Domino's, Mirfield

Plant Noise Assessment

Report 27CD.RP.1.1st Issue // 6 February 2025

prepared for

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Contents

1.0 Introduction

1.1 It is proposed that a unit at 47 Huddersfield Road, Mirfield WF14 8AE, previously in use as a bank, be utilised as a hot food takeaway outlet.

1.2 A noise survey has been undertaken to determine the existing noise levels at the nearest residential noise-sensitive receivers to the site. The survey results have been used to set plant noise limits in line with the relevant planning condition.

1.3 This report sets out the survey and assessment methodology and results, along with the mitigation specified, and demonstrates that atmospheric plant noise can be easily controlled to suitable limits.

2.0 Site Description

2.1 The site can be found at 47 Huddersfield Road, Mirfield WF14 8AE.

2.2 To the north of the site runs Huddersfield Road, beyond which are retail and office units in addition to a community centre. To the east is the local fire station and associated grounds. To the west is Trinity Methodist Church. To the south are residences on Trinity Street, which do not have a direct line of sight to the site.

2.3 The closest and most exposed noise sensitive receptor to the proposed plant is the existing flat above the unit that is to be retained.

2.4 The primary noise sources in the area are from Huddersfield Road and smaller surrounding roads.

3.0 Planning Context

Local Authority Guidance

3.1 The proposed store falls within the jurisdiction of Kirklees Council (KC). The council provide a 'Hot Food Takeaway' SPD that provides guidance on the criteria for any new hot food takeaway developments. Policy 'HFT 4 – Noise abatement and extraction of odours' outlines the requirements relevant to this assessment.

> *'Proposals for new hot food takeaways must demonstrate* effective kitchen odour control and extract systems and appropriate noise attenuation measures. Noise attenuation and odour control measures must:
>
> - Be acceptable in terms of visual amenity, including location and external finish;
> - Not adversely impact on neighbouring occupiers by virtue of noise, vibration or odour; and
> - Remain appropriate to the type of food being prepared and be routinely and properly maintained.
>
> Proposals must demonstrate appropriate sound proofing of party walls and ceilings where necessary.

Where appropriate, restrictions on the hours of operation will be considered.

All applications must be accompanied by an Odour and Noise Impact Assessment. This should include full details of the extraction system proposed including the internal layout and external appearance showing the location of all the main components of the system, together with details of any necessary noise attenuat*ion and odour abatement measures.'*

3.2 This report covers the requested noise impact assessment, which will look to detail any noise control measures required in order to meet the noise limits at the nearest noise sensitive receivers. An assessment of the existing separating ceiling will be covered in a further report.

3.3 Based on the wording above, the assessment will be undertaken drawing from BS 4142:214 +A1:2019.

BS 4142:2014+A1:2019

3.4 The current iteration of BS 4142 is BS 4142:2014 + A1:2019[1], which describes how to assess the noise impact on existing dwellings as a result of any new mechanical services associated with the proposed development. It has been drawn from as appropriate to inform this assessment.

3.5 BS 4142 sets out that the rating level, $L_{Ar,\,Tr}$, is determined by considering the noise emissions from a plant item and adjusting the specific level to account for the acoustic characteristics of the noise. Acoustic feature corrections can be made to account for tonality, impulsivity, intermittency, and other characteristics present in the resultant sound at the assessment position. The magnitude or appropriateness of any correction will depend both on the type of noise source and the context in which it is perceived.

3.6 BS 4142 states in situations where background sound levels are low, it is important to consider context, rather than simply basing an assessment of impact on a difference in noise level. BS 4142 does not set out guidance for what constitutes low background noise levels. Instead, it can be inferred from the World Health Organisation Night Guidelines for Europe (2009) that a noise level of ≥30 dB $L_{night,outside}$ is not likely to give rise to any substantial observed noise effects.

3.7 Full details of BS 4142:2014+A1:2019 methodology can be found in **Appendix B** of this document.

4.0 Noise Survey

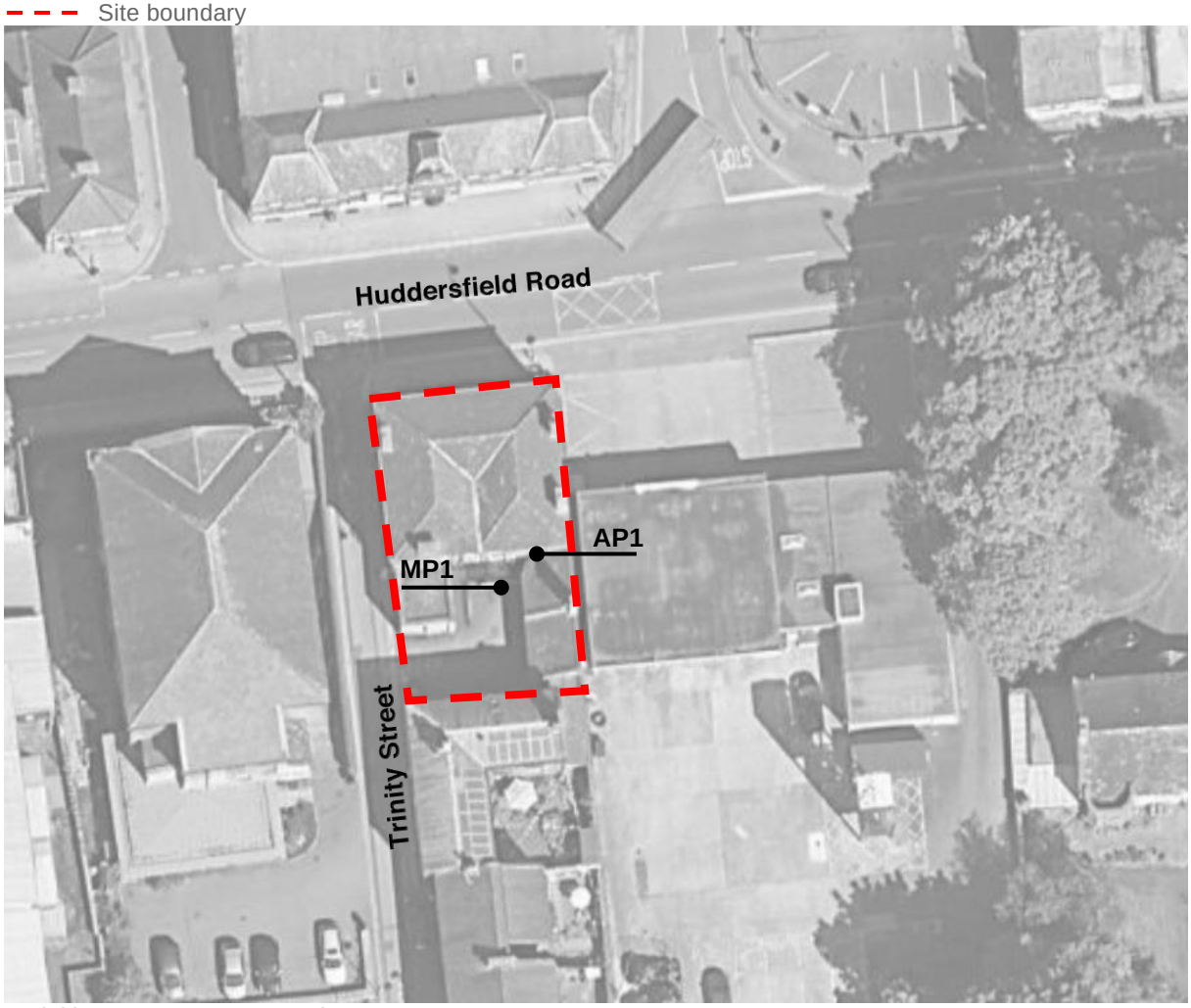
4.1 An unattended noise survey was undertaken to the rear of the unit between 22nd and 23rd January 2025. Full details of the noise survey can be seen in **Appendix A** at the end of this document.

4.2 Noise measurements were taken at a single location, chosen to be representative of residence most affected by the proposed plant items, above the unit, which can be seen in the following **Image 1**.

[1] BS 4142:2014 + A1:2019 - Methods for rating and assessing industrial and commercial sound

Image 1: Aerial photo showing noise measurement location and assessment position

Site boundary



Aerial imagery courtesy Google Maps

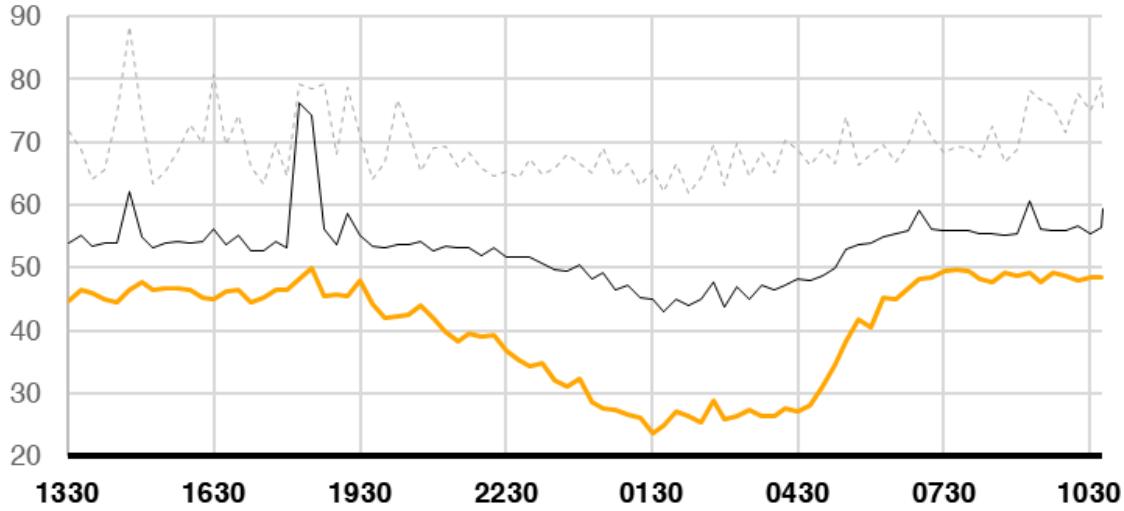
4.3 Measurement position MP1, outlined above, was located approximately 2 m above ground floor level in the rear yard. This is described in more detail in **Appendix A** at the end of this document.

4.4 Noise emissions from the proposed plant installation has been considered to the nearest noise sensitive receivers at AP1, as discussed later in this report.

4.5 The noise levels measured at position MP1 over the duration of the noise survey are illustrated in the following **Image 2**.

Image 2: Noise Measurement Results at MP1

$L_{Aeq,15min}$, $L_{Amax,f}$, and $L_{A90,15min}$ in terms of sound pressure (dB, x-axis) against time (hhmm, y-axis).



4.6 The representative measured background noise levels, over relevant periods, are set out in the table below.

Table 1 Representative measured background noise levels

Location	**Representative measured background noise level, $L_{A90,T}$ dB**	
	Open period (11h00-23h00)	**Closed period (23h00-11h00)**
MP1 – Rear of site	40	30

4.7 The existing noise climate was dominated by local road traffic.

Plant Noise Limits

4.0.1 Based on published local authority guidance and in line with BS 4142 the following noise limits (in terms of rating levels) are set out within **Table 2**.

Table 2 Noise emission limits

Location	**Noise emission limit, $L_{Ar,Tr}$ dB**	
	Open period (11h00-23h00)	**Closed period (23h00-11h00)**
Nearest noise sensitive receivers	40	30

4.8 These noise limits are taken to apply at 1 m from the outside of the nearest residential windows to the proposed plant.

5.0 Plant Noise Assessment

Proposed Installation

5.1 The following table outlines the proposed plant items to be installed.

Table 3 Proposed mechanical plant to be used at the site

Item	Manufacturer	Type
Air Conditioning Unit	Mitsubishi Heavy Industries	FDC125VNX-W
Cold Store Condenser	Tecumseh	WINAJ4519z-FZ
Extract Fan	S&P	CVAT/4-6000/450 D
Fresh Air Fan	S&P	CBM/6-320/240-550W

5.2 The Fresh Air and Extract fans are to be housed within the building's demise, with the Fresh Air fan terminating through a grille at high level on the east façade overlooking the fire station rear yard. The Extract fan ductwork runs to the rear façade then externally upwards, terminating 1 m above the eaves.

5.3 The condensing units are to be housed within an outhouse in the rear courtyard. The plant positions can be seen in the submitted drawings by Simons Design (ref:10131-SD-XX-00-E-A-13002), separate to this report.

Assessment Methodology

5.4 The assessment has been based manufacturers' noise data for each plant item. This noise data and the expected operational regime of the plant suggests that no character corrections need be applied.

5.5 Noise emissions from the proposed plant installation has been considered to the nearest noise sensitive receiver, as described below:

- AP1: Residential window above the proposed unit overlooking the courtyard to the rear

5.6 Levels of plant noise have been calculated at the assessment positions by correcting for radiation, screening, distance, duct and bend losses, façade reflections and other acoustic factors as appropriate. Calculation sheets are not included here for the sake of brevity but can be provided on request.

Required Mitigation Measures

5.7 It will be necessary to install mitigation measures to both fans and the plant room to meet the noise limits at the assessment position.

<u>In-duct attenuators to all fans</u>

5.8 The Extract and Fresh Air fans will require atmospheric-side in-duct attenuators. The proposed plant room will require a louvred opening in place of the existing window. The acoustic performance of these mitigation items must meet the insertion losses outlined in the following **Table 4** in each octave band, as a minimum.

Table 4 Required in-duct silencer insertion losses

Mitigation Type	Equipment	Minimum required insertion loss, dB at octave band centred frequency (Hz							
		63	125	250	500	1k	2k	4k	8k
Louvre	Plant Room	5	7	10	12	14	16	13	12
In-duct attenuator	Fresh Air	2	4	8	16	18	13	12	12
In-duct attenuator	Extract	3	7	12	19	22	17	16	16

5.9 A list of attenuators have been provided to Suono for the Fresh Air and Extract fans. The losses outlined above have been taken from the ALNOR ventilation systems data sheet provided. It is expected that the following attenuators will be required:

- Fresh Air: SIL 50 400-600;
- Extract: SIL 50 450-1000.

5.10 The in-duct attenuators should be mounted internally, to avoid break out noise from their casings, and as close to the fan as practicable. All fans should be mounted on anti-vibration mounts and have flexible duct work to control structure-borne sound transmission.

5.11 Any pressure drops from the attenuators or the atmospheric duct termination grilles should be limited to 40 Pa to avoid regenerated noise.

Acoustically rated plant room louvres

5.12 It will be necessary to replace the existing window and door of the out-building with an acoustically rated louvre in order to mitigate the noise breakout from units installed within the room. The louvres must meet the losses in each octave band outlined in the table below as a minimum requirement.

Table 5 Required plant room louvre insertion losses

Mitigation Type	Equipment	Minimum required insertion loss, dB at octave band centred frequency (Hz							
		63	125	250	500	1k	2k	4k	8k
Louvre	Plant Room	5	7	10	12	14	16	13	12

Sound absorbent lining to plant room ceiling

5.13 It will also be necessary to reduce the build up of reverberant noise within the plant room to assist in reducing noise emissions. An acoustic lining should be fixed to the whole of the ceiling area of the proposed plant room.

5.14 The lining is to be supplied in the minimum thickness stated in the following table and shall be inorganic glass fibre material with minimum density of 48 kg/m^3. Full details of the material required is outlined in Appendix C.

5.15 The sound absorption provided by the material (with erosion-resistive facing) shall meet of exceed the values below.

Table 6 Required plant room louvre insertion losses

Minimum thickness	Minimum required insertion loss, dB at octave band centred frequency (Hz					
	125	250	500	1k	2k	4k
50	0.20	0.45	0.70	0.90	0.95	0.95

Results

5.16 With the outlined mitigation measures in place, the following plant noise levels are predicted at the nearest noise sensitive receptor position.

Table 7 Noise emission levels at the nearest noise sensitive receivers

Location	Assessed rating noise level, $L_{Ar,Tr}$ dB (limit)	
	Open period (11h00-23h00)	Closed period (23h00-11h00)
AP1	36 (40)	18 (30)

5.17 With the proposed plant installation in place and the necessary mitigation measures installed, the noise limits set out within this report are not expected to be exceed during operational periods.

6.0 Conclusions

6.1 It is proposed to convert a former bank building at 47 Huddersfield Road, Mirfield WF14 8AE to use as a Hot Food Takeaway outlet. A noise survey has been undertaken to determine the existing noise levels at the nearest residential noise-sensitive receivers to the site. The survey results have been used to set plant noise limits in line with the relevant planning condition.

6.2 Mitigation is required to all proposed plant items, taking the form of in-duct attenuators for the fans and acoustic louvres and linings for the proposed plant room.

6.3 The mitigation specified within this report will enable the plant noise limits to be met. Other mitigation solutions are possible, however the key principle is that it is possible to achieve the relevant noise limits and therefore the requirements of the local authority.

Appendix A: Noise Survey

Details and results of the environmental noise survey

An unattended noise survey was undertaken in a free field position within the rear courtyard between 13h15 on 22nd January and 10h30 on 23rd January 2025. The measurements were taken at a position representative of the nearest noise sensitive receiver above the proposed unit.

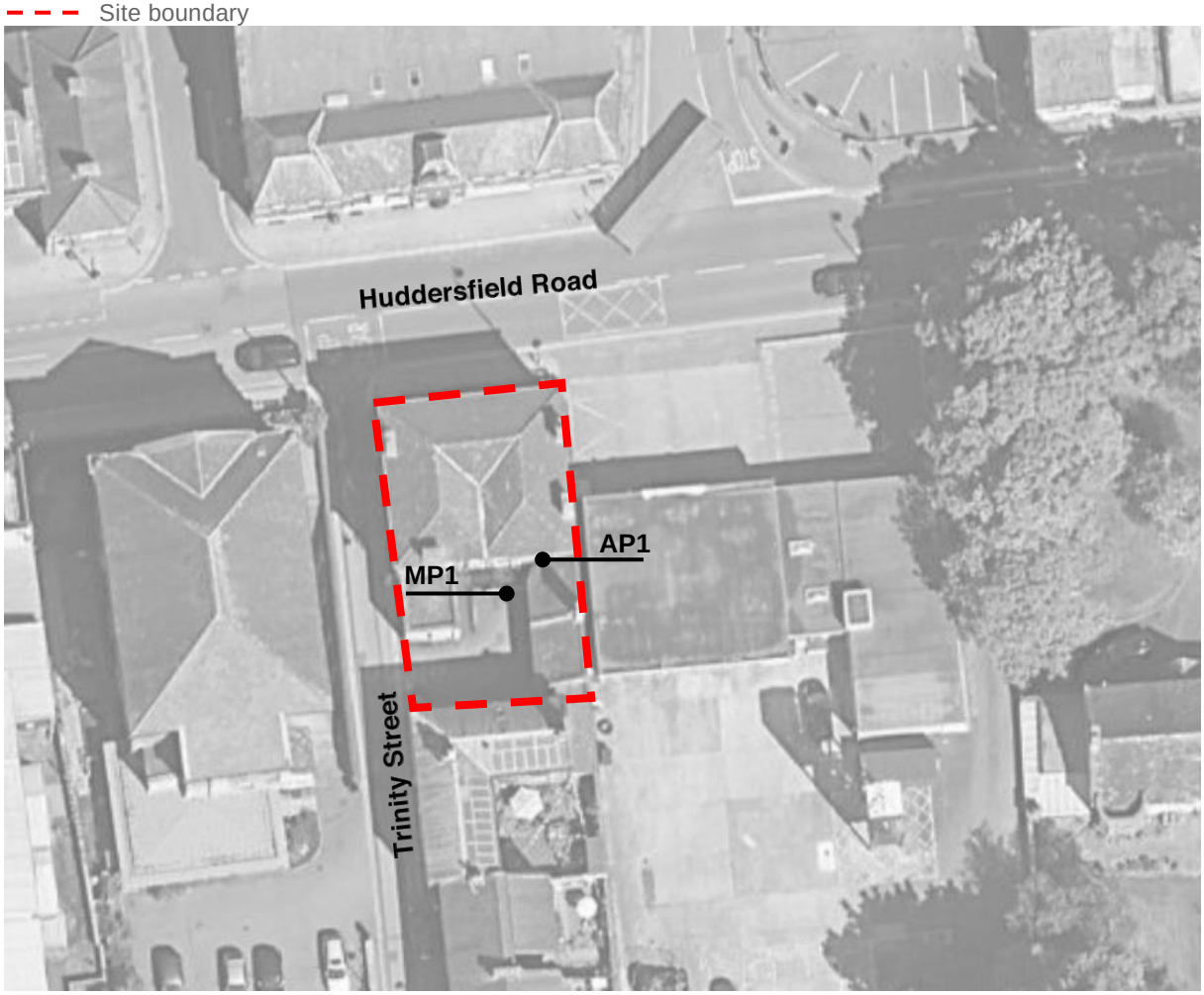
Measurements of the L_{Aeq}, L_{Amax} and L_{A90} indices were recorded over consecutive 15-minute periods for the duration of the unattended survey.

Table A1 Measurement location

Location	Detail
MP1	Microphone at 2 m above ground level, within the rear courtyard of the site, in a free-field position. Measurements were unattended. Noise climate was dominated by passing vehicles on local roads.

Aerial photo showing noise measurement location and assessment position

Site boundary



Aerial imagery courtesy Google Maps

6.4 Noise measurements were made using equipment set out in the following table. The sound level analyser was calibrated before and after the survey to ensure any drift was within acceptable limits. No significant drift was noted to have occurred.

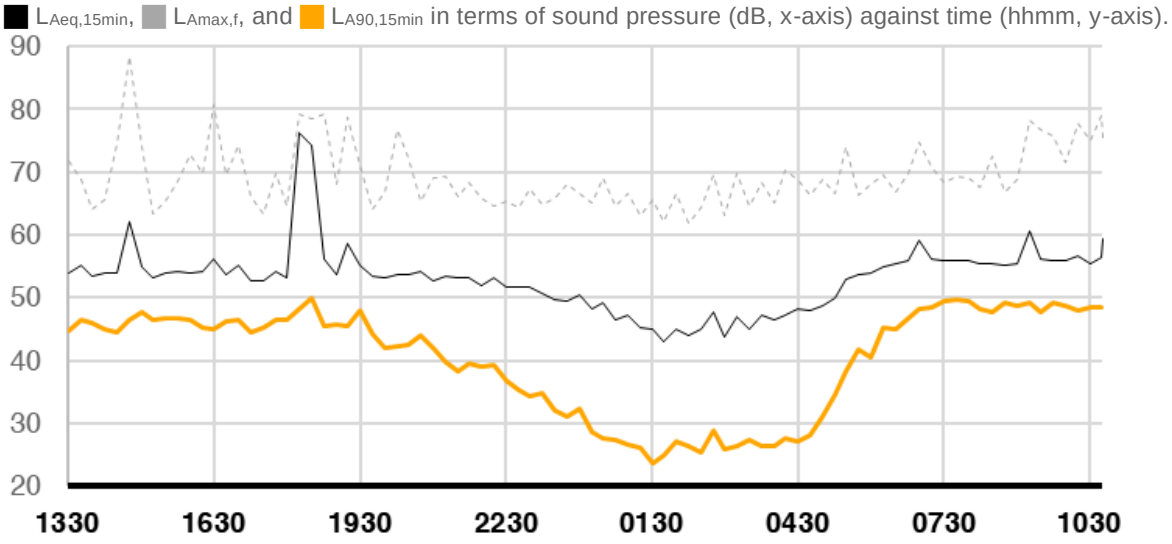
Table A2 Measurement equipment

Location	Item	Detail
All measurement positions	Sound level analyser	Svantek 971A
	Outdoor microphone kit	Svantek SA 271A
	Acoustic calibrator	Svantek SV33B

6.5 During the set up and collection of the survey, the weather was cool and overcast with a light breeze. Historical weather data[2] shows these conditions typically remained unchanged throughout the unattended survey period.

6.6 The following time history graph presents the measured noise levels throughout the full survey period.

Noise Measurement Results at MP1



[2] https://www.wunderground.com/

Appendix B - Planning Policy and Guidance

British Standard BS 4142

British Standard 4142:2014+A1:2019 (Methods for rating and assessing industrial and commercial sound) states in section 1.1:

> *"*This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:
>
> a) sound from industrial and manufacturing processes;
>
> b) sound from fixed installations which comprise mechanical and electrical plant and equipment;
>
> c)sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
>
> d)sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from fork-lift trucks, or that from train or ship movements on or around an industrial and/or commercial site.
>
> The methods described in this British Standard 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.*"*

The standard states its applications as,

> *"This standard is applicable to the determination of the following levels at outdoor locations:*
>
> a) rating levels for sources of sound of an industrial and/or commercial nature; and
> b) ambient, background and residual sound levels,
>
> for the purposes of:
>
> 1) investigating complaints;
> 2) assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
> *3) assessing sound at proposed new dwellings or premises used for residential purposes."*

BS 4142 sets out a daytime assessment period of 1 hour and night time period of 15 minutes. The assessment methodology requires that a "specific level" from a given noise source is determined considering these time periods. Character corrections should be added if the noise has tonality, impulsivity, intermittency or other such characteristics; this gives the "rating level" of a given noise source. The level of the correction is based upon how the noise is perceived, as set out in the standard.

The rating level of noise, $L_{Ar,Tr}$, for the relevant assessment period is the calculated noise level at the nearest receiver location, adjusted to take into account the acoustic characteristic of the noise. Acoustic feature corrections can be made to account for tonality, impulsivity, intermittency and other characteristics present in the resultant sound at the receiver position. The magnitude or appropriateness of any correction will depend both on the type of noise source and the context in which it is perceived. Similarly, in accordance with BS 4142, the period of time for which an individual noise source is active during the relevant reference time period will also be considered in establishing the rating level.

It will also be necessary to consider the existing noise climate and what sound sources contribute to it. For example, where a noise generating activity is proposed adjacent to an existing similar noise generating site, the impact of the new noise source would be less than if it were to be planned in a location where its character and type is different to and more noticeable than any existing noise source nearby.

With regard to the background sound level against which the rating level is compared, the standard states the following:

> *"In using the background sound level in the method for rating and assessing industrial and* commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is *typical during particular time periods."*

The periods of interest over a 24 hour day are usually related to day time activities (07:00-23:00h) and night time (23:00-07:00h). However the standard makes the following statement:

> *"Among other considerations, diurnal patterns can have a major influence on background* sound levels and, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes. Furthermore, in this general context it can also be necessary to separately *assess weekends and weekday periods."*

Therefore, the periods of time which can be considered as 'waking up' and 'falling asleep' stages, for example 06:00h to 07:00h and 23:00h to 24:00h, may need to be considered independently. Alternative periods may also be identified where breakdown beyond the standard day and night time analysis will be necessary, for example where background sound levels are shown to be regularly elevated.

Once the rating level at each receptor has been calculated, reference can be made to the following commentary in BS 4142 in relation to conducting an initial assessment of the impact, based on the difference between the rating level of the noise source and the pre-existing background sound level.

> *"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.
>
> NOTE 1 More than one assessment might be appropriate.
>
> a) Typically, the greater this difference [between industrial site noise rating level and baseline background level], the greater the magnitude of the impact.
>
> b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
>
> c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
>
> d) 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.

NOTE 2 Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse *impact."*

From the above, it can be concluded that ensuring noise emissions from a given site or activity do not exceed noise limits set at a level 5 dB above the representative background noise levels at a given receptors will provide an indication that noise adverse effect will **not** occur.

Appendix C: Sound Absorbent Lining

General

This specification defines the applicable requirements for mineral fibre lining to the plant room. The suppliers of the materials shall provide the necessary information and data to verify the required performance.

The supplier shall be responsible for ensuring that all the performance criteria set out herein are met by the product being offered.

Products

The acoustic lining is to be supplied in the minimum thickness stated and shall be inorganic glass fibre material with a minimum density of 48 kg/m^3. The absorbent internal lining shall be faced with glass fibre cloth or other infill protection membrane and retained by perforated galvanised mild steel sheet having an open area preferably in excess of 20%, or expanded metal.

The acoustic media shall not comprise materials which are generally composed of mineral fibres, either man made or naturally occurring, which have a diameter of 3 microns or less and a length of 200 microns or less or which contain any fibres not sealed or otherwise stabilised to ensure that fibre migration is prevented.

Provision shall be made to prevent settling of the acoustic medium. The panels shall be suitably weather protected. Panels shall have drain holes as required to avoid soaking of the acoustic medium.

The sound absorption provided by the material (with the erosion resistive facing) shall meet or exceed the values tabulated below:

Table 8 Absorption coefficients of acoustically absorbent plant room lining

Minimum thickness (mm)	**Minimum Absorption Coefficient (α) at Octave Band Centre Frequency (Hz)**					
	125	**250**	**500**	**1k**	**2k**	**4k**
50	0.20	0.45	0.70	0.90	0.95	0.95

Execution

Linings should be installed across the full extent of the Plant Room ceiling.

All available portions of the area designed to receive the acoustic lining shall be completely covered. All joints shall be neatly butted and there shall be no interruptions or gaps.

The acoustic lining shall be secured with mechanical fasteners which shall compress the lining sufficiently to hold it firmly in place.