



BLACKETT  
MAGUIRE+  
GOLDSMITH

The National Construction Code Volume One  
Stage Significant Development Application  
RPA Hospital Redevelopment



Health  
Infrastructure

Revision 2

Date: 11 November 2022

Project No.: 210182



Address

Suite 2.01,  
22-36 Mountain St  
Ultimo NSW 2007

Contact

Ph: 02 9211 7777  
Fax: 02 9211 7774



## CONTENTS

<b>A.</b>	<b>INTRODUCTION</b>	<b>4</b>
A.1	PROJECT DESCRIPTION	4
A.2	PROJECT BACKGROUND	ERROR! BOOKMARK NOT DEFINED.
A.3	AIM	5
A.4	PROJECT TEAM	6
A.5	DOCUMENTATION	6
A.6	REGULATORY FRAMEWORK	6
A.7	COMPLIANCE WITH THE BCA	6
A.8	RELEVANT STAKEHOLDERS	7
A.9	LIMITATIONS & EXCLUSIONS	8
A.10	TERMINOLOGY	9
<b>B.</b>	<b>BUILDING CHARACTERISTICS</b>	<b>12</b>
B.1	BUILDING CLASSIFICATION	12
<b>C.</b>	<b>SUMMARY OF KEY COMPLIANCE ISSUES</b>	<b>14</b>
C.1	SUMMARY OF KEY COMPLIANCES ISSUES:	15
.2	SUMMARY OF ITEMS REQUIRING A FIRE ENGINEERING PERFORMANCE SOLUTION:	23
C.3	SUMMARY OF ITEMS REQUIRING A PERFORMANCE SOLUTION:	25
<b>D.</b>	<b>BCA ASSESSMENT</b>	<b>26</b>
D.1	BCA Deemed-to-Satisfy Compliance Issues:	26
	SECTION B – STRUCTURE	26
	PART B1 – STRUCTURAL PROVISIONS	26
	SECTION C – FIRE RESISTANCE	26
	PART C1 – FIRE RESISTANCE AND STABILITY	26
	PART C2 – COMPARTMENTATION AND SEPARATION	29
	PART C3 – PROTECTION OF OPENINGS	32
	SECTION D - ACCESS & EGRESS	39
	PART D1 – PROVISION FOR ESCAPE	39
	PART D2 – CONSTRUCTION OF EXITS	43
	PART D3 – ACCESS FOR PEOPLE WITH A DISABILITY	51
	SECTION E – SERVICES AND EQUIPMENT	73
	PART E1 – FIRE FIGHTING EQUIPMENT	73
	PART E2 – SMOKE HAZARD MANAGEMENT	81
	PART E3 – LIFT INSTALLATIONS	83



PART E4 – VISIBILITY IN AN EMERGENCY, EXIT SIGNS AND WARNING SYSTEMS	84
SECTION F – HEALTH & AMENITY	85
PART F1 – DAMP AND WEATHERPROOFING	85
PART F2 – SANITARY AND OTHER FACILITIES	86
PART F3 – ROOM HEIGHTS	93
PART F4 – LIGHT AND VENTILATION	93
SECTION G – ANCILLARY PROVISIONS	94
SECTION J – ENERGY EFFICIENCY	94
<b>E. CONCLUSION</b>	<b>96</b>

REVISION STATUS				
REVISION	DATE	STATUS	PREPARED BY	REVIEWED BY
0	29.09.2022	SSDA Submission	Adam Durnford	David Blackett
1	10.10.2022	SSDA Submission - Update	Adam Durnford	David Blackett
2	01.11.2022	SSDA Submission - Update	Adam Durnford	David Blackett

Prepared by:

**Adam Durnford**  
**Accredited Certifier (BPB1821)**  
**Associate Director**

Reviewed by:

**David Blackett**  
**Accredited Certifier (BPB0032)**  
**Director**



## A. INTRODUCTION

### A.1 SITE DESCRIPTION

The Royal Prince Alfred (RPA) Hospital campus is located in Sydney's inner west suburb of Camperdown, within the City of Sydney Local Government Area. The campus is situated between the University of Sydney to the east and the residential area of Camperdown to the west. A north-south arterial road (Missenden Road) divides the campus into two distinct portions, known as the East and West Campuses. The northern boundary of the campus is defined by the Queen Elizabeth II Rehabilitation Centre and the southern extent of the campus is defined by Carillon Avenue.

The works are proposed to both the East and West Campuses, as well as some off-site works occurring within the University of Sydney.

The site comprises the following land titles:

- + East campus:
  - ▲ Lot 1000 DP 1159799 (12 Missenden Road, Camperdown, 2050).
- + West campus:
  - ▲ Lot 11 DP 809663 (114 Church Street, Camperdown, 2050); and
  - ▲ Lot 101 DP 1179349 (68-81 Missenden Road, Camperdown 2050).

Off-site works are proposed on University of Sydney land, known as Lot 1 DP 1171804 (3 Parramatta Road, Camperdown, 2050) and Lot 1001 DP 1159799 (12A Missenden Road, Camperdown, 2050).

### A.2 PROJECT BACKGROUND

In March 2019, the NSW Government announced a significant \$750 million investment for the redevelopment and refurbishment of the RPA Hospital campus. The Project will include the development of clinical and non-clinical services infrastructure to expand, integrate, transform and optimise current capacity within the hospital to provide contemporary patient centred care, including expanded and enhanced facilities.

The last major redevelopment of RPA Hospital was undertaken from 1998 to 2004 projected to 2006 service needs. Since then, significant growth has been experienced in the volume and complexity of patients, requiring significant investment to address projected shortfalls in capacity and to update existing services to align with leading models of care.

The redevelopment of RPA Hospital has been the top priority for the Sydney Local Health District since 2017 through the Asset Strategic Planning process, to achieve NSW Health strategic direction to develop a future focused, adaptive, resilient and sustainable health system

Description of development

- + Alterations and additions to the RPA Hospital East Campus, comprising:
  - ▲ Eastern wing: A new fifteen (15) storey building with clinical space for Inpatient Units (IPU's), Medical Imaging, Delivery, Neonatal and Women's Health Services, connecting to the existing hospital building and a rooftop helicopter landing site (HLS);
  - ▲ Eastern extension: A three (3) storey extension to the east the existing clinical services building to accommodate new operating theatres and associated plant areas;
  - ▲ Northern expansion: A two (2) storey vertical expansion over RPA Building 89 accommodating a new Intensive Care Unit and connected with the Eastern Wing;
  - ▲ Internal refurbishment: Major internal refurbishment to existing services including Emergency Department and Imaging, circulation and support spaces;



- ▶ Enhanced Northern Entry/ Arrival including improved pedestrian access and public amenity;
- ▶ Demolition of affected buildings, structures and trees;
- ▶ Changes to internal road alignments and paving treatments; and
- ▶ Landscaping works, including tree removal, tree pruning, and compensatory tree planting including off-site on University of Sydney land.

Ancillary works to the RPA Hospital West Campus, comprising:

- ▶ Temporary helicopter landing site above existing multi storey carpark;
- ▶ Re-routing of existing services; and
- ▶ Associated tree removal along Grose Street.

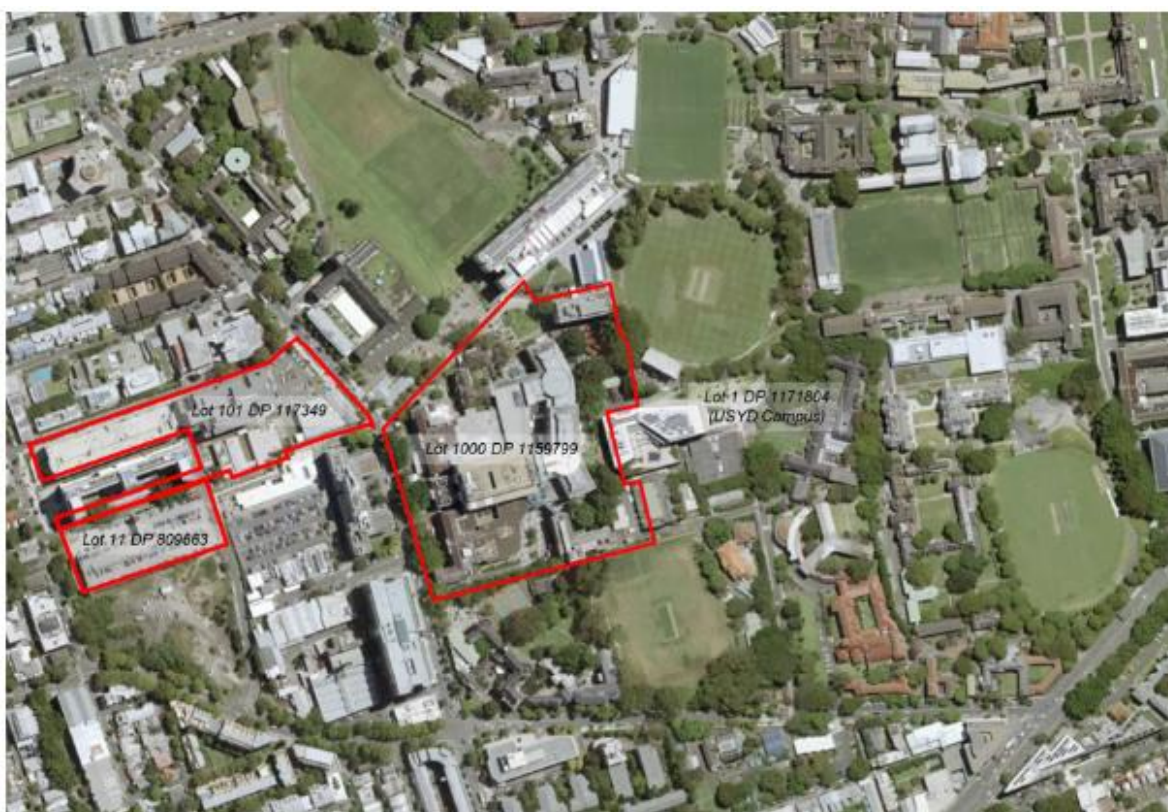


Figure No. 1: Proposed location of the RPA hospital redevelopment detailing the site boundary

### A.3 AIM

---

The aim of this report is to:

- + Confirm that the Development Application Architectural Documentation has been reviewed by an appropriately qualified Registered Certifier.
- + Confirm that the proposed new building works can readily achieve compliance with BCA 2019 Amendment 1 pursuant to s6.28 of the Environmental Planning & Assessment Act 1979.



- + Accompany the Development Application submission to enable the Consent Authority to be satisfied that subsequent compliance with the fire & life safety and health & amenity requirements of the BCA, will not necessarily give rise to design changes to the building which may necessitate the submission of an application under Section 4.55 of the Environmental Planning and Assessment Act 1979.
- + Accompany the Development Application submission to enable the Consent Authority to be satisfied the accessibility provisions required under the BCA, Premises Standards have been met in the design, with full compliance being achievable.

It should be noted that it is not the intent of this report to identify all BCA provisions that apply to the subject development. The development will be subject further assessment following receipt of more detailed documentation throughout the subsequent Design Stages and as the project proceeds toward the issue of the subsequent Crown Certificate(s).

#### **A.4 PROJECT TEAM**

---

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

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

#### **A.5 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
- + Referenced Australian Standards as detailed throughout the Report.
- + SSDA Architectural Issue Drawings issued by Bates Smart 26 September 2022.

#### **A.6 REGULATORY FRAMEWORK**

---

Pursuant to Section 19 of the Environmental Planning and Assessment (Building Certification & Fire Safety) Regulation 2021 all new building work must comply with the applicable BCA. In relation to Crown Development, the applicable NCC is the BCA in force at time of calling for tenders or in the absence of calling for tenders, at the time of application for a Crown Certificate.

Whilst this NCC Assessment has been prepared in accordance with the Building Code of Australia 2019 Amendment No. 1, it is understood that the project is proposed to be designed in accordance with the requirements of BCA 2022 which comes into force on the 1 May 2022. Subsequent BCA Reports prepared for the development post the Development Consent will be prepared against the requirements of BCA 2022.

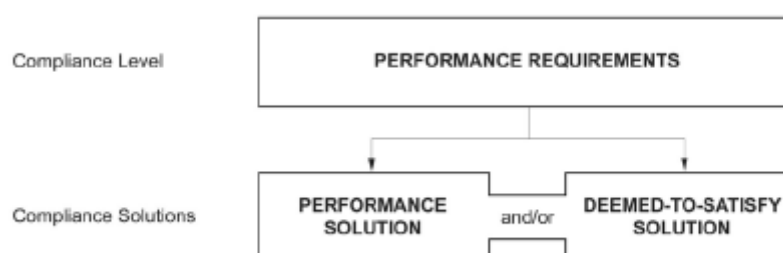
#### **A.7 COMPLIANCE WITH THE BCA**

---

The BCA is a performance-based code which contains the 'Performance Requirements' for the construction of buildings. Being a performance-based document, the BCA provides options and flexibility, allowing practitioners to satisfy the Performance Requirements for building by:

- + Developing a Performance Solution; or
- + Complying with Deemed to Satisfy Provisions (known as a DTS Solution); or
- + A combination of the above two options.





This Report has been prepared based on an assessment of the proposed design against the DTS provisions of the BCA and identifies matters which are non-compliance and which BM+G are capable of being subject to a Performance Solution subject to consultation and agreement between all stakeholders.

Where a Performance Requirement is proposed to be satisfied by a Performance Solution, the following steps must be undertaken:

- + Prepare a Performance-Based Design Brief (PBDB) in consultation with the project stakeholders.
- + Undertake analysis using one or more Assessment Methods listed in Clause A2.2(2) of BCA2019[A1]
- + Evaluate the results against the acceptance criteria in the PBDB.
- + Prepare a final Performance Solution Report that:
  - ▲ Identifies the applicable Performance Requirements and DtS departures identified through Clause A2.2 (3) or A2.4 (3) of BCA2019 [A1] as applicable; and
  - ▲ Identifies of all Assessment Methods used; and
  - ▲ Includes details of the steps taken under; and
  - ▲ Confirms that the applicable BCA Performance Requirement(s) are met; and
  - ▲ Stipulates any applicable conditions / limitations required as part of the Performance Solution

## A.8 RELEVANT STAKEHOLDERS

The relevant stakeholders for the project are detailed in the table below:

Role	Organisation	Representative(s)
<b>Client</b>	Health Infrastructure	Steve Hall Michael Smytheman
<b>Project Manager</b>	TSA	Greg Barlow Tim McNair Danielle Gardner Imogen Ruberg
<b>Architect</b>	Bates Smart	Matthew Allen Cheuk Chiu Rob Graham Joshua Harrex Alison Huynh



<b>Architect</b>	Jacobs	Domenico Fimmano Vanessa Hawkes Matina Rajbhandari Donald Garner Russell Goldstein Chin Young
<b>Architect</b>	Neeson Murcutt Architects	Laura Graham Rachel Neeson
<b>Structural Services Engineer</b>	TTW	Michael Barrett
<b>Civil Services Engineer</b>	TTW	Tim Moore
<b>Mechanical Services Engineer</b>	Arup	Neil Phipps Sihui Wang Bruce Fernandes
<b>Electrical Services Engineer</b>	Arup	Ryan Fisher
<b>Hydraulic Services Engineers</b>	WSP	James Skubevski Manu John
<b>Fire Services Engineers</b>	WSP	Manu John David Bolt
<b>Fire Safety Engineer</b>	AECOM	Nabeel Darwish Michael Strasser
<b>BCA Consultant</b>	Blackett Maguire + Goldsmith	Adam Durnford David Blackett
<b>Access Consultant</b>	Blackett Maguire + Goldsmith	Adam Durnford

Table No. 1: Project stakeholders

## A.9 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.





- + BM+G Pty Ltd do not guarantee acceptance of this report by Local Council, NSW Fire Brigades or other approval authorities.
- + No part of this document may be reproduced in any form or by any means without written permission from BM+G Pty Ltd. This report is based solely on client instructions, and therefore should not be used by any third party without prior knowledge of such instructions.

## A.10 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 healthcare 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.



Figure No. 2: Proposed Northern Elevation of the RPA Hospital Redevelopment

## B. BUILDING CHARACTERISTICS

### B.1 BUILDING CLASSIFICATION

The following table presents a summary of relevant building classification items of the proposed RPA Hospital Redevelopment.

#### New East Block Tower



<b>+ BCA Classification:</b>	Class 9a (Health-care Building) Class 3 (overnight accommodation rooms) <i>Note: Class 6 retail areas have been assessed as being less than 10% of the floor area and have not been classified separately.</i>
<b>+ Storeys Contained</b>	Sixteen (16)
<b>+ Rise in Storeys:</b>	Sixteen (16)
<b>+ Effective Height:</b>	> 25 m & > 50 m
<b>+ Type of Construction:</b>	Type A Construction
<b>+ Sprinkler System Installed Throughout</b>	Yes – New building is proposed to be protected throughout with an Automatic Fire Suppression System installed in accordance with AS 2118.6 – 2012 and AS 2118.1 - 2017
<b>+ Importance Level</b>	Importance Level 4
<b>+ Climate Zone:</b>	Energy Efficiency Zone 5
<b>+ Maximum Floor Area:</b>	Max 5,000m <sup>2</sup> compartments for Class 9a Health Care buildings. <i>Note: 2,000m<sup>2</sup> compartments applies to all Patient Care Areas within the building.</i>
<b>+ Maximum Volume:</b>	Max 30,000m <sup>3</sup> compartments for Class 9a Health Care buildings.
<b>+ Largest Fire Compartment</b>	To be confirmed upon design finalisation of Fire Compartment Sizes

Table No. 2 – Summary of building classification items of the new East Tower

### Existing Buildings incorporating Extensions

<b>+ BCA Classification:</b>	Class 9a (Health-care Building) Class 3 (overnight accommodation rooms) Class 5 (professional consultation)
------------------------------	---



	<i>Note: Class 6 retail areas have been assessed as being less than 10% of the floor area and have not been classified separately.</i>
<b>+ Storeys Contained</b>	Twelve (12)
<b>+ Rise in Storeys:</b>	Eleven (11)
<b>+ Effective Height:</b>	> 25 m & < 50 m
<b>+ Type of Construction:</b>	Type A Construction
<b>+ Sprinkler System Installed Throughout</b>	It is understood that the existing buildings have an Automatic Fire Suppression System installed.  All new extensions along with refurbished areas will be required to be provided with an Automatic Fire Suppression System in accordance with AS 2118.1 – 2017 and AS 2118.6 – 2012.
<b>+ Importance Level</b>	Importance Level 4
<b>+ Climate Zone:</b>	Energy Efficiency Zone 5
<b>+ Maximum Floor Area:</b>	Max 5,000m <sup>2</sup> compartments for Class 9a Health Care buildings.  <i>Note: 2,000m<sup>2</sup> compartments applies to all Patient Care Areas within the building.</i>
<b>+ Maximum Volume:</b>	Max 30,000m <sup>3</sup> compartments for Class 9a Health Care buildings.
<b>+ Largest Fire Compartment</b>	To be confirmed upon design finalisation of Fire Compartment Sizes

Table No. 3 – Summary of building classification items of existing RPA Hospital Building

## C. SUMMARY OF KEY COMPLIANCE ISSUES

Based on the SSDA Architectural Drawings prepared by Bates Smart, the following is a summary of the key compliance issues identified associated with the proposed RPA Hospital Redevelopment



## C.1 SUMMARY OF KEY COMPLIANCES ISSUES:

No.	BCA CLAUSE	DESCRIPTION
1.	B1.2	<p><i>Importance Level</i></p> <p>The new works associated with the redevelopment will be required to be designed and constructed in accordance with the requirements of Importance Level 4.</p> <p>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.</p>
2.	C1.9	<p><i>Aluminium Panels</i></p> <p>Aluminium Panels proposed on the external façade of the building 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.</p> <p>All components within installed within the external wall assembly will be required to comply with the requirements of Clause C1.9.</p>
3.	C2.2	<p><i>Fire Compartment Size</i></p> <p>The maximum size of any fire compartment with a Class 9a building cannot exceed 5,000m<sup>2</sup> &amp; 30,000m<sup>3</sup>.</p> <p><i>Note: the size of fire compartments within patient care areas is limited to a maximum of 2,000m<sup>2</sup>.</i></p> <p>The SSDA Drawings indicate that compliance can be achieved in this instance with no fire compartment within the Class 9a part of the building exceeding 5,000m<sup>2</sup> &amp; 30,000m<sup>3</sup>.</p>
4.	C2.5	<p><i>Fire &amp; Smoke Compartment Sizes</i></p> <p>It is expected that number of compartment sizes within ward and treatment areas throughout the building may exceed the maximum compartment sizes of Clause C2.5 having regard to the clinical planning requirements of the LHD.</p> <p>The compartment sizes which exceed the DTS Provisions of the BCA will be required assessed as part of a Fire Engineering Performance Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p> <p>Any smoke compartment sizes that are greater than 10% over the maximum permitted size will require additional review by BM+G and the appointed Fire Safety Engineer to determine that they are acceptable to be subject of a Fire Engineering Assessment.</p>
5.	C3.2	<p><i>Exposure between the new East Tower and the existing Main Hospital Building including Extensions</i></p>





No.	BCA CLAUSE	DESCRIPTION
		<p>Where the external wall of a building is located less than 6m from an adjoining building located on the same allotment, the openings in the external wall of the building are required to be protected in accordance with Clause C3.4.</p> <p>The proposed new East Tower is located less than 6m from the external walls of the existing Main Hospital Building including the new extensions.</p> <p>The exposure and protection of the subject external walls and openings of the new East Tower and the existing Main Building will be required to be protected in accordance with the DTS Provisions of the BCA or alternatively will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p>
6.	C3.3	<p><i>Protection of External Walls and associated Openings in Different Fire Compartments</i></p> <p>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.</p> <p>There will be numerous locations throughout the buildings as a result of the redevelopment where exposure occurs between external walls and their associated openings of different fire compartments.</p> <p>The subject external walls and openings will be required to be protected in accordance with the DTS Provisions of the BCA or alternatively be assessed as part of a Fire Engineering Performance Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p>
7.	D1.4	<p><i>Egress Travel Distance to a Point of Choice and to an Alternative Exit</i></p> <p>Detailed egress travel distance assessments will be undertaken as the design developments and detailed layouts are issued in relation to egress travel distance to a point of choice and to an alternative exit.</p> <p>There will be instances due to clinical design requirements and layouts, where travel distances will likely exceed the maximum requirements of the DTS provisions of the BCA. Where non compliances are identified, they will be reviewed on a case-by-case basis to determine if the non-compliance can be assessed via a Fire Engineering Performance Solution.</p>
8.	D1.5	<p><i>Egress Travel Distance between Alternative Exits</i></p> <p>Detailed egress travel distance assessments will be undertaken as the design developments and detailed layouts are issued in relation to egress travel distance between alternative exits.</p> <p>There will be instances due to clinical design requirements and layouts, where travel distances will likely exceed the maximum requirements of the DTS provisions of the BCA. Where non compliances are identified, they will be reviewed on a case-by-case basis to determine if the non-compliance can be assessed via a Fire Engineering Performance Solution</p>



No.	BCA CLAUSE	DESCRIPTION
9.	Part D3	<p><i>Access for a Person with a Disability</i></p> <p>Access for a person with a disability will be required to be provided from the allotment boundaries along with vehicular drop off points to and within the new East Tower and Northern and Eastern Extensions via the new Northern Entry and existing Main Entry on Level 5 of the Main Hospital Building. and interconnected buildings i.e., Stage 1 Tower and North Block.</p> <p>The design at present is capable of complying with the requirements pertaining to access for a person with a disability.</p>
10.	E1.3	<p><i>Fire Hydrants</i></p> <p>Fire hydrant coverage is required to be provided to serve the building in accordance with AS 2419.1.</p> <p><b>Note: BCA 2022 requires the Fire Hydrant System to be designed in accordance with AS 2419.1 – 2021. The below requirements are based on the current version of AS 2419.1 – 2005, however will be updated in the next revision of the Report to encompass the new requirements of AS 2419.1 – 2021.</b></p> <p><i>System Design</i></p> <p>Due to the fact that the building has an effective height greater than 25 m and 50 m, the following additional provisions are required to be provided as part of the fire hydrant system design:</p> <ul style="list-style-type: none"> <li>+ Provision of on-site water storage tanks to meet the minimum capacity as required by Clause 4.3 of AS 2419.1 – 2015.</li> <li>+ Provision of a fire hydrant ring main (incorporated as part of the combined fire sprinkler and fire hydrant system).</li> </ul> <p><i>Fire Hydrant Booster</i></p> <p>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.</p> <p>In this regard it is noted that the fire hydrant booster is proposed to be located on the Northern Elevation of the building facing Kensington Street within 8m of a hardstand area and within sight of the entry airlock of Kensington Street which provides access to Level 01 of the building.</p> <p>The main entry of the building is nominated as the entry on the Eastern Elevation on the Ground Floor of the building where the Fire Indicator Panel, EWIS Panel and Fire Fan Control Panel is proposed to be located.</p> <p>The location of the booster in terms of proximity and sight to the main entrance of the building which is nominated as the entry on the Eastern Elevation on the Ground Floor of the building will be required to be addressed as part of a Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer to demonstrate compliance with the nominated Performance Requirements of the BCA.</p>
11.	E1.4	<p><i>Fire Hose Reels</i></p>



No.	BCA CLAUSe	DESCRIPTION
		<p>Fire hose reels are required to be installed throughout the building areas in accordance with AS 2441 – 2005.</p> <p><i>Fire Hose Reel Coverage to Fire Separated Rooms</i></p> <p>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 i.e., fire separated Comms Rooms etc.</p> <p>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 the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p>
12.	E1.5	<p><i>Sprinklers</i></p> <p>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.</p> <p><i>System Design</i></p> <p>Due to the fact that the building has an effective height exceeding 25m &amp; 50m, the following additional measures are required to be installed as part of the Automatic Fire Suppression System installation:</p> <ul style="list-style-type: none"> <li>+ Provision of a Grade 1 Water Supply; and</li> <li>+ Provision of on-site water storage tanks.</li> </ul> <p><i>Fire Sprinkler Booster</i></p> <p>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.</p> <p>In this regard it is noted that the fire hydrant booster is proposed to be located on the Northern Elevation of the building facing Kensington Street within 8m of a hardstand area and within sight of the entry airlock of Kensington Street which provides access to Level 01 of the building.</p> <p>The main entry of the building is nominated as the entry on the Eastern Elevation on the Ground Floor of the building where the Fire Indicator Panel, EWIS Panel and Fire Fan Control Panel is proposed to be located.</p> <p>The location of the booster in terms of proximity and sight to the main entrance of the building will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p> <p><i>Omission of Sprinklers to Rooms provided with Low Voltage Equipment</i></p> <p>Clause 3.1.3 of AS 2118.1 – 2017 only permits sprinklers to be omitted from rooms containing high voltage equipment.</p>



No.	BCA CLAUSe	DESCRIPTION
		<p>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.</p> <p>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 the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p> <p><i>Location of Sprinkler Valve Sets</i></p> <p>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.</p> <p>It is understood that the sprinkler valve sets installed as part of the Combined System will be located within the central fire isolated stairway being Stair 2.</p> <p>A technical non-compliance occurs with the location of the sprinkler alarm valve sets by virtue of the fact that FRNSW have to enter Fire Stair 1 and travel down to Basement Level 1 before accessing the fire isolated passageway which then leads to Fire Stair 2 in which the sprinkle alarm valves are located.</p> <p>The non-provision of direct access to Fire Stair 2 and the sprinkler valves for FRNSW personnel will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p> <p><i>Sprinkler Coverage Shortfall to Doorway Entrance to Bedrooms</i></p> <p>Clause 5.4.8 of AS 2118.1-2017 requires that a clear space of not less than 500 mm is always maintained below the level of the sprinkler deflectors so as to ensure that effective water spray is maintained.</p> <p>Verification is required as to whether there will be any full height curtain with tracking provided between the entry door to patient bedrooms and the remainder of the bedroom as detailed in the figure bel which may impede sprinkler coverage.</p> <p>Any shortfall of sprinkler coverage will be required to be assessed as part of a Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p>
13.	E1.8	<p><i>Fire Control Centre</i></p> <p>A Fire Control Centre is required to be located within a building having regard to the fact that the building has an effective height greater than 25 m. The Fire Control Centre is proposed to be located within the main entry of the building on Ground Floor of the building which will house the Fire Indicator Panel, EWIS Panel and Fire Fan Control Panel.</p> <p>Furthermore, it is noted that a Sub FIP is proposed to be installed at the secondary entrance to the building on Level 01 within the airlock which is accessed off Kensington Street.</p>
14.	E2.2	<p><i>Zone Smoke Control System</i></p>



No.	BCA CLAUSE	DESCRIPTION
		<p>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.</p> <p>The Zone Smoke Control System will be required to be designed in accordance with Table E2.2a and AS 1668.1 – 2015.</p> <p><i>Zone Smoke Control System serving the Atrium Front of House</i></p> <p>Table E2.2a of the BCA requires that a Zone Smoke Control system installed within a Class 9a building must achieve a pressure differential between vertically separated fire compartments in accordance with AS 1668.1 – 2015.</p> <p>Section 8 of AS 1668.1 – 2015 requires that a zone pressurisation system is required to operate in a manner such that the pressure in the fire affected compartment is required to be maintained between 20 Pa and 80 Pa below that of all non-fire affected smoke control zones.</p> <p>As a result of the proposed Atrium connecting the Ground Floor and Level 1, verification will be required to be provided from the Mechanical Services Engineer that the required pressure differential can be achieved between Basement Level and the Ground Floor and Level 01 and Level 02.</p> <p>If the pressure differential cannot be achieved between vertical fire compartments directly below and above the atrium, then the technical non-compliance will be required to be addressed as part of a Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated performance requirements of the BCA.</p> <p><i>Mechanical Air Handling Systems</i></p> <p>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 &amp; Alarm System and Automatic Fire Suppression System.</p> <p><i>Fire Isolated Stairway Pressurisation</i></p> <p>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.</p> <p>Having regard to the fact that each of the fire isolated stairways contain rising and descending stair flights are to be separated by smoke proof walls, verification is required to be provided from the Mechanical Services Engineer that the compliance stairway pressurisation can be provided to the entire fire isolated stairway shaft including smoke separated flights.</p>
15.	E2.2 & Spec. E2.2a	<p><i>Automatic Fire Detection &amp; Alarm System</i></p> <p>An Automatic Fire Detection &amp; Alarm System is required to be installed throughout the building in accordance with AS 1670.1 - 2018.</p> <p><i>Extended Spacing Smoke Detectors within Ceiling Voids</i></p> <p>In accordance with Clause 5.1.7 of AS 1670.1 – 2018, smoke detectors are required to be installed within ceiling voids on a grid basis with maximum 10 m spacing.</p>



No.	BCA CLAUSe	DESCRIPTION
		<p>If smoke detectors are proposed to be installed on an extended grid system within the ceiling void i.e., 15 m in lieu of 10 m then the proposed design will be required to be addressed as part of a Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p>
16.	Spec. E2.2a	<p><i>Manual Call Points in Fire Hose Reel / Fire Hydrant Cupboards</i></p> <p>In accordance with AS 1670.1 – 2018, manual call points are required to be mounted between 750 mm and 1200 mm above floor level and a clear space of 300 mm on both sides and 600 mm directly in front are required to be provided in an arc in front of the manual call points.</p> <p>Where manual call points are installed within fire hose reel cupboards to avoid them being visible and being subject to unintended use, the clearance requirements of AS 1670.1 – 2018 around the manual call point will be unable to be achieved.</p> <p>The clear space around the manual call points will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p>
17.	E3.4	<p><i>Emergency Lifts</i></p> <p>A minimum of two (2) Emergency Lifts are required to serve each level of the building that are served by passenger lifts.</p> <p>In this instance, the Emergency Lifts will need to be Lift 3 and Lift 4 which serve each level of the building.</p> <p>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.</p>
18.	E4.9	<p><i>EWIS</i></p> <p>An Emergency Warning &amp; Intercom System (EWIS) is required to be installed throughout the entire building in accordance with AS 1670.4 – 2018.</p> <p><i>Rationalisation of EWIS System</i></p> <p>It is noted that EWIS speakers are proposed to be rationalised within ward and treatment rooms including patient bedrooms and other sensitive environments where the activation of the speaker within the room may cause trauma to the patient.</p> <p>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 the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p>
19.	F1.0	<p><i>Weatherproofing of External Walls and Roof</i></p> <p>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.</p>



No.	BCA CLAUSe	DESCRIPTION
		<p>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.</p>
20.	F2.3	<p><i>Ratio of Showers in Treatment Areas</i></p> <p>A ratio of 1:8 showers is required to be provided for patients within patient care areas.</p> <p>Within all ward areas, the minimum shower ratio is provided, however it appears that there may be a number of treatment areas that are not provided with a minimum shower ratio of 1:8 as summarised below:</p> <ul style="list-style-type: none"> <li>+ Level 03 Medical Imaging</li> <li>+ Level 03 Medical Imaging</li> <li>+ Level 03 Cardiology</li> </ul> <p>If showers are not provided within the treatment areas, then the non-provision of showers to these areas will be required to be subject of a Performance Solution in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p> <p>The Performance Solution will require written confirmation from the LHD explaining the use of each area, average length of stay, occupant characteristics while they are located within these areas and the need for a shower together with the fact that once they leave these treatment areas, they will be sent to a ward area with an ensuite provided to the bedroom.</p> <p><i>Sanitary Facilities for Staff throughout the Building</i></p> <p>A detailed summary of staffing numbers (including probable ratios of males to females if available) for each department floor by floor is required to be submitted in order for BM+G for review to determine if the sanitary facilities documented on the Schematic Architectural Drawings is sufficient for expected staffing numbers throughout the building.</p> <p>Notwithstanding minimum compliance with the BCA, verification should be sought from the LHD that they are satisfied that the sanitary facilities provided cater for expected staffing numbers and are adequately distributed around each storey for use by staff.</p> <p><i>Provision of Unisex Sanitary Compartments containing Water Closets</i></p> <p>Sanitary compartments containing water closets are required to be provided separately for males and females.</p> <p>The provision of unisex sanitary compartments containing water closets in lieu of separate facilities for males and females throughout the building will be required to be assessed as part of a Performance Solution in order to demonstrate compliance with the nominated Performance Requirements of the BCA.</p>
21.	F2.4	<p>Sanitary facilities for a person with a disability are to be provided throughout each floor of the building. Facilities will be required to consist of:</p> <ul style="list-style-type: none"> <li>+ Suitable provision of unisex accessible sanitary facilities for both staff and patients / public.</li> <li>+ Suitable provision of unisex ambulant sanitary compartments for both staff and patients / public.</li> </ul>





No.	BCA CLAUSE	DESCRIPTION
		<p>Based on the 'For Tender' Architectural Drawings issued, it is considered that an adequate provision of sanitary facilities for a person with a disability has been provided on each storey of the building.</p> <p><i>Provision of Unisex Ambulant Sanitary Compartment</i></p> <p>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.</p> <p>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.</p> <p>The Performance Solution Assessment is consistent with the assessment undertaken on the Stage 1 Tower.</p>
22.	Section J	<p><i>Energy Efficiency</i></p> <p>The energy efficiency provisions of Section J are applicable to the proposed building.</p> <p>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 &amp; Part J8 – Access for Maintenance is required to be provided.</p> <p>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.</p>

Table No. 4 – Summary of key compliance items

## .2 SUMMARY OF ITEMS REQUIRING A FIRE ENGINEERING PERFORMANCE SOLUTION:

No.	DtS CLAUSE	BCA PERFORMANCE REQUIREMENT	DtS DEPARTURE
1.	C1.9	CP1, CP2, CP3, CP4	Timber noggins located within fire walls.
2.	C2.5	CP2, CP3	Excessive smoke compartment sizes.
3.	C3.2	CP2, CP8	Exposure created between Buildings
4.	C3.3	CP2, CP8	Protection of external walls and associated openings in different fire compartments
5.	C3.15	CP2, CP8	Insulation of water filled metal pipes.
6.	Spec. C2.5	CP3	Omission of smoke dampers to mechanical ducts serving isolation rooms.



7.	Spec.C2.5	CP1, CP2, CP3, CP4	Timber noggins located within fire walls.
8.	Spec. C3.4	CP3, DP2	Swing of fire safety doors against the direction of egress.
9.	D1.4	DP4, EP2.2	Extended travel distance to a point of choice and to an alternative exit.
10.	D1.5	DP4, EP2.2	Extended travel distances between alternative exits.
11.	D1.6	DP6	Paths of travel within plant areas to have a clear unobstructed width of 800 mm in lieu of 1000 mm
12.	D1.11	DP4	Travel via horizontal exits.
13.	D2.7	CP2, DP5	Communication equipment within the fire isolated stairways
14.	D2.20	CP3, DP2	Swing of horizontal exit doors.
15.	E1.3	EP1.3	Location of fire hydrant booster in relation to the main entry of the building.
16.	E1.4	EP1.1	Omission of fire hose reel coverage to individual rooms that are completely fire separated from the remainder of the building.
17.	E1.5	EP1.4	Location of fire sprinkler booster in relation to the main entry of the building.
18.	E1.5	EP1.4	Omission of sprinklers from rooms containing low voltage equipment.
19.	E1.5	EP1.4	Concealed sprinkler heads within Operating Theatres and associated Sterile Rooms.
20.	E2.2	EP2.2	Pressure differential not achieved in vertical fire compartments above and below the atrium
21.	Spec E2.2a	EP2.2	Smoke detection system within the ceiling void to be on an extended grid basis
22.	Spec E2.2a	EP2.2	Clearance around manual call points in fire hose reel cupboards
23.	E4.9	EP2.1, EP4.3	Rationalisation of EWIS speakers within ward and treatment rooms.

Table No. 5 – 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.	F2.3	FP2.1	Shower ratio within treatment areas.
4.	F2.3	FP2.1	Males and females sharing unisex sanitary compartments containing water closets
5.	F2.4	FP2.1	Males and females sharing unisex ambulant sanitary compartments

Table No. 6 – 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 RPA Hospital Redevelopment.

## SECTION B – STRUCTURE

### PART B1 – STRUCTURAL PROVISIONS

#### 1. Clause B1.2- Determination of Individual Actions

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: Structural Design Actions - General Principles
2. AS 1170.1 – 2002: Structural Design Actions – Permanent, Imposed and Other Actions including certification for balustrading (dead and live loads)
3. AS 1170.2 – 2002: Structural Design Actions – Wind Actions
4. AS 1170.4 – 2007: Structural Design Actions – Earthquake Actions in Australia
5. AS 3700 – 2018: Masonry Structures
6. AS 3600 – 2018: Concrete Structures
7. AS 4100 – 1998: Steel Structures
8. AS/NZS 4600 – 2018: Cold formed steel.
9. AS 2047 – 2014: Windows and External Glazed Doors 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

### PART C1 – FIRE RESISTANCE AND STABILITY

#### 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 9a
<b>EXTERNAL WALL</b> (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 –  <i>For load bearing parts-</i> less than 1.5m 1.5m to less than 3m 3m or more  <i>For non-load bearing parts-</i> less than 1.5m 1.5m to less than 3m 3m or more	           120/120/120 120/90/90 120/60/30  -/-/120 -90/90 -/-/-
<b>EXTERNAL COLUMN</b> 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/-/- -/-/-
<b>COMMON WALLS &amp; FIRE WALLS</b>	120/120/120
<b>INTERNAL WALLS</b>  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 – <i>Loadbearing</i> <i>Non-loadbearing</i>	           120/120/120 -/-/120    120/90/90 -90/90
<b>OTHER LOADBEARING INTERNAL WALLS &amp; COLUMNS</b>	120/-/-
<b>FLOORS</b>	120/120/120
<b>ROOF</b>	120/60/30

Table No. 7 – 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 (in accordance with DtS Provisions) and all buildings (as required by Health Infrastructure Design Guidance Note 32), external walls including all components incorporated in them including all façade covering, framing and insulation, packers are required to be constructed of non-combustible construction.

#### *Aluminium Cladding*

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.

No composite aluminium panels can be installed on the external façade of the building.

*Appropriate Test Reports / Certificates will be required to be submitted for any Aluminium Cladding demonstrating compliance with Clause C1.9 of the BCA.*

#### *Sarking within the External Wall Assembly*

Sarking type materials installed within existing or new external walls will be required to have a thickness not exceeding 1mm and have a Flammability Index not greater than 5.

#### *Insulation within the External Wall Assembly*

Insulation installed within the external wall assembly will be required to be non-combustible.

#### *Packers*

All packers installed with the external wall assembly are required to be non-combustible.

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, insulation 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.

An External Wall Disclosure Statement will be required to be submitted prior to the issue of the Crown Certificate that details all elements of the external wall assembly.

#### *Timber Noggins in Fire Walls*

In a Building of Type A or B Construction, non-load bearing walls where they are required to be fire-resisting, load bearing walls and load bearing fire walls are required to be constructed of non-combustible construction.

Timber noggins are proposed to be located within the internal fire walls throughout the building in order to support services, handrails etc.

The use of timber noggins within fire rated walls throughout the building will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineering in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

### 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/m<sup>2</sup>
- + Non-Patient Care Areas – not less than 1.2 kW/m<sup>2</sup>
- + Fire Isolated Exits – not less than 4.5 kW/m<sup>2</sup>
- + Lifts – not less than 2.2 kW/m<sup>2</sup>

#### 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<sup>2</sup> 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.

## PART C2 – COMPARTMENTATION AND SEPARATION

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

The maximum size of any fire compartment with a Class 9a building cannot exceed 5,000m<sup>2</sup> & 30,000m<sup>3</sup>.

*Note: the size of fire compartments within patient care areas is limited to a maximum of 2,000m<sup>2</sup>.*

The SSDA Architectural Drawings indicate that compliance can be achieved in this instance with no fire compartment within the Class 9a part of the building exceeding 5,000m<sup>2</sup> & 30,000m<sup>3</sup>.

### 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<sup>2</sup> with fire walls having a minimum FRL of 120/120/120.

#### Ward and Treatment Compartment Sizes





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

Area Use		Max. Compartment Size		
Patient Care Area (max 2,000m <sup>2</sup> )	Ward Area	Where total floor area is <u>less</u> than 500m <sup>2</sup> :	Where total floor area is <u>greater</u> than 500m <sup>2</sup> , but <u>less</u> than 1000m <sup>2</sup> :	Where total floor area is <u>greater</u> than 1000m <sup>2</sup> :
		Separate from other areas with Smoke Walls	Separate with smoke walls into areas less than 500m <sup>2</sup>	Separate with smoke walls with an FRL of not less 60/60/60 into areas less than 1000m <sup>2</sup>
	Treatment Area	Where total floor area is <u>less</u> than 1000m <sup>2</sup> :	Where total floor area is <u>greater</u> than 1000m <sup>2</sup> :	
		Separate from other areas with Smoke Walls	Separate with smoke walls into areas less than 1000m <sup>2</sup>	
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.				

Table No. 8 – Required fire and smoke compartmentation for patient care areas

It is expected that number of compartment sizes within ward and treatment areas throughout the building may exceed the maximum compartment sizes of Clause C2.5 having regard to the clinical planning requirements of the LHD.

The compartment sizes which exceed the DTS Provisions of the BCA will be required assessed as part of a Fire Engineering Performance Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

Any smoke compartment sizes that are greater than 10% over the maximum permitted size will require additional review by BM+G and the appointed Fire Safety Engineer to determine that they are acceptable to be subject of a Fire Engineering Assessment.

#### 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 >30m<sup>2</sup>, hyperbaric facility, storage of medical records >10m<sup>2</sup> 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.

### 8. Clause C2.6 – Vertical separation of openings in External Walls

Spandrel separation is not required to be provided between openings located in storeys one above the other due to the fact that the building is provided with an Automatic Fire Suppression System throughout.

### 9. Clause C2.7 – Separation by Fire Walls

#### Construction of 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. Details of the proposed fire wall construction is to be submitted for review.

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.

#### **10. 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.

#### **11. Clause C2.11 – Stairways and Lifts in One Shaft**

Fire isolated stairways and lifts cannot be located within the same fire isolated shaft.

The Architectural Drawings indicate that the fire isolated stairways and lifts shafts are provided in separated fire rated shafts.

#### **12. 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.

#### **13. 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.

*Note: The above requirements are the minimum requirements of the BCA and do not consider or any additional fire separation requirements from the nominated Energy Service Providers.*

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 plantrooms 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.

## PART C3 – PROTECTION OF OPENINGS

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

#### *Exposure between the new East Tower and the existing Main Hospital Building including Extensions.*

Where the external wall of a building is located less than 6m from an adjoining building located on the same allotment, the openings in the external wall of the building are required to be protected in accordance with Clause C3.4.

The proposed new East Tower is located less than 6m from the external walls of the existing Main Hospital Building including the new extensions.

The exposure and protection of the subject external walls and openings of the new East Tower and the existing Main Building will be required to be protected in accordance with the DTS Provisions of the BCA or alternatively will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

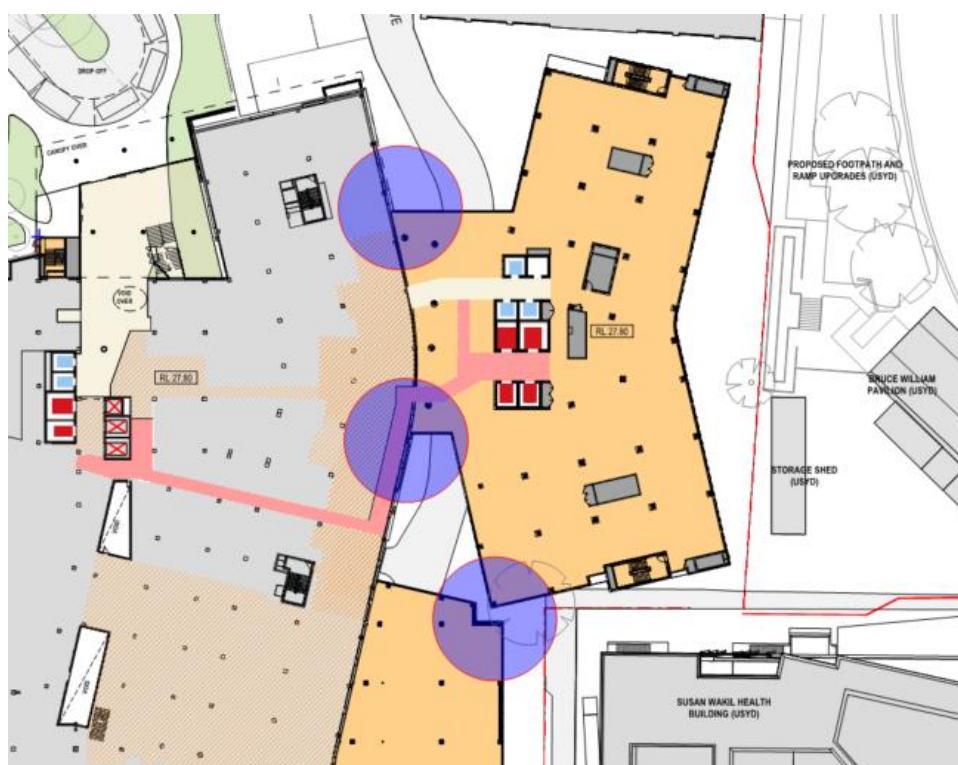


Figure No. 3: Plan detailing exposure on Level 3 of external walls of the new East Tower from the existing Main Hospital Building including the Eastern Extension

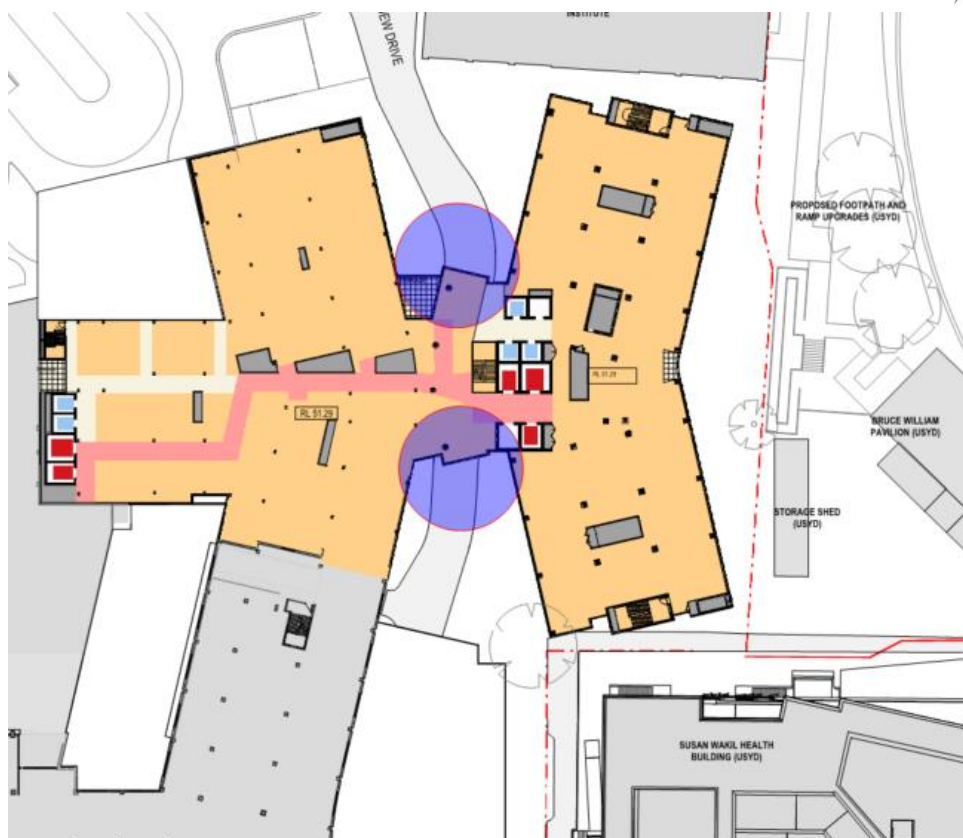


Figure No. 4: Plan detailing exposure on Level 9 of external walls of the new East Tower from the vertical Northern Extension of the existing Main Hospital Building

## 15. 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 will be numerous locations throughout the buildings as a result of the redevelopment where exposure occurs between external walls and their associated openings of different fire compartments.

The subject external walls and openings will be required to be protected in accordance with the DTS Provisions of the BCA or alternatively be assessed as part of a Fire Engineering Performance Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.



Ground Floor

Figure No. 5: Example of locations of exposure between fire compartments on Level 3 of the building

#### 16. 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 1500 mm of the automatic closing doors (on both sides of the door).

#### 17. 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 1500 mm of the automatic closing doors (on both sides of the door).





#### 18. 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.

#### 19. 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.

#### 20. Clause C3.10 – 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.

#### 21. Clause C3.11 – Bounding Construction: Class 2 and 3 Buildings and Class 4 Parts

##### *Fire Separation of Overnight Rooms*

It is understood that the proposed redevelopment will contain overnight rooms for parents and family staying overnight along with overnight rooms for staff members.

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

Where a bank of overnight rooms are located together, it is understood that the bank of rooms may be fire separated from the remainder of the storey rather than the fire separation of each room individually.

The fire separation of a bank of overnight rooms rather than the individual separation of the rooms will be required to be assessed as part of Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

#### 22. Clause C3.13 – Openings in Shafts

An opening in a wall providing access to a ventilating, pipe, garbage, or other service shaft must be protected by one of the following:

- + If it is a sanitary compartment – a door or panel which, together with its frame, is non-combustible or has an FRL of not less than -/30/30; or
- + A self-closing -/60/30 fire door or hopper; or
- + An access panel having an FRL of not less than -/60/30

#### 23. 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 insulation 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 the appointed Fire Safety Engineer 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.

#### **24. 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.

#### **25. Clause C3.17 – Columns Protected with Lightweight Construction to achieve an FRL**

A column protected by lightweight construction to achieve an FRL which passes through a building element that is required to have an FRL or a resistance to the incipient spread of fire, is required to be installed using a method and materials identical with a prototype assembly of the construction which has achieved the required FRL or resistance to the incipient spread of fire.





## 26. 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*

The following requirements of Specification C1.1 are applicable to the proposed design:

- + Where part of a building required to have an FRL depends on direct vertical or lateral support from another part to maintain its FRL, that supporting part must:
  - + Have an FRL not less than the required by other provisions of Specification C1.1; and
  - + If located within the same fire compartment as the part its supports have an FRL in respect of structural adequacy the greater of that required –
    - ▲ For the supporting part itself; and
    - ▲ For the part is supports
  - + Be non-combustible –
    - ▲ If required by other provisions of Specification C1.1; or
    - ▲ If the part is supports is required to be non-combustible
- + Shafts required to have an FRL must be enclosed at the top and bottom by construction having an FRL not less that the required for the walls of a non-loadbearing shaft in the same building except the provisions do not apply to the top of a shaft extending beyond the roof covering (other than one enclosing a fire stair or ramp) or the bottom of a shaft if it is non-combustible and laid directly on the ground.
- + 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.
- + 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.

## 27. 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 Noggins in Smoke Walls*

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

Timber noggins are proposed to be located within the internal fire and smoke walls throughout the building in order to support services, handrails etc.

The use of timber noggins within smoke walls throughout the building will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer 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 down 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 required to be assessed as part of a Fire Engineering Performance Assessment to be undertaken by the appointed Fire Safety Engineer 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.

#### **28. 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 unless it serves a fire compartment provided with stair pressurisation.

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 be assessed as part of the Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

#### **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 the appointed Fire Safety Engineer.

### **SECTION D - ACCESS & EGRESS**

#### **PART D1 – PROVISION FOR ESCAPE**

##### **29. 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.

The Architectural Drawings issued as part of the SSDA Application indicate that a minimum of two (2) exits in addition to the horizontal exits are provided from each storey of the building.

##### **30. Clause D1.3 – When Fire Isolated Stairs are Required**

All exit stairways serving the redevelopment 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 i.e., stairway within the Atrium.

### 31. 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.

Detailed egress travel distance assessments will be undertaken as the design developments and detailed layouts are issued in relation to egress travel distance to a point of choice and to an alternative exit.

There will be instances due to clinical design requirements and layouts, where travel distances will likely exceed the maximum requirements of the DTS provisions of the BCA. Where non compliances are identified, they will be reviewed on a case-by-case basis to determine if the non-compliance can be assessed via a Fire Engineering Performance Solution.

Egress travel distance to a point of choice and alternative exit complies from the proposed temporary Helicopter Landing Site (HLS) on Level 5B of the existing Multi Storey Car Park.

### 32. 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.

Detailed egress travel distance assessments will be undertaken as the design developments and detailed layouts are issued in relation to egress travel distance between alternative exits.

There will be instances due to clinical design requirements and layouts, where travel distances will likely exceed the maximum requirements of the DTS provisions of the BCA. Where non compliances are identified, they will be reviewed on a case-by-case basis to determine if the non-compliance can be assessed via a Fire Engineering Performance Solution.

Egress travel distance to a point of choice and alternative exit complies from the proposed temporary Helicopter Landing Site (HLS) on Level 5B of the existing Multi Storey Car Park.

### 33. 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 2000 mm, except for doorways which may be reduced to not less than 1980 mm.

In addition, the unobstructed width of any new exit or a path of travel to an exit must not be less than 1000 mm except where patients are normally transported in beds within treatment and ward areas in which case a minimum of 1800 mm 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 2200 mm must not be less than 1200 mm, or
- b) Doorways leading to or from a corridor with a corridor width greater than 2200 mm must not be less than 1070 mm.

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

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 1000 mm. 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.



### *Reduced Egress Widths within Plant Areas*

Paths of travel leading to required exits are required to have a minimum clear unobstructed width of 1000 mm.

Within the Plant Rooms, it is noted that there will likely be locations where the clear unobstructed widths of 1000 mm is impeded by plant and equipment installed throughout.

The reduction in egress width within the plant rooms will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

## **34. Clause D1.7 – Travel via Fire Isolated Exits**

A doorway from a room must not open directly into a fire isolated stairway or fire isolated passageway unless it is from one of the following:

- + A public corridor, public lobby, or the like; or
- + A sole occupancy unit occupying all of a storey; or
- + A sanitary compartment, airlock, or the like

A fire isolated stairway is required to provide independent egress from each storey that it serves and discharge directly or by way of its own fire isolated passageway –

- + 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
- + Into a covered area that –
  - ▲ Adjoins a road or open space; and
  - ▲ Is open for at least 1/3 of its perimeter; and
  - ▲ Has an unobstructed clear height throughout, including the perimeter openings, of not less than 3m; and
  - ▲ Provides an unimpeded path of travel from the point of discharge to the road or open space of not more than 6 m.

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

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

If more than 2 access doorways, not from a sanitary compartment or the like, open to a required fire isolated exit in the same storey –

- + A smoke lobby in accordance with Clause D2.6 must be provided; or
- + The exit must be pressurised in accordance with AS 1668.1

The proposed design is capable of achieving compliance with the above requirements of Clause D1.7.



### 35. 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.

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. Handrails are required to be installed to all ramps used for external egress from the building.

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 where exit paths may be blocked by parked motor vehicles.

### 36. Clause D1.11 – Horizontal Exits

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 fact that the floors will contain multiple fire compartments, there will likely be instances where travel from one compartment will not lead to an adjoining fire compartment that is provided with a fire isolated exit or an exit providing direct egress to a road or open space.

### 37. 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 Level 3 to Level 4 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.

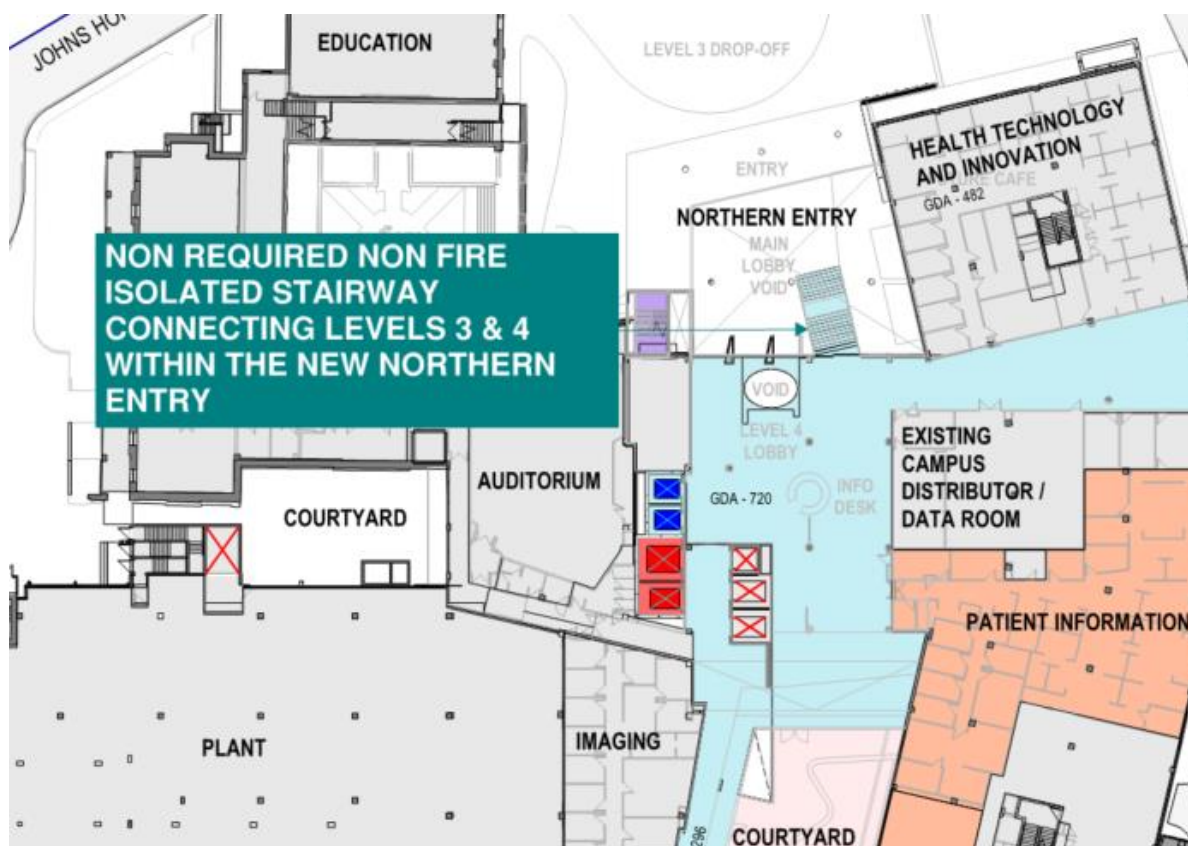


Figure No. 6: Non-required non-fire isolated stairway connecting Level 3 and Level 4 within the new Northern Entry





### 38. Clause D1.16 – Plant Rooms, Lift Machine Rooms, and Electricity Network Substations: Concession

A ladder is permitted to be used in lieu of a stairway to provide egress from –

- + A plant room with a floor area of not more than 100 m<sup>2</sup>; or
- + All but one point of egress from a plant room, a lift machine room, or a Class 8 electricity network substation with a floor area of not more than 200 m<sup>2</sup>

### 39. Clause D1.17 – Access to Lift Pits

Access to new lift pits is required to be provided as follows:

- + Where the lift pit depth is not more than 3m, be through the lowest landing doors; or
- + Where the pit depth is more than 3m, be provided through an access doorway complying the following:
  - ▲ In lieu of D1.6, the doorway must be level with the pit floor and not be less than 600 mm wide by 1980 mm high clear opening, which may be reduced to 1500 mm where it is necessary to comply with following item.
  - ▲ No part of the lift car or platform must encroach on the pit doorway entrance when the car is on a fully compressed buffer.
  - ▲ Access to the doorway must be by a stairway complying with AS 1657.
  - ▲ In lieu of D2.21, doors fitted to the doorway must be -
    - Of the horizontal sliding or outwards opening hinged type; and
    - Self-closing and self-locking from the outside; and
    - Marked on the landing side with the letters not less than 35 mm:  
**'DANGER LIFTWELL – ENTRY OF UNAUTHORISED PERSONS PROHIBITED - KEEP CLEAR AT ALL TIMES'.**

## PART D2 – CONSTRUCTION OF EXITS

### 40. 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.

### 41. 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.

### 42. 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.

#### *Provision of Communication Equipment within the Fire Isolated Stairways*

The fire isolated stairways are proposed to be provided with Wireless Access Points (WAP) or Distributed Antenna Systems (DAS) on each storey of the fire isolated stairways in order to enhance radio frequency within the stairways. As detailed above, the provision of communication equipment within the fire isolated stairways is not permitted in accordance with the DtS Provisions of the BCA.

The installation of WAPs and/or DAS within the fire isolated stairways will be required to be assessed as part of a Fire Engineering Performance Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

#### **43. 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.

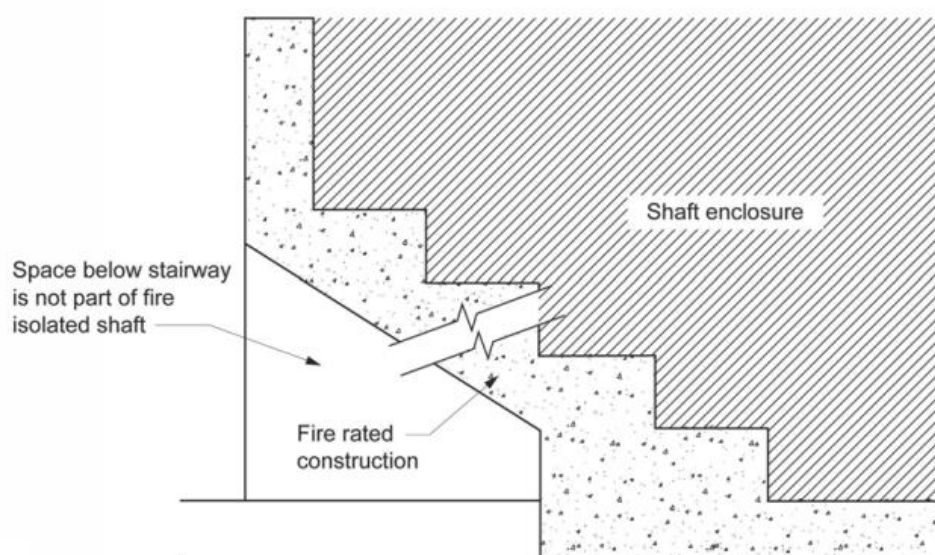


Figure No. 7: Fire separated space below stairway which is not considered part of the fire isolated shaft

#### **44. Clause D2.11 – Fire Isolated Passageways**

The enclosing construction of the fire isolated passageway which discharges from the fire isolated stairway is required to have a minimum FRL of 120/120/120.

#### **45. 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.

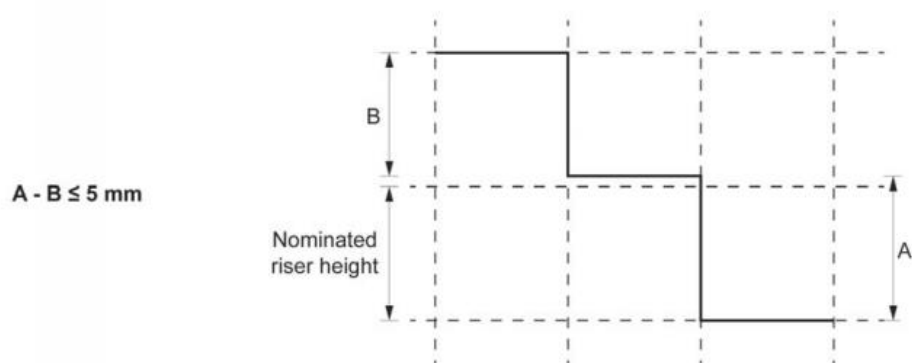
Riser and Going Dimensions (mm)			
	Riser (R)	Going (G)	Quantity (2R + G)
Maximum	190	355	700





Minimum	115	250	550
---------	-----	-----	-----

Table No. 9 – Riser and going dimensions for stairways

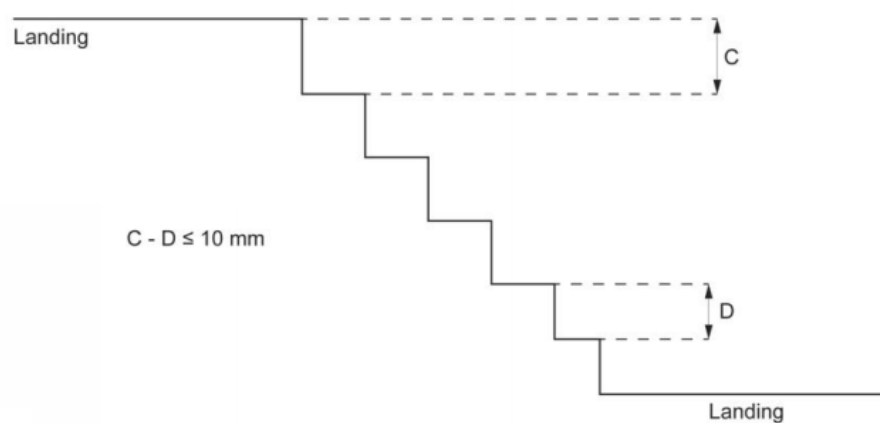


**Notes:**

1. A = larger riser of two adjacent risers.
2. B = smaller riser of two adjacent risers.
3. This figure only shows deviations in risers, however the same principle can apply for goings.

Figure No. 8: Permitted deviations in adjacent stair risers

**Figure D2.13(2) Deviations over a flight**



**Notes:**

1. C = largest riser of the flight.
2. D = smallest riser of the flight.
3. This diagram only shows deviations in risers, however the same principle can apply for goings.

Figure No. 9: Permitted deviations over a stair flight

- + 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

#### 46. 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° landing, with a clear width of 1600 mm and clear length of 2700 mm.

Details will be required to be submitted detailing stretcher movement around the landings of the fire isolated stairways.

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
Loading Dock	P5 or R12
External walkways etc	P4 or R11
Bathrooms and ensuites	P3 or R10



Wards and corridors	P2 or R9
<i>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.</i>	
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

#### 47. Clause D2.15 – Thresholds

No steps can be located within the internal or external door thresholds unless the doorway is within a patient care area and the door sill is not more than 25mm above the finished level to which the doorway opens.

In areas other than patient care areas, where there are any steps within door thresholds, a threshold or step ramp is required to be installed in accordance with Clause 10 of AS 1428.1 which requires the following:

- + Maximum rise of 35 mm
- + Maximum length of 280 mm
- + Maximum gradient of 1:8
- + Be located within 20 mm of the door leaf it serves

Where the threshold ramp does not abut a wall, the edges of the threshold ramp are required to be tapered or splayed at a minimum of 45°.

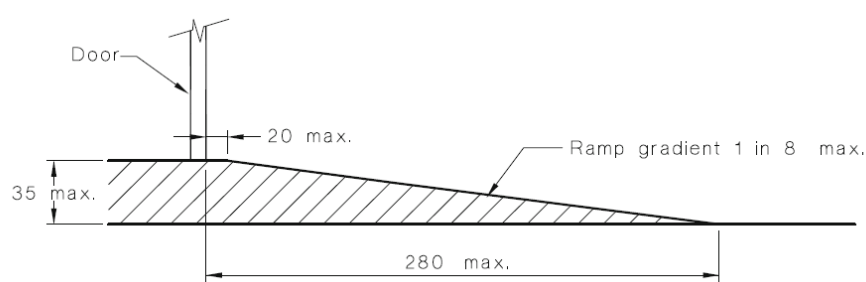


Figure No. 10: Threshold ramp dimensions

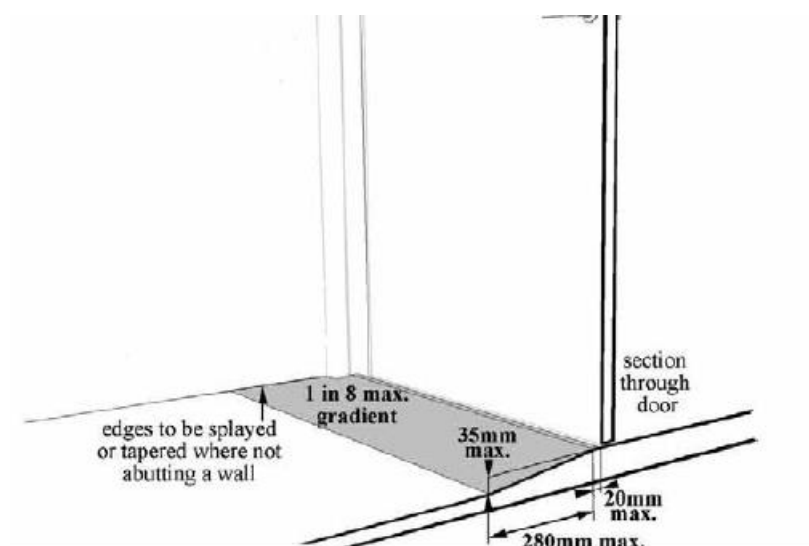


Figure No. 11: Threshold Ramp

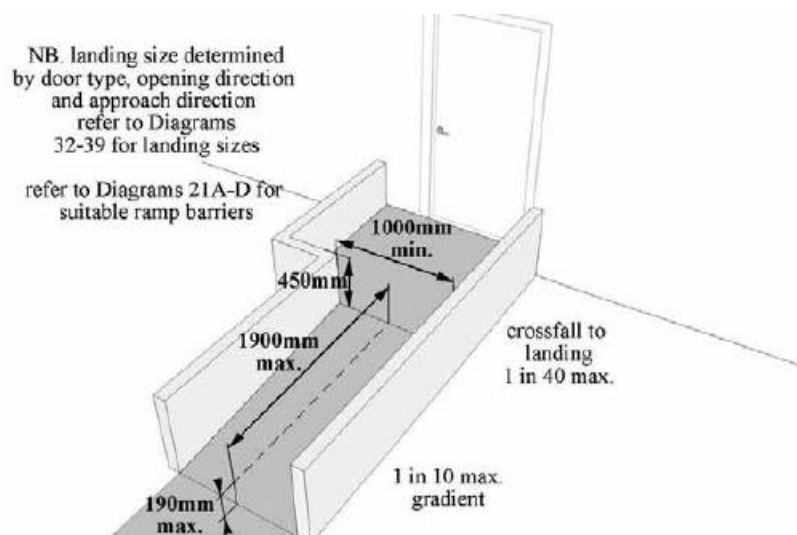


Figure No. 12: Step Ramp at External Doorway – Front Approach

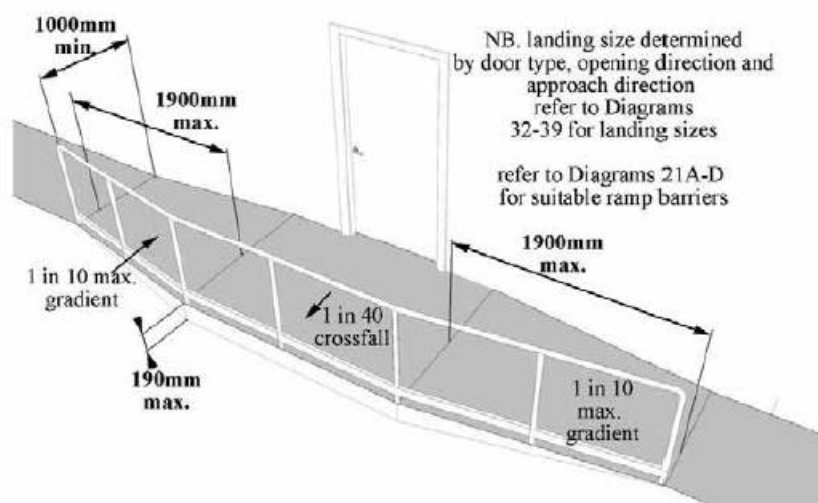


Figure No.13: Step Ramp at External Doorway – Side Approach



#### 48. 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.

Where the level below exceeds 4000mm the balustrades must not have any climbable elements between 150mm and 760mm above the floor.

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.

##### *Balustrade to the Atrium Void*

No horizontal climbable elements are permitted to be located on the balustrade within a zone of 150 – 760 mm above floor level. Furthermore, no building elements that could be used as a foothold can be located within 1000 mm of the balustrade i.e., GPO outlets etc.

From a safety design in perspective, it is recommended that no loose furniture be designed to be located adjacent to the balustrade bounding the atrium void.

#### 49. 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.

#### 50. 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.



## 51. Clause D2.19 – Doorways and Doors

### *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.

Sliding doors are not permitted to be located within patient care areas in accordance with the DTS Provisions of the BCA. If any sliding doors are proposed to be located within patient care areas, the installation of the sliding doors will be required to be assessed as part of a Fire Engineering Performance Solution to be undertaken by the appointed Fire Safety Engineer in order to address compliance with the nominated Performance Requirements of the BCA.

### *Glazed Sliding Doors leading to Open Space*

The power operated glazed sliding doors within the Entry Airlocks that also serve as required exits from the Ground Floor and Level 01 are required to be designed as follows:

- + It must be able to be opened manually under a force of not more than 110 N if there is a malfunction or failure of the power source; and
- + Must open automatically if there is a power failure to the door or on the activation of the Automatic Fire Detection & Alarm System anywhere in the fire compartment served by the door.

## 52. 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.

### *Swing of Horizontal Exit Doors*

All exit doors including horizontal exit doors are required to swing in the direction of egress.

There will likely be numerous fire doors used as horizontal exits that are proposed to not swing in the direction of egress in certain instances i.e., doors will swing in one direction only.

The swing of the horizontal exit doors will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

## 53. Clause D2.21 – Operation of Latch

### *Door Hardware*

All exit doors and doors in a path of travel are required to be provided with door hardware that is operable 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 35 mm and not more than 45 mm more

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



#### 54. 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.

#### 55. 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**

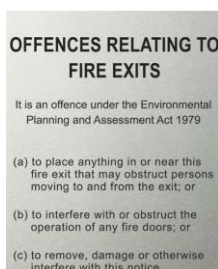
All **automatic closing** fire and/or smoke doors located within fire and smoke walls throughout the building together with automatic closing fire doors leading to the fire isolated stairways are to be provided with signage that states:

**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.



### PART D3 – ACCESS FOR PEOPLE WITH A DISABILITY

#### 56. Clause D3.1 – General Building Access Requirements

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

Based on a review of the SSDA Architectural Documentation, the new East Tower and Norther and Eastern extensions along with the alterations and additions to the existing building, the development is capable of complying with the requirements of Part D3 of the BCA and AS 1428.1 – 2009.

#### 57. Clause D3.2 – Access to Buildings

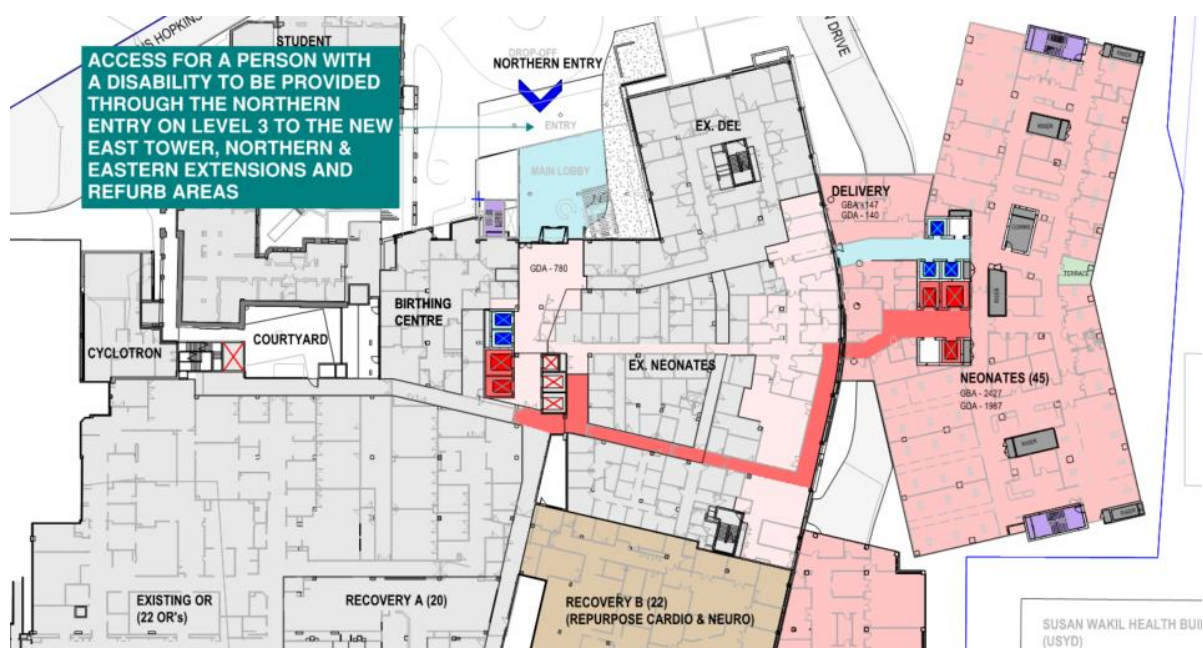
Access to the building is required as follows:





- + An accessible accessway is required to be provided as follows:
  - ▲ From the main points of a pedestrian entry at the allotment boundary, and
  - ▲ From another accessible building connected by a pedestrian link; and
  - ▲ From any required accessible carparking space on the allotment
- + In a building required to be accessible, an access is required to be provided throughout the principal pedestrian entrance and –
  - ▲ Through not less than 50% of all pedestrian entrances including the principal pedestrian entrance; and
  - ▲ In a building with a total floor area of more than 500 m<sup>2</sup>, a pedestrian entrance which is not accessible must not be located more than 50m from an accessible pedestrian entrance.

Access for a person with a disability will be required to be provided through the Northern Entry on Level 3 of the building (accessed off John Hopkins Drive) which occupants will use to directly access the new East Tower along with access via the Main Entry on Level 5 of the existing Main Hospital Building (accessed off Missenden Road)





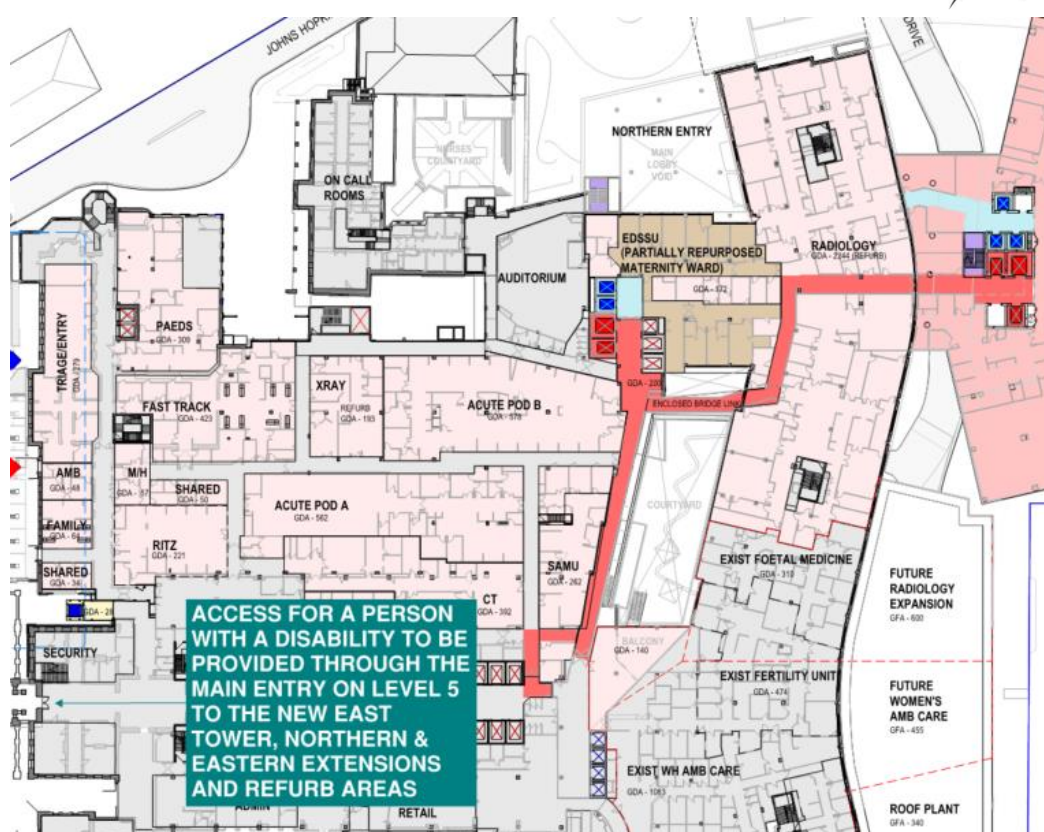


Figure Nos. 14 - 15: Access for a person with a disability through the main entrances on Level 3 & 5

- + An accessible pedestrian entrance with multiple doorways is considered to be one pedestrian where -
  - ▶ All doorways serve the same part or parts of the building; and
  - ▶ The distance between each doorway is not more than the width of the widest doorway at that pedestrian entrance

Except for pedestrian entrance serving only areas exempted from Clause D3.4 (refer to areas below under Clause D3.4)

- + Where a pedestrian entrance required to be accessible has multiple doorways –
  - ▶ If the pedestrian entrance consists of not more than 3 doorways, - not less than 1 of those doorways is required to be accessible.
  - ▶ If a pedestrian entrance consists of more than 3 doorways, - not less than 50% of those doorways is required to be accessible.
  - ▶ From any required accessible carparking space on the allotment
- + The minimum unobstructed height of a continuous accessible path of travel is required to be 2000 mm and 1980 mm at doorways.

Unless otherwise specified (such as at doors, curved ramps and similar), the minimum unobstructed width of a continuous accessible path of travel is required to be 1000 mm and following elements cannot intrude into the minimum width:

- ▶ Fixtures and fittings such as lights, awnings, windows that when open intrude into the circulation space, telephones, skirtings, and similar objects.



- ▶ Essential fixture and fittings such as fire hose reels, fire extinguishers and switchboards.
- ▶ Door handles less than 900 mm above the finished floor

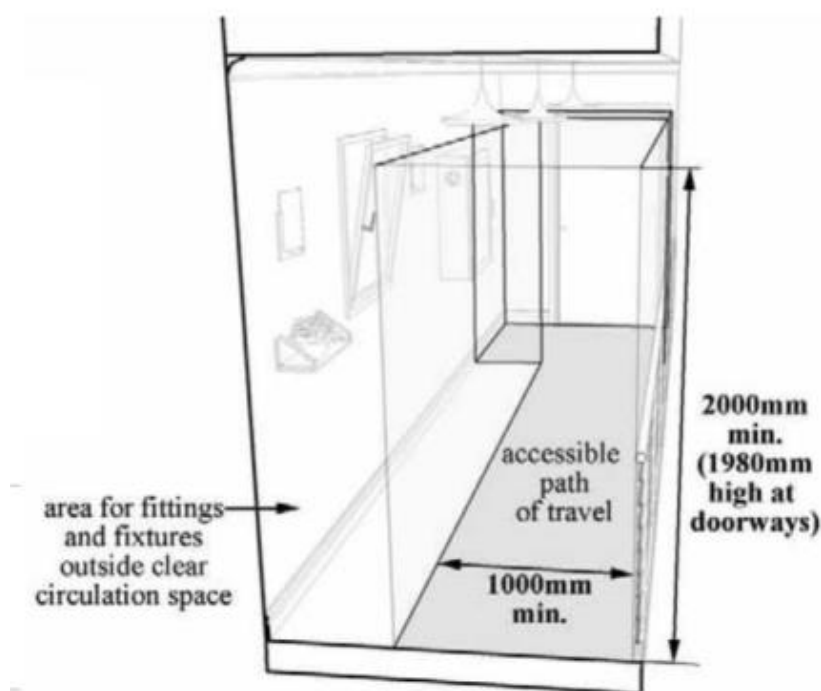


Figure No. 16: Minimum height and width of accessible path of travel

- + 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.*

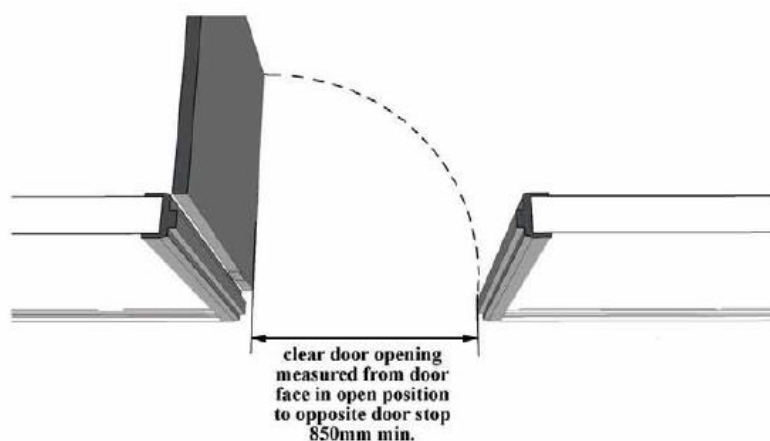


Figure No. 17: Clear Unobstructed Width of Doorway

- + 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.*

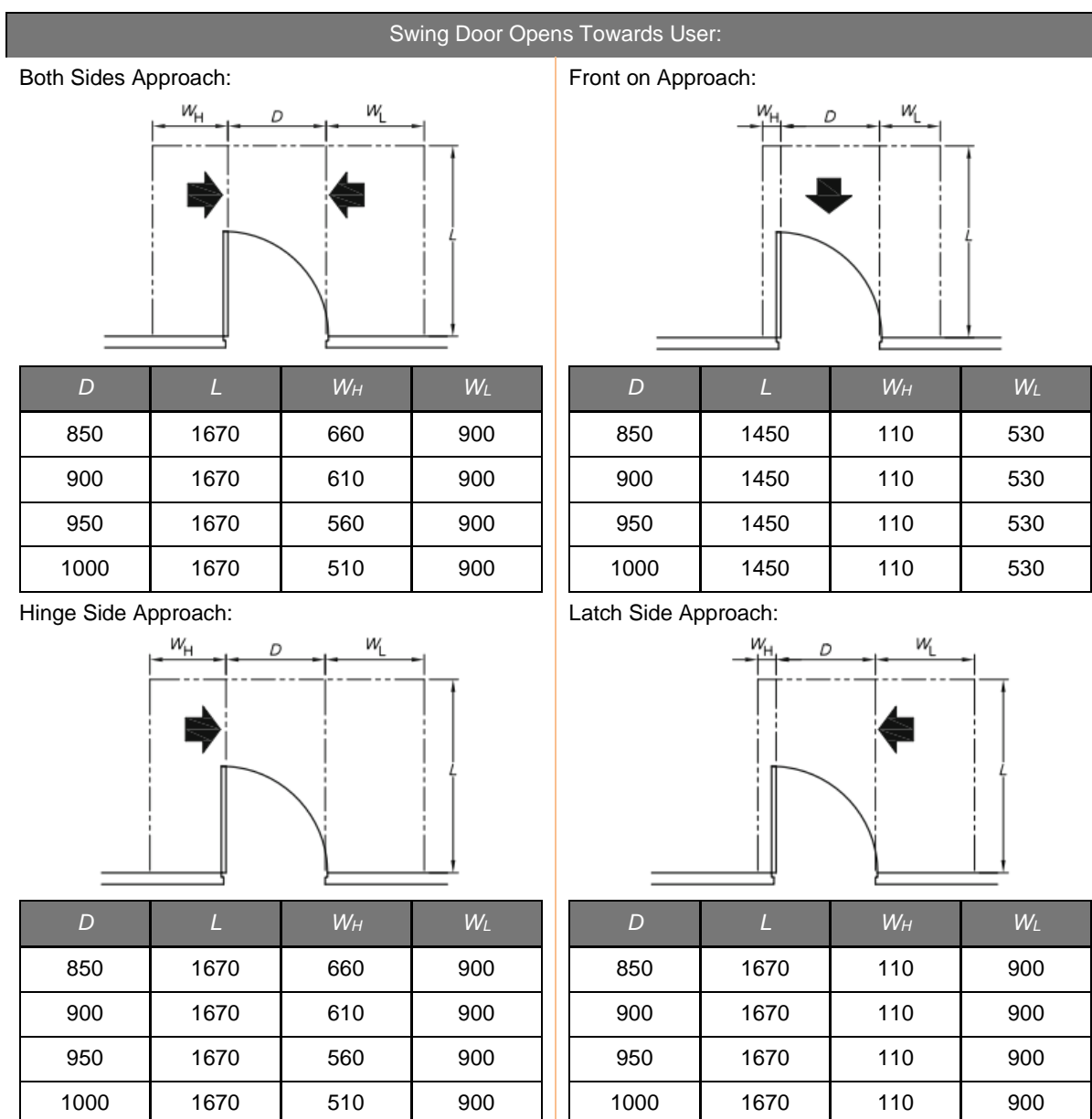


Figure No. 18: Circulation Space at Swing Doors – Door Opens Toward User



**Swing Door Opens Away from User:**

**Both Sides Approach:**

D	L	W <sub>H</sub>	W <sub>L</sub>
850	1240	560	660
900	1210	510	660
950	1175	460	660
1000	1155	410	660

**Front on Approach:**

D	L	W <sub>H</sub>	W <sub>L</sub>
850	1450	0	510
900	1450	0	510
950	1450	0	510
1000	1450	0	510

**Hinge Side Approach:**

D	L	W <sub>H</sub>	W <sub>L</sub>
850	1220	560	340
900	1185	510	340
950	1160	460	340
1000	1140	410	340

**Latch Side Approach:**

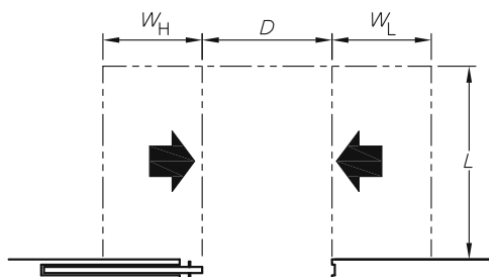
D	L	W <sub>H</sub>	W <sub>L</sub>
850	1240	240	660
900	1210	190	660
950	1175	140	660
1000	1155	90	660

Figure No. 19: Circulation Space at Swing Doors – Door Opens away from User



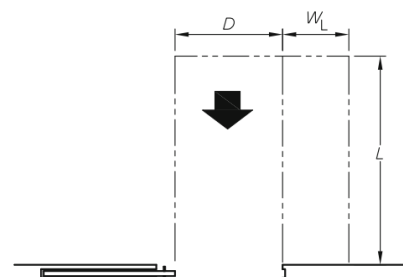
## Sliding Doors Recessed in Wall:

Both Sides Approach:



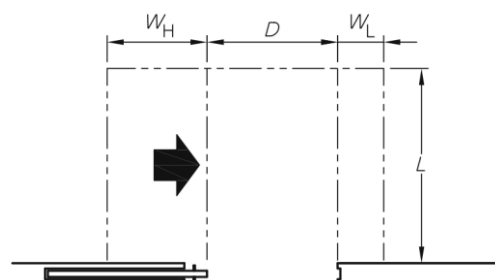
$D$	$L$	$W_H$	$W_L$
850	1280	660	660
900	1280	610	660
950	1280	560	660
1000	1280	510	660

Front on Approach:



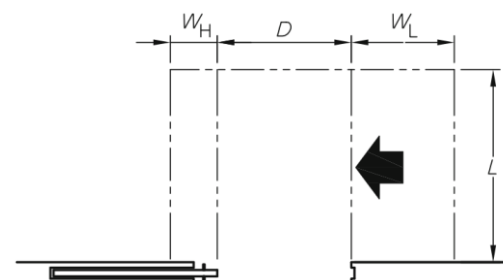
$D$	$L$	$W_H$	$W_L$
850	1450	0	530
900	1450	0	530
950	1450	0	530
1000	1450	0	530

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. 20: 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  $W_H$ .

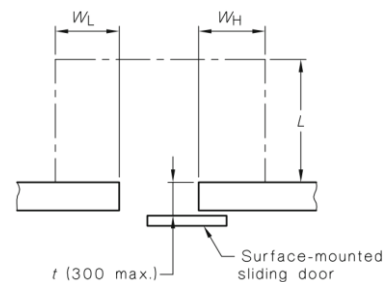


Figure No. 21: Circulation Space at Sliding Doors – Surface Mounted

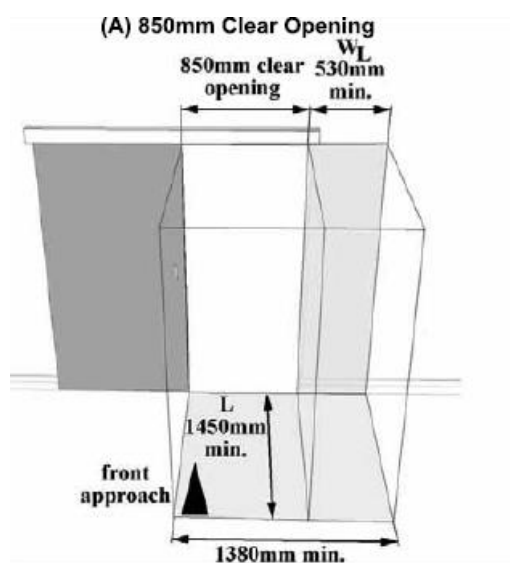


Figure No. 22: Circulation Space at Swing Doors

## 58. Clause D3.3 – Parts of Buildings to be Accessible

In a building required to be accessible –

- + Every ramp and stairway, excepts for ramps and stairways in areas exempted from Clause D3.4, are required to comply with –
  - ▲ For a ramp, except a fire isolated ramp, Clause 10 of AS 1428.1; and
  - ▲ For a stairway, except a fire isolated stairway, Clause 11 of AS 1428.1; and
  - ▲ For a fire isolated stairway, Clause 11 (f) and (g) of AS 1428.1.
  - ▲ Door handles less than 900 mm above the finished floor
- ▲ Every passenger lift is required to be designed in accordance with Clause E3.6
- ▲ Accessways throughout the building are required to have –
  - ▲ Passes spaces complying with AS 1428.1 at a maximum 20m intervals on those parts of an access where a direct line of sight is not available; and
  - ▲ Turning spaces complying with AS 1428.1 –
    - Within 2 m of the end of accessways where it is not possible to continue travelling along the accessway, and
    - At maximum 20 m intervals along the accessway
- + All dead-end corridors where a person in a wheelchair is required to make a 90° to 180° turn is required to be not less than 2070mm in the direction of travel and not less than 1540 mm wide.

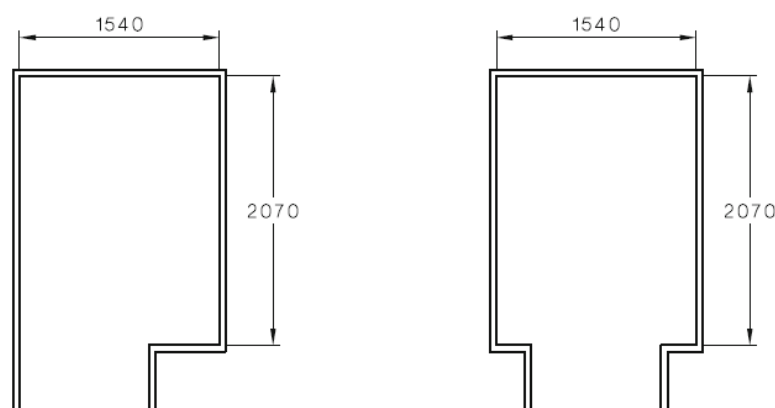


Figure No. 23: Minimum space required for >90° to 180° turn

**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

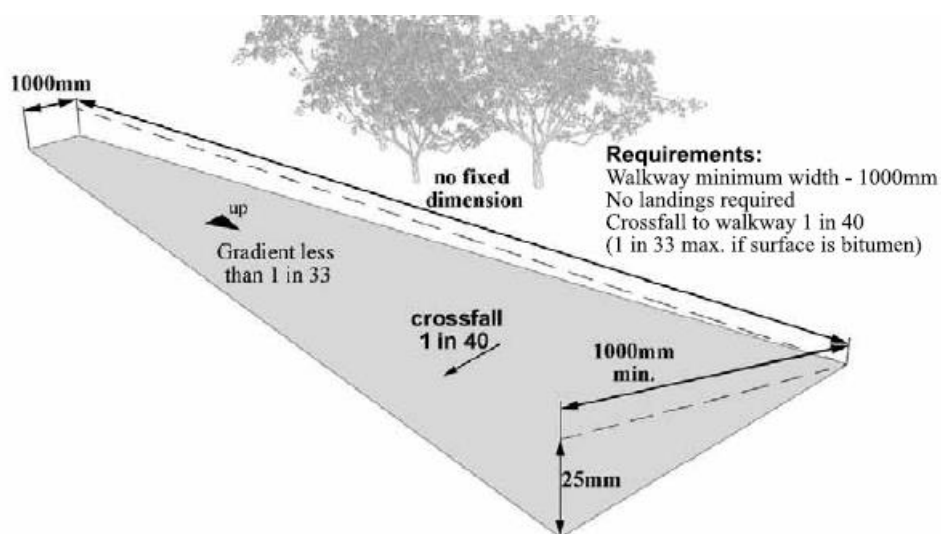


Figure No. 24: Requirements for a Walkway with a Gradient Less Than 1 in 33



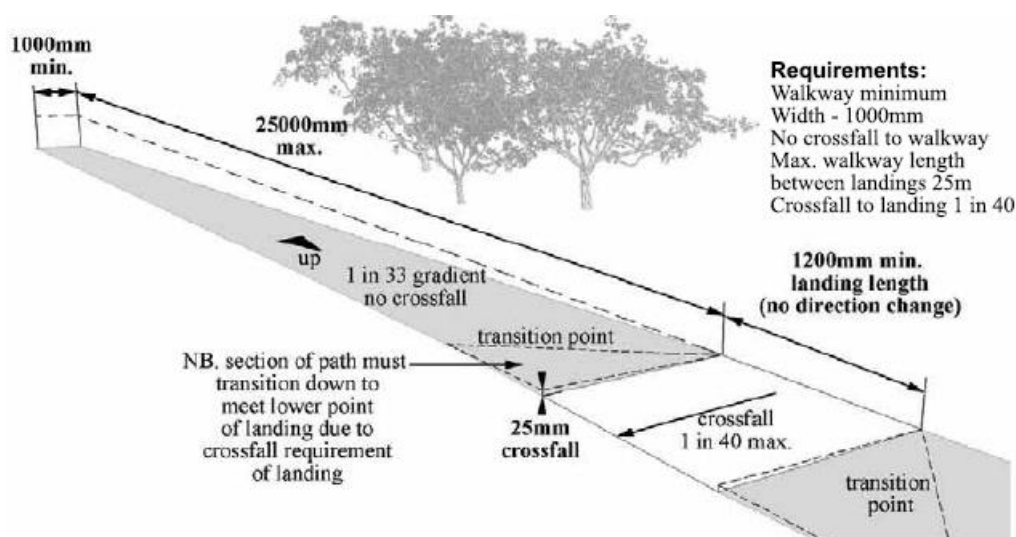


Figure No. 25: Requirements for a Walkway with a 1 in 33 Gradient

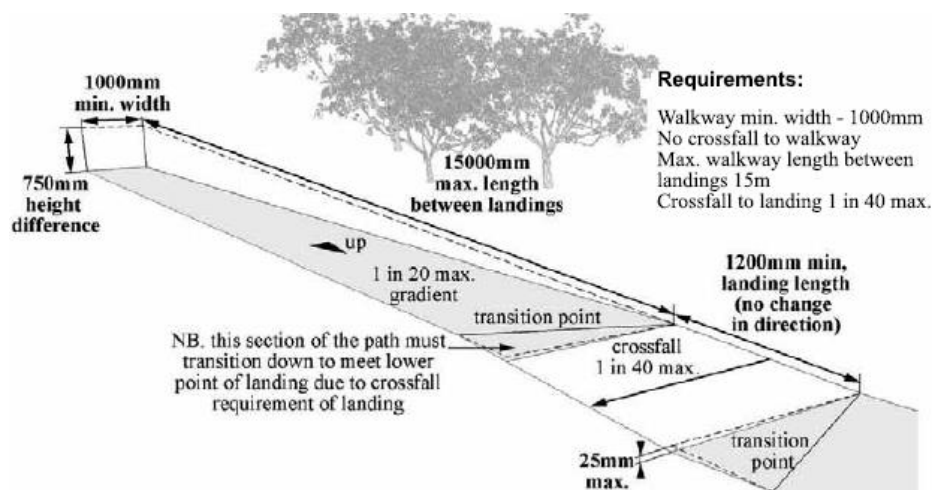


Figure No. 26: Requirements for a Walkway with a 1 in 20 Gradient

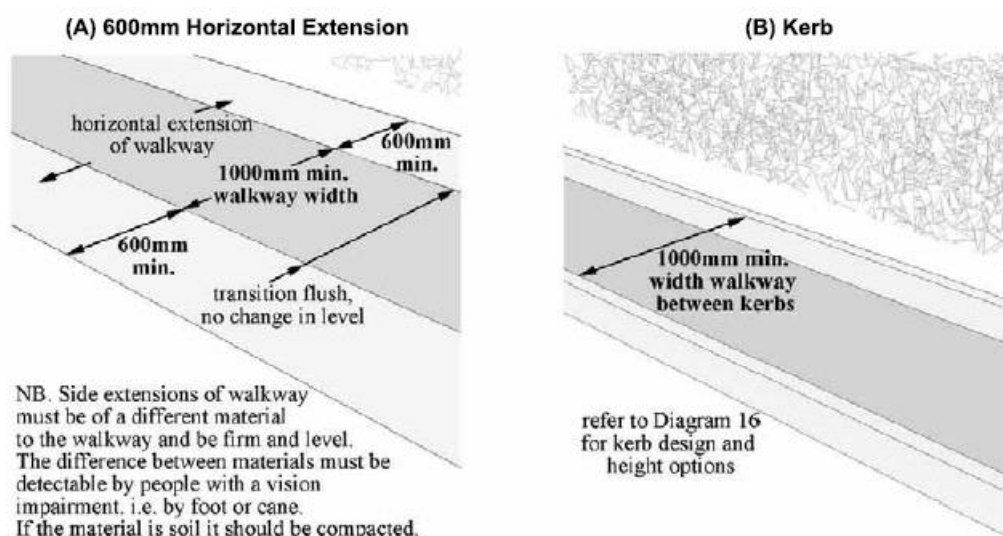


Figure No. 27: Requirements for Edges of Walkways





*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.

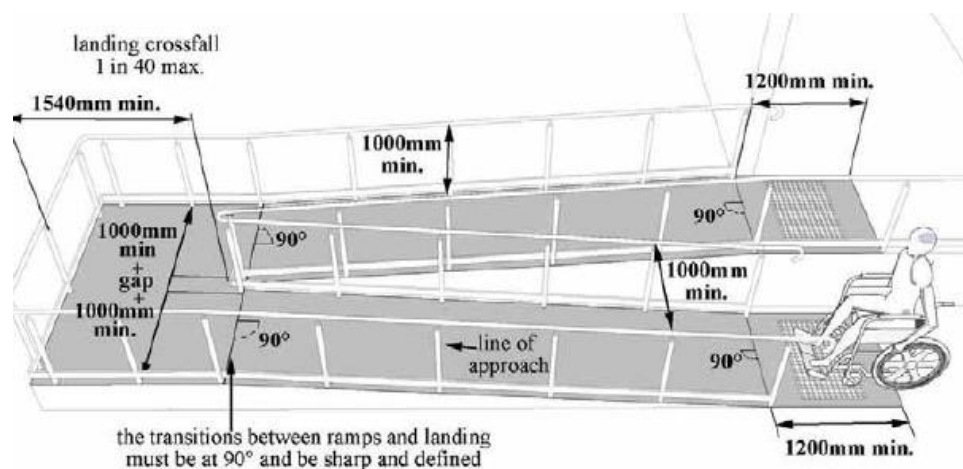


Figure No. 28: Ramp and Landing with Change in Direction of 180°

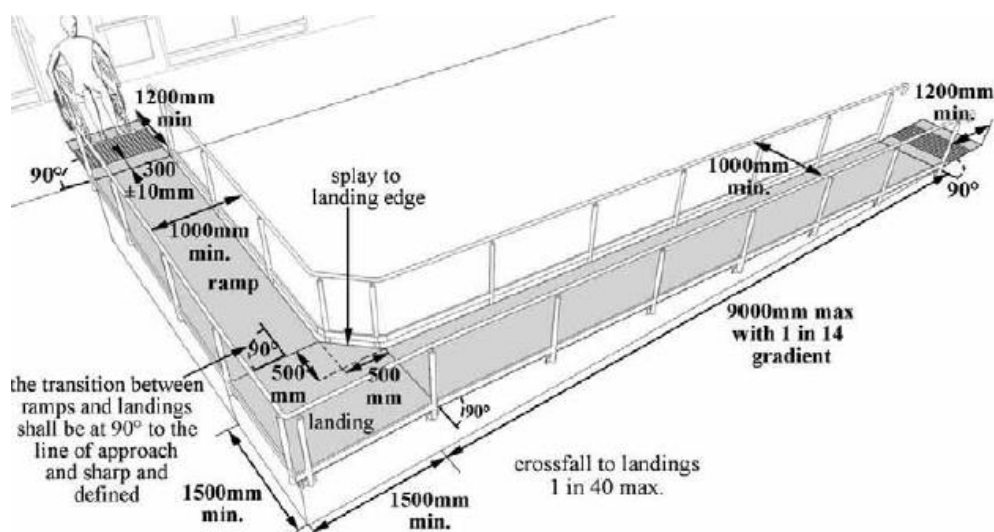


Figure No. 29: Ramp and Landing with Change of 90°

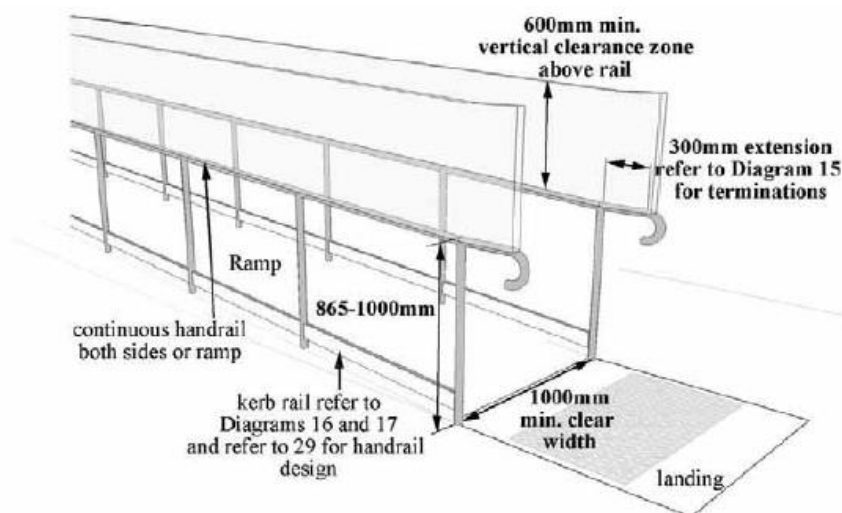


Figure No. 30: Handrail Extensions at Ramp Ending

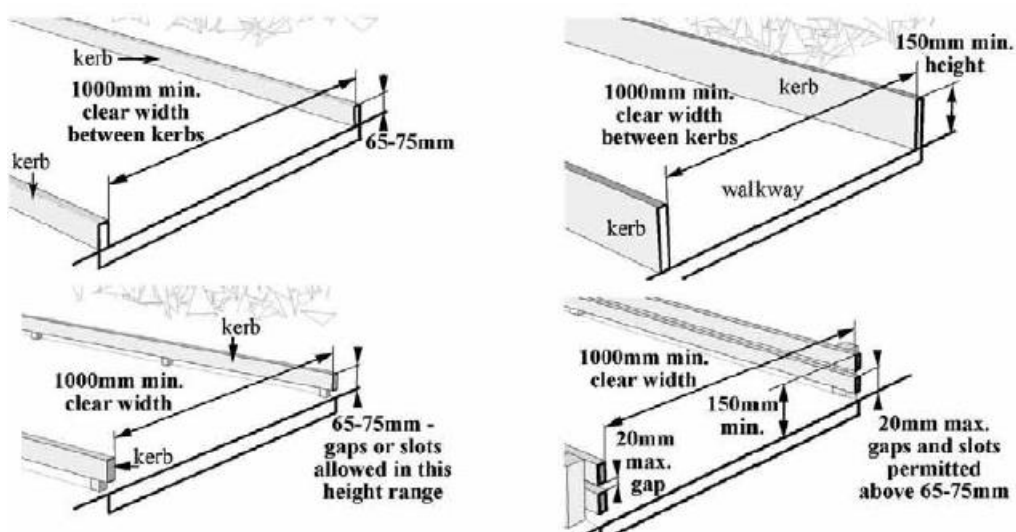




Figure No. 31: Kerb and Kerb Rail Design Options

### Accessible Stairways:

Circulation stairways (including any fire isolated stairways dedicated as staff circulation stairways) are required to be designed in accordance with AS 1428.1 - 2009. 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.*

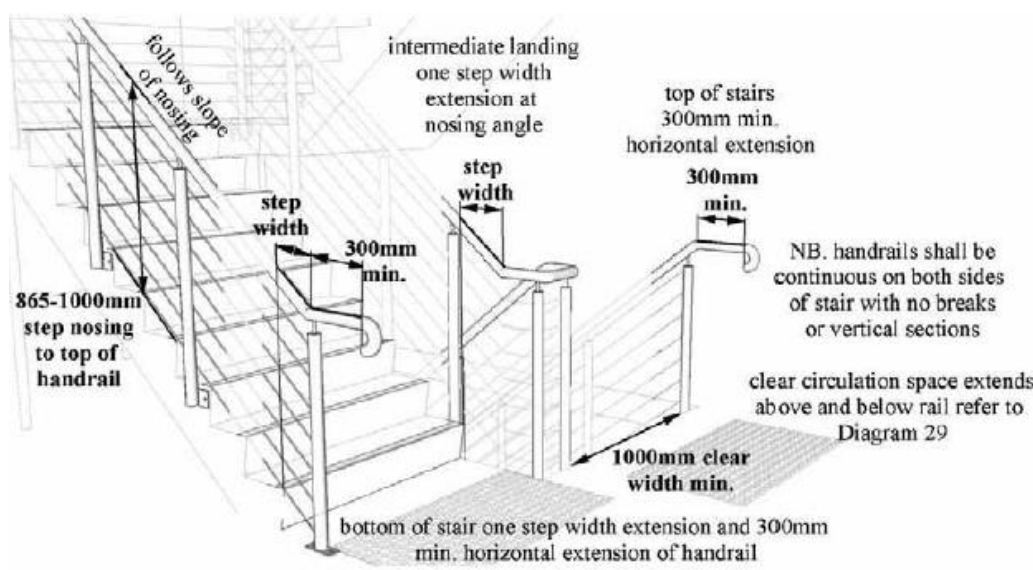


Figure No. 22: Handrails to Stairways

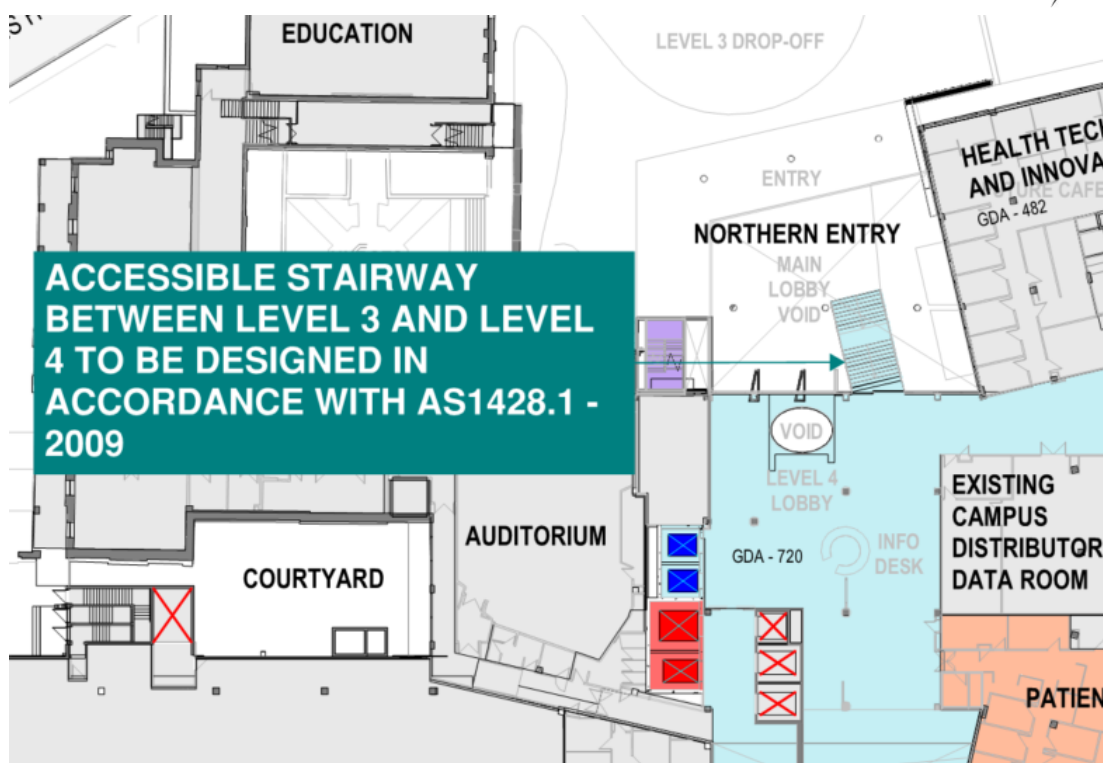


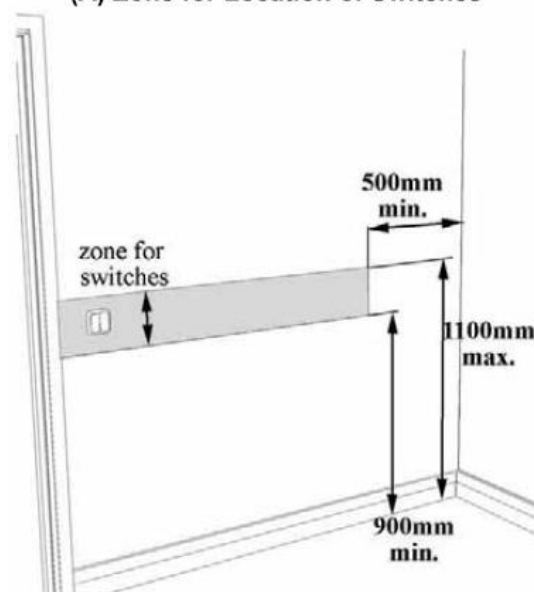
Figure No. 33: Stairway between Level 3 and Level 4 to be designed in accordance with AS 1428.1.

#### Access Control

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

#### (A) Zone for Location of Switches



#### (B) Zone for General Purpose Outlets in Sole Occupancy Units and Sanitary Facilities

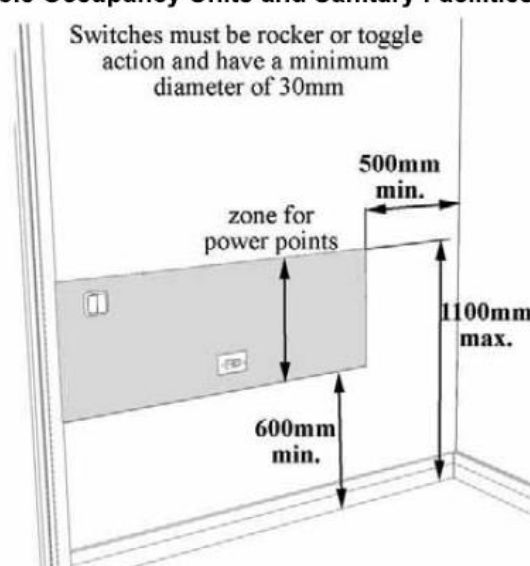


Figure No. 34: Zones for the location of switches and power outlets



### *Clear Turning Space Behind Workstations*

A minimum clearance of 1550mm is required to be provided between the edge of workstations / desks and the wall behind or between workstations located back-to-back to ensure that a staff member who is wheelchairbound has sufficient space to ensure manoeuvrability.

### *Wheelchair Seating in Waiting Areas*

Within the waiting areas at least one zone of 1300mm x 800mm is required to be provided for a wheelchair seating location for a person with a disability.

### *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.

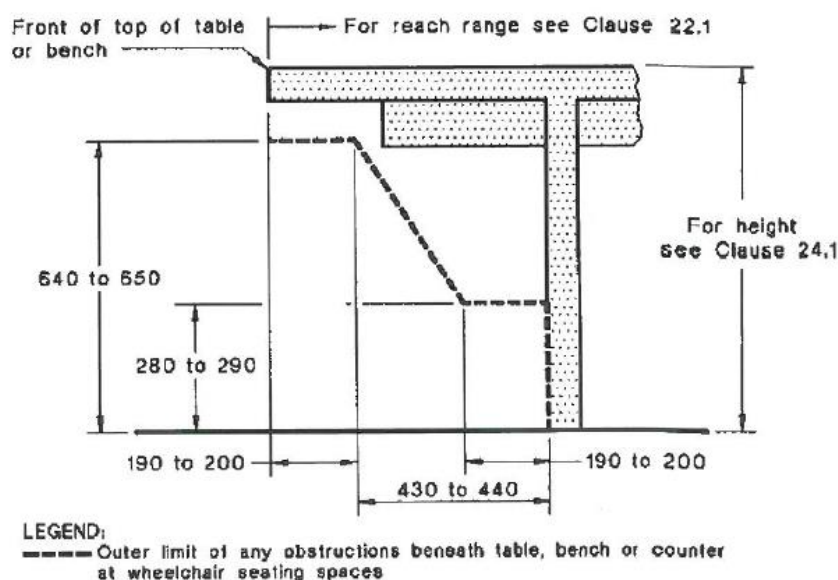


Figure No. 35: Clearances below an accessible counter or bench

### *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° 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.



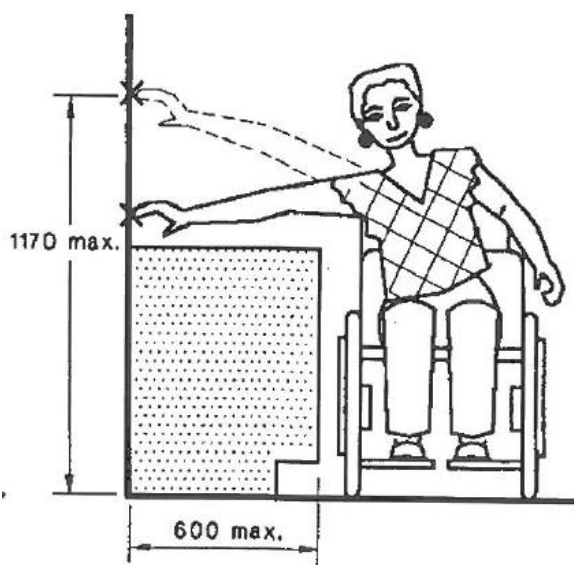


Figure No. 36: Side reach requirements for a wheelchair user

### Carpet

The pile height or pile thickness cannot exceed 11 mm and the carpet backing thickness cannot exceed 4 mm.

Exposed edges of floor covering are required to be fastened to the floor surface and is required to have a trim along the entire length of any exposed edge.

At the leading edges, carpet trims and any soft flexible materials are required to have a vertical face no higher than 3 mm or a rounded bevelled edge no higher than 5mm or above that height a gradient of 1 in 8 up to a total maximum height of 10 mm.

Note: In accordance with Clause D3.3 (h), the dimensions of 10mm, 6mm and 4mm are to be replaced with 11 mm, 4mm and 15 mm respectively.

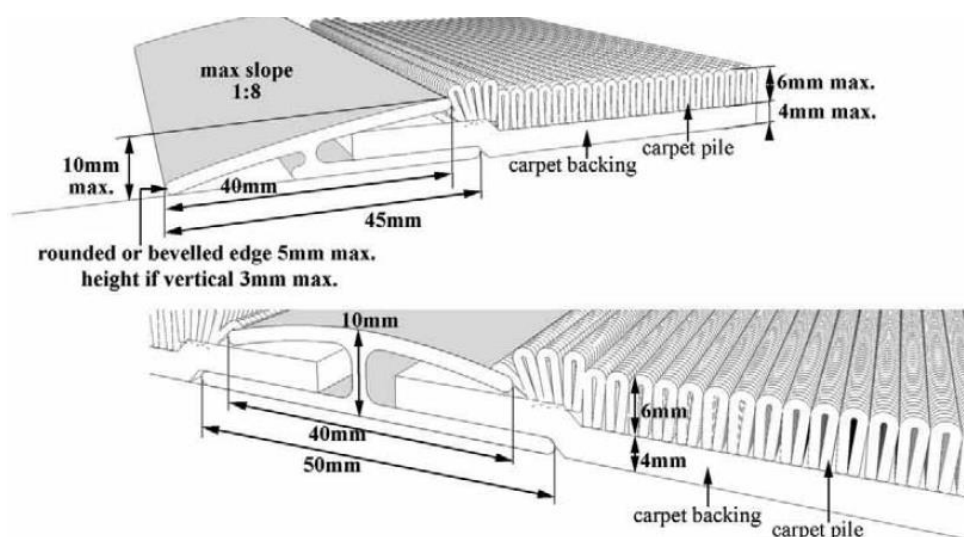


Figure No. 37: Carpet joints on an accessible path of travel



### Recessed Matting

Matting recessed within a continuous accessible path of travel is required to comply with the following:

- + Where of metal and bristle type construction or similar, its surface cannot be more than 3 mm if vertical or 5 mm if rounded or bevelled, above or below the surrounding surface; and
- + Where a mat or carpet type material, it is required to have the fully compressed surface level with or above the surrounding surface with a level difference no greater than 3 mm if vertical or 5 mm if rounded or bevelled.

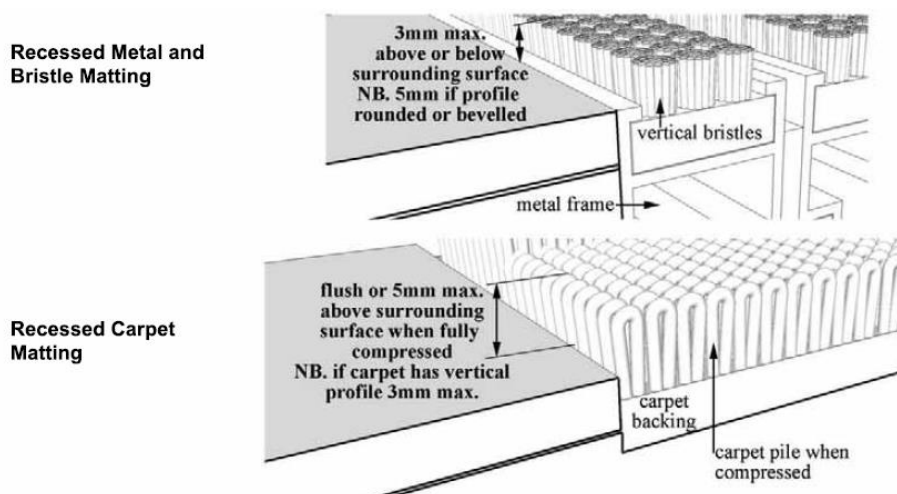


Figure No. 38: Recessed matting height tolerances

### Grates

Grates installed are required to comply with the following:

- + Circular openings cannot be greater than 13 mm in diameter.
- + Slotted openings cannot be greater than 13 mm wide and be orientated so that the long dimension is transverse to the dominant direction of travel.

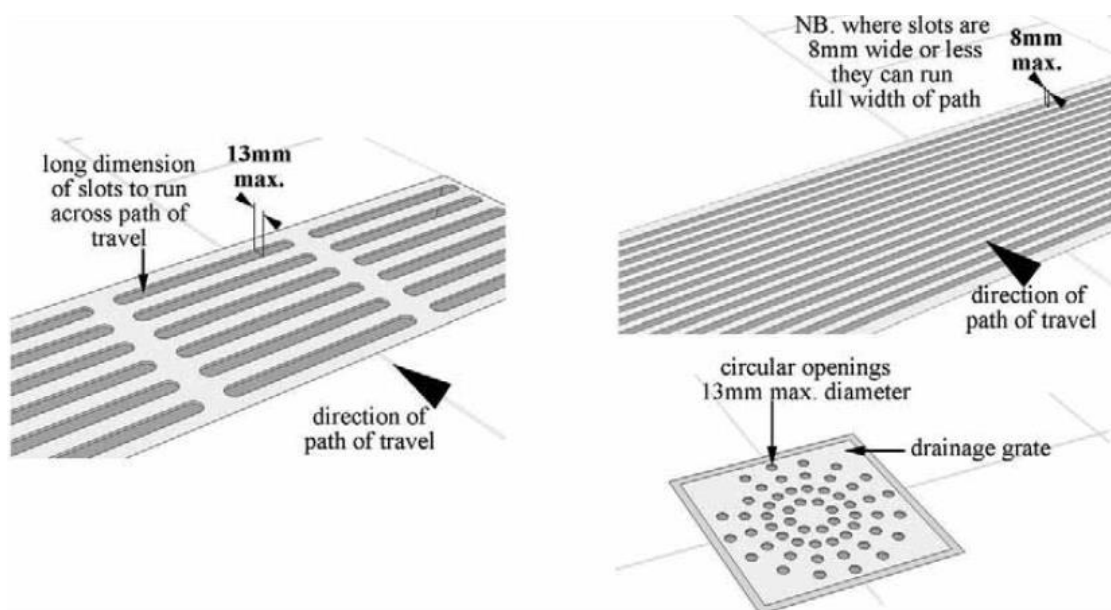


Figure No. 39: Maximum size of openings in grates





### Accessible Fixtures & Fittings:

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

Door hardware to swing doors is to be in accordance with the following diagrams:

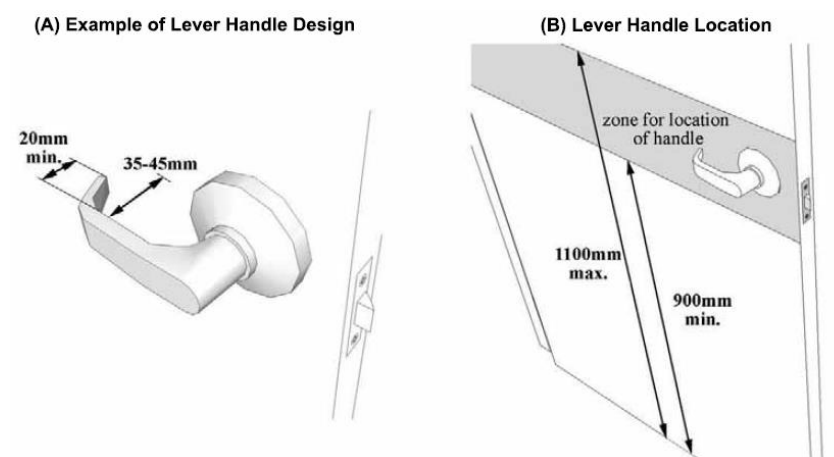


Figure No. 40: Door hardware to swing doors

Door hardware to sliding doors is to be in accordance with the following diagram:

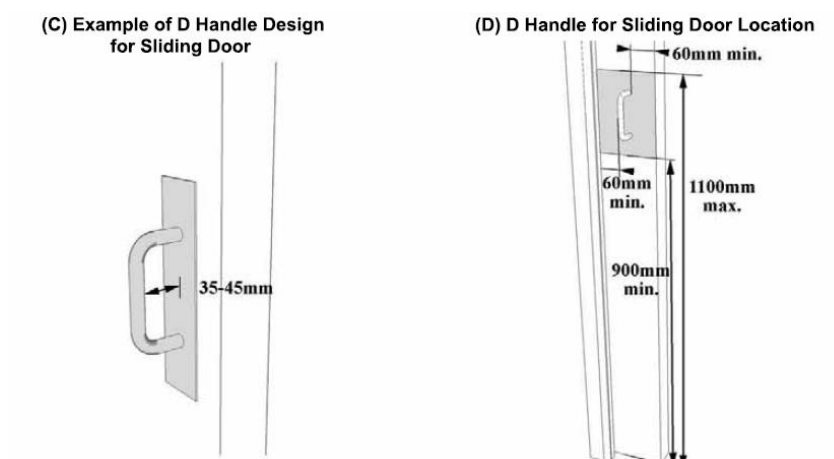


Figure No.41: Door hardware to sliding doors

- + 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.

## 59. Clause D3.4 – Exemptions

The following areas are not required to be accessible:

- + 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 Storerooms
- + General Storerooms
- + 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

The LHD are to provide written confirmation that access for any staff members with a disability is not required to be provided to the abovementioned rooms.

## 60. Clause D3.6 – Signage

Braille and tactile signage complying the requirements of Specification D3.6 is required to:

- + Incorporate the international symbol of access or deafness, as appropriate, in accordance with AS 1428.1 and identify each -
  - + Sanitary facility; and
  - + A space with a hearing augmentation system; and
- + 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
- + Signage including the international symbol for deafness in accordance with AS 1428.1 must be provided within a room containing a hearing augmentation system identifying –
  - ▲ The type of hearing augmentation; and
  - ▲ The are covered within the room; and
  - ▲ If receivers are being used and where the receivers can be obtained
- + Signage in accordance with AS 1428.1 must be provided for accessible unisex sanitary facilities to identify the facility is suitable for left or right-handed use.
- + Signage to identify an ambulant accessible sanitary facility in accordance with AS 1428.1 must be located on the door of the facility.
- + Where a pedestrian entrance is not accessible, directional signage incorporating the international symbol of access, in accordance with AS 1428.1 must be provided to the location of the nearest accessible pedestrian entrance.
- + Where a bank of sanitary facilities is not provided with an accessible unisex sanitary facility, directional signage incorporating the international symbol of access in accordance with AS 1428.1 must be placed



at the location of the sanitary facilities that are not accessible, to direct a person to the location of the nearest accessible unisex sanitary facility.

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.

### **Location of Braille and Tactile Signs**

Braille tactile signage including symbols, numbering and lettering is required to be designed in accordance with the following: -

- + Braille and tactile components of the sign must be located not less than 1200 - 1600mm above the ground or floor surface.
- + Signs with single lines of characters are to have the line of the tactile characters not less than 1250 mm and not more than 1350 mm above the floor or ground surface.
- + Signs identifying rooms containing features or facilities listed in D3.6 are required to be located –
  - ▲ On the wall on the latch side of the door with the leading edge of the sign located between 50 mm and 300 mm from the architrave; and
  - ▲ Where the above is not possible, the sign is permitted to be located on the door itself.
- + Signs identifying a door required to by Clause E4.5 to be provided with an exit must be located –
  - ▲ On the side that faces a person seeking egress; and
  - ▲ On the wall on the latch side of the door with the leading edge of the sign located between 50 mm and 300 mm from the architrave; and

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
- + Provides direct egress to a roadway or open space

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





### **Signage Specification: -**

- + Tactile characters must be raised or embossed to a height of not less than 1 mm and not more than 1.5 mm.
- + Title case must be used for all tactile characters, and
  - ▲ Upper case tactile characters must have a height of not less than 15 mm and not more than 55 mm, except that the upper-case tactile characters on a sign identifying a door required by Clause E4.5 to be provided with an exit sign must have of not less 20 mm and not more than 55 mm; and
  - ▲ Lower case tactile characters must have a minimum height of 50% of the related uppercase characters.
- + Tactile characters, symbols, and the like, must have rounded edges.
- + The entire sign, including any frame, must have all edges rounded.
- + The background, negative space or fill of signs must be of matt or low sheen finish.
- + The characters, symbols, logos and other features on signs must be matt or low sheen finish.
- + The minimum letter spacing of tactile characters on signs must be 2 mm.
- + The minimum word spacing of tactile characters on signs must be 10 mm.
- + The thickness of letter strokes must not be less than 2 mm and not more than 7mm.
- + Tactile text must be left justified, except that single words may be centre justified.
- + Tactile text must be Aerial typeface

## **61. Clause D3.7 – Hearing Augmentation**

### **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.

If a hearing augmentation system is:

- + An induction loop, it must be provided to not less than 80% of the floor area of the room or space served by the inbuilt amplification system; or
- + A system requiring the use of receivers or the like, it must be available to not less than 95% of the floor area of the room or space served by the inbuilt amplification system, and the number of receivers must not be less than -
  - ▲ If the room or space accommodates up to 500 persons, 1 receiver for every 25 persons or part thereof, or 2 receivers, whichever is the greater; and



- ▲ If the room or space accommodates more than 500 persons but not more than 1000 persons, 20 receivers plus 1 receiver for every 33 persons or part thereof in excess of 500 persons.

#### 62. Clause D3.8 – Tactile Indicators

The DTS Provisions of the BCA grant a concession for the provision of tactile ground surface indicators to stairways and ramps within the building.

In this instance tactile ground surface indicators are not required to be installed to internal stairways, however all external stairways and ramps providing access to and from the building will be required to be provided with tactile ground surface indicators.

#### 63. Clause D3.11 – Ramps

On an accessway –

- + A series of connected ramps must not have a combined vertical rise of more than 3.6 m; and
- + A landing for a step ramp must not overlap a landing for another step ramp or ramp.

The Schematic Architectural Drawings indicate that there are no pedestrian ramps associated with the development.

#### 64. Clause D3.12 – Glazing on an Accessway

On an accessway where there is no chair rail, handrail or transom provided to all frameless or fully glazed doors, sidelights and any glazing capable of being mistaken for a doorway or 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

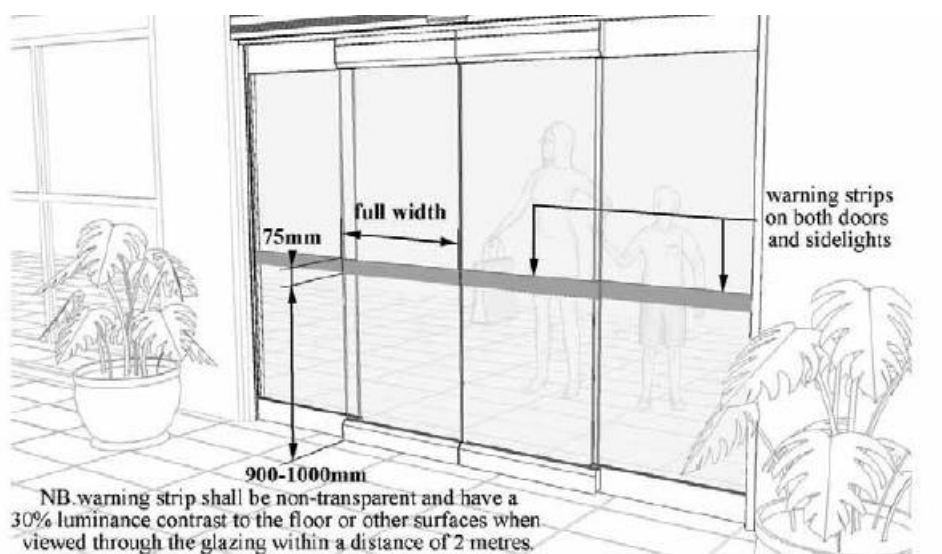


Figure No. 42: Warning Strips to Full Height Glazing



## SECTION E – SERVICES AND EQUIPMENT

### PART E1 – FIRE FIGHTING EQUIPMENT

#### 65. Part E1 – E4 – Essential Fire Safety Measures

The following essential fire safety measures are required to be installed within the new RPA Hospital Redevelopment.

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.
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 – 2022 (based on NCC 2022)



Essential Fire and Other Safety Measures	Standard of Performance
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
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





## 66. 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 and AS 2118.6.

### *System Performance*

Based on the fact that the building contains 3 storeys or more together with the fact that the Fire Compartments will exceed 500 m<sup>2</sup>, 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 fire hydrant ring main (incorporated as part of the combined fire sprinkler and fire hydrant system).

### *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*

In accordance with AS 2419.1 – 2005, an internal fire hydrant pump room is required to be located so that the doorway opening to the pump room leads directly to a road or open or alternatively to a fire isolated exit via an airlock.

The proposed design is capable of achieving compliance with the requirements of AS 2419.1 – 2005.

### *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.

It is understood that a new Combined Fire Hydrant & Sprinkler Booter is proposed as part of the Lambie Dew Drive works which will serve the New East Building together with the existing areas served. The new



location is nominated along John Hopkins Drive 'existing Level 3 drop-off' with the final location to be co-ordinated amongst the consultant team.

It is understood that the proposed booster will comply with the provisions of AS 2419.1 – 2005 in terms of location with the exception of the fact that the fire hydrant booster will not be located within sight of the main entrance of the building. The proposed location of the booster not within sight of the main entrance of the building will be required to be assessed as part of a Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in consultation with FRNSW in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

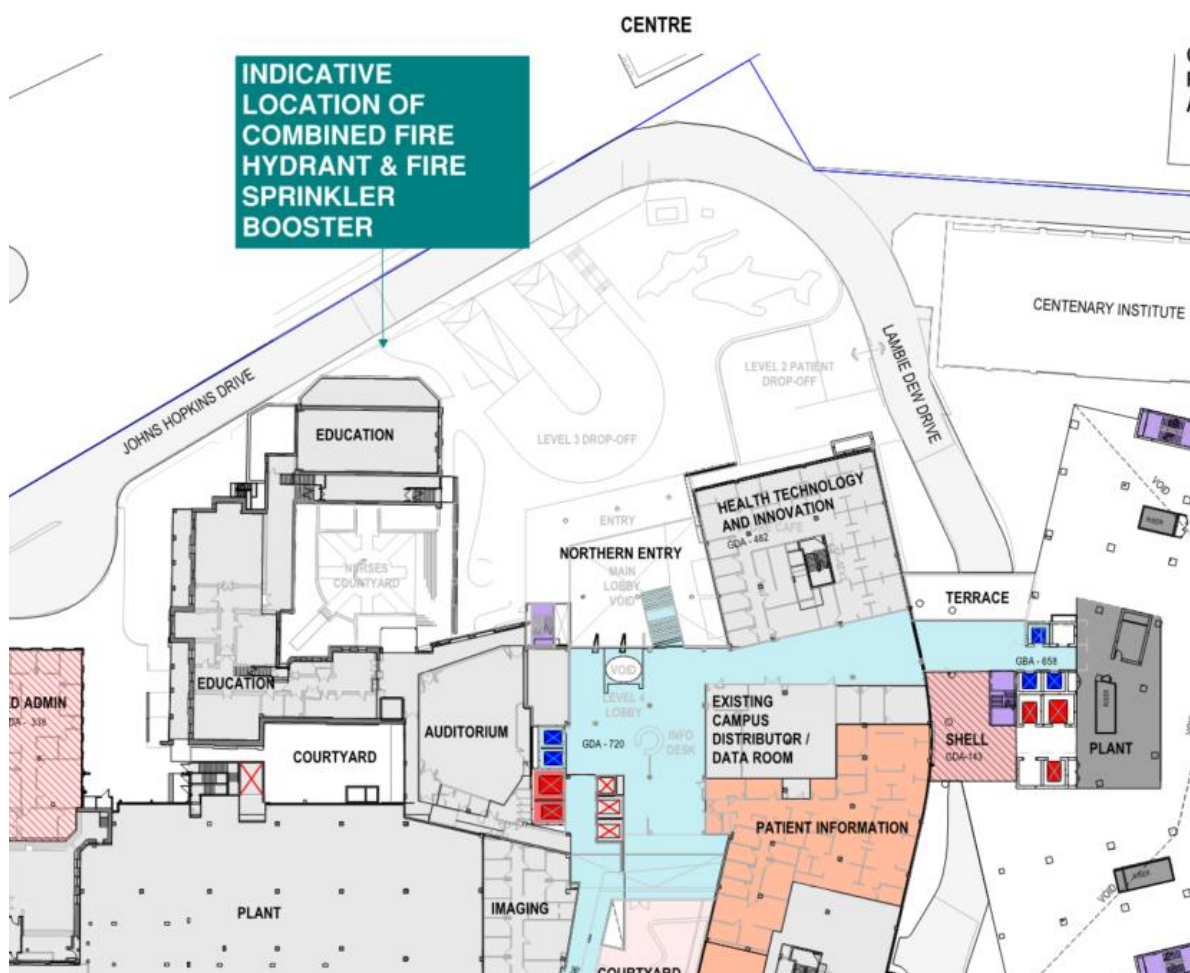


Figure No. 43: Indicative location of Fire Hydrant & Sprinkler Booster on John Hopkins Drive within proximity to the Level 3 Northern Entry

#### *Ring Main*

The fire hydrants installed within the building are required to be connected to a ring main as part of the of Combined Fire Sprinkler and Hydrant System.

#### *Existing Fire Hydrant System serving the existing Multi Storey Car Park*

The existing fire hydrant system serving the existing multi storey car park where the temporary HLS is proposed to be constructed will be reviewed and verified as being acceptable to meet the operational requirements of FRNSW for the length of time that the temporary HLS site is in use for.

### **67. 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 i.e., fire separated Comms Rooms etc.

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 the appointed Fire Safety Engineer 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 180° 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*

#### *Services within cupboards Housing FHRs*

In accordance with AS 2441 – 2005, the cupboards housing fire hose reels are not permitted to contain non-fire equipment services.

### **68. Clause E1.5 – Sprinklers**

An Automatic Fire Suppression System will be required to be installed throughout the new East Tower and proposed Eastern and Northern extensions along with each of the refurbished areas . 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.

### *Fire Sprinkler 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.

It is understood that a new Combined Fire Hydrant & Sprinkler Booter is proposed as part of the Lambie Dew Drive works which will serve the New East Building together with the existing areas served. The new location is nominated along John Hopkins Drive 'existing Level 3 drop-off' with the final location to be co-originated amongst the consultant team.

It is understood that the proposed booster will comply with the provisions of AS 2419.1 – 2005 in terms of location with the exception of the fact that the fire hydrant booster will not be located within sight of the main entrance of the building. The proposed location of the booster not within sight of the main entrance of the building will be required to be assessed as part of a Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in consultation with FRNSW in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

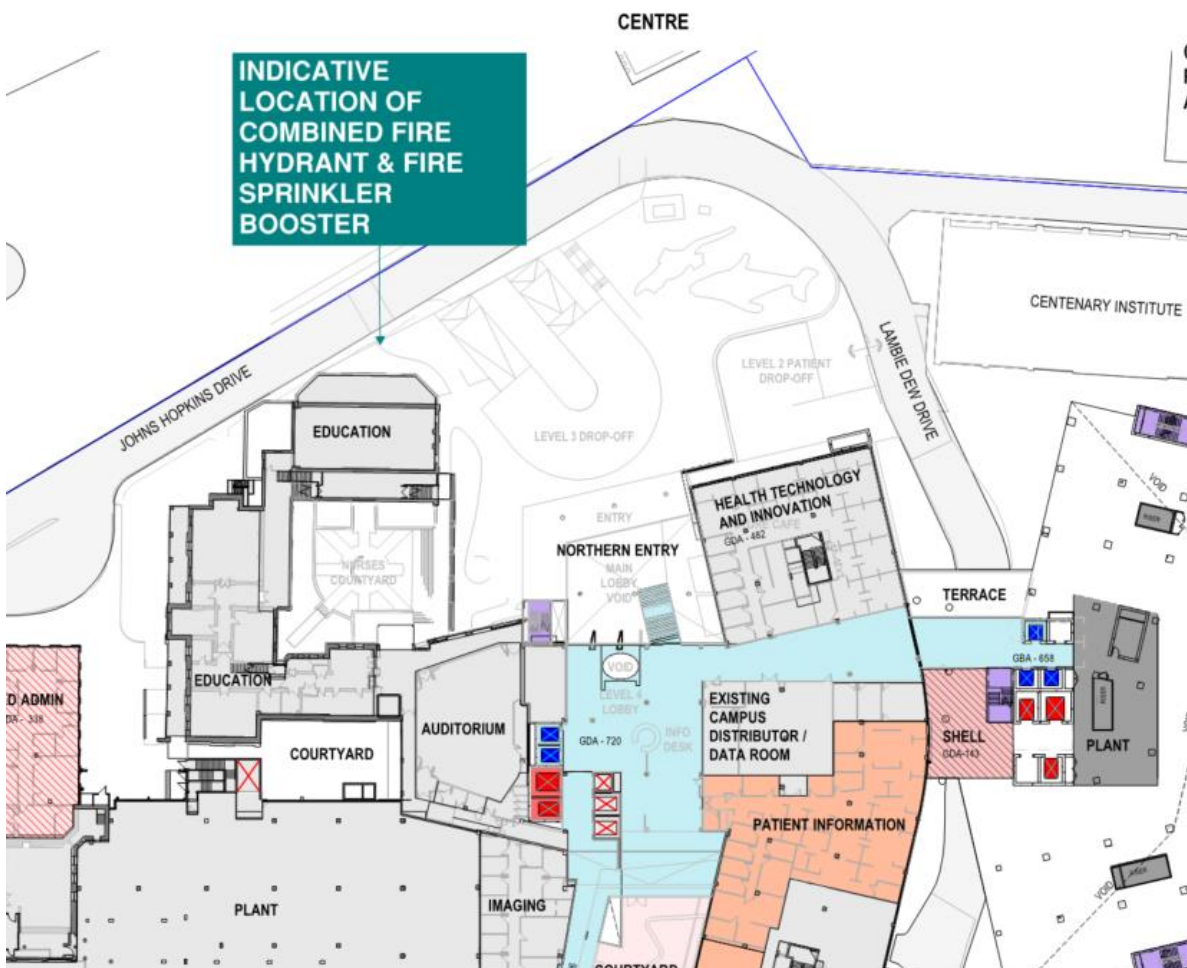


Figure No. 44: Indicative location of Fire Hydrant & Sprinkler Booster on John Hopkins Drive within proximity to the Level 3 Northern Entry

### *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/undercroft 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 the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

#### *Connection to Other Systems*

It is likely having regard to the number of fire compartments contained on each of the level of the building that it will not be practicable for the Zone Smoke Control System to be activated by the Automatic Fire Suppression System.





In this instance, the Zone Smoke Control will typically only be activated by the Automatic Fire Detection & Alarm System and not the Automatic Fire Suppression System.

The activation of the Zone Smoke Control System by the Automatic Fire Detection & Alarm System only will be required to be addressed as part of a Fire Engineering Performance Solution to be prepared by the appointed Fire Safety Engineer.

#### *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 stairway(s) on each level with direct access being provided to the stairway from open space for FRNSW personnel.

#### *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.

#### *Sprinkler Coverage to Cupboards*

Sprinklers are permitted to be omitted from cupboards for Light Hazard and Ordinary Hazard occupancies, provided the following is achieved:

- + The floor area of the cupboard does not exceed 2.5 m<sup>2</sup>;
- + The walls and ceilings are lined with non-combustible materials;
- + The cupboard is not used for the storage of flammable liquids; and
- + Sprinklers in the corridor are positioned in front of the cupboard so the sprinkler head provides coverage or the area of the cupboard if the doors are in the open position
- + Be capable of being isolated and drained, either separately or collectively without isolating any other sprinklers in the building.

#### *Sprinkler Coverage in Plant Rooms obstructed by Mechanical Ducts*

Design co-ordination needs to take place between the Mechanical Design Consultant and Fire Services Consultant to ensure that all mechanical ducts that have a width of 800 mm greater are provided with a sprinkler head below the duct and where there are ducts that are less than 800 mm in width but are located in close proximity to one another, that sprinkler coverage below the ducts is reviewed to ensure that compliant coverage is achieved.

## **69. Clause E1.8 – Fire Control Centres**

### *Fire Control Room*

Due to the building having an effective height greater than 50m, a dedicated fire control room must be constructed as a separate room that is fire separated from the remainder of the building with two points of access (if installed within the building).

### *Location of Fire Control Room*

A fire control room is required to be accessible from the front entrance of the building and be located so that egress from any part of its floor, to a road or open space, does not involve a change in level which in aggregate exceeds 300mm.



Verification will be required as to whether the existing Fire Control Room serving the hospital development will be retained and if so, complies with the requirements of Clause E1.8 or whether a new Fire Control Room will be constructed as part of the redevelopment.

#### *Construction of Fire Control Room*

The fire control centre is required to be constructed in a separate room where: -

- + The enclosing construction is of concrete, masonry or the like, sufficiently impact resistant to withstand the impact of any likely falling debris, and with an FRL of not less than 120/120/120; and
- + Any material used as a finish, surface, lining or the like within the room complies with the requirements of Specification C1.10; and
- + Services, pipes, ducts and the like that are not directly required for the proper functioning of the fire control room do not pass through it; and
- + Openings in the walls, floors or ceilings which separate the room from the interior of the building are confined to the doorways, ventilation and other openings for services necessary for the proper functioning of the fire control room.

#### *No. of Doorways Accessing*

A fire control room is required to be accessed by a minimum of two (2) doorways, one from outside and one direct from a public place or fire isolated passageway.

## **PART E2 – SMOKE HAZARD MANAGEMENT**

### **70. Clause E2.2 – General Requirements**

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.

Key elements of Specification E2.2a and AS 1670.1 - 2018 which require close attention are as follows:

- + Photoelectric type smoke detectors are required to be installed in all patient care areas in paths of travel to exits from patient care areas.
- + In rooms where there is the likelihood of spurious alarms i.e., Dirty Utilities, Cleaners Rooms etc smoke detectors may be replaced with thermal detectors.
- + Smoke detectors required to activate the stair pressurisation system for the fire isolated stairways and zone pressurisation system are required to –
  - ▲ Be installed in accordance with AS 1670.1 – 2018; and
  - ▲ Have additional smoke detectors installed adjacent to each back of lift landings doors set back horizontally from the door openings by a distance of not more than 3m.
- + 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 50m<sup>2</sup> i.e., when less than 50m<sup>2</sup>, 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 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<sup>2</sup>.
- + Any cupboard with a floor area >3m<sup>3</sup> is required to be protected.
- + All electrical cupboards, comms cupboards etc. irrespective of the size are required to be protected.
- + Detectors are to be installed to the lift shafts, service shafts etc as required by AS 1670.1 – 2018.

#### *Extended Spacing Smoke Detectors within Ceiling Voids*

In accordance with Clause 5.1.7 of AS 1670.1 – 2018, smoke detectors are required to be installed within ceiling voids on a grid basis with maximum 10 m spacing.

If smoke detectors are proposed to be installed on an extended grid system within the ceiling void i.e., 15 m in lieu of 10 m then the proposed design will be required to be addressed as part of a Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

#### *Manual Call Points*

Manual call points are required to be installed in evacuation routes so that no point on a floor is more than 30 m from a manual call point. All Manual Call Points that activate the buildings Fire Alarm System are required to be red.

#### *Manual Call Points in Fire Hose Reel / Fire Hydrant Cupboards*

In accordance with AS 1670.1 – 2018, manual call points are required to be mounted between 750 mm and 1200 mm above floor level and a clear space of 300 mm on both sides and 600 mm directly in front are required to be provided in an arc in front of the manual call points.

Where manual call points are installed within fire hose reel cupboards to avoid them being visible and being subject to unintended use, the clearance requirements of AS 1670.1 – 2018 around the manual call point will be unable to be achieved.

The clear space around the manual call points will be required to be assessed as part of the Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

#### *Zone Smoke Control System*

A Zone Smoke Control System is required to be installed throughout the new East Tower and proposed Eastern and Northern extensions along with each of the refurbished areas.

The Zone Smoke Control System will be required to be designed in accordance with Table E2.2a and AS 1668.1 – 2018. For the new East Tower and Northern and Eastern expansions, the system is proposed to be designed so that a pressure differential is achieved between vertical fire compartments as required by Table E2.2a of the BCA.

Where new extensions and alterations and additions interface within existing parts of the building and where refurbishments are undertaken within the existing building, the existing Zone Smoke Control System strategy where a pressure differential is achieved between horizontal fire compartments will look to maintained

#### *Zone Smoke Control System serving the Atrium Front of House Area*



Table E2.2a of the BCA requires that a Zone Smoke Control system installed within a Class 9a building must achieve a pressure differential between vertically separated fire compartments in accordance with AS 1668.1 – 2015.

Section 8 of AS 1668.1 – 2015 requires that a zone pressurisation system is required to operate in a manner such that the pressure in the fire affected compartment is required to be maintained between 20 Pa and 80 Pa below that of all non-fire affected smoke control zones.

As a result of the proposed Atrium connecting Levels 3 – 6 it is unlikely that the required pressure differential will be able to be maintained between vertical fire compartments above and below the atrium.

If the pressure differential cannot be achieved between vertical fire compartments directly below and above the atrium, then the technical non-compliance will be required to be addressed as part of a Fire Engineering Assessment to be undertaken by the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated performance requirements of the BCA.

#### *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.

## **PART E3 – LIFT INSTALLATIONS**

### **71. 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 within the new East Tower, North and East extensions.

A stretcher facility will also be required to be designed for the lifts serving the temporary HLS site on the existing multi storey car park.

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.

### **72. 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.

### **73. 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.

### **74. Clause E3.6 – Passenger Lifts**

The passenger lifts serving the new East Tower, North and East extensions along with the Temporary HLS site are required to be designed and installed in accordance with the requirements of Clause E3.6 and specifically Table E3.6b.

### **75. 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.

#### **76. 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.

### **PART E4 – VISIBILITY IN AN EMERGENCY, EXIT SIGNS AND WARNING SYSTEMS**

#### **77. 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<sup>2</sup> 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.

#### **78. 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.

#### **79. 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.

#### **80. 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 likely to be rationalised within ward and treatment rooms including patient bedrooms 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 the appointed Fire Safety Engineer in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

## **SECTION F – HEALTH & AMENITY**

### **PART F1 – DAMP AND WEATHERPROOFING**

#### **81. 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.

#### **82. Clause F1.4 – External above Ground Membranes**

All waterproofing membranes to external areas are to be designed and constructed in accordance with AS 4654 Parts 1 & 2. Particular attention is required to doorways leading to external areas where there is a level threshold.

This is not just a waterproofing issue but also an architectural design issue where grated drains may be required to be installed in front of the door where a step down is not provided.

#### **83. Clause F1.5 – Roof Coverings**

A roof is required to covered with –

- + Concrete roofing tiles complying with AS 2049 and fixed in accordance with AS 2050; or
- + Terracotta roofing tiles complying with AS 2049 and fixed in accordance with AS 2050; or
- + Cellulose cement corrugated sheeting complying with AS/NZS 2908.1 and installed in accordance with AS/NZS 1562.2; or
- + Metal sheet roofing complying with AS 1562.1; or
- + Plastic sheet roofing designed and installed in accordance with AS/NZS 4256.1, AS/NZS 4256.2, AS/NZS 4256.3, AS/NZS 4256.5 and AS/NZS 1562.3; or
- + Terracotta, fibre-cement and timber slates and shingles design and installed in accordance with AS 4597.

#### **84. Clause F1.6 – Sarking**

Sarking-type material used for weatherproofing of roofs and walls is required to comply with AS/NZS 4200.1 and AS 4200.2.

#### **85. Clause F1.7 – Waterproofing of Wet Areas**



Building elements in the bathroom or shower room, a slop hopper or sink compartment, a laundry or sanitary compartment is required:

- + Be water resistant or waterproof in accordance with Table F1.7; and
- + Be constructed in accordance with AS 3740

#### 86. Clause F1.9 – Damp-Proofing

Moisture from the ground must be prevented from reaching –

- + The walls above the damp-proof course; and
- + The underside of a suspended floor construction of a material other than timber, and the supporting beams or girders.

Where a damp-proof course is provided, it is required to consist of:

- + A material that complies with AS/NZS 2904; or
- + Impervious sheet material in accordance with AS 3660.1

## PART F2 – SANITARY AND OTHER FACILITIES

#### 87. 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

#### *Ratio of Showers in Treatment Areas*

A ratio of 1:8 showers is required to be provided for patients within patient care areas.

#### *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	2			1 - 8	1
	> 16	Add 1 per 8			> 8	Add 1 per 8
Female Patients	1 - 16	2			1 - 8	1
	> 16	Add 1 per 8			> 8	Add 1 per 8

Table No. 14 – Sanitary facilities required for patients

### *Provision of Unisex Sanitary Compartments containing Water Closets*

Sanitary compartments containing water closets are required to be provided separately for males and females.

The provision of unisex sanitary compartments containing water closets in lieu of separate facilities for males and females throughout the building will be required to be assessed as part of a Performance Solution in order to demonstrate compliance with the nominated Performance Requirements of the BCA.

## **88. 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.

### Accessible Sanitary Facilities

The unisex accessible sanitary facility to be provided is required to be designed spatially in accordance with the following figures:

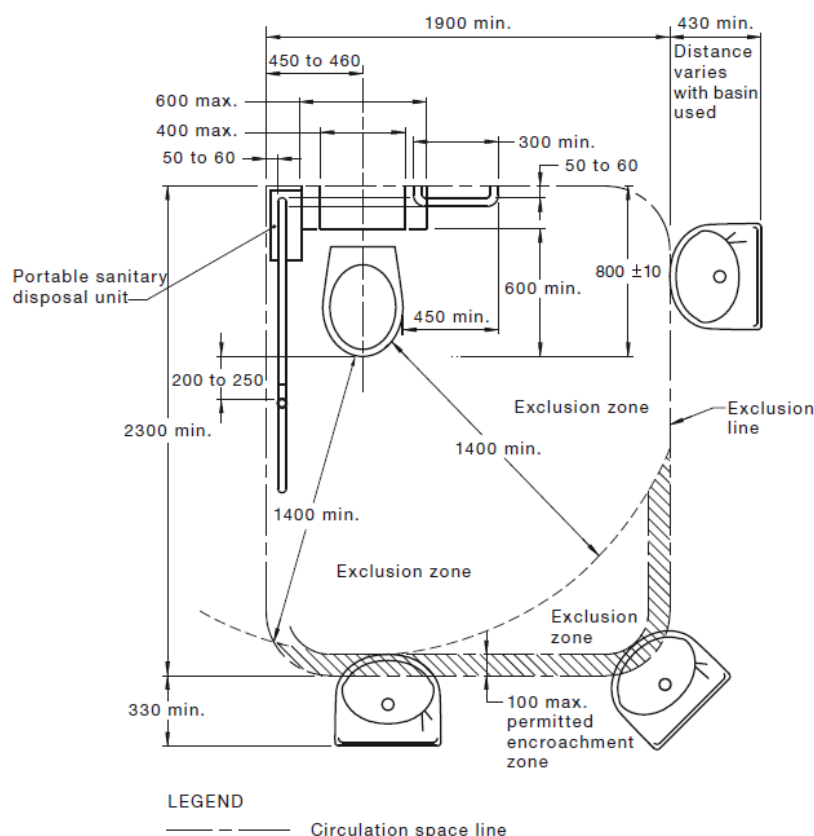
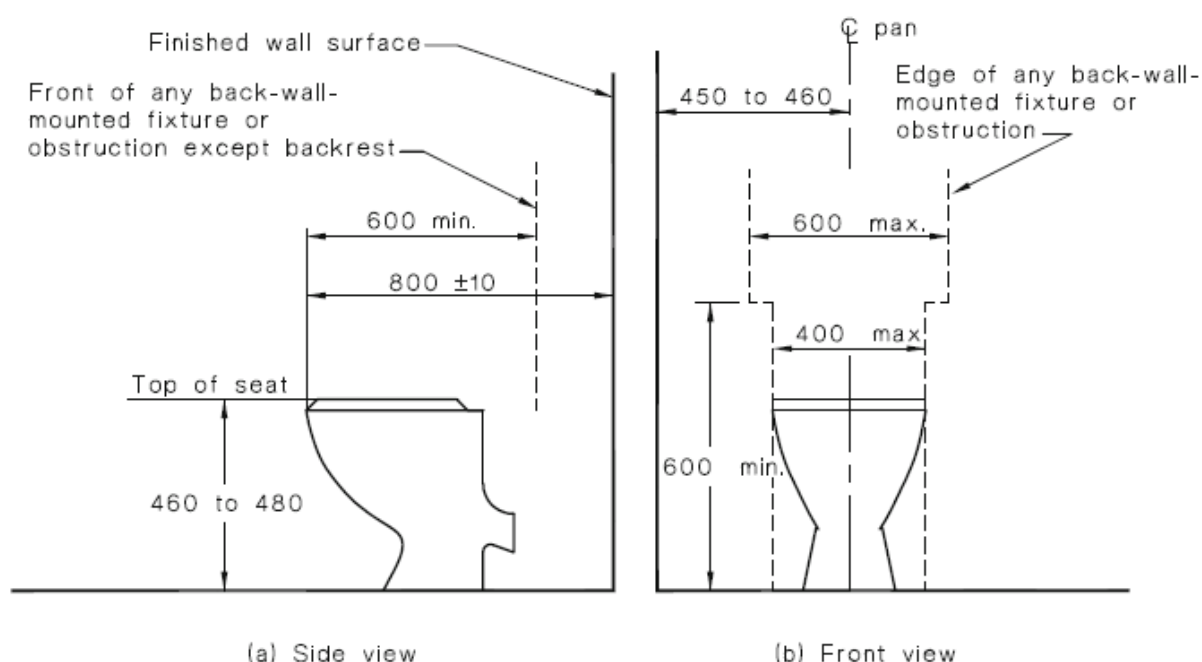


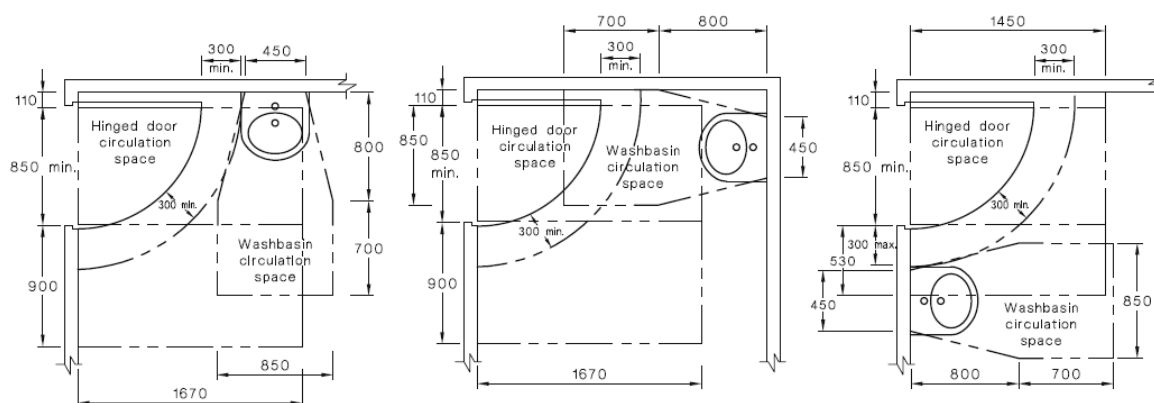
Figure No. 45: Circulation space required within the accessible sanitary facility

Clearances around the water closet are to be in accordance with the figure below:





Basins are permitted to encroach within the circulation space of doorways as detailed within the following Figure:



The following specific items are required to be installed within the unisex accessible sanitary facility:

- + Rocker action and toggle switches are required to be installed which have a minimum dimension of 30 mm x 30 mm. Push-pad switches are to have a minimum dimension of 25mm in diameter.
- + General purpose outlets are to be located between 600 mm to 1100 mm above FFL and not less than 500 mm from any internal corner.
- + The outlet for the toilet paper dispenser is to be located in accordance with the following figure. The toilet paper cannot encroach upon the clearance space required around the grabrail.

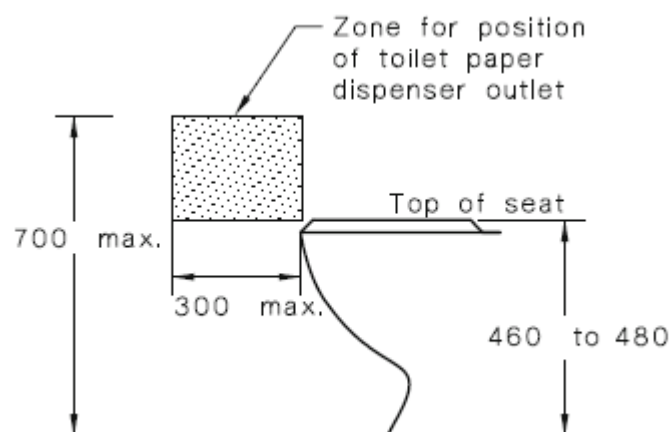


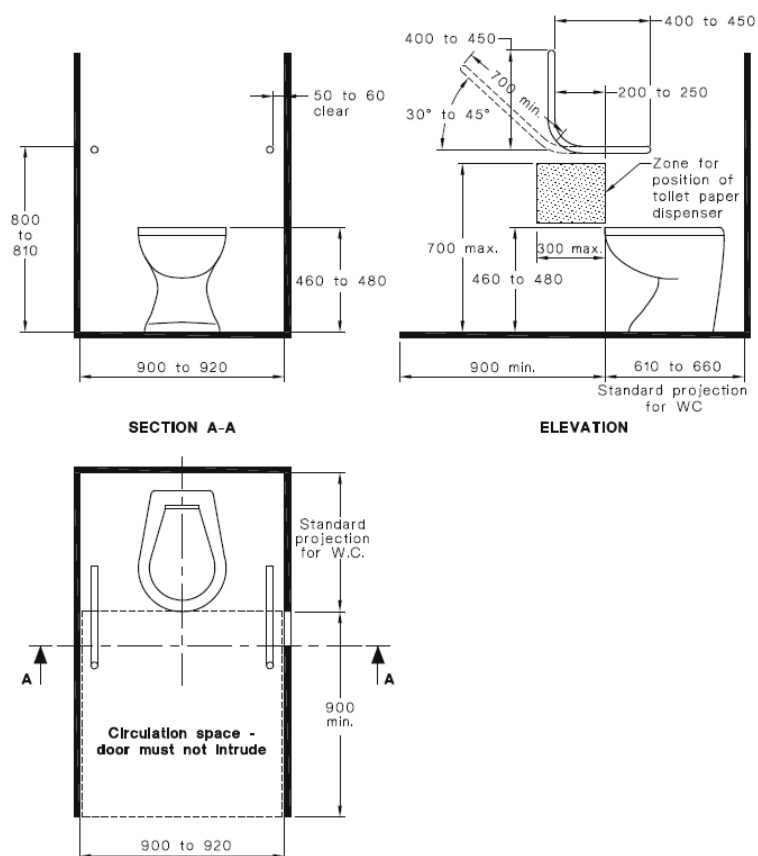
Figure No. 48: Required zone for toilet paper dispenser

Shelf space is required to be provided adjacent to the washbasin in accordance with the one of the following:

- + As a vanity top at a height of 800 mm to 830 mm and a minimum width of 120 mm and a depth of 300 mm to 400 mm without encroaching into any circulation space.
- + As a separate fixture –
  - ▶ Within any circulation space at a height of 900 mm to 1000mm with a width of 120 mm to 150 mm and length of 300 mm to 400 mm; and
  - ▶ External to all circulation spaces at a height of 790 mm to 1000 mm with a minimum width of 120 mm and a minimum length of 400 mm.
  - ▶ Where provided, Soap dispensers, towel dispensers, hand dryers and similar fittings are required to be operable by one hand and are to be installed with the height of their operative component or outlet not less than 900 mm and not more than 1100 mm above FFL and no closer than 500 mm from an internal corner.
  - ▶ A coat hook is to be provided at a height between 1200 mm to 1350 mm above FFL and not less than 500 mm from an internal corner.

#### *Ambulant Sanitary Compartments*

The ambulant sanitary compartments are required to be designed spatially in accordance with the following Figures:



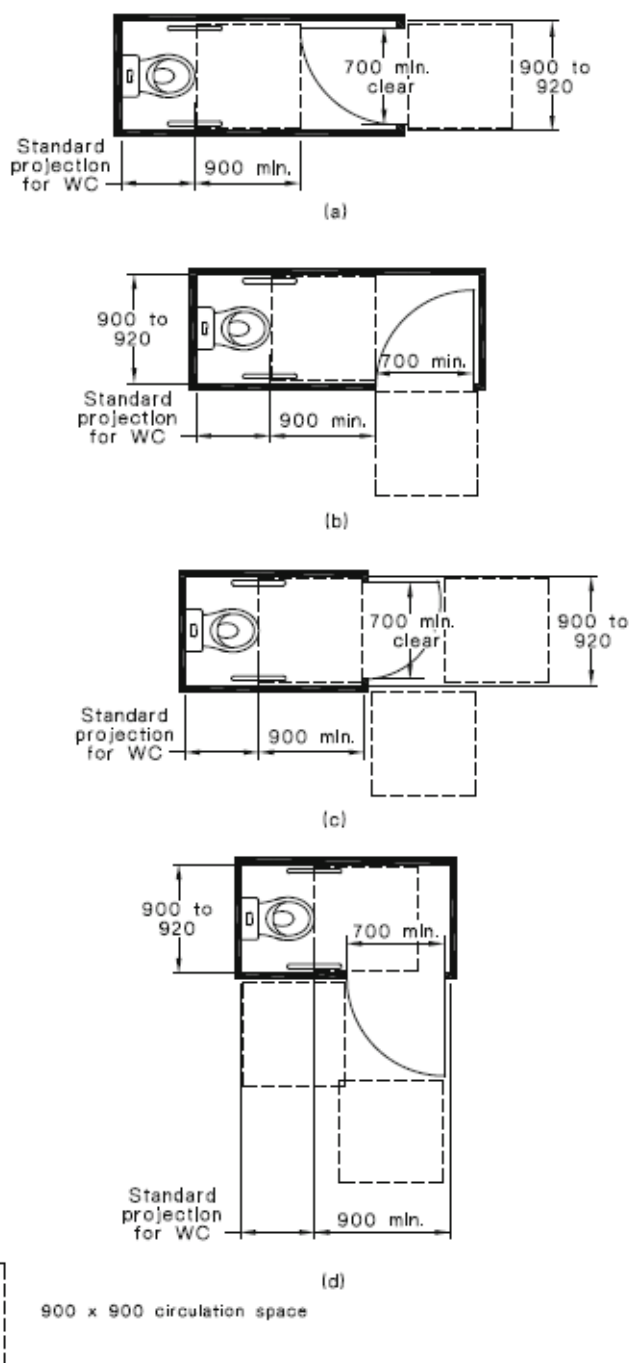


Figure No. 50: Options for doorways leading to ambulant sanitary compartments

## 89. 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 1200 mm measured in accordance with the below figure, between the closet pan within the sanitary compartment and the doorway.

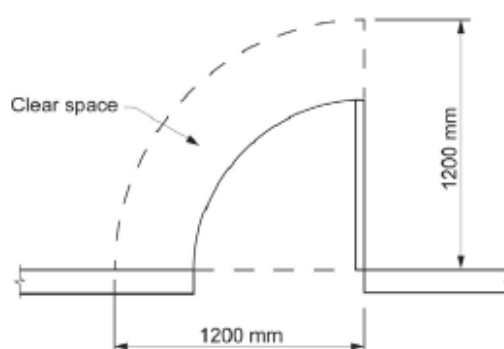


Figure No. 51: Minimum distance required between doorway and pan in a fully enclosed sanitary compartment

## 90. 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.

## PART F3 – ROOM HEIGHTS

## 91. 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, consultation room, passageway, corridor or the like – 2400 mm;
- + in an operating theatres or delivery rooms – 3000 mm;
- + Staff administration areas including offices, meeting rooms etc – 2400 mm
- + Bathroom, shower room, sanitary compartment, airlock, tea preparation room, pantry, storeroom or the like must achieve a minimum height of 2.1m; and
- + Fire isolated exits – 2000 mm.

## PART F4 – LIGHT AND VENTILATION

## 92. Clause F4.1 – Provision of Natural Light

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

## 93. Clause F4.4 – Artificial Lighting

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

Artificial lighting is required to be provided to all stairways, passageways and ramps.

If natural light of a standard equivalent to that required by Clause F4.2 is not available, and the periods of occupant or use of the room or space will create undue hazard to occupants seeking egress in an emergency then artificial lighting is required to be provided to all rooms that are frequently occupied, all spaces required to be accessible, all corridors, lobbies, internal stairways, other circulation spaces and paths of egress.

## 94. 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.

## 95. Clause F4.11 – Carparks

The carpark will be required to be provided with a system of Mechanical Ventilation designed in accordance with AS 1668.2.



## SECTION G – ANCILLARY PROVISIONS

### 96. 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.

### 97. Part G3 – Atrium Construction

Where the new alterations and additions and extensions of the proposed redevelopment interact with the existing hospital, an atrium connecting four (4) storeys will be formed which connects Levels 3 -6.

An atrium that connects more than three (3) consecutive stores in a sprinkler protected building triggers the requirements of Part G3 of the BCA.

Due to the proposed design which creates an atrium as a result of the redevelopment works, the atrium design is proposed to be assessed as part of a Fire Engineering Performance Assessment where the lowest level of the Atrium being the modified Level 3 Northern Entry which connects to Level 4 via a non-required non fire isolated stairway will be proposed be fire separated from the remainder of Level 3 via Fire Wall so that that the only part of Level 3 that forms part of atrium well is the Entry Lobby.

The proposed atrium structure will be required to be adequately fire separated on the subject levels from the main atrium structure within the existing main hospital building.

### 98. Part G6 – Occupiable Outdoor Areas

The external terraces, courtyards etc are by definition occupiable outdoor areas and thus the relevant provisions of Part G6 of the BCA are required to be complied with.

### 99. Clause G6.2 – Fire Hazard Properties

Any lining, material or assembly in an occupiable outdoor area 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

### 100. Clause G6.6 – Fire Fighting Equipment

Fire hydrant and fire hose reel coverage will be required to be provided to all occupiable outdoor areas.

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

The outdoor occupiable areas are 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

### 102. Parts J1 – J8

The energy efficiency provisions of Section J are applicable to the new East Tower and proposed Eastern and Northern extensions along with each of the refurbished areas.



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 BCA2019 Amendment 1 and Access to Premises Standards 2010 assessment of the SSDA Architectural Documentation for the proposed RPA Hospital Redevelopment.

In view of the assessment that has been undertaken to date, Blackett Maguire + Goldsmith are of the opinion that the development is capable of complying with the requirements of the Building Code of Australia, either via the DTS Provisions of the BCA or alternatively via the preparation of Performance Solutions to demonstrate compliance with the nominated Performance Requirements of the BCA.

In addition, and based on the documentation reviewed to date it is considered that compliance can be achieved without giving rise to any inconsistencies within the State Significant Development Consent.

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