



BRAIDEN ACOUSTICS LTD

Innovation Forum | 51 Frederick Road | Salford | Manchester | M6 6FP

NURSERY ACOUSTIC SURVEY

Prepared For : Peter Hitchen Architects

Date : 18 Dec 2019

Site : The Judge Walmsley Hotel, Billington

Report No. : 10808

1 INTRODUCTION

Braiden Acoustics has been commissioned by Peter Hitchen Architects to undertake an acoustic survey at the site of The Judge Walmsley Hotel, Billington in order to support a planning application for the change of use to daytime nursery.

1.1 PLANNING

The planning proposal states:

Proposed change of use from Public house to Children's Day Nursery

In a pre-application response from Ribble Valley Borough Council, the following comments, relating to potential noise from the site, were raised:

It is considered that given the proximity of the open space at the rear of the building to the residential properties known as 1-5 Co-operative Terrace, Whalley Road that it would be likely to lead to significant amenity issues in relation to privacy and noise that could warrant a recommendation of refusal. It is accepted that that the Public House, if reopened has some potential for an amenity issue but it is viewed that the proposed use would have a greater impact given the nature of the proposal.

In considering the use, the tranquillity of the Conservation Area is also a factor to take into account. It is in close proximity to the grounds of Whalley Abbey and any adverse impact in relation to noise would need to be addressed.

It is advised that should you wish to submit a planning application that a noise and acoustic report would be a requirement of any application in order for the Council to give full consideration.

In an email from Peter Hitchen, dated Wednesday 13th November, the scope of the assessment was confirmed:

Enviro Health have confirmed satisfaction with a noise report limited to the noise break out element with regard to the external play area.

1.2 AIM

The aim of this report is to assess noise from the children in outdoor areas. On site noise measurements have been undertaken and will be assessed using relevant acoustic guidance and standards. Where appropriate, mitigation measures will be recommended so that the site complies with relevant noise guidelines.

2 DESCRIPTION OF SITE

The site is the former Judge Walmsley Hotel that is a detached building sitting on a modest plot, as shown in Figure 1. There are some outbuildings to the left and rear of the former pub.



Figure 1
Site location – front elevation

2.1 NEIGHBOURING USES

The site is in the semi rural village of Billington near Whalley, Lancashire facing onto Walley Road.



Figure 2
Site location and surrounding uses with nearest residents shown in yellow

The nearest residential dwellings are to the left of the site at 1-5 Co-operative Terrace, Whalley Road. The properties shown to the south of the site in Figure 2 are at much higher elevation and set back so there is no direct line of sight and therefore not considered as a 'nearest sensitive receiver'.

Although the site is on a semi-residential road, it is only flanked by a residential dwelling on one side. On the other side (east) is a field that is part of a working farm.

2.2 EXISTING USE

The building has previously been used as a public house and restaurant.



2.3 PROPOSED USE

From the Pre-Application Planning Supporting Statement:

The floorspace provision has yet to be thought through and no plans have been drawn up as yet. However, the existing premises cover three storeys; the intention is to use the ground and first floor for all facilities connected with the running of the establishment as a day nursery. The second floor is given entirely over to residential accommodation. This has clearly been used in the past by the licensee and family when running the pub. The applicant will reside on the premises and occupy the whole of this floor.

On the ground floor there will be a baby room with 9 children and 3 staff; here will also be two toddler rooms catering for 20 children and 4 staff. The manager's office will also be on this floor. There are existing toilets on the floor and they will remain.

On the first floor will be the pre-school rooms catering for 32 children and 4 staff; there is a kitchen on this floor and this will be replaced; new toilet facilities will be installed.

>> internal layout drawing here

To the rear there will be an outdoor play area for the children where there will be no more than 20 children at any one time.

There will also be an external area for 'non mobile babies' which is to the west of the building and will accommodate 3-6 babies at any one time.

2.3.1 Opening hours

The nursery will only be open during office hours, more or less:

Monday to Friday 07:30 – 18:00.

The nursery will be closed on bank holidays.

2.3.2 External mechanical services

There will be no external mechanical services. There will be natural ventilation via open windows.

>>> possible noise break-out via open windows???? No considered previously

3 ACOUSTIC CRITERIA AND METHODOLOGY

As the property is detached then there is no issue of Internal noise from the premises being transmitted via the building fabric.

The main issues of noise are:

- noise from external uses
- noise break out via windows

In order to determine external noise thresholds, it has been necessary to undertake a background noise survey. This background noise study is the baseline for a BS 4142 type assessment where 'industrial' noise is compared to the background noise at the nearest sensitive receptor.

3.1 BS 4142

BS 4142:1999 "Method for rating industrial noise affecting mixed residential and industrial areas" [1] assesses industrial noise with regards to nearby residential dwellings. The guidance is commonly used to compare the equivalent noise from an industrial source only (specific noise level), L_{Aeq} , to the background noise level, L_{A90} , at the nearest sensitive receptor (NSR).



This Standard has been recently updated, BS 4142:2014 “Methods for rating and assessing industrial and commercial sound” [2]. Whereas the old standard added 5dB ‘penalty’ to the Specific Noise Level (SNL) if the noise source has a ‘character’ that can draw attention that may be described as tonal, intermittent or impulsive, the new standard gives clearer guidance on noise ‘character’. Furthermore, the previous Standard gave only one 5 dB penalty whereas the new Standard may not. When added to the specific noise level it forms the rating level. The new Standard gives the guidance for the following types of noise character:

Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.

Correct the specific sound level if a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.

NOTE 1 The prominence of tonal or impulsive sound from a source can be masked by residual sound. In many cases the amount of masking varies as the residual sound changes in level and possibly character. The source’s tonal and/or impulsive characteristics could also vary with time.

Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.

Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Once a penalty for noise character is added to the Specific Noise Level then this is termed the Rating Level.

The background level is then compared to the rating level. It is usual that the rating level due to the source should be below the background noise level at the nearest sensitive receptor; indeed BS 4142 states:

“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.”

3.2 BS 8233: 2014

British Standard BS 8233:2014 “Guidance on sound insulation and noise reduction for buildings” [3] gives guidance on, among other things, acceptable internal noise levels within residential dwellings. Table 4 within the Standard gives recommended unoccupied ambient noise levels in dwellings

Activity	Location	Daytime (07:00 – 23:00)
		$L_{Aeq,T}$ dB
Resting	Living room	35 dB
Dining	Dining room/area	40 dB
Sleeping (daytime resting)	Bedroom	35 dB

Table 1
Indoor ambient noise levels for dwellings

3.3 COUNCIL CRITERIA

It is usual for councils to set a threshold noise limit of 5dB below background. Therefore, noise from ‘industrial’ sources should be 5 dB less than the prevailing background noise level at the nearest resident.

It must be noted that for daytime only operations, the criterion is sometimes relaxed so that the noise source is ‘not above background’.

4 NOISE MEASUREMENT DETAILS

On site noise measurements have been made of the ambient and background noise levels on site.

4.1 MONITORING DETAILS

Personnel: John Braiden, BSc & MSc Acoustics, MIOA.

Equipment: NTi XL2 integrated real time analyser & B&K 4231 calibrator.

Date : Wed 27/11/2019

Weather: 6 – 12degC; 60 – 80% cloud cover; <5ms⁻¹ wind, intermittent precipitation

Monitoring unmanned but with audio recorded.

4.2 MONITORING LOCATION

Noise measurements were made one metre from a first floor window to the rear of the property and on the western elevation facing the nearby houses.



4.3 MONITORING RESULTS

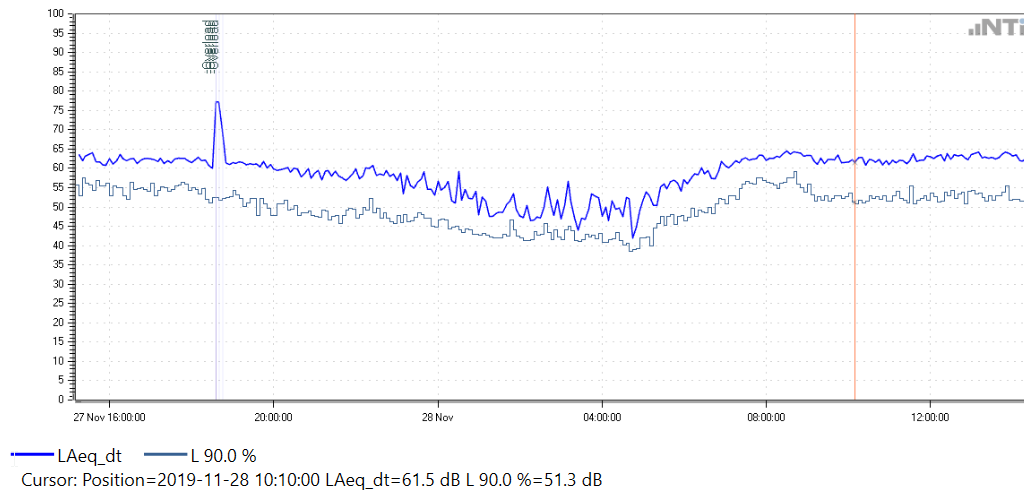


Figure 3
Noise levels measured

The measured noise levels ebbed and flowed with traffic flows. The lowest five minute L_{A90} , during the proposed opening hours was 51.3dB(A). Relatively high for a semi rural location. However, Whalley Road can be busy with free flowing traffic and also noise could be heard from Harrisons Engineering at the other side of Whalley viaduct, even though it is approximately 400m away from the site.

5 ACOUSTIC ASSESSMENT

There are two noise source types associated with the development:

1. Noise from external activities
2. Noise break out via windows

A BS 4142 type assessment has been performed whereby the 'rating minus background' level should be -5dB or less.

5.1 NOISE MEASUREMENTS OF OTHER NURSERIES

As part of the assessment, some historic data has been used to indicative values of typical noise levels from nursery type uses.



Time Period, T	Activity	Noise descriptor	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)
15:05 – 15:25	Singing indoors (10 children and 2 carers)	Small CD player at low and bass-light level, carers and children singing loudly with tapping and shaking musical instruments	75	95
14:40 – 15:00	Outdoor play @ 5m (11 children and 4 carers)	Children playing on moveable toys such as tractors on concrete yard, carer talking loudly and raised voices	52	70
11:08 – 11:31	Free play indoors (10 children and 3 carers)	Children crying and screaming whilst playing on toys such as tapping and shaking with carers making loud noises as entertainment	74	94

Table 2
Typical nursery noise measurements

The measurement of the outdoor play area was taken from a first floor window approximately **5m** from the centre of the play area – as shown in the Figure below.

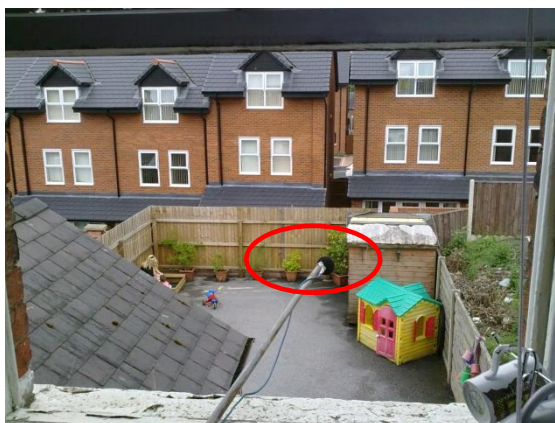


Figure 4
External noise measurement at the first floor of different nursery outdoor play area showing microphone circled in red

5.2 NOISE BREAK OUT

5.2.1 Via glazing

For ventilation, the two windows on the western elevation may be opened.

Windows to the front of the property will have no direct line of sight to the windows of the nearby properties at Co-operative Terrace – so there will be a shielding effect from the building itself.





Figure 5
Distance from first floor window to rear of nearest sensitive receiver

Description	Value	Calculation	Result	dB
Noise Level of children internally L_{Aeq}	74			74
Glazing Attenuation (open)	15			59
Distance Attenuation	14	$20 \cdot \log(14)$	-23	36
Intermittency	3		+3	39
Rating Level				39
Background Noise Level				51
Rating minus Background				-12

Table 3
Summary of the calculation of noise break out from the side

As the noise level will be relatively low once it reaches the adjacent neighbour then impulsivity and tonality will not be sufficiently perceived at the resident to warrant any penalty. However, a penalty for intermittency has been given due to the inherent intermittent nature of noise from children.

5.3 NOISE FROM EXTERNAL AREAS

Typical external noise from young children playing, according to Table 2, is an equivalent value of 52 dB(A) at 5m.

5.3.1 Noise from baby area

The baby area is bounded by the masonry wall to the front and close boarded timber fencing. In addition, there is no line of sight to a habitable window. Therefore, any potential noise from the baby area should not be an issue.



5.3.2 Noise from play area

The play area is to the rear of the property with the rear section having partial line of sight to the rear of the adjacent neighbour; albeit 24m in distance.



Figure 6
Distance from play area to nearest habitable window

Description	Value	Calculation	Result	dB
Noise Level of children externally L_{Aeq}	52	@ 5m		52
Barrier effect of wall (grazing incidence)	5		-5	47
Distance Attenuation	24	$20 \cdot \log(24/5)$	-13	34
Intermittency	3		+3	37
Rating Level				37
Background Noise Level				51
Rating minus Background				-14

Table 4
Calculation for external noise

Noise level from the external play area is well below, -14 dB, the background noise level at the nearest resident.

5.3.2.1 Noise to Whalley Abbey

Whalley Abbey is approximately 145m from the rear of the play area.



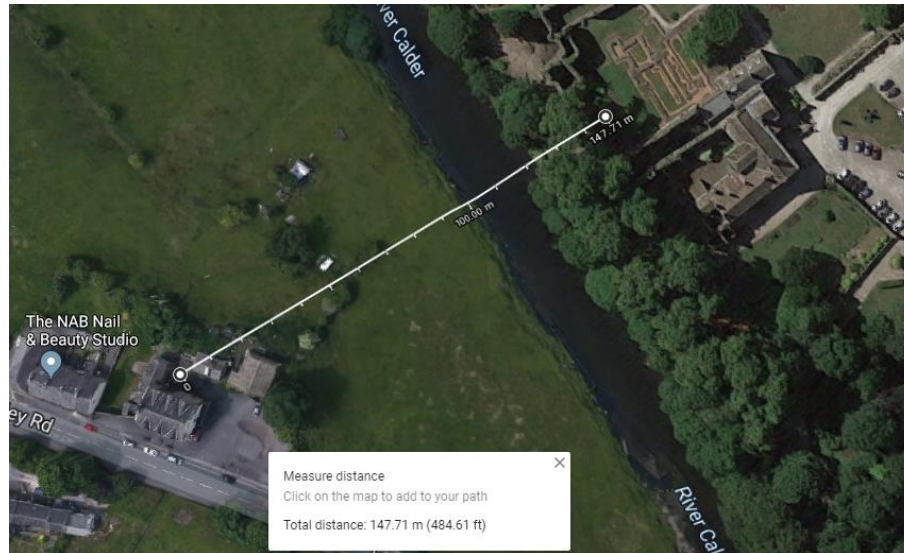


Figure 7
Distance from play area to Whalley Abbey

Description	Value	Calculation	Result	dB
Noise Level of children externally L_{Aeq}	52	@ 5m		52
Distance Attenuation	145	$20 \cdot \log(145/5)$	-30	22
Level				22

Table 5
Calculation of kitchen extract noise

Noise from the rear play area will be very low at the Abbey at 22dB, and very likely to be inaudible due to the large intervening distance.

6 CONCLUSION

An acoustic survey has taken place at the The Judge Walmsley Hotel, Billington to support an application for a nursery. Measured background noise levels have been undertaken at the site as well using measured noise levels from existing nurseries with a similar number of children.

Noise break out and external play area noise have been assessed using a BS 4142 type assessment and all have shown to be at least 5dB below the background in all cases – this is the usual criterion for Councils.

Furthermore, as the nursery will only operate during office hours then the sleep and rest of local residents will not be affected.

Therefore, no specific mitigation measures are required in order to safeguard the amenity of the nearby residents.

7 REFERENCES



- [1] BS 4142: 1997
Method for Rating industrial noise affecting mixed residential and industrial areas
British Standards Institute, 1997.
- [2] BS 4142: 2014
Methods for rating and assessing industrial and commercial sound
British Standards Institute, 2014.
- [3] BS 8233:2014
Guidance on sound insulation and noise reduction for buildings
British Standards Institute, 2014.



A1 PROPOSED LAYOUT

<p>Peter Hitchen Architects</p> <p>Marathon House The Sidings Business Park Whalley, BB7 9SE 01254 823 885 www.peterhitchenarchitects.co.uk</p>		<p>NOTES:</p>		<p>CLIENT: EARLY BAIRDS NURSERY</p>		<p>PROJECT: ALTERATIONS TO THE JUDGE WALMSLEY</p>		<p>SHEET: PROPOSED PLANS</p>		<p>Project number PHA/399</p>	<p>Date 04/12/2019</p>	<p>Drawn by RH</p>	<p>Checked by PH</p>	<p>Scale 1 : 100</p>	<p>Sheet size A1</p>	
<p>1 PROPOSED BASEMENT 1 : 100</p>		<p>2 PROPOSED GROUND FLOOR 1 : 100</p>		<p>3 PROPOSED FIRST FLOOR 1 : 100</p>		<p>4 PROPOSED SECOND FLOOR 1 : 100</p>		<p>A201</p>		<p>PH</p>		<p>PH</p>		<p>1 : 100</p>		<p>A1</p>