auricl
acoustic consulting

47a, 47 and 49 Lower Mortlake Road
Richmond
TW9 2LW

Acoustic Report

February 2022

For

Westlake Property Limited

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Contents

SUMMARY

A new small co-living led development is proposed at land at 47a, 47 and 49 Lower Mortlake Road in Richmond to create 14 co-living units with internal amenity areas, new lower ground amenity space to the neighbouring properties, alongside communal external amenity space.

The London Borough of Richmond upon Thames requires that development proposals consider potential adverse impacts to future occupiers due to noise.

auricl has therefore undertaken an assessment of external noise affecting the proposed co-living units.

A noise survey has been undertaken to determine external noise levels affecting the Site.

Based on the noise survey results, calculations have been undertaken to determine the acoustic requirements of the proposed façades, so as to achieve suitable internal noise levels within the new co-living units and lower ground floor level habitable rooms of 47a, 47 and 49.

It was concluded that the internal noise levels should be achievable using suitably selected double glazing and ventilation options. A detailed acoustic specification for the proposed development façades will be produced during the project design stage.

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1.0 Introduction

A new small co-living led development is proposed at land at 47a, 47 and 49 Lower Mortlake Road in Richmond to create 14 co-living units with internal amenity areas, new lower ground amenity space to the neighbouring properties, alongside communal external amenity space.

The proposed development is as follows:

"*Construction of a part 1/2/3 storey building (plus lower ground) to provide 14 co-living units (sui generis) and associated internal amenity space at lower ground floor level, with new lower ground level amenity space to neighbouring buildings, and alongside external communal space at ground and lower ground level*"

London Borough of Richmond upon Thames requires that development proposals consider potential adverse impacts to future occupiers due to noise.

This report presents the methodology and results of a noise survey to determine the existing ambient noise levels at the Site, as well as subsequent preliminary advice to address the LBR requirements.

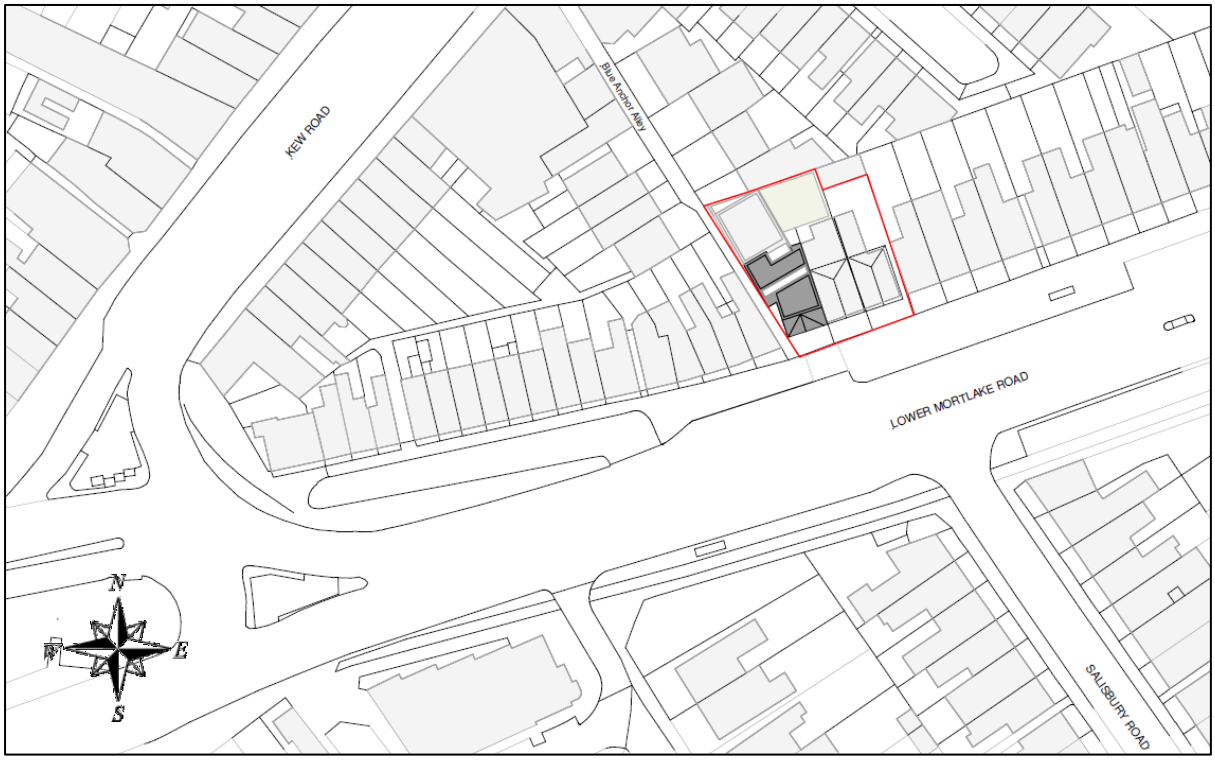
2.0 Description of Site

The Site is located at 47a, 47 and 49 Lower Mortlake Road in Richmond TW9 2LW.

The Site is located within a predominantly residential area and is bounded by Lower Mortlake Road to the south and neighbouring residential properties to the north, east and west.

Figure 2.1 shows the approximate existing Site extent in **blue** in relation to the surrounding area.

Figure 2.1 Existing Site Extent and Surroundings



3.0 London Borough of Richmond upon Thames Requirements

The London Borough of Richmond upon Thames (LBRuT) policy for noise sensitive developments is provided in their Supplementary Planning Document *Development Control for Noise Generating and Noise Sensitive Development* Adopted September 2018.

The Proposed Development predominantly comprises co-living (sui generis) floorspace, alongside some lower ground level internal amenity space supporting the existing HMO accommodation at 47 and 49 Lower Mortlake Road. In order to robustly assess impacts we have considered the LBRuT policy for new residential development (this being the closest similar type of land use to HMA/co-living uses), which requires that internal noise levels recommended in BS 8233: 2014 "*Guidance on sound insulation and noise reduction for buildings*" are achieved within residential (and in this case HMO/co-living) properties. The BS 8233 internal noise levels are presented in Table 3.1.

Table 3.1 BS 8233 Recommended Internal Noise Levels

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00 hours
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 $L_{Aeq,8hour}$

With regard to individual noise events within dwellings during night-time hours the policy also provides the following:

"*Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. In noise sensitive rooms at night (e.g. bedrooms) individual noise events should not normally exceed 45dB L_{AFmax} more than 10 times a night. This guideline is supported by advice contained in the WHO Community Noise Guidelines (2000).*"

We have therefore based our assessment on the standards presented above.

4.0 Noise Survey

4.1 Methodology

A manned environmental noise survey was undertaken at the proposed Site during daytime and night-time hours on Tuesday 10 September 2019.

A manned short-term survey was chosen over a longer-term survey due to lack of a secure location to install noise monitoring equipment over a longer period.

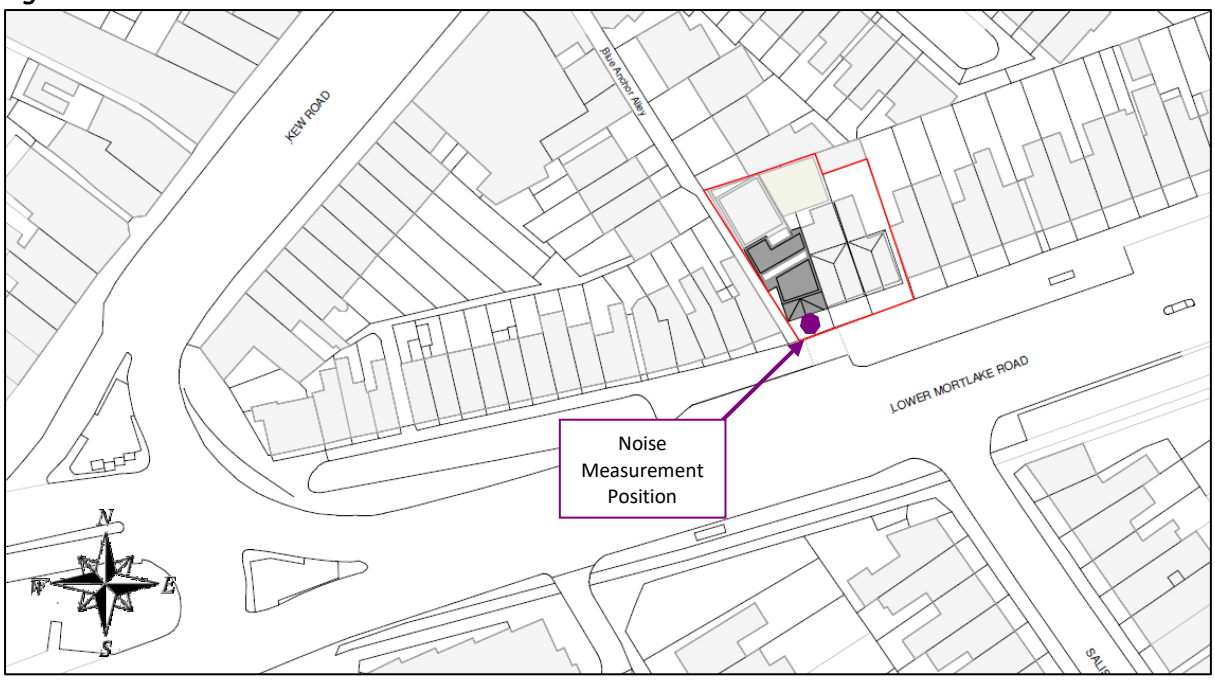
For the measurement of daytime road traffic noise, manned measurements were undertaken in accordance with the shortened methodology defined in the Department of Transport/Welsh Office document "*Calculation of Road Traffic Noise*" (1988). This involved measuring noise levels over three consecutive hours between 10:00 and 13:00 hours.

There is no CRTN shortened methodology for night-time hours, however noise levels during the first and last 2 hours of the 8-hour night-time period (23:00 to 07:00 hours) are generally representative of the overall night-time period, where road traffic is the dominant noise source. A noise survey was therefore undertaken from 05:00 to 07:00 hours.

Noise levels were measured at approximately first-floor level with the measurement microphone positioned on an extendable pole fixed to the front gate of the Site, approximately 2.5m above ground level in a free-field position.

The manned measurement position is indicated in **purple** on Figure 4.1.

Figure 4.1 Noise Measurement Location



The measurement position is considered representative of the south façade of the development most affected by road traffic noise from Lower Mortlake Road.

The equipment used for the noise survey is summarised in Table 4.1.

Table 4.1 Description of Equipment used for Noise Survey

Item	Make & Model	Serial Number
Type 1 automated logging sound level meter	01dB DUO	12032
Type 1 ½" external microphone	GRAS 40CD	330829
Calibrator	01dB CAL 31	87267

L_{Aeq}, L_{Amax} and L_{A10} sound pressure levels were measured throughout the noise survey over contiguous 125-millisecond intervals.

Weather conditions during the survey were dry with light wind speeds. Weather conditions are not considered to have had any significant effect on the measured noise levels.

The noise monitoring equipment was calibrated before and after the noise survey period. No significant change was found. Laboratory equipment calibration certificates can be provided upon request.

4.2 Noise Survey Results

The measured L_{A10} and L_{Aeq} sound pressure levels during the daytime and night-time survey periods are summarised in Table 4.2.

Table 4.2 Noise Survey Results

Period	Measured Sound Pressure Level (dB)	
	$L_{A10, T}$	$L_{Aeq, T}$
05:00 – 06:00	-	69
06:00 – 07:00	-	72
10:00 – 11:00	73	70
11:00 – 12:00	73	70
12:00 – 13:00	73	71

During the noise survey, road traffic noise from Lower Mortlake Road, and occasional aircraft flyover was noted to be the dominant noise sources affecting the Site.

We would consider the measured noise levels to be reasonable, considering the location of the measurement position and the dominant nearby noise sources.

The CRTN shortened method estimates the $L_{A10\,(18\,hour)}$ for a daytime period using the arithmetic mean average of three consecutive hourly L_{A10} measurements made over any three consecutive hours between 10:00 and 17:00 hours, using the following relationship:

$$L_{A10\,(18\,hour)} = L_{A10\,(3\,hour)} - 1dB.$$

BS 8233 provides a calculation method for the conversion of the $L_{A10\,(18\,hour)}$ road traffic noise level to an $L_{Aeq\,(16\,hour)}$ noise level, achieved by the following relationship:

$$L_{Aeq\,(16\,hour)} = L_{A10\,(18\,hour)} - 2\ dB$$

As discussed above for night-time road traffic noise assessments, the first and last 2 hours of the 8-hour night-time period (23:00 to 07:00 hours) are generally representative of the overall night-time period, where road traffic is the dominant noise source.

Table 4.3 presents the results of the calculated $L_{Aeq\,(16\,hour)}$ and $L_{Aeq\,(8\,hour)}$ noise levels based on the survey results and the calculation methods described above.

Table 4.3 External Day and Night-time L_{Aeq} Noise Levels Affecting Proposed Development Site

Daytime $L_{Aeq\,(16\,hour)}$ (dB)	Night-time $L_{Aeq\,(8\,hour)}$ (dB)
70	70

To determine the L_{AFmax} level used in this assessment, the 10th highest $L_{AFmax\ (1\ min)}$ noise level measured over the 2-hour night-time noise survey has been used. The noise levels captured throughout the 2-hour night-time survey ranged from 74 – 86 dB $L_{AFmax\ (1\ min)}$.

The 10th highest L_{AFmax} noise level used in our assessment is 81 dB L_{AFmax}.

5.0 External Noise Intrusion

5.1 South Façade

An assessment of external noise intrusion has been carried for the south façade of the development, which is most affected by road traffic noise from Lower Mortlake Road.

Our assessment is based on plans provided by Boehm Lynas and considers the south façade of the co-living units and the lower ground floor level façades of 47a, 47 and 49, with the largest window area as a worst-case. To be robust, only the more onerous internal noise level criterion (night-time) for bedrooms has been considered for each of the co-living units and the lower ground floor level façade of 47a. For the lower ground floor level of 47 and 49, we have considered daytime noise levels.

Our calculations indicate that the target internal noise levels are achievable through the use of suitable external façade constructions.

We have determined two possible options for the design of the south external façade of the co-living units – Option 1 based on a natural passive ventilation strategy and Option 2 based on a mechanical ventilation strategy. For the lower ground floor of 47a, 47 and 49, we have assumed mechanical ventilation.

Table 5.1 presents the recommended glazing and ventilation specifications for each option (assuming an open area of no greater than 2,500mm^2).

Table 5.1 Specification of Glazing (Windows Closed) and Ventilators (Open)

Façade	Option	Glazing	Ventilation
Co-Living Units	1	R_w 46 dB e.g. 10.8mm glass / 20mm cavity / 8.8mm acoustic laminate glass	$D_{ne,w}$ 41 dB e.g. acoustic trickle ventilator
	2	R_w 40 dB e.g. 6.4mm glass / 9mm cavity / 10.4mm acoustic laminate glass	Mechanical ventilation with no direct façade openings
47a Lower Ground Floor Level	-	R_w 34 dB e.g. 6mm glass / 16mm cavity / 6mm glass	Mechanical ventilation with no direct façade openings

Façade	Option	Glazing	Ventilation
47 and 49 Lower Ground Floor Level	-	R_w 34 dB e.g. 6mm glass / 16mm cavity / 6mm glass	Mechanical ventilation with no direct façade openings

Our calculations assume that non-glazed façade areas achieve at least R_w 52 dB (e.g. brick/block cavity wall).

Where a mechanical ventilation strategy is incorporated the system should be designed so that the target internal noise levels are not exceeded with the system running.

5.2 Other Façades

The proposed development plans show the windows of co-living units at other facades to be further set back from Lower Mortlake Road and to benefit from screening from the road by the building itself. The external noise levels at these facades are therefore likely to be considerably lower than those presented in Section 4.2 once the development is built.

Considering the above it is expected that the target internal noise levels can be achieved within the individual co-living units located at non-south facing facades using standard double glazing and natural passive ventilation options, with windows closed and ventilators open.

6.0 Building Services Plant Noise

6.1 External Noise Limits

The LBRuT requirements for noise emissions associated with building services plant are specified the Supplementary Planning Document "*Development Control for Noise Generating and Noise Sensitive Development*" (July 2014). The requirements state that the noise should be assessed in accordance with BS 4142: 2014.

British Standard (BS) 4142: 2014 "*Methods for rating and assessing industrial and commercial*" provides a procedure for the measurement and rating of noise levels form industrial and commercial noise sources. BS 4142: 2014 is the current industry standard for predicting the likelihood of adverse impact due to these sources.

The rating level ($L_{Ar,Tr}$) is defined in BS 4142: 2014 and is used to rate the source (known as the specific noise source) at the assessment location. This level is obtained by adding a correction for tonal and/or impulsive noise sources. Additionally, corrections can be made for other sound characteristics and intermittency of the noise source.

The method for predicting the likelihood of complaints is based on differences between the rating level and the background $L_{A90,T}$ noise level. The standard states that:

a) "Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on 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 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 LBRuT requirements state that a Rating Level ($L_{Ar,Tr}$) at least 5 dB below the background level (L_{A90}) would normally be acceptable.

6.2 Control of Noise Emissions

At this stage in the design process it is considered that the building services plant design is sufficiently flexible to ensure that suitably quiet, non-tonal plant can be procured and where necessary mitigation options can be included to ensure the noise limits are not exceeded.

The building services design is at an early stage, but noise mitigation measures that will be considered for the plant are as follows:

- Housing of certain items of building services plant within the building and inside enclosures, to contain plant noise within the building envelope
- Sensible location of external plant, so as to maximise distance and screening from noise sensitive façades
- Selection of low-noise fans and condenser units, including night set-back modes
- Appropriate casings on external fans and air handling units, so as to limit noise break-out
- Use of appropriate atmospheric duct-mounted attenuators on fans and air handling units

Appendix A – Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing ($20x10^{-6}$ Pascals).
Sound Pressure Level (L_p)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (L_A or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
L_{Amax}	The A-weighted maximum noise level measured during the measurement period.
$L_{Aeq,T}$	The A-weighted equivalent continuous noise level over the time period T (typically T= 16 hours for daytime periods, T = 8 hours for night-time periods). This is the sound level that is equivalent to the average energy of noise recorded over a given period.
$L_{A10,\ T}$	The noise level exceeded for 10% of the time, measured over the time period, T.
R_w	The weighted (w) sound reduction index (R), a single figure rating of the laboratory airborne sound insulation performance of a construction, usually measured across the frequency range 100-3150Hz. The higher the value, the greater the sound insulation, and the more onerous the requirement.
$D_{n,e,w}$	The weighted (w) element (e) normalised (n) level difference (D), a single figure indicator of the ability of a small building element (such as a trickle ventilator) to reduce sound. The higher the value, the greater the sound reduction, and vice versa.