

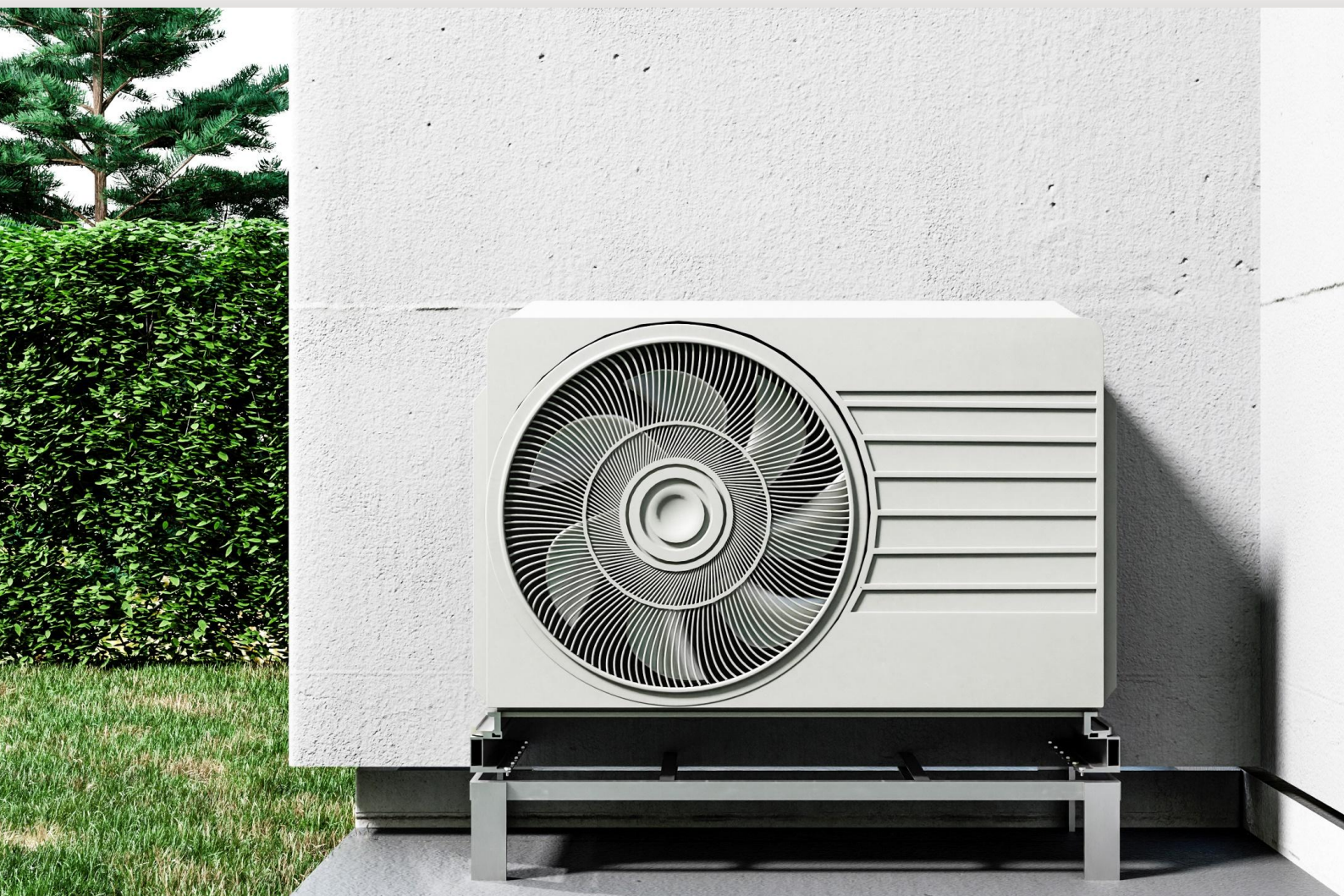


PENINSULAR
ACOUSTICS

Ms Kathy Cui

44-46 Faulkner Street, Manchester

Acoustic Assessment



PUBLIC

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44-46 Faulkner Street, Manchester

Acoustic Assessment

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1. Introduction

1.1. Introduction

Peninsular Acoustics have been commissioned by Ms Kathy Cui (hereafter referred to as 'the Client') to conduct a BS 4142 Assessment of the proposed extract ventilation equipment, located at 44-46 Faulkner Street, Manchester M1 4FH (hereafter referred to as 'the Site').

An assessment is required to evaluate the noise impact of the proposed equipment on nearby sensitive receptors and provide mitigation measures to reduce the impact if necessary. The known external items have been considered in the noise assessment and all other internal equipment should be designed so as not to exceed the levels set out in this report.

An acoustics glossary is provided in Appendix A to assist the reader.

1.2. Site Description

Existing Site

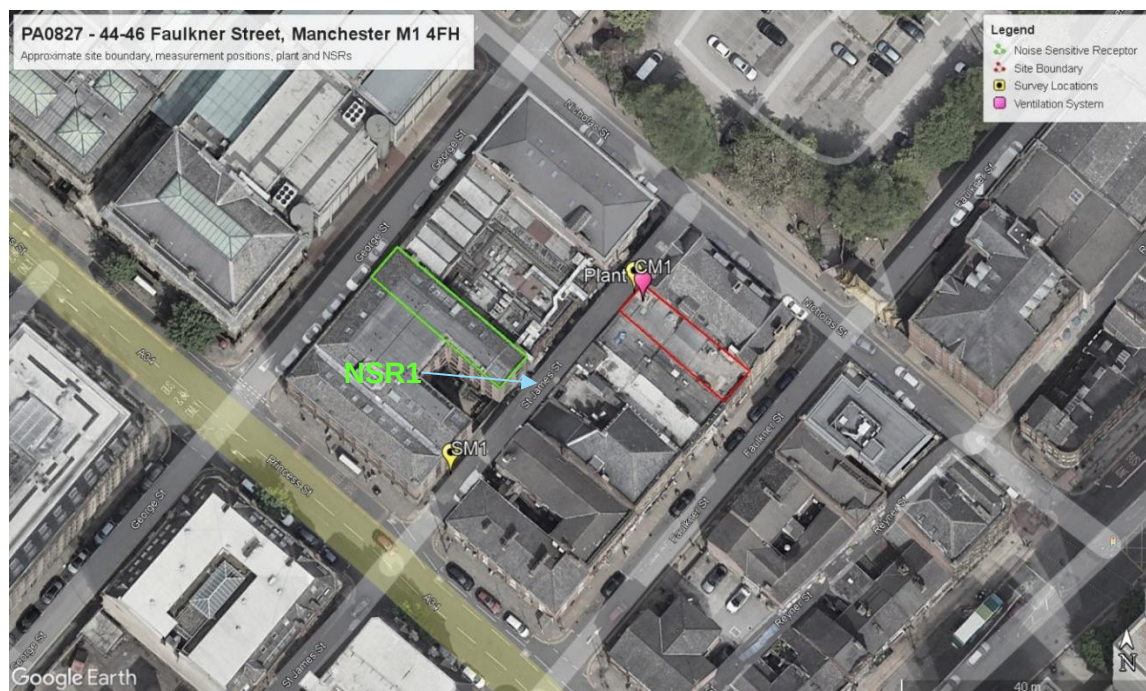
The Site is a three-storey building with a basement and is currently not in use. The nearest residential properties are approximately 20m away on the opposite side of St James Street. The surrounding buildings at ground floor level consist mainly of restaurants with some residential above.

The nearest Noise Sensitive Receptor (NSR) has been identified as follows:

- **NSR1:** 1m outside third-floor residential window, on the opposing side of St James Street and circa 20m from Site

An approximate Site boundary is provided below in Figure 1.1, along with survey / plant locations and the identified sensitive receptor.

Figure 1.1: Approximate site boundary, measurement positions, plant and NSR

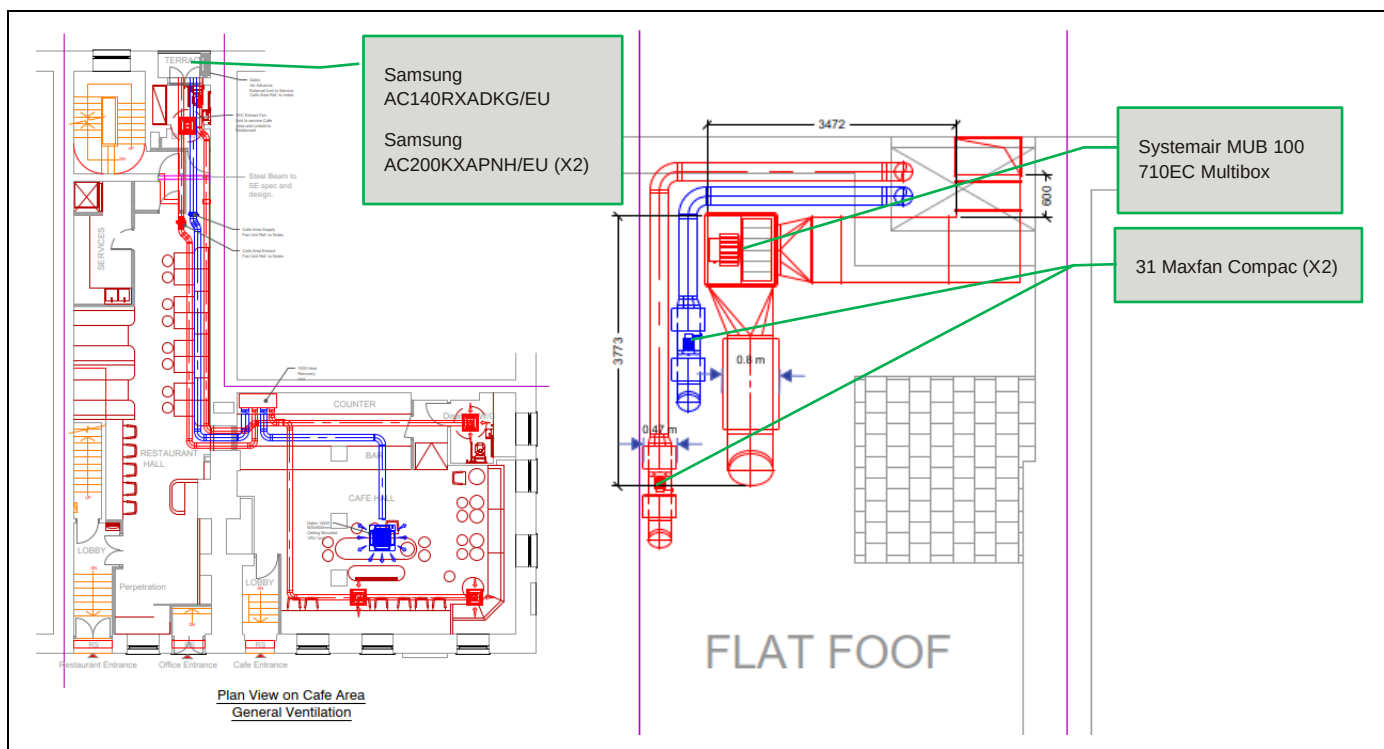


Development Proposals

The Site is being redeveloped to include an office at basement level, a café and restaurant on the ground floor, and storage on the upper floors. The proposed ventilation system for the café and restaurant will include ducting that exits the building along St James Street and terminates at rooftop level. Additionally, air handling equipment such as condensers will be installed on the terrace facing St James Street.

It is understood that the restaurant will be open between 12:00 and 22:00 every day and the café between 11:00 and 22:00.

Figure 1.2: Proposed Ventilation System



1.3. Scope of Works

The following scope of works has been undertaken:

- An environmental sound survey has been undertaken to determine existing background sound levels in the vicinity of the Site;
- Calculations have been undertaken in accordance with ISO 9613-2¹ and an assessment has been undertaken in accordance with BS 4142² to determine the noise impact at the nearest NSR from restaurant and café operations.
- Suitable mitigation measures have been proposed where necessary to reduce noise impact at the nearest NSR.

¹ ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.'

² BS 4142:2014 +A1:2019 'Methods for rating and assessing industrial and commercial sound.'

1.4. Standards and Guidance

Whilst the National Planning Policy Framework 2023 (NPPF) and Noise Policy Statement for England (NPSE) provide overarching guidance relevant to this assessment, the assessment framework most appropriate for this noise is found in BS 4142. A summary of this Standard is presented below.

1.4.1. BS 4142

BS 4142 describes methods for rating and assessing industrial and/or commercial sound including sound from deliveries and mechanical services; both of which will form part of the development proposals.

The methods in BS 4142 use outdoor sound levels to assess the likely effects of sound on people who are typically outside their residential premises, however, indoor effects can be indicated where a façade composition is known.

A summary of the approach is outlined below:

- Establish the specific sound level of the source(s);
- Establish a representative daytime background sound level (07:00 – 23:00) and, if necessary, a night-time background sound level (23:00 – 07:00);
- Estimate the sound level at the receptor and apply a rating correction to account for distinguishing characteristics such as tonality, intermittency and impulsivity;
- Estimate the initial impact by subtracting the background sound level from the rating level; and
- Consider the overall impact in the context of the noise, its environment and other pertinent contextual considerations as part of the application.

The results of the initial impact assessment can be described as follows:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB or more is likely to be an indication of an adverse impact, depending on the context;
- The lower the rating level is relative to the background sound level, the less likely it is that the specific sound will have an adverse impact or significant adverse impact; and
- Where the rating level does not exceed the background sound level, this is an indication that the specific sound will have a low impact.

2. Background Sound Survey

2.1. Methodology and Equipment

An unattended environmental sound survey was conducted between 11:00 on Wednesday 05th March and 13:00 on Wednesday 12th March 2025, to measure background sound levels at Continuous Measurement Position 1 (CM1) as follows:

- **CM1:** Extended through partially opened window on the 2nd floor of the Site, 1m from façade, overlooking St James Street (shown below)



An attended survey was also undertaken further down along St James Street at Sample Measurement Position 1 (SM1) as below, to compare with longer term measurements.

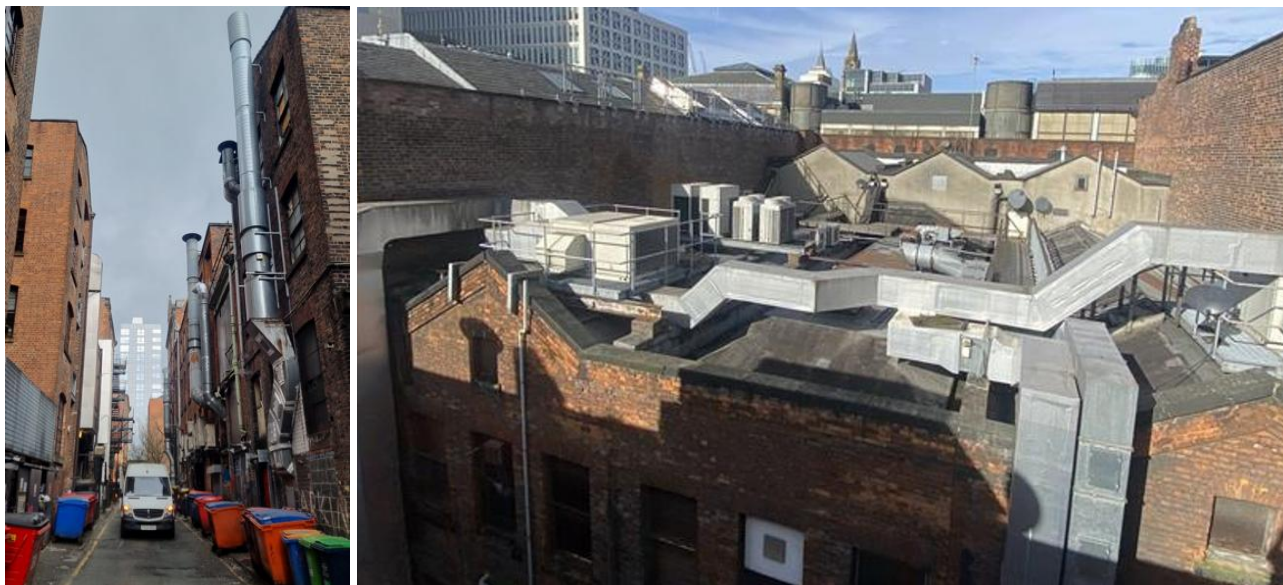
- **SM1:** Outside residential windows, 1.5m above ground height, at road edge and 1m from façade



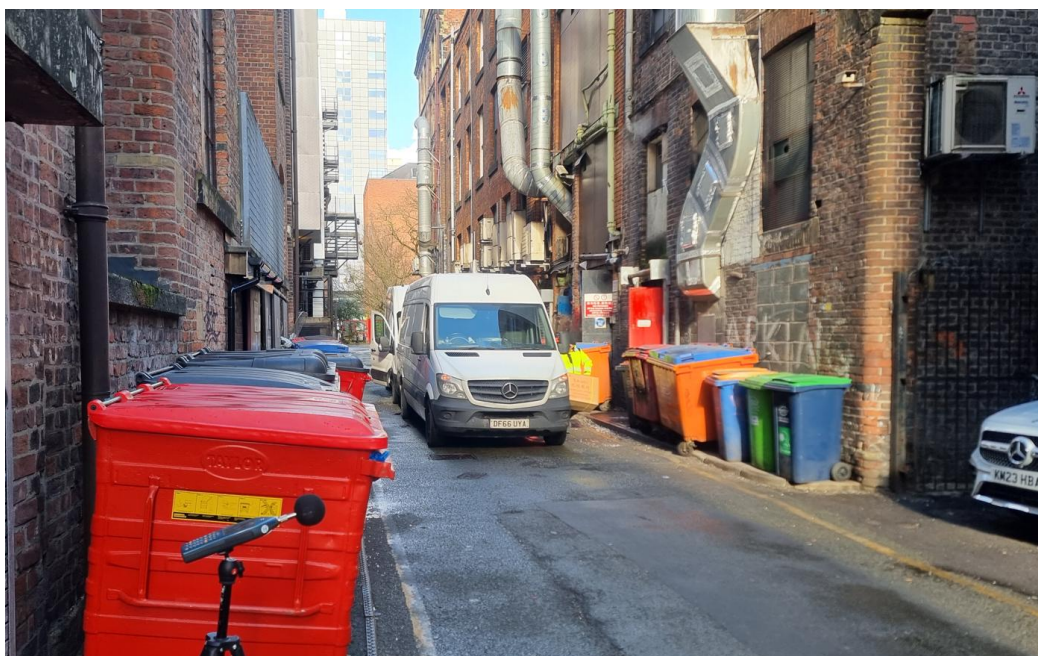
Sound levels were measured using Class 1 Sound Level Meters (SLMs) housed in environmental protection apparatus where necessary. Each SLM was field calibrated before and after the survey using a Class 1 calibrator, with no significant drift in calibration levels recorded ($> \pm 0.5\text{dB}$).

2.2. Observations

Site observations identified numerous ventilation systems along St James Street, serving various restaurants that front Faulkner Street shown below. Additionally, there are air handling units serving offices, residential properties, and Grosvenor Casino, which is adjacent to the identified residential receptors. The casino has extensive rooftop plant equipment, also shown below.



The background sound levels were primarily influenced by ventilation systems along St James Street, as well as road traffic and pedestrian activity. Deliveries to the restaurants were frequent, with vans often queuing along St James Street while unloading, shown below.



Noise from vehicles along Princess Street was significant at SM1 due to two-way traffic and a bus stop located at the corner of St James Street. Frequent bus-related sounds such as air suspension and horns beeping were also noted at this position.



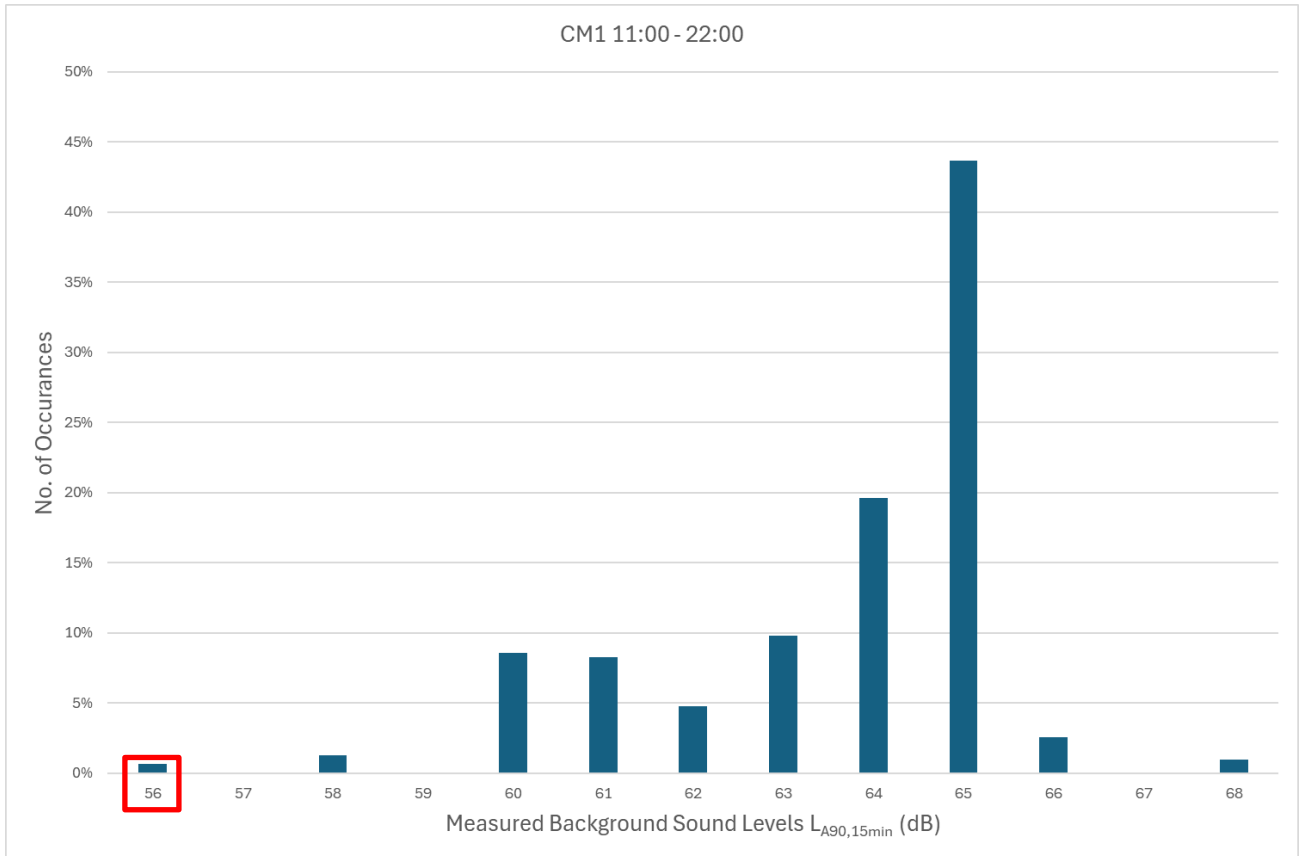
2.2.1. Meteorological Conditions

Weather conditions were monitored using local weather software and were noted to be generally dry with low winds throughout the survey. There were brief periods of light rain, but these have not been found to have had an effect on the measurements. As a result, all recorded data is considered valid.

2.3. Results

2.3.1. Background Sound Levels at CM1

Statistical analysis of measured background sound levels between the proposed operating times of the café and restaurant indicates that the most frequently occurring $L_{A90,15min}$ levels are between 60 and 65 dB, with the most dominant level between 11:00 and 22:00 each day being 65 dB. As a worst-case the lowest measured background level ($L_{A90,15min}$ 56 dB) has been selected for a robust assessment.



2.3.2. Background Sound Levels at SM1

The background sound levels measured at SM1 on 12th March 2025 are presented below:

Table 2.1: Sample background sound levels

Measurement Start Time	$L_{A90,15min}$
14:00	66 dB
15:00	65 dB
15:15	65 dB

3. Source Level Data

3.1. Source Levels

The manufacturers data for the proposed rooftop extraction equipment, as confirmed by the Client, is presented below. The locations of the units are shown in Figure 1.2.

Table 3.1: Ventilation equipment outlet L_w

Unit	Sound Power Level (dB) in Octave Band Centre Frequencies (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Systemair MUB 100 710EC Multibox (1 unit)	61	79	79	82	84	82	79	76	89
31 Maxfan Compac (2 units)	83	80	81	82	80	77	72	67	89

The manufacturers data for the proposed condensing-units, as confirmed by the Client, are provided below and the locations of the units are shown in Figure 1.2.

Table 3.2: Condensing-units L_w

Unit	Number of Units	Sound Power Level dBA
Samsung AC140RXADKG/EU	1	69
Samsung AC200KXAPNH/EU	2	75

3.2. Silencers

The Client is proposing to install silencers on both room-side and atmospheric sides for each external rooftop fan as follows:

- **MUB 100 710 EC Multibox:** 630mm diameter, 2D silencers
- **31 Maxfan Compac:** 315mm diameter, 2D silencers

No insertion loss data has been provided by the Client for the above silencers therefore as a worst-case data has been taken from straight-through 1.5D silencers, with similar diameters, shown below:

Table 3.3: Library Data of Static Insertion Losses for Straight-Through 1.5D Silencers

Diameter	Insertion Loss (dB) in Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
300mm	1	2	5	9	13	10	7	5
800mm	1	3	7	11	13	9	6	4

4. Assessment

The results of the Initial Numerical Impact Assessment (INIA) to the nearest identified sensitive receptor, circa 20m away, are provided in Table 4.1. As operations will cease by 22:00, a daytime assessment only is necessary.

BS 4142 states that appropriate acoustic feature corrections should be applied to the source value where necessary. As the sources are proposed, a +3 dB correction for potential tonality has been assumed to ensure a robust assessment.

Table 4.1: BS 4142, Initial Numerical Impact Assessment

Assessment Step	NSR1
Specific Sound Level at Receptor, dB $L_{Aeq, T}$	48
Acoustic Feature Correction, dB	+3 for potential tones
Rating Level, dB $L_{Ar, Tr}$	51
Background Sound Level, dB $L_{A90, T}$	56
Rating over Background, dB	-5
Estimation of Impact	Low impact

The results show that there is a Low Impact predicted at the identified NSR.

4.1. Assessment of the Plant Noise Impact

Based on the INIA assessment, the predicted impact from the proposed sources is low, and no adjustments to the initial assessment are considered necessary.

4.2. Uncertainty

Uncertainty is an unavoidable feature of measurements in the field, which can be subject to many factors; the weather typically being the most significant of which with respect to the measurement of sound. Uncertainty is also unavoidable in the prediction of sound levels, where naturally, before the scenario being considered becomes a reality, a number of assumptions need to be relied upon. There is also the uncertainty of people's reactions, which can be influenced by a number of factors, not just the magnitude or character of the sound in question.

In keeping with the scale of each project, Peninsular Acoustics aims to minimise uncertainty at each stage as far as reasonably practicable. With this in mind, the control measures listed in Appendix D have been followed, which themselves, have been derived from the guidance within BS 4142.

Crucially, measurements have been undertaken by suitably qualified staff, using state of the art, in calibration equipment, over suitable periods and avoiding adverse weather conditions.

The predictions have also been undertaken by suitably qualified staff, and by using a broad spread of source data obtained through archived specific sound level measurements.

Notwithstanding this, naturally some uncertainty remains. Given the sheer number of factors involved, however, it is not feasible to place a numerical value on the level of uncertainty, without resulting in an unhelpful range of possible outcomes.

It is the professional position of Peninsular Acoustics that uncertainty has been kept to a realistic minimum and that the outcome of this assessment is sufficiently representative and robust.

5. Conclusions

Peninsular Acoustics have been commissioned by Ms. Kathy Cui to assess the potential noise impact of the proposed extract ventilation equipment and air-handling units at 44-46 Faulkner Street, Manchester M1 4FH, on nearby residential receptors.

An environmental sound survey has been undertaken to determine the prevailing background sound levels in the vicinity of the residential receptors.

Using manufacturers data for source sound levels for external plant, calculations have been undertaken to determine the combined noise impact at the nearest receptor and subsequently assessed in accordance with BS 4142. Predictions have shown there is a likelihood of a low impact in accordance with BS 4142 as the Rating Level from the combined equipment is -5 dB below the background sound level at the nearest Noise Sensitive Receptor and therefore, no further measures are required beyond the attenuation proposed already by the Client.

Based on the manufacturer's sound levels and the Client's information on acoustic attenuation, the proposed equipment is not expected to have an adverse impact on nearby receptors during its operation and is therefore considered suitable.

The limitations of this report are presented in Appendix E.



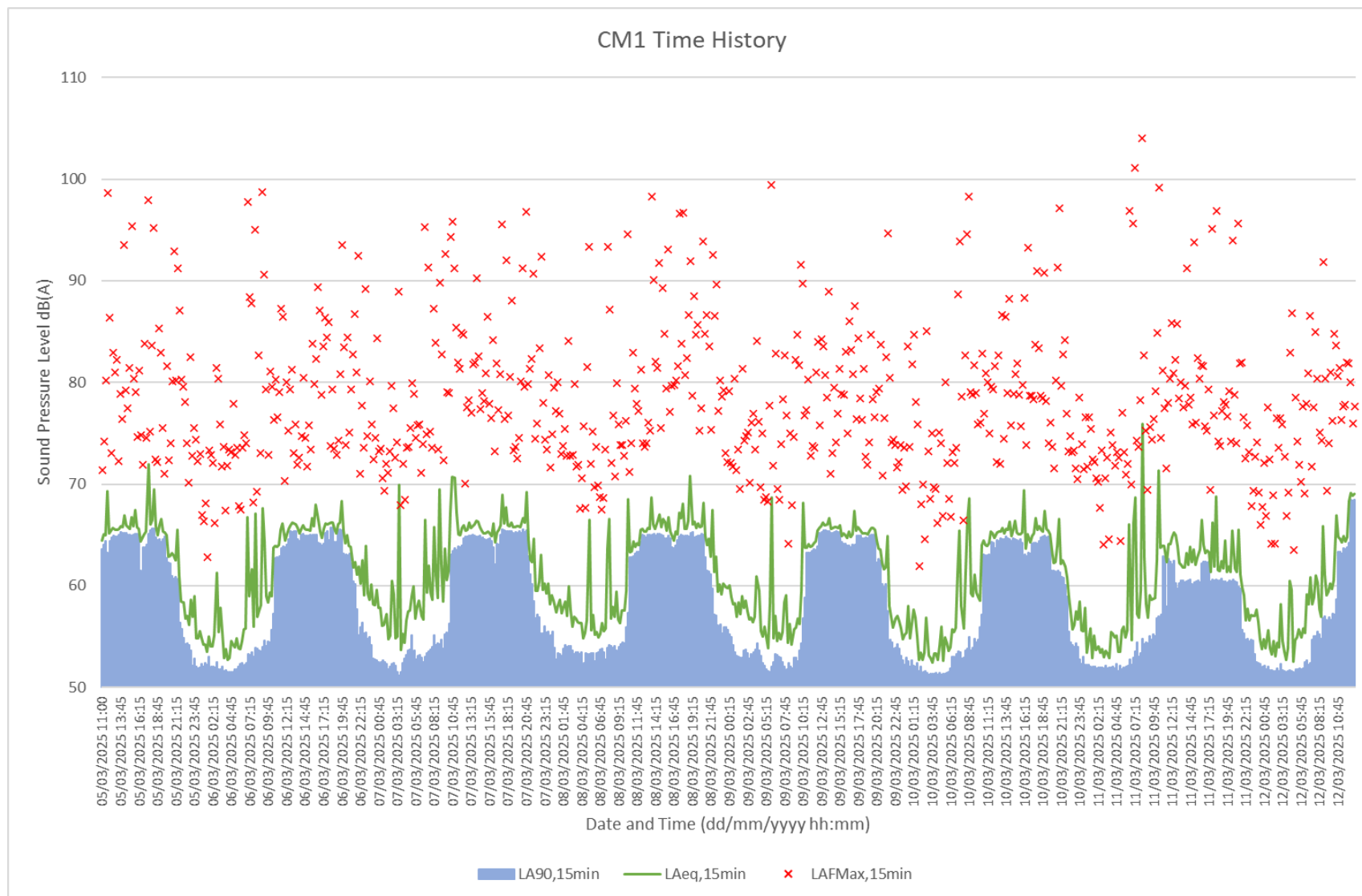
Appendix A

Technical Terminology

Noise	Typically defined as unwanted, unpleasant or disturbing sound
Frequency (Hz)	The number of oscillations in acoustic pressure per second. It represents the 'tone' of the sound. Often determined in octave bands
Maximum sound pressure level (L_{Fmax})	The maximum or highest sound pressure level measured with a 'fast' time weighting
Equivalent continuous sound pressure level ($L_{eq,T}$)	The average of the total sound energy over a specified time period (T). L_{eq} represents the equivalent sound level that a fluctuating source would have compared to a steady source with the same total sound energy over a specific time period. Commonly used as a descriptor of human perception of sound over time.
'A' weighting	Frequency-dependent weighting based on the response of the human auditory system which has been found to correlate well with the subjective response to sound. Denoted by the use of the letter 'A'. For example, dBA denotes an 'A' weighted sound level in decibels, or L_{Amax} denotes an 'A' weighted maximum sound pressure level.
Internal Ambient Noise Level (IANL)	The noise level within a room or enclosed space. Usually determined as an equivalent continuous sound pressure level over a specific time period ($L_{Aeq,T}$, dB)
Purge ventilation	Ventilation to aid removal of high concentrations of pollutants and water vapour released from occasional activities such as painting and decorating or accidental releases such as smoke from burnt food or spillage of water.
$D_{n,e}$ / $D_{n,e,w}$	The laboratory tested sound insulation of small building elements, normalised to an equivalent absorption area of 10m ² .
Façade level	The sound pressure level measured close to a building façade that includes contribution from both the incident sound and the sound reflected from the façade. Normally taken to be 3dB higher than the equivalent free-field level, when located at 1 metre from a façade.
Free-field level	A measured sound pressure level that is independent of any contributions due to reflections from nearby surfaces and is therefore representative of the direct path only.
R / R_w	The laboratory tested airborne sound insulation of a building element
Sound insulation	The capacity of a structure to prevent sound from reaching a receiving location. Sound energy is not necessarily absorbed; impedance mismatch, or reflection back toward the source, is often the principal mechanism

Appendix B

Time-History of Measured Noise Levels



Appendix C

Specific Noise Calculation

EXTERNAL PLANT NOISE EMISSIONS CALCULATION										
Combined Plant to NSR1										
		63	125	250	500	1000	2000	4000	8000	dB(A)
Calculation 1:		Kitchen Extract MUB 100 710EC Multibox								
Sound power level		61	79	79	82	84	82	79	76	88
End reflection		5	2	1	0	0	0	0	0	
Sound pressure level	1 m	48	69	70	74	76	74	71	68	80
Silencer Insertion Loss (1.5D 600mm Dia)		1	3	6	11	13	8	6	4	
No. of units	1	0	0	0	0	0	0	0	0	0
Distance loss to receiver	22 m	-27	-27	-27	-27	-27	-27	-27	-27	-27
Barrier attenuation*										
Sound Pressure Level at nearest receiver		20	39	37	36	36	39	38	37	45
Calculation 2:		Air Supply 31 Maxfan compac								
Sound power level		83	80	81	82	80	77	72	67	85
End reflection		12	7	3	1	0	0	0	0	
Sound pressure level	1 m	63	65	70	73	72	69	64	59	76
Silencer Insertion Loss (1.5D 300mm Dia)		1	2	5	9	13	10	7	5	
Silencer Insertion Loss (1.5D 300mm Dia)		1	2	5	9	13	10	7	5	
No. of units	1	0	0	0	0	0	0	0	0	0
Distance loss to receiver	22 m	-27	-27	-27	-27	-27	-27	-27	-27	-27
Barrier attenuation*										
Sound Pressure Level at nearest receiver		34	34	33	28	19	22	23	22	31
Calculation 3:		Air Extract 31 Maxfan compac								
Condensers										
Sound power level		83	80	81	82	80	77	72	67	85
End reflection		12	7	3	1	0	0	0	0	
Sound pressure level	1 m	63	65	70	73	72	69	64	59	76
Silencer Insertion Loss (1.5D 300mm Dia)		1	2	5	9	13	10	7	5	
Silencer Insertion Loss (1.5D 300mm Dia)		1	2	5	9	13	10	7	5	
No. of units	1	0	0	0	0	0	0	0	0	0
Distance loss to receiver	22 m	-27	-27	-27	-27	-27	-27	-27	-27	-27
Barrier attenuation*										
Sound Pressure Level at nearest receiver		34	34	33	28	19	22	23	22	31
Cumulative SPL from plant at nearest receiver		37	41	40	37	36	39	38	37	45
										45 dBA without condensing units
Calculation 4:		Restaurant Samsung AC200KXAPNH/EU								
		dB(A)								
Sound Power Level		75								
Sound pressure level		70.0285								
No. of units	2	3								
Distance loss to receiver	21 m	-26								
Angle correction	90 deg	-3								
Parapet Screening										
Lp at receptor		44								
Calculation 5:		Café Samsung AC140RXADKG/EU								
		dB(A)								
Sound Power Level		69								
Sound pressure level		64.0285								
No. of units	1	0								
Distance loss to receiver	21 m	-26								
Angle correction	90 deg	-3								
Parapet Screening										
Lp at receptor		35								
										48 dBA with condensing units
Design Criterion for Daytime Operation										56 dB(A)
Combined Plant Noise Level at nearest receiver										48 dB(A)

Appendix D

Uncertainty

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Measurement		
Only use in calibration Type/Class 1 equipment and check (and record) calibration level before and after measurements	✓	Yes
Measurements taken using the time and frequency weighting specified by the relevant standard?	✓	Yes
Detailed notes made, including details of the equipment, weather, survey positions (including approximate distances), contributing noise sources, presence of screening etc.?	✓	Yes
Photographs taken and recorded survey locations using GPS?	✓	Yes
Avoided standing waves/interference – listen for effects, taken spatial average from several locations or conducted a sweep	x	N/A
Taken measurements of source at different distances to establish propagation.	x	N/A used manufacturers data to inform assessment
Taken measurements at different heights where relevant	x	Not relevant
Avoided just measuring in the “noisiest” parts of the site, and established how “quiet” it is, too, where relevant to the assessment.	✓	Measured sound levels in 2no. locations.
Measured under different source operating conditions relevant to the assessment / adopt worst case if known	x	N/A used manufacturers data to inform assessment
Measured more than one cycle/event	x	N/A used manufacturers data to inform assessment
Determined the state of repair of any associated source, where relevant	✓	Sources are proposed
Used a windshield and avoided windy conditions (i.e. gusts regularly exceeding 5 m/s)	✓	Yes
Avoided wet conditions (particularly in terms of rain on the windshield/microphone and on neighbouring surfaces)	✓	Yes – only very light rainfall occurred and not affected measurements
Avoided electrical and electromagnetic interference (such as from power cables and radio transmitters)	✓	Yes
Avoided extreme temperatures?	✓	Yes
Traffic conditions can be different in freezing conditions, whilst meters can overheat and fail in a case when in direct sunlight during the summer.		
Made measurements during different weather conditions?	✓	Not considered necessary for this assessment
Particularly relevant in terms of wind direction for sites affected by aircraft movements, but also for sites affected by other distant, but significant, sources of noise, in different directions		
Where one source is dominant (such as a main road), have measurements been taken during conditions favourable to propagation (i.e. when wind direction is within +/-45° of the line between the source and receiver or during temperature inversion, such as on clear calm nights)	✓	Not considered necessary for this assessment

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Avoided tree/leaf (movement) sound where possible? Ideally take measurements the same distance from sources of such sound as any receptors of interest	✓	Yes – low wind speeds observed during surveys
Avoided dawn chorus sound? Ideally take measurements the same distance from trees and bushes as any receptors of interest	✓	Yes – not near any large trees/bushes.
Measured outside the receptor in question where possible? It is worst case typically to measure under free-field conditions and apply +3 dB correction if necessary to convert to “façade” where applicable – for most planning (new residential development) assessments, free-field is preferable	✓	Measured at representative location therefore considered acoustically equivalent, no façade correction applied.
Avoided atypical traffic conditions (such as during school holidays and road works – road traffic incidents can significantly affect flows, but which can't be predicted and their occurrence can't always be established after the survey – check the data for anomalies)?	✓	Yes
Avoided the presence of the engineer and/or the microphone resulting in atypical conditions (e.g. people stopping to talk, workers on site adjusting their way of working, etc.)?	✓	Yes
Data handling		
Was the data downloaded immediately after survey and process promptly whilst details are fresh?	✓	Yes
Were digital transfer methods used and was the data written down too?	✓	Yes
Was the time-history examined (in as fine a resolution as possible) for any unexpected events – preferably with active spectral data	✓	No unexpected data events.
If removing any data (due to an atypical event, for example), was the data saved as a new file, with notes to the data provided within the corresponding Excel file?	✓	Yes, raw data separate from processed data
Prediction		
Was measurement data used at different distances to verify propagation?	✓	Not possible to measure source at different distances
Were measurements at different heights used to verify screening effects, where relevant?	✓	Not possible to measure source at different heights
Were propagation calculation procedures relevant to the source and distance used?	✓	Yes, based on ISO 9613-2
Were detailed traffic flow data applicable to the assessment methodology used?	×	N/A
Were detailed sound source data (including octave-bands levels) used, accounting for size, height and directivity, where known?	✓	Spectral data used accounting for directivity, and up to 2no. reflective surfaces considered

Appendix E

Report Limitations

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorisation of Peninsular Acoustics Limited. Peninsular Acoustics Limited accept no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/ or Peninsular Acoustics Limited and agree to indemnify Peninsular Acoustics Limited for any and all loss or damage resulting therefrom. Peninsular Acoustics Limited accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned.

The findings and opinions expressed are relevant to the dates of the site works and design drawings/specifications and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations Peninsular Acoustics Limited reserve the right to review the information, reassess any new potential concerns and modify our opinions accordingly.



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