Our Ref: CDIS/1148/23/190/V1.0/Newton Street, Barnsley

15th May 2023

Mr Philip Fletcher
302 New Road
Staincross
Barnsley
S75 6GP

Dear Sir

NOISE IMPACT ASSESSMENT FOR CONSENTED RESIDENTIAL DEVELOPMENT LAND ADJACENT NEWTON COURT, NEWTON STREET, BARNSLEY, S70 6DF

BARNSLEY METROPOLITAN BOROUGH COUNCIL PLANNING PERMISSION 2020/0023 DISCHARGE OF CONDITION 5 (NOISE IMPACT ASSESSMENT)

1.00 INTRODUCTION

1.01 RP Acoustics Limited has been commissioned by Mr Javed to carry out a noise impact assessment for a consented residential development (erection of a 3-storey apartment block containing 4 no. apartments at land adjacent to Newton Court, Newton Street, Barnsley S70 6DF (hereafter referred to as the site).

1.02 Planning Permission 2020/00023 was granted by Barnsley Metropolitan Borough Council on 22nd April 2020, subject to conditions. Condition 5 states '*Prior to the commencement of the development, a noise impact assessment report shall be provided to the local planning authority for approval. The noise report shall consider the impact of all existing significant noise sources affecting the development and shall include a detailed noise mitigation scheme. The approved mitigation scheme shall be implemented prior to occupation of the development and shall be maintained thereafter. Reason: To ensure the future occupants of the development are not unduly impacted through noise by nearby, existing uses.'*

1.03 The objectives of the noise impact assessment were to:

- Determine the ambient noise levels at the application site
- Provide recommendations for mitigation measures (glazing / ventilation) in order to protect amenity with reference to planning noise-related policies and guidelines

1.04 This report sets out the methodology and findings of the noise impact assessment. It has been prepared on behalf of Mr Javed for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult Mr Javed (applicant), Mr Philip Fletcher (applicant's agent) and RP Acoustics Limited as to the extent to which the findings may be appropriate for their use.

1.05 A glossary of acoustic terms is contained in Appendix 1 for reference.

2.00 APPLICATION SITE SETTING

2.01 The application site is located close to Barnsley town centre is a mixed residential and commercial use setting. The application site location plan is reproduced in Appendix 2.

2.02 Planning permission has been granted for the erection of a 3-storey apartment block containing 4 no. apartments. The proposed site layout and floor plans are reproduced in Appendix 3 for reference.

Continued from page 1

3.00 BASELINE NOISE SURVEY

3.01 A baseline noise survey was undertaken at the application site in April 2023. The following noise monitoring positions were adopted (as reproduced in Appendix 4):

- NMP1 was located at the proposed front façade of the development at first floor level
- NMP2 was located at the proposed rear façade of the development at first floor level

3.02 Baseline noise measurements were undertaken using a NTi Audio XL2 Type 1 integrating sound level meter. The calibration was verified immediately before and after measurement sessions and no drift in calibration level was noted (calibration certificates reproduced in Appendix 5). Baseline noise measurements consisted of A–weighted broadband parameters, together with linear one-third octave band L_{eq} levels, a logging interval of 1 second. The baseline noise measurement data is summarised in the following table.

Table 3.1 – Baseline Noise Measurement Data (April 2023)

NMP	Date	Time	LAeq (dB)	LA90 (dB)	LA10 (dB)	LA1 (dB)	Comments
NMP1	Monday 20/04/2023	1345–1445	57	51	60	63	Summer Lane & Newton Street traffic
	Monday 20/04/2023	1445–1545	57	51	60	63	
	Monday 20/04/2023	1545–1645	57	51	60	63	Takeaway extract switched on at 1730 hours; circa 52 to 53 dB(A) and broadband in character
	Monday 27/04/2023	1645–1730	57	54	59	62	
	Monday 27/04/2023	1730–1745	57	56	60	61	
57 dB LAeq (0700–2300) and 49 dB LAeq (2300–0700) based on CRTN and TRL							
NMP2	Monday 27/04/2023	1545–1645	55	51	58	63	Summer Lane & Newton Street traffic; Takeaway extract (broadband)
	Monday 20/04/2023	2300–0000	51	48	54	58	

3.03 At NMP1 the baseline survey was conducted in accordance with the procedure contained in the Department for Transport's Calculation of Road traffic Noise (CRTN). Under the CRTN procedure, measurements of L_{A10} are made over any three consecutive hours between 1000 and 1700 hours. Using $L_{A10\ (3\ hour)}$ as the arithmetic mean of the hourly L_{A10}, the $L_{A10\ (18\ hour)}$ is calculated from the equation $L_{A10\ (18\ hour)} = L_{A10\ (3\ hour)} - 1$ dB. The $L_{A10\ (3\ hour)}$ at NMP1 was measured at 59.8 dB(A) and therefore the $L_{A10\ (18\ hour)}$ at NMP1 was 58.8 dB(A).

3.04 A study prepared by TRL Limited on behalf of the Department for Environment, Food and Rural Affairs entitled 'Converting the UK Traffic Noise Index $L_{A10\ (18\ hour)}$ to EU Noise Indices for Noise Mapping' states that CRTN should be used to obtain the $L_{A10\ (18\ hour)}$ and presents a methodology by which the $L_{Aeq\ (0700–2300)}$ and $L_{Aeq\ (2300–0700)}$ on non-motorway roads as follows:

$L_{Aeq\ (0700–2300)}$ = 10*log(10^((0.95*$L_{A10(18h)}$+1.44)/10*12) + 10^((0.95*$L_{A10(18h)}$–2.87)/10*4) / 16)

$L_{Aeq\ (2300–0700)} = 0.90 * L_{A10\ (18h)} - 3.7$

3.05 Based on the above equations and a measured road traffic noise level of 58.8 dB $L_{A10\ (18\ hour)}$, as per the TRL methodology, the ambient noise level at NMP1 (proposed front façade; living rooms) is calculated at 57 dB $L_{Aeq\ (0700–2300)}$ and 49 dB $L_{Aeq\ (2300–0700)}$. Daytime ambient noise levels at NMP2 (proposed rear façade; bedrooms) were circa 2 dB lower.

3.06 For reference, octave band analysis of the road traffic noise at the application site illustrates consistency with the 'C' spectrum i.e. predominantly free flowing traffic.

3.07 In summary, the principal noise source at the proposed front façade (living room) during the daytime was due to Summer Lane and Newton Street traffic, albeit at a relatively low level of circa 57 dB LAeq.

3.08 From 1730 hours the extract flue at a nearby takeaway was audible at NMP1 and was measured at circa 52 dB(A) as illustrated by the LA90 changing from 54 to 56 dB LA90 at 1730 hours (54 + 52 = 56 dB) and was broadband in character (see Appendix 6 for NMP1 daytime tonality assessment).

3.09 The principal noise source at the proposed rear façade (bedroom) during the daytime was due to Summer Lane, albeit at a relatively low level of circa 55 dB LAeq (a reduced angle of view of Summer Lane compared to NMP1). This fell to 51 dB LAeq during the early part of the night time period due to traffic on Summer Lane.

3.10 From 1730 hours the extract flue at a nearby takeaway was audible at NMP2 and was measured at circa 48 dB(A) as illustrated by the LA90 at 2300 to 0000 hours and was broadband in character (see Appendix 6 for NMP2 night time tonality assessment).

4.00 BS 8233 GUIDANCE ON SOUND INSULATION & NOISE REDUCTION FOR BUILDINGS

4.01 BS 8233 sets guideline indoor ambient noise levels for dwellings, for steady external noise sources. These levels are reproduced in the following table.

Table 4.1 – BS 8233 Indoor Ambient Noise Levels in Dwellings

Activity	Location	0700–2300 hours	2300–0700 hours
Resting	Living Room	35 dB L_{Aeq}	–
Dining	Dining Room	40 dB L_{Aeq}	–
Sleeping (daytime resting)	Bedroom	35 dB L_{Aeq}	35 dB L_{Aeq}

4.02 Note 5 to the above table states *'If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.'*

5.00 NOISE MITIGATION MEASURES

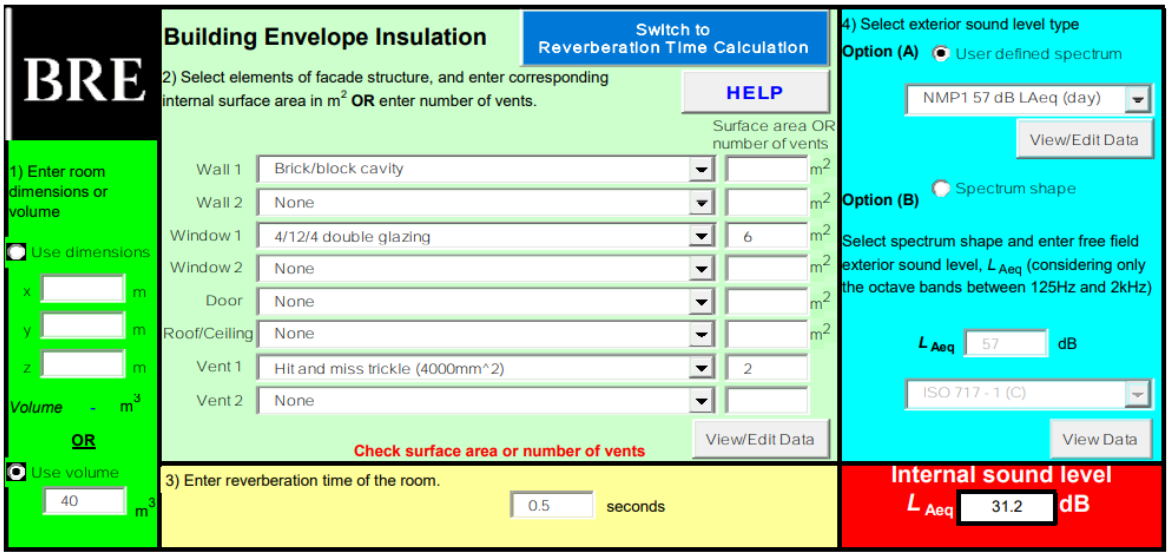
5.01 The noise mitigation measures have been calculated using the methodology advocated in BS 8233:2014 and the Building Research Establishment's Building Envelope Insulation software (and are based on the worse cast of the living rooms which have relatively large windows).

Table 5.1 – Noise Mitigation Measures

Location	External Level	Noise Mitigation Measures to Habitable Rooms (Living / Bedroom)
Front	57 dB $L_{Aeq\ (0700–2300)}$ 49 dB $L_{Aeq\ (2300–0700)}$	Standard 29 dB R_w double glazing (4 mm glass / (6–20 mm cavity) / 4 mm glass) Standard window vent rated at least 34 dB $D_{n,e,w}$ in open position
Rear	55 dB $L_{Aeq\ (0700–2300)}$ 47 dB $L_{Aeq\ (2300–0700)}$	Standard 29 dB R_w double glazing (4 mm glass / (6–20 mm cavity) / 4 mm glass) Standard window vent rated at least 34 dB $D_{n,e,w}$ in open position

Continued from page 3

Figure 5.1 – BRE Building Envelope Insulation Model



5.02 In summary, the provision of standard double glazing and standard trickle vents will provide at least circa 26 dB attenuation to traffic noise.

6.00 CONCLUSION

6.01 A noise assessment has been undertaken for a consented residential development at land adjacent to Newton Court, Newton Street, Barnsley S70 6DF. The principal noise source at the application site is Summer Lane traffic, albeit at relatively low levels. Noise associated with the nearby commercial premises is considered negligible.

6.02 A scheme of sound insulation works (glazing / ventilation) has been determined in order to protect residential amenity with cognisance to current planning and noise-related policies and guidelines.

6.03 In summary, Condition 5 of Barnsley Metropolitan Borough Council Planning Permission 20/00023/FUL should be discharged.

If we can be of any further assistance, please do not hesitate to contact us.

Yours sincerely

Richard Pennell
MSc, BSc (Hons), Diploma in Acoustics and Noise Control
Member of the Institute of Acoustics

For and on behalf of RP Acoustics Limited

APPENDIX 1
GLOSSARY OF ACOUSTIC TERMS

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_0)$ where

L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μPa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF\ max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Building Regulations ADE 2003 Standard ($D_{nT,w} + C_{tr}$)

A single-number quantity which characterises the airborne sound insulation between rooms using noise spectrum No. 2 as defined in BS EN ISO 717–1:1997.

Flanking Element

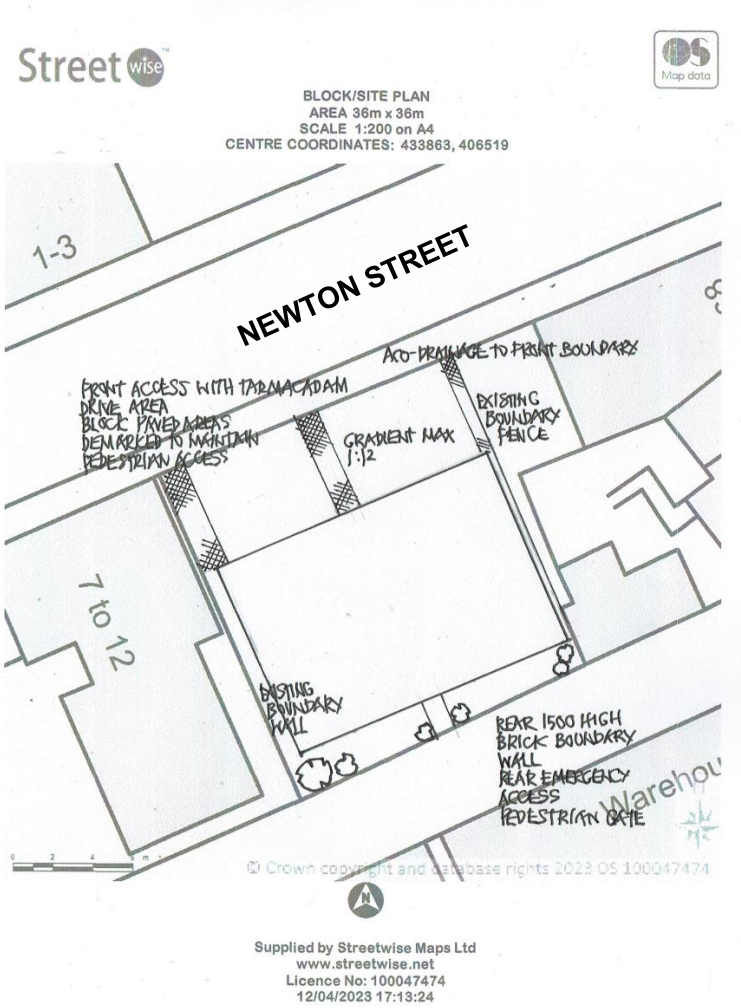
Any building element that contributes to sound transmission between rooms in a building that is not a separating floor or separating wall.

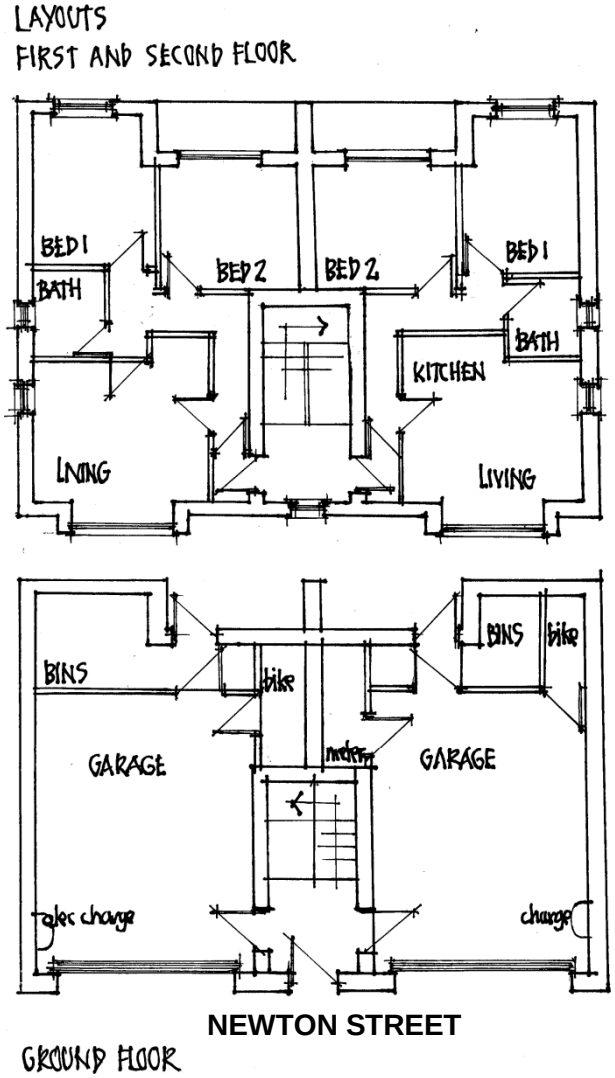
Flanking Sound

Sound transmitted between rooms via flanking elements instead of directly through separating elements or along any path other than the direct path.

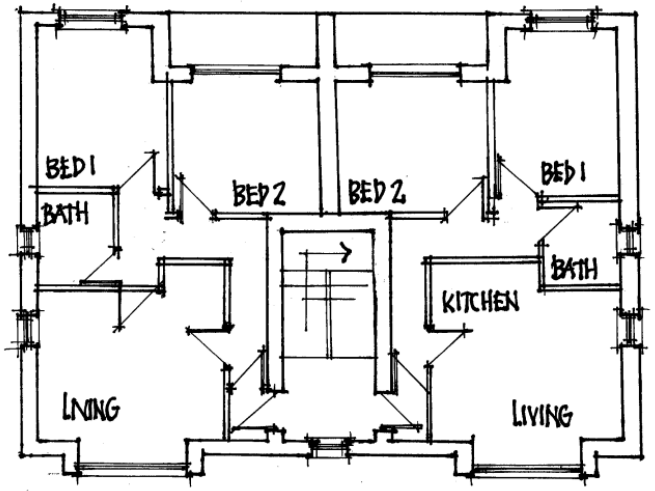
APPENDIX 2
APPLICATION SITE LOCATION PLAN

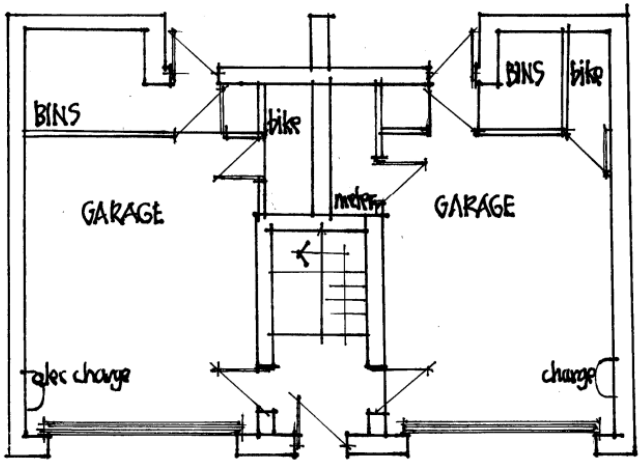
APPENDIX 3
PROPOSED SITE LAYOUT, FLOOR PLANS AND ELEVATIONS



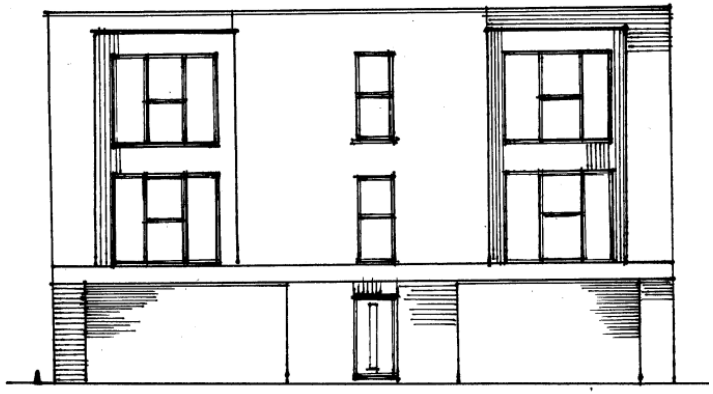


APPENDIX 3
PROPOSED SITE LAYOUT, FLOOR PLANS AND ELEVATIONS

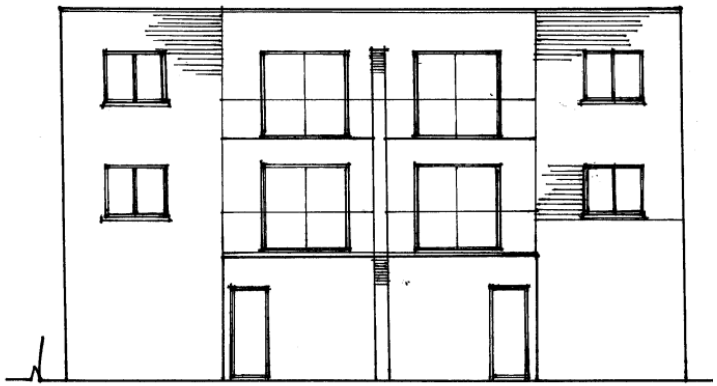




GROUND FLOOR

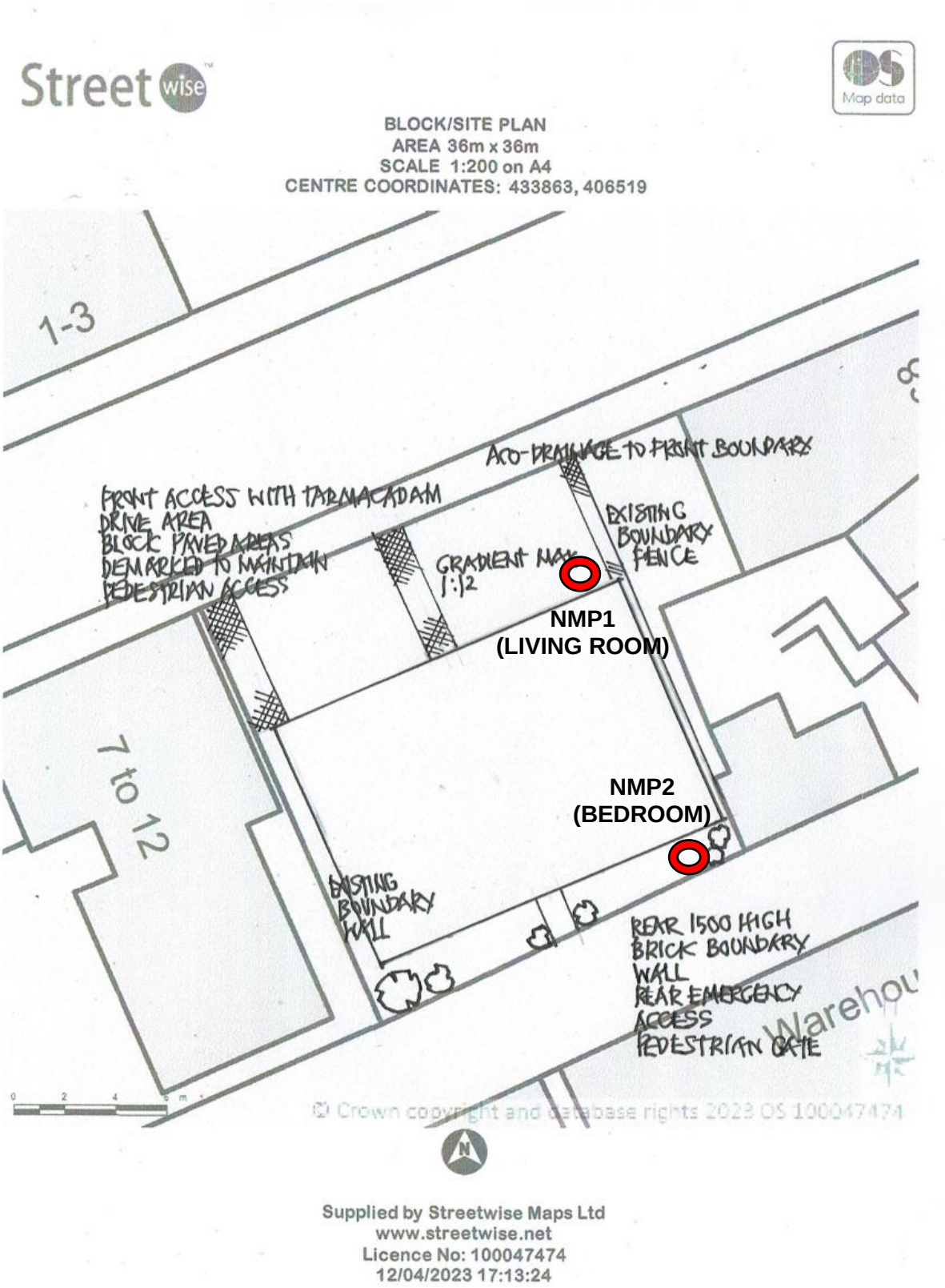


FRONT ELEVATION



REAR ELEVATION

APPENDIX 4
NOISE MONITORING POSITIONS



APPENDIX 5
CALIBRATION CERTIFICATE FOR SOUND LEVEL METER (CALIBRATION EVERY 2 YEARS)

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

0789

Certificate of Calibration and Conformance

Certificate number: **U39995**

Test Object:	**Sound Level Meter, BS EN IEC 61672-1:2013 Class 1** **Associated Frequency Analyser to BS EN IEC 61260:1996 Class 1**
Producer:	**NTi Audio**
Type:	**XL2-TA**
Serial number:	**A2A-17283-E0**
Customer:	**RP Acoustics Ltd**
Address:	**1 Dobcroft Close,** **Sheffield, South Yorkshire. S11 9LL.**
Contact Person:	**Richard Pennell**
Order No:	

Introduction:
Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	*Producer*	*Type*	*Serial No*	*Certificate No*
Microphone	NTi Audio	MC230A	A18352	39994
Calibrator*	Larson Davis	CAL200	17115	U39993
Preamplifier	NTi Audio	MA220	8854	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield	-	-
Attenuator	-	
Extension cable	-	

These items have been taken into account wherever appropriate.

Instruction Manual: NTi-Audio XL2 Operating Manual v3.11.02 August 2016 Firmware Version: v4.21 The test object is a single channel instrument.

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	102.80 ±0.04	22.65 ±0.15	31.35 ±0.25

Calibration Dates:

Received date:	17/01/2022	Reviewed date:	25/01/2022
Calibration date:	25/01/2022	Issued date:	25/01/2022

Technicians: (Electronic certificate)

Calibrated by: *Palaniwel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Darren Batten*

APPENDIX 5
CALIBRATION CERTIFICATE FOR SOUND LEVEL METER (CALIBRATION EVERY 2 YEARS)

Certificate of Calibration and Conformance

Continuation of Certificate number: **U39995**

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	**BS EN IEC 61672-1:2013**
Periodic Tests:	**BS EN IEC 61672-3:2013**
Pattern Evaluation:	**BS EN IEC 61672-2:2013**
Filter Evaluation:	**BS EN IEC 61260:1996 Class 1**

Conformance:
From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - IEC61672-3 Ed.2 #10	Passed
Self-generated noise - IEC 61672-3 Ed.2.0 #11.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.2.0 #12	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.2.0 #13	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.2.0 #14	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.2.0 #16	Passed
Level linearity including the level range control - IEC 61672-3 Ed.2.0 #17	Passed
Toneburst response - IEC 61672-3 Ed.2.0 #18	Passed
Peak C sound level - IEC 61672-3 Ed.2.0 #19	Passed
Overload indication - IEC 61672-3 Ed.2.0 #20	Passed
High level stability test - IEC 61672-3 Ed.2.0 #21	Passed
Long term stability test - IEC 61672-3 Ed.2.0 #15	Passed
1/1octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed
1/3octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed

Comments
Correct level with associated calibrator is 114.0dB(A).

Statement of Conformance
The sound level meter submitted has successfully completed the periodic tests of the standard listed for the environmental conditions under which the tests were performed. As public evidence(1) was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with the manufacturer's standard to demonstrate that the model of sound level meter fully conformed to the requirements of the said standard, the sound level meter submitted for testing conforms to the relevant class of the said standard.
(1 - evidence is held on file at the calibration laboratory)

Filter Calibration
The filter functions have been found to conform, by electrical testing, to the relative attenuation requirement of the standard noted over the range of frequencies shown in the attached test report.

Observations
No information on the uncertainty of measurement, required by the listed standard, for the correction data was made available in the instruction manual / data sheets from the equipment manufacturer / supplier for thetest object. The uncertainty of measurement of the correction data was therefore assumed to be the maximum-permitted uncertainty given in IEC 62585 for the corresponding free-field correction data and for a coverage probability of 95 %.

1 Dobcroft Close, Sheffield, S11 9LL. Tel: 07786 735282 e-mail:info@rpacoustics.co.uk. Registered No.: 11312952

APPENDIX 5
CALIBRATION CERTIFICATE FOR SOUND LEVEL METER (CALIBRATION EVERY 2 YEARS)

Certificate of Calibration and Conformance

Continuation of Certificate number: **U39995**

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

Decision Rule
The decision rules will be applied in accordance with the procedure as described in BS EN 61672-3:2013.

A PASS or PASSED statement indicates that the instrument conforms with the relevant accuracy requirements of the testing standard AND the expanded measurement uncertainty (k = 2 for approximately 95 % coverage probability) is no greater in magnitude than the accuracy requirements defined in BS EN IEC 61260:1996 standard.

This certificate relates only to the items tested above.

** End of Certificate **

1 Dobcroft Close, Sheffield, S11 9LL. Tel: 07786 735282 e-mail:info@rpacoustics.co.uk. Registered No.: 11312952

APPENDIX 5
CALIBRATION CERTIFICATE FOR SOUND CALIBRATOR (CALIBRATION EVERY YEAR)

Laboratory Location

Campbell Associates Ltd

5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

0789

Certificate of Calibration and Conformance

Certificate number: **U43128**

Test Object: **Sound Calibrator**

Producer: **Larson Davis**
Type: **CAL200**
Serial number: **17115**
Customer: **RP Acoustics Ltd**
Address: **1 Dobcroft Close, Sheffield, S11 9LL**
Contact Person: **Richard Pennell**
Order No: **N/A**

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	114.17	0.01	1000.32	0.48
Measurement 2	114.17	0.01	1000.32	0.48
Measurement 3	114.17	0.02	1000.32	0.48
Result (Average):	**114.17**	**0.01**	**1000.32**	**0.48**
Expanded Uncertainty:	0.1	0.02	1	0.1
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

The stated level is relative to 20µPa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement

Pres:0 dB/kPa Temp:0 dB/°C Humi:0 dB/%RH Load volume: 0 dB/mm3

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	101.932 ±0.042	22.4 ±0.1	32.9 ±0.8

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\Current Year\LDL200_17115_M1.nmf

Preconditioning

The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method

Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date:	24/01/2023	Reviewed date:	31/01/2023
Calibration date:	30/01/2023	Issued date:	31/01/2023

Technicians: (Electronic certificate)

Calibrated by: *Katie Brown*
Reviewed by: *Jenny Crawford*

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Doc ref: Calb-Cert-Master-V3-05

APPENDIX 5
CALIBRATION CERTIFICATE FOR SOUND CALIBRATOR (CALIBRATION EVERY YEAR)

Certificate of Calibration and Conformance

Continuation of Certificate number: **U43128**

Reference Microphone: WSM11 (C) - GRAS40AG-291442

Measurements

The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Instruments and Program
A complete list of instruments, hardware and software that have been used for this calibration is available from the calibration laboratory

Comments
94dB spot check = 94.15dB. Note this is not UKAS data.

Statement of Conformance and Calibration
As public evidence was available*, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in annex A of BS EN IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of that BS EN IEC 60942:2003.

*This evidence is held on file at the calibration laboratory.

Notes:
The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in BOLD are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Observations:

Decision Rule:
The decision rules have been applied in accordance with the procedure as described in BS EN 60942:2003

This certificate relates only to the items tested above.

** End of Certificate **

APPENDIX 6
TONALITY ASSESSMENT

NMP1 DAYTIME

Frequency	LZeq	Difference to Lower Adjacent Band	Difference to Upper Adjacent Band	Tonality Criteria
20	61.4		-1.7	
25	63.1	1.7	1.7	
31.5	61.4	-1.7	4.7	Any 1/3 octave band does not exceed BOTH adjacent 1/3 octave bands by > 15 dB, no tonal audibility
40	56.7	-4.7	-1.0	
50	57.7	1.0	3.2	
63	54.5	-3.2	-1.7	
80	56.2	1.7	-8.4	
100	64.6	8.4	10.7	
125	53.9	-10.7	-4.2	
160	58.1	4.2	4.1	
200	54.0	-4.1	2.6	Any 1/3 octave band does not exceed BOTH adjacent 1/3 octave bands by > 8 dB, no tonal audibility
250	51.4	-2.6	-3.5	
315	54.9	3.5	4.3	
400	50.6	-4.3	0.8	
500	49.8	-0.8	0.0	
630	49.8	0.0	0.8	
800	49.0	-0.8	-0.4	
1000	49.4	0.4	1.4	
1250	48.0	-1.4	8.6	
1600	39.4	-8.6	2.0	Any 1/3 octave band does not exceed BOTH adjacent 1/3 octave bands by > 5 dB, no tonal audibility
2000	37.4	-2.0	1.0	
2500	36.4	-1.0	-0.2	
3150	36.6	0.2	4.4	
4000	32.2	-4.4	3.8	
5000	28.4	-3.8	3.4	
6300	25.0	-3.4	3.6	
8000	21.4	-3.6	3.3	
10000	18.1	-3.3	2.9	
12500	15.2	-2.9		

APPENDIX 6
TONALITY ASSESSMENT

NMP2 NIGHT TIME

Frequency	LZeq	Difference to Lower Adjacent Band	Difference to Upper Adjacent Band	Tonality Criteria
20	56.9		1.5	
25	55.4	-1.5	6.4	
31.5	49.0	-6.4	-1.9	Any 1/3 octave band does not exceed BOTH adjacent 1/3 octave bands by > 15 dB, no tonal audibility
40	50.9	1.9	-3.2	
50	54.1	3.2	4.1	
63	50.0	-4.1	-0.1	
80	50.1	0.1	-1.3	
100	51.4	1.3	0.3	
125	51.1	-0.3	-4.2	
160	55.3	4.2	8.9	Any 1/3 octave band does not exceed BOTH adjacent 1/3 octave bands by > 8 dB, no tonal audibility
200	46.4	-8.9	-0.2	
250	46.6	0.2	-3.8	
315	50.4	3.8	6.9	
400	43.5	-6.9	0.3	
500	43.2	-0.3	0.7	Any 1/3 octave band does not exceed BOTH adjacent 1/3 octave bands by > 5 dB, no tonal audibility
630	42.5	-0.7	0.8	
800	41.7	-0.8	-0.7	
1000	42.4	0.7	2.0	
1250	40.4	-2.0	1.0	
1600	39.4	-1.0	2.0	
2000	37.4	-2.0	1.0	
2500	36.4	-1.0	-0.2	
3150	36.6	0.2	4.4	
4000	32.2	-4.4	3.8	
5000	28.4	-3.8	3.4	
6300	25.0	-3.4	3.6	
8000	21.4	-3.6	3.3	
10000	18.1	-3.3	2.9	
12500	15.2	-2.9		