



PLANT NOISE ASSESSMENT

PUREGYM PRESCOT

PUREGYM

AUGUST 2025

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1 INTRODUCTION

Anderson Acoustics Ltd has been commissioned by PureGym Ltd to undertake a noise impact assessment in relation to the installation of new fixed plant serving a proposed gym in a mezzanine unit within an existing Tesco Extra store in Prescott.

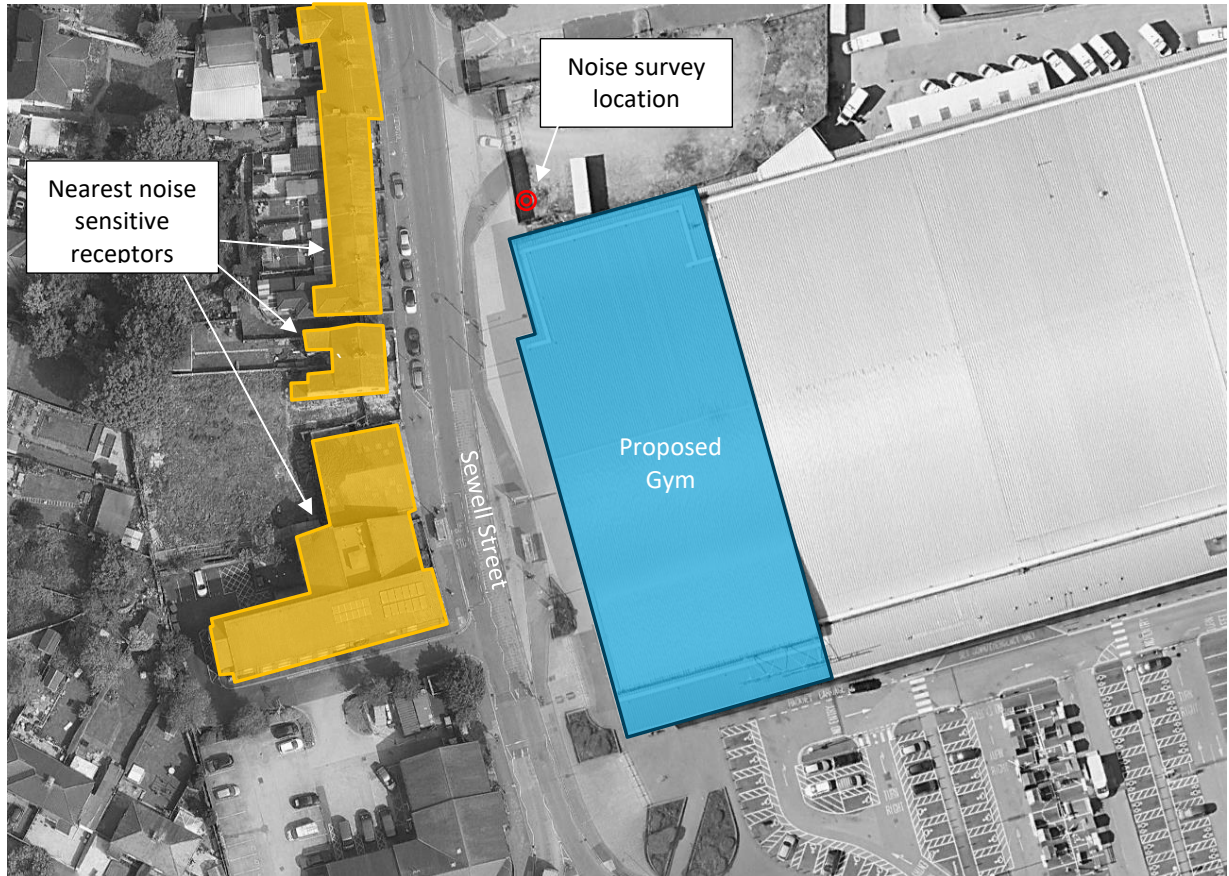
An unattended noise survey was carried out on 16-17th July 2025 to measure existing background noise levels at the nearest sensitive receptors.

This noise impact assessment establishes design targets and details an assessment of noise transfer from the proposed plant to nearby sensitive receptors. Outline mitigation measures are presented where necessary

2 SITE DETAILS

The development site is shown below in Figure 2.1.

Figure 2.1: Site location plan (location of first floor mezzanine unit in blue)



Imagery: Google Maps, Airbus, Bluesky, Infoterra Ltd & COWI A/S 2025 (annotated by Anderson Acoustics)

The existing site consists of a large double height retail unit which is currently occupied by Tesco Extra. The site is located in Cables Retail Park in Prescot, with several commercial units located to the east of the site.

The noise climate was noted to consist of road traffic noise from the surrounding road network and large car park to the south of site.

3 PLANT NOISE ASSESSMENT

3.1 Background Noise Survey

A background noise survey was undertaken to establish baseline noise levels at the nearest noise-sensitive receptor to assist in determining noise emission limits for plant associated with the new gym.

A noise monitor, with the microphone mounted at 1.5m height at ground floor level and was positioned at a location representative of the neighbouring noise-sensitive receptors (see Figure 2.1) under free-field conditions between 14:30 on the 16th July and 09:30 on the 17th July 2025.

The weather conditions were suitable for noise monitoring during the measurement period. Details of the equipment used for the background noise survey are presented in Appendix A.

During visits to site, the soundscape was noted to be dominated by commercial noise and road traffic.

3.2 Survey Results

Results of the measured typical background sound levels are shown in Table 3.1. Results can be found in graphical form in Appendix A.

Table 3.1: Results from the attended noise survey (free-field)

Period	Typical background noise level, dB L _{A90,15mins}
Daytime (0700 – 2300)	42
Night-time (2300 – 0700)	36

3.3 Proposed External Noise Emission Limits

In relation to noise, the Planning Consultation Response from the Environmental Health and Consumer Protection Service of Knowsley Council recommends the following condition is imposed:

Development shall not commence until a scheme has been submitted to and approved in writing by the local planning authority which specifies the provisions to be made for the control of noise emanating from the site. The scheme shall be based on the results of a noise assessment which suitably characterises the noise climate at nearby residential dwellings both prior to and following the operation of the development permitted.

*The following noise levels shall be met after implementation of the scheme;
For fixed plant, the rating level of noise emitted from the site, measured at the closest boundary of the nearest residential dwellings shall be at least 5dB(A) below the existing background level. For other operations on site the rating level of noise shall not exceed the existing background level at the positions described above. Measurement and assessment shall be made according to British Standard BS 4142:2014.*

All works which form part of the scheme shall be implemented in full in accordance with the scheme as agreed. Documentary evidence of the works shall be submitted to and approved in writing by the Local Planning Authority prior to first use of the development.

The recommended condition sets out the design criteria for fixed plant in addition to other operation noise, in this instance other operational noise is considered to be noise of gym activities breaking out through the external building façade.

This reports specifically considers plant noise. Please see report reference 8057_003R_1-0_JN_Op_Noise_Breakout for an assessment of operational noise.

Based on the criteria given in the recommended condition, plant noise should be controlled to a rating level of 31dB $L_{Ar,Tr}$ (typical background noise at night minus 5dB).

The consultation response specifically mentions the residents on Williams Street and Chester Street. Since the receptors on Sewell Street highlighted in Figure 2.1 are closer to the proposed plant, these are considered the worst affected. Controlling plant noise at these properties will thus ensure the plant noise at Williams Street and Chester Street residents meets the design criteria.

3.4 Plant Selection

The following items of plant are to be installed:

- 8 no. Outdoor condensers
 - 4 no. Mitsubishi PUZ-M250YKA, SPL=62dBA @ 1m
 - 3 no. Mitsubishi PUZ-M125YKA, SPL=56dBA @ 1m
- 1 no. Heat pump
 - 1 no. Mitsubishi PUZ-WZ80VAA Ecodan Monobloc, SPL=40dBA @ 1m
- 3 no. Heat Recovery Units
 - 2 no. Mitsubishi LGH 250 RVXT3-E
 - 1 no. Mitsubishi LGH 200 RVX3-E
- 1 no. Extract Fan
 - 1 no. Systemair Prio 315 EC

It is understood that the condensers will provide both heating and cooling to the gym, therefore we have considered the worst-case sound pressure level data for our assessment.

The gym plant is understood to operate throughout the day and night.

3.5 Environmental Noise Model

The noise assessment was performed using a 3D noise model. The potential impact of noise generated by the proposed plant has been predicted using the CadnaA 2025 software by Datakustik.

The software allows the site topography, existing buildings and sound sources to be built into the model such that the propagation of the various sound sources generated by the proposed development can be simulated and predicted at the nearest Noise Sensitive Receptors (NSR's). Calculations are carried out using the methodology outlined in ISO 9613, which considers the effects of the topographical conditions throughout the area, ground absorption, atmospheric absorption, acoustic reflections and acoustic screening, as well as applying a light downwind propagation correction to represent a worst-case.

The results of the noise modelling are used to determine the likely impact of noise levels incident on each NSR surrounding the site during its proposed operation.

The following general settings were used in the model:

- All plant was modelled as point sources at a height representative of the dominant source (i.e. the fans at the front of the condensing units)
- Ground absorption has been set to acoustically hard for the entire site representing a worst case scenario.
- Buildings were set as reflecting with an absorption coefficient of 0.21.
- Buildings were imported from OpenStreetMap and modified to match architect's drawings where possible.

3.6 Results

An assessment of plant noise emissions has been carried out based on a worst-case assumption that all items will be operating simultaneously. A 3D view of the noise model showing the results is shown in Figure 3.1.

Figure 3.1: Estimated plant noise level at nearest receptors

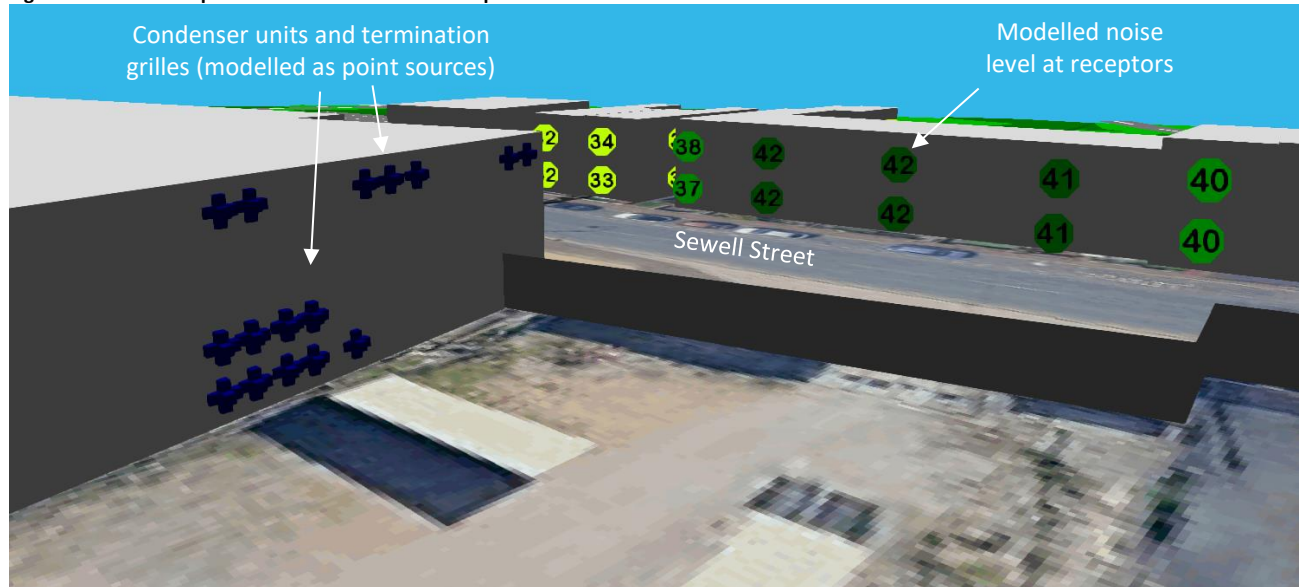


Figure 5.3 shows that, without any mitigation, the highest noise level at the worst affected receptors would be 42dB, exceeding the plant noise limit by 11dB.

3.7 Mitigation

To meet the plant noise criteria at the nearest sensitive receptors, attenuators are required on the exhaust ducts of the HRUs and the extract fan in addition to a solid barrier around the condenser units.

The minimum insertion losses of the attenuators are given in Table 3.2.

Table 3.2: Minimum insertion losses of attenuators

	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Extract Fan – Outlet Duct	5	8	15	33	39	40	36	20
HRU - Extract	3	4	9	17	23	26	25	14

The recommended barrier should be at least 0.5m higher than the top of the highest condenser, be constructed of a material with a surface mass of at least 12kg/m² and shield the plant to the north and west (see Figure 3.2).

Figure 3.2: Position of noise barrier

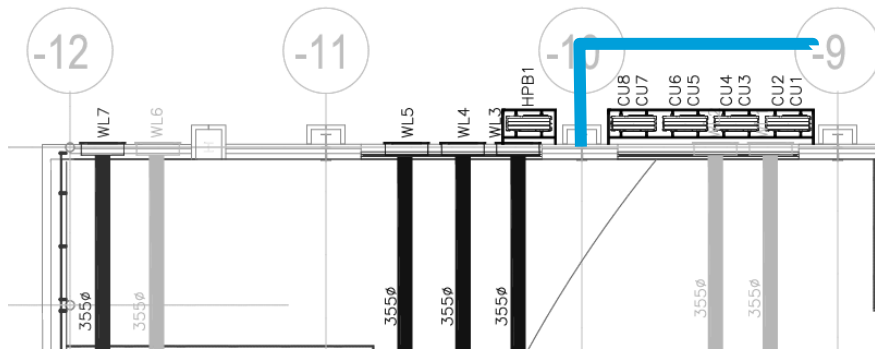
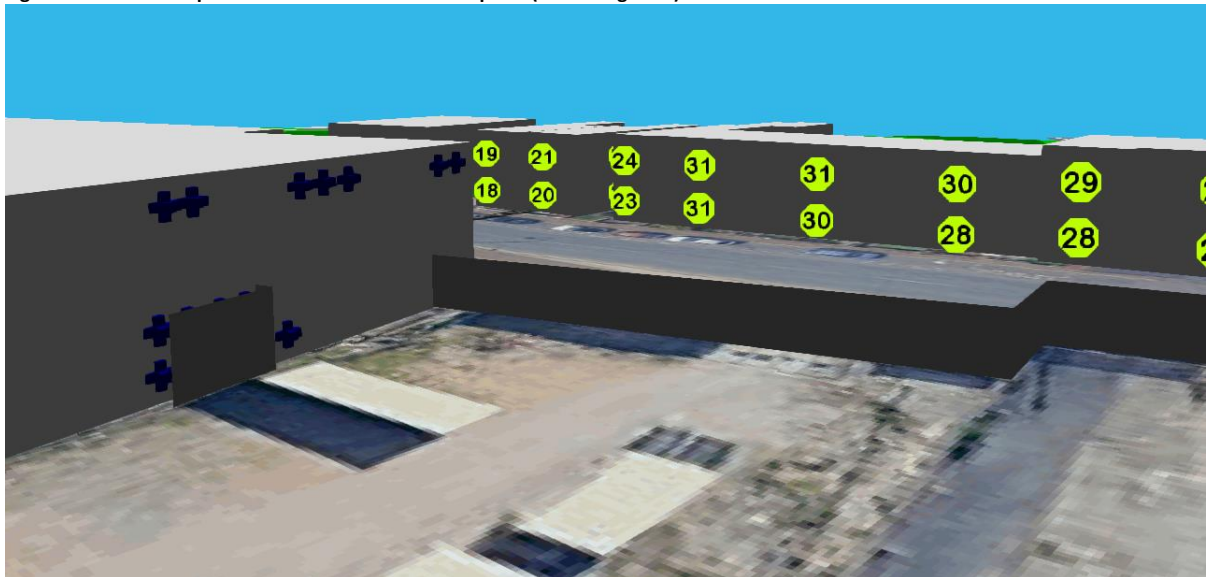


Figure 3.3 shows that with these measures in place, the noise level at the nearest sensitive properties should meet the plant noise limits.

Figure 3.3: Estimated plant noise level at nearest receptors (with mitigation)



The plant noise assessment demonstrates that subject to the recommendations made within this report, planning permission should not be refused on noise grounds.

APPENDIX A

DETAILS OF THE ACOUSTIC SURVEY

Table A.1: Equipment Details

Equipment	Make & Model	Serial No	Date Calibrated	Calibration Certification Number
Sound Level Meter	01dB DUO	10664	27/04/2025	10749
Sound Level Meter	01dB DUO	10667	27/04/2025	10585
Calibrator	SVAN SV36	112518	21/08/2024	1509531-1

APPENDIX B

DUCT CALCULATIONS

Table B.1: HRU1 (fresh air intake above, exhaust below)

Fan Duty:	m^3 / s	N / m^2	SWL Spectrum	63	125	250	500	1k	2k	4k	8k
				68	69	65	59	57	51	40	40
Type	Description	Mtrs/No. off	Dimension								
2	CIRC DUCT	24	355	1	2	2	4	6	6	6	6
4	RADIUS BEND	2	355	0	0	0	2	4	6	6	6
Grille size:		1000 mm X 700 mm	Grille location:		2	1=Free Space, 2=Flush, 3=Jn. of 2 surfaces, 4=Corner					
End Reflection Loss:		0.7	m^2	5	2	0	0	0	0	0	0
Sound Power Leaving:				62	65	63	53	46	39	28	28

Fan Duty:	m^3/s	N/m^2	SWL	63	125	250	500	1k	2k	4k	8k
				Spectrum	76	77	75	71	75	73	71
Type	Description	Mtrs/No. off	Dimension								
2	CIRC DUCT	30	355	2	3	3	5	7	7	7	7
4	RADIUS BEND	2	355	0	0	0	2	4	6	6	6
Grille size:		1000 mm X	700 mm	Grille location:		2	1=Free Space, 2=Flush, 3=Jn. of 2 surfaces, 4=Corner				
End Reflection Loss:		0.7	m^2	5	2	0	0	0	0	0	0
Sound Power Leaving:				69	72	72	64	64	60	58	58

Table B.2: HRU2 (fresh air intake above, exhaust below)

Fan Duty:	m^3/s	N/m^2	SWL	63	125	250	500	1k	2k	4k	8k
				Spectrum	68	69	65	59	57	51	40
Type	Description	Mtrs/No. off	Dimension								
2	CIRC DUCT	32	355	2	3	3	5	7	7	7	7
4	RADIUS BEND	2	355	0	0	0	2	4	6	6	6
Grille size:		1000 mm X 700 mm	Grille location:		2	1=Free Space, 2=Flush, 3=Jn. of 2 surfaces, 4=Corner					
End Reflection Loss:		0.7	m^2	5	2	0	0	0	0	0	0
Sound Power Leaving:				61	64	62	52	45	38	27	27

Fan Duty:	m^3/s	N/m^2	SWL	Spectrum							
				63	125	250	500	1k	2k	4k	8k
				76	77	75	71	75	73	71	71
Type	Description	Mtrs/No. off	Dimension								
2	CIRC DUCT	25	355	2	3	3	4	6	6	6	6
4	RADIUS BEND	2	355	0	0	0	2	4	6	6	6
Grille size: 1000 mm X 700 mm				Grille location: 2				1=Free Space, 2=Flush, 3=Jn. of 2 surfaces, 4=Corner			
End Reflection Loss: 0.7 m^2				5	2	0	0	0	0	0	0
Sound Power Leaving:				70	73	73	65	65	61	59	59

Table B.3: HRU3 (fresh air intake above, exhaust below)

Fan Duty:	m^3/s	N/m^2	SWL	Spectrum							
				63	125	250	500	1k	2k	4k	8k
				67	66	62	56	54	47	38	38
Type	Description	Mtrs/No. off	Dimension								
2	CIRC DUCT	27	355	2	3	3	4	6	6	6	6
4	RADIUS BEND	2	355	0	0	0	2	4	6	6	6
Grille size: 1000 mm X 700 mm				Grille location: 2				1=Free Space, 2=Flush, 3=Jn. of 2 surfaces, 4=Corner			
End Reflection Loss: 0.7 m^2				5	2	0	0	0	0	0	0
Sound Power Leaving:				60	61	59	50	43	35	26	26

Fan Duty:	m^3/s	N/m^2	SWL	Spectrum							
				63	125	250	500	1k	2k	4k	8k
				72	75	71	68	72	69	66	66
Type	Description	Mtrs/No. off	Dimension								
2	CIRC DUCT	24	355	1	2	2	4	6	6	6	6
4	RADIUS BEND	2	355	0	0	0	2	4	6	6	6
Grille size: 1000 mm X 700 mm				Grille location: 2				1=Free Space, 2=Flush, 3=Jn. of 2 surfaces, 4=Corner			
End Reflection Loss: 0.7 m^2				5	2	0	0	0	0	0	0
Sound Power Leaving:				66	71	69	62	62	57	54	54

Table B.4: Extract Fan

Fan Duty:	m^3/s	N/m^2	SWL	Spectrum							
				63	125	250	500	1k	2k	4k	8k
				84	78	84	79	79	75	69	62
Type	Description	Mtrs/No. off	Dimension								
2	CIRC DUCT	26	355	2	3	3	4	6	6	6	6
4	RADIUS BEND	2	355	0	0	0	2	4	6	6	6
Grille size: 1000 mm X 700 mm				Grille location: 2				1=Free Space, 2=Flush, 3=Jn. of 2 surfaces, 4=Corner			
End Reflection Loss: 0.7 m^2				5	2	0	0	0	0	0	0
Sound Power Leaving:				77	73	81	73	69	63	57	50