



153 Friar Street

Acoustic Planning Report

For Vail Williams LLP

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1. INTRODUCTION

Hydrock is appointed by Vail Williams LLP to undertake an environmental noise survey and impact assessment for the proposed residential development at 153 Friar Street, Reading RG1 1HE.

This report presents the results of the environmental noise survey undertaken to establish the existing noise climate across the site. The survey results have been used to assess the suitability of the site for residential development in accordance with relevant policy and guidance.

Preliminary guidance has been given on the mitigation measures that are likely to be required to ensure that noise incident at the development is controlled to a suitable level. It should be noted that such measures are subject to further development during technical design (notably the acoustic specifications for external building fabric elements).

Appropriate noise emission limits have also been determined for fixed building services plant associated with the development. It is anticipated that these will be achieved through selection of appropriately quiet fixed plant, in combination with attenuation measures (screening etc.) where needed.

2. SITE DESCRIPTION

2.1 Existing Site and Noise Sensitive Receptors

The proposed development site is located at 153 Friar Street Reading, and falls under the jurisdiction of Reading Borough Council (RBC).

Existing land use in the surrounding area is mixed with commercial uses on the ground floor levels and residential or office use on the upper floor levels. The site is bounded by the following:

- Friar Street to the north
- Back facades of the adjacent developments to the south
- Adjacent developments to the east and west

The development site is presented in Figure 1 below.



Figure 1 The development site

2.2 Noise Sources Affecting the Site

The main noise source affecting the site is the vehicle movements on the Friar Street to the north of the site.

2.3 Proposed Development

It is understood that the proposed scheme comprises refurbishment of a 3-storey commercial building. It is also understood that the use of the ground floor level will remain as commercial and the upper two floors will be converted to residential use.

3. PLANNING POLICY AND GUIDANCE

The following policy, standards and guidance documents will apply to the proposed development which are detailed in below sections:

- National Planning Policy Framework (NPPF);
- Noise Policy Statement for England (NPSE);
- World Health Organisation (WHO) 1999: Guidelines for Community Noise;
- BS 8233:2014 - Guidance on sound insulation and noise reduction for buildings; and
- BS 4142:2014 + A1 2019 - Methods for rating and assessing commercial and industrial sound.
- Local Planning Policy

3.1 National Planning Policy Framework (NPPF)

Revised in July 2021, this document sets out the Government's planning policies for England and supersedes the previous version of the NPPF (first published in 2012). It makes the following reference to noise in the section entitled Conserving and Enhancing the Natural Environment:

"170. Planning policies and decisions should contribute to and enhance the natural and local environment by: [...]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."

It also makes the following references to noise in the Section entitled Ground Conditions and Pollution:

"185.. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life⁶⁵;

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.

65 See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."

And

"187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the

applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

3.2 Noise Policy Statement for England (NPSE)

Published in March 2010, the Noise Policy Statement for England (NPSE) sets out the long-term vision of Government noise policy as follows:

"Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development."

The NPSE identifies three observed effect levels, names "No Observed Effect Level" (NOEL), "Lowest Observed Adverse Effect Level" (LOAEL) and "Significant Observed Adverse Effect Level" (SOAEL).

The NPSE contains little detail on assessment methodologies and specific parameters at which the varying observed effect levels would occur in the context of a residential development.

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

As discussed above, there is no specific guidance on noise assessment methods or criteria contained within the NPPF and NPSE. In lieu of this, the approach that is generally adopted when assessing the impact of environmental noise sources on residential developments is to undertake an assessment in accordance with BS 8233:2014.

BS8233:2014 provides internal and external ambient noise level criteria which are applicable to steady noise without a specific character affecting dwellings. The standard states it is desirable that the internal ambient noise levels not exceed the criteria set out in the table below:

Table 1 BS 8233 Internal noise limits

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

Whilst BS 8233:2014 recognises that a guideline value may be set in terms of SEL or L_{AFmax} for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated. Accordingly, reference has been made in this assessment to the World Health Organisation (WHO) 1999: Guidelines for Community Noise.

With respect to external amenity spaces, such as gardens and balconies, it is stated that it is desirable that the noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances such as within city centres urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

3.4 World Health Organisation (WHO) 1999: Guidelines for Community Noise

This document draws upon research from Vallet and Vernet to provide the following advice on night-time noise:

"For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night"

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

BS 4142 describes methods for rating and assessing the impact of industrial and commercial sound on dwellings, including fixed plant installations.

The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

A BS 4142 assessment is made by determining the difference between the specific noise under consideration and the background sound level, as represented by the L_{A90} parameter, determined in the absence of the commercial sound. The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time. This parameter therefore excludes short duration noise events, such as individual vehicle movements, and represents the underlying continuous noise.

The commercial or industrial sound is assessed in terms of the equivalent continuous noise level, L_{Aeq} . The equivalent continuous noise level (L_{Aeq}) of the commercial or industrial sound, over the applicable assessment period, is known as the specific sound level.

A character correction penalty can be applied to the specific sound level where the commercial noise exhibits distinguishable tones, impulsiveness, intermittency or other characteristics which "are otherwise readily distinctive against the residual acoustic environment".

The specific noise level with the character correction (if necessary) is known as rating level (L_{Ar}) and the difference between the background noise and the rating level is determined to make the BS 4142 assessment. The following is then considered.

"Typically, the greater this difference, the greater the magnitude of 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."

The standard highlights the importance of considering the context in which a sound occurs. Factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact.

3.6 Local Planning Policy

The development is located within the administrative boundary of the Reading Borough Council (RBC). The Reading Borough Local Plan adopted in November 2019 sets out the Council's supplementary planning advice for controlling noise from new development and protecting noise sensitive new development from existing noise.

Policy EN17:Noise Generating Equipment, in section 4 -General Policies, of the aforementioned document refers to control of noise pollution, and states the following:

EN17: NOISE GENERATING EQUIPMENT

Where noise generating equipment is proposed, the noise source specific⁶¹ level (plant noise level) should be at least 10dBA below the existing background level as measured at the nearest noise sensitive receptor.

4.2.92 The Local Plan proposals will see a high level of development within Reading. Reading is a densely populated town with many new planning developments taking place. Residents live in close proximity to commercial activities; therefore, it is important to minimise background creep in order to protect the noise environment and maintain quality of life for people living and working in the town. The negative impact of environmental noise on health is becoming better understood (for example WHO 1999, 2009 and 2011⁶²).

4.2.93 Planning Practice Guidance on noise states that no specific measures are required to manage the acoustic environment in situations where noise can be heard as a result of a development and there is a slight effect on the acoustic character of the area but there is no effect on the behaviour and attitude of people exposed to the noise. However, the guidance also states that:

The cumulative impacts of more than one source of noise should be considered; and

In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring.

4.2.94 The Council considers that the above two factors apply due to the town being densely populated and there being a high likelihood of subsequent noise generating plant being installed in a particular location. It is therefore necessary for each planning application for noisy plant to protect the acoustic environment and as far as possible prevent the increase in background noise levels because the cumulative impact of installation of noisy plant which causes an increase in background noise level is likely to lead to an adverse effect.

4.2.95 The Planning Practice Guidance on noise also states that local planning authorities may decide to develop specific standards to apply to various forms of proposed development in their area. It cautions against the implementation of fixed thresholds because specific circumstances may justify some variation being allowed. Because this policy sets a noise target in relation to the background noise level, this allows variation of the threshold with the local circumstances because it does not set an absolute noise level that the plant must achieve, it relates it to the local noise level. ⁶¹ The noise source specific level is the measured noise level, as opposed to the rating level, which is the specific level with correction factors included. ⁶² World Health Organisation (WHO) (1999), Guidelines for Community Noise; WHO (2009), Night Noise Guidelines for Europe; WHO (2011), Burden of Disease from Environmental Noise: Quantification of healthy life years lost in Europe

4.2.96 Where the plant noise rating level does not meet this standard, the background noise will increase. When subsequent new plant is added it will be assessed against this higher background level which results in an increasing benchmark against which subsequent new plant is introduced. This leads to an incremental increase in the noise in an area each time new plant is introduced ('background creep'). This policy standard has been applied by Reading Borough Council for a number of years and experience has demonstrated it to be achievable in most cases. In addition, noise control technology is improving, therefore further increasing the achievability of this standard.

3.6.1 Consultation with the Local Authority

The survey methodology has been discussed and agreed with Environmental Health Officer (EHO) Rebecca Moon from the Reading Borough Council. It is agreed that the survey will include the weekend periods and the noise levels from the music store located on the ground floor level of the development.

4. ENVIRONMENTAL NOISE SURVEY

4.1 Survey Methodology Equipment

Noise measurements were made at two façade locations using Class 1, integrating sound level meters. One microphone was positioned on a pole at 1m away from the north facade window and the other microphone was positioned 1m away from the south façade window on a tripod 1.2m away above ground level. The sound level meters were calibrated to a reference level of 94 dB at 1kHz both prior to, and on completion of, the noise survey. No significant drift in calibration was noted during the survey (≤ 0.5 dB).

All measurement equipment has been laboratory calibrated within the appropriate calibration interval.

Details of the equipment used for the environmental noise measurements are shown in Table 2.

Table 2 Environmental noise survey equipment

Monitoring Location	Manufacturer	Instrument	Type	Serial No./Version	Laboratory Calibration due
ML1	NTi Audio	Sound Level Meter	XLA-2	A2A-20385-E0	06/04/2024
		Pre-amp	MA220	10704	
		Microphone	MC230A	A22997	
		Filters	XLA-2	A2A-20385-E0	
ML2	01dB	Sound Level Meter	Fusion	14015	22/04/2023
		Pre-amp	Pre22	1915123	
	G.R.A.S.	Microphone	40CD	2105047	
ML3	Rion	Sound Level Meter	NL-52	775959	14/07/2023
		Pre-amp	NH-15	11689	
		Microphone	UC-59	76076	
ML1, ML2 & ML3	Rion	Acoustic Calibrator	NC74	35157400	12/07/2023

4.2 Survey Methodology

Unattended long-term measurements were undertaken at two measurement locations on site to establish the noise climate. The measurement locations (ML) are shown in Figure 2 and detailed below:

- ML1: Located at the north façade of the development to determine the noise levels from Friar Street affecting the north boundary of the site. The microphone was mounted on a pole outside of the first-floor window 1m away from the façade. Measurement was undertaken between 10:45 hrs on 18 November (Friday) 2022 and 10:30 hrs on 21 November (Monday) 2022, for a period of three days, including week and weekend periods.
- ML2: Located at the south façade of the development to determine the noise levels affecting the south boundary of the site. The microphone was mounted on a tripod at least 1.2m away from the ground level and 1m away from the window at the terrace of the first floor. Measurement was undertaken between 11:00 hrs on 18 November (Friday) 2022 and 09:45 hrs on 21 November (Monday) 2022, for a period of three days, including week and weekend periods.
- ML3: Located indoors on ground floor level, to determine noise levels and characteristics of noise produced at the music store. The microphone was mounted on a tripod at 1.2m height, and at least 0.5 m from any reflective surface at a location below the proposed flat. Measurement was undertaken during the busiest working hours between 11:00 hrs to 18:00 hrs for a period of three days between 18 November (Friday) 2022 and 20 November (Sunday) 2022, including week and weekend periods.

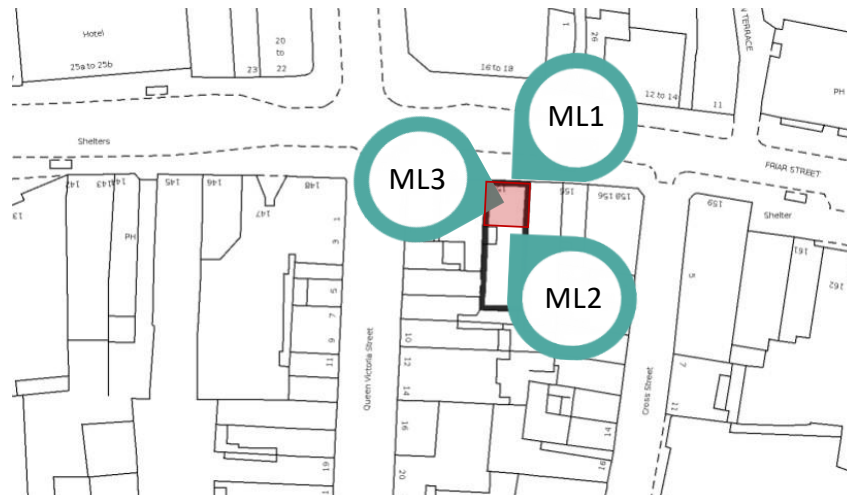


Figure 2 Noise survey measurement locations

4.3 Weather Conditions

Weather conditions during the survey were conducive to capturing representative sound levels. During all daytime and night-time periods average wind speeds were less than 5m/s and no significant precipitation was registered within the historic weather report for Reading (*ref. www.timeanddate.com*).

Therefore, the weather conditions during the survey are considered acceptable.

4.4 Noise Survey Results

Measurements were undertaken using a time interval of 15 minutes for both measurement locations. To inform the assessment in accordance with the criteria outlined in Section 2 of this report, the following parameters have been derived from the survey results at each measurement location:

- Daytime and night-time equivalent continuous noise levels ($L_{Aeq,T}$)
- Lowest background noise levels measured each day and night period ($L_{A90,T}$)
- Typical night-time maximum event levels (L_{AFmax})

These levels are used to determine sound insulation requirements for the building envelope and to set the building services noise emission limits. The results of the survey are presented below in Table 3 for ML1 and ML2, and Table 4 for ML3. The results are also provided within Appendix B of this report in graphical form.

Table 3 Summary of measured noise levels at ML1 and ML2

Location	Site boundary	Daytime 07:00-23:00 Hrs		Night time 23:00-07:00 Hrs		
		$L_{Aeq,16h}$ dB	$L_{A90,15min}$ dB	$L_{Aeq,8h}$ dB	$L_{A90,15min}$ dB	* L_{AFmax} dB
ML1	North façade	67	53	68	53	86
ML2	South façade	48	40	45	38	63

* The 'Typical' L_{AFmax} value is the average of the 90th percentile of the measured L_{AFmax} levels during the respective period for each day.

Table 4 Summary of measured noise levels at ML3

Location		Period		Daytime 10:00-19:00 Hrs	
		Date	Time (hrs)	L _{Aeq,T} dB	* L _{AFmax} dB
ML3	Music store on the ground floor level	18/11/2022 (Friday)	11:00 – 18:00	59	85
		19/11/2022 (Saturday)		64	90
		20/11/2022 (Sunday)		40	62

* The 'Typical' L_{AFmax} value is the 90th percentile of the measured L_{AFmax} levels during the respective period.

Full noise-survey data can be provided upon request.

4.5 Noise Levels used for the Assessment

It should be noted that the noise levels for external environmental noise measure (ML1&ML2), presented above in Table 3 are the measured façade levels, therefore a -3 dB façade correction has been applied to determine the free-field noise levels at each measurement location.

For the internal noise measurement undertaken at ML3, the highest noise levels are measured on Saturday, 19 November. These levels are used to inform the assessment for a worst-case scenario, as it is considered to be the period when the music store located at ground is more active.

The external and internal predicted noise levels which will be used for the purpose of the assessments within this report are presented below in Table 5 and Table 6 respectively.

Table 5 Noise levels used for the assessment for ML1 and ML2

Location	Site boundary	Daytime 07:00-23:00 Hrs		Night time 23:00-07:00 Hrs		
		L _{Aeq,16h} dB	L _{A90,15min} dB	L _{Aeq,8h} dB	L _{A90,15min} dB	L _{AFmax} dB
ML1	North façade	64	50	65	50	83
ML2	South façade	45	37	42	35	60

Table 6 Noise levels used for the assessment for ML3

Location		Period		Daytime 10:00-19:00 Hrs	
		Date	Time (hrs)	L _{Aeq,T} dB	L _{AFmax} dB
ML3	Music store on the ground floor level	19/11/2022 (Saturday)	11:00 – 18:00	64	90

5. BUILDING FABRIC AND VENTILATION

5.1 Purge Ventilation Requirements

The use of opening windows for rapid purge ventilation (i.e. to expel paint fumes or burnt toast odours as per Approved Document F) is acceptable at all facade. This is on the basis that windows will be opened for short periods and may be closed at occupant discretion once odours are purged.

5.2 Relief of Summertime Overheating

5.2.1 *Approved Document O*

Approved Document (ADO) was published on the 15th December 2021. This is an entirely new Approved Document which provides the normal means of complying with Part O to the Building Regulations 2010. Part O addresses overheating in residential buildings and came into force in June 2022. Overheating has not previously been addressed in the Building Regulations.

The simple way to comply with Part O is to provide adequate window openings such that comfortable internal temperatures can be maintained during the hottest times of the year. However, the document precludes the use of open windows for overheating control at night if this would result in internal noise levels above 40 dB L_{Aeq} or 55 dB L_{Amax} .

ADO does not appear to offer any flexibility with respect to how often windows might be required to be opened. Therefore, the noise limits are absolute. I.e., if they will be exceeded with windows open at any time of the year, then the only option would be to install mechanical cooling or otherwise ensure windows do not need to be opened to maintain comfortable internal temperatures. It should be noted that Part O to the Building Regulations took effect on 15th June 2022. It does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the work is started on site before 15th June 2023.

5.3 Building Fabric & Ventilation Strategy for the Proposed Development

An assessment has been undertaken to determine the required sound insulation performance of the building fabric and the ventilation strategy for the development.

An open window will provide, at best, 15 dB attenuation and possibly much less if it is wide open. For areas at a high-risk of overheating, such as London, the attenuation of an open window during the overheating condition may only be 6 dB.

On this basis, ADO noise limits described in Section 5.2.1 may be exceeded on both facades of the development, therefore windows can be opened only for purge ventilation and mechanical cooling is likely to be required. A more detailed assessment should be carried out during design development. Window areas, opening type and the thermal performance of the building will all influence the overheating risk and internal noise levels when windows are open to provide cooling. As there is now a legal requirement (within the Building Regulations) to consider noise levels in the overheating condition at night, this aspect of the acoustic design does not need to be considered further within the planning system.

The BS8233:2014 and World Health Organisation internal noise limits discussed in Section 3 of this report apply at the background ventilation rate, i.e. with windows closed and ventilation provided either via trickle vents or mechanical means. An assessment has been undertaken in order to determine the required sound insulation performance of the façade elements (glazing, wall etc.) and the ventilation strategy for each proposed building. The assessment is based on:

- The predicted noise levels at the building facades,
- Room dimensions provided by the architect within the architectural drawings for the development,
- A reverberation time is assumed to be 0.5 seconds in habitable rooms,
- External walls assumed to achieve a minimum of 50 dB R_w sound insulation performance.

The minimum sound insulation performance required for glazing together with the recommended ventilation strategy are provided within Table 7 shown Figure 3 below.

Table 7 Minimum sound insulation performance required for glazing and the suggested background ventilation strategy for each building façade (please read together with Figure 3 below)

Façade	Suggested background ventilation	Sound insulation performance		Example glazing configuration
	Part F Mechanical Ventilation with Heat Recovery (MVHR), openable windows for purge ventilation only.	Glazing	38(-3) dB $R_w(C_{tr})$	8.8mm laminated glazing /12mm airgap/ 10mm glazing
	Part F Background ventilators and intermittent extract fans, openable windows for Purge and Overheating. Nominal acoustic trickle vent Minimum 32dB $D_{n,e,w}$ advised.	Glazing	32(-3) dB $R_w(C_{tr})$	6mm glazing /12mm airgap/ 6mm glazing

Note: Alternative glazing configurations may be suitable, subject to adequate acoustic performance being achieved. Performance requirements relate to the glazing tested "in situ" with the proposed frame system, and suitable test certificates for proposed selections should be provided to the project acoustician for evidence of compliance at the appropriate design stage.

Ventilator performance requirements are for a single vent to the room. If more than one vent is required the performance of each vent would need to be increase by $10 \times \log(n)$ where 'n' is the number of vents. I.e. For 2 vents each should be 32 dB $D_{n,e,w} + 10 \log(2) = 35$ dB $D_{n,e,w}$ in order to archive the overall ventilator performance of 32 dB $D_{n,e,w}$.

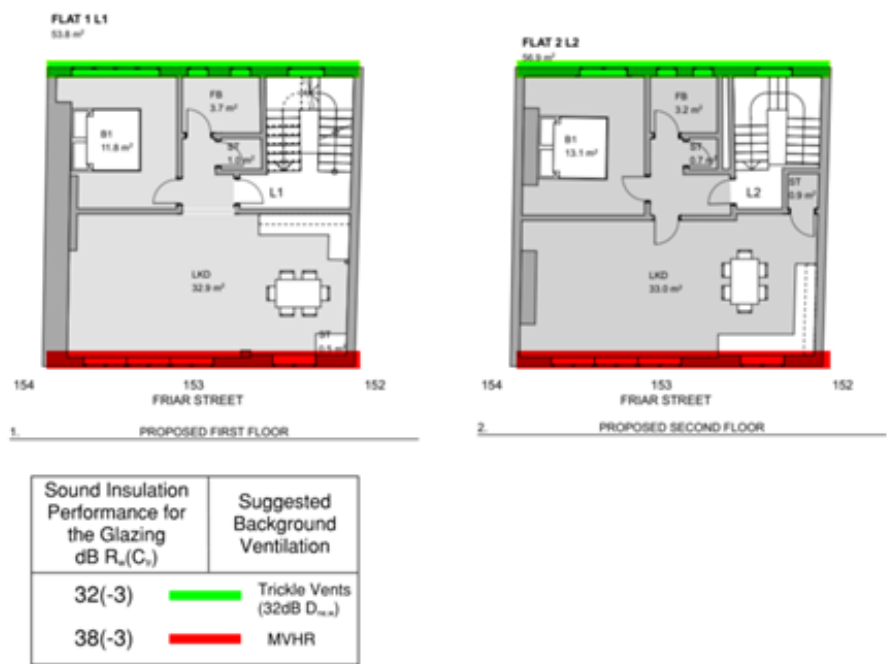


Figure 3 Minimum sound insulation performance required for glazing and the suggested background ventilation strategy for each building façade (please read together with Table 7 above)

6. EXTERNAL AMENITY AREAS

Based on the provided layouts, it is understood that there will not be any external amenity space provided for the development, therefore no further assessment has been undertaken.

7. INTERNAL BUILDING FABRIC ASSESSMENT

It is understood that the existing use of the ground floor levels is an A1 Retail. It is also understood that this use will be retained.

During consultation with the environmental health officer from the RBC, it is requested that the noise transfer from the retail unit to the above residential units is considered at planning stage.

Part E of the Building Regulations is applicable to this scheme, and provides minimum sound insulation performance requirements for the internal building fabric such as party walls, party floors and internal wall within the dwellings. The criteria provided within the document is for the partitions within or between the domestic uses.

However, it states that a higher standard sound insulation may be required between spaces used for normal domestic purposed and communal or non-domestic purposes, and suggests that the appropriate level of performance shall be provided by a specialist.

It is understood that the existing retail unit is a Music Store which sells musical instruments and related equipment and accessories. An assessment has been undertaken to determine the sound insulation requirements for the performance of the separating floor between the retail unit on the ground floor level and the residential unit on the first-floor level.

Spectrum for the maximum noise levels measured inside the Music Store is presented in Table 8 bellow:

Table 8 Measured L_{max} , Octave band spectrum, for the busiest period at the Music Store.

Description	Octave Band Centre Frequency (Hz)							dB(A)
	63	125	250	500	1K	2K	4K	
Measured Levels L_{max} (dB)	58	61	70	79	87	86	74	90
Measured Levels L_{Aeq} (dB)	58	53	57	62	59	57	52	64

At the time of writing, the proposed or the existing floor build-up for the proposed development is unknown. Table 9 shows an example of a separating element, 150mm concrete, that would achieve the minimum sound reduction required to limit break-in levels to 35 dB in bedrooms during day-time, as recommended by the guidance provided within BS 8233:2014 - Guidance on sound insulation and noise reduction for buildings, outlined in section 3.2 of this document, and compliant with the ADE requirements for separating ceilings.

Table 9 Predicted Sound Insulation Performance for a single build of 150mm concrete slab.

Description		Octave Band Centre Frequency (Hz)							Acoustic Rating dB, R_w (Ctr)
		63	125	250	500	1K	2K	4K	
Separating element Sound Reduction Index Required (dB)		42	44	42	49	57	63	68	50
Predicted Break-in Noise levels (dB)	L_{max}	18	19	30	32	32	25	8	Predicted A-weighted Break-in noise Level, dB(A)
									34
	L_{eq}	17	11	16	15	3	<0	<0	14

However, musical instruments can be source of low frequency noise with distinctive character, that might be audible in adjacent dwellings. Therefore, as an initial guidance, based on a worst-case scenario, we would suggest a target of 35 dB for L_{Amax} and 20 dB for L_{Aeq} , 10 dB below the limits stated in BS 8233:2014. This would equate to an airborne sound insulation performance of 55 dB $D_{nt,w}+C_{tr}$ for the separating floor between the retail unit and the residential and is equivalent to a +12 dB enhancement above the ADE airborne sound insulation performance requirements between dwellings formed by material change of use.

An example build-up to achieve 55 dB $D_{nt,w}+C_{tr}$ airborne sound insulation is provided below, predicted sound reduction index is shown in detail in Table 10:

- 150mm concrete slab
- 150mm cavity filled with 75mm insulation (min 10kg/m³ density)
- 1x15mm BG Soundbloc plasterboard ceiling

Table 10 Predicted Sound Reduction provided by advised build-up example.

Description		Octave Band Centre Frequency (Hz)							Acoustic Rating dB, $R_w(C_{tr})$
		63	125	250	500	1K	2K	4K	
Predicted Sound Reduction Index for Advised Build-up (dB)		36	51	57	64	72	79	83	63
Predicted Break-in Noise levels (dB)	L_{max}	24	12	15	17	17	9	<0	Predicted A- weighted Break-in noise Level, dB(A)
									19
	L_{eq}	23	4	1	<0	<0	<0	<0	<3

Impact sound insulation is not anticipated to be a concern since the residential units are located above the retail unit.

A further assessment shall be undertaken within the next design stage once further details are known.

8. BUILDING SERVICES NOISE EMISSION LIMITS

At the time of writing, it is not known whether or where specific external plant items or areas will be proposed on the site. However, there may be an expectation for external plant installations therefore an assessment has been undertaken to determine plant noise emission limits.

Plant noise emission limits are assessed in accordance with the guidance provided within the Local Planning Policy EN17 and the lowest measured background sound levels (measured at ML2 at the rear façade of the development) at the site.

Policy EN17 is repeated below for reference:

EN17: NOISE GENERATING EQUIPMENT

Where noise generating equipment is proposed, the noise source specific level (plant noise level) should be at least 10dBA below the existing background level as measured at the nearest noise sensitive receptor.

The cumulative noise emission limits that will apply to the plant items associated with the proposed development are provided in Table 11. These levels shall be achieved at 1m away from the nearest noise sensitive window.

Table 11 Building Services Noise Emission Limits

Period	Lowest Measured Background Noise	Building Services Criteria (Non-tonal plant)
Daytime (07:00 - 23:00 hrs)	37 dB LA90,15min	27 dB LAeq,T
Night-time (23:00 – 07:00 hrs)	35 dB LA90,15min	25 dB LAeq,T

An assessment will be undertaken in the next design stage to determine further mitigation measures required for the proposed plant area to achieve above proposed noise emission limits at 1m away from the nearest noise sensitive window.

No specific character corrections have been applied at the present time for tonality, intermittency, or impulsiveness, upon review of proposals where appropriate, additional corrections should be applied as per the guidance found in BS4142:2014+A1 2019.

9. CONCLUSION

Hydrock is appointed by Vail Williams LLP, to undertake an environmental noise survey for the proposed residential development at 153 Friar Street, Reading.

A noise survey has been undertaken to establish representative daytime and night-time noise levels in and around the proposed site location in accordance with current guidance.

A noise assessment has been undertaken, with consideration given to the following:

- The impact of road traffic noise on the proposed development;
- Internal building Fabric; and
- Noise impacts associated with any proposed fixed plant and/or services associated with the development.

Calculations indicate that double glazed windows would provide sufficient sound insulation to achieve the target internal ambient noise levels at the rear façade, whereas double glazed laminated windows will be required for the front façade overlooking Friar Street. The results of the assessment have also shown that background ventilation shall be provided via use of Mechanical Ventilation and Heat Recovery (MVHR) at the north facade and via trickle vents at the south (rear) façade.

An initial guidance on the required internal sound insulation performance of the separating floor between the retail unit on the ground floor level and the dwelling above has been provided.

Atmospheric plant noise emission limits have been established and are likely to be achieved with appropriate consideration for the selection of low-noise plant and proprietary attenuation measures as appropriate during technical design.

As demonstrated in this report, appropriate acoustic conditions can be achieved within proposed shared outdoor living areas, private gardens and habitable rooms, with the implementation of relatively standard acoustic mitigation measures. Therefore, it is considered that there is no reason for refusal of planning permission, on acoustic grounds.

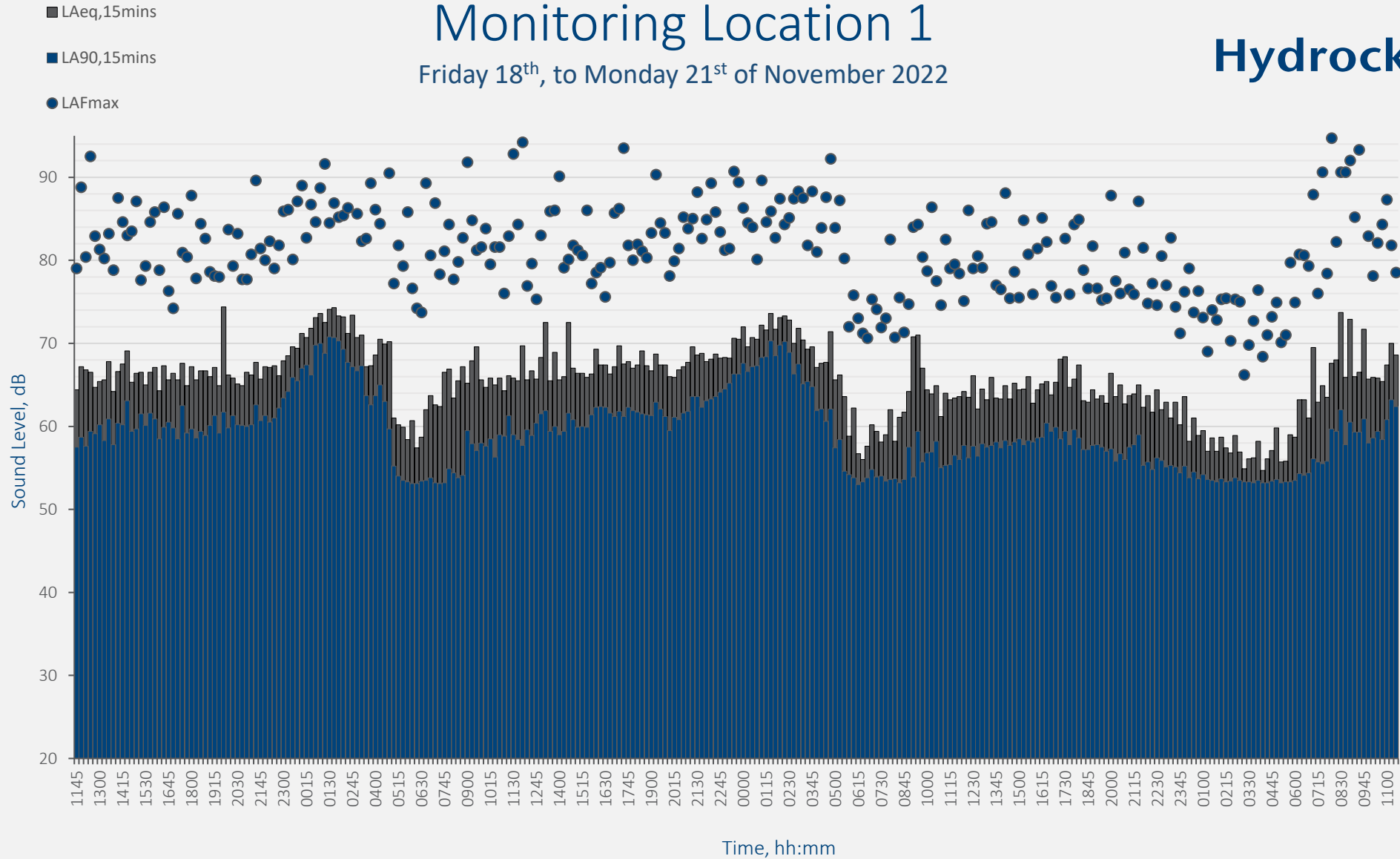
Appendix A Glossary of technical terms

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10 ⁻⁵ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
L_{Aeq,T}	L _{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L _{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L _{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L _{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L10 and L90	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L10 is the level exceeded for 10% of the time, and the L90 is the level exceeded for 90% of the time.
R_w	R _w is the single-number quantity which characterizes the sound insulating properties of a given material over a range of frequencies. This is typically measured in a laboratory in accordance with BS EN ISO 717-1.
D_{n,e,w}	D _{n,e,w} is the single number quantity which characterizes the airborne sound insulation performance across a given 'element' and is typically used to describe the acoustic performance of trickle ventilators etc.
C_{tr}	C _{tr} is a correction term applied to single-number sound insulation values (R _w , D _{n,e,w} etc.) to afford additional weighting against low frequency performance.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and at least 3m from buildings.

Appendix B Noise Survey Results

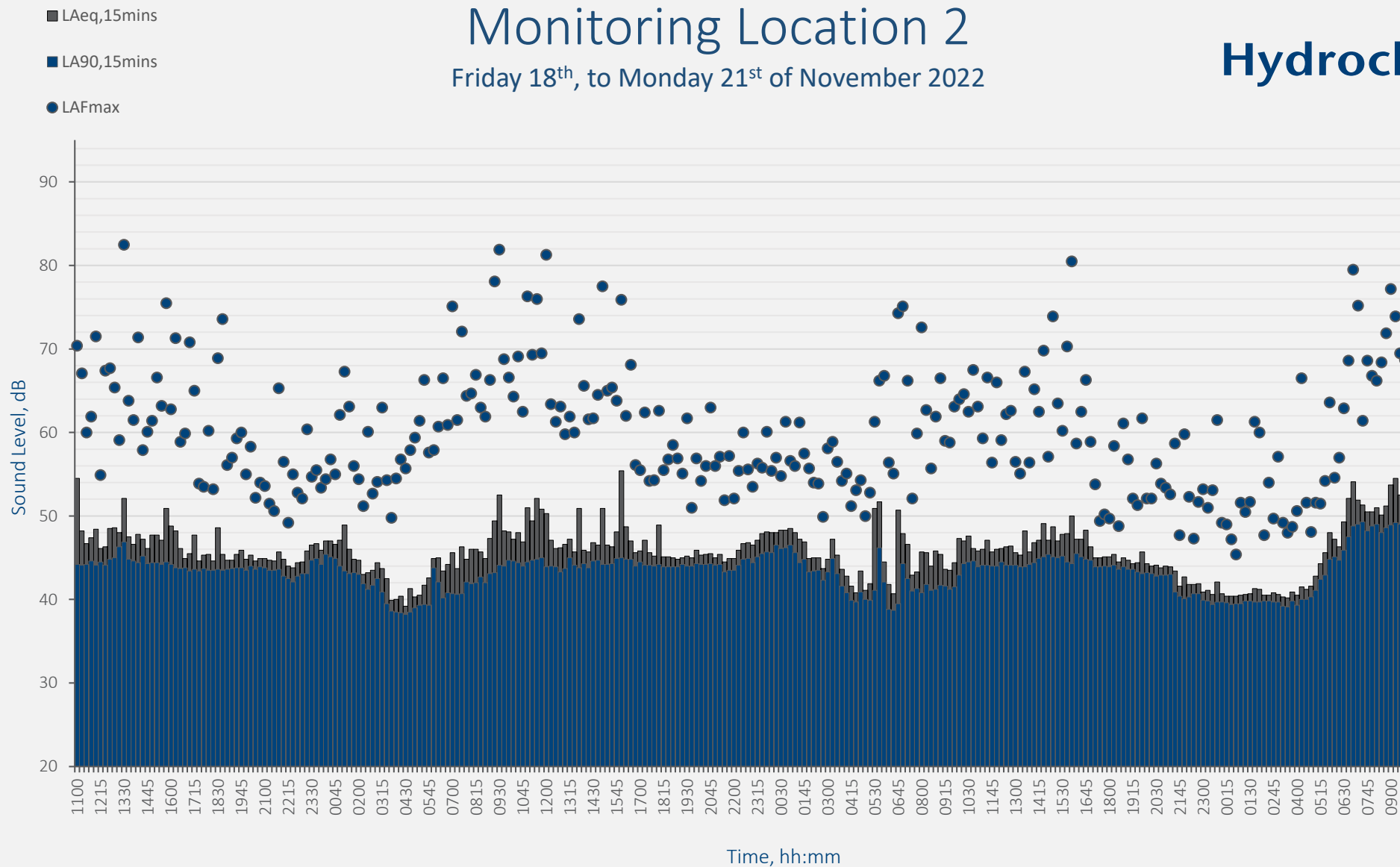
Monitoring Location 1

Friday 18th, to Monday 21st of November 2022



Monitoring Location 2

Friday 18th, to Monday 21st of November 2022



■ LAeq,15mins

■ LA90,15mins

● LAFmax

Monitoring Location 3

Friday 18th, to Monday 21st of November 2022

