Sound Advice
ACOUSTICS LTD

REPORT REFERENCE:

SA – 7539-3

POST INSTALLATION

NOISE IMPACT ASSESSMENT

British Standard 4142:2014+A1:2019

CLIENT:

Climate Control Southern

SITE:

Manchester Crown Court

Crown Square

Manchester

M3 3FL

BACKGROUND SURVEY DATE:

7th - 9th August 2023

COMPLETED NOISE SURVEY DATE:

6th August 2026

Report By



Mr. B. J. Scrivener MIOA.

Sound Advice Acoustics Ltd

2 West Links, Tollgate, Chandlers Ford, Hampshire, SO53 3TG

Tel: 02380 641357

soundadviceacoustics.co.uk

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1 EXECUTIVE SUMMARY

1.1 Instruction

Following the completed installation of the roof mounted chiller units at Manchester Crown Court, Crown Square, Manchester, M3 3FL, Sound Advice Acoustics Ltd have been instructed to assess the noise levels on site following this installation and feed this data back into our original noise impact assessment dated August 2023, to understand the level of impact at the existing site in relation to affected windows at the development and carry out assessments to BS 4142:2014+A1:2019.

1.2 Scope of Report

The measurements have been undertaken in accordance with British Standard 4142:2014+A1:2019 and ISO 1996 – Part 2: 2017 to establish if the proposed plant will have a demonstrable adverse effect in terms of noise that outweigh the benefits of the development. This report aims to establish the following:

- Existing background noise levels at the residential façade (L_{A90});
- Noise levels from the Proposed Plant (L_{Aeq});
- Impact on the nearest noise sensitive property.
- Mitigation Levels if Required

1.3 Measured Background Noise Levels (August 2023)

Continuous background noise measurements were undertaken between the 8th and 9th August 2023 at the Assessment Position 1. The day time background noise levels between 07:00 and 23:00 was found to be $L_{A90,1\ hour}$ 57 dB and the night time background noise level between 23:00 and 07:00 found to be $L_{A90,15\ MIN}$ 56 dB at the assessment position. This background noise level has been assessed during daytime and night time hours, however the proposed plant is only to operate during daytime hours.

Daytime Equivalent Existing Background Noise Levels 5 days (07:00 – 23:00)	Measured Levels at Assessment Position 1	$L_{A90,t}$ 57 dB

1.4 Installed Plant

The plant has been roof mounted within the refurbished and recently completed compound area, generally as detailed within this report. The sound pressure levels have been recorded around a single unit with it operating under normal load and are detailed in section 6.1 of this report and were recorded on 6th August 2026. Each unit is separated into 6 compressors, and these are detailed below. It should also be noted that at any one time, only two of the three units will be operating. Therefore, a worst case scenario of the two closest units to the offices directly adjacent, has been used.

1.5 Assessment

1.5.1 Daytime (07:00 – 23:00)

Rating Level	51 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\ hour}$	57 dB	8.1	Modal Background Noise Level (07:00 – 23:00)
Assessment Level	-6 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014+A1:2019 [1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	**-6 dB**		
Conclusion	**The assessment level is 'Low Impact'**		

1.6 Conclusions

The operation of the completed roof mounted plant has been assessed to establish if the units will have a demonstrable adverse effect in terms of noise that outweigh the benefits of the development. Measurements have been undertaken in accordance with British Standard 4142:2014+A1:2019 and ISO 1996 – Part 2: 2017. This report has established the existing background noise levels at the closest façade to the roof mounted plant and the assessment of the impact of the operation on neighbouring offices. The resulting emissions from the plant running on a worst case scenario show no conflict with 'low impact' criteria and give a strong indication that complaint and impact on the local amenity is unlikely.

Therefore, it is the conclusion of this report that the post installation tests have demonstrated compliance with our initial assessments and calculations made within our report SA – 7539-2 August 2023.

2 INTRODUCTION

2.1 Instruction

Following the completed installation of the roof mounted chiller units at Manchester Crown Court, Crown Square, Manchester, M3 3FL, Sound Advice Acoustics Ltd have been instructed to assess the noise levels on site following this installation and feed this data back into our original noise impact assessment dated August 2023, to understand the level of impact at the existing site in relation to affected windows at the development and carry out assessments to BS 4142:2014+A1:2019.

2.2 Ambient and Background Measurements

August 2023 external noise levels were recorded over, what was considered for the site, an average / typical time period in order to assess the daytime noise levels. Levels have been recorded over more than one day in order to ensure the uncertainty of measurement aspects of BS 4142:2014+A1:2019 have been satisfied and that the data recorded is representative for the purpose of a robust assessment.

2.3 BS 4142: 2014+A1:2019

British Standard 4142:2014+A:2019 was adopted for the basis of this background noise level assessment. A BS 4142:2014+A1:2019 noise assessment was carried out in order to demonstrate the acoustic impact the proposed roof mounted plant could have on the nearest affected noise sensitive premises.

2.4 Manchester City Council Local Development Framework

Manchester City Council's Local Development Framework Core Strategy Development Plant Document July 2012 does not make any specific reference to British Standard 4142:2014+A1:2019 or target noise levels in relation to background noise levels. However, the document does contain the following statements within its Development Management Policy DM 1, which states.

Policy DM 1

Development Management

All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:-

- Appropriate siting, layout, scale, form, massing, materials and detail.
- Impact on the surrounding areas in terms of the design, scale and appearance of the proposed development. Development should have regard to the character of the surrounding area.
- Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise.

- Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes.
- Community safety and crime prevention.
- Design for health.
- Adequacy of internal accommodation and external amenity space.
- Refuse storage and collection.

Therefore, British Standard 4142:2014+A1:2019 is to be adopted for the purpose of this assessment.

2.5 National Planning Policy Framework 2023 & Noise Policy Statement for England 2010

References and evaluations are to be made to the National Planning Policy Framework 2023 (NPPF) and the Noise Policy Statement for England 2010 (NPSE). The purpose of this document is to include all aspects of environmental noise within assessments i.e. environmental noise, neighbour noise and neighbourhood noise. Noise is to be considered alongside other relevant issues relating to the site and should not be considered in isolation, according to the NPSE.

There are several key phrases within the NPSE aims and these are discussed below.

2.6 "Significant adverse" and "adverse"

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

2.7 NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

2.8 LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.
Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

2.9 SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

3 SITE LOCATION

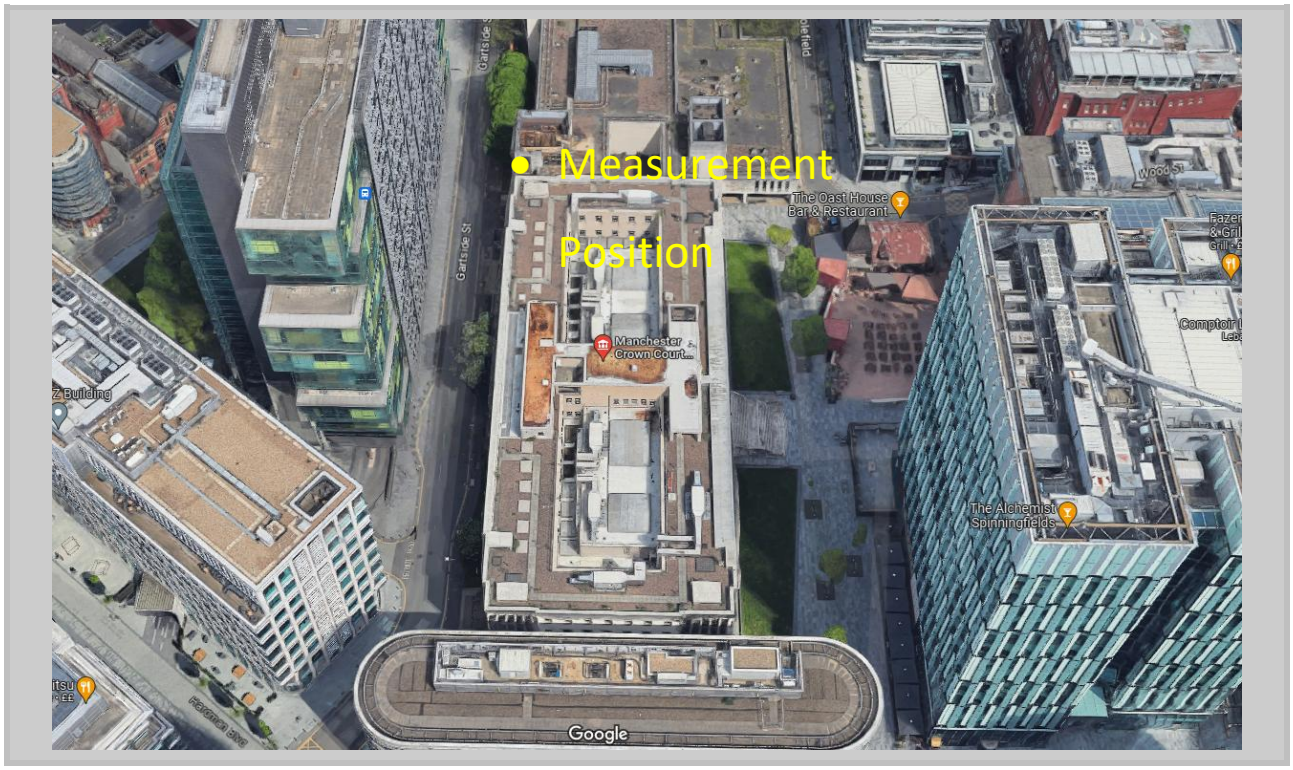
3.1 Position of Site in Wider Area

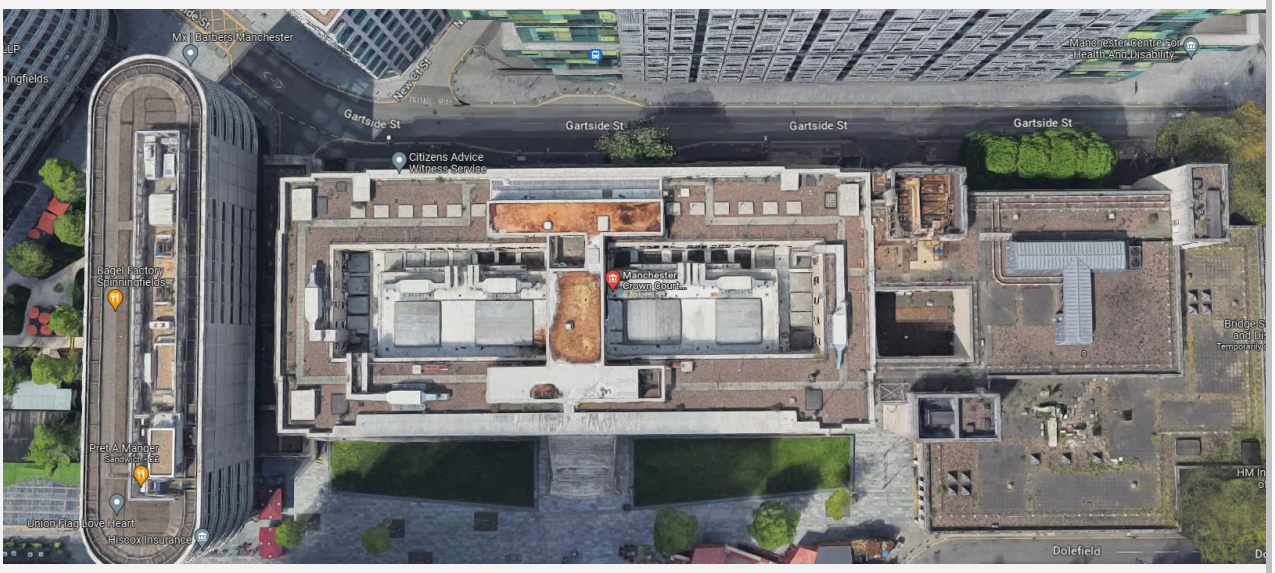
The site is located in Manchester.

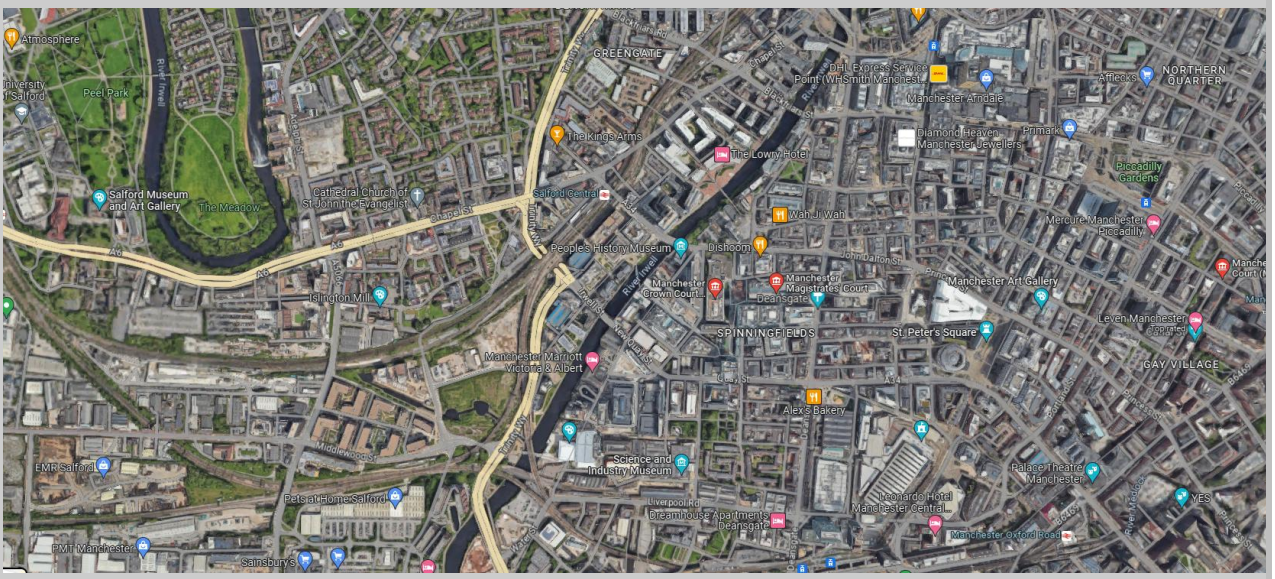


3.2 Assessment Position and Background Position

Continuous measurements were undertaken at the assessment position between the 7th & 9th of August 2023. Measurement was undertaken at roof level on the Manchester Crown Court at the nearest representative noise sensitive premises / receptor in accordance with ISO1996 part 2: 2017.




Gartside St
Gartside St
Gartside St
Gartside St
Citizens Advice Witness Service
Manchester Crown Court
Bagel Factory Spinningfields
Pret A Manger
Union Flag Love Heart
Hiscox Insurance
Dolefield


GREENGATE
Salford Museum and Art Gallery
The Meadow
Cathedral Church of St John the Evangelist
Salford Central
The Kings Arms
The Lowry Hotel
Peoples History Museum
Dishoom
Manchester Crown Court
Manchester Magistrates Court
Deansgate
Manchester Art Gallery
NORTHERN QUARTER
Manchester Arndale
Primark
Piccadilly Gardens
Mercure Manchester Piccadilly
Leven Manchester
St Peter's Square
SPINNINGFIELDS
GAY VILLAGE
Manchester Marriott Victoria & Albert
Alex's Bakery
Science and Industry Museum
Liverpool Rd
Dreamhouse Apartments Deansgate
Leonardo Hotel Manchester Central
Palace Theatre Manchester
YES
Manchester Oxford Road
Islington Mill
EMR Salford
Pets at Home Salford
PMT Manchester
Sainsburys

4 RESULTS

4.1 Downloaded results, and averages

4.1.1 07:00 – 07:00 7th – 8th August 2023

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	LAeq	LAmax	LA90	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LA90 1 HOUR & Corresponding LAeq 1 HOUR	62.1	81.8	59.0	64.1	61.3	60.6	59.2	57.5	53.7	50.3	41.0	21.9
NIGHT TIME 23:00 - 07:00 LA90 15 MIN & Corresponding LAeq 15 MIN	59.7	89.5	55.0	58.1	56.2	57.7	56.8	54.2	52.5	49.3	38.4	22.1

4.1.2 07:00 – 07:00 8th – 9th August 2023

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	LAeq	LAmax	LA90	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LA90 1 HOUR & Corresponding LAeq 1 HOUR	72.3	94.5	60.0	86.0	77.7	72.7	70.6	66.6	60.3	57.9	46.9	42.8
NIGHT TIME 23:00 - 07:00 LA90 15 MIN & Corresponding LAeq 15 MIN	31.9	67.5	16.0	50.1	37.7	32.1	30.5	24.9	19.2	19.0	12.1	10.4

Continuous background noise measurements were undertaken between the 8th and 9th August 2023 at the Assessment Position 1. The day time background noise levels between 07:00 and 23:00 was found to be $L_{A90,1\ hour}$ 57 dB and the night time background noise level between 23:00 and 07:00 found to be $L_{A90,15\ MIN}$ 56 dB at the assessment position. This background noise level has been assessed during daytime and night time hours, however the proposed plant is only to operate during daytime hours.

Daytime Equivalent Existing Background Noise Levels 5 days (07:00 – 23:00)	Measured Levels at Assessment Position 1	$L_{A90,t}$ 57 dB

5 APPARATUS

5.1 Equipment Calibration

The equipment was calibrated using a sound pressure level of 114.0 dB at an octave band centre frequency of 1000Hz with reference to 2 x 10-5 Nm-2 before and after the tests and the equipment set to have no inaccuracy greater than 0.2 dB.

All the following equipment was calibrated in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS) on the following dates. Calibration schedules are implemented within Sound Advice Acoustics Ltd in accordance with UKAS directive LAB 23.

5.2 August 2023 Background Noise Survey Position 1

Description	Make	Type	Serial No.	Calibration Intervals	Last Calibrated	Next Due Calibration
Integrated Sound Level Meter	Norsonic	140	1403140	2 YEARS	12.04.2023	12.04.2025
12.5mm Microphone (with windshield)	Norsonic	1225	413206	2 YEARS	12.04.2023	12.04.2025
Microphone Pre – Amplifier	Norsonic	1209	12245	2 YEARS	12.04.2023	12.04.2025
Calibrator	Norsonic	1251	31310	1 YEAR	0.12 dB	01.09.2023

The noise meter was calibrated before and after the assessment period and found to be within the tolerance of the manufacturer's guidance. Full Calibration certificates are available upon request.

5.3 August 2026 Completed Installation Around Unit

Description	Make	Type	Serial No.	Calibration Intervals	Last Calibrated	Next Due Calibration
Integrated Sound Level Meter	Norsonic	118	28191	2 YEARS	17.05.2025	16.05.2027
12.5mm Microphone (with windshield)	GRAS	40AF	73337	2 YEARS	17.05.2025	16.05.2027
Microphone Pre – Amplifier	Norsonic	1206	27587	2 YEARS	17.05.2025	16.05.2027
Calibrator	Norsonic	1251	31963	1 YEAR	18.05.2026	17.05.2027

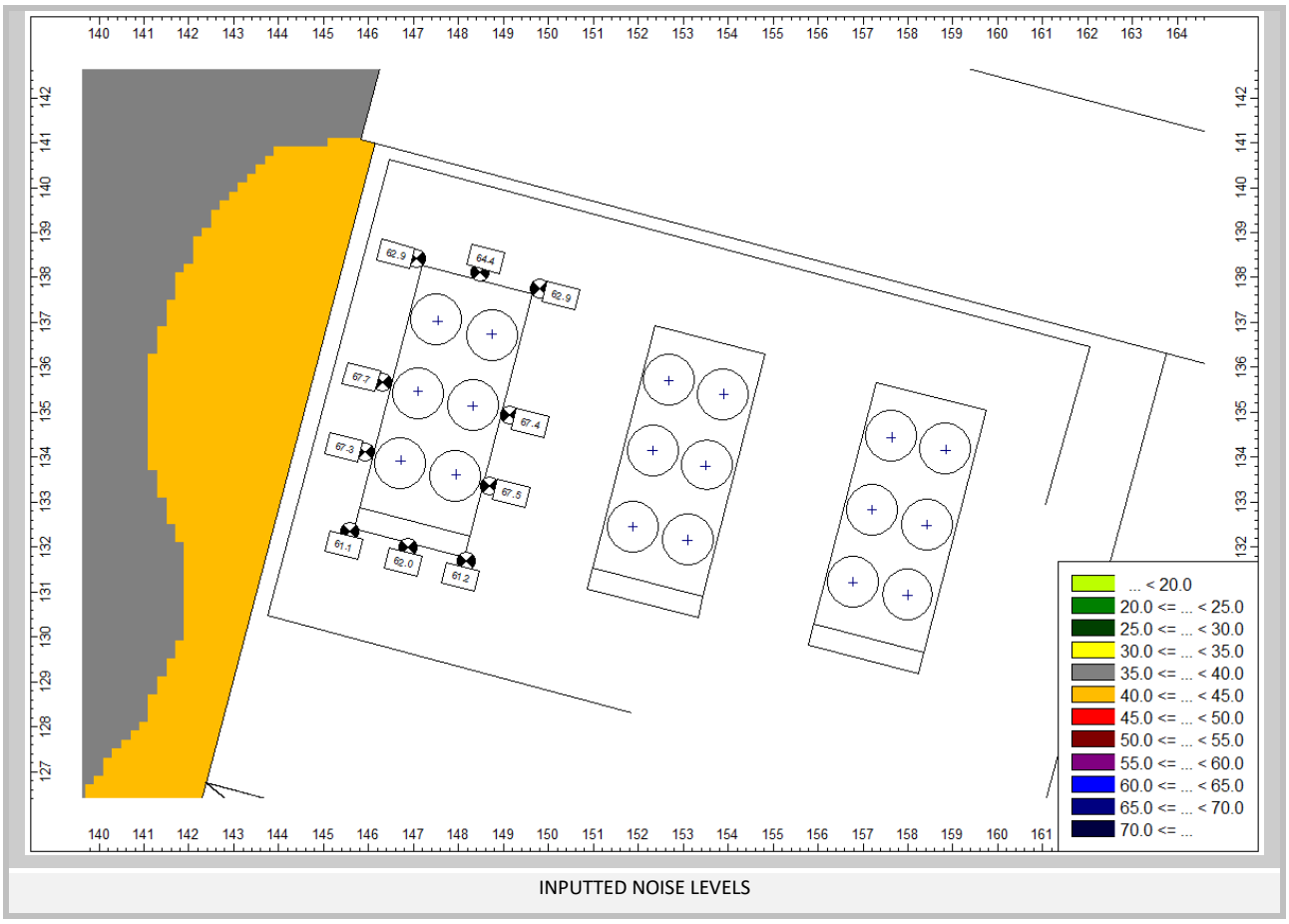
The noise meter was calibrated before and after the assessment period and found to be within the tolerance of the manufacturer's guidance. Full Calibration certificates are available upon request.

6 AUGUST 2026 MEASUREMENTS AND CALCULATIONS

The following plant has been roof mounted within the refurbished and recently completed compound area, generally as detailed within this report. The following sound pressure levels have been recorded around a single unit with it operating under normal load. Each unit is separated into 6 compressors, and these are detailed below. It should also be noted that at any one time, only two of the three units will be operating. Therefore, a worst case scenario of the two closest units to the offices directly adjacent, has been used.

6.1 Inputted Noise Levels.

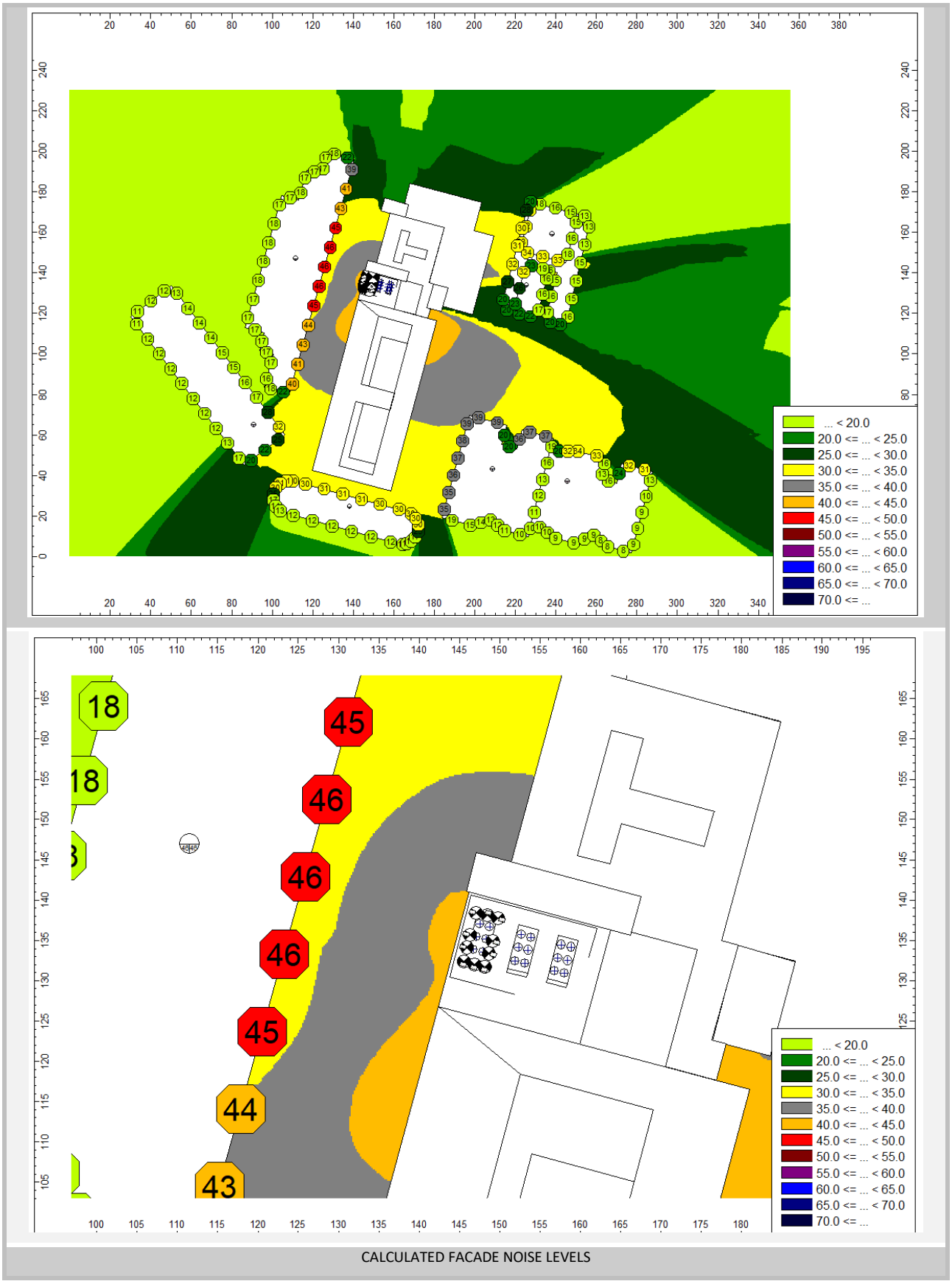
The above noise levels have been inputted into the CADNA A 3D Model.



INPUTTED NOISE LEVELS

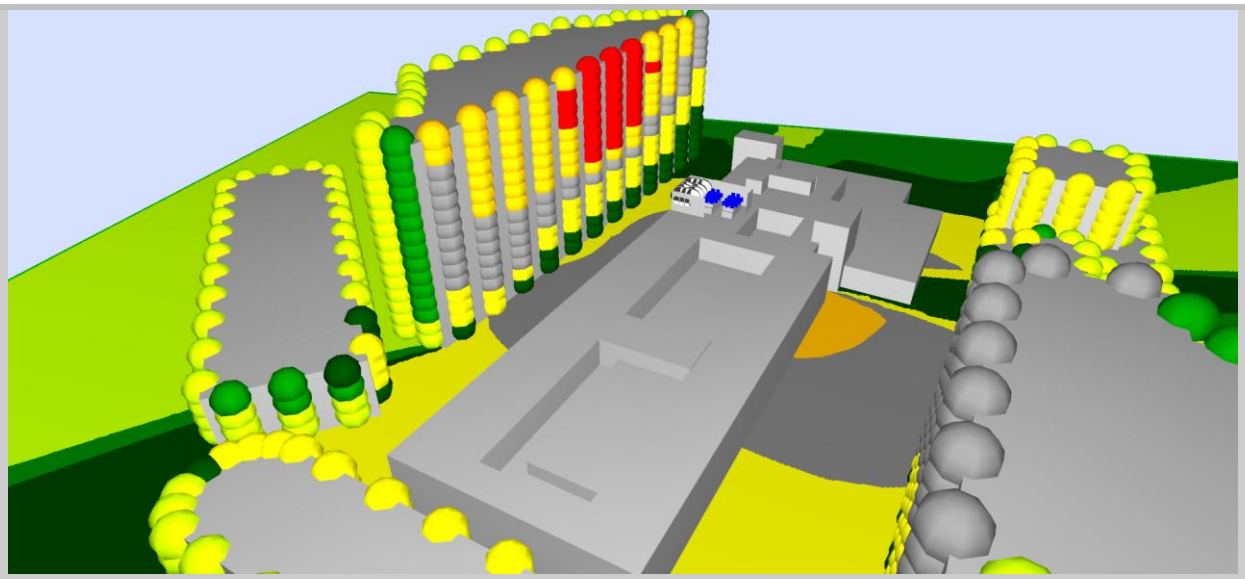
6.2 Calculated Façade Levels.

Based on the above inputted noise levels, the following calculated façade levels have been evaluated.



CALCULATED FACADE NOISE LEVELS

6.3 3D Models



3D MODELS

Based on these recommendations, the following assessments can be made:-

7 BS 4142:2014+A1:2019 NOISE ASSESSMENT

7.1 Scope of British Standard 4142: 2014

In the assessment of the existing surrounding commercial premises, consideration has been given to the scope of British Standard 4142:2014+A1:2019, which in section 1, details applicability of this standard to rating assessing sound of an industrial and/or commercial nature. It is considered appropriate that both the background noise levels, and the rating noise levels obtained fall within the scope of British Standard 4142:2014+A1:2019 by using outdoor sound levels to assess the effect of sound on local residents.

7.2 Terms and Definitions

Symbol	Term	Definition
AP	Assessment Position	Position externally at the façade property under investigation at which the assessment is undertaken which is usually 1m from the 1st floor bedroom window.
EP	Equivalent Position	Position at which the background noise levels are measured if there is no access to the assessment position or if source under investigation is audible.
$L_s = L_{Aeq,T}$	Specific Level	The average continuous equivalent sound pressure level of the source at the assessment position.
$L_{Ar,Tr}$	Rating Level	The average continuous equivalent sound pressure level of the source at the assessment position with a correction to account for the characteristic features.
$L_r = L_{Aeq,T}$	Residual Level	The average continuous equivalent sound pressure level at the assessment position without the source operating.
$L_{A90,T}$	Background Level	The sound pressure level that is not exceeded 90% of the time at the assessment position.
$L_a = L_{Aeq,T}$	Ambient Level	The totally encompassing sound at the assessment position including the residual and specific noise.

7.3 Assessment Position

The assessment position 1 was established as the offices in the next building facing the completed plant location.

7.4 Calculations

The specific noise levels are calculated at the assessment position located at the offices to the west of Manchester Crown Court using the calculations detailed within ISO 9613 Part 1 and 2: 1996. These calculations take the manufacturers sound power levels into account for a variety of factors including source directivity, distance, atmospheric absorption, ground absorption and the effects of any barriers and determine the resultant noise levels at the assessment position.

7.5 Equivalent Position

The background noise levels were measured at the equivalent position, chosen as it most represented the closest noise sensitive façade.

7.6 Rating Levels (Character Correction)

It is appropriate to add a character correction where there is a new source that cannot be measured in line with BS 4142:2014+A1:2019. There are 3 methods for approaching this.

a) Subjective method
b) Objective method (for tonality)
c) Reference method

7.7 Subjective Method

The subjective method establishes a rating penalty that is added to the specific noise level if any of the following is present at the assessment position. If a tone is expected to be present a character correction of 0 dB to 6 dB is added depending on how perceptible it is at noise sensitive locations.

BS 4142:2014+A1:2019 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Tonality Ranging from not tonal to prominently tonal	Not tonal	+0
	Just perceptible	+2
	Clearly perceptible	+4
	Highly perceptible	+6

If the source is expected to be impulsive a character correction of 0 dB to 9 dB is added depending on how perceptible it is at noise sensitive locations.

BS 4142:2014+A1:2019 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Impulsivity Considering both the rapidity and any overall change in sound levels	Not impulsive	+0
	Just perceptible	+3
	Clearly perceptible	+6
	Highly perceptible	+9

When the sound features are neither tonal nor impulsive, a character correction of +3 is added for the readily distinctive quality against the acoustic environment or for the intermittency of the source.

BS 4142:2014+A1:2019 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Readily Distinctive	Is not present	+0
	Is present	+3
Intermittency	Is not present	+0
	Is present	+3

7.8 Assessment Criterion

The significance of the resulting noise on the residential property depends on the margin by which it exceeds the background noise levels. British Standard 4142:2014+A1:2019 provides the following guidance within section 11.

Difference	Assessment of Impact
+10 dB	Indication of a significant adverse impact
+5 dB	Indication of an adverse impact
+0 dB	Indication of low impact

7.9 Noise Meter Floor

BS 4142:2014+A1:2019 suggests that Care is necessary in circumstances where background sound levels are low to ensure that self-generated and electrical noise within the measurement system does not unduly influence reported values, which might be the case if the measured background sound levels are less than 10 dB above the noise floor of the measuring system. The floor of a typical class 1 noise meter is in the region of 14 dB(A) and therefore measurements of less than 24 dB(A) should be assessed with care.

7.10 BS 4142:2014+A1:2019 Penalties

Whilst BS 4142:2014+A1:2019 allows receptor assessments to be made to achieve levels equal to prevailing background noise levels, it also ensures that appropriate and more stringent penalties are applied to the specific noise level to ensure the correct level of protection for the local residents.

7.11 Assessments

7.11.1 Daytime (07:00 – 23:00).

Rating Industrial Noise affecting Mixed Industrial and Residential Areas			British Standard 4142:2014+A1:2019 Daytime (07:00 to 23:00)
Assessment Position			Offices within the next building
Background Position			At the assessment position
Item	Calculation	Clause	Commentary
Specific Noise Level $L_{Aeq,1\ hour}$	46 dB	7	Calculated using ISO 9613:1996[3].
Tonality	+2 dB	8.1	Tonality Characteristic
Impulsivity	+3 dB	8.1	Impulsive Characteristic
Rating Level	51 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\ hour}$	57 dB	8.1	Modal Background Noise Level (07:00 – 23:00)
Assessment Level	-6 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014+A1:2019[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	**-6 dB**		
Conclusion	**The assessment level is 'Low Impact'**		

7.12 Tonal Penalty

A +2 dB penalty has been applied to the specific noise level to allow for any minor tonal elements that may be present from the proposed plant.

7.13 Intermittency Penalty

A +3 dB penalty has been applied to the specific noise level to allow for any intermittent elements that may be present from the proposed 3 rooftop chiller units.

7.14 Assessment Conclusion

It can be seen from the above assessments that with the proposed roof mounted plant in operational, an assessment conclusion of Low Impact could be expected during the daytime and that no further remedial works are required.

8 NPPF & NPSE

The National Planning Policy Framework 2023 (NPPF) and assessments to the Noise Policy Statement for England 2010 (NPSE) should be made in conjunction with each other. Paragraphs 185 - 188 of the National Planning Policy Framework 2023 (NPPF) states the following:

Paragraph 185 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:

a) 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.

b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

Paragraph 186 Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications.

Paragraph 187 Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

Paragraph 188 The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.

The Noise Policy Statement for England gives various levels of effect as detailed within this report.

With the specifications achieved within this report, the development can be implemented within the guidelines of the aforementioned documents and ensure a conclusion of **NOEL – No Observed Effect Level.** This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

9 CONCLUSIONS

9.1 Measured Background Noise Levels (August 2023)

Continuous background noise measurements were undertaken between the 8th and 9th August 2023 at the Assessment Position 1. The day time background noise levels between 07:00 and 23:00 was found to be $L_{A90,1\ hour}$ 57 dB and the night time background noise level between 23:00 and 07:00 found to be $L_{A90,15\ MIN}$ 56 dB at the assessment position. This background noise level has been assessed during daytime and night time hours, however the proposed plant is only to operate during daytime hours.

Daytime Equivalent Existing Background Noise Levels 5 days (07:00 – 23:00)	Measured Levels at Assessment Position 1	$L_{A90,\ t}$ 57 dB

9.2 Installed Plant

The plant has been roof mounted within the refurbished and recently completed compound area, generally as detailed within this report. The sound pressure levels have been recorded around a single unit with it operating under normal load and are detailed in section 6.1 of this report and were recorded on 6th August 2026. Each unit is separated into 6 compressors, and these are detailed below. It should also be noted that at any one time, only two of the three units will be operating. Therefore, a worst case scenario of the two closest units to the offices directly adjacent, has been used.

9.3 Assessment

9.3.1 Daytime (07:00 – 23:00)

Rating Level	51 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\ hour}$	57 dB	8.1	Modal Background Noise Level (07:00 – 23:00)
Assessment Level	-6 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014+A1:2019 [1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	**-6 dB**		
Conclusion	**The assessment level is 'Low Impact'**		

9.4 Conclusions

The operation of the completed roof mounted plant has been assessed to establish if the units will have a demonstrable adverse effect in terms of noise that outweigh the benefits of the development. Measurements have been undertaken in accordance with British Standard 4142:2014+A1:2019 and ISO 1996 – Part 2: 2017. This report has established the existing background noise levels at the closest façade to the roof mounted plant and the assessment of the impact of the operation on neighbouring offices. The resulting emissions from the plant running on a worst case scenario show no conflict with 'low impact' criteria and give a strong indication that complaint and impact on the local amenity is unlikely.

Therefore, it is the conclusion of this report that the post installation tests have demonstrated compliance with our initial assessments and calculations made within our report SA – 7539-2 August 2023.

10 APPENDIX A – UNCERTAINTY BUDGET

10.1 Scope

British Standard 4142:2014+A1:2019 entitled *"Uncertainty"* requires the following:

> *"Consider the level of uncertainty in the data and associated calculations. Where the level of uncertainty could affect the conclusion, take reasonably practicable steps to reduce the level of uncertainty. Report the level and potential effects of uncertainty.*

Annex B of British Standard 4142:2014+A1:2019 entitled "consideration of uncertainty and good practice for reducing uncertainty" makes reference to the University of Salford publication entitled "A Good Practice Guide on the Source and Magnitude of Uncertainty arising in the Practical Measurement of Environmental Noise" edition 1a dated May 2007.

10.2 Uncertainty of Measured Values

Ref	Source of Uncertainty Section 10.2 British Standard 4142:2014+A1:2019	Value dB(A)	Distribution (Divisor)	Uncertainty dB(A)
a	Variability and complexity of sound source	0.50	$\sqrt{2}$	0.35
b	Variability and complexity of residual sound	0.00	$\sqrt{3}$	0.00
c	Residual sound present in specific sound	0.00	$\sqrt{3}$	0.00
d	Background noise position selection	0.10	$\sqrt{3}$	0.06
e	Distance between source and receiver	0.15	$\sqrt{2}$	0.11
f	Number of measurements taken (5 Days)	0.10	$\sqrt{3}$	0.06
g	Measurement time interval variation	0.00	$\sqrt{2}$	0.00
h	Range of times measurements taken	0.10	$\sqrt{3}$	0.06
i	Suitable weather conditions during measurements	0.20	$\sqrt{3}$	0.12
j	Application of British Standard 4142:2014+A1:2019	0.10	$\sqrt{2}$	0.07
k	Rounding of each measurement	0.05	$\sqrt{3}$	0.03
l	Instrumentation – Calibration	1.20	$\sqrt{3}$	0.69
Reported Expanded Uncertainty (95% confidence, convergence k = 2)				1.61

10.3 Uncertainty in Calculations

Ref	Source of Uncertainty Section 10.2 British Standard 4142:2014+A1:2019	Value dB(A)	Distribution (Divisor)	Uncertainty dB(A)
a	Impact of measured sound level on calculations	0.00	$\sqrt{2}$	0.00
b	Assumption on sound power level of source	0.00	$\sqrt{3}$	0.00
c	Uncertainty of calculation method (ISO 9613)	0.20	$\sqrt{3}$	0.12
d	Model fit against real world conditions	0.10	$\sqrt{3}$	0.06
e	Error in the calculation process	0.15	$\sqrt{2}$	0.11
Reported Expanded Uncertainty (95% confidence, convergence k = 2)				0.33

10.4 Uncertainty from Other Factors

Ref	Source of Uncertainty Section 10.2 British Standard 4142:2014+A1:2019	Value dB(A)	Distribution (Divisor)	Uncertainty dB(A)
a	Standing waves or interference patterns	0.15	$\sqrt{3}$	0.09
b	Approximation of sound source to a point source	0.10	$\sqrt{3}$	0.06
c	Maintenance and repair of source over 15 years	0.50	$\sqrt{3}$	0.29
Reported Expanded Uncertainty (95% confidence, convergence k = 2)				0.61

10.5 Combined Reported Expanded Uncertainty

Ref	Source of Uncertainty Section 10.2 British Standard 4142:2014+A1:2019	Value dB(A)	Distribution (Divisor)	Uncertainty dB(A)
a	Section 7.1.2. Uncertainty of measured values	2.7	$\sqrt{2}$	1.14
b	Section 7.1.3. Uncertainty of calculations	2.7	$\sqrt{2}$	0.23
c	Section 7.1.4. Uncertainty from other factors	2.7	$\sqrt{2}$	0.43
Combined Reported Expanded Uncertainty (95% confidence, convergence k = 2)				2.55

It should be noted that the uncertainty calculations have assumed a Type B uncertainty.

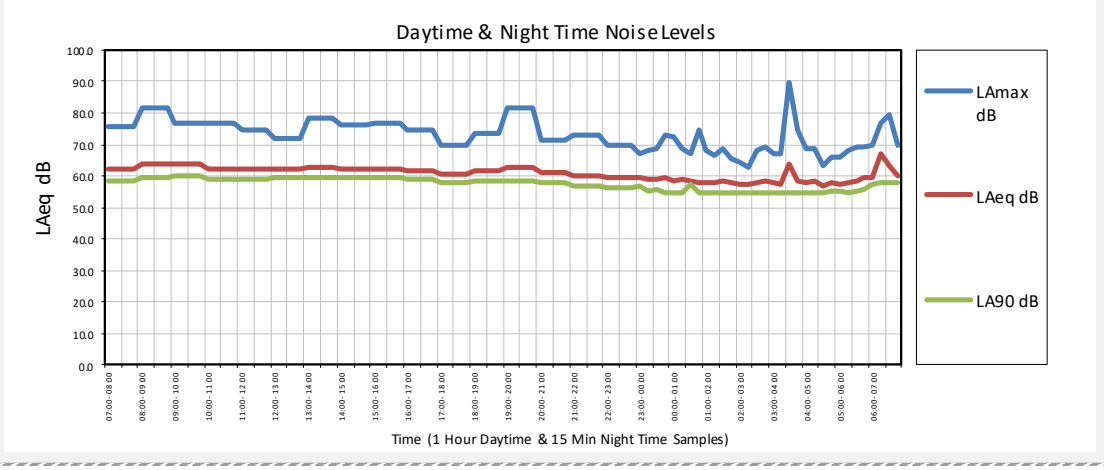
11 APPENDIX B – RESULTS

11.1 7th – 8th August 2023

NOISE LEVEL SUMMARY ASSESSMENT				Octave Band Centre Frequency (Hz)								
Date / Time	LAeq	LAmax	LA90	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LAeq 16 HOUR & Corresponding LAmax 16 HOUR	62.1	81.8	59.0	64.1	61.3	60.6	59.2	57.5	53.7	50.3	41.0	21.9
NIGHT TIME 23:00 - 07:00 LAeq 8 HOUR & Corresponding LAmax 8 HOUR	59.7	89.5	55.0	58.1	56.2	57.7	56.8	54.2	52.5	49.3	38.4	22.1

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES				Octave Band Centre Frequency (Hz)								
Date / Time	LAeq	LAmax	LA90	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	62.4	75.5	59.0	64.3	61.5	60.8	59.3	57.7	54.7	51.0	40.7	20.4
08:00 - 09:00	63.8	81.8	60.0	65.0	62.5	61.2	59.7	59.7	56.5	51.6	41.8	21.1
09:00 - 10:00	63.6	76.7	60.0	65.3	61.9	61.7	59.9	58.5	55.5	54.6	44.5	25.6
10:00 - 11:00	62.4	76.6	59.0	64.1	61.1	60.5	59.4	57.6	54.4	51.6	42.0	21.7
11:00 - 12:00	62.1	74.8	59.0	63.6	60.8	60.6	59.5	57.6	53.6	50.3	40.3	26.7
12:00 - 13:00	62.3	72.1	60.0	63.6	61.0	60.6	59.6	57.7	53.6	50.9	40.7	19.1
13:00 - 14:00	62.5	78.5	60.0	64.3	60.6	60.8	59.8	58.0	54.1	50.6	42.0	21.3
14:00 - 15:00	62.3	76.1	60.0	64.2	61.2	60.9	59.8	57.9	53.5	49.7	40.5	24.9
15:00 - 16:00	62.2	76.8	59.0	64.1	61.8	60.9	59.6	57.9	53.4	49.1	39.5	17.5
16:00 - 17:00	61.7	74.7	59.0	62.8	60.3	60.3	59.2	57.4	52.8	48.8	38.9	19.8
17:00 - 18:00	60.8	69.8	58.0	62.0	60.0	59.3	57.7	56.7	52.3	48.1	38.7	18.2
18:00 - 19:00	61.5	73.3	58.0	64.6	63.2	60.3	58.5	57.2	53.0	48.7	39.7	19.2
19:00 - 20:00	63.0	81.7	58.0	65.8	63.8	62.5	60.0	58.0	54.5	51.9	45.5	23.1
20:00 - 21:00	60.9	71.5	58.0	65.8	61.5	59.8	58.5	56.3	52.0	47.3	38.0	20.7
21:00 - 22:00	59.9	72.8	57.0	61.3	58.4	58.6	57.8	55.4	50.8	46.0	35.8	18.5
22:00 - 23:00	59.6	69.5	56.0	60.9	57.6	58.1	57.4	55.2	50.8	46.2	36.5	18.2

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES				Octave Band Centre Frequency (Hz)								
Date / Time	LAeq	LAmax	LA90	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	59.3	67.2	57.0	62.0	57.0	58.1	57.2	54.7	50.3	45.6	35.2	16.5
23:15 - 23:30	59.1	68.1	55.0	60.3	55.9	57.8	57.0	54.7	49.9	45.0	35.1	19.8
23:30 - 23:45	58.9	68.6	56.0	58.5	58.0	58.3	56.9	54.1	49.9	45.7	35.9	22.7
23:45 - 00:00	59.6	72.8	55.0	58.9	57.9	58.5	57.8	54.8	50.3	46.2	36.7	22.0
00:00 - 00:15	58.6	72.4	55.0	58.9	56.6	58.4	57.0	53.6	48.9	44.6	34.6	18.3
00:15 - 00:30	58.8	68.6	55.0	57.9	55.6	57.6	56.8	54.4	49.6	44.5	34.6	22.2
00:30 - 00:45	58.5	66.9	57.0	56.8	55.1	57.6	57.2	53.8	48.4	44.0	34.2	15.3
00:45 - 01:00	58.1	74.4	54.0	56.4	54.6	57.0	56.4	53.1	49.1	44.4	34.3	23.1
01:00 - 01:15	58.1	68.0	55.0	56.8	55.0	57.1	56.3	53.3	48.7	44.6	36.2	22.5
01:15 - 01:30	57.8	66.6	54.0	55.7	54.4	56.9	56.5	52.9	48.0	43.6	33.9	15.0
01:30 - 01:45	58.2	68.8	55.0	56.0	54.9	57.3	56.6	53.6	48.7	44.0	34.1	18.9
01:45 - 02:00	57.9	65.5	55.0	55.9	54.9	57.0	56.4	53.0	48.3	43.7	33.8	25.6
02:00 - 02:15	57.6	64.4	55.0	55.4	54.4	56.9	56.0	52.8	48.1	43.6	33.6	19.9
02:15 - 02:30	57.4	62.9	54.0	55.4	54.4	56.9	55.9	52.5	47.6	43.4	33.7	24.0
02:30 - 02:45	58.0	68.0	54.0	56.1	55.4	57.2	56.4	52.7	48.7	45.3	35.6	17.9
02:45 - 03:00	58.5	69.1	55.0	55.9	55.8	57.5	56.7	53.4	49.3	46.0	36.2	22.5
03:00 - 03:15	57.7	67.2	54.0	55.6	54.7	56.9	56.2	52.6	48.3	44.3	34.3	25.6
03:15 - 03:30	57.6	66.8	54.0	56.6	54.6	56.7	55.8	52.8	48.4	44.4	34.7	15.7
03:30 - 03:45	63.8	89.5	55.0	58.8	55.3	57.3	56.7	57.2	58.2	57.1	45.5	23.3
03:45 - 04:00	58.3	74.5	55.0	58.9	57.8	58.0	56.2	53.4	49.1	44.5	34.5	20.1
04:00 - 04:15	58.0	68.9	55.0	56.5	56.6	57.5	56.2	52.8	48.8	45.6	35.9	19.6
04:15 - 04:30	58.3	68.6	55.0	57.8	55.7	57.3	56.4	53.1	49.5	46.1	36.2	19.5
04:30 - 04:45	57.0	63.4	55.0	54.5	54.1	56.5	55.7	51.8	47.2	43.0	33.0	27.0
04:45 - 05:00	57.8	66.1	55.0	55.9	55.0	57.3	56.2	52.6	48.3	44.6	34.6	24.7
05:00 - 05:15	57.3	66.1	55.0	57.3	56.9	56.7	55.8	52.0	47.8	44.4	34.9	23.3
05:15 - 05:30	57.8	68.1	55.0	56.4	55.0	56.7	55.5	52.5	49.2	46.8	37.1	15.3
05:30 - 05:45	58.4	69.4	55.0	59.0	56.4	57.3	56.3	53.0	49.6	47.4	36.1	14.8
05:45 - 06:00	59.3	69.4	56.0	58.2	56.2	57.8	57.0	54.6	50.6	47.1	37.6	18.9
06:00 - 06:15	59.7	69.7	58.0	59.1	57.0	58.4	57.6	54.8	51.0	47.5	37.9	17.8
06:15 - 06:30	67.3	76.9	58.0	59.8	57.6	61.1	59.2	59.6	63.2	59.2	48.4	28.7
06:30 - 06:45	63.1	79.2	58.0	61.7	58.8	59.6	58.5	56.1	56.7	55.9	41.5	21.3
06:45 - 07:00	60.3	69.8	58.0	61.2	59.0	59.0	57.9	55.5	51.5	48.0	38.3	17.7

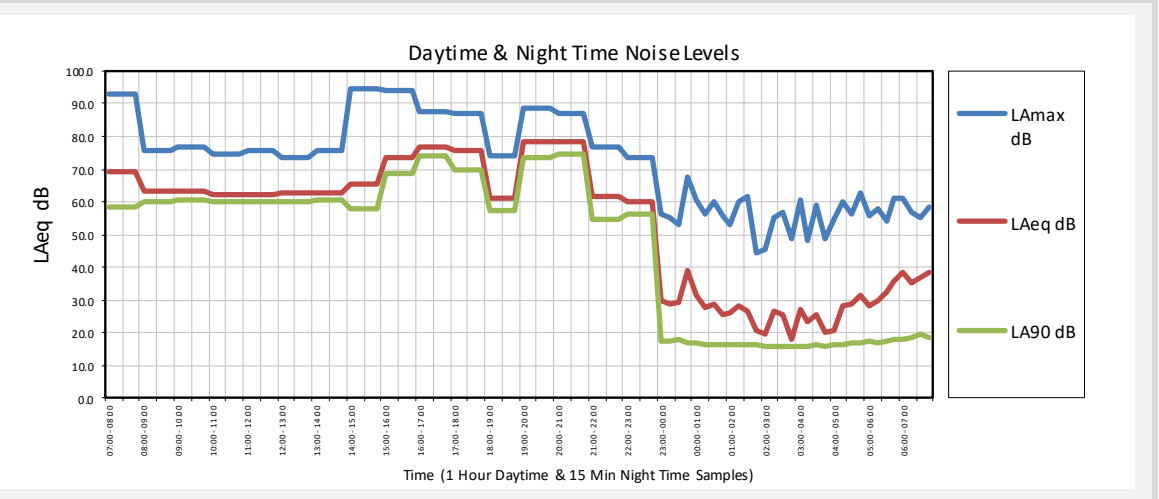


11.2 8th – 9th August 2023

NOISE LEVEL SUMMARY ASSESSMENT				Octave Band Centre Frequency (Hz)								
Date / Time	LAeq	LAmax	LA90	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LAeq 16 HOUR & Corresponding LAmax 16 HOUR	72.3	94.5	60.0	86.0	77.7	72.7	70.6	66.6	60.3	57.9	46.9	42.8
NIGHT TIME 23:00 - 07:00 LAeq 8 HOUR & Corresponding LAmax 8 HOUR	31.9	67.5	16.0	50.1	37.7	32.1	30.5	24.9	19.2	19.0	12.1	10.4

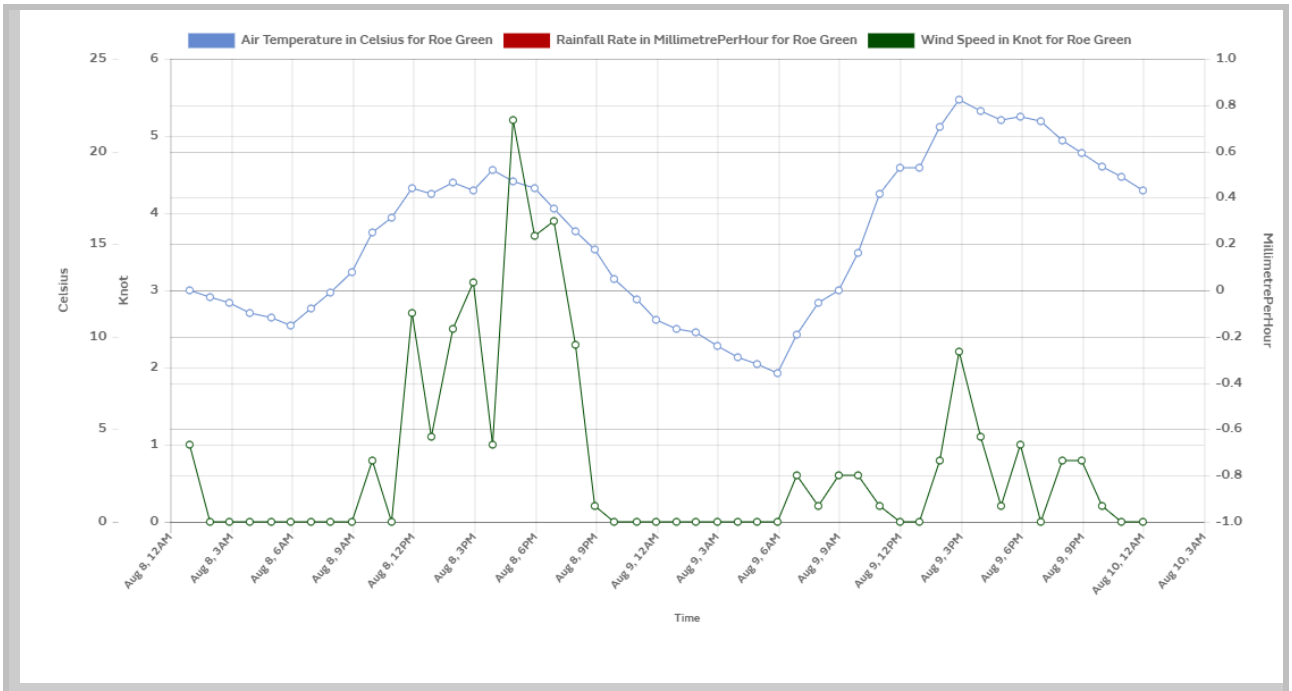
DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES				Octave Band Centre Frequency (Hz)								
Date / Time	LAeq	LAmax	LA90	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	69.3	92.7	59.0	63.2	61.0	60.5	59.3	65.0	65.2	51.9	41.3	21.0
08:00 - 09:00	63.1	75.9	60.0	65.6	62.5	62.0	60.2	58.4	54.6	51.6	42.0	22.7
09:00 - 10:00	63.4	76.9	61.0	66.6	64.3	62.7	60.5	58.1	54.8	53.1	42.6	24.3
10:00 - 11:00	62.4	74.8	60.0	64.4	61.1	61.1	59.9	57.9	53.4	50.0	40.7	19.7
11:00 - 12:00	62.3	75.5	60.0	64.9	61.0	61.5	59.8	57.7	53.2	50.3	40.9	28.7
12:00 - 13:00	62.5	73.4	60.0	65.4	61.5	61.4	60.4	57.9	53.2	50.0	40.7	21.5
13:00 - 14:00	62.7	75.8	60.0	64.7	60.9	61.2	60.4	58.1	53.5	50.3	41.1	21.3
14:00 - 15:00	65.5	94.5	58.0	63.8	63.4	62.7	60.9	59.0	57.1	58.3	55.3	54.6
15:00 - 16:00	73.7	94.1	69.0	88.2	77.7	73.2	73.1	67.6	61.9	57.3	46.4	38.4
16:00 - 17:00	76.6	87.8	74.0	90.6	81.2	76.8	76.0	70.8	62.3	55.3	40.9	31.7
17:00 - 18:00	75.7	87.2	70.0	90.7	81.7	76.2	74.4	70.5	60.8	54.9	41.2	30.4
18:00 - 19:00	61.0	74.0	57.0	63.8	60.2	58.9	58.4	56.8	52.4	46.9	36.5	15.7
19:00 - 20:00	78.5	88.7	74.0	92.0	84.5	79.0	76.8	73.1	65.6	63.9	49.4	33.9
20:00 - 21:00	78.2	87.3	74.0	92.3	84.9	79.5	75.7	71.9	65.3	66.5	52.5	36.0
21:00 - 22:00	61.9	76.8	55.0	79.9	69.3	62.5	58.2	55.1	51.4	49.3	39.4	26.7
22:00 - 23:00	59.8	73.6	56.0	62.0	58.4	58.0	56.9	55.6	51.7	46.3	35.8	24.3

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES				Octave Band Centre Frequency (Hz)								
Date / Time	LAeq	LAmax	LA90	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	30.1	56.1	18.0	48.6	33.7	30.4	28.2	24.6	17.6	15.7	10.8	9.9
23:15 - 23:30	28.8	55.0	18.0	46.9	32.6	28.5	26.5	23.0	17.5	16.7	10.9	9.9
23:30 - 23:45	29.3	52.8	18.0	48.8	32.8	28.7	26.8	23.5	18.0	17.0	10.9	10.2
23:45 - 00:00	39.1	67.5	17.0	48.4	47.1	41.8	39.9	24.3	17.5	19.4	12.8	10.1
00:00 - 00:15	31.7	60.6	17.0	54.3	36.7	29.7	28.0	24.9	20.2	22.0	13.4	11.8
00:15 - 00:30	27.8	56.3	17.0	51.8	29.8	25.5	24.2	20.6	15.3	18.0	12.4	10.0
00:30 - 00:45	28.7	60.3	16.0	44.7	34.3	27.3	26.2	21.5	18.1	21.2	12.6	10.1
00:45 - 01:00	25.7	55.5	16.0	41.9	30.6	23.6	22.8	19.7	15.8	16.0	11.4	9.7
01:00 - 01:15	26.1	53.2	16.0	42.9	30.7	25.0	24.3	20.2	14.3	12.7	10.6	10.4
01:15 - 01:30	28.1	60.1	16.0	42.3	26.7	25.6	23.5	21.1	18.5	22.0	14.0	10.3
01:30 - 01:45	26.6	61.7	17.0	38.8	29.0	21.5	22.6	21.4	19.4	16.4	10.9	9.7
01:45 - 02:00	20.5	44.3	16.0	41.3	24.1	18.8	17.2	12.2	8.9	9.8	10.1	9.9
02:00 - 02:15	19.7	45.4	16.0	33.0	22.5	19.4	16.6	13.3	9.1	10.0	10.1	9.8
02:15 - 02:30	26.7	55.2	16.0	51.1	33.0	23.8	21.6	18.9	13.0	11.0	10.1	9.7
02:30 - 02:45	25.3	56.7	16.0	40.1	29.1	23.1	22.8	20.4	14.9	12.6	10.3	9.7
02:45 - 03:00	18.1	48.9	16.0	29.8	18.9	13.2	11.2	7.8	9.3	13.0	10.5	9.8
03:00 - 03:15	26.9	60.5	16.0	33.6	19.1	13.7	13.6	12.5	17.7	24.4	16.4	10.5
03:15 - 03:30	23.4	48.1	16.0	43.0	25.9	23.0	21.2	14.4	12.6	14.2	10.7	10.0
03:30 - 03:45	25.5	59.1	16.0	39.3	25.9	22.7	21.0	14.9	16.5	20.8	12.8	9.9
03:45 - 04:00	20.3	48.5	16.0	37.4	22.7	18.6	16.0	12.5	10.6	12.6	10.4	9.8
04:00 - 04:15	20.9	54.7	16.0	34.8	20.8	18.3	16.3	9.8	11.2	15.7	11.6	10.0
04:15 - 04:30	28.4	59.9	17.0	47.1	33.2	25.6	23.2	19.6	17.6	22.8	14.9	10.4
04:30 - 04:45	28.5	56.3	17.0	46.8	33.3	27.6	25.4	23.0	16.1	16.7	11.5	9.9
04:45 - 05:00	31.5	62.7	17.0	50.4	34.3	29.2	30.1	25.8	19.8	19.7	12.0	10.2
05:00 - 05:15	28.1	55.7	17.0	49.5	31.0	26.6	26.3	20.2	15.3	18.6	12.6	9.8
05:15 - 05:30	29.8	57.7	17.0	47.9	32.4	29.0	27.5	23.2	18.8	20.6	12.4	10.1
05:30 - 05:45	32.3	54.1	18.0	52.4	35.2	31.2	30.7	26.4	20.3	17.0	10.5	9.7
05:45 - 06:00	35.7	61.1	18.0	50.6	40.6	35.8	34.9	29.3	23.8	21.1	11.1	9.7
06:00 - 06:15	38.2	61.0	18.0	57.6	45.5	39.3	35.6	31.5	24.8	21.8	11.7	9.9
06:15 - 06:30	35.3	56.9	18.0	53.4	40.4	35.0	33.9	29.6	23.4	20.0	14.0	15.6
06:30 - 06:45	36.7	55.2	20.0	56.1	40.9	36.2	35.2	31.3	23.8	19.0	11.0	10.5
06:45 - 07:00	38.4	58.3	19.0	56.6	44.8	38.3	37.1	32.2	25.5	22.0	11.7	10.5



12 APPENDIX C – WEATHER CONDITIONS

12.1 7th – 9th August 2023



7th – 9th AUGUST 2023

13 APPENDIX D – BS 4142:2019+A1:2019 INFORMATION

In accordance with BS 4142:2014:A1:2019, section 12, the following information is provided.

13.1 Professional Competence

Acoustic Consultant	Mr Brian Scrivener MIOA
Qualifications	Member of the Institute of Acoustics (MIOA)
Date Certified	June 2003
Time Operating as an active Noise Consultant	Permanently Since June 2003
Professional Position	Owner of Sound Advice Acoustics Ltd & Sound Advice Engineering Managing Director & Share Holder
Professional Status	Noise Consultant
Professional Statement	
I have been active within the field of noise consultancy and noise control engineering since I joined the company in April 1997. Working my way through the company and gaining experience in this specialist field, I qualified as a noise consultant in June 2003 when I passed my Diploma in Noise Control & Engineering from Epsom College under the tutor of Dr Latha Vesudevan. Subsequently I was awarded the status of 'Member of the Institute of Acoustics (MIOA)'. Since then I have taken over the company and continued to work and develop my professional competence within the field of acoustic consultancy, engineering and noise control.	

13.2 Site Status

Site Attended By	Mr Brian Scrivener MIOA
Baseline Measurements Conducted by	Mr Brian Scrivener MIOA
Site Source Measurements Conducted By	Mr Brian Scrivener MIOA

13.3 Measurement Information – Location 1

Details & Justification	Measurement position 1 was located at the rear of the existing premises, representative of the Nearest Nosie Sensitive Premises
Height from Roof	1.5m
Reflective Surfaces	None (Free Field)
Distance to NSP	23m
Distance to Source	0m
Topographical Change (m)	None
Ground between Source and Receiver	100% Hard surface from proposed roof top plant to offices in next building.
Windshield Information	Norsonic Outdoor Microphone Protection Kit Model No: 1212
Distance from Proposed Source to Receiver	23m
NSP* - Noise Sensitive Premises	

END OF REPORT