



ABRAHAM MOSS LIBRARY & LEISURE CENTRE PLANNING CONDITION 11 & 12 PART B

Project name **Abraham Moss Library and Leisure Centre**
Report no. **LP44107-RAM-B01-XX-RP-Y-60003**
Version **P01**
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Checked by **Ryan McNulty**
Approved by **Simon Taylor**

1. Introduction

This report provides the results of plant and operational noise measurements at the new Abraham Moss Library and Leisure Centre, to support the discharge of relevant planning conditions for the scheme given in permission 125033/VO/2019.

Condition 11 relates to noise break-out from the leisure centre:

- 11) *Notwithstanding the noise assessment prepared by Ramboll (dated 2/08/2019) stamped as received by the City Council, as Local Planning Authority, on the 3 October 2019, (a) prior to the first use of the development hereby approved, a scheme to secure a reduction in the level of noise emanating from the building shall be submitted for approval in writing by the City Council, as Local Planning Authority. The approved scheme shall be implemented prior to the first use of the development hereby approved.*

Where entertainment noise is proposed the LAeq (entertainment noise) shall be controlled to 10dB below the LA90 (without entertainment noise) in each octave band at the facade of the nearest noise sensitive location, and internal noise levels at structurally adjoined residential properties in the 63Hz and 125Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47dB and 41dB, respectively.

(b) Prior to the first use of the development a verification report will be required to validate that the work undertaken throughout the development conforms to them recommendations and requirements in the approved acoustic consultant's report.

The report shall also undertake post completion testing to confirm that acceptable criteria has been met. Any instances of non-conformity within the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To safeguard the amenities of the occupiers of nearby accommodation, pursuant to policies SP1 and DM1 of the Core Strategy.

Condition 12 relates to plant noise emissions.

- 12) *(a) Before the building hereby approved is first used details of any externally mounted ancillary plant, equipment and servicing submitted for approval in writing by the City Council as local planning authority. The approved scheme shall be implemented prior to the first use of the development*

hereby approved. The plant selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location.

(b) Prior to the first use of the development, a verification report will be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report.

The report shall also undertake post completion testing to confirm that the noise criteria has been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To safeguard the amenities of the occupiers of nearby residential accommodation, pursuant to policies SP1 and DM1 of the Core Strategy.

This report provides details of post construction noise measurements done to address part b) of the conditions.

2. Nearest Properties

The nearest noise sensitive properties are shown on Figure 1 and listed below:

- Houses on Greenstead Avenue, approximately 45m from the leisure centre
- Houses on Woodlands Road, approximately 90m from the leisure centre

It is noted that the ground level at these houses is lower than ground level of the leisure centre site. There will therefore be a significant degree of screening to lower floor rooms and gardens, though in the case of Greenstead Avenue at least, there are dormer windows at upper floors that will have some view of the site.

Measurement positions used during the assessments are also shown in Figure 1.



Figure 1 – Noise Measurement Positions and Results (old Leisure Centre shown but new centre is in a similar position)

3. Condition 11 - Noise Break Out

The Leisure Centre will not be used for entertainment (e.g. school discos or parties), but music is expected in the dance studio and gym, and has therefore been assessed against the criteria of Condition 11.

Note that it is not possible to measure music that is 10dB or more lower than the background level (overall or in octave bands), but measurements of the background L_{A90} with music on and off have been made to provide an indication. Where the music is subjectively inaudible and there is no increase in the measured L_{A90} , this is a positive indication that the music level is at least 10dB lower than the background. Note that modelling previously predicted that the music level would be significantly more than 10dB lower than background.

Background Noise Level

The background noise level was measured for a 15-minute period at positions equivalent to the nearest noise sensitive properties to the Dance Studio and Gym facades, Position A1 and A2 respectively.

To represent the worst-case, the measurement was paused when trams arrived at the tram stop. The measurement positions are shown in Figure 2.

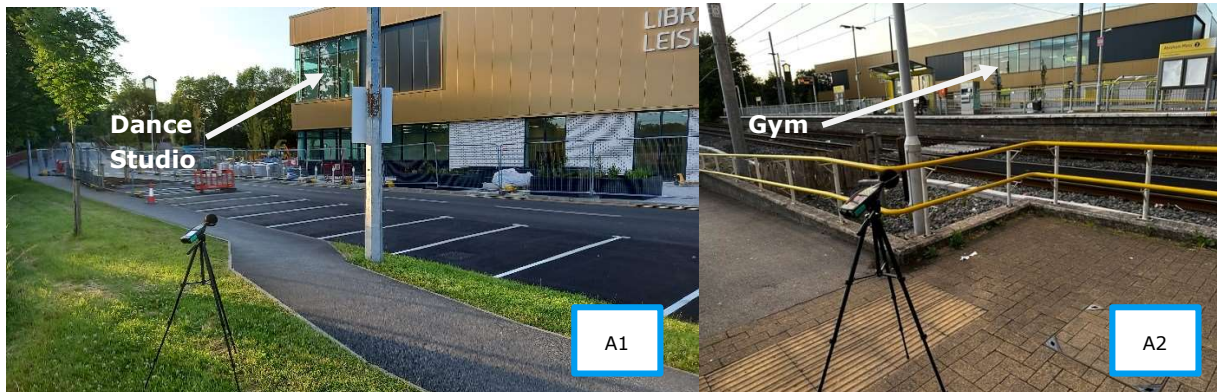


Figure 2 – Photos of measurement positions A1 & A2

The measurements were made between 20:00 and 22:00 on Monday 19 June 2023. This represents the latest period that the Dance Studio and Gym are likely to be in operation and when background levels would be lowest.

The background noise levels measured are summarised in Table 1. Note that the background noise will be somewhat higher when the influence of intermittent trams passing the houses is included.

Internal Noise Level

A speaker was set up inside the first floor Dance Studio and in the Gym and a repetitive sample of typical music¹ was played and adjusted to approximately 80dB L_{Aeq} in the centre of each space. This is very loud and significantly higher than would normally be expected during use of the Dance Studio and Gym.

Music Level

With the music playing at 80dB(A) in the Dance Studio and Gym, the background noise level was measured again at the same positions. Additional measurements were also made much closer to the building facades for verification purposes.

Source of Music	Background noise level (music Off)	Background noise level (music On)	Comments
Dance Studio	40dB $L_{A90,15mins}$ at Position A1	40dB $L_{A90,5mins}$ at Position A1	Music inaudible at this position
Internal level of 80dB L_{Aeq}	-	40dB $L_{A90,5mins}$ at Position B1 (close to Dance Studio)	Music only just audible at this closer position
Gym	41dB $L_{A90,15mins}$ at Position A2	39dB $L_{A90,5mins}$ at Position A2	Music inaudible at this position

¹ 3 minutes of repeated samples of "Get Lucky" by Daft Punk (30 seconds) and "Shake it Off" by Taylor Swift (30 seconds)

Source of Music	Background noise level (music Off)	Background noise level (music On)	Comments
Internal level of 80dB L_{Aeq}	-	38dB $L_{A90,5mins}$ at Position B2 (Close to Gym)	Music only just audible at this closer position

Table 1 – Measured background and music noise levels

It can be seen that the background noise level (L_{A90}) did not increase when the music was playing, compared to when it was off. Differences in L_{A90} measured were attributable to general variations in activity in the area. No music was audible at the positions representative of the nearest properties (which were in fact slightly closer to the Leisure Centre than the nearest properties). Where the L_{A90} does not change, this indicates that the music level does not contribute to the measured noise level and must be 10dB or more below the background level at the nearest properties.

This corresponds with the level predicted for Part a of Condition 11 which predicted that music would be at least 21dB lower than the L_{A90} and at least 12dB lower in each octave frequency band (Ramboll report LP44107-RAM-B01-XX-RP-Y-43003, dated 16 December 2022).

4. Condition 12 - Plant

Plant serving the leisure centre includes:

- 4no. air handling units located on the roof plant deck, with atmosphere side attenuators
- 3no. outdoor condenser units on the roof plant deck

Noise emissions from all external plant associated with the Leisure Centre were calculated previously using proprietary noise modelling software (Ramboll report LP44107-RAM-B01-XX-RP-Y-60002_P01 dated 10 January 2023). The noise levels calculated at the nearest houses were very low, less than 10dB(A). This is significantly lower than the plant noise limit required to meet Condition 12 requirements during the day or night, even allowing for any penalties for tonality or intermittency. In practice where plant noise is so far below background, this would result in inaudible noise levels from these sources.

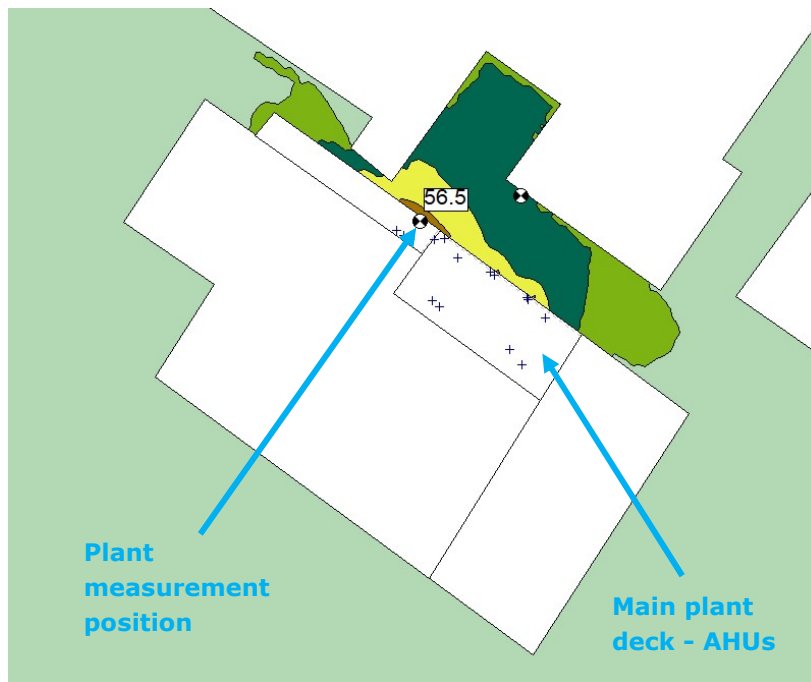
Plant serving the Leisure Centre is not expected to run overnight, but it is possible that it may be turned on in the early hours of the morning from about 06:00 onwards for heating etc.

Condition 12 requires that plant noise emissions (L_{Aeq}) are at least 5dB below the background noise level (L_{A90}) at the nearest noise sensitive properties. As for the music breakout, it is not possible to measure this at the nearest properties, but where the plant is inaudible this is a positive indication that the plant noise level is at least 5dB lower than the background.

Plant Noise Levels

As the plant noise level is so much lower than the background level it is not possible to measure it in isolation at the nearest properties. Therefore, a measurement was made at the roof plant deck close to the plant, with all plant running, and this compared to the level calculated at the same position using our noise model.

The level calculated by the noise model at the position shown below is 56.5dB(A). This is at the edge of the plant deck, approximately 23m from the AHUs on the main plant deck.



The level measured on the plant deck at the same position as shown above was 55.5dB(A) and correlates well with the calculated level.

On this basis, the plant noise level at the nearest residential properties in the absence of any other noise sources in the area is expected to be in line with the noise model and would be around 10dB(A), which is significantly lower than existing background levels.

As no plant was audible at the positions representative of the nearest properties (the positions used are in fact slightly closer to the Leisure Centre than the houses), this indicates that the plant level is significantly below the background level at the nearest properties, by more than 10dB. No penalties for tonality or intermittency apply as the plant was operating in steady state and noise levels were broadband.

This corresponds with the level predicted for Part a of Condition 12.

5. Conclusions

Measurements of the external plant at the Leisure Centre, indicate that plant noise levels are consistent with predicted levels and are significantly lower than existing background noise levels at the nearest properties by more than the required 5dB. Plant is subjectively inaudible at the nearest properties. As such the requirements of Planning Condition 12 are achieved.

Measurements of music breaking out of the Dance Studio and Gym with an internal level of 80dB(A), indicate that music levels are lower than existing background noise levels at the nearest properties by more than the required 10dB. The music was inaudible at the nearest properties. As such the requirements of Planning Condition 11 are achieved.

Appendix – Noise Survey Details

Time and Date: 19/06/2023 20:14 – 22:57

Equipment: Bruel & Kjaer 2250 Sound Level Analyser (serial #3002075)

Calibrator type 4231 (serial #2642788)

Personnel Present: Matthew Bull (Ramboll)

During the survey the weather was dry, with no standing water on the roads. Wind speeds were low during all periods.