



PUREGYM,
MANCHESTER FORT
SHOPPING CENTRE

Plant Noise
Commissioning
Assessment

Reference: 11245.RP01.PNCA.0

Prepared: 14 July 2022

Revision Number: 0

PureGym

Town Centre House

Merrion Centre

Leeds

LS2 8LY



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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	14 July 2022	James Melville	Martin Raisborough

Terms of contract:

RBA Acoustics Ltd has prepared this report in accordance with our agreed Scope of Work. RBA Acoustics Ltd shall not be responsible for any use of the report or its contents for any purpose other than that for which it was provided. Should the Client require the distribution of the report to other parties for information, the full report should be copied. No professional liability or warranty shall be extended to other parties by RBA Acoustics Ltd without written agreement from RBA Acoustics Ltd.

The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and again will need to be developed in to full working drawings by the lead designer to incorporate all other design disciplines.



LONDON
44 Borough Road
London SE1 0AJ
T. +44 (0) 20 7620 1950

MANCHESTER
Lowry House, 17 Marble Street
Manchester, M2 3AW
T. +44 (0) 161 661 4504

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1.0 INTRODUCTION

Manchester City Council's standard requirements in relation to fixed plant installations are outlined within Manchester City Council's Noise and Planning Guidance dated December 2015 in Section 3.6.1.5.1, which states that the noise assessment should be based on BS 4142:2014. It also states that:

"Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) noise level at the nearest noise sensitive location."

RBA Acoustics has been commissioned to undertake an assessment of noise from the external plant items in order to ensure that the target noise levels identified in the submitted Noise Impact Assessment are complied with. The noise impact assessment submitted with the planning application is the RBA Acoustics Report reference 210743.RP01.PNA.2.151021.MJR.

Now that the plant has been installed and commissioned, and the recommended mitigation measures applied, this report presents the details and results of acoustic commissioning assessments undertaken to demonstrate practical compliance with Manchester City Councils criteria.

The report occasionally employs technical acoustic terminology. In order to assist the reader, a glossary of terms is included in Appendix A.

2.0 SITE DESCRIPTION & PLANT NOISE EMISSION LIMITS

2.1 Site Description

The unit is proposed within a row of terraced retail units that form part of the Bicester Shopping Park, an out-of-town retail park in Cheetham Hill area of north Manchester, Lancashire. The unit is proposed at 1st floor level above a Lidl store. Retail units are also located either side of the PureGym unit.

The unit is located in a mixed commercial and residential area of Cheetham Hill. A grade level car park is located to the south of the unit, while the main area of the retail park is located to the east of the site, on the opposite side of Cheetham Hill Road. Elizabeth Street bounds the site to the west, beyond which a number of light industrial units are located. To the north of the site is the A6010, Queens Road, beyond which are a line of 3 to 4 storey residential properties. These properties overlook the rear of the site, and the rear service yard area for the units. It is also understood that services plant for the Pure Gym unit are to be located in this service yard area.

The nearest affected noise sensitive receptors to the site are those located to the north of the unit, directly opposite the service yard of the gym. These are at an approximate distance of 20 metres.

2.2 Location of Nearest Residential Receptors

The closest affected noise sensitive properties are identified to be those on the opposite side of Queens Road to the site.

These properties are indicated below in Figure A in Appendix B.

2.3 Plant Noise Emission Limit

The below Table 1, is extracted from the RBA Acoustic report reference, regarding plant noise emissions limits at the nearest noise sensitive properties fronting Queens Road.

Table 1 – Plant Noise Emission Limits

Period	Typical lowest $L_{A90,15min}$ (dB)
Daytime (07:00 – 23:00)	43dB $L_{Ar,T}$
Night-time (23:00 – 07:00)	36dB $L_{Ar,T}$

These limits are to be achieved at 1 metre from the façade of the noise sensitive properties fronting Queens Road due to cumulative operation of the proposed PureGym plant at representative worst case duty.

3.0 PLANT NOISE COMMISSIONING ASSESSMENT

3.1 General

Measurements and observations of noise from the installed plant items were undertaken by James Melville (MSc, BSc, AMIOA) in the afternoon of 6th July 2022.

During the measurement period weather conditions were considered appropriate for the measurement of noise, it being dry with light winds around 6 m/s. The temperature was recorded to be around 18 degrees centigrade and partly cloudy with still winds.

Details of the instrumentation used to undertake the measurements are provided in Appendix C. The sound level meter was calibrated both prior to and on completion of the survey with no significant calibration drift observed. The measurements equipment has been laboratory calibrated within the past 2 years, with the field calibrator having undergone an additional calibration check within the past year.

3.2 Measurement Locations

Measurements of environmental noise were undertaken for each item of noise generating plant, where noise from the plant was audible above the otherwise residual sound level at close range. Measurements of noise for each plant item were undertaken over a period of time considered suitable so as to not have been significantly affected by residual sound, but not less than 1 minute.

Additionally, a measurement was taken at a location close to the plant where the plant was no longer audible, in order that a suitable correction may be applied to the ambient sound levels measured close to the plant in order to determine the specific sound levels, in accordance with BS 4142 (Methods for rating and assessing industrial and commercial sound) methodology.

3.3 Identified Noise Generating Plant Items

Immediately prior to the measurements of noise from the plant, the cooling within the PureGym unit was turned up high so as to present a high load on the condenser units lined up along the rear façade of the unit, as indicated in Figure 1 below. This was considered to represent worst case operation of these units.

Figure 1 – Condenser Units



In Addition to the condensers the site also has two AHU duct termination on the rear façade of the building. However, due to the height of the AHU outlets, it was not possible to undertake measurements of these items. However subjectively the noise from the inlet and outlet ducts were not audible, when in operation, at the ground level close to the ducts as well as outside the nearest noise sensitive locations.

These observations would be positive indication that the noise emissions from the units are below the background noise level and are not adding to the existing background noise level at the nearest receptor and therefore can be to be compliant with the criteria.

3.4 Measurement Details

The results of the sound level measurements are presented in Table 2 below

Table 2 – Measured Sound Levels

Measurement	Measured Sound Pressure Level (dB re 20x10 ⁻⁶ Pa.) @ Octave Band Centre Frequency (Hz)								dBA	NR
	63	125	250	500	1k	2k	4k	8k		
Residual Sound Level	75	69	64	59	60	55	46	36	64	60
Condenser Units @ 1 meter	70	64	63	63	61	54	46	41	65	61

In correcting the ambient sound level measurements of the plant for residual sound, the following specific sound levels of the plant are obtained:

Table 3 – Plant Specific Sound Levels

Measurement	Specific Sound Pressure Level (dB re 20x10 ⁻⁶ Pa.) @ Octave Band Centre Frequency (Hz)								dBA	NR
	63	125	250	500	1k	2k	4k	8k		
Condenser Units @ 1 meter	70*	64*	63*	60	56	54*	36	39	62	57

* It has not been mathematically possible to calculate these values since the Residual level was in-line with the Total level.

Finally, correcting the above specific sound levels of plant for distance and screening, the following sound levels are predicted at the façade of the nearest affected noise sensitive properties along Queens Road.

Table 4 – Plant Specific Sound Levels at the Identified Noise Sensitive Receptors

Measurement	Specific Sound Pressure Level (dB re 20x10 ⁻⁶ Pa.) @ Octave Band Centre Frequency (Hz)								dBA	NR
	63	125	250	500	1k	2k	4k	8k		
Condenser Units @ 1 meter	38	30	28	22	15	10	0	0	24	18

The total calculated overall level at the noise sensitive receptor is 24dBA. This is within the adopted plant noise emission limit set out in Section 2.3 and it is considered, therefore, that plant noise emissions are in accordance with the requirements of the Local Authority.

4.0 CONCLUSIONS

RBA Acoustics has been commissioned to undertake an assessment of noise from the external plant items in order to ensure that the target noise levels identified in the submitted Noise Impact Assessment are complied with.

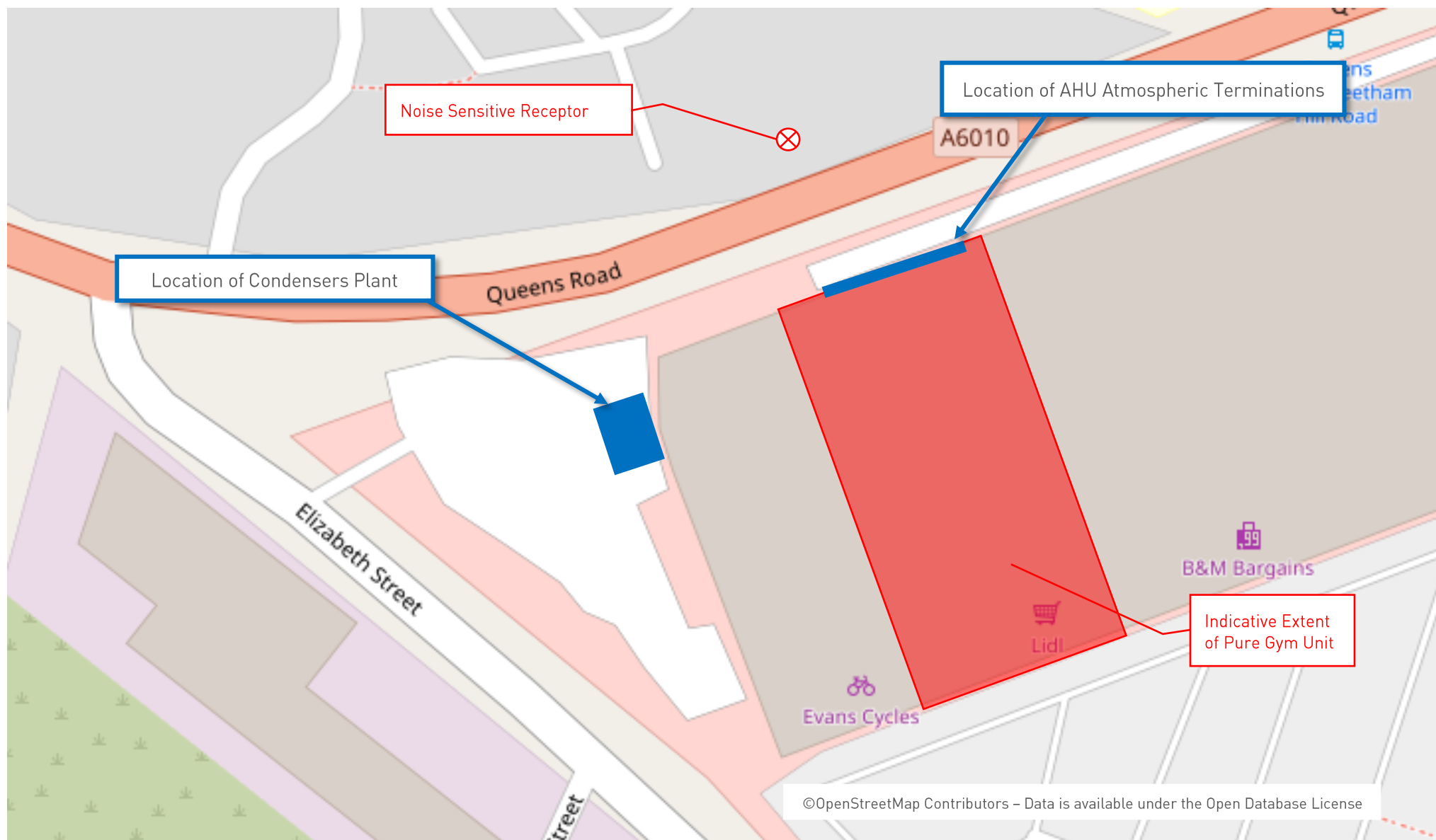
Now that the plant has been installed and commissioned, Measurements of environmental noise were undertaken for each item of noise generating plant, where noise from the plant was audible above the otherwise residual sound level at close range.

Based on the measured noise levels at the site, the over level at the nearest affected noise sensitive receptors along Queens Road is calculated to be 24dBA. This is within the adopted plant noise emission limit, and it is considered, therefore, that plant noise emissions are in accordance with the requirements of the Local Authority.

Appendix A - Acoustic Terminology

dB	Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.
dB(A)	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level. Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.
L_{eq}	L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (1 hour).
L_{Aeq}	The level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.
L_{An} (e.g. L_{A10} , L_{A90})	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the L_{eq} value.

Appendix B – Site Plans & Measurement Positions



PureGym, Manchester Fort Shopping Centre
Site Location Plan
Project 11245

Figure A
14 July 2022
Not to Scale

Appendix C - Instrumentation

The following equipment was used for the measurements

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1406969	U38863	01 September 2023
Norsonic Pre Amplifier	1209	21204		
Norsonic ½" Microphone	1225	285599	38862	01 September 2023
Norsonic Sound Calibrator	1251	34966	U38861	01 September 2023

RBA ACOUSTICS

W. www.rba-acoustics.co.uk

E. info@rba-acoustics.co.uk

London:

44 Borough Road

London SE1 0AJ

T. +44 (0) 20 7620 1950

Manchester:

Lowry House, 17 Marble Street

Manchester M2 3AW

T. +44 (0) 16 1661 4504

