



ROFFT DEVELOPMENTS 2000 LTD
43-43A KING ST, WREXHAM LL11 1HR

NOISE INGRESS ASSESSMENT
R1945-REP01-SJW
11 MARCH 2021

REPORT DETAILS

Project	43-43A King St, Wrexham LL11 1HR
Client	Rofft Developments 2000 Limited Pinfold Works Rossett Road Trevalyn Wrexham
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SUMMARY

Red Acoustics Ltd has been commissioned by Rofft Developments 2000 Ltd to provide an assessment of the impact of environmental noise on the proposed development site at 43-43A King Street, Wrexham LL11 1HR, specifically noise from the adjacent bus station activity.

Noise surveys have been carried out to determine the internal ambient noise levels provided by the existing facade constructions due to environmental noise sources.

The results of the internal ambient noise measurements have demonstrated compliance with performance requirements with the existing facade constructions.

Although the use of secondary glazing is not required for compliance with the requirements of TAN 11 and Wrexham County Borough Council, the provision of secondary glazing for thermal comfort to spaces fronting King Street will reduce impact from night-time pass by levels in bedroom spaces and provide an enhanced amenity.

CONTENTS

1.0 INTRODUCTION	5
2.0 SITE DESCRIPTION & PROPOSED DEVELOPMENT	6
3.0 PLANNING GUIDANCE WALES - TECHNICAL ADVICE NOTE 11 (TAN 11), NOISE: 1997	8
4.0 MEASUREMENT PROCEDURE	10
4.0 AMBIENT NOISE MEASUREMENT RESULTS	12
5.0 CONCLUSION	17
APPENDIX A: GLOSSARY OF ACOUSTIC TERMS	18
APPENDIX B: SURVEY DETAILS	19

1.0 INTRODUCTION

Red Acoustics Ltd has been commissioned by Rofft Developments 2000 Ltd to provide an assessment of the impact of environmental noise on the proposed development site at 43-43A King Street, Wrexham LL11 1HR.

Noise surveys have been carried out to determine the internal ambient noise levels provided by the existing facade constructions due to environmental noise sources.

The measurements were conducted on the following date periods:

5th - 8th March 2021

A glossary of acoustic terms used in this report is given in Appendix A.

2.0 SITE DESCRIPTION & PROPOSED DEVELOPMENT

The proposed development is located at 43-43A King Street, Wrexham, LL11 1HR. The existing building comprises a two storey office building with rear car parking. The site location is shown by the red line in Figure 2.1 below. King Street is a one way street providing access to Trinity Street and the rear of the adjacent Bus Station.

Figure 2.1: Site Location



The development comprises the change of use into 5 no. residential flats. The existing and proposed plans are shown in Figure 2.2 below.

Figure 2.2: Existing & Proposed Plans



3.0 PLANNING GUIDANCE WALES - TECHNICAL ADVICE NOTE 11 (TAN 11), NOISE: 1997

Planning Guidance Wales Technical Advice Note 11 (TAN 11) provides guidance on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development.

TAN 11 outlines the considerations to be taken into account in determining planning applications for both noise sensitive developments and those activities that generate noise. It aims to help local planning authorities in their consideration of applications for residential development near transport related noise sources.

The guidance provides a method whereby a plot of land can be rated and placed into a Noise Exposure Category (NEC) for residential development.

The recommended range of noise levels for each NEC covering day and night-time periods in relation to road noise and mixed noise sources are presented in Table 3.1 below. It should be noted that TAN 11 states that it may be appropriate in some cases for local planning authorities to vary the noise levels that the NEC's apply to. For instance, where there is a clear need for new residential development in a noisy area, some or all NECs may be increased by 3dB(A) above the recommended levels.

Table 3.1: Noise Levels Corresponding to the NEC for New Dwellings

$L_{Aeq,T}$ dB(A)	A	B	C	D
Mixed Sources and Road Traffic 0700 - 2300	<55	55 - 63	63 - 72	>72
Mixed Sources and Road Traffic 2300 - 0700*	<45	45 - 57	57 - 66	>66
* sites where noise events at night regularly exceed 82 dB L_{Amax} (slow time weighting) several times in any hour should be treated as being in Category C				

Measurement results are separated into day and night-time periods, and the average L_{Aeq} found for each period. The results are used to determine which category the residential development will fall into. TAN 11 advises that local planning authorities should have regard to the advice presented in Table 3.2 when considering the NEC in which a development lies.

Table 3.2: Explanation of Noise Exposure Categories

NEC	Advice
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.
C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused.

With regard to the achievement of satisfactory acoustic conditions within dwellings, Annex A section 6 of TAN 11 states that 'The NEC principle cannot therefore be applied sensibly to such developments and it will be more appropriate to refer to specific guidance on internal noise standards in respect of each activity. General information can be found in BS 8233: 1987' ('Sound insulation and noise reduction or buildings').

Design Targets

The noise design targets for internal habitable spaces are detailed in Table 3.3. The targets are based on the advice provided in BS8233:2014 (updated from 1987 version). These targets will therefore be used to assess mitigation in accordance with the requirements of TAN 11 and Wrexham County Borough Council.

Table 3.3: BS8233:2014 Design Targets

Space	L _{Aeq,16hr} (07:00 - 23:00)	L _{Aeq,8hr} (23:00 - 07:00)
Living Room & Kitchen	35dB	-
Dining Room & Study	40dB	-
Bedroom	35dB	30dB

In accordance with BS8233: 1997, for a reasonable standard in bedrooms at night, individual noise events (measured with F time-weighting) should not normally exceed 45 dB L_{Amax} although this is not defined in the updated BS8233: 2014.

4.0 MEASUREMENT PROCEDURE

Internal measurements were taken with the sound level meter mounted on a tripod at the approximate centre of each measured space, and at least 1.5 meters from any reflective surface. During the measurements the windows and doors were closed with window ventilators set to the open position where applicable and installed. The sound level meter was set to measure A-weighted noise levels and spectra over 5 minute intervals and was calibrated before and after the survey period - no drift in sensitivity was observed over the survey period.

In addition, parallel measurements were undertaken to assess the performance provided by the existing facade constructions.

Details of all instrumentation used is given in Appendix B with all noise measurements presented in Appendix C.

A sample of 2 internal spaces were selected in-line with the requirements detailed above. All internal spaces were fully complete, without furnishings.

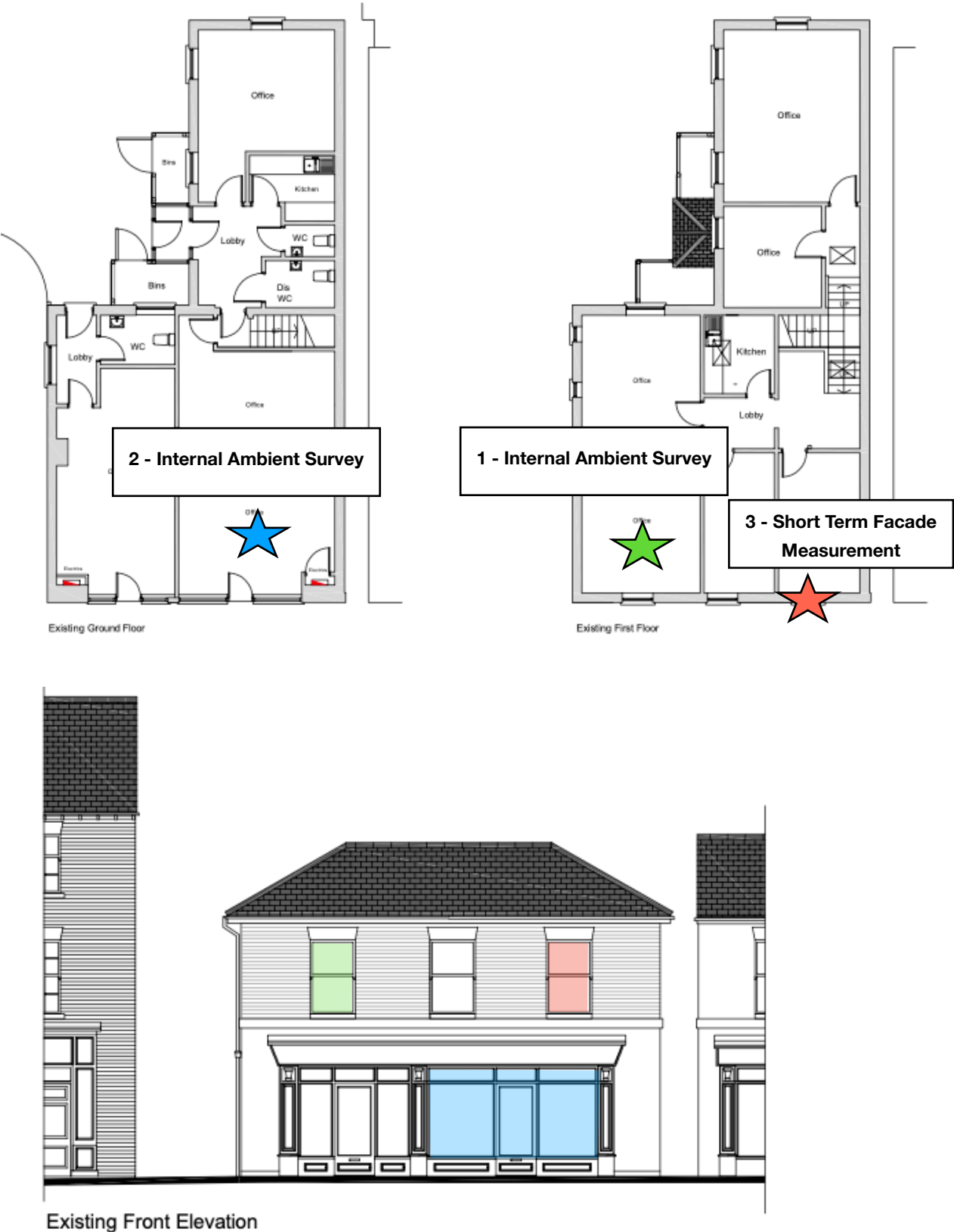
Table 3.1 contains details of each internal and external ambient noise measurement conducted.

Table 3.1: Internal & External Ambient Noise Measurements

Measurement Number	Date	Equipment Number	Measurement Location
1	5th March 2021 - 8th March 2021	RED13	First Floor Space
2	5th March 2021 - 8th March 2021	RED11	Ground Floor Space
3	5th March Facade Level to Assess Facade Performance	RED11	First Floor Space (at one window position)

Figure 3.1 shows the measurement locations.

Figure 3.1: Measurement Locations



4.0 AMBIENT NOISE MEASUREMENT RESULTS

Noise Ingress

Table 4.1 compares the measured internal ambient noise levels against the target performance requirements within section 2.0.

Table 4.1: Noise Ingress Measurements

	Receiver Location		Target Criteria
	First Floor Position 1	Ground Floor Position 2	
Test Result (Day) $L_{Aeq, 16Hr}$	Friday: 32dB (not a full 16hr period) Saturday: 33dB Sunday: 30dB	Friday: 34dB (not a full 16hr period) Saturday: 33dB Sunday: 32dB	35dB
Test Result (Night) $L_{Aeq, 8Hr}$	Friday / Saturday: 27dB Saturday / Sunday: 30dB Sunday / Monday: 24dB	Friday / Saturday: 29dB Saturday / Sunday: 30dB Sunday / Monday: 27dB	30dB

The results in Table 4.1 indicate that the existing facade constructions, including existing sash windows meet the target criterion for Living Room and Bedroom spaces, noting that the ground floor space comprised a worst case large shop front glazing and entrance door.

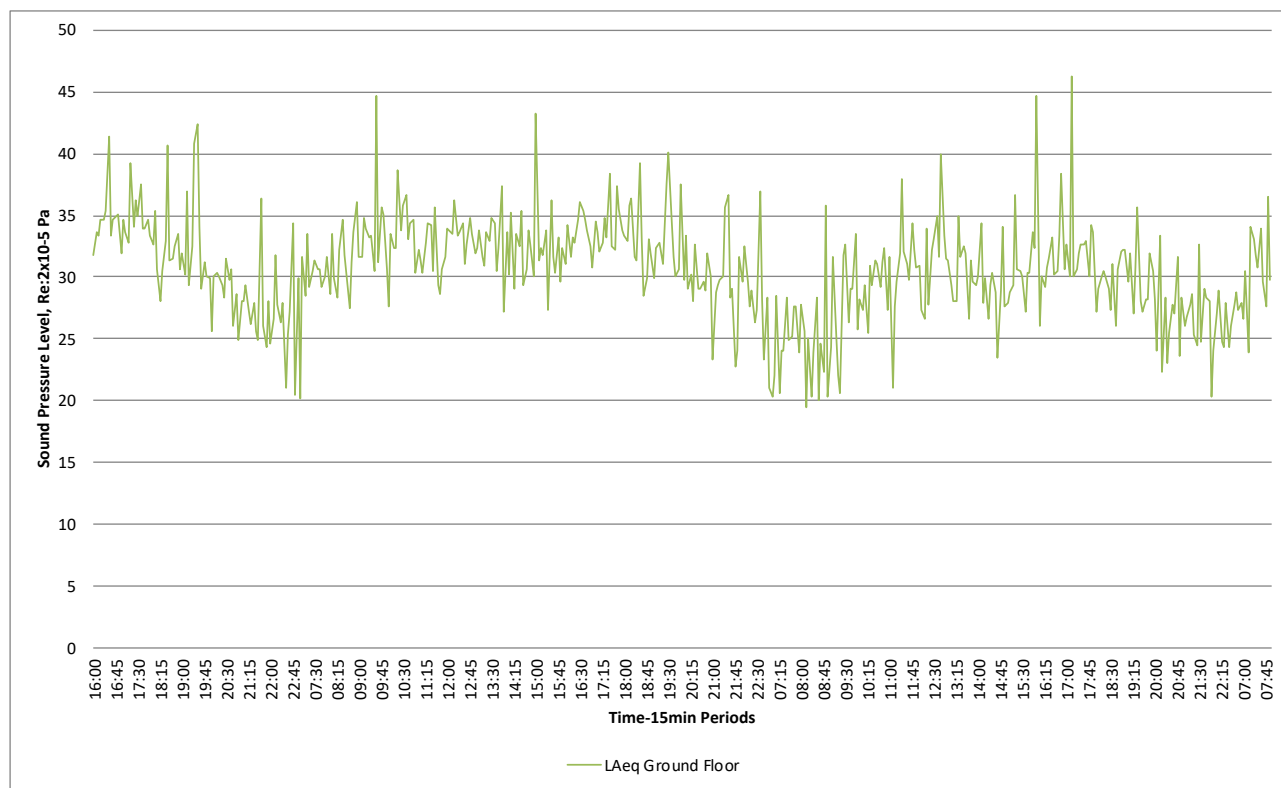
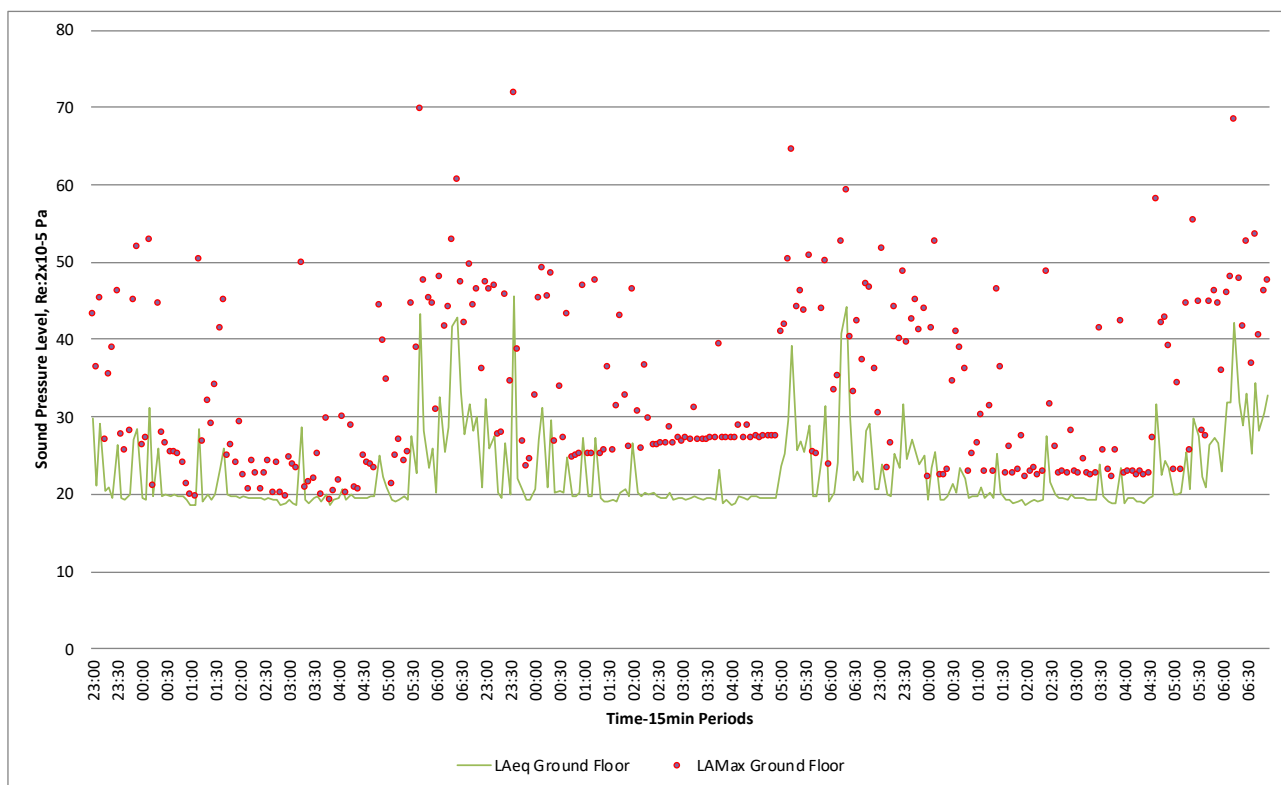
Figures 4.1 and 4.2 show the daytime 5 minute broadband logging data for Position 1 as measured internally at first floor level.

Similarly, Figures 4.3 and 4.4 show the daytime 5 minute broadband logging data for Position 2 as measured internally at ground floor level.

It should be noted that no reverberation time corrections have been applied to the noise ingress measurements as the office spaces include carpet floor finishes and are equivalent to the acoustic environment of unfurnished habitable spaces.

The graph displays the LAeq First Floor sound pressure level in Pa over a 24-hour period. The y-axis represents the Sound Pressure Level, ranging from 0 to 50 Pa in increments of 5. The x-axis represents time in 15-minute periods, from 16:00 to 07:45. The data is plotted as a green line, showing significant fluctuations throughout the day. The highest peaks occur around 09:45 and 15:00, reaching approximately 43 Pa. The lowest values are observed around 22:00 and 22:30, dropping to about 19 Pa. The overall trend shows higher sound levels during the day and lower levels at night.

Figure 10 is a line and scatter plot comparing LAeq and LAMax sound pressure levels over time. The y-axis represents Sound Pressure Level (Re:2x10⁻⁵ Pa) from 0 to 80. The x-axis represents Time-15min Periods from 23:00 to 06:30. The LAeq (green line) shows a fluctuating trend, generally staying between 18 and 45. The LAMax (red dots) shows a more varied distribution, with values ranging from approximately 20 to 72. The legend indicates LAeq First Floor (green line) and LAMax First Floor (red dots).

Figure 4.3: Noise Ingress Measurements - Position 2 Ground Floor Daytime 5-Minute Logging Broadband Noise Data**Figure 4.4:** Noise Ingress Measurements - Position 2 Ground Floor Night-time 5-Minute Logging Broadband Noise Data

The results in Figures 4.2 and 4.4 for night-time periods indicate that the internal noise levels only exceed the recommended target of 45dB L_{A1Max} by up to 12 times per night, with the majority of night-time pass-by maximum noise levels falling below the target of 45dB L_{A1Max} .

Although these short term exceedences are deemed to be acceptable for bedroom space which overlook King Street (which include only two spaces at first floor level), consideration is being given to the provision of secondary glazing for additional thermal enhancement to the residential spaces.

Figure 4.5 below shows the measured level difference performance provided by the existing facade. The data indicates that the facade is providing a typical performance of 26dB which is expected from a single glazed sash window with 4mm or 6mm glass.

Figure 4.5: Facade Performance - Measured



The use of a secondary glazed panel comprising 4mm toughened glass will provide an enhanced sound insulation performance of approximately 8dB¹.

Although the use of secondary glazing is not required for compliance with the requirements of TAN 11 and Wrexham County Borough Council, the provision of secondary glazing to spaces fronting King Street will reduce impact from night-time pass by levels in bedroom spaces and provide an enhanced amenity.

¹ <https://www.selectaglaze.co.uk/>

5.0 CONCLUSION

The results of the internal ambient noise measurements have demonstrated compliance with performance requirements with the existing facade constructions.

Although the use of secondary glazing is not required for compliance with the requirements of TAN 11 and Wrexham County Borough Council, the provision of secondary glazing for thermal comfort to spaces fronting King Street will reduce impact from night-time pass by levels in bedroom spaces and provide an enhanced amenity.

APPENDIX A: GLOSSARY OF ACOUSTIC TERMS

Decibel (dB)

This is the unit used to quantify sound levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). We therefore use a logarithmic scale to describe sound pressure level, intensities and sound power levels. The logarithms used are to base 10. Hence, an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in acoustic pressure in Pascals. Subjectively, this corresponds to a doubling in the perceived loudness of sound.

Octave & One-Third Octave Bands

The human ear is sensitive to sound over a range of frequencies between approximately 20Hz to 20000Hz (20kHz), and is generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum is divided into frequency bands, and the sound pressure level is measured in each band. The most commonly used frequency bands are octave bands, in which the mid-frequency of each band is twice that of the band below it. For instance, the octave bands above and below the 500Hz octave band are 1kHz and 250 Hz respectively. For finer analysis, each octave band may be split into three one-third octave bands or in some cases, finer frequency bands (e.g. 1/12 octaves).

APPENDIX B: SURVEY DETAILS

Location

43-43A King St, Wrexham LL11 1HR

Date of Measurements

5th March 2021 - 8th March 2021

Personnel

Simon Webster BEng. (Hons) MIOA

Instrumentation

Table B1 below presents the instrumentation used during the surveys.

Methodology

Before and after the measurements the sound level meters were check calibrated to an accuracy of $\pm 0.3\text{dB}$ using their associated Class 1 Calibrators. No drift in the instruments' sensitivities were noted across any of the survey periods.

Calibration Certificates

Copies of all calibration certificates are kept on file by Red Acoustics Ltd and can be supplied if requested.

Instrumentation Used

Table B1: List of Instrumentation Used

Kit No	Equipment Description	Type Number	Manufacturer	Serial Number	Date of Last Calibration	Calibration Certificate Number
RED11	Sound Level Meter	Type 140 Type 1	Norsonic	1402968	29/07/2019	U32441
	Preamplifier	Nor 1209	Norsonic	12551	29/07/2019	U32441
	Microphone Capsule	GRAS 4AF	GRAS	179632	29/07/2019	U32440
RED13	Sound Level Meter	Type 140 Type 1	Norsonic	1402994	03-Oct-19	U33011
	Preamplifier	Nor 1209	Norsonic	12548	03-Oct-19	U33011
	Microphone Capsule	Nor 1225	Norsonic	91872	23-Oct-19	U33010
	Sound Calibrator	Type 1251 Class 1	Norsonic	34390	21-Aug-20	35531