

Project

Dixons Newall Green Academy
Plant noise assessment (main building)

Prepared for

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PI	06/06/2025	First issue	Adam Dixon

Summary

SRL have been appointed to assess the noise impacts of fixed plant and externally terminating services associated with the new and refurbished buildings at Dixon's Newell Green Academy on Greenbrow Road in Wythenshaw.

We have used data for the proposed plant and services to predict noise levels at the residential receptors surrounding the school and compared these against the background noise levels measured by Pace Consult for the DfE.

The predicted noise levels are 5 dB below the background noise levels in rear gardens of the nearest residential receptor. This meets the noise limit set out in planning Condition 22.

Although not strictly a requirement of the planning condition, we have also considered the impact of noise levels of the surrounding residential area. The predicted levels in the other residential gardens and amenity areas are expected to be $\leq 32\text{dB } L_{A_{r,Tr}}$. It is not clear from the existing noise survey data what the existing background noise levels at the other receptors are.

BS4142 states that when noise emissions are very low (defined as being $\leq 30\text{dB } L_{A90}$ background level or $35\text{dB } L_{A_{r,Tr}}$ rating level by the Association of Noise Consultants guidance), it is not appropriate to assess noise using BS4142 methodology, as levels this low are typically not likely to cause a significant noise impact on receptors even if it exceeds the existing background noise level. As the noise levels at all receptors are below $35\text{dB } L_{A_{r,Tr}}$, we believe Planning Condition 22 can be discharged despite the lack of information regarding the existing noise levels at some of the receptors.

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1.0 Introduction

Morgan Sindall is working on a scheme to refurbish and extend buildings for Dixon's Newell Green Academy, on Greenbrow Road in Wythenshaw. The scheme includes new fixed plant and externally terminating building services, including Air Source Heat Pumps (ASHPs), Air Handling Units (AHUs), Mechanical Ventilation with Heat Recovery units (MVHRs), extract fans and IT cooling condenser units. Figure I shows a 3-D render of the scheme and the surrounding residential areas.

Figure I - 3D render of scheme



The planning approval for the main school building includes a condition limiting noise from plant and services at the nearest noise sensitive receptor, which is the houses on Barnacre lane immediately to the south of the site (highlighted in orange). We have modelled the noise levels from the various plant and services and assessed the resultant impacts. This report presents the results of that assessment.

2.0 Noise criteria and guidance

2.1 Planning condition 22

The planning approval for the scheme includes the following condition in relation to noise from building plant and services:

22) a) 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 (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.

b) Prior to the operation of the scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have 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 minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site pursuant to Core Strategy Policy DM1 and saved Unitary Development Plan policy DC26.

2.2 BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*

BS 4142 provides a method to assess whether “sound of an industrial and/or commercial nature” is likely to have an adverse impact at noise sensitive receptors.

When comparing such sound (the “specific” noise) against existing background noise levels, BS 4142 highlights that certain acoustic features (such as tonality, impulsivity, intermittency, and so on) can increase any significance of impact. Where this occurs, penalties can be applied to the specific noise level, in accordance with the guidance set out in BS 4142, to provide the “rating level” of the noise source.

Comparison of the rating level to the background noise level indicates the significance of the new noise source at the receptors under assessment. Typically, the greater this difference, the greater the magnitude of the impact.

- A difference of around + 10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

- A difference of around + 5 dB or more is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured typical background noise level, the less likely it is that the specific sound source will have an adverse impact.
- Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact, depending on the context.

BS 4142 states that “In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.”

3.0 Background noise levels

The DfE commissioned Pace Consult Ltd to measure noise levels at the site as part of the feasibility study for the project. The results of these measurements were presented in their report 'PC-22-0086-RPI' dated 06/01/2022. The relevant parts of that report are reproduced below:

Figure 2 - Pace Consult measurement locations



The graphs of the logged noise levels are shown in Appendix A of this report. From the Pace Consult plots, we have determined the following typical daytime and night-time background noise levels at MP2, which we would expect to be representative of noise levels at the nearest receptors on Barnacre lane

Measurement Position	Period	Typical background noise level, dB L _{AF90}
MP2	Daytime (07:00 - 23:00)	41
	Night-time (23:00 - 07:00)	33

4.0 Predicted noise levels

4.1 Proposed plant

The proposed plant is as follows:

- 3 roof-mounted Air Source Heat Pumps (ASHPs)
- 2 roof mounted and 1 internal Air Handling Units (AHUs)
- 2 internal Mechanical Ventilation with Heat Recovery units (MVHRs)
- 1 external IT cooling unit
- Various extract fans

A full list of plant and equipment numbers is contained in Appendix B of this report. The classrooms are also served by fan assisted hybrid ventilation units, but these are not expected to generate significant noise levels outside the buildings and are therefore not included in the model.

The ASHP and IT cooling equipment could run at any time of day or night. The ventilation plant will only operate during the daytime.

4.2 Noise model

We have built a 3D noise model of the site in noise propagation software *CadnaA* to calculate the cumulative plant noise levels at the nearest noise sensitive receptors (Figure 3). We have summarised the relevant plant noise data and attenuation in Appendix A. The model uses the guidance contained in BS EN ISO 9613:2024 and a plot of the predicted noise levels is shown in Figure 3. The model predicts plant noise levels of 28 dB $L_{Aeq,T}$ in the rear garden of the nearest house.

Figure 3 - 3D view from CadnaA model showing school building and surrounding area



4.3 BS4142 assessment – Barnacre Gardens

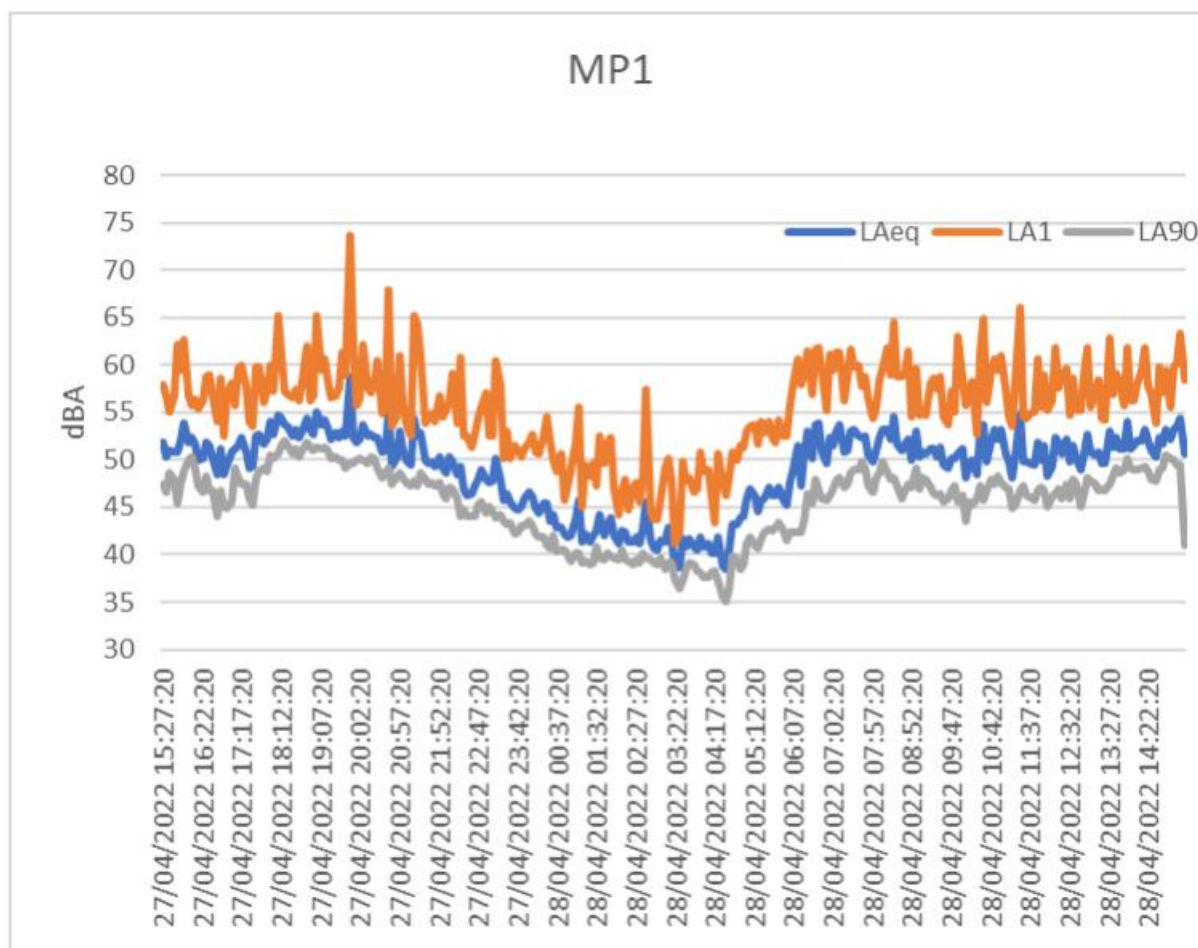
The predicted noise levels are dominated by noise from the ASHPs. We understand that these units will have slow ramp up/down functions and on this basis we would not expect a rating level correction for intermittency or other acoustic characteristics to be required. Therefore, the rating level of noise from school plant and services is **28 dB L_{Ar,Tr}**. This is 5 dB(A) below the background noise levels measured nearby at MP2 and therefore we consider that the noise limits set out in planning condition 22 are met.

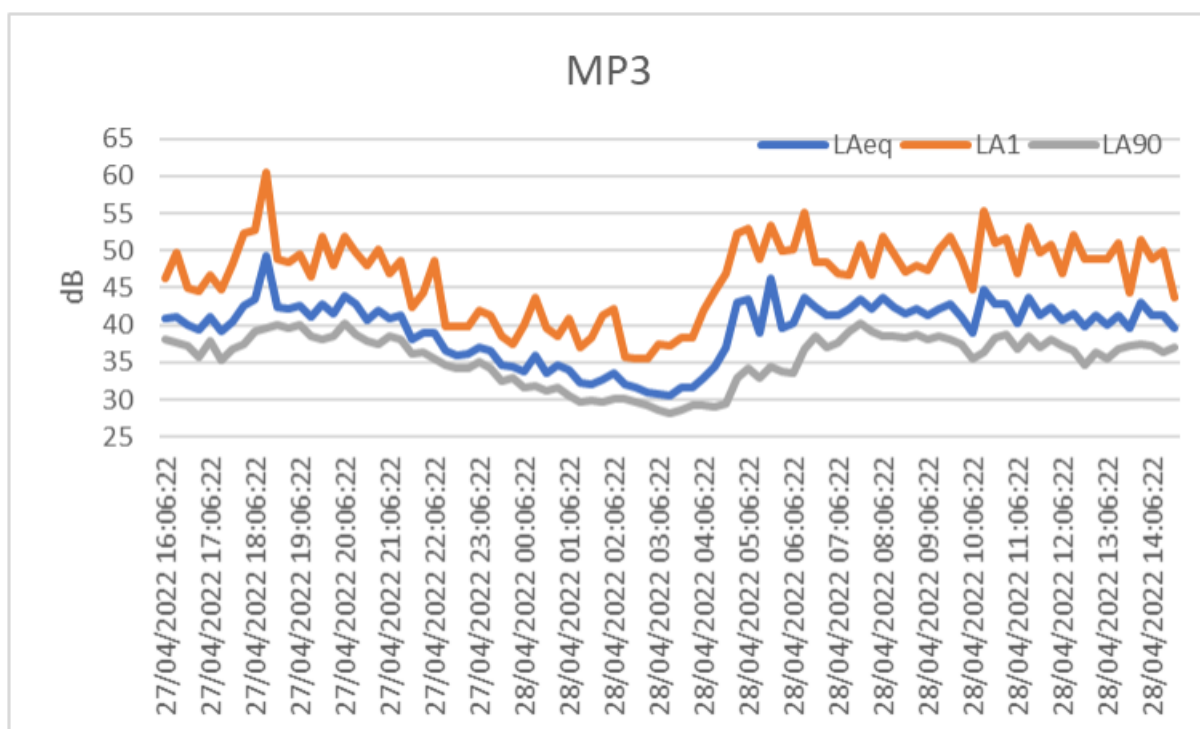
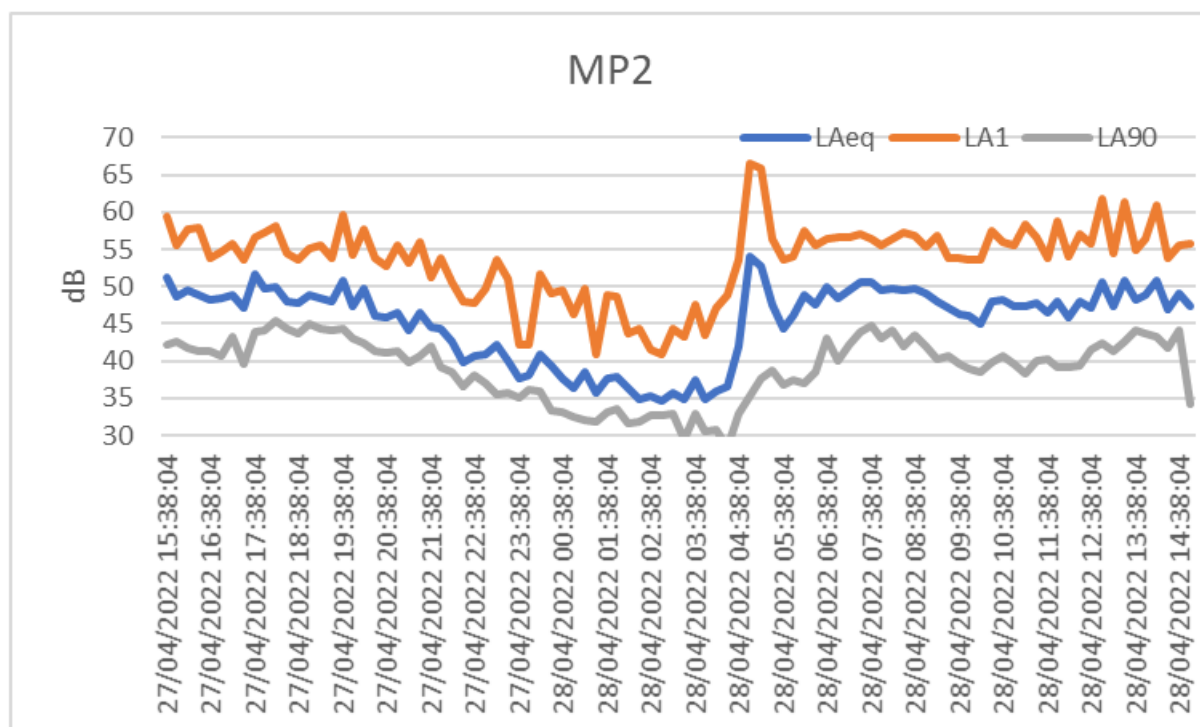
4.4 Noise levels in other residential areas

Although not strictly a requirement of the planning condition, we have also considered the impact of noise levels of the surrounding residential area. The model predicts noise levels of up to 32 dB L_{Aeq,T} in the back gardens and other residential amenity areas surrounding the site. We would not expect the DfE's background noise survey data to be directly applicable to any of these receptors. However, these levels are dominated by the noise from the ASHPs in each case and the predicted levels are all within the new more stringent permitted development noise limits for domestic ASHPs set out in MSCS020a. Although not technically applicable to non-domestic ASHPs this is a positive indication that noise from the ASHPs will not have an adverse impact on any of the surrounding residential receptors.

Additionally, BS4142 states that when noise emissions are very low (defined as being ≤ 30 dB L_{A90} background level or 35 dB L_{Ar,Tr} rating level in the Association of Noise Consultants guidance) it is not appropriate to assess noise using BS4142 methodology, as levels this low are typically not likely to cause a significant noise impact on receptors even if it exceeds the existing background noise level. As the noise levels at all receptors are below 35 dB L_{Ar,Tr}, we believe Planning Condition 22 can be discharged.

Appendix A – Pace Consult noise levels





Appendix A - Plant noise data

A1. ASHP

Ref.	Sound Power Level dB L _w , at octave band centre frequency, Hz							
	63	125	250	500	1k	2k	4k	8k
ASHP	90	89	88	86	83	78	71	65

A2. AHUs and MVHRs (AHRs)

Ref.	Type	Sound Power Level dB L _w , at octave band centre frequency, Hz							
		63	125	250	500	1k	2k	4k	8k
AHU 001 *	Inlet	45	50	62	67	66	63	55	49
	Exhaust	48	53	67	73	73	71	67	61
	Casing Breakout	38	44	55	53	47	40	32	18
AHU 002 *	Inlet	45	50	62	67	66	63	55	49
	Exhaust	45	51	65	71	71	69	65	59
	Casing Breakout	40	41	52	51	48	37	27	13
AHU 003 *	Inlet	40	56	69	75	76	74	67	62
AHR 070 *	Inlet	38	43	56	32	63	61	55	50
	Exhaust	40	45	59	65	64	62	56	50
AHR 071 *	Inlet	45	47	52	49	43	40	44	41
	Exhaust	39	44	57	63	64	62	57	52

*data is pre A-weighted.

A3. Fans

Ref.	Type	Sound Power Level L _w , at octave band centre frequency, Hz							
		63	125	250	500	1k	2k	4k	8k
FAN001*	Exhaust	21	31	37	48	43	44	36	30
FAN002*	Exhaust	40	46	61	65	59	50	46	49
	Casing	35	38	44	44	34	27	19	20
FAN003	Exhaust	89	71	77	81	84	84	80	68
FAN004*	Exhaust	50	55	63	63	59	52	46	45
	Casing	-	43	45	41	34	28	19	14
FAN005	Omitted								
FAN006*	Exhaust	20	37	48	48	52	52	47	37
FAN007*	Exhaust	21	31	36	37	42	43	35	29

*data is pre A-weighted.

A4. Attenuator data

Ref.	Type	Insertion loss, dB, at octave band centre frequency, Hz							
		63	125	250	500	1k	2k	4k	8k
AHU1	Inlet	4	8	13	21	32	28	24	16
	Exhaust	4	8	13	21	32	28	24	16
AHU2	Inlet	4	8	13	21	32	28	24	16
	Exhaust	4	8	13	21	32	28	24	16
AHU3	Inlet	5	8	16	25	35	28	24	24
ARU 070	Inlet	10	17	26	36	37	34	29	20
	Exhaust	7	12	20	28	35	28	23	14
ARU 071	Inlet	2	3	7	18	25	19	17	13
	Exhaust	2	3	7	18	25	19	17	13
FAN001	Exhaust	1	2	6	16	23	19	17	12
FAN002	Exhaust	3	9	14	22	30	30	27	23
FAN003	Exhaust	8	14	21	34	42	32	29	19
FAN004	Exhaust	2	3	7	18	25	19	17	13
FAN005	Omitted								
FAN006	Exhaust	1	2	6	16	23	19	17	12
FAN007	Exhaust	1	2	6	16	23	19	17	12

A6. IT Cooling

Ref.	Sound Power Level dBA L _w , at octave band centre frequency, Hz
CON 006	67 dBA

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