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New Mills Leisure Centre, New Mills

Environmental Noise Study

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1.0 SUMMARY

Fisher Acoustics Ltd has been commissioned by Hensall Mechanical Services Limited to conduct an environmental noise assessment relating to a planning application for a proposed air handling unit at New Mills Leisure Centre, New Mills.

An assessment of environmental noise around the Leisure Centre has determined the pre-existing environmental noise levels during the day and night at the closest noise sensitive receptors. The allowable noise level at the noise sensitive receptors due to the operation of the proposed air handling unit has then been determined, based on the recommendations of BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'.

The potential noise levels at the closest noise sensitive receptors due to the operation of the proposed air handling unit have been calculated. The recommended acoustic performance of attenuators at the air handling unit to allow compliance with the environmental noise limits has then been determined.

Based on the reported sound power levels of the proposed AHU at New Mills Leisure Centre and the minimum recommended performance of attenuators detailed in this report, the calculated noise levels at the closest noise sensitive receptors comply with the applicable environmental noise criteria.

The expected noise levels at the closest noise sensitive receptors due to the operation of the proposed AHU are therefore considered to be fully commensurate with the maintenance of residential amenity.

2.0 INTRODUCTION

Fisher Acoustics Ltd has been commissioned by Hensall Mechanical Services Limited to conduct an environmental noise assessment relating to a planning application for a proposed air handling unit at New Mills Leisure Centre, New Mills.

This report examines the pre-existing environmental noise conditions at the closest noise sensitive receptors to the Leisure Centre and advises on the achievement of acceptable noise levels at the noise sensitive receptors due to the operation of the proposed air handling unit.

The steps undertaken in compiling this study are as follows:

- Carrying out of daytime and night time external noise surveys to determine the typical levels of background noise at the closest noise sensitive receptors to the site during daytime and night time periods
- Determination of suitable overall noise limits for building services plant to comply with the recommendations of BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'
- Calculation of the expected noise levels at the closest noise sensitive receptors due to the operation of the proposed air handling unit and determination of the recommended acoustic performance of attenuators at the air handling unit to allow the achievement of the environmental noise limits.

3.0 DESCRIPTION OF SITE

General Site Description

New Mills Leisure Centre (the 'Site') is located on Hyde Bank Road, New Mills, High Peak, SK22 4BP. The Site is bounded by Hyde Bank Road to the north and west, by the Sett Valley Medical Centre to the east and by New Mills Secondary School and residential properties to the south. The River Sett runs to the north and west of Hyde Bank Road.

Residential properties are located around the Site on Hyde Bank Road and Church Lane.

Figure 1 shows New Mills Leisure Centre in the context of the surrounding roads and buildings.

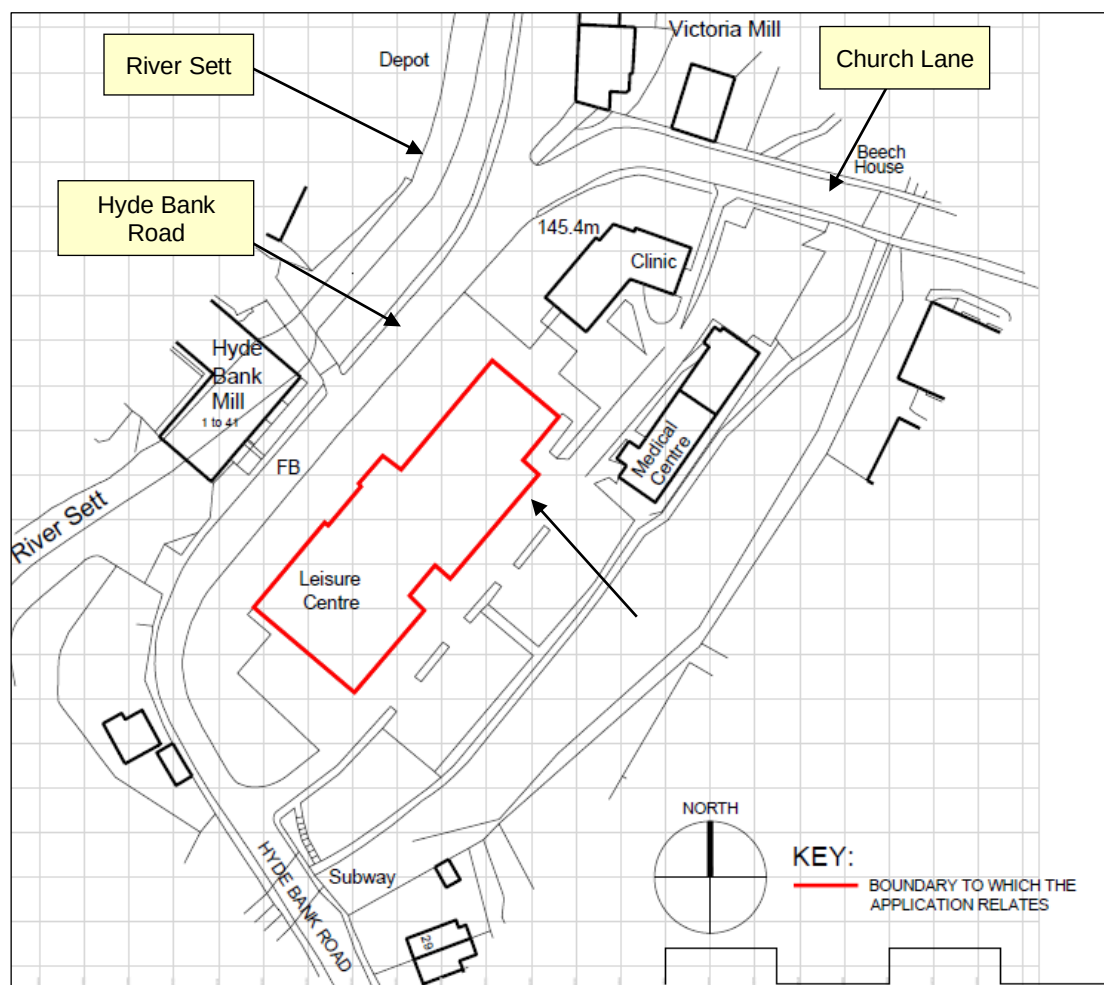


Figure 1: Site location plan

4.0 DESCRIPTION OF PROPOSED DEVELOPMENT

The proposal to which this report relates is the installation of an air handling unit (AHU) on the roof of New Mills Leisure Centre. The AHU is to serve the swimming pool within the Leisure Centre.

Figure 2 and 3 show the proposed location of the roof-mounted AHU. The AHU is located towards the centre of the main Leisure Centre building.

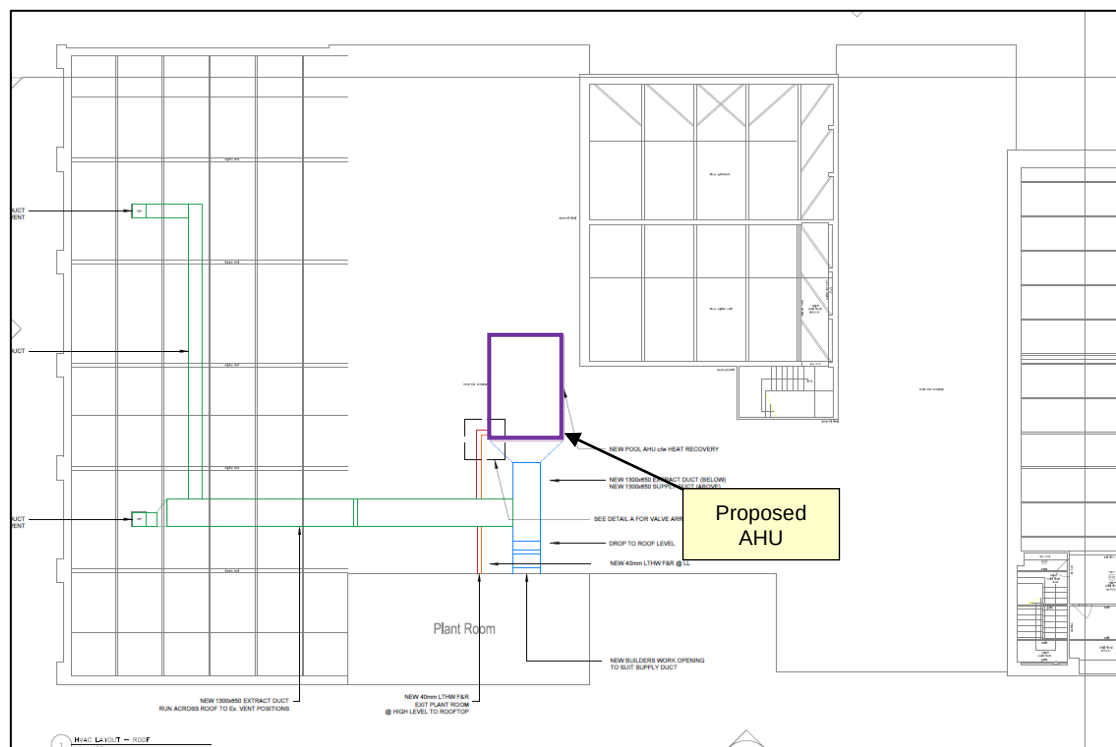


Figure 2: Proposed plan at roof level

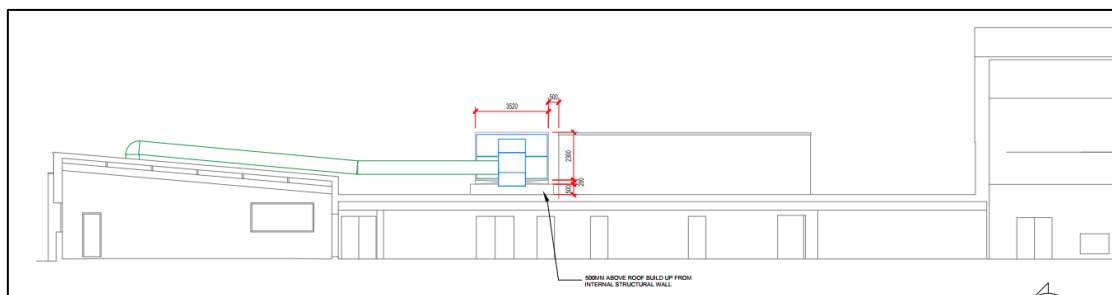


Figure 3: Proposed south elevation

5.0 PUBLISHED GUIDANCE ON ENVIRONMENTAL NOISE

For noise of an industrial nature such as fixed building services plant, an assessment of the likely effects on people inside or outside residential buildings due to noise can be carried out using BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'.

The following acoustic parameters are described within BS 4142:2014+A1:2019:

- Specific Noise Level – the equivalent continuous A-weighted sound pressure level measured over a specified time period, T_r , at the assessment position with the specific noise source contribution, L_{Aeq, T_r} (i.e. the noise level due to the new noise source).
- Rating Level – the Specific Noise Level plus an adjustment for any characteristic noise features, L_{Ar, T_r}
- Residual Noise Level – the equivalent continuous A-weighted sound pressure level measured when the specific noise does not contribute to the ambient noise
- Background Noise level – measured for a specific duration, T , in the absence of the specific noise source, $L_{A90, T}$

To complete a BS4142 assessment of potential noise effects upon residential properties, it is necessary to obtain the Rating Level due to the sound source in question. The Rating Level is derived by adding corrections to the measured Specific Noise Level if the noise source:

- is tonal (correction of 0dB to +6dB, depending on severity)
- contains distinct impulses (correction of 0dB to +9dB, depending on severity)
- is intermittent (correction of +3dB if applicable)
- is otherwise distinctive against the residual acoustic environment (correction of +3dB)

For instance, where a sound source is strongly tonal and impulsive over the duration of the appropriate assessment period, a correction of +15 dB may apply.

The Rating Level can then be used in order to ascertain the *likelihood of complaints* due to industrial noise disturbance by subtracting the measured background noise level. The greater the positive difference, the greater the likelihood of complaints.

Table 1 summarises the assessment method.

Difference between Rating Level and Measured Background Level	Assessment
+10 dB or greater	Significant adverse impact
+5 dB	Indication of adverse impact, depending on context
0 dB or less	Indication of low impact, depending on context

Table 1: BS 4142:2014+A1:2019 Assessment Method

Where a new noise source has not yet been introduced, a recommended specific noise level can be determined based on a knowledge of the existing background noise level.

It is recommended that a Rating Level for the proposed AHU that is 5dB lower than the pre-existing background noise levels at the closest residential receptors to the Site is targeted.

Figure 4 identifies the closest noise sensitive receptors to the proposed AHU.

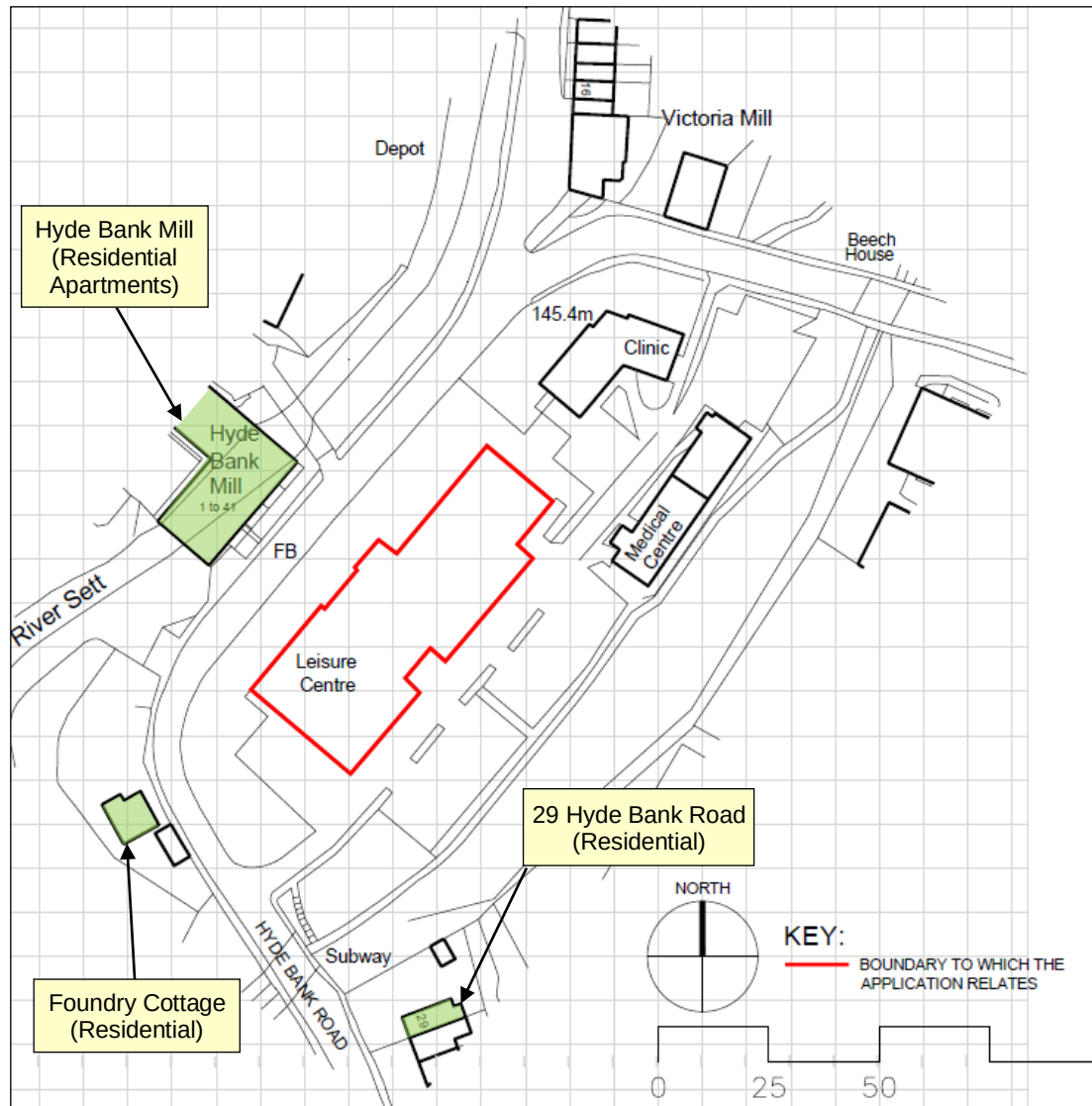


Figure 4: Closest noise sensitive receptors

The distances from the proposed AHU to the closest receptors are as follows:

- 29 Hyde bank Road: 75 metres
- Hyde Bank Mill: 40 metres
- Foundry Cottage: 55 metres

6.0 ENVIRONMENTAL NOISE SURVEY

In order to determine the prevailing ambient noise levels at and around the Site, manned surveys of the existing noise environment were carried out by Fisher Acoustics Ltd from 11:15pm Thursday 16 January 2025 to 0:30am Friday 17 January 2025 and from 09:50am to 11:00am on Monday 20 January 2025.

The measurement locations used for the surveys are identified in Figure 5 and are representative of the closest noise sensitive receptors to the Site. The measured noise levels can therefore be used to determine acceptable levels of noise at the receptors due to noise from the proposed AHU.

The measurement locations were as follows:

- Location 1: With New Mills Leisure Centre car park, in line with the west facing (rear) façade of 29 Hyde Bank Road, at a microphone height of 1.5 metres above ground level
- Location 2: At Hyde Bank Mill, at a microphone height of 1.5 metres above ground level
- Location 3: Hyde Bank Road, due south from the Leisure Centre at a microphone height of 1.5 metres above ground level

Full survey details are given in Appendix A. Appendix A also contains a summary of the results obtained from the surveys.

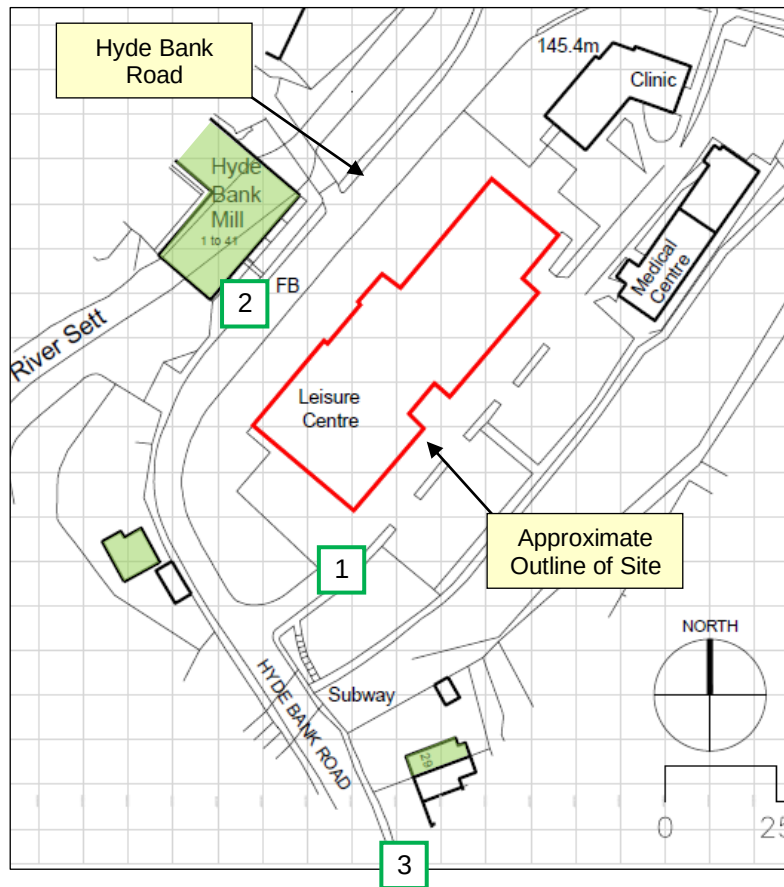


Figure 5: Noise survey measurement locations

The long-term background noise environment around the Site is governed by the River Sett, distant road traffic, occasional car movements on Hyde Bank Road and occasional aircraft over-flights

The noise levels measured during the noise surveys are summarised in Table 2.

Measurement Location	Measured Noise Level					
	Daytime (defined as 7 am to 11 pm)			Night time (defined as 11 pm to 7 am)		
	dB, LAeq	dB, LAmax	dB, LA90	dB, LAeq	dB, LAmax	dB, LA90
1	54	61 to 78	45	47	54 to 71	45
2	61	76 to 80	46	52	57 to 80	47
3	-	-	-	53	62	52

Table 2: Summary of measured environmental noise levels

The statistical noise levels ('LA_{max}' and 'LA₉₀') given in Table 2 show the range of noise levels measured over the sample periods. The quoted average (LA_{eq}) noise levels are the average noise levels measured over the full measurement periods in question at each measurement position.

7.0 ALLOWABLE EXTERNAL NOISE LEVELS DUE TO BUILDING SERVICES

The measured background noise levels around the Site can be used to establish the acceptable level of noise from the proposed AHU. With reference to the discussion in Section 5.0, it is recommended that the rating level due to the operation of the AHU is at least 5 dB lower than the typical pre-existing background noise level at the closest noise sensitive receptors to the Site.

Table 3 identifies the recommended allowable free-field rating level at the closest noise sensitive receptors due to the AHU.

Location	Rating Level (dB LAeq)	
	Daytime (07:00 hrs to 23:00 hrs)	Night time (23:00 hrs to 07:00 hrs)
29 Hyde Bank Road	40	40
Hyde Bank Mill	40	40
Foundry Cottage	40	40

Table 3: Environmental noise limits for non-emergency building services plant

8.0 CALCULATED EXTERNAL NOISE LEVELS DUE TO AHU

Table 4 identifies the reported in-duct sound power levels of the proposed AHU.

Building services plant item	Sound Power Level (dB re 1 x 10 ⁻¹² Watts)							
	dB(A)	Octave Band Centre Frequency (Hz)						
		63	125	250	500	1k	2k	4k
Supply Fan Inlet, duty: 5.25 m ³ /s at 425 Pa (Induct)	75	69	85	76	71	69	66	62
Supply Casing Radiated*	62	64	74	66	56	48	40	32
Extract Fan Outlet, duty: 5.53 m ³ /s at 350 Pa (Induct)	82	75	86	79	80	76	73	70
Extract Casing Radiated*	66	70	75	69	65	55	47	40

Table 4: Sound power levels of AHUs

* Estimated using anticipated sound reduction of AHU casing

Based on the reported sound power level of the AHU detailed above and the distance to the closest noise sensitive properties, the expected noise levels at the properties have been calculated.

With no attenuators fitted to the AHU, the calculated noise level at the noise sensitive receptors exceeds the targets in Table 3 by 7dB at Hyde Bank Mill. It is therefore recommended that attenuators are fitted to the fresh air inlet and the exhaust of the AHU to achieve the applicable noise limits.

Table 5 gives the calculated minimum recommended dynamic insertion loss of the attenuators.

Location	Minimum Dynamic Insertion Loss, Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
AHU Fresh Air Intake	0	4	6	12	13	7	3
AHU Exhaust	0	4	6	12	19	11	7

Table 5: Recommended Dynamic Insertion Loss of AHU attenuators

Table 6 identifies the calculated noise levels at the closest noise sensitive receptors due to the AHU operating at normal duty given the attenuator performance identified in Table 5.

Receptor Location	Free-field Sound Pressure Level (dBA)			
	Day-time		Night-time	
	Noise Level (LAeq)	Limit (LA90)	Noise Level (LAeq)	Limit (LA90)
29 Hyde Bank Road	32	40	32	40
Hyde Bank Mill	37	40	37	40
Foundry Cottage, Hyde Bank Road	35	40	35	40

Table 6: Calculated noise levels at the closest noise sensitive receptors due to proposed AHU

With reference to Table 6, it can be seen that the calculated noise levels comply with the applicable noise limits.

Although the noise from the AHU at the noise sensitive receptors is not expected to be tonal or impulsive and the AHU is not expected to operate intermittently, no noise corrections as described in BS4142 are expected to be applicable.

Any noise sensitive receptors that are at a greater distance from the New Mills Leisure Centre AHU than the receptors identified in Figure 4 will benefit from greater attenuation of noise due to increased distance from the AHU. Therefore, compliance with the identified noise limits at any other receptor is also fully expected.

Conclusion

Based on the reported sound power levels of the proposed AHU at New Mills Leisure Centre and the minimum recommended performance of attenuators detailed in this report, the calculated noise levels at the closest noise sensitive receptors comply with the applicable environmental noise criteria.

The expected noise levels at the closest noise sensitive receptors due to the operation of the proposed AHU are therefore considered to be fully commensurate with the maintenance of residential amenity.

APPENDIX A: NOISE SURVEY DETAILS AND SUMMARY RESULTS

LOCATION

New Mills Leisure Centre, Hyde Bank Road, New Mills, High Peak, SK22 4BP

DATES AND TIMES

11:15 pm to 0:30am, Thursday 16 to Friday 17 January 2025

09:50am to 11:00am, Monday 20 January 2025

WEATHER DURING SURVEYS

Thursday 16 to Friday 17 January 2025 (Night-time) 1/8 cloud cover, 2.6 m/s wind, no rain, 5°C

Monday 20 January 2025 (Day time) 8/8 cloud cover, < 1 m/s wind, occasional light rain, 3°C

PERSONNEL PRESENT DURING SURVEY

Matt Fisher – Fisher Acoustics

INSTRUMENTATION

Norsonic Type 140 IEC 60651 Type 1 Integrating-Averaging Sound Level Meters (serial no. 1403193)

Norsonic Type 1251 IEC 60942-1997 Class 1 Sound Calibrators (serial no. 27878)

MEASUREMENT METHODOLOGY

Before and after the noise survey the sound level meter was check calibrated to an accuracy of $\pm 0.3\text{dB}$ using the Norsonic Type 1251 Calibrator - no drift in sensitivity was detected. The measurement microphone was installed at the locations identified in this report. All survey measurements were in 'free field' conditions.

Tables A1 and A2 identify the free-field noise levels measured around the Site. Measurement locations are shown in Figure 4 and described below:

- Location 1: With New Mills Leisure Centre car park, in line with the west facing (rear) façade of 29 Hyde Bank Road, at a microphone height of 1.5 metres above ground level
- Location 2: At Hyde Bank Mill, at a microphone height of 1.5 metres above ground level
- Location 3: Hyde Bank Road, due south from the Leisure Centre at a microphone height of 1.5 metres above ground level

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
1	23:15	46.8	62.1	45.3	River Sett, distant traffic
2	23:30	55.8	80.2	47.2	River Sett, distant traffic, car pass-by
1	23:40	46.1	54.2	45.3	River Sett, distant traffic
3	23:54	52.5	61.6	51.8	"
2	00:00	48.0	59.8	47.2	"
1	00:07	46.9	71.4	44.9	River Sett, distant traffic, car pass-by
2	00:22	47.6	56.7	47.1	River Sett, distant traffic

Table A1: Summary Statistical Noise Levels – Night-time, 16th to 17th January 2025

Measurement Position	Start Time	Measured Noise Levels, dB			Background noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
1	09:53	53.2	69.2	45.2	River Sett, car pass-bys
2	10:06	62.3	79.5	47.9	"
1	10:16	57.4	78.2	47.4	River Sett, car pass-bys, Idling car close to measurement position
2	10:31	59.4	76.4	45.9	River Sett, car pass-bys
1	10:41	53.5	67.4	46.1	River Sett, car pass-bys, New Mills School playground
2	10:51	59.6	79.0	45.7	River Sett, car pass-bys
1	10:57	49.7	60.8	45.0	"

Table A2: Summary Statistical Noise Levels – Daytime, 20th January 2025