Number of Occupants & Facilities

This clause sets out the requirements for the calculation of the number of occupants and the number of sanitary facilities required to be installed in Class 2 to 9 buildings. The parameters for the calculation are set out in sub-clauses (a) to (d).

Comments: The following sanitary facilities are required within the Class 9a health care building:-

(a) Facilities for Staff:-

Toilet facilities for staff are to be provided in accordance with the following:-

Class 9a						
User Group	Closet Pans		Urinals		Washbasins	
	Design Occupancy	Number	Design Occupancy	Number	Design Occupancy	Number
Male employees	1 – 20	1	1 – 10	0	1 – 30	1
	> 20	Add 1 per 20	11 – 25	1	> 30	Add 1 per 30
			26 – 50	2		
			> 50	Add 1 per 50		



Female employees	1 – 15	1			1 – 30	1
	> 15	Add 1 per 15			> 30	Add 1 per 30

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

Comments: Compliance is readily achievable

(b) *Facilities for Patients:*

- + Male – 1-16 + 2 closet pans; 1 additional pan for every 8 additional males. Hand basins are to be provided for every 8 patients.
- + Female – as above.

In addition, the Class 9a health care building is required to have access to the following:

- + Kitchen facilities
- + Laundry facilities,
- + One shower for each 8 patients or part thereof.
- + One island-type plunge bath in each storey containing a ward area.

Comments: Compliance is readily achievable for the above.

88. Clause F2.4 – Accessible Sanitary Facilities

Accessible unisex sanitary compartments must be provided, in accordance with Table F2.4(a) and unisex showers must be provided in accordance with Table F2.4(b), in buildings or parts that are required to be accessible.

Comments: For the class 9a building (except for within the ward areas), an accessible WC complying with AS1428.1-2009 is to be provided on each storey containing sanitary compartments. Compliance is readily achievable given the details provided to date (e.g. It is apparent that there is “Toilet – Accessible” indications in various locations throughout the storeys. Compliance is readily achievable with respect to the detailed dimensions and compliance with AS1428.1. Note: an Accredited Access consultant has also provided an assessment of the requirements of AS1428.1, Part D3 and Part F2.

Note, toilets available for public use must also be designed for ‘ambulant’ features s per AS1428.1.1

89. Clause F2.8 – Waste Management

In a Class 9a health-care building facilities must be provided with the following to facilitate the emptying of containers of sewage and dirty water.

- + At least one slop hopper or other device, other than a WC pan or urinal, must be provided on any storey containing ward areas or bedrooms to facilitate emptying of containers of sewage or dirty water; and with a flushing apparatus, tap and grating.

Comments: Compliance is readily achievable.

PART F3 ROOM HEIGHTS

90. Clause F3.1 Height of Rooms and other spaces

The ceiling heights in Class 2 to 9 buildings must not be less than required in sub-clauses (a) to (f) of this clause. The ceiling minimum heights for a class 9a building are as follows:

- + Patient care – 2.4m.
- + Operating theatre or delivery room – 3m.
- + Treatment room, clinic, waiting room, passageway, corridor or the like – 2.4m.



Comments: Compliance is readily achievable. It is noted that operating theatres are not part of this new development (are existing within the STAR building that adjoins this Stage 2 development).

PART F4 LIGHT AND VENTILATION

91. Clause F4.1 – Provision of natural Light

Natural lighting must be provided in:

- + Class 2 buildings and Class 4 parts of buildings – to all habitable rooms.
- + Class 3 buildings – all bedrooms and dormitories.
- + Class 9a and 9c buildings – all rooms used for sleeping purposes.
- + Class 9b buildings – to all general purpose classrooms in primary or secondary schools and all playrooms and the like for the use of children in an early childhood centre.

Comments: This clause is applicable to this building.

92. Clause F4.2 - Methods & Extent of Natural Lighting

Sub-clauses (a), (b) & (c) set out the requirement that natural light must be provided by windows and the size and location of such windows. Natural light can also be provided by the use of rooflights in accordance with the provisions of this Clause.

Note: the Guide to the BCA, as part of the commentary under **F4.2**, contains an example for determining proportional combination of windows and rooflights. **Figure F4.2(1)** in the Guide to the BCA contains an elevation showing method of measuring distance of window from boundary. **Figure F4.2(2)** contains an illustration of window sill in aged care building.

Comments: Applies to ward sleeping areas. Compliance is readily achievable noting a minimum 6m setback for the proposed open courtyard areas where the Patient Sole Occupancy units are provided with access to external natural light.

93. Clause F4.3 – Natural Light Borrowed from Adjoining Room

Natural light may be borrowed from an adjoining room in a sole-occupancy unit in a Class 2 building, a Class 4 part of a building or a sole-occupancy unit in a Class 3 building in accordance with sub-clauses (a) & (b).

Comments: Not applicable to this development.

94. Clause F4.4 – Artificial Lighting

Artificial lighting is required where it is necessary to minimise the hazard to occupants during an emergency evacuation. Sub-clauses (a), (b) & (c) sets out the places where artificial lighting is always required in all classes of buildings and the standard to which it must be installed.

Comments: Compliance is assumed. Design statement is to be provided for assessment at the Crown Certificate stage.

95. Clause F4.5 – Ventilation of Rooms

A habitable room, office, shop, factory, workroom, sanitary compartment, bathroom, shower room, laundry and any other room occupied by a person for any purpose must have natural ventilation complying with F4.6 **or** a mechanical or air-conditioning system complying with AS1668.2 and AS/NZS 3666.1.

Comments: Design statement is to be provided from the mechanical design consultant for all ventilation to the building at the application stage.



SECTION G – ANCILLARY PROVISIONS

PART G1 MINOR STRUCTURES AND COMPONENTS

96. Clause G1.2 – Refrigerated Chambers, Strong-Rooms and Vaults

A refrigerated or cooling chamber, strongroom or vault which is of sufficient size for a person to enter must be capable of being opened from the inside by hand without a key. This clause also sets out the acceptable safety standards for a cooling chamber or strongroom by installation of dedicated controls within the chamber or vault and the external lights that indicate that the space is in use.

Comments: *Compliance is readily achievable.*

97. NSW Clause G1.101 – Provision for Cleaning of Windows

A building must provide for a safe manner of cleaning any windows located 3 or more storeys above ground level.

A building satisfies this requirement where the windows can be cleaned wholly from within the building; or provision is made for the cleaning of the windows by a method complying with the Occupational Health and Safety Act 2000 and regulations made under that Act.

Comments: *Client to understand their obligations in this regard.*

PART G3 ATRIUM CONSTRUCTION

98. Clause G3.1 – Atriums Affected by This Part

This part does not apply to an atrium which connects only 2 storeys; or connects only 3 storeys if each storey is provided with a sprinkler system complying with Specification E1.5 throughout; and one of those storeys is situated at a level at which there is direct egress to a road or open space.

Comments: *The atrium provisions will apply to the proposed void and stair that connects all levels. In this instance a **Fire Engineered Performance Solution** is being formulated to address the following:*

- *The dimension of the Atrium Well does not achieve a cylindrical 6m in diameter;*
- *Atrium bounding walls will not be fire rated.*
- *Balconies within the Atrium will be glass, rather than non-combustible;*
- *The upper levels of the Atrium will only have access to a single exit;*
- *Smoke control / exhaust systems will depart from some of the requirements of Clause 3 of Spec G3.8.*

The following items are to be constructed in accordance with the DTS provisions

- *G3.sprinklers to roof of Atrium.*
- *Sprinkler systems to glazed walls*
- *Smoke alarm systems*
- *Fire detection and alarm system.*
- *EWIS to AS1670.1-2015.Including visual warning devices that operate upon the evacuation signal and display the words EVACUATE in red.*
- *Stand by power systems – alternative power supply complying with Clause 6 of BCA Specification G3.8.*
- *Air-pressurisation to exits (already addressed by virtue of BCA Spec E2.2 and class 9a with a rise in storeys of more than 2).*



PART G5 CONSTRUCTION IN BUSHFIRE PRONE AREAS

99. NSW Clause GP5.1 – Application

NSW GP5.1 – only applies in a designated bushfire prone area, to-

- a Class 2 or 3 building;
- a Class 4 part of a building;
- a Class 9 building that is a special fire protection purpose; or
- a Class 10a building or deck associated with a building or part referred to in sub-clauses (a), (b) or (c).

Comments: *Hornsby Council mapping indicates that the site is not in a designated bushfire prone area.*



SECTION J – ENERGY EFFICIENCY

Energy efficiency design measures will be implemented into the 'new' building design to satisfy the requirements under BCA Parts J1, J2, J3, J5, J6, J7 and J8 for Climate Zone 5 as follows;

- + building fabric (insulation)
- + external glazing
- + building sealing to doors, exhaust vents and windows
- + efficiency of the running of air conditioning systems and mechanical ventilation systems with respect to insulation of ductwork, timer switches, etc.
- + performance of glazing
- + artificial lighting & power controls (interior and exterior lighting)
- + hot water systems
- + access and maintenance of energy efficiency systems.

Comments: *Compliance with the above is readily achievable, and it is understood that a consultant has been engaged to prepare a report confirming that compliance with Section J is achieved.*



E. CONCLUSION

This report contains an assessment of the referenced architectural documentation for the proposed Stage 2 Redevelopment of the Hornsby Ku-Ring-Gai Hospital against the Deemed-to-Satisfy Provisions of the BCA 2016. Arising from the review, it is considered that the proposed development can readily achieve compliance with the relevant Performance Requirements of the BCA, subject to addressing the items highlighted in the body of the report, whether via the Deemed-to-Satisfy provisions of the BCA or by way of a Performance Solution.

The assessment also includes comments associated with the temporary demountable building for the ED refurbishment, the Fire Brigade Panel building, and also the works associated with the future proofing of the building for the upper level helipad proposal. The result of this assessment concludes that compliance with the Performance Requirements of the BCA is readily achievable.



APPENDIX 1

The following fire safety measures are required for the main building:

Essential Fire and Other Safety Measures	Standard of Performance
Access Panels, Doors & Hoppers	BCA Clause C3.13 & AS 1530.4 - 2014
Alarm Signaling Equipment	AS1670.3 – 2004
Automatic Fail Safe Devices	BCA Clause D2.21
Automatic Fire Detection & Alarm System	BCA Spec. E2.2a & AS 1670.1 - 2015
Automatic Fire Suppression Systems	BCA Spec. E1.5 & AS 2118.1-1999
Building Occupant Warning System activated by the Sprinkler System	BCA Spec E1.5 Clause 8 and/ or Clause 3.22 of AS 1670.1 – 2015
Emergency Lifts	BCA Clause E3.4 & AS 1735.2 - 2001
Emergency Lighting	BCA Clause E4.4 & AS 2293.1 - 2005
EWIS	BCA Clause E4.9 & AS 1670.4 – 2015 & AS 4428.4 - 2015
Emergency Evacuation Plan	AS 3745 - 2002
Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS 2293.1 – 2005
Fire Blankets	AS 3504 – 2006 & AS 2444 - 2001
Fire Dampers	BCA Clause C3.15, AS 1668.1 - 2015 & AS 1682.1 & 2 – 1990
Fire Doors	BCA Clause C2.12, C2.13, C3.2, C3.4, C3.5, C3.7, C3.8, D1.11 and AS 1905.1 – 2015
Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005
Fire Hydrant Systems	Clause E1.3 & AS 2419.1 - 2005
Fire Seals	BCA Clause C3.15 & AS 1530.4 – 2014 & AS 4072.1 – 2005
Lightweight Construction	BCA Clause C1.8 & AS 1530.3 – 1999
Mechanical Air Handling Systems	BCA Clause E2.2, AS/NZS 1668.1 - 2015 & AS 1668.2 – 2012
Paths of Travel	EP & A Regulation Clause 186
Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
Pressurisation of Fire Isolated Exits	BCA Clause E2.2a and AS1668.1-2015
Smoke Dampers	AS/NZS 1668.1 - 2015
Smoke Doors	BCA Spec. C3.4 & C2.5
Stand-by Power Systems	BCA Clause E1.3, E3.4, E4.2 & E4.5 and AS 3000 – 2000
Wall wetting sprinklers (protection of window openings in external walls)	BCA Clause C3.4 & AS 2118.2 – 1995
Warning & Operational signs	Section 183 of the EP & A Regulations 2000, AS 1905.1 - 2005, BCA Clause C3.6, D2.23, E3.3
Part G3.8 Provisions including smoke exhaust	BCA Part G3.8 and BCA Specification G3.8
<i>Fire Engineered Performance Solutions</i>	<i>As per point C2 in the body of the report</i>

Notes:

The measures included and the standards of performances nominated above may vary as a result of any proposed fire engineered alternative solutions.



APPENDIX 2
Table 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS

BUILDING ELEMENT	CLASS 5, 7a or 9 FRL: (In Minutes)
	<i>STRUCTURAL ADEQUACY/ INTEGRITY/ INSULATION</i>
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any fire-source feature to which it is exposed is—	
<u>For loadbearing parts—</u>	
less than 1.5 m	120/120/120
1.5 to less than 3 m	120/ 90/ 90
3 m or more	120/ 60/ 30
<u>For non- loadbearing parts—</u>	
less than 1.5 m	–/120/120
1.5 to less than 3 m	–/ 90/ 90
3 m or more	–/–/–
EXTERNAL COLUMN not incorporated in an external wall, where the distance from any fire-source feature to which it is exposed is—	
less than 3 m	120/–/–
3 m or more	–/–/–
COMMON WALLS and FIRE WALLS—	120/120/120
INTERNAL WALLS—	
<u>Fire-resisting lift and stair shafts—</u>	
Loadbearing	120/120/120
Non- loadbearing	–/120/120
<u>Bounding public corridors, public lobbies and the like—</u>	
Loadbearing	120/–/–
Non- loadbearing	–/–/–
<u>Between or bounding sole-occupancy units—</u>	
Loadbearing	120/–/–
Non- loadbearing	–/–/–
<u>Ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of combustion—</u>	
Loadbearing	120/ 90/ 90
Non- loadbearing	–/ 90/ 90
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES and COLUMNS—	120/–/–
FLOORS	120/120/120
ROOFS	120/ 60/ 30



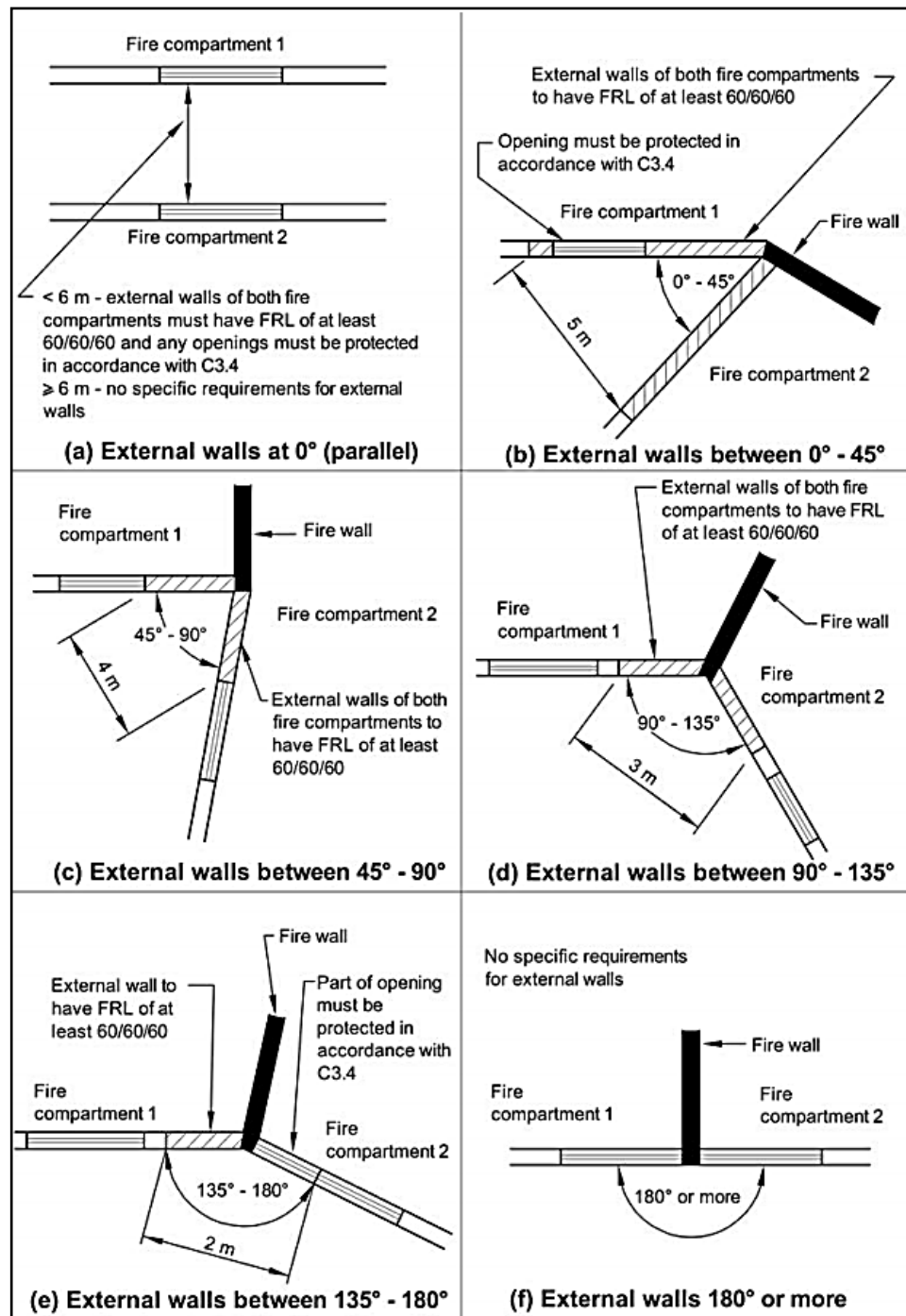
Notes:

1. The concession granted under clause C3.5 results in the roof of the building not being required to be fire rated (*i.e. the building is provided throughout with sprinklers*)
2. Where a combustible material is used as a finish or lining to a wall or roof, or sunscreen, or awning, to a building element required to have an FRL the material must be exempted or complies with the fire hazard properties prescribed under C1.10 and does not otherwise constitute an undue risk of fire spread via the façade of the building
3. Lift shafts are required to be enclosed at the top of the shaft with fire rated construction having an FRL of 120/120/120.
4. Fire isolated exit stairs are to be provided with a fire rated “lid” that achieves an FRL of 120/120/120.
5. Any loadbearing internal walls or loadbearing fire walls are to be masonry or concrete.
6. A non-loadbearing wall that is required to be fire resisting must be non-combustible construction.
7. Details are to be provided for the method of protecting gaps at the junction between the floor and any curtain wall (*i.e. to maintain fire compartmentation between levels*).
8. External walls must be non-combustible construction. Non-loadbearing parts of an external wall that are more than 3m from a fire source feature need not be fire rated.
9. Internal columns in this building (being less than 25m in effective height) that are in the storey immediately below the roof, can be constructed as follows:
 - a. Building with a rise in storeys exceeding 3 – FRL 60/60/60
 - b. Building with a rise in storeys not exceeding 3 – no FRL.In this instance the building exceeds 3 storeys and therefore the concession of 60/60/60 FRL is applicable.



APPENDIX 3

BCA Clause C3.3 – (GUIDE)



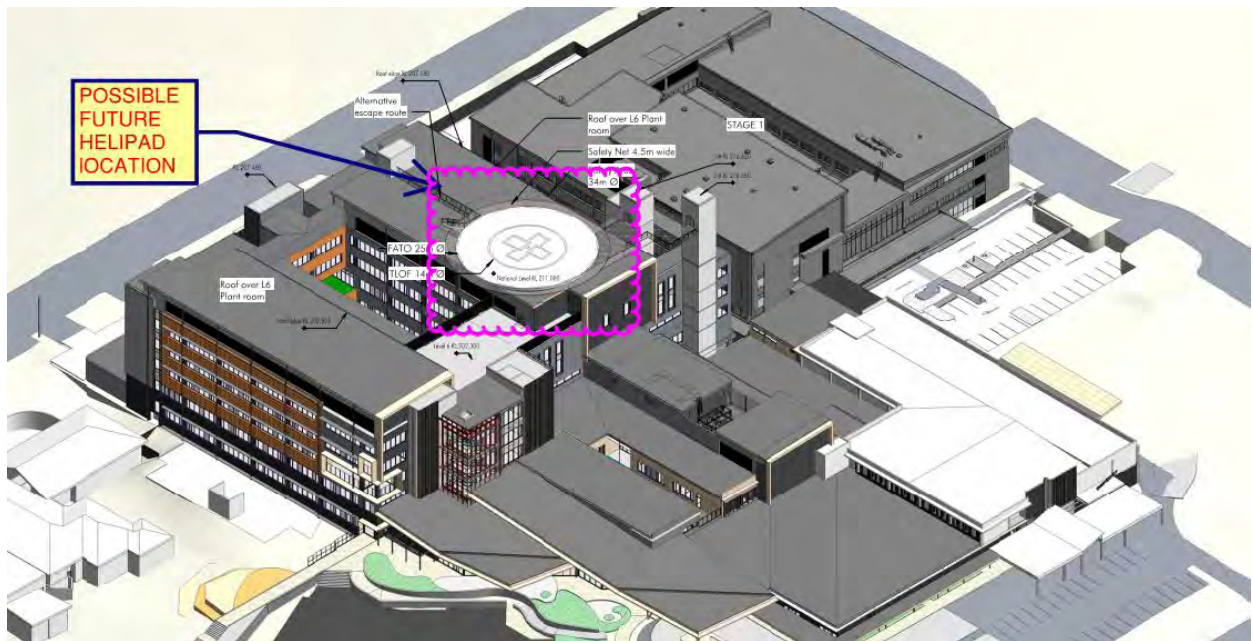
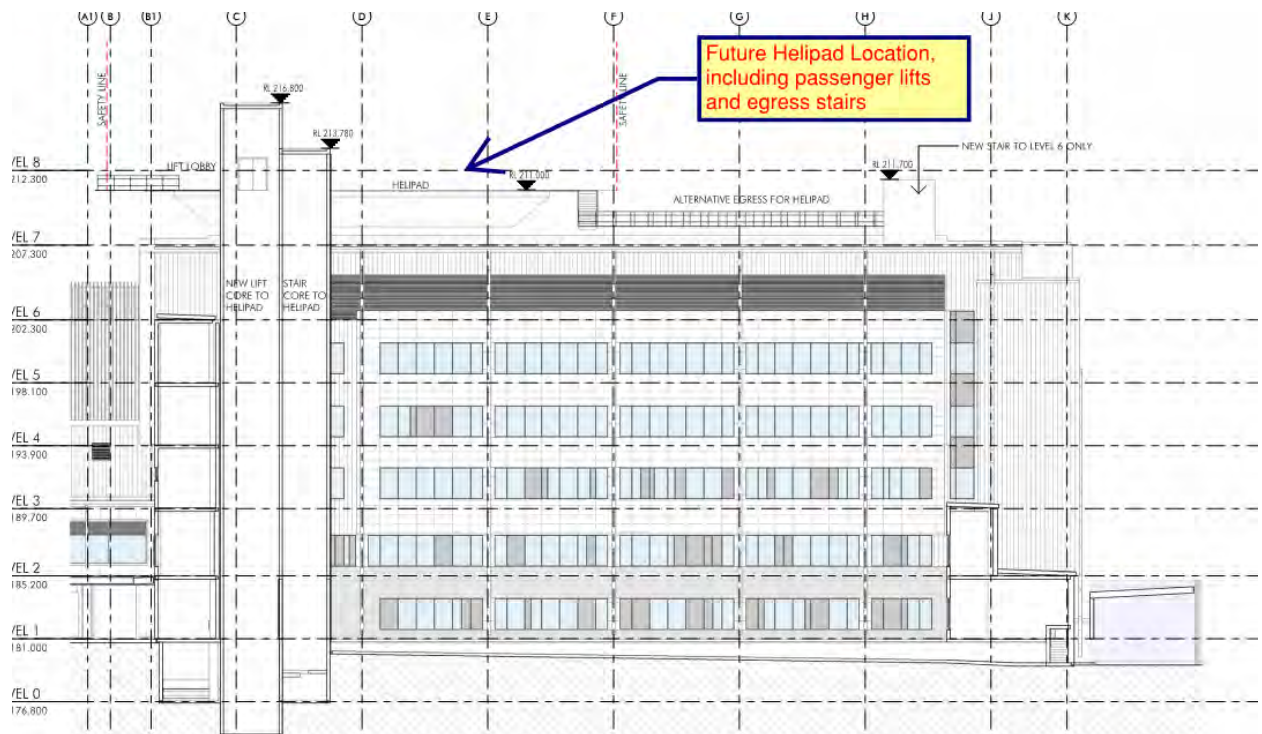


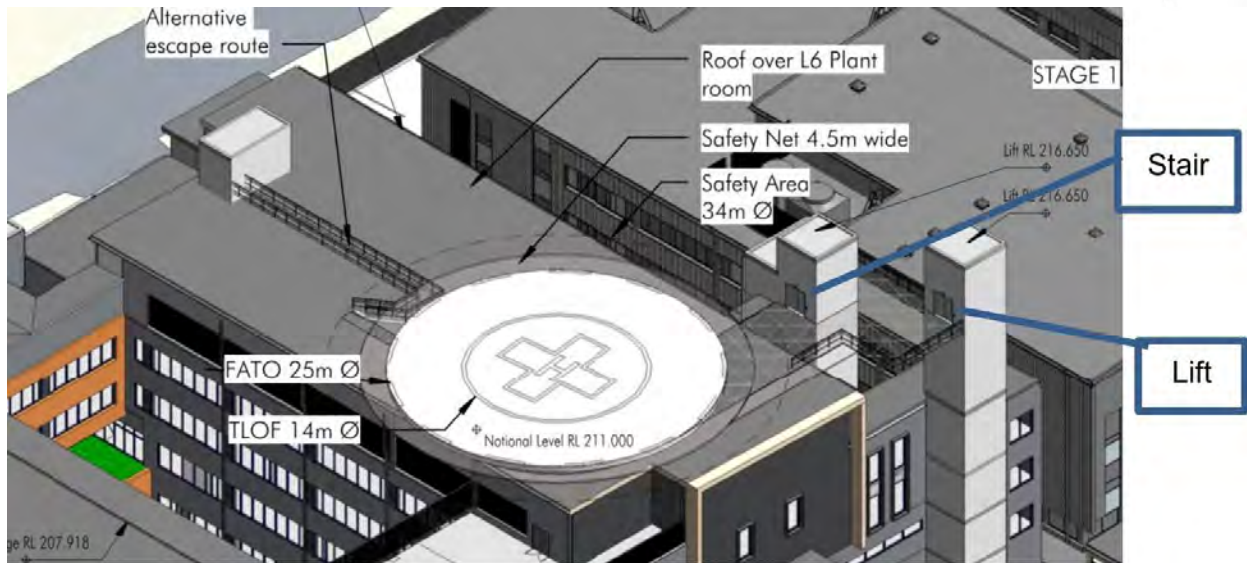
APPENDIX 4
FIRE/SMOKE COMPARTMENTS AND EXITS/PATHS OF TRAVEL

SEE SEPARATE ATTACHMENT



Future Helipad





Notes:

The future Helipad will result in the building increasing in effective height from the current design, i.e. the building will now be in excess of 25m measured from Level 7 lift lobby, and accordingly requires the introduction of a series of additional fire safety measures (as listed below). It is worthy of noting that the current design of the building with an Atrium and also by virtue of a multi-level Health Care facility, the additional fire safety measures for being >25m is as follows:

1. Zone smoke control throughout the building;
2. Enhanced Sprinkler control zoning in accordance with As2118.1-1999;
3. Grade 1 water supply in accordance with AS2419.1-2005.

Other matters such as minimum number of exits; sprinklers, stair pressurisation, EWIS, smoke exhaust, fire control centres and Emergency lifts are already accommodated in the building due to either its floor area, or due to its classification and/or Atrium design. Additionally, items 1 and 2 above are the subject of the formulation of a Fire Engineering Performance Solution to justify their exclusion, based on the principle that the only part of the building that is above 25m effective height is a lift lobby associated with patient transfers from the Helipad, rather than any substantial accommodation or treatment areas.