ACOUSTIC CONSULTANTS LTD

Noise Impact Assessment

13 Kings Mews
London

Reference: 11227/CP/AW

Client:
Michael Sfez

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Table of Contents

1.	Introduction	4
2.	The Site	5
3.	Planning and Noise	6
4.	Assessment Methodology	10
5.	Baseline Noise Monitoring	14
6.	Plant Noise Predictions	18
7.	Noise Assessment	21
8.	Summary and Conclusions	25
9.	Appendix 1 – Glossary of Acoustic Terminology	26

1. Introduction

Michael Sfez appointed Acoustic Consultants Limited (ACL) to undertake a noise impact assessment for the relocation of two existing items of plant at a residential property located at 13 Kings Mews, London, WC1N 2HZ.

This report provides a noise impact assessment of the proposed relocated plant at the most noise-sensitive existing noise sensitive receivers (NSRs), in support of a planning application.

The noise impact assessment is based on the results of an on-site noise survey and noise level predictions using the manufacturer's plant data.

The noise impact assessment has been undertaken in accordance with the guidance in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE), Planning Practice Guidance (PPG), British Standard 4142:2014+A1:2019 (BS4142) and British Standard 8233:2014 (BS8233), and Local Authority guidance.

2. The Site

The site is located at 13 Kings Mews, London. Currently there are two condenser units located on the rooftop, with a 1m tall fence surrounding them (see the red dots in Figure 1). The proposal is to extend the property with one additional storey and relocate the plant to the new rooftop. It is understood that the plant has the potential to operate during the day and night.

The proposed relocation of the plants may result in noise from the condenser units affecting the residential properties on both sides of the site (see R1, R2 in Figure 1).

The proposal site is surrounded by residential properties to all sides. To the north of the site, the residence at R2 has a rooftop terrace, and windows with a clear line of sight to the new plant location. This is considered the nearest and most noise sensitive receiver (NSR). R1 to the south features an outdoor patio located directly below the plant, also making it sensitive to plant noise.

Figure 1 presents an annotated Google Street image showing the site location, plant locations, and location of the NSRs.

Figure 1: A Google Street View Marked with Site Location, Plant Locations (red dots) and NSRs (green dots, R1 and R2)

3. Planning and Noise

3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published in March 2012 and revised in December 2024. Section 15 entitled 'Conserving and enhancing the natural environment' addresses noise as a requirement of planning. Paragraph 187 states:

"187. 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; and."

Paragraph 198 states:

"198. 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; and
c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation. "

The document does not prescribe any assessment methodology or criteria to assess the adverse effect of noise and refers you to the NPSE.

3.2. Noise Policy Statement for England

The NPPF refers to the Noise Policy Statement for England (NPSE). This was published in March 2010 and aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion and applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

The NPSE sets out the long-term vision of Government noise policy. This long-term vision is supported by three noise policy aims as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

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

The NPSE introduces the concept of "Significant adverse" and "Adverse" impacts of noise which relate to the noise policy aims. These are applied as follows:

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.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

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

The Noise Policy Statement for England (NPSE) states that noise levels above the Lowest Observed Adverse Effect Level are acceptable in planning where reduced to a minimum.

With regard to where there is potential for noise impact it states the following in relation to the second noise policy aim:

"The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur."

The NPSE does not provide any assessment criteria for the noted effect levels and each case must be considered on its merits.

The NPSE does, however, emphasise that in dealing with noise Local Planning Authorities are required to take a balanced approach in considering the benefits of development as against any adverse effects which arise. Paragraph 2.18 of the NPSE is particularly relevant in this respect and states:

"There is a need to integrate consideration of the economic and social benefits of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors."

The planning need is outside the scope of noise and acoustics and will need to be addressed by others.

3.3. Planning Practice Guidance, Noise

The Planning Practice Guidance (PPG) on noise referred to here is based on the current version (January 2019) as provided on the Planning Guidance Website. It states that, *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."*

It provides generic guidance on how to determine the noise impact and what factors could be a concern.

It includes the option types to mitigate any adverse effects of noise stating that there are four broad types of mitigation. These are engineering, layout, using planning conditions or obligations and noise insulation.

Paragraph 5 of the PPG provides a table identifying the effect level and examples of effect relating to the impact effect levels provided in the NPSE. The table is duplicated below:

Table 1: PPG Noise – Perception of Effect Levels

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The table does not provide any objective assessment which equates to the noted effect levels. However, the PPG identifies that where noise is audible, it is not necessarily intrusive. The effect and impact on people are based primarily on the level of noise.

4. Assessment Methodology

4.1. British Standard 4142:2014

British Standard 4142:2014 entitled 'Method for rating and assessing industrial and commercial sound' uses outdoor sound levels to assess the likely effects of sound upon people who might be inside or outside a dwelling or other premises used for residential purposes. The principle is that of establishing the 'difference' between the 'rating level' and the 'background sound level'.

The 'rating level' is the 'specific sound level' of the source over a period of one hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours).

Section 9 entitled 'Rating Level' states: *"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."*

An acoustic character correction should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies, dependent on the prominence of the character of the sound source at the assessment location.

In Section 11 of the Standard, entitled 'Assessment of the Impacts', it states: *"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9) and consider the following.*

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

In all instances the context needs to be considered when determining the overall impact. In terms of context BS 4142:2014 states: *"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.*

1) *Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.*

2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

   NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography.

3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*
   i) façade insulation treatment;
   ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
   iii) acoustic screening."

In terms of good internal acoustic conditions, the most relevant criteria and methodology is provided in BS8233:2014. This is in accordance with a March 2020 Technical Note published by the ANC Working Group, which provided comments and guidance to clear any ambiguity in BS414:2014+A1:2019.

The March 2020 Technical Note later states:

"Whilst BS 4142 can be used to assist in the determination of the likelihood of an adverse or significant adverse impact, guidance on internal design criteria and mitigation is provided elsewhere. BS 8233:2014, for example, provides guidance on indoor ambient noise levels."

4.2. Camden Local Plan

The London Borough of Camden published the "Camden Local Plan" in 2017 which provides noise thresholds for developments. Appendix 3: Noise thresholds "Industrial and Commercial Noise Sources" states the following:

"The significance of noise impact varies dependent on the different noise sources, receptors and times of operation presented for consideration within a planning application. Therefore, Camden's thresholds for noise and vibration evaluate noise impact in terms of various 'effect levels' described in the National Planning Policy Framework and Planning Practice Guidance:
NOEL – No Observed Effect Level
LOAEL – Lowest Observed Adverse Effect Level
SOAEL – Significant Observed Adverse Effect Level

Three basic design criteria have been set for proposed developments, these being aimed at guiding applicants as to the degree of detailed consideration needed to be given to noise in any planning application. The design criteria outlined below are defined in the corresponding noise tables. The values will vary depending on the context, type of noise and sensitivity of the receptor:
Green – where noise is considered to be at an acceptable level.
Amber – where noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development.
Red – where noise is observed to have a significant adverse effect."

It provides the following table of noise level criteria:

"Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{Amax}

*10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room 348 Camden Local Plan | Appendices (based upon measured or predicted Leq,5mins noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area."

5. Baseline Noise Monitoring

A noise survey was carried out in accordance with British Standard 4142:2014 between 13:10 hours on the 20th of January 2025 and 14:30 hours on the 21st of January 2025. However, due to ongoing construction near the site (see Figure 1), data collected between 08:00 and 18:00 will be excluded, as these are the permitted construction hours on weekdays in London.

5.1. Monitoring Equipment

Sound Pressure Levels were measured using a Class 1 sound level meter with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as outlined below, with certificates available for inspection.

Table 2: Details of the Equipment Used and Their Calibration Dates

Equipment Description	Manufacturer	Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM	NTI	XL2	A2A-20416-E0	10/10/2023	UK-23-114
Pre-Amp	NTI	MA220	9568	10/10/2023	UK-23-114
Microphone	NTI	MC230A	A19772	10/10/2023	UK-23-114
Calibrator	Larson Davis	CAL200	19704	14/05/2024	1508623-2

5.2. Weather Conditions

The weather conditions at the start and end of the survey are given in the table below.

Table 3: Weather Conditions at the Site During the Survey's Start and End

Date	Wind Speed (m/s)	Prevailing Wind Direction	Temperature (°C)	Precipitation Time (hrs)	Cloud Cover (%)
20/01/25	0-1	SW	4	0	100
21/01/25	<2	S	6	0	75

These weather conditions are not expected to have an adverse effect on the collected noise data.

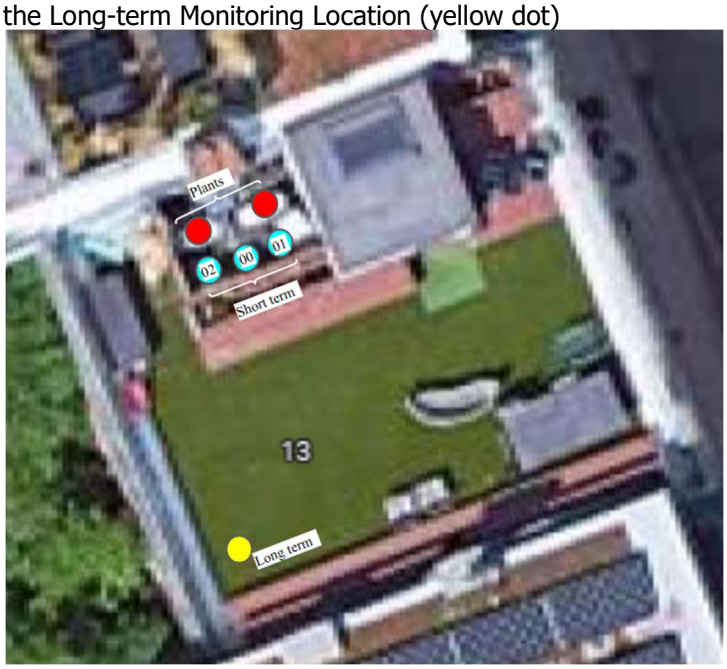
5.3. Monitoring Procedure

The survey aimed to determine background noise levels at the site, in a location representative of the NSRs. A long-term noise measurement was conducted over a 25-hour period, with a microphone mounted on a tripod at a height of 1.5 meters in a free-field position (see yellow dot in Figure 2). To minimise the impact of plant noise on the measured data, as the residence's heating could not be turned off, the microphone was placed on the opposite side of the roof, close to NSR R1. The plant was not clearly audible at the monitoring location during site attendance.

Three attended short-term plant noise measurements were also measured of the existing plant (see blue dots in Figure 2). However, due to the influence of reflections within the existing plant enclosure, the measured data will not be used to predict the noise impact after the relocation. Instead, the manufacturer's data will be used to provide a more accurate prediction.

The monitoring locations are shown in Figure 2 below.

Figure 2: A Google Street Image Showing the Plants (red dots), Short-term Monitoring Locations (blue dots 00,01,02), and the Long-term Monitoring Location (yellow dot)



5.4. Measured Noise Levels

Below, Chart 1 shows the equivalent noise level ($L_{Aeq,15min}$) and background noise level ($L_{A90,15min}$) in dB(A) over the entire duration of the survey. In this graph, the greyed-out sections reflect the construction periods where data is excluded.

The primary noises heard on-site at the start of the survey were road traffic, occasional vehicle movements, aeroplanes and construction noise. At the end of the survey only road traffic, occasional vehicle movements and aeroplanes were present.

Chart 1: Free-field Equivalent and Background Noise Levels Over the Survey Period (grey sections reflect the construction hours where data was excluded)

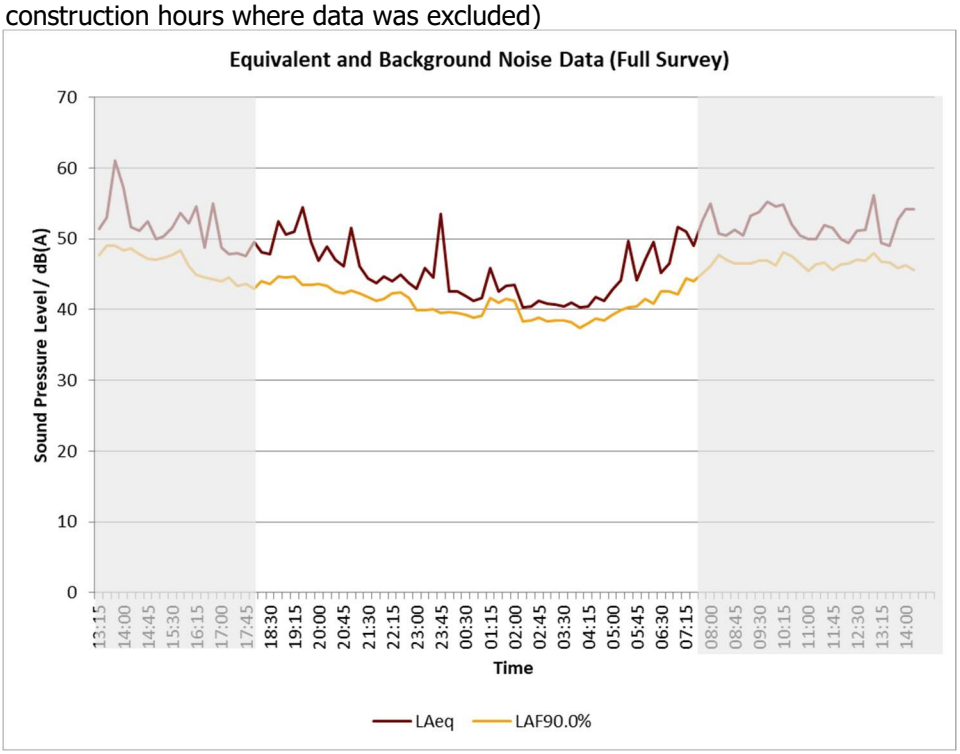
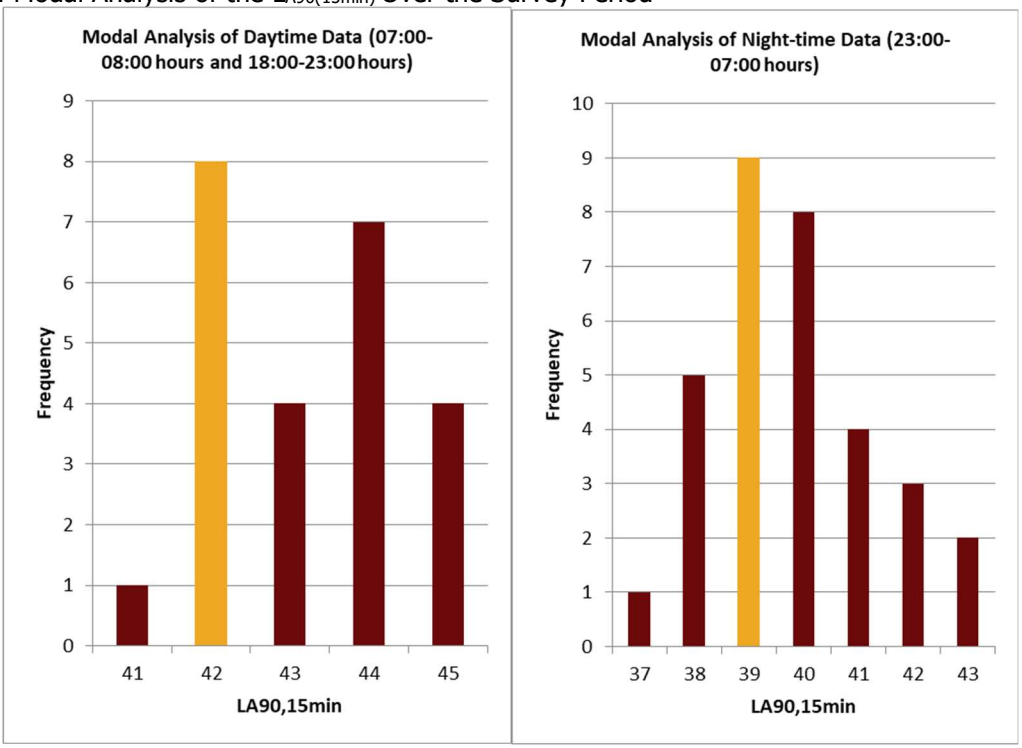


Chart 2 seen below displays two modal analyses of the daytime data, excluding the construction periods, and the night-time data.

Chart 2: Modal Analysis of the $L_{A90(15min)}$ Over the Survey Period



The following table summarises the range and modal equivalent and background noise levels:

Table 4: Measured Range and Modal Values of the Equivalent and Background Noise Level

Period	dB $L_{A90,15min}$		dB $L_{Aeq,15min}$	
	Range	**Mode**	**Range**	**Mode**
Day (20/01/2025 18:00 – 23:00) and (21/01/2025 07:00 – 8:00)	41 - 45	42	44 - 55	44
Night (20/01/2025 23:00 – 07:00)	37 - 43	39	40 - 54	41

The measurement was taken in a free-field position, so no façade correction is required.

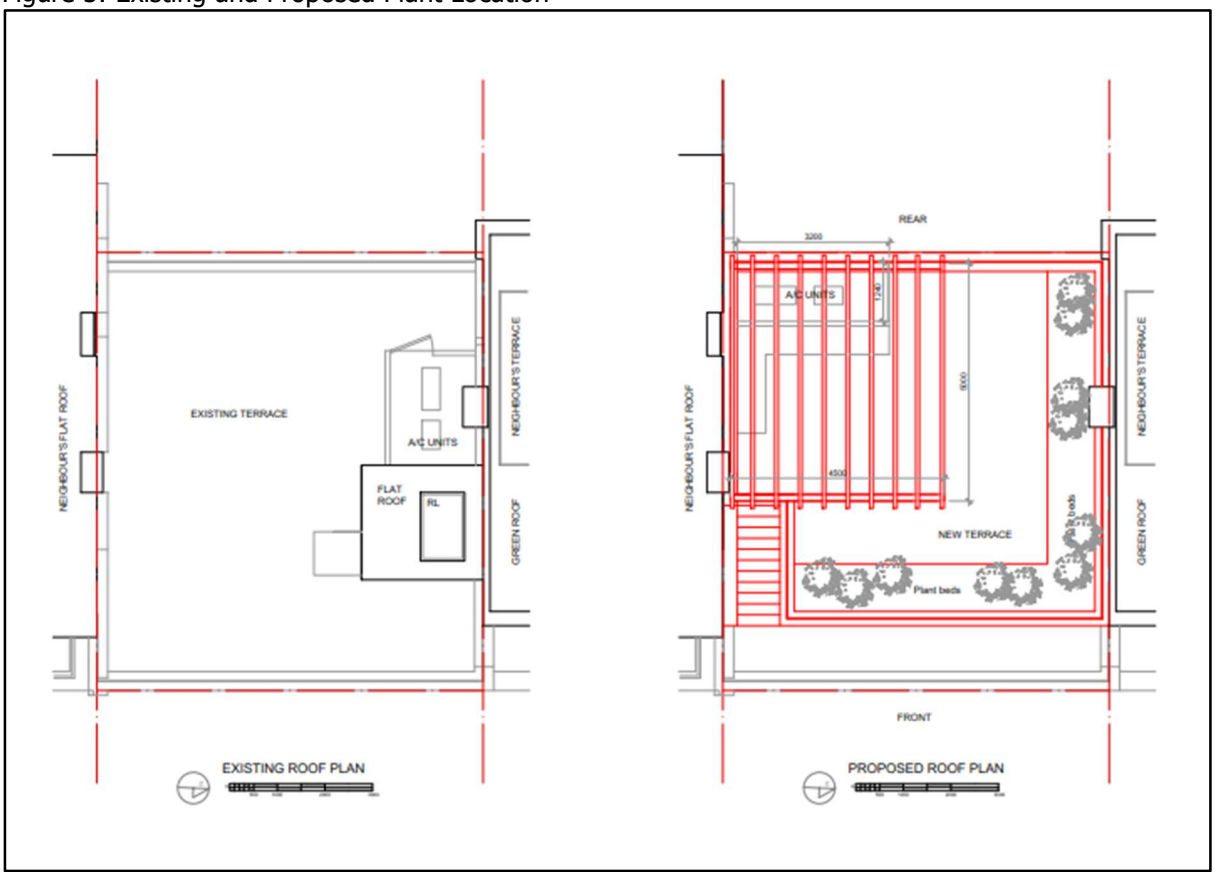
From the analysis above we have determined a representative background sound level of 42 dB $L_{A90(15min)}$ for daytime (07:00 to 23:00 hours) and 39 dB $L_{A90(15min)}$ for nighttime (23:00 to 07:00 hours).

6. Plant Noise Predictions

6.1. Plant Location

The existing plant locations and proposed locations are seen in Figure 3.

Figure 3: Existing and Proposed Plant Location



6.2. Proposed Plant Relocation

The proposal involves relocating two condensers currently positioned on the building's roof terrace (see Table 3). Following the addition of a new floor to the building, the plant would be moved to the new roof. The plant details and sound power levels are provided below. As previously mentioned in section 5.3, the measured plant noise levels were not used due to excessive reflections at the measurement location. It is considered more robust to predict the plant noise propagation at the proposed location using manufacturers sound power levels.

Table 5: Existing Plant Models and the Manufacturers Measured Sound Power Level (dBA)

Plant Model	Quantity	Unit Sound Power Level (dB L_{WA})[1]
Daikin 3MXS68G2V1B	1	62
Daikin 2MXS50H2V1B	1	63

[1] the noise data is sourced from the published manufacturers sound power data for the units (located here – Daikin 3MXS68G / Daikin 2MXS50H).

It should be noted that any changes to the schedule, location or layout of the plant will affect the predicted levels at the receiver points around the site and, as such, will need reassessing.

As per the proposal drawings a 1-metre-high barrier is included around the plant. This assessment will consider this barrier to be sealed with no gaps and has a total mass of at least 10kg/m^2. This could be a good quality close board timber fence, or PIR panels as long as the mass is met.

6.3. Noise Modelling

6.3.1. Noise Modelling Parameters

The plant noise emission has been modelled in the noise modelling software Cadna:A by DataKustik. The modelling software calculates sound levels based on the inputted sound emission values, source and receiver locations, and primarily distance, barrier and ground attenuation. Calculations are undertaken using the General Method of Calculation from ISO 9613.

The parameters within the Cadna:A model are as follows and are considered reasonable assumptions:

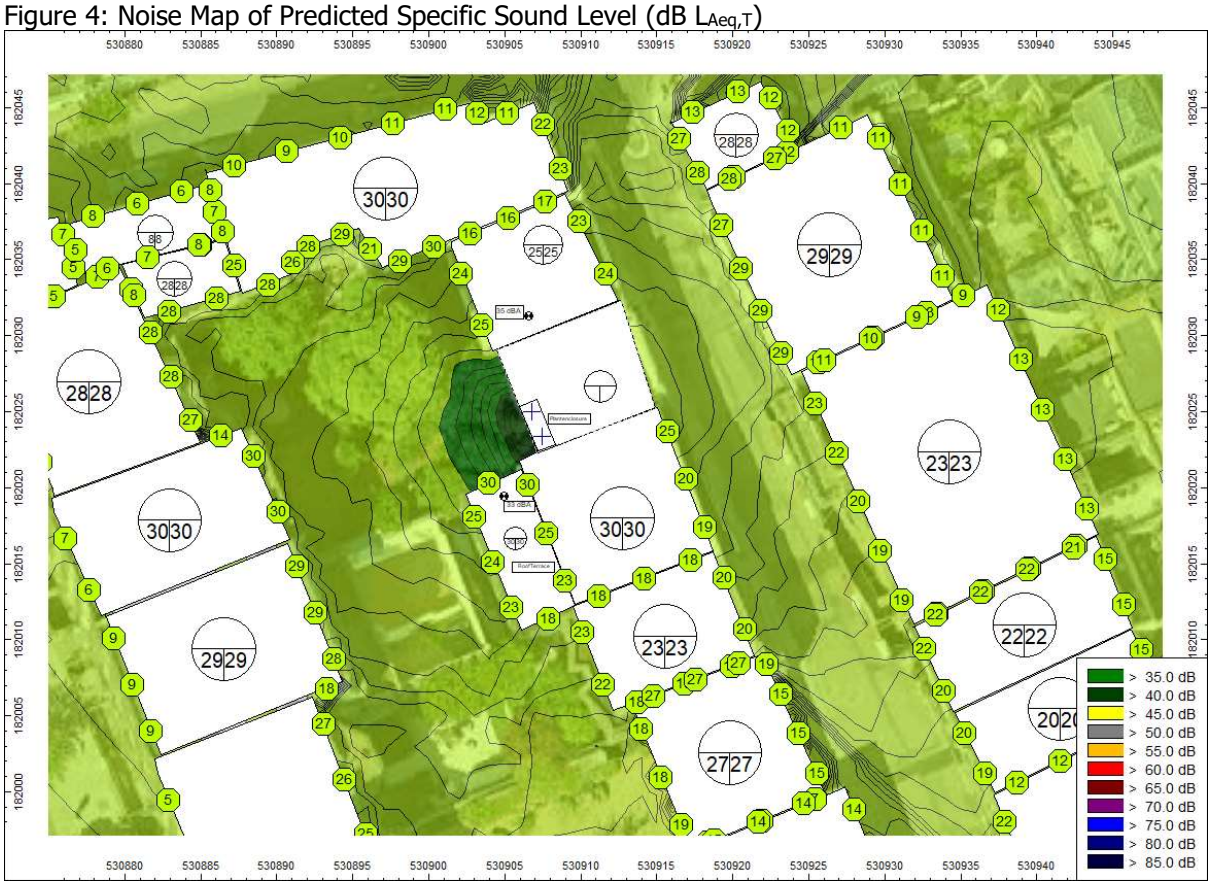
- The buildings have been based on Google Street View imagery and reasonable assumptions.
- The order of reflections is 3, and all buildings are considered reflective.
- The ground across the site and surrounding area is considered hard and reflective.
- The topography of the site is assumed to be flat.
- The predictions are based on all plant operating continuously and simultaneously.
- The predicted building noise map levels indicate the maximum levels at each façade.
- The noise grid is displayed at a height of 9m.
- The noise map also displays the daytime specific sound level at the terraces of the two NSRs located 2m and 10m from the plants.
- A 1m high barrier has been included around the plant as per in the existing plant location. The modelled barrier is sealed with no gaps and has a total mass of at least 10kg/m^2. This could be a good quality close board timber fence, or PIR panels as long as the mass is met.

6.3.2. **Noise Modelling Results**

In accordance with Camden Local Plan (see section 4.2), during the daytime the plant noise is assessed in gardens or terraces. During the night the plant noise is assessed outside bedroom windows.

A noise map of the predicted plant specific sound level is provided below:

Figure 4: Noise Map of Predicted Specific Sound Level (dB $L_{Aeq,T}$)



7. Noise Assessment

A British Standard 4142:2014 assessment has been undertaken at the sensitive receivers on the site.

7.1. Initial Estimate of Impact

7.1.1. Background Sound Level

We have determined a typical daytime background sound level of 42 dB $L_{A90(15min)}$ (free-field level) and a typical nighttime background sound level of 39 dB $L_{A90(15min)}$ (free-field level) at the nearest NSR.

7.1.2. Predicted Specific Sound Level

With the 1 metre enclosure around the plant, the cumulative specific sound level on the terrace of the NSR during the daytime is 35 dB $L_{Aeq(1hour)}$ (free-field level). The specific sound level at the window of the NSR during the nighttime is 30 dB $L_{Aeq(15min)}$ (free-field level). This is the level determined at the noise sensitive receiver without any character corrections applied.

7.1.3. Character Corrections

Character corrections should be added to the 'specific sound level' if it exhibits any *tonality, impulsivity, other specific characteristics and/or intermittency* at the assessment location. The corrections are as follows:

Tonality – Plant of this type is not normally tonal in our experience.

Intermittency – We do not expect that the intermittency of the plant will be distinguishable at the sensitive receiver over the residual noise climate. We have also assumed all plant is running continuously within our noise model.

Impulsivity – Plant of this type is not normally impulsive in nature.

Other Sound Characteristics – We do not believe any correction is necessary for other sound characteristics.

7.1.4. Initial Estimate

Therefore, the British Standard 4142:2014 initial estimate at the most sensitive location is as follows:

Table 6: British Standard 4142:2014 Initial Estimate on the Terrace of the NSR (daytime)

Parameter	Daytime (07:00 – 23:00)
Background Level, $L_{A90, (T)}$	42 dBA
Specific Sound Level, $L_{Aeq, (T)}$	35 dBA
Character Correction	0 dBA
Rating Level, $L_{Ar(T)}$	35 dBA
Excess of rating over background level	- 7 dBA

Table 7: British Standard 4142:2014 Initial Estimate Outside Window of the NSR (night-time)

Parameter	Nighttime (23:00-07:00)
Background Level, $L_{A90, (T)}$	39 dBA
Specific Sound Level, $L_{Aeq, (T)}$	30 dBA
Character Correction	0
Rating Level, $L_{Ar(T)}$	30 dBA
Excess of rating over background level	- 9 dBA

The initial estimate indicates that the plant noise will have a low impact during the day and night when assessed to British Standard 4142:2014.

As per the Camden Local Plan, the plant rating levels fall within the 'Amber' category, where *"noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development".*

To address this the following section will discuss the context of the site.

7.2. Context

With regard to context, British Standard 4142:2014 states:

7.2.1. Absolute Levels

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following".

> *"1) Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse."*

With regard to 'absolute levels', the most relevant guidance is British Standard 8233:2014. Section 7.7.2 Table 4 of the British Standard provides internal ambient noise levels for dwellings from noise sources 'without a specific character' and are based on existing guidelines issued by the World Health Organisation in 1999. We would advise the rating level is considered to allow for the character of the source. Internally to a dwelling during the day, the internal ambient noise levels should not exceed 35 dB $L_{Aeq(16hr)}$.

The internal level is approximately 15 dB quieter than the external free-field level (as stated by the BS8233:2014 and WHO 1999) allowing for the attenuation of a partially open window. Therefore, based on the predicted rating levels noted above, the internal absolute levels are as follows.

Table 8: Assessment of Daytime Impact Against BS8233/WHO Internal Noise Criteria

Period	Predicted External Level dB $L_{Ar(T)}$	Open Window Correction dB(A)	Predicted Internal Level dB(A)	Within Criteria?
Day (07:00 – 23:00)	35	-15	20	YES
Night (23:00 – 07:00)	30	-15	15	YES

As can be seen from the above table, the internal rating sound level for the daytime is 15 dBA below the British standard 8233:2014 criteria for daytime hours and 15 dBA below the British standard 8233:2014 criteria for nighttime hours.

We would therefore consider the plant noise to be of a low impact when absolute levels are considered.

7.2.2. Residual Sound Levels

British Standard 4142:2014 also states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following".

1) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography."

The daytime typical free-field residual sound level is 44 $L_{Aeq,15min}$ (free-field level), and a typical night-time residual sound level of 41 dB $L_{A90(15min)}$.

With the 1m high barrier around the plant, the specific sound level results were 35 dB $L_{Aeq(T)}$ during the day (on the adjacent roof top terrace) and 30 dB $L_{Aeq(T)}$ at night (at the windows of the NSRs). The specific sound levels are clearly below the typical residual sound levels during the day and night. As such, we would consider that the plant noise may be perceptible, but would not be dominant over the residual noise climate.

We would therefore consider the plant noise to be of a low impact when residual sound levels are considered

7.3. Summary of Assessment

In accordance with Camden Local Plan, the plant noise falls within the Amber category. However, once context is considered we see the plant has low impact when assessed in accordance with BS4142, and falls below the Lowest Observed Adverse Effect Level (LOAEL) of the NPSE and PPG.

We therefore consider the proposals to be acceptable.

8. Summary and Conclusions

Michael Sfez appointed Acoustic Consultants Limited to undertake a noise impact assessment for the relocation of two plants currently located on the roof terrace of a residential building at 13 King's Mews, London.

This report provides a noise impact assessment for the proposed plant relocations at the most noise-sensitive existing receiver (NSR) for planning application.

As detailed in Section 6.2, a 1-metre-high barrier has been included around the plant.

The noise impact assessment is based on the results of an on-site noise survey and noise level predictions using the manufacturer's plant data.

In accordance with Camden Local Plan, the plant noise falls within the Amber category. However, once context is considered we see the plant has low impact when assessed in accordance with BS4142, and falls below the Lowest Observed Adverse Effect Level (LOAEL) of the NPSE and PPG.

We therefore consider the proposals to be acceptable.

9. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure pA – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} - quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$L_{pA} = 10 \log_{10} (p_A/p_0)^2$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
p_0 is the reference sound pressure (20 µPa)

Background sound level, $L_{A90,T}$ – A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{AeqT} = 10\lg_{10}\left\{(1/T)\int_{t1}^{t2}[p_A(t)^2/p_0^2]dt\right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 µPa); and
$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,Tr}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, $L_{Ar,Tr}$ – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, eVDV – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).

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