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Stantec

19 King Street,
Manchester

Noise Impact Assessment

For Cushman & Wakefield

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1. Introduction

1.1 Overview

Hydrock have been appointed by Cushman & Wakefield to provide a noise impact assessment for the installation of 2 no. louvres and 4 no. new air conditioning condenser units, which will replace 4 no. existing condenser units, to the rear elevation of 19 King Street, Manchester, M2 6AW. It is understood that the existing units do not currently have planning permission, therefore the proposed units are considered as if a new installation. This report provides an assessment of noise in accordance with current policy and guidance.

This report is technical in nature; therefore, a glossary is provided in **Appendix A**.

1.2 Site Context

The rear elevation of the building (the 'Site'), where the proposed plant and louvres are to be located, faces on to Mayo Street. The Site is surrounded by existing office, commercial and retail premises. The existing noise environment is dominated by existing plant from surrounding properties in the vicinity of the 'Site' and for the nearest noise sensitive receptors.

2. Methodology

2.1 Overview

A noise impact assessment is required in support of the planning application to demonstrate suitable noise levels can be achieved in accordance with current policy and guidance. This assessment considers the following noise impacts associated with the scheme:

- » Noise impacts from the proposed ancillary equipment associated with the development at nearby Existing Sensitive Receptors (ESRs), including the Site itself.

2.2 Consultation with Manchester City Council

The proposed scope of works and assessment methodology were sent to Environmental Health at Manchester City Council (MCC), on 24th October 2024.

A response from Graeme Souter of Environmental Protection at MCC was received on 24th October 2024 who agreed with the noise survey and assessment methodology in principle. It was also highlighted that proposed ancillary plant will need to achieve a noise rating level of 5dB below the typical background level, in accordance with BS4142 in order to satisfy MCC guidance.

2.3 Policy, Standards and Guidance

The assessment carried out considers the following policy, standards and guidance documents:

- » National Planning Policy Framework, 2023 (NPPF);
- » Noise Policy Statement for England, 2010 (NPSE).
- » Planning Practice Guidance – Noise, 2019 (PPG);
- » World Health Organisation 1999: Guidelines for Community Noise (WHO);
- » British Standard 8233: 2014 Guidance on sound insulation and noise reduction for buildings (BS8233);
- » BS 4142:2014 + A1 2019 - Methods for rating and assessing commercial and industrial sound (BS4142);
- » CIBSE Guide A: Environmental Design, 2016 (CIBSE)

A review of the relevant planning policy, standards and guidance is found in **Appendix B**.

2.4 Existing Sensitive Receptors

The following ESRs have been identified as those most likely to be affected by the proposals, presented in **Table 1**. ESR1 represents the Proposed Development Site itself on the first floor of 19 King Street, where the proposed plant will be mounted on the façade. The location of ESR2 is considered to be representative of the closest window of the façade associated with existing offices on the 1st floor of St Ann's House, which has windows facing Mayo Street.

Table 1: Existing Sensitive Receptors

Existing Receptor	Address	Coordinates		Bearing from Site
		X (Easting)	Y (Northing)	
ESR1	19 King Street, Civic Quarter, City Centre, Manchester, M2 6AW	383739	398337	South
ESR2	St. Anns House, St. Ann's Place, Civic Quarter, City Centre, Manchester, M2 7LP	383749	398336	East

ESRs are also illustrated on **Figure 1**. Any impacts associated with the proposed plant at other nearby ESRs will be less than those considered at the selected ESR locations.

2.5 Noise Survey

An attended noise survey has been carried out in order to characterise the existing noise environment at ESR2. A combination of site observations and a review of audio recordings have been carried out the Monitoring Location (ML) to facilitate the analysis of baseline conditions.

The ML is shown in **Figure 1** and full details of the survey are set out in **Section 3** of this report. Calibration information is also included in **Appendix C**.



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Key		
<div>Approximate Site Boundary</div>		
<div>Monitoring Location</div>		
<div>Existing Sensitive Receptor</div>		
Notes		
Revisions		
First Issue		
CREATED 31/10/2024	CHECKED 31/10/2024	
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Figure 1		

3. Noise Survey

3.1 Survey Overview

An attended noise survey was undertaken at the Site on the 25th October 2024.

Two 1-hour attended measurements were taken between approximately 0720-0820 and 1445-1545. Monitoring equipment was set up to measure A-weighted, time-equivalent, one-third octave band sound pressure levels for the duration of the survey. Noise measurements were carried out using a Class 1, integrating Sound Level Meter (SLM). The SLM was set up on a tripod approximately 1.5m above the ground and equidistant from the facades on either side of the alleyway of Mayo Street.

Sound level meters were calibrated to a reference level of 94 dB at 1kHz both prior to, and on completion of, the noise survey. No significant drift in calibration was noted during the survey (≤ 0.5 dB).

All noise monitoring was carried out in accordance with British Standard 7445-2 - *Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use*, where appropriate.

3.2 Weather Conditions

Weather conditions were dry and calm throughout the survey, with wind speeds less than 5ms⁻¹ and no precipitation. Weather forecasts were reviewed prior to the survey, observations were made during setup and decommissioning of monitoring equipment, and a review of the audio data from the survey allowed the following information to be gathered:

- » Temperatures ranging between 12°C and 17°C;
- » No precipitation;
- » Wind speed varying between 1ms⁻¹ and 5ms⁻¹; and,
- » Dry ground.

3.3 Monitoring Locations

Monitoring Locations (MLs) are summarised in **Table 2** and illustrated on **Figure 1**.

Table 2: Noise Monitoring Locations

ML	Description	Approximate Measurement Period
ML1	Located 1.5m above ground floor level, adjacent to the nearest existing sensitive receptors in St Ann's House. The nearest office spaces are situation at 1 st floor level and above. This location was selected to establish typical ambient and background noise levels in the vicinity of ESR2.	0721 to 0821, and 1445 to 1545, On the 25/10/24

3.4 Summary of Baseline Acoustic Environment

Observations made during the survey and a review of audio recordings identified the following noise sources contributing to the noise climate at the Site:

Commercial/Industrial Noise: Noise from various plant items along Mayo Street from neighbouring commercial/retail properties was dominant at ML1.

Construction Noise: Noise from construction machinery and tools was occasionally audible during the survey. Periods where construction noise was audible have been excluded from the assessment.

Road Traffic: Road traffic noise from Deansgate was occasionally audible during the survey at ML1.

Other Sources: Bird noise, aircraft noise, pedestrian noise, and church bells from St Anns Church were occasionally audible at ML1.

3.5 Summary of Baseline Noise Levels

A summary of average measured noise levels has been provided in **Table 3** and set out in full in **Appendix D**.

Table 3: Summary of Daytime Noise Levels

Monitoring Location	Time Period	Measured Noise Level, L _{Aeq, T} dB
ML1	0721 – 0821	53
	1445 – 1545	54

4. Noise Impact Assessment

4.1 Noise Impact Assessment at ESR1

4.1.1 Overview

Since the proposed condenser units will be mounted on the façade of ESR1, specific noise from these units will transmit directly into the building. It is therefore considered to be more relevant to consider the break-in noise from the proposed condenser units and assess against internal noise level criteria set out in BS8233.

4.1.2 Criteria

Within BS8233, the most relevant Internal Ambient Noise Level (IANL) criterion for the ESR1 retail space is the design range provided for department stores, 50-55 dB(A), as BS8233 does not specify criteria for smaller shops. In contrast, CIBSE does provide guidance for small shops, recommending an NR range of 35-40, which equates to an IANL of 40-45 dB(A).

4.1.3 Specific Noise

Technical data sheets for the proposed condenser units have been used to calculate the combined sound power level of the 4 no. proposed condenser units.

Based on information provided by the appointed MEP consultant, the proposed louvres will be mounted on the façade at a height of 7m above ground and will emit air with a noise level of 25 dB(A) at 1m, which is considered to be negligible relative to the residual acoustic environment and to the condenser units.

Table 4 shows a summary of the sound power levels for each item of plant used in this assessment.

Table 4: Sound Power Levels of Individual Proposed Plant Items

Unit	Quantity	Sound Power Level per Unit
Condenser Unit (Toshiba RAV-GP1101AT8-E)	4	67
Acoustic Louvre	2	33

4.1.4 Glazing and Façade Insulation Assumptions

The façade separating the proposed plant and the retail space at ESR1 is predominantly glazed so in order to calculate the noise transmission through the façade, the attenuation of the glazing needs to be considered.

The façade is composed of single glazed windows. The sound reduction of a typical 4 mm single glazing specification has been adopted to provide a robust assessment.

Table 5 shows the octave band sound reduction of Pilkington 4mm single glazing. A penalty of 5 dB per octave band has been applied to account for the possible degradation of the windows since their installation, given the age of the building.

Table 5: Summary of Glazing Specification

Glazing Specification	Octave Band Centre Frequency (Hz)						
	63 Hz	125 Hz	250	500	1 k	2 k	4 k
Pilkington 4mm Single Glazing	15	20	22	28	33	34	28
Degradation Penalty	-5	-5	-5	-5	-5	-5	-5
Assessed Glazing	10	15	17	23	28	29	23

4.1.5 Façade Break-in Assessment

As the condenser units are located on the façade itself, the distance from the units to the façade is negligible compared to the area of the units, and are considered to behave as area sources in the near field. Therefore, the sound pressure at the façade is considered to equal the average sound power level of the combined units across the façade.

The average sound power level of the 4 no. condenser units is 67 dB(A).

This façade level of 67 dB forms the basis of a façade noise break-in calculation, in line with ISO 12354-3 and subsequent Noise Rating (NR) assessment, in accordance with BS8233 and CIBSE.

Appendix E shows the predicted internal noise level within the building is 38 dB(A) and achieves NR33; this is considered to provide a good standard for the retail space and it is below the NR range of 35-40 recommended by BS8233 and CIBSE.

Therefore, no specific mitigation for the plant is required when considering specific noise at ESR1.

4.2 Noise Impact Assessment at ESR2

4.2.1 Identification of Specific Sound Sources

The cumulative specific noise level associated with the proposed plant configuration has been determined via the logarithmic addition of the specific sound power level of each condenser unit and is presented in **Table 5** below.

Table 6 Derivation of Combined Proposed Plant Noise Level

Noise Level Description	Noise Level, dB L _{Aeq, T}
Sound Power Level of Single Unit, dB(A) L _w	67
Combined Sound Power Level of Proposed Plant dB(A) L _w	73

The proposed plant will only operate during the daytime period (0700-2300) and has been assumed to emit noise continuously throughout the daytime period, which provides a robust assessment.

4.2.2 Identification of Background Sound Level

Appropriate daytime (0700-2300) background sound levels have been established at ESR2 (see **Table 1**). It has been determined that an assessment against the night-time (2300-0700) background sound levels is not necessary as the proposed plant will not operate during this period.

In order to provide a robust assessment of background noise levels at ESR2, the lowest measured daytime $L_{A90, 1\text{hour}}$ background sound level from both survey periods at ML1 has been adopted. For the purposes of this assessment the background level is 52dB L_{A90} .

4.2.3 Formulation of Rating Level

Attenuation of Sound over Distance

In order to establish a noise rating level at ESR2, in accordance with BS4142, a correction for attenuation of sound over distance has been applied to the specific level, to form the basis of the rating level. The average distance from the plant configuration to the closest window of ESR2 is approximately 9m; this equates to a specific level of 46 dB at ESR2.

Application of any Acoustic Feature Corrections

In accordance with BS4142, a correction should be applied to the specific level of noise where it is perceived as tonal, intermittent, impulsive, or otherwise readily distinctive against the existing acoustic environment, at the receptor location.

The existing noise environment in the vicinity of ESRs is currently dominated by existing plant associated with the neighbouring buildings, therefore noise from the proposed condenser units is not considered to be readily distinctive above the residual environment.

Furthermore, condenser units of this type are not typically tonal or impulsive. The units will need to switch on or off or ramp up or down depending on the internal heating or cooling requirements of the building. However, it is considered that the periods between these events will not be short enough in duration to be considered intermittent.

Therefore, no specific acoustic feature corrections are required.

4.2.4 BS4142 Comparison of Rating and Background Sound Levels

Rating levels and background sound levels have been compared at ESR2 during the daytime and night time periods, in accordance with BS4142.

Table 7: Assessment of Rating Level Against Measured Background Level

Description	Daytime
Specific Level at ESR2, $L_{s,T}$ dB	46
Feature Correction, dB	0
Rating Level at ESR2, $L_{A,r,T}$ dB	46
Background Level, $L_{A90,T}$ dB	52
Exceedance Level, dB	-6

Table 6 indicates that noise rating level in the vicinity of ESR2 is 6 dB below the existing background level during the daytime period. This provides an indication of low potential impacts, depending on context, in accordance with BS4142.

Furthermore, this demonstrates that noise from the proposed installation satisfies MCC guidance, which recommends that the rating level of proposed plant must be at least 5 dB below the measured background sound level.

Therefore, no specific mitigation measures are required.

5. Conclusions

Hydrock have been appointed by Cushman & Wakefield to provide a noise impact assessment for the installation of 2 no. louvres and 4 no. new air conditioning condenser units, which will replace 4 no. existing condenser units, to the rear elevation of 19 King Street, Manchester, M2 6AW. It is understood that the existing units do not currently have planning permission, therefore the proposals are considered as if new.

The Site is located at the rear façade of 19 King Street, Manchester, facing Mayo Street. The closest Existing Sensitive Receptor (ESR), ESR1, is the retail space inside 19 King Street; the façade directly outside this space will house the proposed plant. The next closest, ESR2, is the assumed office space at first floor height of St Anns House, facing Mayo Street approximately 9m to the east of the Site.

In order to assess the noise impacts within the Proposed Development building itself, noise break-in calculations and a Noise Rating (NR) curve assessment have been carried out. The assessment indicates that NR33 is achieved within internally within the building, when taking in to account a robust representation of the existing single glazed façade. This NR value is below the criteria set out in both BS8233 and CIBSE. Therefore, no specific mitigation measures are required regarding the Proposed Development building itself.

An assessment of the rating level from the proposed plant items against the measured background level has been carried out externally at the nearest window of the neighbouring office, in accordance with BS4142. This assessment indicates that the predicted rating level is 6 dB below the background level, which is also 1 dB below the threshold recommended by MCC guidance. Therefore, no specific mitigation is required.

In summary, the assessment demonstrates that potential noise impacts associated with the proposed plant are likely to be negligible at existing sensitive receptors. Therefore, no mitigation measures are required.

Appendix A Glossary

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2×10^{-5} Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{AFmax}	L_{AFmax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{AFmax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time, and the L_{90} is the level exceeded for 90% of the time.
R_w	R_w is the single-number quantity which characterizes the sound insulating properties of a given material over a range of frequencies. This is typically measured in a laboratory in accordance with BS EN ISO 717-1.
$D_{n,e,w}$	$D_{n,e,w}$ is the single number quantity which characterizes the airborne sound insulation performance across a given 'element' and is typically used to describe the acoustic performance of trickle ventilators etc.
C_{tr}	C_{tr} is a correction term applied to single-number sound insulation values (R_w , $D_{n,e,w}$ etc.) to afford additional weighting against low frequency performance.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and at least 3 m from buildings.

Appendix B Policy, Standards & Guidance

National Planning Policy Framework (NPPF)

Published in December 2023, this document sets out the Government's planning policies for England and supersedes the previous version of the NPPF published in 2021. It makes the following reference to noise in the section entitled Conserving and enhancing the natural environment:

"180. Planning policies and decisions should contribute to and enhance the natural and local environment by:

[...]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."

It also makes the following references to noise in the Section entitled Ground conditions and pollution:

"191. 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 life⁶⁹;

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.

69 See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."

And

"193. 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."

Noise Policy Statement for England (NPSE)

Published in March 2010, the Noise Policy Statement for England (NPSE) sets out the long-term vision of Government noise policy as follows:

"Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development."

The NPSE identifies three observed effect levels, names "No Observed Effect Level" (NOEL), "Lowest Observed Adverse Effect Level" (LOAEL) and "Significant Observed Adverse Effect Level" (SOAEL).

The NPSE contains little detail on assessment methodologies and specific parameters at which the varying observed effect levels would occur in the context of a residential development.

World Health Organisation (WHO) 1999: Guidelines for Community Noise

As with the 'good' and 'reasonable' criteria in BS 8233, the L_{AFmax} criterion in BS8233 is largely concordant with the World Health Organisation (WHO) guidance 1999: Guidelines for community noise. This document draws upon guidance from Vallet and Vernay, which states:

"For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night"

BS 8233:2014 - Guidance on sound insulation and noise reduction for buildings

This British Standard provides guidance based on research and experience to help design buildings with suitable internal acoustic environments. It covers noise control from external sources, building plant, and internal services, as well as room acoustics for non-critical situations. It is intended for use by non-specialist designers, builders, and professionals involved in building control, planning, and environmental health.

The recommended noise level criterion for department stores is outlined in Table 6 of Section 7.7.4 in BS8233, which recommends a design range of 50-55 dB L_{Aeq} .

The design range should allow for the assumed primary activity of speech or telephone communications to be carried out effectively.

BS 4142:2014 - Methods for rating and assessing commercial and industrial sound

BS 4142 describes methods for rating and assessing sound from industrial and manufacturing processes, fixed installations which comprise mechanical and electrical plant and equipment, the loading and unloading of goods and materials at industrial and/or commercial premises and mobile plant and vehicles that are an intrinsic part of the overall sound emanating from premises or processes.

The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates

the difference between the rating level of the sound and the prevailing background sound level ($L_{A90,T}$). Comparing the rating level with the background sound level, BS 4142 states:

"Typically, the greater this difference, the greater the magnitude of 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."

CIBSE Guide A: Environmental Design

CIBSE Guide A: *Environmental Design* is a leading reference for building services designers and installers, focusing on low-energy and sustainable buildings. The eighth edition introduces substantial updates to both its format and content, aligning with UK legislation, including the 2013 Building Regulations Approved Documents L and F, and the Energy Performance of Buildings Directive.

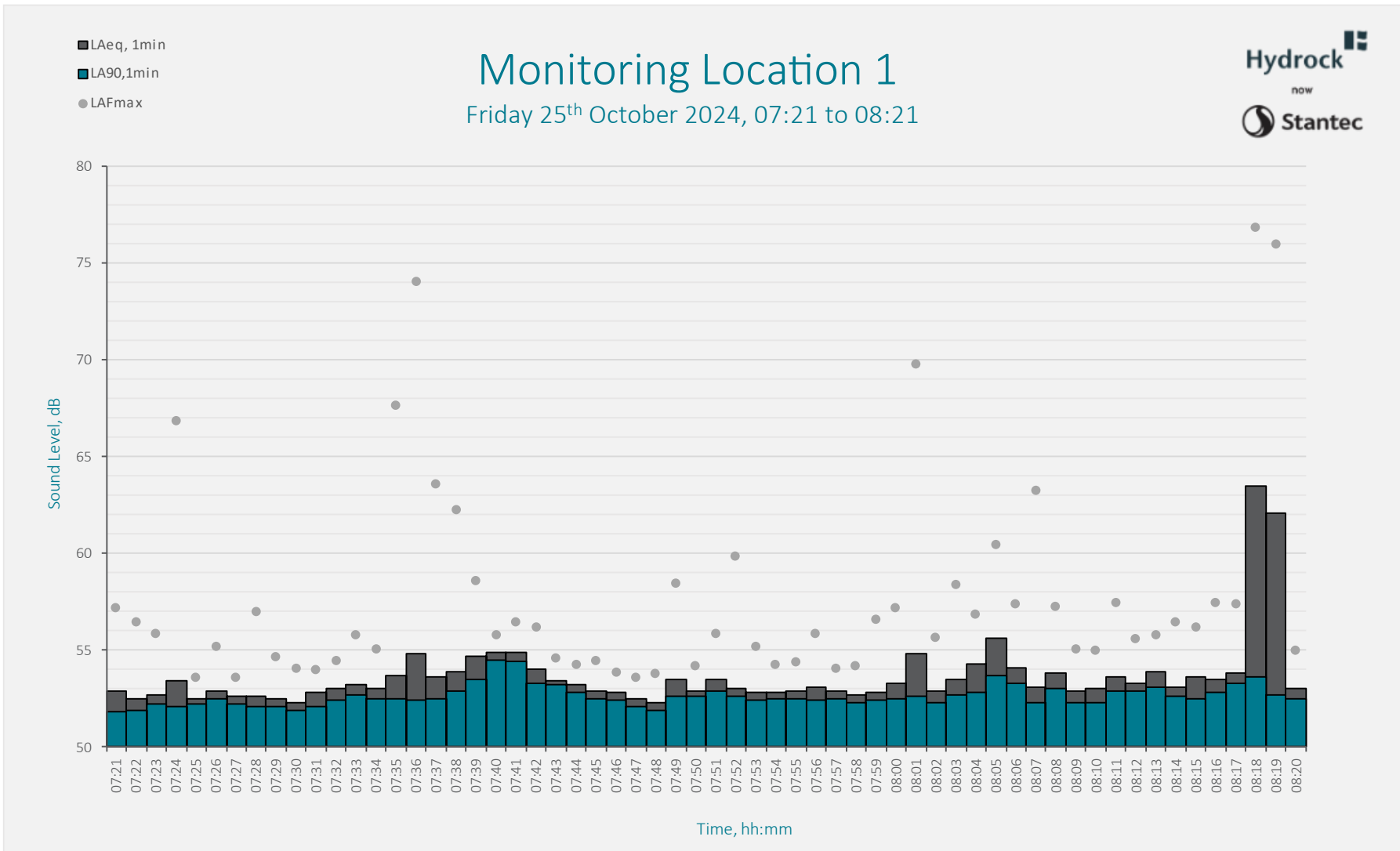
The recommended noise level criteria for small shops are outlined in Table 1.5 CIBSE Guide A, which recommend a design range of 40-45 dB L_{Aeq} and NR between 35-40.

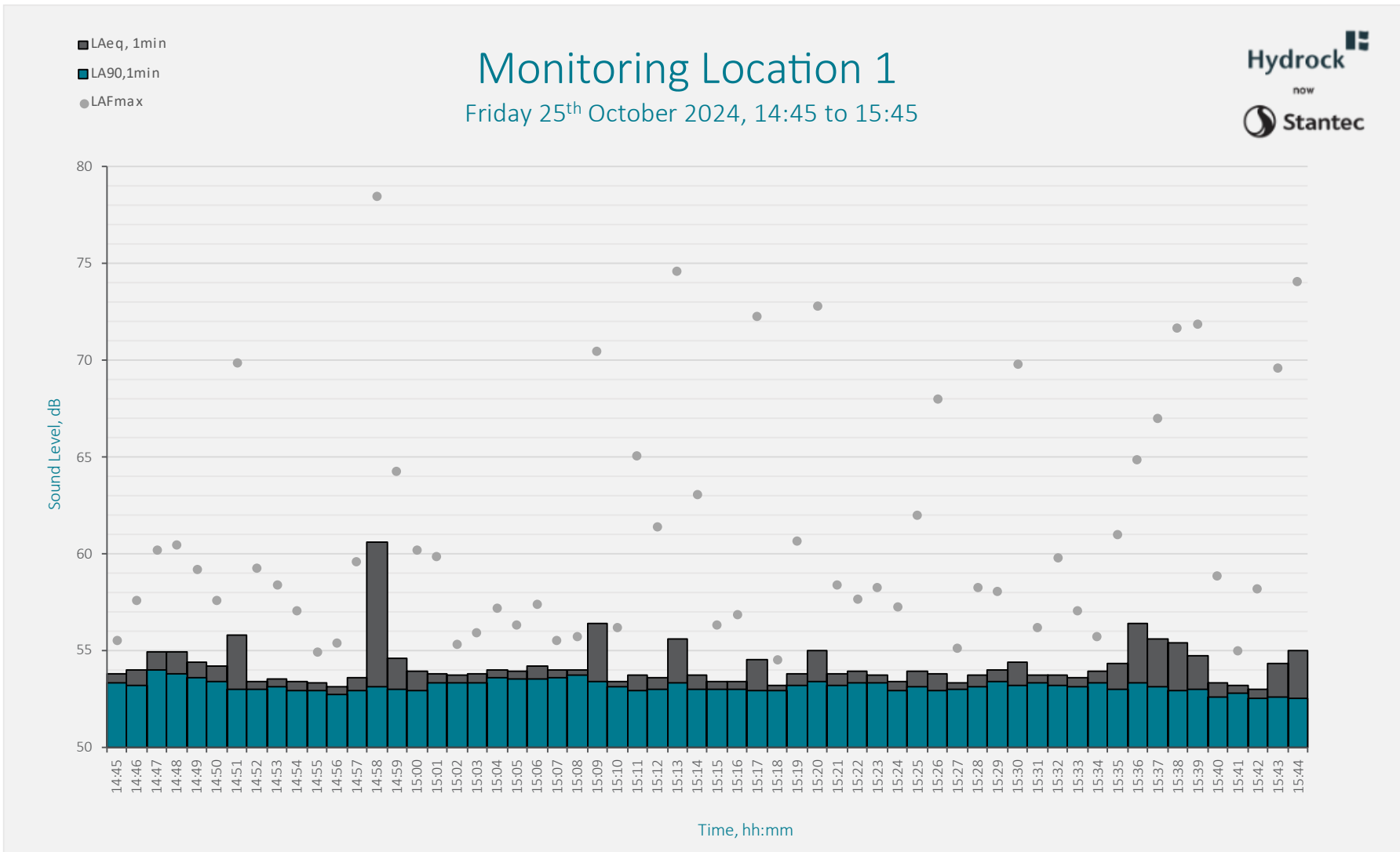
Appendix C Equipment Calibration Information

Equipment Calibration Information

Kit Name	Equipment	Manufacturer	Model	Serial No.	Cal Cert No.	Cal Date.	Calibration Due
ML1	Sound Level Meter	01dB	Fusion	14015	06260/1	23-May-23	25-May-25
	Pre-amp		Pre22	2105047	06260/1	23-May-23	
	Microphone	G.R.A.S	40CD	428498	06260/1	23-May-23	
	Calibrator	Cirrus	CR:515	100148	06529/1	18-Dec-23	17-Dec-24

Appendix D Measured Noise Levels





Appendix E Noise Rating Curves

Appendix E

Noise Rating Curve Assessment - Air Conditioning Condenser Units

Frequency, Hz	Internal Noise Level, dB	NR33	NR35	A weighting	A-Weighted Internal Noise Level, dB(A)
63 Hz	33.2	61.5	63.1	-26.2	7.0
125 Hz	45.0	50.7	52.5	-16.1	28.9
250 Hz	37.6	42.7	44.6	-8.6	29.0
500 Hz	35.8	36.5	38.5	-3.2	32.6
1 kHz	31.1	33.0	35.0	0.0	31.1
2 kHz	25.4	30.0	32.0	1.2	26.6
4 kHz	25.8	27.7	29.8	1.0	26.8
Overall Internal Noise Level, $L_{Aeq, T}$					29.0

Comparison of Internal Noise Level and NR45

