BLACKETT MAGUIRE+ GOLDSMITH

The National Construction Code Volume One

SSDA Submission

Nepean Hospital Redevelopment - Stage 2

NSW GOVERNMENT Health Infrastructure

Revision I

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Project No.: 200182

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REVISION STATUS				
REVISION	**DATE**	**STATUS**	**PREPARED BY**	**REVIEWED BY**
A	04.05.2020	Master Plan Report	Adam Durnford	David Blackett
B	26.06.2020	Draft Concept Design Report	Adam Durnford	David Blackett
C	03.07.2020	Final Concept Design Report	Adam Durnford	David Blackett
D	01.10.2020	Final Concept Design Report - Updated	Adam Durnford	David Blackett
E	08.10.2020	Final Concept Design Report - Updated	Adam Durnford	David Blackett
F	19.03.2021	Draft 70% Schematic Design Report	Adam Durnford	David Blackett
G	26.04.2021	100% Schematic Design Report	Adam Durnford	David Blackett
H	16.08.2021	SSDA Submission	Adam Durnford	David Blackett
I	30.09.2021	SSDA Submission	Adam Durnford	David Blackett

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A. INTRODUCTION

A.1 BACKGROUND / PROPOSAL

Health Infrastructure NSW (HI) is the applicant for the proposed Stage 2 Redevelopment of Nepean Hospital in Penrith Local Government Area (LGA).

The proposal is State Significant Development (SSD) for the purposes of the Environmental Planning and Assessment Act 1979 (EP&A Act) and clause 14(a) of Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011 (SEPP SRD) as it involves development for the purposes of a hospital with a capital investment value in excess of $30 million.

The Stage 2 Redevelopment seeks to deliver significantly enhanced acute services, as well as a new campus main entry and drop-off area. It complements the recent Stage 1 Redevelopment (SSD 8766) approved in February 2019 and due for completion by early 2022.

The proposed Stage 2 Tower will be located west of, and connected to, the Stage 1 Tower. Portions of the North Block (north section) will be demolished with the remaining sections of the North Block (to the south of the Stage 2 Tower) to remain operational.

Departments to be provided in the Stage 2 Tower include:

- Front of House, including retail;
- Education and Training Centre;
- Transit Lounge;
- Medical Imaging;
- Interventional Radiology;
- Intensive Care Unit and Close Observation Unit;
- In-Centre Dialysis and Renal Inpatient Unit;
- Paediatric In-patient Unit;
- Plant areas;
- Clinical Support areas; and
- Kitchen.

The Stage 2 Redevelopment project scope includes:

- The Stage 2 Tower, being predominantly a 7-storey building, with roof plant;
- Demolition of parts of the existing North Block and other satellite buildings directly within the Stage 2 Tower footprint (excluding other buildings already approved under the Stage 1 SSD consent);
- Demolition of the Total Asset Management (TAM) facility;
- Reconfiguration of the loading dock area and back of house functions;
- Landscaping and other associated at-grade works within the Stage 2 Tower's immediate vicinity; and
- Barber Avenue upgrade and access road to the Stage 2 Tower's forecourt, port cochere, and front of house area.

The Stage 2 Redevelopment's SEARs was issued by the Department of Planning, Industry and Environment on 22 April 2021.

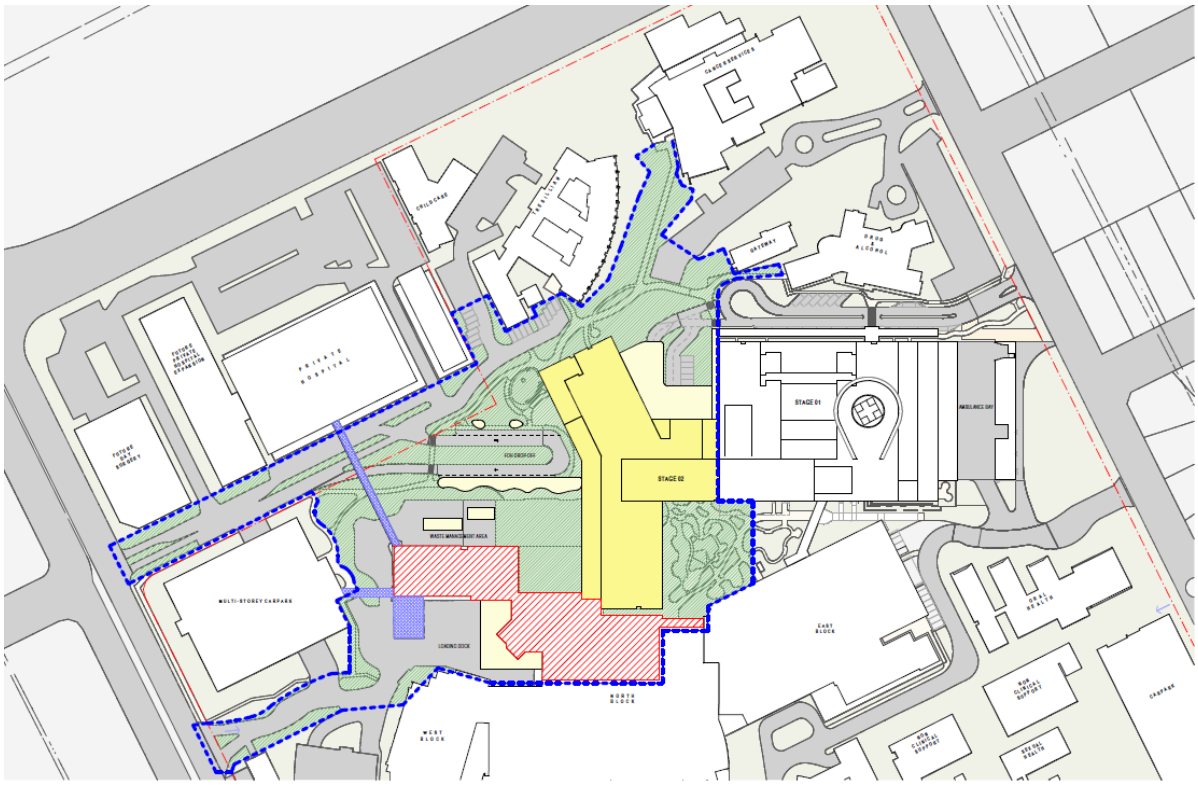

Figure No. 01 – Proposed Stage 2 Site Plan

A.2 AIM

The aim of this report is to:

- Undertake a high level assessment of the SSDA Architectural Documentation for the proposed Stage 2 Tower Building against the Deemed-to-Satisfy (DtS) provisions of Part C, D, E, F, G & J of the BCA 2019 Amendment No. 1.
- Identify any key BCA compliance issues that will require resolution/attention for the proposed redevelopment.
- Undertake a high level review of the SSDA Architectural Documentation against the Access to Premises Standards 2010.

A.3 PROJECT TEAM

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

- Adam Durnford (Associate Director)
- David Blackett (Director)

A.4 DOCUMENTATION

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

- Building Code of Australia 2019 Amendment No. 1
- Guide to the Building Code of Australia 2019 Amendment No 1.
- Access to Premises Standards 2010

- 100% Schematic Architectural Drawings issued by BVN dated 31 March 2021.

A.5 Regulatory Framework

Pursuant to clause 145 of the Environmental Planning and Assessment (EPA) Regulation 2000 all new building work must comply with the current BCA however the existing features of an existing building need not comply with the BCA unless upgrade is required by other clauses of the legislation.

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.
- The Report does not address matters in relation to the following:
  - Local Government Act and Regulations.
  - Occupational Health and Safety (OH&S) Act and Regulations.
  - WorkCover Authority requirements.
  - Water, drainage, gas, telecommunications and electricity supply authority requirements.
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A.7 Terminology

Accessible

Means having features to enable use by people with a disability.

Accessway

Means a continuous accessible path of travel (as defined by AS 1428.1) to, into or within a building.

Carpark

Means a building that is used for the parking of motor vehicles but is neither a private garage nor used for the servicing of vehicles, other than washing, cleaning or polishing.

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

Means the vertical distance between the floor of the lowest storey included 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).

Exit

Means

a) Any, or any combination of the following if they provide egress to a road or open space:

i) An internal or external stairway.
ii) A ramp.
iii) A fire-isolated passageway.
iv) A doorway opening to a road or open space

b) A horizontal exit or a fire isolated passageway leading to a horizontal exit

Fire Isolated Stairway

Means a stairway within a fire resisting shaft and includes the floor and roof or top enclosing structure.

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 Resisting

For the purposes of Volume One, applied to a building element, means having an FRL appropriate for that element.

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.

Flight

Means that part of a stair that has a continuous series of risers, including risers of winders, not interrupted by a landing or floor.

Health-care building

A building whose occupants or patients undergoing medical treatment generally need physical assistance to evacuate the building during an emergency and includes—

(a) a public or private hospital; or

(b) a nursing home or similar facility for sick or disabled persons needing full-time care; or

(c) a clinic, day surgery or procedure unit where the effects of the predominant treatment administered involve patients becoming non-ambulatory and requiring supervised medical care on the premises for some time after the treatment.

Landing

Means an area at the top or bottom of a flight or between two flights.

Loadbearing

Means intended to resist vertical forces additional to those due to its weight.

Non-combustible

Means

a) Applied to a material – not deemed combustible as determined by AS 1530.1 – Combustibility Tests for Materials; and
b) Applied to construction or part of a building – constructed wholly of materials that are not deemed combustible

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 Solution

A method of complying with the Performance Requirements other than by a Deemed-to-Satisfy Solution.

Patient care area

a part of a health-care building normally used for the treatment, care, accommodation, recreation, dining and holding of patients including a ward area and treatment area.

Primary Building Element

For the purposes of Volume One, means a member of a building designed specifically to take part of the loads specified in B1.2 and includes roof, ceiling, floor, stairway or ramp and wall framing members including bracing members designed for the specific purpose of action as a brace to those members.

Performance Solution

A method of complying with the Performance Requirements other than by a Deemed-to-Satisfy Solution.

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).

Self-closing

For the purpose of Volume One, applied to a door, means equipped with a device which returns the door to the fully closed position immediately after each opening.

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

An area within a 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 moved.

Ward area

That part of a patient care area for 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 Stage 2 Tower:

+ **BCA Classification:**	Class 9a (Health-care Building) Class 5 (professional consultation) Class 3 (overnight accommodation rooms) Class 9b (Education areas) *Note: Class 6 retail areas have been assessed at present as being less than 10% of the floor area and have not be classified separately.*
+ **Storeys Contained**	Seven (7) - Stage 2 The total storeys contained for the combined Stage 1 & Stage 2 building is fifteen (15)
+ **Rise in Storeys:**	Seven (7) - Stage 2 The total rise in storeys for the combined Stage 1 & Stage 2 building is fifteen (15)
+ **Effective Height:**	The total effective height based on the combined Stage 1 & Stage 2 building is > 50m
+ **Type of Construction:**	Type A Construction
+ **Sprinkler System Installed Throughout**	Yes – New building is proposed to be protected throughout with an Automatic Fire Suppression System
+ **Importance Level**	Importance Level 4
+ **Climate Zone:**	Energy Efficiency Zone 6
+ **Maximum Floor Area:**	Max 5,000m² compartments for Class 9a Health Care buildings. Note: 2,000m² compartments applies to all Patient Care Areas within the building.
+ **Maximum Volume:**	Max 30,000m³ compartments for Class 9a Health Care buildings.
+ **Largest Fire Compartment**	3,962 m^2

Table No. 1 – Summary of building classification items

C. SUMMARY OF KEY COMPLIANCE ISSUES

Based on the 100% Schematic Architectural Drawings prepared by BVN, the following is a summary of the key compliance issues identified associated with the proposed Stage 2 Tower.

C.1 SUMMARY OF KEY COMPLIANCES ISSUES:

No.	BCA Clause	Description
1.	B1.2	*Importance Level* The Stage 2 Tower will be required to be designed and constructed in accordance with the requirements of Importance Level 4. The Structural Engineer together with Services Engineers are to nominate the Importance Level that has been assigned to the building in accordance with Table B1.2a i.e., Importance Level 4.
2.	C1.9	*Aluminium Panels* If aluminium panels are proposed on the external façade of the building, the panels will be required to consist of a single piece of pre-finished metal sheeting having a combustible surface finish not exceeding 1mm thickness and where the Spread of Flame Index of the product is not greater than 0. The product selected will be required to have a current Certificate of Conformity or other appropriate Test Report.
3.	C2.2	*Gap between Concrete Slab and Curtain Wall* Based on a typical curtain wall construction, it is noted that the small gap between the slab edge and external curtain wall will only be smoke sealed in lieu of fire sealed. If any curtain wall design is proposed then the design will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
4.	C2.5	*Fire & Smoke Compartment Sizes* A number of smoke compartments within treatment and ward areas are greater than the maximum 500 m^2 (ward areas) and 1000 m^2 (treatment areas) threshold permitted by the DtS Provisions. The excessive smoke compartment sizes will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
5.	C3.3	*Protection of External Walls and associated Openings in Different Fire Compartments* Where an internal fire wall intersects at the junction of an external wall, the external walls of the different compartments and any associated openings that are exposed to one another are required to be protected in accordance with Clause C3.3. There are numerous locations throughout the building where exposure occurs between external walls and their associated openings of difference fire compartments. The subject external walls and openings will be assessed as part of a Fire Engineering Performance Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA. *Separation of Stage 2 Tower from Adjoining Hospital Buildings*

No.	BCA Clause	Description
		The new Stage 2 Tower will be required to be adequately fire and smoke separated from all existing hospital buildings that are directly connected via enclosed linkways, walkways and direct internal connections. In this instance adequate fire separation will be required to be provided at the interface between the Stage 2 Tower and Stage 1 Tower and Stage 2 Tower and North Block. All new linkways, enclosed corridors etc will be assessed as part of the Stage 2 Tower and will be required to be adequately fire and smoke separated from the existing hospital buildings.
6.	C3.11	*Fire Separation of Overnight Rooms* Overnight rooms provided for family members staying overnight or alternatively rooms provided for staff to sleep overnight are technically required to be individually fire separated from the remainder of the building based on their classification of Class 3 residential accommodation. It is noted that overnight rooms are provided on Level 04. It is proposed not to fire separate the overnight room(s) in accordance with the DtS Provisions of the BCA. The separation of the overnight rooms will be required to be assessed as part of a Fire Engineering Performance Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
7.	C3.15	*Pipes Systems Comprised of Metal* In accordance with Clause C3.15, a tested system is not required to comply with the insultation criteria relating to the service subject to the pipe system being constructed of entirely of metal and not having any combustible building elements being located within 100mm for a distance of 2000mm from the penetration and combustible materials not being able to be located within 100mm of service for a distance of 2000mm from the penetration. Having regard to the requirements of Clause C3.15 which are difficult to achieve in a hospital environment due to the number of services especially in corridors, it is understood that is proposed to pipes constructed of metal to not comply with the requirements of Clause C3.15 in terms of the 100mm separation for a distance of 2000mm from the penetration. The proposed design of the subject metal pipes used for fire services, medical gas etc if not protected in accordance with Clause C3.15 will be required to be assessed as part of Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
8.	Spec. C2.5	*Omission of Smoke Dampers to Mechanical Ducts* Where Isolation Rooms are provided throughout the hospital in order for patients to be isolated from infection, the room will be required to be pressurised in order to maintain a germ free environment by limiting air exchanges between rooms. As a result, it is crucial to the functionality of the room that the air handling system not shut in fire mode as the accidental shut down of the system may have significant health consequences for the patient within the room. As a result of the above, the mechanical ducts serving the Isolation Rooms will be proposed to have the Smoke Dampers removed where the duct penetrates a fire/smoke wall.

No.	BCA Clause	Description
		The omission of Smoke Dampers will be assessed as part of a Fire Engineering Performance Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
9.	Spec.C3.4	*Swing of Fire Safety Doors* There will be numerous fire safety doors located in fire and smoke walls throughout the building that are proposed to not swing in the direction of egress i.e., in both directions, as required by Specification C3.4. It is understood that all fire and smoke doors will be required to swing in one direction only as a result of wear and tear to doors that swing in both directions. The proposed swing of the doors in one direction only or against the direction of egress will be required to assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
10.	D1.4	*Egress Travel Distance to a Point of Choice and to an Alternative Exit* Based on the Schematic Design Architectural Drawings, we have undertaken an egress assessment in terms of egress travel distance to a point of choice and to an alternative exit. As a result of the review, there are a number of areas identified where travel distance currently exceeds the maximum distance permitted by the DtS provisions of the BCA. The excessive travel distances are noted as being within acceptable fire engineering limitations. In this instance the excessive travel distances to a point of choice and to an alternative exit will be required to assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
11.	D1.5	*Egress Travel Distance between Alternative Exits* Based on the Schematic Design Architectural Drawings, we have undertaken an egress assessment in terms of egress travel distance between alternative exits. As a result of the review, there are a number of areas identified where travel distance currently exceeds the maximum distance permitted by the DtS provisions of the BCA. The excessive travel distances are noted as being within acceptable fire engineering limitations. In this instance the excessive travel distances between alternative exits will be required to assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
12.	D1.7	*Fire Stair 01 discharging with the confines of the Building on Level 02* Fire Stair 01 discharges within the confines of the building on Level 01 to the lobby space in lieu of the stairway discharging directly to open space as required by Clause D1.7. Consistent with the Performance Solution for the two Fire Stairs in the Stage 1 Hospital, the discharge of the fire isolated stairway will be required to assessed as part of the

No.	BCA Clause	Description
		Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA. *Fire Stairs 01 & 03 lead to Courtyard which is not directly connected to Open Space* Once occupants discharge from Fire Stair 01 (via the lobby space) and Fire Stair 03 they discharge into a large courtyard area, however in order to reach open space they will be required to pass through an enclosed linkway connecting the Stage 1 Tower and East Block prior to reaching the internal roadway. Occupants having to pass back within the confines of the linkway is a non-compliance and will be required to assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA. *Note: The Performance Solution will also be required to address any required exits discharging from the Education space along with the FOH that discharge into the courtyard area.*
13.	D2.7	*Communication Equipment in Fire Isolated Stairways* The provision of any Wireless Access Points and/or DAS Antennae Systems within the fire isolated stairways will be required to assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA as they are not permitted to be located within the fire isolated stairway in accordance with Clause D2.7.
14.	D1.11	*Travel via Horizontal Exits* A technical non-compliance occurs in terms of travel via horizontal exits from within multiple fire compartments within building. Having regard to the proposed design, there are numerous instances whereby occupants will egress from one compartment into an adjoining compartment which will not be provided with direct access to a fire isolated stairway or exit discharging directly to open space. The proposed design will be required to assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
15.	D2.19	*Sliding Doors in Patient Care Areas* Doorways located in a patient care area must not incorporate a sliding door unless that door leads directly to open space and is able to be manually opened under a force of not more than 110 N and open automatically upon fire trip or power failure. It is noted that sliding doors will be installed within patient care areas throughout the building. The proposed provision of sliding doors throughout patient care areas within the building will be required to be to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
16.	D2.20	*Swing of Horizontal Exit Doors*

No.	BCA Clause	Description
		All exit doors or doors forming part of a required exit are required to swing in the direction of egress. Fire doors used as horizontal exits are proposed to not swing in the direction of egress in certain instances. The swing of the horizontal exit doors will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
17.	Part D3	Access for a person with a disability will be required to be provided from the allotment boundary along and accessible car parking spaces to and within the new Stage 2 Tower and interconnected buildings i.e., Stage 1 Tower and North Block. The Class 3 overnight room will be required to be fully accessible for a person with a disability including an accessible sanitary facility.
18.	E1.3	*Fire Hydrants* Fire hydrant coverage is required to be provided to serve the building in accordance with AS 2419.1 – 2005. *System Design* Due to the fact that the building has an effective height greater than 25 m and 50m , the following additional provisions are required to be provided as part of the fire hydrant system design: + Provision of on-site water storage tanks to meet the minimum capacity as required by Clause 4.3 of AS 2419.1 – 2015. + Provision of a fire hydrant ring main (incorporated as part of the combined fire sprinkler and fire hydrant system). + Provision of Fire Brigade Relay Pumps to enable relay boosting of each 50m pressure gauge *Fire Hydrant Booster* A fire hydrant booster needs to be located in a manner where it is within sight of the main entrance of the building and adjoins a primary vehicular entrance and is situated within 8m of a hardstand access to permit Brigade access. In this regard it is noted that the fire hydrant booster is located on the Eastern side of Tower 1 adjacent to the Fire Control Room and Fire Services Pump Room which is not within sight of the main entrance of the building on the Western Elevation. The location of the booster in terms of proximity and sight to the main entrance of the building is noted as being as assessed as part of the Fire Engineering Assessment undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA. The above is assessed as part of the Stage 1 Development but will need to be included in the Stage 2 Fire Engineering Report to be prepared by Arup.
19.	E1.4	*Fire Hose Reels*

No.	BCA Clause	Description
		Fire hose reels are required to be installed throughout the building areas in accordance with AS 2441 – 2005. *Fire Hose Reel Coverage to Fire Separated Rooms* It is noted that there will be small percentage of rooms that are fire or smoke separated from the remainder of the building that may not be provided with compliant fire hose reel coverage. In this instance, the omission of Fire Hose Reel coverage to isolated rooms will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
20.	E1.5	*Sprinklers* An Automatic Fire Suppression System will be required to be installed throughout the Stage 2 Tower. The combined Sprinkler and Fire Hydrant System will be required to be designed in accordance with AS 2118.6 – 2012 and AS 2118.1 – 2017. *System Design* Due to the fact that the building has an effective height exceeding 25m & 50m, the following additional measures are required to be installed as part of the Automatic Fire Suppression System installation: + Provision of a Grade 1 Water Supply; and + Provision of on-site water storage tanks. *Fire Sprinkler Booster* A fire sprinkler booster needs to be located in a manner where it is within sight of the main entrance of the building and adjoins a primary vehicular entrance and is situated within 8m of a hardstand access to permit Brigade access. In this regard it is noted that the fire sprinkler booster is located on the Eastern side of the building adjacent to the Fire Control Room and Fire Services Pump Room which is not within sight of the main entrance of the building on the Western Elevation. The location of the booster in terms of proximity and sight to the main entrance of the building is noted as being as assessed as part of the Fire Engineering Assessment undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA. The above is assessed as part of the Stage 1 Development but will need to be included in the Stage 2 Fire Engineering Report. *Omission of Sprinklers to Rooms provided with Low Voltage Equipment* Clause 3.1.3 of AS 2118.1 – 2017 only permits sprinklers to be omitted from rooms containing high voltage equipment. It is noted that at the request of HI / LHD sprinklers are proposed to be omitted from rooms containing low voltage electrical equipment including Comms Rooms, DAS Room and EDB enclosures etc. The omission of sprinklers from rooms containing low voltage equipment will be required to be assessed as part of the Fire Engineering Assessment to be

No.	BCA Clause	Description
		undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA. *Location of Sprinkler Valve Sets* Having regard to the fact that the sprinkler system is designed as part of a combined Fire Hydrant and Sprinkler System, the sprinkler control valves are required to be located within the fire isolated stairways on each level with direct access being provided to the stairway from open space for FRNSW personnel. If the sprinkler valves are located within the fire isolated stairway 01 that discharges within the confines of the building on Level 01, then the non-provision of direct access to the fire isolated stairway from open space for FRNSW personnel will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup. *Concealed Sprinkler in Operating Theatres and associated Sterile Rooms* The proposed use of concealed sprinkler heads in Operating Theatres and associated Sterile Rooms will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
21.	E1.8	*Fire Control Room* A Fire Control Centre (Fire Control Room) is required to be located within a building. It is noted that the proposed design consists of the Fire Control Room being located adjacent to Tower 1 remote from the building adjacent to the Fire Hydrant Booster and Pumps and Valve Room etc The location of the Fire Control Room is a technical non-compliance. Furthermore, the proposed Fire Control Room is only proposed to be provided with one (1) point of access in lieu of the minimum required two (2) points of access as a result of the room being located externally and thus Fire Brigade personnel are not required to be provided with an internal access point direct from the building. The above is assessed as part of the Stage 1 Development but will need to be included in the Stage 2 Fire Engineering Report.
22.	E2.2	*Automatic Fire Detection & Alarm System* An Automatic Fire Detection & Alarm System is required to be installed throughout the building in accordance with AS 1670.1 - 2018. *Zone Smoke Control System* A Zone Smoke Control System is required to be installed throughout the Stage 2 Tower having regard to the fact that the building has an effective height exceeding 25m. The Zone Smoke Control System will be required to be designed in accordance with Table E2.2a and AS 1668.1 – 2015.
23.	E3.4	*Emergency Lifts* A minimum of two (2) Emergency Lifts are required to serve each level of the building that are served by passenger lifts.

No.	BCA Clause	Description
		In this instance, the Emergency Lifts will need to be two (2) lifts that are located within the Bank of Lifts Nos. 01-06. Due to the fact that the lifts are contained within the same bank, they will be required to be contained within separate fire rated shafts.
24.	E4.9	*EWIS* An Emergency Warning & Intercom System (EWIS) is required to be installed throughout the entire building in accordance with AS 1670.4 – 2018. *Rationalisation of EWIS System* It is noted that EWIS speakers are proposed to be rationalised within ward and treatment rooms including patient bedrooms, operating theatres and other sensitive environments where the activation of the speaker within the room may cause trauma to the patient. The rationalisation of EWIS system from within patient care areas will be required to be assessed as part of the Fire Engineering Assessment undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.
25.	F1.0	Performance Requirement FP1.4 relating to the prevention of water through the external is required to be demonstrated as being complied. There is no specific DtS Clause for this Performance Requirement in respect of external walls. In this instance a Performance Solution Report is required to be prepared to demonstrate that the external wall and roof weatherproofing system meets Performance Requirement FP1.4 and will prevent the penetration of water through the external walls.
26.	F2.3	A ratio of 1:8 showers is required to be provided for patients within patient care areas. Verification is required as to whether this ratio is achieved within the Treatment areas. If the shower ratio is not achieved within the Treatment Areas, then a Performance Solution will be required to be prepared to address the technical non-compliance.
27.	F2.4	Sanitary facilities for a person with a disability will be required to be provided throughout each floor of the building. Facilities will be required to consist of: + Suitable provision of unisex accessible sanitary facilities for both staff and patients / public. + Suitable provision of unisex ambulant sanitary compartments for both staff and patients / public. *Provision of Unisex Ambulant Sanitary Compartment* Ambulant Sanitary Compartments are required to be provided separately for males and females and unlike Unisex Accessible Sanitary Facilities receive no concession for the provision of unisex facilities.

No.	BCA Clause	Description
		The provision of unisex ambulant sanitary compartments in lieu of separate facilities for males and females throughout the building will be required to be assessed as part of a Performance Solution to be prepared by the appointed Access Consultant.
28.	Section J	*Energy Efficiency* The energy efficiency provisions of Section J are applicable to the proposed building. In this regard Parts J1 - Building Fabric, J2, Part J3 - Building Sealing, Part J5 - Air Conditioning and Mechanical Ventilation, Part J6 - Artificial Lighting and Power, and Part J7 - Hot water supply & Part J8 – Access for Maintenance is required to be provided. If the proposed design will not comply with the DtS provisions of the BCA, then a JV3 Assessment will be required to be undertaken to demonstrate compliance with the Performance Requirements of the BCA.

Table No. 2 – Summary of key compliance items

C.2 Summary of Items Requiring a Fire Engineering Performance Solution:

No.	DtS Clause	BCA Performance Requirement	DTS Departure
1.	C2.2	CP2, CP3	Gap between slab edge and external wall not fire rated.
2.	C2.5	CP2, CP3	Excessive smoke compartment sizes.
3.	C3.3	CP2, CP8	Protection of external walls and associated openings in different fire compartments
4.	C3.11	CP2, CP3	Fire separation of overnight rooms.
5.	C3.15	CP2, CP8	Insultation of water filled metal pipes.
6.	Spec. C2.5	CP3	Omission of smoke dampers to mechanical ducts serving isolation rooms.
7.	Spec. C3.4	CP3, DP2	Swing of fire safety doors against the direction of egress.
8.	D1.4	DP4, EP2.2	Extended travel distance to a point of choice and to an alternative exit.
9.	D1.5	DP4, EP2.2	Extended travel distances between alternative exits.

10.	D1.7	DP4, DP5, EP2.2	Discharge from Fire Stairs 01 & 03 on Level 01.
11.	D1.11	DP4	Travel via horizontal exits.
12.	D2.19	DP2	Sliding doors located within patient care areas.
13.	D2.20	CP3, DP2	Swing of horizontal exit doors.
14.	E1.3	EP1.3	Location of fire hydrant booster in relation to the main entry of the building.
15.	E1.4	EP1.1	Omission of fire hose reel coverage to individual rooms that are completely fire separated from the remainder of the building.
16.	E1.5	EP1.4	Location of fire hydrant booster in relation to the main entry of the building.
17.	E1.5	EP1.4	Omission of sprinklers from rooms containing low voltage equipment.
18.	E1.5	EP1.4	Access to the sprinkler alarm valves in Fire Stairs 01 are not accessed directly from open space.
19.	E1.5	EP1.4	Concealed sprinkler heads within Operating Theatres and associated Sterile Rooms.
20.	E1.8	EP1.6	Location of fire control room not accessible from the main entrance and number of doorways accessing the fire control room.
21.	E4.9	EP2.1, EP4.3	Rationalisation of EWIS speakers within ward and treatment rooms.

Table No. 3 – Summary of required non-compliances to be addressed via a Fire Engineering Assessment

The FER process must include input from the LHD and HI, being key stakeholders in the delivery and operation of the hospital project.

C.3 SUMMARY OF ITEMS REQUIRING A PERFORMANCE SOLUTION:

NO.	DTS CLAUSE	BCA PERFORMANCE REQUIREMENT	DTS DEPARTURE
1.	F1.0	FP1.4	Weatherproofing of external walls.
2.	F2.4	FP2.1	Males and females sharing unisex ambulant sanitary compartments

3.	F4.1	FP4.1	No natural light to overnight room on Level 04

Table No. 3 – Summary of required non-compliances to be addressed via a Performance Solution

D. BCA ASSESSMENT

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

The following comments have been made in relation to the relevant BCA compliance issues associated with the proposed Stage 2 Tower as part of the Nepean Hospital Redevelopment.

SECTION B - STRUCTURE

1. Part B1 – Structural Provisions

Structural engineering details prepared by an appropriately qualified structural engineer to be provided to demonstrate compliance with Part B1. This will include 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 – 2018, 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.

Importance Level

The BCA outlines minimum Importance Levels which reflect the values and expectations the community place on specific types of buildings in the event of an earthquake.

It is generally accepted that the structure is expected not to collapse but substantially damaged when this condition is reached. The interpretation of the performance expectations for buildings of different Importance Level in the event of an earthquake are generally as follows:

- Buildings of Importance Level 1: not expect to survive
- Buildings of Importance Level 2: expect not to collapse but substantially damaged
- Buildings of Importance Level 3: expect to survive with some damage
- Buildings of Importance Level 4: expect to survive intact and continue to function

AS1170.0-2002 *Structural design Actions – General Principals* categorises the Importance Levels for different building types as outlined below. *Note that the BCA only identifies Importance Levels 1-4, and hence Importance Level 5 is not a mandatory requirement under the National Code.*

In this regard, the building is required to be designed as **Importance Level 4**, as the building is proposed to have surgery facilities (operating theatres).

The Structural Engineer together with Services Engineers are to nominate the Importance Level that has been assigned to the building in accordance with Table B1.2a i.e., Importance Level 4.

SECTION C – FIRE RESISTANCE

2. Clause C1.1 – Type of Construction Required

The new building elements will be required to be constructed in accordance with the FRL's detailed in Table 3 of Specification C1.1 for Type A Construction (refer to table below).

TYPE A CONSTRUCTION	
BUILDING ELEMENT	**Class 5 & 9a**
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any fire-source feature to which it is exposed is –	
For *load bearing* parts-	
less than 1.5m	120/120/120
1.5m to less than 3m	120/90/90
3m or more	120/60/30

For *non-load bearing* parts- less than 1.5m 1.5m to less than 3m 3m or more	 -/120/120 -/90/90 -/-/-
EXTERNAL COLUMN not incorporated in an external wall, where the distance from any fire source feature to which it is exposed is – Less than 3m 3m or more	 120/-/- -/-/-
COMMON WALLS & FIRE WALLS	120/120/120
INTERNAL WALLS Fire Resisting lift and stair shafts – Loadbearing Non-loadbearing Ventilating, pipe, garbage, and the like shafts not used for the discharge of hot products of combustion – *Loadbearing* *Non-loadbearing*	 120/120/120 -/120/120 120/90/90 -/90/90
OTHER LOADBEARING INTERNAL WALLS & COLUMNS	120/-/-
FLOORS	120/120/120
ROOF	120/60/30

Table No. 4 – Required FRL's for building elements

3. Clause C1.9 – Non Combustible Building Elements

In a building required to be constructed of Type A Construction, external walls and all components incorporated in them including façade covering, framing. insulation etc are required to be constructed of non-combustible construction.

Sarking installed within the external wall assembly is required to have a thickness that does not exceed 1mm and have a flammability index not greater than 5.

In this instance any proposed panels to be used on the external walls of the building will be required to comply with the requirements of Clause C1.9 i.e. single piece of pre-finished metal sheeting having a combustible surface finish not exceeding 1mm thickness and where the Spread of Flame Index of the product is not greater than 0.

Note: No form of Aluminium Composite Panel can be installed on the external façade of the building.

Documentation is required to be provided as relevant to:

+ Any external wall claddings.
+ Any framing or integral formwork systems i.e., timber framing, sacrificial formwork, etc.
+ Any external linings or trims i.e., external UPVC window linings, timber window blades, etc.
+ Any sarking or insulation contained within the wall assembly.
+ Any packers, insultation of plumbing or mechanical services or any other building element

This is not an exhaustive list, and any element incorporated within any external wall assembly must be identified and provided for review. Any departures from non-combustibility must be advised prior to specification / installation.

4. Clause C1.10 – Fire Hazard Properties

The fire hazard properties of all new building materials and assemblies as well as all new floor materials, floor coverings, wall and ceiling lining materials used in the development must comply with the requirements of Specification C1.10 of the BCA.

In accordance with Specification C1.10, we note the following requirements:

Critical Radiant Flux of Floor Materials and Floor Coverings

- Patient Care Areas – not less than 2.2 kW/m²
- Non-Patient Care Areas – not less than 1.2 kW/m²
- Fire Isolated Exits – not less than 4.5 kW/m²
- Lifts – not less than 2.2 kW/m²

Wall and Ceiling Lining Materials – Group Number

- Fire Isolated Exit – Group 1
- Public Corridor – Group 1 or 2
- Patient Care Areas – Group 1, 2 or 3
- Other Areas – Group 1, 2 or 3
- Lifts – Group 1 or 2

Rigid and flexible air handling ductwork will be required to comply with fire hazard properties set out in AS 4254 Parts 1 and 2.

Material test data sheets will need to be submitted for further assessment to ensure compliance with the above.

5. Clause C1.14 – Ancillary Elements

An ancillary element (attachment) must not be fixed, installed or attached to the internal parts or external face of an external wall that is required to be *non-combustible* unless it is one of the following:

- Gutter/downpipe / other plumbing fixture
- A flashing.
- A grate/grille <2m^2 associated with a building service.
- An electrical switch/GPO/cover plate, or the like.
- A light fitting.
- A required sign.
- A combustible non-required sign may be permitted if achieving a Group Number of 1 or 2 and not extending beyond one storey or fire compartment.

  This issue must be carefully noted in relation to any proposed signage structures.
- A combustible awning, sunshade, canopy, blind, or shading hood may be permitted at ground storey or a storey immediately above ground storey if complying as relevant to fire hazard properties and not affecting a required exit.
- A part of a security, intercom or announcement system.
- Wiring.
- A paint, lacquer or a similar finish.
- A gasket, caulking, sealant, or adhesive associated with the above ancillary elements.

6. Clause C2.2 – General Floor Area and Volume Limitations

The maximum size of any fire compartment with a Class 9a cannot exceed 5,000m² & 30,000m³.

The maximum size of the fire compartment containing the Class 6 retail space cannot exceed 5,000m² & 30,000m³.

Note: the size of fire compartments within patient care areas is limited to a maximum of 2,000m2.

The size of the fire compartments as documented on the 100% Schematic Design Architectural Drawings indicate compliance.

Gap between Concrete Slab and Curtain Wall

Based on a typical external wall construction, it is noted that the small gap between created between the slab edge and external wall is difficult to fire seal in accordance with a tested system.

In this instance it is noted that it is likely that a smoke seal will be provided to the gap between the slab edge and external wall in lieu of a proprietary fire seal. The provision of a smoke seal to the gap in lieu of a fire seal is a technical non-compliance with the DtS Provisions of the BCA.

Any gap between the slab edge and the curtain wall which is to be smoke sealed in lieu of a proprietary fire seal will be required to be assessed as part of the Fire Engineering Performance Solution to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

7. Clause C2.5 – Class 9a Buildings

Fire & Smoke separation is to be as per BCA specifications C2.5 and C3.4.

Patient care areas are required to be separated into fire compartments with a maximum floor area of 2,000 m^2 with fire walls having a minimum FRL of 120/120/120.

Ward and Treatment Areas are required to be designed in accordance with the following table.

<table>
<tr><th colspan="2">Area Use</th><th colspan="3">Max. Compartment Size</th></tr>
<tr><td rowspan="4">Patient Care Area
(max 2,000m²)</td><td rowspan="2">Ward Area</td><td>Where total floor area is less than 500m² :</td><td>Where total floor area is greater than 500m², but less than 1000m² :</td><td>Where total floor area is greater than 1000m² :</td></tr>
<tr><td>Separate from other areas with Smoke Walls</td><td>Separate with smoke walls into areas less than 500m²</td><td>Separate with smoke walls with an FRL of not less 60/60/60 into areas less than 1000m²</td></tr>
<tr><td rowspan="2">Treatment Area</td><td colspan="2">Where total floor area is less than 1000m² :</td><td>Where total floor area is greater than 1000m² :</td></tr>
<tr><td colspan="2">Separate from other areas with Smoke Walls</td><td>Separate with smoke walls into areas less than 1000m²</td></tr>
<tr><td colspan="5">Note: Walls identified above which are required to achieve an FRL or be smoke separated must be of non-combustible construction i.e., no timber framed stud walls.</td></tr>
</table>

Table No. 5 – Required fire and smoke compartmentation for patient care areas

Ancillary Areas

The construction of any ancillary use areas located within the patient care areas and containing equipment or materials that are a high potential fire hazard (such as kitchens >30m², hyperbaric facility, storage of medical records >10m² or laundry with gas fire dryers), must be separated from the patient care area by construction achieving an FRL of not less than 60/60/60 and doors having an FRL of not less than –/60/30.

LEVEL	COMPARTMENT SIZE	USE
Level 00	Complies	Non Patient Care Area

Level 01	Complies	Patient Care & Non Patient Care
Level 02	Complies	Patient Care & Non Patient Care
Level 03	Complies	Patient Care & Non Patient Care
Level 04	Complies	Non Patient Care
Level 05	1,083 m^2 (smoke)	Treatment 05.01b
Level 06	651 m^2 (smoke) 630 m^2 (smoke)	Ward Area 06.04a Ward Area 06.05a
Level 07	Complies	Non Patient Care
Level 08	Complies	Non Patient Care
Level 09	Complies	Non Patient Care
Level 10	Complies	Non Patient Care

Table No. 6 – Summary of excessive fire and smoke compartment sizes

Having regard to the above table we note the following:

+ A very small number of smoke compartments within treatment and ward areas are greater than the maximum 500m^2 (ward areas) and 1000m^2 (treatment areas) threshold permitted by the DtS Provisions.

Based on the above table, the abovementioned compartment sizes which exceed the DtS Provisions of the BCA will be assessed as part of a Fire Engineering Performance Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

The excessive compartment sizes which exceed the DtS Provisions of the BCA are considered to be within acceptable fire engineering limitations for a Performance Solution and are consistent with other recent HI projects subject to approval by FRNSW.

8. Clause C2.7 – Separation by Fire Walls

Fire walls (*including fire rated walls*) required by Clause C2.5 above, must extend from the floor slab to the underside of the floor slab above or where no floor is provided above the roof sheeting, with no penetrations by building elements through the fire wall other than roof battens with a dimension of 75mm x 50mm or sarking.

All fire walls are required to achieve the required FRL of 120/120/120 in both directions.

Verification will be required from the Architect / Structural Engineer / Head Contractor that no proposed building elements have been designed to pass through or over the fire walls.

Note: -
No building elements penetrating fire walls includes steel brackets supporting electrical cable trays or any other structural elements supporting another building element.

Particular attention is drawn to where internal fire (smoke) walls intersect at the external wall. The internal fire (smoke) walls are required to extend to the backpan of the curtain wall with no internal void or space between adjoining compartments where fire or smoke could spread between compartments.

Timber Noggins in Fire Walls

All parts of the fire walls are required to be constructed of non-combustible construction which extends to timber noggins, plywood used within fire walls.

In this instance it is noted that timber noggings or plywood will likely be installed within smoke and fire walls used throughout the building.

The use of timber noggings will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

9. Clause C2.10 – Separation of Lift Shafts

The lift shafts are required to have a fire resistance level 120/120/120 (if load bearing) and -/120/120 (if non-load bearing) in accordance with Table 3 of Specification C1.1.

10. Clause C2.12 – Separation of Equipment

Any of the following equipment must be fire rated with a fire resistance level of 120/120/120 and any doorway to have an FRL of not less than --/120/30:

- Lift motors and lift control panels; or
- Emergency generators used to sustain emergency equipment operating in the emergency mode;
- Central smoke control plant; or
- Boilers where the water is boiled to greater than 100 degrees Celsius; or
- Battery system installed in the building that has a total voltage of 12 volts or more and a storage capacity of 200 kWh or more.

11. Clause C2.13 – Electricity Supply System

Main Switchroom, Generator Rooms etc are to be fire separated from the remainder of the building with construction achieving an FRL of 120/120/120 with any doors to be –/120/30 self-closing fire doors.

The main switchboard sustaining emergency equipment operating in the emergency mode must be separated from the remainder of the building with construction achieving an FRL of 120/120/120 with any doors to be –/120/30 self-closing fire doors.

The electrical conductors located within a building that supply a main switchboard as detailed within (2) above must have a classification in accordance with AS/NZS 3013 of not less than WS53W (where subject to damage by motor vehicles) or WS52W otherwise. Alternatively, the conductors may be enclosed or otherwise protected with construction having an FRL of not less than 120/120/120.

Where emergency equipment is required within a building all switchboards in the electrical installation that sustain the electrical supply to the emergency equipment will be constructed so that emergency equipment switchgear is separated from non-emergency equipment switchgear by metal partitions designed to minimise the spread of fault from the non-emergency switchgear.

Emergency equipment requiring separation from non-emergency switchgear includes but it not limited to the following:

- Fire hydrant booster pumps
- Pumps for automatic sprinklers systems, water spray, chemical fluid suppression systems or the like
- Pumps for fire hose reels where such pumps and fire hose reels from the sole means of fire protection in the building
- Air handling systems designed to exhaust and control the spread of fire and smoke
- Emergency lifts
- Control and indicating equipment
- Emergency warning and intercom systems

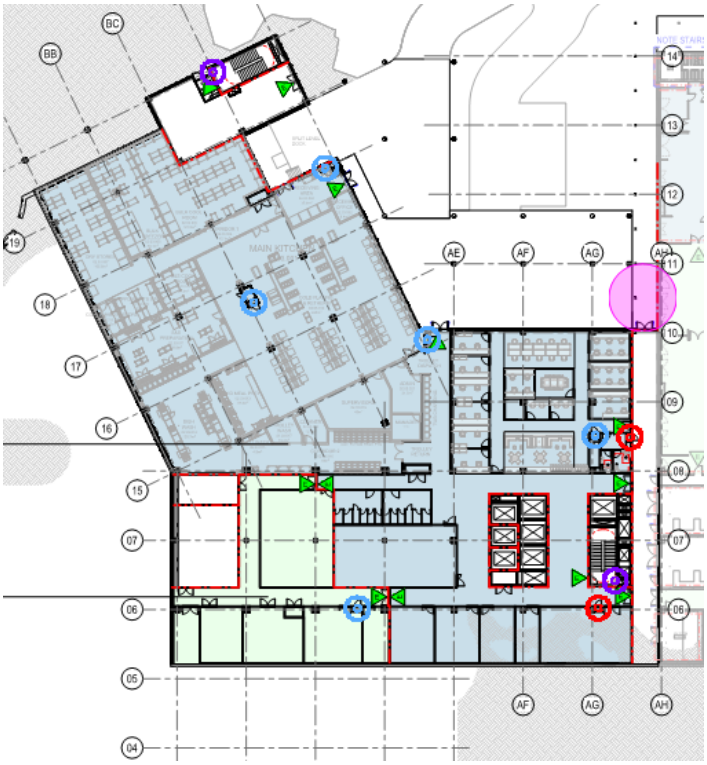
Any plantroom housing switchboards for smoke control equipment will be required to be fire separated from the remainder of the building by construction achieving a minimum FRL of 120 mins.

12. Clause C3.3 – Separation of External Walls and Other Openings in Different Fire Compartments

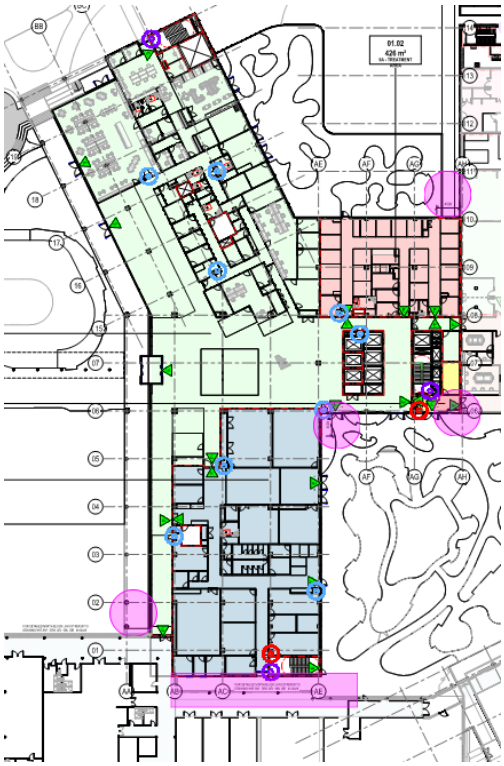
Protection of External Walls and associated Openings in Different Fire Compartments

Where an internal fire wall intersects at the junction of an external wall, the external walls of the different compartments and any associated openings that are exposed to one another are required to be protected in accordance with Clause C3.3.

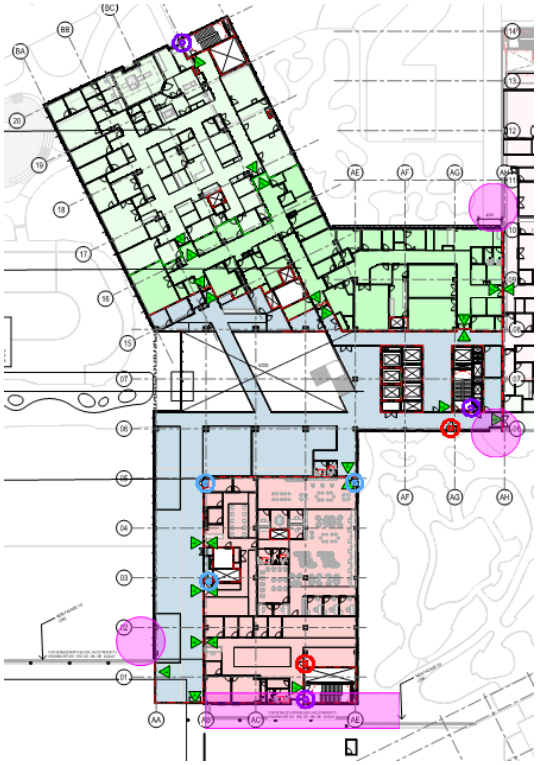
There are numerous locations throughout the building where exposure occurs between external walls and their associated openings of difference fire compartments. The below figure details an example of locations throughout the building where exposure occurs at the junction of external walls of different fire compartments.



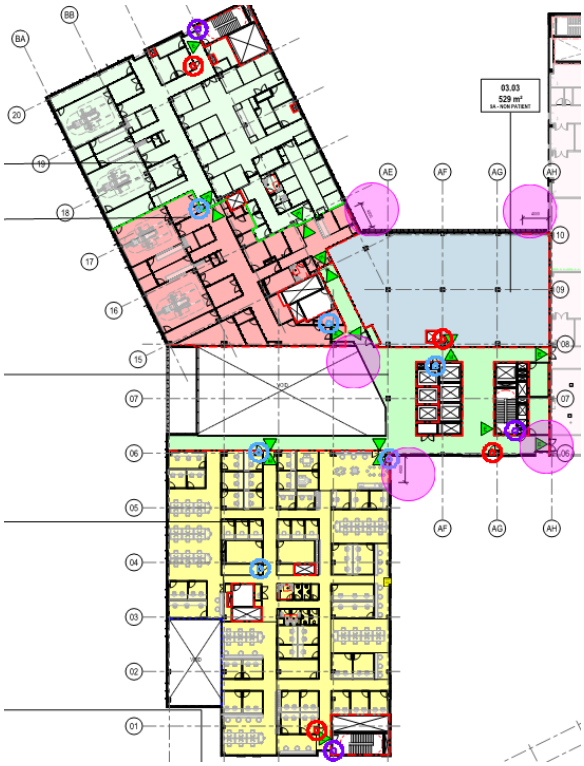
Level 00



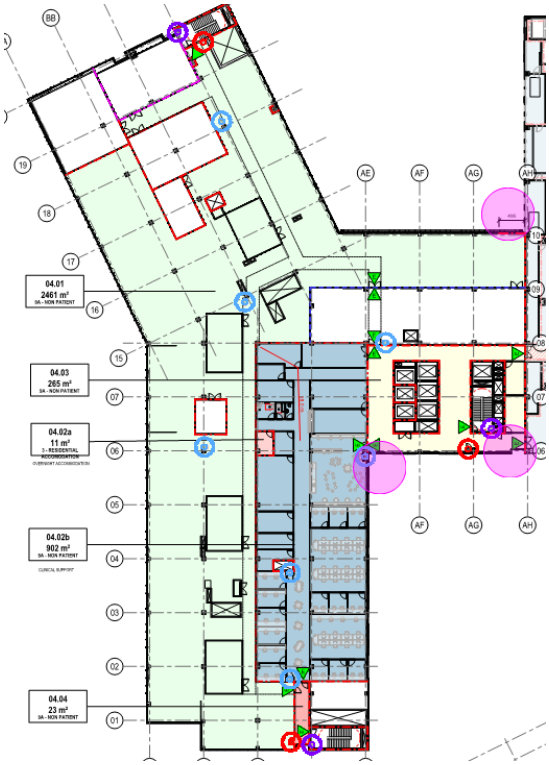
Level 01



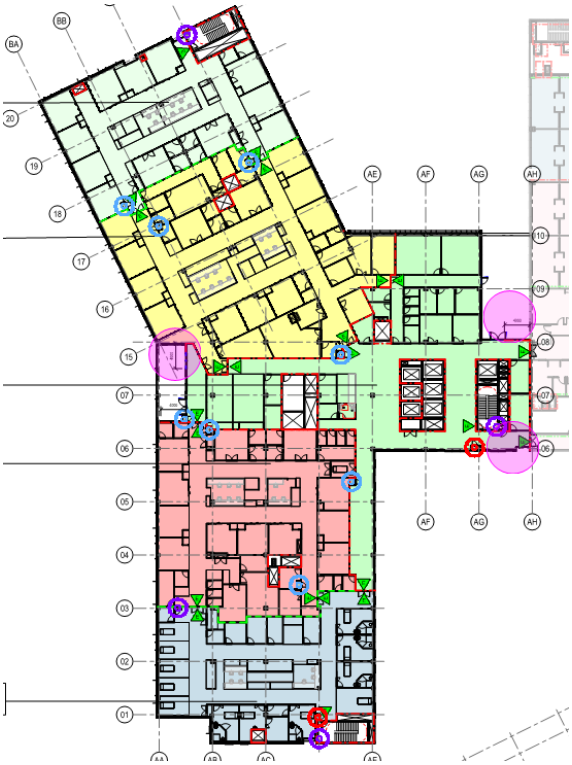
Level 02



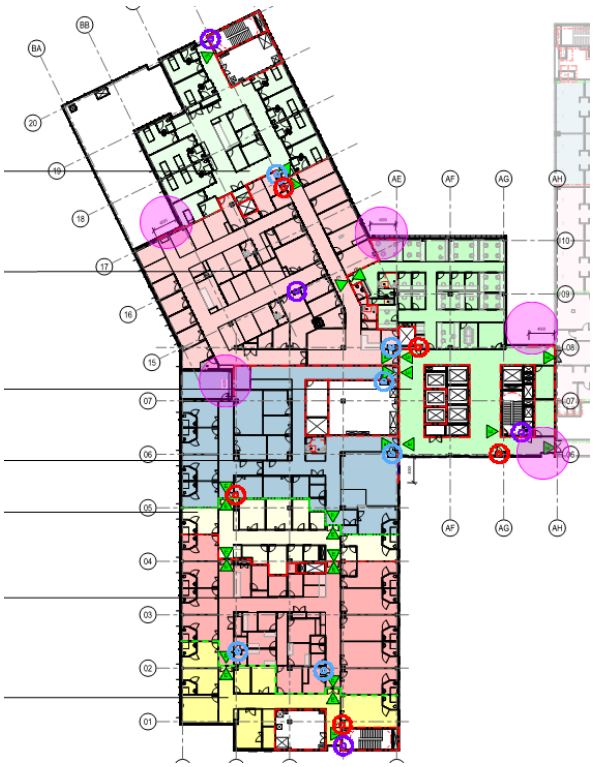
Level 03



Level 04



Level 05



Level 06

Figure No.02 – Typical locations of exposure of external walls of different fire compartments throughout the building

Separation of Stage 2 Tower from Adjoining Hospital Buildings

The new Stage 2 Tower will be required to be adequately fire and smoke separated from all existing hospital buildings that are directly connected via enclosed linkways, walkways and direct internal connections. In this instance adequate fire separation will be required to be provided at the interface between the Stage 2 Tower and Stage 1 Tower and Stage 2 Tower and North Block.

All new linkways, enclosed corridors etc will be assessed as part of the Stage 2 Tower and will be required to be adequately fire and smoke separated from the existing hospital buildings.

The subject external walls and openings will be assessed as part of a Fire Engineering Performance Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

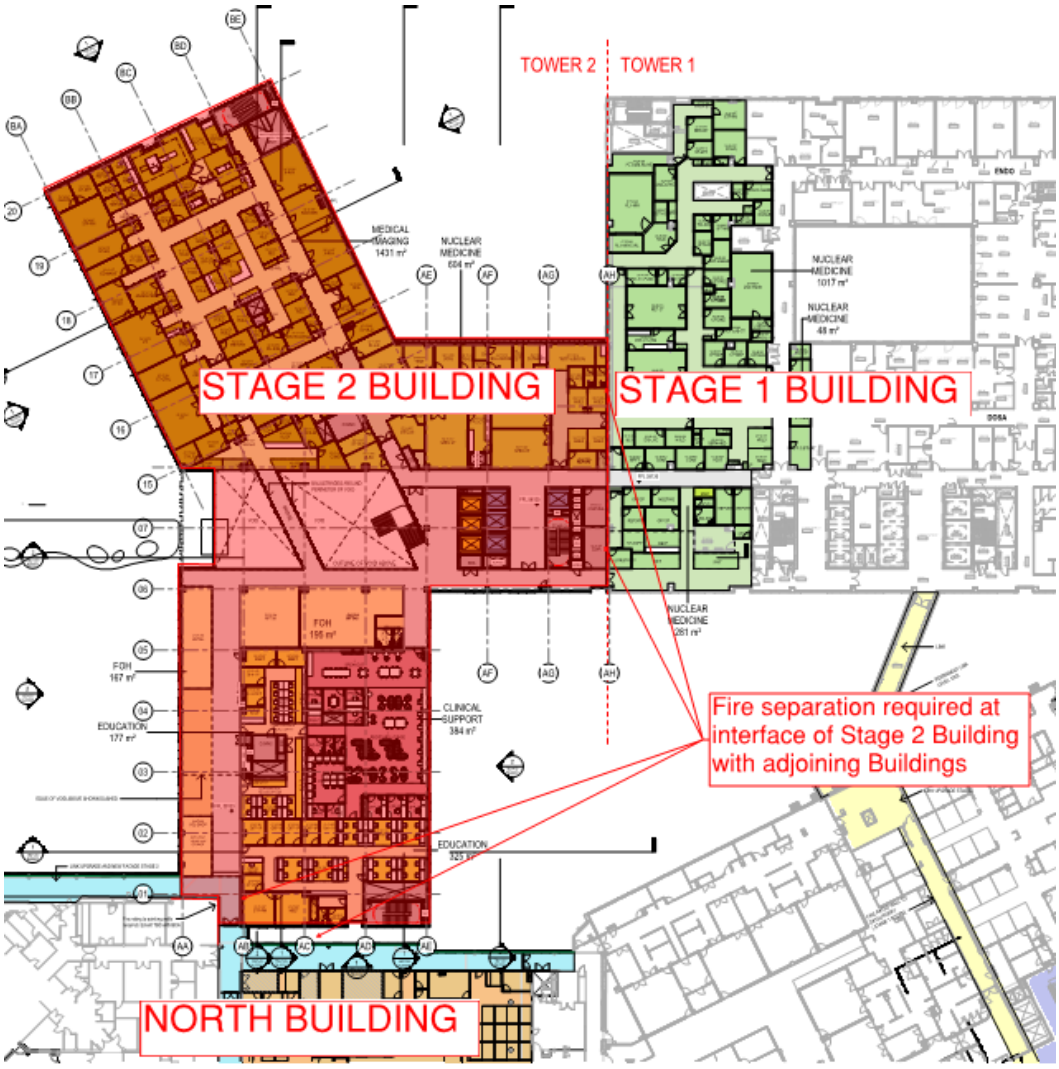


Figure No. 03 – Required fire separation of Stage 2 Tower from existing adjoining buildings on Level 02

13. Clause C3.5 – Doorways in Fire Walls

Any doors located within fire walls must be fire rated to achieve the same rating as the fire wall itself i.e., 120 mins.

All fire doors are required to be self-closing or automatic closing. All automatic closing doors are required to close upon activation of the fire alarm system within the building i.e., Automatic Fire Detection & Alarm System and Automatic Fire Suppression System.

Smoke detectors must be installed within 1.5m of the automatic closing doors (on both sides of the door).

14. **Clause C3.7 – Protection of Doorways in Horizontal Exits**

All horizontal exits are required to have a FRL of -/120/30.

All horizontal exit doors are required to be self-closing or automatic closing. All automatic closing doors are required to close upon activation of the fire alarm system within the building i.e., Automatic Fire Detection & Alarm System, Automatic Fire Suppression System etc.

Smoke detectors must be installed within 1.5m of the automatic closing doors (on both sides of the door).

15. **Clause C3.8 – Openings in Fire Isolated Exits**

The doors providing access to the fire isolated exits are required to be protected by self-closing or automatic closing –/60/30 fire doors.

16. **Clause C3.9 – Service Penetrations in Fire Isolated Exits**

No service penetrations can penetrate the fire isolated stairways other than electrical wiring for lighting, security or essential services, ducting for stair pressurisation (if adequately separated from the remainder of the building) and water supply pipes for fire services.

If a service penetrates a fire isolated stairway / passageway, and is not covered under the above list, it must be adequately fire separated from the fire isolated stairway / passageway. The service must be boxed out with lightweight construction, such that it achieves the FRL from both directions i.e., prevents fire spread from the service to the stair, and from the stair to the service.

17. **Openings in Fire Isolated Lift Shafts**

The doorways to the lift shafts are required to have a minimum FRL of -/60/-, comply with AS 1735.11 and are set to remain closed except when discharging or receiving passengers, goods or services.

18. **Clause C3.11 – Bounding Construction: Class 2 and 3 Buildings and Class 4 Parts**

The overnight room located on Level 04 provided for staff is classified as Class 3 in accordance with Part A6 of the BCA.

In accordance with Clause C3.11 and Specification C1.1, the overnight room is deemed a sole occupancy unit and is required to be fire separated from the remainder of the building based on the classification of Class 3 residential accommodation.

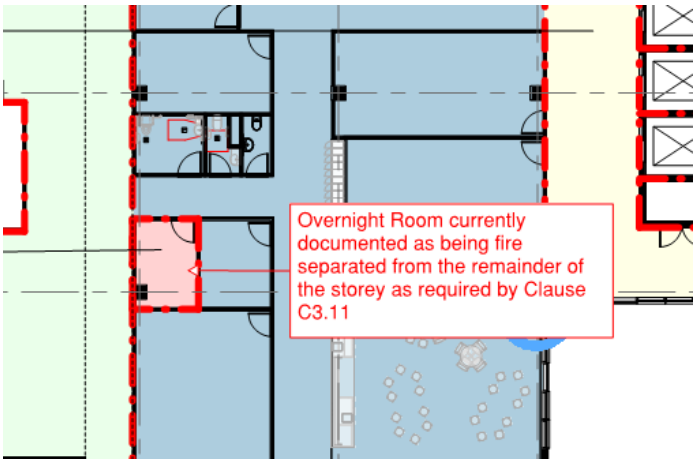


Figure No. 04 – Location of Class 3 overnight room on Levels 04

At present, the Fire Compartment Drawings indicate Consistent with standard design within a hospital, the rooms will not be fire separated from the remainder of the building based on their Class 3 classification as the risk to an occupant is no worse than a patient in a building with 24 hour upright hospital staff.

The separation of the overnight rooms is noted as being to be assessed as part of Fire Engineering Assessment undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

19. Clause C3.15 – Openings for Service Installations

Where service installations penetrate the walls or floors required to have an FRL with respect to integrity and insulation they are to be protected by fire seals having an FRL of the building element concerned. Fire seals are required to comply with Specification C3.15. Where the mechanical ventilation system penetrates floors or walls that require an FRL the installation is to comply with AS/NZS 1668.1.
The proposed installation of pipework containing combustible liquids or gas (i.e., natural gas) is prohibited in accordance with Clause C3.15 unless it is a tested system.

Pipes Systems Comprised of Metal

In accordance with Clause C3.15, a tested system is not required to comply with the insultation criteria relating to the service subject to the pipe system being constructed of entirely of metal and not having any combustible building elements being located within 100mm for a distance of 2000mm from the penetration and combustible materials not being able to be located within 100mm of service for a distance of 2000mm from the penetration.

Having regard to the requirements of Clause C3.15 which are difficult to achieve in a hospital environment due to the number of services especially in corridors, it is understood that is proposed to pipes constructed of metal to not comply with the requirements of Clause C3.15 in terms of the 100mm separation for a distance of 2000mm from the penetration.

The proposed design of the subject metal pipes used for fire services, medical gas etc if not protected in accordance with Clause C3.15 will be required to be assessed as part of Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

Note 1: -

Where a wall is required to achieve both smoke and fire compartmentation, the penetrations must be protected to accommodate both i.e., combined fire and smoke dampers through all fire walls that bound or separate patient care areas throughout the building.

All fire walls double up as smoke walls when they are within or bound patient care areas and thus must be combined fire and smoke dampers.

The motorised component of the Damper is to be located no more than 600mm from the fire/smoke wall.

Note 2: -

A pipe system comprised entirely of metal that is not normally filled with liquid must not be located within 100mm, for a distance of 2000mm from the penetration of any combustible building element or a position where a combustible material may be located and must be constructed of:

+ Copper alloy or stainless steel with a wall thickness of at least 1mm; or
+ Cast iron or steel (other than stainless steel) with a wall thickness of at least 2mm

Note 3: -

All pipes normally filled with water cannot be less than 200mm from another service penetration unless protected with a fire wrap installed in accordance with a Tested System approved by a registered Testing Authority.

Note 4: -

A Tested System approved by a registered Testing Authority may be used as an alternative to complying Specification C3.15.

20. Clause C3.16 – Construction Joints

Construction joints, spaces and the like in and between building elements required to be fire-resisting with respect to integrity and insulation must be protected in a manner identical with a prototype tested in accordance with AS 1530.4 to achieve the required FRL.

21. Specification C1.1 – Fire Resisting Construction

The building design is required to comply with the requirements of Specification C1.1 for a building of Type A Construction. The following key items of Specification C1.1 are identified:

General Requirements

- All internal walls that are required to have a fire rating must extend to the underside of the slab above.
- All loadbearing internal walls must be constructed of concrete or masonry.
- Due to the fact that the building is required to be constructed of Type A Construction, the FRL to the load bearing elements of the external applies in both directions.
- Any load bearing structural steel columns located within the external wall assembly of the building will require an FRL in accordance with the Table 3. This applies to Structural Steel columns located in the external wall that may be supporting the roof, link bridges above etc.
- All internal non-loadbearing walls that are required to be fire resisting and lift, ventilating, pipe, garbage or similar shaft that is not for the discharge of hot products of combustion is required to be constructed of non-combustible construction.
- All fire rated shafts i.e., fire isolated stairways and lift shafts must be enclosed at the top and bottom by a construction having an FRL of not less than -/120/120.
- Based on the provision of an Automatic Fire Suppression System installed throughout the building, the roof is not required to be fire rated, but rather be constructed with non-combustible materials.

Structures on Roof

- Non-combustible structures situated on the roof top of the building are not required to comply with the requirements of Specification C1.1 if the structures contain only the following:
- Lift motor equipment; or
- One or more of the following:
  - Hot water or other water tanks;
  - Ventilating ductwork, ventilating fans and their motors.
  - Air conditioning chillers
  - Window cleaning equipment
  - Other service units that are non-combustible and do not contain flammable or combustible liquids or gases.

Pedestrian Link Bridges

The floors of the pedestrian link bridges along with any load bearing element supporting the floors are required to have a minimum FRL of 120 mins in accordance with Specification C1.1.

22. Specification C2.5 – Smoke Proof Walls in Health Care Buildings

Smoke proof walls within all patient care areas (or bounding patient care area) are required to comply with the following:

- Be non-combustible and 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.
- Not incorporate any glazed areas unless the glass is safety glass as defined in AS 1288.
- Only have doorways which are fitted with smoke doors.
- Have all openings around penetrations and the junctions of the smoke-proof wall and the remainder of the building stopped with non-combustible material to prevent the free passage of smoke.
- Incorporate smoke dampers where air-handling ducts penetrate the wall unless the duct forms part of a smoke hazard management system required to continue air movement through the duct during a fire.

Note: -

All ducts that penetrate fire and smoke walls within patient care areas that do not form part of the zone smoke control system must be provided with smoke dampers.

Use of Timber Noggings in Smoke Walls

All parts of the smoke walls are required to be constructed of non-combustible construction which extends to timber noggins, plywood used within fire walls.

In this instance it is noted that timber noggings or plywood will likely be installed within smoke walls used throughout the building.

The use of timber noggings will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Performance Based Consulting in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

Omission of Smoke Dampers to Mechanical Ducts

Where Isolation Rooms are provided throughout the hospital in order for patients to be isolated from infection, the room will be required to be pressurised in order to maintain a germ free environment by limiting air exchanges between rooms. As a result, it is crucial to the functionality of the room that the air handling system not shut in fire mode as the accidental shut down of the system may have significant health consequences for the patient within the room.

As a result of the above, the mechanical ducts serving the Isolation Rooms will be proposed to have the Smoke Dampers removed where the duct penetrates a fire/smoke wall.

The omission of Smoke Dampers will be assessed as part of a Fire Engineering Performance Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

Note: -
Thermally activated Fire Dampers will be required to be installed where the mechanical ducts pass through fire walls.

As part of the Performance Solution for the omission of Smoke Dampers, the mechanical duct serving the isolation room will be required to form a continuous path back to the riser and will not serve other areas of the floor, thereby eliminating any connection between smoke compartments via the duct.

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

A smoke reservoir of 400mm must be provided above every fire safety door located within a fire/smoke wall.

The smoke reservoir must extend to the underside of:

+ A roof covering; or
+ The floor above; or
+ An imperforate false ceiling that will prevent the free passage of smoke.

Note: The smoke reservoir should extend for the full length of the corridor.

Smoke doors must be constructed so that smoke will not pass from one side of the doorway to the other and, if they are glazed, there is minimal danger of a person being injured by accidentally walking into them.

Smoke doors are required to swing: -

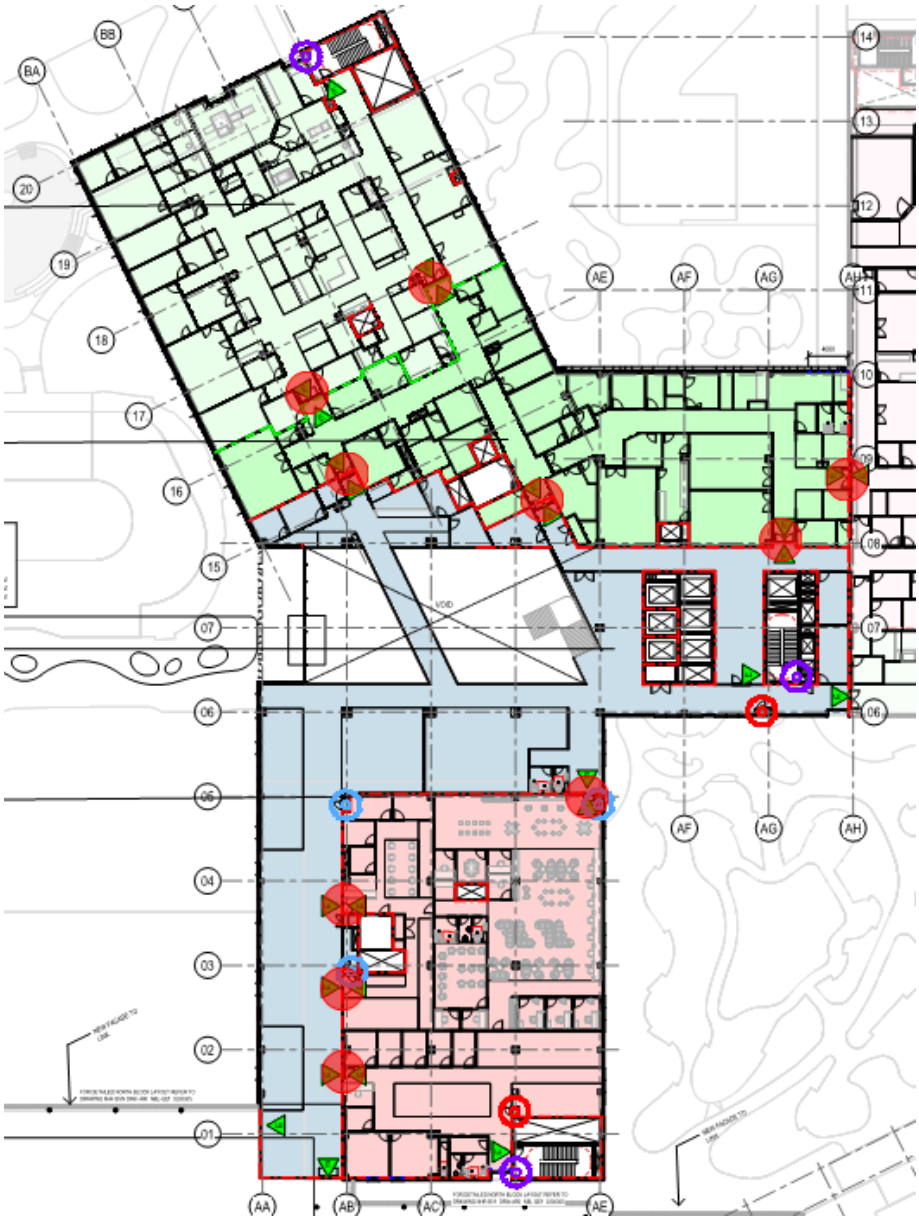
+ in the direction of egress, or
+ in both directions

Swing of Smoke Doors

There will be numerous fire safety doors located in fire and smoke walls throughout the building that are proposed to not swing in the direction of egress i.e., in both directions, as required by Specification C3.4.

It is understood that all fire and smoke doors will be required to swing in one direction only as a result of wear and tear to doors that swing in both directions.

The proposed swing of the doors in one direction only or against the direction of egress will be required to assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.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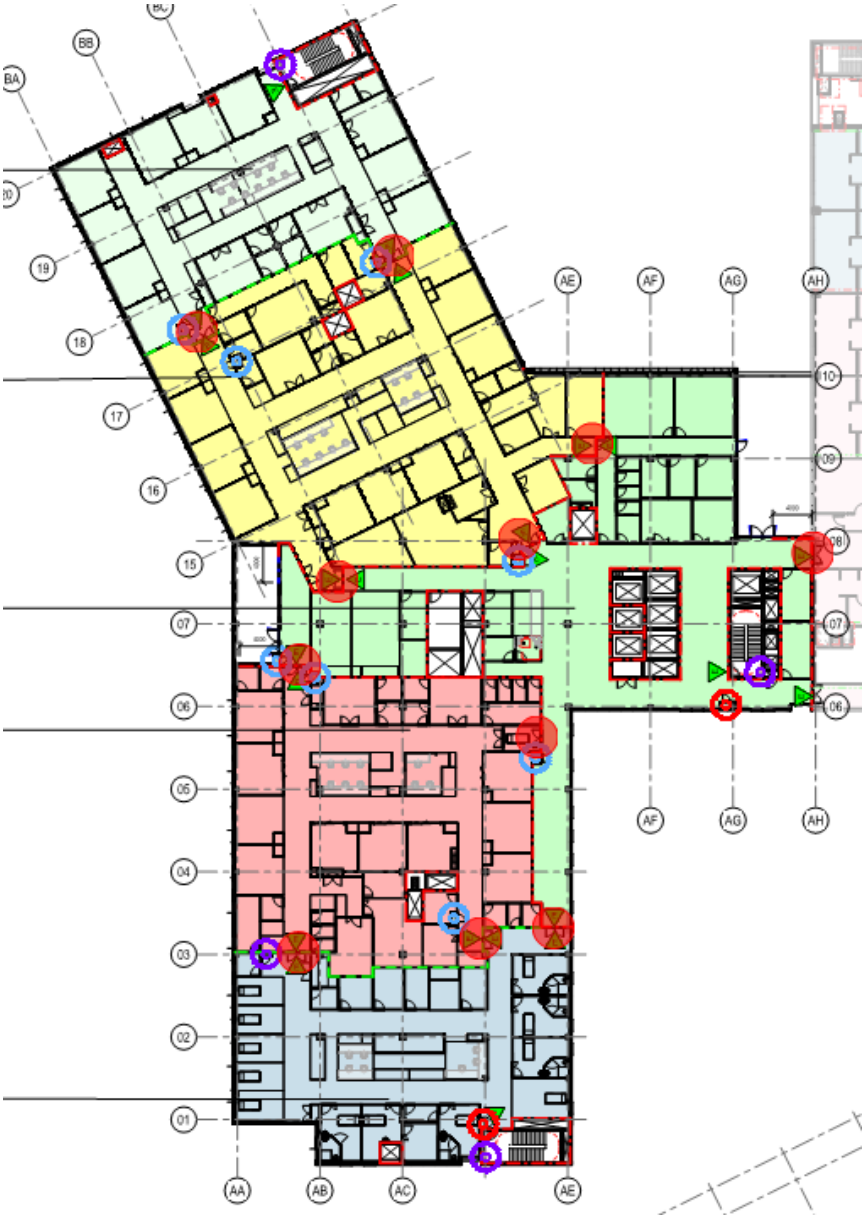
Level 02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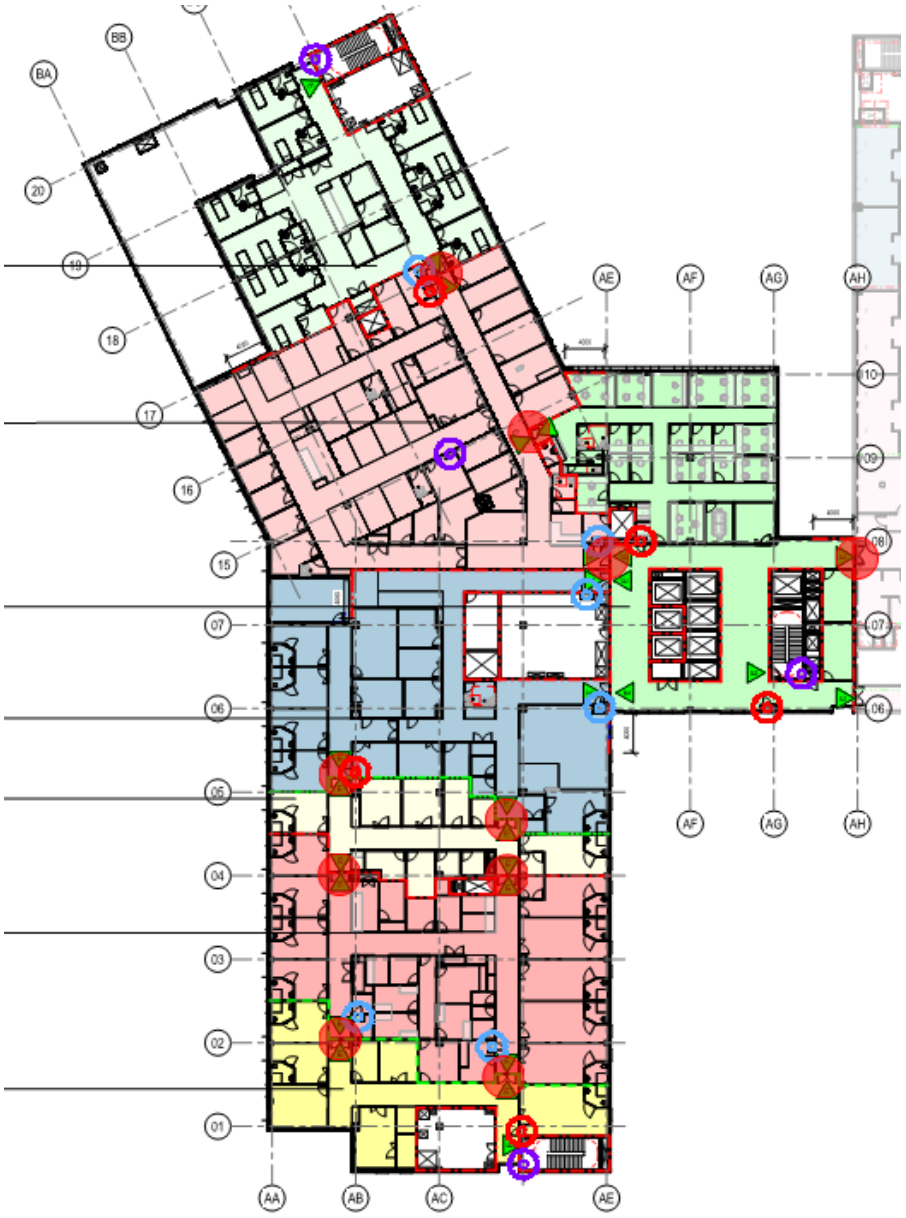
Level 05



Level 06

Figure No. 05– Fire safety doors that swing against the direction of egress on Levels 02, 05 & 06

Smoke Door Leakage

Where pivot smoke doors are proposed to be installed (i.e., to swing in both directions) smoke leakage performance in accordance with AS 6905 is to be achieved in lieu of strict compliance with the DtS Provisions of the BCA which does not permit any smoke leakage by smoke doors separating smoke compartments.

Any pivot fire safety doors will be required to be assessed as part of the proposed Fire Engineering Performance Solution to be undertaken by Arup.

SECTION D - ACCESS & EGRESS

24. Clause D1.2 – Number of Exits Required

A minimum of two (2) exits (in addition to any horizontal exit) must be provided from each part of each storey within the building based on the building having an effective height greater than 25m. Compliance is achieved from each level of the building.

25. Clause D1.3 – When Fire Isolated Stairs are Required

All exit stairways serving the Stage 2 will be required to be fire isolated stairways. It is noted that the Architectural Drawings indicate that each of the exit stairways have been designed as fire isolated.

Refer to Clause D1.12 for non-required non fire isolated stairways located within the building.

26. Clause D1.4 – Exit Travel Distances

Egress travel distances from all areas used by patients is required in accordance with the DTS provisions of the BCA which requires a maximum distance of 12m to a point of choice of two alternative exits in which case a maximum travel distance of 30m is permitted to the nearest exit.

Egress from non-patient care areas is permitted to extend to 20m to a point of choice and a maximum distance of 40m to an alternative exit.

Based on the Schematic Architectural Drawings assessed to date, we have undertaken a high level egress assessment in terms of egress travel distance to an exit based on the Fire Compartmentation Drawings available for review. A further detailed assessment will be required to be undertaken once the Fire Compartmentation drawings are further developed.

As a result of the review, we have identified in the below table the non-compliances (where compliance is not achieved) in relation to travel distance from each storey of the building. The table below details the most excessive travel distance from each respective area of the storey where a non-compliance has been identified (not every single travel distance non compliance is noted if it is less than the maximum distance identified).

Note: All proposed areas on the Schematic Drawings have not been assessed due to lack of detail at this stage of the design.

Legend: (PC): Patient Care Area, (PC - ST): Patient Care Area (but area only accessed by Staff), (NPC): Non Patient Care Area

LEVEL	AREA	TRAVEL DISTANCE
Level 00	Kitchen (NPC) Back of House (NPC)	52 m 29 m (point of choice)
Level 01	Transit Lounge / Staff Courtyard (PC & NPC) Staff Administration Area (Front of House) (NPC)	41m 57 m
Level 02	Internal Linkway to North Block / Front of House Area (NPC)	46 m 52 m
Level 03	IR (PC) IR (PC-ST)	15.5 m (point of choice) & 45 m 17 m (point of choice)
Level 04	Plant Room & ICU Clinical Support (NPC)	To be assessed upon further details

LEVEL	AREA	TRAVEL DISTANCE
Level 05	ICU (PC) ICU (PC) Clinical Support (NPC)	37 m 33 m 27 m (point of choice)
Level 06	Paeds IPU Courtyard (PC) Renal Dialysis (PC)	18 m (point of choice) 38 m

Table No. 7 – Summary of excessive travel distance to a point of choice and alternative exit

Having regard to the above table, we note the following:

- Throughout the building egress travel distance to an exit from a patient care area exceeds the maximum distance permitted by the DtS Provisions, with the most excessive distance being up to 45 m from where a patient would be located (15 m over the maximum permitted DtS distance).
- Throughout the building egress travel distance to a point of choice from a patient care area exceeds the maximum distance permitted by the DtS Provisions, with the most excessive distance being up to 18 m where a patient would be located (6 m over the maximum permitted DtS distance).
- Throughout the building egress travel distance to a point of choice from a patient care area (where staff only would be located) exceeds the maximum distance permitted by the DtS Provisions, with the most excessive distance being up to 17 m (5 m over the maximum permitted DtS distance).
- Throughout the building egress travel distance to an exit from a non-patient care area exceeds the maximum distance permitted by the DtS Provisions, with the most excessive distance up to 57 m (17 m over the maximum permitted DtS distance).

In this instance the excessive travel distances to a point of choice and to an exit will be required to assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

27. Clause D1.5 – Distances Between Alternative Exits

The maximum travel distance between alternative exits from within patient areas cannot exceed 45m.

The maximum travel distance between alternative exits from non-patient care areas cannot exceed 60m.

Based on the Schematic Architectural Drawings assessed to date, we have undertaken a high level egress assessment in terms of egress travel distance to an exit based on the Fire Compartmentation Drawings available for review. A further detailed assessment will be required to be undertaken once the Fire Compartmentation drawings are further developed.

As a result of the review, we have identified in the below table the non-compliances (where compliance is not achieved) in relation to travel distance from each storey of the building. The table below details the most excessive travel distance from each respective area of the storey where a non-compliance has been identified (not every single travel distance non-compliance is noted if it is less than the maximum distance identified).

Note: All proposed areas on the Schematic Drawings have not been assessed due to lack of detail at this stage of the design.

Legend: (PC): Patient Care Area, (PC - ST): Patient Care Area (but area only accessed by Staff), (NPC): Non Patient Care Area

LEVEL	AREA	TRAVEL DISTANCE
Level 00	Kitchen (NPC)	78 m & 109 m
Level 01	Transit Lounge / Staff Courtyard (PC & NPC) Staff Administration Area (Front of House) (NPC)	53 m 98 m
Level 02	Internal Linkway to North Block / Front of House Area	68 m
Level 03	IR (PC)	62 m
Level 04	Plant Room & ICU Clinical Support (NPC)	To be assessed upon further details
Level 05	ICU (PC) ICU (PC)	66 m 60 m
Level 06	Paeds IPU (PC) Renal Dialysis (PC)	54 m 68 m

Table No. 8 – Summary of excessive travel distance between alternative exits

Having regard to the above table, we note the following:

- Throughout the building egress travel distance between alternative exits from a patient care area exceeds the maximum distance permitted by the DtS Provisions, with the most excessive distance being up to 68 m from within a patient care area (23 m over the maximum permitted DtS distance).
- Egress travel distance between alternative exits from the Kitchen Area on Level 00 to open space is up to 109 m between alternative exits to open space (49 m over the maximum permitted DtS distance)
- Egress travel distance between alternative exits from the plant areas is anticipated to be up to approximately 85 m – 90 m (30 m over the maximum permitted DTS distance).

In this instance the excessive travel distances to a point of choice and to an exit will be required to assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

28. Clause D1.6 – Dimensions of Exits

The unobstructed height throughout an exit or a path of travel to an exit must not be less than 2 metres, except for doorways which may be reduced to not less than 1980mm.

In addition, the unobstructed width of any new exit or a path of travel to an exit must not be less than 1 metre except where patients are normally transported in beds within treatment and ward areas in which case a minimum of 1.8m corridor and passageway widths are required.

The unobstructed width of new doors throughout the patient care areas where patients are normally transported in beds are as follows:

a) Doorways leading to or from a corridor with a corridor width of less than 2.2m must not be less than 1200mm, or
b) Doorways leading to or from a corridor with a corridor width greater than 2.2m must not be less than 1070mm.

Horizontal exit fire doors are to achieve a clear unobstructed width of 1250mm. Where a single door is provided as a horizontal exit, it will need to achieve the clear unobstructed width of 1250mm.

All other doorways other than the above are to achieve an unobstructed width of not less than 850mm.

All external egress paths are to achieve a minimum clear width of not less than 1000mm. This the minimum width required by the DtS Provisions of the BCA and in this instance, it is recommended that a minimum width of 1500mm or greater be adopted for all external egress paths.

29. Clause D1.7 – Travel via Fire Isolated Exits

A fire isolated stairway is required to provide independent egress from each storey that it serves and discharge directly –

- To a road open space; or
- To a point –
  - In a storey or space, within the confines of the building, that is used only for pedestrian movement, car parking or the like and is open for at least 2/3 of its perimeter; and
  - From which an unimpeded path of travel, not further than 20m, is available to a road or open space

Fire Stair 01 discharges within the confines of the building on Level 01 to the lobby space in lieu of the stairway discharging directly to open space as required by Clause D1.7.

Figure No. 06 – Fire Stair 01 discharging into the confines of the building on Level 01

Consistent with the Performance Solution for the two Fire Stairs in the Stage 1 Hospital, the discharge of the fire isolated stairway will be required to assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

Consistent with the design adopted for Stage 1, the following will be required to be undertaken:

- The lobby space in which the fire isolated stairway discharges within will be required to be fire separated from the remainder of the storey and be a sterile area.

+ Direct and independent egress to open space will be required to be provided from the fire isolated stairway to open space.

Once occupants discharge from the fire isolated stairway on the Southern Elevation, the external pathway they travel on is required to be located a minimum distance of 6m from the external wall of the Stage 1 and 2 Tower. If the path of travel is less than 6m from the external wall, the external wall and any openings located within it are required to be protected.

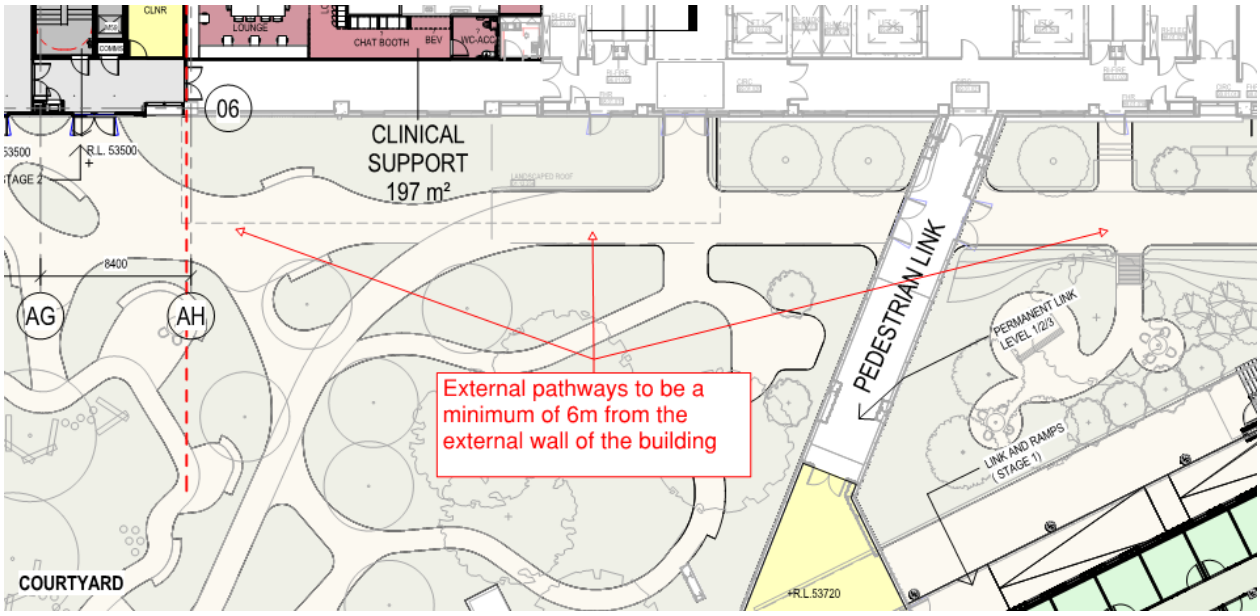


Figure No. 07 – External pathways to be located a minimum distance of 6m from the external wall of the building

Fire Stairs 01 & 03 lead to Courtyard which is not directly connected to Open Space

Once occupants discharge from Fire Stair 01 (via the lobby space) and Fire Stair 03 they discharge into a large courtyard area, however in order to reach open space they will be required to pass through an enclosed linkway connecting the Stage 1 Tower and East Block prior to reaching the internal roadway.

Occupants having to pass back within the confines of the linkway is a non-compliance and will be required to assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

Note: The Performance Solution will also be required to address any required exits discharging from the Education space along with the FOH that discharge into the courtyard area.

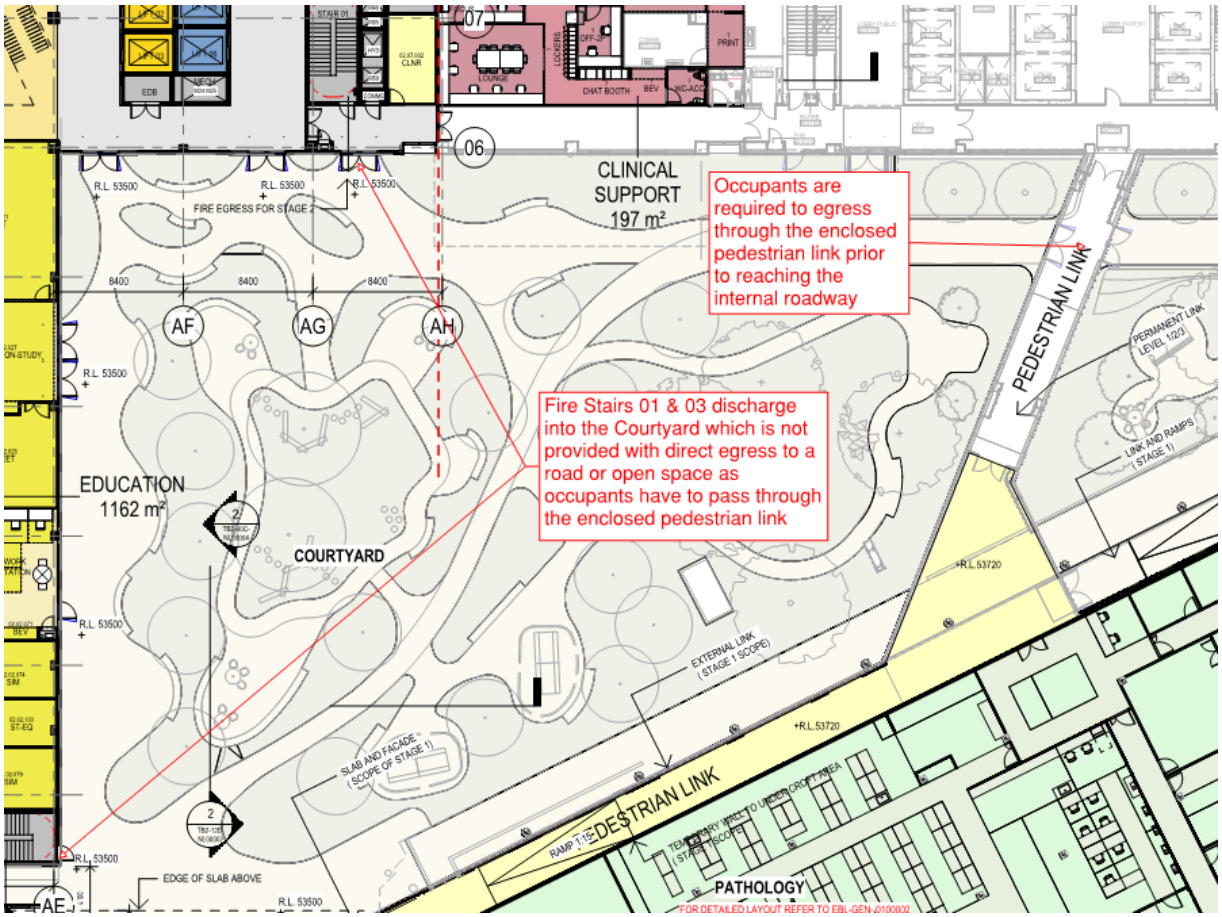


Figure No. 08 – Discharge of Fire Stairs 01 & 03 on Level 01 via the internal courtyard

30. Clause D1.10 – Discharge from Exits

In accordance with the DTS provisions of the BCA, the discharge of exits to open space cannot incorporate any steps to connect the discharge point to the adjoining roadway.

Verification will be required as to whether there are any proposed stairways connecting the exits to the public roadways that a person is required to travel via (where there is no alternative ramp).

Where ramps are used, the gradient cannot exceed 1:8 at any part or 1:14 where the ramp is also used for access for a person with a disability.

An exit cannot be blocked at the point of discharge and where necessary suitable barriers are to be installed to prevent vehicles blocking the exit i.e., installation of bollards.

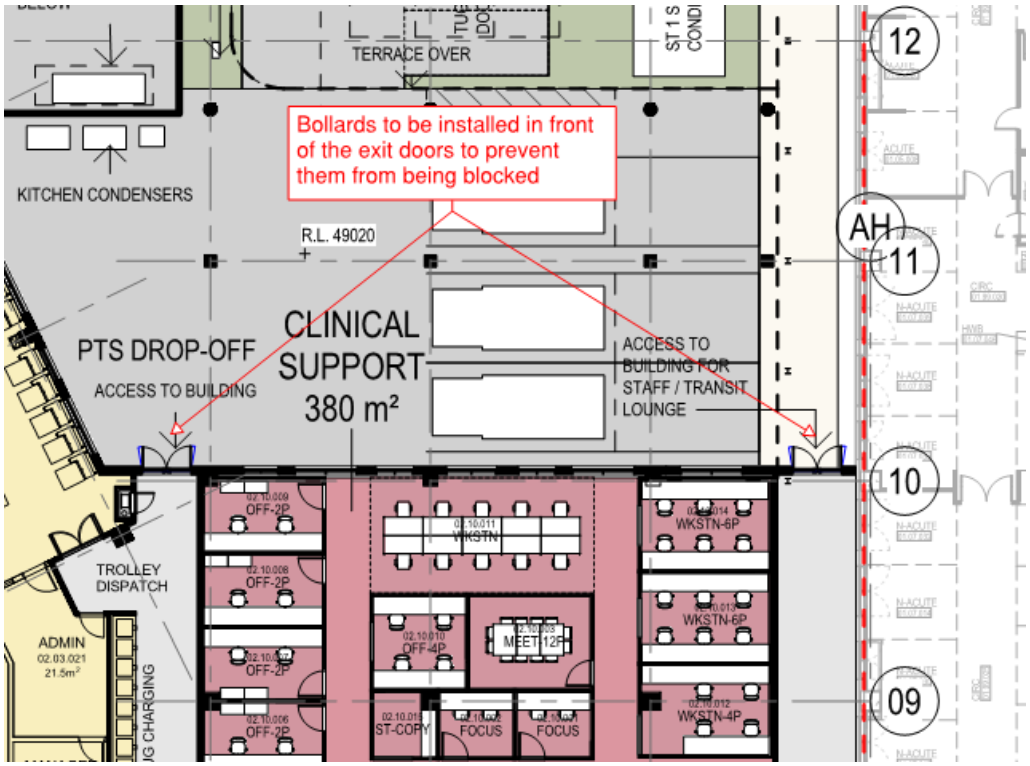


Figure No. 09 – Bollards to be installed in front of exit doors discharging on Level 00

31. Clause D1.11 – Horizontal Exits

A technical non-compliance will occur in terms of travel via horizontal exits from within fire compartments within building. In accordance with the BCA, a horizontal exit may be counted as a required exit 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.

Having regard to the proposed design, there will be instances whereby occupants will egress from one compartment into an adjoining compartment which will not be provided with direct access to a fire isolated stairway or exit discharging directly to open space.

The proposed design will be assessed as part of a Fire Engineering Performance Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

32. Clause D1.12 – Non required stairways, ramps and escalators

Non-Required Non-Fire Isolated Stairway within the Front of House Atrium

The proposed non-required non-fire isolated stairway situated within the Front of House Atrium which connects Levels 01 -02 is permitted in accordance with the DtS Provisions subject to all patient care areas being fire separated from the front of house area in which the open stairway directly connects.

No patient care areas can be directly connected to or open onto the front of house are without being fire and smoke separated.

The discharge of horizontal exits into the front of house area occupied by the non-required non-fire isolated stairway and void will be required to be assessed as part of the Fire Engineering Strategy developed for the building.

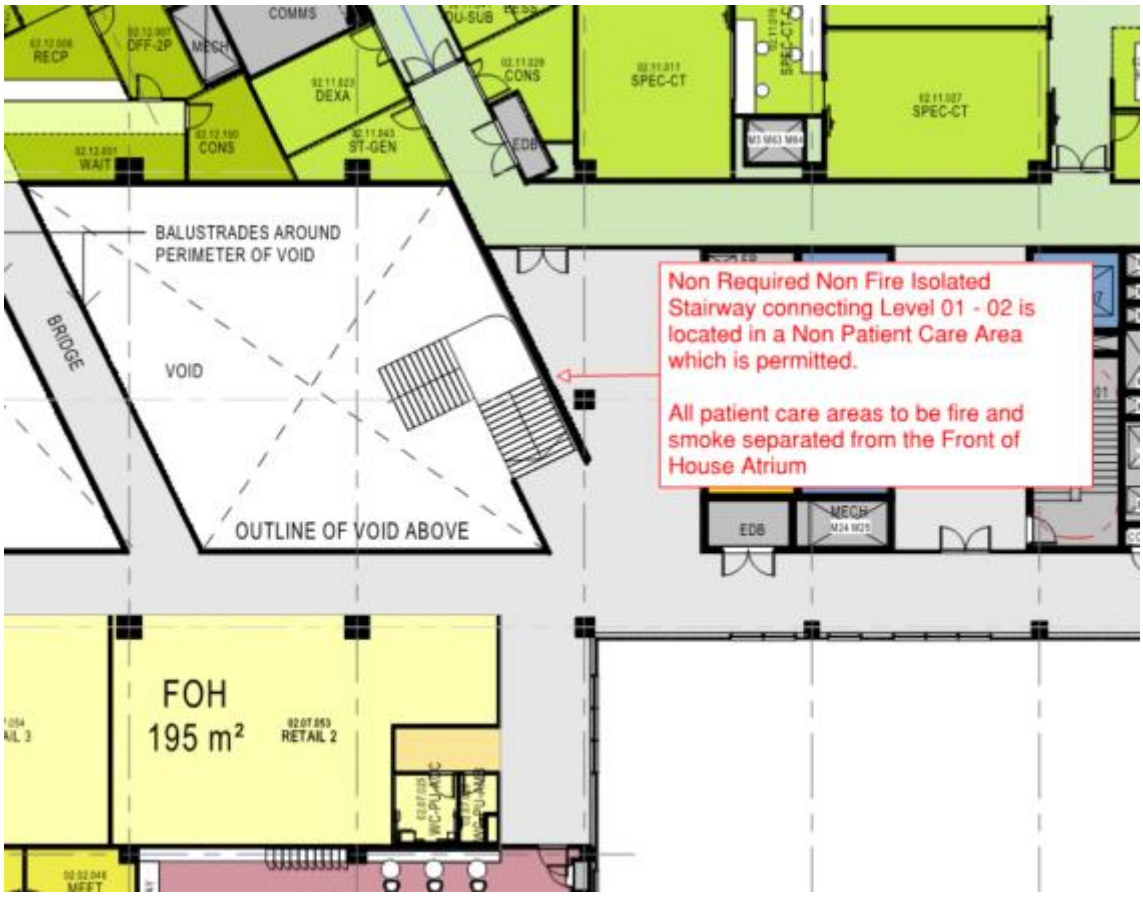


Figure No. 10 – Non required non-fire isolated stairway within the Kids Atrium connecting Levels 02 & 03

33. Clause D2.2 – Fire Isolated Stairways

The fire isolated stairways are required to be constructed of non-combustible materials and so that if there is local failure it will not cause structural damage, or impair the fire resistance of the shaft.

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

Rising and descending stair flights located within the same fire isolated shaft are required to be separated by construction that is non-combustible and smoke proof in accordance with Specification C2.5.

In this instance, it is noted that Fire Stair 01 contains a rising and descending stair flight, with the stairway discharging on Level 01, however the stairway descends down to Level 00.

The rising and descending stair flights will be required to be smoke separated in accordance with the Specification C2.5.

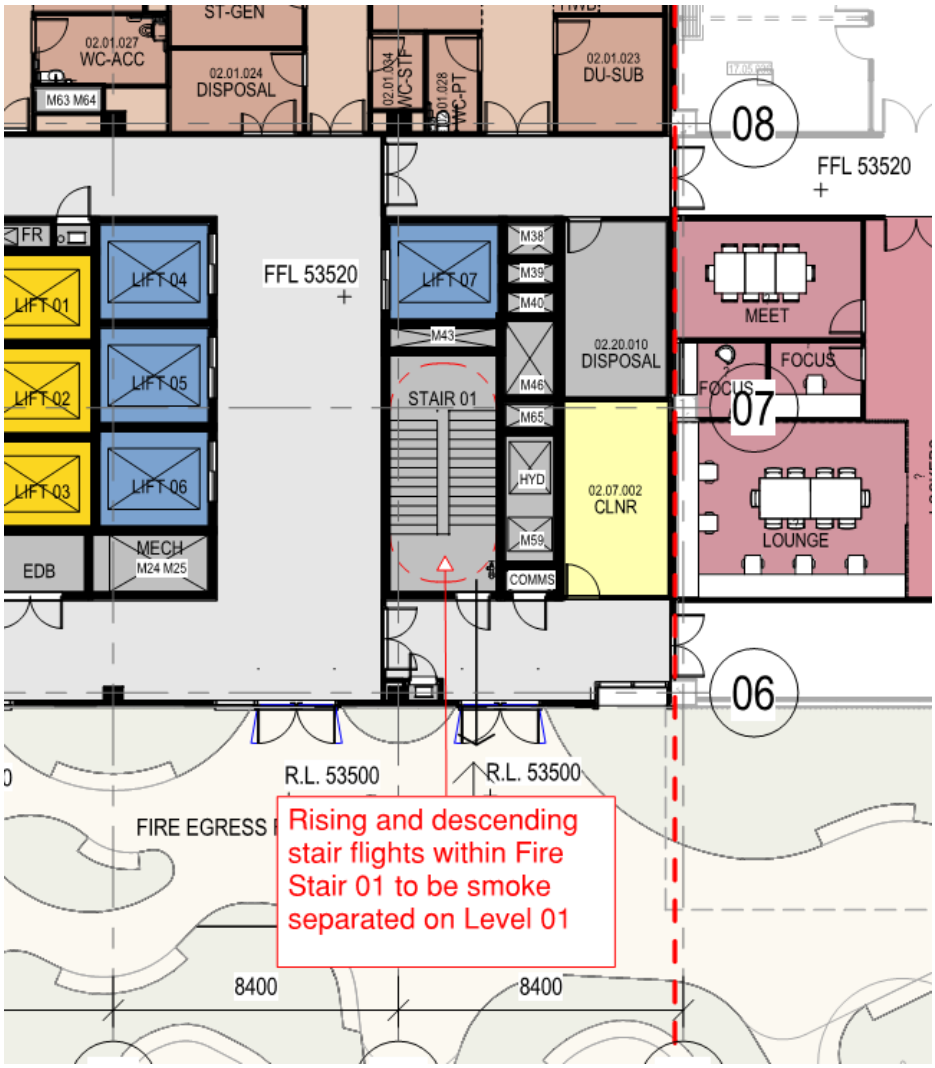


Figure No. 11 – Rising and descending stair flights within Fire Stair 01 to be separated

If the stairways are not to be smoke separated in accordance with Specification C2.5, then the design will be required to be assessed as part of a Fire Engineering Performance Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

35. Clause D2.7 – Installations in Exit and Paths of Travel

No access is permitted to service shafts within the fire isolated stairs.

Any electrical meters, distribution boards or ducts, central communications distribution boards or equipment or electrical motors located within the corridors are to be smoke sealed and enclosed within non-combustible construction with any penetrations smoke sealed.

Note: The smoke sealing is required of any penetrations located between ceiling level.

Gas and other fuel services must not be located within a required exit.

Note that an opening to any chute that or duct that is to convey hot products or combustion from a boiler incinerator, fireplace or the like must not be located in any part of a required exit or any corridor, hallway, lobby or the like leading to a required exit.

36. Clause D2.8 – Enclosure of Space under Stairs and Ramps

A space below a required fire-isolated stairway or ramp within a fire-isolated shaft cannot be enclosed to form a cupboard or other enclosed space within the fire isolated stairway shaft.

37. Clause D2.13 – Goings and Risers

In relation to the construction of all stairways we note the following:

- Stairway must have not more than 18 and not less than 2 risers in each flight.
- Goings and risers within the stair flights must be constant throughout.
- Goings and risers are to be in accordance with the following dimensions.

Riser and Going Dimensions (mm)			
	Riser (R)	Going (G)	Quantity (2R + G)
Maximum	190	355	700
Minimum	115	250	550

Table No. 9 – Riser and going dimensions for stairways

- The stair treads are required to be provided with the following:
  - Have a surface with a slip resistance classification not less than that listed in Table D2.14 when tested in accordance with AS 4586; or
  - Be provided with a nosing strip with a slip resistance classification not less than that detailed in Table D2.14 when tested in accordance with AS 4586.
- Each stairway is to be provided with a contrast strip to the nosing in accordance with AS1428.1-2009

38. Clause D2.14 – Landings

The stair landings to the fire isolated stairways are required to be designed in accordance with the following:

- The area of any landing must be sufficient to move a stretcher, 2m long and 600mm wide, at a gradient not more than the gradient of the stairs, with at least one end of the stretcher on the landing while changing direction between flights; or
- The stair must have a 180 degree landing, with a clear width of 1600 mm and clear length of 2700 mm.

Furthermore, the stair landings must:

- A surface with a slip resistance classification not less than that listed in Table D2.14 when tested in accordance with AS 4586; or
- A strip at the edge of the landing with a slip resistance classification not less than that listed in Table D2.14 when tested in accordance with AS 4586, where the edge leads to a flight below.

Table D2.14 Slip Resistance Classification

Application	Surface Conditions	
	Dry	Wet
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but not steeper than 1:14	P3 or R10	P4 or R11
Tread or landing surface	P3 or R10	P4 or R11
Nosing or landing edge strip	P3	P4

Table No. 10 – Minimum slip resistance ratings required to stairs and ramps

In addition to the slip resistance ratings detailed within the table, the following slip resistance ratings are required throughout the building:

Location	Minimum Slip Resistance
Undercover Car Parking Areas	P3 or R10
External Car Park	P4 or R11
Loading Dock	P5 or R12
External walkways etc	P4 or R11
Bathrooms and ensuites	P3 or R10
Wards and corridors *Note: Where handwash basins are contained within a corridor, a minimum Slip Rating of P3 or R10 should be maintained for a radius of 2m from the basin.*	P2 or R9
Consultation Areas	P2 or R9
Building Entry (wet area)	P3 or R10
Building Entry (transitional area)	P3 or R10
Building Entry (dry area)	P2 or R9
Lifts	P2 or R9

Table No. 11 – Minimum slip resistance ratings required to specific areas throughout the hospital

39. Clause D2.15 – Thresholds

No steps can be located within the internal or external door thresholds. Where there are any steps within external door thresholds, a threshold or step ramp is required to be installed in accordance with Clause 10 of AS 1428.1.

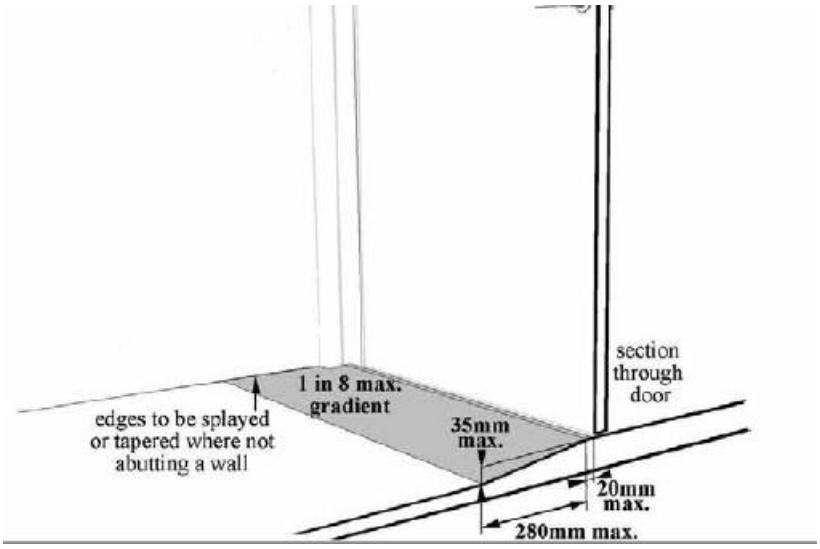


Figure No. 12 – Threshold Ramp

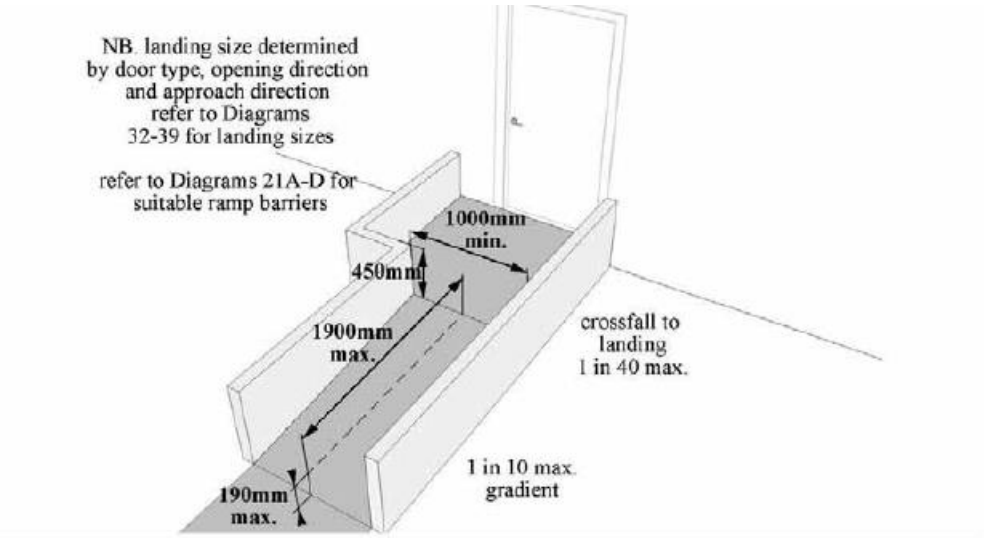


Figure No. 13 - Step Ramp at External Doorway – Front Approach

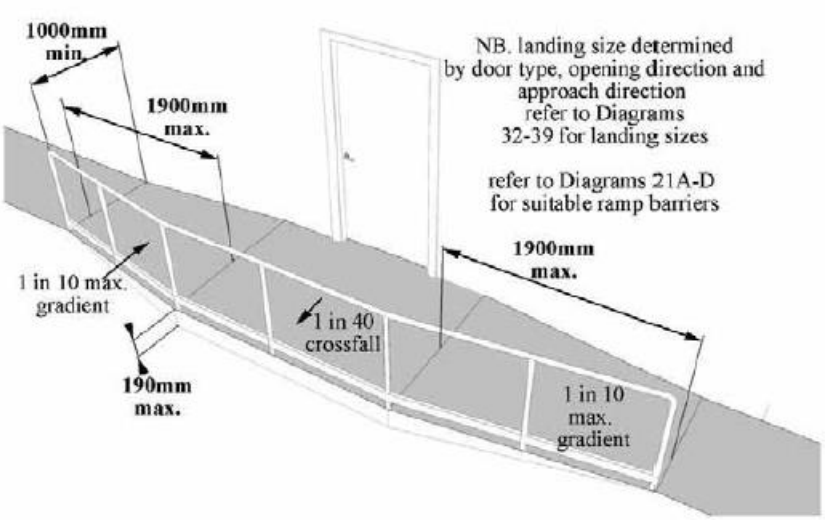


Figure No. 14 – Step Ramp at External Doorway – Side Approach

40. Clause D2.16 – Balustrades or Other Barriers

General Requirements

All balustrades are required to be constructed to a minimum height of 1000 mm where the level below is greater than 1000mm to all landings, between car parking levels, walkways etc.

Note: Verification is required as to the proposed barrier between car parking levels where the change in level exceeds more than 1000mm.

Where the level below exceeds 4000mm the balustrades must not have any climbable elements between 150mm and 760mm above the floor. The minimum height of the balustrades is 1000 mm.

Note: Verification is required as to the proposed barrier construction to the roof top level of the car park.

All balustrades are required to comply with the structural loading requirements of AS 1170.1.

Fire Isolated Stairways

Within the fire isolated stairways where the fall exceeds 1000mm, the balustrading must be a minimum of 865-mm above the nosing of the tread with a rail no more than 150-mm above the nosing of the tread and no gaps between rails greater than 460-mm.

Within the fire isolated stairways, at stair landings, where the landing exceeds 500-mm in length the balustrade must be increased to 1m in height, with a rail no more than 150-mm above the landing and no gaps greater than 460-mm.

Non-Fire Isolated Stairways

For all non-fire isolated stairways, the openings between balusters cannot exceed 125mm.

41. Clause D2.17 – Handrails

Handrails are to be provided along at least one side of all corridors in the patient care areas, which are fixed not less than 50-mm from the wall and continuous where practical.

Handrails are required be provided along at least one side of the fire isolated stairways. The handrails are required to be designed and constructed in accordance with Clause 12 of AS 1428.1.

Handrails must be provided along both sides of the non-required non-fire isolated stairways. The handrails are required to be designed and constructed in accordance with Clause 11 and 12 of AS 1428.1 – 2009.

42. Clause D2.18 – Fixed Platforms, Walkways, Stairways and Ladders

A fixed platform, walkway, stairway or ladder and any going and riser, landing, handrail or barrier attached thereto is permitted to comply with AS 1657 in lieu of Clause D213, D2.14, D2.16 if it only serves:

+ Machinery rooms, boiler houses, lift machine rooms, plant rooms and the like.

43. Clause D2.19 – Doorways and Doors

Doorways located in a patient care area must not incorporate a sliding door unless that door leads directly to open space and is able to be manually opened under a force of not more than 110 N and open automatically upon fire trip or power failure.

It is noted that sliding doors will be installed within patient care areas throughout the building.

The proposed provision of sliding doors throughout patient care areas within the building will be required to be to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

44. Clause D2.20 – Swinging Doors

All exit doors or doors forming part of a required exit are required to swing in the direction of egress. This applies to all exit doors leading into fire isolated stairways along with the doorways discharging from the fire isolated stairways along with egress doors discharging direct to open space.

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 200m^2).

Fire doors used as horizontal exits are proposed to not swing in the direction of egress in certain instances. The swing of the horizontal exit doors will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

45. Clause D2.21 – Operation of Latch

All exit doors and doors in a path of travel are required to be provided with door hardware that is openable by a single handed downward action without recourse to a key or locking device and meet the following criteria:

- The door hardware is to be of a design that the hand of a person who cannot grip will not slip from the handle during the operation of the latch: and
- Have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35mm and not more than 45mm more

The door hardware is to be positioned between 900 – 1100mm from the ground.

Doors providing re-entry to the building from balcony areas etc. must be fitted with key-operated fastenings only, the tongues of which must be locked in the retracted position whenever the building is occupied so that the door can yield to pressure.

46. Clause D2.22 – Re-entry from Fire Isolated Exits

Doors to the fire isolated exits must not be locked from inside the stair or if they are proposed to be locked, they must be fitted with a fail-safe device that automatically unlocks the door upon fire trip and comply with one of the following design options:

- 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 visible alarm system, operated from within the enclosure is provided near the doors on every level and a sign is fixed adjacent to such doors explaining its purpose and method of operation.

47. Clause D2.23 – Signs on Doors

All **self-closing** fire and/or smoke doors located within fire and smoke walls throughout the building together with the fire doors providing access to the fire isolated stairways are to be provided with signage that states:

FIRE SAFETY DOOR
DO NOT OBSTRUCT
DO NOT KEEP OPEN

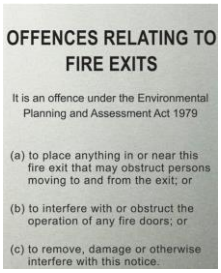
All **automatic closing** fire and/or smoke doors located within fire and smoke walls throughout the building together with automatic closing fire doors leading to the fire isolated stairways are to be provided with signage that states:

FIRE SAFETY DOOR
DO NOT OBSTRUCT

The doors discharging from the fire isolated stairways are to be provided with signage as follows (on both sides of the doorways):

FIRE SAFETY DOOR
DO NOT OBSTRUCT

The doors discharging into the fire isolated stairways are to be provided with the following additional signage installed on the wall on the latch side of the door.



The DtS Provisions requires Braille signage for egress systems from the building. In this instance the following is required to be provided: -

+ Identify each door required by **E4.5** (door to be provided with exit signs) to be provided with an exit sign and state –

    a. ***"Exit"****; and*
    b. ***"Level"*** *followed by the floor number*

    Signs identifying a door required by E4.5 to be provided with an exit sign must be located:

    i. On the side that faces a person seeking egress; and

    ii. On the wall on the latch side of the door with the leading edge of the sign located between 50mm and 300mm from the architrave; and

    iii. Where (ii) is not possible, the sign may be placed on the door itself.

    The provision of Braille and tactile exit signage with the message, *for example*. *"**Exit - Level 1**"* assists people with vision impairment to orientate themselves in case of an emergency situation and to find an exit and evacuate the area in a safe and equitable manner.

Signage Specification: -

The signage is to be: -

+ Located between 1200-1600mm above FFL
+ Signs with single lines of characters are to have the line of the tactile characters between 1250mm-1350mm above FFL
+ Signage tactile characters must be raised or embossed to a height between 1mm-1.5mm
+ Upper case letter to be between 20mm-55mm

Signage is to be contrasting & is to comply with BCA Specification E3.6.

Signage Locations:

The Braille & tactile egress signage is to be located adjacent or on (see above) each door that: -

- Provides direct egress into a fire isolated stairway
- Provides direct discharge from the storey into a passageway or lobby (airlock) associated with the fire isolated stairway
- Provide direct discharge from a fire isolated stairway to open space (discharge door)
- Horizontal exit doors providing egress into an adjoining fire compartment

The below signage is an example of what will be required: -

48. D3 – Access Requirements for People with Disabilities

Access for a person with a disability will be required to be provided from the allotment boundary along and accessible car parking spaces to and within the new Stage 2 Tower and interconnected buildings i.e. Stage 1 Tower and North Block.

The design at present is capable of complying with the requirements pertaining to access for a person with a disability.

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 beds, throughout all patient care areas, staff areas and communal areas.

Access need not be provided to:

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

Areas / rooms that are not required to be accessible for a person with a disability include the following:

- Dirty Utility Rooms
- Clean Utility Rooms
- Equipment Store Rooms
- General Store Rooms
- Cleaners Rooms
- Disposal Rooms
- Back of House Area containing the Bulk Store, General Waste Room etc
- Plant Rooms
- Main Switch Room, Chamber Sub, UPS / EDB / Comms Rooms

This Report contains high level comments pertaining to access for a person with a disability. A separate and more detailed Report will be prepared by iAccess Consultants.

BCA2019 Part D3.2 – Access to Buildings & D3.3 – Parts of Buildings to be Accessible

- Access for a person with a disability will be required to be provided from the allotment boundary along and accessible car parking spaces to and within the new Stage 2 Tower and interconnected buildings i.e., Stage 1 Tower and North Block.
- The Class 3 overnight room will be required to be fully accessible for a person with a disability including an accessible sanitary facility.

+ The minimum width of an accessible doorway must have a *clear opening* width of not less than 850mm in accordance with AS1428.1. Where double doors are provided, at least one leaf must have a clear unobstructed width of 850mm.

Note: -
Please refer to Clause D1.6 above having regard to the clear width of doorways where patient transportation in beds is required.

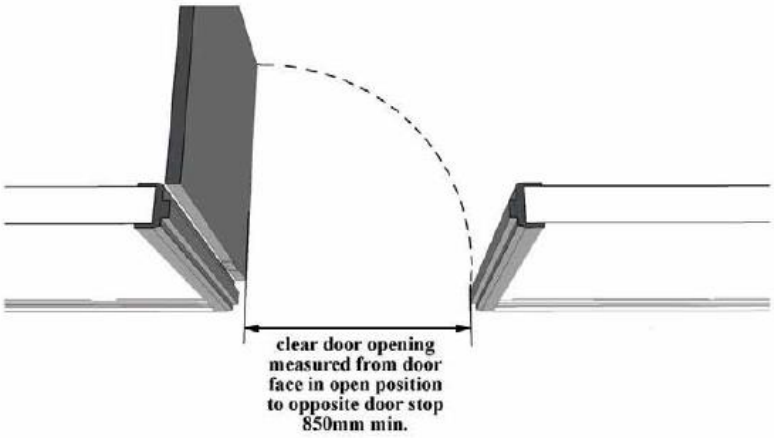


Figure No. 15 – Clear Unobstructed Width of Doorway

+ All new doorways shall have a minimum luminance contrast of 30% provided between—

(a) door leaf and door jamb;

(b) door leaf and adjacent wall;

(c) architrave and wall;

(d) door leaf and architrave; or

(e) door jamb and adjacent wall.

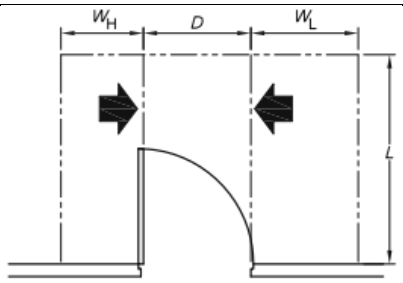
The minimum width of the area of luminance contrast shall be 50 mm.

Doorways providing access to rooms that are not required to be accessible, are not required to be provided with a luminance contrast i.e., clean utility rooms, dirty utility rooms, equipment stores etc.

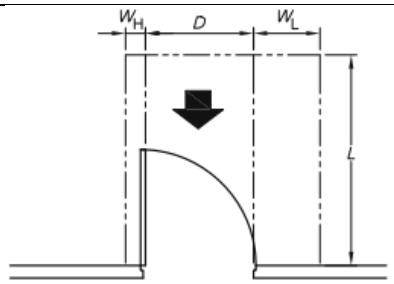
+ Circulation space is required to all doorways throughout the building that are required to be accessible in accordance with Section 13 of AS 1428.1 – 2009 (see diagrams below).

Note: Where doorways are provided with one and half leaves, the half leaf is required to permit the required latch side circulation space as required by AS 1428.1 – 2009.

Swing Door Opens Towards User:	
Both Sides Approach:	Front on Approach:

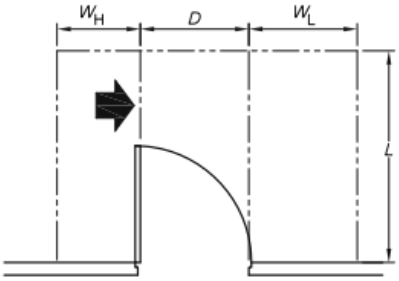


D	L	W_H	W_L
850	1670	660	900
900	1670	610	900
950	1670	560	900
1000	1670	510	900



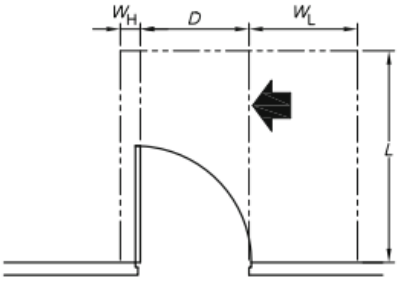
D	L	W_H	W_L
850	1450	110	530
900	1450	110	530
950	1450	110	530
1000	1450	110	530

Hinge Side Approach:



D	L	W_H	W_L
850	1670	660	900
900	1670	610	900
950	1670	560	900
1000	1670	510	900

Latch Side Approach:

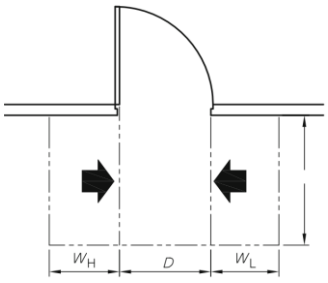


D	L	W_H	W_L
850	1670	110	900
900	1670	110	900
950	1670	110	900
1000	1670	110	900

Figure No. 16 – Circulation Space at Swing Doors – Door Opens Toward User

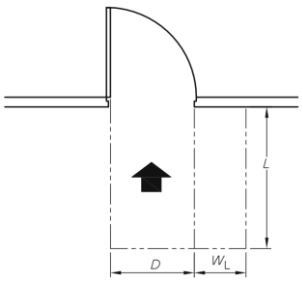
Swing Door Opens Away from User:

Both Sides Approach:



D	L	W_H	W_L
850	1240	560	660
900	1210	510	660

Front on Approach:

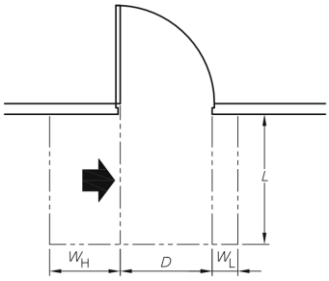


D	L	W_H	W_L
850	1450	0	510
900	1450	0	510

950	1175	460	660
1000	1155	410	660

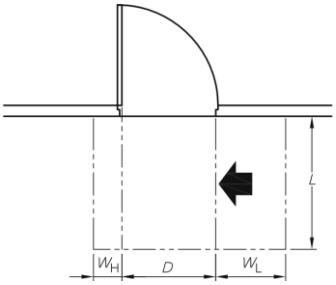
950	1450	0	510
1000	1450	0	510

Hinge Side Approach:



D	L	W_H	W_L
850	1220	560	340
900	1185	510	340
950	1160	460	340
1000	1140	410	340

Latch Side Approach:

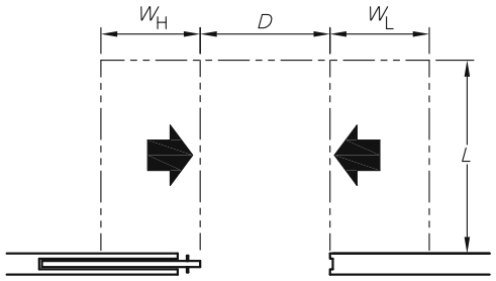


D	L	W_H	W_L
850	1240	240	660
900	1210	190	660
950	1175	140	660
1000	1155	90	660

Figure No. 17 – Circulation Space at Swing Doors – Door Opens away from User

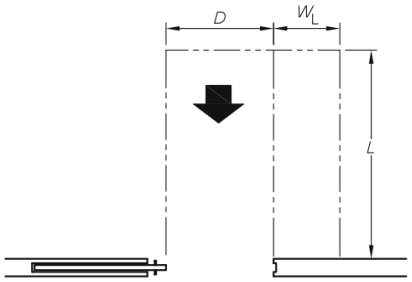
Sliding Doors Recessed in Wall:

Both Sides Approach:



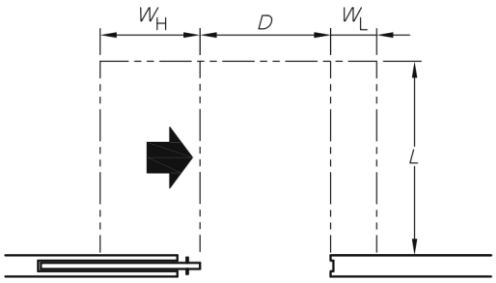
D	L	W_H	W_L
850	1280	660	660
900	1280	610	660
950	1280	560	660
1000	1280	510	660

Front on Approach:



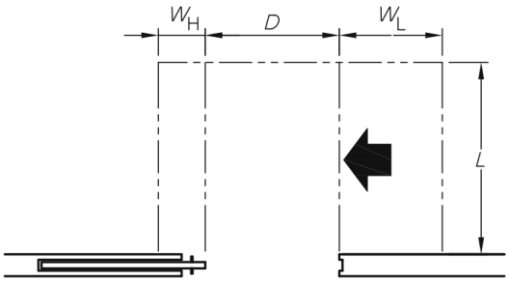
D	L	W_H	W_L
850	1450	0	530
900	1450	0	530
950	1450	0	530
1000	1450	0	530

Slide Side Approach:



D	L	W_H	W_L
850	1280	660	395
900	1280	610	395
950	1280	560	395
1000	1280	510	395

Latch Side Approach:



D	L	W_H	W_L
850	1230	185	660
900	1230	180	660
950	1230	180	660
1000	1230	180	660

Figure No. 18 – Circulation Space at Sliding Doors – Recessed in Wall

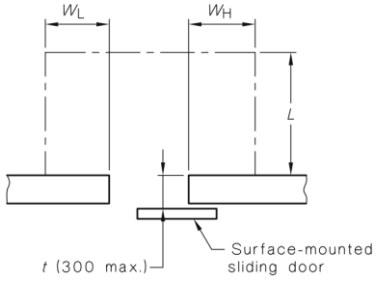
Sliding Doors Surface Mounted		
For any side on approach:	Add dimension *t* to W_L and W_H.	
For only a front on approach:	Add dimension *t* to *L*, W_L and W_H.	

Figure No. 19 – Circulation Space at Sliding Doors – Surface Mounted

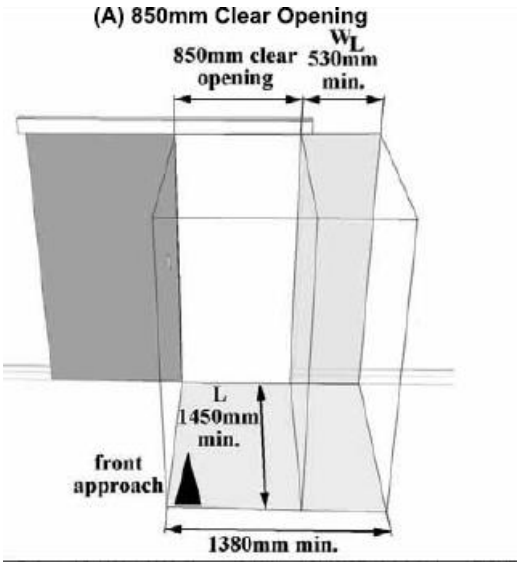


Figure No. 20 – Circulation Space at Swing Doors

+ All dead end corridors where a person in a wheelchair is required to make a 90º to 180º turn is required to be not less than 2070mm in the direction of travel and not less than 1540mm wide.

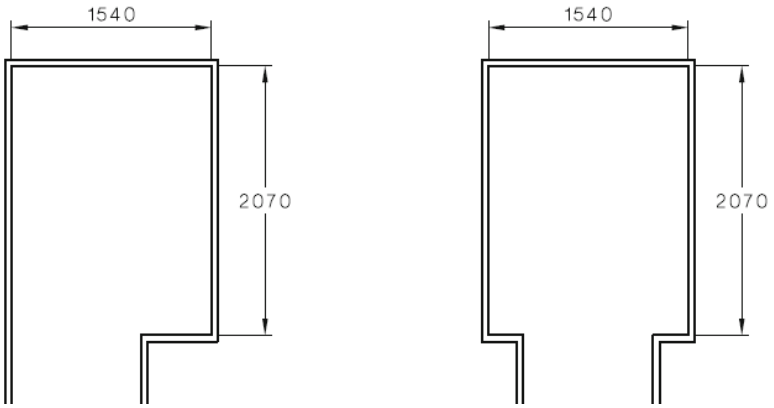


Figure No. 21 – Minimum space required for >90º to 180º turn

Accessible Walkways (AS1428.1 – 2009 Section 10.2):

The requirements for walkways serving the development are as follows:

+ Walkways can have a gradient up to 1:20. Anything steeper is a ramp and requires kerbs or kerb rails plus handrails to both sides.
+ A walkway with a gradient less than 1 in 33 does not require landings but does require a crossfall of maximum 1 in 40 (maximum cross fall of 1 in 33 if the surface is bitumen).
+ Walkways steeper than 1 in 33 do not require a crossfall to the main walkway but do require a crossfall of 1 in 40 to landings

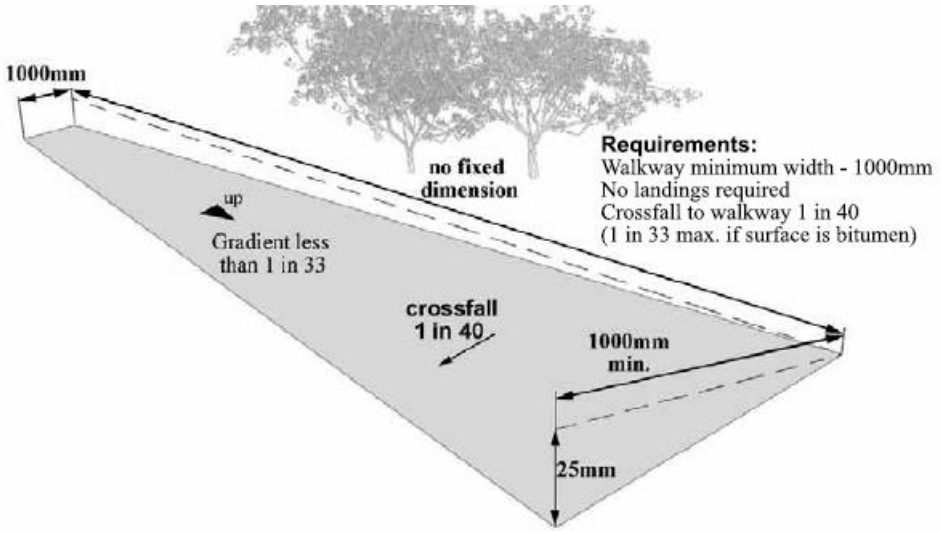


Figure No. 22 - Requirements for a Walkway with a Gradient Less Than 1 in 33

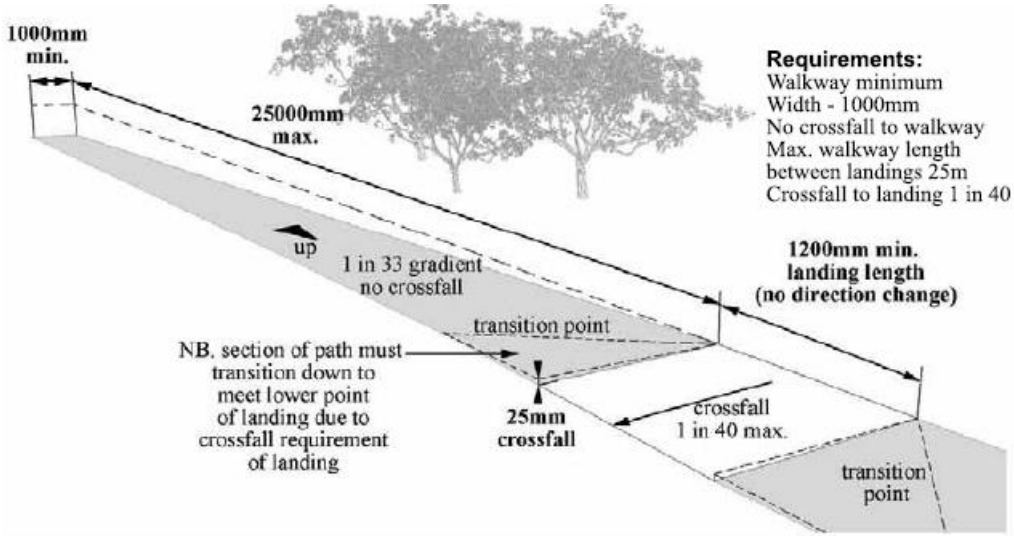


Figure No. 23 - Requirements for a Walkway with a 1 in 33 Gradient

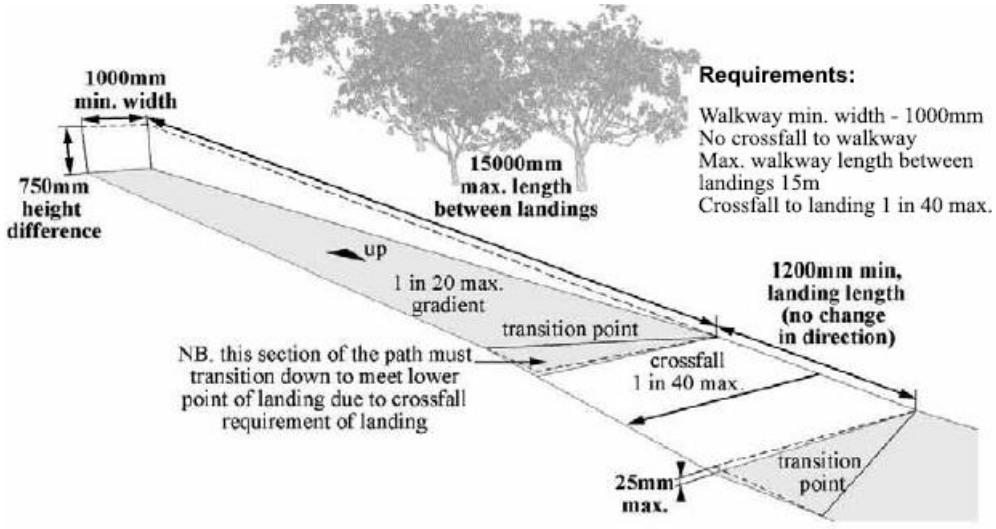


Figure No. 24 - Requirements for a Walkway with a 1 in 20 Gradient

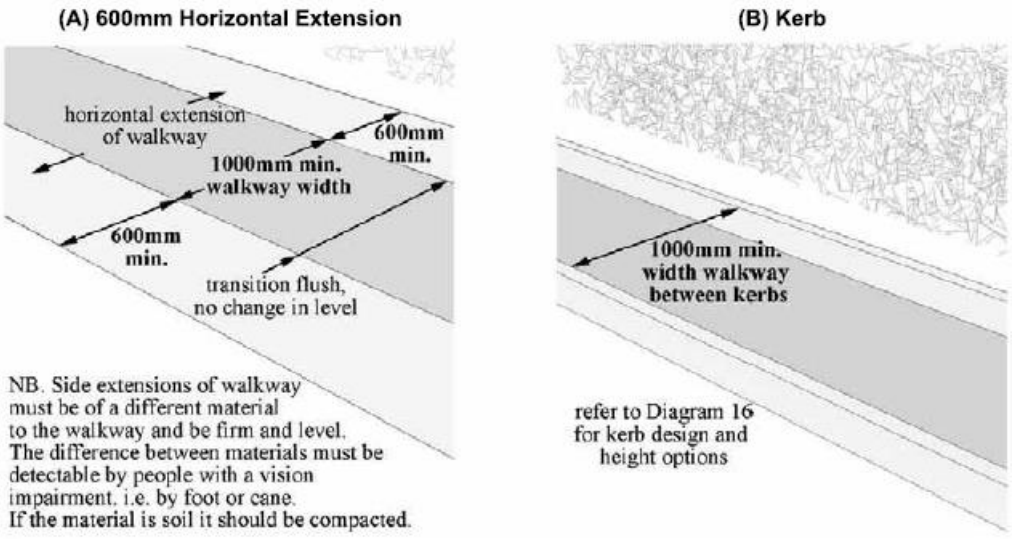


Figure No. 25 - Requirements for Edges of Walkways

Accessible Ramps (AS1428.1-2009 Section 10.3):

Accessible ramps are required to be designed and constructed in accordance with the following:

- The maximum gradient is to be 1:14.
- Landings are to be provided at the top and bottom of the ramp and at intervals not exceeding 9m.

  The landings to the ramps are required to have a minimum width of 1200mm.
- Handrails are to be provided to both sides of the ramp. The handrails are required to be extended 300mm at both the top and bottom of the ramp.
  - The ramps are to be provided with kerb rails that comply with the following:
  - The minimum height above the finished floor shall be 65mm
  - The height of the top of the kerb or kerb rail shall not be within the range of 75mm to 150mm above the finished floor.
  - There cannot be a longitudinal gap or slot greater than 20mm in the kerb or kerb rail within the range 75mm to 150mm above the finished floor.
- Where ramps are constructed with a change in direction, the angle of approach shall create a 90° angle to the line of transition between the ramp surface and the landing surface.

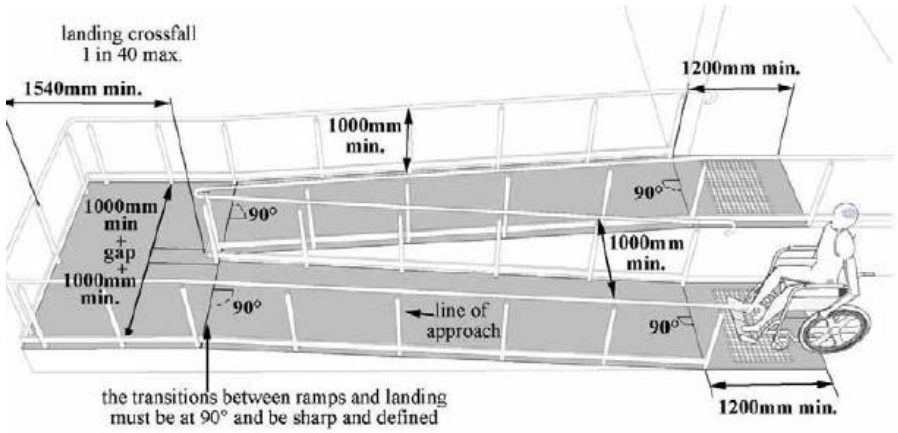


Figure No. 26 – Ramp and Landing with Change in Direction of 180°

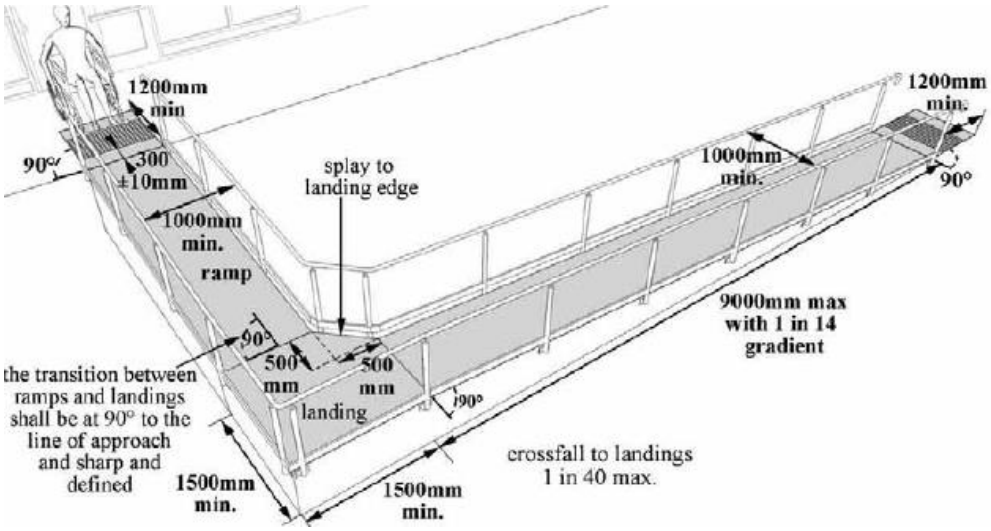


Figure No. 27 – Ramp and Landing with Change of 90°

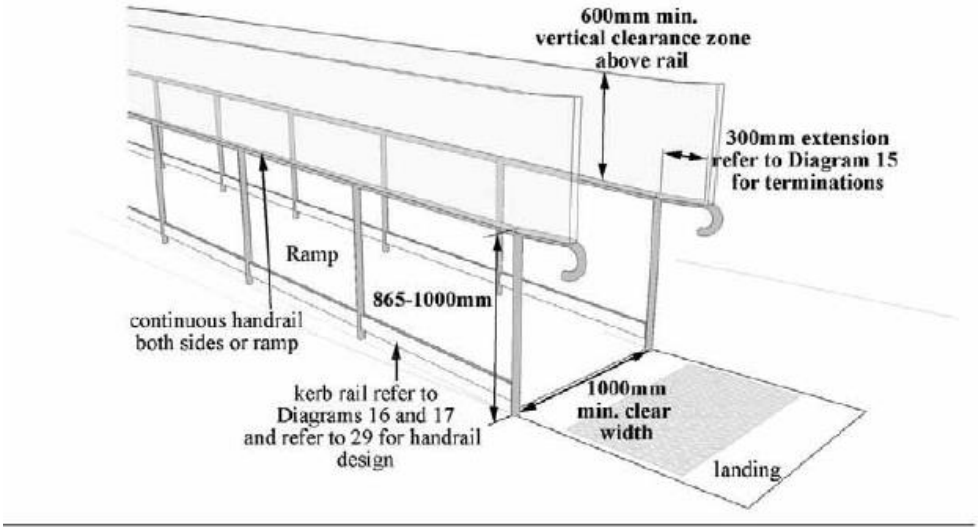


Figure No. 28 – Handrail Extensions at Ramp Ending

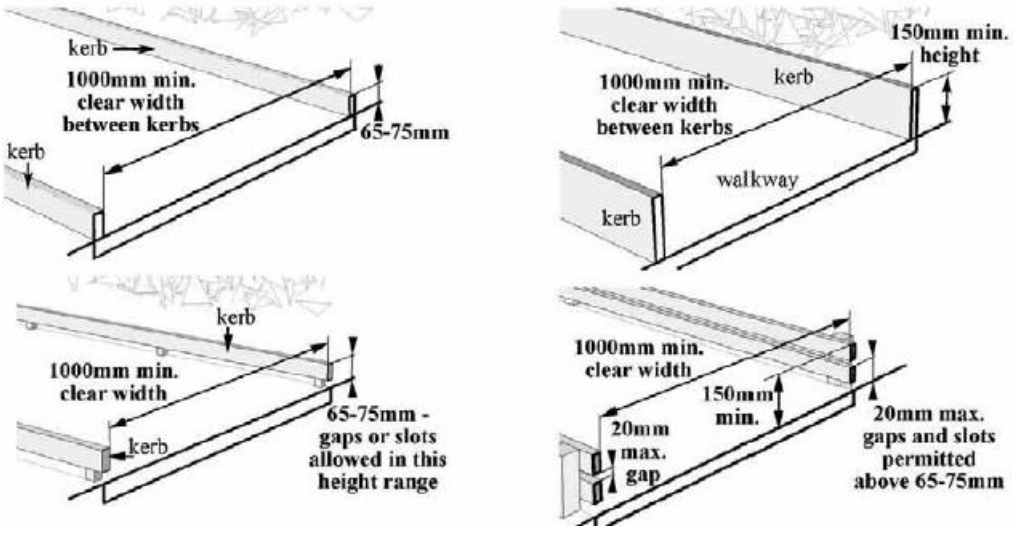


Figure No. 29 – Kerb and Kerb Rail Design Options

Accessible Stairways:

Circulation stairways are required to be designed in accordance with AS 1428.1. In this instance, the following is required:

- A handrail to each side of stairway.
- Handrails are required to be extended at the top and bottom of the stairway. At the bottom of the stairway, the handrails are required to extend one tread width plus 300mm from the last riser. At the top of the stairway, the handrails are required to extend 300mm from the last riser.
- Solid opaque risers.
- Contrast nosing's to the stair treads.
- The handrails are to have a maximum dimension of 50mm and be spaced a minimum distance of 50mm from the wall.

  Note: -
  Handrails within fire isolated stairways that are not used as circulation stairways are only required to comply with Clause 12 of AS 1428.1 which regulates the size of the handrails, cross section and distance from adjacent walls surfaces etc. In this instance the extensions at the top and bottom of the handrails are not required within the fire isolated stairway.

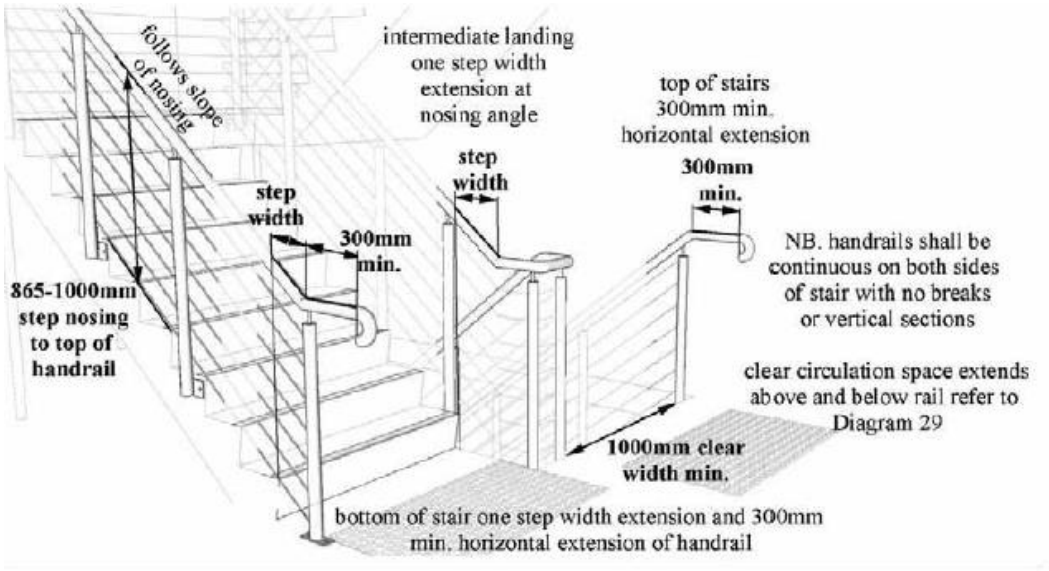


Figure No. 30 – Handrails to Stairways

Hearing Augmentation

A hearing augmentation system will be required to be installed to all rooms / areas where a built in amplification system is installed.

A built in amplification system is a system where either speakers are installed within a room or a wall mounted monitor has built in speakers. Such installations are typically found in meeting rooms, training rooms and waiting areas.

Where the wall mounted screen is not capable of broadcasting sound and any audio is provided way of speakers attached to a laptop or that are portable, the hearing augmentation provisions will not need to be applied.

Access Control

Access control swipe readers are required to be installed between 900 – 1100mm above FFL and not closer than 500mm to an internal corner.

Door release buttons are required to be located between 900 – 1100mm above FFL and closer than 500mm to an internal corner. Door release buttons will need to be large format switches (35mm x 35mm rocker style switches) or a 'mushroom' push button type.

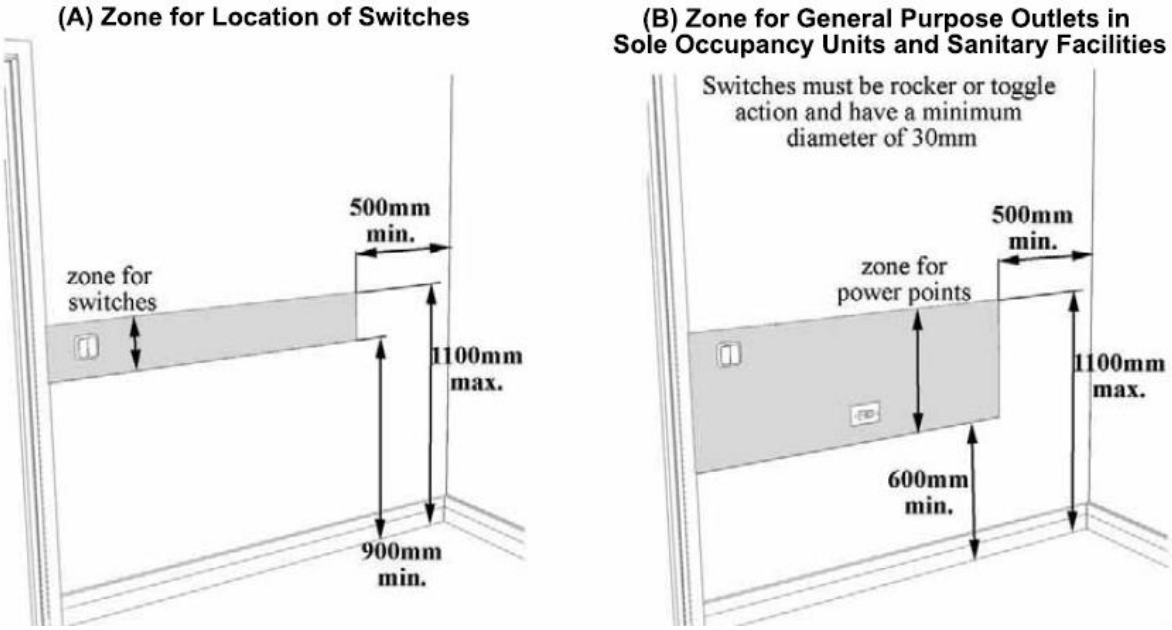


Figure No. 31 – Zones for the location of switches and power outlets

Accessible Counters

The reception counters associated with the entrance to the building or department entries is to include a portion of the counter that is accessible to a person with a disability. The height of the counter should be 850mm +/- 20mm.

The knee and foot clearances below the counter or bench are required to be provided in accordance with AS 1428.2 – 1992.

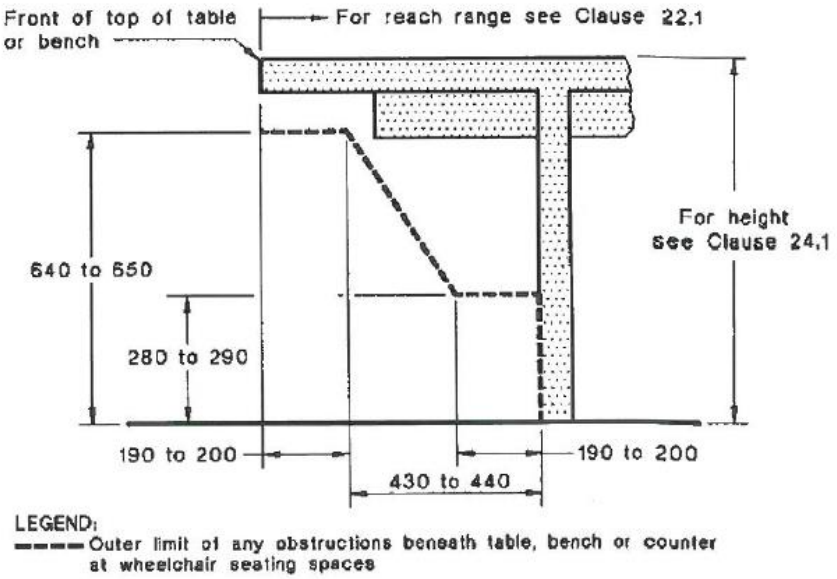


Figure No. 32 – Clearances below an accessible counter or bench

Beverage Bays

Where Beverage Bays are proposed to be installed, they are required to be designed as follows:

+ If the beverage bays are located within a room, the circulation space within the room will be required to comply with the provisions of AS 1428.1 – 2009 with a zone of 1500mm x 1500mm provided to ensure that that an occupant can make a 180^{o} turn.
+ The distance between the beverage bay counter and any adjacent wall cannot be less than 1540mm.
+ Where the beverage bay is located adjacent to a doorway, circulation space around the doorway is required to be provided as detailed above.
+ Water zip taps cannot be located closer than 500mm from an internal corner.
+ Side reach access to the tap hardware of the beverage bay is permitted. Side reach access is required to be provided in accordance with AS 1428.2 – 1992 as detailed in the below Figure.

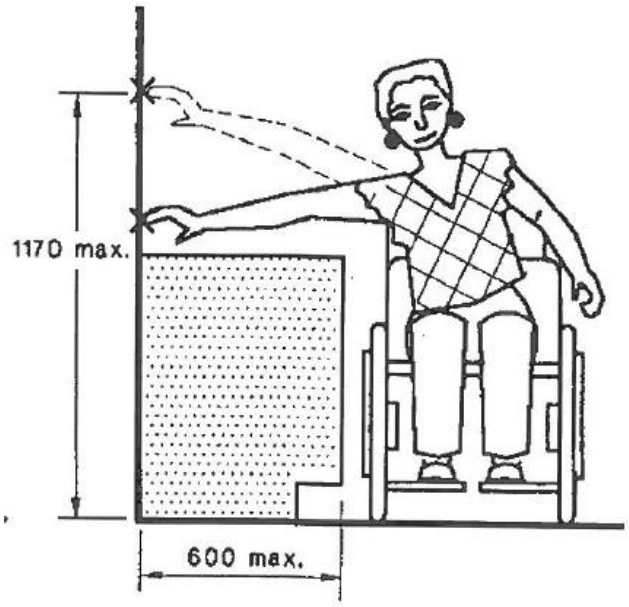


Figure No. 33 – Side reach requirements for a wheelchair user

Accessible Fixtures & Fittings:

+ All fixtures, fittings and door hardware are to comply with Section 13.5 & Section 14 of AS1428.1-2009.

  In this instance, toggle style light switches and GPO outlets etc. should be provided within all patient care areas and to all accessible sanitary facilities (unless automatic lighting is provided within the sanitary facility)
+ Braille tactile signage will be required to be installed throughout the building identifying accessible sanitary facilities, exits and lifts in accordance with the DTS Provisions of the BCA and AS 1428.1.

  Signage to identify any ambulant or accessible sanitary facility is required to be located on the wall on the latch side of door or on the door itself leading to the sanitary facility.

- On an accessway where there is no rail, handrail or transom provided to glazed walls and doors which may be mistaken as an opening must be clearly line marked in accordance with the following:
  - Must be clearly marked for the full width of the glazed element,
  - Must be a solid and non-transparent contrasting line,
  - The contrasting line must have a minimum of 30% luminance contrast when viewed against the floor surface or surfaces within 2m of the glazing of the opposite side.
  - Must be not less than 75mm in width,
  - The lower edge of the contrasting line must be located between 900mm and 1000mm above the finished floor level

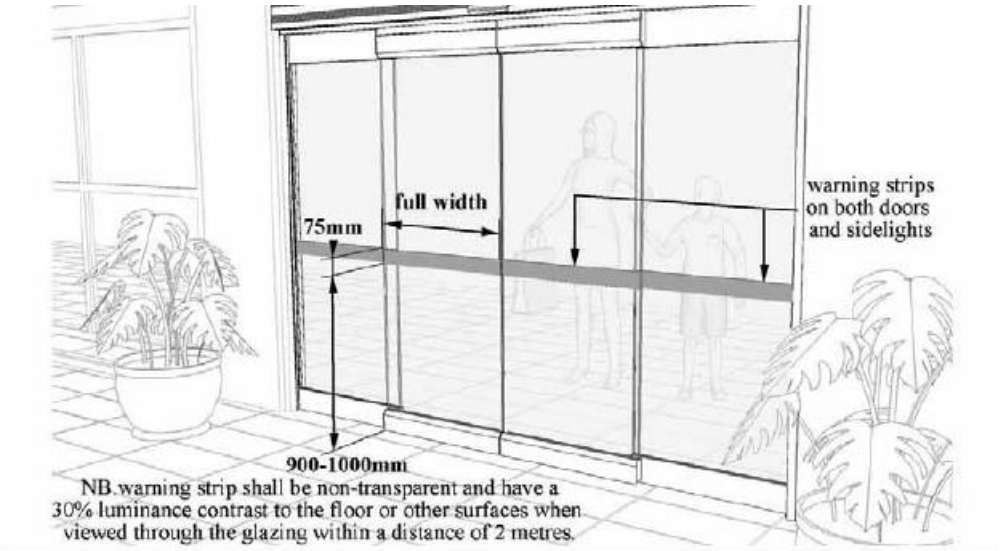


Figure No. 34 – Warning Strips to Full Height Glazing

SECTION E – SERVICES AND EQUIPMENT

49. Part E1 – E4 – Essential Fire Safety Measures

The following essential fire safety measures are required to be installed within the building based on an effective height greater than 50m i.e., Stage 1 & 2 form a single building:

Essential Fire and Other Safety Measures	Standard of Performance
Access Panels, Doors & Hoppers	BCA Clause C3.13 AS 1530.4 - 2005
Alarm Signalling Equipment	AS1670.3 – 2004
Automatic Fail Safe Devices	BCA Clause D2.21
Automatic Fire Detection & Alarm System	BCA Spec. E2.2a AS 1670.1 - 2018.

Essential Fire and Other Safety Measures	Standard of Performance
Automatic Fire Suppression System	BCA Spec. E1.5 AS2118.1 - 2017
Emergency Lighting	BCA Clause E4.4 AS/NZS 2293.1 - 2018
Emergency Lifts	BCA Clause E3.4 AS 1735.2 - 2001
Emergency Evacuation Plan	AS 3745 - 2002
Emergency Warning & Intercommunication System	BCA Clause E4.9 AS 1670.1 - 2018
Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 AS/NZS 2293.1 – 2018
Fire Dampers	BCA Clause C3.15 AS/NZS 1668.1 - 2015 AS 1682.1 & 2 – 2015
Fire Doors	BCA Clause C2.12, C2.13, C3.5, C3.7, C3.8 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
Fire Walls	BCA Spec. C1.1
Lightweight Construction	BCA Clause C1.8 & AS 1530.4 – 2014
Manual Call Points	BCA Section E
Mechanical Air Handling Systems (automatic shutdown)	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

Essential Fire and Other Safety Measures	Standard of Performance
Pressurisation Systems (Fire Isolated Stairways and associated Passageways)	BCA Clause E2.2 AS/NZS 1668.1 - 2015 AS 1668.2 – 2012
Required Exit Doors (power operated)	BCA Clause D2.19(d)
Smoke Dampers	AS/NZS 1668.1 – 2015 AS 1682.1 & 2 – 2015
Smoke Doors	BCA Spec. C3.4 & C2.5
Smoke Seals	BCA Spec C3.4
Smoke Walls	BCA Spec. C2.5
Smoke Hazard Management System – (Zone Smoke Control System)	BCA Clause E2.2, AS/NZS 1668.1 - 2015 AS 1668.2 – 2012
Wall-Wetting Sprinklers	BCA Clause C3.4 AS 2118.2 – 2010
Warning & Operational signs	Section 183 of the EP & A Regulations 2000 BCA Clause D2.23, E3.3 AS 1905.1 – 2015

Table No. 12 – Required essential fire safety measures

50. Clause E1.3 – Fire Hydrants

A fire hydrant service is required to be provided throughout the entire building. The system which forms part of a combined Hydrant and Sprinkler System will be required to be designed in accordance with AS 2419.1 – 2005 and AS 2118.6 – 2012.

System Performance

Based on the fact that the building contains 3 storeys or more together with the fact that the Fire Compartments will exceed 500m^2, the maximum number of fire hydrants that are required to flow simultaneously is 2 in accordance with Table 2.1 of AS 2419.1 – 2005.

Having regard to the above, the hydraulic consultant is to provide confirmation that the flow rate of the hydrant system has been designed for the required number of hydrants simultaneously flowing at the appropriate flow rate i.e., 2 hydrants flowing simultaneously at 10 l/s which equates to a minimum flow rate of 20 l/s.

System Design

Due to the fact that the building has an effective height greater than 25 m and 50m , the following additional provisions are required to be provided as part of the fire hydrant system design:

- Provision of on-site water storage tanks to meet the minimum capacity as required by Clause 4.3 of AS 2419.1 – 2015.

- Provision of a fire hydrant ring main (incorporated as part of the combined fire sprinkler and fire hydrant system).

- Provision of Fire Brigade Relay Pumps to enable relay boosting of each 50m pressure gauge

Hydrant Locations

External hydrants if relied upon, are required to be set back a minimum distance of 10m from the external walls of the building unless protected by construction having an FRL of 90/90/90 which extends 3m above and 2m beyond either side of the hydrant outlet.

Internal Hydrants are to be located within each of the fire isolated stairways as part of the combined fire hydrant and sprinkler assembly. Additional hydrants located for coverage may be located within the confines of each storey within 4m of a horizontal exit or non-fire isolated exit i.e., exit discharging directly to open space on lower levels of the building. If full coverage cannot be achieved by the above locations, additional internal fire hydrants may be positioned throughout the floor.

A minimum of one fire hydrant is required to serve each fire compartment unless covered by a fire hydrant within a fire isolated stairway or an external hydrant.

Fire Hydrant Pump Room

It is noted that an external Fire Hydrant Pump Room is provided within the enclosure remote from the building as part of the Stage 1 development. The external pump room is located more than 6m away from the external wall of the building and a hardstand is provided within 20m of the access to the pumproom.

Fire Hydrant Booster

A fire hydrant booster needs to be located in a manner where it is within sight of the main entrance of the building and adjoins a primary vehicular entrance and is situated within 8m of a hardstand access to permit Brigade access.

In this regard it is noted that the fire hydrant booster is located on the Eastern side of the building adjacent to the Fire Control Room and Fire Services Pump Room which is not within sight of the main entrance of the building on the Western Elevation.

The location of the booster in terms of proximity and sight to the main entrance of the building is noted as being as assessed as part of the Fire Engineering Assessment undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

The above is assessed as part of the Stage 1 Development but will need to be included in the Stage 2 Fire Engineering Report to be prepared by Arup.

51. Clause E1.4 – Fire Hose Reels

Fire hose reels are required to be installed throughout the building in accordance with AS 2441 – 2005.

Location

Fire hose reels are required to be located within 4m of an exit (including a horizontal exit) or adjacent to an internal fire hydrant (other than hydrants within a fire isolated stairway).

Fire Hose Reel Coverage to Fire Separated Rooms

It is noted that there will be small percentage of rooms that are fire or smoke separated from the remainder of the building that may not be provided with compliant fire hose reel coverage.

In this instance, the omission of Fire Hose Reel coverage to isolated rooms will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

Doors to Cupboards Housing FHR's

Doors to cupboards housing fire hose reels and fire hydrants are to be designed in such a manner that when they are open, they do not impede on the path of travel leading to an exit. In this instance, doors to cupboards will be required to swing 180º open against the wall face or in some instances, two smaller doors may need to be provided to cupboards so as not to impede the width of exits. Special attention is required to cupboards located directly adjacent to fire safety doors throughout the building.

Note: -

1. *A fire hose reel need not be located adjacent to every exit or internal fire hydrant provided system coverage can be achieved.*
2. *Where coverage cannot be achieved by locating a hose reel in accordance with the above, additional fire hose reels may be located in paths of travel to an exit in order to achieve coverage.*
3. *Fire hose reels are not permitted to pass through fire and smoke doors separating compartments.*
4. *Fire hose reels are permitted to pass through fire doors serving shafts or doors serving equipment or electrical supply systems i.e., main switchboard, electrical conductors etc*

52. Clause E1.5 – Sprinklers

An Automatic Fire Suppression System will be required to be installed throughout the entire Stage 2 Tower. It is understood that the sprinkler system is being designed as part of a combined Sprinkler and Fire Hydrant System designed in accordance with AS 2118.6 – 2012 and AS 2118.1 – 2017.

System Design

Due to the fact that the building has an effective height exceeding 25m & 50m, the following additional measures are required to be installed as part of the Automatic Fire Suppression System installation:

+ Provision of a Grade 1 Water Supply; and

+ Provision of on-site water storage tanks.

Fire Main (Ring) Reticulation

The combined sprinkler and fire hydrant system is required to incorporate a ring main that complies with the following requirements:

+ One ring for each pressure zone
+ The vertical piping of the ring main(s) is required to be located within the fire isolated stairway(s)
+ Adjoining pressure zones cannot share common horizontal interconnections. Each interconnection is required to be located within the pressure zone it shares.
+ The ring main piping cannot be less than DN 100.

Sprinkler Floor Isolating Valves

Each storey of the building is required to be provided with a monitored isolating valve so that it can be separately isolated for maintenance.

Sprinklers in Linkways

The enclosed linkways leading to adjoining buildings that are non-sprinkler protected are required to be protected throughout with an Automatic Fire Suppression System.

The sprinkler protected linkway and non-sprinkler protected adjoining building will then be required to be separated by construction that achieves a minimum FRL of 120 mins.

Fire Sprinkler Booster

A fire sprinkler booster needs to be located in a manner where it is within sight of the main entrance of the building and adjoins a primary vehicular entrance and is situated within 8m of a hardstand access to permit Brigade access.

In this regard it is noted that the fire sprinkler booster is located on the Eastern side of the building adjacent to the Fire Control Room and Fire Services Pump Room which is not within sight of the main entrance of the building on the Western Elevation.

The location of the booster in terms of proximity and sight to the main entrance of the building is noted as being as assessed as part of the Fire Engineering Assessment undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

The above is assessed as part of the Stage 1 Development but will need to be included in the Stage 2 Fire Engineering Report.

Location of Sprinklers

The sprinkler system will be required to all external canopies, covered walkways, balconies etc. in accordance with AS 2118.1 – 2017.

The sprinkler system is required to be installed to all lift shafts and riser shafts throughout the building in accordance with AS 2118.1 - 2017.

The sprinkler system will be required to be installed to all EDB cupboards, Fire Services cupboards, Services cupboards etc throughout the building in accordance with AS 2118.1 – 2017.

The sprinkler system is required to be installed to any void spaces/under croft areas where access to the space is provided.

Where full height curtains are proposed to be installed within treatment areas, ward areas etc, they will be required to be reviewed by the Fire Services Consultant to determine the impact on Sprinkler coverage. If sprinkler coverage is proposed to be impeded, the curtains will be required to contain an open mesh for at least 500mm from the top of the curtain.

In accordance with AS 2118.1 – 2017, sprinklers are required to be installed in any roof void unless the following criteria achieved:

- The roof void is to be constructed entirely of non-combustible materials and contains only
- Fire resistant cables to AS/NZS 3000;
  - Non-bundled electrical wiring and lighting installed in accordance with AS/NZS 3000;
  - Piping; and
  - Metal ducting with flexible connections and insulation complying with AS 4254.
- The roof void cannot have readily permanent access or be capable of being used either intermittently or permanently as a storage area.

The sprinkler system is required to be installed to all Comms Rooms, DAS Rooms etc. throughout the building. In order to alleviate potential water damage to Comms and DAS Rooms etc by sprinkler heads being knocked, these rooms are permitted to be provided with Pre-Action Systems in accordance with Clause 2.3.1.5 of AS 2118.1 – 2017 whereby the subject room is provided with a combination of sprinkler system and independent smoke detector which when activated allows the pre-action valve to open and water to flow into the sprinkler piping.

Note: Pre-action systems are required to be designed so that the water transit times from valve tri to discharge of water at the most remote sprinkler (when only it is operating), cannot exceed 60 s.

Omission of Sprinklers to Rooms provided with High Voltage Equipment

In accordance with Clause 3.1.3 of AS 2118.1 – 2017, sprinklers are permitted to be omitted from high voltage, normally unoccupied areas such as rooms used for no purposes other than to contain transformers, electrical switch or control gear (non-oil filled), which are bounded by walls which achieved a minimum FRL of 120/120/120 and are provided with a smoke detection and alarm system installed within the room in accordance with AS 1670.1 - 2018.

Omission of Sprinklers to Rooms provided with Low Voltage Equipment

As detailed above, Clause 3.1.3 of AS 2118.1 – 2017 only permits sprinklers to be omitted from rooms containing high voltage equipment.

It is noted that at the request of HI / LHD sprinklers are proposed to be omitted from rooms containing low voltage electrical equipment including Comms Rooms, DAS Room and EDB enclosures etc.

The omission of sprinklers from rooms containing low voltage equipment will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

Connection to Other Systems

It is understood that the Automatic Fire Suppression System is proposed to be zoned in accordance with the Zone Smoke Control System as required by Clause 9 of Specification E1.5.

Location of Sprinkler Valve Sets

Having regard to the fact that the sprinkler system is designed as part of a combined Fire Hydrant and Sprinkler System, the sprinkler control valves are required to be located within the fire isolated stairways on each level with direct access being provided to the stairway from open space for FRNSW personnel.

As detailed in Clause D1.7 above, Fire Isolated Stairways 01 does not discharge directly to open space but rather in the Level 01 lobby which is fire separated from the remainder of the Ground Floor and from the alternative stairway as part of the Fire Engineering Design.

The non-provision of direct access to the fire isolated stairway (if the combined sprinkler valve assembly is installed within Fire Stair 01) from open space for FRNSW personnel will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

Sprinkler valve sets will be required to be provided within the fire isolated stairways installed on each storey as required based on the operational needs of the system as per AS 2118.6 – 2012.

Concealed Sprinkler in Operating Theatres and associated Sterile Rooms

As detailed above, an Automatic Fire Suppression System is to be installed throughout the building in accordance with the provisions of A 2118.1 – 2017.

For the proposed occupancy use as defined by AS 2118.1 – 2017, a light hazard sprinkler system with fast response heads is required to be installed. Due to the infection control requirements associated with the Operating Theatres and do to avoid accidental activation of the sprinkler heads, concealed sprinklers heads are proposed to be installed.

Due to the fact that the RTI for the sprinkler head cannot be confirmed as being 50 for a fast response head, a technical non-compliance occurs with AS 2118.1 – 2017.

The proposed use of concealed sprinkler heads within the Operating Theatres and associated sterile rooms be required to be assessed as part of the Fire Engineering Assessment to be undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

Sprinklers in Lift Shafts

Sprinklers installed at the top of the lift shafts are required to be designed as follows:

+ Have heads protected from accidental damage by way of a guard that will not impair the performance of the head; and

- Be capable of being isolated and drained, either separately or collectively without isolating any other sprinklers in the building.

Valves provided to control the sprinklers are required to be fitted with anti-tamper monitoring devices connected to a monitoring panel.

53. Clause E1.8 – Fire Control Centres

Fire Control Room

A Fire Control Centre (Fire Control Room) is required to be located within a building.

It is noted that the proposed design consists of the Fire Control Room being located remote from the building adjacent to the Fire Hydrant Booster and Pumps and Valve Room etc

The location of the Fire Control Room is a technical non-compliance.

Furthermore, the proposed Fire Control Room is only proposed to be provided with one (1) point of access in lieu of the minimum required two (2) points of access as a result of the room being located externally and thus Fire Brigade personnel are not required to be provided with an internal access point direct from the building.

The above is assessed as part of the Stage 1 Development but will need to be included in the Stage 2 Fire Engineering Report.

54. Clause E2.2 – Smoke Hazard Management

In terms of the requirements for smoke hazard management throughout the building, the following key items are noted:

Automatic Fire Detection & Alarm System

An Automatic Fire Detection & Alarm System is required to be installed throughout the building in accordance with AS 1670.1 - 2018. Photoelectric type smoke detectors are required to be installed in patient care areas and in paths of travel to exits from patient care areas.

Manual call points are required to be installed in evacuation routes so that no point on a floor is more than 30m from a manual call point.

Key elements of AS 1670.1 which require close attention are as follows:

- Where a sole occupancy unit i.e., bedroom consists of one main room and water closet/shower/bathroom (which is not used for other purposes i.e., laundry), it may be protected by one smoke detector located in the main room provided that the total area of the whole unit is less than 50m² i.e., when less than 50m², the water closet/shower/bathroom is not required to be protected.
- Where an area is divided into sections by walls, partitions, or storage racks reaching within 300mm of the ceiling (or the soffits of the joists where there is no ceiling) each section is to be treated as a room and is required to be protected.
- Where full height curtains are proposed to be installed within treatment areas, ward areas etc, they must be of open mesh material for at least 300mm to permit smoke to pass through, otherwise the curtains will be considered a wall and smoke detectors will be have to be installed either side of the curtains.
- A clear space of at least 300mm radius, to a depth of 600mm is required to be maintained from the smoke detector.
- Detectors are required to be located a minimum distance of 900mm from supply air fans or ceiling fans.
- Detectors are required in all sanitary facilities with a floor area greater than 3.5m^2.
- Any cupboard with a floor area >3m^3 is required to be protected.
- All electrical cupboards, comms cupboards etc. irrespective of the size are required to be protected.
- Detectors are required to be installed to the void spaces/under croft areas on Level 01 where access to the space is provided.

- Detectors are to be installed to the lift shafts, service shafts etc as required by AS 1670.1 – 2018.

Zone Smoke Control System

A Zone Smoke Control System is required to be installed throughout the Stage 2 having regard to the fact that the building has an effective height exceeding 25m.

The Zone Smoke Control System will be required to be designed in accordance with Table E2.2a and AS 1668.1 – 2015.

Note: Pressure differential requirements are only required to be achieved between vertically separated fire compartments.

Mechanical Air Handling Systems

Any air-handling system which does not form part of the Zone Smoke Control System (other than non-ducted systems with a capacity not more than 1000 litres/second, systems serving critical treatment areas and miscellaneous exhaust air system installed in accordance with Sections 5 and 6 of AS/NZS 1668.1) must shut down automatically on the activation of the Automatic Fire Detection & Alarm System and Automatic Fire Suppression System.

Fire Isolated Stairway Pressurisation

Each of the fire isolated stairways are required to be provided with a system of Stairway Pressurisation in accordance with AS 1668.1 – 2015. The pressurisation system is required to be extended throughout the entire fire isolated stairway system.

Fire Indicator Panels

For any buildings which are physically connected to the new tower via direct internal connections or alternatively via enclosed link ways etc there will be a requirement for connectivity between the FIP's between the buildings so that staff can be made aware of the fact that there may be a fire related emergency in the adjoining building.

55. Clause E3.2 – Stretcher Facility in Lifts

A stretcher facility is required to be provided in at least one of the Emergency Lifts serving the floors.

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

56. Clause E3.3 – Warning Against Use of Lifts in Fire

Signage stating "DO NOT USE LIFT IF THERE IS A FIRE" is to be provided near the lift call buttons in letters not less than 10-mm in height.

57. Clause E3.4 – Emergency Lifts

A minimum of two (2) Emergency Lifts are required to serve each level of the building that are served by passenger lifts.

In this instance, the Emergency Lifts will need to be two (2) lifts that are located within the Bank of Lifts Nos. 01-06.

Due to the fact that the lifts are contained within the same bank, they will be required to be contained within separate fire rated shafts.

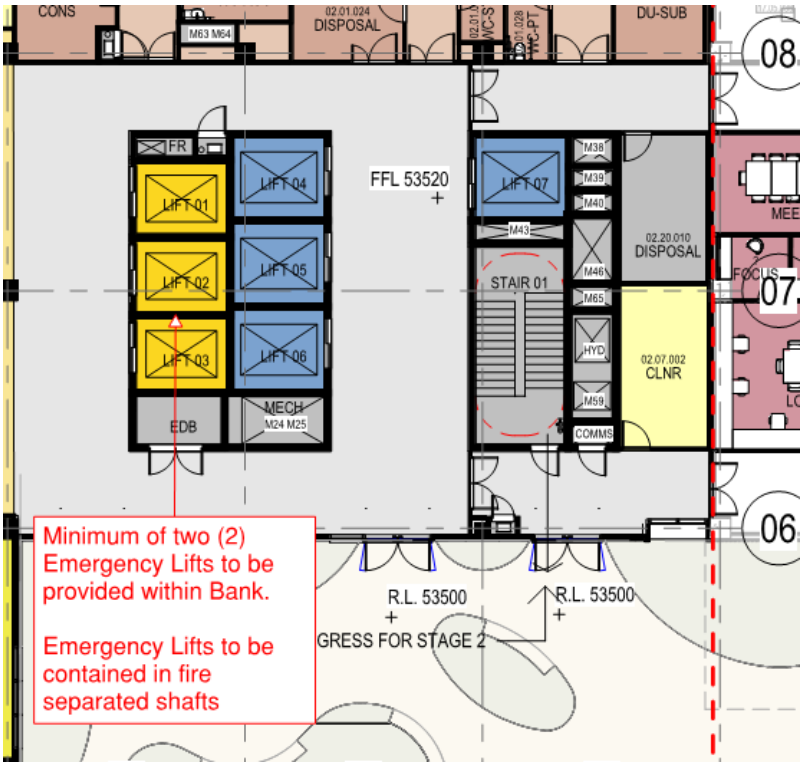


Figure No. 35 – Required provision of Emergency Lifts

58. Clause E3.6 – Passenger Lifts

The passenger lifts are required to be designed and installed in accordance with the requirements of Clause E3.6 and specifically Table E3.6b.

59. Clause E3.7 – Fire Service Controls

In terms of the Fire Service Controls the following is required to be provided:

- A fire service recall control switch complying with Clause E3.9 for:
  - A group of lifts; or
  - A single lift not in a group that serves the storey
- A lift care fire service drive control switch complying with Clause E3.10 for every lift.

60. Clause E3.9 – Fire Services Recall Operation Switch

Each group of lifts must be provided with one fire service recall control switch required by Clause E3.7 that activates the fire service recall operation in accordance with Clause E3.9.

61. Clause E4.2 – Emergency Lighting

Emergency Lighting is required throughout the building in accordance with AS/NZS 2293.1 -2018 in the following locations:

- All fire isolated stairways and passageways;
- In every passageway, corridor, hallway or the like that is part of the path of travel to an exit;
- In every passageway, corridor, hallway or the like serving a treatment area or a ward area;

- In every room having a floor area of more than 120m^2 in a patient care area, corridors, passageways, hallways or the like leading to required exits; and
- All covered balconies, walkways etc. that a person is required to egress under.

62. Clause E4.5 – Exit Signs

Exit signs are to be installed throughout the building in accordance with AS/NZS 2293.1 -2018 in the following locations:

- Doors providing direct egress from a storey to a fire isolated stairway or passageway;
- Doors providing egress from a fire isolated stairway or passageway to open space;
- Horizontal exit doors;
- Fire Safety Doors (i.e., fire/smoke doors) separating compartments;
- Doors leading directly to open space;
- Doors leading from balcony areas, courtyards etc. back into the building; and
- Above doorways in a path of travel where the location of the exit is not clear.

63. Clause E4.6 – Directional Exit Signs

Directional exit signs are to be installed throughout the building where the exits are not readily apparent to occupants in accordance with AS/NZS 2293.1 -2018.

64. Clause E4.9 – Emergency Warning & Intercom Systems

An Emergency Warning & Intercom System (EWIS) is required to be installed throughout the entire building in accordance with AS 1670.4 – 2018.

It is noted that all external areas from which an occupant is required to re-enter the building (e.g., courtyards, balconies, terraces etc.) are also required to be provided with compliant EWIS speakers to ensure that occupants in external areas are aware of the activation of the fire alarm system.

It is noted that EWIS speakers are proposed to be rationalised within ward and treatment rooms including patient bedrooms, operating theatres and other sensitive environments where the activation of the speaker within the room may cause trauma to the patient.

The rationalisation of EWIS system from within patient care areas will be required to be assessed as part of the Fire Engineering Assessment undertaken by Arup in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

Speakers will be required to be provided to all corridors and other rooms within Patient Care Areas etc where the omission is not addressed as part of the Fire Engineering Assessment.

SECTION F – HEALTH & AMENITY

65. Clause F1.0- Deemed to Satisfy Provisions

Performance Requirement FP1.4 relating to the prevention of water through the external is required to be demonstrated as being complied. There is no specific DtS Clause for this Performance Requirement in respect of external walls.

In this instance a Performance Solution Report is required to be prepared to demonstrate that the external wall and roof weatherproofing system meets Performance Requirement FP1.4 and will prevent the penetration of water through the external walls.

66. Clause F2.3 – Facilities in Class 3 to 9 Buildings

The Class 9a facility is required to have:

+ Kitchen facilities
+ Laundry facilities
+ A shower for each 8 patients or part thereof
+ One island-type plunge bath in each storey containing Ward Areas

Verification is required as to whether the shower ratio is achieved within the Treatment areas.

If the shower ratio is not achieved within the Treatment Areas, then a Performance Solution will be required to be prepared to address the technical non-compliance.

Any Performance Solution prepared would rely on verification from the LHD that the provision of showers for patients in treatment areas i.e., ED, OT's, Recovery etc. is not as critical as within a ward area where showers are usually provided per bedroom.

Required Sanitary Facilities

+ BCA2019 Part F requires sanitary facilities with the Class 9a facilities as follows: -

(a) Facilities for Staff: -

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

User Group	Closet Pans		Urinals		Washbasins	
	Design Occupancy	Number	Design Occupancy	Number	Design Occupancy	Number
Male Employees	1-20	1	1	0	1-30	1
			11-25	1		
	>20	Add 1 per 20	26-50	2	>30	Add 1 per 30
			>50	Add 1 per 50		
Female Employees	1-15	1	N/A		1-30	1
	> 15	Add 1 per 15			> 30	Add 1 per 30

Table No. 13 – Sanitary facilities required for staff members

(b) Facilities for Patients:

User Group	Closet Pans		Urinals		Washbasins	
	Design Occupancy	Number	Design Occupancy	Number	Design Occupancy	Number
Male Patients	1-16	1			1-8	1
	> 16	Add 1 per 16			>8	Add 1 per 8
Female Patients	1-16	1			1-8	1
	> 16	Add 1 per 16			> 8	Add 1 per 8

Table No. 14 – Sanitary facilities required for patients

67. Clause F2.4 – Accessible Sanitary Facilities

Facilities for a person with a disability must be provided in accordance with the following:

+ Accessible sanitary facilities for use by a person with a disability are required to be provided on each floor adjacent to a bank of male and female sanitary facilities.
+ Where more than 1 bank of sanitary compartments containing male and female sanitary compartments is provided on a level, an accessible unisex facility must be provided at not less than 50% of those banks.

Note: -
Ensuites associated with beds in Ward Areas are not required to be accessible wc's in accordance with AS 1428.1.

- Within each bank of male and female sanitary facilities, an ambulant sanitary compartment must be provided for each sex for use by a person with an ambulant disability.
- The design should allow for the following for patients / members of the public on each level of the building having regard to the size and layout of each floor:
  - A suitable number of unisex accessible sanitary facilities distributed throughout the floor so that all patients / members of the public have access to
  - A suitable number of unisex ambulant sanitary compartments distributed throughout the floor.

    Note 1: The provision of unisex ambulant sanitary compartments will require to be assessed as a Performance Solution.

    Note 2: The accessible sanitary facilities should be a mix of LH and RH installations throughout.
- The design is to allow adequate provision of accessible sanitary facilities for members of staff on each level of the building have regard to the size and layout of each floor:
  - A suitable number of unisex accessible sanitary facilities distributed throughout the floor
  - A suitable number of unisex ambulant sanitary compartment available for staff use.

    Note 1: The provision of unisex ambulant sanitary compartments will be required to be assessed as a Performance Solution.

Provision of Unisex Ambulant Sanitary Compartment

Ambulant Sanitary Compartments are required to be provided separately for males and females and unlike Unisex Accessible Sanitary Facilities receive no concession for the provision of unisex facilities.

The provision of unisex ambulant sanitary compartments in lieu of separate facilities for males and females throughout the building will be required to be assessed as part of a Performance Solution to be prepared by the appointed Access Consultant.

68. Clause F2.5 – Construction of Sanitary Compartments

The door to a fully enclosed sanitary compartment is required to: -

- Open outwards; or
- Slide; or
- Be readily removable from the outside of the sanitary compartment i.e., removable hinges

Unless there is a clear space of at least 1.2m measured in accordance with the below figure, between the closet pan within the sanitary compartment and the doorway.

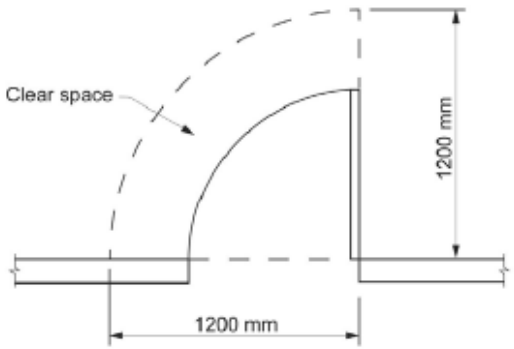


Figure No. 36– Minimum distance required between doorway and pan in a fully enclosed sanitary compartment

69. Clause F2.8- Waste Management

In class 9a areas at least one slop hopper or other device must be provided on any storey containing ward areas or bedrooms and must have a flushing apparatus, tap and grating.

70. Clause F3.1 – Height of Rooms

The floor to ceiling heights throughout are required to comply with the following:

- in a patient care area, treatment room, clinic, waiting room, passageway, corridor or the like – 2400mm; and
- in an operating theatres or delivery rooms – 3000mm; and
- Bathroom, shower room, sanitary compartment, airlock, tea preparation room, pantry, store room or the like must achieve a minimum height of 2.1m.
- Fire isolated exits – 2.0m.

71. Clause F4.1 – Provision of Natural Light

Natural light is required to be provided to all ward areas used for sleeping purposes.

Natural light is technically required to be provided to all overnight rooms that are used by family members and staff.

In this instance, the following is noted:

- The proposed overnight rooms for family and/or staff within Level 04 Building which are classified as Class 3 are also required to be provided with natural light. Due to the nature and use of these rooms, they will not be provided with natural light.

  The non-provision of natural light to these bedrooms will be required to be subject of a Performance Assessment to demonstrate compliance with the Performance Requirement FP4.1.

The provision of natural light to existing buildings that the new PSB adjoins in close proximity will be reviewed to ensure that there is no detrimental impact on the provision of natural light.

72. Clause F4.4 – Artificial Lighting

Artificial lighting is required to be provided in accordance with AS 1680.0 - 2009.

73. Clause F4.5 – Ventilation of Rooms

The building is required to be ventilated by either natural or mechanical ventilation in accordance with the DTS Provisions of the BCA and AS 1668.2.

74. Clause G1.01 (NSW) – Provision for Cleaning of Windows

A building must provide a safe manner of cleaning windows located 3 or more storeys above ground level. In this regard, the windows must be able to be cleaned from within the building, or provisions made for cleaning of windows by a method complying with the OH&S Act 2000 and regulations made under the Act.

SECTION G – ANCILLARY PROVISIONS

75. Part G3 – Atrium Construction

The Atrium Provisions of Part G3 will not be applicable to the proposed atrium formed between Levels 01 – 03 based on the fact that only connects a maximum of three (3) storeys in a sprinkler protected building together with the fact that Level 01 is at a level with direct egress to road or open space.

The Atrium structure cannot contain any patient care areas located within it and will be required to be adequately fire and smoke separated from all patient care areas on Levels 01 – 03. It is noted that the proposed design has all patient care areas separated from the atrium structure.

76. Clause G6.2 – Fire Hazard Properties

Any lining, material or assembly in an occupiable outdoor area (external terraces, courtyards, balconies etc) is required to comply with the requirements of Specification C1.10 as if it were an internal lining.

Note: The following fire hazard properties of a lining, material or assembly in an occupiable outdoor area are not required to comply with Specification C1.10:

- *Average specific extinction area*
- *Smoke Developed Index*
- *Smoke Development rate*
- *Smoke Growth Rate Index*

77. Clause G6.6 – Fire Fighting Equipment

Fire hydrant and fire hose reel coverage will be required to be provided to all occupiable outdoor areas (external terraces, courtyards, balconies etc)

78. Clause G6.8 – Visibility in an Emergency, Exit Signs and Warning Systems

The outdoor occupiable area is required to be provided with Exit Signage above the doors leading from the external areas back into the building.

As noted under Clause E4.9 above, the EWIS speakers are required to be extended to all outdoor areas.

SECTION J – ENERGY EFFICIENCY

79. Parts J1 – J8

The energy efficiency provisions of Section J are applicable to the new Stage 2 Tower.

In this regard Parts J1 - Building Fabric, J3 - Building Sealing, J5 Air Conditioning and Mechanical Ventilation, Part J6 - Artificial Lighting and Power, and Part J7 - Hot water supply & Part J8 – Access for Maintenance is required to be provided.

If the proposed design will not comply with the DtS provisions of the BCA, then a JV3 Assessment will be required to be undertaken to demonstrate compliance with the Performance Requirements of the BCA.

E. CONCLUSION

This report contains a preliminary BCA2019 Amendment 1 and Access to Premises Standards 2010 assessment of the 100% Schematic Design Architectural Documentation for the new Stage 2 Tower at Nepean Hospital

Further reviews will be undertaken by Blackett Maguire + Goldsmith and Arup as the Architectural Design progresses to ensure that the development is capable of complying with the requirements of the Building Code of Australia.

Arising from our assessment we are satisfied that the project design can satisfy the requirements of the BCA2019 Amendment 1 if the works are designed and constructed in accordance with the requirements of this BCA Report and subsequent Fire Engineering Report prepared by the Fire Safety Engineer and Access Report and Performance Solutions prepared by Access Consultant.