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49 WILLOW ROAD
HAMPSTEAD

NOISE IMPACT ASSESSMENT

Technical Report: R7865-1 Rev 0

Date: 29th March 2019

For: DZLM Ltd
8 Gainsborough Gardens
NW3 1BJ
London

24 Acoustics Document Control Sheet

Project Title: 49 Willow Road, Hampstead –Noise Impact Assessment

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For and on behalf of 24 Acoustics Ltd				

Document Status and Approval Schedule

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0	Approved for Issue	Kiel Edwards	Chris McConnell	Stephen Gosling

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1.0 INTRODUCTION

1.1 24 Acoustics Ltd has been instructed by Michael Burroughs Associates to undertake an assessment of the potential impact of noise associated with the proposed renovation and conversion of a former pottery studio into a children's bookshop, café and theatre at 49 Willow Road, Hampstead.

1.2 The proposals for the redevelopment include the installation of new kitchen extract plant to serve a proposed café and improvements to the sound insulation between the ground floor bookshop/café spaces and the existing first floor flat.

1.3 This report presents the results of the assessment following site visits, sound insulation tests and environmental noise surveys undertaken from 13th to 20th March 2019.

1.4 All sound pressure levels quoted in this report are in dB relative to 20 µPa. A glossary of the acoustic terminology used in this report is provided in Appendix A.

2.0 SITE DESCRIPTION

2.1 49 Willow Road, Hampstead is a three-story building located on the junction of Willow Road and Gayton Road in Hampstead.

2.2 It is proposed to refurbish the ground floor retail space to provide a combined book shop/café area and associated kitchen. A puppet theatre and WC are proposed to the lower ground floor. New extract plant is proposed to serve the kitchen. It is proposed to run the kitchen extract flue within the currently disused chimney, terminating at roof level.

2.3 Residential properties are located nearby directly adjacent to the building, on Gayton Road and are shown as Receptor 1 in Figure 1. Residential properties are also located to the east of the building at the second floor of 48 Gayton Road, with partial line of sight to the roof and proposed flue termination and are shown as Receptor 2 in Figure 1. The proposed kitchen extract will be in operation between 11:00 and 18:00 hours in line with the proposed operating hours of the premises.

2.4 Equipment selections have not yet been confirmed, therefore this report has provided limiting external noise criteria for the plant based on the requirements of the London Borough of Camden. An assessment of noise levels from the proposed plant will be undertaken once the plant equipment selections are available.

2.5 Additionally, it is proposed to provide to improve the level of airborne sound insulation between the ground floor retail/café area and the first floor flat. Sound insulation tests have been undertaken to determine the existing level of sound insulation. Recommendations have been provided to increase the overall sound insulation performance of the party floor.

2.6 Figure 1 shows the existing site layout and surroundings.

3.0 CRITERIA

Local Authority Guidance

3.1 A pre-application enquiry was submitted to the London Borough of Camden in December 2018. Sections 5.4 and 5.5 of the pre application response from LB Camden (reference: 2018/6298/PRE) states the following in relation to noise from plant and sound insulation of the floors:

> *"5.4 In relation to the proposed kitchen area and extract and associated plant system, in order to ensure limited harm to the amenity of neighbouring occupiers and customers, this should be supported by an assessment of noise, vibration, fumes and odours."*

> *"5.5 At the meeting it was suggested that the whole building would be refurbished, which would be beneficial for noise and sound insulation and overall enhancement of the premises. In order to ensure that the amenity of the occupiers of the upper floors would not be harmed by the proposed use, details of the sound/noise insulation should be provided."*

3.2 Appendix 3 of the Camden Local Plan [Reference 1] provides criteria for assessing noise from plant and machinery and states the following:

> *"Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion)."*

British Standard 4142:2014

3.3 BS 4142:2014 provides a method for rating the effects of industrial and commercial sound on residential areas. The standard advocates a comparison between the typical measured L_{A90} background noise level and L_{Aeq} noise level from the source being considered. For rating purposes if the noise source is tonal, intermittent or otherwise distinctive in character, a rating correction of up to 15 dBA is applied.

3.4 The standard states that a difference between the rating level and the background level of around +10 dBA is an indication of a significant adverse impact, depending on the context and a difference of around +5 dBA is likely to be an indication of an adverse impact again depending on the context. Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact (depending upon the context).

Sound Insulation Criteria

2.1 The minimum sound insulation performance required by Approved Document E for converted properties is shown in Table 1 below.

Separating Element	**Airborne Sound Insulation**	**Impact Sound Transmission**
Floor	Not less than 43 dB $D_{nT,w} + C_{tr}$	Not more than 64 dB $L'_{nT,w}$
Wall	Not less than 43 dB $D_{nT,w} + C_{tr}$	N/A

Table 1: Approved Document E - Sound Insulation Performances for Converted Properties

3.5 Following the pre application advice, recommendations have been provided to improve the overall sound insulation of the floor between the ground floor retail/café space and the first floor flat.

3.6 In this instance, given the nature of the existing building and the proposed change of use, achieving the sound insulation values from Approved Document E, as stated in Table 1, is not mandatory. It is therefore considered that providing a reasonable improvement in the sound insulation between ground and first floor levels would be acceptable.

4.0 ASSESSMENT METHODOLOGY

4.1 The following assessment methodology has been used:

i. Background noise surveys have been undertaken to determine existing levels of background noise at the nearest residential properties;
ii. Based on the survey results and Camden Council's requirements, plant noise limits have been defined;
iii. Sound insulation testing has been undertaken to determine the current performance of the separating floor between ground and first floors;
iv. Recommendations have been provided to enhance the overall sound insulation performance of the separating floor between retail/café and the first floor flat.

5.0 ENVIRONMENTAL NOISE SURVEY

5.1 Environmental noise surveys were undertaken between the 13th and 20th March 2019 to the rear of the property to determine the prevailing background noise levels in the area. The monitor was installed at first floor level (at approximately 4m) at a location representative of the residential properties that would be most affected by the proposed kitchen extract system. The measurement location is shown in Figure 1.

5.2 Background noise levels were measured using the following equipment:

- Rion precision sound level meter Type NL-52;
- B&K acoustic calibrator Type 4231.

5.3 Background noise measurements were undertaken in samples of 5 minutes in terms of the overall free-field A-weighted L_{eq}, L_{90} and $L_{max,f}$ noise levels. Measurements were made in accordance with BS 7445:1991 "Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use" [Reference 4].

5.4 The instrumentation's calibration was checked before and after the surveys in accordance with the manufacturer's instructions. No significant drift in calibration was recorded. Calibration of 24 Acoustics' equipment is traceable to National Standards. All instruments were fitted with environmental weather shields during the surveys.

5.5 Weather conditions during the survey were fine and dry. Wind speeds were typically lower than 5 m/s.

5.6 The results of the background noise surveys are shown graphically in Appendix B. The typical background noise levels during the proposed plant operating hours have been derived and are summarised in Table 2.

Typical Daytime Measured Background Noise Level, dB 10:00 – 19:00 hours $L_{A90,\ 5\ min}$
46

Table 2: Summary of Measured Background Noise Levels.

6.0 PLANT NOISE LIMITS

6.1 Based on the measured background noise levels and Camden Councils requirements, maximum plant noise levels during the daytime plant operating hours, applicable at the nearest residential properties, are shown in Table 3.

Maximum External Plant Noise Levels, dB 10:00 – 19:00 hours $L_{Aeq,\ 1\ hour}$
36

Table 3: Plant Noise Limits

6.2 The plant noise limits in Table 3 are to be achieved at the most affected residential windows to the proposed kitchen extract flue.

6.3 Plant noise levels shall be determined in accordance with BS 4142: 2014. If the noise emissions contain a tonal or otherwise distinctive characteristic, then the levels in Table 3 would decrease by 5 dB in accordance with Camden Councils Guidance.

6.4 An assessment of noise levels from proposed plant will be undertaken once the plant details are fully known. Plant noise mitigation measures should be incorporated into the design, where deemed necessary in order to achieve the external plant noise limits.

6.5 Subject to the design and section of the kitchen extract system, with mitigation as necessary, it is considered that the plant noise levels in Table 3 would be readily achievable.

6.6 It is noted that the potential for noise breakout from the extract flue to the flats on the upper floors, through the chimney breast, will be subject to detailed design and should be considered further in the design of the kitchen extract system.

7.0 SOUND INSULATION ASSESSMENT

7.1 Through on-site investigations, it is understood that the existing party floor between ground and first floors comprises the following construction;

- Timber floor boards;
- Timber joists;
- Plaster ceiling.

7.2 Testing has been undertaken to determine the airborne sound insulation performance of the existing floor construction. Sound insulation testing was undertaken on the 13th March 2019 using the following equipment:

- Rion precision sound level meter Type NA-28;
- B&K acoustic calibrator Type 4231.
- Yamaha loudspeaker Type DBR10

7.3 For interfaces separating residential and non-residential spaces, the use of the $D_{nT,w}$ parameter is considered appropriate for assessing airborne sound insulation. Results from the airborne tests are shown in Table 4.

Source Room	Receiving Room	Sound Insulation [dB $D_{nT,w}$]
First Floor Flat Living Room	Ground Floor Storage Room	**37**
First Floor Flat Living Room	Ground Floor Shop Space	**37**

Table 4: Airborne Test Results

7.4 Based on the results of the tests and the construction of the party floor, it is recommended to upgrade the ceiling within the ground floor bookshop, café and kitchen in order to improve the overall level of sound insulation. Subject to other (non-acoustic) factors, a preliminary specification for the ceiling upgrade is provided below:

- Install a new suspended plasterboard ceiling (below the existing ceiling) comprising two layers 15mm high density plasterboard (e.g. SoundBloc) suspended either on independent joists or on suitable acoustic hangers;
- Install 100mm mineral wool (minimum density 33 kg/m^3) laid above the new ceiling boards.

7.5 The above construction, if installed correctly, would be capable of providing a reasonable improvement in the level of airborne sound insulation compared to the existing floor construction.

8.0 CONCLUSIONS

8.1 24 Acoustics Ltd has been instructed by DZLM Ltd to undertake a noise impact assessment for the proposed change of use at 49 Willow Road, Hampstead.

8.2 Environmental noise surveys have been carried out at the site to determine existing noise levels during daytime and night-time periods.

8.3 Based upon the survey results and Camden Council's guidance, maximum noise levels have been established for the new plant, to be achieved at the nearest residential properties.

8.4 Testing has been carried out to determine the airborne sound insulation performance of the existing floor between the ground floor premises and first floor flat above. Preliminary recommendations have been provided for upgrading the overall sound insulation performance of the separating floor.

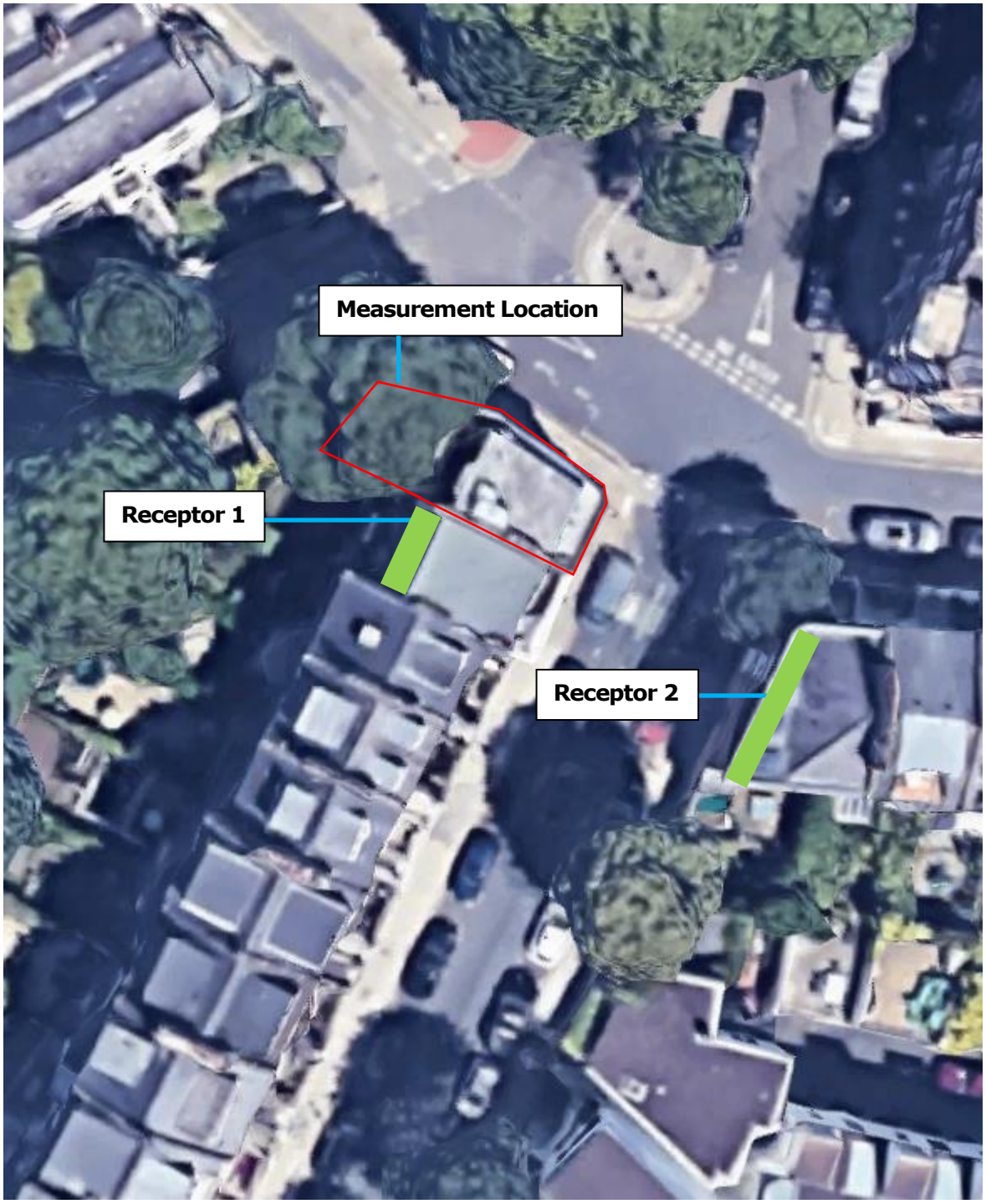
REFERENCES

1. Camden Local Plan: Appendix 3: Noise thresholds, 2017.

2. British Standard 4142: 2014, Methods for rating and assessing industrial and commercial sound.

3. Approved Document E, Resistance to the passage of sound, 2015.

4. British Standards Institution. British Standard 7445:1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use, 1991.



Project: 49 Willow Road, Hampstead	**Title:** Site Aerial Image	
DWG No: Figure 1	**Scale:** N.T.S.	**Rev:** A
Date: March 2019	**Drawn By:** KE	**Job No:** 7865-1

APPENDIX A – ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dB is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dB corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time internal, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

APPENDIX B – NOISE SURVEY RESULTS