

Wagga Hospital Re development

Capability Report – Phase 1 Mental Health

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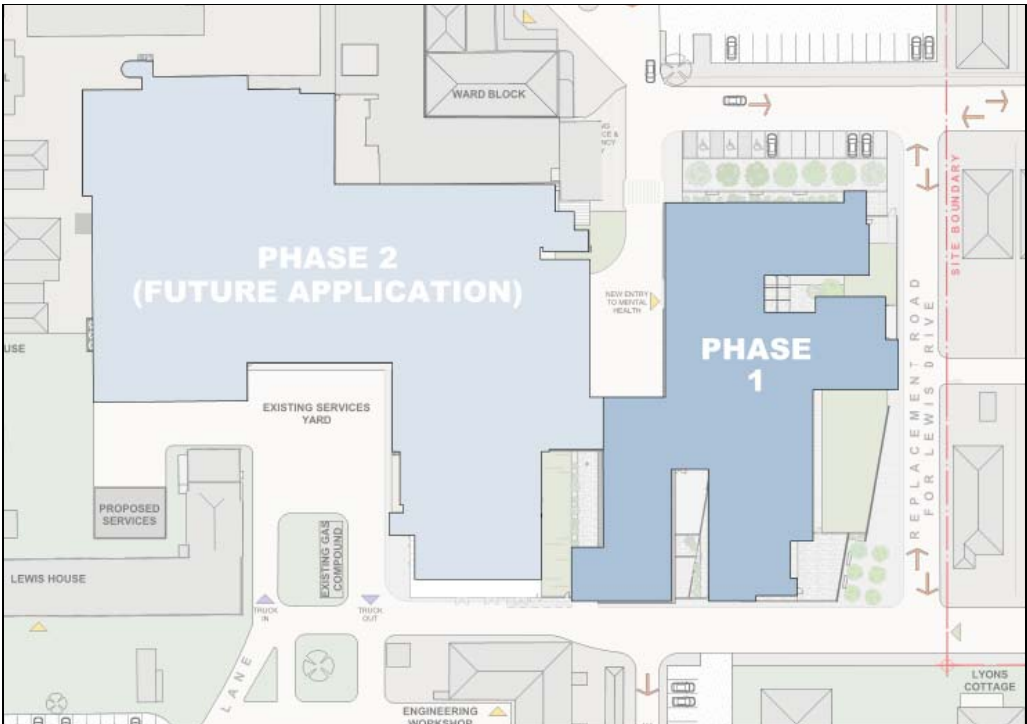


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1.0 Introduction and Documentation

This assessment involves a Capability design review of the proposed new two storey mental health facility designated as Phase 1 of the redevelopment for Wagga Hospital.

Capability design review is essentially a philosophy review and in this vein we have reviewed the submitted architectural documentation compiled to date for the proposed two storey building.

The intent is to identify major areas of compliance and non compliance with the deemed-to-satisfy provisions of the Building Code of Australia 2011. A capability review does not close out all items under the BCA, but considers the major elements and philosophies. The design is examined in greater detail under the schematic design and design development phases to follow. Where compliance with the deemed to satisfy provisions may not be possible a schedule of alternate solutions has been provided.

This schematic review has aimed to cover the main issues under Parts C, D, E and F of the Building Code of Australia. In the following phases of design we will be continuing our input and assessment of the buildings' design.

Methodology is principally a desktop review of the available documentation provided by Rice Daubney.

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Documentation assessed

Design architectural documentation prepared by Rice Daubney Group and reviewed.

Drawing Nos
DA1401(A), DA1302(A), A1301(A), A1201(A)



Image – Rice Daubney Group

DOCUMENT ACCEPTANCE

	Name	Signed	Date
Prepared by	Rod Shepherd		01/09/2011

REVISION HISTORY

Revision No.	Prepared by	Description	Date



2.0 Use and Class of Building

The use and classification is as per the following table for the parts of the building assessed.

Building Matrix – whole of works

Levels	BCA Designation	BCA Class	Use
Ground floor			
		9a Patient care area (wards)	Mental Health Acute, Open pods / Closed Pods and associated ward rooms for living, therapy and staff.
		9a Non Patient Care	Stair, waiting / reception area, training, meetings
Level 1			
		9a Non patient care areas (Wards)	Mental Health Rehabilitation
		9a Non patient care areas	Waiting, Lobby
Level 2			
		9a (ancillary)	Plant rooms and equipment

The following matrix considers each part of the building as though they were separate buildings

BCA Designation for each of the current proposed buildings

Stage 1a Mental Health Wing (9a Health Care)		
Number of storeys	3	Includes plant at roof (excludes Plant at roof)
Rise in Storeys	2	
Compartmentation (max 3500m ²)	< 2000	
Minimum Type of Construction	B	

3.0 Building Construction

The minimum Type of construction is Type B. The structure is yet to be resolved as design progresses. Some notes are provided below.

4. TYPE B FIRE-RESISTING CONSTRUCTION (part)
4.1 Fire-resistance of building elements
In a building <i>required</i> to be of Type B construction—
(a) each building element listed in Table 4, and any beam or column incorporated in it, must have an FRL not less than that listed in the Table for the particular Class of building concerned; and
(b) the <i>external walls, common walls</i> , and the flooring and floor framing in any lift pit, must be <i>non-combustible</i> ; and
(c) if a stair <i>shaft</i> supports any floor or a structural part of it—
(i) the floor or part must have an FRL of 60/—/— or more; or
(ii) the junction of the stair <i>shaft</i> must be constructed so that the floor or part will be free to sag or fall in a fire without causing structural damage to the <i>shaft</i> ; and
(d) any <i>internal wall</i> which is <i>required</i> to have an FRL with respect to <i>integrity</i> and <i>insulation</i> , except a wall that bounds a <i>sole-occupancy unit</i> in the topmost (or only) <i>storey</i> and there is only one unit in that <i>storey</i> , must extend to—
(i) the underside of the floor next above if that floor has an FRL of at least 30/30/30; or
(ii) the underside of a ceiling having a <i>resistance to the incipient spread of fire</i> to the space above itself of not less than 60 minutes; or
(iii) the underside of the roof covering if it is <i>non-combustible</i> and, except for roof battens with dimensions of 75 mm x 50 mm or less or <i>sarking-type material</i> , must not be crossed by timber or other <i>combustible</i> building elements; or
(iv) 450 mm above the roof covering if it is <i>combustible</i> ; and
(e) a <i>loadbearing internal wall</i> and a <i>loadbearing fire wall</i> (including those that are part of a <i>loadbearing shaft</i>) must be of concrete or masonry; and
(f) a <i>non-loadbearing internal wall required</i> to be <i>fire-resisting</i> must be of <i>non-combustible</i> construction; and
(g) in a Class 5, 6, 7, 8 or 9 building, in the <i>storey</i> immediately below the roof, internal columns and <i>internal walls</i> other than <i>fire walls</i> and <i>shaft walls</i> , need not comply with Table 4; and
(h) lift, subject to C2.10, ventilating, pipe, garbage, and similar <i>shafts</i> which are not for the discharge of hot products of combustion and not <i>loadbearing</i> , must be of <i>non-combustible</i> construction in—
(i) a Class 2, 3 or 9 building; and
(ii) a Class 5, 6, 7 or 8 building if the <i>shaft</i> connects more than 2 <i>storeys</i> ; and
(i) in a Class 2 or 3 building, except where within the one <i>sole-occupancy unit</i> , or a Class 9a <i>health-care building</i> or a Class 9b building, a floor separating <i>storeys</i> or above a space for the accommodation of motor vehicles or used for storage or any other ancillary purpose, must—
(i) be constructed so that it is at least of the standard achieved by a floor/ceiling system incorporating a ceiling which has a <i>resistance to the incipient spread of fire</i> to the space above itself of not less than 60 minutes; or
(ii) have an FRL of at least 30/30/30; or
(iii) have a <i>fire-protective covering</i> on the underside of the floor, including beams incorporated in it, if the floor is <i>combustible</i> or of metal; and



Specification C1.1 Table 4 - TYPE B CONSTRUCTION: FRL OF BUILDING ELEMENTS

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

BCA 2011, C2.7 Separation by fire walls

(a) Construction — A <i>fire wall</i> must be constructed in accordance with the following:
(i) The <i>fire wall</i> has the relevant FRL prescribed by Specification C1.1 for each of the adjoining parts, and if these are different, the greater FRL, except where Tables 3.9, 4.2 and 5.2 of Specification C1.1 permit a lower FRL on the <i>carpark</i> side.
(ii) Any openings in a <i>fire wall</i> must not reduce the FRL <i>required</i> by Specification C1.1 for the <i>fire wall</i> , except where permitted by the <i>Deemed-to-Satisfy Provisions</i> of Part C3.
(iii) Building elements, other than roof battens with dimensions of 75 mm x 50 mm or less or <i>sarking-type material</i> , must not pass through or cross the <i>fire wall</i> unless the <i>required fire resisting</i> performance of the <i>fire wall</i> is maintained.
(b) Separation of buildings — A part of a building separated from the remainder of the building by a <i>fire wall</i> may be treated as a separate building for the purposes of the <i>Deemed-to-Satisfy Provisions</i> of Sections C, D and E if it is constructed in accordance with (a) and the following:
(i) The <i>fire wall</i> extends through all <i>storeys</i> and spaces in the nature of <i>storeys</i> that are common to that part and any adjoining part of the building.
(ii) The <i>fire wall</i> is carried through to the underside of the roof covering.
(iii) Where the roof of one of the adjoining parts is lower than the roof of the other part, the <i>fire wall</i> extends to the underside of—
(A) the covering of the higher roof, or not less than 6 m above the covering of the lower roof; or
(B) the lower roof if it has an FRL not less than that of the <i>fire wall</i> and no openings closer than 3 m to any wall above the lower roof; or
(C) the lower roof if its covering is <i>non-combustible</i> and the lower part has a sprinkler system complying with Specification E1.5.
(c) Separation of fire compartments — A part of a building separated from the remainder of the building by a <i>fire wall</i> may be treated as a separate <i>fire compartment</i> if it is constructed in accordance with (a) and the <i>fire wall</i> extends to the underside of—
(i) a floor having an FRL <i>required</i> for a <i>fire wall</i> ; or
(ii) the roof covering.



4.0 Compartmentation (Patient Care Areas)

The below requirement are a general summary of the BCA fire separation clauses applicable in patient care areas. Minor areas such as file stores, laundries and the like that may have fire sources would normally be detailed in design development and the appropriate fire rated walls applied.

Class 9a (Patient care areas)

The Patient Care Areas of the hospital will need to be assessed and compartmented into areas of a maximum of 2000m², with walls having a FRL of 120/120/120. They are to be fire separated from other non patient care areas with fire walls.

Ward areas have been compartmented according to the BCA and specifically treated as follows;

- Fire compartments are to be maintained with areas of a maximum of 2000m², by walls having an FRL of 120/120/120.
- Such compartments are to be further divided into 1000m² areas by smoke walls having a FRL of 60/60/60.
- Furthermore, non combustible smoke walls will be provided to reduce the maximum area of a smoke compartment to 500m².
- Where the fire compartment is less than 1000 m² (ie the 120/120/120 fire resistance level compartment) the first division needs to be a wall with a fire resistance level of at least 60/60/60.

Treatment areas need also to be compartmented according to the BCA and specifically treated as follows;

- Fire compartments are to be maintained with areas of a maximum of 2000m², by walls having an FRL of 120/120/120.
- Such compartments are to be further divided into 1000m² areas by non combustible smoke walls.

Other uses within patient care areas - Kitchens, medical store areas, Sterilising Services and laundries will also be separated with fire rated walls of an FRL of at least 60/60/60 where located within the patient care area fire compartments. Other areas of high fire hazard will also be required to be fire separated in patient care areas.

(note that these provisions have been amended with increased requirements) under BCA2011. It should be made clear to the owner that BCA2010 applies to this project due to the date of tender and if they want the enhanced provisions to apply they will need to provide a direction for this to be done at design stage).

Subdivision of the building within the patient care areas is determined by the above fire compartmentation parameters and also by the necessity to provide horizontal exits in all the ward areas and treatment providing exits within 30 metres of any point on the floor.

General fire ratings of non patient care areas – class 9a buildings

Plant rooms containing essential services will also need to be kept separated from the remainder of the building by construction with a minimum fire resistance level of 120/120/120.

This applies to the following -

- lift motors and lift control panels, except that the separating construction between the lift shaft
- and the lift motor room need only be 120/–/–; or
- emergency generators or central smoke control plant; or
- boilers; or
- batteries or
- main switchboard located within the building which sustains emergency equipment operating in the emergency mode

According to the Energy Australia requirements for separation between the substation and building above has been provided to a minimum fire resistance level of 180/180/180.

NOTE – Under C2.5 (v) Floors in Class 9a buildings of Type B construction, the floors must be FRL 120/120/120 and Spandrel Separation is to be provided as per C2.6 as if the building was of Type A construction. Designers will need to review window detailing in order to ensure the Spandrels can be accommodated.



5.0 Access and Egress

The current project strategy is that all attempts will be made to design in accordance with the deemed to satisfy provisions of the Building Code of Australia. The current design is at Capability Stage and hence resolution in detailed terms of compliance is not yet possible. Alternative fire engineered solutions may be implemented where it efficient to do so. We provide comments on the existing schematic plans in Appendix B.

Class 9a Patient Care Areas

- Every storey has at least two exits.
- A point of choice to two exits must be available within 12m.
- The maximum distance of travel to an exit in patient care areas is 30m.
- The distance between alternate exits will not exceed 45m for patient care areas and not be closer than 9m.
- In patient care areas where patients would normally be transported in beds, the door widths are determined by the corridor width. Corridor less than 2.2m = 1200mm door AND Corridor greater than 2.2m = 1070 door
- All stairs in patient care buildings will be fire isolated or fire separated to comply.
- In patient care areas open stairs will not be permitted.
- Open stairs may be used to connect non patient care area compartments.
- For patient care areas - where only horizontal exits are used in any one compartment, the adjacent compartment must be provided with an exit not being a horizontal exit, (ie a fire stair, a stair leading directly to the outside, or directly via a door to the outside).
- Widths of exits and corridors will be sufficient to hold the number of persons occupying the building.
- Class 9a Non Patient Care Areas and Class 5, 6 and 7
- The Stage 1a new mental health facility will be subject to special security arrangements and this will impact on the emergency evacuation of the building. It has been discussed that on fire alarm, clients and staff evacuate to secure external yard areas. User group consultation needs to occur to determine which courtyards would be rally points with a preference for the larger courtyards due to the ability to remain secure but more remote from the building evacuated from. The BCA requires that after exiting the building, occupants are provided with unobstructed connection to the street. However D2.21 permits the following for mental health facilities –

Where a door serves the secure parts of a bank, *detention centre*, mental health facility, *early childhood centre* or the like and it can be immediately unlocked -

- (A) by operating a fail-safe control switch, not contained within a protective enclosure, to actuate a device to unlock the door; or
- (B) by hand by a person or persons, specifically nominated by the owner, properly instructed as to the duties and responsibilities involved and available at all times when the building is lawfully occupied so that persons in the building or part may immediately escape if there is a fire; or
- (iv) is fitted with a fail-safe device which *automatically* unlocks the door upon the activation of any sprinkler system complying with Specification E1.5 or smoke, or any other detector system deemed suitable in accordance with AS 1670.1 installed throughout the building; or

Note - Variation from the above would require an alternative fire engineered solution.

Class 9a Non Patient Care Areas

- Every storey has at least two exits.
- The maximum distance of travel to an exit is 40m.
- An exit or a point of choice to two exits must be available within 20m.
- The distance between alternate exits will not exceed 60m, or be closer than 9m.
- Paths of travel to different exits must not converge within 6m.
- Not less than 50% of exits are to be non horizontal exits.
- Widths of exits and corridors will be sufficient to hold the number of persons occupying the building.

General

- In a class 9a building the area of a stair 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 change of direction at 180° and the landing a clear width of not less than 1.6m and a clear length of not less than 2.7m.
- The construction and discharge of stairs, landings, thresholds, balustrades and handrails will need to meet the requirements of the BCA.
- Following discharge from the building, connection to the road must be available via ramps not steeper than 1 in 8 (not stairs)



Accessibility

Access for disabled persons will need to meet the requirements of Part D3 of the BCA and AS1428.1-2009. The following notes are provided. For more detailed information , refer to reporting by the accessibility consultant.

- Every storey has at least two exits.
- Accessibility is required to and within all areas normally used by the occupants.
- Accessible entries are required from all allotment boundaries and from other accessible buildings connected by a pedestrian link.
- From any required accessible car parking space on the allotment.
- Not less than 50% of entrances are to be accessible.
- A non accessible entrance must not be located more than 50m from an accessible entrance.
- Accessible car parking is to meet Table 3.5.
- Hearing augmentation to be provided where the public is screened from service providers.
- Tactile indicators are required to all stairs and ramps used by staff and the public except for dedicated fire isolated stairs non used for circulation.
- Glazing on “accessways” now requires decals meeting AS1428.1-2009.
- Circulation spaces at doors and corridors to be resolved
- Derivation of accessible WC’s and ambulant WC’s for staff and Visitors is to be resolved.
- Some dispensations are likely to be required.

6.0 Service and Equipment

The following is a commentary on the services that are required to the buildings.

Fire Hydrants	Fire hydrants are to be provided throughout to AS 2419.1-2005. The fire pump room is to have direct egress to open space (e.g. not located within a basement). A Hydrant booster location within 10 metres of a building is required to be protected by 90 minute fire rated walls extended 2 metres either side of booster and 3 metres above ground level. The location of the fire hydrants to the building will need to be assessed but should be located within the fire isolated stairs of the building.
Fire Hose-Reels	Fire hose-reels should be arranged to provide for full coverage to the building in accordance with AS 2441. Fire hose-reels are to be located within 4 metres of an exit or a fire hydrant.
Sprinklers - External Wall Wetting	Any openings within the prescribed distances in BCA for openings in different compartments, facing each other may be protected with external wall wetting sprinkler heads as permitted by C3.3, C3.4.
Automatic Fire Sprinkler System	Only required if designers do not wish to provide complying spandrels as per C2.5 (iv)
Fire Control Centre	A fire control centre is required meeting Specification E1.8 clauses 2-5. Designers should consult these clauses directly - Clause 2 - Purpose and contents Clause 3 - Location of fire control centre(not required at main entry) Clause 4 - Equipment not permitted in the fire control centre Clause 5 - Ambient sound level for fire control centre



Smoke hazard management

The smoke hazard management requirements are defined in the Building Code of Australia for the building and based on the component, the building use, effective height and rise in storeys.

The following apply to the buildings: -

Part E Smoke Control	The building does not exceed 2 storey’s / 25m in effective height and therefore must have – Mechanical Smoke dampers are to be provided to all smoke walls. Mechanical Fire and smoke dampers are to be provided to all fire walls, and to all fire and smoke walls. A smoke detection and alarm system is required throughout all of the Class 9a buildings, meeting AS1670.1-2004 and Spec E2.2a clauses 4, 5, and 7. Manual Call Points in evacuation routes so no point on a floor is less than 30m from an MCP. Consideration under AS3745 (Evacuation Management Plan) is also needed in designing the WIP phone layout.
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Lift systems

Stretcher facility in lifts	Required to at least 1 emergency lift.
Emergency lifts	Is required to each building where Patient Care Areas are located at levels without direct access to a road or open space. Therefore this is required. Also note that in buildings where emergency backup power generation is available, the emergency lifts must also be connected to that backup power. As there is more than 1 lift serving each floor, two emergency lifts are required.
Accessible Lifts	There are detailed requirements for accessibility for all passenger lifts. The Lift consultant should confer with the accessibility consultant when specifying the requirements.
Fire service facility	To be provided to passenger lifts.

Emergency Lighting, Exit Signs and Warning Systems

Exit and emergency lighting	A system of emergency lights and exit signage will be installed in the building to AS2293.1-2005
Sound system and intercom systems for emergency purposes (SSIS)	A sound system and intercom system for emergency purposes complying where applicable with AS 1670.4 must be installed in hospitals where they have a <i>floor area</i> more than 1000 m ² <u>or a rise in storeys</u> of more than 2 – Therefore Required.

Re-entry from fire isolated stairs is required at all floors – D2.22

7.0 Part J - Energy Efficiency

The proposed hospital must be designed in accordance with the requirements of Part J of the BCA in terms of Energy Efficiency. The requirements are to be considered and integrated in the design prior to the finalisation of the buildings actual completed design.

The building will be in **Climate Zone 4** and will be required to comply with Parts J1 through to J8. An Energy Efficiency Consultant should be consulted regarding compliance for the building and the appropriate modelling completed for the design prior to finalisation of SDP.

8.0 Conclusion

The basic philosophies concerning compliance with the Building Code of Australia have been assessed. Despite the fact that further design development and detailing is required, development consent should not be withheld for concern that the building will not be capable of compliance. There will be some instances where designers may choose to use alternative fire engineered solutions as part of the design.