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UCA EPSOM
PLANT NOISE ASSESSMENT

Technical Report: R10446-1 Rev 0

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For: Savills
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1.0 INTRODUCTION

- 1.1 24 Acoustics Ltd has been appointed by Savills to undertake an assessment of noise arising from replacement plant at The Wells, on Church Street, Epsom.
- 1.2 This report presents the results of the assessment, following site visits and background noise measurements, undertaken between the 30th January and 2nd February 2024.
- 1.3 All noise levels in this report are presented in dB relative to 20 µPa.

2.0 SITE DESCRIPTION

- 2.1 The site for development is owned by the University for the Creative Arts (UCA). Planning permission has been granted by Epsom and Ewell Borough Council for the change of use of the site from Office (Class E(g)(i)) to Education (Class F1(a)) planning reference 23/00488/FUL). As part of the development, existing rooftop plant is to be replaced, and a noise impact assessment is required to support an application for minor external works at the site.
- 2.2 The site is located at The Wells on Church Street, adjacent to the junction adjoining with Depot Road. It is a mixed-use area, with a number of commercial units surrounding the site, as well as residential properties to the east on Depot Road. Depot Road features residential properties, an Odeon cinema, offices, and a small number of commercial units, and provides access to a public car park.
- 2.3 A site overview is shown in Figure 1.

3.0 CRITERIA

Local Authority

- 3.1 The site falls under the jurisdiction of Epsom and Ewell Borough Council. The council published its Development Management Policies Document [Reference 1] in September 2015, in which Policy DM10 states that development proposals should:

"have regard to the amenities of occupants and neighbours, including in terms of privacy, outlook, sunlight/daylight, and noise and disturbance."

- 3.2 The council's supplementary document 'Revised Sustainable Design Supplementary Planning Document' [Reference 2] states that an acoustic study should be undertaken where there is potential for noise impact.

- 3.3 There are no objective requirements set out by the council in relation to the assessment of plant noise at this development. Replacement of existing plant should not exceed the existing level of the plant to be replaced, considered to be 45 dB L_{Aeq} , at the nearest residential properties. Noise arising from new plant should be controlled to a level 5 dB below prevailing background noise levels.

National Planning Policy Framework & Noise Policy Statement for England

- 3.4 The National Planning Policy Framework (NPPF) [Reference 3] states that planning policies and decisions should aim to:
- 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 quality of life.
 - Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.
- 3.5 The NPPF also refers to the Noise Policy Statement for England (NPSE) [Reference 4] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term 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' which is supported by the following aims.
- Avoid significant adverse impacts on health and quality of life;
 - Mitigate and minimise adverse impacts on health and quality of life.
- 3.6 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'.
- 3.7 The Planning Practice Guidance (PPG) [Reference 5] is written to support the NPPF with more specific planning guidance. The PPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also states that opportunities should be taken, where practicable, to achieve improvements to the acoustic environment. The NPPG states that noise can over-ride other planning concerns but should not be considered in isolation from the other economic, social and environmental dimensions of the proposed development.

- 3.8 The PPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system.

BS 4142: 2014+A1:2019 - Methods for Rating Industrial and Commercial Sound

- 3.9 The documents described above do not refer to specific noise criteria, therefore 24 Acoustics considers that the spirit of the requirements of the NPPF and NPSE will be complied with if criteria from British Standard 4142:2014 [Reference 6] are adopted.
- 3.10 BS 4142: 2014+A1:2019 provides a method for rating the effects of industrial and commercial sound on residential areas. The standard advocates a comparison between the typical measured L_{A90} background noise level and L_{Aeq} noise level from the source being considered. For rating purposes if the noise source is tonal, intermittent or otherwise distinctive in character, a rating correction of up to 15 dBA is applied.
- 3.11 The standard states that a difference between the rating level and the background level of around +10 dBA is an indication of a significant adverse impact, depending on the context and a difference of around +5 dBA is likely to be an indication of an adverse impact again depending on the context. Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact (depending upon the context).

4.0 ENVIRONMENTAL NOISE MEASUREMENTS

Measurement Instrumentation and Procedure

- 4.1 An environmental noise survey was undertaken between the 30th January and 2nd February 2024 in order to determine the typical background noise levels in the area.
- 4.2 The measurement equipment was located externally at the south-eastern boundary of site. The microphone was situated approximately 2.5m above ground floor level in free-field conditions, and is representative of the nearest habitable receptors.
- 4.3 The instrumentation was set up to monitor background noise levels and store data in 5-minute intervals of the overall A-weighted L_{90} using fast time weighting. The following instrumentation was used during the survey:
- Rion NL32 Type 1 sound level meter;
 - Brüel & Kjær type 4231 acoustic calibrator.

- 4.4 Calibration of the equipment was checked before and on completion of the measurements and no drift was recorded. Noise measurements were made in accordance with BS 7445: 1991 'Description and measurement of environmental noise Part 2 – Acquisition of data pertinent to land use' [Reference 7].
- 4.5 Weather conditions during the measurement period were dry, with low wind speeds.
- 4.6 The background noise climate at the measurement location featured noise from construction plant at the site, though only during the daytime. These periods were removed prior to analysis.
- 4.7 The measured background noise levels are summarised in Table 1 and shown graphically in Appendix B. 24 Acoustics' interpretation of the typical background noise level is the average of the range of levels less one standard deviation.

Date	Measured Typical Background Noise Level	
	Daytime (07:00 to 23:00) dB LA90 1 hour	Night-time (23:00 to 07:00) dB LA90 15 min
Tuesday 30 th January	50	49
Wednesday 31 st January	50	49
Thursday 1 st February	50	49
Representative Level	50	49

Table 1 - Measured background noise levels

- 4.8 There are a number of noise sources in the area that contribute to the background noise climate:
- Road traffic noise from Church Street and Depot Road;
 - Existing services plant from the Odeon Cinema (north);
 - Existing services plant from the Kirkgate (19-33 Church Street), located in the enclosed car park to the east of site.

5.0 ASSESSMENT

5.1 The following plant items are proposed:

- Condenser 01 – Daikin REYQ18U
- Condenser 02 – Daikin REYQ24U (REYQ16U + REYQ8U)
- Condenser 03 – Daikin REYQ26U (REYQ14U + REYQ12U)
- AHU Condenser 01 – Daikin RYMQ10U
- AHU Condenser 02 – Daikin RYMQ12U
- AHU – IVProdukt AA-50, 3.7m³/s

5.2 All condenser units will be located on the rooftop of site, surrounded by a parapet. The parapet is 4m in height above the plant area floor level, and is expected to be of minimum 0.5m above the plant units.

5.3 Octave-band sound power levels have been provided by the manufacturer for each condenser unit, and are summarised in Table 2.

Plant Type	Plant Model	Unweighted Sound Power Level (dB) per Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
Condenser 01	Daikin REYQ18U	87	81	79	78	71	71	67	61	79
Condenser 02	Daikin REYQ16U	95	90	85	85	77	75	72	71	85
	Daikin REYQ8U	87	81	79	77	71	68	64	59	78
Condenser 03	Daikin REYQ14U	88	83	80	80	74	70	70	67	81
	Daikin REYQ12U	90	85	83	81	76	75	76	67	81
AHU Condenser 01	Daikin RYMQ10U	87	81	79	78	71	71	67	61	79
AHU Condenser 02	Daikin RYMQ12U	90	84	82	79	76	75	76	68	83

Table 2 - Condensers – manufacturer's sound power level data

5.4 The AHU will be located in a louvred plant room, with intake and exhaust ductwork terminating at louvres in the rooftop plant area described above. The AHU ductwork will feature attenuators near the terminations.

- 5.5 Manufacturer's sound power data has been provided for the AHU, categorised by each component as shown in Table 3:

Unweighted Sound Power Level (dB) per Octave Band Centre Frequency (Hz)										dBA
Unit	Component	63	125	250	500	1k	2k	4k	8k	
IVProdukt AA-50	Intake	67	81	72	66	58	53	43	35	69
	Discharge	72	88	78	80	77	74	71	65	82
	Breakout	71	83	61	55	49	47	44	33	67

Table 3 - AHU – manufacturer's sound power level data

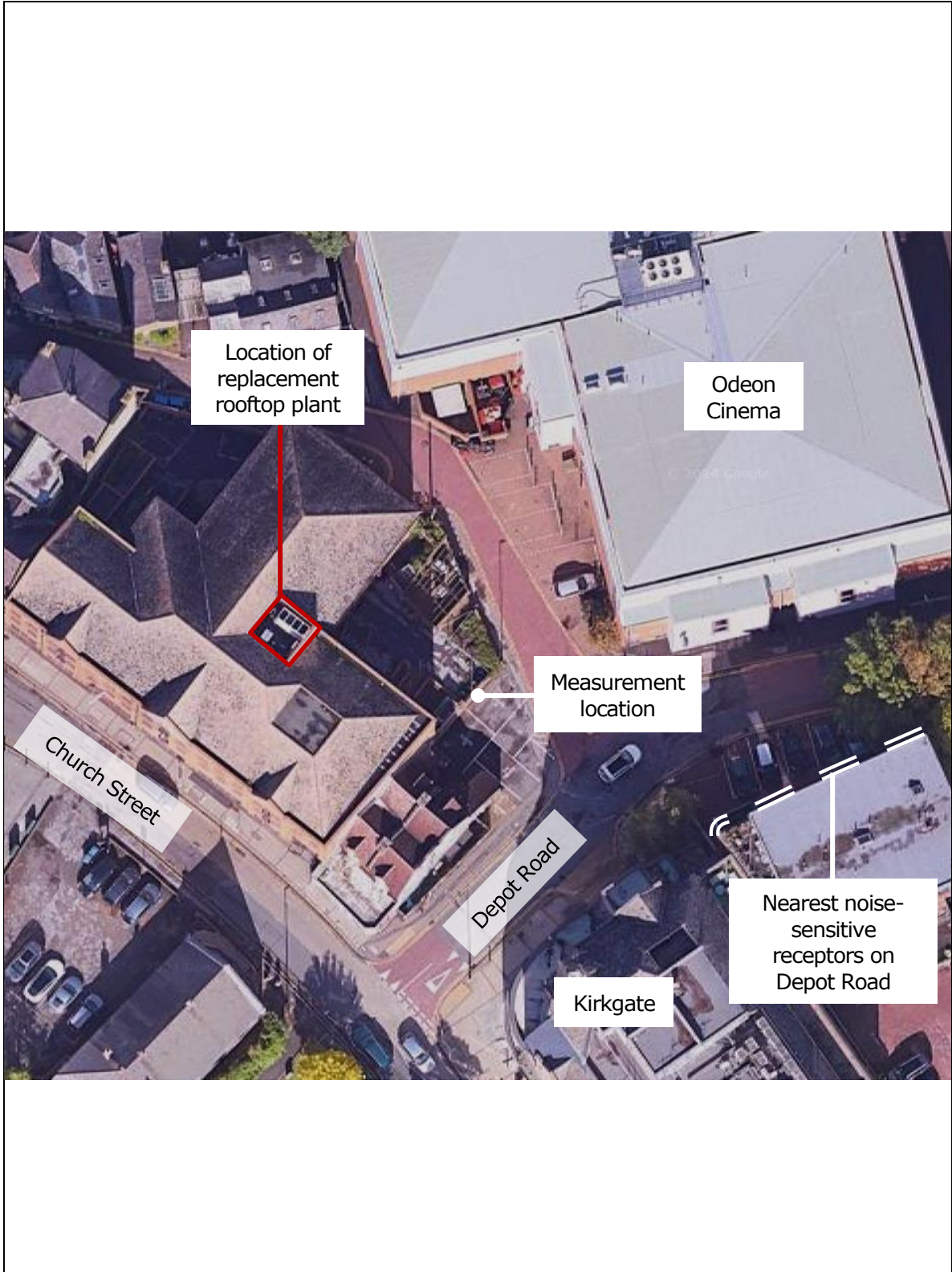
- 5.6 The nearest residential properties are located on Depot Road, with the nearest habitable windows approximately 45m from the proposed plant location.
- 5.7 Calculations have been undertaken, based on the manufacturer's stated plant noise levels, to determine the cumulative level of noise from replacement plant at the nearest residential properties. Calculations include losses for distance, screening, ductwork and directivity, where appropriate. The plant will not contain tonal or otherwise distinctive noise characteristics that are sufficiently perceptible at the nearest residential property.
- 5.8 The resultant plant noise level at the nearest residential property is 44 dB $L_{Aeq, T}$, and hence meets the target criterion of 45 dBA. Additionally, for context, this level is 5 dBA below the night-time background noise level.


6.0 CONCLUSIONS

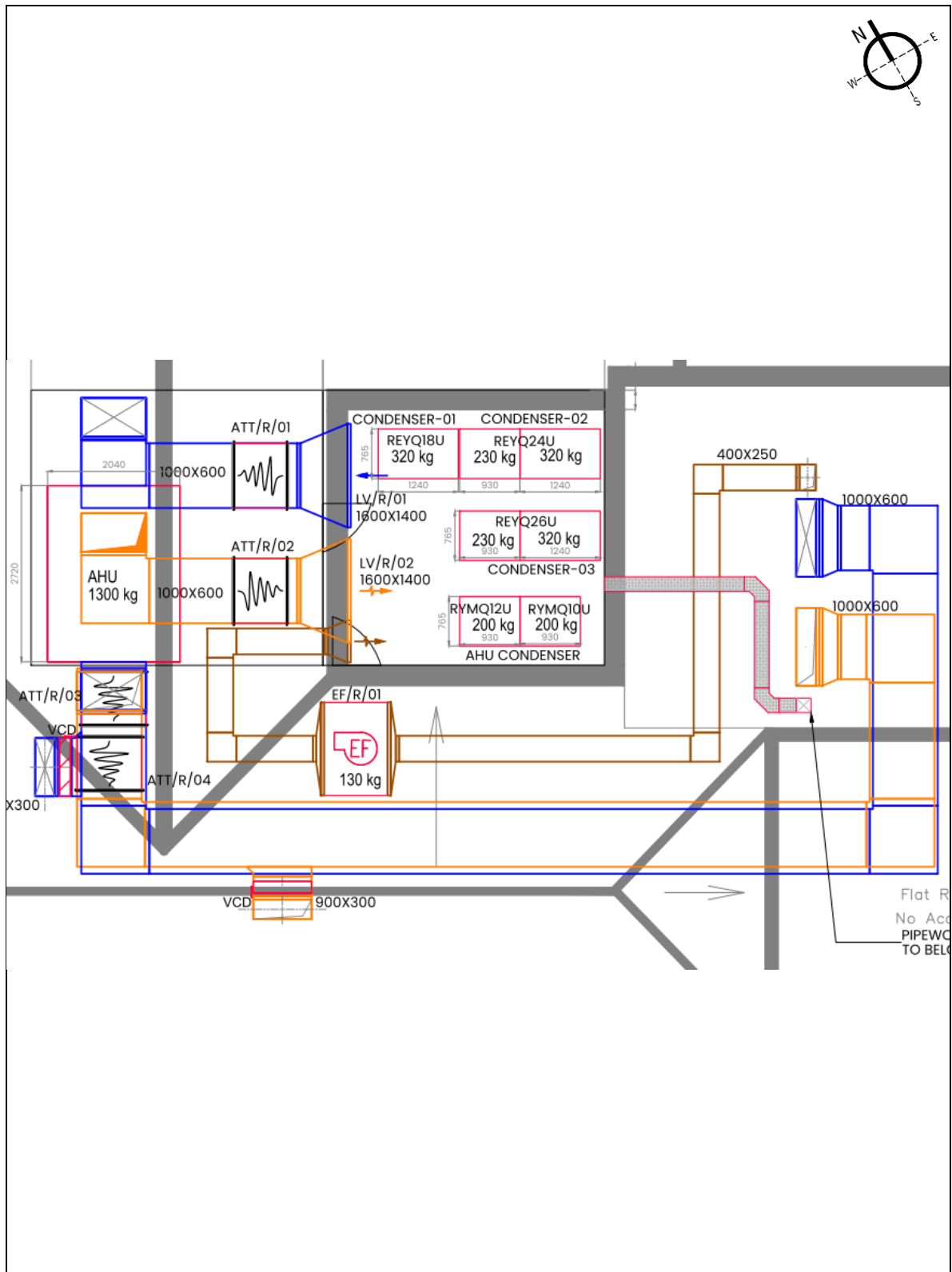
- 6.1 24 Acoustics Ltd has been instructed by Savills to undertake a noise assessment for replacement rooftop plant at the premises of The Wells on Church Street in Epsom.
- 6.2 An environmental noise survey has been undertaken to determine the existing background noise levels representative of nearby residential properties.
- 6.3 Calculations have been undertaken, based on manufacturers' noise data, to determine the plant noise levels at the nearest noise-sensitive receptors.
- 6.4 The assessment demonstrates that noise arising from the proposed plant will be acceptable at all times.


REFERENCES

1. Epsom & Ewell Borough Council. Development Management Policies Document, September 2015.
2. Epsom & Ewell Borough Council. Revised Sustainable Design Supplementary Planning Document, February 2016
3. Department for Levelling Up, Housing & Communities. National Planning Policy Framework, updated December 2023.
4. DEFRA, Noise Policy Statement for England, March 2010.
5. Planning Practice Guidance - Noise, Department of Communities and Local Government, updated July 2019.
6. British Standards Institution. British Standard 4142: Methods for rating and assessing commercial and industrial sound, 2014. BS 4142:2014+A1:2019
7. British Standards Institution. British Standard 7445: 1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use.



Project: UCA Epsom	Title: Site Overview		
DWG No: Figure 1	Scale: N.T.S.	Rev: -	
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Project: UCA Epsom	Title: Proposed Plant Layout		
DWG No: Figure 2	Scale: N.T.S.	Rev: -	
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APPENDIX A – ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dB is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dB corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

- i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

- ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T , has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

- iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

- iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

APPENDIX B: ENVIRONMENTAL NOISE MEASUREMENTS

