ACOUSTIC CONSULTANTS LTD

Noise Impact Assessment

Coleg Gwent,
Risca Road, Crosskeys, NP11 7ZA

Reference: 11194/CW

Client

AtkinsRéalis

Document Control

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1.0	First Issue	11/12/2024	Cameron Wheaton	Daniel Oldaker	Daniel Oldaker
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The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise, acoustic, and vibration aspects as included in this report. We provide advice only in relation to noise, vibration and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and, on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

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1. Introduction

Atkins Réalis appointed Acoustic Consultants Limited to undertake a noise impact assessment for phase 1 of the renovations to Coleg Gwent, Crosskeys.

This report addresses the environmental noise aspects of the proposed development in relation to compliance of the criteria set out in Building Bulletin 93 (BB93) and planning.

A noise survey was carried out to measure environmental noise that could affect the proposed school and determine background sound levels during the school day at the location of nearby noise sensitive premises.

Noise levels were measured at positions representative of the proposed new school building to assess the required construction to achieve suitable internal noise limits inside the development as well as at nearby noise sensitive receptors.

The report has been reviewed by a full Member of the Institute of Acoustics (MIOA) who has over nineteen years of experience in the field of noise and acoustics.

2. The Site

The site is located within the site of Coleg Gwent, Crosskeys campus, Crosskeys, NP11 7ZA

The proposal is for a three-storey block comprising classrooms, toilets, social spaces, electrical labs, and exam rooms/ offices, all connected on each floor by an extended corridor. The building will require the demolition of Thorsbury house, along with

The main source of noise affecting the site is road traffic along B4591 to the north, and Waunfawr Park Road to the south.

The following drawings show the site location, proposed floor plans and elevations.

Figure 1: Proposed location of block.

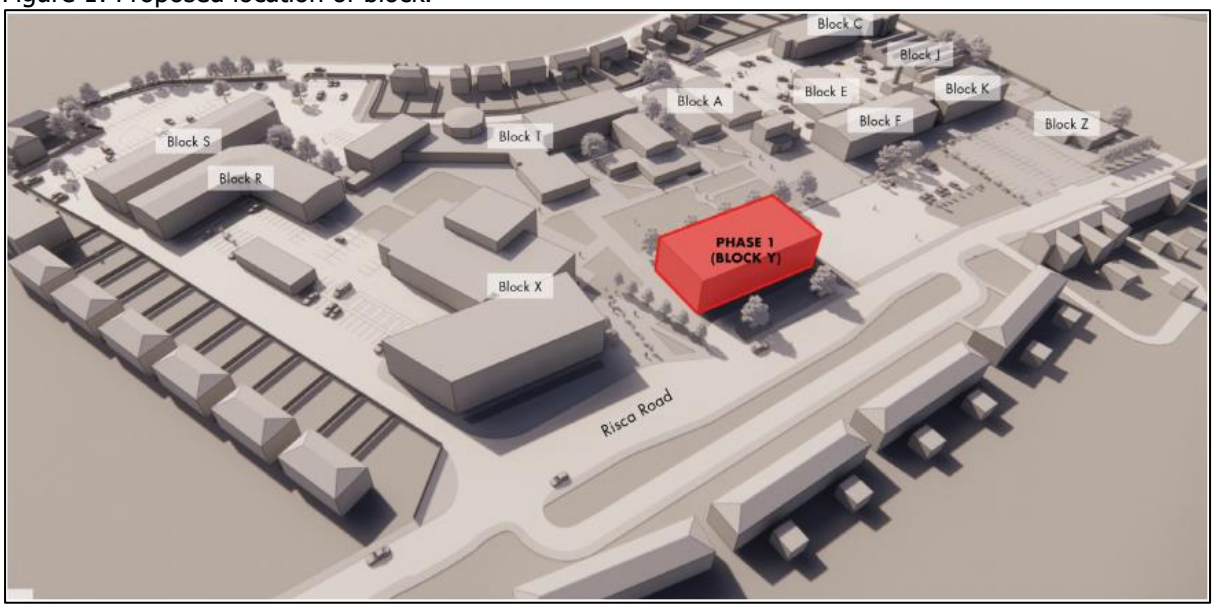


Figure 2: Proposed floor plans

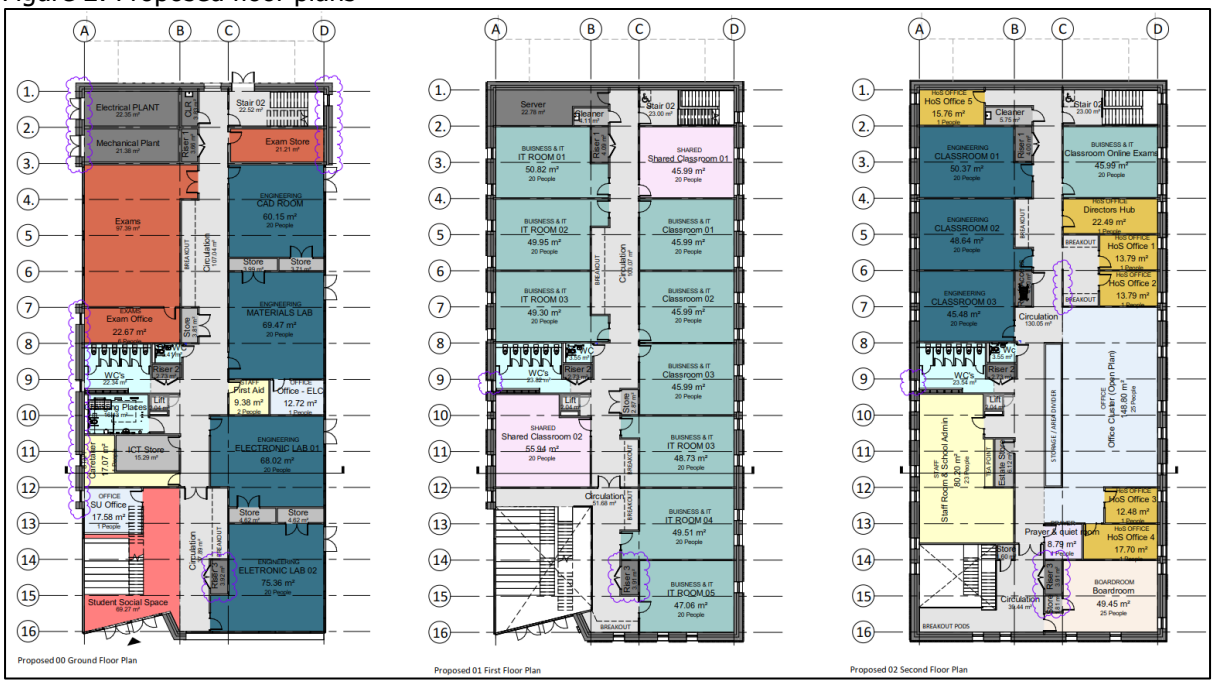


Figure 3: Proposed site elevations

3. Planning and Noise

3.1. Planning Policy Wales (PPW)

Planning Policy Wales (PPW) Edition 12 dated February 2024 sets out the land use planning policies of the Welsh Government. Section 1 states:

1.1 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs1, MTANs2 and policy clarification letters comprise national planning policy.

The most relevant statements for noise affecting a residential use are provided in Section 6.7 and summarised below:

"6.7.1 Clean air and an appropriate soundscape, contribute to a positive experience of place as well as being necessary for public health, amenity and well-being. They are indicators of local environmental quality and integral qualities of place which should be protected through preventative or proactive action through the planning system. Conversely, air, noise and light pollution can have negative effects on people, biodiversity and the resilience of ecosystems and should be reduced as far as possible."

6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

6.7.5 In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.

6.7.6 In proposing new development, planning authorities and developers must, therefore:

- *address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;*
- *not create areas of poor air quality or inappropriate soundscape; and*
- *seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.*

6.7.7 To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer."

6.7.8 Good design, for example setting back buildings from roads to avoid canyon effects and using best practice in terms of acoustic design to ensure the appropriate and intended acoustic environment of completed developments should be incorporated at an early consideration in the design and planning process. Other mitigation measures must be capable of being effectively implemented for their intended purpose, and could include those related to:

- *traffic management and road safety;*
- *ensuring progress towards a shift to low or zero emissions means of road transport, such as electrical charging points;*
- *supporting low or zero emissions public transport;*
- *providing active travel infrastructure; and*
- *incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its dispersal, reduce real or perceived noise levels by absorbing and scattering noise and introducing natural sounds to soften man-made noise, provide areas of relative tranquillity, and reduce exposure by putting a buffer between sources of pollution and receptors.*

6.7.14 Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur. In circumstances where impacts are unacceptable, for example where adequate mitigation is unlikely to be sufficient to safeguard local amenity in terms of air quality and the acoustic environment it will be appropriate to refuse permission.

6.7.19 The health imperative of good air quality and appropriate soundscapes in contributing to the overall character and quality of places and the health and well-being of people and wildlife should be fully recognised. It will not be appropriate to locate sensitive uses, such as hospitals, schools, care homes and housing adjacent to busy roads or other transport routes, where there are no connectivity benefits to be gained and where health and amenity impacts associated with increased exposure of people to pollution will be unacceptable. Whilst some uses may be appropriate with

the aid of good design air quality and soundscape considerations can be overriding factors, especially for sensitive uses, if they cannot be adequately mitigated and impacts minimised.

6.7.20 Where sensitive developments need to be located close to existing transportation infrastructure for sustainable movement and access they should be designed, as far as practicable, to limit harmful substances and noise levels within and around those developments both now and in the future. This may include employing the principles of good acoustic design and the inclusion of active travel or travel management measures as part of development proposals. Such development, however, should preferably be located away from existing sources of significant noise, which may include aircraft noise or roads, particularly new roads or those with programmed route improvements.

6.7.21 Regard should be paid to current air quality and noise levels and the quality of the existing soundscape and account taken of any relevant local air quality action plan, noise action plan and/ or local or regional air quality strategy as part of development strategies and proposals in development plans and before determining planning applications.

6.7.24 The potential impacts of noise pollution arising from existing development, be this commercial, industrial, transport related or cultural venues (such as music venues, theatres or arts centres), must be fully considered to ensure the effects on new development can be adequately controlled to safeguard amenity and any necessary measures and controls should be incorporated as part of the proposed new development. This will help to prevent the risk of restrictions or possible closure of existing premises or adverse impacts on transport infrastructure due to noise and other complaints from occupiers of new developments. It will be important that the most appropriate level of information is provided and assessment undertaken.

PPW does not provide any quantifiable criteria and directs you to the Technical Advice Notes (TAN 11).

3.2. Technical Advice Note (Wales) - Noise

The relevant planning criteria for proposed residential development is in Technical Advice Note (Wales) 11 entitled "Noise" which was published in October 1997. The introduction states:

"This note provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business. It outlines some of the main considerations which local planning authorities should take into account in drawing-up development plan policies and when determining planning applications for development which will either generate noise or be exposed to existing noise sources".

Section B18 of TAN11 references noise from commercial premises such as the proposed but, as with PPW, does not provide any quantifiable criteria.

"B18. Commercial developments such as fast food restaurants, discos, night clubs and public houses pose particular difficulties, not least because associated activities are often at their peak in the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the attendant problems of noise that may be made by customers in the vicinity. Disturbance that can be caused by traffic and associated car parking should not be underestimated."

4. Assessment Methodology

4.1. Noise Affecting School Buildings – Building Bulletin 93

To assess the impact of external noise on the proposed educational use, the most important consideration is the effect of noise on teaching activities.

The normal way of demonstrating compliance with the Approved Document is to comply with the performance standards of Building Bulletin 93: 2014 published by the DfES entitled "Acoustic Design of Schools: Performance Standards".

Section 1.1 of Building Bulletin 93 gives guidance on internal ambient noise levels (IANL) within different spaces; Table 1 of Building Bulletin 93 gives the required upper limit for these levels in rooms, in terms of the 'thirty minute equivalent A-weighted noise level', in decibels, the $L_{Aeq,30min}$. This is a site-measured sound pressure level.

The Building Bulletin 93 indoor am-bient noise criterion for new-build teaching spaces in primary schools is an upper limit of 35 dB $L_{Aeq\ 30min}$.(exempt?)

For naturally ventilated spaces the Building Bulletin states that the criteria noted above can be increased by 5 decibels for normal ventilation modes. This also applies to the environmental noise element in a hybrid system although the mechanical noise of the system should not exceed the criteria in BB93 Table 1.

In overheating conditions (the hottest 200 hours of the year) the upper limit for noise within teaching spaces that are ventilated naturally or via hybrid means is 55 dB $L_{Aeq\ 30min}$.

4.2. Noise Impact from Building Plant

The British Standard 4142:2014+A1:2019 entitled "Method for rating and assessing industrial and commercial sound" describes a method to use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon. The principle is that of establishing the "difference" between the "rating sound level" and the "background sound level".

The "rating sound level" is the "specific sound level" of the source over a period of 1 hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours). Section 9 entitled "Rating Level" 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."

An acoustic character correction should be added to the "specific sound level" if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies dependant on the prominence of the character of the noise source at the assessment location.

In Section 11 of the Standard, under "Assessment of the Impacts", it states:

"*Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9), and consider the following.*

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) 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."

As such, where the assessed difference is of 0 dB or less, the impact is likely to be low, depending on the context.

5. BREEAM

The scheme is to be assessed under BREEAM. The relevant credits are set out below.

5.1. HEA 5 – Three Credits Available

The scheme is being assessed under BREEAM. The credit relevant to building acoustics is HEA5 and the aim of this credit is to ensure the building is capable of providing an appropriate acoustic environment to provide comfort for building users. Three credits are available and the requirements are as follows:

Figure 4: Extract from BREEAM 2018 giving HEA5 requirement

Education buildings (three credits)	
First credit - Sound insulation	
Criteria	Achieve the performance standards set out in Section 1 of Building Bulletin 93: Acoustic design of schools: performance standards, February 2015 (BB93)[87] relating to airborne sound insulation between spaces and impact sound insulation of floors.
Testing requirement	A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the BB93 requirements and the Association of Noise Consultants (ANC) Good Practice Guide, Acoustic testing of Schools[88].
Second credit - Indoor ambient noise levels	
Criteria	Achieve the indoor ambient noise level standards set out within Section 1 of BB93 for all room types.
Testing requirement	A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the ANC Good Practice Guide, Acoustic testing of schools.
Third credit - Room acoustics	
Criteria	Room acoustics (Control of reverberation, sound absorption and speech transmission index (STI)): **Teaching and study spaces** achieve the requirements relating to reverberation time for teaching and study spaces set out within Section 1 of BB93. **Open plan teaching spaces** achieve the performance requirements relating to reverberation time and STI set out within Section 1 of BB93. **Corridor and stairwells**, for those that give direct access to teaching and study spaces, achieve the performance requirements relating to sound absorption.
Testing requirement	**Teaching and study spaces:** A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the requirements of BB93 and ANC Good Practice Guide, Acoustic testing of schools. **Open plan teaching spaces:** A programme of pre-completion acoustic testing of reverberation time is carried out within open plan teaching spaces. The measurement is carried out by a compliant test body in accordance with the requirements of BB93 and ANC Good Practice Guide, Acoustic testing of schools. STI testing is not required. To demonstrate compliance the SQA shall undertake measurements of reverberation times to compare against the STI model. The SQA should provide a report confirming that the surface finishes and distribution of sound absorption within the completed space is in line with the design intent implemented within the STI model. Where significant changes or differences are observed, the SQA shall re-model the space accordingly to demonstrate that the STI measurement is met by the completed spaces. **Corridors and stairwells:** Installation of a specification compliant with the BB93 criteria demonstrates compliance. A site inspection by the developer or SQA is required to confirm that a compliant specification has been installed.

5.2. Pol 05 – One Credit Available

The aim of Pol 05 is *"To reduce the likelihood of noise arising from fixed installations on the new development affecting nearby noise-sensitive buildings"*.

The following is required to demonstrate compliance:

"1 There are no noise-sensitive areas within the assessed building or within 800 m radius of the assessed site.

OR

2 Where there are noise-sensitive areas within the assessed building or noise-sensitive areas within 800 m radius of the assessed site, a noise impact assessment compliant with BS 4142:2014 is commissioned. Noise levels must be measured or determined for:

2.a: Existing background noise levels:
- *2.a.i at the nearest or most exposed noise-sensitive development to the proposed assessed site*
- *2.a.ii including existing plant on a building, where the assessed development is an extension to the building*

2.b: Noise rating level from the assessed building.

3 The noise impact assessment must be carried out by a suitably qualified acoustic consultant.

4 The noise level from the assessed building, as measured in the locality of the nearest or most exposed noise-sensitive development, must be at least 5dB lower than the background noise throughout the day and night.

5 If the noise sources from the assessed building are greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with the criterion."

"At the design stage of assessment, where noise-sensitive areas or buildings are present, actual measurement is unlikely to be possible due to the planned but non-existent installation. In such situations, compliance can be demonstrated through the use of acousticians' calculations or by scale model investigations.

"For such cases, BS 4142 states 'Determine the specific sound level by calculation alone if measurement is not practicable, for example if the source is not yet in operation. In such cases, report the method of calculation in detail and give the reason for using it'. Where prediction methods are not possible, measurement will be necessary using either a noise source similar to that proposed or measurement of the actual noise from the installation (once installed). Compliance with the latter approach requires a written commitment to appoint a suitably qualified acoustician to carry out

the required measurements post-installation, and a further commitment to attenuate the noise source in compliance with criteria 4 and 5 (if proved necessary by the measurements).”

5.3. Suitably Qualified Acoustician

This report has been reviewed by a Director of Acoustic Consultants Limited and a corporate member of the Institute of Acoustics, with a relevant degree and 19 years’ experience in noise and acoustics. As such, the author is a Suitably Qualified Acoustician as defined in BREEAM.

The advice within this report demonstrates that the design of the building is compliant with the criteria of the three credits of HEA05 and the one credit of POL05 and fulfils the design stage requirements of BREEAM 2018.

Acoustic Consultants have been appointed to undertake a programme of pre-completion testing which meets the testing requirements of the HEA05 credits. Testing will be undertaken by a Suitably Qualified Acoustician in accordance with the ANC Good Practice Guide for acoustic testing of schools. Acoustic Consultants Ltd are a member of the Association of Noise Consultants registration scheme for acoustic testing.

6. Baseline Noise Monitoring

A partially attended noise survey was undertaken at two locations to measure the external noise sources affecting the proposed school building and existing noise sensitive receptors on the 25th-27th June 2023.

6.1. Equipment

Sound Pressure Levels were measured using a Class 1 sound level meter with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 1: Equipment and Calibration Status

Equipment Description / Manufacturer / Type	Serial number	Date of calibration	Calibration Certification Number
SLM, NTI, XL2	A2A-11041-E0	07/07/2023	44799
Pre-Amp, NTI, MA220	1822	07/07/2023	44799
Microphone, NTI, MC230	9583	07/07/2023	44799
Calibrator, Larson Davis, CAL200	18273	14/02/2024	1507736-2
SLM, NTI, XL2	A2A-09705-E0	10/10/2023	UK-23-113
Pre-Amp, NTI, MA220	5332	10/10/2023	UK-23-113
Microphone, NTI, MC230A	A14374	10/10/2023	UK-23-113
Calibrator, NOR-1251	35230	24/10/2024	1510319-1
SLM, NTI, XL2	A2A-13561-E0	24/11/2023	1507073-1
Pre-Amp, NTI, MA220	13831	24/11/2023	1507073-1
Microphone, NTI, MC230A	A17955	24/11/2023	1507073-1
Calibrator, Larson Davis, CAL200	15064	20/09/2024	45555

The measurement systems were checked before and after use with the noted calibrators and no significant drift was detected.

6.2. Weather Conditions

During the measurement exercise the weather was dry with a temperature of around 8 degrees centigrade, dry and wind speeds not exceeding 5 metres per second.

The weather conditions are not expected to have significantly affected the measured noise levels.

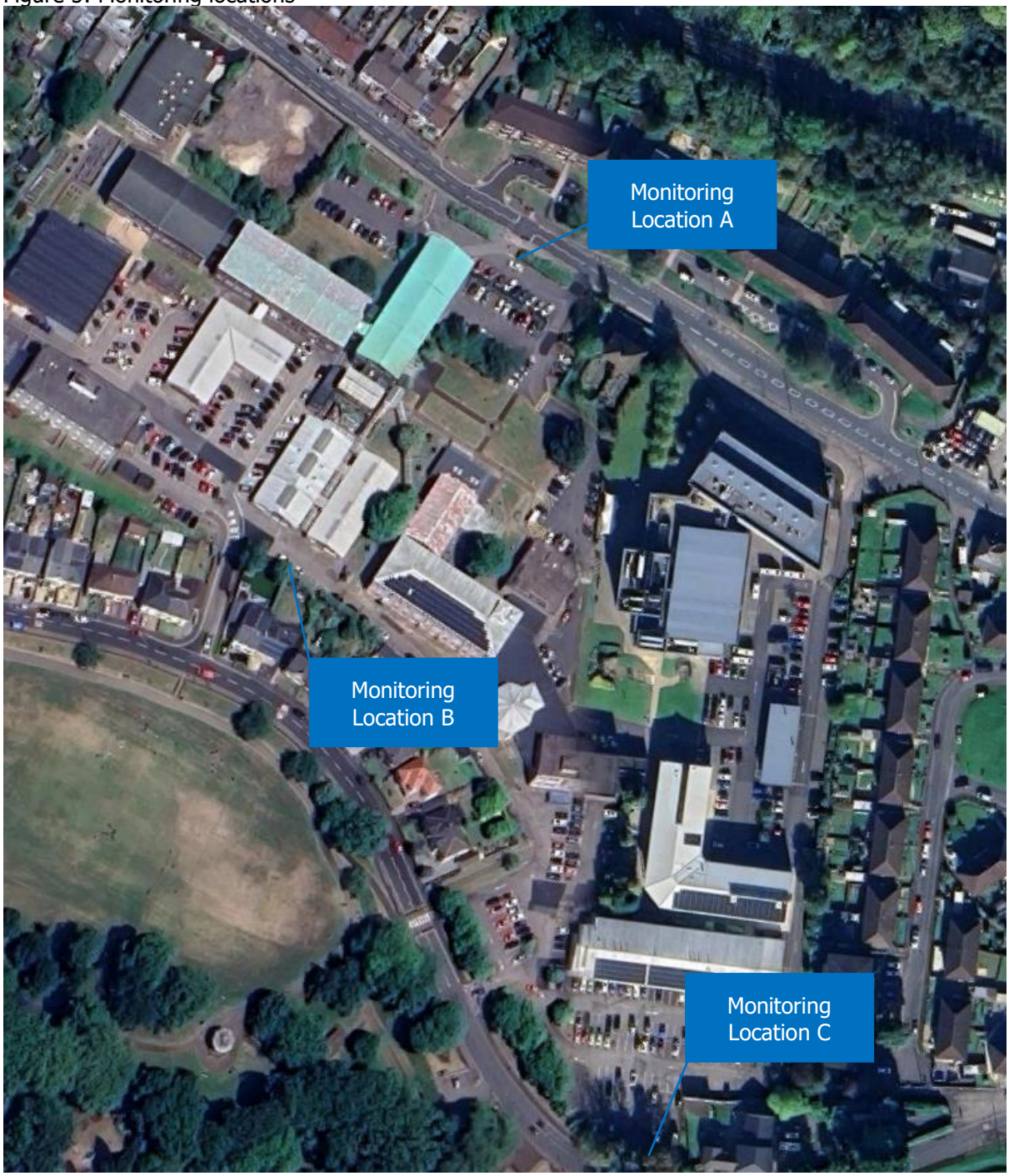
6.3. Monitoring Locations

The monitoring locations are shown below on Figure 3. The main source of noise was road traffic.

The background sound levels were determined by distant plant and periods of mechanical noise, the source of which is unknown. Given this noise is not consistently present it has been omitted from the assessment.

The sound level meters were both in a free-field position at a height of 1.5 metres above the ground at each location.

Figure 5: Monitoring locations



6.4. Measured Sound Levels

Chart 1: Measured noise levels at location A

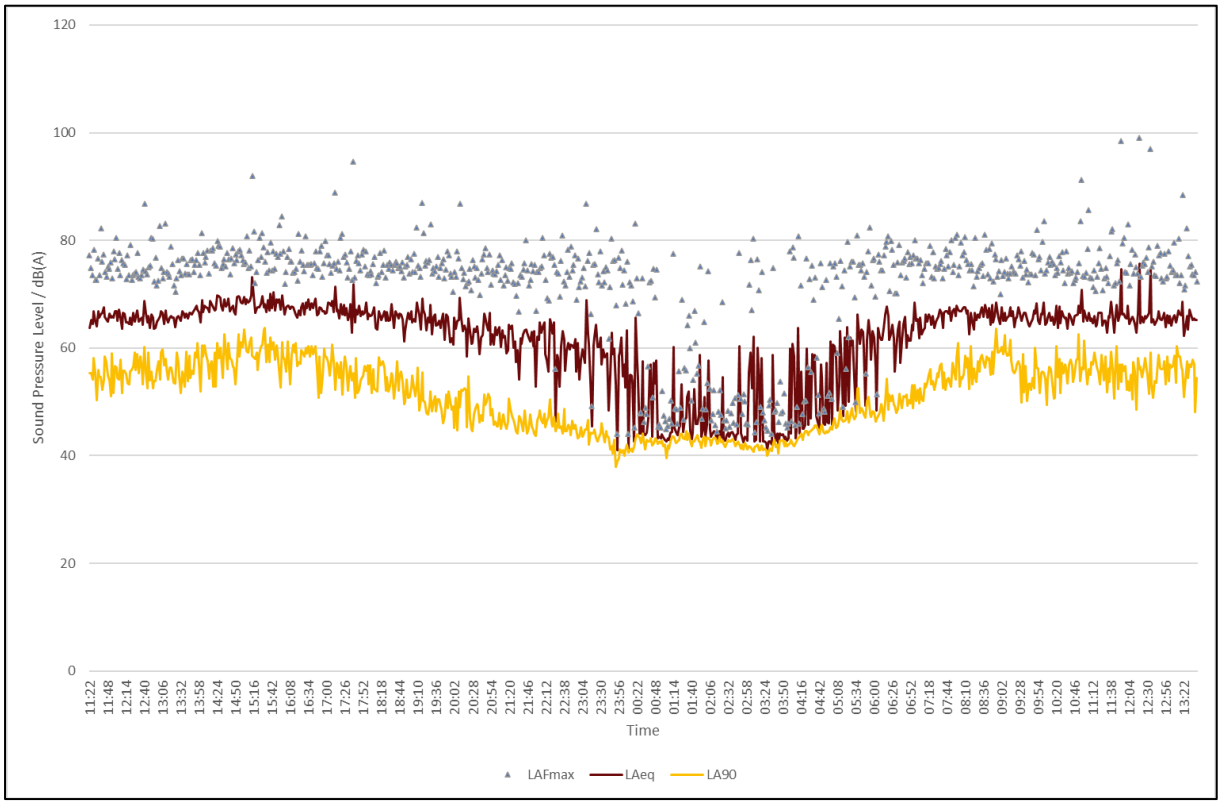


Chart 2: Measured noise levels at location B

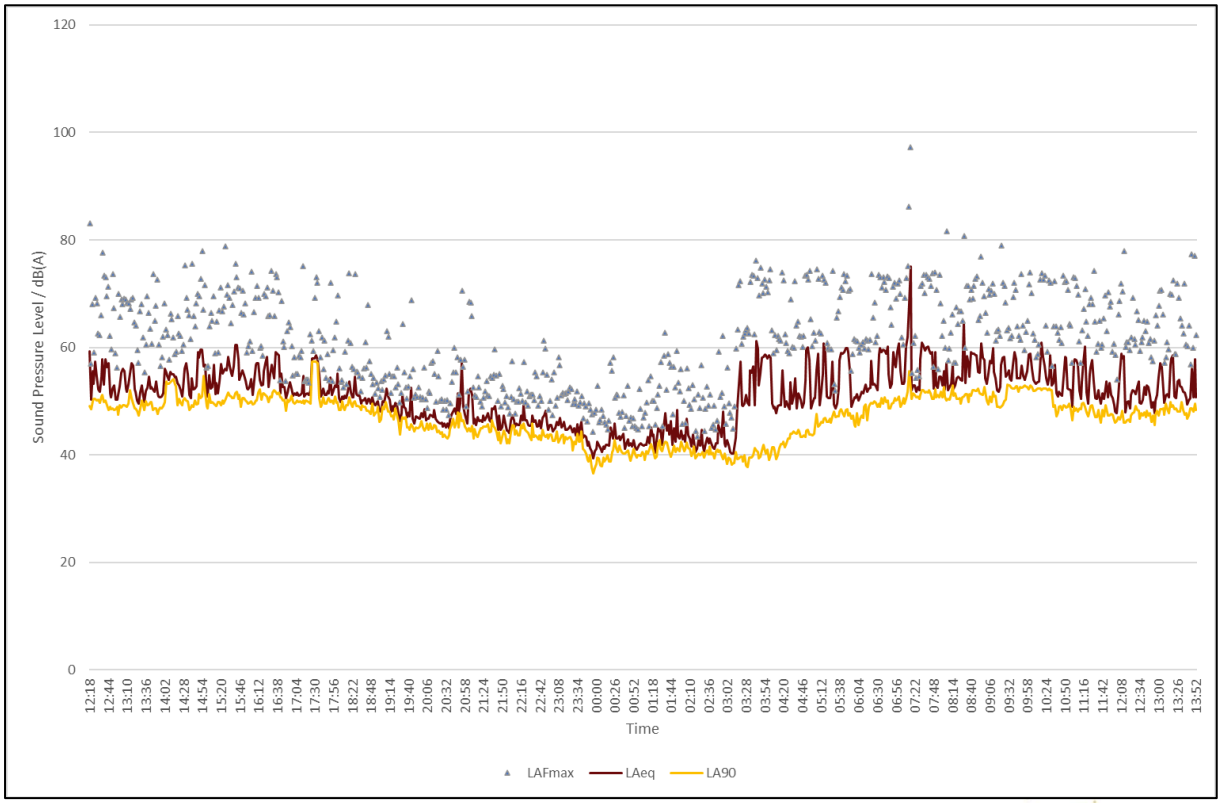
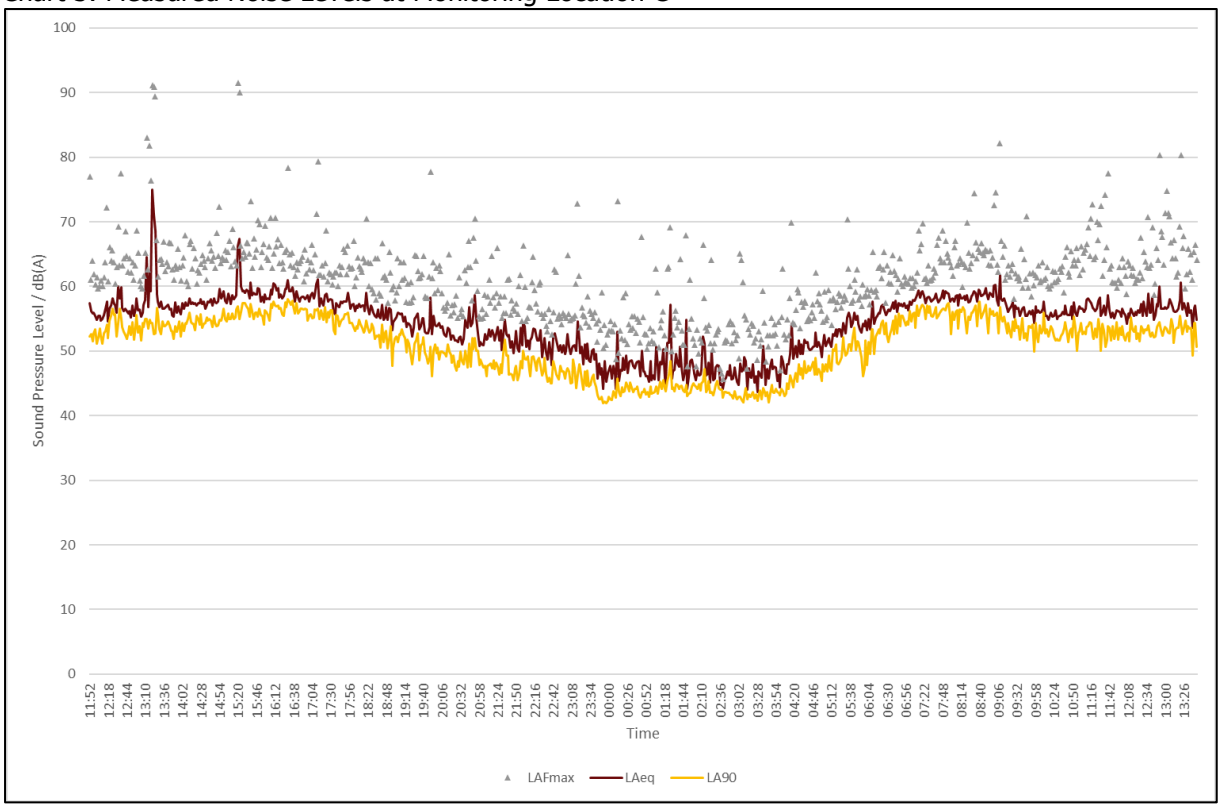


Chart 3: Measured Noise Levels at Monitoring Location C



From the measurement data, the following noise levels have been determined at the monitoring locations to assess the impact noise on the internal noise level in school.

These noise levels are worst case 30-minute periods during school hours and were caused my road traffic.

Table 2: Measured Free-field Octave Band Noise Levels ($L_{Aeq\ 30mins}$) (free-field levels)

Frequency	63	125	250	500	1000	2000	4000	8000	dB(A)
$L_{eq,30\ minutes}$ (dB)	70	64	62	61	64	60	51	45	67
$L_{1,30\ minutes}$ (dB)	81	76	71	68	71	69	64	58	75

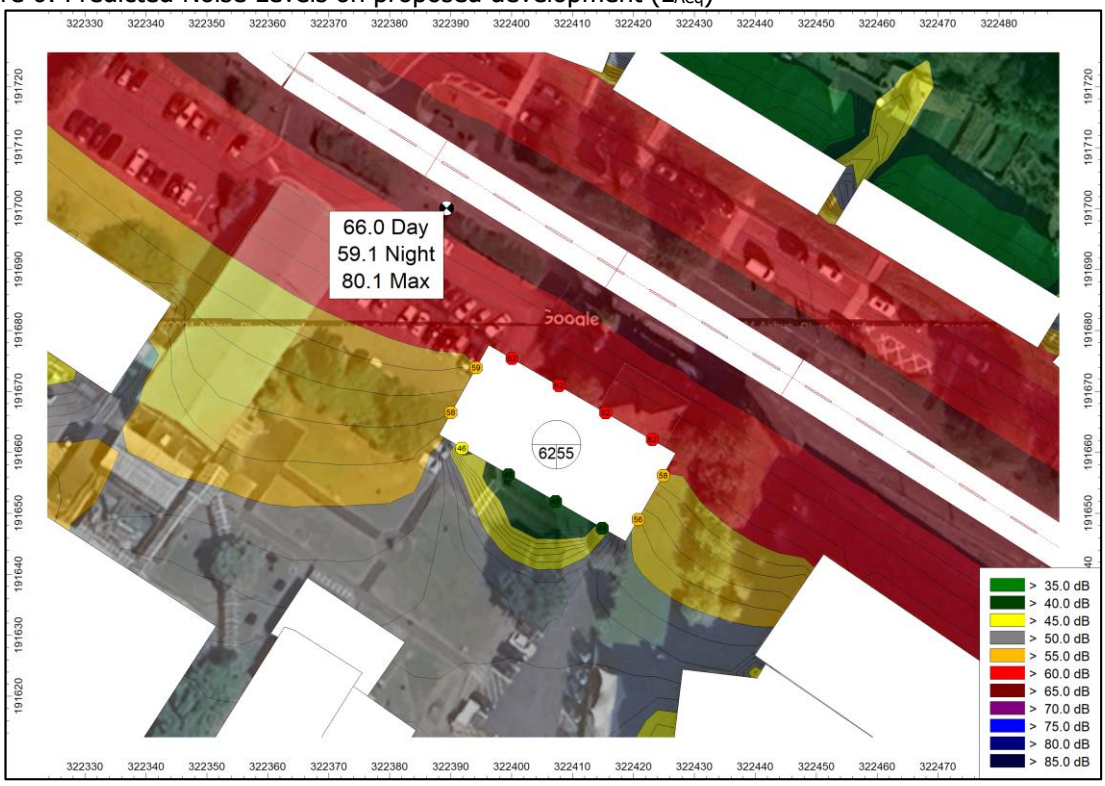
6.5. Background Sound Levels

The typical background sound levels taken from Location C are 51dB $L_{A90,1\ hour}$ between the hours of 07:00 to 23:00 and 44dB $L_{A90,15\ minutes}$ between the hours of 23:00 to 07:00 hours.

7. Noise impact Upon Teaching Spaces

The following figure displays a noise map of the predicted noise level on the proposed development

Figure 6: Predicted Noise Levels on proposed development (L_{Aeq})



Building Bulletin 93 states that where external noise levels do not exceed the internal ambient noise level criteria by more than 16 decibels for single sided ventilation and 20 dB for cross ventilated or roof ventilated spaces, the criteria for natural ventilation can usually be achieved.

The external noise level is such that windows cannot be used as part of the ventilation strategy under normal conditions and an alternative, attenuated, ventilation method will be required.

Open windows can be used for intermittent boost under local teacher control and for summertime overheating during the hottest 200 hours of the year.

Where NVHR or MVHR units are proposed, the system should provide sufficient attenuation to achieve the noise criteria. Noise generated by the plant must also not exceed the noise criteria.

The building fabric, including walls, roof, rooflights, windows and external doors will be designed to adequately control external noise and be demonstrated at RIBA Stage 4. This is a requirement of Part E of the Building Regulations and therefore does not need to be considered in terms of planning.

8. Plant Noise Limits

Heating and ventilation plant will serve the building.

In accordance with BS4142:2014 and POL5, noise from the plant should be at least 5 decibels below the existing background sound levels at nearby noise sensitive receptors.

Furthermore, noise from plant should not exceed the internal noise criteria with a partially open window at the facades of the school buildings.

On the basis of the above requirements and the site measured noise levels the plant noise limits are as follows.

Table 3: Plant noise limits

Location	Plant Noise Limit
Nearby dwellings - Day (23:00 to 07:00 hours)	46 dB $L_{Ar,T}$
Nearby dwellings - Night (07:00 to 23:00 hours)	39 dB $L_{Ar,T}$
Teaching room facade	46 dB $L_{Aeq,T}$

9. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure pA – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} - quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$L_{pA} = 10 \log_{10} (p_A/p_0)^2$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
p_0 is the reference sound pressure (20 µPa)

Background sound level, $L_{A90,T}$– A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{AeqT} = 10\lg_{10}\left\{(1/T)\int_{t_1}^{t_2}[p_A(t)^2/p_0^2]dt\right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 µPa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

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.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,Tr}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, $L_{Ar,Tr}$ – Specific sound level plus any adjustment for the characteristic features of the sound.

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 T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, eVDV – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).

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