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**PROPOSED MIXED-USE DEVELOPMENT
21-57 WILLOW WAY, SYDENHAM
NOISE ASSESSMENT**

Technical Report: R9784-1 Rev 1

Date: 16th December 2022

For: Kitewood Estates Ltd
7 Dacre Street
London
SW1H 0DJ

24 Acoustics Document Control Sheet

Project Title: Proposed Mixed-use Development, 24-57 Willow Way, Sydenham - Noise Assessment

Report Ref: R9784-1 Rev 1

Date: 16th December 2022

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CONTENTS		Page
1.0	INTRODUCTION	4
2.0	SITE DESCRIPTION	4
3.0	STANDARDS AND GUIDANCE	5
4.0	ENVIRONMENTAL NOISE SURVEY	9
5.0	MITIGATION MEASURES	11
6.0	CONCLUSIONS	13
	REFERENCES	15
	FIGURES	16
	APPENDIX A – ACOUSTIC TERMINOLOGY	19
	APPENDIX B – ENVIRONMENTAL NOISE MEASUREMENTS	21

1.0 INTRODUCTION

- 1.1 24 Acoustics Ltd has been appointed by Kitewood Estates Ltd ('Kitewood') to undertake a noise impact assessment for a proposed mixed-use development at Willow Way, Sydenham. The proposed scheme comprises the demolition of existing buildings and redevelopment to provide employment floorspace and residential dwellings including affordable housing and amenity spaces.
- 1.2 The primary source of noise affecting the site is road traffic from Willow Way. The site is located in a mixed-use area with some light industry around the site. Accordingly, this noise impact assessment has included:
- Environmental noise monitoring;
 - Consideration of noise arising from road traffic;
 - Assessment of noise levels within the proposed dwellings;
 - Consideration of the noise impact of new commercial uses;
 - Consideration of noise mitigation measures.
- 1.3 This report presents the results of the assessment, following environmental noise measurements undertaken between 30th November to 6th December 2022.
- 1.4 All sound pressure levels quoted in this report are in dB relative to 20 µPa. A glossary of the acoustic terminology used in this report is provided in Appendix A.

2.0 SITE DESCRIPTION

- 2.1 The site is located at Willow Way, Sydenham, London. The surrounding properties are a mix of light industry and residential, with the closest residential receptors on the eastern and northern boundaries of the site.
- 2.2 The existing site comprises three businesses currently operating, including a vehicle repair / garage, storage / warehouse catering business and a drinks machine repair / servicing business. The sites contain a mix of single storey and double storey buildings with areas of hardstanding, parking, yard areas and shipping containers interspersed between the buildings.

2.3 The proposed development will comprise the demolition of the existing buildings and construction of a new mixed used development, comprising three commercial units on the ground floor and four floors of residential properties above, with a car park and amenity area on the east side of the proposed building and in the roof terraces. The existing site location is shown in Figure 1. Proposed ground floor and first floor layouts are shown in Figure 2 and 3.

2.4 The commercial ground floor will be used for Class E (g) as described below:

Class E(g) uses which can be carried out in a residential area without detriment to its amenity:

- E(g)(i) Offices to carry out any operational or administrative functions
- E(g)(ii) Research and development of products or processes
- E(g)(iii) Industrial processes

3.0 STANDARDS AND GUIDANCE

National Planning Policy Framework and Noise Policy Statement for England

3.1 The National Planning Policy Framework (NPPF) [Reference 1] states that planning policies and decisions should ensure that new development is appropriate for its location taking into account the likely 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 (paragraph 185):

- 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

3.2 The NPPF states that where the operation of an existing business could have a significant adverse effect on new development in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed. Paragraph 182 states:

"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."

- 3.3 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
 - Where possible, contribute to the improvement of health and quality of life
- 3.4 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'.
- 3.5 The Planning Practice Guidance (PPG) [Reference 3] was 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 PPG 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.
- 3.6 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.
- 3.7 The PPG also expands on the 'agent of change' principle and provides guidance on how the risk of conflict between new development and existing businesses can be addressed, including where mitigation is required.

3.8 None of the documents referred to above provide specific noise criteria. The following guidance documents are considered appropriate (technically and objectively) to assess noise impact on the proposed development.

Professional Practice Guidance on Planning & Noise (ProPG)

3.9 The Professional Practice Guidance on Planning and Noise (ProPG) [Reference 4] 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 development and strives to:

- Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- Encourage the process of good acoustic design in and around new residential developments;
- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- Improve understanding of how to determine the extent of potential noise impact and effect; and
- Assist the delivery of sustainable development.

3.10 The guidance describes a recommended approach for new residential development, which includes four key elements of the assessment process, identified below:

- i) Good acoustic design process;
- ii) Internal noise level guidelines;
- iii) External amenity area noise assessment;
- iv) Assessment of other relevant issues.

3.11 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.

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

3.12 BS 4142:2014+A1:2019 [Reference 5] provides a method for rating the effects of industrial and commercial sound on residential areas.

- 3.13 The standard advocates a comparison between the representative measured LA90 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 should be applied.
- 3.14 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, also 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).
- 3.15 BS 4142 requires the noise impact to be assessed depending on the context. In relation to situations where background noise levels are low, the standard states "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".

BS 8233:2014 and World Health Organisation Criteria

- 3.16 BS 8233:2014 [Reference 6] 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. These are considered suitable for general environmental noise sources.
- 3.17 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."*
- 3.18 BS 8233:2014 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 $L_{Amax,F}$, depending on the character and number of events per night."

- 3.19 Although the guidelines have no formal standing, the World Health Organisation (WHO) [Reference 7] provides guidance on desirable internal noise levels to minimise the risk of sleep disturbance. The WHO 2000 guidelines suggest internal night-time noise levels not exceeding 30 dB $L_{Aeq, 8 \text{ hour}}$ or regularly (10 – 15 times per night) exceeding 45 dB $L_{Amax, f}$ for 'a good night's sleep'.

Summary of Criteria

- 3.20 The impact of noise from existing sources upon the new dwellings has been assessed using the following criteria from BS 8233 and WHO Guidelines:
- Not to exceed 35 dB $L_{Aeq, 16hr}$ in living rooms and bedrooms during the daytime (07:00 to 23:00 hours)
 - Not to exceed 30 dB $L_{Aeq, 15min}$ in bedrooms at night (23:00 to 07:00 hours)
 - Not to regularly exceed 45 dB $L_{Amax, fast}$ in bedrooms at night (23:00 to 07:00 hours)
- 3.21 Noise from commercial sources associated with the scheme has been assessed in accordance with the methodology in BS 4142: 2014.

4.0 ENVIRONMENTAL NOISE SURVEY

- 4.1 Environmental noise measurements were undertaken at the site between 30th November to 6th December 2022 to determine the prevailing noise levels around the site. Measurements were undertaken using the following equipment:

- | | |
|------------------------------------|------------|
| • Rion precision sound level meter | Type NL-52 |
| • Rion precision sound level meter | Type NL-32 |
| • Brüel & Kjær acoustic calibrator | Type 4231 |

- 4.2 The equipment was located at the following key locations:

- Location 1 – West boundary of the site facing Willow Way Road at a height of 2 m above local ground level.
- Location 2 – East boundary of the site facing the closest residential receptor at a height of 2 m above local ground level.

- 4.3 Noise measurements were undertaken in samples of 5 minutes in terms of the octave-band and free-field A-weighted L_{eq} , L_{90} and $L_{max,f}$ parameters. 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 8].
- 4.4 The instrument calibration was verified before and after the survey in accordance with the manufacturer's instructions and no variation in calibration level was recorded. Calibration of 24 Acoustics' equipment is traceable to National Standards.
- 4.5 All instrumentation was fitted with environmental weather shields during the survey. Weather conditions throughout the survey were suitable, being dry with light wind speeds below 5 m/s.

Noise Measurements

- 4.6 The results of the ambient noise surveys are shown graphically in Appendix B and summarised in Tables 1 and 2, for locations 1 and 2 respectively.

Date	Daytime Level (07:00 - 23:00), dB	Night Time Level (23:00 - 07:00), dB	
	$L_{Aeq, 16\text{ hour}}$	$L_{Aeq, 8\text{ hour}}$	Typical $L_{Amax, f}$
Wednesday 30/11/2022	58	50	70
Thursday 1/12/2022	59	49	70
Friday 2/12/2022	60	51	71
Saturday 3/12/2022	57	50	71
Sunday 4/12/2022	56	50	72
Monday 5/12/2022	59	47	67
Tuesday 6/12/2022	61	-	-
Representative	59	49	70

Table 1 - Measured Noise Levels at Location 1 – Overlooking High Street

Date	Daytime Level (07:00 - 23:00), dB	Night Time Level (23:00 - 07:00), dB	
	L _{Aeq} , 16 hour	L _{Aeq} , 8 hour	Typical L _{Amax} , f
Wednesday 30/11/2022	49	44	58
Thursday 1/12/2022	51	39	56
Friday 2/12/2022	49	45	62
Saturday 3/12/2022	47	37	53
Sunday 4/12/2022	45	40	56
Monday 5/12/2022	50	39	55
Tuesday 6/12/2022	53	-	-
Representative	49	41	57

Table 2 - Measured Noise Levels at Location 2 – Overlooking the Eastern Boundary

- 4.7 24 Acoustics determines the typical night-time maximum noise event to be the tenth highest value during the measurement period (23:00 – 07:00).
- 4.8 The measured typical background noise levels at Location 2, representative of the existing noise sensitive properties to the east of the site, were in the order of 37 dB L_{A90,5min} during daytime periods (07:00 – 23:00) and 29 dB L_{A90,5min} during the night (23:00 to 07:00 hours).
- 4.9 The prevailing noise levels were determined by local road traffic using Willow Way at both measurement locations.

5.0 MITIGATION MEASURES

- 5.1 Calculations have been undertaken to determine the acoustic requirements for glazing to the proposed apartments, which will ensure that the internal noise levels meet the criteria described in Section 3. The calculations are based on the floorplans by DC Architecture+Design provided to 24 Acoustics in December 2022.

Glazing

- 5.2 The required sound insulation performance for the glazing is described in Table 3.

Glazed Elements	Minimum Octave (Hz) Band Sound Reduction Index, dB					
	125	250	500	1k	2k	4k
	21	20	25	35	37	31

Table 3 - Glazing Sound Insulation Specification – All habitable rooms

- 5.3 In making a comparison with the values in Table 3, it is important that the glazing figures used are the result of tests in accordance with ISO 10140, Part 2: 2010. The quoted minimum sound reduction specifications must be achieved by the entire glazing system as a whole, including frames, seals, any insulated panels and not just the glass. The requirements also apply to external doors.
- 5.4 For order to assist with the selection process, a standard double glazed unit (e.g. 4mm glass / 12mm cavity / 4mm glass in a suitable frame), minimum overall performance 31 dB R_w , would be capable of achieving the required sound reduction performances in Table 3.

Ventilation

- 5.5 It is understood that mechanical ventilation (MVHR) is to be provided to all habitable rooms with no trickle ventilators or passive ventilation openings in the façades.
- 5.6 Ventilation systems should allow for adequate ventilation to meet background ventilation requirements as per Part F of the Building Regulations [Reference 9].

Non-Glazed Elements

- 5.7 The external walls to apartments will be designed to achieve a minimum sound insulation performance of 52 dB R_w .

External Amenity Areas

- 5.8 External communal amenity spaces are proposed on the east side of the new building at ground floor level and in three roof terrace areas on the fourth floor. The noise measurement results indicate that external noise levels within all the communal amenity spaces would be comfortably below 55 dB $L_{Aeq, 16 \text{ hour}}$ and therefore acceptable.

New Plant Noise Criteria

- 5.9 The new commercial uses are likely to include new building services plant.
- 5.10 The cumulative noise from all new plant associated with the development should have a maximum rating noise level of 5 dBA below the background noise levels, in accordance with Lewisham council's standard criteria, when assessed at the nearest sensitive property in accordance with BS 4142:2014.
- 5.11 The daytime and night-time plant noise level criteria, for new plant associated with the development, are shown in Table 5 below.

Period	Maximum Rating Noise Level (dB)
Daytime (07:00 to 23:00)	32 dB $L_{Aeq, 1 \text{ hour}}$
Night-time (23:00 to 07:00)	24 dB $L_{Aeq, 15 \text{ min}}$

Table 4 - Plant noise level criteria

- 5.12 The plant noise level criteria shown in Table 5 are to be achieved at the nearest noise sensitive properties to the site, namely the residential properties to the north and west. It is noted that the properties to the north have no windows directly overlooking the proposed site.
- 5.13 The noise levels in Table 5 apply to the cumulative noise level from all new plant associated with the development. Plant noise levels shall be assessed in accordance with BS 4142: 2014.

Separating Elements between Commercial and Residential

- 5.14 It is recommended that the sound insulation of party walls and party floors separating residential properties from the ground floor commercial units be enhanced above the minimum requirement of Part E of the Building Regulations [Reference 10]. These party walls and floors should be specified and built to achieve a minimum sound insulation performance of 55 dB $D_{nT,w} + C_{tr}$, i.e 10 dB above the minimum Part E requirements.

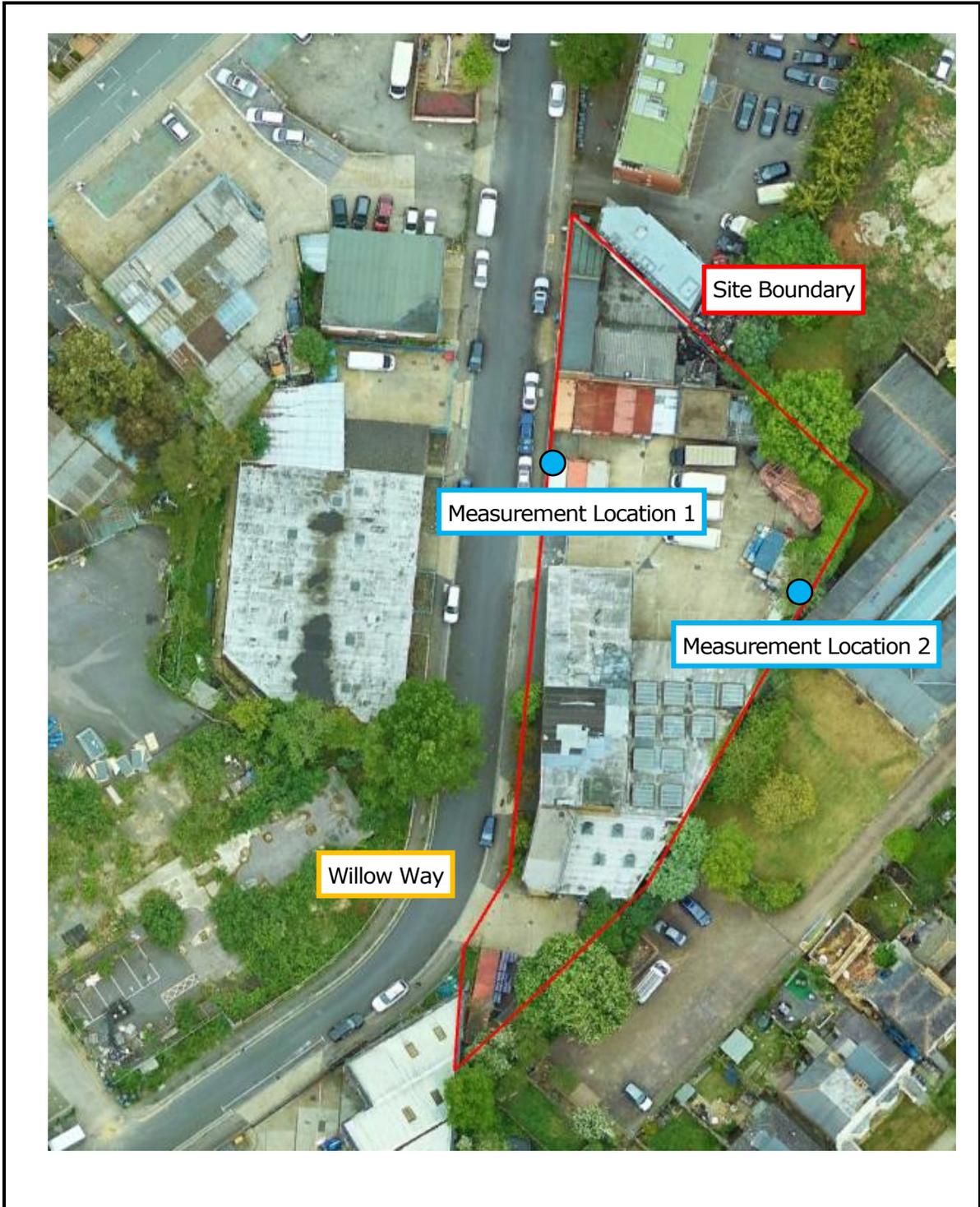
6.0 CONCLUSIONS

- 6.1 24 Acoustics Ltd has been appointed by Kitewood Estates Ltd to undertake a noise impact assessment for a proposed mixed-use development at Willow Way, Sydenham. It is proposed the demolition of existing buildings and redevelopment to provide employment floorspace and residential dwellings including affordable housing and amenity spaces.
- 6.2 Environmental noise measurements have been undertaken at the site to determine existing noise levels during daytime and night-time periods.
- 6.3 Calculations have been undertaken to determine the acoustic requirements for the glazing and ventilation to the proposed apartments. Specifications have been provided for the external façade elements, in order to achieve suitable internal noise levels in line with British Standard 8233 and WHO Guidelines.
- 6.4 Noise levels in external amenity areas will be within the constraints identified in BS 8233.

- 6.5 On the above basis, it is considered that an appropriate acoustic environment can be provided to the proposed residential properties, both externally and internally, and there is considered no reason, on noise grounds, why planning consent should be refused.
- 6.6 Limiting criteria for the new commercial units has been established, in terms of noise from new building services plant in line with BS 4142 and the sound insulation performance of separating floors and walls between commercial and residential uses.

REFERENCES

1. Department for Communities and Local Government. National Planning Policy Framework, 2021.
2. DEFRA. Noise Policy Statement for England, 2010.
3. Department of Communities and Local Government. Planning Practice Guidance, July 2019
4. 2014. ProPG Professional Practice Guidance on Planning and Noise (ProPG), ANC, IOA, CIEH, May 2017.
5. British Standards Institution. British Standard 4142: Methods for Rating Industrial and Commercial Sound, 2014+A1:2019.
6. British Standards Institution. British Standard 8233: Guidance on sound insulation and noise reduction for buildings, 2014.
7. World Health Organisation. Guidelines for Community Noise, 2000.
8. British Standards Institution. BS 7445: 'Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use' 1991.
9. Building Regulations. Approved Document F - Ventilation, 2021 edition.
10. Building Regulations. Approved Document E – Resistance to the Passage of Sound, 2010.



Project: Willow Way, Sydenham	Title: Site Overview and Measurement Locations		
DWG No: Figure 1	Scale: N.T.S.	Rev: 1	
Date: December 2022	Drawn By: AP	Job No: 9784	



<p>Project: Willow Way, Sydenham</p>	<p>Title: Proposed Ground floor layout - Commercial</p>		 <p>24Acoustics</p>
<p>DWG No: Figure 2</p>	<p>Scale: N.T.S.</p>	<p>Rev: 1</p>	
<p>Date: December 2022</p>	<p>Drawn By: AP</p>	<p>Job No: 9784</p>	



Project: Willow Way, Sydenham	Title: Proposed Residential floor layout		
DWG No: Figure 3	Scale: N.T.S.	Rev: 1	
Date: December 2022	Drawn By: AP	Job No: 9784	

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.

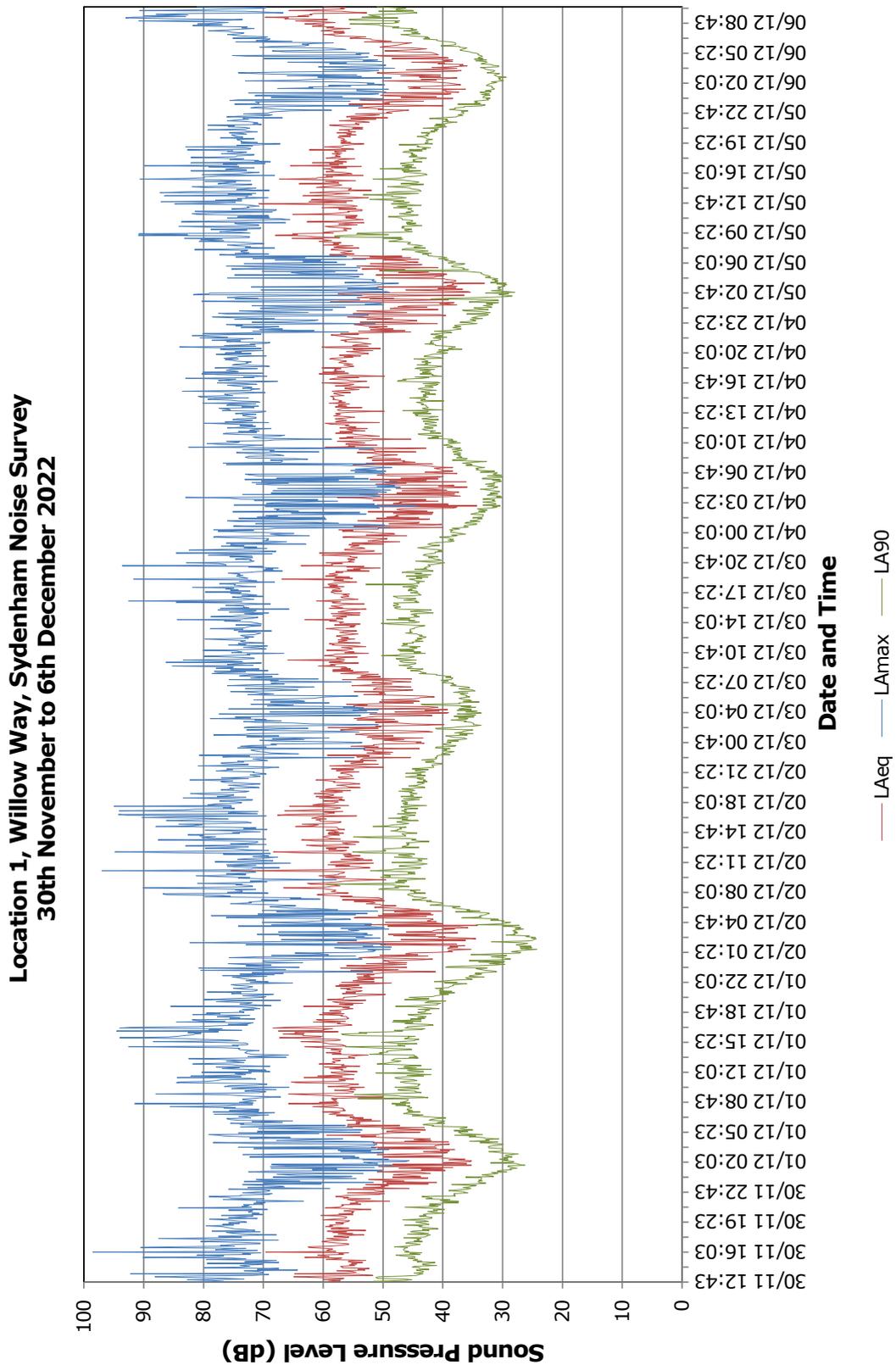
iii) The L_{A10} noise level

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



**Location 2, Willow Way, Sydenham Noise Survey
30th November to 6th December 2022**

