2-4 Ballarat Street

Acoustic Specification
<table>
<thead>
<tr>
<th>Revision</th>
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<th>Document Reference</th>
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<th>Checked By</th>
<th>Approved By</th>
<th>Reason for Revision</th>
</tr>
</thead>
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<tr>
<td>0</td>
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TABLE OF CONTENTS

A APPLICATION OF THIS SPECIFICATION ................................................................. 6
B GENERAL REQUIREMENTS ...................................................................................... 7
  B.1 BUILDING CODE OF AUSTRALIA ................................................................. 7
  B.2 SEALANTS ......................................................................................................... 7
  B.3 WALL AND FLOOR JOINTS ................................................................................ 7
  B.4 MANUFACTURER’S RECOMMENDATIONS ...................................................... 7
  B.5 CONTACT WITH SERVICES .............................................................................. 7
  B.6 NOISE DURING A FIRE EMERGENCY .............................................................. 7
  B.7 EXTERNAL NOISE LEVELS ................................................................................ 7
    B.7.1 Property Boundaries .................................................................................. 7
    B.7.2 Outdoor Areas on the Development Site .................................................... 7
  B.8 PLASTERBOARD ............................................................................................... 7
  B.9 FIBRE CEMENT SHEET .................................................................................... 8
  B.10 CONCRETE ..................................................................................................... 8
  B.11 AERATED AUTOCLAVED CONCRETE .......................................................... 8
C ARCHITECTURAL ELEMENTS ............................................................................... 9
  C.1 WALLS ............................................................................................................... 9
    C.1.1 Minimum $R_w/R_w + C_r$ Requirements .................................................. 9
    C.1.2 Penetrations .............................................................................................. 9
    C.1.3 Wall Junctions .......................................................................................... 10
    C.1.4 Brick/Blockwork ...................................................................................... 10
  C.2 FLOORS ........................................................................................................... 10
    C.2.1 Minimum $R_w/R_w + C_r$ Requirements .................................................. 10
    C.2.2 Minimum $L_{10w}/L_{20w}$ Requirements .................................................... 11
    C.2.3 PENETRATIONS ....................................................................................... 11
  C.3 CEILINGS ......................................................................................................... 12
    C.3.1 MINIMUM $R_w$ REQUIREMENTS .......................................................... 12
    C.3.2 PENETRATIONS ....................................................................................... 12
  C.4 ACCESS PANELS ............................................................................................. 12
  C.5 DOORS ............................................................................................................ 13
    C.5.1 Requirements .......................................................................................... 13
  C.6 REVERBERATION CONTROL ........................................................................... 13
    C.6.1 Absorptive Finishes ................................................................................ 14
D MECHANICAL SERVICES – NOISE AND VIBRATION ......................................... 15
  D.1 PROJECT NOISE AND VIBRATION CRITERIA .............................................. 15
    D.1.1 INTERNAL NOISE LEVELS ...................................................................... 15
    D.1.2 DOMESTIC PLANT NOISE CRITERIA .................................................... 16
    D.1.3 NOISE DURING A FIRE EMERGENCY ..................................................... 16
    D.1.4 PLANT NOISE LEVELS .......................................................................... 16
    D.1.5 VIBRATION PRODUCED BY PLANT ...................................................... 17
  D.2 TESTING ON COMPLETION .......................................................................... 17
  D.3 NOISE GENERATED BY THE AIR DISTRIBUTION SYSTEM ......................... 17
  D.4 STRUCTURE BORNE NOISE AND VIBRATION .............................................. 17
    D.4.1 ANTI-VIBRATION MOUNTS AND ISOLATORS .......................................... 18
    D.4.2 Selection of Equipment Isolation Mounts ............................................... 18
    D.4.3 Piping Isolation Mounts .......................................................................... 18
    D.4.4 EQUIPMENT BASES .............................................................................. 19
I. GARAGE DOORS .................................................................................................................................................. 35
I.1 GENERAL .......................................................................................................................................................... 35
I.2 CARPARK ENTRY GATES .................................................................................................................................. 35
J. ENTRY GATE ....................................................................................................................................................... 36
K. ACOUSTIC DETAILS ......................................................................................................................................... 37
L. APPENDIX 1 – FAÇADE MARKUP .................................................................................................................... 59
A  APPLICATION OF THIS SPECIFICATION

The requirements or standards contained within this acoustic specification are in addition to any other non-acoustic requirements such as structural integrity, fire rating, material compatibility, etc.

Where the acoustic requirements or standards contained in this specification exceed those stated in another specification or drawing then the requirements of this specification shall override the other requirement. Where multiple performance requirements are stated the systems installed shall comply with all requirements.

The acoustic details indicated in Section P are in principle only for the purpose of acoustic performance. Refer to architectural documentation and manufacturers' recommendations/specification for construction detailing.
B GENERAL REQUIREMENTS

B.1 BUILDING CODE OF AUSTRALIA

Select and install all systems to comply with the requirements of the Building Code of Australia May 2020 unless this brief nominates a higher standard of treatment. \( R_w \) is the Weighted Sound Reduction Index of a building element.

B.2 SEALANTS

Carry out sealing of joints in acoustic walls using Selleys Proseries Fireblock. If it is proposed to use a sealant other than that nominated, then approval must first be gained from the Acoustic Consultant.

B.3 WALL AND FLOOR JOINTS

Unless otherwise detailed in this acoustic specification, construction joints in walls and floors shall be 10-15mm high joint with minimum 10mm sealant bead depth, plus foam backing rod.

B.4 MANUFACTURER’S RECOMMENDATIONS

Install all systems in accordance with the manufacturer’s requirements and recommendations unless this specification requires a higher standard.

B.5 CONTACT WITH SERVICES

Prevent contact between any part of the walls or the ceiling supports framing with water, waste, stormwater or air conditioning piping/ductwork. Maintain a minimum 15mm gap clearance.

B.6 NOISE DURING A FIRE EMERGENCY

Noise from all plant during a fire emergency shall comply with the requirements of AS 1668. AS 1668 requires that noise levels during a fire emergency not exceed 80 dB(A) within fire isolated passageways or 65 dB(A) within occupied spaces. Noise levels inside the fire control room shall not exceed 65dB(A) during a fire emergency.

B.7 EXTERNAL NOISE LEVELS

B.7.1 Property Boundaries

Noise levels emitted by the plant at all property boundaries and nearby buildings on adjacent properties shall be treated to ensure background noise levels are not increased any time, day or night. In addition they shall also achieve the following whichever is more stringent.

1. SEPP N-1
2. Council.
3. Any other relevant statutory authority.

B.7.2 Outdoor Areas on the Development Site

Noise levels emitted by the mechanical plant to terraces, balconies and outside facades containing SOU windows on the development site shall not exceed the A-weighted background noise level (i.e. the \( L_{90} \) noise level) at any time during the day or night by more than 5 dB(A).

B.8 PLASTERBOARD

Where plasterboard has been nominated within any partition system, it is to have a minimum density of 650kg/m\(^3\). Where fire-rated plasterboard has been nominated, this is to have a minimum density of 750kg/m\(^3\).
B.9 FIBRE CEMENT SHEET

Where fibre cement sheet has been nominated within any partition system, this is to have a minimum density of 1500kg/m$^3$.

B.10 CONCRETE

All concrete is to have a minimum density of 2200kg/m$^3$.

B.11 AERATED AUTOCLAVED CONCRETE

All AAC is to have a minimum density of 550kg/m$^3$.
C ARCHITECTURAL ELEMENTS

C.1 WALLS

C.1.1 Minimum $R_w/R_w + C_t$ Requirements

Following is list of minimum requirements.

Table C-1 – Wall Performance Requirements

<table>
<thead>
<tr>
<th>Wall Type</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intertenancy Walls Dividing Apartments – Wet Areas to Habitable Areas</td>
<td>$R_w + C_t$ 50 + DC (slab to slab)</td>
</tr>
<tr>
<td>Intertenancy Walls Dividing Apartments – Habitable Areas to Habitable Areas</td>
<td>$R_w + C_t$ 50 (slab to slab)</td>
</tr>
<tr>
<td>Intertenancy Walls Dividing Apartments – Wet Areas to Wet Areas</td>
<td>$R_w + C_t$ 50 (slab to slab)</td>
</tr>
<tr>
<td>Walls Between Apartments and Common Corridors, Public Stairwells etc</td>
<td>$R_w$ 50 (slab to slab)</td>
</tr>
<tr>
<td>Walls Between Apartments and Retail/Assemble Space</td>
<td>$R_w + C_t$ 50</td>
</tr>
<tr>
<td>Walls Between Apartments and Lift Shaft / Plant Room / Carpark</td>
<td>$R_w$ 50 + DC (slab to slab)$^3$</td>
</tr>
<tr>
<td>Walls Between Apartment Habitable Areas and Services Ducts/Risers</td>
<td>$R_w + C_t$ 40 (slab to slab)</td>
</tr>
<tr>
<td>Walls Between Apartment Bathrooms/Laundries and Services Ducts/Risers</td>
<td>$R_w + C_t$ 25 (slab to slab)</td>
</tr>
<tr>
<td>Plant rooms</td>
<td>$R_w$ 50</td>
</tr>
<tr>
<td>Wet Area Perimeter Wall</td>
<td>Refer AC014</td>
</tr>
<tr>
<td>External Lightweight Walls</td>
<td>Refer Section L</td>
</tr>
<tr>
<td>Operable Walls</td>
<td>$R_w$ 50$^4$</td>
</tr>
</tbody>
</table>

Note 1 – DC – Discontinuous Construction
Note 2 – Currently apartment corridor walls are documented as $R_w$ 55, however the actual wall rating is limited by the performance of the door
Note 3 – Final wall rating is to be based on noise levels of future mechanical equipment selections
Note 4 – Operable rating to be based on manufacturers laboratory test report. Final rating will be 10-15 R’w points lower when testing in the field.

Carry out the installation of all walls/partitions in a manner that will not reduce the performance of the walls/partitions below the tabled $R_w$ requirements. This includes but is not limited to the proper filling of joints between blocks/panels, back filling with mortar any chasing of walls and sealing of wall junctions, and the acoustic sealing of glazed panels/mullions. The field-tested performance shall be no less than 5 points below the tabled $R_w$ requirement.

Unless stated otherwise all acoustically rated walls shall be installed slab-to-slab and sealed at the head and floor where nominated (refer Section K – Acoustic Details).

C.1.2 Penetrations

Acoustically treat all penetrations through walls to maintain the nominated acoustic rating as listed in the table of minimum requirement.

No penetrations are to be made into the wall constructions unless specified or shown in the drawings or approval of the acoustic consultant. If a penetration is made where it is not required, it should be made good.
C.1.3  Wall Junctions

Unless otherwise detailed in this acoustic specification, with the exception of set plasterboard-to-plasterboard sheet joints or Hebel to Hebel panel joints acoustically seal all vertical and horizontal wall junctions using a fire rated flexible sealant (10-15mm high joint with minimum 10mm sealant bead depth, plus foam backing rod) such as Selleys Proseries Fireblock.

Acoustically seal all vertical and horizontal junctions between wall panels and plasterboard wall sheeting required to have an acoustic rating.

C.1.4  Brick/Blockwork

Lay brick/blockwork with full beds and perpends in walls required to have an acoustic rating.

Seal vertical and horizontal wall junctions/joints using a fire rated flexible sealant (10-15mm high joint with minimum 10mm sealant bead depth, plus foam backing rod). Seal intersecting brick/blockwork walls either by keyed together or by leaving a gap and using a fire rated flexible sealant (10-15mm wide joint with minimum 10mm sealant bead depth, plus foam backing rod).

C.2  FLOORS

C.2.1  Minimum Rw/Rw+Ctr Requirements

Following is list of minimum requirements. The requirements listed below are the overall rating including ceiling where installed.

<table>
<thead>
<tr>
<th>Floor Type</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floors Separating Apartments</td>
<td>Rw + Ctr &gt; 50</td>
</tr>
<tr>
<td>Between Apartments and Common Areas/Non-Residential</td>
<td>Rw + Ctr &gt; 50</td>
</tr>
</tbody>
</table>

Carry out the installation of floors in a manner that will not reduce the performance below the tabled Rw/Rw+Ctr requirements. This includes but not limited to the proper filling of joints, back filling with non-shrink grout any chasing, and installation of ceilings where required to comply with the overall floor/ceiling rating.
C.2.2 Minimum $L_{nw}$ / IIC Requirements

Following is a list of minimum requirements. The requirements listed below are the overall rating including ceiling where installed.

**Table C-3 – Floor $L_{nw}$ / IIC Performance Requirements**

<table>
<thead>
<tr>
<th>Floor Type</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartment to Another Apartment (excluding stacked bathrooms and laundries)</td>
<td>$L_{n,w} &lt; 62$ / IIC 52</td>
</tr>
<tr>
<td>Apartment bathroom/laundry over Another Apartment bathroom/laundry (ie stacked bathrooms)</td>
<td>$L_{n,w} &lt; 62$</td>
</tr>
<tr>
<td>Balconies to Apartments (internal space of another apartment below. If the balcony is only partially located over the apartment below treat whole balcony area)</td>
<td>$L_{n,w} &lt; 62$ / IIC 52</td>
</tr>
<tr>
<td>Apartment corridor/entry over another apartment</td>
<td>$L_{n,w} &lt; 62$ / IIC 52</td>
</tr>
<tr>
<td>Apartment bathroom/laundry over another apartment excluding bathrooms/laundries stacked over bathrooms/laundries</td>
<td>$L_{n,w} &lt; 62$ / IIC 52</td>
</tr>
</tbody>
</table>

Notwithstanding the minimum required installed performance levels the underlay should have the following minimum properties:

- 4mm minimum thickness.
- Composed of 100% rubber product (and binder) (rubber/cork composites are unacceptable).
- The adhesives, etc used to bond the underlay to the substrate, and the tile system adhesives, grouts, etc, shall be compatible with the acoustic underlay.

Carry out the installation of floors in a manner that will not reduce the performance below the tabled requirements. This includes, but not limited to; the installation of acoustic underlays; prevention of flanking around underlay; prevention of screed/grout/tile adhesive falling between underlay sheets, prevention of contact between tiles/screed/grout/tile adhesive and walls/joinery/kick plates/floor grates/etc; no mechanical fixing through the acoustic underlay.

A schedule of all areas requiring the application of impact isolation treatment shall be issued to the Acoustic Consultant for approval.

**C.2.3 PENETRATIONS**

Acoustically treat all penetrations through floors to maintain the nominated acoustic rating as listed in the table of minimum requirement. Duct and Pipe penetrations shall be treated as indicated in the Mechanical and Hydraulic sections of this specification.

No penetrations are to be made into the floor constructions unless specified or shown in the drawings. If a penetration is made where it is not required, it should be made good.
C.3 CEILINGS

C.3.1 MINIMUM $R_w$ REQUIREMENTS

Following is list of minimum requirements.

<table>
<thead>
<tr>
<th>TABLE C-4 – Ceiling Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEILING TYPE</td>
</tr>
<tr>
<td>Lobby 01</td>
</tr>
<tr>
<td>Common Room 01 and 02</td>
</tr>
<tr>
<td>Apartment ceilings generally</td>
</tr>
<tr>
<td>Apartment ceilings below light weight roof</td>
</tr>
<tr>
<td>Apartment Bathroom Ceilings</td>
</tr>
<tr>
<td>Apartment ceilings below apartment fan coil units and heat recovery units, and apartment toilet exhaust fans</td>
</tr>
<tr>
<td>Apartment ceilings generally within 500mm of waste or stormwater pipe</td>
</tr>
</tbody>
</table>

Carry out the installation of all floor/ceiling constructions in a manner that will not reduce the performance of the floor/ceiling below the tabled $R_w/R_w + C_{tr}$ requirements. This includes but not limited to the proper filling of joints between sheets, sealing of joints ceiling to wall junctions. Following is list of minimum requirements.

C.3.2 PENETRATIONS

Acoustically treat all penetrations through acoustic ceilings to maintain the nominated acoustic rating as listed in the table of minimum requirements.

No penetrations are to be made into the ceiling constructions unless specified or shown in the drawings. If a penetration is made where it is not required, it should be made good.

C.4 ACCESS PANELS

Install acoustically certified access panels to equal the acoustic performance of the element in which they are installed, typically that will require the use of $R_w + C_{tr}$ 25 access panels in SOU’s where waste/soil/stormwater pipework is located within the SOU. Where **two layer** ceilings are installed the access panel shall be rated at $R_w + C_{tr}$ of 30. Access panels for waste piping shall not be located on the sides of risers facing habitable rooms (Refer to BCA requirements).
C.5 DOORS

C.5.1 Requirements

Following is list of minimum requirements.

Table C-5 – Door Requirements

<table>
<thead>
<tr>
<th>Door</th>
<th>Minimum Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartment Entry Doors</td>
<td>Pyropanel Life Safety door equal Min 38mm solid core construction with full perimeter acoustic seals equal to Raven Raven RP8si drop seal to the base and Euroseals/rebate to the perimeter based on SFC40964 certificate.</td>
</tr>
<tr>
<td>Plant Room/Fire Pump Room Doors</td>
<td>Minimum 45mm thick solid core doors set into door frames with no grilles. Raven RP10 seals should be installed on top and sides combined with Ravel RP-38 along the bottom or equal</td>
</tr>
</tbody>
</table>

Carry out the installation of all doors and seals in a manner that will not reduce the performance of the doors including:

- Ensuring doors are installed without warps and hung with even gaps.
- For doors noted in the table above with acoustic seals
- Installing door with minimum gap at door bottom complying with manufacturer’s requirement. Threshold under door seal is to be level and flat. Install aluminium threshold plate under door seals where door seals close onto carpet.
- Installing seals with minimum gaps at joints/junctions.
- Adjusting seals so that they are acoustically effective around the full perimeter without excessive effort required to close the doors.
- Ensure that the door hardware does not foul the seals and the seals form a continuous seal around the door perimeter.
- Doors not to contain air grilles unless specifically stated in acoustic specification.

C.6 REVERBERATION CONTROL

Suitable internal finishes shall be provided such that the following comply with the corresponding Reverberation Time criteria given for Office Buildings in AS/NZS 2107:2016 as indicated below.

Table C-6 – Reverberation Times for Development

<table>
<thead>
<tr>
<th>SPACE/ACTIVITY TYPE</th>
<th>Project Requirement (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Rooms 1 and 2</td>
<td>0.8</td>
</tr>
<tr>
<td>Lobby 01</td>
<td>Minimise as far as practicable</td>
</tr>
</tbody>
</table>
C.6.1 Absorptive Finishes

The following table provides reverberation treatment in principle. We note that further development and confirmation of treatment will be undertaken during detailed design.

Table C-7 – Absorptive finishes

<table>
<thead>
<tr>
<th>Room</th>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Rooms 1 and 2</td>
<td>Option 1 – Install mineral fibre tile ceiling with NRC 0.7 and CAC 37. Option 2 – Allow for an absorptive finish to the ceiling with minimum NRC 0.7 with approximately 70% ceiling coverage. Any ceiling reverberation treatment to be installed below double layer plasterboard ceiling. For both options allow for absorptive treatment to the inside face of the external wall from 900mm to 2100mm with NRC 0.5.</td>
</tr>
<tr>
<td>Lobby 01</td>
<td>Allow for an absorptive finish to the ceiling with minimum NRC 0.7 with approximately 70% ceiling coverage. Any ceiling reverberation treatment to be installed below the plasterboard ceiling.</td>
</tr>
</tbody>
</table>
D MECHANICAL SERVICES – NOISE AND VIBRATION

D.1 PROJECT NOISE AND VIBRATION CRITERIA

D.1.1 INTERNAL NOISE LEVELS

Noise from mechanical plant inside the development shall not exceed the levels given below. Unless stated otherwise, the noise level criteria shall not be exceeded with the plant operating under normal operating conditions, and at start-up for intermittently operating plant items. Maximum noise levels in are listed in Table D.1 and Table D.2. Areas not listed in these tables shall be designed to comply with the relevant recommended design sound level as detailed in Australian/New Zealand Standard 2107-2016 ‘Acoustics – Recommended design sound levels and reverberation times for building interiors’.

Allow for any additional treatment to fully comply with the internal and external noise level requirements, including noise from diffusers, grilles and louvres, ductwork and risers notwithstanding the equipment noise ratings indicated in the mechanical services brief or the acoustic treatments indicated in the mechanical services specification or drawings. Noise within apartments and commercial/retail space shall be free of tones or other undesirable characteristics.

### Table D-1 – Noise Criteria For Residential

<table>
<thead>
<tr>
<th>SPACE/ACTIVITY TYPE</th>
<th>NOISE LEVEL dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedrooms</td>
<td>30&lt;sup&gt;1&lt;/sup&gt; 35 dB(A) from A/C operating on Design Speed</td>
</tr>
<tr>
<td>Living / Dining / Study</td>
<td>35&lt;sup&gt;1&lt;/sup&gt; 35 dB(A) from A/C operating on Design Speed</td>
</tr>
<tr>
<td>Bathrooms / Toilets / Laundries</td>
<td>45&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Note 1 - Excludes individually controlled toilet exhaust fans, kitchen exhaust fans and air-conditioning units within the same unit that are under control of the unit that they serve.

### Table D-2 – Noise Criteria for Common and Non-Residential Areas

<table>
<thead>
<tr>
<th>SPACE/ACTIVITY TYPE</th>
<th>NOISE LEVEL dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Areas including Lift Lobbies</td>
<td>45</td>
</tr>
<tr>
<td>Waste Rooms / Carpark</td>
<td>65</td>
</tr>
</tbody>
</table>
D.1.2 DOMESTIC PLANT NOISE CRITERIA

The EPA Noise Control Guidelines (Publication 1254, October 2008) requires the following (attached):

1. **Fixed Domestic Plant and Home Occupation Noise** - (such as domestic air conditioners, swimming pool equipment, spas, ducted heating, internal vacuum systems and home occupation noise)

... 

**Night operation**

Noise from any fixed domestic plant must not be audible within a habitable room of any other residence (regardless of whether any door or window giving access to the room is open) during prohibited hours prescribed by the Environment Protection (Residential Noise) Regulations 2008.

The following **prohibited hours** apply to air conditioners, swimming pool and spa pumps, ducted heating systems and the like:

- 10 pm – 7 am Monday-Friday.
- 10 pm – 9 am weekends & public holidays.

**Day/evening operation (non-prohibited times)**

Where noise from any fixed domestic plant is audible beyond the boundary of the residential premises on which the plant is situated, the intrusive noise shall not exceed the background noise level by more than 5 dB at the measurement position.

Noise assessment must be made in accordance with noise assessment techniques listed in section 17 of these guidelines. Adjustment for tonality and/or impulsiveness must be included if applicable.

The criteria for noise emission from a domestic plant have been summarized in the Table D.3 below.

<table>
<thead>
<tr>
<th>Noise Source</th>
<th>Period</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic air conditioning unit</td>
<td>Daytime</td>
<td>Background $L_{90} + 5$ dB(A)</td>
</tr>
<tr>
<td></td>
<td>Night time</td>
<td>Inaudible within adjoining residence</td>
</tr>
</tbody>
</table>

D.1.3 NOISE DURING A FIRE EMERGENCY

Noise from all plant during a fire emergency shall comply with the requirements of AS 1668. AS 1668 requires that noise levels during a fire emergency not exceed 80 dB(A) within fire isolated passageways or 65 dB(A) within occupied spaces. Noise levels inside the fire control room shall not exceed 65dB(A) during a fire emergency.

D.1.4 PLANT NOISE LEVELS

Adjust and balance all systems so that excessive noise is not created and the scheduled internal and external noise levels are complied with.
D.1.5 VIBRATION PRODUCED BY PLANT

Tactile structure vibration levels produced by the plant shall not exceed the criteria given in AS 2670.2-1990. Where the standard recommends a range of criteria for a particular occupancy, the low end of the range shall be used, except for residences where the base curve shall be used to assess vibration in all cases.

D.2 TESTING ON COMPLETION

Following installation, carry out random noise and vibration level tests to confirm compliance with the criteria given in Section D.1. The locations selected for measurement shall include all critical occupancies close to plant including: residences located near plant rooms; balconies; roof terraces; carpark areas lobbies and corridors. Noise levels should be measured in the worst affected part of the room.

The sound level meter used for the noise tests shall comply with the type 2 instrument brief in AS 1259, Part 2 Sound Level Meters – Precision. Testing method shall be in accordance with AS 2107-1987 Clause 5 except that all openable windows shall be closed during the test.

If the noise or vibration levels exceed those specified carry out rectification work and remeasure noise levels to demonstrate compliance with the brief. Rectification work is at the Contractor’s expense.

D.3 NOISE GENERATED BY THE AIR DISTRIBUTION SYSTEM

Noise from the air distribution system shall be minimised by:

- Selecting grilles, diffusers, dampers and accessories to meet the specified noise levels.
- Balancing the system using dampers on duct branches, with dampers at grilles being used for minor adjustment of air volumes. Where excessive noise levels are due to noise generated at dampers near grilles, the branch dampers shall be readjusted to eliminate excessive dampering and noise at the grilles.
- Installing ductwork with a minimum number of bends, offsets, etc. Flexible ducts should not be kinked or have excessively bends, particularly near grilles, etc. Ensure there are no protrusions inside the duct that could generate noise. Unless indicated otherwise, install turning vanes in tee’s and bends or use long radius bends to minimise turbulence. Spigots plenum boxes should maintain the full internal cross section of the duct connecting into the plenum box.
- Seal duct joints adequately so there is no noise resulting from air leakage.

D.4 STRUCTURE BORNE NOISE AND VIBRATION

Minimise the transmission of vibration to the building structure to ensure the noise and vibration criteria are achieved by:

- Statically and dynamically balancing rotating plant and equipment to comply with AS3709-1989. Where specified, provide balancing test certificates.
- Providing isolation mounts or hangers for vibrating plant and equipment.
- Providing inertia blocks where indicated to limit the vibration amplitude.
- Isolating piping, electrical conduit, etc subject to vibration from the building structure.
- Providing flexible connections where ducts and piping is connected to vibrating plant and machinery.
- Submit a schedule of isolation mounts for approval by Acoustic Logic indicating make, model, rated load and static deflection, actual load and static deflection, unloaded height and fully loaded height.
D.4.1 ANTI-VIBRATION MOUNTS AND ISOLATORS

D.4.2 Selection of Equipment Isolation Mounts

Select isolation mount type and minimum static deflection according to the following table (refer below for isolator types).

Table D-4 – Isolator Schedule

<table>
<thead>
<tr>
<th>PLANT</th>
<th>ISOLATOR TYPE</th>
<th>MINIMUM STATIC DEFLECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-line Centrifugal Fans and Small Axial Fans (up to 400 diameter)</td>
<td>M3/H1</td>
<td>10 mm</td>
</tr>
<tr>
<td>Axial Fans (&gt;400mm diameter)</td>
<td>M4</td>
<td>25 mm</td>
</tr>
<tr>
<td>Centrifugal Fans and Pumps</td>
<td>M4</td>
<td>25 mm</td>
</tr>
<tr>
<td>Fan/Coil Units</td>
<td>M1/H1/HE1</td>
<td>1 mm</td>
</tr>
<tr>
<td>Boiler</td>
<td>M1</td>
<td>6 mm</td>
</tr>
<tr>
<td>Apartment Condensing Units</td>
<td>M1</td>
<td>2 mm</td>
</tr>
<tr>
<td>Heat Recovery Ventilation Unit</td>
<td>M4/H2</td>
<td>25 mm</td>
</tr>
</tbody>
</table>

D.4.3 Piping Isolation Mounts

Piping within 25m of the pumps, air cooled chillers (except small diameter piping runouts to fan/coil units) shall be vibration isolated using type M4 or H2, 25mm static deflection isolators for piping fixed to the plant room floor slab or walls of the SOU’s; type M3/H1, 10mm static deflection mounts elsewhere within 20m of the pumps or chillers.

Isolate any other small diameter piping runouts to fan coil units within 20m of the pumps or chillers using a flexible 12mm thick foam sleeve between the pipe and the clamp similar to Poron 4701-12-20250-1604 (2 layers) (suppliers: Mason Grogan 9748 3838) fitted between the pipe and the clamp. The clamp should then be tightened just sufficiently to hold the pipe, but not over tightened.

Isolate piping within 20m of the air cooled chillers or any other main piping runs fixed to the walls of the SOU’s using type M4/H2, 25mm static deflection mounts.

Isolation Mount Types

**Type M1 – Waffle Pad Mounts**

Waffle pad mounts shall be: minimum 17mm thick neoprene rubber (nitrile rubber where oil contamination is possible); cross ribbed with alternately raised ribs on both faces of the pad; loaded within the load range of the isolator with a minimum static deflection of 1.5mm.

**Type M2 – Multiple Layer Waffle Pad Mounts**

Multiple layer waffle pad mounts incorporating; specified number of layers of Type M1 Waffle Pad Mount; 1.5mm thick metal shim plate between the pad layers; minimum 1.5mm static deflection per layer.
**Type M3 – Neoprene Mounts**

Neoprene mounts should be selected to give the static deflections under load nominated for the item of plant and incorporate: separate steel top and base plates completely embedded in elastomer; elastomer colour coded for identification of load rating; non-skid mounting surfaces; bolt holes for bolting down plant.

**Type M4 – Spring/Neoprene Mounts**

Spring/neoprene mounts should be selected to give the static deflections under load nominated for the item of plant and: be laterally stable without any housing or other lateral support; be capable of an additional travel to solid of at least 50% of the rated static deflection; incorporate a levelling facility; a spring diameter not less than 0.8 of the loaded height; incorporate a 6mm thick neoprene base pad to isolate acoustical frequencies. Isolators exposed to weather should have zinc plated springs and housings coated with a flexible epoxy to prevent corrosion.

Isolation Hanger Types

**Type HE1 – Neoprene Hanger Elements**

Neoprene hanger elements should be selected to give the static deflections under load nominated for the item of plant and incorporate: separate steel top and base plates completely embedded in elastomer which should interlock in the event of fire or mechanical failure; elastomer colour coded for identification of load rating; hole for locating hanger and a lip to locate the element within in the mounting hole.

**Type H1 – Neoprene Hangers**

Neoprene hanger elements should be selected to give the static deflections under load nominated for the item of plant and incorporate: Type HE1 – Neoprene Hanger Element located within a galvanised steel cage with provision for threaded hanger rods to screw into the hanger element; provide sufficient clearance around the threaded hanger rod to ensure it cannot touch the hanger cage.

**Type H2 – Spring/Neoprene Hangers**

Spring/neoprene hangers should be selected to give the static deflections under load nominated for the item of plant and: be laterally stable without any housing or other lateral support; be housed in a galvanised steel cage; be capable of an additional travel to solid of at least 50% of the rated static deflection; incorporate a levelling facility; a spring diameter not less than 0.8 of the loaded height; incorporate a neoprene base pad to isolate acoustical frequencies. Isolators exposed to weather should have zinc plated springs and housings coated with a flexible epoxy to prevent corrosion, and self-draining cups.

D.4.4 EQUIPMENT BASES

Mount equipment on rigid bases. The bases shall be sufficiently rigid not to deform under the weight of the machinery or during operation and reduce the effectiveness of the isolation mounts.

D.4.5 INSTALLATION OF VIBRATION ISOLATION MOUNTS

Level the mounts once the equipment is fully loaded in its operating condition with a minimum clearance between the machine and the structure of 20mm, and adjusted to ensure that the isolators are loaded correctly. Ensure that the isolators are not bridged by mounting bolts or contact between any part of the machine or an unisolated part of the isolation mounts and the structure.

Select the number and spacing of the mountings to minimise machine rocking. Consider static and dynamic forces during operation and start-up when selecting the mounts.
Where there is a possibility of significant lateral loads occurring use hold down bolts, lateral restraints, or housed mounts to locate equipment.

**D.5 PENETRATIONS**

**D.5.1 GENERAL**

Duct, pipe and electrical penetrations through walls, floors etc shall not:

- Decrease the required sound rating isolation rating of the wall, floor, ceiling, etc.
- Allow the transmission of vibration from pipes and ducts to the wall, floor, etc.

Flexible ducts shall not be taken through full height walls. Where ducts pass through above ceiling barriers or full height walls, the main sheet metal duct should be taken through the penetration to over the room served by the flexible duct, and the flexible duct runout to the grille connected. Alternatively, the flexible duct may be drawn through a 700mm long sheet metal sleeve that is grouted into the wall. An insulated four zero fire rated flexible duct should be used and the outside diameter of the sleeve should be the same as the flexible duct outside diameter.

Penetrations through ceilings/ceiling bulkheads for air supply grilles connected to flexible ducts should be fitted with acoustic plenum boxes. The plenum boxes should be internally lined with 25 mm perforated foil faced fibreglass insulation.

Penetrations in wet area ceilings having an acoustic rating as required by the Building Code of Australia shall be treated so as not to decrease the ceiling sound rating performance. This will require, as a minimum, the use of minimum 1m length of 25mm insulated four zero rated acoustic flexible ducting with an inner aluminium fabric core and outer aluminium wrapping to connect the rigid sheet metal ducting to the grille, with a ninety degree 25mm perforated foil faced fibreglass internally insulated sheet metal plenum box fitted over the exhaust grilles.

**D.5.2 PIPE PENETRATIONS**

Seal pipes penetrating slabs or walls, as follows:

<table>
<thead>
<tr>
<th>PROJECT NOISE CRITERION IN ADJACENT SPACES</th>
<th>SEAL TYPE</th>
<th>ACOUSTIC DETAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 20m of a pump and condenser water pipes</td>
<td>Type PB seal.</td>
<td>AC010</td>
</tr>
<tr>
<td>Other pipes including hot and cold water</td>
<td>Type PA or PB seal.</td>
<td>AC010</td>
</tr>
</tbody>
</table>

Where the building element penetrated consists of one or more leaves then all leaves shall be acoustically sealed.
D.5.3  DUCT PENETRATIONS

Seal ducts penetrating slabs, walls and above ceiling baffles as follows:

<table>
<thead>
<tr>
<th>SPACES</th>
<th>WALL/FLOOR CONSTRUCTION</th>
<th>SEAL TYPE</th>
<th>ACOUSTIC DETAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>All</td>
<td>Type DA or DB seal</td>
<td>AC011</td>
</tr>
</tbody>
</table>

Where the building element penetrated consists of one or more leaves then all leaves shall be acoustically sealed.

D.5.4  ELECTRICAL WIRING

Individual electrical cables can be sealed with Selleys Proseries Fireblock sealant or equal. Bunches of cables shall be drawn through a 5mm thick, 600mm long PVC conduit packed with polyester fibre, or glasswool insulation. Seal around the conduit by filling with a non-shrinking grout.

D.6  SILENCERS AND INTERNALLY LINED DUCTING – GENERAL

D.6.1  LINED DUCTING

Internal duct insulation should be of a resin bonded mineral wool insulation in a batt or board form having a minimum density of 32kg/m³. Lining acoustic absorption shall exceed the following performance when measured in accordance with AS 1045-1988:

<table>
<thead>
<tr>
<th>INSULATION THICKNESS</th>
<th>MINIMUM ABSORPTION COEFFICIENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>125Hz</td>
</tr>
<tr>
<td>25mm</td>
<td>0.08</td>
</tr>
<tr>
<td>50mm</td>
<td>0.35</td>
</tr>
<tr>
<td>75mm</td>
<td>0.45</td>
</tr>
<tr>
<td>100mm</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Insulation shall be either factory faced with perforated aluminium foil similar to Sisilation 450 or faced with 30% open area perforated zincanneal steel sheet. Perforated steel sheet shall be used whenever airflow velocities in the duct exceed 10m/s, or where specified elsewhere.

D.7  SILENCERS

D.7.1  Performance

Unless stated otherwise comply with the scheduled minimum silencer performance requirements for insertion loss, airflow pressure drop and regenerated noise.
D.7.2 Construction

D.7.2.1 General

Acoustic silencers shall be manufactured by a specialist manufacturer approved by the acoustic consultant and shall comprise:

- A minimum 1.6mm thick galvanised outer casing, stiffened as required to ensure that deformation of the silencer does not occur during installation and operation.
- Acoustically absorbent internal splitters constructed of perforated zincanneal steel sheet with acoustically absorbent, heavy density mineral fibre infill. The ends of the splitters shall be shaped to minimise airflow resistance and regenerated noise.
- Heavy gauge flanges where the silencer is to be connected to ducting. Flanges shall be corrosion protected with an approved finish.
- Allow for duct transition sections before and after the silencers, if required. Select and install silencers to ensure that airflow generated noise levels do not cause exceedances of the specified levels in Section D.1. Where silencers are installed in risers, behind louvres, etc seal around the perimeter of the silencer to the building opening with minimum 1.6mm thick sheet metal, fixed and caulked in a similar to that indicated in the “PB” duct penetration detail.

D.7.2.1 Silencers For Kitchen Exhaust Ducts And Similar

Wherever possible, quiet running kitchen exhaust fans are to be selected for kitchen exhausts to avoid the need for silencer treatment. Where required, silencers used in kitchen exhaust ducts or other ducts carrying contaminated air shall be have a 12µm thick Melinex sheet between the splitter perforated metal facings and the absorptive infill to prevent the ingress of grease, dirt, etc into the infill material. Connect silencers to ductwork and maintain access so that the silencers are easily removable for cleaning.

D.7.2.2 Silencers And Internally Lined Ductwork Exposed To Moisture

Use hydrophobic grade rockwool absorbent lining faced with perforated zincanneal steel sheet in all silencers and all internally insulated ductwork carrying moisture laden air or that are internally exposed to the weather. Alternatively, use Bradford Ultraphon or equal insulation with factory applied weatherproof acoustically transparent facing.

D.8 ELECTRICAL

D.8.1 BELT DRIVEN PLANT

Fit belt driven intermittently operating plant having motors rated at greater than 2.5kW with motor starters that limit the build-up in motor speed at start-up. These are required to eliminate the possibility (especially in the future after belt wear has occurred) of belt squeal being audible in occupied spaces having a noise criterion of 45dB(A) or lower, on adjacent properties and on residential terraces/external spaces.

D.8.2 CONTACTORS/STARTERS/CONTROLLERS

Noise from contactors, starters and controllers shall be inaudible inside rooms having a noise of 45dB(A) or lower, on adjacent properties and on residential terraces/external spaces. Provide enclosures around these items and/or vibration isolate the items from building elements where they may give rise to the transmission of structure-borne noise.
D.9 MECHANICAL PLANT AND EQUIPMENT TREATMENT

Final treatment TBC pending review of contractor selections and layouts.

**General Comments**

- Rooftop plant areas may require solid screening to perimeter of rooftop plant area. Screen shall be approximately 300mm higher than the tallest equipment (pending acoustic review of equipment selections).
- All flexible duct to be insulated flexible duct.
- Select quiet bathroom exhaust fans to limit noise to adjacent spaces.
- Install a minimum of 1 metre of insulated flexible duct both sides of apartment bathroom exhaust fans.
- Apartment bathroom exhaust fans and insulated flexible duct be located in ceiling space above bathrooms. Refer AC015
- Ductwork outside of bathroom ceiling space to be rigid sheet metal or pvc duct.
- Flexible duct shall not penetrate full height walls.
- All mechanical risers are to contain sheet metal ductwork.
- Untreated grilles in apartment ceilings will require additional treatment to waste/stormwater pipes in apartment ceilings refer Table E-5. Recommend backing ceiling grilles within apartment with 90-degree internally lined bends.
- All equipment shall be installed on vibration isolation mounts specified.
- Install attenuators/acoustic treatment to plant as required to reduce noise levels to within specified internal and external noise levels.
- Apartment air to air heat exchangers shall be located in the ceiling cavity away from bedrooms and have a minimum of 1 metre of ductwork internally lined with 25mm thick insulation to ductwork connected to the unit and where connected to grilles and other plant items including toilet exhaust incorporate 1 metre of insulated flex. Grilles to be backed with 25mm internally lined 90-degree cushion head boxes.
E HYDRAULIC SERVICES – NOISE AND VIBRATION

E.1 PROJECT NOISE AND VIBRATION CRITERIA

E.1.1 INTERNAL NOISE LEVELS

Noise from hydraulics plant inside the development shall not exceed the levels given below. Unless stated otherwise, the noise level criteria shall not be exceeded with the plant operating under normal operating conditions, and at start-up for intermittently operating plant items. Maximum noise levels in residential SOU’s and other areas are listed in Table E.1, Table E.2. Areas not listed in these tables shall be designed to comply with the relevant recommended design sound level as detailed in Australian/New Zealand Standard 2107-2000 ‘Acoustics – Recommended design sound levels and reverberation times for building interiors’.

Allow for any additional treatment to fully comply with the internal and external noise level requirements notwithstanding the equipment noise ratings indicated or the acoustic treatments indicated in the hydraulics services specification or drawings. Noise within SOU’s shall be free of tones or other undesirable characteristics.

Table E-1 – Noise Criteria For Residential

<table>
<thead>
<tr>
<th>SPACE/ACTIVITY TYPE</th>
<th>NOISE LEVEL dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedrooms</td>
<td>30(^1)</td>
</tr>
<tr>
<td></td>
<td>35 dB(A) from A/C operating on Design Speed</td>
</tr>
<tr>
<td>Living / Dining / Study</td>
<td>35(^1)</td>
</tr>
<tr>
<td></td>
<td>35 dB(A) from A/C operating on Design Speed</td>
</tr>
<tr>
<td>Bathrooms / Toilets / Laundries</td>
<td>45(^1)</td>
</tr>
</tbody>
</table>

Note 1 - Excludes individually controlled toilet exhaust fans, kitchen exhaust fans and air-conditioning units within the same unit that are under control of the unit that they serve.

Table E-2 – Noise Criteria For Common and Non-Residential Areas

<table>
<thead>
<tr>
<th>SPACE/ACTIVITY TYPE</th>
<th>NOISE LEVEL dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Areas including Lift Lobbies</td>
<td>45</td>
</tr>
<tr>
<td>Waste Rooms / Carpark</td>
<td>65</td>
</tr>
</tbody>
</table>

E.1.2 PLANT NOISE LEVELS

The contractor shall ensure that systems are installed, adjusted and balanced so that excessive noise is not created and the scheduled internal and external noise levels are complied with.

E.1.3 VIBRATION PRODUCED BY PLANT

Tactile structure vibration levels produced by the plant shall not exceed the criteria given in AS 2670.2-1990. Where the standard recommends a range of criteria for a particular occupancy, the low end of the range shall be used, except for residences where the base curve shall be used to assess vibration in all cases.

E.2 TESTING ON COMPLETION

Following installation, carry out random noise and vibration level tests to confirm compliance with the criteria given in Section E.1.
The locations selected for measurement shall include all critical occupancies close to plant including: residences located near plant rooms; balconies; roof terraces; carpark areas, lobbies/corridors and gymnasium. Noise levels should be measured in the worst affected part of the room.

The sound level meter used for the noise tests shall comply with the type 2 instrument brief in AS 1259, Part 2 Sound Level Meters - Precision. Testing method shall be in accordance with AS 2107-1987 Clause 5 except that all openable windows shall be closed during the test.

If the noise or vibration levels exceed those specified carry out rectification work and remeasure noise levels to demonstrate compliance with the brief. Rectification work is at the Contractor’s expense.

E.3 NOISE GENERATED BY THE HYDRAULICS SYSTEM

Noise from the hydraulics system should be minimised by:

- Limiting pipe velocities in water systems to not more than 1.5m/s.
- Laying out pipes to minimise the number of changes in direction and installing pipes so that the effective cross-sectional area of the pipe is maintained at pipe bends and junctions.
- Selecting valves and fittings that minimise the generation of noise.
- Installing pressure reducing stations as required to eliminate excessive pressure at the terminal valves.
- Controlling structure-borne noise (i.e. plant and pipe vibration transmitted into the building structure) with the use of plant isolation mounts, resilient sleeves, etc.
- Routing piping to avoid noise sensitive locations such as SOU bedrooms and living rooms.
- Provision of water hammer arrestors in reticulation piping to dishwashers and washing machines.

E.4 STRUCTURE BORNE NOISE AND VIBRATION

Minimise the transmission of vibration to the building structure to ensure the noise and vibration criteria are achieved by:

- Statically and dynamically balancing rotating plant and equipment to comply with AS3709-1989. Where specified, provide balancing test certificates.
- Providing isolation mounts or hangers for vibrating plant and equipment.
- Providing inertia blocks where required to limit the vibration amplitude.
- Isolating piping, electrical conduit, etc subject to vibration from the building structure.
- Providing flexible connections where piping is connected to vibrating plant and machinery.
E.4.1 ANTI-VIBRATION MOUNTS AND ISOLATORS

Isolation Mounts and Hanger Types

Refer sections D.4.3.

E.4.2 EQUIPMENT BASES

Mount equipment on rigid bases. The bases shall be sufficiently rigid not to deform under the weight of the machinery or during operation and reduce the effectiveness of the isolation mounts. For pumps install a layer of 20mm thick Acoustic Supplies Vibramat or equal between the plinth and plant room floor slab.

E.4.3 ANTI-VIBRATION MOUNTS AND ISOLATORS

Selection of Equipment Isolation Mounts

Select isolation mount type and minimum static deflection according to the following table (refer above for isolator types).

<table>
<thead>
<tr>
<th>PLANT</th>
<th>ISOLATOR TYPE</th>
<th>MINIMUM STATIC DEFLECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumps</td>
<td>M4</td>
<td>25 mm</td>
</tr>
<tr>
<td>Water tanks</td>
<td>M1/H1/HE1</td>
<td>1 mm</td>
</tr>
<tr>
<td>Boilers</td>
<td>M2</td>
<td>6 mm</td>
</tr>
</tbody>
</table>

Piping Isolation Mounts

Piping within 25m of the pumps, air cooled chillers (except small diameter piping runouts to fan/coil units) shall be vibration isolated using type M4 or H2, 25mm static deflection isolators for piping fixed to the plant room floor slab or walls of the SOU’s; type M3/H1, 10mm static deflection mounts elsewhere within 20m of the pumps or chillers.

Resilient Pipe Sleeves

Waste/storm water and common supply pipes including symphonic drainage shall be supported off an independent frame not connected to walls. Where piping is to be fixed to walls then they shall be isolated from the supporting clip using a proprietary rubber/neoprene gasket equal to Superfix Acoustic Pipe Clips.

Where required in other locations, install resilient pipe sleeves between the pipe and pipe clamps to isolate pipe vibration from the clamps. Sleeves should be 12mm thick foam similar to Poron 4701-12-20250-1604 (2 layers) (suppliers: Mason Grogan 02 9748 3838) fitted between the pipe and the clamp. The clamp should then be tightened just sufficiently to hold the pipe, but not over-tightened.

Flexible Pipe Connections

Flexible connections shall be fitted to all pump piping connections. These shall be twin sphere reinforced-rubber elements, be capable of withstanding internal pressure and other forces and be compatible with the fluid in the pipe.

E.4.4 EQUIPMENT BASES

Mount equipment on rigid bases. The bases shall be sufficiently rigid not to deform under the weight of the machinery or during operation and reduce the effectiveness of the isolation mounts.
Where required, concrete inertia bases shall be installed. The mass of the base shall be at least 1.5 times the mass of the equipment being supported including pipe fittings, etc. Bases shall minimise the height of the centre of gravity of the machine/base. They shall be installed on a 10 mm thick layer of Acoustic Supplies Vibramat such that the base does not mechanically contact the supporting slab/ground.

**E.4.5 INSTALLATION OF VIBRATION ISOLATION MOUNTS**

The mounts shall be levelled once the equipment is fully loaded in its operating condition with a minimum clearance between the machine and the structure of 15mm, and adjusted to ensure that the isolators are loaded correctly. Ensure that the isolators are not bridged by mounting bolts or contact between any part of the machine or an unisolated part of the isolation mounts and the structure.

The number and spacing of the mountings shall be selected to minimise machine rocking. Static and dynamic forces during operation and start-up shall be considered when selecting the mounts.

During construction, pump isolation mounts shall be bridged with a timber block to prevent the possibility of overloading of the mounts during the installation of the piping.

Piping hangers and mounts shall be adjusted so that there is minimum strain on piping with the system operating in its normal condition.

Where there is a possibility of significant lateral loads occurring use hold down bolts, lateral restraints, or housed mounts to locate equipment.

**E.5 PENETRATIONS**

**E.5.1 GENERAL**

Pipe and electrical penetrations through walls, floors etc shall not:

- Decrease the sound rating isolation rating of the wall, floor, etc.
- Allow the transmission of vibration from pipes and ducts to the wall, floor, etc.

**E.5.2 PIPE PENETRATIONS**

Seal pipes penetrating slabs or walls, as follows:

<table>
<thead>
<tr>
<th>PROJECT NOISE CRITERION IN ADJACENT SPACES</th>
<th>SEAL TYPE</th>
<th>ACOUSTIC DETAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 20m of a pump and condenser water pipes</td>
<td>Type PB seal.</td>
<td>AC010</td>
</tr>
<tr>
<td>Other pipes including hot and cold water</td>
<td>Type PA or PB seal.</td>
<td>AC010</td>
</tr>
</tbody>
</table>

Where the building element penetrated consists of one or more leaves then all leaves shall be acoustically sealed.

**E.5.3 ELECTRICAL WIRING**

Individual electrical cables can be sealed with Selley’s Proseries Fireblock sealant or equal. Bunches of cables shall be drawn through a 5mm thick, 600mm long PVC conduit packed with polyester fibre, or glasswool insulation. Seal around the conduit by filling with a non-shrinking grout.
E.6 WASTE PIPES

Unless a higher standard is specified, all waste pipes shall be treated to comply with the requirements of the Building Code of Australia.

The following schedule lists the required minimum acoustic treatment to piping. Note that where waste/storm water pipework is located in risers outside bathrooms and laundries in SOU’s where the riser construction achieves less than $R_w+C_{tr} = 40$ then that pipework shall be wrapped with 5 kg/m² loaded vinyl / 25mm thick foam sandwich.

It is noted that waste pipes that serve their own unit do not require lagging unless other SOU’s use that pipework as part of their drainage.

**Table E-5 – Acoustic Pipe Lagging Requirements**

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>LOCATION</th>
<th>PIPE TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste Piping / Stormwater Piping (including symphonic drainage)</td>
<td>Apartments generally including vertical risers within apartments</td>
<td>Pipes wrapped with 5 kg/m² loaded vinyl / 25mm thick foam sandwich.</td>
</tr>
<tr>
<td></td>
<td>Apartment ceilings outside of bathrooms and laundries within 3 metres of untreated return air grilles¹</td>
<td>Pipes wrapped with 2 layers of 5 kg/m² loaded vinyl / 25mm thick foam sandwich.</td>
</tr>
<tr>
<td></td>
<td>Lobbies, common areas, retail, clubhouse, hotel communal areas, conference space, gym, childcare (including risers not acoustically treated to achieve acoustic rating of $R_w+C_{tr} = 40$)</td>
<td>Pipes wrapped with 5 kg/m² loaded vinyl / 25mm thick foam sandwich.</td>
</tr>
<tr>
<td></td>
<td>Apartments generally (including risers not acoustically treated to achieve acoustic rating of $R_w+C_{tr} = 40$)</td>
<td>Pipes wrapped with 5 kg/m² loaded vinyl / 25mm thick foam sandwich.</td>
</tr>
</tbody>
</table>

¹Note 1: Untreated grilles are Return air grilles backed with minimum 90 degree sheet metal bend internally lined with 25mm thick perforated foil faced insulation

Pipes required to be externally lagged using 5 kg/m² loaded vinyl shall have an outer aluminium foil backing. 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 that 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 equal to Selleys Proseries Fireblock. 5 kg/m² loaded vinyl shall be equal to Acoustic Supplies Vibralag.

All waste pipes/lagging 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 shall be kept clear of the penetrations so as to prevent any bridging between the pipe and the wall.

Cast in waste soil pipework shall be isolated from the building structure by wrapping the pipe where it is located within the concrete slab/column in a minimum layer of 6mm foam equal to Ableflex or Softlon 3000. A sample shall be submitted to the Acoustic Consultant prior to approval for use on site.
E.7 ELECTRICAL

E.7.1 Belt Driven Plant

Belt driven intermittently operating plant having motors rated at greater than 2.5kW shall be fitted with motor starters that limit the build-up in motor speed at start-up. These are required to eliminate the possibility (especially in the future after belt wear has occurred) of belt squeal being audible in occupied spaces having a noise criterion of 45 dB(A) or lower, on adjacent properties and on residential terraces/external spaces.

E.7.2 Contactors/Starters/Controllers

Noise from contactors, starters and controllers shall be inaudible inside rooms having a noise of 45dB(A) or lower, on adjacent properties and on residential terraces/external spaces. Provide enclosures around these items and/or vibration isolate the items from building elements where they may give rise to the transmission of structure-borne noise.
F  ELECTRICAL SERVICES – NOISE AND VIBRATION

This section specifies the acoustic requirements for electrical services.

Penetrations in sound rated ceilings or walls or floors should maintain the acoustic performance of the element. Where required provide acoustic boxes or other treatment.

Where penetrations are made in sound rated walls for either GPOs or light switches, these should be backed using the HPM 430 Fire/Acoustic wall box. It is noted that based on the wall systems they will only be required along party walls where decoupled studwork is installed. In addition, it is noted that they will not be required in SOU to common corridor walls or on party walls where furring channels are installed.

Light fittings penetrating sound rated ceilings over wet areas shall be treated with acoustic boxes if gimballed downlights are installed, alternatively non-gimballed downlights will be acceptable to maintain the acoustic performance of the ceiling.

Individual electrical cables can be sealed with Selleys Proseries Fireblock sealant or equal. Bunches of cables shall be drawn through a 5mm thick, 600mm long PVC conduit packed with polyester fibre, or glasswool insulation. Seal around the conduit by filling with a non-shrinking grout.
G GLAZING

G.1 GENERAL

This section of the brief provides the minimum requirements to satisfy only the acoustical requirements for the glazing. Where other requirements for the glazing are specified elsewhere in the glazing brief, the glazing shall be selected to meet all requirements and may result in increased glass thicknesses over those specified in the acoustic brief but shall in no cases fall below the minimum thicknesses and requirements set out in this brief.

G.1.1 Traffic Noise

Maximum internal noise levels within internal spaces due to external noise intrusion from traffic into the development listed in Table G.1. Areas not listed in the tables below shall be designed to comply with the relevant recommended design sound level as detailed in Australian Standard AS/NZS2107:2016 “Recommended Design Sound Levels and Reverberation Times for Building Interiors”.

Table G-1– Internal Noise Level Criteria for Traffic

<table>
<thead>
<tr>
<th>Location</th>
<th>Required Internal Noise Level¹</th>
<th>Day Time Period dB(A) L_{eq (1h)} (7am-10pm)</th>
<th>Night Time Period dB(A) L_{eq (1h)} (10pm-7am)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedrooms</td>
<td></td>
<td>40-45</td>
<td>35-40</td>
</tr>
<tr>
<td>Living rooms</td>
<td></td>
<td>35-45</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Note 1: Based on apartments suitably furnished ready for occupation

G.2 MINIMUM GLASS THICKNESS AND GLASS TYPE

The glass thickness, design of the window mullions, perimeter seals of openable and fixed glazing, and the installation of the windows/doors in the building openings shall be selected so that the completed system reduces internal noise levels to at or below the scheduled maximum internal noise criteria requirements. As well as complying with the minimum thicknesses, the glazing system must comply with the minimum performance requirements detailed in Tables G.4. It is the contractor’s responsibility to verify the minimum glazing requirements to ensure compliance with the internal traffic noise objectives detailed in Table G.1.

Table G-2 – Minimum External Glazing Requirements / Performance

<table>
<thead>
<tr>
<th>REQUIRED GLAZING CONSTRUCTION</th>
<th>MINIMUM Rw OF INSTALLED WINDOW</th>
<th>ACOUSTIC SEALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6mm OR 6/12/6mm IGU</td>
<td>31</td>
<td>Yes</td>
</tr>
<tr>
<td>6.38 lam OR 6/12/6.38mm IGU</td>
<td>33</td>
<td>Yes</td>
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<tr>
<td>10.38 lam OR 6/12/10.38mm IGU</td>
<td>35</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note that mohair seals in openable windows and doors are not acceptable where acoustic seals are required. Seals in these instances shall be equal to Schlegel Q-lon bulb type seals.

G.3 ACOUSTIC SEALING OF WINDOW FRAMES

Where glazing is required to achieve a nominated acoustic performance the perimeter of the window frame shall be acoustically sealed into the window opening so there is no leakage of noise between the window frame and the building opening. The sealing method selected shall take into account and allow for any movement of the window frame relative to the building opening and so that the acoustic performance is maintained.
One of the following two methods shall be used to seal the gap between the window and the building opening. These shall be followed even if there is internal or external cladding butting against the window frame.

Method 1

A 10-15mm wide gap shall be left between the window frame and the building opening.

The gap between the window frame and the building opening shall be caulked with an elastomeric sealant having a cured density of not less than 1000 kg/m$^3$. Minimum 10mm thick caulking shall be applied near the external face of the mullion with additional 10mm thick caulking near the inner face.

Provide backing rods and bond breaker tapes as specified or required by sealant manufacturer.

If the gap between the mullion and the building opening exceeds 15mm the gap shall be packed with 8 kg/m$^3$ fibreglass or polyester fibre insulation.

Method 2

A 10-15mm wide gap shall be left between the window frame and the building opening. This gap shall be covered with 3mm thick aluminium angles for all 12.38mm thick (or greater) single glazing, and 1.5mm thick angles for single glazing less than 12.38mm thickness as well as IGU with Rw rating less than 35.

The flange of the angle sections shall seat onto the building opening, and the other flange shall seat onto the window mullion. The angle flanges should be fixed in position, with the faces of the flanges seating against the mullion and building opening bedded in flexible sealant to seal all gaps.

One set of angles is required on the inside face of the window and one set is required on the outside face of the window frame.

If the gap between the mullion and the building opening exceeds 15mm the gap shall be packed with 8 kg/m$^3$ fibreglass or polyester fibre insulation.

G.4 SPRINKLER PIPES

The following treatment is required where sprinkler pipes are required to penetrate the cover/in-fill plate between the mullion and the building opening at the top of windows, in rooms required to have a sound rating.

1. The cover/in-fill plate where the pipes pass through shall be min. 3mm thick aluminium for all double glazing and 10.38mm thick single glazing, and 1.5mm thick for single glazing less than 10.38mm thickness or IGU with Rw rating less than 35. One cover/in-fill plate shall be provided on the external face of the mullion and one cover/in-fill plate shall be provided on the inside face of the window mullion.

2. The cover/in-fill plate should seat against flanges fixed into the building opening and onto the window mullion. All gaps shall be fully sealed using a flexible sealant.

3. A 2-5mm wide gap should be left around the sprinkler pipe that shall be fully caulked on both cover/in-fill plates between the window frame and the building opening using a flexible sealant.

4. The gap between the mullion and the building opening shall be packed with 8 kg/m$^3$ fibreglass or polyester fibre insulation.

G.5 SAMPLES AND TEST DATA

Samples of glazing systems shall be submitted to the builder and developer’s representative prior to installation in the building. In addition, submit Laboratory test data performed in accordance with AS 1191-1985 providing evidence that
the proposed window systems comply with the requirements of the brief. Only windows having laboratory test data indicating compliance with the specification requirements in Tables G.2.

G.6  FAÇADE SCHEDULE

Refer to Appendix 1 – Façade Markup
H LIFT SPECIFICATION

H.1 PASSANGER LIFTS

H.1.1 Noise Within occupied areas

Lifts motors and control equipment shall be vibration isolated from the building structure. The maximum noise level produced by the lift car operation shall not exceed 30 dB(A) when measured within a bedroom and 35 dB(A) when measured within a living room. Lift motors and associated equipment shall be vibration isolated so that structure borne noise will not be audible within SOU’s.

H.1.2 Lift Call Bells and lobby noise levels

It is standard practice that when a lift arrives at a floor a bell or auditory call signal is activated to let the waiting passenger know of the lifts arrival. This type of lift call system can be highly annoying for SOU’s located near the lifts. Therefore, on this project it is required that any auditory lift call system must be low in volume and dull in nature.

H.1.3 Noise within lift car

Maximum noise level within the lift car during operation of 55 dB(A).
I GARAGE DOORS

I.1 GENERAL

• Carpark finish to be broom finish or similar to minimise tyre squeal
• Carpark ramps are not to be corrugated
• Construction joints/expansion joints in carpark finish to be treated to minimise bump between sections of slab.

I.2 CARPARK ENTRY GATES

The following treatment is recommended for car park entry doors –

• We recommend the car park doors to be fold up doors or hinged pivot type doors.
• Vibration from the operation of automatic doors shall be vibration isolated from the building structure.
• Doors shall be quiet in operation. For isolation of the door, Embelton NRD mounts shall be used where the motors are fixed to the structure.
• Teflon guides shall be installed in all rails.
• Ensure that door panels do not rattle, and the operation of any door guides, rollers, etc is smooth.
• Door guides should be fitted with vibration isolated fixings where required to prevent door operation from being audible within occupied spaces.
• Door motors shall be fitted with a soft start/stop controller to minimise noise.
• The door shall be stopped approximately 5 mm from the slab/ground to ensure the base of the door does not contact the concrete surface.

Isolation of the door structure is shown in the schematic below -
J ENTRY GATE

The development currently incorporates an automatic steel door gate with custom design pattern. It is recommended that the gate be fixed and free standing from surrounding walls. In addition the gate should have a soft close mechanism to reduce noise and vibration from operation.
K ACOUSTIC DETAILS
Nom 200mm thick concrete slab (min density 2200kg/m³)

Nominal 80mm

Suspended 10mm plasterboard ceiling

Note: Ceiling is not required within the carpark

<table>
<thead>
<tr>
<th>FLOOR CONSTRUCTION BETWEEN APARTMENTS</th>
<th>2-4 Ballarat Street Brunswick WALL/FLOOR/CEILING CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date: 11/12/2020</td>
<td>Drawn: JT</td>
</tr>
<tr>
<td>Issue:</td>
<td>Scale: NTS</td>
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</tbody>
</table>
ACOUSTIC TREATMENT OF TILED FINISHES INCLUDING BALCONIES LOCATED ABOVE APARTMENT $L_{wA} < 62$

**Wall:**

Stop wall and floor tiles 2-3mm short of edges and fill with resilient caulking compound equal to Bostik Seal n' Flex 1 on top.

4mm thick Acoustic Supplies Vibramat

Mortar bed to falls as required

Note: Ensure no direct contact with wall or meeting surfaces between tiles or grout.

Stop wall and floor tiles 2-3mm short of edges and fill with resilient caulking compound equal to Bostik Seal n’ Flex 1

Min. 200mm Concrete Slab

Vibramat to run along edge to ensure that no mechanical connection between tiles/grout and wall occurs

4mm thick Vibramat Mat (note waterproof membrane to be installed above and/or below mat as required)

Tiles adhered to Vibramat via Bostik Ultraset. Adhere mat to mortar bed using Bostik Ultraset or equal.

Nom 80mm Plasterboard ceiling

Wall

Note:
- For load bearing wall structures ensure a suspended plasterboard ceiling is installed within the apartment below with a minimum 80mm airgap between the ceiling and soffit.

---

### ACOUSTIC LOGIC

2-4 Ballarat Street Brunswick
WALL/FLOOR/CEILING CONSTRUCTION

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</tbody>
</table>
Stop timber floor nom 4mm clear of perimeter

Wall / cupboard etc.

Note: Ensure no direct contact with wall or meeting surfaces between timber flooring and perimeter.

Min 200mm thick concrete floor

Acoustic Supplies Vibramat to run along edge to ensure that no mechanical connection between floor and wall

Min 80mm airgap

Plasterboard ceiling

Timber adhered to Acoustic Supplies Vibramat via Selleys Flexistik Polyurethane Adhesive. Adhere mat to mortar bed using Selleys Flexistik Polyurethane Adhesive. Alternatively install timber floor without adhering to underlay

ACOUSTIC TREATMENT OF TIMBER FINISHES LOCATED ABOVE APARTMENTS

$L_{n,w} + CL < 55$

---

**ACOUSTIC LOGIC**

2-4 Ballarat Street Brunswick

WALL/FLOOR/CEILING CONSTRUCTION

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INTER TENANCY WALL APARTMENTS
Rw + CTR 50 + Discontinuous Construction

APARTMENT 1

1x16mm Fire rated plasterboard
64mm studwork

Gap min 10mm, max 15mm filled to full depth of sheet with Selleys Proseries Fireblock

1x110mm thick 11kg/m³ glasswool

Note:
o GPO’s shall be backed with fire/acoustic boxes equal to HPM430 manufacture caulked into the wall

APARTMENT 2

1x16mm Fire rated plasterboard
64mm studwork

Gap min 10mm, max 15mm filled to full depth of sheet with Selleys Proseries Fireblock

1x110mm thick 11kg/m³ glasswool insulation

Minimum 204mm

Minimum 44mm cavity no connections
**INTER TENANCY WALL APARTMENTS**
**IN CORPORATING CONCRETE COLUMN**
**(PLAN VIEW)**
\[ R_w + C_{TR} 50 + \text{Discontinuous Construction} \]

**2-4 Ballarat Street, Brunswick**
**WALL/FLOOR/CEILING CONSTRUCTION**

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</table>

**Description:**
- **Apartment 1 – HABITABLE AREA**
  - 64mm studwork
  - 25mm thick 18kg/m³ glasswool insulation
  - 28mm furring channel
  - 1x16mm thick fire rated plasterboard
  - 1x110mm thick glasswool 11kg/m³ insulation
- **Apartment 2 – WET AREA**
  - Min 150mm thick concrete
  - 1x110mm thick glasswool 11kg/m³ insulation
  - 1x75mm thick glasswool

**Notes:**
- Caulk gap 10-15mm at head and base of sheeting to full depth of sheet with Selleys Proseries Fireblock
- Minimum 20mm cavity between studwork and concrete. No mechanical connections.
WALL BETWEEN APARTMENTS AND CORRIDORS/LOBBIES

**R_w 50**

- **Date:** 11/12/2020
- **Drawn:** MS
- **Checked:** MS
- **Issue:** 0
- **Scale:** NTS

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**Project Number:** 20201371.1
**Drawing Number:** AC006

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2-4 Ballarat Street, Brunswick
WALL/FLOOR/CEILING CONSTRUCTION

---

**APARTMENT**

- 1×16mm thick fire rated plasterboard
- 92mm rondo Quietstuds
- 75mm thick 11kg/m³ glasswool insulation

---

**CORRIDOR/LOBBY**

- 1×16mm thick fire rated plasterboard
- 92mm rondo Quietstuds
- 75mm thick 11kg/m³ glasswool insulation

---

**ASSEMBLY**

- Gap min 10mm, max 15mm filled to full depth of sheet with Selleys Pro Series Fireblock or equal
- 124mm
LIFT CORE ADJACENT TO APARTMENTS

Rw 50 + DISCONTINUOUS CONSTRUCTION

- Minimum 150mm concrete
- 64mm studwork decoupled from lift core wall
- Gap min 10mm, max 15mm filled to full depth of plasterboard with Selleys Proseries Fireblock
- 13mm thick plasterboard
- 75mm thick 11kg/m³ density glasswool insulation
- Gap min 10mm, max 15mm filled to full depth of plasterboard with Selleys Proseries Fireblock

Note:
- No mechanical connections are permitted between the concrete/blockwork and stud work

---

AECOUSTIC

LOGIC

2-4 Ballarat Street, Brunswick
WALL/FLOOR/CEILING CONSTRUCTION

<table>
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</table>
**Corridor/Facade Junction Detail**

**Plan View**

- **Corridor/Facade**: Run inter-tenancy wall sheathing through to the outer sheet of the corridor wall.
- **Tape and Set Joint**: Tape and set joint.
- **10-15mm Gap**: 10-15mm gap filled to the full depth of the plasterboard with Selleys Pro Series Fireblock.
- **Caulk Gap**: Caulk gap 10-15mm at head and base of sheeting to full depth of sheet with Selleys Proseries Fireblock.

---

**Intertenancy Wall – Corridor/Facade Junction Detail**

(Plan View)

**2-4 Ballarat Street, Brunswick**

**WALL/FLOOR/CEILING CONSTRUCTION**

<table>
<thead>
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**Issue**: 0  
**Scale**: NTS
10-15mm clear gap around pipe filled for min. depth of 12mm with Selleys Pro Series Fireblock.

**TYPE PA PIPE SEAL**

25mm thick rockwool sectional pipe sleeve insulation around pipe. Rockwool is to be encapsulated to prevent loss of fibres.

**TYPE PB PIPE SEAL**

1.2mm thick steel or copper sleeve around insulation grouted into wall with a non-shrinking grout.

---

### PIPE SEALING DETAILS

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</table>

2-4 Ballarat Street, Brunswick
WALL/FLOOR/CEILING CONSTRUCTION
10-20mm gap around duct filled for min. depth of 12mm with Selleys Pro Series Fireblock.

**TYPE DA DUCT SEAL**
(Note: Typical fire damper detail is also adequate provided any gaps are sealed with Selleys Pro Series Fireblock)

20mm gap between duct and wall filled with polyester fibre, fibreglass or rockwool. Use rockwool for fire rated walls.

5mm gap between angle and wall sealed with flexible mastic sealant for min. depth of 10mm.

**TYPE DB DUCT SEAL**
(Note: Typical fire damper detail is also adequate provided flange is sealed to wall with Selleys Pro Series Fireblock)
**CEILING DETAIL TREATMENT OF WASTE SOIL PIPE WORK AND STORM WATER PIPE WORK WITHIN APARTMENTS OUTSIDE BATHROOMS/LAUNDRIES**

**R_{W+C_{TR}} 40**

- **Date:** 11/12/2020
- **Drawn:** JT
- **Checked:** MS
- **Issue:** 0
- **Scale:** NTS

**Project Number:** 20201371.1
**Drawing Number:** AC011

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**Waste pipe**

Lag with 5kg/m² foam backed loaded vinyl - Acoustic Supplies Vibralag.

**25mm open cell foam**

**Plasterboard ceiling**

**75mm thick 11kg/m³ glasswool insulation to be installed beneath waste pipe for a 1 metre band centred below the waste**

**Note:**
- Non gimbaled downlights (fixed with no gaps) may be installed in the insulated zone however the insulation should be left minimum 50mm clear of the light fitting.
- Loaded vinyl joints shall be overlapped a minimum of 50mm and taping airtight with aluminium tape. No gaps are permitted.
Waste pipe lagged with 5kg/m² foam backed loaded vinyl – Acoustic Supplies Vibralag. Waste soil pipes contained in ceiling space. Pipe to be no closer than 50mm to wall and ceiling.

BATHROOM/LAUNDRY

AREA OUTSIDE BATHROOM/LAUNDRY

13mm plasterboard running full height to the underside of the slab

75mm thick 11kg/m³ density glasswool insulation

Min 50mm

Plasterboard ceiling

64mm studwork

Min 50mm

Plasterboard ceiling

Taped and set

SECTIONAL ELEVATION OF WALL/CEILING REQUIREMENTS FOR BATHROOM/LAUNDRY

<table>
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</table>
Minimum 1 metre of insulated flexible ductwork to the intake and discharge sides of the fan.

Continue external sheet of bathroom perimeter wall full-height to the underside of the slab above and minimise gaps.

Rigid PVC duct outside of bathroom.

Plasterboard ceiling

75mm thick
11kg/m³ insulation

Bathroom exhaust fan installed on resilient mounts.

AREA OUTSIDE
BATHROOM/LAUNDRY

BATHROOM/LAUNDRY

SECTIONAL ELEVATION OF WALL/CEILING
REQUIREMENTS FOR
BATHROOM/LAUNDRY

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Line of wall. Seal sheet to wall where applicable.

HYDRAULIC RISER LOCATED SOLELY WITHIN WET AREA

$R_w + C_{tr} \leq 25$

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Lagged waste pipe with Acoustic Supplies Vibralag

Gap min 10mm, max 15mm filled to depth of 1 sheet of plasterboard with Selleys Pro Series

20 mm minimum gap between the waste pipe and any support element or plasterboard

10mm plasterboard
HYDRAULIC RISER LOCATED SOLELY WITHIN HABITABLE AREA

$R_w + C_{tr} 40$

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Line of wall. Seal sheet to wall where applicable.

Lagged waste pipe with Acoustic Supplies Vibralag
75mm thick, 11kg/m$^3$ glasswool insulation

Gap min 10mm, max 15mm filled to depth of 1 sheet of plasterboard with Selleys Pro Series Fireblock
20 mm minimum gap between the waste pipe and any support element or plasterboard
13mm plasterboard
25mm thick 18kg/m³ glasswool insulation

Apartment

13mm thick plasterboard

Furring channel

Common Corridor / Fire stair

Min 150mm thick reinforced concrete wall

Direct fixed plasterboard where nominated

WALL BETWEEN APARTMENTS AND FIRE STAIRS

$R_w = 50$

PRECAST CONCRETE WALL

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WALL/FLOOR/CEILING CONSTRUCTION

2-4 Ballarat Street, Brunswick

**ACOUSTIC LOGIC**

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**INTER TENANCY WALL – FACADE JUNCTION DETAIL**

(PLAN VIEW)

- Run inter-tenancy wall sheathing behind the window frame
- Facade as documented
- Inter-tenancy wall as documented
- 10-15mm gap filled to the full depth of the plasterboard with Selleys Pro Series Fireblock
- Tape and set joint

### Details:

**Facade as documented**

**Inter-tenancy wall as documented**

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**ACOUSTIC LOGIC**

2-4 Ballarat Street, Brunswick
WALL/FLOOR/CEILING CONSTRUCTION

<table>
<thead>
<tr>
<th>Date:</th>
<th>Drawn:</th>
<th>Checked:</th>
<th>Project Number:</th>
<th>Drawing Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/12/2020</td>
<td>JT</td>
<td>MS</td>
<td>20201371.1</td>
<td>AC017</td>
</tr>
</tbody>
</table>

**Issue:** 0  
**Scale:** NTS  
**Approved:**
Line of adjoining walls. Sheets to be sealed to wall where

Gap min 10mm, max 15mm filled to depth of 1 sheet of plasterboard with Selleys Proseries Fireblock with backing rod behind where required (typical).

**Note:** Mechanical plant riser only suitable for apartment related mechanical services – common risers such as retail kitchen exhaust fans, bin exhaust fans, common carpark fans etc. will require a concrete riser construction. See Detail below
Concrete paver

4mm thick 100% rubber pads (sized larger than polypad)

Polypad

Slab

Note: Ensure no mechanical connection between pavers or poly pad and perimeter of paved area.
Operable Wall Track

Caulk with Selleys Proseries
Fireblock (Typical)

Timber or steel stud fixed to slab

Operable Wall support hangers and beams as recommended by wall manufacturer. If bracing penetrates plasterboard seal all gaps with Selleys Proseries Fireblock

Operable Wall Above Ceiling Baffle Details

2 x 13mm plasterboard

75mm thick 11kg/m³ glasswool insulation

Project Number: 20201371.1
Drawing Number: AC020
Operable wall stacking cupboard detail

Maximum 2mm gap

Operable wall

Wall as nominated

2-4 Ballarat Street, Brunswick
WALL/FLOOR/CEILING CONSTRUCTION

Date: 11/12/2020
Drawn: JT
Checked: MS
Project Number: 20201371.1

Issue: 0
Scale: NTS
Approved: AC021
APPENDIX 1 – FAÇADE MARKUP
Rev: 0
Date: 11/12/2020

Minimum Glazing Requirements:
- 6mm or 612/6 IGU + acoustic seals
- 6.33mm laminated or 612/6.38 laminated IGU + acoustic seals
- 0.30mm laminated or 612/10.3 laminated IGU + acoustic seals

Minimum Apartment External Wall Construction:
- Precast or masonry wall does not require further upgrading acoustically.
- External lightweight wall for bedroom facing Sydney Road shall be constructed from min:
  1x17.5mm FC sheet /norm 100mm stud with min. 75mm thick 110g/m2 glass wool insulation / 2x13mm plasterboard
- External lightweight wall elsewhere (generally) shall be constructed from min: 1x17.5mm FC sheet / norm 100mm stud with min. 75mm thick 110g/m2 glass wool insulation / 1x13mm plasterboard
Minimum Glazing Requirements
- 6mm or 6/12 IGU + acoustic seals
- 6.38mm lam or 6/12 6.38mm lam IGU + acoustic seals
- 10.38mm lam or 6/12 10.39mm lam IGU + acoustic seals

Minimum Apartment External Wall Construction
- Precast or masonry wall does not require further upgrading acoustically.
- External lightweight wall for bedroom facing Sydney Road shall be constructed from min: 1x7.5mm FC sheet / nom 100mm stud with min 75mm thick 11kg/m² glasswool insulation / 2x13mm plasterboard
- External lightweight wall elsewhere (generally) shall be constructed from min: 1x7.5mm FC sheet / nom 100mm stud with min 75mm thick 11kg/m² glasswool insulation / 1x13mm plasterboard
Minimum Glazing Requirements
- 6mm or 6/12/6 IGU + acoustic seals
- 6.38mm lam or 6/12/6.38mm lam IGU + acoustic seals
- 10.38mm lam or 6/12/10.38mm lam IGU + acoustic seals

Minimum Apartment External Wall Construction
- Precast or masonry wall does not require further upgrading acoustically.
- External lightweight wall for bedroom facing Sydney Road shall be constructed from min: 1x7.5mm FC sheet / nom 100mm stud with min 75mm thick 114g/m² glasswool insulation / 2x13mm plasterboard
- External lightweight wall elsewhere (generally) shall be constructed from: 1x7.5mm FC sheet / nom 100mm stud with min 75mm thick 114g/m² glasswool insulation / 1x13mm plasterboard
Minimum Glazing Requirements
- 6mm or 6/12/6 IGU + acoustic seals
- 6.38mm laminated IGU + acoustic seals
- 10.38mm laminated IGU + acoustic seals

Minimum Apartment External Wall Construction
- Precast or masonry wall does not require further upgrading acoustically.
- External lightweight wall for bedroom facing Sydney Road shall be constructed from min: 1x7.5mm FC sheet / 100mm stud with min 75mm thick 11kg/m² glasswool insulation / 2x13mm plasterboard
- External lightweight wall elsewhere (generally) shall be constructed from min: 1x7.5mm FC sheet / 100mm stud with min 75mm thick 11kg/m² glasswool insulation / 1x13mm plasterboard
Rev: 0
Date: 11/12/2020

Minimum Glazing Requirements
- 6mm or 6/12/6 IGU + acoustic seals
- 6.38mm laminated IGU + acoustic seals
- 10.38mm laminated IGU + acoustic seals

Minimum Apartment External Wall Construction
- Precast or masonry wall does not require further upgrading acoustically.
- External lightweight wall for bedroom facing Sydney Road shall be constructed from min: 1x7.5mm FC sheet / nom 100mm stud with min 75mm thick 11kg/m² glass wool insulation / 2x13mm plasterboard
- External lightweight wall elsewhere (generally) shall be constructed from min: 1x7.5mm FC sheet / nom 100mm stud with min 75mm thick 11kg/m² glass wool insulation / 1x13mm plasterboard
Minimum Glazing Requirements:
- 6mm or 6/12/6 IGU + acoustic seals
- 6.38mm laminated or 6/12/6.38mm IGU + acoustic seals
- 10.38mm laminated or 6/12/10.38mm IGU + acoustic seals

Minimum Apartment External Wall Construction:
- Precast or masonry wall does not require further upgrading acoustically.
- External lightweight wall for bedroom facing Sydney Road shall be constructed from min: 1x7.5mm FC sheet / norm 100mm stud with min 75mm thick 11kg/m3 glasswool insulation / 2x13mm plasterboard
- External lightweight wall elsewhere (generally) shall be constructed from min: 1x7.5mm FC sheet / norm 100mm stud with min 75mm thick 11kg/m3 glasswool insulation / 1x13mm plasterboard
Rev. 0
Date: 11/12/2020

Minimum Glazing Requirements
- 6mm or 6/12/6 IGU + acoustic seals
- 6.38mm laminate or 6/12/6.38mm IGU + acoustic seals
- 6.38mm laminate or 6/12/10.36mm IGU + acoustic seals

Minimum Apartment External Wall Construction
- Precast or masonry wall does not require further upgrading acoustically.
- External lightweight wall for bedroom facing Sydney Road shall be constructed from min: 1x7.5mm FC sheet / nom 100mm stud with min 75mm thick 11kg/m^3 glasswool insulation / 2x12mm plasterboard
- External lightweight wall elsewhere (generally) shall be constructed from min: 1x7.5mm FC sheet / nom 100mm stud with min 75mm thick 11kg/m^3 glasswool insulation / 1x12mm plasterboard