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PROPOSED RESIDENTIAL DEVELOPMENT

**LAND ADJACENT TO WOODGATE NURSERIES,
CHICHESTER**

NOISE IMPACT ASSESSMENT

Technical Report: R9249-1 Rev 1

Date: 4th October 2021

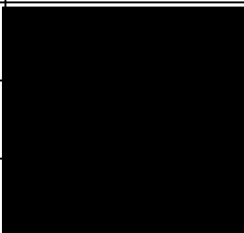
For: Hanbury Properties
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24 Acoustics Document Control Sheet

Project Title: Land Adjacent to Woodgate Nurseries, Woodgate - Noise Impact Assessment

Report Ref: R9249-1 Rev 1

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0	Approved for Issue	Miles Hodge	Chris McConnell	Reuben Peckham
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1.0 INTRODUCTION

- 1.1 24 Acoustics Ltd has been instructed by Hanbury Properties to undertake an environmental noise impact assessment at land to the south-east of Woodgate Nurseries, Woodgate, in connection with a proposed residential development.
- 1.2 Noise arising from traffic on Lidsey Road dominates the ambient noise environment on the site. Accordingly, this noise impact assessment has included:
- Environmental noise monitoring;
 - Consideration of the noise arising from nearby sources affecting the site;
 - Assessment of internal noise levels within the dwellings;
 - Assessment of external noise levels within garden areas.
- 1.3 This report presents the results of the assessment, following site visits and ambient noise surveys undertaken between 17th to 22nd September 2021.
- 1.4 An explanation of acoustical terms used in this report is provided in Appendix A. All sound pressure levels in this report are given in dB re: 20 μ Pa.

2.0 SITE DESCRIPTION

- 2.1 The site is currently farmland with a small track running across the middle to Farrows Barn. The site is bounded by Lidsey Road (A29) to the east and residential properties along the north. To the south is further farmland and to the west is the derelict Woodgate Nurseries. Road traffic from Lidsey Road is the dominant source of ambient noise in the area.
- 2.2 A site location plan is provided in Figure 1.
- 2.3 It is proposed to submit an outline application to redevelop the site for up to 95 dwellings, to be a mix of houses and apartments. The illustrative masterplan layout is shown in Figure 2.

3.0 ASSESSMENT CRITERIA

National Planning Policy Framework and Noise Policy Statement for England

3.1 The National Planning Policy Framework (NPPF) [Reference 1], revised in July 2021, states (paragraph 185) in relation to noise 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 the 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.

3.2 The NPPF also refers to the Noise Policy Statement for England (NPSE) [Reference 2] 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.

3.3 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'. The following guidance is provided within the NPSE:

"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."

- 3.4 The National Planning Practice Guidance (NPPG) [Reference 3], updated in July 2019, is written to support the NPPF with more specific planning guidance. The NPPG 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. 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.
- 3.5 The NPPG 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.
- 3.6 The NPPF, NPSE and NPPG documents do not refer to specific noise criteria. For residential developments 24 Acoustics considers that the spirit of the requirements of the NPPF and NPSE will be complied with if criteria and guidance from British Standard 8233: 2014 are adopted.

BS 8233: 2014

- 3.7 BS 8233:2014 [Reference 4] provides design guidance for dwelling houses, flats and rooms in residential use and recommends that internal noise levels in dwellings do not exceed 35 dB $L_{Aeq,16\text{ hour}}$ in living rooms and bedrooms during the day, 40 dB $L_{Aeq, 16\text{ hour}}$ in dining rooms during the day and 30 dB $L_{Aeq, 8\text{ hour}}$ in bedrooms at night.
- 3.8 The standard states that the above limits apply to steady external noise sources without specific character, and also states the following:
- "Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."*
- 3.9 BS 8233 also notes that "Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{Amax,f_T} depending on the character and number of events per night."

- 3.10 The World Health Organisation (WHO) [Reference 5] provides guidance on desirable internal noise levels to minimise the risk of sleep disturbance. The WHO guidelines suggest internal noise levels not exceeding 30 dB $L_{Aeq,8hr}$ or regularly exceeding 45 dB $L_{Amax,f}$ for 'a good night's sleep'.

Professional Practice Guidance on Planning & Noise (ProPG)

- 3.11 The Professional Practice Guidance on Planning and Noise (ProPG) [Reference 6] was published jointly by the Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health in May 2017. The guidance relates to the consideration of existing sources of transportation noise upon proposed new residential developments.
- 3.12 It is important to note that the guidance in ProPG does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy. It is provided for guidance only and has no formal place within planning legislation.

Local Authority Policy and Consultation

- 3.13 The Arun Local Plan 2011-2031 was adopted in July 2018 [Reference 7]. Policy QE SP1 (Quality of the Environment) refers to noise exposure categories (NECs) for residential developments affected by noise from transportation sources. Policy QE DM1 (Noise Pollution) states that new noise-sensitive development affected by noise from industrial and commercial uses should not normally be permitted where there is a likelihood of complaints.
- 3.14 The Sussex Planning Noise Advice Document [Reference 8] states, that for noise sensitive developments, measures are provided to achieve internal noise levels specified in BS 8233 and WHO Guidance.

Summary of Noise Criteria

- 3.15 The impact of noise upon the site has been assessed using the following methodology:

- BS 8233: 2014 and the WHO Guidelines for recommended internal noise levels, inside the properties. An upper internal daytime level of 35 dB $L_{Aeq, 16 \text{ hour}}$ for bedrooms and living rooms should apply; and a night-time level for bedrooms of 30 dB $L_{Aeq, 8 \text{ hour}}$ should apply. Similarly, a maximum night-time internal level of 45 dB $L_{Amax, \text{fast}}$ should apply in bedrooms for regular events.

3.16 The above criteria are considered to be in line with Arun District Council's Local Plan, Policy QE DM1 and The Sussex Planning Noise Advice Document.

4.0 ENVIRONMENTAL NOISE MEASUREMENTS

4.1 An ambient noise survey was undertaken on site between 17th and 22nd September 2021. The following instrumentation was used during the surveys:

- 2 x Rion Type 1 sound level meters: Type NL-52;
- Brüel and Kjær Class 1 acoustic calibrator: Type 4231.

4.2 The sound level meter was configured to monitor in 5 minute sample periods and was set up to measure and store overall A-weighted and linear octave band statistical parameters including the L_{eq} , L_{90} , and $L_{max,f}$ sound pressure levels. 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 9].

4.3 The equipment was located in free-field conditions at a height of approximately 1.5 m above local grade level and an environmental wind shield was fitted. The two noise monitors were set-up in the following locations as shown in Figure 1:

- Location 1 – In the north west corner of the site.
- Location 2 – To the east of the site, along Lidsey Road.

4.4 Calibration of all instrumentation was checked before and on completion of the measurements and no drift was found. The calibration of all 24 Acoustics' equipment is traceable to National Standards.

4.5 The weather during the survey was mainly fine and dry with wind speeds generally lower than 5 m/s.

Noise Survey Results

- 4.6 The results of the long-term noise measurements at Location 1 are presented graphically in Appendix B and are summarised in Table 1 below.

Date	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)	
	L _{Aeq} , 16 hr	L _{Aeq} , 8 hr	Typical L _{Amax,f}
Friday 17/9/2021	48*	40	57
Saturday 18/9/2021	48	40	58
Sunday 19/9/2021	46	40	56
Monday 20/9/2021	47	43	59
Tuesday 21/9/2021	48	44	59
Wednesday 22/9/2021	49*	-	-
Design Level	47	42	58

Table 1: Location 1 Ambient Noise Survey Results

*partial sample

- 4.7 The results of the long-term noise measurements at Location 2 are presented graphically in Appendix B and are summarised in Table 2.

Date (August 2019)	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)	
	L _{Aeq} , 16 hr	L _{Aeq} , 8 hr	Typical L _{Amax,f}
Friday 17/9/2021	63*	54	75
Saturday 18/9/2021	62	54	75
Sunday 19/9/2021	62	56	75
Monday 20/9/2021	62	56	76
Tuesday 21/9/2021	62	56	75
Wednesday 22/9/2021	63*	-	-
Design Level	62	55	75

Table 2: Location 2 Ambient Noise Survey Results

*partial sample

- 4.8 24 Acoustics determines the typical L_{Amax} to be the 10th highest L_{Amax} level over the measurement period.
- 4.9 Noise from road traffic on Lidsey Road was the primary source of ambient noise at both measurement locations. It was noted that the nursery site to the west is now derelict and no other significant noise sources were observed.

5.0 CALCULATIONS AND NOISE IMPACT ASSESSMENT

- 5.1 The following assessment has been undertaken based on the illustrative masterplan by Davies Landscape Architects (drawing number DLA.2052.L.26.S08 Illustrative Masterplan) provided to 24 Acoustics in September 2021 and is shown in Figure 2. The drawing shows the closest dwellings at approximately 25 m from the centre of Lidsey Road.
- 5.2 As it is proposed to submit an outline planning application, the exact locations / orientations of dwellings, floor layouts and elevations are currently unknown and will be left to reserved matters. The application is supported however by an illustrative masterplan.
- 5.3 The following assessment should therefore be updated during the detailed design stages, once further details are available.
- 5.4 Using the measured noise levels at Location, distance corrections have been applied in order to calculate the ambient noise level from road traffic at the façades of the proposed properties.
- 5.5 A preliminary analysis has been undertaken to determine indicative acoustic requirements for the external façade elements, based on the submitted illustrated masterplan as this is an outline application. Detailed floorplans and elevations will not be available until reserved matters, therefore preliminary calculations are based on typical room sizes, volumes and glazed areas. A room size of 3 m x 3 m x 2.3 m has been assumed, with a glazed window area of 3 m² and a masonry façade construction.
- 5.6 An updated assessment to determine the acoustic requirements of the external façade elements must therefore be undertaken during the detailed design stages, once the final site plans are available.
- 5.7 Based on the corrected noise levels, calculations have been undertaken to determine preliminary acoustic requirements for windows and ventilators, which will ensure that noise levels do not exceed the criteria set out in Section 3. The recommendations should be read alongside the illustrative masterplan (Figure 2) submitted with the application of this report.
- 5.8 Ventilation systems should allow for adequate ventilation to meet background ventilation requirements as per Part F of the Building Regulations [Reference 10].

- 5.9 The calculations have assumed that external wall construction will comprise a cavity masonry construction, which is expected to achieve a minimum sound insulation performance of 52 dB R_w .
- 5.10 The minimum acoustic requirements for the windows and ventilators, for all habitable rooms are summarised in Table 3 below.

Zone	Room	Window Type	Ventilation Type
Zone 1	Bedrooms & Living Rooms	Window Type A	Vent Type A
Zone 2	Bedrooms & Living Rooms	Window Type A	Vent Type B

Table 3: Acoustic Window and Ventilation Requirements

- 5.11 The indicative acoustic performance requirements for the window types are stated below in Table 4.

Window	Minimum SRI (dB) per Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Window Type A	24	20	25	35	38	35

Table 4: Indicative Window Performances

- 5.12 In making a comparison with the values in Table 4, it is important that the window figures used are the result of tests in accordance with ISO 10140, Part 2: 2010 and that the quoted minimum sound reduction specifications are met by the entire window system as a whole, including frames, seals, any insulated panels and not just the glass. The requirements also apply to any external glazed doors to habitable rooms.
- 5.13 The following window configurations, if installed properly, would be capable of achieving the required sound reduction performance:
- Window Type A: 4 mm glass: 12 mm cavity (minimum): 4 mm (31 dB R_w).
- 5.14 The indicative acoustic performance requirements for ventilation types are shown in Table 5.

Ventilation	Minimum $D_{n,ew}$ (dB) per Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Vent Type A	40	36	35	33	37	37
Vent Type B	23	26	29	30	33	33

Table 5: Indicative Ventilator Performance

5.15 The ventilation acoustic specifications in Table 5 relate to the following minimum sound insulation performance ratings:

- Type A: 36 dB $D_{n,e,w,r}$, acoustically attenuated trickle ventilator
- Type B: 32 dB $D_{n,e,w,r}$, standard trickle ventilator

5.16 Alternatively, a whole house MVHR system would also be suitable.

5.17 In making a comparison with the above ventilator specifications, it is important that the figures used are the result of laboratory tests with the vent in the open position. Note that the stated minimum performance value assumes one ventilator per habitable room. The specific ventilation requirements (e.g. equivalent free area etc.) should be confirmed by others.

5.18 The ventilation systems should allow for adequate ventilation to meet background ventilation requirements as per Part F of the Building Regulations.

5.19 The above indicative assessment demonstrates that the internal noise level criteria (outlined in Section 3) would be readily achievable, subject to the appropriate specification and design of the external façade elements. This assessment should be updated during the detailed design stages, once further details are available.

Noise levels in External Amenity Areas

5.20 It is recommended that a close boarded fence, at least 1.8 m high be installed around the gardens facing Lidsey Road. The fence material should comprise timber of minimum mass per unit area 12 kg/m².

5.21 Based on the measured noise levels and the screening provided by the fence, noise levels in gardens on the east of the proposed development would be lower than 55 dB $L_{Aeq,16\text{ hour}}$.

5.22 Based on the above, noise levels in all gardens are considered acceptable.

6.0 CONCLUSIONS

- 6.1 24 Acoustics Ltd has been instructed by Hanbury Properties to undertake a noise impact assessment for proposed redevelopment of land adjacent to Woodgate Nurseries, Chichester for residential use.
- 6.2 The assessment has considered the noise impact upon proposed new residential properties from road traffic using Lidsey Road.
- 6.3 An ambient noise survey has been carried out at the site to determine existing noise levels during daytime and night-time periods.
- 6.4 Recommendations have been provided for acoustically rated windows and ventilation to habitable rooms.
- 6.5 It is concluded that, with mitigation (such as the recommended measures), noise within habitable rooms would comply with internal levels of 35 dB $L_{Aeq, 16hr}$ during the daytime and 30 dB $L_{Aeq, 8hr}$ and 45 dB $L_{Amax, f}$ at night which is in accordance with the Arun District Council Local Plan.
- 6.6 Calculations have been undertaken which show that daytime external noise levels will be lower than 55 $L_{Aeq, 16 \text{ hour}}$, which is considered acceptable.

REFERENCES

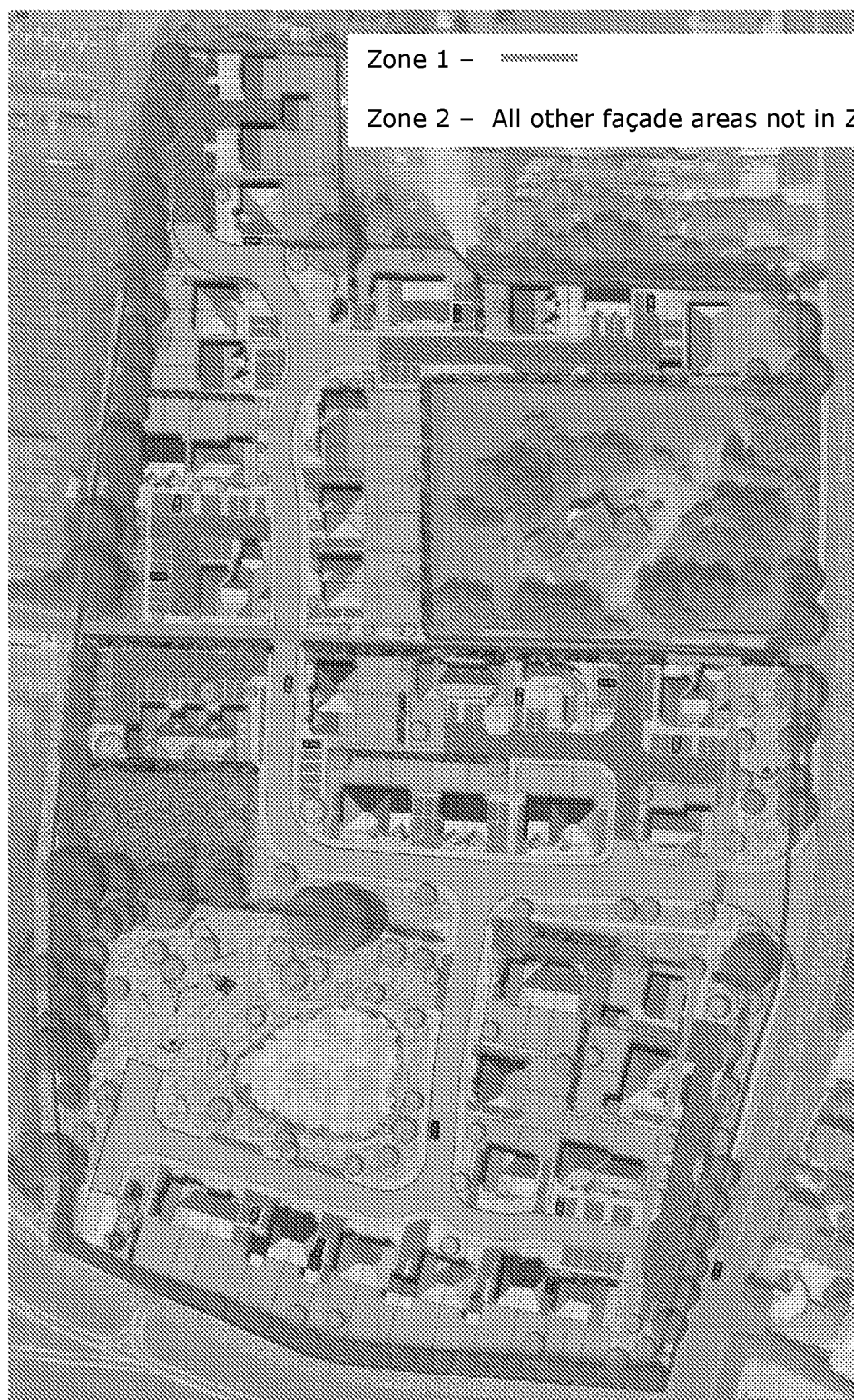
1. Department for Communities and Local Government. The National Planning Policy Framework (NPPF), revised July 2021.
2. DEFRA. Noise Policy Statement for England, 2010.
3. Department of Communities and Local Government. Planning Practice Guidance, revised July 2019.
4. British Standards Institution. British Standard 8233: Guidance on sound insulation and noise reduction for buildings, 2014.
5. World Health Organisation. Guidelines for Community Noise, 2000.
6. ProPG Professional Practice Guidance on Planning and Noise (ProPG), ANC, IOA, CIEH, May 2017.
7. Arun District Council, Adoption Arun Local Plan 2011-2031, July 2018.
8. Sussex Planning Noise Advise Document, 2013.
9. British Standards Institution. BS 7445: 'Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use' 1991.
10. Building Regulations. Approved Document F - Ventilation, 2010.

Measurement Location 1

Measurement Location 2



Project: Land Adjacent to Woodgate Nurseries	Title: Site & Survey Location		
DWG No: Figure 1	Scale: N.T.S.	Rev: 0	
Date: September 2021	Drawn By: MH	Job No: 9249-1	



Project: Land Adjacent to Woodgate Nurseries	Title: Proposed Residential Development Scheme		 24Acoustics
DWG No: Figure 2	Scale: N.T.S.	Rev: 0	
Date: September 2021	Drawn By: MH	Job No: 9249-1	

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 dBA is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dBA. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dBA 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".

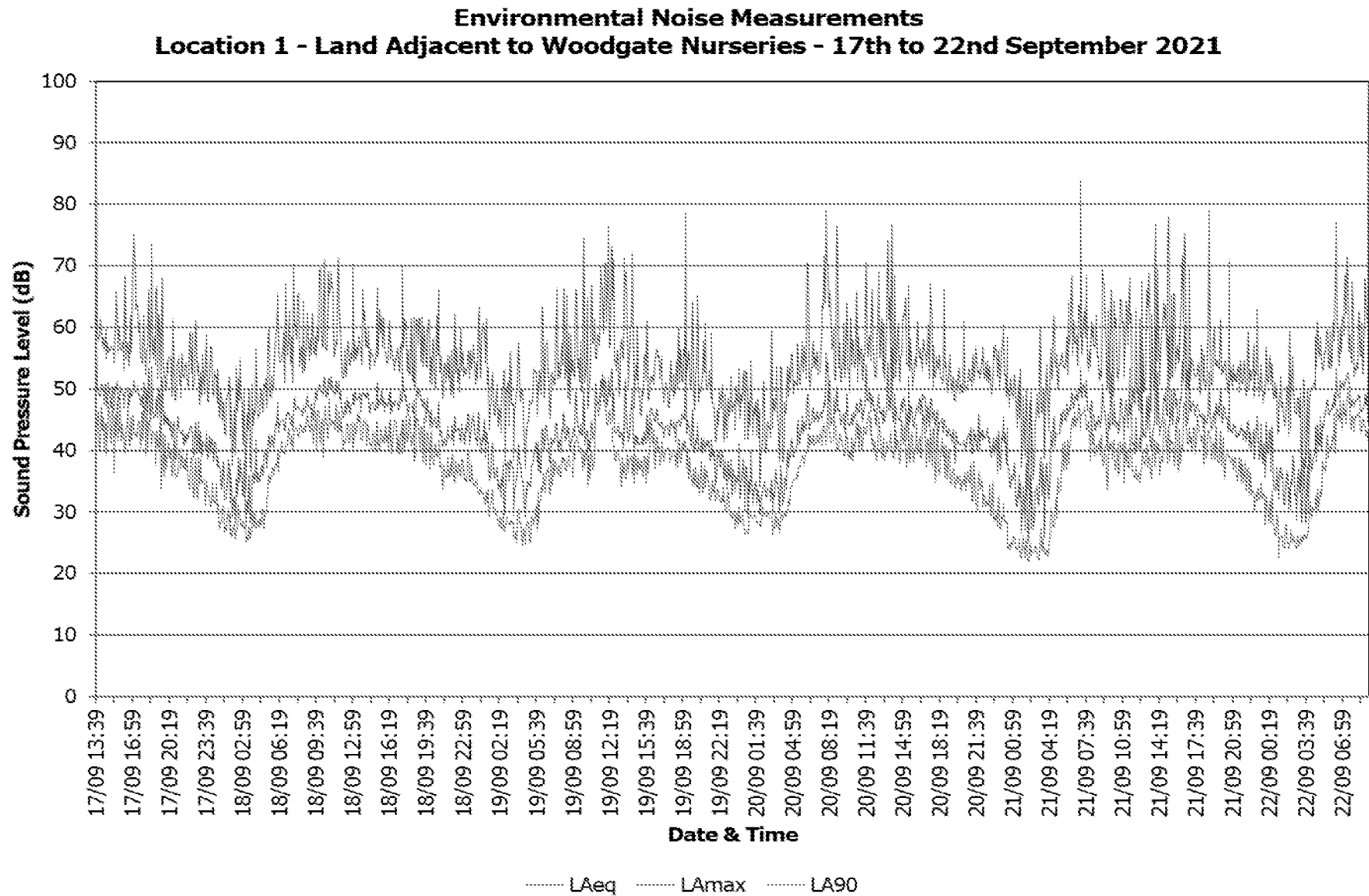
It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

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 SURVEY RESULTS

Environmental Noise Measurements
Location 2 - Land Adjacent to Woodgate Nurseries - 17th to 22nd September 2021

