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Cc:

Dear George,

Blossom Street – ANCO GYM MEZZANINE ACOUSTIC Testing

Acoustic tests of the existing gym noise levels received in adjacent apartments, and an assessment of suggested iKoustic noise control products, were undertaken on Friday 12th August 2022 at the Anco and Co gymnasium, Blossom Street, Manchester.

A summary of the measurements undertaken, and a subjective assessment of the improvements afforded is provided below.

Measurements within the apartments were witnessed by Laura Miller of Manchester City Council (MCC), while the music noise levels in the gym and the weight drop tests were witnessed by Lisa Jones of MCC. Drop tests were conducted by Rick Parsons of iKoustic.

Measurements were undertaken in Apartments 4A and 5A on the mezzanine and apartment 13A on the first floor.

Criteria

Manchester City Council's (MCC) requirements for music noise are detailed in their guidance document "Planning & Noise - Technical Guidance", dated December 2015, as reproduced below:

"...a criterion that would achieve a condition of 'inaudible' / 'virtually inaudible' which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be:

'Music noise levels in the 63Hz and 125Hz octave centre frequency bands (Leq) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq), respectively'.

In terms of maximum noise levels due to gym activity, there are no specific criteria. It was therefore agreed that the Local Authority would make a subjective assessment of the perceived noise levels with the various mitigation measures in place.

Airborne Noise

Noise levels of music and instruction were measured in the gym itself, and in the adjacent apartments as described above.

Noise levels in the gym were 80-86dB_{L_{Aeq,T}}, similar to those measured at the commissioning stage. The speakers were crackling at this level, and it appeared that it would not be possible to turn the music levels any higher without damaging the PA system. It is therefore considered that this therefore represents an absolute worst case noise level. The gym operators confirmed that typically noise levels would be lower than this.

With this level used as a noise source, noise levels in the adjacent apartments were as detailed in Table 1, below.

Table 1 – Airborne Noise Transfer, dB_{L_{Aeq,T}}

Apartment	Music Noise Level, dB _{L_{Aeq,T}}	Music, 63Hz, dB _{L_{eq,T}}	Music, 125Hz, dB _{L_{eq,T}}
4A	33	45	39
5A	33	44	38
13A	34	48	37

Music noise was generally inaudible, although the vocal instruction was (just) audible in apartments 4A and 5A, and barely audible in 13A. Background ambient noise levels with windows shut were around 20-25dB_{L_{Aeq,T}}, and around 35dB_{L_{Aeq,T}} with windows open. Hence, instruction was audible over the background ambient noise levels with windows shut.

All noise levels measured were lower than MCC's typical daytime noise level limits of 35dB_{L_{Aeq,T}}, and entertainment noise limits at 63Hz and 125Hz. The measured noise levels exceeded the night-time noise limits of 30dB_{L_{Aeq,T}}.

Therefore, if the gym is used in the night-time period (23:00-07:00h), music noise levels should be reduced by at least 5dB, or more.

Calibration

It has been agreed to calibrate the internal gym noise levels and set a limiter to ensure the calibrated levels are not exceeded. This will be independently undertaken by dBx Acoustics.

The limiter will be installed prior to our visit. The music will be played and instruction undertaken, while noise levels in the gym are measured. This limiter will then be set to operate at a level no higher than 75dB_{L_{Aeq,T}}, based on the minimum reduction required, or a lower level if deemed appropriate for typical teaching levels. A short written report will then be prepared confirming the outcome of the above.

Running Machine Noise

Noise levels of music and instruction were measured in Apartment 4A, along with 4 people running on the running machines (of a total of 8 machines).

The noise level measured in the apartment was $35\text{dB}_{\text{L}_{\text{Aeq,T}}}$, with low frequency noise levels of $52\text{dB}_{\text{L}_{\text{Aeq,T}}}$ at 63Hz and $39\text{dB}_{\text{L}_{\text{Aeq,T}}}$ at 125Hz. Subjectively, the noise transferred was dominated by low frequency running noise.

As runners tend to run in sync with the music, it seems reasonable to assume that when all 8 machines are in use, the overall noise levels would increase by around 3dB – to around $38\text{dB}_{\text{L}_{\text{Aeq,T}}}$, and $55\text{dB}_{\text{L}_{\text{Aeq,T}}}$ at 63Hz and $42\text{dB}_{\text{L}_{\text{Aeq,T}}}$ at 125Hz.

This therefore meets MCC's daytime noise limit, and the entertainment noise criterion at 125Hz. It does, however, exceed the night time noise limits, and the entertainment noise criterion at 63Hz.

It was discussed on site that, due to height restrictions, it is not possible to fit the proposed MuteMat Gym 70 B68 system beneath the running machines. An alternative product (MutePad Performance - Treadmill Isolator) was therefore recommended by iKoustic.

Based on test data provided by iKoustic, the impact sound insulation improvement provided by this product at 63Hz is around 10dB. On this basis, in theory, the running machine noise would be reduced to around $45\text{dB}_{\text{L}_{\text{Aeq,T}}}$ @ 63Hz, with overall levels of around $25\text{--}30\text{dB}_{\text{L}_{\text{Aeq,T}}}$.

This would therefore, in principle, achieve the MCC criteria. However, this cannot be verified without in-situ acoustic testing. This can be undertaken by dBx Acoustics once samples are provided and access arranged to adjacent apartments.

Weights Impact Noise

Noise levels were measured in Apartments 4A and 13A of weights being dropped onto a variety of floors finishes;

- a) Bare floor finish as installed
- b) Bare floor plus iKoustic Mute Bloc
- c) Base floor plus iKoustic MuteMat Gym 70 B68 system
- d) Base floor plus iKoustic MuteMat Gym 70 B68 system and Mute Bloc

A 20kg weight was dropped from a height of around 330mm above a sample of each floor finish, understood to be representative of the typical height from which weights are usually dropped.

A summary of the noise levels measured in the apartments is provided in Table 2, below.

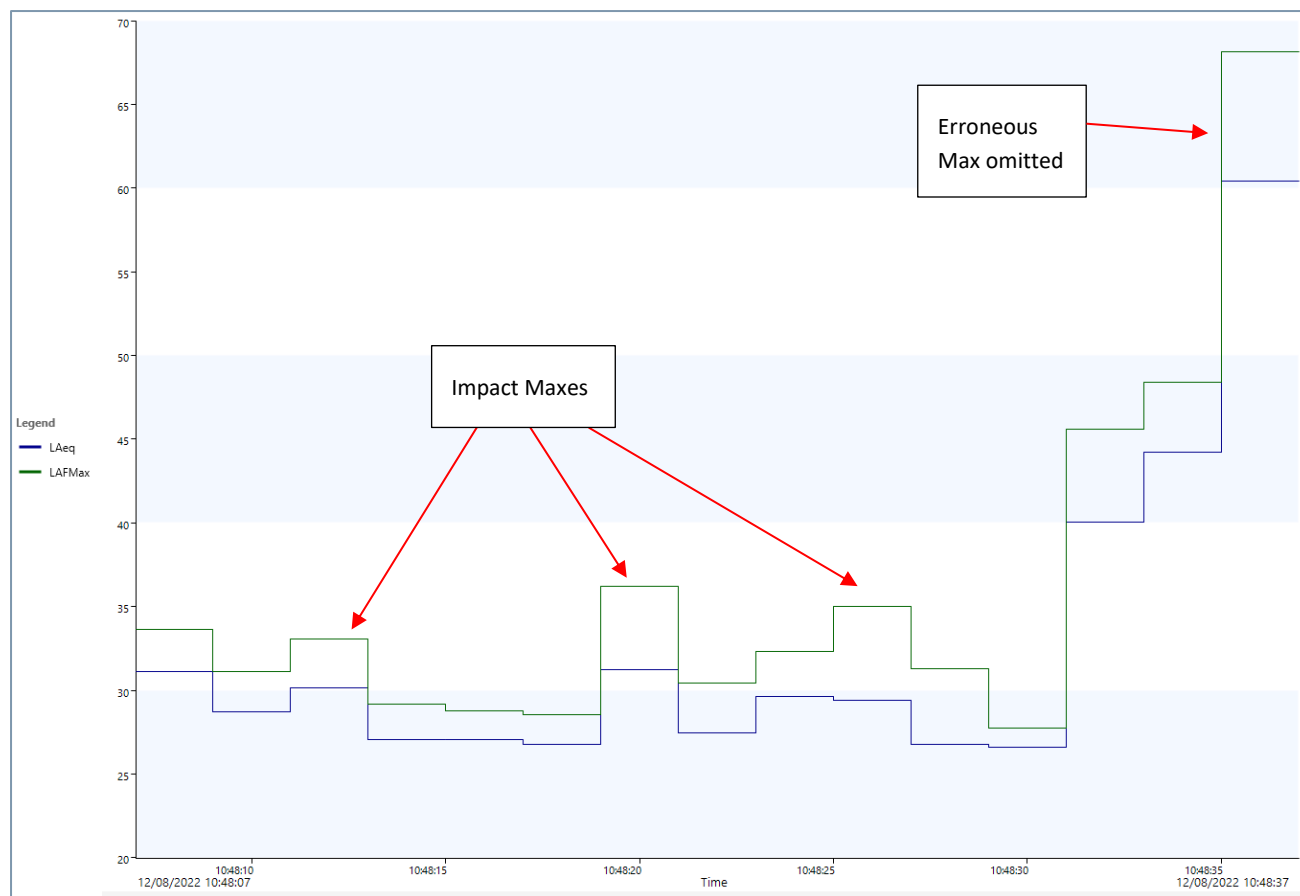
Table 2 – Impact Noise Transfer, $dB_{L_{Amax,F}}$

Apartment	Scenario	Description	Impact Noise Maximum, $dB_{L_{Amax,F}}$	Improvement, dB	Comments
4A	a	Bare floor finish as installed	78	-	Clearly audible
4A	b	Bare floor plus iKoustic Mute Bloc	57	21	Barely audible
4A	c	Base floor plus iKoustic MuteMat Gym 70 B68 system	36	41	Barely audible/inaudible
4A	d	Base floor plus iKoustic MuteMat Gym 70 B68 system and Mute Bloc	41	36	Inaudible. Improvement likely to be greater than shown; maximums due to other sources.
13A	a	Bare floor finish as installed	59	-	Audible
13A	b	Bare floor plus iKoustic Mute Bloc	46	14	Barely audible/inaudible – comparable to other maximum noise sources
13A	c	Base floor plus iKoustic MuteMat Gym 70 B68 system	40	19	Barely audible/inaudible – comparable to other maximum noise sources
13A	d	Base floor plus iKoustic MuteMat Gym 70 B68 system and Mute Bloc	39	20	Inaudible. Improvement likely to be greater than shown; maximums due to other sources.

NB When the iKoustic products were used, impact noise was inaudible/barely audible, and other maximum events (such as door closures, activity in adjacent apartments, slight movements by witnesses and residents etc) dominated, particularly in Apartment 13A. In some cases, these have been removed manually from the data reported, to provide a representative as possible maximum noise level. In the final tests (scenario d), impact noise was inaudible in both apartments, and hence all maximum events reported were due to other sources. This has affected the calculated improvements, particularly in Apartment 13A.

Examples of erroneous excluded maximum noise levels are shown in Figure 1, below.

Figure 1 – Scenario c, Apartment 4A



Discussion

As can be seen, the iKoustic products provide a significant improvement in impact noise levels, of up to around 40dB. dBx Acoustics has discussed this result with iKoustic who confirmed that this was in line with their expectations. Subjectively, as witnessed by MCC, the noise levels were either barely audible, or inaudible, in the adjacent apartment under strict listening conditions, and with windows closed.

Therefore, in normal use, particularly if windows are open, it is expected that impact noise would be inaudible or barely perceptible at all times, once the proposed iKoustic MuteMat Gym 70 B68 system is installed, and Mute Bloc pads used for local weight impact control.. The improvement is significant, subjectively.

SUMMARY AND CONCLUSION

Acoustic tests of the existing gym noise levels in adjacent apartments, and an assessment of suggested iKoustic noise control products were undertaken on Friday 12th August 2022 at the Anco and Co gymnasium, Blossom Street, Manchester.

A summary of the measurements undertaken and a subjective assessment of the improvements afforded has been undertaken.

In summary, the proposed mitigation reduced impact noise significantly, to a level which was barely audible or imperceptible.

It is therefore dBx Acoustics' professional opinion that the iKoustic MuteMat Gym 70 B68 flooring system, with local control of weight drops with Mute Bloc pads, would provide sufficient mitigation of impact noise such that the planning conditions can be discharged, and outstanding noise nuisance issues can be resolved.

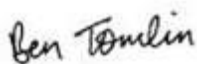
This is however ultimately the decision of MCC.

In terms of running machine noise, it is estimated that the proposed MutePad Performance - Treadmill Isolator would reduce low frequency structure borne noise by around 10dB, which would meet all of MCC's relevant criteria. This would however need to be verified by measurement.

In terms of airborne music/instruction noise, noise levels in the gym should be reduced by at least 5dB or ideally more, such that MCC's criteria are met. This can be calibrated on site, if required, and/or a limiting system installed to ensure the agreed levels are not exceeded. A method statement in terms of achieving this has been provided.

I trust this is helpful at this stage, but if you have any further comments or queries, please call or email.

Yours sincerely,

A handwritten signature in black ink that reads 'Ben Tomlin'.

Ben Tomlin

PRINCIPAL ACOUSTIC CONSULTANT

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Checked By: Susan Witterick (Director)