Noise Impact Assessment

Site Address: Units 4 & 5, Ballingdon Hill Industrial Estate, Sudbury, CO10 2DX

Client Name: Sudbury Print Group

Project Reference No: NP-010712

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Disclaimer

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Delivering sustainable development by promoting good health and well-being through effective management of noise.

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1. Introduction

NOVA Acoustics Ltd has been commissioned to prepare a retrospective noise impact assessment for a pair of external condenser units ('the Existing Development') at Units 4 & 5, Ballingdon Hill Industrial Estate, Sudbury, CO10 2DX ('the Site').

Following a noise nuisance complaint, the Planning Enforcement Officer has requested a Noise Impact Assessment be undertaken for the 2 No. units currently installed on the rear wall of the existing factory.

A noise survey has been undertaken to establish the prevailing background sound levels at the closest Noise Sensitive Receptors ('NSRs'). The report details the existing background sound climate and the predicted noise emissions associated with the development.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.1 Standards, Legislation, Policy & Guidance

The following performance standards, legislation, policy and guidance have been considered to ensure good acoustic design in the assessment:

- The Local Planning Authorities (LPA) conditional approval; specifically, 'Condition 3'.
- National Planning Policy Framework (2023).
- Noise Policy Statement for England (2010).
- British Standard BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'.

Further information on the legislation can be found in Appendix B.

1.2 Existing Development

The existing building currently has 2 No. *Midea AG2Eco-24M8D0-O(U2)* units installed on the rear wall of the development.

NOVA Acoustics has been informed that the units only run between the hours of 07:00 – 17:00.

The figure below shows the existing development. For ease of reference, the units will be refered to as 'Unit A' and 'Unit B'.

Photo Provided by Client

Figure 1 – Existing Development

1.3 Local Planning Authority & Background

The following email from the Planning Enforcement Officer of Babergh and Mid Suffolk District Councils states the following regarding the existing development:

"Condition 3 of approved application DC/21/03907 states

3. ACTION REQUIRED PRIOR TO INSTALLATION OF PLANT, EQUIPMENT OR MACHINERY: SCHEME OF NOISE CONTROL

Prior to the installation or use of any plant, equipment or machinery internally or externally to the new extension, a competent person shall have ensured that the rating level of noise emitted from said plant, equipment or machinery (including air conditioning, and extraction units) shall not exceed 0dB(A) above the background levels determined at the BOUNDARIES of noise-sensitive premises. The assessment shall have been made in accordance with the current version of British Standard 4142 and confirmation of the findings of the assessment shall have been submitted to, and agreed in writing by, the Local Planning Authority and shall be adhered to thereafter".

2. Environmental Noise Survey

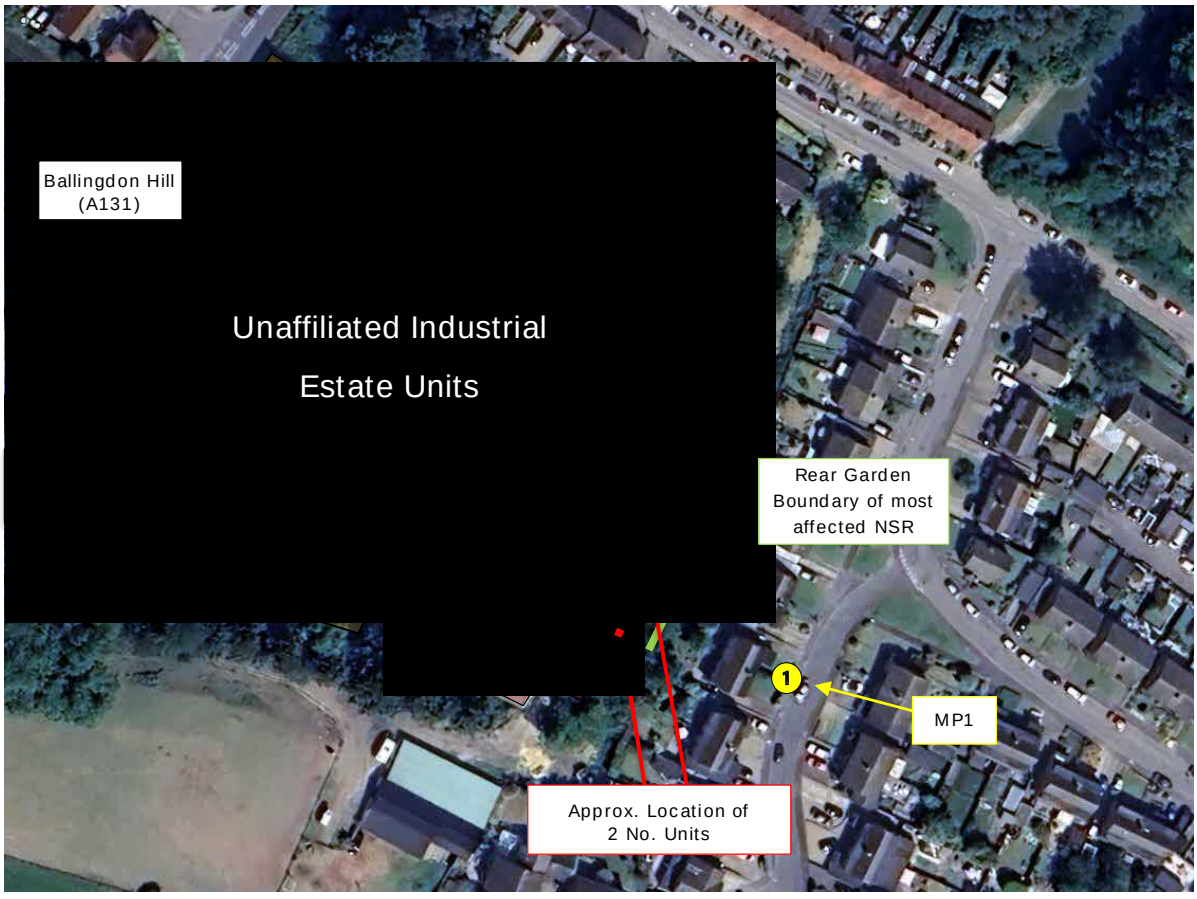
2.1 Measurement Methodology

The following table outlines the measurement dates and particulars. Weather conditions during the environmental sound survey can be found in Appendix D.

Location	Survey Dates	Measurement Particulars
MP1	26-27/02/2024	Equipment mounted on a lamppost along Hill Rise (directly outside the front façade of closest NSR). The microphone was poisoned approximately 3.5m above the ground and at least 3.5m from any other large reflective surface. A 130mm diameter windshield was fitted to the microphone. The equipment was filed calibrated before and after the survey; negligible drift was noted.

Table 1 – Measurement Methodology

The figure below outlines the site surroundings and the unattended measurement location:



Imagery ©2023, Map data ©2023

Figure 2 – Measurement Locations and Site Surroundings

In addition to MP1, spot measurements were undertaken at 1m from both items of plant when running at 100% capacity.

2.1 Context & Subjective Impression

The Sudbury Print Group building is located as part of a large industrial estate area, with unaffiliated businesses such as Spraybooth Technology Ltd, Daro UV System and Whitehouse Solutions all in proximity.

In the absence of noise from the existing items of plant, the general acoustic environment consisted of birdsong and distant road traffic from Ballingdon Hill, which remained constant throughout the entire visit.

Additional attended monitoring was undertaken close to the rear garden boundary of the closest receptor, with it being noted that whilst the 2 No. units were in operation, a slight tonal feature was present within the low to mid frequencies, particularly for Unit B. Overall, it was summarised by the on-site engineer that there was a nominal difference in the acoustic environment between on and off conditions for the units, with limited impact on the character of the area. Further to this, Table 2 provides a 1/1 octave comparison between the two measurements when standing at the boundary fence to the closest NSR:

Description	Octave Band (Hz, L_{eq} dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Both Units On	62	54	49	47	46	41	44	39	51
Both Units Off	61	52	49	47	46	42	40	38	51

Table 2 – Comparison in Acoustic Environment at Closest Boundary Fence

As shown above, there is minimal difference in measured values with both units operating (ambient sound level) and off (residual sound level), further indicating a low likelihood of adverse impact at the NSRs.

2.2 Environmental Noise Survey Results

Background Sound Level Analysis

The following section outlines the measured background sound levels that have been used as the baseline for the subsequent BS4142 noise assessment. The figures below show a histogram graph of the background sound levels measured during the operational hours for the condenser units (07:00 – 17:00) and full daytime operational hours as reference (07:00 – 23:00). The time history results can be found in Appendix D.

It is understood that the two units were not in operation throughout the duration of the unattended noise survey.

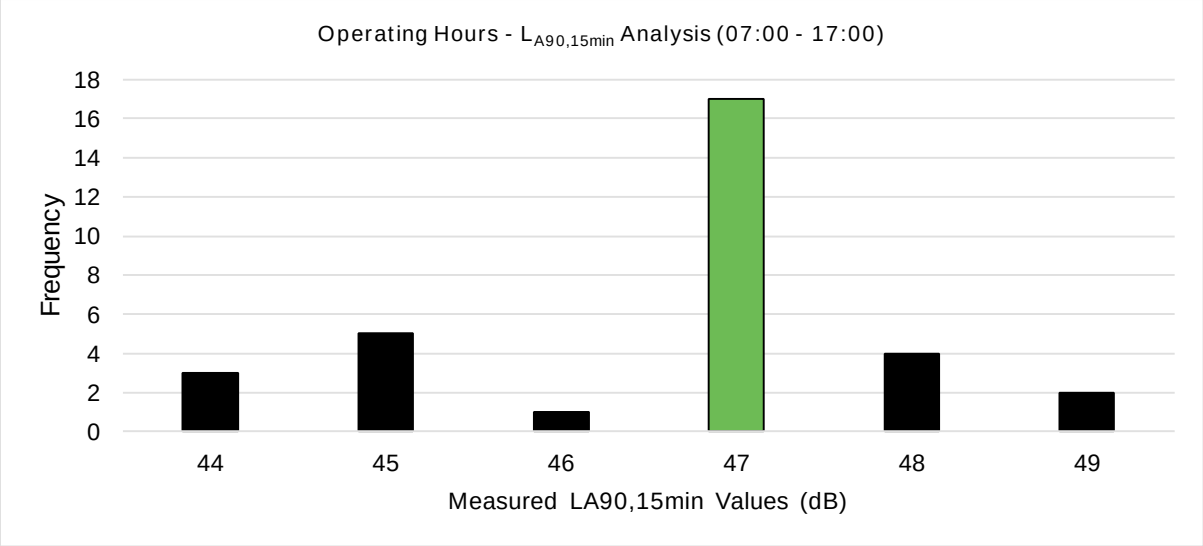


Figure 3 – MP1 Condenser Operational Hours Background Sound Level Analysis

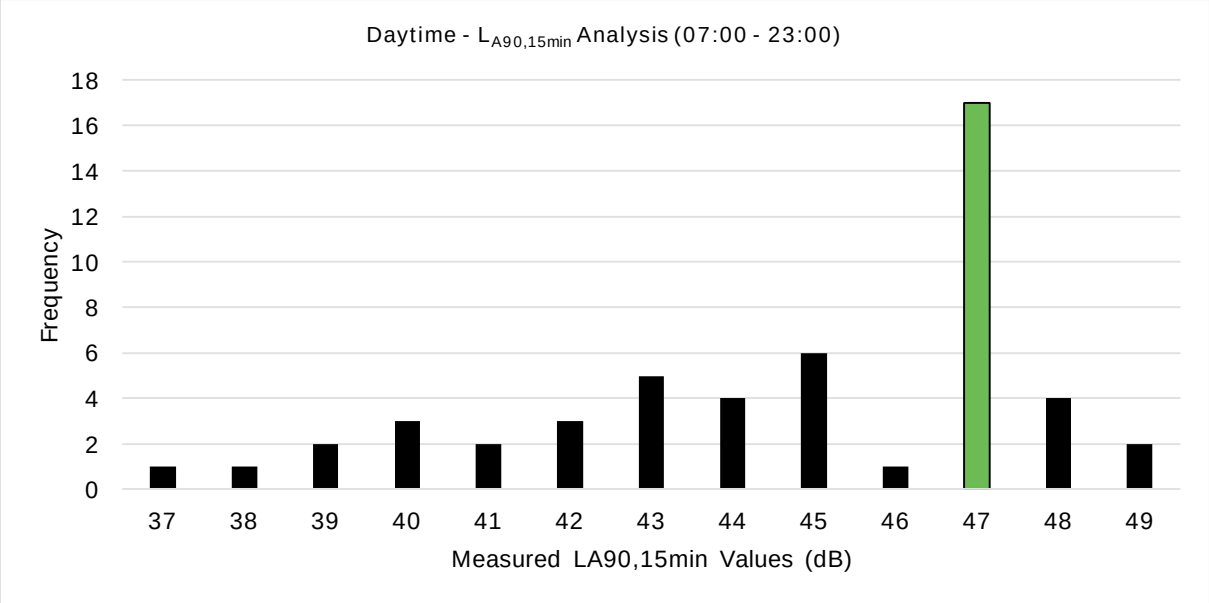


Figure 4 – MP1 Full Daytime Operational Hours Background Sound Level Analysis

As can be seen across Figures 3 & 4, the 'lowest typical' $L_{A90,15min}$ values across both the standard hours of operation and full daytime hours is 47dB.

It is also worth noting that due to the existing rear garden spaces being in closer proximity to other items of plant un-affiliated with Sudbury Print Works, MP1 is considered suitably robust due to the screening and additional distance from the estate.

Spot Measurement Results Summary

Spot measurements of the plant equipment were conducted during a site visit on 27th February 2024. For all on-site measurements the following methodology was adhered to:

- All measurements have been taken at a position where point source propagation is expected and corrected for residual noise.
- All measurements were taken using a fast time-weighting and the sound level meter was set to log every 0.1s.
- Measurements were taken in 1/3 octave frequency bands; however, the report details the 1/1 octave band sound levels used in the specific sound level calculations.

The following table shows the calculated specific sound levels for each plant equipment.

Description	Measurement Distance (m)	Octave Band (Hz, L_{eq} dB)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
Unit A	1	62	61	58	55	53	48	41	41	58
Unit B	1	70	64	59	57	53	49	44	42	59

Table 3 – Calculated Specific Sound Levels of Condenser Units

3. BS4142 Noise Impact Assessment

In the following section of the report, the impact of the noise emissions generated by the existing development is assessed.

As stated in the email excerpt in Section 1.3, although this assessment is primarily focused on the noise at the rear garden boundary of the closest NSR, an additional BS4142 assessment is provided at the closest window of the NSR.

3.1 External Fixed Plant & Specific Sound Levels

The following table shows the 1/1 octave frequency band sound power levels of the existing items of plant that will be used in the subsequent calculations. The following assumptions have been made within the calculations:

- The specific sound levels and measurement distances presented in Table 2,
- Point source propagation,
- The relevant Q factors depending on the source location.

Description	Q Factor	1/1 Octave Frequency Band (Hz, L_w dB)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
Unit A	4	67	66	63	60	58	53	46	46	63
Unit B	4	75	69	64	62	58	54	49	47	64

Table 4 – Sound Power Levels of Condenser Units

3.2 BS4142 Noise Impact Assessment

The following section outlines the predicted noise levels at the NSRs in addition to the BS41412 assessment. Detailed plant calculations are provided in Appendix E.

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Cumulative Specific Sound Level at most affected NSR	51	46	42	39	36	32	26	25	41
Acoustic Feature Correction	As discussed in Section 2.1, *a +2 dB penalty has been applied to account for the 'just perceptible' low to mid frequency hum present during the on-site measurements*								+2
Rating Sound Level ($L_{Ar,Tr}$)	Specific Sound Level + Rating Penalties								43
Background Sound Level	MP1 Daytime $L_{A90,15min}$ – Figure 3.								37
Exceedance	$L_{Ar,Tr} - L_{A90,15min}$								-4
BS4142 Assessment Outcome	Low impact, dependent on context, in accordance with BS4142 at the closest NSR's garden boundary.								
NPPF & NPSE Outcome	The assessment indicates 'No Observed Adverse Effect Level' (NOAEL) in accordance with the NPPF and NPSE.								
No mitigation measures are required to reduce noise impact.									

Table 5 – BS4142 Noise Impact Assessment at Closest Garden Boundary

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Cumulative Specific Sound Level at NSR Window	45	40	36	34	30	26	20	19	36
Acoustic Feature Correction	As discussed in Section 2.1, *a +2 dB penalty has been applied to account for the 'just perceptible' low to mid frequency hum present during the on-site measurements*								+2
Rating Sound Level ($L_{Ar,Tr}$)	Specific Sound Level + Rating Penalties								38
Background Sound Level	MP1 Daytime $L_{A90,15min}$ – Figure 3.								47
Exceedance	$L_{Ar,Tr} - L_{A90,15min}$								-9
BS4142 Assessment Outcome	Low impact, dependent on context, in accordance with BS4142 at the closest NSR's window.								
NPPF & NPSE Outcome	The assessment indicates 'No Observed Adverse Effect Level (NOAEL) in accordance with the NPPF and NPSE.								
No mitigation measures are required to reduce noise impact.									

Table 6 – BS4142 Noise Impact Assessment at Closest NSRs Window

4. Conclusion and Action Plan

The existing development has been assessed against the requirements of BS4142 and the comments made by the LPA.

The following 'Action Plan' is outlined to ensure the design considerations and specifications from this report are duly implemented:

1. The existing make and model of both condenser units should not be altered. If alterations to the specification and location of the unit are required, then further assessment should be undertaken.
2. If the existing items of plant are to operate outside of daytime hours (07:00 – 23:00), then further assessment should be undertaken.

The findings of this report will require written approval from the Local Authority prior to work commencing.

Appendix A – Acoustic Terminology

A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure given by the following formula in decibels (dBA). $L_{pA} = 10 \log_{10} (pA/p_0)^2$. Where: pA is the A-weighted sound pressure in pascals (Pa) and $p0$ is the reference sound pressure (20 µPa)
Background Sound	Underlying level of sound over a period, T, which might in part be an indication of relative quietness at a given location
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T, has the same mean-squared sound pressure as the sound under consideration that varies with time
Facade level	Sound pressure level 1 m in front of the facade
Free-field level	Sound pressure level away from reflecting surfaces
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants
Noise Criteria	Numerical indices used to define design goals in a given space
Noise Rating (NR)	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves
Octave Band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit
Percentile Level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting “F”, which is exceeded for N% of a specified time interval
Rating Level, $L_{Ar,Tr}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise
Reverberation time, T	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped
Sound Pressure, p	root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound
Sound Pressure Level, L_p	Quantity of sound pressure, in decibels (dB), given by the formula: $L_p = 10\log_{10}(p/p_0)^{2.}$ Where: p is the root-mean-square sound pressure in pascals (Pa) and $p0$ is the reference sound pressure (20 µPa)
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

Appendix B – Standards, Legislation, Policy, and Guidance

This report is to be primarily based on the following standards, legislation, policy and guidance.

B.1 – National Planning Policy Framework (2023)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), with the latest revision published in 2023. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 180e, it states:

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;

Paragraph 191 states:

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 impact 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.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 191 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

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

To achieve this vision the Statement identifies the following three aims:

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

1) Avoid significant adverse impacts on health and quality of life;
2) Mitigate and minimise adverse impacts on health and quality of life;
3) Where possible, contribute to the improvement of health and quality of life.

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that "significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development".

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: "all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur."

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. This can be related to the third aim above, which seeks: "where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

This is further expanded using the updated "Noise Exposure Hierarchy Table" which includes an additional level of impact referred to as the 'No Observed Adverse Effect Level' ('NOAEL'). It is stated that at this level: *"noise can be heard, but does not cause any change in behaviour, attitude or other physiological response"*. In addition, noise at this level *"can slightly affect the acoustic character of the area but not such that there is a change in the quality of life".*

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B.3 – BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'

Overview

BS4142 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ 'rating sound level'. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

Rating Penalty

Section 9 of BS4142 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142 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. This can be approached in three ways:

a) subjective method;
b) objective method for tonality;
c) reference method."

Due to the nature of the development the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142, which states:

"Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources."

BS4142 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

a) Tonality

A rating penalty of +2dB is applicable for a tone which is "just perceptible", +4dB where a tone is "clearly perceptible", and +6dB where a tone is "highly perceptible".

b) Impulsivity

A rating penalty of +3dB is applicable for impulsivity which is "just perceptible", +6dB where it is "clearly perceptible", and +9dB where it is "highly perceptible".

c) Other Sound Characteristics

BS4142 states that where "the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3dB can be applied."

d) Intermittency

BS4142 states that when the "specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time ... if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3dB can be applied."

Background Sound Level

The background sound level is the underlying level of sound over a period, T, and is indicative of the relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a 'typical' background sound level for a given period. The purpose has not been to simply select the lowest measured value. Diurnal patterns have also been considered as they can have a major influence on background sound levels, 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.

Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.

Assessment of Impact

BS4142:2014 states: "The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- "Typically, the greater this difference, the greater the magnitude of the impact."
- "A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."
- "A difference of around +5dB 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 negligible impact, depending on the context."

Interpreting the guidance given in BS4142:2014, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

- A rating sound level that is +10 dB above the background sound level is likely to be an indication of a Significant Observed Adverse Effect Level;
- A rating sound level that is +5 dB above the background sound level is likely to be an indication of a Lowest Observed Adverse Effect Level;
- The lower the rating sound 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 sound level does not exceed the background sound level, this is an indication of the specific sound source having a negligible impact and would therefore classified as No Observed Adverse Effect Level.

During the daytime, the assessment is carried out over a reference time period of 1-hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

Appendix D – Environmental Survey

D.1 – Time History Noise Data

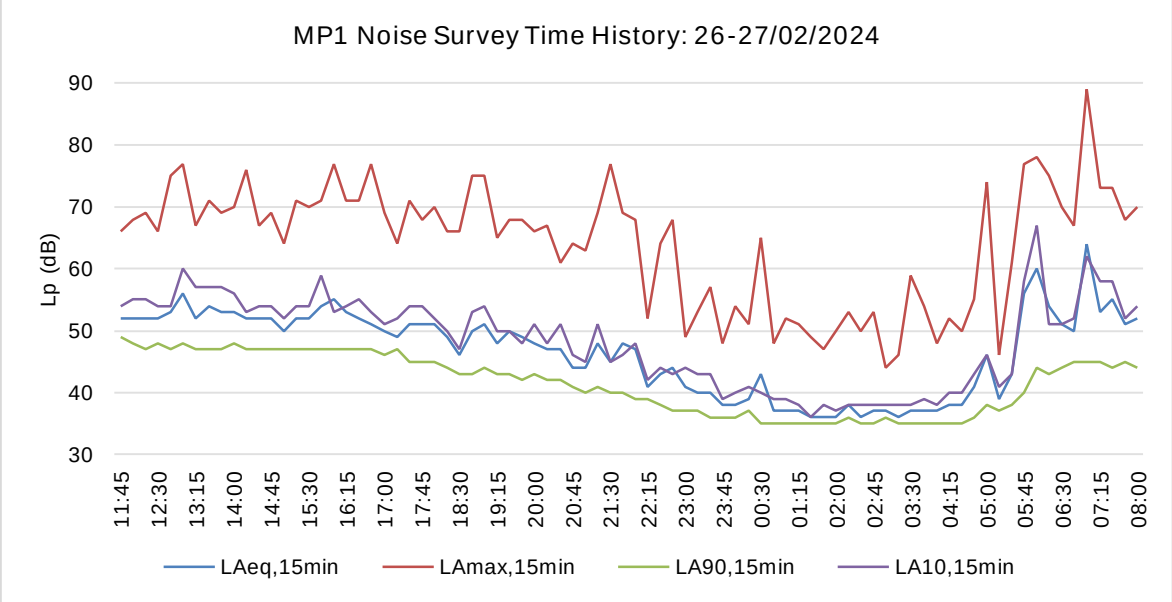


Figure 5 – MP1 Noise Survey Time History

D.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
Svantek 971A Class 1 Sound Level Meter	141345	≤0.1
CESVA CB011 Class 1 Calibrator	T253551	

Table 7 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with negligible deviation noted. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

D.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. However, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – Great Yeldham (Approx. 9.9km W of Site)				
Time Period	Air Temp (^{0}C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
26/02/24: 00:00 – 23:59	2.0 – 7.6	0.0	NE	0.1 – 10 [1]
27/02/24: 00:00 – 13:15	0.3 – 7.9	0.0	WSW	0.0 – 2.2

Note [1] Although high wind speeds were present throughout this period, it should be noted that the weather station located in Great Yeldham is adjacent to large open fields, with significantly less screening from wind in the area in comparison to MP1. It should also be noted that the typical LA90 occurred significantly more than other measured dB values, indicating the criteria is very likely derived from periods with low wind speed.

Table 8 – Weather Conditions

Appendix E – Full Noise Impact Assessment Calculations

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k	Lp Dist (m)	Q Factor
Model / Unit	Unit A	Octave-Band Lp	Lp at 1m, Q factor (Q=4)	58	62	61	58	55	53	48	41	41	1	4
No. of	1													
Data Type	Emperical Data		Total Lw	63	67	66	63	60	58	53	46	46		
Source Mitigation	No													
Description	N/A													
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)											
	60	Day	0	63	67	66	63	60	58	53	46	46		
Propagation Loss to NSR Garden (Point Source)	Distance (m)	Q Factor	Loss (dB)		Shielding (dB)							No		
	10	4	-25											
Specific Sound Level at NSR1				38	42	41	38	35	33	28	21	21		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k	Lp Dist (m)	Q Factor
Model / Unit	Unit B	Octave-Band Lp	Lp at 1m, Q factor (Q=4)	59	70	64	59	57	53	49	44	42	1	4
No. of	1													
Data Type	Emperical Data		Total Lw	64	75	69	64	62	58	54	49	47		
Source Mitigation	No													
Description	N/A													
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)											
	60	Day	0	64	75	69	64	62	58	54	49	47		
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor	Loss (dB)		Shielding (dB)							No		
	10	4	-25											
Specific Sound Level at NSR1				39	50	44	39	37	33	29	24	22		

Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Unit A	38	42	41	38	35	33	28	21	21
Unit B	39	50	44	39	37	33	29	24	22
Cumulative Specific Sound Level	41	51	46	42	39	36	32	26	25

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