hepworth acoustics

BRANCH HILL HOUSE, HAMPSTEAD

NOISE ASSESSMENT

On behalf of:

Almax Group

Report No: P18-534-R01v3
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BRANCH HILL HOUSE, HAMPSTEAD

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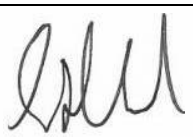

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Almax Group to carry out a noise assessment relating to a planning application for the proposed residential development of Branch Hill House, Spedan Close, Hampstead, London NW3 7LS.

1.2 The site is bounded to the north and east by Branch Hill. To the south of the site are private allotment plots, bounded by Oak Hill Way. To the west is the Branch Hill housing estate off Spedan Close. The adjacent properties are residential. There are no commercial or business premises in the immediate vicinity. The site location plan is shown in Figure 1.

1.3 The proposed development is the change of use of Branch Hill House from care home (Use Class C2) to residential (Use Class C3) and associated external alterations, demolition of the 1960s extension and erection of replacement building, including basement, comprising residential accommodation (Use Class C3), ancillary plant, access and servicing, and car parking. There will be private outdoor amenity areas provided for residents.

1.4 We understand that the intention is to replace the existing single-glazed windows to habitable rooms in Branch Hill House with double-glazed units, where this has not already been carried out.

1.5 This assessment is based on the following drawings, prepared by Stanhope Gate Architecture, which should be referred to in conjunction with this report:

- PL-01 Site Location Plan
- PL -02 Block Plan
- PL -03 Existing Ground Floor Plan
- PL -04 Existing First Floor Plan
- PL -05 Existing Second Floor Plan
- PL-06 Existing Third Plan
- PL-07 Existing Roof Plan
- PL-08 Existing Elevations
- PL-09 Existing Sections
- PL-10 Existing and Removal Ground Floor Plan
- PL-11 Existing and Removal First Floor Plan
- PL-12 Existing and Removal Second Floor Plan
- PL-13 Existing and Removal Third Floor Plan
- PL-14 Existing and Removal Roof Plan

- PL-15 Existing and Removal Elevations
- PL-16 Existing and Removal Sections
- PL-17 Proposed Basement Floor Plan
- PL-18 Proposed Ground Floor Plan
- PL-19 Proposed First Floor Plan
- PL-20 Proposed Second Floor Plan
- PL-21 Proposed Third Plan
- PL-22 Proposed Fourth Plan
- PL-23 Proposed Roof Plan
- PL-24 Proposed Elevations
- PL-25 Proposed Elevations
- PL-26 Proposed Sections

1.6 There is no outdoor mechanical plant proposed for the development.

1.7 The various noise indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 ACOUSTIC CRITERIA

2.1 The *National Planning Policy Framework* (NPPF) provides some general guidance to local authorities on taking noise into account in planning policies and decisions. This includes guidance that local authorities should '*aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development'* and also '*recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established*.'

2.2 However, there is as yet no specific guidance on numerical acoustic assessment/design criteria for proposed new housing developments provided in the NPPF, accompanying Technical Guidance document, National Planning Practice Guidance 'Noise', nor the *Noise Policy Statement for England* (NPSE) 2010.

ProPG: Planning & Noise

2.3 ProPG: Planning & Noise '*Professional Practice Guidance on Planning & Noise'* 2017 provides "guidance on a recommended approach to the management of noise within the planning system in England", predominantly for proposed new residential developments on land that is exposed to transportation noise.

2.4 It is noted that the guidance has no legal status. It does not constitute an official government code of practice and does not provide an authoritative interpretation of the law or government policy.

2.5 The ProPG recommends a staged approach to assessment. Stage 1 is an initial site noise risk assessment, indicating whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.

2.6 At low noise levels, the more likely the site is to be acceptable from a noise perspective provided that a good acoustic design process is followed and an ADS (Acoustic Design Statement) confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

2.7 As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and an ADS confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

2.8 High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS.

2.9 Stage 2 of the recommended approach in ProPG is a full assessment to consider good acoustic design. The guidelines of ProPG in terms of suitable acoustic design criteria are broadly consistent with (and essentially adopted from) the guidance of BS 8233, and the sound insulation recommendations made later in this report have been designed to achieve the BS 8233 guidelines, as described below.

BS 8233

2.10 British Standard 8233: 2014 *Guidance on sound insulation and noise reduction for buildings,* which carries the full weight of an adopted British Standard, recommends guidance on design criteria for acceptable noise levels within residential accommodation. BS 8233 guidelines for the daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods are summarised in Table 1.

Table 1: BS 8233 Recommended Acoustic Design Criteria

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

2.11 BS 8233 clarifies that the above guidance relates only to noise without specific character (e.g. such as that which has a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content) and that where such characteristics are present, lower noise limits might be appropriate.

2.12 BS 8233 states that if there is a reliance on closed windows to meet the guide values, "*there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level*". Further, it is stated that assessments should be based on a room with "*adequate ventilation provided (e.g. trickle ventilators should be open)*".

2.13 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable. ProPG: Planning & Noise '*Professional Practice Guidance on Planning & Noise'* 2017 states that "*in most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good*

acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events". This is broadly consistent with research described in WHO *Community Noise Guidelines* that states, "*for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night*".

2.14 Regarding outdoor living areas, BS 8233 states that "*it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB L_{Aeq}, which would be acceptable in noisier environments. However, it is recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas such as city centres or urban areas adjoining the strategic transport network, compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, developments should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited*".

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 A survey of prevailing environmental noise levels was carried out at the site at Location 1 indicated in Figure 1, around 10 metres in front of the existing building. This location was selected as it was the noisiest side of the building during our site inspection so represents the worst-case.

3.2 Continuous noise monitoring was undertaken in sequential 5-minute samples from 16:41 on Thursday 25th October to 19:26 on Friday 26th October 2018. The noise measurements were taken in 'free-field' conditions with the microphone at approximately 1.5 metres above ground level.

3.3 The daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ noise exposure values have been determined from the logarithmic average of all measured $L_{Aeq,5min}$ noise measurement samples over each of those periods.

3.4 The overall night-time L_{Amax} noise level has been determined for assessment purposes as the measured $L_{Amax,5mins}$ noise level exceeded no more than 5 times over the full night-time period. This accounts for possible occasions that multiple events exceed the given level during an individual 5-minute sample period.

3.5 The measured levels at Location 1 are summarised in Table 2. The detailed results are presented in Appendix II in graph form.

Table 2: Overall Noise Levels

Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)	
	dB $L_{Aeq,16hr}$	dB $L_{Aeq,8hr}$	dB $L_{Amax,f}$
1	46	37	63

3.6 The dominant noise source was road traffic on the local highways.

3.7 The weather conditions throughout the noise survey were mild, dry, and overcast. Wind was from the west and south-west, with wind speeds below 5 m/s. These were considered suitable conditions for the survey.

3.8 The noise monitoring was carried out using a Rion NL-31 Type 1 sound level meter (serial no. 01120844).

3.9 Calibration checks were carried out on the meter before and after the survey using a Brüel & Kjær Type 4231 sound calibrator (serial no. 2412667). No variation in the calibration levels was observed.

4.0 NOISE ASSESSMENT

4.1 The overall road traffic noise levels set out in Table 2 are low. Based on these levels, no specific acoustic mitigation is considered necessary, as adequate control of road traffic noise in accordance with BS 8233 and WHO guidelines for internal noise will be achieved using standard thermal double glazing (typically a system comprising two 4 mm thick standard panes with a minimum 12 mm air cavity, i.e. 4-12-4) with standard non-acoustic trickle ventilators. The $L_{Aeq,T}$ internal noise level targets will be achieved with windows partially open.

4.2 The proposed outdoor amenity areas for use by residents are predicted to be exposed to daytime noise levels below the recommended limit of 50 dB L_{Aeq}. Based on this, no specific noise mitigation measures are required for these areas.

5.0 SUMMARY AND CONCLUSIONS

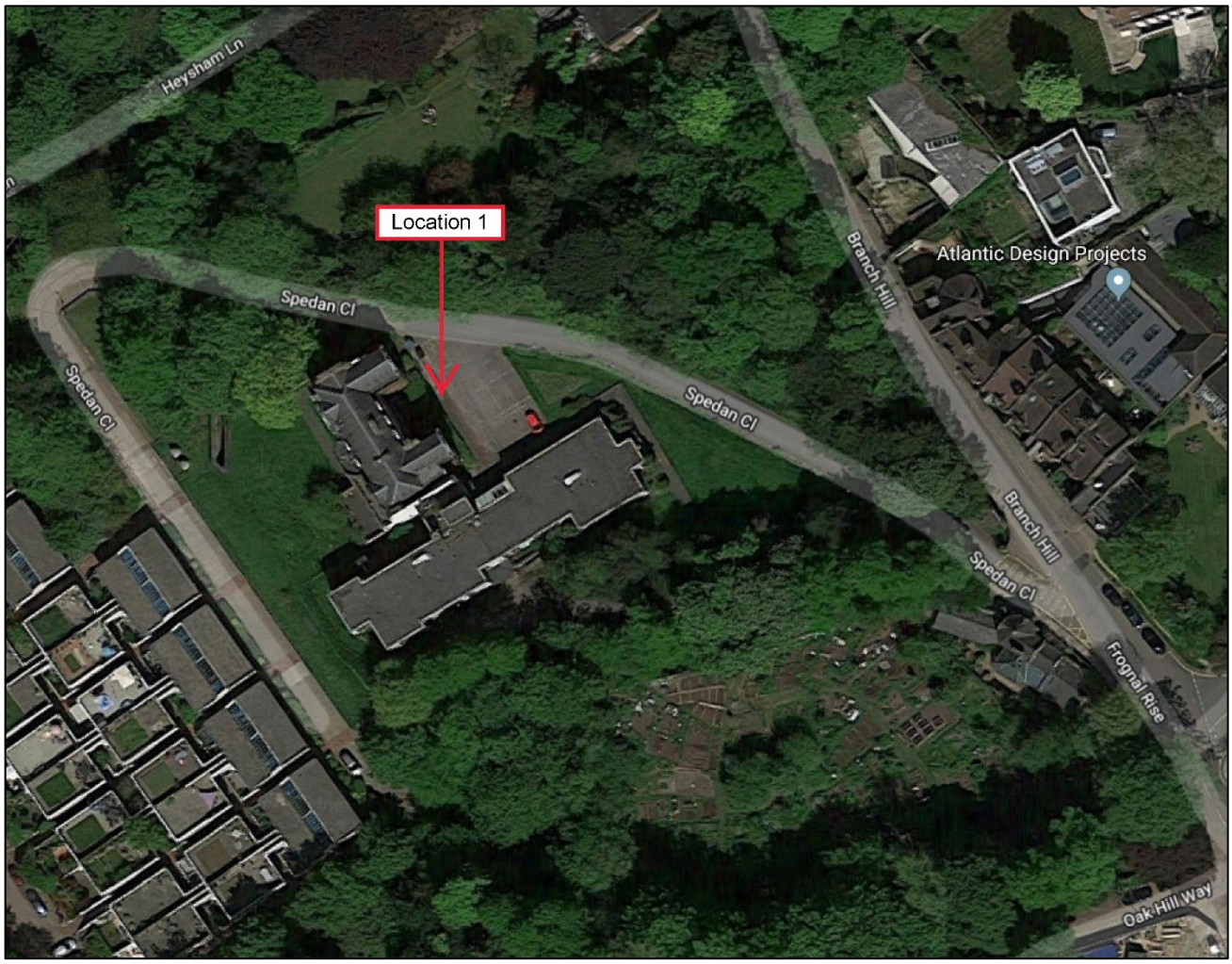
5.1 Hepworth Acoustics has undertaken a noise assessment for the proposed residential development at Branch Hill House, Spedan Close, Hampstead, London NW3 7LS.

5.2 A noise survey has been undertaken at the site and daytime and night-time noise levels have been determined.

5.3 The results of the noise survey demonstrate that the proposed development site is exposed to low levels of noise.

5.4 Appropriate acoustic design criteria for the development have been adopted from BS8233: 2014, which will protect the amenity of the new residents. Based on an assessment of the noise survey results, it is considered that no specific noise mitigation measures are necessary at the proposed development in order to achieve the adopted acoustic design criteria.

Figure 1 – Site plan



Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

L_{Aeq} This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{Amax} This is the maximum A-weighted noise level that was recorded during the monitoring period.

L_{A90} This is the A–weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

Appendix II: Noise Survey Results

Equipment: Brüel & Kjær 2250 Type 1 Sound Analyser (serial no. 3011626) fitted with a windshield.

Weather: Dry, mild, wind speed below 5 m/s.

All levels in dB re 20 µPa.

Location 1