PLANT NOISE ASSESSMENT

UNITS 11-13, THE GRANGE INDUSTRIAL ESTATE

REAL PATISSERIE

FEBRUARY 2022

PLANT NOISE ASSESSMENT
UNITS 11-13, THE GRANGE INDUSTRIAL ESTATE

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1 INTRODUCTION

Anderson Acoustics Ltd has been commissioned by Real Patisserie to undertake a noise impact assessment in support of a planning application for the installation of mechanical ventilation and refrigeration plant at Units 11-13, The Grange Industrial Estate, Southwick.

An assessment has been made in accordance with the requirements of Adur District Council to determine suitability of the proposed plant. The assessment has been carried out to:

a) evaluate the existing acoustic environment and background sound levels at neighbouring noise sensitive receptors;

b) establish the plant noise emission limits that will be required outside noise sensitive receptors to maintain occupant amenity; and

c) predict noise emission levels from the proposed installation at sensitive receptors and provide mitigation advice where required to comply with the noise emission limits as defined within the local authority noise policy.

This report presents the results of our attended environmental noise survey and impact assessment in the context of the baseline conditions.

Environmental noise criteria relevant to the assessment have been presented and briefly discussed in Section 2.

A brief description of the site and proposed plant is given in Section 3.

The methodology and results of an attended environmental noise survey undertaken at the site are given in Section 4.

The noise impact assessment is presented in Section 5.

The report is summarised in Section 6.

A description of relevant noise units and acoustics terminology is provided in Appendix A.

Plant noise calculations are presented in Appendix B.

2 ASSESSMENT CRITERIA

Adur District Council (ADC) requirements and associated assessment guidance are summarised below. These should be read in conjunction with the government's overarching planning principles with respect to noise including: Noise Policy Statement for England [1]; National Planning Practice Framework [2] and Planning Practice Guidance – Noise [3]. These documents are summarised in Appendix A along with a description of relevant acoustic terminology.

2.1 Planning Policy

2.1.1 Planning Noise Advice Document: Sussex

Adur District Council noise guidance is defined in Planning Noise Advice Document: Sussex March 2021 [4]. With regard to noise sources of an industrial and commercial nature, this document states the following:

2.6.1 For a new noise source being introduced near existing noise sensitive premises then an ambient and background noise survey (LA90) should cover the times when the proposed development will be in operation. The expected levels and duration of all the potential noise sources likely to be in operation from the proposed development, whether measured or predicted, should be provided with details of tonality, character, impulsivity and/or intermittency of each noise (e.g. BS 4142). Reference shall also be made if a noise source is anticipated to be readily distinctive against the residual acoustic environment. This could also apply to extensions / alterations to existing development.

3.2.1. The rating level of the industrial or commercial sound source should, where practicable, achieve a level no greater than the representative background sound, when measured in accordance with BS 4142:2014 + A1: 2019. There may be instances, for specific sites, where a rating level below background is deemed appropriate. This can be determined through discussion with the Local Planning Authority (LPA). A rating level below background may be required if there are concerns for potential noise creep, for example in a High Street setting. It is considered that meeting this criterion would avoid adverse noise impacts, in the interests of ensuring a good standard of amenity and protecting human health. Where these criteria are not attainable, the noise report should explain why, and how best practicable means will be implemented to control noise in order to satisfy the LPA that the development is acceptable. At all times the reports shall have regard to the context.

Details of BS 4142 are provided below.

2.1.2 British Standard 4142:2014+A1:2019

Guidance on the rating of noise from fixed installations and sources of an industrial nature is provided in British Standard (BS) 4142:2014+A1:2019 [5]. The "+A1:2019" in the reference reflects that the 2014 version of the Standard received minor (mostly typographical) amendments in 2019. It provides a procedure for the measurement and rating of noise levels outside dwellings from industrial or commercial type sources and forms current best practice. It includes guidance on determining the likely degree of adverse impact, but the assessment of nuisance explicitly falls outside the scope of this British Standard. This is for the Council to determine as the need arises.

The rating level ($L_{Ar,Tr}$) is defined in BS 4142 as the level from the industrial or commercial source(s) in question (known as the specific sound level ($L_{Aeq,Tr}$)) outside residential dwellings, having been corrected for any (potentially) noticeable characteristics. The "subjective method" is typically used for this purpose, where a correction of between 0 and 6 dB is considered for tonal noise sources,

and/or a correction of between 0 and 9 dB for impulsive sources. Additionally, or alternatively, a correction of up to 3 dB can be made for other sound characteristics, such as intermittency of the noise source, or "*Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment…*"

The reference time intervals, T_r, are 1 hour and 15 minutes during the day and night, respectively. Where the on-time of the source or sources is less than these periods, a time correction is applied.

In terms of the assessment of impacts, the Standard 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 effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.

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).

NOTE 1 More than one assessment might be appropriate.

a) Typically, the greater this difference, 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 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 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 may include but not be limited to annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

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 absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

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 should 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) facade 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."

An assessment, therefore, is effectively split into two parts. The first part results in an initial indication of the impact, which is subsequently considered in terms of the context unique to the situation at hand; whereas the second part may require consideration of alternative guidance and metrics. Alternatively, the context can be considered upfront and a specific threshold (or set of thresholds) determined accordingly in place of the default values presented in points *a)* to *d)* quoted above.

2.2 Assessment Criteria

On the basis of the above, the rating level of the plant, when measured in accordance with BS 4142:2014, should be no greater than the representative background levels when measured in accordance with BS 4142:2014+A1:2019, where practicable.

3 SITE DESCRIPTION

3.1 Proposed Installation

It is proposed that mechanical ventilation and refrigeration plant is installed at Units 11-13, The Grange Industrial Estate, Southwick. The existing noise environment around the proposed development site and at the nearest noise sensitive premises has been considered and discussed below.

Figure 3-1 details the proposed plant configuration. Figure 3-2 details the wider site with the proposed site location, nearest noise sensitive receptors and measurement position highlighted.

Details of the proposed plant items and proposed operation times are provided in Section 5.

Figure 3-1: Proposed Plant Configuration

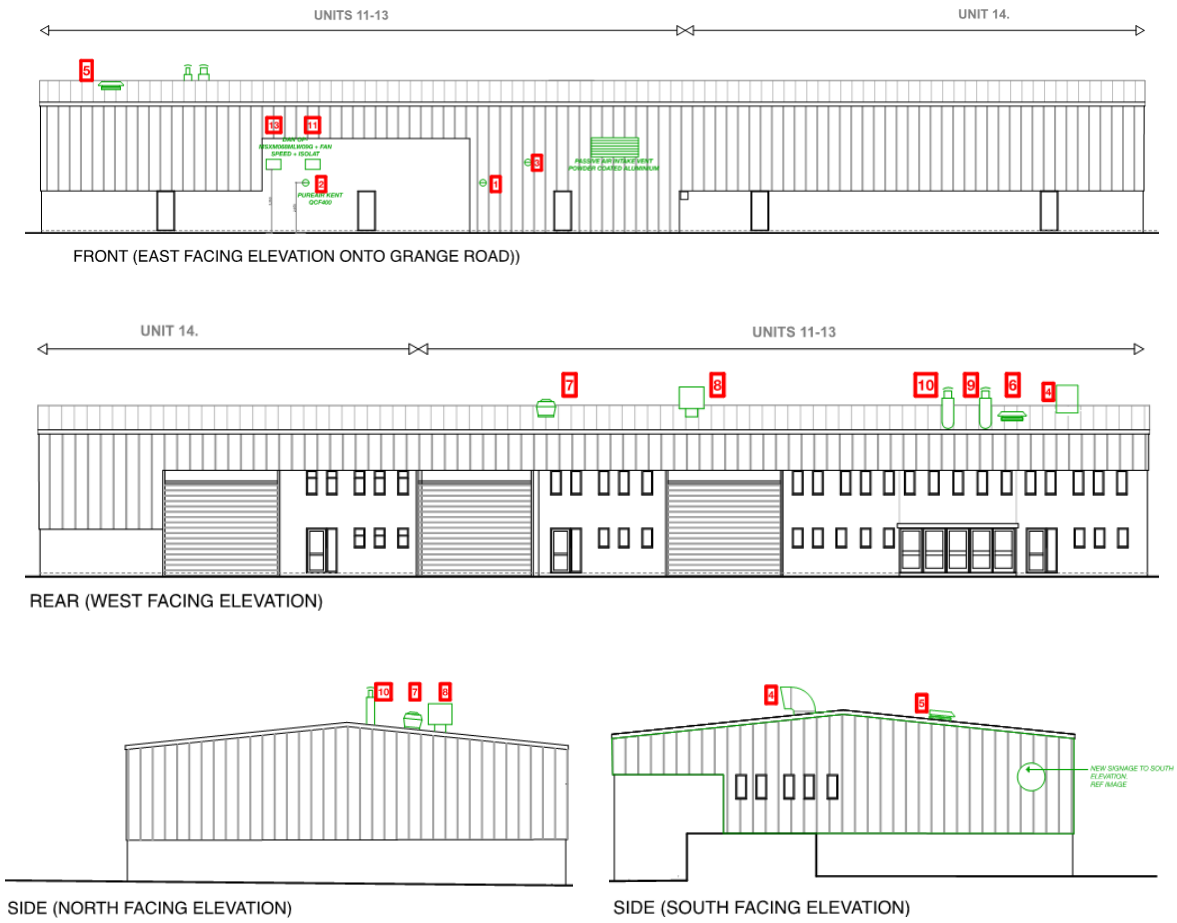

Figure 3-2: Site Location Plan



3.2 Existing Environment and Context

The closest noise sensitive premises have been identified as residential properties in the form of a three-storey block of flats on Grange Road, approximately 20 m east of the site. These residential properties have direct line of sight to the proposed development.

The site is located at Grange Industrial Estate, Southwick where a number of existing commercial premises are operational during the daytime period. No commercial activities were observed during the night-time period.

Albion Street is located to the south of the proposed site and the nearest residential properties. This road was noted to be the dominant noise source during site visits and during attended monitoring. Several industrial premises are located beyond Albion Street to the south. These include Shoreham Port and Dudman Shoreham Terminal. Industrial noise from these premises was noted to be audible but not dominant during the daytime period.

4 NOISE LEVELS ON SITE

The prevailing noise conditions at the site have been determined by detailed environmental noise surveys, comprising of attended measurements, supported with observations of the existing noise environment at the nearest noise sensitive premises. The attended surveys were undertaken in order to determine the representative background sound levels at the assessment location during the daytime and night-time periods. No unattended survey was undertaken due to the lack of a secure location to install noise monitoring equipment. The attended monitoring location is detailed in Figure 3-2.

Measurements were taken at a height of 1.2 m under free field conditions on Thursday 2nd December 2021 from 13:00 to 16:00 and 23:00 to 02:00 on Friday 3rd December 2021. The location was considered representative of the acoustic conditions at the nearest noise sensitive receptors on Grange Road. Consecutive 15-minute $L_{Aeq, T}$ and $L_{A90, T}$ measurements were obtained using the fast time weighting.

4.1 Instrumentation

All noise measurements were undertaken by a consultant certified as competent in environmental monitoring. All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of British Standard 61672 [6]. A full inventory of this equipment is shown in Table 4-1 below. All equipment's calibration certificates are available on request.

Table 4-1: Unattended survey equipment details

Measurement Type	Equipment	Make and Model	Serial Number	Calibration	
				Certificate Number	Expiry Date
Attended Monitoring	Sound Level Meter	NL-52	00610202	UCRT20/2264	22.12.2022
	Preamplifier	NH-25	10611		
	Microphone	UC-59	17093		
Calibrator		Rion NC-74	35015349	UCRT21/1436	31.03.2022

The noise measurement equipment used during the survey was calibrated at the start and end of each measurement. The calibrator used had itself been calibrated by a UKAS accredited calibration laboratory within the 12 months preceding the measurements. No significant drift in calibration was found to have occurred.

4.2 Weather Conditions

At the time of attended noise measurements, conditions were favourable, dry with light winds.

4.3 Results

The results of the attended monitoring surveys at NM1 are summarised in Table 4-2.

Table 4-2: Attended Monitoring Results – NM1

Date	Measurement Time	$L_{Aeq,T}$ (dB)	Typical (modal) $L_{A90,15min}$ (dB)
Thursday 2nd December 2021 (Daytime Period)	13:00 – 13:15	63	52
	13:15 – 13:30	60	52
	13:30 – 13:45	60	52
	13:45 – 14:00	59	51
	14:00 – 14:15	59	50
	14:15 – 14:30	61	52
	14:30 – 14:45	60	52
	14:45 – 15:00	60	50
	15:00 – 15:15	72	53
	15:15 – 15:30	60	53
	15:30 – 15:45	61	54
	15:45 – 16:00	61	54
Thursday 2nd December 2021 to Friday 3rd December 2021 (Night-time Period)	23:15 – 23:30	55	43
	23:30 – 23:45	55	41
	23:45 – 00:00	52	40
	00:00 – 00:15	54	40
	00:15 – 00:30	50	38
	00:30 – 00:45	52	39
	00:45 – 01:00	51	38
	01:00 – 01:15	50	39
	01:15 – 01:30	49	40
	01:30 – 01:45	51	38
	01:45 – 02:00	50	39
Summary	**Daytime Period (13:00 to 16:00)**	**61**	**52**
	Night-time Period (23:15 to 02:00)	**52**	**38**

The unattended survey results at NM1 indicate daily free-field ambient sound levels ranging between 59 and 72 dB $L_{Aeq,\ T}$ for daytime, and 49 and 55 dB $L_{Aeq,\ T}$ for night-time periods. Background sound levels range between 50 and 54 dB $L_{A90,\ 15min}$ during the daytime, and 38 and 43 $L_{A90,\ 15min}$ during the night-time periods. The typical background sound levels during these periods have been identified as 52 dB $L_{A90,15min}$, and 38 dB $L_{A90,15min}$ for the daytime and night-time period respectively.

5 PLANT NOISE ASSESSMENT

5.1 Design Criteria

In line with the local authority's noise policy outlined in Section 2, the rating level of the proposed plant will need to be controlled to no greater than the measured typical background sound level during the proposed hours of operation at 1 m from the nearest noise sensitive premises.

The target rating level is therefore 52 dB $L_{Ar,Tr}$ during the daytime period, and 38 dB $L_{Ar,Tr}$ during the night-time period at 1 m from the nearest noise sensitive properties. The operating times of each plant item has been detailed below.

5.2 Proposed Plant Information

Table 5-1 details the plant that is proposed at the site alongside the periods of operation for each unit. The plant system reference can be seen on the proposed drawings detailed within Section 3.1. Insertion loss values of attenuators that are proposed for plan references are detailed in Table 5-2. Plant is operational during the daytime and night-time period, except where detailed within Table 5-1.

Table 5-1: Proposed Plant Details

Plant Ref.	Manufacturer/Model Ref.	Octave Band (Hz)								Total
		63	125	250	500	1k	2k	4k	8k	
1	ELTA Revolution SLCX355 4-3+1DENP	65	62	66	55	51	52	54	47	70
2	PureAir Ken QCF400	76	73	68	59	60	59	57	55	78
3	Colasit CIV315/280 [2]	75	75	77	73	71	67	59	51	82
4	ENCON 75UN-7/9	78	72	80	77	74	74	72	70	85
5	ENCON 75U-7/9	76	77	77	79	75	72	69	54	84
6	ENCON 50UN-9-T	65	74	67	66	68	65	61	56	77
7	ELTA Clearflow CFHT500/4-3AC [2]	71	80	79	79	80	79	73	75	87
8	Climate Wizard CW3	46	55	62	65	70	65	58	50	73
9	Bifuricated Internal Fan [1]	66	69	67	64	65	63	58	48	74
10	Flue Outlet RSV 315-4-1	-	71	75	70	73	68	57	52	79
11	JEHS-0680-B3-M3	57	61	63	65	63	63	61	55	71
13	JEHR-0140-B2-M1	51	55	57	59	57	57	55	49	65

Note
[1] No fan has been proposed at this stage, therefore, a BIFA313410 has been used as a representative source.
[2] Operational during the daytime only.

Table 5-2: Proposed Attenuator Insertion Loss

Plant Ref.	Manufacturer/Model Ref.	Octave Band (Hz)							
		63	125	250	500	1k	2k	4k	8k
2	CP01-M40-060	-2	-4	-7	-14	-17	-18	-14	-11
4	R02 8-900 Attenuator	-2	-4	-7	-15	-19	-18	-10	-5
5	R02 8-900 Attenuator	-2	-4	-7	-15	-19	-18	-10	-5

A cumulative specific noise level has been calculated at 1 m from the façade of the nearest residential property. Detailed calculations are provided in Appendix B.

5.3 Assessment

Table 5-3 details the plant noise assessment. To provide a worst-case assessment, it has been assumed that all of the proposed plant will be operational.

Table 5-3: Plant noise assessment

Detail	Sound Level	
	Daytime Period	Night-time Period
Calculated Specific Sound Level	50 dB	39 dB
Acoustic Penalties	-	-
Rating Level, $L_{Ar,Tr}$	50 dB	39 dB
Target Background Sound Level, $L_{A90,T}$	52 dB	38 dB
Excess of rating over background sound level	-2 dB	+1 dB

Note
[1] Although the octave band data detailed for plant item 6, as detailed within Table 5 1, indicates tonal elements, the calculated specific sound level of this unit is more than 10 dB below the measured background sound level, as detailed within Appendix B. Therefore, no acoustic character correction has been applied.
[2] To undertake a worst-case assessment it has been assumed that plant on for 100% of the assessment period, therefore, no time correction has been applied. Plant is also assumed to not be intermittent as 100% operation has been assumed throughout the assessment period.

The assessment indicates that the operation of the proposed plant units results in a *Low Impact* during the daytime in accordance with BS 4142 guidance.

At night the proposed plant is likely to exceed the measured background sound level during the night-time period by +1 dB. This is below the *Adverse Impact* level (+5 dB) as detailed within BS 4142 guidance.

Although no existing commercial noise was noted to be operational during the night-time period, it is considered that a rating level of +1 dB is unlikely to adversely impact the amenity of the nearest residential properties during the night-time period.

To provide further context in support of this view, the calculated rating level of the proposed plant during the night-time period is 11 dB below the night-time $L_{Aeq,T}$ measured during attended monitoring, which is dominated by noise train passbys and vehicle movements on the A259 road (Albion Street).

As a result, should residents choose to provide ventilation through opening windows, the operation of the proposed plant is unlikely to result in a material change in internal ambient noise levels.

It should be noted that our calculations will need to be updated when a Bifuricated Internal Fan is specified. Noise data for system reference 9 within Table 5-1 may be used to identify a suitable model.

5.4 Uncertainty

5.4.1 Measurement Location

- Attended sound level measurements were taken approximately 10 m from the location of the nearest noise sensitive receptor; as the main background sound source was road traffic

and commercial noise during the daytime and road traffic noise during the night-time, this location is considered representative.

- Measurements were taken under free-field conditions

5.4.2 Weather Conditions

- Weather conditions were clear throughout attended measurements and are not considered to have impacted surveys

5.4.3 Instrumentation

- An IEC 61672 Class 1 sound level monitor was used for sound level measurements
- A calibration drift of 0.1 dB, which is within normal tolerances, was observed between the start and end of the unattended survey.
- The sound level meter and field calibrator used for the unattended survey have been sent for calibration at UKAS approved laboratories within the last 12 months

5.4.4 Calculations

- Distance propagation from specific sound source to receiver based on scale drawings and Google Maps; any slight differences in distance should be negligible
- Calculations rounded up to nearest dB
- During normal operation, specific sound source is not expected to exhibit any impulsive or intermittent characteristics that would warrant a correction penalty
- Unable to validate predicted specific sound level with measurements as the plant is yet to be installed
- Assumes all plant running simultaneously throughout the assessment period to provide a worst-case

5.4.5 Uncertainty Summary

The effect of uncertainty on the outcome of the assessment is not considered to be significant.

6 SUMMARY

Anderson Acoustics Ltd was commissioned by Real Patisserie to conduct a noise impact assessment for the proposed installation of ventilation and refrigeration plant at Units 11-13, The Grange Industrial Estate, Southwick.

This report identifies the proposed plant items and their locations in relation to the nearest residential properties. Calculations have been made to assess the resultant rating levels at the nearest noise sensitive dwellings in accordance with BS 4142.

The assessment is based on plant noise data provided by the manufacturer, attended background noise measurements, and relevant technical drawings for the proposal.

Our assessments predicts that plant noise levels result in a *Low Impact* in line with BS 4142 guidance and thus not exceed the measured background sound level during the daytime period. The operation of plant during the night-time period is likely to generate a rating level that is +1 dB above the measured background sound level, however, this does not exceed the *Adverse Impact* level as detailed within BS 4142 guidance. It is considered that a rating level of +1 dB is unlikely to adversely impact the nearest residential properties during the night-time period given site context.

7 REFERENCES

[1] Department for Environment, Food and Rural Affairs, “Noise Policy Statement for England,” DEFRA, London, 2010.

[2] C. &. L. G. Ministry of Housing, “National Planning Policy Framework,” London, 2019.

[3] Ministry of Housing, Communities & Local Government, “Planning Practice Guidance - Noise,” 2019. [Online]. Available: https://www.gov.uk/guidance/noise--2. [Accessed 2020].

[4] “Planning Noise Advice Document: Sussex,” 2021.

[5] The British Standards Institution, “BS 4142:2014+A1:2019 - Methods for rating and assessing industrial and commercial sound,” BSI Standards Limited 2019, 2019.

[6] The British Stands Institution, “British Standard 61672 - Electroacoustics. Sound level meters. Specifications,” 2013.

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APPENDIX A

ACOUSTIC TERMINOLOGY & NOISE POLICY

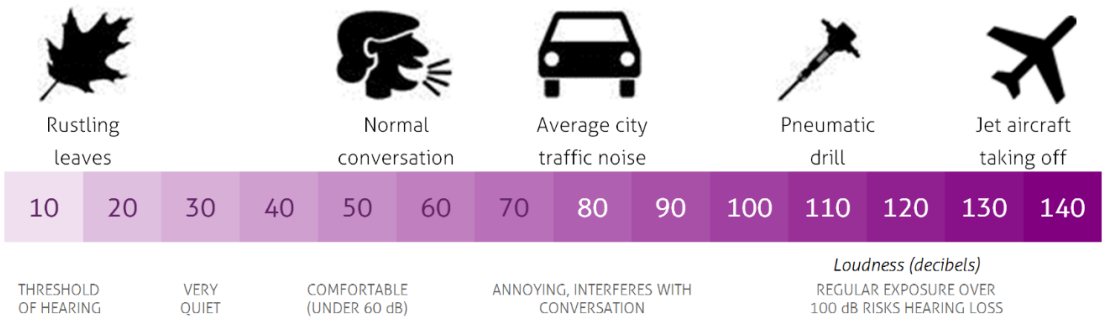
ACOUSTIC TERMINOLOGY

There is a ten million to one ratio between the threshold of hearing and the highest tolerable sound pressure. Sound is therefore measured using a logarithmic scale, to account for this wide range, called the decibel (dB). Noise is defined as unwanted sound and the range of audible sound varies from around 0 dB to 140 dB.

The human ear is capable of detecting sound over a range of frequencies from around 20 Hz to 20 kHz, however its response varies depending on the frequency and is most sensitive to sounds in the mid frequency range of 1 kHz to 5 kHz. Instrumentation used to measure sound is therefore weighted across the frequency bands to represent the sensitivity of the ear. This is called 'A weighting' and is represented as dB(A).

It is generally accepted that under normal conditions humans are capable of detecting changes in steady sound levels of 3 dB, whilst a change of 10 dB is perceived as a doubling or halving of the sound level. An indication of the range of sound levels commonly found in the environment is given below.

Figure A-1: Typical sound levels



A number of different indices are used to describe the fluctuations in sound level over certain time periods. The main indices include:

$L_{A90,T}$ This is the sound level exceeded for 90% of the measurement period and provides a measurement of relatively continuous sounds that make up quieter 'lull' periods in between sound events. It is often referred to as the background sound level.

$L_{Aeq,T}$ This is the "equivalent continuous A weighted sound pressure level" and is the level of a notional steady sound which has the same acoustic energy as the fluctuating sound over a specified time period. It is often used for measuring all sources of sound in the environment, which can be referred to as the ambient sound.

$L_{Amax,F}$ This is the maximum sound pressure level measured in a given time period with the sound level meter set to 'fast' response.

Reference is often made to acoustic measurements being undertaken in 'free-field' or 'façade' locations. Free-field measurements represent a location away from vertical reflecting surfaces, normally by at least 3.5 m. A façade measurement is taken or calculated to a position 1 m from an external façade and a correction of up to 3 dB can be applied to account for the sound reflected from the façade. This latter position is often used when assessing the impact of external noise affecting residents inside properties.

NOISE POLICY

Noise Policy Statement for England (NPSE, 2010)

The NPSE is the Government's overarching statement on noise policy for England, and applies to all forms of noise other than occupational noise, setting out the long-term vision of Government noise policy, which is 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.

Which is supported by the following noise policy aims:

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.

When discussing the meaning of significant adverse and adverse within an Explanatory Note, the NPSE states:

There are two established concepts from toxicology that are currently being applied to noise impacts for example, by the World Health Organisation. They are

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.

To which the NPSE added the following related concept:

SOAEL – Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur.

The Explanatory Note continues:

It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three aims listed above. Logically, it starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL, when *"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."* The final aim envisages proactive management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development.

National Planning Policy Framework (NPPF, 2019)

First published in 2012, and most recently updated in July 2021, the NPPF sets out the Government's planning policies for England, and how these are expected to be applied. Noise is referenced within the NPPF as follows. These are effectively the NPPF's policies on noise.

174. Planning policies and decisions should contribute to and enhance the natural and local environments 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…

185. 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[60]…

Reference number 60 of the above quotation points to the Explanatory Note to the NPSE (see above).

The following policy is also relevant to noise.

187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

As mentioned above, the Government has published accompanying web-based planning guidance for a number of categories, including noise (see below).

Planning Practice Guidance

Issued 6 March 2014, the Planning Practice Guidance on Noise 'PPG(N)' reinforces the guidance set out in the NPSE and NPPF and provides a noise exposure hierarchy based on the likely average response to each level of perception, see Table A-2:

Table A-2: PPG(N) noise Exposure Hierarchy

Perception	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level (NOEL)			
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

APPENDIX B

PLANT NOISE CALCULATIONS

Figure B-1: Plant Noise Calculations

Ref.	Plant Ref.	Air Flow	Calculation	Detail	Octave Band (Hz)								Total
					63	125	250	500	1k	2k	4k	8k	
1	SLCX355 4-3+1DENP	OUT	Sound Power		65	62	66	55	51	52	54	47	**70 dB**
			System Losses		-10	-6	-3	0	0	0	0	0	-
			To SPL at 1 m		-8	-8	-8	-8	-8	-8	-8	-8	-
			Distance Correction	19 m	-26	-25	-24	-23	-22	-21	-20	-20	-
			SPL at Receiver Position		21	23	31	24	21	23	26	19	**31 dBA**
2	PureAir Kent QCF400	IN	Sound Power		76	73	68	59	60	59	57	55	**78 dB**
			System Losses		-7	-4	-2	-2	-3	-3	-3	-3	
			To SPL at 1 m		-8	-8	-8	-8	-8	-8	-8	-8	
			Distance Correction	21 m	-25	-24	-23	-22	-21	-20	-20	-20	
			CP01-M40-060 Attenuator		-2	-4	-7	-14	-17	-18	-14	-11	
			SPL at Receiver Position		34	33	28	13	11	10	12	13	**23 dBA**
3	Colasit CIV315/280	OUT	Sound Power		75	75	77	73	71	67	59	51	**82 dB**
			System Losses		-10	-6	-3	0	0	0	0	0	
			To SPL at 1 m		-8	-8	-8	-8	-8	-8	-8	-8	
			Distance Correction	19 m	-26	-25	-24	-23	-22	-21	-20	-20	
			SPL at Receiver Position		31	36	42	42	41	38	31	23	**46 dBA**
4	Encon 75UN Roof Extract Fan	OUT	Sound Power		78	78	76	79	76	74	68	56	**85 dB**
			System Losses		-4	-1	0	0	0	0	0	0	
			To SPL at 1 m	-8	-8	-8	-8	-8	-8	-8	-8	-8	
			Distance & Directivity Correction	28 m, 180°	-31	-32	-37	-40	-40	-40	-40	-40	
			R02 8-900 Attenuator		-2	-4	-7	-15	-19	-18	-10	-5	
			SPL at Receiver Position		33	33	24	16	9	8	10	3	**21 dBA**
5	Encon 75UN Roof Extract Fan	IN	Sound Power		76	77	77	79	75	72	69	54	**84 dB**
			System Losses		-3	0	0	0	0	0	0	0	
			To SPL at 1 m	-8	-8	-8	-8	-8	-8	-8	-8	-8	
			Distance & Directivity Correction	33 m, 90°	-30	-30	-30	-34	-37	-37	-37	-37	
			R02 8-900 Attenuator		-2	-4	-7	-15	-19	-18	-10	-5	
			Shielding Correction	-5	-5	-5	-5	-5	-5	-5	-5	-5	
			SPL at Receiver Position		28	30	26	16	5	3	8	-2	**21 dBA**
6	Encon 50UN Roof Extract Fan	OUT	Sound Power		65	74	67	66	68	65	61	56	**77 dB**
			System Losses		-3	0	0	0	0	0	0	0	
			To SPL at 1 m	-8	-8	-8	-8	-8	-8	-8	-8	-8	
			Distance & Directivity Correction	35 m, 90°	-31	-31	-31	-35	-38	-38	-38	-38	
			Shielding Correction	-5	-5	-5	-5	-5	-5	-5	-5	-5	
			SPL at Receiver Position		18	30	23	18	17	14	10	5	**23 dBA**

Ref.	Plant Ref.	Air Flow	Calculation	Detail	Octave Band (Hz)								Total
					63	125	250	500	1k	2k	4k	8k	
7	CFHT 500/4-3AC	OUT	Sound Power		71	80	79	79	80	79	73	75	**87 dB**
			System Losses		0	0	0	0	0	0	0	0	
			To SPL at 1 m	-8	-8	-8	-8	-8	-8	-8	-8	-8	
			Distance Correction	35	-29	-28	-27	-26	-25	-25	-25	-25	
			Shielding Correction	-5	-5	-5	-5	-5	-5	-5	-5	-5	
			SPL at Receiver Position		29	39	39	40	42	41	35	37	**47 dBA**
8	CW3 Encon Evaporative Cooler	IN	Sound Power		72	71	71	68	70	64	57	51	**78 dB**
			System Losses		0	0	0	0	0	0	0	0	
			To SPL at 1 m	-8	-8	-8	-8	-8	-8	-8	-8	-8	
			Distance Correction	35 m	-31	-31	-30	-29	-29	-29	-29	-29	
			Shielding Correction	-5	-5	-5	-5	-5	-5	-5	-5	-5	
			SPL at Receiver Position		28	27	28	26	28	22	15	9	**31 dBA**
9	Flue Outlet (Steam) - Bifuricated internal fan (REF BIFA251240)	OUT	Sound Power		66	69	67	64	65	63	58	48	**74 dB**
			System Losses		-4	-1	0	0	0	0	0	0	
			To SPL at 1 m	-8	-8	-8	-8	-8	-8	-8	-8	-8	
			Distance & Directivity Correction	33 m, 90°	-30	-30	-30	-34	-37	-37	-37	-37	
			SPL at Receiver Position		24	30	29	22	20	18	13	3	**26 dBA**
10	Flue Outlet (Bakery) RSV 315-4-1	OUT	Sound Power		-	71	75	70	73	68	57	52	**79 dB**
			System Losses		-	-1	0	0	0	0	0	0	
			To SPL at 1 m	-8	-	-8	-8	-8	-8	-8	-8	-8	
			Distance & Directivity Correction	33 m, 90°	-	-30	-30	-34	-37	-37	-37	-37	
			SPL at Receiver Position		-	32	37	28	28	23	12	7	**32 dBA**
11	JEHS-0680-B3-M3	BREAKOUT	Sound Power		57	61	63	65	63	63	61	55	**71 dB**
			Sound pressure		-8	-8	-8	-8	-8	-8	-8	-8	
			Distance Correction	21 m	-26	-26	-26	-26	-26	-26	-26	-26	
			SPL at receiver		26	30	32	34	32	32	30	24	**38 dBA**
13	JEHR-0140-B2-M1	BREAKOUT	Sound Power		51	55	57	59	57	57	55	49	**65 dB**
			Sound pressure		-8	-8	-8	-8	-8	-8	-8	-8	
			Distance Correction	21 m	-26	-26	-26	-26	-26	-26	-26	-26	
			SPL at receiver		17	21	23	25	23	23	21	15	**29 dBA**
Daytime Period			**Total SPL at receiver (free field)**		39	43	45	45	45	43	38	38	**50 dBA**
Night-time Period			**Total SPL at receiver (free field)**		38	40	40	35	34	32	30	24	**39 dBA**