
44-46 The Grove, Gravesend Kent, DA12 1DF

Noise Impact Assessment Report
26800.NIA.03

Substantia Group Ltd.

Report26800.NIA.03		
Revision History		
Revision	Written by	Checked by
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1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by Substantia Group Ltd to assess the acoustic suitability of the proposed lower ground floor residential scheme at 44-46 The Grove, Gravesend, Kent DA12 1DF.

This application seeks full planning permission for the creation of five (5) lower ground floor residential units (comprising four studio apartments and one 1-bedroom flat).

The purpose of this report is to:

- Validate and reuse background and ambient noise data obtained during previous site monitoring (Ref: 26800.NIA.02).
- Specify the acoustic performance requirements for windows and trickle ventilators to achieve the BS 8233:2014 internal noise criteria based on the measured external noise levels.
- Provide acoustic specifications for the glazed building fabric and background ventilation to ensure appropriate internal noise levels within the proposed dwellings.

2.0 SITE SURVEYS

2.1 Site Description

The site is bounded by residential properties and Edwin Street to the west and north, commercial premises to the south, and The Grove to the east. Entrance to the site is provided via Edwin Street. The prevailing noise climate in the vicinity is dominated by road traffic noise from surrounding local roads.

The proposed site plan is enclosed within Appendix B.

2.2 Re-Validation of Environmental Noise Data

An automated environmental noise survey was previously undertaken at the site between 13 October 2024 and 18 October 2024 (Report Ref: 26800.NIA.02).

Substantia Group has confirmed that there have been no material changes to the local road network, traffic composition or surrounding land uses since the original assessment in October 2024. Therefore, in accordance with standard acoustic practice, the existing environmental noise data remains valid and representative of the current noise climate.

2.3 Measurement Positions

Noise levels were continuously logged at the representative external boundary locations described in Table 2.1 and shown on the site plan in Appendix B.

Position	Location Description
1	The microphone was installed on a boom extended from a window on the first floor of the building overlooking the Grove. The microphone was located within 3.5 metres of the nearest façade and therefore includes local reflections.
2	The microphone was installed on a tripod on a ground floor roof terrace on the west elevation of the building. The microphone was located within 3.5 metres of the nearest façade and therefore includes local reflections.

Table 2.1 Measurement positions and descriptions

2.4 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used is described within Table 2.2.

Measurement instrumentation		Serial no.	Date	Cert no.
Noise Kit 26	NTI Audio XL2 Class 1 Sound Level Meter	A2A-21130-E0	23/07/2024	TCRT24/1572
	Free-field microphone NTI Acoustics MC230A	A25902		
	Preamp NTI Acoustics MA220	5522		
	NTI Audio External Weatherproof Shroud	-	-	-
Noise Kit 27	NTI Audio XL2 Class 1 Sound Level Meter	A2A-21174-E0	23/07/2024	TCRT24/1570
	Free-field microphone NTI Acoustics MC230A	A23366		
	Preamp NTI Acoustics MA220	11034		
	NTI Audio External Weatherproof Shroud	-	-	-
B&K Type 4231 Class 1 Calibrator		2147411	14/06/2024	UKAS24/06438

Table 2.2 Measurement instrumentation

3.0 RESULTS

The $L_{Aeq,5min}$, $L_{Amax,5min}$ and $L_{A90,5min}$ acoustic parameters were measured throughout the duration of the survey. Measured levels are shown as time histories in Figures 26800.TH1–2.

The measured noise levels, as shown in Table 3.1, are considered representative of the noise exposure levels expected to be experienced all facades of the proposed development.

Time Period	Measured Ambient Noise Levels, dBA $L_{eq,T}$		10 th Highest Measured Maximum Night-Time Noise Levels, dBA L_{max}	
	Position 1	Position 2	Position 1	Position 2
Daytime $L_{Aeq,16hour}$	55	50	-	-
Night-time $L_{Aeq,8hour}$	51	46	73	67

Table 3.1 Site average noise levels for daytime and night time

4.0 NOISE ASSESSMENT GUIDANCE

4.1 National Planning Policy Framework 2024 & Noise Policy Statement for England 2010

The National Planning Policy Framework (NPPF), published in December 2024, requires development to avoid unacceptable noise exposure. Paragraphs 187 and 198 require significant adverse effects on health and quality of life to be avoided and other adverse effects to be mitigated and minimised.

The Noise Policy Statement for England (NPSE), published by DEFRA in March 2010, supports these aims and defines the following effect levels:

- NOEL: No detectable effect.
- LOAEL: Adverse effects become detectable.
- SOAEL: Significant adverse effects occur.

No universal noise levels are assigned to these categories, as the significance of an effect depends on its source and context.

4.2 Planning Practice Guidance – Noise (PPG-N)

Planning Practice Guidance – Noise was published in March 2014 and revised in July 2019. It advises how noise should be considered through the planning process and applies the observed effect levels established by the NPSE to assess potential effects on health and quality of life.

4.3 ProPG: Planning and Noise

ProPG: Planning and Noise was published in May 2017. It provides good-practice guidance for protecting new residential development from noise through appropriate site layout, building orientation, façade design and ventilation.

ProPG is not a government code of practice and does not replace legislation or national planning policy. However, it provides a recognised framework for assessing the acoustic suitability of residential development.

4.4 British Standard BS 8233:2014

BS 8233:2014 ‘Sound insulation and noise reduction for buildings’ describes recommended internal noise levels for residential spaces. These levels are shown in Table 4.1.

Activity	Location	Internal Ambient Noise Level Limit (dBA $L_{eq,T}$)	
		07:00 to 23:00	23:00 to 07:00
Resting	Living Rooms	35	-
Dining	Dining Room/area	40	-
Sleeping (daytime resting)	Bedrooms	35	30

Table 4.1 BS8233 recommended internal background noise levels

It should be noted that the recommended internal noise levels outlined above are not applicable under “purge ventilation” conditions as defined by Approved Document F of the Building Regulations, as this should only occur occasionally (e.g. to remove odour from painting or burnt food). However, the levels above should be achieved whilst providing sufficient background ventilation, either via passive or mechanical methods.

The external building fabric would need to be carefully designed to achieve these recommended internal levels.

4.5 WHO Guidelines for Community Noise (1999) & Night Noise Guidelines for Europe (2009)

WHO Guidelines for Community Noise (1999) recommend that internal noise levels for individual events should not exceed 45dB L_{Amax} more than 10–15No. times per night.

WHO Night Noise Guidelines for Europe (2009) presents guidelines for noise levels outside dwellings and discusses the relationship between these and the criteria for internal noise presented in Guidelines for Community Noise. The document states that the two should be considered complimentary and that the 1999 guidelines should be considered valid to achieve the 2009 guidelines.

4.6 Approved Document O (ed. 2021)

Approved Document O (ADO) supports Part O of Schedule 1 to the Building Regulations 2010. ADO introduces requirements for residential premises in order to prevent overheating from occurring.

Where windows are used for overheating control, bedroom noise levels should not exceed:

- 40 dBA $L_{eq,8hr}$; or
- 55 dBA L_{Fmax} more than 10 times per night.

Where exceeded, the overheating specialist should develop an alternative strategy.

Exceedance of these criteria does not prevent windows from being openable; it means they cannot be relied upon as the primary means of overheating control.

5.0 EXTERNAL BUILDING FABRIC SPECIFICATION

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed and non-glazed elements in order to achieve the recommended internal noise levels shown in Table 4.1, taking into account average and maximum noise levels monitored during the environmental noise survey.

5.1 Assessment Methodology & Worst-Case Room Parameters

To establish a robust acoustic specification for the lower ground floor units, sound insulation calculations were performed in accordance with BS EN 8233:2014.

The calculation uses the most onerous (worst-case) room configuration from the proposed drawings (enclosed within Appendix C):

- Room Floor Area: 39.0m²
- Room Depth: ~4.8m
- Room Width: ~6.5m
- Room Height: ~2.5m
- Glazing Area: ~4.4m x 2.1m (sliding door) and ~1.6m x 2.1m (glazed panel) (representing high glazing-to-façade ratio).

The windows and sliding doors face the rear (west) of the site. The assessment therefore uses the environmental noise levels measured at Position 2, which are representative of this façade.

5.2 Non-Glazed Elements

It is currently understood that the non-glazed building façade is comprised of the elements as shown within Table 5.1 based on the construction detail provided. The anticipated sound reduction index has been calculated and would be expected to provide the minimum figures shown in the following table when tested in accordance with the BS EN ISO 10140 series of standards.

Element	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Concrete frame 100mm External leaf of brickwork infill 50mm Cavity wall insulation 100mm Internal skin of blockwork / SFS frame	27	38	45	49	50	50

Table 5.1 Assumed sound reduction performance for non-glazed elements

5.3 Glazed Elements

The minimum acoustic performance requirements for the complete window system, including glazing, frames, seals and installation, are presented in Table 5.2.

Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)						$R_w(C;C_{tr})$, dB	Example Glazing Type*
125	250	500	1k	2k	4k		
24	20	25	35	38	35	31 (-1; -4)	4/12/4mm
* The example glazing is indicative only. Alternative systems may be used where independent laboratory test data, obtained in accordance with the BS EN ISO 10140 series, demonstrates that the complete window system meets or exceeds the specified performance in every octave band. Glass-only performance data is not sufficient. Note: The specified performance applies to the complete window system, including glazing, frames, seals and installation details. Performance data for the glass alone is not sufficient to demonstrate compliance.							

Table 5.2 Required glazing performance

6.0 VENTILATION AND OVERHEATING RELIEF

6.1 Ventilation Strategy

Approved Document F (ADF) 2021 outlines the standard ventilation system types suitable for background and extract ventilation in residential developments. These are summarized in the following below:

Ventilation System Type	Whole Dwelling Ventilation	Extract Ventilation
Natural Ventilation	Trickle ventilators	Intermittent extract fans
Continuous Mechanical Extract Ventilation (MEV)	Continuous mechanical extract (low rate) and trickle vents for supply	Continuous mechanical extract (high rate) with trickle vents providing inlet air
Mechanical Ventilation with Heat Recovery (MVHR)	Continuous mechanical supply and extract (low rate)	Continuous mechanical supply and extract (high rate)

Table 6.1 Ventilation system types as described in ADF 2021

Based on the environmental noise survey results, the acoustic suitability of each ventilation system type and the corresponding performance requirement for background trickle ventilation are detailed in Table 6.2 below.

ADF Ventilation Type	Suitable?	Minimum Trickle Ventilator Performance (dB $D_{n,e,w}$)
Natural Ventilation	Yes	35
Continuous Mechanical Extract (MEV)	Yes	35
Mechanical Ventilation with Heat Recovery (MVHR)	Yes	N/A
Note: Where trickle ventilators are incorporated into window frames or building fabric (Natural or MEV systems), they must achieve a minimum acoustic attenuation of 35dB $D_{n,e,w}$ in the open position to preserve internal target noise levels.		

Table 6.2 Suitability and required performance of ventilation systems

For our assessment of trickle ventilator performance, we have assumed up to two (2No.) vents are proposed in each of the basement studios/flat. As trickle vents introduce a weak point in the building façade, increasing the number of trickle vents will reduce the composite performance of the facade. If trickle vents are proposed, the total number of trickle vents for each sensitive space should be confirmed so that calculations can be accurately revised.

Where mechanical ventilation is proposed, systems should be designed so that the combined internal noise levels from external sources and from the mechanical ventilation meet the BS 8233: 2014 criteria shown in Table 4.1.

In all cases, purge ventilation would be provided by openable windows. As outlined in Section 4.4, the internal noise level requirement would not be applicable during purge conditions as this would only occur occasionally.

6.2 Openable Windows for Overheating Relief

Table 6.3 presents the maximum openable window area that may be used for overheating relief while satisfying the Approved Document O noise criteria.

Parameter	Limit
Maximum Free Acoustic Area (as a % of total floor area)	3%

Table 6.3 Window open areas

Note: Acoustic open area is the measurable, cross-sectional, geometric area of an opening. For a partially open window, this is considered to be the lesser of either the size of the hole in the window frame that is left by the opening light, or the combined cross-sectional area around the opening light through which air must pass to move from outside to inside. The area around a hinged opening light includes the triangular areas on the sides adjacent to the hinge, and the rectangular area on the side opposite the hinge. This should not be used for comparing the air-flow performance of elements because this will also be dependent on factors such as depth (length of air-path), surface roughness and tortuosity.

The overheating specialist should confirm whether an open area of 3% is sufficient to provide the required overheating relief. Where an open area of 3% is insufficient to provide the required overheating relief, the overheating specialist should develop an alternative strategy that does not rely on open windows. Windows may remain openable for purge ventilation or occupant use.

The overheating strategy should be developed by the overheating specialist. KP Acoustics can review the acoustic implications of the proposed solution, where required.

7.0 CONCLUSION

A noise impact assessment has been undertaken for the proposed five lower ground floor residential units at 44–46 The Grove, Gravesend. Previously measured environmental noise data has been revalidated and remains representative of the current noise climate.

The assessment demonstrates that the BS 8233:2014 internal noise criteria can be achieved, subject to:

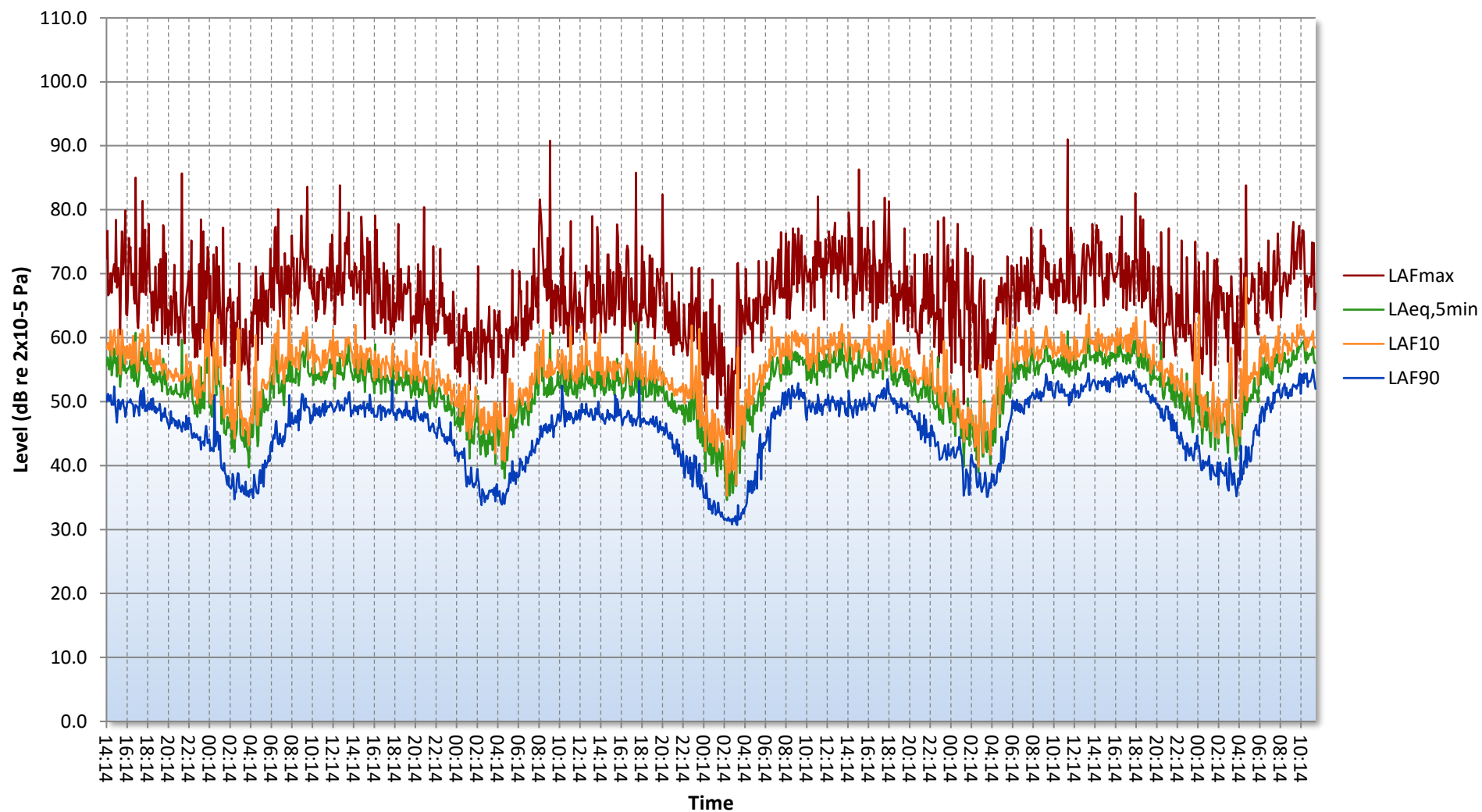
- Glazing meeting the minimum octave-band performance specified in Table 5.2;

- Trickle ventilators achieving the minimum performance specified in Table 6.2, where proposed; and
- Mechanical ventilation systems being designed to satisfy the applicable internal noise criteria.

Standard openable windows may provide overheating relief up to a maximum acoustic open area specified in Table 6.3. The overheating specialist should confirm whether this is sufficient and develop an alternative strategy where required.

Subject to the recommendations of this report, the proposed development is considered acoustically suitable for residential use.

44-46, the Grove, Gravesend, Kent - Position 1
Environmental Time History
13/09/2024 to 18/09/2024



44-46 the Grove, Gravesend, Kent - Position 2
Environmental Time History
13/09/2024 to 18/09/2024

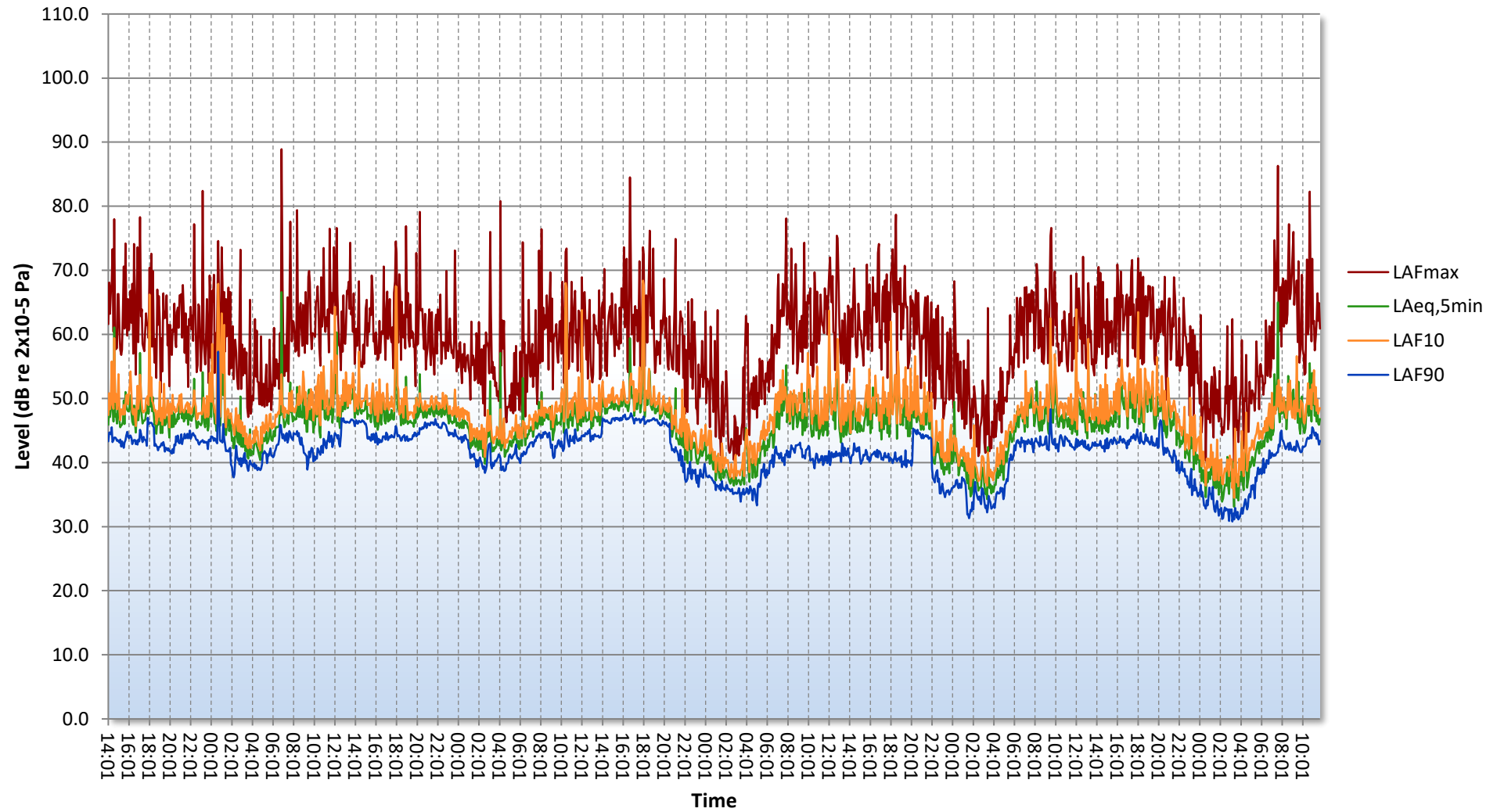


Figure 26800.TH2

GENERAL ACOUSTIC TERMINOLOGY

Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of 10^{13} units, that only a logarithmic scale is the sensible solution for displaying such a range.

Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq} . The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

L_{90}

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

APPLIED ACOUSTIC TERMINOLOGY

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud

Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

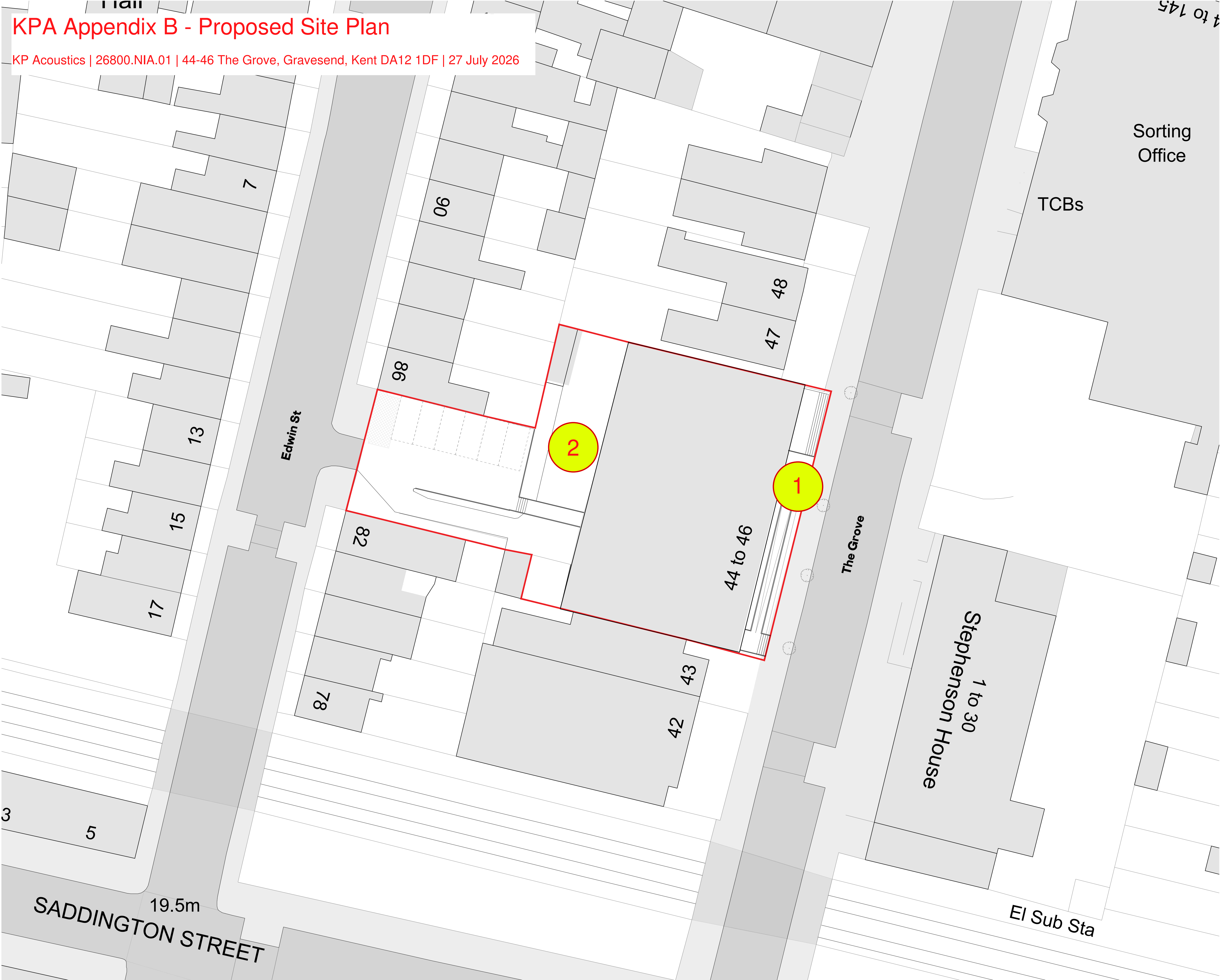
Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.

KPA Appendix B - Proposed Site Plan

KP Acoustics | 26800.NIA.01 | 44-46 The Grove, Gravesend, Kent DA12 1DF | 27 July 2026

X Measurement positions



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Project | 44-46 THE GROVE
GRAVESEND,----
Client | THE SUBSTANTIA GROUP
Title | PROPOSED SITE PLAN
Status | PLANNING

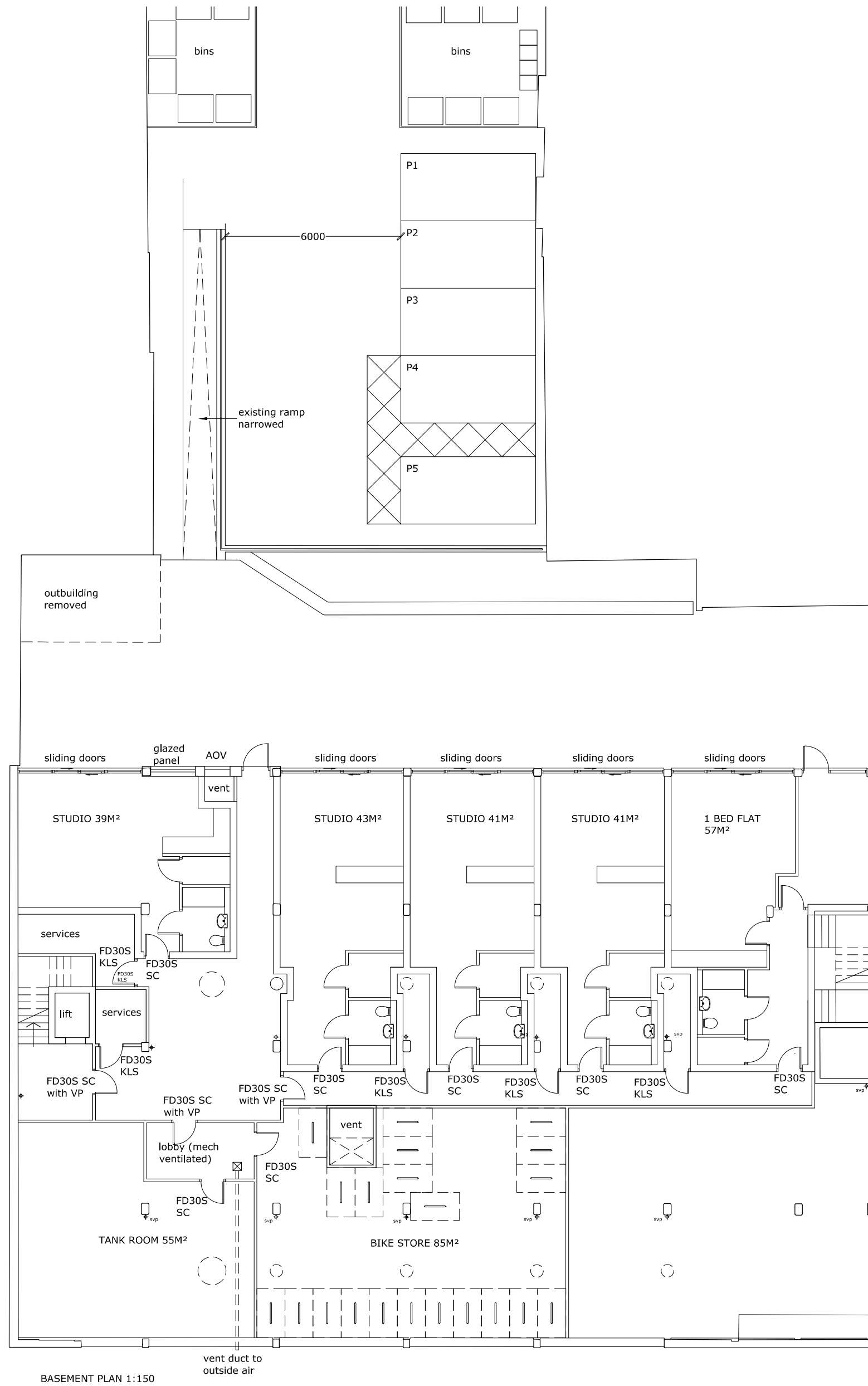
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KPA Appendix C - Proposed Basement Plan

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