

## **Wagga Wagga Hospital Stage 3 Redevelopment**

### **Acoustic Brief**

**WWH-ALC-RPT-AC-GEN-0000001(D)**

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## 1 INTRODUCTION

This document presents the acoustic design parameters for Stage 3 of the Wagga Wagga Base Hospital redevelopment project.

The proposed acoustic design criteria have been developed based on ALC's experience on similar projects, client requirements (NSW Health Infrastructure Engineering Services Guideline – Updated July 2017) and feedback and discussions with Jacobs regarding appropriate levels of privacy for the various spaces.

## 2 ARCHITECTURAL ACOUSTICS

### 2.1 DETERMINATION OF REQUIRED ACOUSTIC MEASURES

To determine suitable acoustic measures for this project it is first necessary to understand the level of sound isolation provided by different acoustic rated partition systems. **(Note: a partition system as used in this report refers to the total performance of the wall and ceiling between two adjoining spaces)**.

The best way to describe the level of sound privacy provided by acoustic partitions systems, is by conducting a comparison of the level of privacy achieved by different partitions. Acoustic performance of partitions is generally defined using a rating system, generally the Weighted Sound Reduction Index ( $R_w$ ). The table below provides an indication of various volumes of speech and resultant audibility with different partitions systems.

**Table 1 – Level of Privacy for Acoustic Rated Partitions**

Speech Noise Level	Represents	$R_w$ Rating of partition	Audibility of Speech in Adjacent Space
60 dB(A)	Normal conversation	25	Speech clearly audible
60 dB(A)	Normal conversation	30	Speech barely audible. Content of speech not recognisable
70 dB(A)	Raised voice	30	Speech clearly audible. Content of speech not fully recognisable
60 dB(A)	Normal conversation	35 <sup>1</sup>	Speech barely audible/inaudible. Content of speech not recognisable
70 dB(A)	Raised voice	35	Speech audible. Content of speech just recognisable
70 dB(A)	Raised voice	45	Speech faintly audible.
70 dB(A)	Raised voice	50	Speech inaudible/very faintly audible

From the above table it can be determined that;

- An  $R_w$  37 rated partition, provides a moderate level of privacy for normal conversations. Raised conversations across this partition would be clearly audible in an adjacent space.
- Increasing the rating from  $R_w$  37 to 40 marginally reduces the noise level from raised conversation in the adjacent room. However, speech will still be audible and the content of the speech still intermittently recognisable. However normal conversations are unlikely to be audible.

- An  $R_w$  45 rated partition would provide an adequate level of privacy for any typical use of a private room – raised voices will be unintelligible, normal voices barely audible (if any).
- An  $R_w$  50 partition would provide an adequate level of privacy for any noise intensive uses for a room – raised voices will be mostly inaudible, shouting will be just audible.

## 2.2 PARTITION WALLS

Suitable  $R_w$  ratings for the various partition walls will be determined with reference to the following:

- The architectural layouts. Different space types will generate differing noise levels (e.g. – a seminar room is likely to produce more noise than a private office). Further, different space types will require differing levels of acoustic privacy (e.g. a meeting room will require a higher level of privacy than general office areas).
- Audibility of human speech across different  $R_w$  rated partitions, as described in Table 1. These results were based on studies conducted across a wide array of projects, with the aim of determining the minimum acceptable level of sound transmission for a partition separating two sensitive spaces. An understanding of the perception of sound and general audibility/intelligibility of human speech for different sound rated partitions, is fundamental to determining the appropriate  $R_w$  ratings.
- Flanking paths – Flanking occurs where sound travels to one space to another by some path other than through the sound rated wall. For example, sound may pass from room to room via a ceiling cavity. Elements such as mechanical systems (duct layouts etc.) and the position of doorways should be reviewed in order to ensure that flanking paths do not detrimentally affect a sound rated wall.

ALC recommends the following minimum rating for partitions within the new Ambulatory Care Building. Indicative partition constructions are detailed in Appendix 2.

**Table 2 – ALC Recommended Partition Acoustic Ratings**

Space Type	Minimum Wall $R_w$ Rating	
	Adjacent Room	Corridor/Common Space
Lecture Theatre	50	50
Lecture/Conference	50	40 with lining on one side to extend to underside of slab (i.e. full height construction)
Audio*	50 + dummy wall	50
Observation/Viewing	50	40 with lining on one side to extend to underside of slab (i.e. full height construction)
Library	50	45
EEG	45	40
Consult Rooms	45	40
Enclosed Examination/Treatment/Procedure Rooms	45	40
Dental Surgery Room & DENLAB	45	40
Multi/Sensory	45	40

Space Type	Minimum Wall $R_w$ Rating	
	Adjacent Room	Corridor/Common Space
Lab	45	40
SIMCR	50	40 with lining on one side to extend to underside of slab (i.e. full height construction)
Virtual Training Room and SIM/IMMERSIVE	45	40
Meeting / Interview /Quiet Rooms (generally)	45	40
Create Brainstorm / Format / Coordinate / Dialogue (generally)	45	40
DND	45	40
Ward Room (1 bed)	45	40
Independent Living Unit	45	40
Office (1 person)	45	40
Meeting / Interview /Quiet Rooms	Retail – 50 All other areas – 45	40
Education & Audit	45	40
Activity	1 Bed ward room – 50 All other areas – 40	40
Ward Room (2 bed or more)	40	40
Office (2 person or more)	40	40
Gym/PAEDS	40	40
Collection Room	40	40
Staff Room	40	40
Personal Care / Parent / Waiting	40	40
Toilets and WC (generally)	40	40
Disposal / Dirty Utility / Laundry (generally)	40 + dummy wall (sensitive spaces) 37 (adjoining stores/cleaning rooms etc.)	40
Open Examination/Treatment/ Procedure Rooms	37	37
Store, Cleaners Rooms, Cleaning Utility, Linen Rooms and Supply Rooms	37	37

\*ALC has been advised that the audio room will have a small proprietary booth.

**Note:**

1. The ratings recommended in Table 2 are design (laboratory tested) ratings. After construction, a field measured rating will commonly be less than the design rating. This can

occur because of field testing uncertainties. A deficiency of 5 points between the field test result and the laboratory recommended rating can occur as a result of field test uncertainty and does not necessarily indicate a defect in construction.

2. A wall containing a door or glazed panel will achieve a lower rating than the table above, as a result of the acoustic limitation of the glass/door. However – the wall must still be constructed as per the detail (i.e. – if a  $R_w$  40 wall contains a door, even though the wall will not achieve the nominated rating, it must still be constructed as per the  $R_w$  40 detail, not the  $R_w$  37 detail).
3. **Medical Services Panels** – The following treatments are required where medical services panels are proposed to be installed in partition walls:
  - Gas piping/cabling to be drawn through small penetrations, and any remaining gap sealed airtight with flexible sealant, with panel fixed to front of wall OR.
  - If a penetration in the plasterboard wall the same size as the panel is required – construct a backing box behind the panel using 13mm plasterboard sheet.
4. **Recessed X-Ray Viewer** – A minimum 13mm plasterboard backing to the viewer is required for any recesses in the partition walls ( $R_w$  40 or higher) for X-Ray viewers.
5. Carry out the installation of all walls/partitions in a manner that will not reduce the performance of the walls below the tabled  $R_w$  requirements. This includes but not limited to the proper filling of joints between blocks/panels, back filling with mortar any chasing of walls and sealing of wall junctions. Detailed review of all junctions/wall furniture to be conducted during detailed design phase.

#### 2.2.1 Power Outlets in Sound rated Walls

GPO's and light switches in walls rated greater than  $R_w$  40 shall be backed with acoustic boxes equal to HPM Fire Box manufacture. Where walls incorporate metal services boxes these are also acceptable.

Alternatively, outlets can be offset by a minimum of 600mm for  $R_w$  50 & 45 partitions.



## 2.3 INTERNAL GLASS PARTITIONS

### ***Partition with Entry Doors***

Partition walls with entry doors will be limited by the acoustic performance of the door (typically  $R_w$  25 – 30). For this reason, installation of glazing within these partitions will not further reduce the performance of this partition. Hence, we recommend the following;

- $R_w$  40 partitions – 6.38mm glazing is recommended.
- $R_w$  45 – 50 partitions – 10mm glazing is recommended.

### ***Observation Panels in Partitions with No Doors***

The following minimum constructions are required if there are observation panels installed within walls that do not also contain a door:

- $R_w$  40 – 45 partitions – 10.38mm laminate + 70mm airgap + 10mm float toughened.
- $R_w$  50 partitions – 12.38mm laminate + 150mm airgap + 11mm float toughened.

If small glazed panels ( $\leq 2.7\text{m}^2$ ) are located in solid partitions and privacy is not a concern (anyone standing or eavesdropping on conversation outside the room will be visible through the glazed panel), 6.38mm laminate ( $R_w$  40 rated partitions) and 10.38mm laminate ( $R_w$  45-50 rated partitions) glazing recommended above are acceptable. This will typically result in a performance reduction of 5dB ( $R_w$  40 and 45 partitions) and 10dB ( $R_w$  50 partitions).

Above ceiling baffles will be required above any glazed partitions if perforated ceiling or no ceiling is proposed to 1 or both spaces (separated by the partition).

## 2.4 OPERABLE PARTITION WALLS

Operable walls are proposed between the following areas;

- Ground level – Lecture/conference rooms.
- Level 3 – Format rooms and Coordinate rooms.

An  $R_w$  45 rated proprietary operable wall panel is nominated for this partition. To ensure this performance will be maintained, an above ceiling baffle is required, as illustrated in detail AC009 in Appendix 2.

**Note: Operable Wall manufacturer to ensure  $R_w$  45 rating is achieved for the entire assembly and not just wall panel.**

## 2.5 DOORS

The acoustic performance of partition walls with entry doors is limited by the performance of the door.

ALC recommended minimum requirements for door construction are outlined in the table below.

**Table 3 – Recommended Door Constructions**

<b>SPACE TYPE</b>	<b>ALC Recommended Minimum Door Construction</b>
Plant Rooms	45mm thick solid core doors with full perimeter acoustic seals (Raven RP 10 to top and sides, Raven RP 38 drop seal to base).
Inter-connecting doors between consult rooms	Proprietary Rw 45 door with proprietary door frame (Pyrol/IAC Colpro or equal).
Corridor to: Interview, Birthing Suites, Consult, Lecture Theatre, Virtual Learning	Min 45mm thick solid core or 10.38mm glass door with doors with full perimeter acoustic seals (Raven RP 10 to top and sides, Raven RP 38 drop seal to base).
Corridor to: Private Offices, Quiet, Bereavement/Distressed Relatives, Treatment, Observation, Dental Suite	Min 38mm thick solid core or 10.38mm glass door with doors with full perimeter acoustic seals (Raven RP 10 to top and sides, Raven RP 38 drop seal to base).
Remaining Doors	Min 35mm thick solid core doors with (undercut no more than 10mm).
Audiometric Room	Refer to Section 5.

### 2.5.1 Double Door Sets (or 1/5 Leaf Doors)

The meeting stile seal in a double door presents an acoustic weakness, so double doors should only be used when required to provide a larger door opening than normal. Where it is necessary to use double doors then the following guidelines should be followed:

If the meeting stile is to be rebated, then the aluminium “Tee” seal recommended should be installed on the same side of the door that contains the semi-morticed drop seal and the perimeter seals. This seal should be continuous from top to bottom and should not be fouled by any latching, or other door hardware. The bottom seal should also be continuous and be installed across the full width of the door so that the seals meet in the centre without a gap. To do this the door meeting stile rebate should be wide enough to achieve this.

## 2.6 REVERBERANT NOISE CONTROL (ROOM FINISHES)

Reverberant (echo) noise is measured using the “Reverberation Time” parameter. A longer/higher reverberation time indicates a more acoustically live space.

Control of reverberation time is done through appropriate selection of room finishes, with sound absorptive surfaces such as carpets, mineral tile ceilings, curtains and specialist noise absorptive panel.

Compliance with AS2107 recommended reverberation times is to be achieved except where compliance is impractical (operating theatres, bathrooms or other spaces where clinical necessity dictates the use of plasterboard ceilings).

Target reverberation times are as follows:

**Table 3 - Recommended Target Reverberation Times**

Space Type	Recommended Target Reverberation Times (s)
Consultation Rooms, Treatment, Virtual Training	0.4-0.6
Waiting Areas	0.8
Corridors	0.4-0.6
Office Areas (Private Person)	0.6-0.8
Office Areas (Multi Person)	0.4-0.6
Meeting Spaces	0.6-0.8
Group and Communal Areas	0.6-0.8
Lecture Theatres	0.6-0.8
Audiometric Test Room	<0.3s – refer to section 5.

**\*Potentially not achievable based on NSW Health room finish requirements.**

**Note: For any space not identified above, AS2107 recommended reverberation time is to apply.**

Other than the Audiometric test room - any rooms where, mineral tile ceilings are proposed, AS2107 compliant reverberant times will be achieved.

For rooms where plasterboard/villaboard ceilings are proposed:

- Detailed acoustic review of room finishes is to be undertaken to determine whether additional acoustic panelling is required. Typically, either an acoustic lining fixed to the underside of the ceiling sheet, or a perforate ceiling is required. Surface mounted lining to consist of 25mm thick Autex or equivalent (NRC no less than 0.7), to 50% of ceiling area. Areas where treatments are required are identified in Appendix 2.
- Perforated ceilings are not to be adopted in the event that there are fans or fan coil units in the ceiling space above.

### 2.6.1 Ceilings

Refer to Appendix 1 for ceiling details.

- Ceiling tiles:
  - Ceilings to any confined occupied space (meeting room, office, treatment, consult, training, ward room etc) are to have CAC no less than 40 and NRC no less than 0.6.
  - Ceilings to open plan areas (waiting, open plan office etc) are to have CAC no less than 35 and NRC no less than 0.6.
- Refer to Appendix 1 where above ceiling acoustic treatments are required.
- Any enclosed room containing perforated ceilings must have the bounding walls sheeted slab to slab.

## 2.7 MEDICAL SERVICES PANELS

Detail to be determined.

Typically, if located on the wall itself (not on the bedhead) – install 1mm thick sheet metal box in wall cavity behind the panel with any penetration of the box sealed air-tight.

## 2.8 FLANKING TRANSMISSION

Sound transmission via flanking paths (e.g. through façade and ceiling cavities, through façade window mullions, services penetrations and ducting, etc.) should be treated to maintain the required minimum  $R_w$  rating for the dividing partition.

Sill/Transom/Skirtings must not be continuous through line of  $R_w$  50, 45 & 40 rated partition walls.

### 2.8.1 Partition / Façade Junctions - Mullions

Acoustically rated partitions butting up to the façade are to be acoustically treated to avoid flanking paths through the mullion. Indicative treatments are presented in the following table.

**Table 4 – Acoustic Treatment to Façade Junction**

Wall Rating	Acoustic Treatment
$R_w$ 50	Refer to AC007a in Appendix 2
$R_w$ 45	Refer to AC007b & AC007c in Appendix 2
$R_w$ 40	Refer detail AC007d in Appendix 2

ALC to review any alternate wall junction details to ensure wall ratings are not adversely impacted as a result of acoustic weakness at junctions.

### 2.8.2 Partition / Façade Junctions - Elsewhere

Where required pack any cavities behind external wall linings, etc. to prevent excessive flanking via the curtain wall cavity (horizontally and vertically).

Where partitions butt into the façade, the junction should be sealed. Refer to indicative junction details in Appendix 2.

Depending on the desired rating the sill element of the façade may also require additional treatment to prevent flanking transmission. This detail will be provided when the façade details are known.

### **2.8.3 Perimeter Linear Slot Diffusers**

Any existing perimeter linear slot diffusers will need to be sealed off where we have non – full height (not slab to slab) partitions butting up to the façade, to avoid flanking path via these slots.

### **2.8.4 Ceiling Penetrations (Lights and Supply/Return Air Grilles)**

ALC recommends:

- All ceiling grilles require internally insulated (25mm internal lining) sheet metal plenum boxes with offset spigot behind them.
- Untreated ceiling grilles (e.g. linear slot diffusers open directly to ceiling space or grilles around light fittings) are not recommended. ALC to review proposed light fitting selections.

## **2.9 FIELD VERIFICATION OF SOUND TRANSMISSION PERFORMANCE**

In general, there is a variation of +/- 5  $R_w$  points between a construction system selected from manufactures laboratory test data and  $R_w$  data results measured in the field ( $R'_w$ ), in an actual installation. This is a normal variance and is due to a number of factors including normal deviations which occur between separate test results, construction on-site as compared to construction set up in the laboratory, and (importantly) the inherent inaccuracy of site rating measurements compared to laboratory ratings. Therefore, it is usual to apply a 5 dB tolerance to site measured  $R_w$  ratings ( $R'_w$ ) to determine compliance with the minimum performance ratings.

It should be noted that, notwithstanding the above comments, the field  $R_w$  rating should be optimized with the incorporation of suitable acoustic details in the design and on-site supervision to provide the highest potential result.

Where doors are installed into partitions the required field rating would be assessed against the composite wall and door  $R_w$  rating.

### **2.10 PARTITION MARKUPS**

Refer to Appendix 1 for partition rating mark-ups.

### 3 EXTERNAL NOISE IMPACTS/BUILDING SHELL DESIGN

#### 3.1 CRITERIA TO BE ADOPTED

##### 3.1.1 Helicopter Noise - Target Noise Impacts within the Development

The site is potentially impacted by the roof top Helipad from Stage 1.

Table 12 of the NSW Health Infrastructure Engineering Services Guidelines (July 2017) presents internal noise criteria for hospitals with respect to helicopter noise impacts. The criteria has been presented in the below:

**Table 5 - Health Infrastructure Engineering Services Guidelines Internal Helicopter Noise Criteria**

Area Designation	Internal Noise Level from Helicopters dB(A) $L_{Max}$ (slow)
Corridors and Lobby Spaces	80
Intensive Care	65
Patient Wards	68
Consultation/Interview Rooms	65
Treatment/Medication/Examination Room	65
Waiting Rooms, Reception Areas	80
Cafeterias/Dining	80
Meeting Room	70
Board/Conference Room	70
Open Plan Offices	75
Private Offices	70
Laboratories	75
Toilet/Ensuite	75

**Note – HI Engineering Services Guidelines require compliance with the above table is mandatory only for roof top helipads and Westmead and North Shore Hospitals. The criteria will be used as guidance, but not mandatory when provided façade design advice (discussed in section 5.2).**

### 3.1.2 Other External Noise Sources (Road Traffic – Sturt Highway/Docker Street)

Building shell is to be acoustically designed such that internal noise levels of Table 12 of the NSW Health Infrastructure Engineering Services Guidelines (July 2017) for continuous noise sources are achieved, as detailed below.

**Table 6 - Health Infrastructure Engineering Services Guidelines Continuous Internal Noise Criteria (to be Adopted for Traffic Noise Impacts)**

Area Designation	Continuous Internal Noise Levels dB(A) <sub>Leq</sub>	
	Satisfactory	Maximum
Corridors and Lobby Spaces	40	45
Intensive Care	40	45
Patient Wards	35	40
Consultation/Interview Rooms	40	45
Treatment/Medication/Examination Room	40	45
Waiting Rooms, Reception Areas	45	50
Cafeterias/Dining	45	50
Meeting Room	35	40
Board/Conference Room	30	35
Open Plan Offices	40	45
Private Offices	35	40
Laboratories	45	50
Classrooms, Training Rooms	35	40
Toilet/Ensuite	50	55

## 3.2 RECOMMENDATIONS/COMMENTS

### 3.2.1 Glazing and Façade Requirements

We recommend:

- For glass elements:
  - Min 6mm/12mm airgap/6mm if an Insulated Glazed Unit or
  - 6.38mm laminated glass if single glazed.
- For any light weight façade elements, 1x13mm thick plasterboard internal lining and minimum 90mm thick 11kg/m<sup>3</sup> insulation to external wall cavity. 0.55mm steel back pan is to be incorporated in any light weight wall element.

The rationale behind adopting the above is as follows:

- Road traffic noise will be attenuated to meet the internal noise levels in table 6.
- Minor exceedances table 5 (up to 5dB(A)) are expected in the event of helicopter movements to the north or west of the Stage 1 helipad.

- Further façade upgrades are not proposed given the expected infrequency of helicopter movements (less than one per day on average).
- Any further upgrade of the façade is potentially disproportionately expensive given



## 4 SERVICES NOISE

This section nominates the acoustic standards for mechanical and hydraulic services.

The section will be separated into two sub-sections;

- Mechanical services
- Hydraulic services.

Detailed review of plant treatments to be undertaken following completion of services plans.

### 4.1 ACOUSTIC CRITERIA

Criteria required to assess the impact of service systems are as follows:

- Internal noise levels within the development.
- Noise emissions to external areas
- Vibration levels from plant to all habitable spaces.

#### 4.1.1 Internal Noise Levels

Noise from mechanical and hydraulic plant inside the development will be designed to meet the criteria presented below. These criteria apply to noise levels with the plant operating under all normal operating conditions.

The criteria set out in this section are represented as dB(A) values. All noise levels have been adopted from the required continuous noise levels from Table 12, column A from the NSW Health Infrastructure Engineering Services Guidelines (July 2017).

**Table 7 - Internal Mechanical and Hydraulic Noise Criteria**

Area Designation	Continuous Internal Noise Levels dB(A) <sub>L<sub>Aeq</sub></sub>	
	Satisfactory	Maximum
Corridors and Lobby Spaces	40	50
Intensive Care and Operating Theatres	40	45
Patient Wards and Therapy Rooms	35	40
Consultation, Interview Rooms	40	45
Treatment, Medication and Examination Room	40	45
Waiting Rooms, Reception Areas	40	50
Cafeterias/Dining	45	50
Meeting Room, Lecture Theatres, Virtual Learning, Audio-Testing*	35	40

\*Noise level in the room. Noise level within booth as per section 5.

**Table 9 - Internal Mechanical and Hydraulic Noise Criteria (Cont.)**

Area Designation	Continuous Internal Noise Levels dB(A) <sub>L<sub>Aeq</sub></sub>	
	Satisfactory	Maximum
Laboratories	45	50
Open Plan and Multi Person Office	40	45
Private Offices	35	40
Toilet/Ensuite	50	55

Noise should be free of tones, low frequency content, impulsiveness or other characteristics which would typically attract a penalty when applying the NSW EPA *Noise Policy for Industry (NPfI) 2017*.

#### **4.1.2 Noise During a Fire Emergency**

Noise from all plant during a fire emergency shall comply with the requirements of AS1668. Noise levels inside the fire control room shall not exceed 65dB(A) during a fire emergency.

#### **4.1.3 External Noise Levels**

Noise levels emitted by the mechanical plant at all property boundaries and nearby buildings on adjacent properties shall meet the requirements of:

- Conditions of Consent.
- NSW EPA *Noise Policy for Industry (NPfI) 2017*.
- Conditions of consent.

Noise to external areas within the hospital grounds more than 4m from the building façade are not to exceed 55dB(A)<sub>L<sub>eq</sub></sub>. This noise level of 55dB(A) applied at ground level of occupiable external areas and should be measured without any influence/contribution from pre-existing plant noise.

#### **4.1.4 Diesel Generator (emergency use only)**

The design goals specified in table 7 above are not applied for emergency plant (diesel generator), which will generate higher noise levels within the development.

Noise levels from emergency plant will be designed to levels 5dB(A) higher than the requirements for mechanical services in the above tables, except that noise levels on walkways, public would be designed 10 dB(A) higher.

We recommend that any regular testing of the generator be done at a time that causes minimum disruption.

ALC to review proposed generator selection.

#### **4.1.5 Vibration Produced by Plant**

Tactile structure vibration levels produced by the plant should not exceed the criteria given in AS2670.2-1990 and the EPA document *Assessing Vibration – A Technical Guideline*.

Where the standards recommend a range of criteria for a particular occupancy, the low end of the range shall be used.

## 4.2 RECOMMENDATIONS

Detailed acoustic design of all plant items to be undertaken following plant selection to ensure compliance with the criteria outlined above.

Typical vibration isolation and hydraulic pipe treatments are nominated below.

### 4.2.1 Mechanical Services Vibration Isolation

Vibration isolation of plant as follows:

**Table 10 - Vibration Isolation of Mechanical Plant**

Plant	Isolator Type	Minimum Static Deflection
In-line Centrifugal Fans and Small Axial Fans	Spring	10 mm
Axial Fans (>450mm diameter), Centrifugal Fans and Pumps	Spring	25 mm
Fan/coil and air conditioning units	Spring or Pad	2 mm
Cooling Towers	Multiple layer pad mount	6mm
Boiler	Pad	6 mm
Air-conditioning condenser Units	Pad	2mm
Chillers	Spring	25mm* with 17mm Supershearflex base pad.
Pumps	Spring	25mm*
Emergency Generator	Spring	50mm*

**\*Plant to be installed on isolators as specified above. Isolators are then to be installed on a isolated plinth (plinth to be separated from structural slab using 2x10mm layers of Acoustic Supplies Vibramat).**

First 20m of pipework from pumps, chillers and generators to be hung using 25mm static deflection springs with 6mm neoprene base pad.

### 4.2.2 Hydraulic/Fire Services

#### 4.2.2.1 Pipework

The following schedule lists the ALC recommended acoustic treatment to piping. Refer to Appendix 1 for detailed drawings.

Note – all rooms are assumed to have a plasterboard or mineral tile ceiling below, except where expressly noted in red.

**Table 11 - Acoustic Treatment of Hydraulic Pipework**

Service	Location*	Pipe Treatment
Waste Piping / Stormwater Piping (not siphonic)	Offices, Consulting, Meeting, Treatment/Procedure, Group Rooms, Lounges, Multi-purpose, Seminar/Training and Quiet Rooms.	Pipes wrapped with Acoustic Supplies 5 kg/m <sup>2</sup> Vibralag or equivalent.
	Offices, Consulting, Meeting, Treatment/Procedure, Group Rooms, Lounges, Multi-purpose, Seminar/Training and Quiet Rooms <b>with perforated/slotted ceiling below</b>	Pipes wrapped with <b>2 layers of</b> Acoustic Supplies 5 kg/m <sup>2</sup> Vibralag or equivalent.
	Lobbies/waiting <b>areas with perforated or slotted ceiling below.</b>	Pipes wrapped with Acoustic Supplies 5 kg/m <sup>2</sup> Vibralag or equivalent
	Wards/In-patient units – generally - Main pipe run and first 500mm of pipe from the main run to be lagged.	Pipes wrapped with Acoustic Supplies 5 kg/m <sup>2</sup> Vibralag or equivalent.
	Wards/In-patient units – individual ensuite waste more than 500mm from main pipe run.	No treatment
Siphonic Drainage	All Habitable Spaces	Pipes wrapped with Acoustic Supplies 5 kg/m <sup>2</sup> Vibralag or equivalent. <b>Wrap with 2 layers if located over perforated/slotted ceiling.</b>

**\*If the walls around the rooms nominated do not run full height – lagging should extend minimum one metre past the line of the wall below.**

Pipes required to be externally lagged using 5 kg/m<sup>2</sup> loaded vinyl shall have an outer aluminium foil backing equal to Vibralag from Acoustic Supplies. The loaded vinyl shall be separated from the pipe with a layer of minimum 25mm thick open cell foam. Overlap all joints by minimum of 50mm and tape airtight with aluminium tape. In addition, all pipes which are required to be lagged which penetrate slab soffits, walls, risers or like shall have the pipe lagging flanged (minimum 50mm lap) to the meeting surface or sealed with a flexible sealant.

All waste pipes shall be kept a minimum of 20mm clear of any part of the structure including walls, ceilings, ceiling hangers, etc. Waste pipe penetrations shall be sealed as recommended above for pipe penetrations. Mortar or render should be kept clear of the penetrations so as to prevent any bridging between the pipe and the wall.

Where waste pipes or in-wall cisterns are located within walls backing onto noise sensitive rooms (e.g. ward rooms, meeting rooms and generally spaces with a mechanical services noise level requirement of 40 dB(A) or less) the piping should be located in a discontinuous services wall with the piping attached only to the wall leaf on the wet area side (see detail AC007 in appendix 1).

#### 4.2.2.2 Other treatment of hydraulic plant

Detailed acoustic review of review of plant treatments to be undertaken once plant selections are finalised to determine requirements for attenuators, in-duct lining and screening.

Vibration isolation of plant as follows:

**Table 12 - Vibration Isolation of Hydraulic Plant**

Plant	Isolator Type	Minimum Static Deflection
Small Vertical and In-line Pumps < 1 kW motor	Spring	10 mm
Pumps > 1 kW motor	Spring	25 mm
Water tanks	Spring or Pad	2mm
Boilers	Spring or Pad	6 mm
Hot water units	Spring or Pad	6mm
Electric Fire Pumps	Spring	10mm
Diesel Fire Pumps (in separate, dedicated building)	Spring or Pad	6 mm

#### 4.2.3 Diesel Generator

Generator to be located in an external enclosure adjacent to Docker Street.

Generator to have acoustic enclosure such that a noise level of no more than 65dB(A) at 7m distance is achieved.

Generator area to have a solid fence/screen to the perimeter (lapped and capped timber or Colorbond) equal in height to the top of the generator container.

## 5 AUDIOMETRIC ROOM

If NOT a proprietary booth - Refer to Appendix 1 for detailed drawings of room construction.

If a proprietary acoustic booth is proposed – ALC to review proposed booth selection.

### 5.1 AMBIENT / MECHANICAL SERVICES NOISE LEVELS

#### 5.1.1 Audiometric Room

Maximum permissible ambient noise levels have been derived from the two Standards applicable to this project in conjunction with Client requests. The Standards are:

1. ISO 8253-1:1989 Ed. 1.0 *“Acoustics – Basic Pure Tone Air and Bone Conduction Threshold Audiometry”*,
2. ISO 8253-2:1992 Ed. 1.0 *“Acoustics – Audiometric Test Methods – Sound Field Audiometry with Pure Tone and Narrow-Band Test Signals”*,
3. ISO 8253-3:1996 Ed. 1.0 *“Acoustics – Acoustics – Audiometric Test Methods – Speech Audiometry”*,

**Table 13 - Project Maximum Permissible Ambient Noise Levels for Audiometric Test Rooms (250Hz Pure Tone)**

Frequency (Hz)	Audiometric Test Rooms MPANLs L <sub>MAX</sub> dB			Overall Criteria L <sub>MAX</sub> dB*
	Ears Uncovered (Sound Field)	Ears Covered (Supra Aural)	Ears Covered (Insert)	
31.5	65	71	n/a	<b>65</b>
63	46	57	n/a	<b>46</b>
125	30	44	67	<b>30</b>
250	15	24	53	<b>15</b>
500	10	23	50	<b>10</b>
1000	9	28	47	<b>9</b>
2000	9	35	49	<b>9</b>
4000	4	41	50	<b>4</b>
8000	17	38	56	<b>17</b>
12500	20	n/a	n/a	<b>20</b>

\*Sound field testing criteria adopted as this is the most stringent of the proposed uses of the room.

### 5.1.2 Control Rooms and/or Viewing Rooms

In the absence of ambient noise levels criteria for control rooms and/or viewing rooms associated with the audiometric test rooms in ISO 8253 or ANSI S3.1-1999, ALC recommends the ambient noise levels in Table 3 for these spaces. It is noted that these ambient design sound levels are cumulative and inclusive of all noise sources including noise resulting from the normal operation of HVAC systems, lighting and associated control systems, external noise intrusion, audiometers, amplifiers and other instrumentation located within the control rooms and auditioning space.

**Table 14 - Internal Noise Level Criterion for Control Rooms and/or Viewing Rooms**

Frequency (Hz)	Space
	Audiometric Control Rooms and/or Viewing Rooms (dB)
63	59
125	48
250	40
500	34
1000	30
2000	27
4000	25
8000	23
BROADBAND LEVEL (dB)	NR 30 / L <sub>Aeq</sub> 35

### 5.1.3 Room finishes - TEST ROOM

Section 4.4 of ISO 8823-3:1996 Ed. 1.0 “Acoustics – Acoustics – Audiometric Test Methods – Speech Audiometry” details specific internal acoustic quality parameters to be achieved in audiometric test rooms. ISO 8253-3:1996 Ed. 1.0 requires test rooms in which speech is recorded shall be sufficiently quiet to provide a speech-to-noise ratio of at least 40dB and that the test room shall have a noise decay time of less than 0.5s at any frequency in the range of 125Hz to 8000Hz. It is noted that no tolerances for the noise decay time spectrum has been provided.

Notwithstanding the above criteria, it is recommended that early reflections caused by the boundary surfaces of the audiometric test rooms, which reaches the test subject during a time interval up to 15ms after the direct sound (*for sound field audiometry*), should be attenuated a minimum of 10dB relative to the direct sound.

In order to achieve the required noise decay time objectives:

- All walls to be acoustically lined with noise absorptive panels, NRC no less than 0,9.
- Ceiling to have a noise absorptive lining or ceiling tile with NRC no less than 0.8.
- The floor finish shall typically be 6mm pile carpet installed on underlay or a machine tufted carpet tile equal to 10mm thick 3.5kg/m<sup>2</sup> EcoSoft Carpet (*needle punch backing*) Tile manufacture (*source: [www.customcarpets.co.nz](http://www.customcarpets.co.nz)*).

#### 5.1.4 Noise from Mechanical Services

The transfer of air within ducts and associated HVAC elements gives rise to turbulence and airflow-generated noise which will form the make-up of the ambient environment within all specialist spaces. Table 13 of this document has presented the cumulative design criteria for each type of critical space thus far.

In order to achieve these design criteria, and to avoid turbulence and airflow-generated noise, appropriate duct velocities should be implemented.

Best practice recommendations as follows:

- Noise levels generated by the supply air to within all critical spaces shall be designed to not exceed the design noise criterion presented in Section 3.1 of this Document.
- The velocity of air in both the supply and return air ducts is not to exceed  $2.5\text{ms}^{-1}$ . Run-outs to supply and return grilles should be sized for a maximum of  $0.5\text{ms}^{-1}$ .
- Face velocities at both the supply and return air grilles and in flexible ducting are not to exceed  $0.5\text{ms}^{-1}$ .
- The supply and return air inlets and outlets are to be fitted with either egg crate grilles or if architecturally suitable, no grille covering. *(The determination of whether a grill covering is to be used will be resolved once the room and mechanical layouts have been finalized).*
- Sheet metal plenum boxes shall be installed behind grilles internally insulated with 50mm thick insulation and be of side intake type. In addition, all flexible ductwork used shall be acoustic flexible ductwork.
- Supply ductwork shall not be fitted with damping devices or turning vanes for a minimum distance of 6m from the supply air outlet.
- The sound power level of base building duct take off shall not exceed 40-45dB(A)  $L_{Aeq}$  and base building connection air flow velocities not to exceed a maximum of  $2.5\text{ms}^{-1}$ .

#### 5.1.5 Doors

Door from control room to audiometry room to consist of a proprietary  $R_w$  45 doors.

Door from corridor to control room to consist of 45mm thick solid core door with full perimeter seals (Raven RP 10 seals to top and sides, Raven RP 38 drop seal to base or equal).



## 6 GENERATOR NOISE

In previous advice we noted that generators are not typically held to the same noise emission criteria as the rest of the site, however the conditions of consent do not expressly state one way or the other.

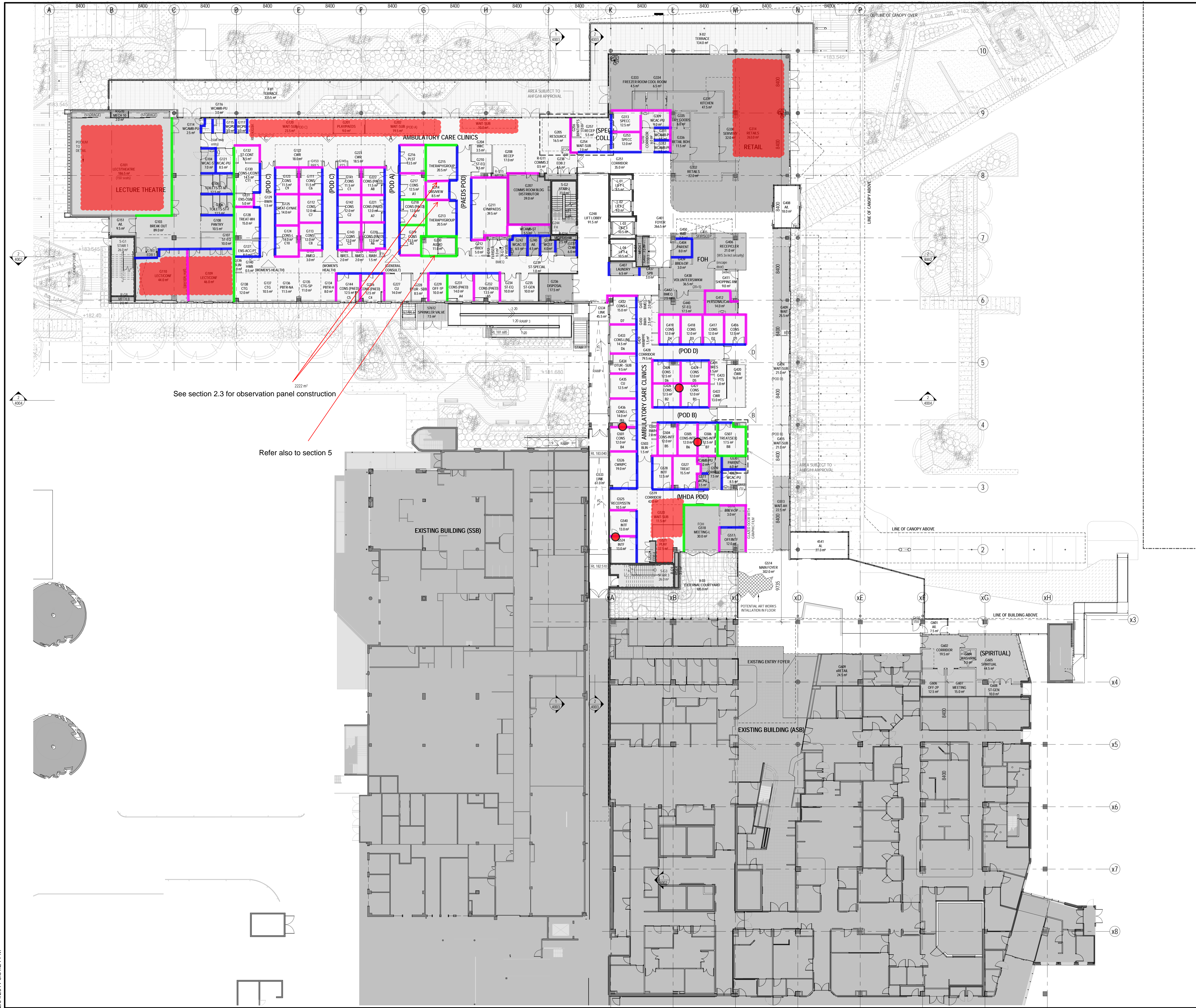
It is proposed that noise from the generator noise not exceed daytime background noise levels by more than 10dB(A).

Recommendations:

- Generator to have an acoustic enclosure (75dB(A) at 7m distance).
- 4m high metal screen around the perimeter of the generator is recommended. Screen is to be solid (no holes- eg Colorbond).
- A noise absorptive lining on the inside face of the screen (ie facing the generator) is recommended. The lining can consist of Echosoftware or other noise absorptive lining suitable for external use (NRC 0.8 or higher)

## **APPENDIX 1 – INTERNAL PARTITION MARKUP**



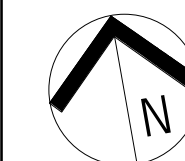


**ALC Wall Rating Mark Up**

- Rw 50 Wall Construction
- Rw 45 Wall Construction
- Rw 40 Wall Construction
- Rw 45 Proprietary Acoustic Door
- Acoustic (Noise Absorbing) Ceiling or Carpet Floor

Author: JM 26/06/2019

REV	DATE	DRAWN	REV'D	APPRO	REASON
K	02.04.2019				ISSUED FOR INFORMATION
J	14.03.2019				ISSUED FOR INFORMATION
I	08.03.2019				ISSUED FOR INFORMATION
H	20.02.2019				ISSUED FOR INFORMATION
G	17.10.2018				TENDER ADDENDUM
F	05.10.2018				FROZEN ISSUE
E	21.09.2018				TENDER ADDENDUM #1
D	12.09.2018				FOR REVIEW
C	10.09.2018				FOR INFORMATION
B	31.08.2018				TENDER ISSUE
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PROJECT  
**WAGGA WAGGA HEALTH SERVICE REDEVELOPMENT**  
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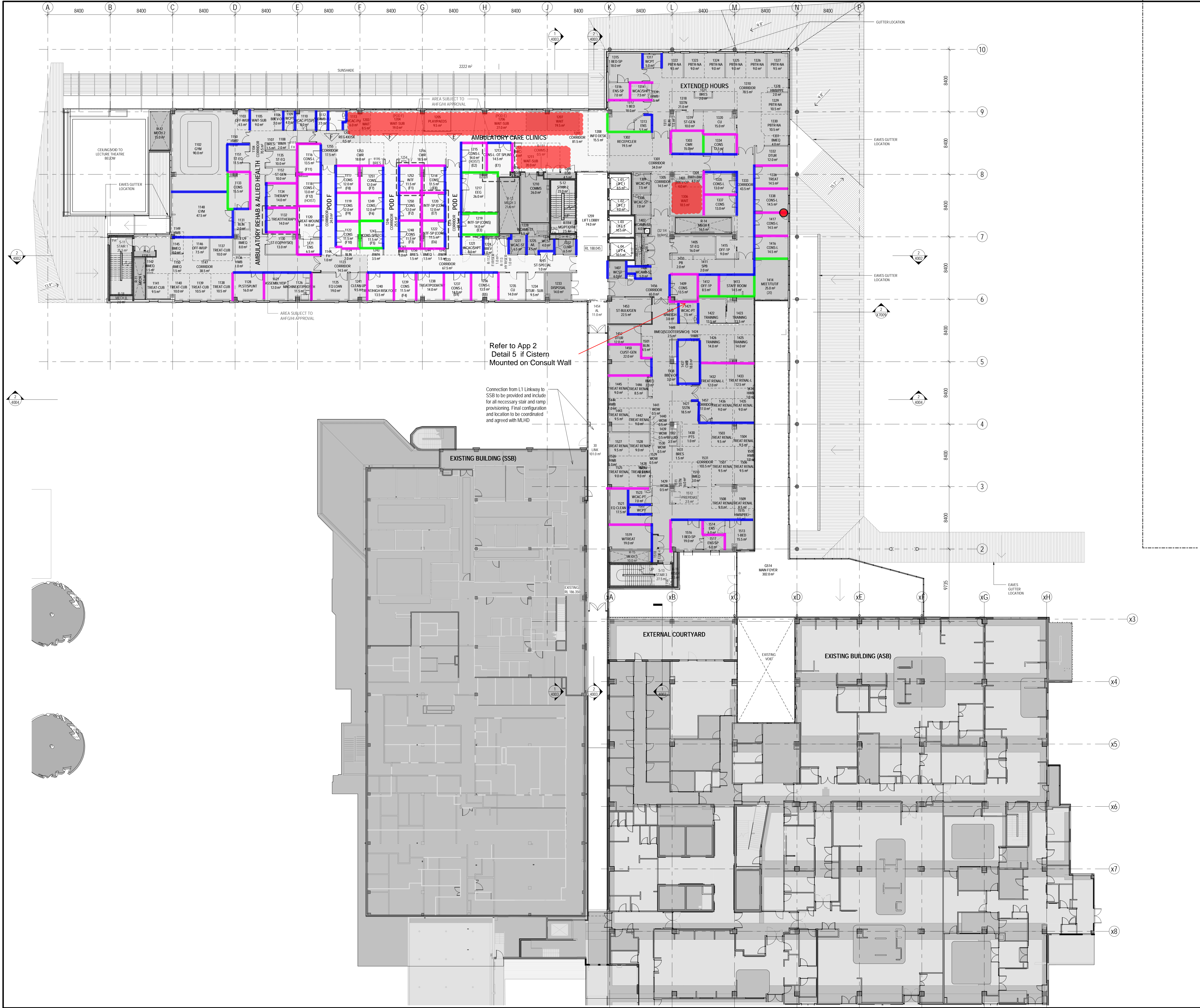
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TITLE  
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GENERAL ARRANGEMENT PLAN -  
GROUND**

DRAWING STATUS  
**FOR INFORMATION**

DRAWN	LH / EF	DRAWING CHECK	EF
DESIGNED	DG / JS	DESIGN REVIEW	AC
REVIEWED	AC / DG	DATE	10.08.2018
APPROVED	CY	DATE	17.08.2018
SCALE	1 : 200		
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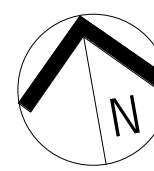
**ALC Wall Rating Mark Up**

- Rw 50 Wall Construction
- Rw 45 Wall Construction
- Rw 40 Wall Construction
- Rw 45 Proprietary Acoustic Door
- Acoustic (Noise Absorbing) Ceiling or Carpet Floor

Author: JM 26/06/2019

REV	DATE	DESCRIPTION
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II	14.03.2019	ISSUED FOR INFORMATION
G	17.10.2018	TENDER ADDENDUM
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E	21.09.2018	TENDER ADDENDUM #1
D	12.09.2018	FOR REVIEW
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B	31.08.2018	TENDER ISSUE
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KEY PLAN



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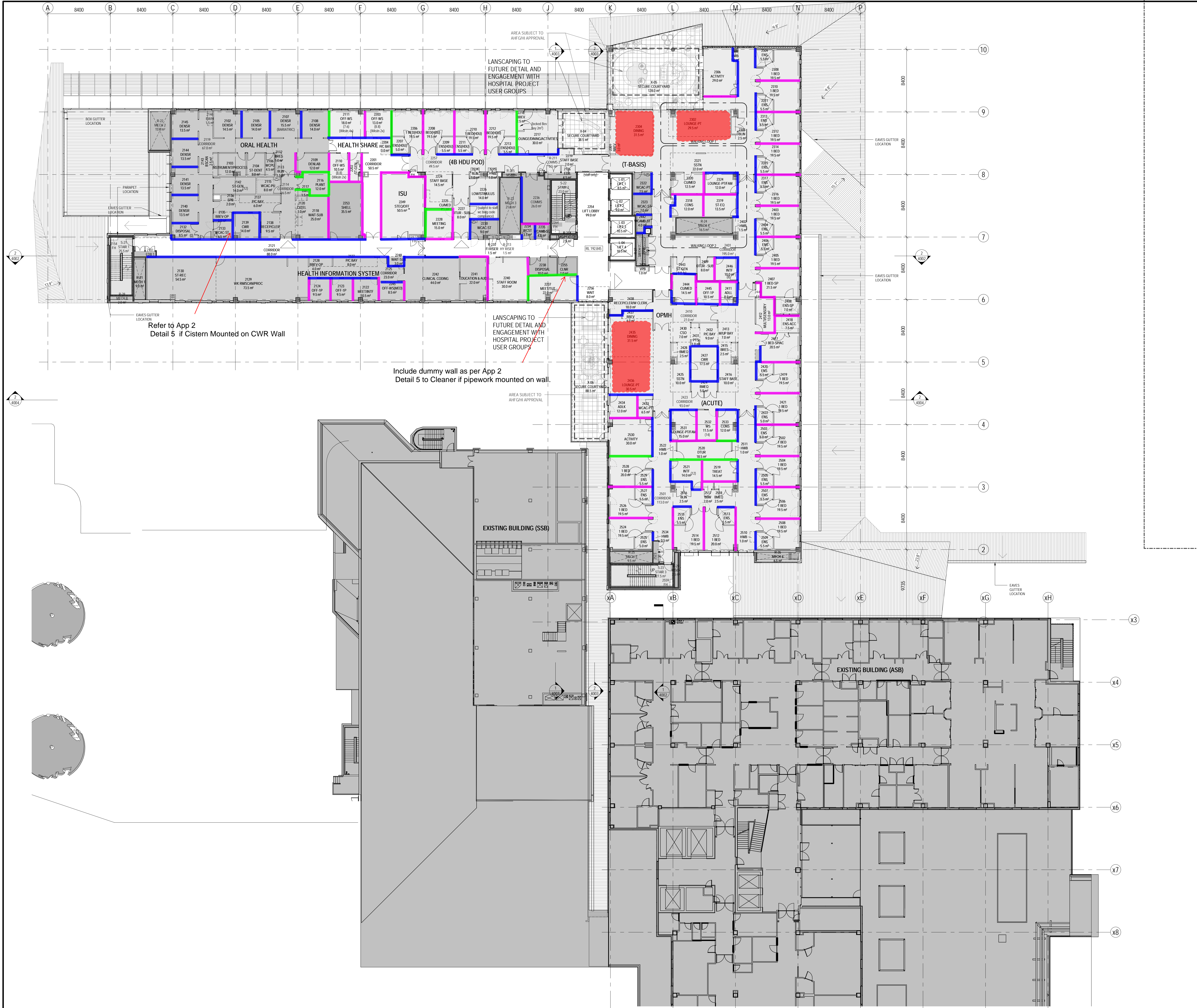
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**ARCHITECTURAL SERVICES**  
**GENERAL ARRANGEMENT PLAN -**  
**LEVEL 1**

**FOR INFORMATION**

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DESIGNED	DESIGN REVIEW	APPROVED	DATE
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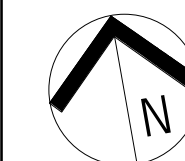


### ALC Wall Rating Mark Up

- Rw 50 Wall Construction
- Rw 45 Wall Construction
- Rw 40 Wall Construction
- Rw 45 Proprietary Acoustic Door
- Acoustic (Noise Absorbing) Ceiling or Carpet Floor

Author: JM 26/06/2019

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II	14.03.2019				ISSUED FOR INFORMATION
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E	21.09.2018				TENDER ADDENDUM #1
D	12.09.2018				FOR REVIEW
C	10.09.2018				FOR INFORMATION
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A	17.08.2018				SD ISSUE FOR REVIEW



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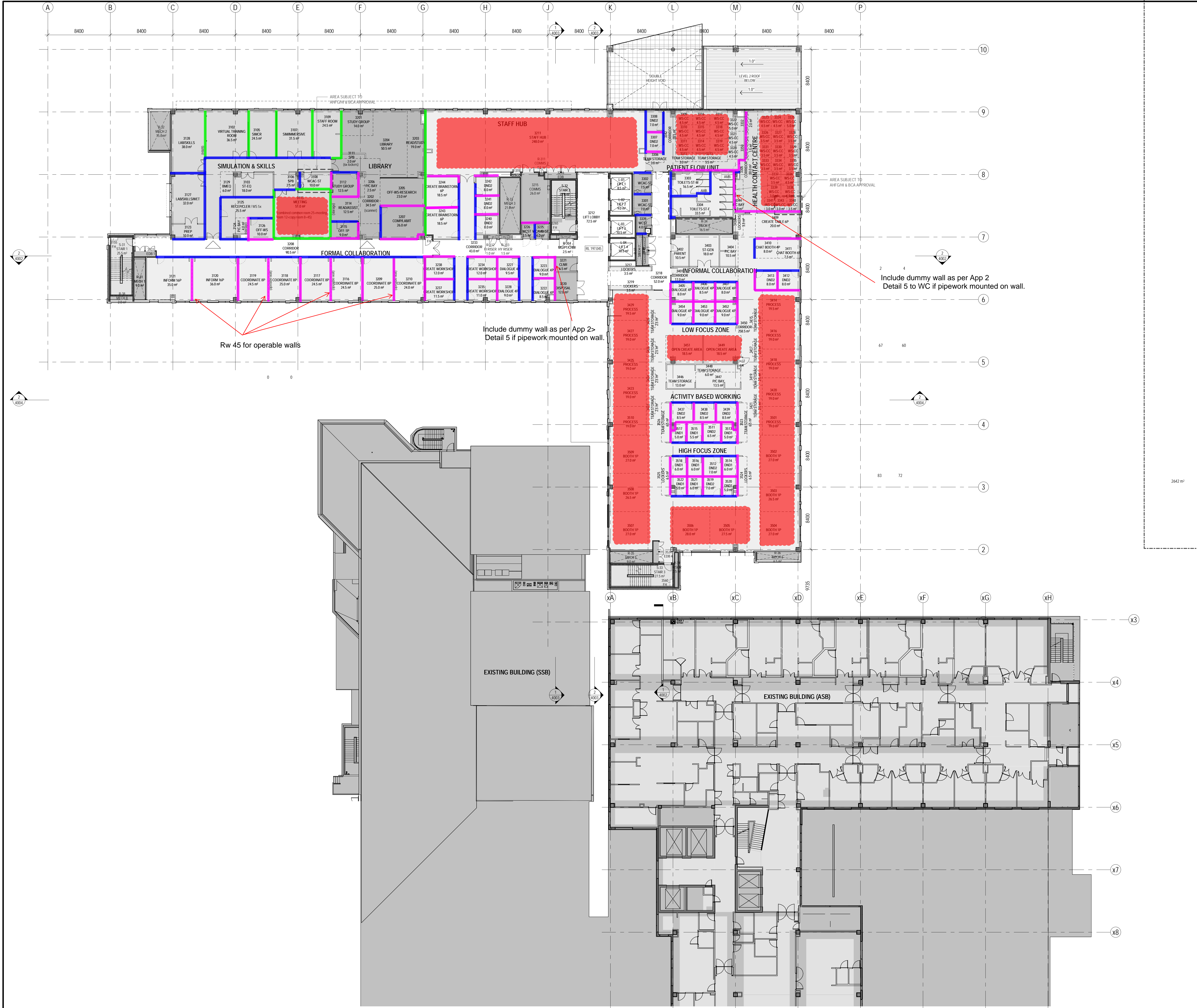
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### ARCHITECTURAL SERVICES GENERAL ARRANGEMENT PLAN - LEVEL 2

### DRAWING STATUS FOR INFORMATION

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DG / JS	AC	DESIGN REVIEW	AC	10.08.2018
REVIEWED	AC / DG	DATE		10.08.2018
APPROVED	CY	DATE		17.08.2018
SCALE	1 : 200			
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ALC Wall Rating Mark Up

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- Rw 45 Wall Construction
- Rw 45 Proprietary Acoustic Door
- Acoustic (Noise Absorbing) Ceiling or Carpet Floor

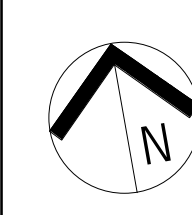
Author: JM 26/06/2019

Include dummy wall as per App 2  
Detail 5 to WC if pipework mounted on wall.

Rw 45 for operable walls

Include dummy wall as per App 2-  
Detail 5 if pipework mounted on wall.

REV	DATE	DRAWN	REV'D	APPRO	REVISION
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II	14.03.2019				ISSUED FOR INFORMATION
G	17.10.2018				TENDER ADDENDUM
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D	12.09.2018				FOR REVIEW
C	10.09.2018				FOR INFORMATION
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ARCHITECTURAL SERVICES  
GENERAL ARRANGEMENT PLAN -  
LEVEL 3

DRAWING STATUS  
**FOR INFORMATION**

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REVIEWED		DATE	10.08.2018
APPROVED	AC / DG	DATE	17.08.2018
CY		SCALE	1 : 200
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### ALC Wall Rating Mark Up

- Rw 50 Wall Construction
- Rw 45 Wall Construction
- Rw 45 Proprietary Acoustic Door
- Acoustic (Noise Absorbing) Ceiling or Carpet Floor

Author: JM 26/06/2019

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II	14.03.2019				ISSUED FOR INFORMATION
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D	12.09.2018				FOR REVIEW
C	10.09.2018				FOR INFORMATION
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A	17.08.2018				SD ISSUE FOR REVIEW

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### ARCHITECTURAL SERVICES GENERAL ARRANGEMENT PLAN - LEVEL 4

DRAWING STATUS

## FOR INFORMATION

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DESIGN REVIEW	AC
REVIEWED	AC / DG
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APPROVED	CY
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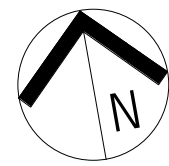
### ALC Wall Rating Mark Up

- Rw 50 Wall Construction
- Rw 45 Wall Construction
- Rw 45 Proprietary Acoustic Door
- Acoustic (Noise Absorbing) Ceiling or Carpet Floor

Author: JM 26/06/2019

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KEY PLAN



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ARCHITECTURAL SERVICES  
GENERAL ARRANGEMENT PLAN -  
LEVEL 5

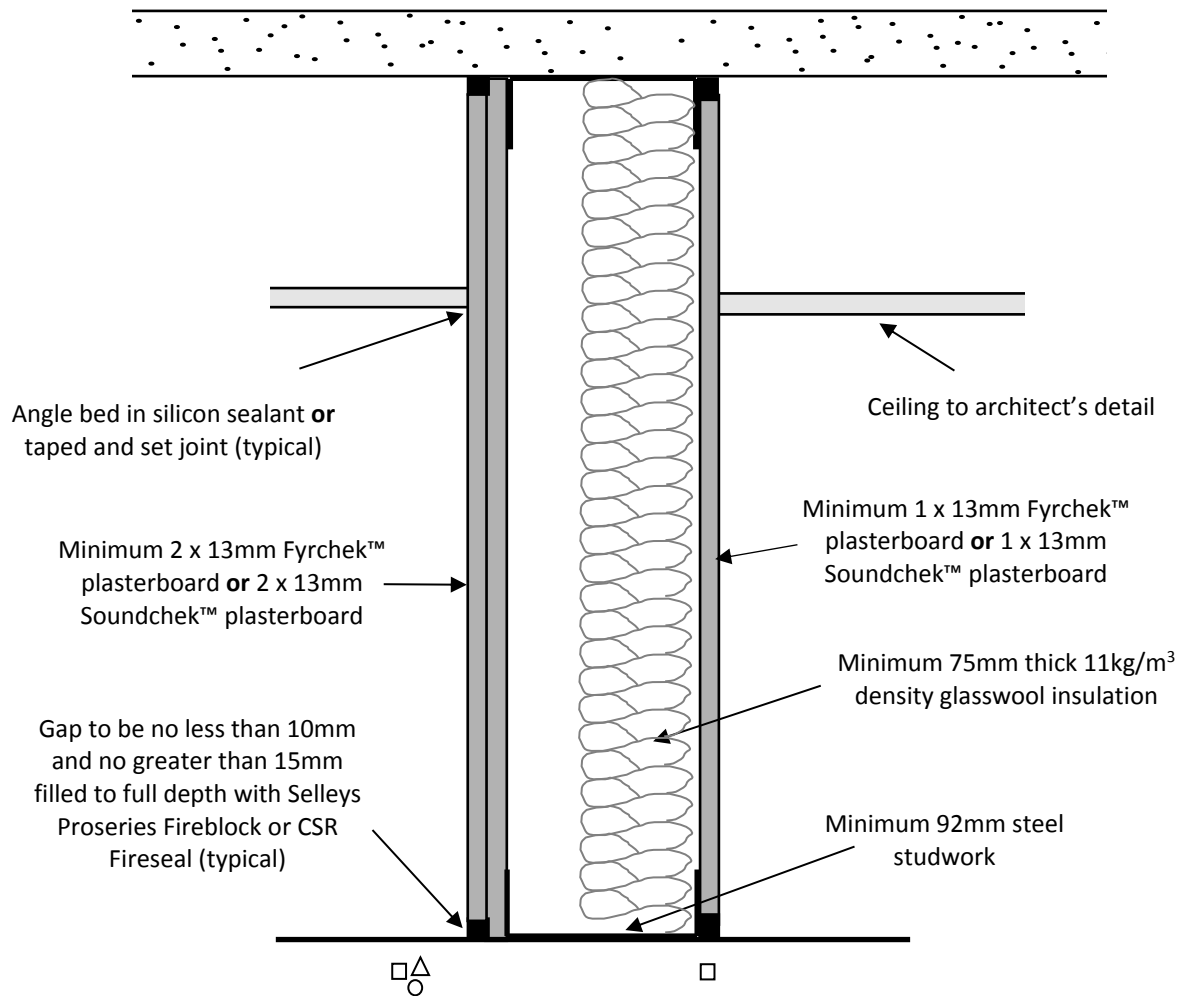
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APPROVED	CY	DATE	17.08.2018
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## **APPENDIX 2 – ACOUSTIC DETAILS**



**Note:**

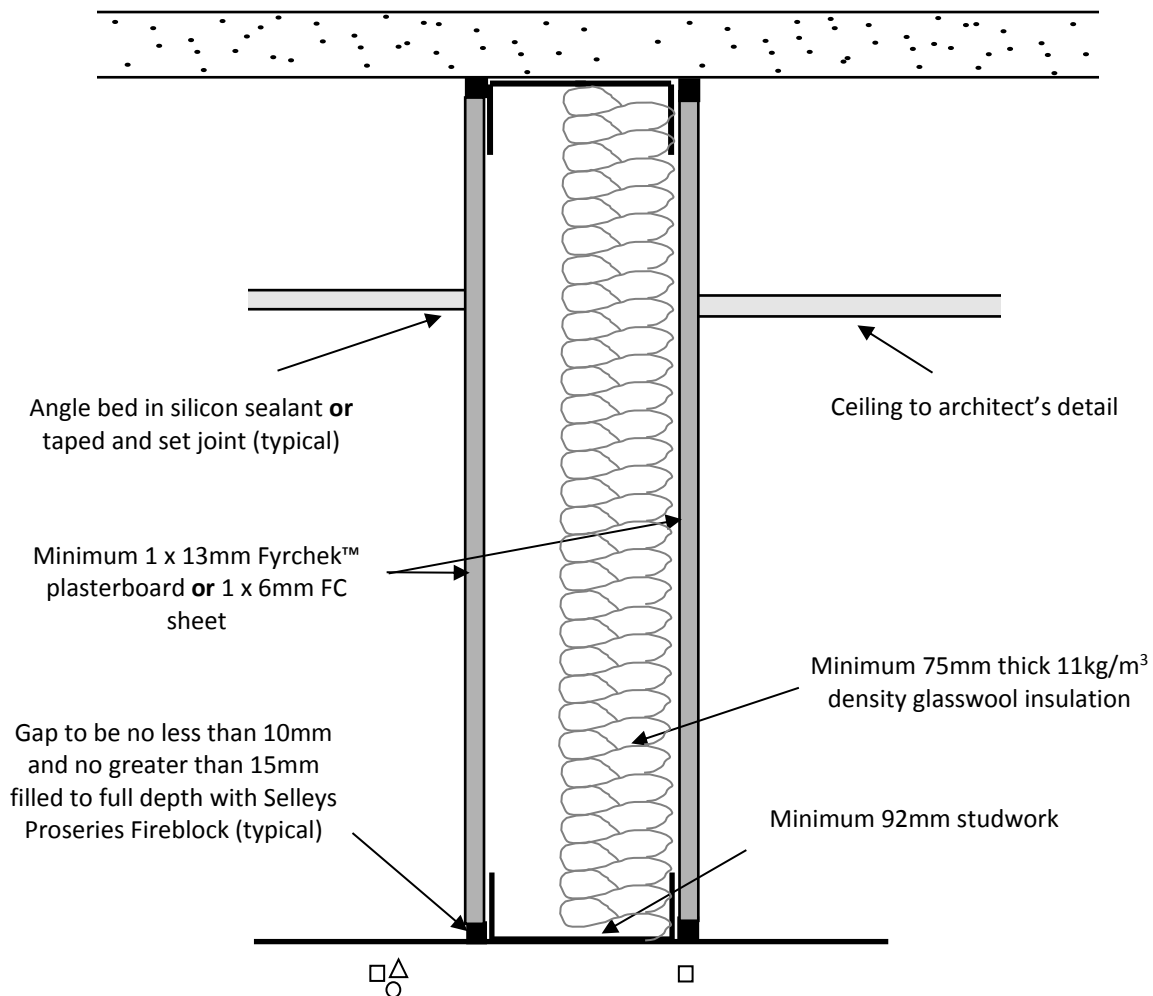
-All wall penetrations to be acoustically sealed. GPO's to have acoustic box (HPM firebox) behind or offset 600mm.

**R<sub>w</sub> 50 PARTITION**



**Wagga Wagga Hospital Stage 3  
Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
19/12/2019	YK		20180392.2	AC001
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
R0	NTS			



**Note:**

-All wall penetrations to be acoustically sealed. GPO's to have acoustic box (HPM firebox) behind or offset 600mm.

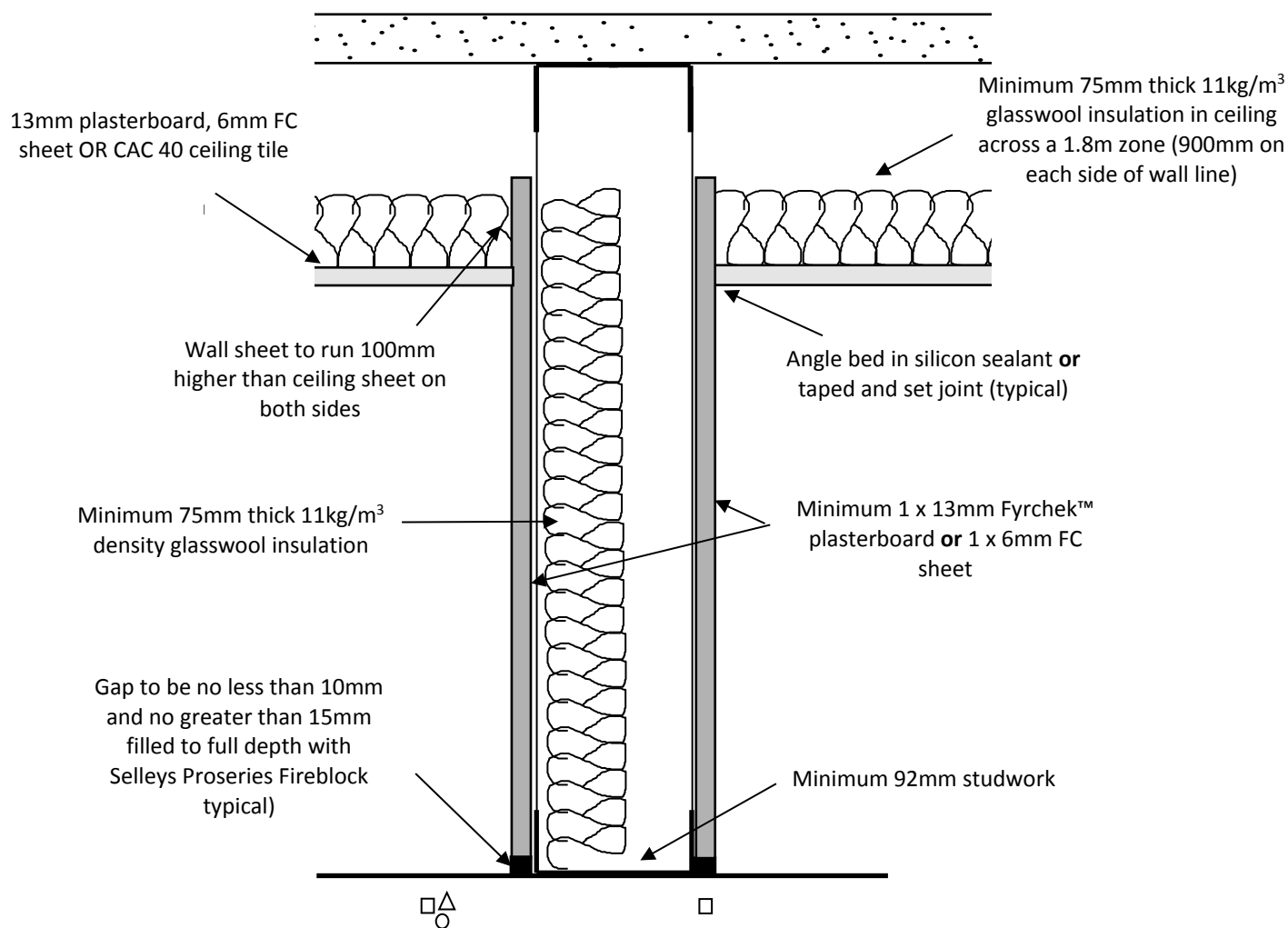
**R<sub>w</sub>45 PARTITION**

**OPTION A – FULL HEIGHT WALL LINING**



**Wagga Wagga Hospital Stage 3 Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
19/12/2019	YK		20180392.2	AC002a
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
	NTS			



**Note:**

- All wall penetrations to be acoustically sealed. GPO's to have acoustic box (HPM firebox) behind or offset 600mm.
- Ceiling penetrations including mechanical ventilation grilles to be acoustically treated with plenum box to the rear of the grille with offset spigot and acoustic flexible ducting.

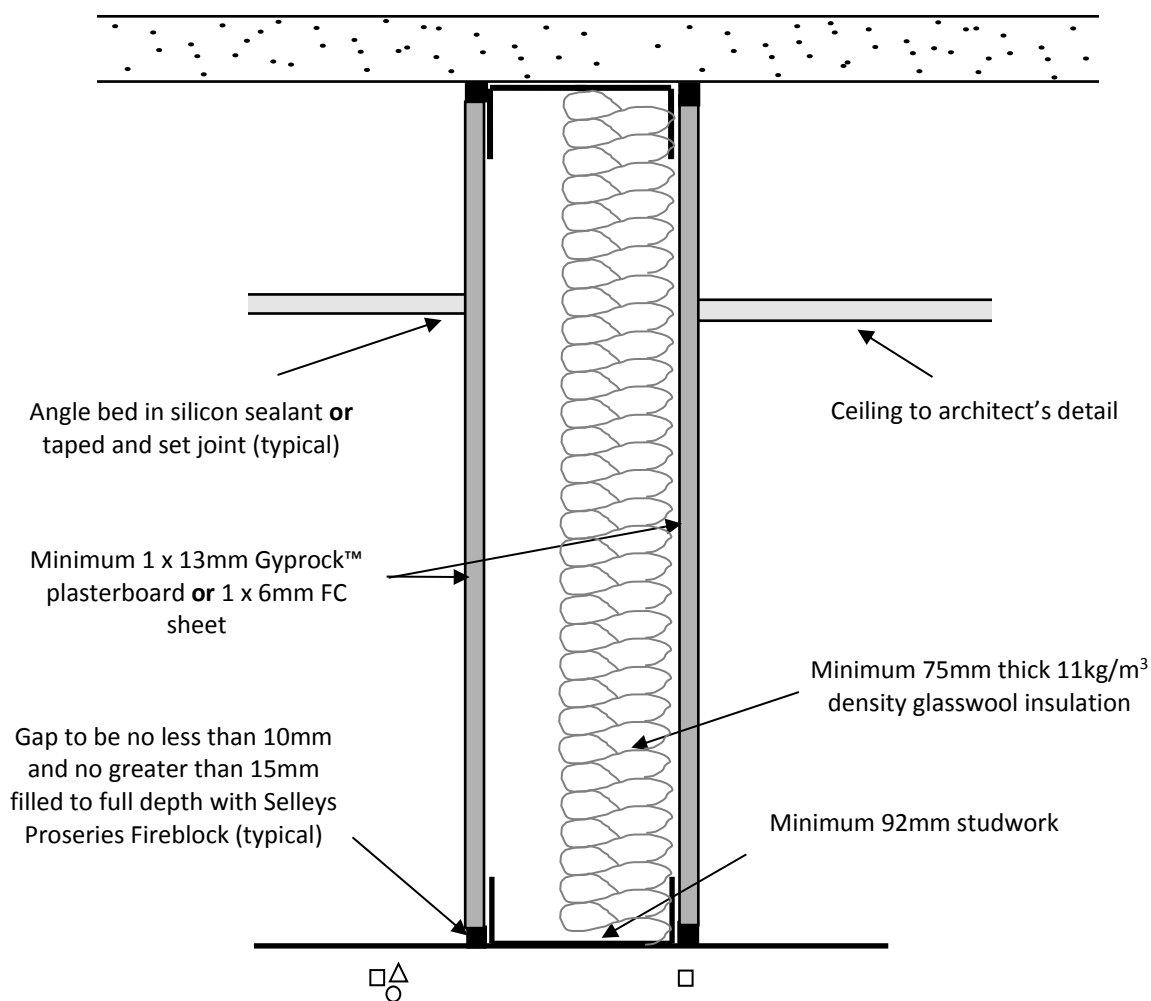
**R<sub>w</sub>45 PARTITION**

**OPTION B – NOT FULL HEIGHT WALL LINING**



**Wagga Wagga Hospital Stage 3 Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
19/12/2019	YK		20180392.2	AC002b
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
R1	NTS			



**Note: All wall penetrations to be acoustically sealed. GPO's to have acoustic box (HPM firebox) behind or offset 300mm.**

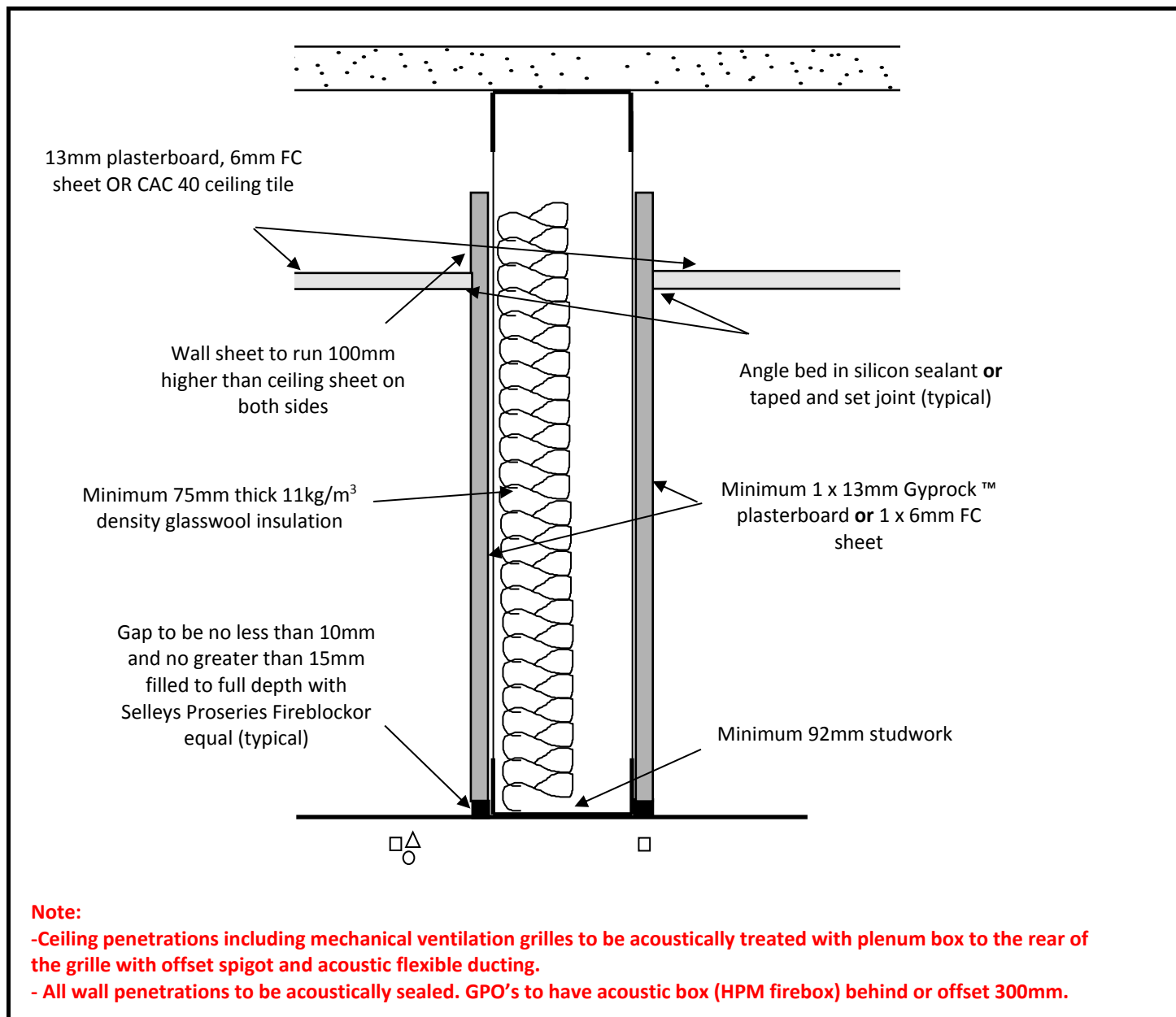
**R<sub>w</sub>40 PARTITION**

**OPTION A – FULL HEIGHT WALL LINING**



**Wagga Wagga Hospital Stage 3 Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
19/12/2019	YK		20180392.2	AC003a
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
	NTS			



## R<sub>w</sub>40 PARTITION

### OPTION B – NOT FULL HEIGHT WALL LINING



## Wagga Wagga Hospital Stage 3 Redevelopment

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
19/12/2019	YK		20180392.2	AC003b
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
R1	NTS			

Ceiling to Architects Detail

Wall sheet to run 100mm  
higher than ceiling sheet on  
both sides

Angle bed in silicon sealant or  
taped and set joint (typical)

Minimum 1 x 13mm Gyprock™  
plasterboard or 1 x 6mm FC  
sheet

Gap to be no less than 10mm  
and no greater than 15mm  
filled to full depth with  
Selleys Proseries Fireblockor  
equal (typical)

Minimum 92mm studwork



**Note:**

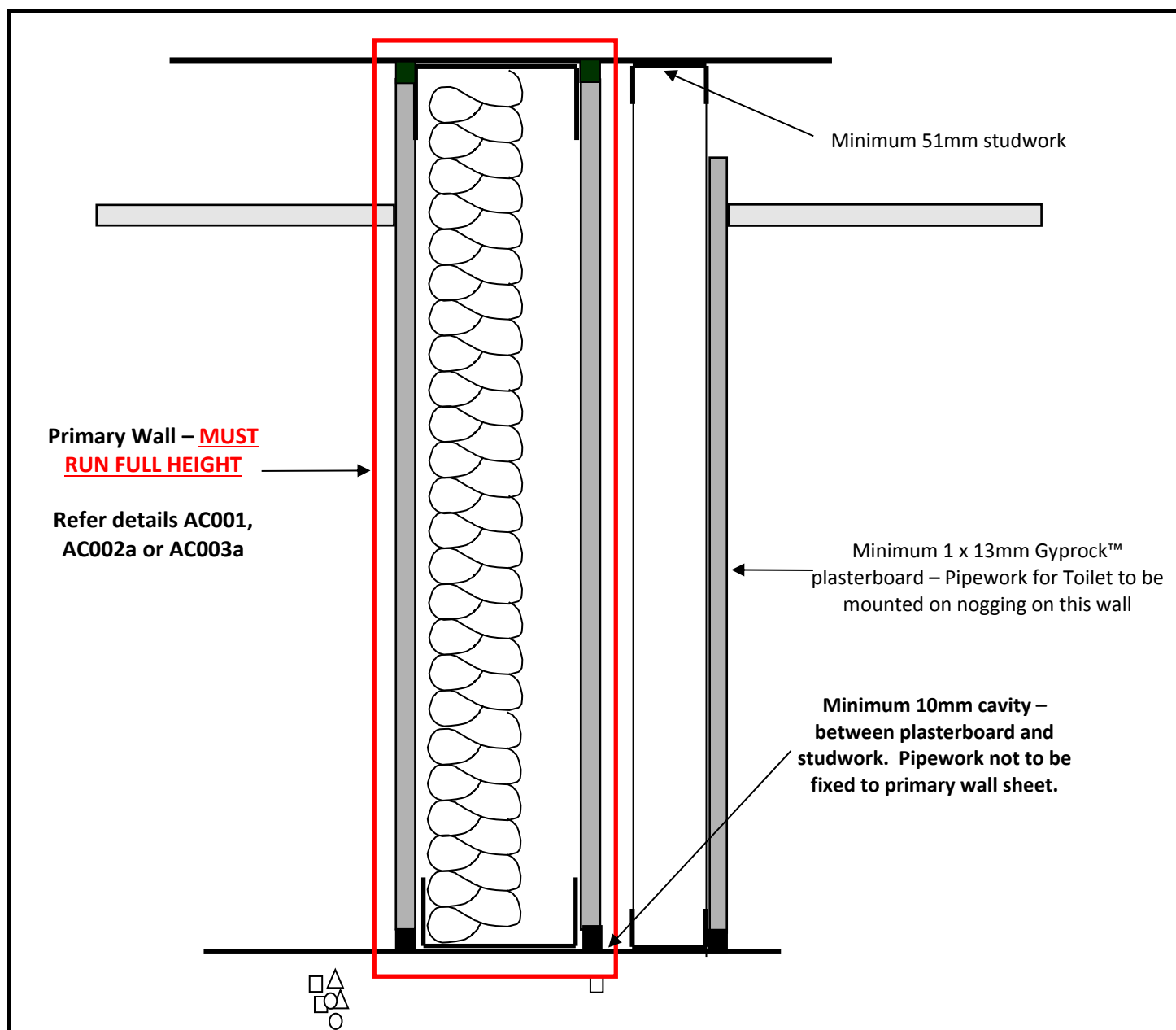
-Ceiling penetrations including mechanical ventilation grilles to be acoustically treated with plenum box to the rear of the grille with offset spigot and acoustic flexible ducting.

**R<sub>w</sub>37 PARTITION**



**Wagga Wagga Hospital Stage 3 Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
19/12/2019	YK		20180392.2	AC004
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
R1	NTS			



**DUMMY WALL FOR WET AREA SERVICES  
ADJACENT SENSITIVE SPACES**

**THIS APPLIES ONLY TO CISTERNS MOUNTED  
ON WALLS ADJACENT TO SENSITIVE SPACES  
AS MARKED IN APPENDIX 2**

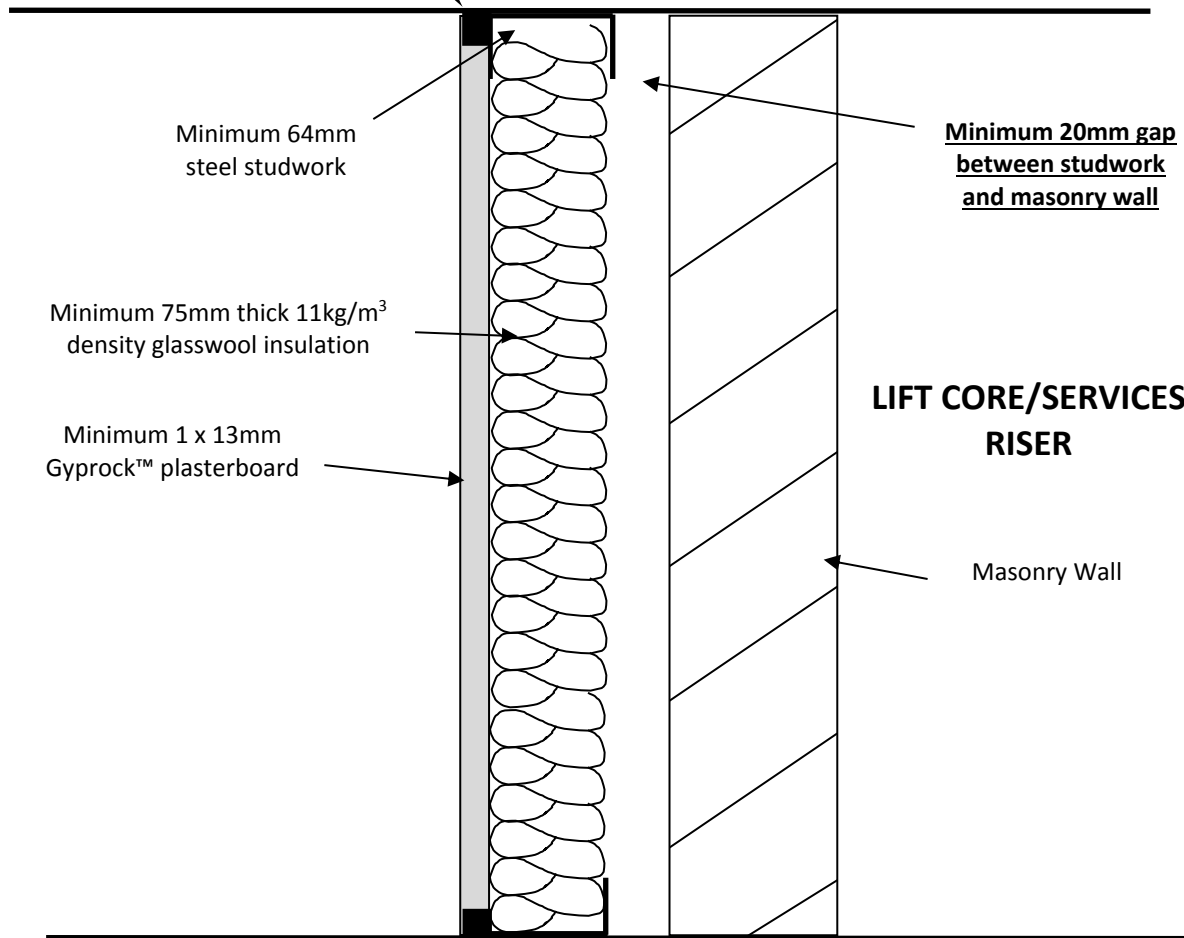


**Wagga Wagga Hospital Stage 3 Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
19/12/2019	YK		20180392.2	AC005
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
R1	NTS			



Gap to be no less than 10mm and no greater than 15mm filled to full depth with Selleys Proseries Fireblock or CSR Fireseal (typical)



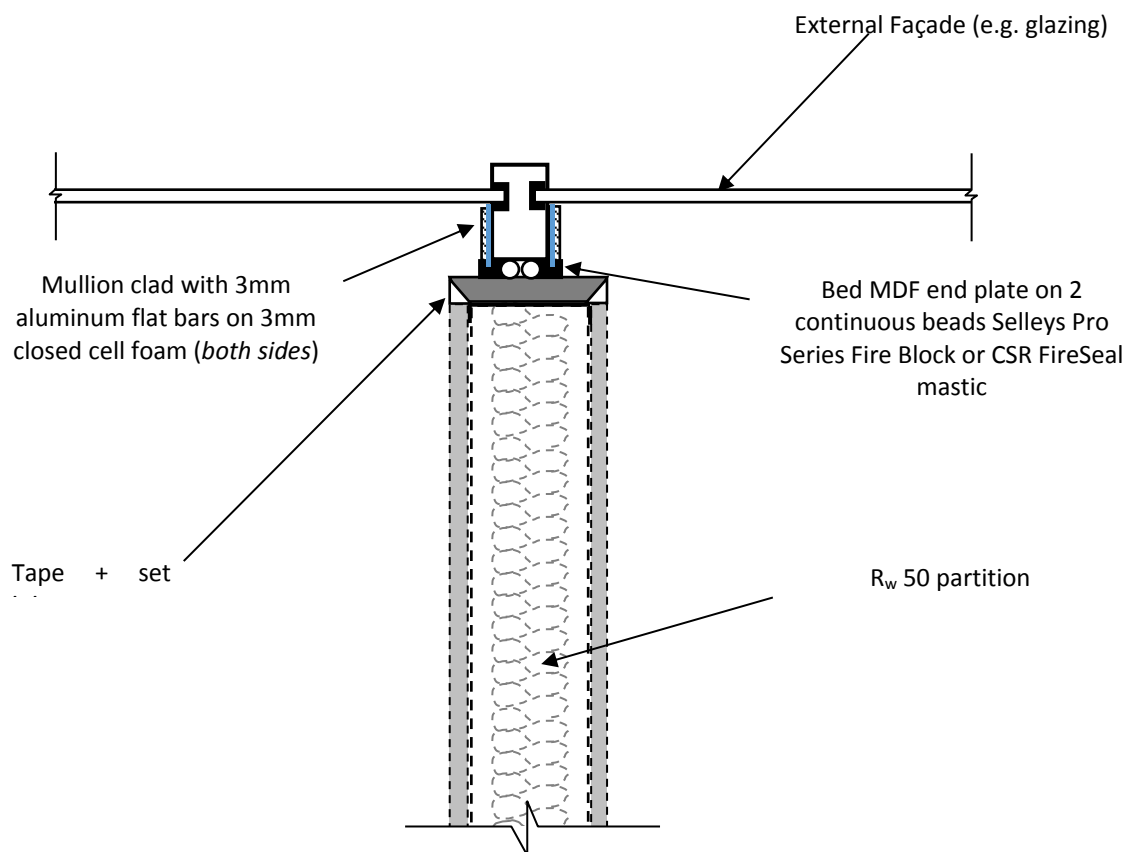
**Note: No connection between the studwork and any lift core wall or services permitted.**

**SECTIONAL ELEVATION  
LIFT CORE/RISER WALL DETAIL  
(DE – COUPLED STUD)**



**Wagga Wagga Hospital Stage 3  
Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
19/12/2019	YK		20180392.2	AC006
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
R1	NTS			



**NOTE: Sill/Transom/Skirtings must not be continuous through line of partition wall.**

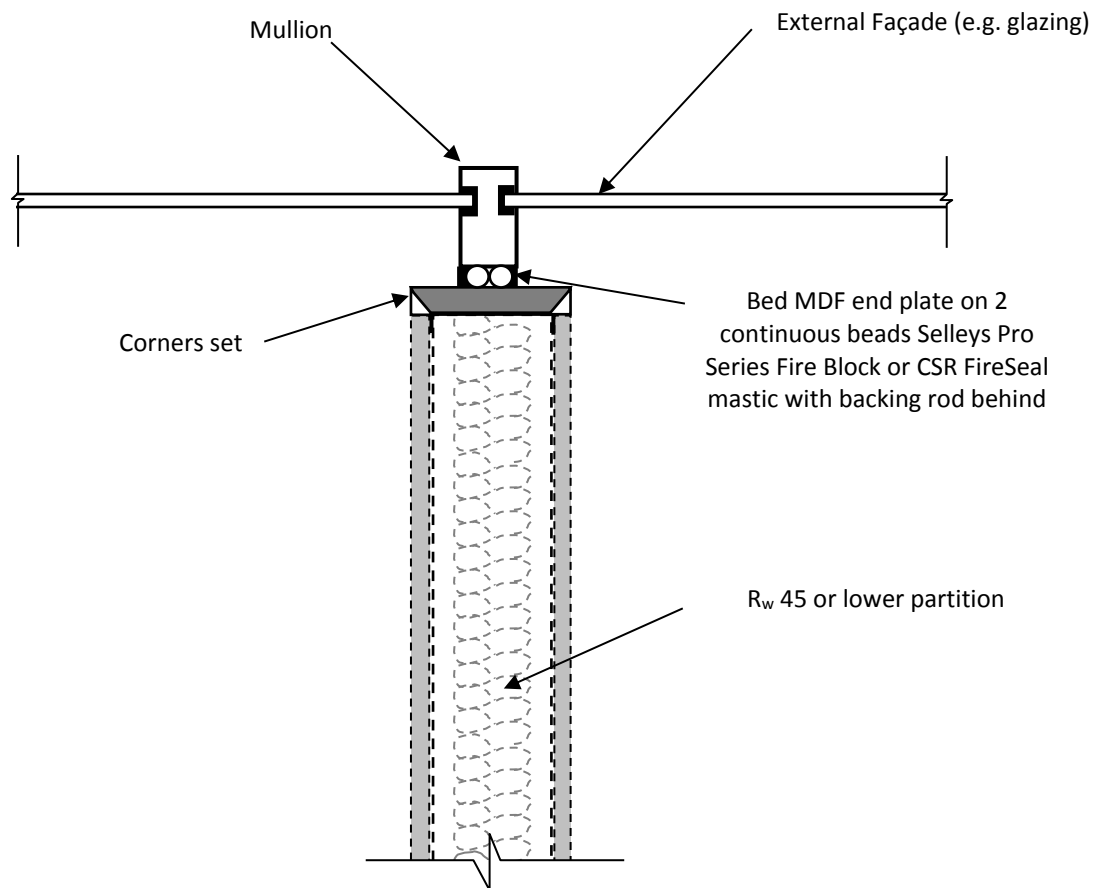
## PLAN SECTION

### R<sub>w</sub> 50 PARTITION TO FAÇADE MULLION JUNCTION



**Wagga Wagga Hospital Stage 3  
Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
19/12/2019	YK		20180392.2	AC007a
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
	NTS			



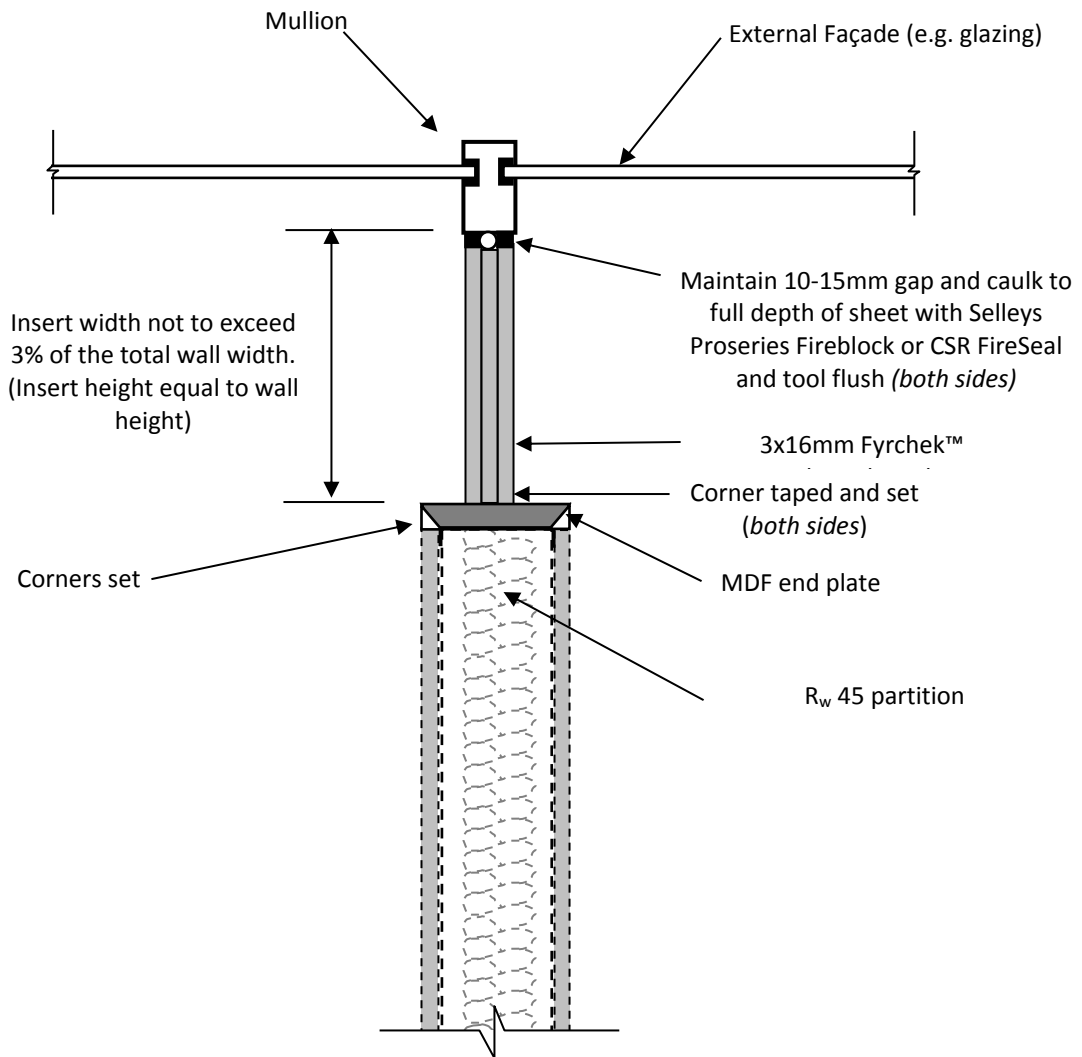
**NOTE: Sill/Transom/Skirtings must not be continuous through line of partition wall.**

**$R_w \leq 45$  PARTITION TO FAÇADE MULLION  
JUNCTION**



**Wagga Wagga Hospital Stage 3  
Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
19/12/2019	YK		20180392.2	AC007b
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
	NTS			



**NOTE: Sill/Transom/Skirtings must not be continuous through line of partition wall.**

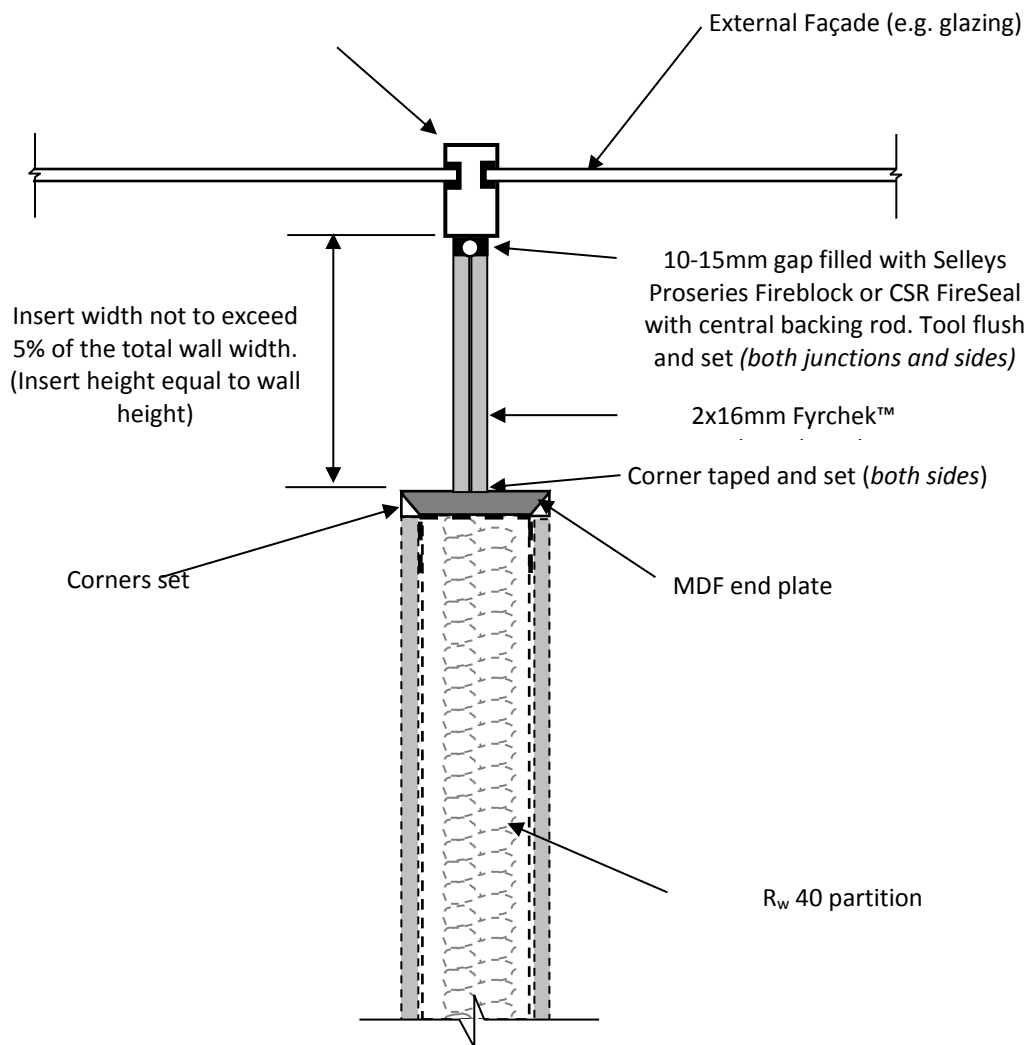
## R<sub>w</sub> 45 PARTITION TO FAÇADE MULLION JUNCTION

### INFILL PANEL OPTION



**Wagga Wagga Hospital Stage 3  
Redevelopment**

<b>Date:</b> 19/12/2019	<b>Drawn:</b> YK	<b>Checked:</b>	<b>Project No:</b> 20180392.2	<b>Drawing No:</b> AC007c
<b>Issue</b>	<b>Scale:</b> NTS	<b>Approved</b>		



**NOTE: Sill/Transom/Skirtings must not be continuous through line of partition wall.**

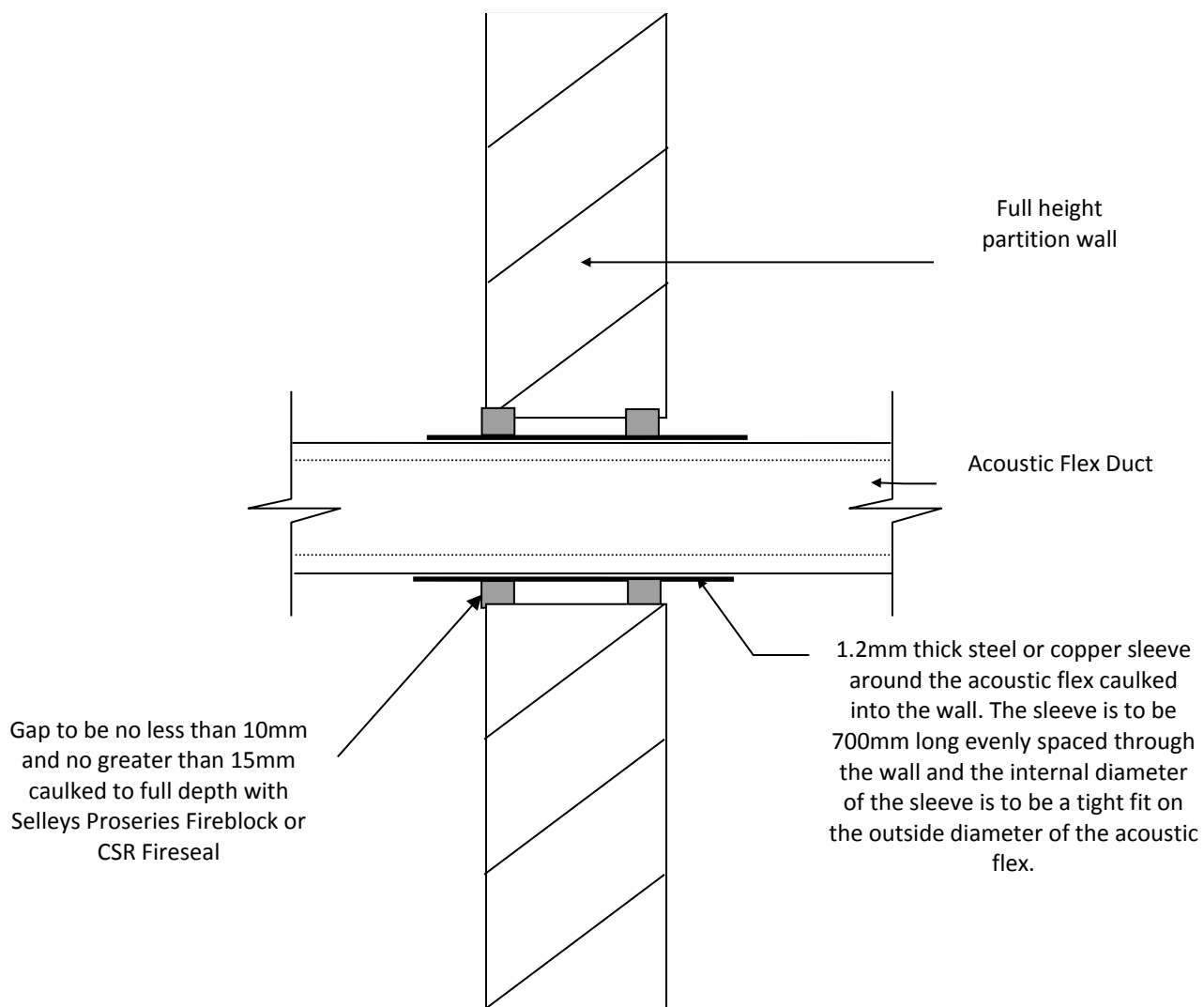
## R<sub>w</sub> 40 PARTITION TO FAÇADE MULLION JUNCTION

### INFILL PANEL OPTION



**Wagga Wagga Hospital Stage 3  
Redevelopment**

<b>Date:</b> 19/12/2019	<b>Drawn:</b> YK	<b>Checked:</b>	<b>Project No:</b> 20180392.2	<b>Drawing No:</b> AC007d
<b>Issue</b>	<b>Scale:</b> NTS	<b>Approved</b>		



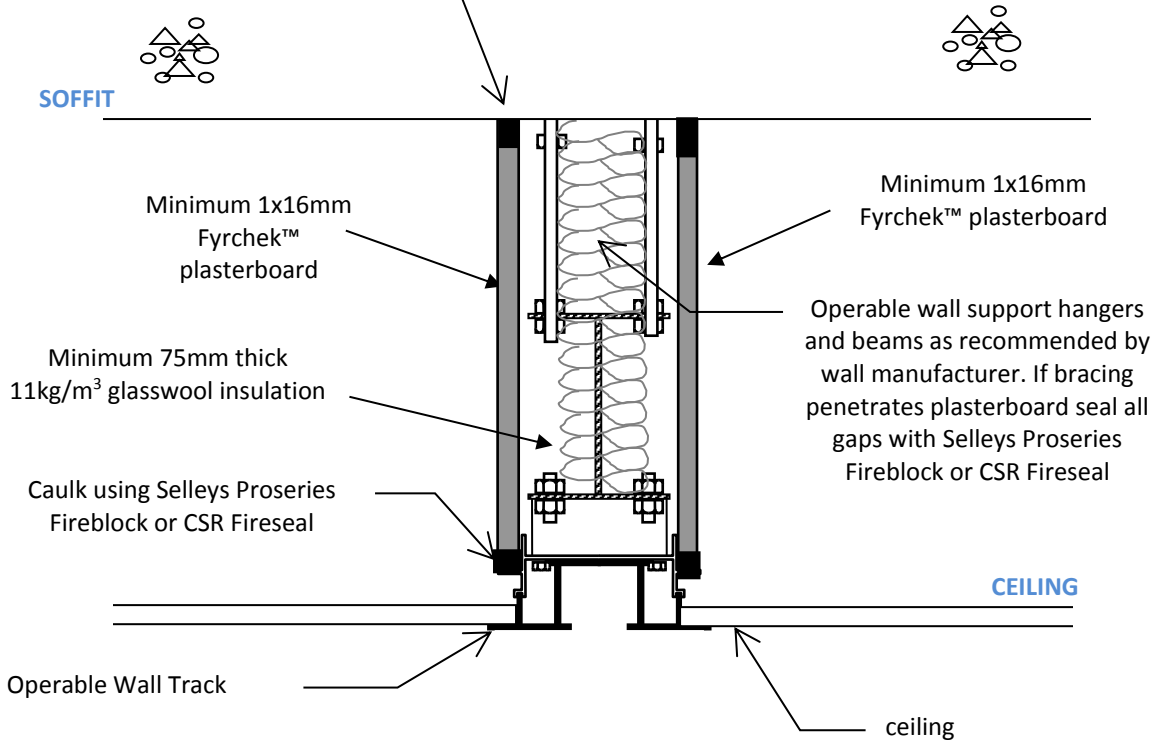
## FLEX DUCT PENETRATIONS THROUGH FULL HEIGHT PARTITION WALLS



**Wagga Wagga Hospital Stage 3  
Redevelopment**

<b>Date:</b> 19/12/2019	<b>Drawn:</b> YK	<b>Checked:</b>	<b>Project No:</b> 20180392.2	<b>Drawing No:</b> AC008
<b>Issue</b>	<b>Scale:</b> NTS	<b>Approved</b>		

Stop plasterboard sheet 10mm short and caulk using Selleys Proseries Fireblock



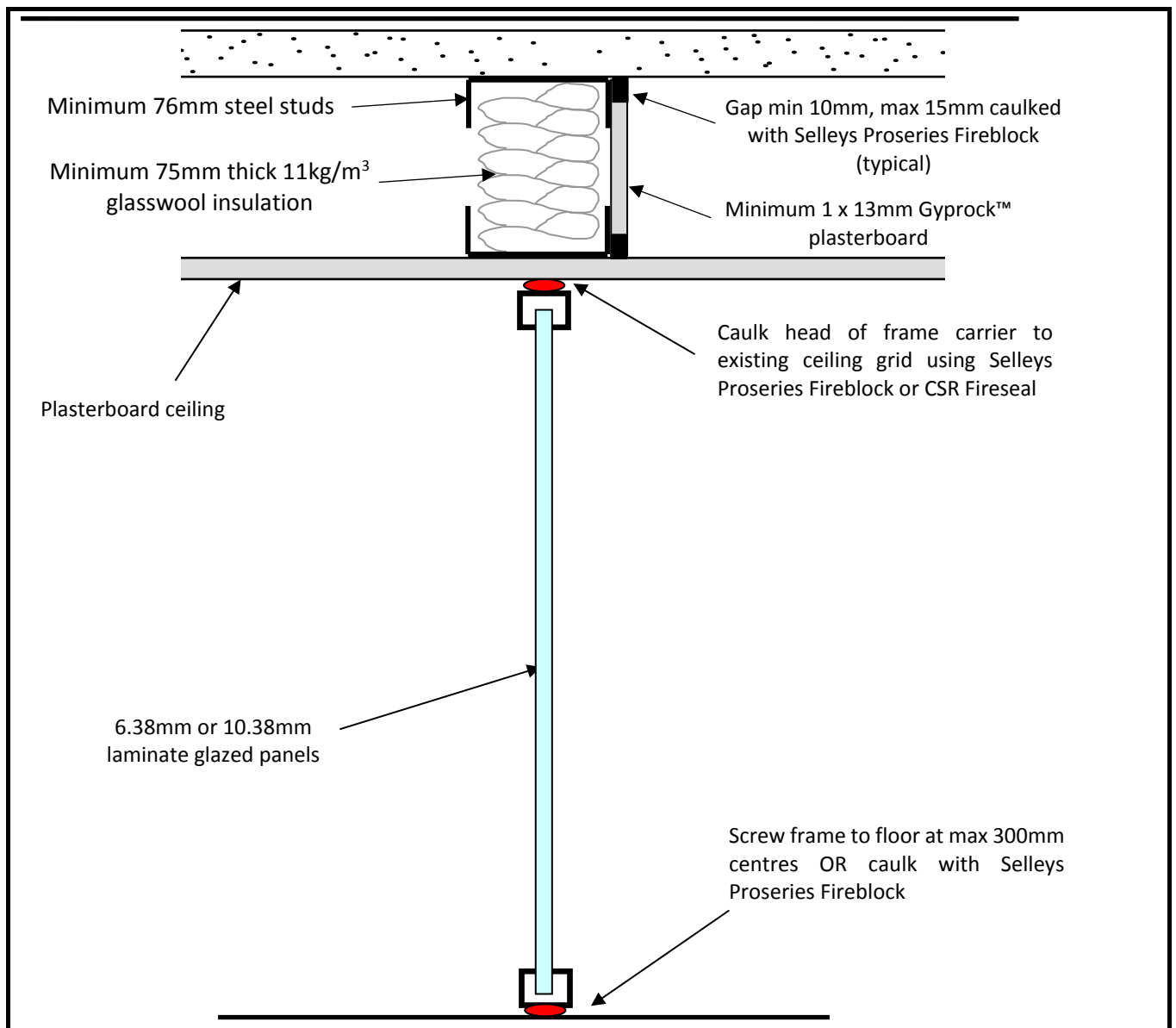
## SECTIONAL ELEVATION

### OPERABLE WALL ABOVE CEILING BAFFLE



Wagga Wagga Hospital Stage 3  
Redevelopment

<b>Date:</b> 19/12/2019	<b>Drawn:</b> YK	<b>Checked:</b>	<b>Project No:</b> 20180392.2	<b>Drawing No:</b> AC009
<b>Issue</b>	<b>Scale:</b> NTS	<b>Approved</b>		



## SECTIONAL ELEVATION

### GLAZED CORRIDOR WALL ABOVE CEILING TREATMENTS

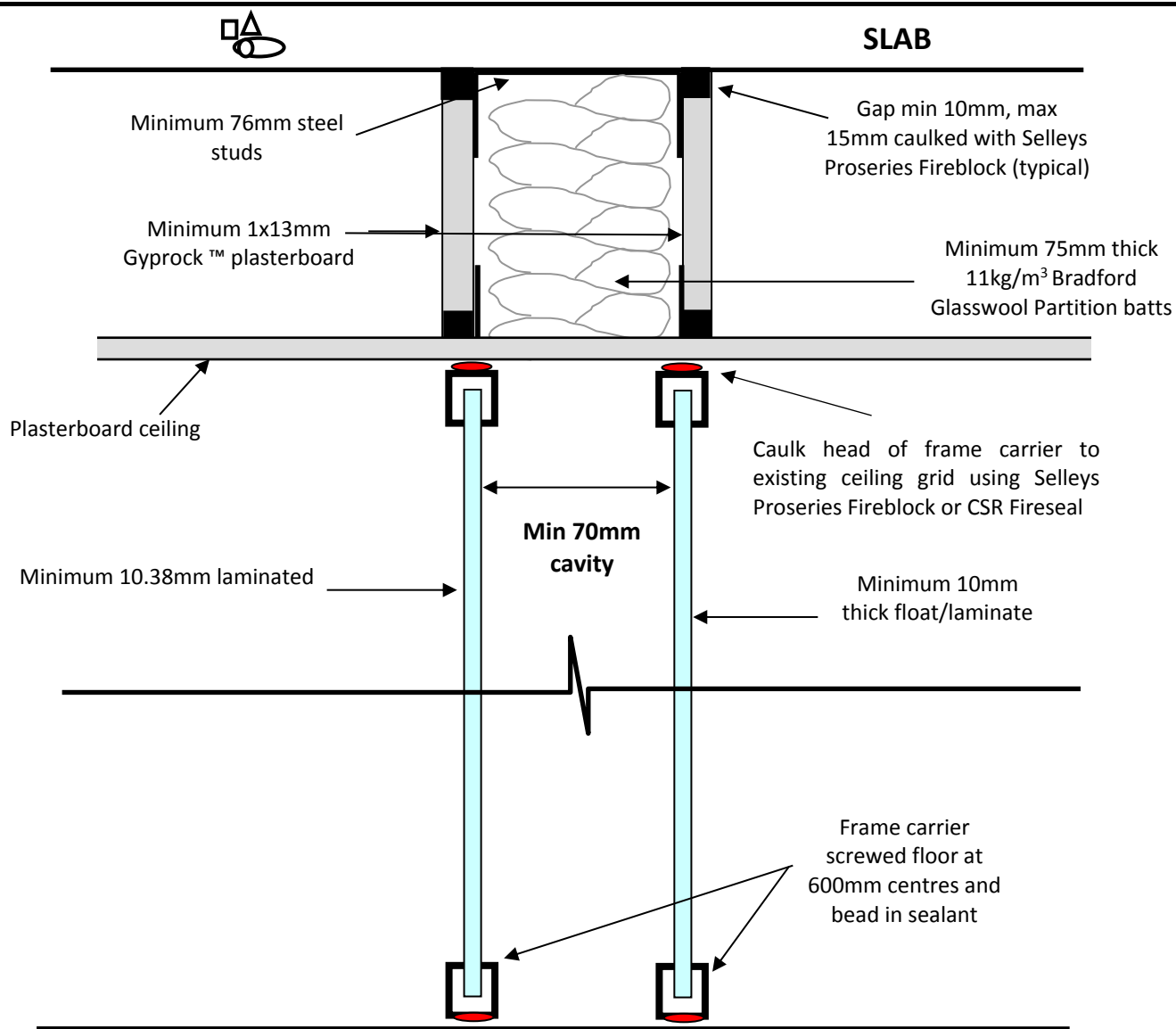
(Adjacent to full height (i.e. slab to slab) partition walls)



Wagga Wagga Hospital Stage 3  
Redevelopment

<b>Date:</b> 19/12/2019	<b>Drawn:</b> YK	<b>Checked:</b>	<b>Project No:</b> 20180392.2	<b>Drawing No:</b> AC010
<b>Issue</b>	<b>Scale:</b> NTS	<b>Approved</b>		





**SECTIONAL ELEVATION  
R<sub>w</sub> 40 – 45 GLAZED WALL SYSTEMS**

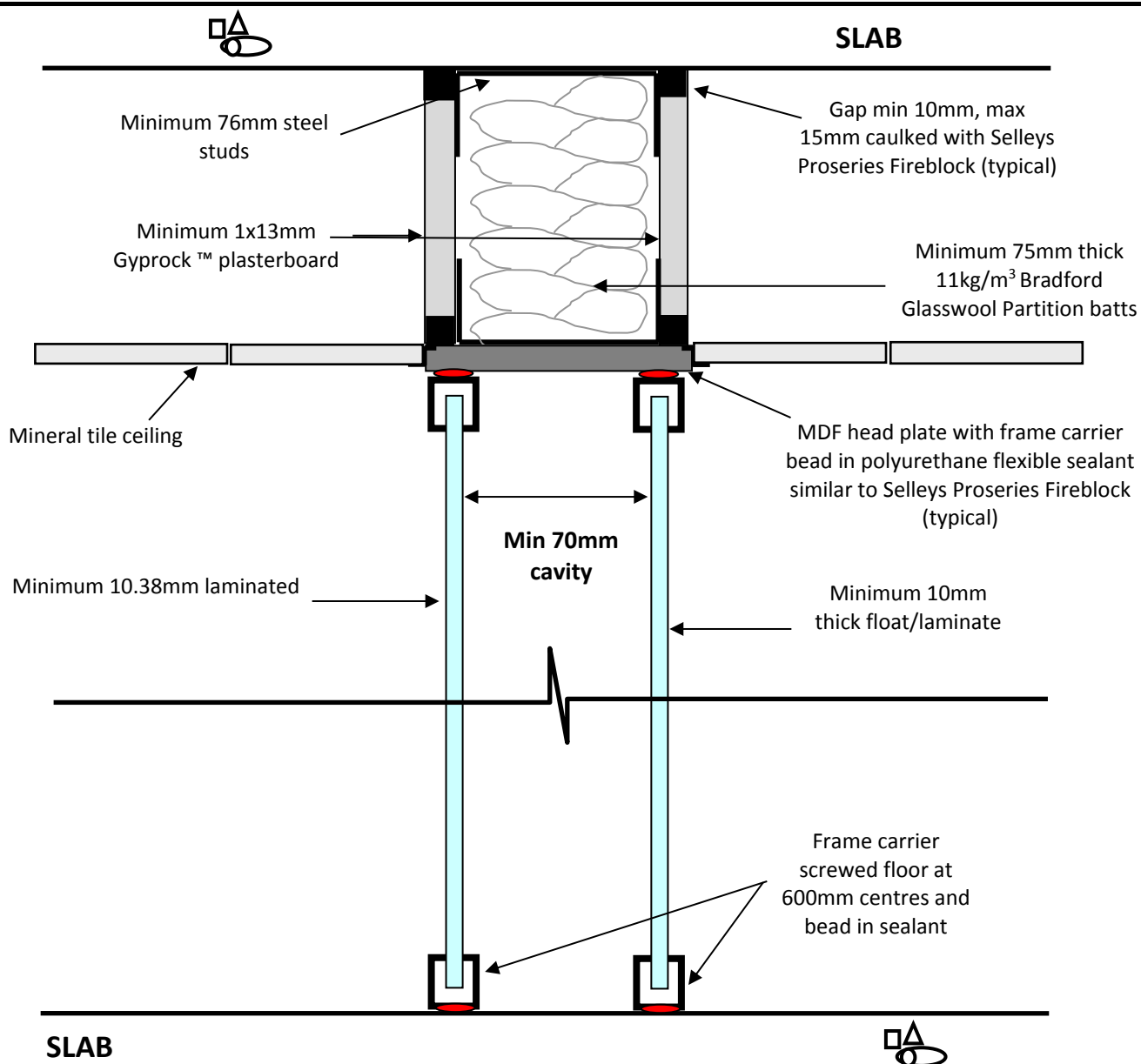
**(Plasterboard Ceiling)**



9 Sarah Street, Mascot 2020  
Tel: 8338 9888 Fax: 8338 8399

**Wagga Wagga Hospital Stage 3  
Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
26/06/2019	JM		20180392.2	AC011a
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
0	NTS			



**SECTIONAL ELEVATION**  
**R<sub>w</sub> 40 – 45 GLAZED WALL SYSTEMS**

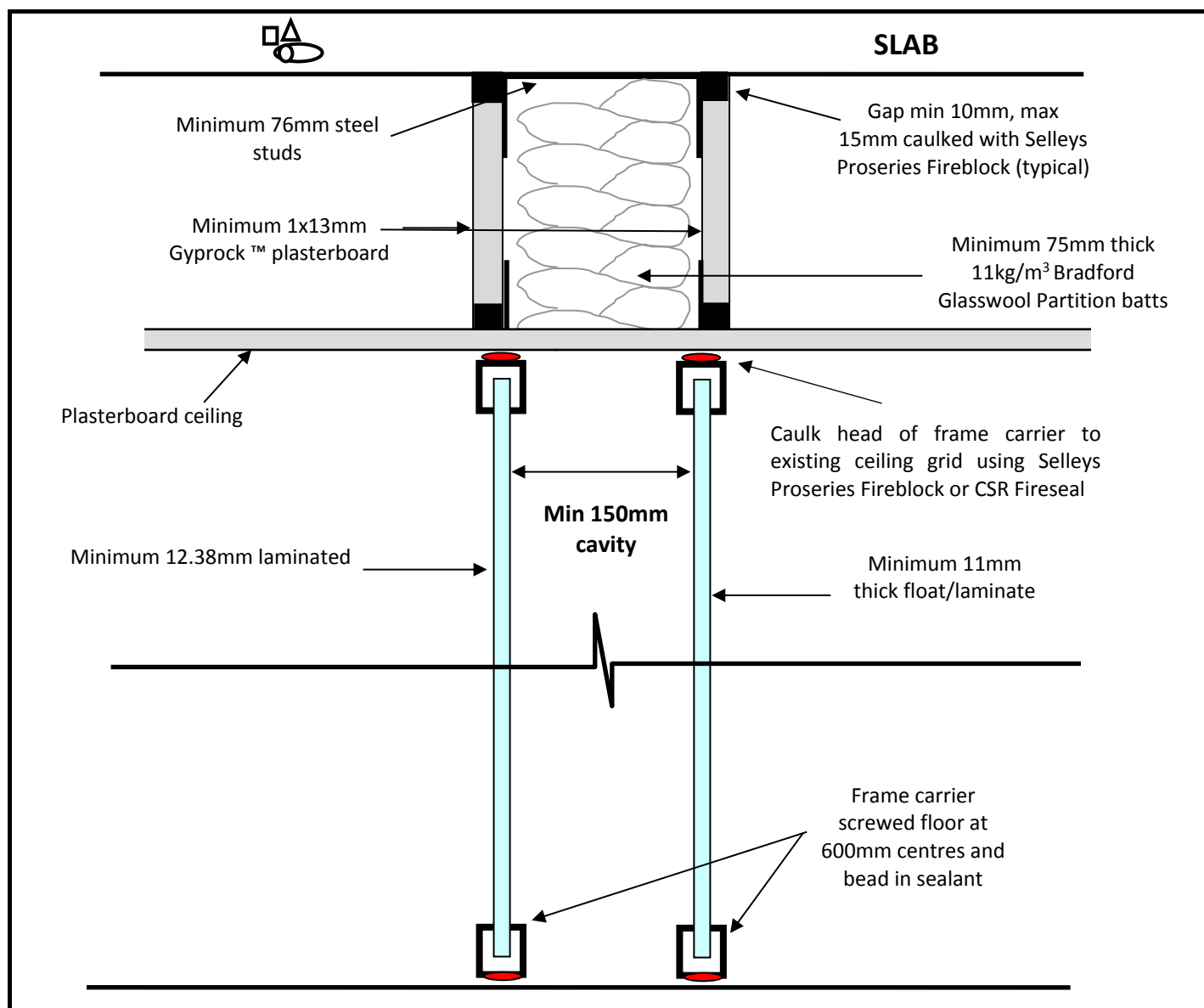
**(Mineral Tile Ceiling)**



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**Wagga Wagga Hospital Stage 3  
Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
26/06/2019	JM		20180392.2	AC011b
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
0	NTS			



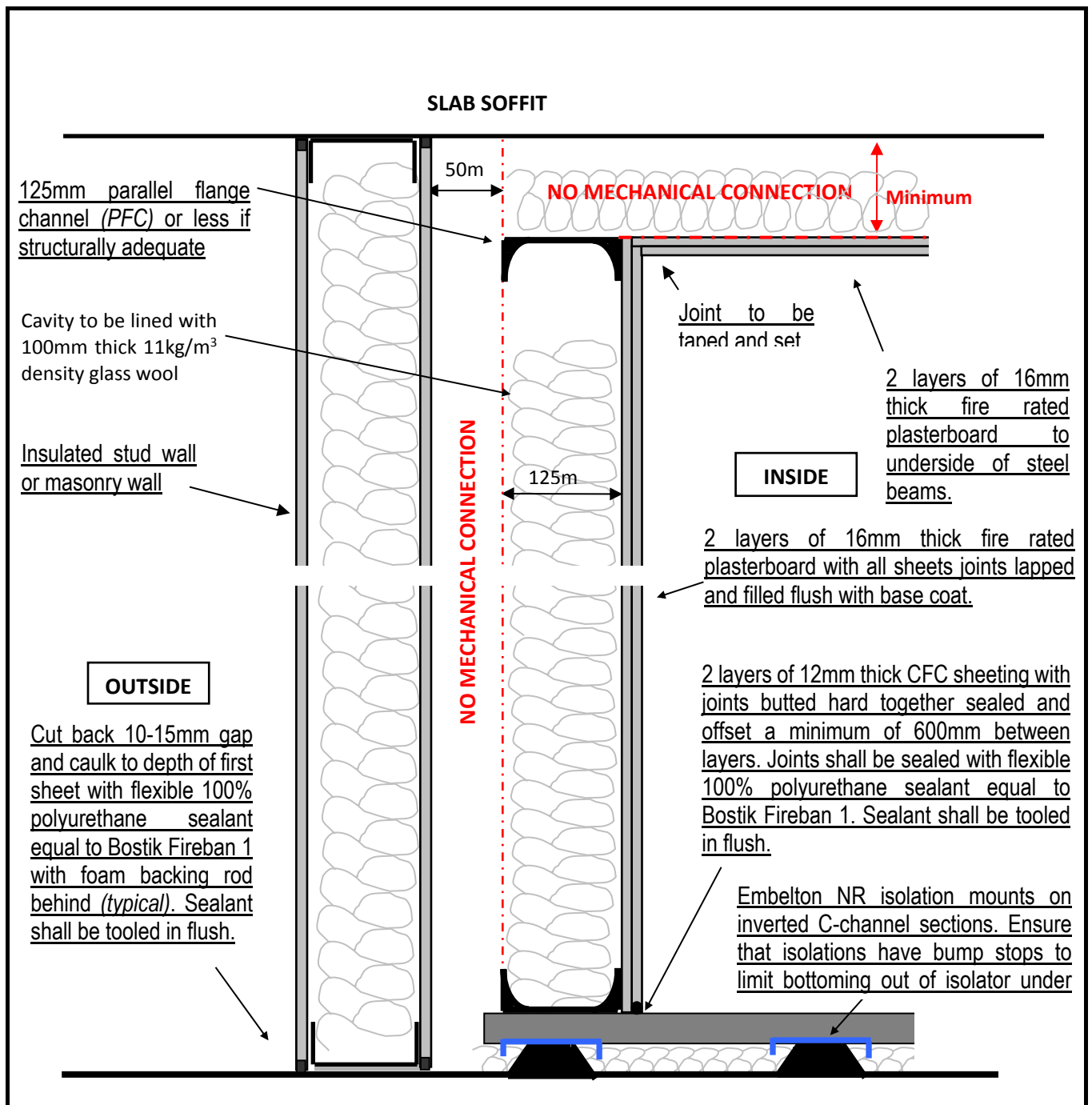
**SECTIONAL ELEVATION  
R<sub>w</sub> 50 GLAZED WALL SYSTEM**



9 Sarah Street, Mascot 2020  
Tel: 8338 9888 Fax: 8338 8399

**Wagga Wagga Hospital Stage 3  
Redevelopment**

<b>Date:</b>	<b>Drawn:</b>	<b>Checked:</b>	<b>Project No:</b>	<b>Drawing No:</b>
26/06/2019	JM		20180392.2	AC012
<b>Issue</b>	<b>Scale:</b>	<b>Approved</b>		
0	NTS			

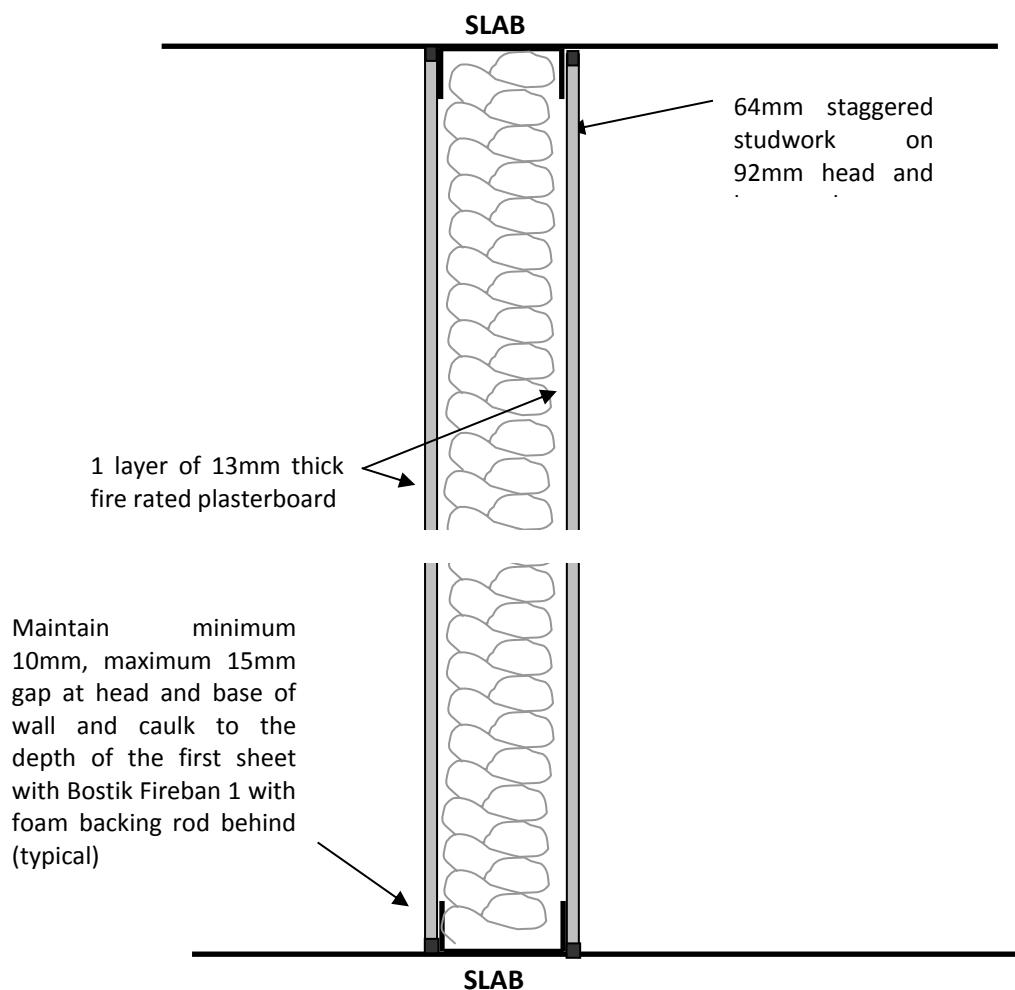


**AUDIOMETRIC TEST ROOM  
PERIMETER WALL  
SECTION ELEVATION**



**Wagga Wagga Hospital Stage 3  
Redevelopment**

Date:	Drawn:	Checked:	Project No:	Drawing No:
26/06/2019	JM		2009522	AC013
Issue:	Scale:	Approved:		
	NTS			



**NOTE:** Power outlets shall not be installed back-to-back. Offset by a minimum 500mm utilising HPM430-type GPO's

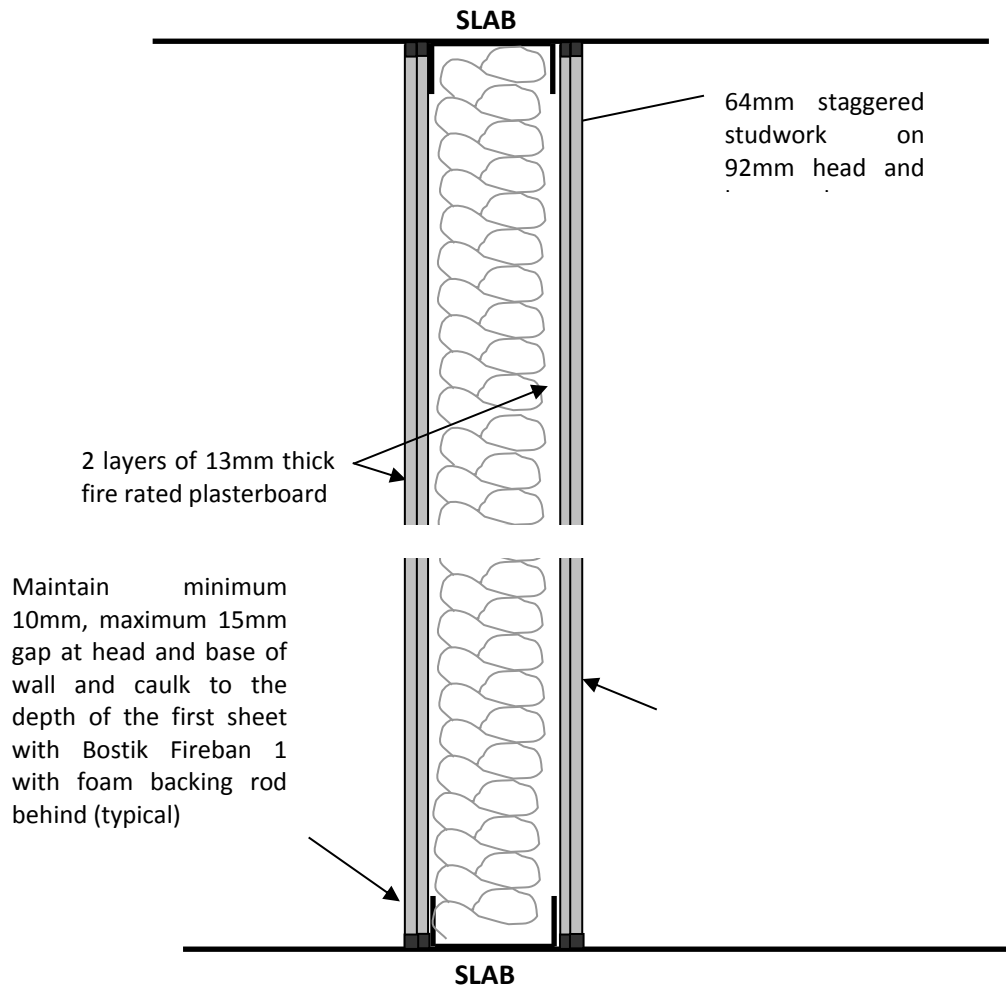
## CONTROL ROOM / CORRIDOR WALL DETAIL



**ACOUSTIC  
LOGIC**  
9 Sarah Street, Mascot 2020  
Tel: 8338 9888 Fax: 8338 8399

## Wagga Wagga Hospital Stage 3 Redevelopment

Date:	Drawn:	Checked:	Project No:	Drawing No:
26/06/2019	JM		2009522	AC014
Issue:	Scale:	Approved:		
	NTS			



**NOTE:** Power outlets shall not be installed back-to-back. Offset by a minimum 500mm utilising HPM430-type GPO's.

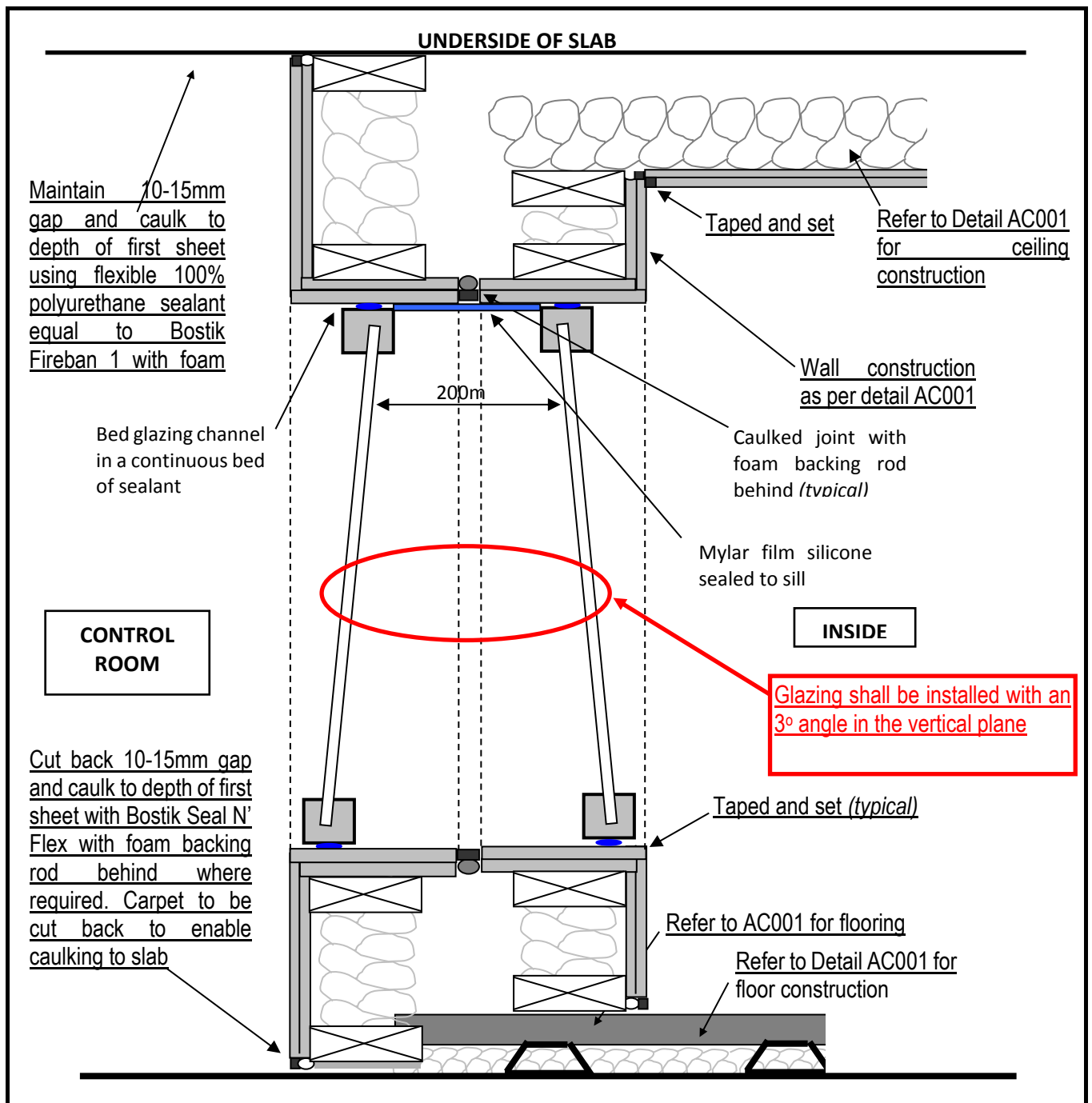
## CONTROL ROOM PERIMETER WALL DETAIL



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Tel: 8338 9888 Fax: 8338 8399

## Wagga Wagga Hospital Stage 3 Redevelopment

Date:	Drawn:	Checked:	Project No:	Drawing No:
26/06/2019	JM		2009522	AC015
Issue:	Scale:	Approved:		
	NTS			



SPLAYED GLAZING BETWEEN AUDIOMETRIC  
TEST ROOM AND CONTROL/VIEWING  
ROOM  
*(not for construction)*



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Tel: 8338 9888 Fax: 8338 8399

**Wagga Wagga Hospital Stage 3  
Redevelopment**

Date:	Drawn:	Checked:	Project No:	Drawing No:
26/06/2019	JM		2010305.1	AC016
Issue:	Scale:	Approved:		
	NTS			