

Project name	Weldale Street Reading		
Design note title	Sound Insulation Between Gym and Flats		
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1. INTRODUCTION

Hydrock Acoustics has been appointed by Henry Construction to carry out a noise impact assessment for the proposed development at Weldale Street, Reading, relating to the ancillary gym. This note presents the gym noise mitigation measures to demonstrate compliance with Planning Condition 50 (ref. 191974), as follows:

"Prior to the first occupation of the ancillary gym use hereby approved, a noise assessment shall be submitted to and approved, in writing, by the Local Planning Authority. The noise assessment shall include an assessment of the noise environment within the unit and inclusion of any required mitigation measures (including to the internal structure of the unit itself) to protect nearby occupiers from noise and disturbance, including structure borne noise. The scheme itself shall be designed, specified and constructed so that the sound insulation performance of the resultant structure is such that the indoor ambient noise levels within adjoining and nearby premises do not exceed the appropriate values for the use of the premises detailed in Table 4 of BS 8233:2014 as a result of noise from the ancillary gym and the impact noise does not cause disturbance to occupier of residential units. Thereafter, the development shall not be carried out other than in accordance with the approved scheme which shall be completed before the first occupation of the ancillary gym use, and retained/maintained thereafter."

The development on Weldale Street, Reading comprises buildings of between four and eleven storeys to provide 422 apartments. The buildings will include an ancillary gym on the ground floor for use by residents only.

2. CRITERIA

It is proposed to control noise from the gym to below NR20 in the flats above. This is a more onerous limit than the design noise levels from Table 4 of BS8233:2014, as stipulated by Planning Condition 50. A more onerous limit is considered necessary to provide a good level of protection to residents and allow the gym to operate with the minimum restrictions.

A design has been developed which can control noise of up to 83 dB L_{Aeq} in the gym to below NR20 in the flats above. The operational noise of gym equipment and weights equipment is expected to be well below 83 dB L_{Aeq} . However, music in some gyms may approach this level. Note, this is louder than normal background music levels.

3. MITIGATION AND RESIDUAL IMPACT

The sound insulation design of the floor between gym and flats has been considered in the design. Advice on control of noise at source has also been provided to minimise short term noise from weights being dropped etc. Details of the proposed gym noise mitigation measures are provided below.

3.1 Control of Noise at Source

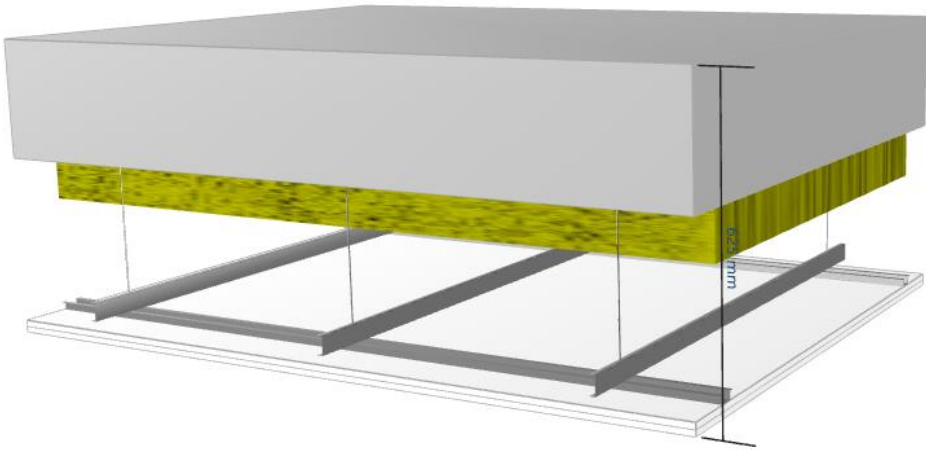
Any installed loudspeaker systems will not include subwoofers. A system comprising a number of small loudspeakers (2-way loudspeakers with largest driver < 15cm) is recommended to limit bass reproduction. Loudspeakers may be free standing or, if mounted to the concrete structure of the building, mounted via suitable resilient mounts.

To control impact sound in the gym, a roll out or tiled rubber flooring solution of 70mm, designed specifically for gym use, will be provided to control impact sound transmitted vertically, through the building structure, to the flats above.

Shock absorbing pads installed to weight machines are also recommended. These can be added to most machines to reduce the noise of a stack of weights being dropped.

3.2 Proposed Airborne Sound Insulation

The ceiling of the gym will be formed of two layers of dense plasterboard (surface mass >10kg/m²) on resilient hangers with a minimum of 100mm mineral or glass fibre insulation (>20Kg/m³) in a 350mm ceiling void. This ceiling is below the 250mm flat reinforced concrete slab which forms the structural floor. The build-up and predicted sound insulation performance is presented below.

Diagram	
Construction	• Finish floor in flats • 250mm RC (min 2400Kg/m³) • 350mm void with 100mm mineral or glass fibre insulation (>20Kg/m³); • 2x12.5mm dense plasterboard (surface mass >10Kg/m²) on metal framing system suspended with resilient acoustic mounts.
Predicted Performance	74 dB R _w + C _{tr} & >60 dB R _{63 Hz}
Comments	Services can be installed within the ceiling void. Service penetrations in the ceiling will reduce the predicted performance but this is allowed for in the design. Nevertheless, services penetrations should be as small as possible and well-sealed. Furthermore, attenuators will be used as close as possible to any penetrations for air handling duct work.

The proposed design is capable of controlling normal gym noise to comfortably below NR20 in the flats above.

The predicted sound insulation between the flats and gym exceeds normal Building Regulations requirements by 15dB to 20dB and is more than adequate to control normal expected noise levels in the gym (including music noise) to below NR20. The additional recommended at source mitigation for weights machines is not required to achieve NR20 but would reduce the audibility of occasional short-term noise from weight drops.