Noise Impact Assessment

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Executive Summary

A Noise Impact Assessment has been undertaken at 1 – 3 Bridge Road, Chatburn in relation to the proposed installation of a kitchen extract system.

Measurements of the background noise climate have been undertaken from 29th – 30th May 2025 at a position deemed representative of the identified Noise Sensitive Receptors (NSRs).

The nearest or most-affected Noise Sensitive Receptors were identified as 1st floor flats above the site.

Details of the system to be installed on site have not yet been finalised and so noise rating level limits have been determined from the measured background noise levels. Likely rating penalties have also been discussed in relation to the specific noise level.

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1. Introduction

Overview

A Noise Impact Assessment has been undertaken at 1 – 3 Bridge Road, Chatburn in relation to the proposal for the installation of a kitchen extraction system.

The system design has not yet been finalised and so the assessment will determine recommended noise rating level limits based on the achievement of BS4142 criteria at the nearest sensitive receptors.

The system is to be installed within the ground floor of the site and the flue is understood to run up the rear façade, terminating at roof level.

The plant equipment is associated with the extraction of air from the kitchen at the ground floor of the existing commercial unit.

Scope & Objectives

The scope of the noise assessment can be summarised as follows:

- Baseline sound monitoring survey to evaluate the prevailing background sound levels at the Noise Sensitive Receptor ('NSR') in accordance with BS7445 - *'Description and Measurement of Environmental Noise'*;
- Determination of noise limits for future plant installations at the site to comply with the requirements of the National Planning Policy Framework (2024), Noise Policy for England (2010) and British Standard BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound.
- Further information on the legislation can be found in **Appendix G.**

2. Environmental Noise Survey

Measurement Methodology

To establish the existing environmental noise levels on site, a noise survey has been conducted from 29th – 30th May 2025. Measurements of $L_{Aeq,T}$ and $L_{A90,T}$ were logged in 5-minute intervals in accordance with BS7445 - *'Description and Measurement of Environmental Noise'*.

The unattended monitoring location (M1) was positioned at a height of approximately 4.5 metres. The monitoring position is deemed representative of sound levels at 'NSR 1' during the typical operational periods of the proposed system.

Further detail of the measurement along with site pictures is given in **Appendix A.**

Measurements were obtained using Class 1 instrumentation. Full equipment details are given in **Appendix B**.

Equipment was calibrated before and after use and no significant drift occurred during measurements. Up-to-date calibration certification can be provided upon request. Full calibration details are provided in **Appendix C**

Daytime temperatures during the survey were noted as between 15 - 16°C with wind speeds of 5 m/s; Higher windspeeds were noted in the area, though the layout of the site and its surroundings were noted to provide a high level of shelter below roof level. Detailed meteorological information can be found in **Appendix D.**

The site, proposed noise source and NSR locations are shown in **Figure 1.**

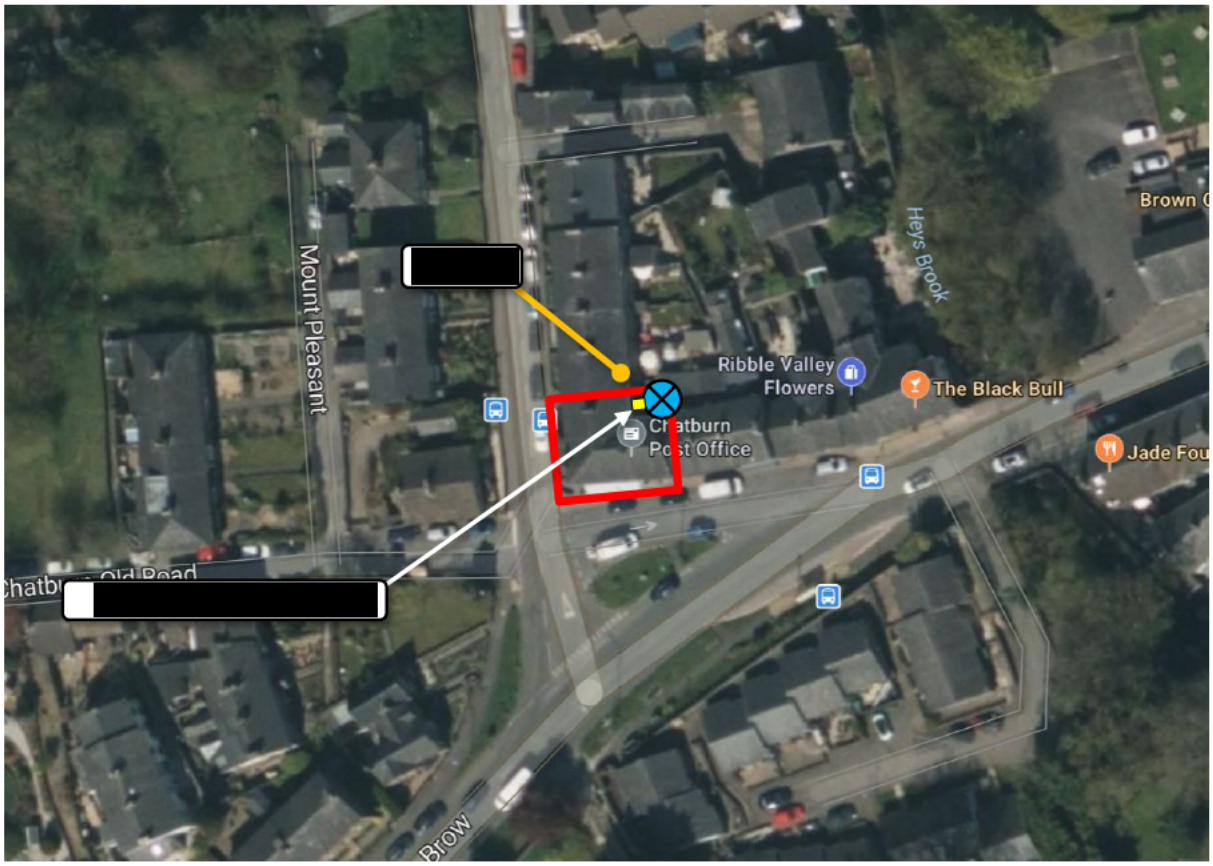

Figure 1: Site, Source & NSR Locations - https://google.co.uk/maps

Site Boundary

Extract Flue

Noise Sensitive Receptor (NSR)

Background Monitoring Location M1

Site Description

The site is located on the corner of Bridge Road and Ribble Lane in Chatburn. The ground floor of the site is a convenience store and post office with residential flats at the 1st floor. The road to the front of the site is utilised for parking for local residents and customers of the store. There is also a bus

stop opposite the site. To the rear of the site is an external yard area and rear gardens of neighbouring properties.

Context and Subjective Noise Climate

Noise Source	Description	Time of Observation	Photo
Road	Light road traffic noise from cars, vans, HGV's and buses passing the front of the site	Intermittent during site visits	
External Plant	Noise from existing external plant items installed to the rear of neighbouring properties.	Constant during site visits	
Black Bull Inn	Small pub with outdoor seating area, open between 4pm and 11pm	Quiet during site visits	

Table 1: Subjective Summary of Noise Sources

Non-Representative Noise Sources

During the survey, no noise events occurred which would be deemed as atypical of the site location.

Noise Sensitive Receptors

The nearest or most-affected Noise Sensitive Receptor (NSR) is considered to be the 1st floor flat above the site. The closest habitable room windows will be considered as specific reception points in calculations.

3. Environmental Noise Survey Results

Measurement Results

The kitchen extract system is to serve the ground floor takeaway and therefore has the potential to operate during daytime hours 7am – 11pm.

The day and night-time background sound levels from measurement M1 are summarised below.

Measurement	Date(s)	Period	$L_{Aeq,T}$	$L_{A90,T}$
M1	29th & 30th May 2025	Daytime (07:00 – 23:00)	54	50
	29th – 30th May 2025	Night-time (23:00 – 07:00)	49	43

Table 2: M1 Background Noise Survey Results

A full-time history of the survey data is shown in **Appendix E.**

For the derivation of a representative daytime background sound level, data from the whole daytime period (07:00 – 23:00) has been statistically analysed:

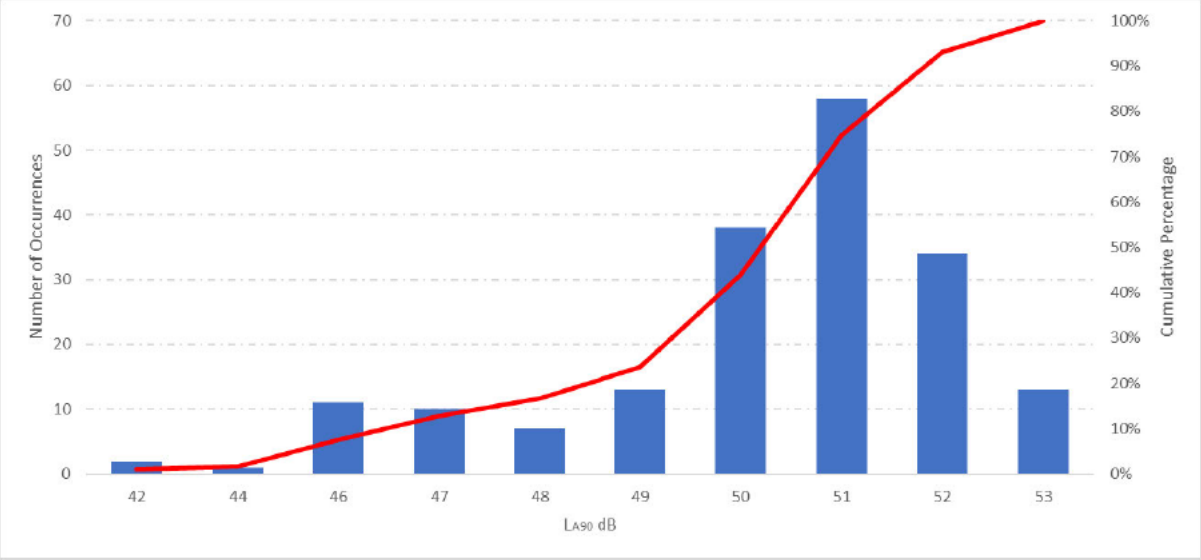

Figure 2: M1 Background Statistical Analysis

From the statistical analysis of the M1 measurement, **50dB L_{A90}** has been selected as the representative background sound level for the BS4142:2014 assessment at the NSR locations.

4. Noise Rating Level Limits

The rating level refers to the noise level experienced at the nearest noise-sensitive receptor (NSR), with any applicable penalties added to account for characteristics that may increase the subjective impact—such as tonality, impulsivity, or intermittency. This level is assessed at a position 1 metre outside the window of the NSR.

Guidance within the BS4142 standard states that a rating level at or below the background level is indicative of a 'Low Impact'.

Based on the measured background levels on site for the relevant period, the following noise level limits have been determined for the kitchen extract system.

Background Level dB L_{A90}	Specific Limit dB L_{As}	Rating Level Limit dB L_{Ar}
50	45	50

Table 3: Plant Noise Limits

Based on the measured background noise levels at the site, a specific limit of 45dB L_{As} received at the nearest receptor window has been determined.

The stated rating level limit incorporates an allowance of 5dB for potential rating penalties in relation to tonality or intermittency. The rating penalty allowance is based on the installation of a kitchen extract system and the noise output of the ductwork termination which may have some slight tonality or otherwise may run intermittently.

5. Discussion

The noise impact of the extract system will depend on the distance between the ductwork termination and nearest NSR window.

As an example:

Where the ductwork termination is 2 meters from the nearest receptor window, a sound pressure level of 51dB at 1m from the ductwork termination would be reduced to ~45dB at the NSR.

It is advisable that the noise output from the extract flue termination should not exceed 51dB when measured at 1m. This assumes the system will not operate beyond 11pm at night.

The real-world noise impact will depend on multiple factors including the system components and location of the system.

6. Conclusion

A Noise Impact Assessment has been undertaken at 1 – 3 Bridge Road, Chatburn in relation to the proposed installation of a kitchen extract system.

Measurements of the background noise climate have been undertaken from 29th – 30th May 2025 at a position deemed representative of the identified Noise Sensitive Receptors (NSRs).

The nearest or most-affected Noise Sensitive Receptors were identified as 1st floor flats above the site.

Details of the system to be installed on site have not yet been finalised and so noise rating level limits have been determined from the measured background noise levels. Likely rating penalties have also been discussed in relation to the specific noise level.

7. Uncertainty

The background monitoring equipment is subject to a 1dB error margin, however, calibration before and after measurements allows the drift within the margin to be monitored and thus demonstrates that minimal drift occurred throughout the measurements.

Uncertainty can arise in the prediction of noise propagation from and around flat reflective surfaces, such as the surrounding structures present on site. This has been reduced to a minimum by utilising an acoustic modelling software that uses the validated method, ISO-9613-2, as described in BS4142.

Uncertainty in the calculated specific sound levels is further reduced by utilising manufacturer-given sound power levels.

APPENDIX A - Measurement Details

Measurement	Kit	Start Date	Start Time	End Date	End Time
M1	2	29/05/2025	11:00	30/05/2025	10:30

Table 4: Measurement Dates

Figure 3: Site Location Measurement Pictures

APPENDIX B - Equipment Details

Kit	Equipment	Make	Model	Class	Serial Number
2	Sound Meter	Svantek	977A	1	69273
	Pre-Amp	Svantek	SV12L	1	71601
	Microphone	ACO	7052E	1	68217
	Calibrator	Svantek	SV33	1	83715

Table 5: Measurement Equipment Details

APPENDIX C - Calibration Details

Measurement	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
M1	113.80	0.47	0.38

Table 6: Calibration Details

APPENDIX D - Meteorology Details

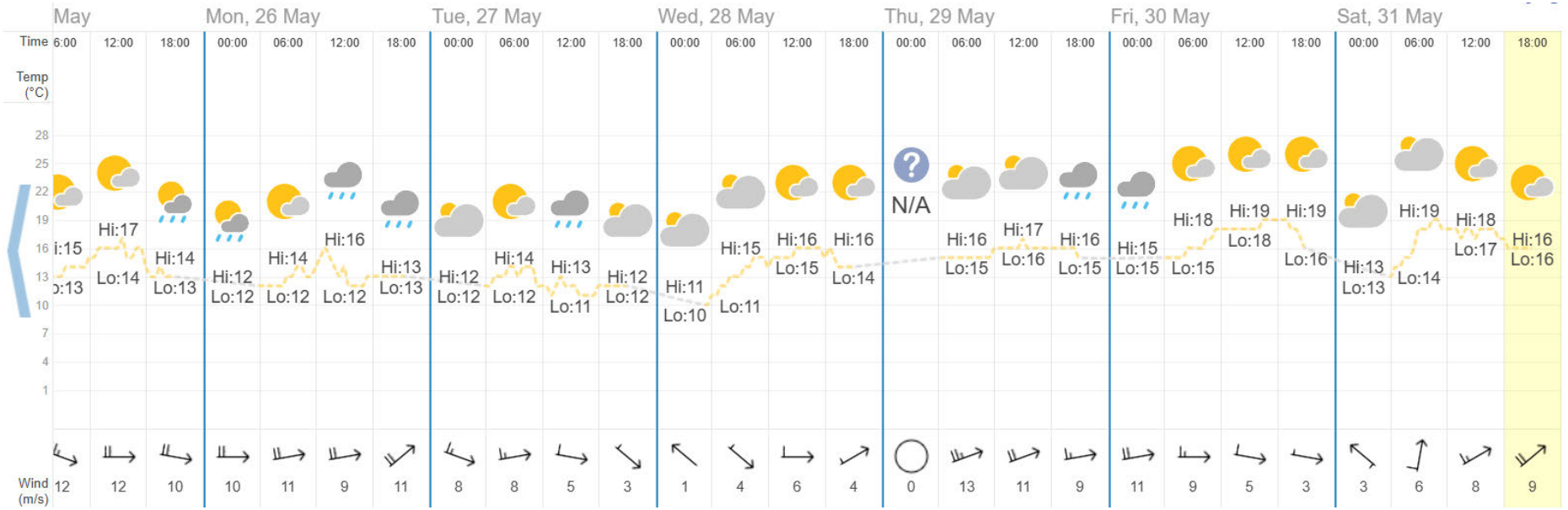

Figure 4: Meteorology Data - https://www.timeanddate.com/weather

APPENDIX E - Noise Survey Results

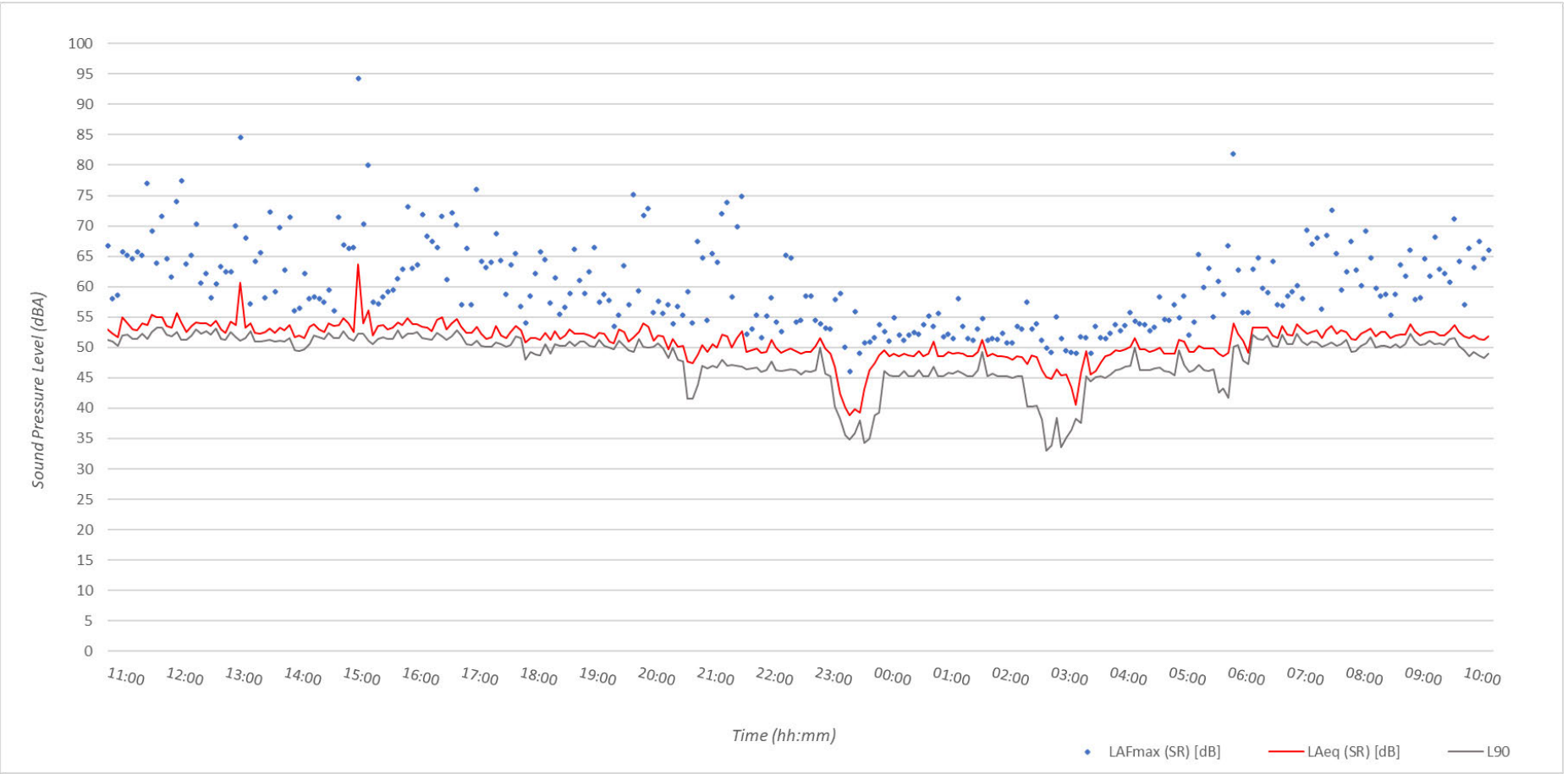

Figure 5: Measured Background Sound Levels Time History (M1): 29th – 30th May 2025

APPENDIX F - Site Plans

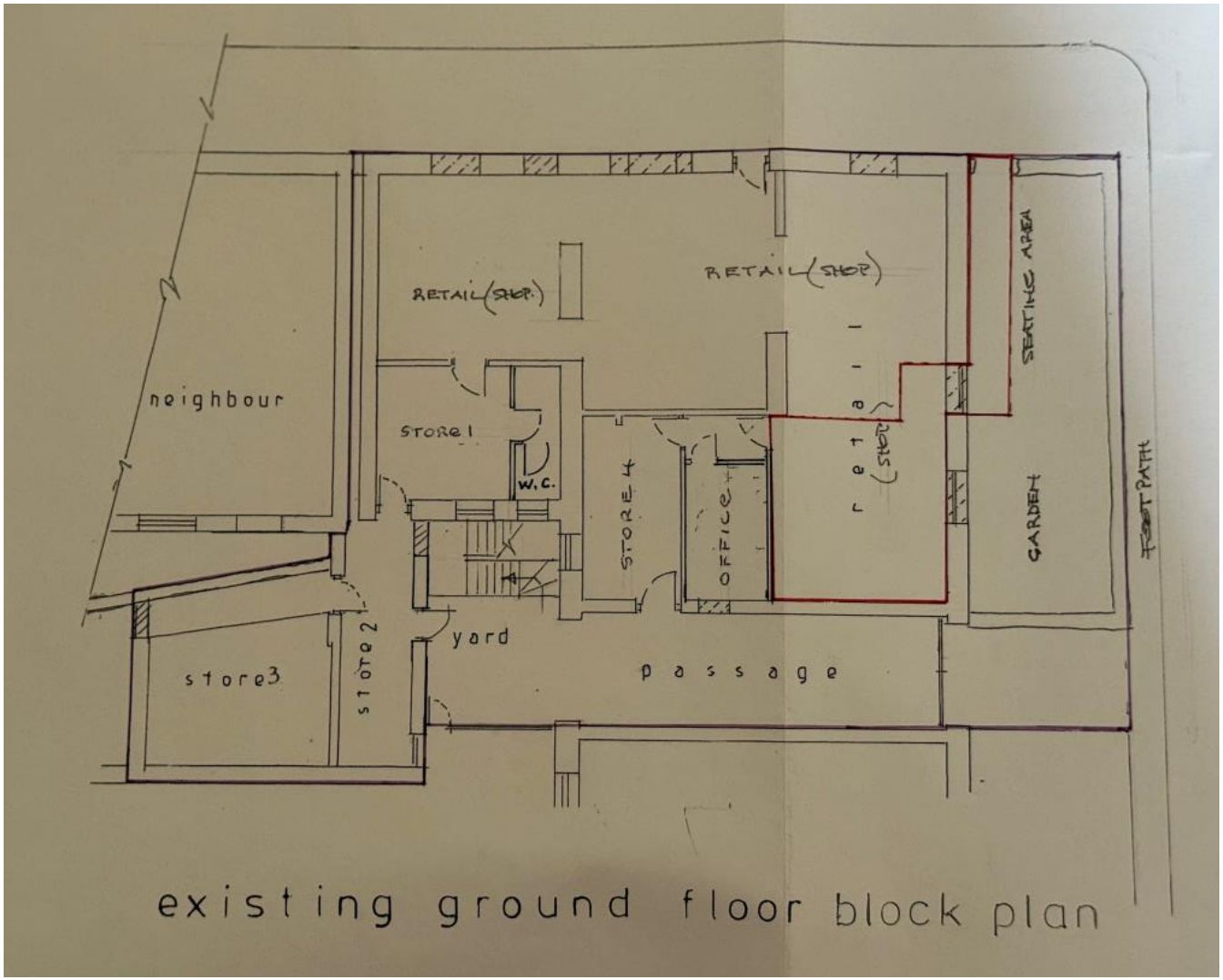

Figure 6: Site Plans Provided by the applicant

APPENDIX G - Legislation, Policy & Guidance

Guidance for the assessment of noise affecting new residential development is given in the National Planning Policy Framework (NPPF). Section 15 of the NPPF states:

> *"174. Planning policies and decisions should contribute to and enhance the natural and local environment by:*
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of…noise pollution."*

Section 185 further states:

> *"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 impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
> *B. Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

Section 187 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."*

To avoid and mitigate adverse noise effects on health arising from and impacting new development, the NPPF makes reference to NPSE. The Noise Policy Statement for England (NPSE) was published in March 2010 and covers all forms of noise other than occupational noise.

The Noise Policy Statement for England (NPSE) states the following aims in paragraph 2.2.

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

The NPSE does not define the SOAEL numerically, stating in paragraph 2.22:

> *"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."*

There is no local or national guidance on how the three terms should be defined numerically, it is for the assessor to collate and interpret appropriate guidance on noise, such as may be found in British Standards, and correlate the guidance with the concepts of NOEL, LOAEL and SOAEL.

BS4142:2014+A1:2019

The common standard for the assessment of industrial and commercial sound is ***'BS4142 – Methods for rating and assessing industrial and commercial sound'.*** The industrial noise assessment method in BS4142 is based on the difference between the measured 'background sound level' (L_{A90}), and the 'Rating Level' of the industrial source, at a noise-sensitive location (NSR). BS4142:2014 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 estimation of the impact of the specific sound can be obtained by the difference between the rating sound level and the background sound level whilst considering the following:

> *"A Sound Rating Level at or below the background noise level is indicative of Low Impact;*
>
> *A Sound Rating Level that exceeds the background noise level by around +5dB is likely an indication of Adverse Impact, depending on the context;*
>
> *A Sound Rating Level that exceeds the background noise level by around +10dB is likely an indication of Significant Adverse Impact, depending on the context;"*

BS4142 further states:

> *"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 a 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 negligible impact, depending on the context."*

Achievement of a *Low Impact* in accordance with BS4142 along with a contextual assessment can be deemed to correspond to '*NOEL – No Observed Effect Level'* in the NPSE.

BS8233:2014

BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings* suggests indoor ambient noise levels for dwellings in Table 4, Section 7.7.2. These are summarised below.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

BS8233 states that the guideline values given above are for 'noise without character', further stating:

> *"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."*

Table 4 of BS8233 also has accompanying notes that were subject to additions in ProPG. The relevant notes with the additions of ProPG are given below.

> *"NOTE 4 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 LAmax,F, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB LAmax,F more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events."*

"NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal LAeq target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

APPENDIX H - Acoustic Terminology

To aid the understanding of acoustic terminology and the relative difference between noise levels the following background information is provided.

We perceive sound when the ear detects fluctuations in air pressure (sound waves), which are then processed by the brain and perceived as sound. Humans can hear an incredibly wide range of sound intensities ranging from jet engines to fingertips lightly brushing against each other. This range is quantified using a logarithmic scale called the decibel scale (dB). The comfortable range of the decibel scale typically ranges from 0dB (the threshold of hearing) to around 140dB. Here are some examples of common environments and their typical noise levels.

Noise Level	Environment
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a moving car
60 to 70 dB(A)	Typical high street
100 to 110 dB(A)	Fire alarm at 1 metre away
140 dB(A)	Threshold of pain

Terminology

dB (decibel) – A unit used to quantify the pressure level of sound. Defined as 20 times the logarithm of the ratio between the root-mean-square pressure of a given sound field and a reference pressure level ($2x10^{-5}$ Pa – threshold of hearing).

$L_{Aeq,\,T}$ – The equivalent continuous sound pressure level over a stated period. It quantifies a fluctuating sound level over a given period as the equivalent continuous sound level over which the same amount of acoustic energy is contained over. This is A-weighted in order to assess human perception.

L_{A90} – The sound level exceeded 90% of the time. Typically used to describe background noise the L_{90} is regarded as the 'average minimum level' and quantifies the common sound level of a fluctuating sound field i.e. the sound level that occurs 90% of the time. Alternatively, L_{10} describes the sound level exceeded 10% of the time and therefore quantifies the 'average maximum level' of sound which is often used during the calculation of road traffic noise.

A-Weighting – A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.

R_w – The Weighted Sound Reduction Index (R_w) is a number used to rate the effectiveness of a soundproofing system or material.