Taff Vale Redevelopment
Pontypridd

Acoustic Specification
4366/AS1 – Building C

10th May 2017

For: Darnton B3
5 Callaghan Square
Cardiff
CF10 5BT
Contents

1.0 Introduction .................................................................................................................. 3

2.0 Acoustic Design Standards ......................................................................................... 4

3.0 Performance Criteria ................................................................................................... 7
   3.1 Building C (Cat B / Fit-Out) ...................................................................................... 7
   3.2 Building Services Environmental Noise Emissions .................................................. 8

4.0 External Building Fabric ............................................................................................... 8
   4.1 Traffic Noise Break-In ............................................................................................... 8
   4.2 Music Noise Break-out .............................................................................................. 9
   4.3 Roof .......................................................................................................................... 9

5.0 Internal Building Fabric ............................................................................................... 10
   5.1 Floors ....................................................................................................................... 10
      5.1.1 Free Weights Area ............................................................................................ 10
   5.2 Walls ....................................................................................................................... 11

6.0 Building Services ......................................................................................................... 12
   6.1 Plantrooms ................................................................................................................ 12
   6.2 Ceiling Void Units to Critical Receiver Spaces ......................................................... 12
   6.3 Roof Mounted Plant ................................................................................................. 12
   6.4 AHUs, HRVs, local fans ........................................................................................... 13
   6.5 Lifts ........................................................................................................................ 13

7.0 Summary ....................................................................................................................... 14

Appendix A – Acoustic Terminology ................................................................................. 15

Figure 4366/F1: Key to Wall Types .................................................................................. 16
Figure 4366/F2: Ground Floor Partitions ........................................................................ 17
Figure 4366/F3: 1st Floor Partitions ............................................................................... 18
Figure 4366/F4: 2nd Floor Partitions .............................................................................. 19
1.0 Introduction

Hunter Acoustics has been appointed to provide acoustic design advice on the Taff Vale Redevelopment, Pontypridd.

The report concentrates on Building C, a leisure building for RCT CBC comprising a mix of library, gym, 'one for all' and café uses.

All buildings are to achieve a BREEAM Excellent Rating with each building to be assessed separately.

The acoustic issues can be broken down into:

a) Sound insulation performance of separating floors and walls, including upgraded constructions where required to Gym and Library areas.

b) Sound insulation through the external building fabric controlling:
   i) Noise intrusion from external noise sources confirmed from the environmental noise survey.
   ii) Noise break-out from / limiting noise levels for Gym activities (music)
   iii) Rain noise intrusion

c) Room acoustics / reverberation control:

d) Building services noise control.
   i) Internal ambient noise levels from mechanical plant in critical spaces.
   ii) Atmospheric / environmental noise emissions from mechanical plant.

This report details acoustic criteria / performance specifications for the critical spaces referring to BREEAM 2014, with additional criteria from BS 8233:2014 and British Council for Offices 2009.

Acoustic terminology used in this report is explained in Appendix A.
2.0 Acoustic Design Standards

2.1 Environmental Noise limits

Pol 05 Reduction of noise pollution

<table>
<thead>
<tr>
<th>Number of credits available</th>
<th>Minimum standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No</td>
</tr>
</tbody>
</table>

**Aim**

To reduce the likelihood of noise arising from fixed installations on the new development affecting nearby noise-sensitive buildings.

**Assessment criteria**

Applicability.

The following is required to demonstrate compliance:

**One credit**
1. Where there are, or will be, no noise-sensitive areas or buildings within 800m radius of the assessed site.

**OR**

2. Alternatively, where the building does have noise-sensitive areas or buildings within 800m radius of the site, one credit can be awarded as follows:
   a. Where a noise impact assessment in compliance with BS 7445 has been carried out and the following noise levels measured/determined:
      i. Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar.
      ii. The rating noise level resulting from the new noise source (see CN4).
   3. The noise impact assessment must be carried out by a suitably qualified acoustic consultant holding a recognised acoustic qualification and membership of an appropriate professional body (see Relevant definitions in the Additional information section).
   4. The noise level from the proposed site/building, as measured in the locality of the nearest or most exposed noise-sensitive development, is a difference no greater than +5dB during the day (07:00 to 23:00) and +3dB at night (23:00 to 07:00) compared to the background noise level.
   5. Where the noise source(s) from the proposed site/building is greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with criterion 4.

Referring to the Rhondda Cynon Taff’s planning conditions:

31 The reserved matters referred to in condition 1 where these relate to Class A3 and D2 uses (as defined under the Town and Country Planning (Use Classes) Order 1987 as applicable to Wales on the date of this planning permission) on the site shall include provision of an accompanying Acoustic Report. This report shall detail any works of noise mitigation measures required and such measures shall be installed in accordance with the approved details and thereafter maintained as such.

Reason: In the interests of neighbouring amenity and in accordance with policy AW10 of the Rhondda Cynon Taf Local Development Plan.

No specific noise criteria have been included relating to plant noise emissions. It is proposed to work to BREEAM Pol05 criteria discussed above, but this should be confirmed acceptable with the EHO.
2.2 Internal Noise Criteria: BS8233:2014

The following table expands on the above BS 8233 guidance and shows various levels of Privacy, against a subjective rating/description, and practical implications for partition design on site.

The objective separation figure is the Weighted Standardised Level Difference ($D_{nTw}$)

<table>
<thead>
<tr>
<th>Classification</th>
<th>DnTw (dB)</th>
<th>Subjective Rating</th>
<th>Practical Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>33</td>
<td>Conversations not private.</td>
<td>Partitions up to suspended ceiling levels, telephones etc minimal. Type is important ($D_{nTw}38$, Class A). Continuous lighting troughs/diffusers require baffles.</td>
</tr>
<tr>
<td>Private</td>
<td>38</td>
<td>Normal speech levels audible but generally unintelligible.</td>
<td>Partitions up to suspended ceiling Intrusion from raised voice. Continuous lighting troughs/diffusers require baffles.</td>
</tr>
<tr>
<td>Confidential</td>
<td>43</td>
<td>Raised voice audible but not intelligible except for occasional words.</td>
<td>Partitions must be slab-slab. Continuous lighting troughs/diffusers require baffles. Minimum partition rating : Rw45.</td>
</tr>
<tr>
<td>Fully Confidential</td>
<td>48</td>
<td>Highest level of separation practical</td>
<td>Doors shall be lobbied. High performance partitions full height with minimal penetrations. Minimum partition rating : Rw55.</td>
</tr>
</tbody>
</table>

Privacy between offices and between an office and an occupied space requires effective insulation and moderate background noise to mask intruding speech. In order to achieve unintelligible speech from another office, the minimum sound insulation between two offices needs to be approximately $D_w = 38$ dB. Where privacy is important the minimum sound insulation should be $D_w = 48$ dB.

The subjective privacy assessments are based on a background masking level of NR35.
2.3 Curtain Walling

Curtain walling shall meet a minimum 45dB $D_{nw}$ at Cat A, but have a defined upgrade to achieve 53dB $D_{nw}$ at Cat B in line with British Council for Offices 2009 (Chapter 8 Acoustics) guidance (ENISO 10848-2: 2006). This upgrade will be required in the Fitness, Gym and Multi-function rooms.

2.4 Separating Floors

Between Library Floors/Offices: 45dB $D_{ntw}$

Between Fitness, Gym &
Multi-function Room to adjacencies: 48dB $D_{ntw}$

Where commercial users propose to use amplified music, they shall be responsible for uprating the performance of their let to ensure levels in adjacent areas do not exceed 40dBL$_{A_{max}}$. This requirement must be included in tenancy agreements.
3.0 Performance Criteria

3.1 Building C (Cat B / Fit-Out)

The table below lists proposed acoustic performance criteria for Building C:

Table 4366/T1: Acoustic Performance Criteria

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Criteria (Library, Exhibition Space)</th>
<th>Criteria (Gym &amp; Fitness)</th>
<th>Criteria (Training, Consult, IT)</th>
<th>Criteria (Café)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services Noise</td>
<td>NR35</td>
<td>NR40-45</td>
<td>NR35-45</td>
<td>NR40-45</td>
</tr>
<tr>
<td>Noise Intrusion (from external sources)</td>
<td>40-45dB $L_{Aeq}$</td>
<td>50-55dB $L_{Aeq}$</td>
<td>40-45dB $L_{Aeq}$</td>
<td>50-55dB $L_{Aeq}$</td>
</tr>
<tr>
<td>Reverberation Time</td>
<td>$&lt;1.0s$ (1)</td>
<td>$&lt;1.5s$ (1)</td>
<td>$&lt;0.8s$ (1)</td>
<td>$&lt;1.5s$ (1)</td>
</tr>
<tr>
<td>Separating Floors</td>
<td>45dB $D_{nTw}$</td>
<td>48dB $D_{nTw}$ (2)</td>
<td>45dB $D_{nTw}$</td>
<td>48dB $D_{nTw}$ (2)</td>
</tr>
<tr>
<td>Curtain Walling</td>
<td>Minimum 45dB $D_{nfw}$</td>
<td>Minimum 53dB $D_{nfw}$ (2)</td>
<td>N/A</td>
<td>Minimum 53dB $D_{nfw}$ (2)</td>
</tr>
<tr>
<td>Separating Partitions</td>
<td></td>
<td></td>
<td>TBA (2)</td>
<td></td>
</tr>
<tr>
<td>Plant Noise Emissions</td>
<td></td>
<td></td>
<td>See section 3.4</td>
<td></td>
</tr>
<tr>
<td>Gym Noise Break-out</td>
<td></td>
<td></td>
<td>See section 3.5</td>
<td></td>
</tr>
</tbody>
</table>

1) No specific criteria included in BREEAM, BS 8233 or BCO for reverberation in cellular offices or meeting rooms. Guidance figure is taken from BB93.

2) Based on a 48dB $D_{nTw}$ separating floor / 53dB $D_{nfw}$ curtain walling specification an initial Gym/Fitness Music limiting level of 80dB(A) is indicated.
3.2 Building Services Environmental Noise Emissions

Referring to background $L_{A90}$ levels measured during our noise survey the following environmental noise limits are proposed at the closest residential receivers, understood to be flats above commercial units at 36 & 37 Taff Street. These limits are based on requirements of BREEAM Pol 5;

- Daytime (0800-1800hrs) $45\,\text{dB}(A)\,L_{A_{eq}}$
- Daytime Extended (0700-2300hrs) $45\,\text{dB}(A)\,L_{A_{eq}}$
- Night (2300-0700hrs) $40\,\text{dB}(A)\,L_{A_{eq}}$

The above limits shall be met with all plant operating normally, allowing for additive effects of services plant serving buildings A, B & C combined, and therefore a suitably qualified acoustic consultant (MIOA and/or ANC member) shall be employed to assess overall emissions.

4.0 External Building Fabric

4.1 Traffic Noise Break-In

Referring to results of our environmental noise survey (report dated 6/1/17), and internal noise criteria detailed above, the following External Building Fabric sound reduction performance is indicated to meet internal noise criteria detailed above;

Roof: 45dB $R_w$  
Walls: 50dB $R_w$

Glazing:

<table>
<thead>
<tr>
<th>Location</th>
<th>Sound Reduction Index ($\text{SRI: BS EN ISO 140}$) at Octave Band Centre Frequency (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Street Façade and first 10m of returns &amp; Fitness Suite curved glazing overlooking Taff Street</td>
<td>24 24 32 37 37 44</td>
</tr>
<tr>
<td>Remaining Facades</td>
<td>20 18 28 38 34 38</td>
</tr>
</tbody>
</table>

The successful tenderer shall provide independent laboratory test data confirming their proposed glazing system (including frames/seals) meets the quoted performance requirement.

For initial budgetary guidance based on Pilkington database figures, the Bridge Street specification should be met by 10/12/6 glazing, remaining facades – 6/12/6 glazing. (We recommend the higher spec’ glazing is also included on the curved glazing section to the Fitness area to control music break-out – see below).
4.2 Music Noise Break-out

It is proposed to control music break-out levels to 10dB below the existing ambient noise levels ($L_{Aeq,7}$). The following criteria are proposed based on levels measured at Position A during our noise survey:

- **Daytime** (0800-1800hrs) $50dBA$ $L_{Aeq}$
- **Daytime Extended** (0700-2300hrs) $45dBA$ $L_{Aeq}$
- **Night** (2300-0700hrs) $40dBA$ $L_{Aeq}$

*These criteria to be confirmed acceptable with EHO/Planners.*

The following limiting music noise level spectrum is to apply in the Gym, Multi-function and Fitness Areas – equates to an overall $80dBA$ limit.

<table>
<thead>
<tr>
<th>$L_{Aeq,5mins}$</th>
<th>Leq at Octave Band Centre Frequency, Hz (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63</td>
</tr>
<tr>
<td>80</td>
<td>85</td>
</tr>
</tbody>
</table>

NB. High-end sound systems tend to generate high levels of low frequency (via sub-woofers). The above limiting spectrum means this performance cannot be utilised.

External Glazing to Fitness Area: The higher 10/12/6 double glazing sound insulation performance specification applies for the curved section of glazing to the Fitness Area overlooking Taff Street to control music break-out.

4.3 Roof

Minimum airborne sound insulation performance: $45dB$ $R_w$

Maximum rain noise sound intensity: $50dB$ $L_{IA}$

The successful roof supplier shall provide independent laboratory test data confirming the above limits are met.

We would also recommend considering a sound absorptive finish to the underside of the roof in building C where no suspended ceiling is proposed (Fitness Areas and top floor of Library) – typically a suitably faced mineral wool behind perforated timber/plasterboard finish between the Glulam Beams (as used on Cardiff Library).

Alternatively (or in addition), sound absorptive rafts can be included (often as part of a suspended lighting raft system) – the supplier should be able to give an estimate of number/area to meet reverberation time criteria in section 3.1 of this report, noting the top floor areas in question are HIGH. It may be necessary to include some wall sound absorptive panels in addition to the ceiling/raft treatments in the high Library space in particular.
5.0 **Internal Building Fabric**

5.1 **Floors**

45dB $D_{nTw}$ should be achieved by a 150mm profiled concrete deck (250kg/m$^2$ mass per unit area).

48dB $D_{nTw}$ – include a 38dB Class A $D_{nfw}$ lay-in grid ceiling below a minimum 300mm ceiling void to uprate the floor performance (in conjunction with the 53dB $D_{nfw}$ curtain walling upgrades).

5.1.1 **Free Weights Area.**

We recommend avoiding free weights in a mixed use building on upper floors in particular – Resistance type weight machines recommended.

The following is a best practical means option to attenuate noise from free-weights.

Locate Free Weights area in the 2$^{\text{nd}}$ floor fitness suite as far as practical from the critical Multi-function room on the floor below, and away from the Party Wall to the Library (the inclusion of noise breaks in the form of offices etc. along the party wall should help with this).

Install a jack-up floating concrete floor section in the free-weights area, as shown in the image and sketch below;

![Diagram](image)

Mason UK Ltd have a lot of expertise in this exact application (installing in free-weights areas of gyms).

- Mason UK Ltd  (Mr Roger Hughes)  Tel: 01252 716610

A typical build-up would be 100mm thick concrete with a minimum 50mm air gap with 25mm deflection springs, (Budgetary estimate £250-300 per m$^2$ installed).

Mason UK Ltd would be able to provide final specifications along with an installation quote upon receipt of drawings.

**Note:** Any added weight onto the existing floor would need to be confirmed acceptable with a suitably qualified structural consultant.
5.2 Walls

Figures 4366/F1 – F3 show marked up floor plans with the recommended on site wall sound insulation performance requirement. All partitions shall be full height slab-slab or slab to roof.

We are relying on the back-up area noise breaks to control noise transfer between Spin/Fitness and the Library. Walls between Spin/Fitness and back-up areas/corridors/stairwells: DnTw45 (can be reduced to DnTw35 where they include an access door. Access doors to meet Rw29 laboratory rating including frame and seals.

**Fitness to Library (high level):** Recommend re-locating consulting room to keep a noise break between the potentially noisy fitness area and library.

**Multi-Function to Spin:** 48dB DnTw High performance stud wall (including a 53dB Dnfw flanking curtain wall). There may need to be some scheduling of use between the Multi-function ( sometime Religious use) and the Spin area if amplified music is used in Spin area. Headphones could significantly reduce this risk.

**Multi-Function to Back-up/changing areas:** 48dB DnTw High performance stud wall (including a 53dB Dnfw flanking curtain wall), reduced to 35dB DnTw for short section of wall adjacent to Rw30 access door

**Spin to Café:** Glazed Wall at High Level: Rw40 glazing system to achieve DnTw35 on site. Predicted levels in Café around 50dB(A) (from 80dB(A) source music level), should fall within the 40-45dB(A) range in the closest library areas open to the Café. Again using headphones in the spin area reduces this risk.

**Walls between Consult/Appt Rooms in Library:** DnTw45 between rooms, DnTw35 (Rw40 rated glazed system) to main library space with Rw30 rated access doors (including frame/seals). This means there will be limited privacy between Consult Rooms and Library / Exhibition space areas – the Client may wish to consider incorporating a lobby/access corridor if improved acoustic separation is required.

**Community & Reference Rooms:** DnTw35 partitions with Rw30 rated access doors – limited privacy – not assessed critical spaces – Client to confirm.

**IT/Education Room to Library:** DnTw35 wall with Rw30 access door limited separation with presence of a door.

Uprated DnTw40 partition with Rw35 access door as a minimum if audio-visual presentations proposed in the IT/learning space, recommended solution – include lobbied access doors.
6.0 Building Services

A full review of building services noise and vibration is to be carried out when plant details are available/received. The following advice is included for initial design and budgetary guidance. The HVCA and CIBSE guides also give general guidance on duct/pipework design and insulation.

6.1 Plantrooms

Preliminary advice:
R\text{w}50 walls, with R\text{w}30 doors (including frame/seals).
Do not mount plant or associated duct/pipework on lightweight wall sections. Services (including ducts and cable trays) should not pass through critical separating walls. Route along communal corridors with spurs into critical areas over/adjacent to access doors.

Risers: R\text{w}45 walls with solid core doors (28kg/m\textsuperscript{2}) including rebated compressible neoprene seals to head threshold and jambs.

6.2 Ceiling Void Units to Critical Receiver Spaces

Do not include ceiling void AHUs, HRV or local fan units in critical areas – in particular the Library and Multi-function room.

Based on past experience VRV/VRF units can be included for cooling running at low/med speeds, however do not rely on manufacturer’s quoted NR or dB(A) figures as they are very optimistic.

Initial Guidance: It is not unusual for manufacturers to quote overall dB(A) levels at 3m ‘free-field’, which in our experience are around 8dB optimistic in a typical on-site situation. E.g. to meet 40dB(A) with ceiling void unit running in a large room (Library/gym/fitness), a unit rated at 32dB(A) is likely to be required, assuming a lay-in grid mineral fiber tile ceiling below the unit.

Suppliers should be made aware at the outset that independent test data will be required to confirm in duct and casing radiated octave band sound power levels – measured to BS 4856-4:1997.

With no suspended ceiling at top floor level, the use of ceiling void units potentially becomes impractical.

6.3 Roof Mounted Plant

For proposed lightweight roofs, roof mounted plant should be kept to a minimum. It is not unusual to include individual smaller AHUs and fans on lightweight roof sections provided they are not located directly above critical spaces and are fully isolated.
6.4 AHUs, HRVs, local fans

For budgetary guidance allow both room-side and atmospheric silencers for AHU’s, HRVs and local fans.

6.5 Lifts

A low-noise lift should be used, including a volume limiter on lift announcements as these frequently cause annoyance. Lift installation shall be fitted with adequate vibration isolation to control transmission of structure-borne noise.

Include masonry shaft with independent wall lining system to critical adjacencies including community & reference rooms (2 x 12.5mm acoustic plasterboard on 50mm stud spaced 20mm off masonry shaft, with 50mm mineral wool in cavity).
7.0 Summary

The above gives an acoustic overview of Building C at the Taff Vale Redevelopment site.

A detailed assessment of Building Services is to be carried out as soon as we receive details of plant and services layout drawings. Initial advice on considerations for the services design has also been included in this report.

Prepared by:

David Hunter
BSc(Hons) MSc MIOA
Hunter Acoustics

Checked by:

Paul McGrath
BSc(Hons) MIOA
Hunter Acoustics
Appendix A – Acoustic Terminology

Noise Levels:

Human response to noise depends on a number of factors including; Loudness, Frequency content, and variations in level with time. Various frequency weightings and statistical indices have been developed in order to objectively quantify 'annoyance'. The following units have been used in this report:

- **dB(A)**: The sound pressure level weighted to correspond with the frequency response of the human ear, and therefore a person's subjective response to frequency content.

- **L<sub>eq</sub>**: The Equivalent continuous sound level is a notional steady state level, which over a quoted time period would have the same acoustic energy content as the actual fluctuating noise measured over that period.

- **L<sub>max</sub>**: The highest instantaneous sound level recorded during the measurement period.

- **L<sub>90</sub>**: The sound level which is exceeded for 90% of the measurement period. E.g. The level exceeded for 54 minutes of a 1 hour measurement - used as a measure of background noise.

Sound Insulation:

Sound insulation through partitions varies with frequency – with less performance at low frequencies, greater performance at high frequencies. Sound insulation tests are carried out at third octave intervals across the frequency range. However for ease of reference, single figure weighted rating numbers are usually quoted, calculated from the third octave results.

- **R<sub>w</sub>**: The weighted sound reduction index of a construction element is the sound reduction index obtained in a laboratory meeting the requirements of relevant standards. It is measured in the absence of flanking paths.

- **D<sub>nTw</sub>**: The weighted standardised level difference across a separating construction measured on site. It is normalised to the corresponding maximum receiving room reverberation time, and includes flanking contributions at junctions with adjacent walls/floors/windows/doors.

- **D<sub>nFw</sub>**: Similar to D<sub>nTw</sub> but a measure of the flanking transmission path typically for curtain walling around separating walls/floors. It is also quoted as the measure for double pass sound attenuation for suspended ceilings (via the open ceiling void).

- **L<sub>nTw</sub>**: The weighted standardised impact noise level across a separating floor measured on site.
Figure 4366/F1: Key to Wall Types

Wall performance key, $D_{\text{ntw}(\text{max}),w}$ (dB)

- **DnTw 55**
  - **STUD** Siniat RSP023: C Stud Partition rated at Rw 69dB, overall thickness 300mm. Twin GTEC CS90W C Studs at 600mm centres with 2x15mm GTEC dB Board both sides, 100mm 10kg/m³ glass mineral wool with GTEC V-Brace at 3000mm centres + extension.
  - **MASONRY** 100mm dense concrete block core with 2x15mm GTEC dB Board independent wall linings each side on 500mm stud spaced a minimum of 20mm off the core wall, include 50mm mineral in wall cavities.

- **DnTw 50**
  - **STUD** Lafarge RMP 140: C Stud Partition rated at Rw 58dB, overall thickness 150mm. GTEC CS90Rx C Studs at 600mm centres with 1x15mm GTEC dB Board (inner) and 1x15mm GTEC Megadeco Board (outer) both sides, 50mm 16kg/m³ glass mineral wool
  - **MASONRY** 215mm dense concrete block (2000kg/m³) with 13mm dense plaster/render both sides

- **DnTw 45**
  - **STUD** Siniat RMP 050: C Stud Partition rated at Rw 56dB, overall thickness 120mm. GTEC CS70Rx C Studs at 600mm centres with 1x9.5mm GTEC Standard Board (inner) and 1x15mm Megadeco Board (outer) both sides, 25mm 16kg/m³ glass mineral wool in cavity
  - **MASONRY** 215mm dense concrete block (2000kg/m³) with 13mm dense plaster/render both sides

- **DnTw 40**
  - **STUD** Siniat RMP 003: C Stud Partition rated at Rw 49dB, overall thickness 100mm. GTEC CS70Rx C Studs at 600mm centres with 1x15mm GTEC Megadeco Board both sides, 25mm 16kg/m³ glass mineral wool in cavity
  - **MASONRY** 100mm dense concrete block (2000kg/m³) fair faced

- **DnTw 35**
  - **STUD** Siniat RMP 001: C Stud Partition rated at Rw 40dB, overall thickness 100mm. GTEC CS70Rx C Studs at 600mm centres with 1x15mm GTEC Megadeco Board both sides
  - **MASONRY** 100mm medium-dense concrete block (1400kg/m³) fair faced

Note:
Manufacturer’s laboratory measured Rw ratings are selected around 7dB higher than the required on-site Dntw performance quoted above.
Figure 4366/F2: Ground Floor Partitions
Figure 4366/F3: 1st Floor Partitions
Figure 4366/F4: 2nd Floor Partitions
**Figure 4366/F5: Duct/ Pipe Penetration Detail through Stud Partition**

- **Stud partition**
- **Mineral wool sleeve (150kg/m³)**
- **Non-hardening mastic seal**

75mm x 65mm x 16swg loose flange fully bedded all round in non-hardening mastic

**Duct/ Pipe Penetration Detail through Masonry Wall / Concrete Floor**

- **Hole made good with heavy grout/mortar or concrete**
- **Mineral wool sleeve (150kg/m³)**
- **Non-hardening mastic seal**

15/25mm Wall/slab
Figure 4366/F6 - Cable Tray Penetration Detail

Note: Cable trays should be taken along corridors with branches into rooms over access doors.