

Report VA5983.250902.NIA1.2

Abbey Wharf, 57-75 Kings Rd, Reading

Noise Impact Assessment

23 September 2025

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VA5983/SP1	Indicative Site Plan
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Report Version	Author	Approved	Changes	Date
NIA	Ben Alexander	Ollie Brunt	-	21/07/2025
NIA1.1	Ben Alexander	Ollie Brunt	Minor update at Mountley request – clarification that windows can remain open at occupant preference	21/07/2025
NIA1.2	Ben Alexander	Steven Liddell	Report updated to reflect Reading Borough Council requests. Internal predicted levels added, advisory S.I performance included for background ventilators	23/09/2025

The interpretations and conclusions summarised in this report represent Venta Acoustics’ best technical interpretation of the data available to us at the time of assessment. Any information provided by third parties and referred to in this report has not been checked or verified by Venta Acoustics, unless otherwise expressly stated in the document. Venta Acoustics cannot accept any liability for the correctness or validity of the information provided. Due to a degree of uncertainty inherent in the prediction of all parameters, we cannot, and do not guarantee the accuracy or correctness of any interpretation and we shall not, except in the case of gross or wilful negligence on our part, be liable for any loss, cost, damages or expenses incurred or sustained by anyone resulting from any interpretations, predictions of conclusions made by the company or employees. The findings and conclusions are relevant to the period of the site survey works, and should not be relied upon to represent site conditions at later dates. Where additional information becomes available which may affect the findings of our assessment, the author reserves the right to review the information, reassess the findings and modify the conclusions accordingly.

1. Introduction

An application is to be submitted for the conversion of all levels of Abbey Wharf, 57-75 Kings Rd, Reading from commercial to residential use under Class MA of the General Permitted Development Order.

Venta Acoustics has been commissioned by Watercastle Ltd to undertake an assessment of the current environmental noise impact on the site and provide recommendations of acoustic mitigation, where required, in support of an application for planning permission.

An environmental noise survey has been undertaken to determine the noise levels incident on the site. These levels are then used to undertake an assessment of the likely impact in accordance with the National Planning Policy Framework with reference to relevant standards, guidance and the planning requirements of Reading Borough Council.

Outline mitigation measures are considered and an appraisal of the requirements of external building fabric elements is provided.

2. Guidance and Legislation

2.1 Permitted Development – Class MA

Class MA of the General Permitted Development Order provides the following requirements.

Conditions

MA.2. (1) *Development under Class MA is permitted subject to the conditions*

(2) *Before beginning development under Class MA, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—*

- (a) transport impacts of the development, particularly to ensure safe site access;*
- (b) contamination risks in relation to the building;*
- (c) flooding risks in relation to the building;*
- (d) impacts of noise from commercial premises on the intended occupiers of the impacts of noise from commercial premises on the intended occupiers of the development;*
- (e) (e)where—*
 - (i) the building is located in a conservation area, and*
 - (ii) the development involves a change of use of the whole or part of the ground floor,*

the impact of that change of use on the character or sustainability of the conservation area;

(f) the provision of adequate natural light in all habitable rooms of the dwellinghouses;

(g) the impact on intended occupiers of the development of the introduction of residential use in an area the authority considers to be important for general or heavy industry, waste management, storage and distribution, or a mix of such uses; and

(h) where the development involves the loss of services provided by—

(i) a registered nursery, or

(ii) a health centre maintained under section 2 or 3 of the National Health Service Act 2006(4), the impact on the local provision of the type of services lost.

(3) An application for prior approval for development under Class MA may not be made before 1 August 2021.

(4) The provisions of paragraph W (prior approval) of this Part apply in relation to an application under this paragraph as if in the introductory words in sub-paragraph (5), for “and highways impacts of the development” there were substituted “impacts of the development, particularly to ensure safe site access”.

(5) Development must be completed within a period of 3 years starting with the prior approval date.

(6) Any building permitted to be used as a dwellinghouse by virtue of Class MA is to remain in use as a dwellinghouse within the meaning of Class C3 of Schedule 1 to the Use Classes Order and for no other purpose, except to the extent that the other purpose is ancillary to the use as a dwellinghouse.”.

Part 3, paragraph W(10)(b) of the GPDO states that the local planning authority must, when determining an application, have regard to the National Planning Policy Framework so far as relevant to the subject matter of the prior approval as if the application were a planning application.

2.2 The National Planning Policy Framework (2024)

The revised *National Planning Policy Framework* (NPPF), published in December 2024, sets out the Government’s planning policies for England, superseding all previous planning policy statements and guidance.

In respect of noise, the NPPF states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing developments from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution.

Hence, Paragraph 198 states that *planning policies and decisions should also ensure 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*

In regards to the term adverse impact, reference is made to the Noise Policy for England:

2.3 Noise Policy Statement for England (2010)

The Noise Policy Statement for England (NPSE) sets out the long term vision of Government noise policy: to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

This vision is supported by the following aims:

- *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.*

The terms “significant adverse” and “adverse” are related to the following concepts:

No Observed Effect Level (NOEL) - *the level below which no effect on health and quality of life can be detected.*

Lowest Observed Adverse Effect Level (LOAEL) - *the level above which adverse effects on health and quality of life can be detected.*

Significant Observed Adverse Effect Level (SOAEL) - *the level above which significant adverse effects on health and quality of life occur.*

The guidance acknowledges 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, but will be different for different noise sources, receptors and times.

In order to enable assessment of impacts in line with these requirements, reference should be made to other currently available guidance.

2.4 BS4142:2014+A1:2019

British Standard BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* describes a method for rating and assessing sound of an industrial and/or commercial nature,

which includes sound from fixed installations comprising mechanical and/or electrical plant and equipment;

The assessment methodology considers the Specific Sound Level, as measured or calculated at a potential noise sensitive receptor, due to the source under investigation. A correction factor is added to this level to account for the acoustic character of the sound as follows:

Tonality – A correction of up to 6dB depending on the prominence of tones;

Impulsivity - A correction of up to 9dB depending on the prominence of impulsivity;

Other sound characteristics - A 3dB correction may be applied where a distinctive acoustic character is present that is neither tonal nor impulsive;

Intermittency - A 3dB correction may be applied where the specific sound has identifiable on/off conditions.

An estimate of the impact of the source is obtained by subtracting the typical background noise level from the corrected Specific Sound Level.

- 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 could 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 there will be an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context.

2.5 WHO Guidelines for Community Noise (1999)

The guidance in this document details suitable noise levels for various activities within residential and commercial buildings.

The relevant sections of this document are shown in Table 2.1.

Criterion	Environment	Design range $L_{Aeq,T}$ dB
Maintain speech intelligibility and avoid moderate annoyance, daytime and evening	Living Room	35 dB
Prevent sleep disturbance, night time	Bedrooms	30 dB

Table 2.1 – Excerpt from WHO

[dB ref. 20μPa]

This guidance also states:

For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times a night (Vallet & Vernet 1991).

For outdoor living areas, it is stated that:

To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB LAeq on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50dB LAeq. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development.

For sleep disturbance, i.e. in bedrooms at night, the NOEL can, therefore, be taken as anything below 30dB(A), whilst the onset of the LOAEL occurs at 30dB(A) and above. The SOAEL cannot be inferred from this information.

During daytime periods, for avoidance of annoyance, the NOEL relates to anything up to 50dB(A) (typically applied to external areas, such as gardens), whilst the onset of the LOAEL occurs at 50dB(A) and above.

2.6 BS8233:2014

BS8233 *Guidance on sound insulation and noise reduction for buildings* provides guidance as to desirable internal ambient noise levels for different areas within residential buildings.

The relevant section of the standard is shown below in Table 2.2.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB LAeq, 16 hour	-
Dining	Dining Room	40 dB LAeq, 16 hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq, 16 hour	30 dB LAeq, 8 hour

Table 2.2 – Excerpt from BS8233:2014 - Indoor ambient noise levels for dwellings

[dB ref. 20µPa]

For external areas the standard states the following:

For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB LAeq,T, with an upper guideline value of 55 dB LAeq,T which would be acceptable in noisier environments.

However, it is also recognized 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.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.

2.7 ISO 1996-2: 2017

There is no standard that provides specific criteria with regards to revelry or entertainment as assessed within a dwelling. BS8233 and WHO 1999 are intended for anonymous noise sources, such as transportation.

Notwithstanding this, ISO 1996-2: 2017 *Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels* describes how corrections can be made to sound sources to account for aspects of their character that may draw additional attention. The standard allows for adjustments to be made to the noise source for tonality, with clearly audible tones, the adjustment may be 5 to 6dB. If the components are only just detectable by the observer, an adjustment of 2 to 3 dB may be appropriate.

When considering patron and pedestrian revelry, the sound insulation performance of any acoustically-specified building glazing will be specified to control the total noise level, (including ISO 1996 penalties, as appropriate) to below the recommended values in WHO (1999) and BS8233:2014.

3. Site Description

Abbey Wharf is a six-storey (ground-to-fourth floor, plus basement level carpark) former office building located in central Reading. The building is of a modern brick construction with 'punch out' glazing and numerous window bays and a tiled roof forming multiple pitches and louvred dormers.

There are balconies on some aspects which are too shallow to allow, for instance, a table and chairs. There is a larger terrace at first floor at the rear of the building which overlooks the River Kennet, to the north of the site.

The fourth floor of the building within the roof pitch is currently only partially fitted out for office use at the rear, with the rest of the roof area occupied by plant and/or maintenance space.

The general area in the vicinity of the building is mixed-use in character with shops, offices, cafes/restaurants and public houses mixed with flats and housing.

Abbey Wharf overlooks Kings Road to the south, with The Outlook public house located approximately 30 metres to the southwest on the opposite side of the road. Discussion with public house management indicates that there are deliveries to the front entrance. The delivery schedule is as follows:

- Monday, 1 drinks delivery via HGV between 06:00 – 09:00. Kegs rolled in.
- Wednesday, 1 food delivery via HGV or Transit van between 08:00 – 12:00. Food unloaded on wheeled cages.
- Saturday, 1 food delivery via HGV or Transit van between 08:00 – 12:00. Food unloaded on wheeled cages.

Abbey Wharf also overlooks a supermarket and restaurant (YY Oriental Supermarket, YL Restaurant) to the east, which has multiple items of mechanical plant generating audible noise at the Abbey Wharf façade when operational. Discussion with management indicates that the business takes daily deliveries via Transit or Luton-sized refrigerated vehicle to the rear goods yard between 09:00 – 10:00. Goods are unloaded on handheld trays.

Further east down Kings Road (approximately 60 – 75 metres away) are the Back of Beyond public house and Thirsty Bear bar and pizza kitchen. Both of these establishments have delivery times during the daytime period only, and deliveries are to Bembridge Place at the side of the buildings, meaning that Abbey Wharf is acoustically screened from delivery noise due to the built form of the area. Because of this and the distances involved, noise impact from this activity is expected to be negligible.

3.1 Proposals

The proposals for the building involve the conversion of all floors (with the exception of the basement carpark, to be retained) into residential dwellings, providing a total of 78 apartments across five floors.

The overall current form of the external building fabric, windows, shallow balconies etc are to be retained as required for the Class MA application.

Although not required at prior approval stage, for information, the ventilation strategy for the majority of the development is understood to be for provision of continuous mechanical extract to each apartment, with supply air drawn in under negative pressure via passive façade ventilators. The only exception to this would be the most noise-affected ground floor receivers at the front of the development, which will have full mechanical intake and extract.

This will allow the provision of in-duct attenuation on the atmosphere side for these most noise-affected apartments, avoiding the difficulties sometimes associated with achieving very high performances from passive façade ventilators (see Section 6.2).

In-duct attenuation requirements for mechanical intakes / exhausts will be reviewed as part of the developed design of the project, once more information becomes available.

4. Environmental Noise Survey

4.1 Survey Procedure & Equipment

In order to establish the existing background noise levels at the site, a noise survey was carried out between Wednesday 9th and Friday 11th July 2025 at the three external first floor locations shown in site plan VA5983/SP1. These locations were chosen to be representative of prevailing noise climate at the façades of the building.

With the exception of monitoring position 3 at the rear, microphones were installed at approximately 0.2 - 0.3 metres from the building façade and measurements were therefore influenced by the proximity of the façade.

Continuous 5-minute samples of the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels were undertaken at each of the measurement locations.

The weather during the survey period was generally dry with light winds. The background noise data is not considered to have been compromised by these conditions.

Measurements were made generally in accordance with ISO 1996 2:2017 *Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels*.

The following equipment was used in the course of the survey:

Manufacturer	Model Type	Serial No	Calibration	
			Certificate No.	Date
NTi Class 1 Integrating SLM	XL2	A2A-12202-E0	1511238-2	14/2/25
NTi Class 1 Integrating SLM	XL2	A2A-15993-E0	1511879-1	3/4/25
Svantek Class 1 SLM	971	143563	00002984-1	19/9/24
Larson Davis calibrator	CAL200	13069	1511238-1	14/2/25

Table 4.1 – Equipment used for the survey

The calibration of the sound level meters was verified before and after use with no significant calibration drift observed.

4.2 Results

The measured sound levels are shown as time-history plots on the attached charts VA5983/TH1-2 for position 1, VA5983/TH3-4 for position 2 and VA5983/TH5-6 for position 3.

On-site observations and audio recordings taken during the survey indicate that facades with a view of Kings Road are primarily affected by road traffic noise from Kings Road, with a contribution from mechanical plant noise from the neighbouring supermarket/restaurant and pedestrians/patrons enjoying the night-time economy of the area. There is also a possibility of delivery noise from nearby businesses, although this was not noted during the survey.

Levels at the north (rear) façade are lower, without substantial levels of either road or commercial noise.

The average noise levels for the Daytime and Night-time periods, as measured at the automated monitoring position were:

Monitoring Period	L _{Aeq, T}			Typical ¹ L _{A90,5min}			Typical ² Night-Time L _{AFmax}		
	Pos 1	Pos 2	Pos 3	Pos 1	Pos 2	Pos 3	Pos 1	Pos 2	Pos 3
07:00 – 23:00	64 dB	58 dB	53 dB	50 dB	48 dB	44 dB	-	-	-
23:00 – 07:00	59 dB	51 dB	46 dB	40 dB	43 dB	36 dB	79 dB	70 dB	62 dB

Table 4.2 – Average ambient, typical background and typical night-time maximum noise levels

¹ The typical L_{A90} value is taken as the 10th percentile of all L_{A90} values measured during the relevant period.

² Level not exceeded more than 10 times per night

Levels for monitoring position 1 and position 2 are not free field, being influenced by the proximity of the building façade. Free-field average and maximum noise levels for these positions would be 3dB lower than indicated.

Façade-incident noise levels generated by patrons or passing pedestrians enjoying night-time economy of the area were measured in the typical range of L_{Aeq} 55 - 60 dB/L_{AFmax} 60 - 75 dB at Position 1.

Façade-incident noise levels generated by the neighbouring supermarket/restaurant mechanical plant during operational times (10:00 – 21:00) are L_{Aeq} 55 dB at Position 2. Background noise levels in the periods immediately preceding and after the plant ceases operation are L_{A90} 48 dB.

5. Assessed Noise Sources

5.1 Commercial Noise Sources

Hypothetical night-time commercial delivery noise from nearby businesses has been taken into account, along with consideration of night-time revelry and mechanical plant noise levels from the adjacent YY Oriental Supermarket/YL Restaurant during the operational 10:00 – 21:00 daytime period.

To control for the higher potential for adverse impact associated with these more characterful sources, suitable character corrections have been allowed for mechanical plant / delivery noise as per the subjective method described in BS4142:2014+A1:2019.

A suitable tonal character correction has also been allowed for patron noise as per ISO1996-2:2017.

Character corrections are summarised in the following table:

Noise Source	Subjective Description	Allocated Corrections
Nearby kitchen extracts/cooling plant	Moderately tonal characteristics are perceptible in audible plant noise at the rear of the site. Operation is not impulsive or intermittent.	Tonality: +4dB Impulsivity: 0dB Intermittency: 0dB (BS4142+A1:2019)
Goods unloading/loading	Impulsive noise from occasional bangs, clatters, from loading. Intermittent nature of deliveries.	Tonality: 0dB Impulsivity: +6dB Intermittency: +3dB (BS4142+A1:2019)
Vehicle chiller compressor	No identifiable tonal, impulsive or intermittent characteristics but nonetheless distinctive against the prevailing noise climate	Other characteristics: +3dB (BS4142+A1:2019)
HGV Manoeuvring	No identifiable tonal, or impulsive characteristics but nonetheless distinctive against the prevailing noise climate	Other characteristics: +3dB (BS4142+A1:2019)
Night-time revelry	Occasional yells, singing etc. would be clearly tonal at times	Tonality: +6dB (ISO 1996)

Table 5.1 – Acoustic character corrections

5.2 BS4142 Assessment

5.2.1 Impact Estimates

The Outlook public house

The noise impact posed by The Outlook public house and restaurant is primarily due to deliveries. The delivery schedule for business has been confirmed as follows:

- Monday, 1 drink delivery between 06:00 – 09:00 hours. Kegs rolled in via front entrance.
- Wednesday, 1 food delivery between 08:00 – 12:00 hours. Food unloaded on wheeled cages and delivered via front entrance.
- Saturday, 1 food delivery between 08:00 – 12:00 hours. Food unloaded on wheeled cages and delivered via front entrance.

The typical background noise level measured at position 1 (representative of receptors most affected by The Outlook delivery noise) between 06:00 – 07:00 hours is **L_{A90,5min} 45 dB**.

The typical background noise level measured between 07:00 – 09:00 hours is **L_{A90,5min} 49 dB**.

The typical background noise level measured between 08:00 – 12:00 hours is **L_{A90,5min} 51 dB**.

A summary of calculations for the initial BS4142 impact estimates is included in Appendix B.

The predicted BS4142 assessment levels (relative to the corresponding representative background noise level) are as follows:

- **+12 dB** for pre-07:00 hours drinks deliveries
- **+2 dB** for drinks deliveries occurring between 07:00 – 09:00 hours
- **-3 dB** for food deliveries occurring between 08:00 – 12:00 hours

These assessments indicate that pre-07:00 hours drinks deliveries could result in a significant adverse impact, but that this impact drops to a marginal/low impact if occurring after 07:00 hours.

Food deliveries occurring after 08:00 hours would likely result in a low impact.

YY Supermarket/YL Restaurant

The noise impact posed by YY Supermarket and YL Restaurant is due to deliveries (which occur between 09:00 – 10:00 hours) and fixed mechanical plant.

The typical background noise level measured at position 2 (representative of receptors most affected by YY Supermarket/YL Restaurant noise) immediately before plant turns on at 10:00 and just after it turns off at 21:00 hours is **L_{A90,5min} 48 dB**.

The typical background noise level between deliveries during morning delivery times (09:00 – 10:00) is **L_{A90,5min} 49 dB**.

A summary of calculations for the initial BS4142 impact estimates is included in Appendix B.

Initial BS4142 impact estimates for fixed mechanical plant and light goods deliveries (Including a cold delivery) occurring at the neighbouring supermarket and restaurant indicates worst-case assessment levels at Abbey Wharf of:

- **+4 dB** for unloading activity
- **+7 dB** for cold delivery compressor
- **+11 dB** for mechanical plant noise

These assessment levels indicate a tendency toward adverse or significantly adverse impact for food deliveries, and for a significant adverse impact from mechanical plant noise outside windows of most affected overlooking apartments.

5.2.2 Context

The BS4142 standard aims to cover a wide variety of situations under the same base assessment methodology and so has some inherent shortcomings. To allow for this, the guidance encourages consideration of the site context as a means of adapting the base assessment to specific scenarios.

The base assessment methodology is considered to be weighted towards the more sensitive case of assessing industrial noise upon an existing residential receiver. The introduction of a new residential use to an area with existing sources of commercial noise provides an opportunity to provide appropriate mitigation against the noise sources.

Mitigation at the source or along the propagation path for the various commercial noise sources discussed would not be achievable in this situation.

However, the redevelopment of Abbey Wharf for residential use offers an opportunity to consider commercial noise intrusion internally via the building façade. It should be noted that, with the exception of the larger rear terrace which is acoustically sheltered from commercial noise, apartment balconies are too small for meaningful use as external amenity spaces, being less than 0.7m deep and with an overall area of less than 4.5m². Consideration of commercial noise internally, allowing for suitable penalties, as discussed in Section 5.1, is therefore a reasonable and viable approach in this instance.

BS8233 recommends that a loss of approximately 15 dB can be expected to external noise ingress via a partially open window. On this basis, nearby commercial activities resulting in an adverse or significantly adverse impact outside Abbey Wharf would result in levels inside affected apartments which are above the design ranges recommended by WHO 1999 and BS8233:2014 in Table 2.1 and Table 2.2, respectively.

As such, the impact of these commercial activities would need to be controlled through the acoustic specification of the façade, which is detailed further in Section 6.

5.3 Night-time Revelry

Average levels of night-time pedestrian and patron revelry at the most exposed (southern) building façade could reach $L_{Aeq,8hour}$ 53 dB on busy evenings, with maxima reaching L_{AFmax} 76 dB. When allowing for character (as per ISO 1996) these levels could be 6 dB higher.

The above external revelry levels would result in internal levels in bedrooms, via partially open windows, that are well above the recommended guidelines detailed in BS8233:2014 and WHO 1999.

Windows would therefore need to be kept shut to meet the internal design criteria would need to be specified with an adequate sound insulation performance. The required glazing specification is considered further in Section 6.

6. External Building Fabric Review

To control sound from the commercial uses, the sound insulation performance of the building glazing will be specified to control commercial noise and revelry (including character penalties) to below the recommended values in BS8233.

This hybrid approach of assessing commercial noise with a BS4142 penalty against the BS8233 criteria (over a shortened assessment period) is endorsed in the ProPG (Professional Practice Guidance on Planning and Noise prepared by the Institute of Acoustics, the Chartered Institute of Environmental Health and the Association of Noise Consultants).

Transportation noise (road traffic etc) is excluded as this is outside of the scope of Class MA of the GPDO.

A review of the architectural drawings for the proposed scheme has been undertaken with the intent of achieving the internal noise levels from average and maximum noise levels stated in BS8233 and the WHO Guidelines.

6.1 Sound Reduction Performances of Building Elements

It has been assumed that all the non-glazed elements, i.e. walls and roof systems, will be capable of providing the following minimum sound insulation performance, when tested in accordance with BS EN ISO 10140-2:2021 *Acoustics - Laboratory measurement of sound insulation of building elements – Part 2: Measurement of airborne sound insulation*.

Building Element	Single figure weighted sound reduction index, dB
Roof	R _w 45
Masonry	R _w 51

Table 6.1 – Assumed sound reductions performances of non-glazed elements

6.2 Sound Reduction Performance of Windowsets and Vents

The monitoring data for commercial activities and revelry along with the architectural drawings have been used to calculate the required sound insulation performance for the windowsets (glazing and frame combination) and background ventilators for the building. These are summarised in Table 6.2 below.

Glazing Reference	Required Glazing SRI, dB	Background Ventilator Performance, dB
Type A	Bedrooms - R _w 39, K/D/L - R _w 30	Attenuated mechanical intake
Type B	Bedrooms - R _w 39, K/D/L - R _w 30	Bedrooms - D _{n,e,w} 39, K/D/L - D _{n,e,w} 27
Type C	Bedrooms - R _w 35, K/D/L - R _w 30	Bedrooms - D _{n,e,w} 33, K/D/L - D _{n,e,w} 27
Type D	Bedrooms - R _w 33, K/D/L - R _w 30	Bedrooms - D _{n,e,w} 31, K/D/L - D _{n,e,w} 27
Type E	Bedrooms + K/D/L - any glazing, e.g., R _w 25	Bedrooms + K/D/L - any ventilator, e.g., D _{n,e,w} 20

Table 6.2 – Required minimum sound reduction indices for glazing and background ventilators

It is important that the glazing performances shown in Table 6.2 are achieved by the entire windowset including frames, ventilators, seals, etc. Glass performance alone would not be likely to show compliance with the specification as the other elements typically provide the weakest noise transmission path.

6.3 Glazing Locations

Table 6.3 shows on which façades and levels of the building the glazing with the sound reduction performances shown in Table 6.2 should be installed, and should be read in conjunction with the attached glazing location plan, VA5983/GP1.

Facade	Floor	Glazing Reference
South, southeast + southwest	GF	Type A
South, southeast + southwest	1F	Type B
South, southeast + southwest	2F	Type C
South, southeast + southwest	3F	Type D
North, northeast + northwest	GF – 4F	Type E

Table 6.3 – Glazing locations

6.4 Internal Noise Assessment

With the above recommendations implemented, the commercial noise (including character corrections) within the proposed dwellings would be controlled in line with recommendations given in the WHO 1999 and BS8233:2014 guidance, as summarised in the following table.

Facade	Floor	Predicted Internal Noise Levels (no higher than...)		
		D.T L _{Aeq,16hour}	N.T L _{Aeq,8hour}	N.T L _{Afmax}
South, southeast + southwest	GF	23 dB	23 dB	45 dB
South, southeast + southwest	1F	22 dB	22 dB	45 dB
South, southeast + southwest	2F	23 dB	23 dB	45 dB
South, southeast + southwest	3F	23 dB	23 dB	45 dB
North, northeast + northwest	GF – 4F	35 dB	28 dB	44 dB

Table 6.4 – Predicted internal noise levels

Internal noise levels can therefore be considered to be between the NOEL the LOAEL levels.

Notwithstanding the assessments above and required sound insulation performances detailed in Table 6.2, glazing at all façade locations should remain openable at occupant preference.

7. Areas of External Amenity

Overall external noise levels on the first floor terrace at the rear of the building comply with the World Health Organisation guideline value for external amenity of L_{Aeq,16hour} 55dB.

No mitigation measures are deemed necessary in relation to external noise levels.

The outdoor noise levels across the site can therefore be considered to fall between the LOAEL and SOAEL levels, generally being below the level that is expected to cause significant annoyance.

8. Conclusion

A baseline noise survey has been undertaken by Venta Acoustics to establish the prevailing noise climate in the locality of Abbey Wharf, 57-75 Kings Rd, Reading in support of a planning application for the proposed development of new residential dwellings.

The measured levels have been assessed against the National Planning Policy Framework and currently available standards and guidance documents including World Health Organisation *Guidelines for Community Noise* (1999) and BS8233:2014 *Guidance on sound Insulation and noise*.

When assessed using BS4142, noise from most activities on site have been shown to have impacts ranging from low to significantly adverse.

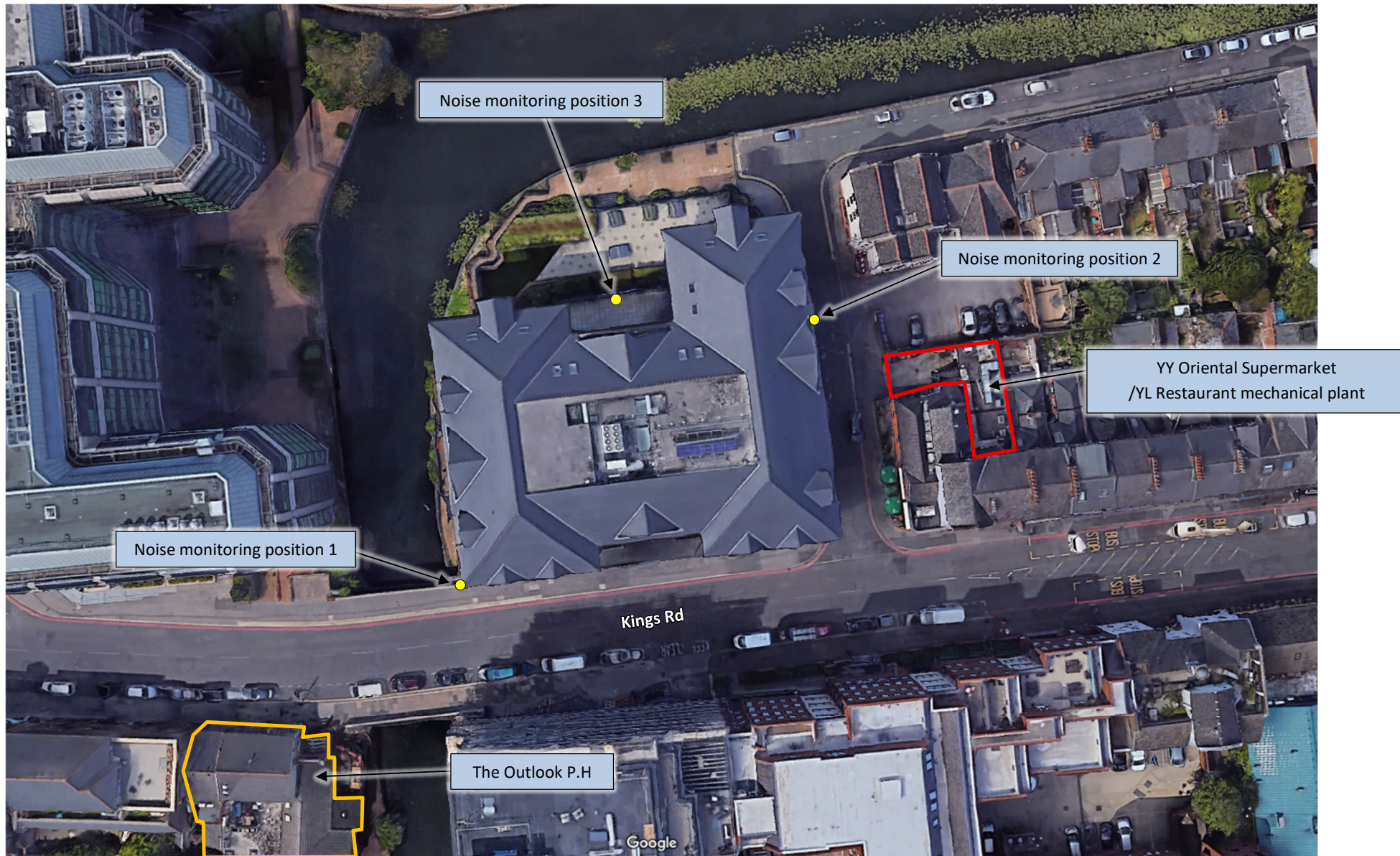
Night time revelry noise levels are also high and, along with commercial noise assessed under BS4142, would require windows to remain closed in order to meet the appropriate indoor noise targets. Glazing specifications have been provided which would allow these targets to be met and to minimise adverse impacts on health and quality of life as a result of the new development.

Notwithstanding this, glazing should remain openable at occupant preference.

Daytime noise levels on the first floor communal terrace at the rear of the building meet WHO 1999 and BS8233:2014 guidelines.

The proposed scheme is not expected to experience a significant adverse noise impact and the site is considered acceptable for the proposed residential use.

Ben Alexander MIOA



VA5983/SP1 Site Plan showing measurement locations



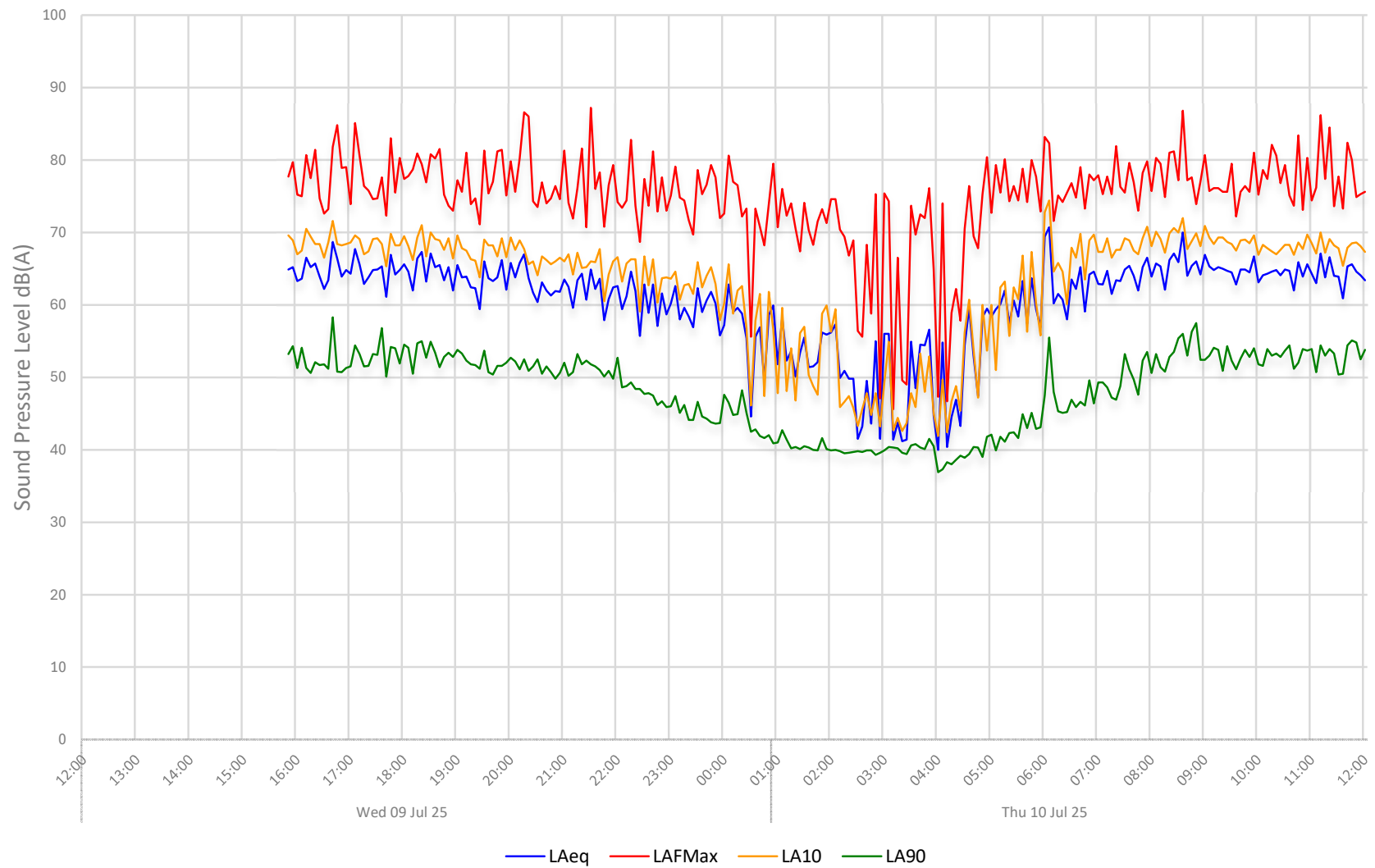
Abbey Wharf, 57-75 Kings Rd, Reading

Environmental Noise Time History: 1

Position 1

 **VENTA** ACOUSTICS

Figure VA5983/TH1



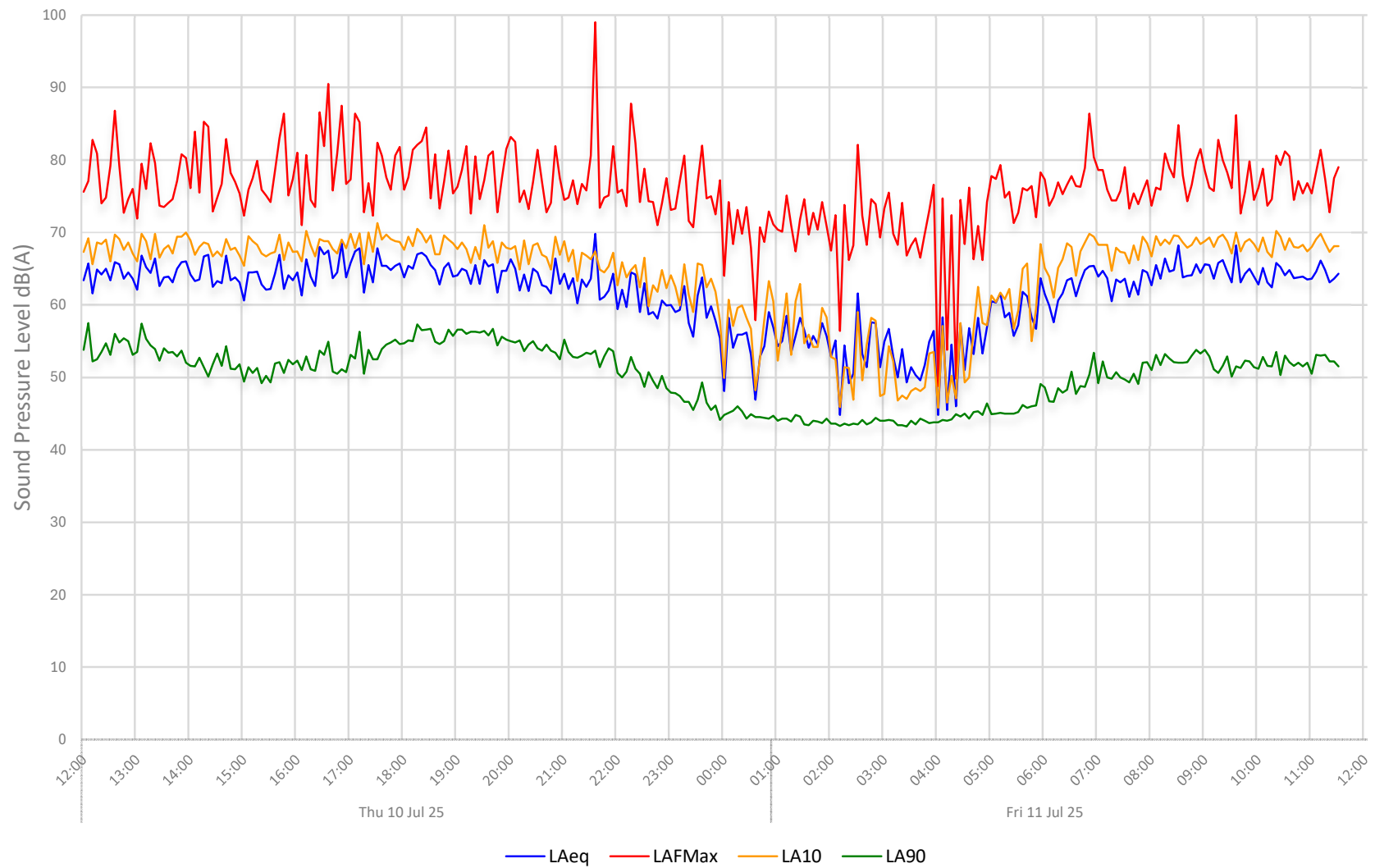
Abbey Wharf, 57-75 Kings Rd, Reading

Environmental Noise Time History: 2

Position 1



Figure VA5983/TH2



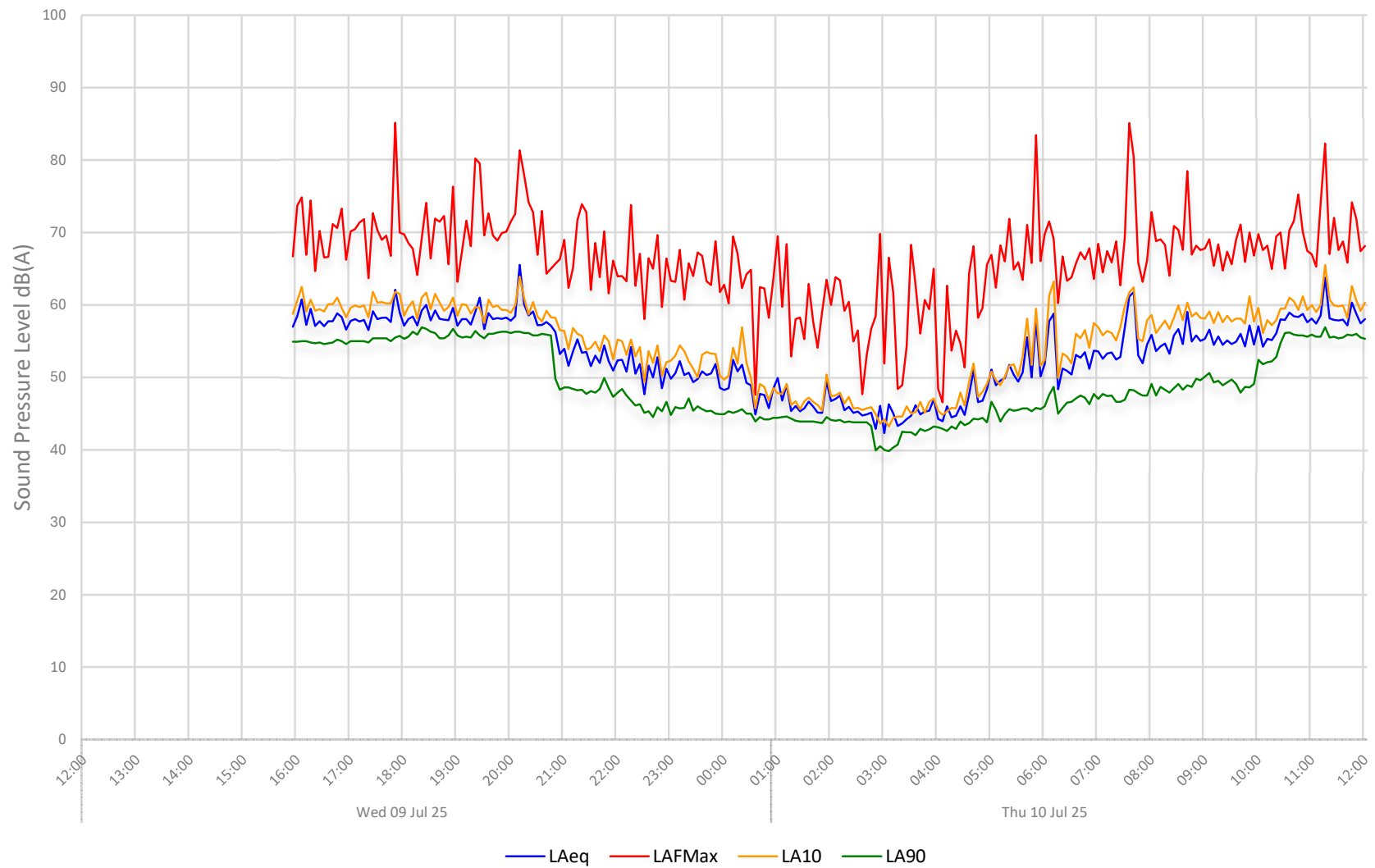
Abbey Wharf, 57-75 Kings Rd, Reading

Environmental Noise Time History: 3

Position 2

 **VENTA** ACOUSTICS

Figure VA5983/TH3



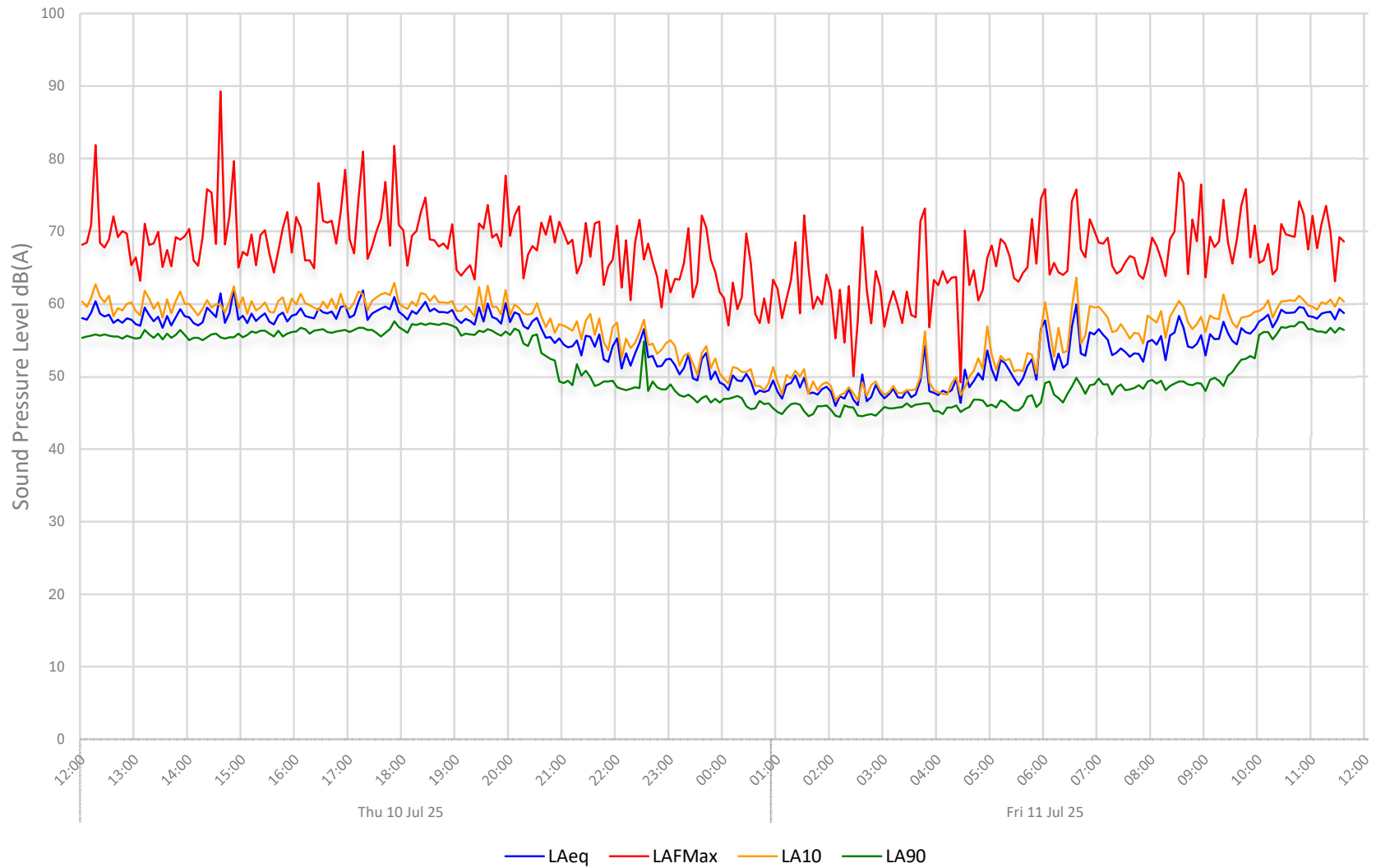
Abbey Wharf, 57-75 Kings Rd, Reading

Environmental Noise Time History: 4

Position 2

 **VENTA** ACOUSTICS

Figure VA5983/TH4



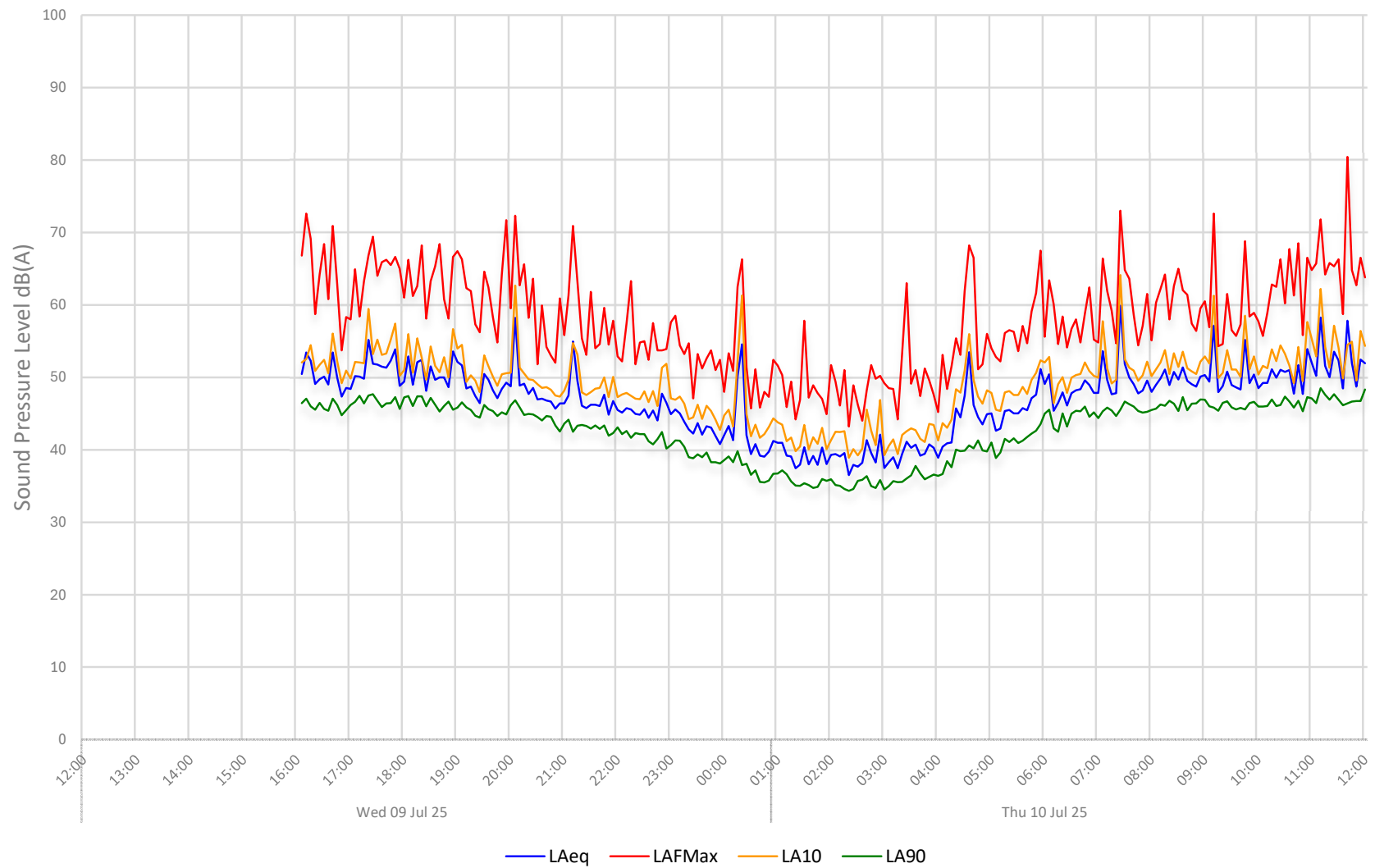
Abbey Wharf, 57-75 Kings Rd, Reading

Environmental Noise Time History: 5

Position 3

 **VENTA** ACOUSTICS

Figure VA5983/TH5



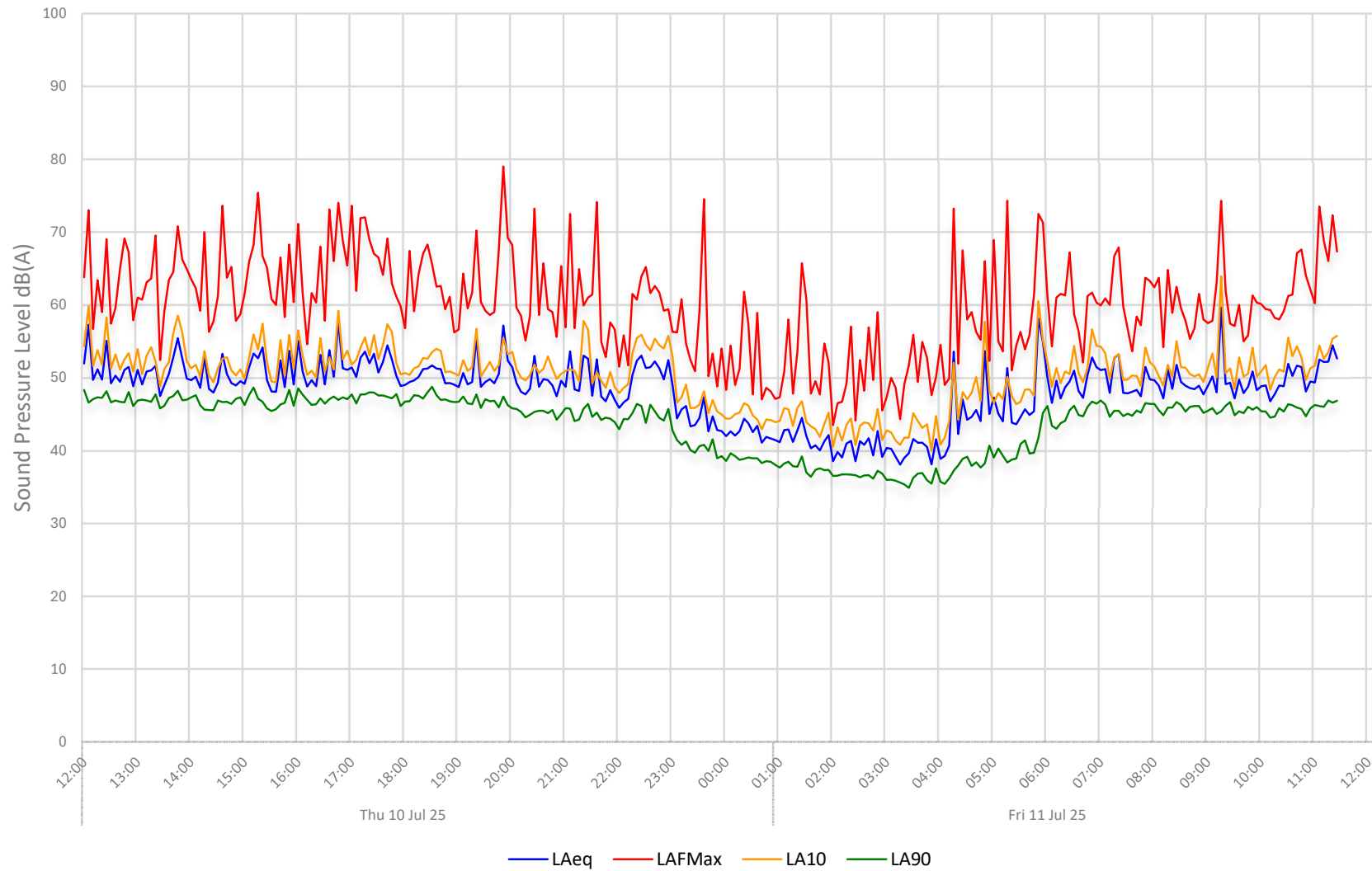
Abbey Wharf, 57-75 Kings Rd, Reading

Environmental Noise Time History: 6

Position 3

 **VENTA** ACOUSTICS

Figure VA5983/TH6



APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A . A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc).
L_{eq} :	The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90} :	Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.
L_{max} :	The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.
R	<i>Sound Reduction Index.</i> Effectively the <i>Level Difference</i> of a building element when measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-2:2010 and corrected for its size and the reverberant characteristics of the receive room.
R_w D_w	Value of parameter, determined as above, but weighted in accordance with the procedures laid down in BS EN ISO 717-1 to provide a single-figure value.
$D_{nT,w}$ $D_{n,e,w}$	
$D_{n,f,w}$	

1.1 Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000
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1.2 Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A).

APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

1.3 Earth Bunds and Barriers - Effective Screen Height

When considering the reduction in sound level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a tall barrier exists between a sound source and a listener, with the barrier close to the listener, the listener will perceive the sound as being louder if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the sound would seem quieter than if he were standing. This is explained by the fact that the "effective screen height" is changing with the three cases above. In general, the greater the effective screen height, the greater the perceived reduction in sound level.

Similarly, the attenuation provided by a barrier will be greater where it is aligned close to either the source or the listener than where the barrier is midway between the two.

APPENDIX B

VA5983 - Abbey Wharf, 57-75 Kings Rd, Reading

BS4142 Assessments

Assessments to Abbey Wharf Southwest Façade - The Outlook P.H & Restaurant Deliveries

06:00 - 07:00 drink deliveries		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Kegs being rolled	SEL @ 9m	95	93	92	86	83	79	74	70	89
Distance Loss	To 36m	-12	-12	-12	-12	-12	-12	-12	-12	
N.T assessment period time correction	15 min	-30	-30	-30	-30	-30	-30	-30	-30	
Specific Sound Level at Receptor		53	51	50	45	42	37	33	28	48
Character corrections										+9
Rating Level										57
Background Sound Level										45
Assessment Level										+12

07:00 - 09:00 drink deliveries		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Kegs being rolled	SEL @ 9m	95	93	92	86	83	79	74	70	89
Distance Loss	To 36m	-12	-12	-12	-12	-12	-12	-12	-12	
D.T assessment period time correction	1 hour	-36	-36	-36	-36	-36	-36	-36	-36	
Specific Sound Level at Receptor		47	45	44	39	36	31	27	22	42
Character corrections										+9
Rating Level										51
Background Sound Level										49
Assessment Level										+2

08:00 - 12:00 food deliveries		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Delivery Rollcage	SEL @ 5m	85	80	76	80	84	87	86	80	92
Distance Loss	To 36m	-17	-17	-17	-17	-17	-17	-17	-17	
D.T assessment period time correction	1 hour	-36	-36	-36	-36	-36	-36	-36	-36	
Specific Sound Level at Receptor		32	27	23	27	31	35	33	27	39
Character corrections										+9
Rating Level										48
Background Sound Level										51
Assessment Level										-3

Assessments to Abbey Wharf East Façade - Supermarket & Restaurant Deliveries

09:00 - 10:00 food deliveries		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Delivery Rollcage	SEL @ 5m	85	80	76	80	84	87	86	80	92
D.T assessment period time correction	1 hour	-36	-36	-36	-36	-36	-36	-36	-36	
Distance correction	To 20m	-12	-12	-12	-12	-12	-12	-12	-12	
Specific Sound Level at Receptor		37	32	28	33	36	40	38	33	44
Character corrections										+9
Rating Level										53
Background Sound Level										49
Assessment Level										+4

09:00 - 10:00 food deliveries		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Vehicle Chilled Food Compressor	SEL @ 5m	112	101	103	99	95	89	83	76	101
D.T assessment period time correction	1 hour	-36	-36	-36	-36	-36	-36	-36	-36	
Distance correction	To 20m	-12	-12	-12	-12	-12	-12	-12	-12	
Specific Sound Level at Receptor	Leq	64	53	55	51	47	41	36	28	53
Character corrections										+3
Rating Level										56
Background Sound Level										49
Assessment Level										+7