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Design Review Report

Design Review for:	Liam Watford HOP Architects Ltd Cell 12, Cell Block Studios Main Rod H M Naval Base Portsmouth PO1 3LJ	
Report By:	Air Pressure Testing Ltd Sayells Farm 7 Harlington Road Upper Sundon Bedfordshire LU3 3PE Telephone: 01525 303905 E-mail: info@airpressuretesting.net	
Project ref & APT Contract Number:	5 -7 Station Rd, Hayling Island, Hampshire, PO11 0EA	
Date:	18 th August 2022	
Signature:	Author:	Mr Darren Helliwell
	Signed:	<i>Darren Helliwell</i>





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1. The Development & Project Brief

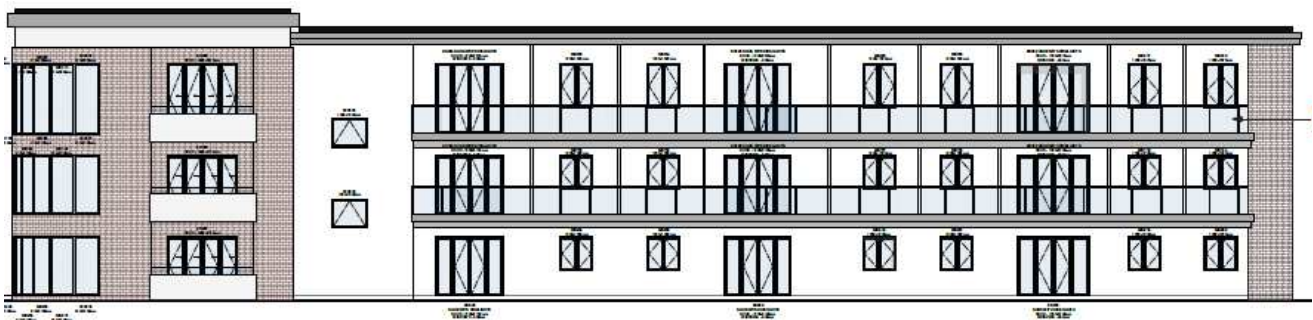
The new development is located at 5-7 Station Rd, Hayling Island, Hampshire, PO11 0EA.

The project contains a new apartment block containing 19 flats and 2 commercial units. There are 2 commercial units and Flats 1-5 located on the ground floor, Flats 6-13 on the 1st floor and Flats 14-19 on the 2nd floor. The apartments share common wall and floor partitions. The commercial units also share party wall and floor with the residential units.

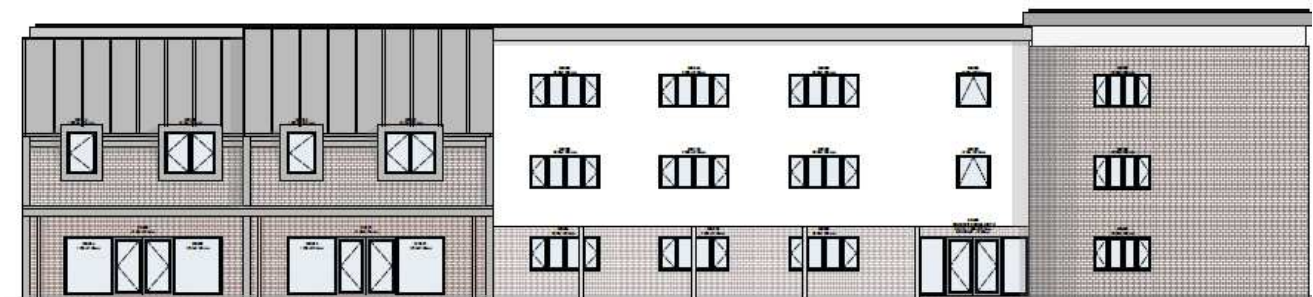
The client Liam Watford or HOP Architects Ltd, has requested an acoustic design review be undertaken to ensure the party walls and floors meet the minimum requirements of Approved Document E for a 'new build' project.

On a new build project Approved Document E stipulates the wall partition needs to achieve a minimum of 45dB for airborne noise. On party floors you need to achieve 45dB for airborne noise and 62dB for impact noise.

The client has requested we undertake an above and below joists acoustic solution to improve the airborne and impact sound insulation through party floors.



Proposed South Elevation @ 1:100



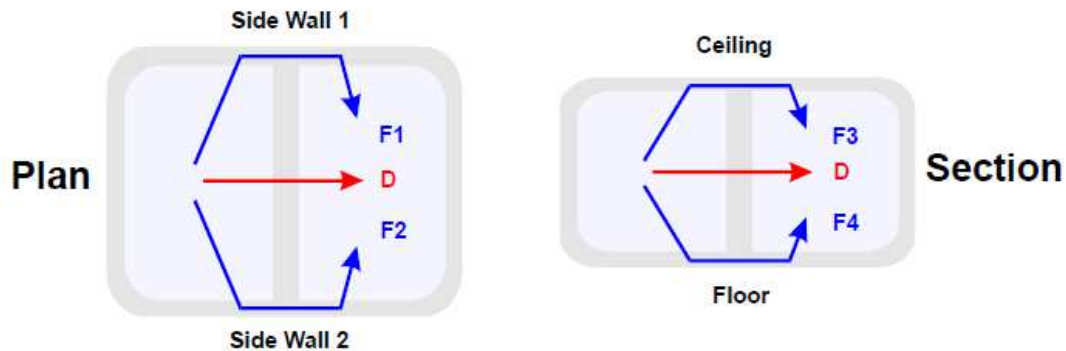
Proposed North Elevation @ 1:100



2.0 Technical Introduction

The sound insulation between two rooms is made up of the sum of the direct path and any flanking paths between two rooms. Plate 1 below indicates some of the flanking paths between rooms.

Plate 1 – Transition Paths between Two Rooms



Where D is the direct sound test path, F1 Flanking via the sidewall 1, F2 Flanking via the sidewall 2, F3 Flanking via the ceiling, F4 Flanking via the Floor

In other words, the sound insulation between two spaces is not only dependent upon the construction of the separating wall or floor, but the levels of separation provided by the building structure and the sound insulation across details.

2.1 Terminology

The words 'separating wall/floor' and 'party wall/floor' are regular used throughout this document. Their meanings are identical and refer to walls and floors which separate a flat/residence.



2.2 Acoustic Performance Standards of Approved Document E

Approved Document E (ADE) provides acoustic performance standards which must be achieved when refurbishing or developing new residential buildings. A summary of the requirements of ADE are shown in the table 1 below.

Table 1: Performance Standards for walls, floors and stairs that have a separating function.

Separating Element	Airborne Sound Insulation $D_{nT,w} + C_{tr}$ dB (Minimum values)	Impact Sound Insulation $L'_{nT,w}$ dB (Minimum values)
Purpose Built Dwellings		
Walls	45	—
Floors and Stairs	45	62
Dwelling-houses and flats formed by material change of use		
Walls	43	—
Floors and Stairs	43	64

Purpose Built Rooms for Residential Purposes		
Walls	45	—
Floors and Stairs	45	62
Rooms for Residential Purposes by Material change of use		
Walls	43	—
Floors and Stairs	43	64

2.2 Summary of performance requirements of ADE applicable to this development.

Separating Element	Airborne Sound Insulation $D_{nT,w} + C_{tr}$ dB (Minimum values)	Airborne Sound Insulation $L'_{nT,w}$ dB (Minimum values)
Purpose Built Rooms for Residential Purposes		
Walls	45	—
Floors and Stairs	45	62



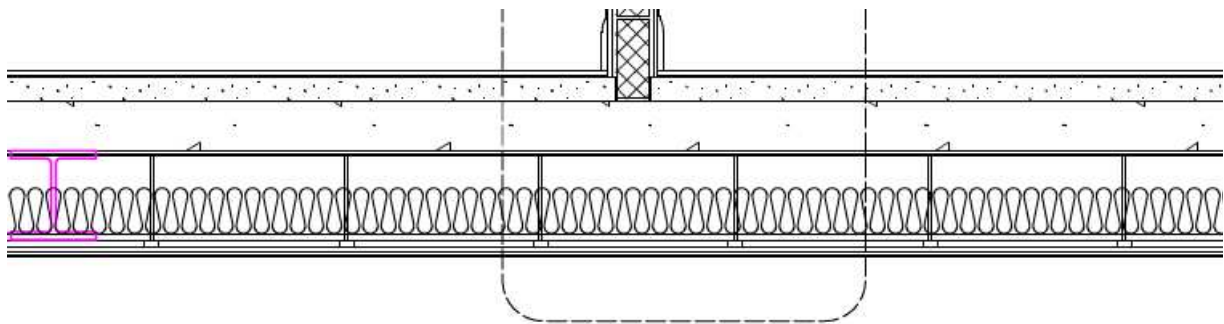
3. Proposed Party Floor Construction

3.1.1. Proposed Party Floor Construction

The proposed party floor will be constructed from 150mm CBS precast hollow core concrete plank. Above the plank a Regupol 4515 acoustic later will be installed, then to the top of the Regupol 70mm fibre reinforced screed. To the top of the screed 5mm flooring underlay or DRITA 25 matting.

Below the precast planks, a BG CasoLine MF suspended ceiling system will be installed allowing for a 300mm ceiling void. Within the ceiling void install RW45 acoustic wool or similar. Two later of 12.5mm soundboard should be installed to the bottom of the MF frame. It assumed that the mass per unit area of the new floor construction is a minimum of 365kg/m².

Plate A –Proposed Party Floor Detail



Proposed First Floor Build-Up:

- Floor finish (tbc by client)
- 5mm Flooring underlay OR DRITA 25 matting,
- 70mm Fibre reinforced screed,
- Regupol 4515 acoustic layer,
- 150mm CBS Precast hollow core concrete plank,
- 100mm Mineral wool insulation within cavity,
- BG CasoLine MF suspended ceiling system (300mm cavity),
- 2x12.5mm Gyproc Plasterboard ,
- 3-5mm skim coat (paint finish tbc by client)

**Commercial Unit
60m²**

**3.1.2 Comments on 1st & 2nd Floor Treatment**

It is important to decouple the bottom of the ceiling construction from the structural floor steel/s, as this may become a noise flanking point. Due to the lightweight nature of the internal perimeter walls it's important to maintain the break between the internal envelope (perimeter) wall, via the precast planks and party walls with associated cavities.

All materials should be installed in-line with manufactures guideline. Taking the above comments into consideration the above floor detail should meet the requirements of approved Document E for Airborne (45dB) and Impact (62dB) sound reduction as it should have sufficient mass and/or isolation to prevent excessive airborne & impact noise transmission through the floor partition.



3.2.1. Proposed 1st Floor Balcony Construction

It is proposed to construct the 1st floor balcony using the detail shown in Plate B below.

Looking at the detail, it would be worth adding a 100mm layer of RW45 acoustic wool into the ceiling void – to stretch from the structural steel to the external wall cavity batt.

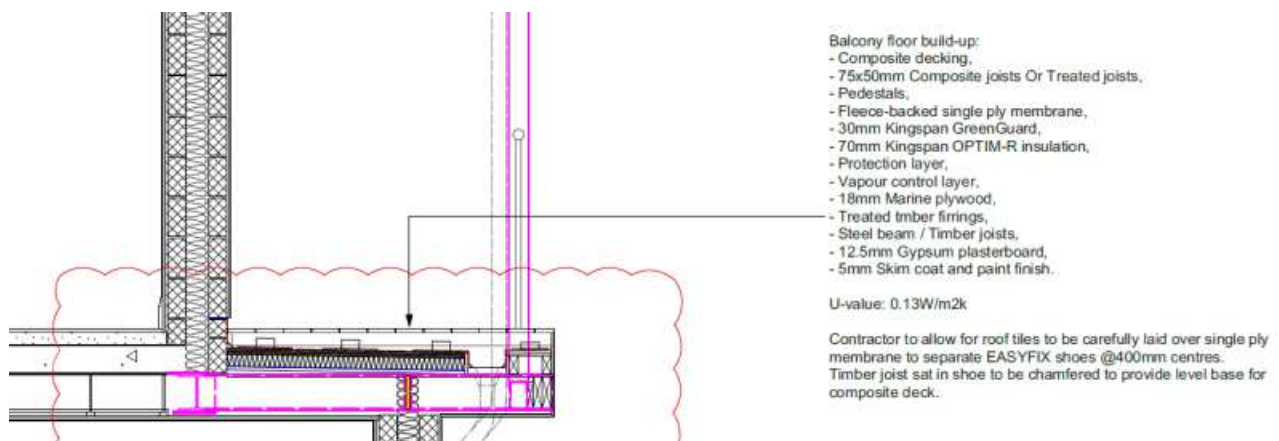
It would also be worth adding extra resilient bars within the rooms where you have the balcony details, so you can decouple the ceiling construction from the balcony construction above.

Please ensure the ceiling construction doesn't touch the structural steels as this may lead to noise flanking.

Also, it would be best to look at acoustic pedestals – such as:

<https://www.roofgiant.com/adjustable-pedestals/raptor-acoustic-base-plate/> - please check with the manufacturer for their suitability

Plate B - Proposed 1st Floor Balcony Detail



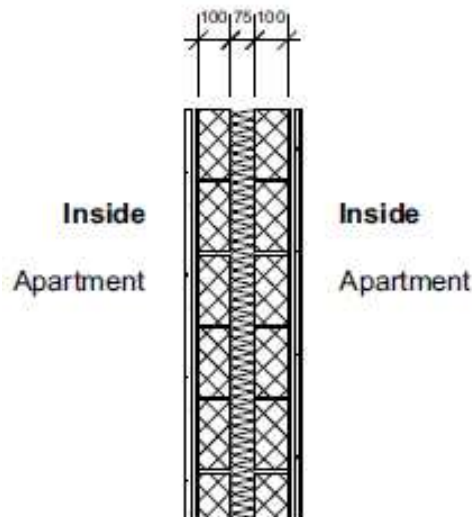


4.0 Proposed Party Wall Construction

4.1.1 Proposed Party Wall Construction - Type IW2

It is proposed to construct the party walls out of a masonry cavity wall – as shown in plate A below. Essentially the wall will be constructed from 2 x 100mm dense concrete blockwork (min mass of 1850kg/m³) with a 75mm cavity (which will be run continuously into the envelope wall cavity). Within the cavity 75mm Earth Wool Acoustic insulation will be installed. to each side of the wall an 8mm sand cement render will be applied to the blockwork. A 12.5mm plasterboard will be applied via dot & dab to the render. The wall will be completed with a 3.5mm skim and paint finish.

Plate C - Proposed Party Wall Detail (Type IW2)



Type IW2 Internal Party Wall between Apartments

- 3-5mm Skim coat and Paint finish,
- 12.5mm Gyproc Wallboard Plasterboard (min. 8kg/m²),
- 15mm dot and dab,
- 8mm Sand:Cement Render with scratch finish*,
- 100mm 7.3N Dense Aggregate Blockwork,
- 75mm Knauf Earthwool Acooustic Insulation Roll or equivalent approved*** within cavity,
- 100mm 7.3N Dense Aggregate Blockwork,
- 8mm Sand:Cement Render with scratch finish*,
- 15mm dot and dab,
- 12.5mm Gyproc Wallboard Plasterboard (min. 8kg/m²),
- 3-5mm Skim coat and Paint finish,

Fire resistance : 60mins

Acoustic rating : Dntw+Ctr 45 dB

*** Typical render mix 1:1:6 to 1:1/2:4.**

***** Acoustic insulation to meet a min. 0.035W/mK Thermal Conductivity.**



4.1.2 Party Wall Construction Notes

- Ensure the party wall cavity is free of mortar etc. to prevent bridging.
- Ensure damaged masonry is not used during the wall construction.
- Ensure all masonry joints are full.
- Ensure masonry at key junctions is constructed within the correct tolerances.
- Ensure the wall is constructed in stretcher bond with minimal straight joints.
- Ensure acoustic wall ties are used on the party wall construction.
- Ensure the acoustic insulation fits tightly together.
- Ensure sockets are not placed back-to-back – allow a minimum 450mm stagger.
- Avoid chasing/holes wherever possible.
- Try and provide 650mm between windows, doors and vents across party walls

4.1.3 Comments on Party Wall Treatment - Type IW2

The party wall is to be built in strict accordance with manufactures guidelines. It is essential that sockets are not places back-to-back within the walls as highlighted in Section 6.3 of this report.

Taking the above information into account, the proposed wall treatment should meet the requirements of approved Document E for Airborne reduction (45dB) for a new build project, as it should have sufficient mass and/or isolation to prevent excessive airborne noise transmission through the wall partition.



5.0 Reverberation Treatment to Corridors and Stairwells

The objective of acoustic treatment in corridors is to absorb sound so that it does not interfere with the adjacent rooms. ADE (Regulation E4) does not nominate a reverberation time target for corridors but instead recommends that the amount of additional absorption should be calculated as shown the following methods:

- **Method A:** Corridors should include an area equal to or greater than the floor area, with a class C absorber or better. It will normally be convenient to cover the ceiling with the additional absorption. For stairwells, calculate the combined area of the stair treads, upper surface of the intermediate landings, upper surface of landings (excluding ground floor) and ceiling area of the top floor. Either, cover at least an area equal to this calculated area with Class D absorber, or cover an area equal to at least 50% of this calculated area with C Class absorber or better.
- **Method B:** This comprises of calculating the total acoustic absorption within the common spaces, which allows for the acoustic absorption from carpeted floors and other similar acoustically absorptive surfaces. For corridors a minimum of 0.25m² of total absorption per cubic metre of the volume is required.

Two other possible solutions for large board systems (both class C rated) are:

- Gyptone 45 Quattro 45.
- Rigitone8/18 and above.

Section 7 of Building Regulations Part E, stipulates that a Class C absorber be used in the construction



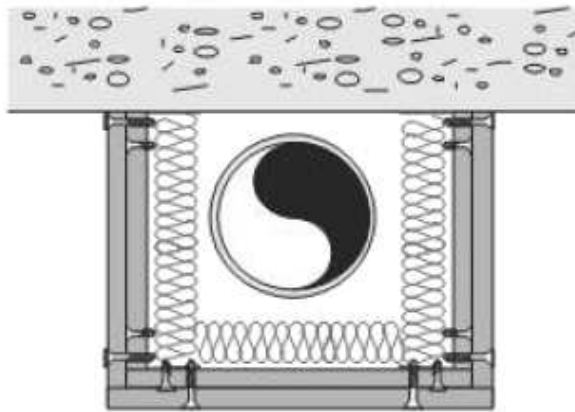
6.0 General Acoustic Details

6.1 Waste Water Pipes

Rainwater and other water-based services must be boxed in using two layers of plasterboard with a mass per unit area of at least 10kg/m² and filled with mineral wool, as shown in Figure 12 below. To avoid sound flanking through the services, the gaps around the pipe should also be sealed as best as possible prior to the boxing being installed. This may be done using a fire collar as required by other disciplines.

Bends within pipe work should be as gradual as possible and sudden 90° angles will create additional unwanted noise and should therefore be avoided where possible - as shown in Plate D below.

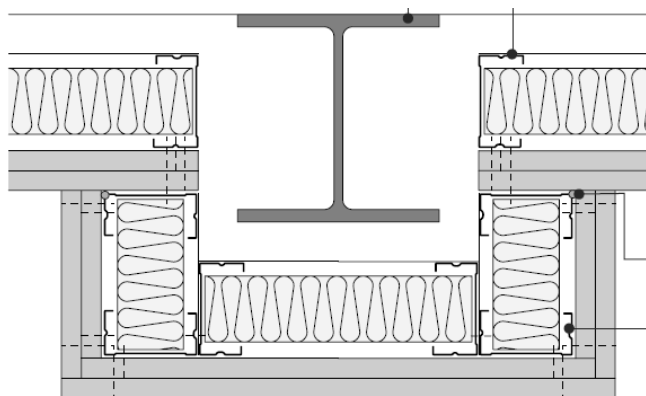
Plate D - Wastewater Pipe Boxing Detail



6.2 Linings around Steel Columns

Apply a sound boards lining (2 boards if possible) to the one side of the Gypframe framework and then install an Isover 50mm Steel Infill, to form an independent lining to structural steel columns – as shown in Plate E below

Plate E - Linings around Steel Columns





6.3 Electrical Outlets

Never put outlets back-to-back - as shown in plate L below. Always position outlets in separate stud cavities and always seal the outlets well with acoustical caulk. Install an acoustical pad such as Rockwool/Intumescent Putty Pads around the outlet - as shown below in Plates F & G below.

Plate F - Electrical Outlet Detail

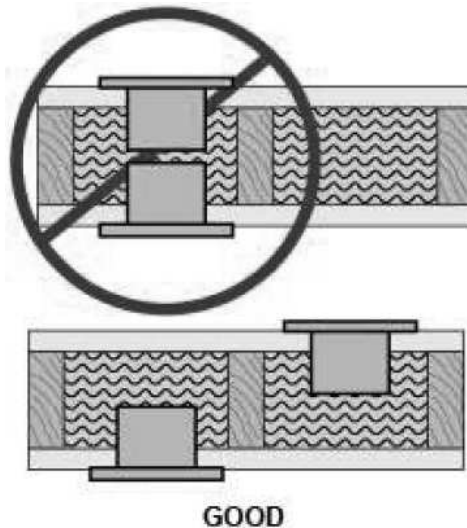
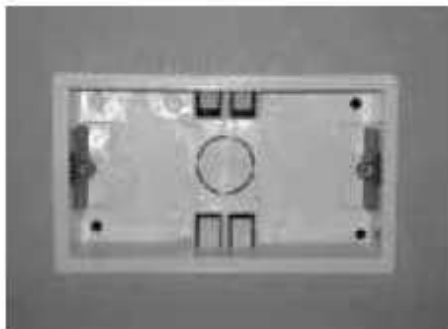


Plate G - Intumescent Putty Pads



Switch box before
installation of Putty Pad



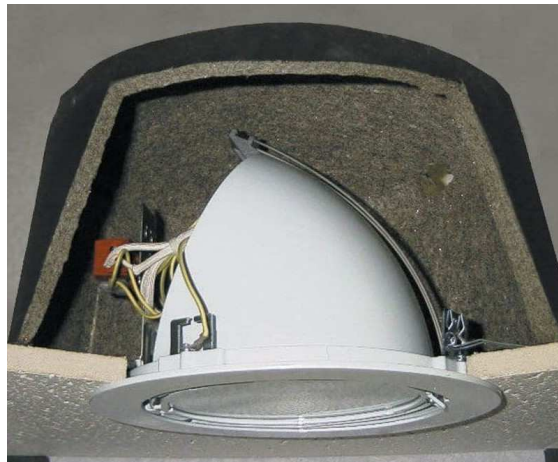
Putty Pad installed
inside switch box



6.4 Acoustic Downlight Covers

If ceiling downlights are going to be installed within the ceilings to party floors, Acoustic Downlighter Covers should be installed. Acoustic covers help to reduce acoustic transmission through the ceiling as well as helping to prevent fire from penetrating your ceiling void – as shown in Plate H Below

Plate H - Acoustic Downlight Covers



7.0 General

The sound insulation performance predictions and advice provided in this document assume that there will be no major faults in workmanship regarding the acoustic detailing of the party elements proposed in this development. Please refer to manufacturers guidance when regards to the selected materials and type of construction. Adequate site supervision should be incorporated throughout the construction to ensure manufactures installation guidelines are followed at all times.

8.0 Conclusion

The acoustic requirement for the party wall and floor at 5-7 Station Rd, Hayling Island, Hampshire, PO11 0EA, has been assessed and the subsequent acoustic design detailing addressed. The acoustic design detailing shown within this report should be adequate to meet Building Regulations Part E for a conversion property. To comply with Part E of the Building Regulations the floor partition will need to achieve a minimum sound reduction of >45dB for Airborne noise and <62dB for Impact Noise.

It is extremely important that extra care and attention should be shown during the installation of the remedial acoustic treatments and should be in strict accordance with the manufacturer's details/guidelines. Special care should also be given at all wall/floor & wall/ceiling junctions to ensure wall and ceiling elements do not touch and acoustic sealant be used on the 5mm gap at the ceiling/floor to wall junction.

All advice is given in good faith. The nature of acoustics science is such that many variables exist at any given time, both related and unrelated to each other, which are further affected by circumstances both obvious and otherwise. This notwithstanding Air Pressure Testing LTD will always endeavour to understand the circumstances for what they are, using both technology and experience to offer the best advice possible. However, advice of this nature can never be regarded as definitive and as such Air Pressure Testing Ltd cannot accept responsibility for any failure to meet the relevant performance. All products and materials should be installed as per manufacturers' recommendations, unless otherwise specifically stated.

Please note this report only includes for the acoustic design element of the build and does not encompass any other elements such as structural, thermal and/or fire stopping details. Is also the customers responsibility to check that all finishing's are compatible with the proposals within this report.

This report has been collated solely for the use of our client Mr. Liam Watford of HOP Architects for their project at 5-7 Station Rd, Hayling Island, Hampshire, PO11 0EA.

Please note this report should not be used on other projects and is subject to copyright.



9.0 Purchasing the Products

The nearest branch to your project is in Portsmouth, the full address is:

SIG Portsmouth
Roofing Centre (Off Moneyfield Lane)
Copnor Rd
Portsmouth
PO3 5AY

Phone: 02392 690214



Appendix A – General Items

In addition to the above items the following should also be considered:

- Ensure there are no service penetrations passing through party walls.
- Ensure new block-work has a minimum mass of 180kg/m^2 and all mortar joints are fully filled to all new and existing masonry.
- Seal all services or penetrations passing between floors using manufacturer's guidelines. Ensure any penetrations cut through the floor, ceilings and walls are no more than 10mm greater than the actual pipe dimension. Ensure this is then fully filled with acoustic mastic.
- Ensure all concrete floors have a minimum mass of 2400kg/m^3
- Ensure site personal are suitably trained in the installation of the acoustic system.
- Ensure all ceiling board joints sealed with tape or caulked with sealant?
- Are service pipes wrapped in quilt and boxed in with two layers of nominal 8 kg/m^2 gypsum-based board, with adequate laps so there are no straight joints running through both layers?
- Ensure that any perimeter strips are incorporated into all pipe boxing, i.e. it doesn't stop at the internal wall/boxing junction.
- Ensure all flanking strips are installed as per manufactures guidelines.
- Ensure all floating floors are installed as per manufactures guidelines
- Ensure any block-work inner leaves are adapted to the external (flanking) walls and they are of the correct density, i.e. avoid lightweight blocks.
- Is the absorbent material un-faced mineral wool batts; or quilt of appropriate density and thickness?
- Insure all acoustic batts or quilt is fitted together tightly.
- Ensure all plasterboard joints in the wall lining are staggered.
- Is separating wall lining correct mass per unit area on both sides?
- Are all joints sealed with tape or caulked with sealant?
- Is separating wall satisfactorily complete?

The comments made in conjunction with the existing details whilst in theory will provide the required sound insulation; the standard of compliance with the details during the construction phase will have a substantial impact on the end result. Of particular importance are making sure that the installation of the relevant acoustic treatment System, is not compromised due to poor workmanship during the installation process.



End of Acoustic Review