



Mansion
House, New
Islington,
Manchester

Plant Noise Assessment – Discharge of Planning Condition 23

January 2021



Ref: 18-3911
Planning
Condition 23

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<i>Revision</i>	-
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1. Executive Summary

This report has been prepared to discharge a Planning Condition for the approved development at **Mansion House, New Islington, Manchester**. The approved scheme involves the construction of 4 blocks containing commercial space on the ground floor and residential flats on floors 1 – 5 above.

The proposed plant will comprise 8No. extract fans located on the roof of the building.

The residential part of the approved development will comprise 4 blocks each containing 2 flats on each floor. The flats will be a mixture of 1 and 2 bedroom flats.

The report assesses, through on-site noise measurements and manufacturers data, the impact of the proposed external plants units on nearby noise sensitive receptors.

The approved development site is located to the south west of Coppersmith Road, Manchester, adjacent to the New Islington Phase 1 residential development. Beyond Coppersmith Road and Weybridge Road to the north east is an area of existing residential housing. The south east of the site is currently open brownfield land before Old Mill Street. To the south west of the site is New Islington Marina, which provides narrow boat moorings and the Central Retail Park beyond comprising retail units. Directly to the west of the site across New Islington Marina is the New Islington Free School, which is currently under construction and further construction is also underway land to the north west of Keepers Quay.

The results of the assessment have identified that the plant as proposed would produce a noise level below the level at which a *low impact* would be expected. The calculations are worst-case and assume a 100% on-time, which is unlikely in practice. It is also noted that the units are unlikely to be used regularly at night.

Accordingly, it can be safely concluded that the plant would not be expected to give rise any adverse impacts on the nearby noise sensitive receptors. This is in line with the aims of Planning Condition 23 and the condition can therefore be discharged.

2. Introduction

This report has been prepared to discharge a Planning Condition for the approved development at **Mansion House, New Islington, Manchester**. The approved scheme involves the construction of 4 blocks containing commercial space on the ground floor and residential flats on floors 1 – 5 above.

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The locations of the proposed plant equipment and nearest noise sensitive receptors are provided in **Figure 2.1**. The nearest noise sensitive receptors are located approximately 15m to the north and 12m higher (5th floor roof compared to 1st floor of the house) and are part of Phase 1 of this residential development.

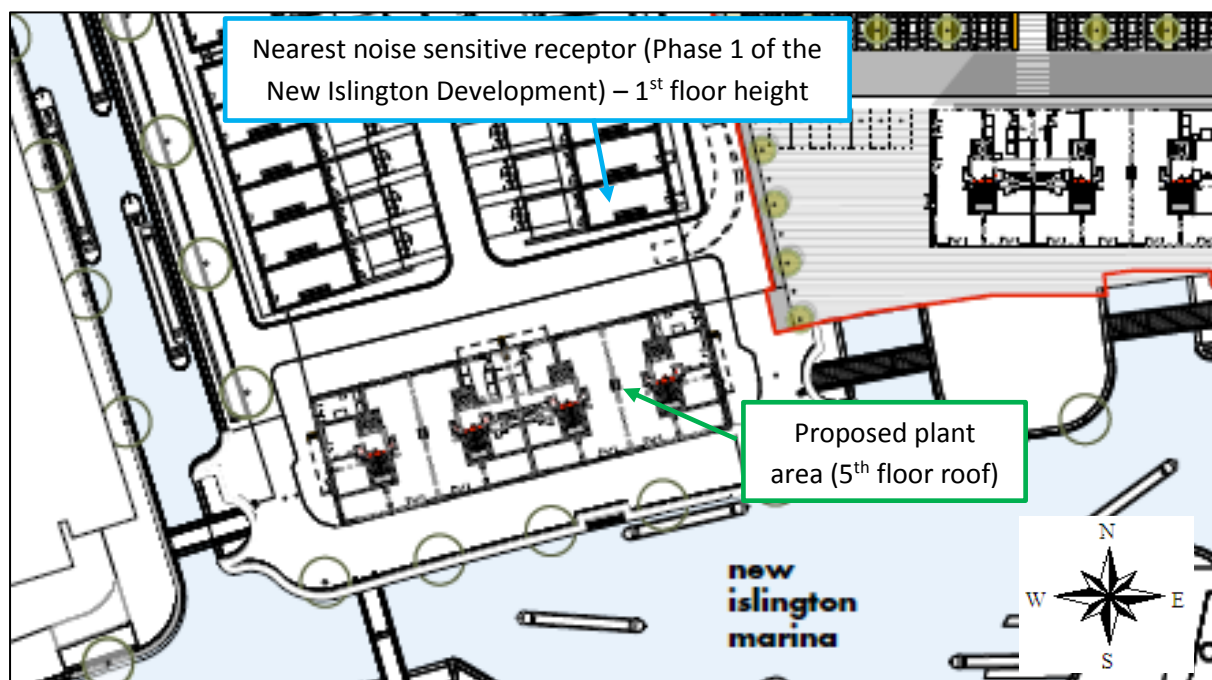


Figure 2.1: Site Location

3. Planning Condition and Guidance Documents

3.1. Planning Condition 23

The development was granted planning permission by Manchester City Council on the 5th April 2016 (application reference 111587/FO/2016/N1). As part of the planning permission, several conditions were set and this report will provide the necessary data to discharge Planning Condition 23, which states:

“23) Before first occupation of the development, any necessary externally mounted ancillary equipment, shall be acoustically insulated in accordance with a scheme 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 equipment.”

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

It is noted that the wording of the Condition is unusual in that it doesn't set any assessment methodology or a criterion to achieve. Accordingly, Syntegra will demonstrate the level of noise impact from the plant items against BS 4142:2014 in accordance with normal good practice and the aim will be demonstrate that adverse impacts from the effects of noise are avoided.

3.2. British Standard 4142:2014

British Standard 4142:2014 *“Methods for rating and assessing industrial and commercial sound”* provides a method for the measurement and rating of industrial type noise sources and background noise levels outside dwellings. The rating level (defined in the BS) is used to rate the noise source outside residential dwellings (this is defined as the “specific sound level”).

The rating level is determined by assessing the character of the noise and applying an acoustic feature correction if appropriate. Corrections are applied for the tonality and intermittency of the noise source which can both make noise more noticeable.

The initial assessment described in BS 4142 to determine whether an adverse impact is likely is based on establishing the difference between the rating level and the background noise level outside the residential property of interest. The British Standard states that the following points should be considered:

- *‘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 is likely to be an indication of an adverse impact, depending on the context.*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.’*

Where it is considered that the initial assessment of the impact needs to be modified due to the context in which the noise is occurring, BS 4142 suggests that all pertinent factors are taken into consideration, including:

- 1) *'The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

Where residual sound ¹levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

- 2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*
- 3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*
 - i) *facade insulation treatment;*
 - ii) *ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and*
 - ii) *acoustic screening.'*

¹ The residual sound is defined as the ambient sound level at the assessment location in the absence of the specific sound source.

4. Baseline Noise Levels

A previous environmental noise survey has been carried out by Sol Acoustics between 1100 hrs on Friday 20th January 2017 and 1000 hrs on Monday 23rd January 2017. The measurement survey is detailed in Sol Acoustic's report "*Environmental and Intrusive Noise Study*" dated 16th February 2016 with reference P1710 REP01-SJF.

The noise measurements utilised two Norsonic 118 Type 1 sound level meters. The meters were field-calibrated immediately prior to and following each measurement period. Full details of equipment are provided in **Appendix 3**.

During the noise measurement survey the prevailing weather conditions were suitable for the purposes of environmental noise measurements throughout the noise survey, albeit light, intermittent rain occurred occasionally between 1100 hrs and 1630 hrs on Sunday 22nd January. Mean wind velocities were below 5 mph throughout the survey.

Measurement Position 1 (MP1) was located at a height of 4 metres above local ground level to ensure that the microphone was unobstructed and entirely unscreened from the existing timber site hoarding surrounding the site. The microphone was located close to the intersection of Winder Drive and Weybridge Road to the northern end of the proposed Development.

Measurement Position 2 (MP2) was located at a height of 4 metres above the local ground level in the southern tip of the New Islington Phase 2 site, with full line of sight to road traffic on Old Mill Street.

The noise monitoring positions are shown in **Figure 4.1**.

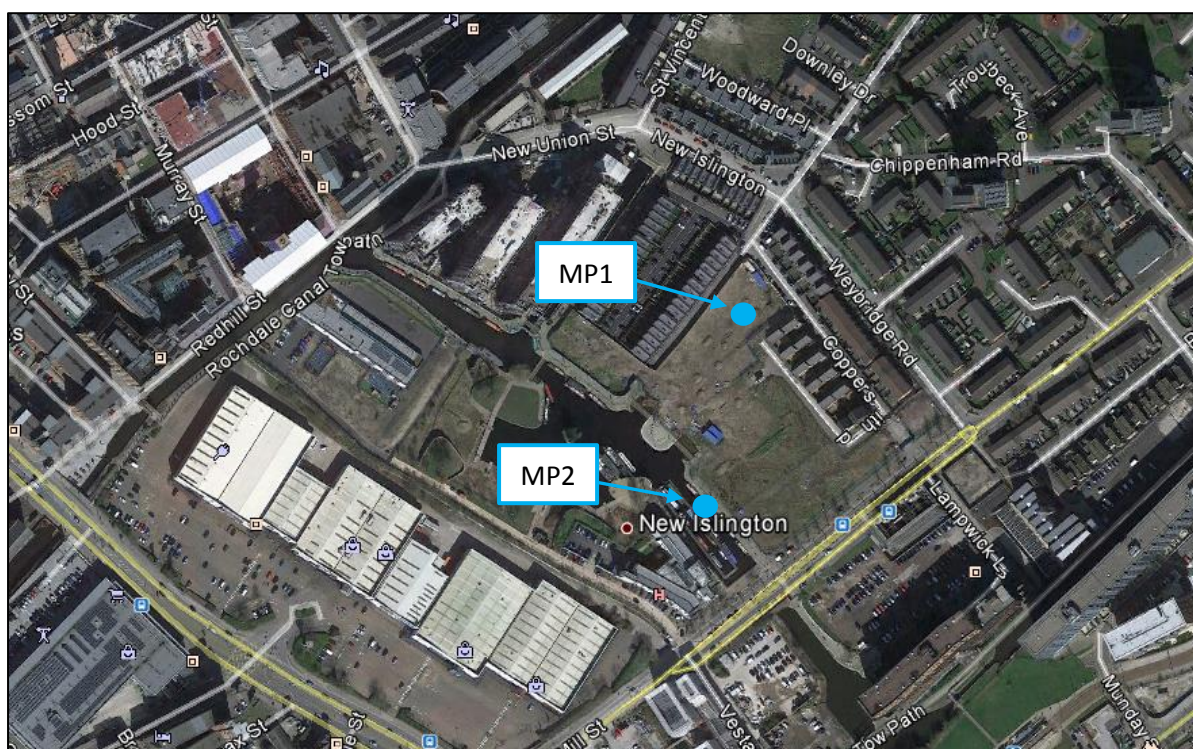


Figure 4.1: Noise Monitoring Locations

Table 4.1 below displays a summary of the measured noise levels and detailed measurement results are presented in **Appendix 4**.

Measurement Position	Period (hours)	$L_{Aeq,T}$ (dB)	L_{A90} (dB)
MP1	Daytime (0700 – 2300)	54	40
	Night-time (2300 – 0700)	45	35
MP2	Daytime (0700 – 2300)	53	40
	Night-time (2300 – 0700)	48	34

Table 4.1: Summary of Free Field Semi-Permanent Noise Levels

Notes: (1) The average noise levels stated are logarithmic for L_{Aeq} .

(2) The L_{A90} noise levels stated are the lowest measured L_{A90} value stated in the Sol Acoustics report. Whilst it is usual for a BS 4142 assessment to be carried out against the “typical” $L_{A90,1hr}$ during the daytime and $L_{A90,15min}$ during the night-time, insufficient data is available from the Sol Acoustics report to determine these levels. Accordingly, utilising the lowest report L_{A90} values represents a worst-case assessment.

5. Plant Noise Levels

5.1. Plant Noise Levels

The plant noise levels have been obtained from manufacturers data. A summary of the manufacturers noise levels is presented in **Table 5.1** and the proposals are to install 8No. of the same extract fan units. No other external plant is proposed. Detailed noise levels are presented in **Appendix 5**.

Plant Reference	Noise Source	Quoted Sound Power Level L _{WA} (dB)
Nuaire DE-Dave DE6-ES	Induct Outlet	76
	Breakout	62

Table 5.1: Plant Noise Levels

5.1.1. Plant Noise Levels – Penalties

The plant noise levels and operating conditions have been assessed by Syntegra in line with the advice provided within BS 4142:2014 and the following penalties will be added:

- Tonality: 0 dB (see **Appendix 5**)
- Impulsivity: 0 dB
- Noticeable feature (e.g. hum, whine, hiss): 0 dB.

The total penalty for the plant noise level features will therefore be +0 dB.

5.2. Inherent Mitigation

The outlet point of each extract fan has been fitted with an attenuator, the details of which are provided in **Table 5.2**.

Attenuator	Insertion Loss (dB) by Frequency (Hz)						
	125	250	500	1000	2000	4000	8000
Nuaire CA40L Circular 400mm un-podded attenuator	-3	-3	-7	-13	-14	-12	-8

Table 5.2: Attenuator Insertion Loss

5.3. Receptor Noise Levels

The future plant noise levels at the nearest noise sensitive receptor have been predicted using standard acoustic formulae based on the measured noise levels and are detailed in **Table 5.3**. The nearest noise sensitive receptor has been taken to be the New Islington Phase 1 Houses 15m to the north and 12m higher (approximately 19m total distance). The calculations for the outlet point have been carried out in octave bands for the silencer and end reflection and reported as an overall correction to the A-weighted level in **Table 5.3** for ease of reporting.

	Receptor (New Islington Phase 1 House)
Outlet Point	
Sound Power Level (L_{WA} dB)	76
Correction for additional units (8 total) (dB)	+9
Distance to Nearest Habitable Room Window (approx.)	19m
Distance Correction (dB)	-26
Ductwork Correction (Silencer and End reflection)	-12
Screening Correction (dB) [note: full screening correction applied as plant located on 5 th floor roof and receptor at 1 st floor height]	-10
Predicted Noise Level at Receptor (L_{Aeq} dB)	29
Breakout	
Sound Power Level (L_{WA} dB)	62
Correction for additional units (8 total) (dB)	+9
Distance to Nearest Habitable Room Window (approx.)	19m
Distance Correction (dB)	-26
Screening Correction (dB) [note: full screening correction applied as plant located on 5 th floor roof and receptor at 1 st floor height]	-10
Predicted Noise Level at Receptor (L_{Aeq} dB)	27
Total Noise Level	
Total Predicted Noise Level at Receptor (L_{Aeq} dB)	31

Table 5.3: Predicted Plant Noise Levels

6. Plant Noise Assessment

The background noise level and plant noise data presented in **Sections 4** and **5** has been utilised to determine the noise impact at the nearest noise sensitive receptor when assessed using the methodology in BS 4142:2014. **Table 6.1** below summarises the BS 4142 assessment procedure carried out for the site.

Results	Daytime (0700 hrs – 2300 hrs)	Night-time (2300 hrs – 0700 hrs)	Relevant Clauses of BS 4142:2014	Commentary
Measured Ambient Sound Level	53	48	7.3.2	Refer to Table 4.1
Residual Sound Level	53	48	7.3.3	<i>The ambient noise level without the plant operating.</i> Refer to Table 4.1
Typical Background Sound Level L _{A90} (dB)	40	34	8.1, 8.2	Refer to Table 4.1
Specific Sound Level	31	31	9.1, 9.2	Refer to Table 5.2
Acoustic Feature Correction	0	0	9.2	Refer to Section 5.1.1
Rating Level L _{Ar} (dB)	31	31	9.1	Specific Sound Level + Acoustic Feature Correction
Excess of Rating over Background Sound Level	-9	-3	11	
	Assessment indicates below a <i>low impact</i>	Assessment indicates below a <i>low impact</i>	11	

Table 6.1: BS 4142 Assessment

Table 6.1 identifies that an assessment in line with BS 4142 indicates that **the plant noise will be below the level where a low impact would be expected at the nearest noise sensitive receptors during both the daytime and the night-time.**

6.1. Context of the Noise Source

BS 4142 advises that the “context” of the noise needs to be considered to determine the results of the assessment.

The plant unit types, which are extract fans, are most likely to be operational during the daytime. Night-time operation is not likely to regularly occur.

Additionally, the assessment a very worst-case 100% on-time, which is unlikely in practice as residential extract fans are used on as required basis only.

Finally, it is also noted that the predicted plant noise levels are significantly below the residual sound level during both the daytime and the night-time and that the lowest measured background noise levels have been utilised, as opposed to the typical background noise level. The assessment of impact is therefore very worst-case.

In consideration of the context of the noise source, including the likely time of day and patterns of use, the plant would not be expected to cause any adverse impacts on the health or quality of life of the nearest noise sensitive receptors and should therefore be acceptable.

6.2. Consideration of Uncertainty

The assessment has considered uncertainty by taking a cautious approach in terms of the likely noise levels from the activities and by taking conservative losses for the distance attenuation. The cautious approach means that the noise impact is more likely to be overstated, as opposed to understated, although it is not likely that the predicted noise levels would be significantly different from those stated within the report. Overall, it is unlikely that the conclusions of the assessment would be changed as a result of any uncertainty in the assessment process.

7. Conclusion

This report has been prepared to discharge a Planning Condition for the approved development at **Mansion House, New Islington, Manchester**. The approved scheme involves the construction of 4 blocks containing commercial space on the ground floor and residential flats on floors 1 – 5 above.

The proposed plant will comprise 8No. extract fans located on the roof of the building.

The results of the assessment have identified that the plant as proposed would produce a noise level below the level at which a *low impact* would be expected. The calculations are worst-case and assume a 100% on-time, which is unlikely in practice. It is also noted that the units are unlikely to be used regularly at night.

Accordingly, it can be safely concluded that the plant would not be expected to give rise any adverse impacts on the nearby noise sensitive receptors. This is in line with the aims of Planning Condition 23 and the condition can therefore be discharged.

8. Appendix 1: Glossary of Acoustic Terminology

Term	Description
'A'-Weighting	<i>This is the main way of adjusting measured sound pressure levels to take into account human hearing, and our uneven frequency response.</i>
Decibel (dB)	<i>This is a tenth (deci) of a bel. The decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of ratio between two quantities expressed in logarithmic form.</i>
$L_{Aeq,T}$	<i>The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. T may be as short as 1 second when used to describe a single event, or as long as 24 hours when used to describe the noise climate at a specified location. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.</i>
L_{A10}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 10 per cent of a given time and is the L_{A10T}. The L_{A10} is used to describe the levels of road traffic noise at a particular location.</i>
L_{A50}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 50 per cent of a given time and is the L_{A50T}.</i>
L_{A90}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 per cent of a given time and is the L_{A90T}. The L_{A90} is used to describe the background noise levels at a particular location.</i>
L_{Amax}	<i>The 'A'-weighted maximum sound pressure level measured over a measurement period.</i>

9. Appendix 2: Professional Statement

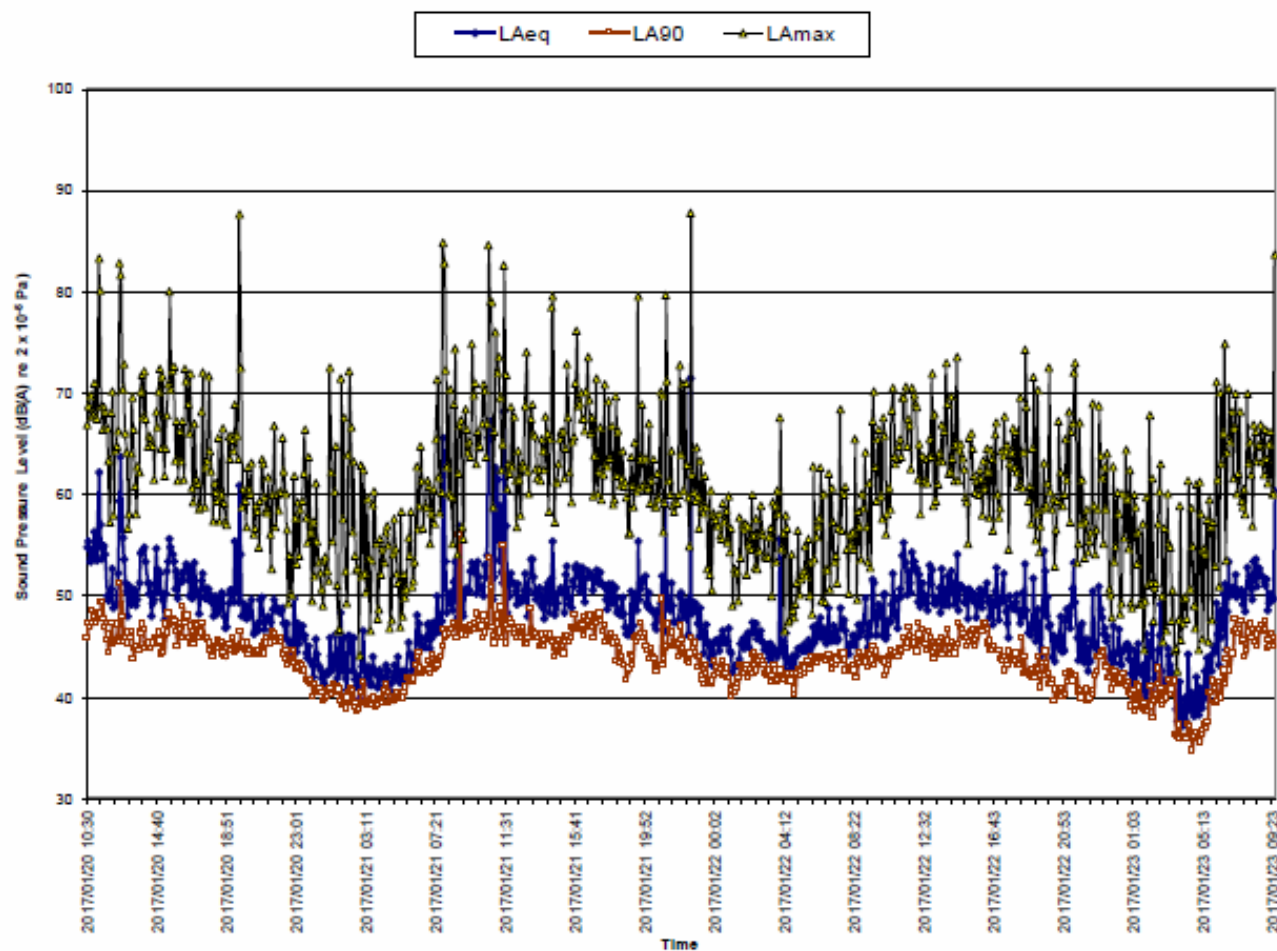
David Yates

David Yates is a full member of the Institute of Acoustics (MIOA) and has over ten years' experience in acoustic consultancy. David has particular expertise in environmental noise providing acoustic consultancy for residential and mixed use planning applications, plant noise and vibration, construction noise and the design of acoustic, noise and vibration control. David is also experienced in providing sound insulation testing and design advice. David is familiar with the application of all relevant standards associated with his work, including but not limited to, BS 4142, BS 8233, BS 7445, BS 6472, BS 5228, BS 140 series, BS 16283 series and BS 717 series. David manages the acoustic department and is responsible for maintaining Syntegra's ANC membership.

10. Appendix 3: List of Equipment

Equipment Type	Manufacturer	Serial Number
Nor-118 Type 1 Sound Level Meter	Norsonic	30962
Nor-1225 Microphone	Norsonic	29923
Nor-1251 Sound Calibrator	Norsonic	29917
Nor-118 Type 1 Sound Level Meter	Norsonic	28957
Nor-1225 Microphone	Norsonic	32979
Nor-1251 Sound Calibrator	Norsonic	31041

11. Appendix 4: Detailed Noise Measurement Results



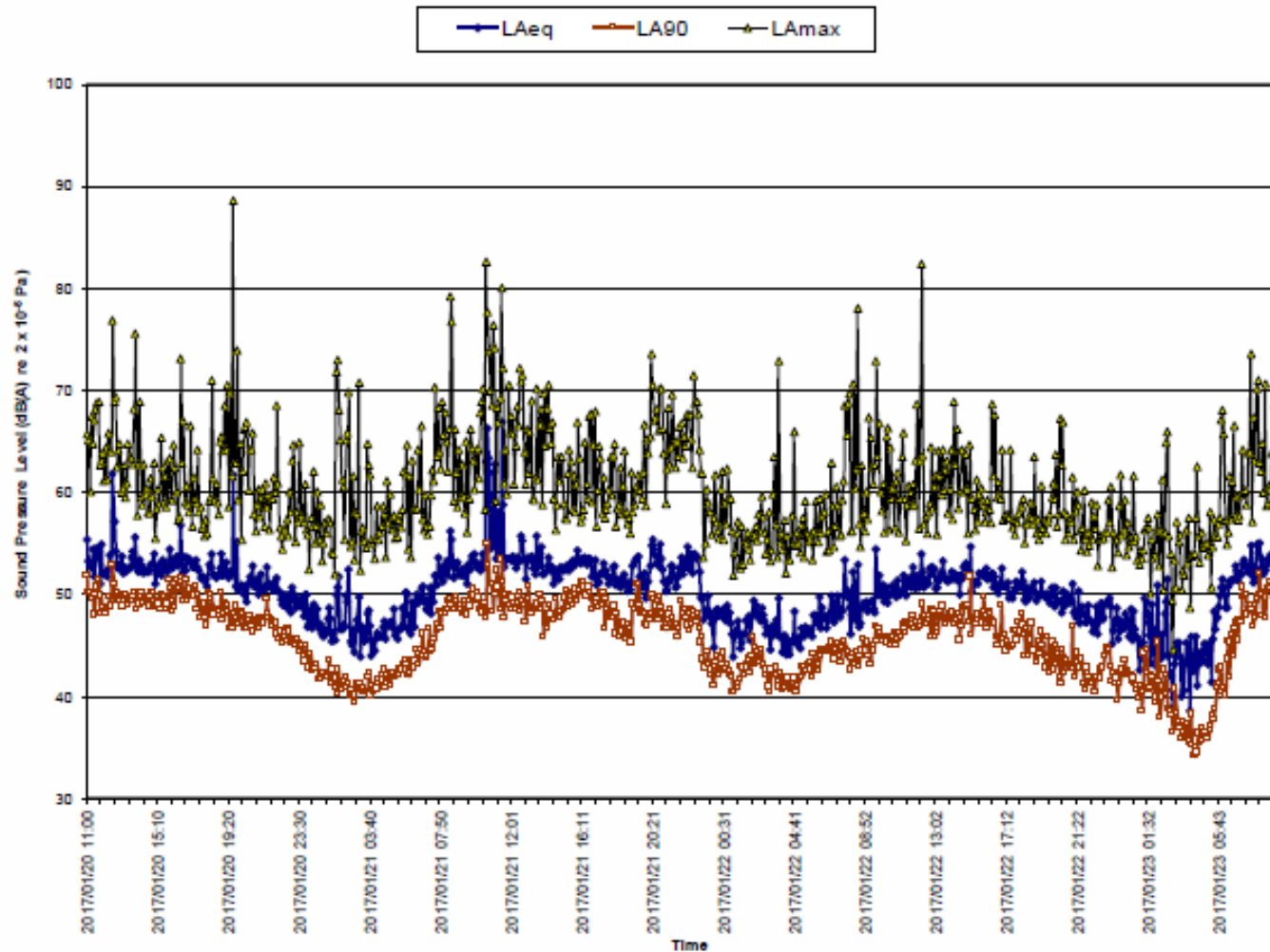
Graph A1: Measurement Position 1 Results

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Graph A2: Measurement Position 2 Results

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12. Appendix 5: Detailed Plant Noise Levels and Tonality Assessment

Unit	Noise Source	Noise Level (dB) in Octave Bands (Hz)								dB(A)
		63	125	250	500	1000	2000	4000	8000	
Nuaire DE-Dave DE6-ES	Induct Outlet	92	88	76	69	68	63	58	51	76
	Breakout	76	68	67	54	55	44	39	32	62

In order to assess tonality, the plant noise levels should be assessed using the ‘Objective Method’ detailed in BS4142:2014. The ‘Objective Method’ states: “for a discrete tone to be identified as present, the time-averaged sound pressure level in the one-third-octave band of interest is required to exceed the time-averaged sound pressure levels of both adjacent one-third-octave bands by:

- 15 dB in the low-frequency one-third-octave bands (25 Hz to 125 Hz);
- 8 dB in the middle-frequency one-third-octave bands (160 Hz to 400 Hz); and
- 5 dB in the high-frequency one-third-octave bands (500 Hz to 10 000 Hz).”

The ‘Objective Method’ for assessing tonality, as set out in BS 4142:2014, strictly requires one-third octave bands to assess. However, a review of the octave band available has determined that no tones are likely to be present.