



Sonic Element Ltd
Acoustic Excellence by Design

ASSESSMENT OF INTERNAL & EXTERNAL NOISE
TECHNICAL REPORT

House 1 – 4, Milton Mount, Old Road East, Gravesend

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REPORT OF ASSESSMENT OF INTERNAL & EXTERNAL NOISE

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1.0 CLIENT DETAILS

Sonic Element Ltd. has undertaken an assessment of as-built internal noise relating to specific planning requirement on behalf of:

Wakes Ltd
c/o Prime Folio
35 Albion Place
Maidstone
ME14 5DZ

2.0 SCOPE OF THIS REPORT

This report discusses the assessment of as-built internal noise levels in relation to the planning requirements. The report provides the results of the acoustic survey, which covers all noise sources affecting the newly built terrace of four houses. There are a further nine flats being constructed on this site which will be assessed upon completion.

3.0 STRUCTURE OF THIS REPORT

The aim of this report is to define the acoustic requirements in relation to specific planning conditions. The assessment takes account of the existing noise environment, which has been quantified using direct measurement. The noise levels inside the houses have been compared to the internal noise standards set out in BS8233:2014.

Due to the technical nature of the report, the terminology used in this document is briefly explained in Appendix 1. Equipment details, and measurement conditions are included in Appendix 2 and measured noise data at measurement positions is included in Appendix 3. Consultants experience and qualifications are included in Appendix 4.

4.0 ACCURACY AND LIMITATIONS OF THIS REPORT

This report relies on typical internal, as built, and external noise level measurements of incident noise over relatively large areas. Background noise at a given location can vary substantially from day to day with variations in road traffic and other sources, and propagation of noise can be strongly affected by weather, in particular wind direction and atmospheric conditions.

The noise surveys were conducted during the school term time and there was normal road traffic on all the major and minor roads in the area. The weather conditions for the duration of the survey were dry and calm. These conditions were witnessed and recorded on-site at the beginning and the conclusion of the survey. Therefore, we believe this assessment is based on typical conditions.

5.0 PROJECT DESCRIPTION & CONSTRUCTION

The property, a terrace of four, three-bedroom dwelling houses over three floors and bedroom within the roof space, towards the rear of the site.

The predominant source of noise affecting this site is road traffic noise from Old Road East.

The houses are screened from the road by the, under-construction, multi-storey building to the front of the site, facing the road. There is no fixed external plant associated with the houses.

The site is surrounded by residential properties to the south with the access road to this and the adjacent residential property to the west. There is an electricity sub-station to the east of the site and the, under-construction flats, and the road to the north, as shown in the site plan, below.



Figure 1: Site GA Plan

The houses are constructed using traditional method of masonry cavity walls and a traditional pitched, tiled roof with double glazed windows incorporating acoustic laminate glass with a built-in ventilator (trickle vent) in the window frame.

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6.0 PLANNING REQUIREMENT

The relevant planning condition is cited below for reference:

Noise Control

13. Within six months of the commencement of the development and before any occupations of any part of the development, a noise impact assessment shall be carried out and submitted to the Local Planning Authority for approval demonstrating that:
- The internal ambient noise levels in all habitable rooms of the proposed residential dwellings shall not exceed the guideline LAeq values found in Table 4 of BS8233:2014.
 - The maximum internal noise levels in all habitable rooms should not exceed 45dB L_{Amax} more than 10 times per night in accordance with the Professional Practice Guidance on Planning & Noise and the WHO Guidelines for Community Noise.
 - If relevant, the rating noise from fixed building services/mechanical plant/equipment associated with the development shall be at least 10dB below the existing LA90 background level at the nearest noise sensitive receptors (i.e., dwellings) when measured and assessed in accordance with BS4142:2014

Any works that are required to address the findings and recommendations of the noise impact assessment shall be implemented before the first occupation of any part of the development.

7.0 BASIS OF ASSESSMENT

7.1 National Planning Policy Framework

The Department of Housing, Communities and Local Government published the National Planning Policy Framework (NPPF) in July 2021, revised in Dec 2023. Paragraphs 180 (e) 191(a), (b) and 193 refer to noise in terms of policy approach:

180. 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 soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

191. 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 impacts 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

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193. 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.

7.2 Noise Policy Statement for England

The Department for Environment, Food and Rural Affairs published the *Noise Policy Statement for England* (NPSE) in March 2010. The explanatory note of NPSE defines the terms used in the NPPF:

"2.20 There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are: 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.

2.21 Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

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 at paragraph 2.22:

"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.

The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development.

The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.

This aim seeks, where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

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7.3 British Standard 8233:2014

The scope of British Standard 8233: 2014 *Sound insulation and noise reduction for buildings – Code of practice* is the provision of recommendations for the control of noise in and around buildings.

It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use.

The standard suggests suitable internal noise levels for residential dwellings, as shown in Table 1.

Activity	Location	07:00 - 23:00 L _{Aeq} , 16 hour	23:00 - 07:00 L _{Aeq} , 8 hour
Resting	Living Rooms	35	-
Dining	Dining Area	40	-
Sleeping	Bedrooms	35	30

Table 1: BS8233:2014 requirements for habitable rooms

In terms of this development the internal noise levels will be compared to the measured internal noise levels in Table 1.

With respect to the night-time maximum noise levels, the World Health Organisation guidelines state:

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB LAF max more than 10-15 times per night.”

7.4 ProPG Planning & Noise

Specific guidance on the assessment of noise affecting new residential development is given in ProPG. The process within the ProPG guidance for the appraisal of noise levels affecting new residential development is current ‘best practice’. The assessment process can be summarised as follows:

Stage 1 – measure noise levels at the site and carry out an initial noise risk assessment of the proposed development site based on the measured levels.

Indicative Daytime Noise Levels L_{Aeq},16hr



Indicative Night-time Noise Levels L_{Aeq},8hr

Stage 2 – where a higher noise risk is identified, carry out a detailed assessment including the following four considerations:

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Element 1 – the overall acoustic design and layout of the site

Element 2 – internal noise levels in habitable areas

Element 3 – noise levels in external amenity areas

Element 4 – consideration of other relevant issues

Based on the results of the Stage assessment, provide a recommendation to the decision maker on whether planning permission can and should be granted.

7.5 BS 4142:2014+A1:2019

When considering if noise constitutes a nuisance, guidance may be taken from British Standard BS 4142:2014+A1:2019, which is a method of rating industrial noise affecting mixed residential and industrial areas and which provides a method of assessing the likelihood of complaints resulting from noise. Strictly speaking, BS 4142:2014+A1:2019 applies only to the noise of an industrial nature, but in the absence of any specific standard relating to noise from music, the underlying principle of BS 4142:2014+A1:2019 is often referred to by local authorities.

BS 4142:2014+A1:2019 essentially sets out a method of assessing the impact of noise, based on the difference between the “rating level” of the noise and the “background noise level” that would otherwise exist in the absence of the noise.

The “rating level” is derived by noise measurement at the assessment position and adding a correction of 5dB(A) if the noise has tonal elements or distinctive characteristics.

The standard suggests that the greater the difference by which the rating level exceeds the background noise the greater the likelihood of complaint. Where the noise exceeds the background by +5dB(A) it is considered to be of marginal significance, a difference of +10dB(A) gives an indication that complaints are likely and a difference of 10dB(A) below the background is an indication that complaints are unlikely.

7.6 ANC Residential Design Guide to Acoustics, Ventilation and Overheating

The ANC guide to acoustics, ventilation, and overheating provides an integrated approach to achieving good acoustic design with the ventilation requirements of Approved Document F and Approved Document O of the Building Regulations and consideration for overheating control.

This good practice document recognises the interdependence of ventilation and overheating when assessing noise and provides a methodology for assessing the noise implications surrounding ventilation and overheating control.

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8.0 AS BUILT INTERNAL NOISE SURVEY METHODOLOGY & RESULTS

An, internal noise survey was conducted over a 24-hour period from 12:15 hrs on 13th December to 12:5 hrs on 14th December 2024. The construction on the site was stopped for the duration of the noise survey.

The instruments used for the survey were Svantek 971 Class 1 sound level meter. The sound level meters were calibrated immediately before and after use with a Bruel & Kjaer 4230 Acoustic Calibrator producing 93.8dB at 1KHz. No drift was noted in calibration readings. Both calibration results were 93.8dB. Full equipment details are included in Appendix 2.

The measurements were taken with the microphone attached to the sound level meter mounted on a tripod at MP1 – House 1, Front FF Bedroom facing Old Road East with the window closed and trickle vent open.

The chosen measurement location is considered representative of the worst-case scenario in terms of noise due to the bedroom window having a direct, un-screed, line of sight to Old Road East. The actual measurement setup is shown in the picture below and also marked, in red, on the elevation drawing, below.



Figure 2: Picture of the Measurement Position & Location on House Elevation (MP1)

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The metrics measured were L_{Aeq} and $L_{AF Max}$. The sound level meter was set to log every 15 minutes.

Date	Duration	MP1 $L_{Aeq,T}$	MP1 No. times 45dB $L_{AF Max}$ exceeded
13/12/24	12:15 – 23:00	28.8	N/A
13 – 14 /12/24	23:00 – 07:00	22.1	2
14/12/24	07:00 – 12:15	30.3	N/A

Table 2: Summary of Measured Internal Noise levels at MP1

No unusual events appear to have occurred during the unattended internal noise survey.

9.0 EXTERNAL NOISE SURVEY METHODOLOGY & RESULTS

In addition to the unattended internal noise survey, an attended external noise survey was also carried out on the western and eastern site boundaries, near the road and the electrical sub-station, respectively, to establish the impact of external sources of noise on the properties.

A simultaneous, two position, external noise survey was conducted over a 2-hour period from 10:00 hrs till 12:00 hrs on 14th December. The time and duration were chosen to capture the worst-case day-time free field noise levels at the site during typical traffic conditions.

There was no construction works being carried out for the duration of the survey.

The instruments used for the survey were Svantek 971 Class 1 sound level meters at MP2 and MP3.

The sound level meters were calibrated immediately before and after use with a Bruel & Kjaer 4230 Acoustic Calibrator producing 93.8dB at 1KHz. No drift was noted in calibration readings. Full equipment details are included in Appendix 2.

The measurements were taken with the microphone attached to the sound level meter mounted on a tripod at MP2 & MP3, as shown in the pictures below.



Figure 3: Picture of the Measurement Positions (MP2 - left) and (MP3 – right)

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The metrics measured were L_{Aeq} . The sound level meter was set to log every 15 minutes.

Date	Duration	MP2 $L_{Aeq,T}$	MP3 $L_{Aeq,T}$
14/12/24	10:00 - 12:00	50.6	51.3

Table 3: Summary of Measured External Noise levels

10.0 EVALUATION OF RESULTS

The internal noise survey results are presented in table 2 of this report. The results meet the BS8233:2014 internal day and nighttime noise level criteria. The LAFmax exceedances during the 8hr, night-time period, are also well within the WHO recommended criteria.

The external noise survey results are presented in table 3 of this report. Based on the day-time results, the façade noise levels fall within the low-risk category of ProPG guidance. Therefore, the internal noise levels can also be achieved with windows partially open, for ventilation purpose.

11.0 SUMMARY AND CONCLUSION

Sonic Element Ltd. has undertaken an assessment of internal and external noise on behalf of Wakes Ltd c/o Prime Folio. Sonic Element Ltd. is a member organisation of the Association of Noise Consultants and all our consultants and engineers are full members of the Institute of Acoustics.

The property for which this report has been prepared is known as House 1 – 4, Milton Mount, Old Road East, Gravesend.

The assessment, by direct measurement, of the internal, as-built, noise levels presented in Table 2 complies with the recommended internal day and night-time noise levels as set out in BS8233:2014 and as required by the terms of planning condition 13.

As the compliant internal noise levels were achieved with windows closed, based on further information gathered by external noise monitoring, the internal noise level can also be achieved with window partially open for ventilation.

BS8233:2014 does not have any values for LAF Max but The WHO guidelines state that a level of 45dBA should not normally be exceeded more than 10-15 times in a night. The number of exceedances in one night was well within the WHO maximum recommended exceedances, also in line with the terms of planning condition 13.

There is no fixed external plant associated to this development to be assessed for noise.

Therefore, in our view, the as-built properties meet the NPSE NOEL conditions.

APPENDIX 1 - ACOUSTIC TERMINOLOGY

Decibel (dB) – This is the unit used to measure sound level. The range of human hearing from the quietest detectable sound to the threshold of pain is very large. If a normal linear scale of measurement were used, it would have to range from 20 μPa to 200,000,000 μPa . Using such large figures would be unmanageable and for this reason sound pressure levels are expressed on a logarithmic scale, which corresponds to the almost logarithmic response of the ear and which compresses the range to a manageable 0dB to 140dB.

Sound Pressure Level (L_p or SPL) – This is a function of the source and its surroundings and is a measure in decibels of the total instantaneous sound pressure at a point in space. The SPL can vary both in time and in frequency. Different measurement parameters are therefore required to describe the time variation and frequency content of a given sound. These are described below.

Frequency – This refers to the number of complete pressure fluctuations or cycles that occur in one second. Frequency is measured in Hertz (Hz). The rumble of thunder has a low frequency, while a whistle has a high frequency. The sensitivity of the ear varies over the frequency range and is most sensitive between 1KHz and 5KHz.

'A' Weighting – The sensitivity of the human ear varies with frequency, some frequencies sound louder than others. The 'A'-weighting curve represents the nonlinear frequency response of the human ear and is incorporated in an electronic filter used in sound level meters. Measurements using an 'A'-weighting filter makes the meter more sensitive to the middle range of frequencies, which approximates to the response of the ear and the subjective loudness of the sound. Sound level measurements using 'A'-weighting will include the subscript A, e.g. dB(A).

Statistical Analysis - These figures are normally expressed as LN, where L is the sound pressure level in dB and N is the percentage of the measurement period. The LN figure represents the sound level that is exceeded for that percentage of the measurement period. L90 is commonly used to give an indication of the background level or the lowest level during the measurement period. L10 may be used to measure road traffic noise.

Leq,T - The equivalent continuous sound level is used to measure sound that varies with time. The Leq,T is the notional equivalent steady sound level, which contains the same acoustic energy as the actual varying sound level over the period of measurement. Because the averaging process used is logarithmic, the Leq,T level tends to be dominated by the higher sound levels measured.

Octave and Third Octave Bands - The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Level Difference, D - This is defined as the difference in decibels between the average sound pressure level in a source room on one side of a separating structure and the average sound pressure level in a receiving room on the other side. The level difference is an absolute measure of the sound insulation of a separating structure.

Standardised Level Difference, D_{nT} - This is a measure of the level difference, corresponding to a reference value of the reverberation time in the receiving room. A correction term of ten times the common logarithm (to

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base 10) of the ratio of the actual reverberation time to the reference reverberation time is added to the level difference, D . For residential dwellings the reference reverberation time is 0.5s. The D_{nT} is measured in decibels. It is used as an airborne noise measurement parameter in sound insulation tests.

Reverberation Time, T - The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level, once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T_{20} (time taken for a 20 dB decay multiplied by three) and T_{30} (time taken for a 30 dB decay multiplied by two).

Standardised Impact Sound Pressure Level, L'_{nT} - This is a measure of the average noise level in a receiving room generated by use of a standard impact source on a separating floor reduced by a correction term corresponding to a reference value of the reverberation time. A correction of ten times the common logarithm (to base 10) of the ratio of the actual reverberation time to the reference reverberation time is subtracted from the received average noise level. For residential dwellings the reference reverberation time is 0.5s. The L'_{nT} is measured in decibels. It is used as an impact noise measurement parameter in sound insulation tests.

Airborne Single Number Quantity Weighting - This is a weighting procedure defined in BS EN ISO 717, Part 1 for converting third octave band R , R' , D and D_{nT} values to a single number quantity denoted as R_w , R'_w , D_w or $D_{nT,w}$. It is a decibel value.

Impact Single Number Quantity Weighting - This is a weighting procedure defined in BS EN ISO 717, Part 2 for converting third octave band L'_{nT} values to a single number quantity denoted in $L'_{nT,w}$. It is a decibel value.

Spectrum Adaptation Term C_{tr} - This is a correction factor calculated from the measured R_w , R'_w , $D_{nT,w}$ and the corresponding third octave band R , R' and D_{nT} values. It uses a set of weighting levels in third octave bands derived from a road traffic noise spectrum. It is applied to airborne test results and is measured in dB.

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APPENDIX 2 – INSTRUMENTATION

Instrumentation Description	Manufacturer	Type	Serial Number	Calibration
MP1				
Type1 Data Logging Sound Level Meter	Sventek	971	100676	Calibration on 09/03/2023
Type 1 ½" Condenser Microphone	ACO Pacific	7052E	79073	Calibration on 09/03/2023
Preamp	Svantek	SV18	103792	Calibration on 09/03/2023
MP2				
Type1 Data Logging Sound Level Meter	Sventek	971	111626	Calibration on 27/06/2023
Type 1 ½" Condenser Microphone	ACO Pacific	7052E	80033	Calibration on 27/06/2023
Preamp	Svantek	SV18	112631	Calibration on 27/06/2023
MP3				
Type1 Data Logging Sound Level Meter	Sventek	971A	113235	Calibration on 09/07/2024
Type 1 ½" Condenser Microphone	ACO Pacific	7152	80653	Calibration on 09/07/2024
Preamp	Svantek	SV18A	113712	Calibration on 09/07/2024
Acoustic Calibrator				
Acoustic Calibrator	B&K 4230	B&K	1559217	Calibration on 23/06/2024

Table 4: Instrumentation & Calibration

External Conditions	Clear skies, south-westerly wind direction, wind speeds between 3 – 6m/s, air temperature between 4 - 8°C
Calibration Level	93.8 dB @ 1 kHz
Person in charge of measurements	Mr A Naqvi BSC, MSC, MIOA MANC MAES
Principal sound sources	Urban noise including road traffic noise
Measurement Parameters	L _{Aeq} , L _{AFmax} , L _{A90} in 1 & 15 -minute periods

Table 5: Measurement Conditions and Parameters

APPENDIX 3 – MEASURED NOISE DATA

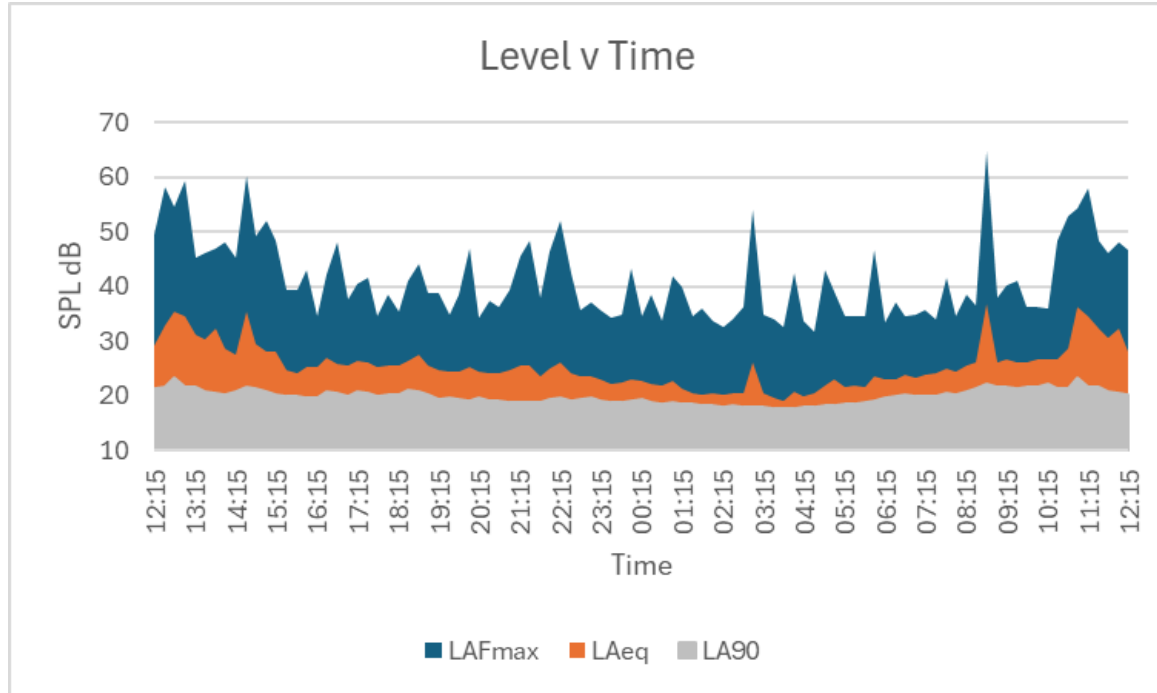


Figure 4: Level v Time plot of the measured noise data at MP1

Start Time	LAFmax	LAeq
12:15	49.5	29.1
12:30	58.2	32.8
12:45	54.6	35.4
13:00	59.3	34.6
13:15	45.4	31.1
13:30	46.2	30.4
13:45	47.1	32.4
14:00	48.1	28.7
14:15	45.4	27.6
14:30	60.1	35.4
14:45	49.3	29.6
15:00	52.1	28.2
15:15	48.4	28.2
15:30	39.3	24.7
15:45	39.3	24.1
16:00	43.1	25.4
16:15	34.6	25.4
16:30	42.1	27.1
16:45	48.2	25.7

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17:00	37.6	25.5
17:15	40.5	26.4
17:30	41.7	26.1
17:45	34.5	25.3
18:00	38.4	25.6
18:15	35.3	25.6
18:30	41.1	26.5
18:45	44.1	27.4
19:00	38.9	25.6
19:15	38.9	24.7
19:30	34.9	24.3
19:45	38.6	24.3
20:00	47	25.2
20:15	34.2	24.5
20:30	37.4	24.2
20:45	36.4	24.2
21:00	39.3	24.6
21:15	45.7	25.6
21:30	48.5	25.5
21:45	38.1	23.7
22:00	46.4	24.9
22:15	52	26
22:30	42.4	24
22:45	35.8	23.7
23:00	37	23.6
23:15	35.7	23
23:30	34.2	22.1
23:45	34.8	22.4
00:00	43.2	23.1
00:15	34.6	22.8
00:30	38.6	22.2
00:45	33.6	21.8
01:00	41.8	22.7
01:15	39.8	21.3
01:30	34.7	20.6
01:45	36.1	20.2
02:00	33.6	20.4
02:15	32.5	20.2
02:30	34.1	20.5
02:45	36.4	20.6
03:00	54.1	26.2
03:15	34.8	20.4

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03:30	34.1	19.5
03:45	32.5	19.1
04:00	42.5	20.7
04:15	33.7	19.8
04:30	31.8	20.4
04:45	43	22
05:00	39.2	22.9
05:15	34.6	21.7
05:30	34.6	21.9
05:45	34.6	21.6
06:00	46.6	23.7
06:15	33.4	23
06:30	37.2	23.1
06:45	34.7	23.9
07:00	34.9	23.4
07:15	35.7	23.8
07:30	34	24.1
07:45	41.6	24.9
08:00	34.7	24.3
08:15	38.6	25.6
08:30	36.5	26.1
08:45	64.7	36.8
09:00	37.9	26
09:15	40.2	26.7
09:30	41.1	26.2
09:45	36.3	26.2
10:00	36.2	26.6
10:15	36.1	26.8
10:30	48.3	26.6
10:45	52.8	28.6
11:00	54.2	36.2
11:15	58.1	34.5
11:30	48.4	32.4
11:45	46.2	30.6
12:00	48.1	32.4
12:15	46.6	28.1

Table 6: Numerical measured noise data at MP1

APPENDIX 4 – CONSULTANTS QUALIFICATIONS & EXPERIENCE

The experience of practitioner undertaking this noise assessment, Mr Amber Naqvi BSc(Hons) MSc MIOA MANC MAES has more than 25 years of experience in all matters related to architectural acoustic design and detailing. He has a Master's Degree in Acoustics. In his professional capacity, he is responsible for developing the acoustic design of the project from the scheme stage and carry out acoustic testing and measurements at pre-defined stages of the project right down to the final commissioning stage. He has hands-on experience in all aspects of acoustic design of commercial and residential projects, in particular acoustic isolation, interior acoustic elements, and electro-acoustic systems to the current industry standards. Mr Naqvi is a corporate member of Institute of Acoustics since 1997 and sits on the certification committee of the Association of Noise Consultants.

The consultant responsible for the internal audit of this report, Mr Ned Johnson MSc MIOA, MCIEH CEnvH is the senior consultant who has over 18 years of expertise and experience in noise control and acoustics. Ned is a member of the Institute of Acoustics, a registered Environmental Health Professional, and a Chartered Environmental Health Practitioner with a Master's Degree and the Institute of Acoustics Diploma in Acoustics and Noise Control.