



190 Rochdale
Road,
Middleton,
M24 2QA

Activity Noise Assessment

September
2024



Ref: 24-13259
ANA Rev B

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<i>Revision</i>	<i>ANA</i>	<i>Rev A</i>	<i>Rev B</i>
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1. Executive Summary

A plant noise assessment has been carried out for the proposed installation at **190 Rochdale Road, Middleton M24 2QA**.

The proposed installation includes a single vehicle wash-bay with planned drive-through operation, enclosed on all other sides and including a solid roof. The wash bay will contain a jet-washer driven by a compressor that is housed in a cupboard on one side of the bay. The pressure washer and vacuum cleaner are likely to be in use up to approximately 60 minutes per day, from 0800 hrs to 1830 hrs Monday to Friday, 0900 hrs to 1700 hrs Saturdays and 1000 hrs to 1700 hrs on Sundays and Bank Holidays.

The results of the assessment have identified that the plant as proposed would be below the level where a low impact may be expected upon the residents at the nearest noise sensitive receptors. Given the context of the noise source, no adverse impacts from noise would be expected.

Achievement of the target noise criteria will ensure compliance with the aims of the NPPF and the PPG in that it will avoid noise from giving rise to significant adverse impacts on health or quality of life on nearby noise sensitive receptors.

2. Introduction

This report has been prepared to assess the impact of the proposed vehicle washing bay area of the proposed vehicle rental premises at **190 Rochdale Road, Middleton M24 2QA**.

The proposed installation includes a single vehicle wash-bay with planned drive-through operation, enclosed on all other sides and including a solid roof. The wash bay will contain a jet-washer driven by a compressor that is housed in a cupboard on one side of the bay. The pressure washer and vacuum cleaner are likely to be in use up to approximately 60 minutes per day, from 0800 hrs to 1830 hrs Monday to Friday, 0900 hrs to 1700 hrs Saturdays and 1000 hrs to 1700 hrs on Sundays and Bank Holidays.

The site is located on Rochdale Road, in an area of mixed commercial and residential use, with houses to the east and south of the site, other commercial properties to the north of the site and a busy road to the west of the site. The noise climate is dominated by road traffic noise from Rochdale Road, with occasional birdsong audible. The nearest noise sensitive receptors from the wash bay are residential properties on Christine Gardens, approximately 7m from the proposed installation.

The report assesses, through on-site noise measurements, the impact of the proposed plant on the surrounding noise sensitive receptors.

A glossary of acoustic terminology is provided in **Appendix 1**.

The location of the proposed development is provided in **Figure 2.1** and the wash-bay location is provided in **Figure 2.2**.

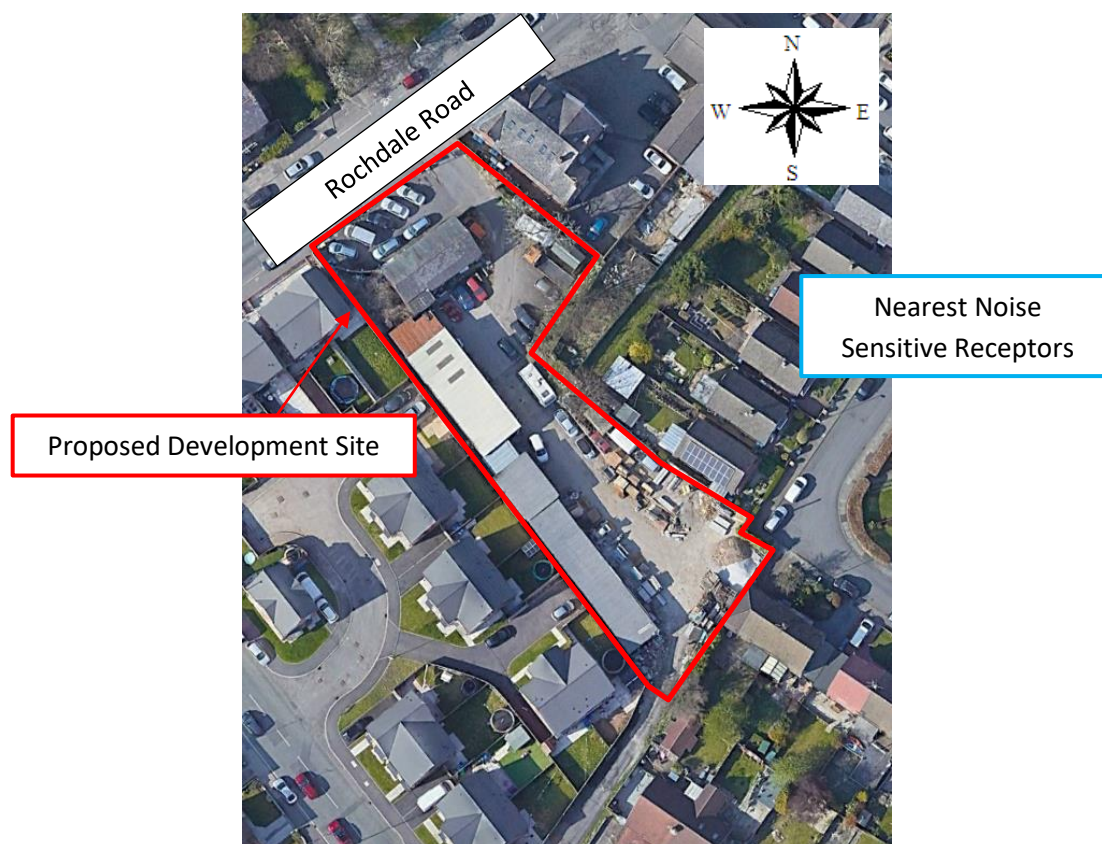


Figure 2.1: Site Location

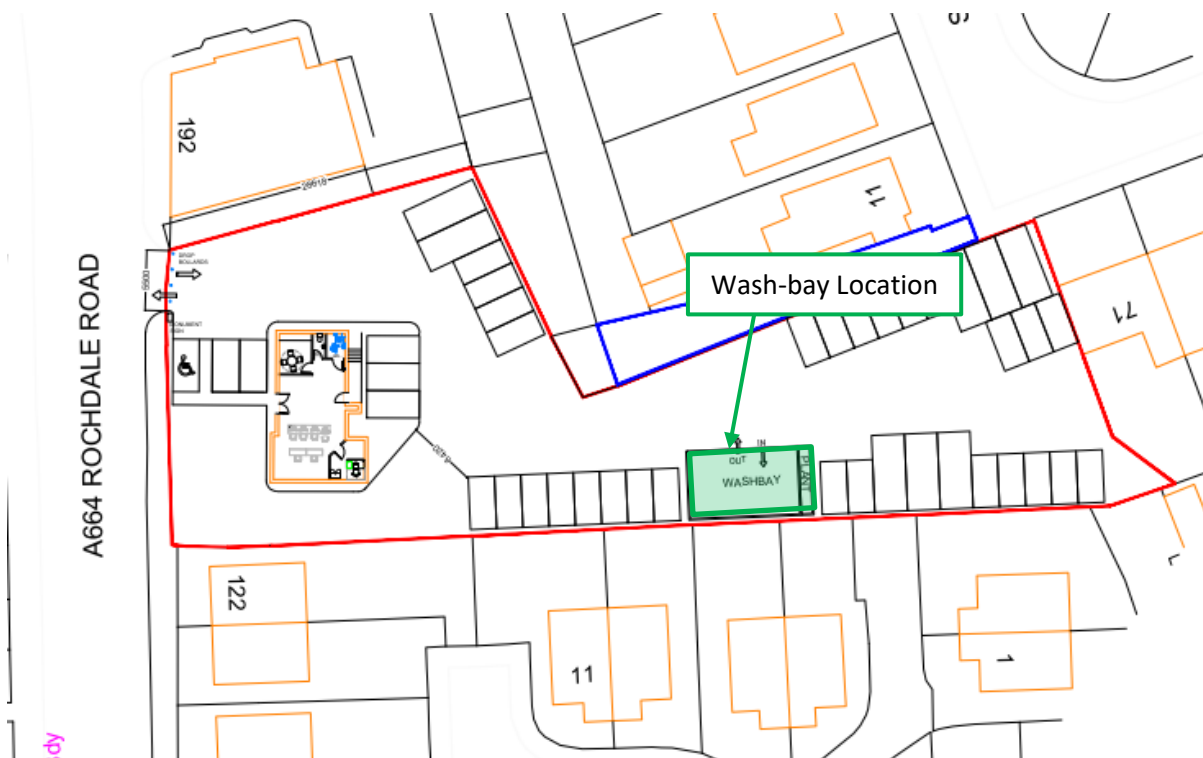


Figure 2.2: Proposed Site Plan with Wash Bay Location

3. Planning Policy

3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was released in March 2012 and last updated in December 2023. The purpose of the planning system is to contribute to the achievement of sustainable development and to encourage good design. There are three dimensions to sustainable development: economic, social and environmental.

Central to the NPPF, paragraph 10 states: *'At the heart of the National Planning Policy Framework is a presumption in favour of [permitting] sustainable development'*. This is expanded upon in paragraph 11, where it is stated:

'...For decision-taking this means:

- *approving development proposals that accord with an up-to-date development plan without delay; or*
- *where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:*
 - *the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or*
 - *any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole'*

Paragraph 174 states *'Planning policies and decisions should contribute to and enhance the natural and local environment by... preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of... noise pollution...'*.

Paragraph 185 states: *'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life (see Explanatory Note to the Noise Policy Statement for England (DEFRA)).*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'*

3.2. Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) aims to *'through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life'.*

3.3. Local Planning Policy

The site is located within the administrative boundary of the Rochdale Borough Council.

Policy G9 of the Rochdale Local Plan Core Strategy relates to the development and is provided below for reference:

“G9 - Reducing the impact of pollution, contamination and land instability

We will reduce all forms of pollution, contamination and land instability in the borough, by:

a. Focusing on measures that reduce air pollution in Air Quality Management Areas, and other areas where pollution levels are unacceptable, particularly around motorways and main roads;

b. Requiring that development does not have impacts that lead to an unacceptable increase in air, water, noise, light or other pollution;

c. Ensuring sensitive new developments such as housing, schools and hospitals are not adversely affected by existing sources of pollution such as roads and certain types of industry;

d. Requiring a Low Emissions Strategy (LES) where development requires a Transport Assessment, and in other circumstances as appropriate;

e. Requiring that any risks arising from contaminated land or land instability, and appropriate actions to address these risks, are identified prior to any development taking place on that land and the identified actions taken;

f. Requiring that any risk to surface water and ground water resources from the disturbance of contaminated land be ascertained and preventative measures devised and carried out; and

g. Using planning conditions or obligations to control pollution from new development, or the impact of pollution on new development.”

As no numerical target for plant and activity noise levels is specified, the target criteria from BS4142:2014 should apply to the development.

4. Guidance Documents

4.1. Planning Practice Guidance for Noise

The Planning Practice Guidance for Noise (PPG-Noise) was published in March 2014 and last updated in July 2019. The PPG provides advice on how to determine the noise impact on development:

'Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy.'

The document goes on to provide a definition for the levels of noise exposure at which an effect may occur:

'Significant observed adverse effect level: *this is the level of noise exposure above which significant adverse effects on health and quality of life occur.*

Lowest observed adverse effect level: *this is the level of noise exposure above which adverse effects on health and quality of life can be detected.*

No observed effect level: *this is the level of noise exposure below which no effect at all on health and quality of life can be detected.'*

It is important to understand that as the PPG-Noise does not provide any advice with respect to specific noise levels/ limits for different sources of noise, it is appropriate to consider other sources of advice and guidance documents when considering whether new developments would be sensitive to the prevailing acoustic environment.

4.2. 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.

5. Baseline Noise Levels

In order to determine the baseline noise levels in the vicinity of the proposed plant, measurements have been carried out in order to characterise the existing noise climate during the most sensitive times of operation over a 4-day period. The noise climate is dominated by road traffic noise, with the occasional passing train.

The noise measurements utilised a Casella C633C Type 1 Precision Sound Level Meter with current certificates of calibration, the full list of equipment is detailed in **Appendix 3**. Before and after the measurement period the equipment was calibrated in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB). Noise Measurements were carried out in consecutive 15 minutes periods with a 1 second resolution.

Measurements were carried out between 1130 hrs on Friday 26th April 2024 and 1130 hrs on Monday 29th April 2024.

During the noise measurement survey the temperature reached a high of 11°C during the day, dropping to a low of approximately 2°C overnight. Wind speeds were generally low throughout the survey (up to 24 m/s). Wind direction was predominantly easterly. Cloud cover was noted to be 50% at the start and 100% at the finish.

Noise measurements were carried out at Measurement Position 1 (MP1) in a free-field location, approximately 1.5m above ground level in the centre of the site at a position chosen to be representative of the noise climate of the rear façade of the adjacent residential properties. The noise monitoring position is shown in **Figure 5.1**.



Figure 5.1: Noise Monitoring Location

Table 5.1 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)	Typical Background Noise Level L_{A90} (dB)
MP1	Daytime (07:00-23:00)	51	45
	Night-time (23:00-07:00)	46	33

Table 5.1: Summary of Free Field Semi-Permanent Noise Levels

Note: The average noise levels stated are logarithmic for L_{Aeq} . The typical L_{A90} is the most commonly measured $L_{A90,5min}$ during the assessment time period.

6. Plant Noise Levels

6.1. Plant Noise Levels

The plant noise levels of an existing wash-bay have been obtained by measurement at a similar Enterprise Car Hire operation in Slough, Berkshire which has a wash bay partial enclosure that is almost identical to the proposed operations.

Noise measurements were carried out of the vacuum cleaner and jet washer in use cleaning a car. A series of measurements were made surrounding the wash-bay in order to predict the noise emissions from each façade of the enclosure. Noise from the roof was assumed to be similar to noise from the closed Compressor Façade, as the wall construction is similar to the roof construction.

The noise measurements utilised a Norsonic 140 Type 1 Precision Sound Level Meter with a current certificate of calibration. Before and after the measurement period the equipment was calibrated in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB).

The results of the noise measurement survey are summarised in **Table 6.1**.

Measurement Position	Distance from Source (m)	Measurement Period (minutes)	Measured Noise Level $L_{Aeq,T}$ (dB)	Calculated Sound Power Level L_{WA} (dB)
Wash-bay Entrance	1	30 seconds	74	82
Compressor Façade	1	30 seconds	65	73
Wash-bay Exit	1	30 seconds	76	84

Table 6.1: Summary of Plant Noise Measurements

6.1.1. 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
- Intermittency: +3 dB for the potential on/off nature of the units.

The total penalty for the plant noise level features will therefore be +3 dB.

6.2. Receptor Noise Levels

The future plant noise levels at the nearest noise sensitive receptors have been predicted using standard acoustic formulae based on the measured noise levels and are detailed in **Table 6.2** for the wash bay exit. Syntegra have assumed a very worst case 25% on-time within any hour (15 minutes per hour), providing a -6 dB reduction. It is understood that the adjacent houses have been approved on the basis of having a 2m high environmental noise barrier around the rear gardens due to other existing commercial properties. The barrier has been designed to achieve a noise level reduction of approximately 15 dB.

We note that as both of the closest receptors are nearest to the open exit of the wash bay, noise levels will be determined by noise emanating from the open exit of the bay therefore this has been used as the basis for the predicted noise levels.

	Receptors
	7 Christine Gardens
Exit to Wash Bay	
Sound Power Level (L_{Aw} dB)	84
On-time Correction (dB)	-6
Distance to Nearest Habitable Room Window (approx.)	7m
Distance Correction – Sound Power to Sound Pressure (dB)	-25
Screening Correction (Noise Barrier around Gardens) (dB)	-15
Predicted Noise Level at Receptor (L_{Aeq} dB)	38

Table 6.2: Predicted Activity Noise Levels

7. Plant Noise Assessment

The background noise level and plant noise data presented in **Sections 5** and **6** has been utilised to determine the noise impact at the nearest noise sensitive receptor when assessed using the methodology in BS 4142:2014. The assessment has been carried for daytime hours only due to the proposed opening hours.

Table 7.1 below summarises the BS 4142 assessment procedure carried out for the site.

Results	11 Christine Gardens	Relevant Clauses of BS 4142:2014	Commentary
Measured Ambient Sound Level	51	7.3.2	Refer to Table 5.1
Residual Sound Level	51	7.3.3	<i>The ambient noise level without the plant operating.</i> Refer to Table 5.1
Typical Background Sound Level L_{A90} (dB)	45	8.1, 8.2	Refer to Table 5.1
Specific Sound Level	38	9.1, 9.2	Refer to Table 6.2
Acoustic Feature Correction	+3	9.2	Refer to Section 6.1.1
Rating Level L_{Ar} (dB)	41	9.1	Specific Sound Level + Acoustic Feature Correction
Excess of Rating over Background Sound Level	-4	11	
	Assessment indicates below a low impact	11	

Table 7.1: BS 4142 Assessment

Table 7.1 identifies that an assessment in line with BS 4142 indicates that **the plant noise would be around the level where a significant impact may be expected upon the residents at the nearest noise sensitive receptors.**

7.1. 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 assessment has demonstrated that the predicted noise levels will be below the level of the existing ambient and background noise levels at the identified noise sensitive receptors. Due to the proposed

times of operation (daytime hours only with no early mornings or evenings) and the limited duration of operations, adverse impacts would be very unlikely.

In consideration of the context of the noise source, the plant would not be expected to cause any adverse impacts on the health or quality of life of the nearest noise sensitive receptors.

7.2. 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.

9. Conclusion

A plant noise assessment has been carried out for the proposed installation at **190 Rochdale Road, Middleton M24 2QA**.

The proposed installation includes a single vehicle wash-bay with planned drive-through operation, enclosed on all other sides and including a solid roof. The wash bay will contain a jet-washer driven by a compressor that is housed in a cupboard on one side of the bay. The pressure washer and vacuum cleaner are likely to be in use up to approximately 60 minutes per day, from 0800 hrs to 1830 hrs Monday to Friday, 0900 hrs to 1700 hrs Saturdays and 1000 hrs to 1700 hrs on Sundays and Bank Holidays.

The results of the assessment have identified that the plant as proposed would be below the level where a low impact may be expected upon the residents at the nearest noise sensitive receptors. Given the context of the noise source, no adverse impacts from noise would be expected.

Achievement of the target noise criteria will ensure compliance with the aims of the NPPF and the PPG in that it will avoid noise from giving rise to significant adverse impacts on health or quality of life on nearby noise sensitive receptors.

10. 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>

11. 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.

12. Appendix 3: List of Equipment

Equipment	Manufacturer & Part No.	Serial Number
Meter	Casella C633C	1716934
Microphone	CEL 251	000847
Calibrator	CEL 120/1	1530668

13. Appendix 4: Detailed Noise Measurement Results

Measured Noise levels – MP1 – Friday 18th November 2022

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
26/04/2024 11:30	50	70	53	43
26/04/2024 11:45	50	68	53	43
26/04/2024 12:00	50	63	53	43
26/04/2024 12:15	50	66	53	44
26/04/2024 12:30	50	59	53	43
26/04/2024 12:45	50	61	53	43
26/04/2024 13:00	50	63	54	42
26/04/2024 13:15	49	58	53	42
26/04/2024 13:30	51	69	54	43
26/04/2024 13:45	51	72	53	43
26/04/2024 14:00	50	59	53	43
26/04/2024 14:15	51	64	54	45
26/04/2024 14:30	50	62	52	45
26/04/2024 14:45	50	66	52	44
26/04/2024 15:00	50	60	53	45
26/04/2024 15:15	51	65	54	44
26/04/2024 15:30	48	59	52	43
26/04/2024 15:45	50	62	53	44
26/04/2024 16:00	50	61	53	45
26/04/2024 16:15	51	60	54	46
26/04/2024 16:30	51	58	54	47
26/04/2024 16:45	52	62	54	48
26/04/2024 17:00	52	64	55	47
26/04/2024 17:15	51	60	54	46
26/04/2024 17:30	52	59	54	48
26/04/2024 17:45	53	64	56	48
26/04/2024 18:00	51	64	55	46
26/04/2024 18:15	51	60	55	44
26/04/2024 18:30	51	60	55	45
26/04/2024 18:45	52	65	55	45
26/04/2024 19:00	51	60	54	45
26/04/2024 19:15	51	71	54	44
26/04/2024 19:30	50	64	54	44
26/04/2024 19:45	51	62	54	45
26/04/2024 20:00	50	61	54	45
26/04/2024 20:15	50	62	54	42
26/04/2024 20:30	50	65	53	43
26/04/2024 20:45	48	59	52	40
26/04/2024 21:00	49	69	52	41
26/04/2024 21:15	49	60	52	43
26/04/2024 21:30	50	75	52	41

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
26/04/2024 21:45	48	57	52	40
26/04/2024 22:00	48	60	52	40
26/04/2024 22:15	47	56	51	41
26/04/2024 22:30	47	60	51	39
26/04/2024 22:45	47	63	52	40
26/04/2024 23:00	47	59	51	39
26/04/2024 23:15	45	59	49	37
26/04/2024 23:30	46	57	50	38
26/04/2024 23:45	45	58	49	38
27/04/2024 00:00	46	58	51	38
27/04/2024 00:15	45	60	50	37
27/04/2024 00:30	45	65	49	36
27/04/2024 00:45	45	61	49	35
27/04/2024 01:00	45	57	49	36
27/04/2024 01:15	43	57	47	36
27/04/2024 01:30	45	60	49	34
27/04/2024 01:45	44	58	48	33
27/04/2024 02:00	42	58	46	33
27/04/2024 02:15	50	78	49	33
27/04/2024 02:30	43	60	47	32
27/04/2024 02:45	42	61	45	31
27/04/2024 03:00	41	58	44	31
27/04/2024 03:15	41	57	44	31
27/04/2024 03:30	41	58	45	32
27/04/2024 03:45	43	62	46	33
27/04/2024 04:00	40	59	43	33
27/04/2024 04:15	42	58	45	34
27/04/2024 04:30	44	58	48	34
27/04/2024 04:45	49	60	53	39
27/04/2024 05:00	48	61	53	38
27/04/2024 05:15	48	61	53	37
27/04/2024 05:30	49	62	54	39
27/04/2024 05:45	49	62	53	39
27/04/2024 06:00	48	60	52	39
27/04/2024 06:15	46	60	51	40
27/04/2024 06:30	48	59	52	41
27/04/2024 06:45	48	63	53	40
27/04/2024 07:00	51	62	55	40
27/04/2024 07:15	48	58	52	41
27/04/2024 07:30	49	63	53	41
27/04/2024 07:45	49	60	53	41
27/04/2024 08:00	50	61	54	41
27/04/2024 08:15	50	59	54	42
27/04/2024 08:30	51	60	54	44

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
27/04/2024 08:45	50	58	54	44
27/04/2024 09:00	51	61	55	44
27/04/2024 09:15	50	63	53	43
27/04/2024 09:30	51	64	54	44
27/04/2024 09:45	52	72	55	44
27/04/2024 10:00	51	61	54	45
27/04/2024 10:15	51	66	54	44
27/04/2024 10:30	51	63	54	45
27/04/2024 10:45	51	61	54	45
27/04/2024 11:00	51	64	54	46
27/04/2024 11:15	51	63	54	45
27/04/2024 11:30	51	63	54	45
27/04/2024 11:45	51	66	54	45
27/04/2024 12:00	51	67	54	45
27/04/2024 12:15	50	58	53	45
27/04/2024 12:30	50	63	53	44
27/04/2024 12:45	51	66	54	45
27/04/2024 13:00	50	65	53	44
27/04/2024 13:15	51	67	54	44
27/04/2024 13:30	50	59	53	43
27/04/2024 13:45	50	59	53	43
27/04/2024 14:00	50	64	53	44
27/04/2024 14:15	51	60	53	46
27/04/2024 14:30	52	65	55	46
27/04/2024 14:45	50	64	53	45
27/04/2024 15:00	50	60	53	44
27/04/2024 15:15	51	75	53	45
27/04/2024 15:30	53	79	55	43
27/04/2024 15:45	50	60	53	43
27/04/2024 16:00	50	74	53	43
27/04/2024 16:15	49	60	53	42
27/04/2024 16:30	50	61	53	44
27/04/2024 16:45	50	60	53	44
27/04/2024 17:00	50	70	53	43
27/04/2024 17:15	50	59	53	44
27/04/2024 17:30	50	66	53	44
27/04/2024 17:45	50	63	53	43
27/04/2024 18:00	50	59	53	45
27/04/2024 18:15	50	60	53	44
27/04/2024 18:30	50	64	53	45
27/04/2024 18:45	50	69	53	43
27/04/2024 19:00	49	58	53	43
27/04/2024 19:15	49	60	53	43
27/04/2024 19:30	49	59	53	43

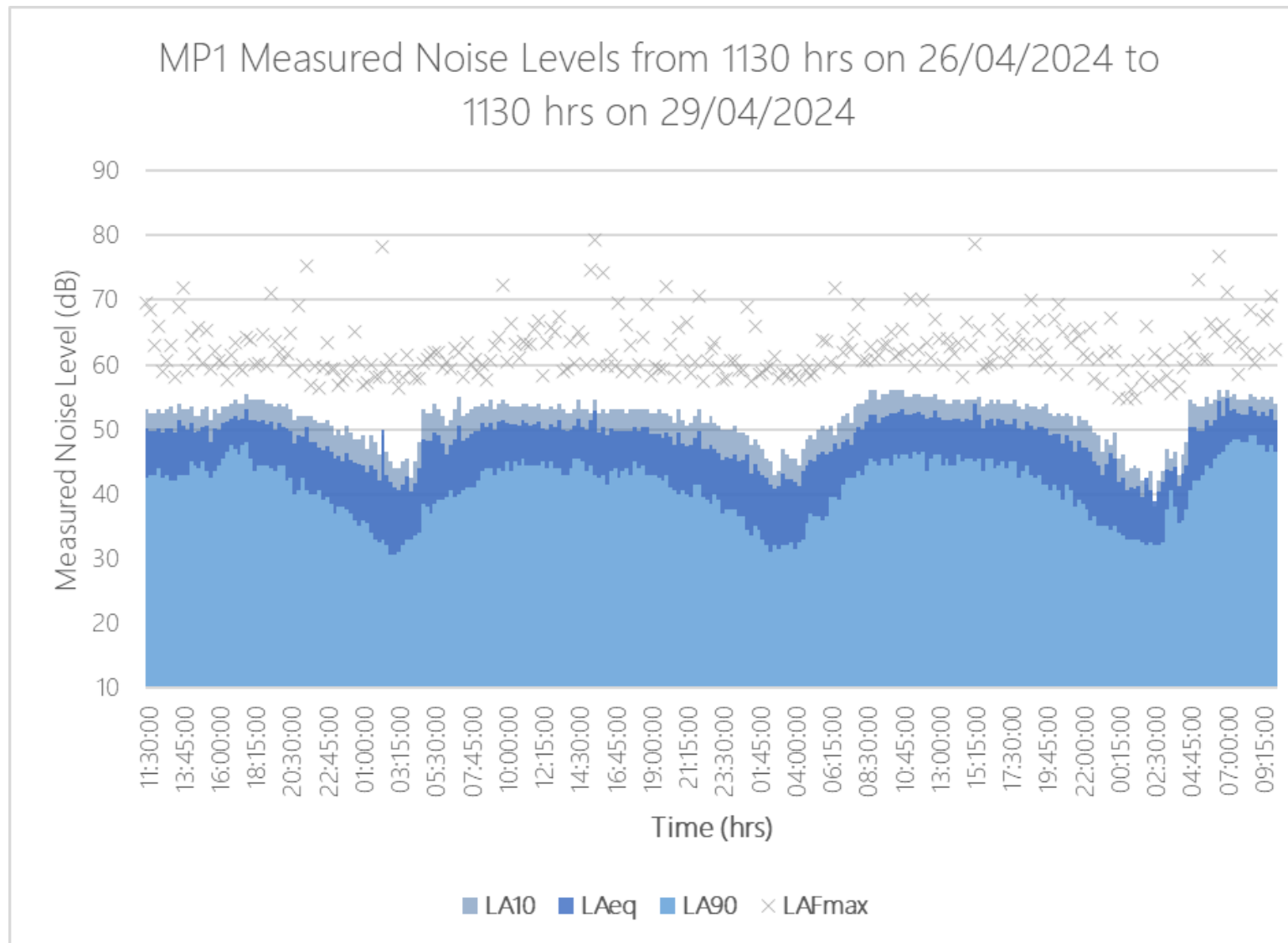
Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
27/04/2024 19:45	49	59	53	42
27/04/2024 20:00	50	72	53	43
27/04/2024 20:15	49	63	52	41
27/04/2024 20:30	48	58	51	41
27/04/2024 20:45	49	66	53	40
27/04/2024 21:00	48	61	52	41
27/04/2024 21:15	47	67	51	40
27/04/2024 21:30	48	59	51	40
27/04/2024 21:45	49	61	52	42
27/04/2024 22:00	50	71	53	42
27/04/2024 22:15	47	57	51	40
27/04/2024 22:30	47	61	51	39
27/04/2024 22:45	48	63	52	39
27/04/2024 23:00	47	64	51	40
27/04/2024 23:15	46	60	51	39
27/04/2024 23:30	45	58	50	37
27/04/2024 23:45	46	58	50	38
28/04/2024 00:00	46	61	50	38
28/04/2024 00:15	46	61	51	38
28/04/2024 00:30	45	59	50	37
28/04/2024 00:45	45	59	50	37
28/04/2024 01:00	46	69	49	35
28/04/2024 01:15	43	57	48	34
28/04/2024 01:30	45	66	49	35
28/04/2024 01:45	44	59	48	35
28/04/2024 02:00	43	59	47	33
28/04/2024 02:15	42	59	46	32
28/04/2024 02:30	41	60	45	31
28/04/2024 02:45	41	61	43	32
28/04/2024 03:00	41	58	44	32
28/04/2024 03:15	43	59	47	32
28/04/2024 03:30	42	59	46	32
28/04/2024 03:45	42	59	46	33
28/04/2024 04:00	42	58	46	32
28/04/2024 04:15	41	58	45	33
28/04/2024 04:30	44	61	47	33
28/04/2024 04:45	45	59	49	36
28/04/2024 05:00	45	58	49	37
28/04/2024 05:15	45	59	49	37
28/04/2024 05:30	46	60	50	37
28/04/2024 05:45	47	64	51	36
28/04/2024 06:00	46	64	50	37
28/04/2024 06:15	47	61	51	40
28/04/2024 06:30	48	72	49	40

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
28/04/2024 06:45	47	60	51	39
28/04/2024 07:00	48	62	52	42
28/04/2024 07:15	48	63	53	43
28/04/2024 07:30	48	62	51	43
28/04/2024 07:45	50	66	54	43
28/04/2024 08:00	50	69	54	44
28/04/2024 08:15	50	61	54	43
28/04/2024 08:30	51	61	55	45
28/04/2024 08:45	52	63	56	46
28/04/2024 09:00	52	61	56	45
28/04/2024 09:15	51	61	55	45
28/04/2024 09:30	52	63	56	46
28/04/2024 09:45	52	63	56	46
28/04/2024 10:00	52	65	56	45
28/04/2024 10:15	53	61	56	46
28/04/2024 10:30	53	62	56	46
28/04/2024 10:45	53	66	56	46
28/04/2024 11:00	52	62	55	46
28/04/2024 11:15	52	70	55	46
28/04/2024 11:30	52	60	56	47
28/04/2024 11:45	53	62	56	46
28/04/2024 12:00	52	70	55	47
28/04/2024 12:15	52	63	55	44
28/04/2024 12:30	52	61	55	46
28/04/2024 12:45	53	67	56	46
28/04/2024 13:00	52	64	55	46
28/04/2024 13:15	52	60	55	45
28/04/2024 13:30	51	64	54	46
28/04/2024 13:45	51	63	54	45
28/04/2024 14:00	52	62	55	45
28/04/2024 14:15	52	63	55	46
28/04/2024 14:30	51	58	54	45
28/04/2024 14:45	52	67	55	46
28/04/2024 15:00	51	63	55	46
28/04/2024 15:15	54	79	55	45
28/04/2024 15:30	52	65	55	46
28/04/2024 15:45	50	60	54	44
28/04/2024 16:00	52	60	54	46
28/04/2024 16:15	52	60	55	46
28/04/2024 16:30	51	62	54	44
28/04/2024 16:45	52	67	55	45
28/04/2024 17:00	51	65	54	45
28/04/2024 17:15	51	61	54	44
28/04/2024 17:30	51	62	54	45

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
28/04/2024 17:45	52	64	55	45
28/04/2024 18:00	50	63	54	43
28/04/2024 18:15	50	66	53	44
28/04/2024 18:30	51	63	54	45
28/04/2024 18:45	51	70	54	43
28/04/2024 19:00	50	61	54	43
28/04/2024 19:15	50	67	53	43
28/04/2024 19:30	50	63	54	42
28/04/2024 19:45	50	62	54	42
28/04/2024 20:00	49	60	53	41
28/04/2024 20:15	49	67	52	42
28/04/2024 20:30	49	69	53	41
28/04/2024 20:45	48	65	52	39
28/04/2024 21:00	49	59	53	42
28/04/2024 21:15	48	63	52	41
28/04/2024 21:30	47	66	51	38
28/04/2024 21:45	48	65	52	39
28/04/2024 22:00	47	62	52	39
28/04/2024 22:15	47	61	52	38
28/04/2024 22:30	47	66	51	36
28/04/2024 22:45	45	58	50	37
28/04/2024 23:00	44	61	49	35
28/04/2024 23:15	43	57	47	35
28/04/2024 23:30	45	62	49	35
28/04/2024 23:45	46	67	48	35
29/04/2024 00:00	46	62	50	35
29/04/2024 00:15	42	55	46	34
29/04/2024 00:30	43	59	46	34
29/04/2024 00:45	41	55	44	33
29/04/2024 01:00	41	56	44	33
29/04/2024 01:15	41	55	45	33
29/04/2024 01:30	41	61	44	33
29/04/2024 01:45	40	58	42	33
29/04/2024 02:00	42	66	42	32
29/04/2024 02:15	41	57	44	33
29/04/2024 02:30	39	62	38	32
29/04/2024 02:45	40	58	42	32
29/04/2024 03:00	42	61	44	33
29/04/2024 03:15	44	58	47	38
29/04/2024 03:30	44	56	46	41
29/04/2024 03:45	44	62	47	38
29/04/2024 04:00	41	57	43	36
29/04/2024 04:15	43	60	46	36
29/04/2024 04:30	44	61	48	38

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
29/04/2024 04:45	50	64	55	41
29/04/2024 05:00	50	63	54	42
29/04/2024 05:15	50	73	54	42
29/04/2024 05:30	50	61	54	43
29/04/2024 05:45	51	61	55	45
29/04/2024 06:00	51	66	54	44
29/04/2024 06:15	51	65	55	46
29/04/2024 06:30	54	77	56	46
29/04/2024 06:45	52	66	55	47
29/04/2024 07:00	55	71	56	48
29/04/2024 07:15	53	63	55	48
29/04/2024 07:30	53	64	56	49
29/04/2024 07:45	52	59	55	49
29/04/2024 08:00	52	64	55	48
29/04/2024 08:15	52	62	55	48
29/04/2024 08:30	54	69	56	49
29/04/2024 08:45	53	60	55	49
29/04/2024 09:00	52	62	55	48
29/04/2024 09:15	53	67	55	48
29/04/2024 09:30	52	68	55	47
29/04/2024 09:45	53	71	55	48
29/04/2024 10:00	51	62	54	47
29/04/2024 10:15	53	70	55	47
29/04/2024 10:30	51	69	54	47
29/04/2024 10:45	52	68	54	48
29/04/2024 11:00	53	71	55	48
29/04/2024 11:15	54	72	56	49
29/04/2024 11:30	52	66	54	47
29/04/2024 06:00	51	66	54	44
29/04/2024 06:15	51	65	55	46
29/04/2024 06:30	54	77	56	46
29/04/2024 06:45	52	66	55	47
29/04/2024 07:00	55	71	56	48
29/04/2024 07:15	53	63	55	48
29/04/2024 07:30	53	64	56	49
29/04/2024 07:45	52	59	55	49
29/04/2024 08:00	52	64	55	48
29/04/2024 08:15	52	62	55	48
29/04/2024 08:30	54	69	56	49
29/04/2024 08:45	53	60	55	49
29/04/2024 09:00	52	62	55	48
29/04/2024 09:15	53	67	55	48
29/04/2024 09:30	52	68	55	47
29/04/2024 09:45	53	71	55	48

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
29/04/2024 10:00	51	62	54	47
29/04/2024 10:15	53	70	55	47
29/04/2024 10:30	51	69	54	47
29/04/2024 10:45	52	68	54	48
29/04/2024 11:00	53	71	55	48
29/04/2024 11:15	54	72	56	49
29/04/2024 11:30	52	66	54	47



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

Façade	Type of Data		Noise Levels (dB) in Octave Bands (Hz)														dB(A)
		25	31.5	40	50	63	80	100	125	160	200	250	315	400	500		
Entrance	SPL at 1m	56.4	57.1	59.3	63.1	61.6	59.9	57.9	70.1	67.5	59.1	59.8	62.2	61.7	60.5	73.6	
		630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10,000			
		60.1	59.7	59.8	60.2	59.9	61.2	63.2	63.1	64.4	62.8	61.8	61.2	57.6			
Compressor	SPL at 1m	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	65.1	
		55.7	54.6	52.6	56.1	60.9	57.7	51.4	61.7	59	62.2	56.2	56.2	54.7	57.2		
		630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10,000			
		52.4	51.9	51.3	54.3	51.6	54.5	57.8	51.1	50.4	47.9	46.2	45.6	41.3			
Exit	SPL at 1m	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	75.9	
		56.4	56	55.9	59.6	62.4	61.1	60.5	60.5	60.8	64.5	61	62.1	62.5	62.9		
		630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10,000			
		66	63.1	62.1	62.2	63	63.5	65.1	65.5	66.7	65.1	64.1	63.4	59.7			
Internal	SPL at 1m	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	81.7	
		63.4	61.8	63.7	58.9	63.1	63.6	60.8	77.5	74.8	67	67.2	66.2	67.3	67.8		
		630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10,000			
		67.8	68	67.8	68.2	69	69.9	70.6	71.6	72.6	71	70.1	69.3	65.5			

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

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- 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, has determined that no tones are present. This accords with the subjective assessment on-site in which no tones were noted.

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