

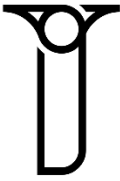


ACOUSTIC
CONSULTANTS LTD

Noise Impact Assessment

**Proposed Café / Wine Bar & Residential Flats
16 High Street, Pontardawe**

Reference: 9082/JA/BL

Client:	Acoustic Consultant:
 Tawe Architectural Design	 ACOUSTIC CONSULTANTS LTD

Document Control

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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 external noise aspects as included in this report. We provide advice only in relation to noise 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

Tawe Architectural Design appointed Acoustic Consultants Limited to carry out an environmental noise assessment and provide acoustic mitigation advice for the proposed café/wine bar and residential development on the site currently occupied by a disused bank.

The assessment takes into consideration the local authority requirements and considers the impact of road traffic noise from the surrounding road network effecting the residential flats. The report also provides internal acoustic insulation advice for the separating elements between the ground floor café/wine bar and flats above, and noise between flats on the upper floors.

Due to proposed use of the ground floor, the report also provides noise limits based on measured ambient noise levels at the site.

The site has already had an initial Planning Application granted, with an amendment submitted to change the number of flats on the first floor at the development. We understand that the proposals are for opening hours of between 08:00 and 00:00.

The report assesses the suitability of the site with respect to TAN 11 and British Standard 8233:2014+A1:2019 and British Standard 4142:2014+A1:2019.

The author of this report is an Associate Member of the Institute of Acoustics (AMIOA) with a recognised acoustic qualification and over two years' experience within the field. The report has been checked by a Director of the company who is a Member of the Institute of Acoustics (MIOA) with over 13 years' experience in the field of acoustics.

2. The Site & Proposals

The site is currently occupied by a disused bank at 16 High Street, Pontardawe, SA8 4HU. The surrounding area is of mixed use, comprising several commercial premises and residential dwellings.

Immediately to the south-east is a public house and sports bar, The Castle, which has outdoor seating. The other immediate surrounding properties are takeaways and restaurants, with the nearest residential dwellings to the west.

The proposals include for a change of use from the bank to a café/wine bar operating on the ground floor, with 3 residential flats on the upper floors: two flats on the first floor and one flat on the second floor. The café/wine bar also has proposals for external seating along High Street.

The existing site with some of the noted existing surrounding commercial premises are noted below. The proposed site is highlighted in red.

Figure 1: Existing Site Location – Google Maps

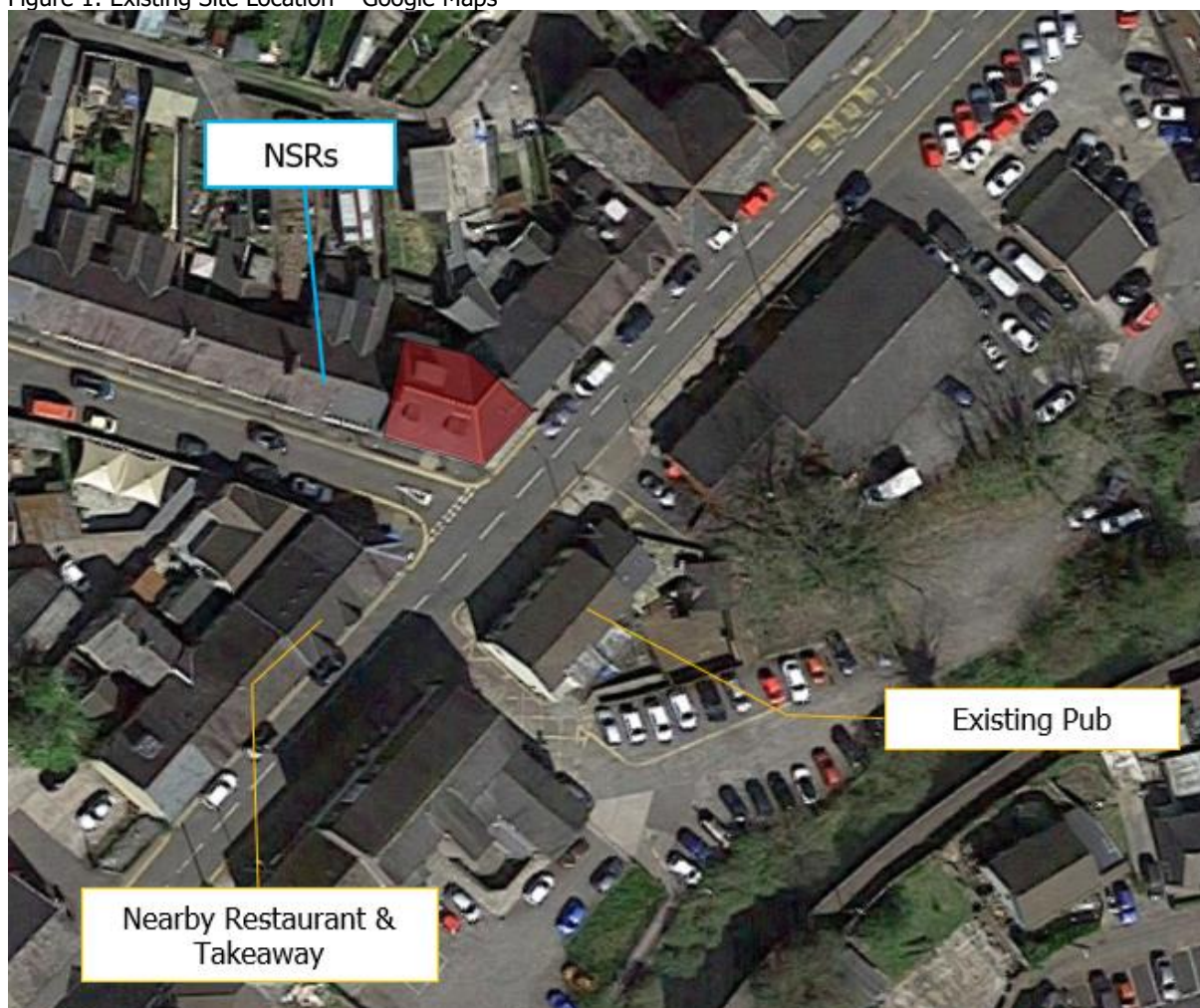


Figure 2: Proposed Ground & First Floor Plans

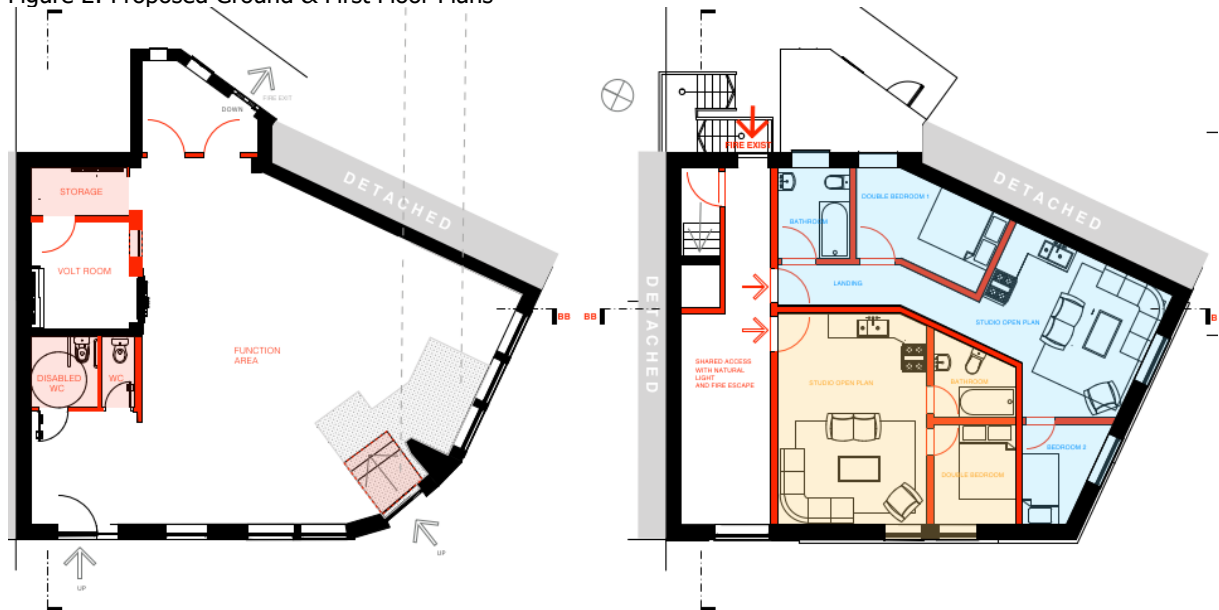
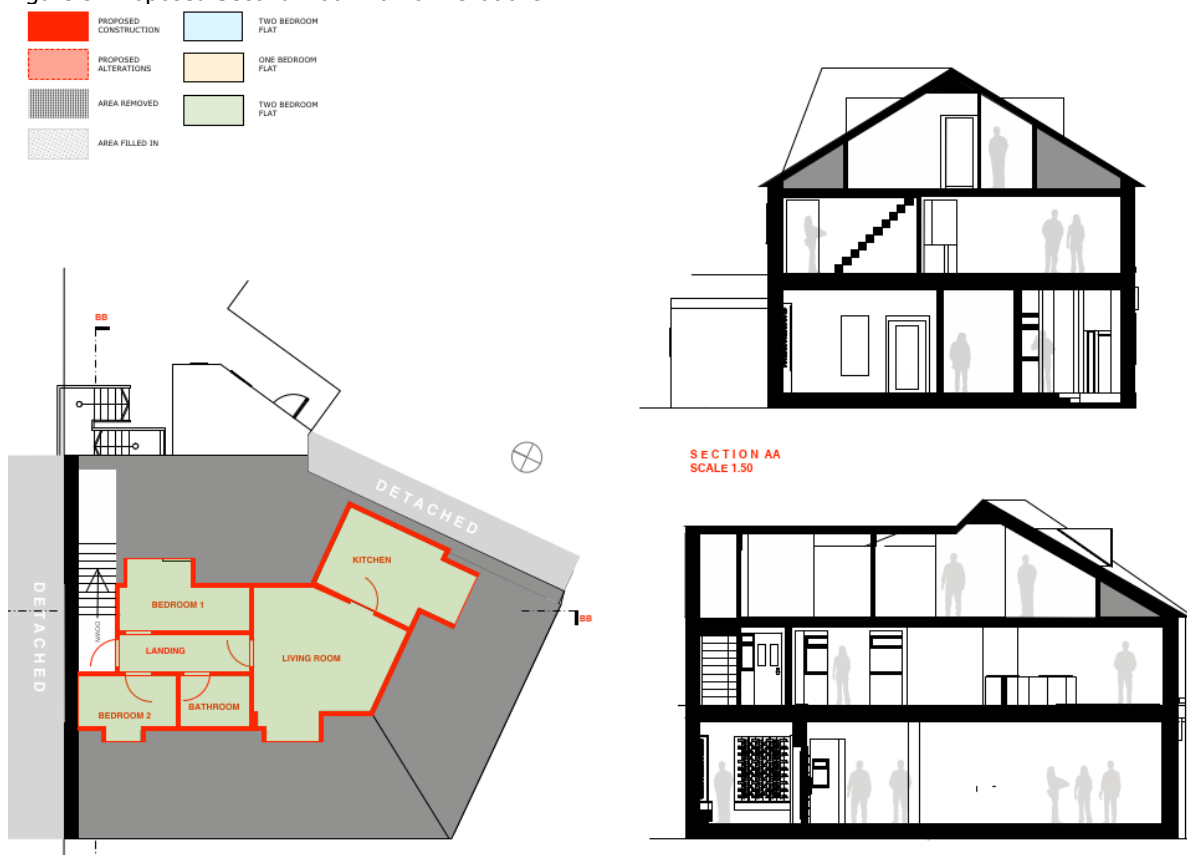


Figure 3: Proposed Second Floor Plan & Elevations



3. Planning Policy

3.1. Planning Policy Wales

Planning Policy Wales (PPW) Edition 11 dated February 2021 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. Location of Commercial, Industrial and other Potentially Polluting Development.

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. Soundscapes and Compatibility of Uses

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

Planning Policy Wales (PPW) Edition 11 dated February 2021 sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes.

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”.

Table 1 provides Noise Exposure Categories, which relate to proposed residential developments near to a transportation noise source. Noise Exposure Categories, (NEC's) in relation to road traffic noise are addressed in ranges according to the free-field equivalent noise levels ($L_{Aeq, T}$) measured at the position of the proposed dwellings.

Table 1: TAN 11 Noise Exposure Categories

NOISE SOURCE	NOISE EXPOSURE CATEGORY			
	A	B	C	D
Road Traffic				
07.00 - 23.00 hrs	<55	55 – 63	63 – 72	>72
23.00 - 07.00 hrs	<45	45 – 57	57 – 66	>66

The Technical Advice Note (Wales) 11 gives advice to Local Planning Authorities on assessing proposals for residential developments near a source of noise, depending upon which of the four Noise Exposure Categories the proposed site falls into:

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

In addition, it states: *"Night-time noise levels (23.00 - 07.00): sites where individual noise events regularly exceed 82 dB L_{Amax} (5 time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq, 8h}$ (except where the $L_{Aeq, 8h}$ already puts the site in NEC D)."*

4. Assessment Criteria

4.1. Residential Internal Noise Levels

The below informative section is based on British Standard 8233:2014 and WHO 1999. By meeting the below criteria, the residential amenity should not be adversely affected.

4.1.1. Internal Equivalent Noise Levels

British Standard 8233:2014 entitled "Guidance on sound insulation and noise reduction for buildings" came into effect on 28th February 2014.

Section 7.7.2 Table 4 of the British Standard 8233:2014 provides internal ambient noise levels for dwellings from noise sources 'without a specific character'.

The British Standard guideline states that noise levels should not exceed those as noted in Table 2 of the British Standard. These criteria are based on the guidance provided within WHO 1999 and are summarised below:

Table 2: British Standard 8233:2014 Internal Noise Criteria

Activity	Location	Daytime (07:00 to 23:00)	Night-time (23:00 to 07:00)
Resting	Living Room	35 dB $L_{Aeq,16 \text{ hour}}$	-
Dining	Dining Room/area	40 dB $L_{Aeq,16 \text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16 \text{ hour}}$	30 dB $L_{Aeq,8 \text{ hour}}$

4.1.2. Maximum Noise Levels

Section 7.7.2 Note 4 of the British Standard states "Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values".

British Standard BS8233 provides no definitive criteria for maximum noise levels from individual events ($L_{Amax,F}$). Section 3.4 of the "Guidelines for Community Noise" published by the World Health Organisation in 1999 (WHO 1999) states *"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 L_{Amax} more than 10-15 times per night (Vallet & Verbey 1991)"*.

4.2. Commercial Noise

For industrial and commercial noise, the most relevant guidance is provided within British Standard 4142:2014+A1:2019. The methods described in the British Standard use outdoor sound levels to assess the likely effects of sound upon people who might be inside or outside a dwelling or other premise used for residential purposes.

The initial estimate principle is that of establishing the 'difference' between the 'rating level' and the 'background sound level'. The 'rating level' is the 'specific sound level' of the source over a period of one 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). Clause 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, dependent on the prominence of the character of the sound source at the assessment location.

In Clause 11 of the Standard, entitled '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.

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *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."*

It should be noted that the numerical outcome only represents the initial estimate of impact, as stated in the first paragraph of Clause 11, and that contextual matters should be considered before determining what the potential impact is. This paragraph states:

The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.

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](#)).

NOTE 1 More than one assessment might be appropriate.

The second part of Clause 11 sets out three contextual matters that should be taken into account once the initial numerical estimate has been determined. It is important to note that the three listed is not exhaustive and all pertinent factors should be considered.

5. Noise Monitoring

A long-term noise monitoring exercise was undertaken from 12:00 on the 1st of July 2021 until 10:00 on the 5th of July 2021. The main noise source was road traffic noise emanating from High Street, and the nearby A474.

5.1. Monitoring Equipment

Sound Pressure Levels were measured using an NTI XL2 sound level meter with a half-inch condenser microphone. The equipment is checked annually using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2005 and in accordance with British Standard EN 10012:2003 and traceable to the National Standards. This equipment was checked and calibrated as noted below and the certificates are available for inspection. Table 3 provides the equipment and calibration status.

Table 3: Equipment and Calibration Status

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM, NTI, XL2	A2A-09705-E0	30/09/2019	U32978
Pre-Amp, NTI, MA220	5332	30/09/2019	U32978
Microphone, NTI, MC230A	A14374	30/09/2019	U32978
Calibrator, CEL, Type 284/2	3/02716829	02/10/2020	35889

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

5.2. Weather Conditions

During the monitoring conditions were clear, dry, and calm. The weather conditions are not expected to have adversely affected the measured data.

Table 4: Weather conditions during survey

Wind Speed (m/s)	Average Air Temperature (°C)	Precipitation (time/hrs)	Cloud Cover (%)
< 5	~ 15 to 20	0	~ 0 to 25

5.3. Noise Monitoring Procedure

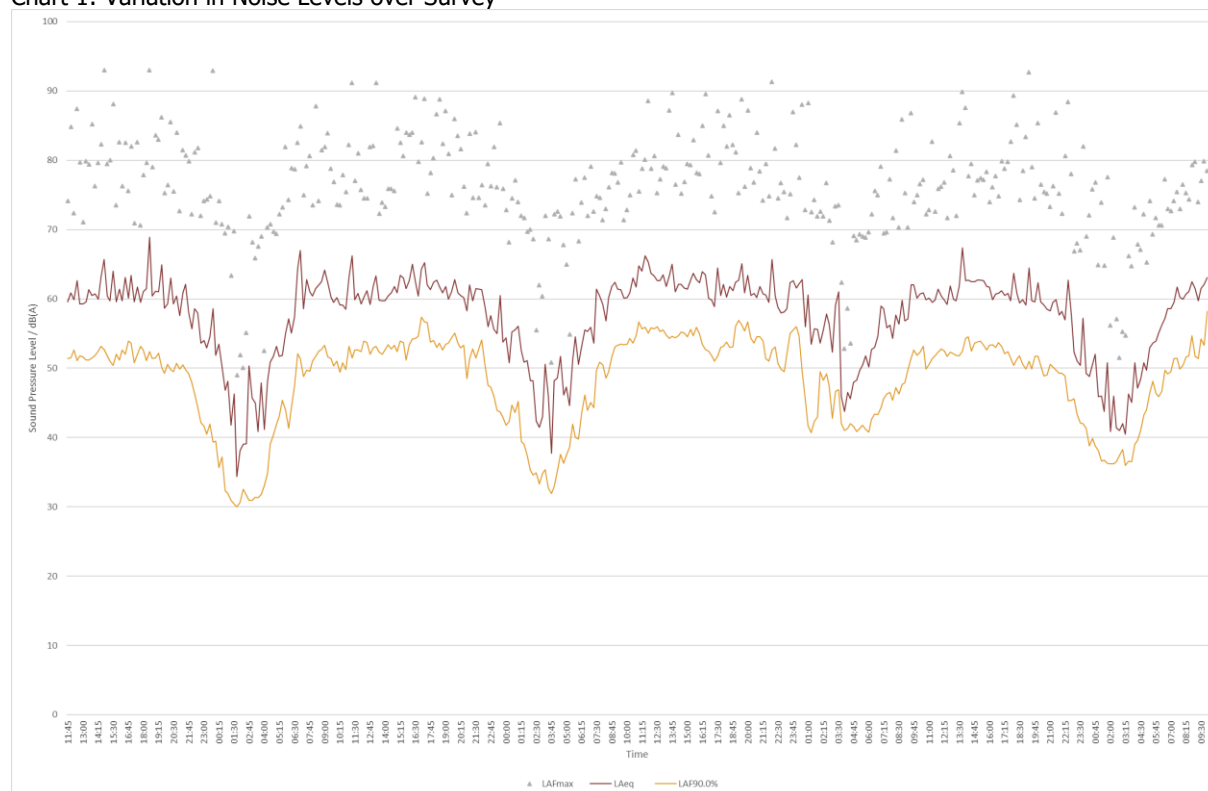
The sound level meter was positioned out of the second-floor window at the existing building, facing out towards High Street. The microphone was in a facade position due to the existing window opening. This has been accounted for in the calculations with a 3-decibel reduction.

During our site visit road traffic was deemed to be dominant at all façades. No commercial or plant noise could be heard.

5.4. Measured Noise Levels

A chart of the variation in ambient noise levels with time is provided below:

Chart 1: Variation in Noise Levels over Survey



From the measured road traffic noise data, we have determined the following free-field octave band design 'daytime' and 'night-time' equivalent noise levels, and maximum noise levels at the monitoring location. The maximum levels provided in the chart are considered unrepresentative of the typical environment of the site. We consider that the higher maximum values presented are from birds on the roof of the existing building.

Table 5: Measured Octave Band Design Noise at 'Monitoring Location A' (Free-Field Levels)

Parameter	63	125	250	500	1000	2000	4000	8000	dB(A)
Day $L_{eq,(16hr)}$	60	59	56	52	53	50	43	37	57
Night $L_{eq,(8hr)}$	52	49	47	43	46	43	37	33	50
Night $L_{max(F)}$	55	50	49	51	48	67	46	35	68

We have summarised the range and modal background levels to aid in completing the BS4142 assessment for plant noise. These are provided below.

Table 6: Summarised Background Range & Modal Levels

Date	Period	L _{A90,T} / dB	
		Range	Mode
Thursday 01/07/2021	Day (12:45 - 23:00)	42 - 54	51
	Proposed Evening Opening Hours (19:00 - 00:00)	42 - 52	50
	Night (23:00 - 07:00)	30 - 52	31
Friday 02/07/2021	Day (07:00 - 23:00)	47 - 57	53
	Proposed Evening Opening Hours (19:00 - 00:00)	47 - 55	54
	Night (23:00 - 07:00)	32 - 46	35
Saturday 03/07/2021	Day (07:00 - 23:00)	44 - 57	55
	Proposed Evening Opening Hours (19:00 - 00:00)	50 - 57	51
	Night (23:00 - 07:00)	41 - 56	41
Sunday 04/07/2021	Day (07:00 - 23:00)	44 - 55	52
	Proposed Evening Opening Hours (19:00 - 00:00)	45 - 52	49
	Night (23:00 - 07:00)	36 - 50	37

6. Noise Assessment

6.1. Transportation Noise Assessment

6.1.1. Noise Exposure Category

From the proposed façade position measurements above, and due to the measured $L_{\max}$ data, the site falls into Noise Exposure Category B (NEC B) which states the following:

"Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection."

6.1.2. Building Façade Mitigation Measures

It will be necessary to design the building fabric of the residential properties to control road traffic noise levels internally.

6.1.3. Calculation Method

Calculations for the internal ambient noise levels due to road traffic noise have been undertaken using the calculation method provided in Annex G Section G.2 of British Standard 8233:2014, the building facade construction specified below, and the octave band free-field design equivalent noise levels and maximum noise levels taken from the measured noise spectra noted above.

The calculations are based on dimensions taken from architectural drawings provided to us by the Client.

We advise that building elements, having the sound insulation performances noted below, be incorporated into the design of the façades including the windows, doors, floor, and the building roof.

Alternative constructions to those noted below could be used, however, they would need to be assessed to ensure they control external noise to within the BS 8233:2014 and Local Authority recommended internal ambient noise level criteria.

6.1.4. External Wall & Roof Room Construction

The existing external wall construction has been based on observations during our site visit.

- The first floor has been based on a masonry wall, approximately 500mm thick, with a mass of 260 kg/m² (as a worst-case). The assumed mass is based on a worst-case scenario. Based on the thickness of the existing wall measured on site, the mass could potentially be higher.

- The second floor storey is based on a typical room in a roof construction. We have assumed a pitched roof with tiles on the main timber structure. We understand that plasterboard will be including on stud frames on the second floor. This could be constructed with two layers of plasterboard internally (mass $\geq 20 \text{ Kg/m}^2$), staggered and sealed on studs.

The above constructions are expected to achieve the following minimum sound reduction index:

Table 7: Assumed Existing Sound Insulation Performance of the External Walls

Type	Sound Reduction Index / dB per Octave Band (Hz)								R _w
	63	125	250	500	1k	2k	4k	8k	
Masonry	37	42	45	49	54	57	57	57	52
Lightweight / Roof Room	25	39	47	53	58	56	60	55	52

6.1.5. Window Construction

The windows on all elevations could be openable. However, they need to be sealed airtight to control external noise and adequate levels of ventilation should be provided with windows closed. The windows should be constructed from sturdy good quality frames with airtight compression seals.

The sound reduction indices required of the windows are as follows (please note the colour coded façade areas:

Table 8: Required Minimum Sound Insulation Performance of Windows

Location	Required Windows Sound Reduction Index (dB) per Octave Band (Hz)								R _w	Typical Construction
	63	125	250	500	1k	2k	4k	8k		
All Façades	20	24	20	25	35	38	35	36	31	4/12/4

Any alternative constructions should achieve the above-noted performance.

6.1.6. Ventilation Provision

There should be no un-attenuated vents or openings in the building façades. There will need to be suitably attenuated ventilation provisions in the habitable rooms where specific noise mitigation measures are required. The ventilation provisions should include the necessary sound attenuation so that the ingress of external noise is controlled to be compatible with the building fabric.

The supplier should provide test data confirming the ventilation system meets the below performance.

For the rooms, we have assumed one vent open per space. The minimum performance for these vents is provided below. The supplier should provide test data confirming ventilation meets the below performance.

Table 9: Required Minimum Sound Insulation Performance of Vents

Location	Required Ventilator Sound Insulation Performance, $D_{n,e}$ per Octave Band (Hz)								$D_{n,e,w}$ (dB)	Typical Construction
	63	125	250	500	1k	2k	4k	8k		
All Façades	30	37	37	36	47	49	55	61	44	Acoustic Trickle Vent: Triton SFX V7

6.1.7. Worst-Case Room Prediction

An example of the worst-case room (bedroom facing on to High Street) is provided below.

Free Field Level at Façade										
Octave Band	63	125	250	500	1000	2000	4000	8000		dBA
Day, $L_{Aeq,T(1hr)}$	60	59	56	52	53	50	43	37		57
Night, $L_{Aeq,T(1hr)}$	52	49	47	43	46	43	37	33		50
Night-time $L_{Aeq,T(1hr)}$	55	50	49	51	48	67	46	35		68
Building Façade Construction										
External Element	63	125	250	500	1000	2000	4000	8000		
SF X V75 / SFSA C75 (open) - 44 Dnew	$D_{n,e}$	30	37	37	36	47	49	55		61
	Number of	1								
		0.00083	0.00017	0.00017	0.00020	0.00002	0.00001	0.00000		0.00000
Double Glazed: 4/12/4 - 31 Rw		20	24	20	25	35	38	35		36
	Area	2								
		0.00167	0.00066	0.00167	0.00053	0.00005	0.00003	0.00005		0.00004
Pitched Roof - 56 Rw		25	39	47	53	58	56	60		55
	Area	10								
		0.002635231	0.00010491	1.66272E-05	4.17656E-06	1.32074E-06	2.09324E-06	8.33333E-07		2.63523E-06
Calculations to BS EN 12354										
	63	125	250	500	1000	2000	4000	8000		
Sum	0.00513523	0.000934694	0.001849566	0.000735782	7.10399E-05	3.8527E-05	5.60546E-05	4.51178E-05		
10log sum	-22.8943998	-30.29330424	-27.32930234	-31.33250892	-41.48497934	-44.14234858	-42.5138884	-43.45652434		
10log S/A	0.26872146	0.268721464	1.467074814	2.492345501	3.053948011	0.826695739	-0.38752589	-0.38752589		
correction factor +3	3	3	3	3	3	3	3	3		
Octave Band	63	125	250	500	1000	2000	4000	8000		dBA
Day, $L_{Aeq,T(1hr)}$	40.4	32.0	33.1	26.2	17.6	9.7	3.1	-3.8		27.8
Night, $L_{Aeq,T(1hr)}$	32.4	22.0	24.1	17.2	10.6	2.7	-2.9	-7.8		19.1
Night-time $L_{Aeq,T(1hr)}$	35.4	23.0	26.1	25.2	12.6	26.7	6.1	-5.8		29.2

6.2. Commercial Noise Assessment

To determine a typical worst-case noise emission from patrons inside the pub we have undertaken an operational noise assessment based on 35 patrons being inside. This is considered a worst-case based on the floor area.

Measurements within an existing bar in Bristol were undertaken on the 11th of September 2016 between 20:40 and 20:55 hours to determine typical noise levels due to speech and background noise music in a licensed premise. During the measurements, the main source of noise was from people's voices with the typical distance from patrons of 2m.

During the measurement period the bar was occupied by approximately 200-220 patrons. The sound level meter was suspended 1 metre from the ceiling, approximately 1.5 metres above head height. The measured levels are from the patrons talking within the space. The results obtained are outlined below:

Table 10: Measured Equivalent Noise Levels due to Speech from 200-220 Patrons

Octave Band (Hz)	63	125	250	500	1k	2k	4k	dB(A)
L_{eq} (15minutes)	69	76	75	78	75	72	66	80

This level has been corrected to assess the noise level produced by 35 patrons using the following method.

$$\text{Patron Noise Attenuation} = 10\log(35/220)$$

This equates to a reduction in patron noise of -8 dB applied to each frequency band level.

A distance correction from 2 to 15 metres has also then been applied (-18dB).

$$\text{Distance Attenuation} = 20\log(2/15)$$

A correction for the lower reverberant space has also been applied (-3dB).

It will be necessary to mitigate potential noise transmission from the ground floor to the residential dwellings above.

6.2.1. **Separating Floor: Commercial to Residential**

The following comments are based on observations made during our site visit. In all cases the floors and ceilings should be fully sealed with non-setting mastic. With the build-up provided below the performance criteria can be met subject to details and installation.

Due to joists potentially running continuously between apartments we would recommend the following platform floor treatment to be installed to all separating floors (noted from the top of the floor down to the ceiling):

Collecta DECKfon 26T system comprising:

- Collecta 26T floating floor with edge isolation strips. The Deckfon system should be installed as per manufacturers requirements.
- 15mm Chipboard or plywood.
- Minimum of 200mm timber or metal joists.
- 100mm mineral wool installed between joists
- Resilient bar (minimum 16mm) or metal frame system with GAH acoustic Hangers
- 2x layers of staggered and sealed 12.5mm board (total mass $\geq 20\text{Kg/m}^2$), such as British Gypsum Soundbloc, staggered and sealed.

With the above floor construction installed as per manufacturer's guidance, and with good workmanship, the predicted internal level due to commercial noise is comfortably within BS 8233 and Approved Document: E criteria.

6.2.2. Ground Floor Internal Wall Linings

From our site visit the external wall is understood to be a solid masonry construction up to 500mm thick. Where this is the case, the following can be disregarded.

Any retained masonry wall (external or internal) with a mass less than 365 kg/m² (typically 215mm dense block, stone, or brick) will need upgrading as follows:

- Timber or metal frame. Minimum gap between frame and masonry wall of 10mm
- Minimum cavity of 35mm between freestanding panel and masonry wall
- Mineral wool in cavity, minimum 35mm thickness, minimum density 10 kg/m³
- 2x layers of 15mm plasterboard (minimum mass per board of 12kg/m²)

The frame could be independent of the masonry wall or installed on resilient fixings. The above system should be applied to both sides of any retained masonry wall fitting the above description.

7. Commercial Plant Noise Limits

The proposed café/wine bar is to install a kitchen extract at the site. Noise from any plant will need to be suitably limited to avoid creating an adverse impact on the residential occupiers.

At this time, we have not been provided with any proposed schedule of plant units. We therefore provide the following design noise limits for the development.

The following noise limits are to be applied to plant associated with the development and should be determined at the façade of the nearby noise-sensitive residential properties. These limits are based on the measured survey results, and British Standard 4142:2014+A1:2019.

From the measured site data, a typical background sound level has been determined for the overall daytime and night-time periods. The most onerous criteria should be applied for the period during which the plant operates.

We would advise that plant noise is designed not to exceed a maximum cumulative 'free-field' Rating Sound Level as follows, when measured at the nearest noise sensitive receivers.

Table 11: Plant noise limits, determined at NSR (free-field level)

Time Period	Background Sound Level	Cumulative Rating Sound Level Limit
Daytime (07:00-19:00)	51 dB L _{A90,1 hour}	51 dB L _{Ar,1 hour}
Proposed Evening Opening (19:00 – 00:00)	49 dB L _{A90,1 hour}	49 dB L _{Ar,1 hour}
Night-time (23:00-07:00) Night-time for any 24-hour plant operation	31 dB L _{A90,15 minutes}	31 dB L _{Ar,15 minutes}

The rating sound level of the plant unit(s) should account for any reasonable character corrections, i.e., tonality, intermittency, impulsivity, and other sound characteristics.

If provided with further information on selected plant units, we can assist further.

8. Noise Management Plan

We have been informed by the Client that all seating and tables within the café/wine bar will be fixed to the ground. This design element is likely to reduce any subjective noise annoyance from operations in the premises.

We have also been informed that the premises will not empty any bins after 21:00 hours. The bins will then be emptied each morning after 09:00 hours.

Both of these points could be written into a Planning Condition to protect the well-being of the residential receivers within the building and the surrounding properties.

It is expected that noise from patrons will be easily controlled with a well-planned noise management policy. We would advise a noise management policy forms part of the license decision. The British Beer and Pub Association provides the following guidance:

This noise source, usually shouting or loud voices, is likely to be especially noticeable at night, when noise levels in the external environment are relatively low.

In most circumstances people arriving at and leaving the premises will not cause any disturbance, but it does happen and must be acknowledged. Noise can also arise from beer gardens and play areas. How to control this type of noise:

- *For new-builds and refurbishments consider the positioning of exits from the building and outside areas such as car parks in relation to noise-sensitive premises.*
- *Where noise-sensitive premises may overlook the frontage of a licensed premise then an alternative exit-route possibly onto a rear or side street may minimise disturbance. Post notices close to exit doors advising that there are residential properties nearby and asking patrons to leave quickly and quietly.*
- *If music has been playing consider reducing the volume and/or playing slower, more mellow music as the evening draws to a close. This often quietens people down before they leave.*

Communication with the local residents and businesses is important and will ensure any concerns about the adverse impacts are reduced. When responding to complaints, the British Beer and Pub Association provides the following guidance:

Occasionally premises receive complaints about noise. To show due consideration in residential communities it is suggested that the actions below be followed, where applicable to each individual outlet:

- *Staff to log and report any complaints to the manager/duty manager.*
- *Where applicable Unit Managers should inform their Area Managers of any complaint and seek their advice.*

- *Where possible seek advice from Head Office specialists in noise control/law enforcement.*
- *On receipt of a complaint and/or where noise generating events are held the area around the premises should be monitored at the boundaries of the noise-sensitive premises (if known) by the Unit Manager. Do this as the equipment is set up and tested and on several occasions throughout the event.*
- *Remember, the hearing of someone who has been inside the building may have been affected by raised noise levels making the noise outside seem quieter.*
- *If a noise problem is established, consider the controls throughout the rest of this booklet that might tackle it.*
- *Seek guidance and suggestions from your Local Authority Environmental Health or Environmental Services section.*

9. Summary & Conclusions

Tawe Architectural Design appointed Acoustic Consultants Limited to carry out an environmental noise assessment and provide acoustic mitigation advice for the proposed café/wine bar and residential development on the site currently occupied by a disused bank.

The assessment takes into consideration the local authority requirements and considers the impact of road traffic noise from the surrounding road network effecting the residential flats. The report also provides internal acoustic insulation advice for the separating elements between the ground floor café/wine bar and flats above, and noise between flats on the upper floors.

Due to proposed use of the ground floor, the report also provides noise limits based on measured ambient noise levels at the site.

The site has already had an initial Planning Application granted, with an amendment submitted to change the number of flats on the first floor at the development. From the Decision Notice associated with the initial granted application, we understand that customers of the café/wine bar will not be permitted on the premises outside the hours between 08:00 and 22:00.

The report assesses the suitability of the site with respect to TAN 11 and British Standard 8233:2014+A1:2019 and British Standard 4142:2014+A1:2019.

The site falls into NEC B which therefore requires noise mitigation measures to the building façade construction, namely external walls, windows and ventilation to habitable rooms.

We have based our calculations on existing external constructions. These should be verified as accurate by the Client. We understand that the internal linings of the existing external walls will be upgraded with stud and plasterboards. This will enhance the predicted internal levels provided in this report.

With the noted building fabric construction, and suitable ventilation provisions as stated above in this report, the predicted internal noise levels within the proposed dwellings from both road traffic and plant noise are within the criteria of British Standard 8233:2014 of 35 dB L_{Aeq} (16 hour) in the daytime rooms, and 30 dB L_{Aeq} (8 hour) and 45 dB $L_{Amax}(F)$ in the night-time rooms.

We have carried out a prediction of noise from the ground floor operations up to the residential dwellings. With the proposed upgrades to the existing separating floor, required internal ambient noise levels can comfortably be achieved.

As such, we would consider external and ground floor operational noise to be suitably controlled within the habitable rooms of the proposed residential development and good internal conditions can be achieved.

10. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure p_A – 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 μ Pa)

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, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

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

where:

p_0 is the reference sound pressure (20 μ Pa); 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, $L_s = L_{Aeq,T_r}$ – 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,T_r} – 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).

11.



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