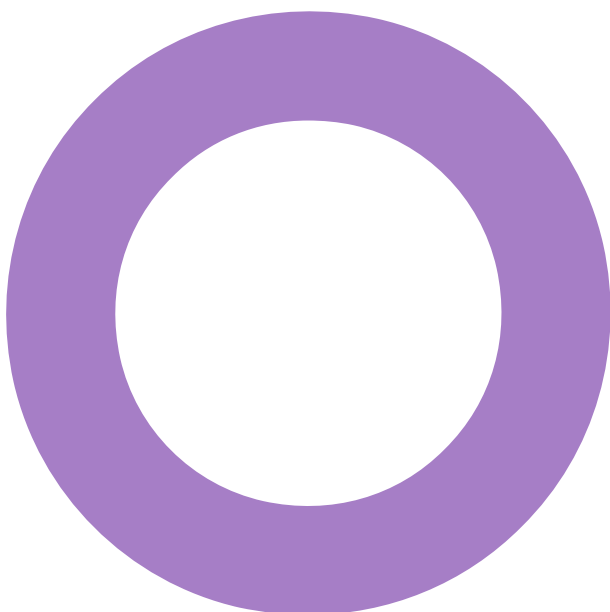


Tavis House.
London.
Tempus Realty Holdings.

ACOUSTICS
NOISE ASSESSMENT REPORT
PLANNING STAGE
REVISION 1 - 28 MARCH 2024



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
0	13/03/2024	Draft for comment and coordination.	LY	MF	-
1	28/03/2024	For Issue	LY	MF	MF

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Project number: 1015259

Document reference: 1015259-HLE-RP-AC-Noise Assessment Report (Planning)-Rev1.docx

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1. Introduction.

Hoare Lea LLP have been appointed to provide acoustic consultancy services in relation to noise associated with the refurbishment and extension to Tavis House, London. This report sets out the existing noise climate, proposes plant noise emission limits and summarises the acoustic assessment undertaken.

The Local Planning Authority for the development site is London Borough of Camden (LBC). Relevant local and national planning policy as well as recognised guidance has been reviewed in relation to the proposed development. The methodology within BS 4142:2014 has been considered along with the requirements of LBC in order to set plant noise emissions limits at the closest noise-sensitive receptors.

Planning permission for a similar scheme was approved on 1 December 2023 under reference 2021/6105/P for the:

“Refurbishment and extension of the existing building to provide new entrances, a new roof top pavilion, roof top plant equipment and enclosures, rear extension and cycle parking associated with Class E use together with new hard and soft landscaping and other ancillary works”.

This S73 application has been submitted to allow the building to be used for flexible lab-enabled space resulting in changes to the rear façade and roof top level to allow for additional plant associated with laboratories.

2. Site context.

The proposal for the refurbishment and extension to Tavis House includes the installation of heat pumps and strobic fans, the units will be located at roof level to enable a lab use. The most exposed noise sensitive receptors are the residential premises along Tavistock Place and Burton Street. The closest identified receptors and site context are shown on the figure below:



Figure 1: Site context showing the development location and nearby identified noise sensitive receptors.

The local noise climate is dominated by traffic noise from the local road network, existing plant noise from surrounding buildings was also present.

3. Planning policy and guidance.

3.1 Noise Policy Statement for England.

The *Noise Policy Statement for England* (NPSE) [1] advises that noise impacts should be assessed on the basis of adverse and significant adverse effect but does not provide any specific guidance on assessment methods or noise limits.

The NPSE introduces the concepts summarised in Table 1 that can be applied when considering the significance of noise impacts, which are applied by the World Health Organization.

The document advises that it is not possible to have “*a single objective noise based measure... that is applicable to all sources of noise in all situation*”. It further advises that the sound level at which an adverse effect occurs is likely to be different for different noise sources, for different receptors at different times.

Effect Level	Description
No Observed Effect Level (NOEL)	This is the noise level below which no effect can be detected. In simple terms, below this level of noise, there is no detectable effect on health and quality of life due to the noise being assessed.
Lowest Observed Adverse Effect Level (LOAEL)	This is the level of noise above which adverse effects on health and quality of life can be detected.
Significant Observed Adverse Effect Level (SOAEL)	This is the level of noise above which significant adverse effects on health and quality of life occur.

Table 1: NPSE observed effect levels.

3.2 National Planning Policy Framework.

National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023) sets out the Government’s planning policies and how these are expected to be applied. In relation to noise and vibration, NPPF section 15 paragraphs 174, 185 and 187 are presented below:

‘174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

...

- a. *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...’*

‘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:

- b. *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;*
- c. *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;*
and
- d. *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

‘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.’

3.3 Technical Guidance to the National Planning Policy Framework.

The *Technical Guidance to the National Planning Policy Framework* [2] provides additional guidance to local planning authorities to ensure the effective implementation of the planning policy set out in the NPPF in relation to mineral extraction. In relation to noise and vibration, paragraphs 21 and 22 of this document states:

“21. Mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level (LA_{90,1h}) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) LA_{eq, 1h} (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level (LA_{90,1h}) by more than 10dB(A) and should not exceed 55dB(A) LA_{eq, 1h} (free field). For any operations during the period 22.00 – 07.00 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) LA_{eq,1h} (free field) at a noise sensitive property. Where the site noise has a significant tonal element, it may be appropriate to set specific limits to control this aspect. Peak or impulsive noise, which may include some reversing beepers, may also require separate limits that are independent of background noise (eg L_{max} in specific octave or third-octave frequency bands – and that should not be allowed to occur regularly at night.) Care should be taken, however, to avoid any of these suggested values being implemented as fixed thresholds as specific circumstances may justify some small variation being allowed.

22. Activities such as soil-stripping, the construction and removal of baffle mounds, soil storage mounds and spoil heaps, construction of new permanent landforms and aspects of site road construction and maintenance.

Increased temporary daytime noise limits of up to 70dB(A) LA_{eq 1h} (free field) for periods of up to 8 weeks in a year at specified noise-sensitive properties should be considered to facilitate essential site preparation and restoration work and construction of baffle mounds where it is clear that this will bring longer-term environmental benefits to the site or its environs.

Where work is likely to take longer than 8 weeks, a lower limit over a longer period should be considered. In some wholly exceptional cases, where there is no viable alternative, a higher limit for a very limited period may be appropriate in order to attain the environmental benefits. Within this framework, the 70 dB(A) LA_{eq 1h} (free field) limit referred to above should be regarded as the normal maximum.”

3.4 Planning Practice Guidance.

Online Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019) has been published to provide greater details in relation to the relevance of noise to the planning process following the introduction of NPPF and NPSE.

This guidance states, under the heading ‘How to Determine the Noise Impact’, that the following should be considered by local authorities:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.’*

In line with NPSE, this includes identifying where noise exposure is above or below the significant observed adverse effect level and the lowest observed adverse effect level for a given situation during the operation of the Proposed Development.

Further guidance on each of the various observed effect levels set out in NPSE is provided in the table detailed in the section headed ‘How to Recognise when Noise could be a concern?’ which is reproduced below in Table 2

It is important to note that no specific noise parameters or target noise levels are defined in the text. Under the heading ‘What factors influence whether noise could be a Concern?’, the subjective nature of noise is discussed. It is stated that there is no simple relationship between noise levels and the impact on those affected. This depends on how various factors combine in particular situations.

Perception	Example of outcomes	Increasing effect level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not Intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.		No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect Level	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Table 2: PPG Observed Effects.

3.5 Relevant local policy.

Relevant planning policies are contained in the documents referenced below. Policies and supporting text that address noise and are relevant for this development have been reproduced below.

The London Plan (March 2021)

The latest London Plan refers to noise in several of the adopted policies, the most relevant for noise impact assessments are summarised below.

Policy D.13 Agent of Change places the responsibility for mitigating impacts from existing noise-generating activities or uses on the proposed new noise-sensitive development. It states that noise impact assessments accompanying planning applications should be carefully tailored to local circumstances and be fit for purpose.

Policy D.14 of The London Plan refers specifically to noise and encourages management of noise and good acoustic design. Section 3.14.3 specifically refers to recognised acoustic guidance as follows:

“The management of noise also includes promoting good acoustic design of the inside of buildings. Section 5 of BS 8223:2014 provides guidance on how best to achieve this. The Institute of Acoustics has produced advice, Pro:PG Planning and Noise (May 2017), that may assist with the implementation of residential developments. BS4214 provides guidance on monitoring noise issues in mixed residential/industrial areas.”

Camden Local Plan (2017)

Policy A1 Managing the impact of development

“The Council will seek to protect the quality of life of occupiers and neighbours. We will grant permission for development unless this causes unacceptable harm to amenity.

We will:

- a. *seek to ensure that the amenity of communities, occupiers and neighbours is protected;*

...

The factors we will consider include

...

- f. *noise and vibration levels;”*

Policy A4 Noise and vibration:

“The Council will seek to ensure that noise and vibration is controlled and managed.

Development should have regard to Camden’s Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:

- a. *development likely to generate unacceptable noise and vibration impacts; or*
- b. *development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.*

We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development.”

3.6 Recognised guidance documentation.

British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

Current Government advice to Local Planning Authorities in both England and Wales makes reference to BS 4142 as being the appropriate guidance for assessing commercial operations and fixed building services plant noise. The British Standard provides an objective method for rating the significance of impact from industrial and commercial operations. It describes a means of determining sound levels from fixed plant installations and determining the background sound levels that prevail on a site.

The assessment of the impacts is based on the subtraction of the pre-existing background sound level ($L_{A90,T}$) from the rating level ($L_{A,r,T}$).

The standard does not give a definitive method for determining the background sound level but instead, as a commentary, states that *“the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods”*.

Clause 8.1.4, which discusses the monitoring duration, states *“there is no “single” background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.”* As a note to this clause the following commentary is given on obtaining a representative background sound level:

“To obtain a representative background sound level a series of either sequential or disaggregated measurements ought to be carried out for the period(s) of interest, possibly on more than one occasion. A

representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value.”

The rating level is defined objectively as the specific source noise level in question (either measured or predicted) with graduated corrections for tonality (up to +6 dB), impulsivity (up to +9 dB), intermittency (+3 dB) and other sound characteristics (+3 dB) which may be determined either subjectively or objectively, if necessary.

The background sound level is subtracted from the rating level and the difference used to assess the impact of the specific noise source:

- A difference of around +10 dB is likely to be an indication of a significant adverse impact, depending on context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on context; and
- A difference of +0 dB or less is an indication of the specific sound source having a low impact, depending on the context.

This method is only applicable for external noise levels. The scope of the method for assessing industrial and commercial sound is clearly defined in Section 1 of the Standard; music, entertainment and people are included in the list of noise sources not intended to be assessed by the method.

4. Acoustic survey.

An environmental noise survey has been undertaken at the proposed development site to establish background sound levels. Unattended survey measurements were undertaken at roof level from Tuesday 3rd August 2021 to Thursday 5th August 2021 as part of the 2021 proposals. At the time of measurements, there was no lockdown restriction on people movement and therefore the measurements taken are considered consistent with typical conditions.

The survey locations were chosen to obtain both exposed and sheltered elevations of the development to ascertain the difference in prevailing background levels across the proposed development site. Figure 2 below shows the measurement positions that were chosen.

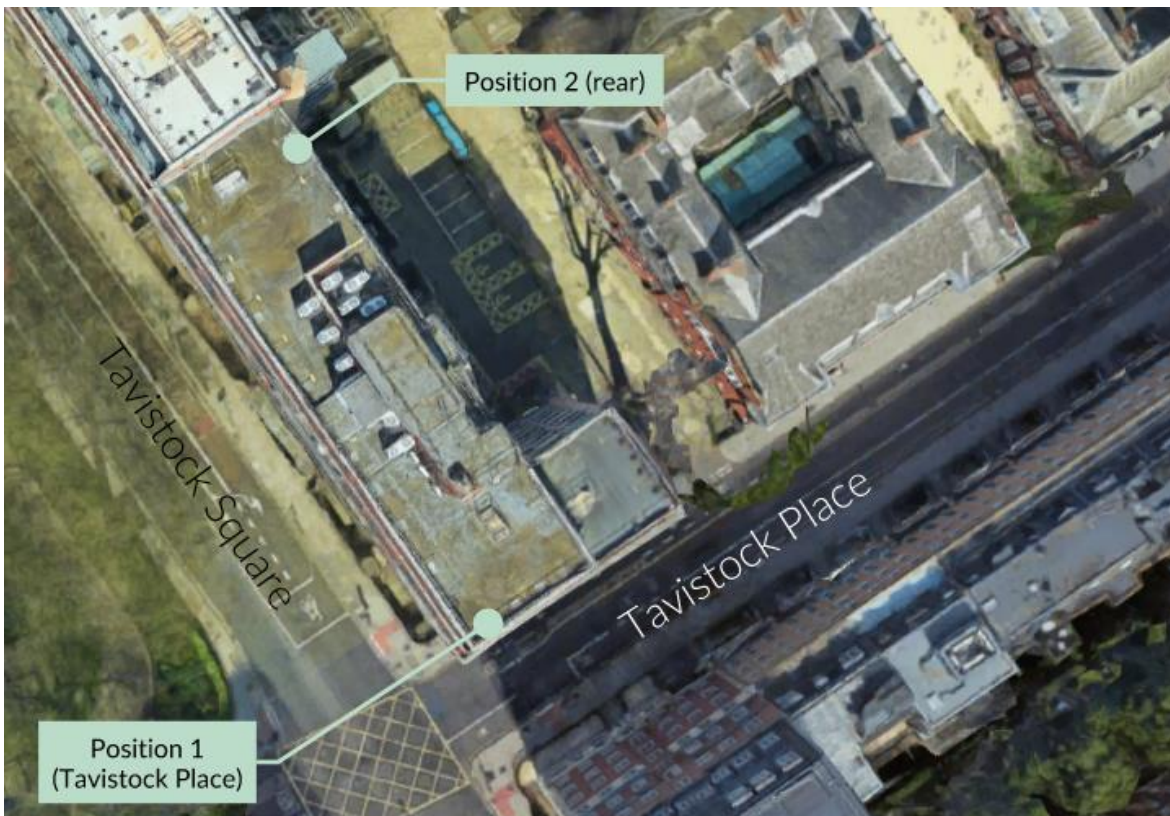


Figure 2 Environmental Noise Survey Positions.

The purpose of measuring at Position 1 was to establish the background sound levels at a lesser shielded position overlooking Tavistock place. The measurements at Position 1 included continuous 15-minute duration samples of broadband A-weighted ambient sound levels ($L_{Aeq,15 \text{ min}}$), maximum sound levels ($L_{Amax(fast),15 \text{ min}}$), and background sound levels ($L_{A90,15 \text{ min}}$). The measurements also recorded instantaneous sound pressure levels. Measurement were made at octave band resolution.

The purpose of measuring at Location 2 was to quantify the background sound levels at a shielded position. The measurements at Position 2 included continuous 15-minute duration samples of broadband A-weighted ambient sound levels ($L_{Aeq,15 \text{ min}}$), maximum sound levels ($L_{Amax(fast),15 \text{ min}}$), and background sound levels ($L_{A90,15 \text{ min}}$). The measurements also recorded instantaneous sound pressure levels. Measurement were made at octave band resolution.

Weather conditions were not measured on site but were monitored remotely. During the survey weather conditions were suitable for conducting noise measurements with dry conditions and wind not exceeding 5m/s.

The summarised average ambient sound levels at the noise monitoring positions are shown in Table 3 below.

Period	Position 1 (Tavistock Place)	Position 2 (Rear elevation)
Daytime (0700-2300)	61 dB L _{Aeq,T}	54 L _{Aeq,T}
Night-time (2300-0700)	56 dB L _{Aeq,T}	47 L _{Aeq,T}

Table 3: Average ambient sound levels.

The summarised minimum prevailing background levels for both positions during day and night periods are displayed below in Table 4.

Period	Position 1 (Tavistock Place)	Position 2 (Rear elevation)
Daytime (0700-2300)	49 dB L _{A90,1h}	44 L _{A90,1h}
Night-time (2300-0700)	44 dB L _{A90,15min}	41 L _{A90,15min}

Table 4 Minimum prevailing background sound levels

5. Proposed plant noise limits.

Noise associated with fixed plant is to be assessed following the BS 4142 methodology. The noise limit for the development is for the rating level (L_{Ar,Tr}) to be equal to the background sound level minus 10 dB (L_{Ar,Tr} = L_{A90,Tr} - 10 dB) as stipulated by the Local Planning Authority London Borough of Camden (LBC).

Representative minimum background sound levels have been determined for the closest identified noise sensitive receptors (Table 4). The locations of the identified receptors are shown in Figure 1. The fixed plant associated with the development is to operate during daytime only (07:00-23:00). The following plant noise limits apply externally at the façade of the identified noise sensitive receptor:

Receptors	Plant noise emission limits - Daytime (07:00 – 23:00)
Receptors on Burton Street	34 dB L _{Ar,1 hour}
Receptors on Tavistock Place	39 dB L _{Ar,1 hour}

Table 5: Plant noise emission limits, assessed at the identified noise sensitive receptor.

The above noise limits are given as rating levels. Corrections appropriate to the character of the sound should be applied when calculating this from the specific sound level, as defined in BS 4142. The above noise limits are cumulative and account for all operational plant.

6. Assessment and mitigation.

6.1 Acoustic model.

An acoustic model including the proposed new fixed plant noise sources and local area has been created using the CadnaA software package. The software utilises the principles of ISO 9613-2 *Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation* [International Organization for Standardization, 1996] to calculate acoustic propagation of sound sources.

The model has been used to predict operational noise levels incident on the façades of the identified nearby noise sensitive receptors. The noise model predictions have been used in assessment of new fixed plant noise sources. The MEP design selections are not yet fully finalised for the development. However, design advice has been provided based on the information available, including plant location and indicative equipment selections.



Figure 3: Screenshot of the Cadnaa noise model - Acoustic screen (Orange line) and plant location (Blue crosses).

6.2 Sound sources.

Manufacturer's sound data has been provided for the provisional plant selection item. The data has been used in an acoustic model using the CadnaA software package. The table below summarises the items included in the predictions and assessments:

Item (no.)	Location	Sound Power Level of the selected plant (per unit) ¹	Correction added for acoustic characteristics	Implemented Mitigation
VRF (24)	External Plantroom Roof Level 8	L _{WA} 69 dB	+2 dB for tonality	Acoustic Package (-8 dB)
VRF (12)	External Plantroom Roof Level 9	L _{WA} 75 dB	+2 dB for tonality	Acoustic Package (-8 dB)
Strobic Fan	External Plantroom Roof Level 8	L _{WA} 82 dB	+2 dB for tonality	Attenuators in line Bespoke enclosure

¹ Sound power level per unit including the proposed mitigation

Table 6: Plant selection used in model.

Note, if the specific sound source contains identifiable acoustic characteristics (for example tonality, impulsivity intermittency, etc.) then it is necessary to account for the required BS 4142 acoustic character feature corrections, as necessary for the sound source.

Noise associated with the proposed installation is likely to include acoustic features: a correction of +2 dB has been included for just perceptible tonality has been included.

Due consideration will need to be given to noise levels when selecting and designing Strobic Fans to achieve the advised noise level limits at closest noise sensitive receptors. Detailed advice on Strobic Fan sizing and limiting noise levels has been developed to work in conjunction with the selected units.

An acoustic screen for VRF units has been included as shown in Figure 3 above (Orange mark-up), the screen height should match the height of the VRF units including the acoustic packs. This is recommended to be of solid construction, unperforated and flush to the roof with a minimum surface mass of 15 kg/m².

6.3 Assessment.

The calculated noise emissions and assessment at the receptor are summarised in the table below:

Receiver	Assessment period	Plant noise emission limits	Rating noise level at receiver	Assessment
Receptors on Burton Street	Daytime (07:00 - 23:00)	34 dB L _{Ar,1h}	34 dB L _{Ar,15 min}	Predicted rating level satisfies noise emission limits.
Receptors on Tavistock Place	Daytime (07:00 - 23:00)	39 dB L _{Ar,1h}	39 dB L _{Ar,15 min}	Predicted rating level satisfies noise emission limits.

Table 7: Assessment of selected plant.

The assessments indicate that noise emissions would satisfy the proposed plant noise emission limits, with the provisional equipment installation and associated mitigation described in Table 6. No further mitigation would be required provided the provisional equipment selection is representative of the actual installation.

7. Summary and conclusion.

Hoare Lea LLP have been appointed to provide acoustic consultancy services in relation to the proposed refurbishment and extension to Tavis House, London. A noise assessment of the proposed plant has been undertaken.

Based on the results of acoustic survey work at the development site, operational noise emission limits are proposed at the identified nearby noise sensitive receptor locations. These align with the Local Planning Authority's requirements.

Noise propagation software predictions have been used to calculate noise emissions and assess the MEP design selection. It has been demonstrated that with the mitigation included in the proposal, the planning noise emission limits are achievable. A description of the likely noise mitigation has been provided.

This document has been prepared to be submitted alongside the S73 application for the proposed development.

Appendix A: Acoustic survey equipment.

Unattended Position 1

Rion NL-52 sound level meter - Serial Number 1087405 (loan from ANV Measurement Systems)

Brüel & Kjær Type 4231 sound calibrator - Serial Number 3000377

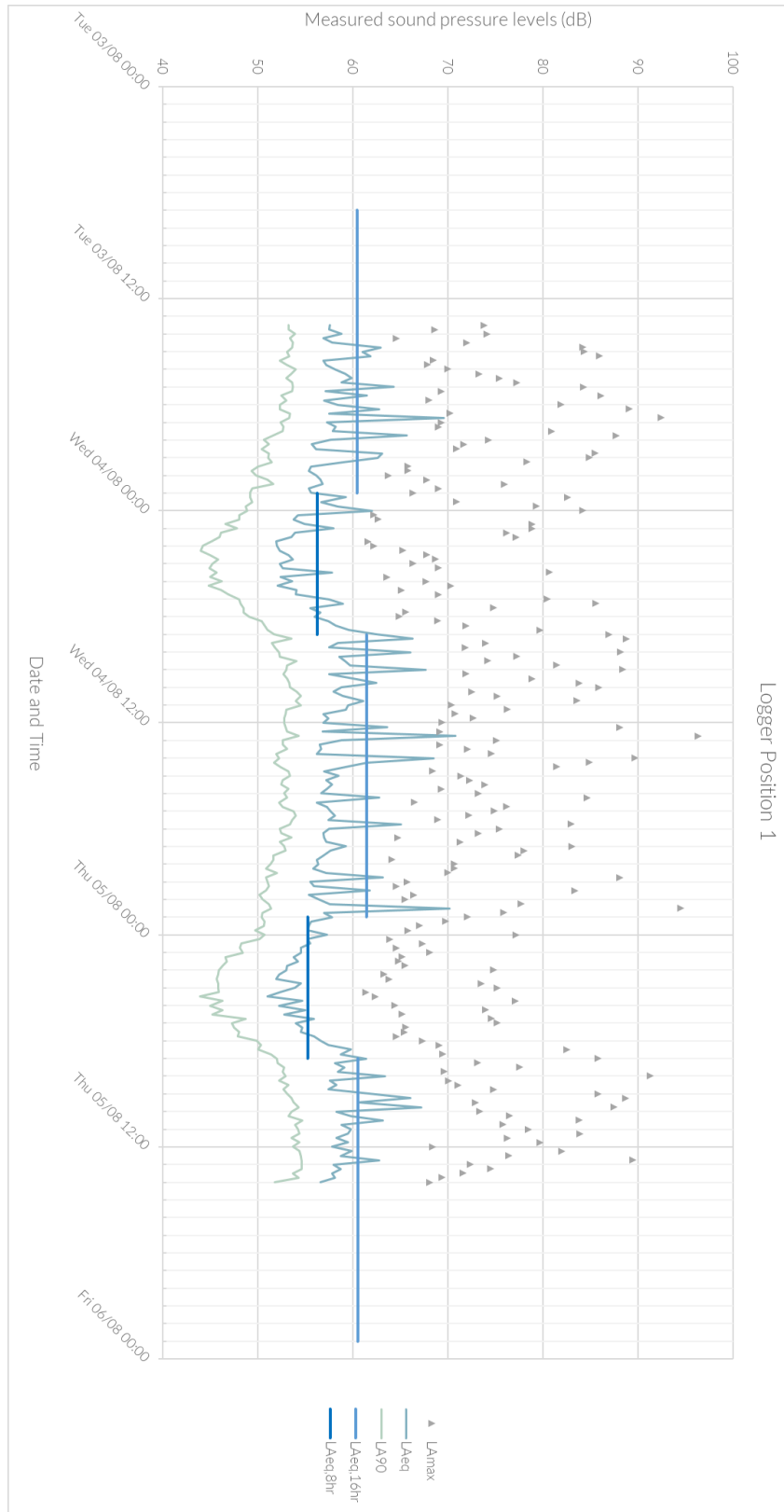
Unattended Position 2

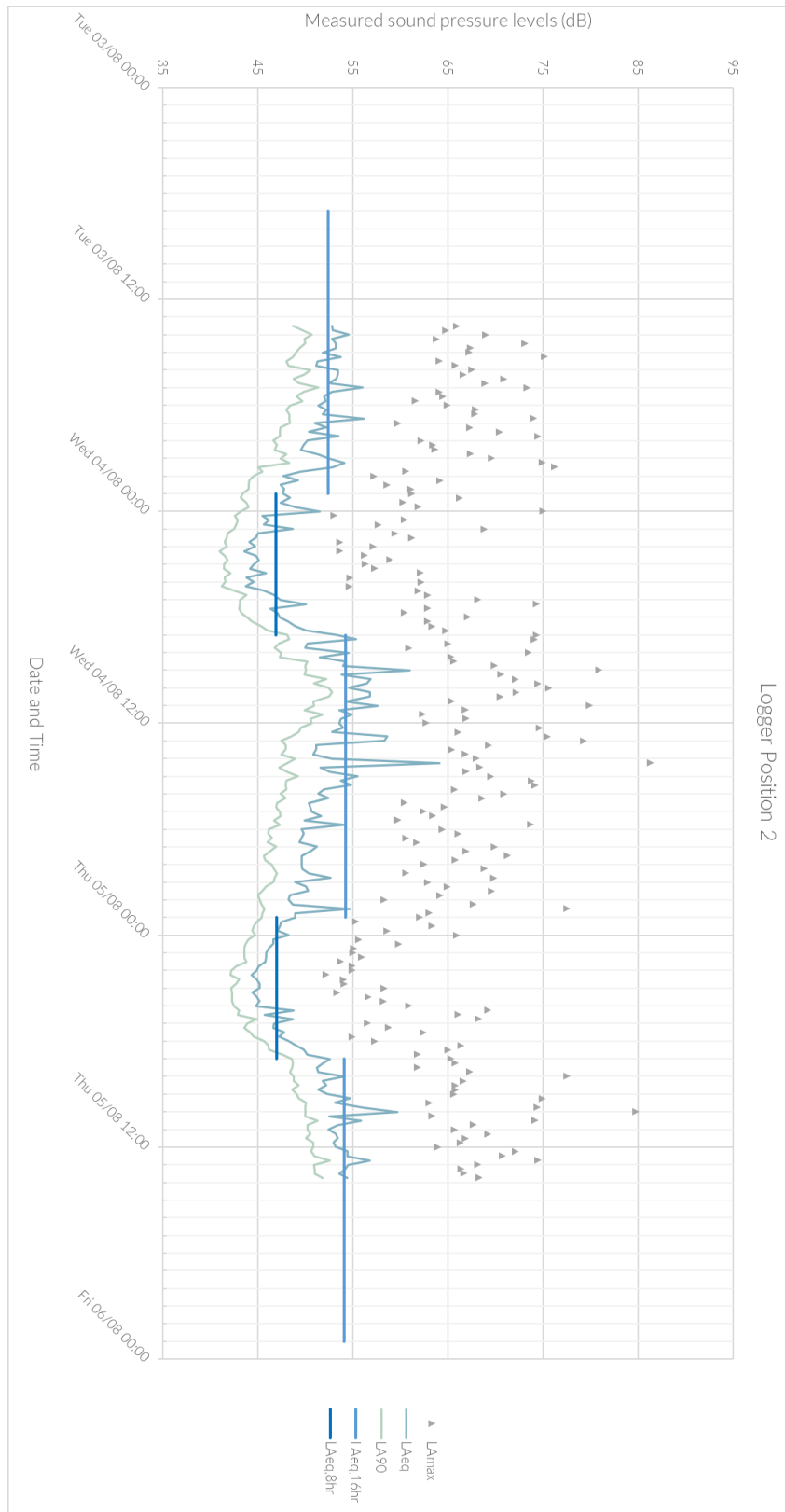
Rion NL-52 sound level meter - Serial Number 586907 (loan from ANV Measurement Systems)

Brüel & Kjær Type 4231 sound calibrator - Serial Number 3000377

Calibration details can be obtained from ANV Measurement Systems upon request.

Appendix B: Time history chart.







LANDER YABEN
ACOUSTICS ENGINEER

+44 1454 806 830
landeryaben@hoarelea.com

HOARELEA.COM

155 Aztec West
Almondsbury
Bristol
BS32 4UB
England

