

Planning Noise Impact Assessment

Dene Holm Care Facility

Gravesham

DA11 8JZ

Stroma Built Environment Ltd.

SBE Ref: G858 – AC - 1v1

I. Revision History

Revision	Date	Description	
1v1	27/04/2026	First Issue	
		Compiled By	Authorised By
		Tom Chaffer MIOA Associate Director	Andrew Gibson MIOA Principal Acoustic Consultant

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1. Introduction

- 1.1 Stroma Built Environment (SBE) has been appointed by BCP Ltd (the client) to undertake acoustic consultancy services in support of a new care home development at Dene Holm Road, Gravesham, DA11 8JZ.
- 1.2 The proposed scheme includes the construction of a new 60 Bed Care Facility with 6 Rehabilitation Apartments. A site plan showing the building layout is included in Appendix I.
- 1.3 The purpose of this report is to provide a review of the acoustic implications related to the development site in support of a planning application. A site noise survey has been undertaken and measured noise levels used to provide a specification for building envelope and ventilation to provide suitable internal noise levels for residential amenity. An assessment of the suitability to use open windows to control overheating has been undertaken, and consideration has been given to the noise impact due to the development on surrounding areas.
- 1.4 This document has been prepared for the sole use, benefit, and information of the client for the purposes set out. The liability of SBE in respect of any information contained herein shall not extend to any third party.
- 1.5 Whilst every effort has been made to ensure this report is easy to understand, it is technical in nature. A glossary of acoustic terms is included as Appendix II.

2. Site Baseline Conditions

Site Description

- 2.1 The development site is located south of Dene Holm Road, Gravesham, and is currently occupied by a former care home building which is to be demolished to make way for the new development. A site plan and the surrounding area are shown in Figure 1 below.
- 2.2 The site is bounded by Dene Holm Road to the north and Tensing Avenue to the West. Existing residential housing is located to the south and east of the site. The site is situated within a suburban residential area, with the noise climate controlled by local road traffic.
- 2.3 The primary noise source noted to affect the site was traffic passing on Dene Holm Road which was primarily comprised of cars with occasional buses noted. Distant traffic noise was audible from the A2 dual carriageway to the south and Coldharbour Road to the east.



Figure 1: Site plan and noise survey locations

Noise Survey Measurements

- 2.4 A noise survey was undertaken at the site between 14th and 15th April 2026. The noise survey consisted of two long term unattended measurements at positions LT1 and LT2, and an attended short term measurement at position ST1. Measurement positions are shown in Figure 1 above.

- 2.5 Weather conditions during installation and collection of equipment were dry and calm with wind speeds of less than 10ms^{-1} ; and are considered suitable for environmental noise monitoring. Review of local weather data indicates that conditions were suitable throughout the survey period with no precipitation and low wind speeds.
- 2.6 Noise levels were measured using NTi Audio XL3 Class 1 sound level meters fitted with weather protection kits. The sound level meters were field calibrated prior to the survey periods, and no significant drift was detected. Noise was measured in terms of broadband A-weighted indices and octave band spectral terms.
- 2.7 Measurement position LT1 was chosen to be representative of the eastern perimeter of the development where Rehabilitation Apartments are to be located. The microphone was mounted on top of an existing shed approximately 3m above ground level and 15 west of Tensing Avenue. The noise climate was controlled by distance road traffic noise from the A2 to the south and Dene Holm Rad to the north, with occasional passing vehicles on Tensing Avenue.
- 2.8 The measurement at LT2 was chosen to be representative of the northern façade of the development. The microphone was mounted out of a first floor window of the existing building and located approximately 0.5m away from the building façade; as such the measurements at this position are inclusive of a façade reflection. The noise climate at this location was controlled by traffic from Dene Holm Road with distant traffic noise from Coldharbour Road.
- 2.9 Photographs of the long term measurement positions are included in Figure 2.



Figure 2: Measurement Positions LT1 and LT2

2.10 Long term measurements are summarised in Table 1, with time history plots provided in Appendix III. A summary of the short-term measurement at position ST1 is provided in Table 2.

Table 1: Noise measurement summary – Unattended positions

Position	Date	Duration	Measured Sound Pressure Level			
			Typical $L_{AFmax}^{[1]}$	L_{AFmax} range ^[2]	$L_{Aeq,T}$	$L_{A90,T}^{[3]}$
LT1	Tuesday 14 th April 2026	Daytime (11:30-23:00)	-	-	54	49
		Night (23:00-07:00)	66	47 - 68	50	45
	Wednesday 15 th April 2026	Daytime (07:00-12:45)	-	-	53	51
LT2 ^[4]	Tuesday 14 th April 2026	Daytime (11:30-23:00)	-	-	54	48
		Night (23:00-07:00)	65	42 – 73	47	43
	Wednesday 15 th April 2026	Daytime (07:00-12:45)	-	-	57	50

Notes to Table:

[1] 10th highest measured $L_{AFmax,2mins}$

[2] Range of L_{AFmax} events over stated period (2 minute).

[3] Arithmetic average over stated period.

[4] Measurements at position LT2 include a façade reflection. A -3dB correction has been applied to the $L_{Aeq,T}$ and L_{AFmax} measurements to provide free field levels

Table 2: Summary of short term measurements

Position	Start date	Start Time	Measurement Position	Measurement Duration	L_{AFmax} (dB)	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)
ST1	15/04/2026	12:59	ST1	55 minutes	75	56	50

3. Acoustic Guidance

3.1 This section describes acoustic standards that are considered relevant to the proposed development.

National Planning Policy Framework

3.2 The current planning guidance for the assessment of the potential environmental noise impact is outlined in the National Planning Policy Framework December 2024 (NPPF). Whilst the NPPF does not set criteria that must be achieved, the NPPF states the following in relation to the appropriate control of potential noise impacts (paragraph 198):

“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; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conversation.”*

3.3 Therefore, the policy requires that new developments are not affected to an unacceptable degree by environmental noise and existing development is not put at an unacceptable risk from noise due to the adjacent new development.

Noise Policy Statement for England

3.4 The Noise Policy Statement for England (NPSE) provides further guidance on the Government’s policy with regard to the potential impacts of noise. The NPSE states the aims of Government policy relating to noise are:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;*
- mitigate and minimise adverse impacts on health and quality of life; and*
- where possible, contribute to the improvement of health and quality of life”*

- 3.5 The Explanatory Note to the NPSE provides further guidance on how significant noise effects should be determined. The concepts of No Observed Effect Level (NOEL), Lowest Observed Adverse Effect Level (LOAEL – the lowest noise level at which an adverse effect can be observed) and Significant Observed Adverse Effect Level (SOAEL – the noise level above which significant adverse effects on health and quality of life can be observed) are introduced, however the NPSE also states that:

“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.”

BS 8233:2014 Guidance on sound insulation and noise reduction for buildings

- 3.6 BS 8233 provides guidance for the control of noise in and around buildings. The guidelines recommend internal ambient noise level (IANL) criteria for a range of spaces. Relevant criteria for the residential aspects of this development are presented in Table 3.

Table 3: BS 8233 Guideline noise levels for residential spaces

Activity	Location	Daytime dB $L_{Aeq,16hr}$ (07:00 - 23:00)	Night Time dB $L_{Aeq,8hr}$ (23:00 - 07:00)
Resting	Living Room	35 dB $L_{Aeq,16hr}$	N/A
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	N/A
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

ProPG: Planning & Noise Professional Practice Guidance in Planning & Noise (2017)

- 3.7 ProPG jointly published by the Institute of Acoustics (IOA), Acoustics and Noise Consultants (ANC) and the Chartered Institute of Environmental Health (CIEH) provides guidance for the assessment of noise affecting new residential developments.
- 3.8 ProPG guidance sets out the importance of good acoustic design for residential developments to limit the impact of existing noise sources on future residents. A hierarchy of noise control is set out, with the preferred option of controlling or reducing noise at source, and control of noise ingress through building façade sound insulation being used only where other options are not available.

- 3.9 ProPG is consistent with the guidance in BS 8223 for average internal noise levels however provides further guidance in relation to maximum noise levels within dwellings where it states:

"In most circumstances in noise sensitive rooms at night, (e.g. bedrooms) good acoustic design can be used so that individual events do not normally exceed 45 dB $L_{Amax,F}$ 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 factors such as the source, number, duration, predictability and regularity of noise events."

BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

- 3.10 BS 4142 describes a method for assessing the potential adverse impact from noise sources that are of an industrial nature (e.g. fans, pumps, chillers, air handling units etc.). The assessment methodology is based upon determining a 'rating level' for the equipment being assessed, which is the level of noise from the item or items of plant being assessed (measured as L_{Aeq}).
- 3.11 The rating level is then compared with the underlying background noise level (measured as L_{A90}) in the absence of noise from the item or items of plant being assessed.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
 - 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 low impact, depending on the context.
- 3.12 BS 4142 states that a penalty should be added for any plant which gives rise to noise features that may increase disturbance such as tonal, impulsive, or intermittent characteristics. With respect to the acoustic feature correction, BS 4142 states:
- "Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."*
- 3.13 Generally, a rating penalty for a sound should be based on a subjective assessment of its characteristics.

Approved Document F: Volume 1 applies to Dwellings

3.14 The relevant section of Approved Document F that relates to noise is reproduced below.

Noise

- 1.5 Mechanical ventilation systems, including both continuous and intermittent mechanical ventilation, should be designed and installed to minimise noise. This includes doing all of the following.
- Correctly sizing and jointing ducts.
 - Ensuring that equipment is appropriately and securely fixed, such as using resilient mountings where noise carried by the structure of the building could be a problem.
 - Selecting appropriate equipment, including following paragraph 1.6.

1.6 For mechanical ventilation systems, fan units should be appropriately sized so that fans operating in normal background ventilation mode are not overly noisy. This might require fans to be sized so that they do not operate near maximum capacity when in normal background ventilation mode.

1.7 Account should be taken of outside noise when considering whether openable windows are appropriate for purge ventilation.

NOTE: Although there is no requirement to undertake noise testing, achieving the levels in the following guidance would ensure good acoustic conditions. The average A-weighted sound pressure level for a ventilator operating under normal conditions and not at boost rates should not exceed both of the following.

- 30dB $L_{Aeq,T}$ * for noise-sensitive rooms (e.g. bedrooms and living rooms) when a continuous mechanical ventilation system is running on its minimum low rate.
- 45dB $L_{Aeq,T}$ * in less noise-sensitive rooms (e.g. kitchens and bathrooms) when a continuous operation system is running at the minimum high rate or an intermittent operation system is running.

* The noise index $L_{Aeq,T}$ is used in BS 8233, where T is the duration of the measurement. If the noise from the sound source is steady (i.e. fluctuating by up to 3dB), a measuring time of 1 minute will be adequate and the $L_{Aeq,1min}$ level will be similar to the dB(A) level used elsewhere. If the noise from the sound source fluctuates more than this, a longer measuring time (T) may be required, but the higher portion of the fluctuating level should be considered, and the sound may attract more attention due to the changes in level.

NOTE: Methods for measuring the sound power level produced by the fan unit of decentralised extract ventilation, centralised extract ventilation and balanced mechanical ventilation with heat recovery systems are described in BS EN 13141.

Approved Document O: Overheating

3.15 The relevant section of Approved Document O that relates to noise is reproduced below.

Noise

- 3.2** In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).
- 3.3** Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.
- a. 40dB $L_{Aeq,T}$ averaged over 8 hours (between 11pm and 7am).
 - b. 55dB L_{AFmax} more than 10 times a night (between 11pm and 7am).
- 3.4** Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' *Measurement of Sound Levels in Buildings* with the overheating mitigation strategy in use.

NOTE: Guidance on reducing the passage of external noise into buildings can be found in the *National Model Design Code: Part 2 – Guidance Notes* (MHCLG, 2021) and the Association of Noise Consultants' *Acoustics, Ventilation and Overheating: Residential Design Guide* (2020).

4. Site Suitability Assessment

Building Envelope Sound Insulation Requirements

- 4.1 Indicative noise ingress calculations have been undertaken according to the methodology outlined in Annex G of BS 8233:2014 to provide guidance on the minimum sound insulation requirements in order to achieve the internal ambient noise criteria outlined in Section 3 for residential areas. In addition, sound insulation measures are based on not exceeding a noise level of 45 dB $L_{AFmax,2min}$ within bedrooms more than 10 times per night in line with ProPG guidance.
- 4.2 Calculations of noise intrusion are based on drawings supplied by the client.
- 4.3 For the purposes of this assessment, the solid walling elements of the building envelope have been calculated based on a typical masonry cavity wall build-up having a sound insulation performance of ≥ 45 dB R_w .
- 4.4 Based on calculation results, Table 4 presents a summary of the minimum sound insulation requirements. Calculations are based on use of passive trickle ventilators for ventilations, with an allowance of a single ventilator for Bedrooms, and two ventilators for Living areas. If additional ventilators are required to provide sufficient air flow then sound insulation values will need to be increased.

Table 4: Minimum glazing and ventilation sound reduction requirements to all residential areas

Minimum Glazing Sound Insulation (dB R_w)	Minimum Ventilator Sound Insulation (dB $D_{n,e,w}$)
30	33

- 4.5 A sound reduction of 30 dB R_w can typically be achieved with standard thermal double or triple glazing such as two panes of 6mm glass separated by a 16mm cavity. 33 dB $D_{n,e,w}$ trickle ventilators are readily available from suppliers and should be provided with a laboratory test certificate to confirm acoustic performance.

Background Ventilation

- 4.6 Typically a partially open windows for background ventilation will provide an acoustic attenuation of 15 dB, therefore BS8233 and ProPG guidance internal noise levels would be exceeded if open windows are primary source of ventilation, therefore an alternative source of background ventilation is required to meet the requirements of Approved Document F. Use of open windows for purge ventilation and overheating control are considered further below.

- 4.7 At the time of writing the ventilation strategy for the new building is yet to be confirmed. It is assumed that natural ventilation provided by façade mounted trickle ventilators will be the preferred option, therefore the assessment provides sound insulation requirements for trickle ventilators.
- 4.8 A whole house mechanical ventilation system may be preferred for residential areas, in which case the sound insulation requirements for ventilators may be disregarded and glazing sound insulation values only should be met.

Purge (Intermittent) Ventilation

- 4.9 Approved Document Part F requires that intermittent rapid ventilation is supplied for occupants to quickly expel fumes from dwellings, such as those from burning toast.
- 4.10 Opening windows as a method of purge ventilation is acceptable for short term use on the basis that the effect of increased internal noise levels would be expected by the occupant, and that the relative exposure would be small.

Mitigation of Overheating

- 4.11 Due to the energy efficiencies required from modern buildings including high levels of air tightness, dwellings can be prone to solar gain and/or heat gain from internally located sources. Rapid ventilation rates are therefore often required in order to provide relief from the effects of summer overheating.
- 4.12 At the time of writing a TM59 overheating assessment is yet to be undertaken, therefore it has not been established whether mitigation of overheating for residential areas is required. If it is indicated that mitigation of overheating is required it is understood that the preference is to utilise open windows to provide cooling where possible. The assessment below presents an outline review of the viability of an open window strategy if required.
- 4.13 Approved Document O indicates that windows are likely to be closed during sleeping hours in bedrooms where internal night noise levels exceed 40 dB $L_{Aeq,8hr}$ or 55 dB $L_{Amax, F}$. A partially open window for the purpose of controlling overheating will reduce the sound insulation performance of the facade to approximately 10 dB.
- 4.14 As such where night time noise levels are equal to or below 50 dB $L_{Aeq,8hr}$ and the maximum noise level equal to or below 65 dB $L_{Amax, F}$ open windows can be used to control overheating for Part O compliance.
- 4.15 Measured night time free field noise levels incident on building facades are ≤ 50 dB $L_{Aeq,8hr}$. Typical maximum noise levels measured are 66 dB L_{AFmax} at Position LT1 and 65 dB L_{AFmax} at Position LT2, however maximum noise levels at Position LT1 are elevated by birdsong close to the microphone, hence maximum noise events incident on the façade of the new building will be ≤ 65 dB L_{AFmax} . As such assessment indicates that open Approved Document O Noise requirements can be met with control of overheating by open windows.

- 4.16 It should be noted that Part O compliance does not consider noise for overheating in bedrooms during the day or overheating at any time in other rooms.

External Amenity Areas

- 4.17 The assessment of external amenity areas across the site has been undertaken having regard to BS 8233, which states:
- 4.18 “For traditional external areas that are used for amenity space, such as gardens or patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq, T}$, with an upper guideline value of 55 dB $L_{Aeq, T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.”
- 4.19 The development features numerous Amenity Gardens located around the building. Generally these areas at ground level will be exposed to noise levels of less than 50 dB $L_{Aeq, 16hours}$ in line with BS 8233 guidance. The Amenity Garden located directly to the north of the building will experience higher noise levels due to proximity to Dene Holm Road, however levels are not expected to exceed the BS 8233 upper limit of 55 dB $L_{Aeq, 16hours}$.

Fixed Plant Noise Limits

- 4.20 At this stage in the development, details regarding fixed plant items which may be installed as part of the development have not been finalised. Therefore, rating noise limits to which all items of fixed plant should adhere have been proposed, based on the guidance set out in Section 3.
- 4.21 Proposed fixed plant noise limits have been derived based on analysis of the measured noise levels summarised in Section 2. Representative background sound levels have been derived from measured data at position LT2 having regard to relevant guidance including BS 4142.
- 4.22 Limits have been proposed at a noise level 5 dB below the representative noise level for the day and night time periods respectively.
- 4.23 Table 5 presents the proposed fixed plant noise limits which are applicable to all building services plant to residential, community use and commercial areas which may be audible outside of the buildings. Limits are applicable at the closest offsite noise sensitive receptor noted to be residential properties on Albert Street.

Table 5: Proposed fixed plant noise limits

Period	Representative Background Noise Level (dB $L_{A90,T}$)	BS 4142 Maximum Rating Noise Level (dB $L_{Ar,Tr}$)
Daytime (07:00-23:00)	43	38
Night Time (23:00-07:00)	40	35

- 4.24 The rating level should be assessed in accordance with BS 4142 including appropriate consideration of any tonal or impulsive characteristics of the proposed mechanical services plant. It is prudent to ensure that the cumulative noise level from all sources does not exceed the stated target level inclusive of any rating noise penalties which may be applied.

5. Conclusions

- 5.1 Stroma Built Environment (SBE) has been appointed to undertake acoustic consultancy services in support of a new care home development at Dene Holm Road, Gravesham.
- 5.2 A comprehensive noise survey including short and long term measurements has been conducted to determine the suitability of the site for residential development.
- 5.3 Measured external noise levels, particularly maximum noise events at night, prohibit the use of open windows for day to day background ventilation, however provision of trickle ventilators or a mechanical ventilation system are suitable for the site.
- 5.4 It is determined that with suitable specification of the building envelope including glazing and suitable ventilation provision that the internal noise level requirements in BS 8233 and ProPG can be achieved throughout the site.
- 5.5 An assessment has been undertaken to consider the suitability to use open windows to control summertime overheating, based on measured site noise levels the noise requirements set out in Approved Document O can be met with open windows to residential areas.
- 5.6 Noise limits for any externally located or ducted mechanical plant associated with the development have been specified based on site background noise levels to protect the amenity of existing residential.
- 5.7 On the basis of the above it is considered that with a suitable design measures set out in this report that the proposed development does not preset a noise impact to existing noise sensitive properties. The new proposed residential accommodation can be suitably protected from noise associated with the surrounding area such that best practice internal acoustic conditions can be met.
- 5.8 On the basis of the assessment it is considered that the development site is acoustically suitable for residential development following the guidance set out within this report.

Appendix II. Acoustic Glossary

Sound pressure level and the decibel, dB

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. The decibel is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Frequency and hertz, Hz

Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz. The human range of hearing is commonly accepted to be 20 Hz to 20,000 Hz. Additionally, an octave can be used to describe the interval between a frequency in Hz and either half or double that frequency.

Frequency weighting

Different weighting networks can be applied to a given sound level in each stated octave band by a specified amount, in order to better represent the response of the human ear. The most commonly used weighting network is the 'A' weighting, and the letter 'A' will be included within a descriptor to indicate that the value has been 'A' weighted, e.g. $L_{Aeq,T}$ or L_{A90} . An 'A' weighted noise level may also be written as dB(A). Other weightings less commonly used are 'C' and 'D' weighting.

Noise indices

When a noise level varies with time, the measured 'A' weighted dB level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple 'A' weighted dB value. In order to describe noise where the level is continuously varying, a number of other indices, including statistical parameters, are used. The various indices used are described as below:

$L_{Aeq,T}$	The 'A' weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period, T
L_{Amax}	The maximum 'A' weighted noise level that was recorded during the monitoring period.
L_{A10}	The 'A' weighted noise level that was recorded for at least 10% of the monitoring period.
L_{A90}	The 'A' weighted noise level that was recorded for at least 90% of the monitoring period, usually taken as the underlying 'background' noise level.

Sound reduction index, R

This describes the sound transmitted through a material or building element, such as a wall, door or window. It is measured in a laboratory with suppressed flanking transmission. The ' R ' value is used to denote the

differences at each third octave or octave band, with a single figure 'weighted' value to describe an overall performance. All values are described using the decibel.

R_w	Weighted single figure sound reduction index
$R_w + C_{tr}$	As above, with a spectral adaptation term applied to account for the effects of low frequency noise, and based on urban traffic noise
R'_w	The 'apparent sound reduction index', a field measurement to obtain the sound reduction index of a material or element, with all effects of site installation accepted.

Reverberation time, T and T_{mf}

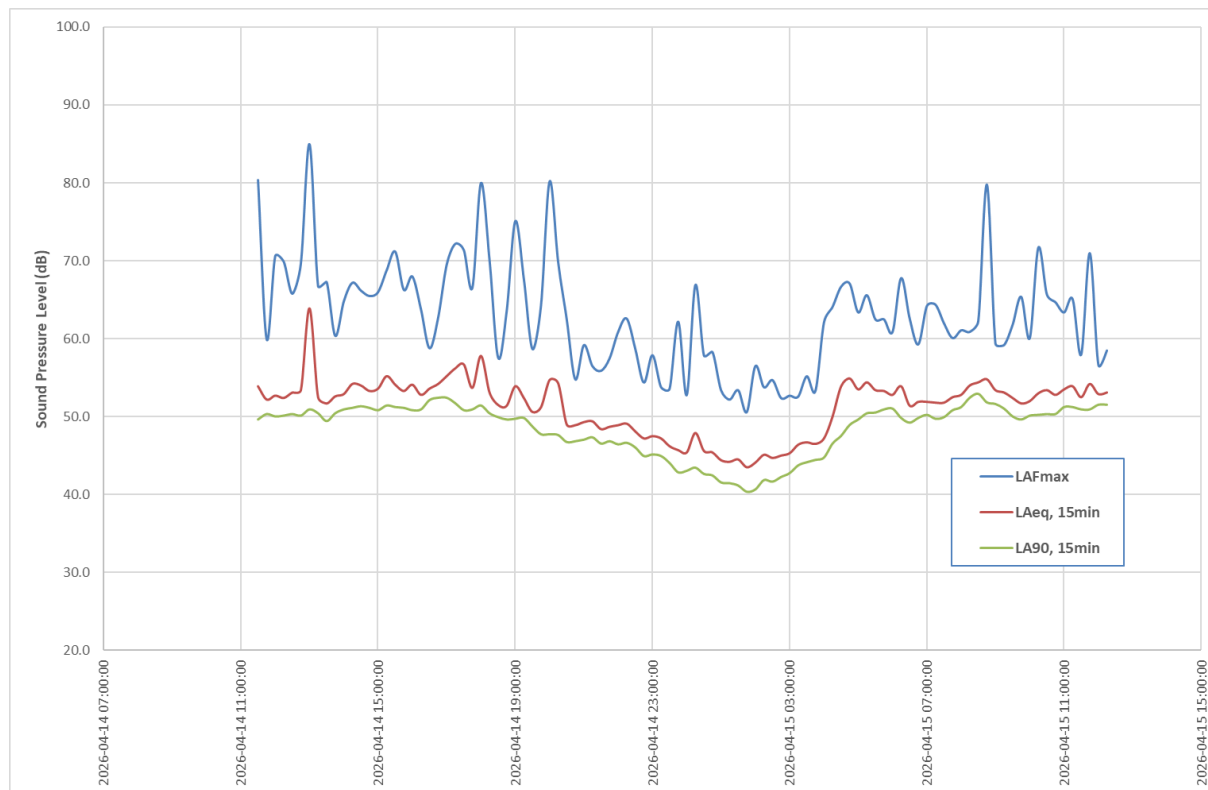
The reverberation time of a space is a measure of the rate at which sound decays, measured in seconds. It is defined as the time taken for the sound pressure level to reduce by 60 dB from its original impulse level. Reverberation time is commonly quoted in terms of the mid-frequency reverberation time, T_{mf} , the arithmetic average of the reverberation times in the 500 Hz, 1 kHz and 2 kHz octave bands.

Noise rating, NR

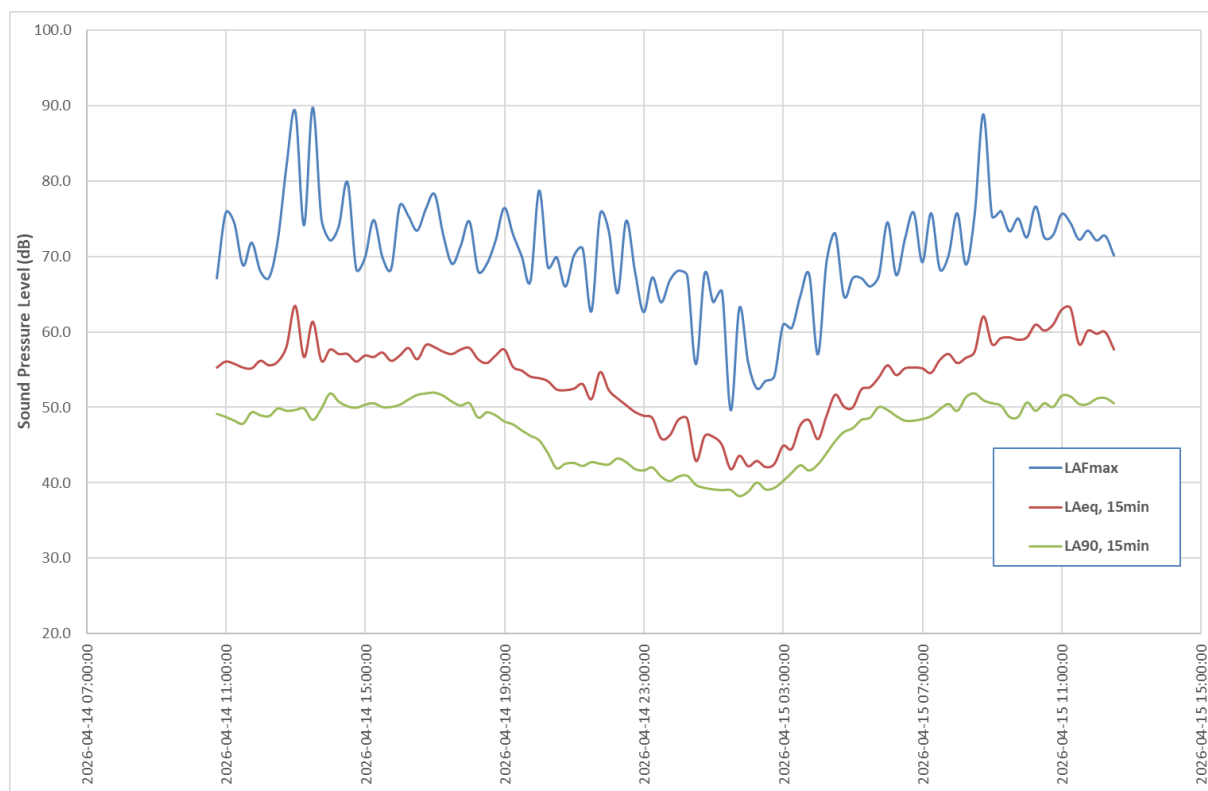
The noise rating or NR system is commonly used in the design of noise emitted by internal building services systems. The system is frequency dependent, and was empirically derived to prevent disturbance to occupants in habitable or working areas from building services noise that exhibits 'tonal' elements, e.g. rumbles, whines, whistles etc. There is no direct relationship between the average 'A' weighted noise level in dB and the NR. However, as a guide, and assuming the absence of strong low frequency content in a given noise, the NR could generally be said to be 6 dB less than the average 'A' weighted dB value.

Appendix III. Noise Survey Data

Position LT1



Position LT2



Appendix IV. SBE Acoustic Credentials

SBE have specialised in providing the UK Construction Industry with a range of acoustics services since 2006. Specialising in Building Acoustics, all SBE acousticians are members of the Institute of Acoustics.

SBE is accredited for on-site acoustic testing by United Kingdom Accreditation Service (UKAS) (Testing Laboratory Number 2731).

SBE meet the relevant acoustic requirements typically required in the UK, including for sound insulation testing as defined in Approved Document E for the purposes of testing for Part E to the Building Regulations 2010.

This report has been prepared by Tom Chaffer, Associate Director who meets the BREEAM requirements for a suitably qualified acoustician (SQA) as follows;

1. Holds an MSc degree in Audio Acoustics from the University of Salford
2. Has been an Acoustic Consultant for more than three year's (within the last five years). This experience includes a practical understanding of factors affecting acoustics in relation to construction and the built environment; including, acting in an advisory capacity to provide recommendations for suitable acoustic performance levels and mitigation measures.
3. Holds Membership of the Institute of Acoustics - MIOA membership.

This report has been read and reviewed by Andrew Gibson and has been found to;

1. Represent sound industry practice
2. Be appropriate given the building being assessed and scope of works proposed
3. Avoid invalid, biased and exaggerated recommendations.

Appendix V. Report Conditions

This document has been prepared for the sole use, benefit and information of the Client. The liability of Stroma Built Environment Ltd. in respect of the information contained herein will not extend to any third party unless prior agreement is obtained in writing from Stroma Built Environment Ltd.

This report is limited to addressing the specific acoustic issues contained herein. Advice has been provided for acoustic reasons only and it is recommended that appropriate expert advice be sought on all the ramifications, e.g. safety, fire, structural, CDM etc., associated with any proposals contained herein.

The in-situ performance of acoustic measures is influenced to a large extent by the quality of workmanship and compliance with the specifications on-site during construction, as such, Stroma Built Environment Ltd. accepts no liability for issues with acoustic performance arising from such factors.

Acoustic survey and testing work carried out for the project is representative of the prevailing conditions at the time of the work. Conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

In particular, it should be noted that where calculations are carried out that are based on assumptions regarding certain aspects where information has not been supplied, these are provided for indicative purposes only and should be treated as such.