

DDN-AC-028

TO	Nick Whitehouse - FEC Development Management Ltd	FROM	R Marriner – WSP Acoustics
DATE	27 April 2023	CONFIDENTIALITY	Public
SUBJECT	Meadowside – Gym Weight Drop Repeat Measurements		

Introduction

WSP has previously carried out sound level measurements in the flat below the plot 3 residents' gym whilst weights were dropped on the gym floor. These results were presented in WSP memo DDN AC 027, and were subsequently discussed with Manchester City Council's (MCC) Environmental Health (EH) department during a meeting held on 17 February 2023.

Gym users are not permitted to drop weights, and this is clearly stipulated on prominent signs displayed in the gym, as shown below.

Figure 1 Photographs of signs in the gym instructing users not to drop weights



A floating floor has also been installed throughout the gym in order to reduce the potential for noise from all gym activities, and minimise the risk of disturbance in the event that a weight is accidentally dropped (e.g. when putting it down). Since the previous measurements, the developer has arranged for an additional layer of gym mat to be installed in the weights area.

During the meeting held on 17 February 2023, MCC requested that further weight drop tests are undertaken from the residents' gym to the apartment below, following the installation of additional gym mats in the weights area. This memo presents the methodology and results of these additional measurements.

Criteria

The gym does not permit residents to drop weights, and this is stipulated on signs displayed in the gym. However, in recognition of the likelihood that occasionally a weight may be dropped by accident, the floating floor and gym mat offer additional protection in these instances.

It is not possible to compare sound from weights against MCC's *Planning and Noise Technical Guidance* criteria, as they are based on a 5-minute L_{eq} (average) sound level and relate to amplified sound. A one-off weight drop would be insignificant when averaged over a 5-minute period. Therefore, and as these sound levels are expected to be only occasional, they have been compared against a level of 45 dB L_{AFmax} , consistent with advice in the WHO Guidelines¹ on maximum sound levels at night from external sound sources. The gym is not open between 23:00 and 07:00, so this is a robust criterion.

Methodology

Tests were carried out on Tuesday 25 April 2023. The measurement methodology was the same as that used during the previous visit (7 November 2022).

Dumbbells weighing 10, 18 and 26 kg were dropped on the gym mat from a 500 mm height five times each, and the maximum sound levels from each drop were measured in the bedroom of flat B3.01.01 below. The measurements were carried out by two WSP acoustic engineers.

The sound level meter used for the measurements is as follows. Details of the equipment used in November 2022 can be found in DDN AC 027.

Table 1: Summary of Measurement Equipment for April 2023

Item	Make and model	Serial number	Calibration due
Sound level meter	Brüel & Kjær 2250	3123998	3 February 2024
Pre-amplifier	Brüel & Kjær ZC 0032	26900	
Microphone	Brüel & Kjær 4189	3130582	
Calibrator	Brüel & Kjær 4231	2524534	20 February 2024

Results

The results of the April 2023 measurements showed a slight improvement in the typical maximum sound level from the 10 kg dumbbell drops. For the other weights no improvement was noted. Differences between the two sets of results are considered to be within measurement tolerances for the test procedure.

This finding indicates that the floor is already providing a high reduction of impact sound transmission.

Overall, maximum sound levels were typically below 45 dB L_{AFmax} , in line with the guideline criterion.

Subjectively, the engineer considered the sound to not be unduly intrusive, considering the daytime opening hours of the gym.

It is noted that the gym is not a commercial operation and it is operated and managed by the building management company. It is understood that the building's management team is managing the use of the gym so that weights are not dropped, in order to minimise the risk of disturbance.

¹ *Guidelines for Community Noise*, (1999). World Health Organization.