



BRAIDEN ACOUSTICS LTD

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

NOISE IMPACT ASSESSMENT

Prepared For : Wythenshawe Community Housing Group

Date : 20 Jan 2022

Site : Oakwood Lodge, Wythenshawe

Report No. : 10963

1 INTRODUCTION

Braiden Acoustics has been commissioned by Wythenshawe Community Housing Group to undertake an acoustic survey at the site of Oakwood Lodge, Wythenshawe in order to support a planning application for the erection of residential dwellings.

1.1 AIM

The aim of the report is to describe the site and its surroundings with regards to potential noise sources affecting the site. The noise assessment, along with any recommendations, shall be described in order that future occupants are not disturbed by external noise.

2 DESCRIPTION OF SITE

The site is currently occupied by a set of interconnected low rise buildings that are no longer in use.



Figure 1
Aerial view of site

2.1 SITE LOCATION AND NEIGHBOURING USES

The site is set back from Longley Lane in Wythenshawe. It is bounded by Kids Start nursery to the south west, The Longmire Centre (adult learning) directly to the south, residential dwellings to the east and north west, and green space to the north east.

Kids Start nursery have the following opening hours:

Sunday	Closed
Monday	11:30am–6pm
Tuesday	11:30am–6pm
Wednesday	11:30am–6pm
Thursday	11:30am–6pm
Friday	11:30am–6pm
Saturday	Closed

2.2 PROPOSED USE

It is proposed to erect 6no. 3-bed semi-detached houses and 14no. 2 bed semi-detached houses on the site.

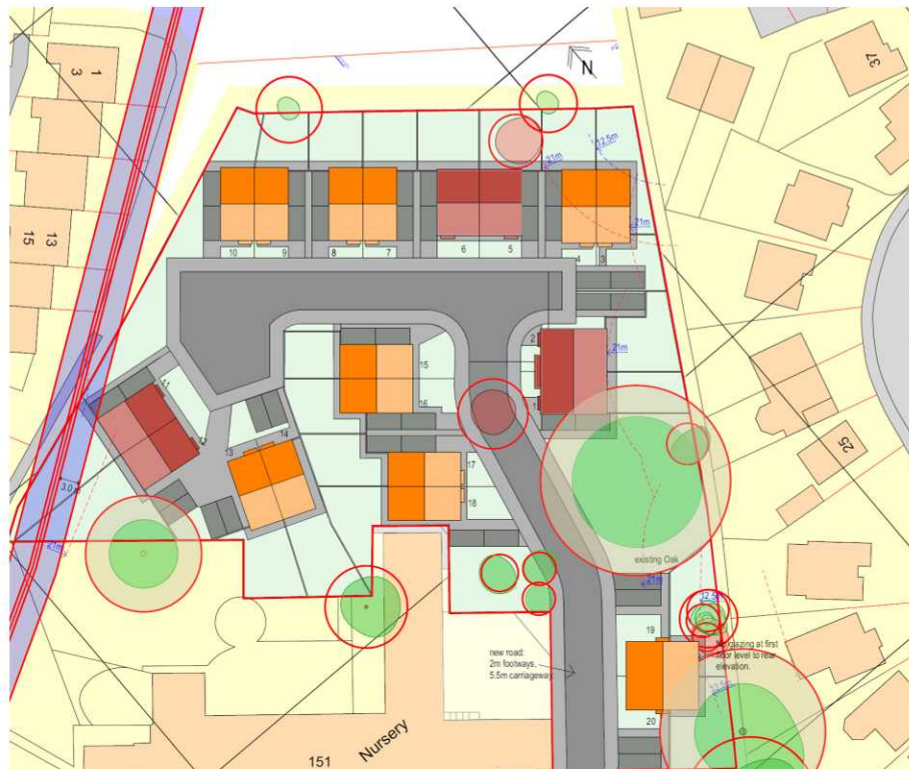


Figure 2
Site layout

3 ACOUSTIC CRITERIA AND METHODOLOGY

This is a residential development that may be susceptible to environmental noise, such as road traffic noise and/or noise from local industry. Recommended noise levels due to environmental noise are taken from BS 8233:2014 “Guidance on sound insulation and noise reduction for buildings” [1] which, in turn, takes guidance from the research based World Health Organisation “Guidelines for Community Noise”. Where necessary, mitigation measures have been recommended so that the noise level thresholds are not breached.

Noise levels are usually given separately for the night-time – 2300-0700 hrs and day time – 0700-2300 hrs.



3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework is the current document for planning guidance. Paragraph 123 of the NPPF says that planning decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum, other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- 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; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

Unfortunately, the NPPF supersedes the previous planning guidance for noise, PPG 24, which is much more descriptive regarding noise assessments and limits; hence, PPG 24 is sometimes still used to assess a site, with relation to noise, by some Councils.

3.2 BS 8233: 2014

The British Standard BS 8233:2014 “Guidance on sound insulation and noise reduction for buildings” gives guidance on recommended indoor ambient noise levels for residential dwellings.

Room	Criterion	$L_{Aeq,T}$	
		night	day
Bedroom	Sleeping	30	35
Dining Room/Area	Dining	--	40
Living Room	Resting	--	35

Table 1

Recommending indoor ambient noise level thresholds from anonymous noise (taken from Table 4, BS 8233:2014)

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

Internal noise levels in habitable rooms are calculated using either the simple or rigorous method as described in Annex G in BS 8233:2104.

3.2.1 Noise levels in external living areas

For external living areas such as gardens and balconies, BS 8233:2014 § 7.7.3.2 recommends an upper limit of 55dB $L_{Aeq,day}$ although there is a caveat:

However, it is also recognized 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, a 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, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.



3.2.2 Maximum noise levels

In the 2014 edition of the Standard, the criterion of 45dB L_{AFMax} inside bedrooms has been removed although there is Note 4:

NOTE 4 regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,P}$ depending on the character and number of events per night. Sporadic noise events could require separate values.

The use of the phrases ‘may be set’ and ‘could require’ imply that this is a discretionary criterion.

The L_{Amax} criterion is used where the level is not exceeded more than 10 times during the night time period.

3.3 BS 4142

BS 4142:1999 “Method for rating industrial noise affecting mixed residential and industrial areas” [2] 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).

When measuring the Background Noise Level, the Standard states:

Choose outdoor measurement locations that will give results that are representative of the ambient sound and residual sound at the assessment location(s). Make the measurement of the ambient sound level, the residual sound level and the background sound level at a height of 1.2 m to 1.5 m above the ground, unless there is a specific reason to use an alternative height (which should be justified), and under similar conditions, e.g. similar influence of reflections and measurement height above the ground. Where practical, minimize the influence of reflections by making the measurements at least 3.5 m from any reflecting surface other than the ground.

Where it is necessary to undertake measurements above ground floor level, choose a location which is approximately 1 m from the facade on the relevant floor of the building if it is not practical to make the measurements at least 3.5 m from the facade at this elevation. NOTE When measurements for distant sources are made at 1 m from a facade, the measured level can be adjusted to an equivalent free-field level by subtracting a 3 dB correction factor. For sources that are relatively close or not perpendicular to the facade the correction may be 1 dB or 2 dB, in which case the reasons for not using a correction of 3 dB ought to be explained.

Essentially, background noise measurement should be made free field. If measurements are made at the façade then a correction should be made in order to represent the free field.

This Standard has been recently updated, BS 4142:2014 “Methods for rating and assessing industrial and commercial sound” [3]. 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.”

3.4 COUNCIL NOISE CRITERIA

There are two issues of potential noise emanating from the site:

1. Environmental noise break in

3.4.1 Residential noise criteria

For residential developments, the noise thresholds are taken from BS8233:

- *Bedrooms (night time - 23.00 - 07.00) 30 dB LAeq (individual noise events should not normally exceed 45 dB L_{Amax,F} by more than 15 times)*
- *Living Rooms (daytime - 07.00 - 23.00) 35 dB LAeq*
- *Gardens and terraces (daytime) 55 dB LAeq*



4 MONITORING DETAILS

4.1 MONITORING OVERVIEW

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

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

Weather: 4- 8degC, <5m/s wind, 80-100% cloud

Date & time: Tues 4th November 2021 from 14:38

The sound level meter was calibrated before after the measurements with no drift reported.

Monitoring was unmanned.

Noise measurements were made at one location. Background noise (L_{A90}), 'average' noise levels (L_{Aeq}) and maximum noise levels (L_{Amax}) were taken in 15 minute intervals.

4.1.1 Monitoring location

The microphone was 1.2 metres from the ground and at least three metre from any facade at the location shown by the arrow in **Error! Reference source not found.**

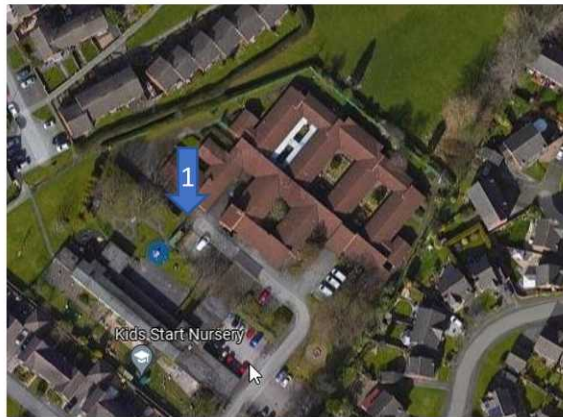


Figure 3
Site location showing monitoring position

4.2 MONITORING RESULTS

Noise monitoring stopped early due to a malfunction. However, daytime noise from the nursery was captured which included activity when the parents collected the children at the end of the working day around 17:00, which can be clearly seen in the time history plot shown in Figure 4.



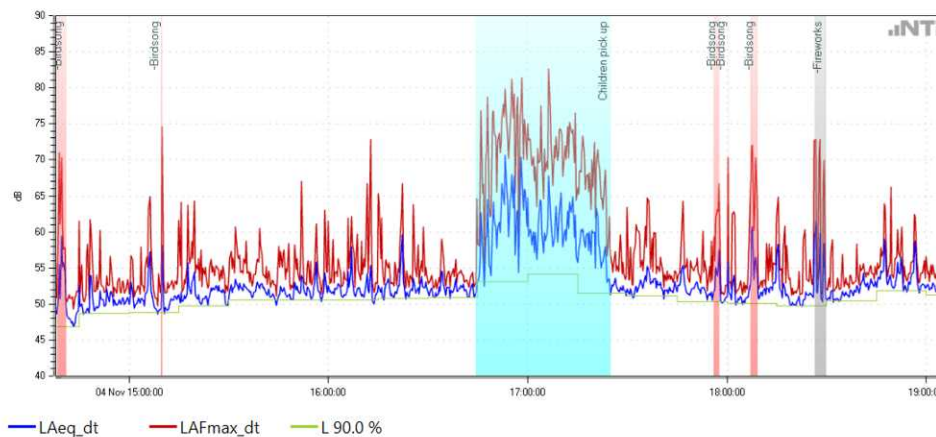


Figure 4
Time history

During the day, there was no discernible noise from the children's nursery but rather road noise from traffic using Longley Lane and the surrounding road network. As **Error! Reference source not found.** shows, there was an increase in noise level around 16:44 which included car engine noise, door slams, human (mainly children) voices, and general noise associated with children being collected. These noises lasted until around 17:25 when the nursery was closing; therefore noise from the rear of nursery lasted only 40 minutes. After 17:30 there was no noise emanating from the rear of the nursery.

Day	Time		Duration	Time Period	L _{A90} dB	L _{Aeq} dB	L _{Amax} dB
	Start	Finish					
Tues 11 th Jan 22	14:28	19:05	0312	day	50.0	55.9	82.6

Table 2
Summary of noise monitoring results –

The overall free field noise levels are as follows:

L_{Aeq} (day) 56 dB(A)

24 hour noise monitoring was taken from a similar location, with the results below:

Date	Time		Duration	Time Period	L _{A90} dB	L _{Aeq} dB	L _{Amax} dB
	Start	Finish					
Thur 22/07/21	15:09:26	23:00:00	07:50:34	day	42.8	55.1	81.0
	23:00:00	07:00:00	08:00:00	night	42.8	49.6	72.9
	07:00:00	15:27:07	08:27:07	day	46.8	57.7	85.5

Figure 5
Noise monitoring summary

A summary of the façade noise levels is given below:

Daytime noise 56 dB L_{Aeq}

Night time noise 50 dB L_{Aeq}



5 ACOUSTIC ASSESSMENT

5.1 ENVIRONMENT NOISE BREAK IN

Given the external noise levels, the initial glazing scheme can be suggested. However, it should be noted that this assumes windows closed in order to achieve the internal noise levels based on BS 8223:1999.

The amount of attenuation from the building façades were readily computed using the simple method in Appendix G of BS 8233:2014 whereby the sound insulation index (SRI) of the glazing (the weakest element of the building façade, acoustically) is determined by simply deducting the required internal noise level from the external free field noise level.

5.1.1 Façade correction

A -3dB façade correction was not necessary as the noise monitoring was free-field.

5.1.2 Distance attenuation

There is no distance attenuation for the majority of the site

However, distance attenuation will be applied to plots 19 and 20 as they are nearer to Longley Lane. Due to the additional distance from the monitoring location, Plot 19/20 will be exposed to $10 \cdot \log_{10}(95/55) = 2$ dB increase due to distance alone.

5.1.3 Barrier attenuation

No additional barrier attenuation has been taken into account.

5.1.4 BS8233 calc

The weakest structural element is the glazing. The required glazing was calculated using recommended internal values. The Table below shows the required Sound Reduction Indices (SRI) for the bedrooms (night) and living areas (day) on each relevant elevation.

Façade	period	room	External Levels measured / calc'd		Internal Levels recommended		Required glazing	
			L _{Aeq} (dB)	L _{Amax} (dB)	L _{Aeq} (dB)	L _{Amax} (dB)	SRI (R _w + C _{tr})	Example Spec ²
PLOT 19/20 FRONT	night	bedroom	50	69	30	45	24	4 (20) 4
	day	lounge	56		35		21	4 (20) 4
PLOT 1 ALL other	night	bedroom	52	71	30	45	26	4 (20) 4
	day	lounge	58		35		23	4 (20) 4

*Table 3
Calculated SRI values and recommended glazing*

Standard double glazing will suffice for all elevations and plots.

¹ The maximum level was not exceeded more than 10 times.

² Example glazing build up and performance from Saint Gobain – table in Appendix. Other glazing build-ups available.



5.2 GARDENS

In order to protect gardens on the boundary of the nursery, it is recommended that a 2.0m high close boarded timber fence, with a surface density of 10 kg/m², be erected, as shown in the figure below.

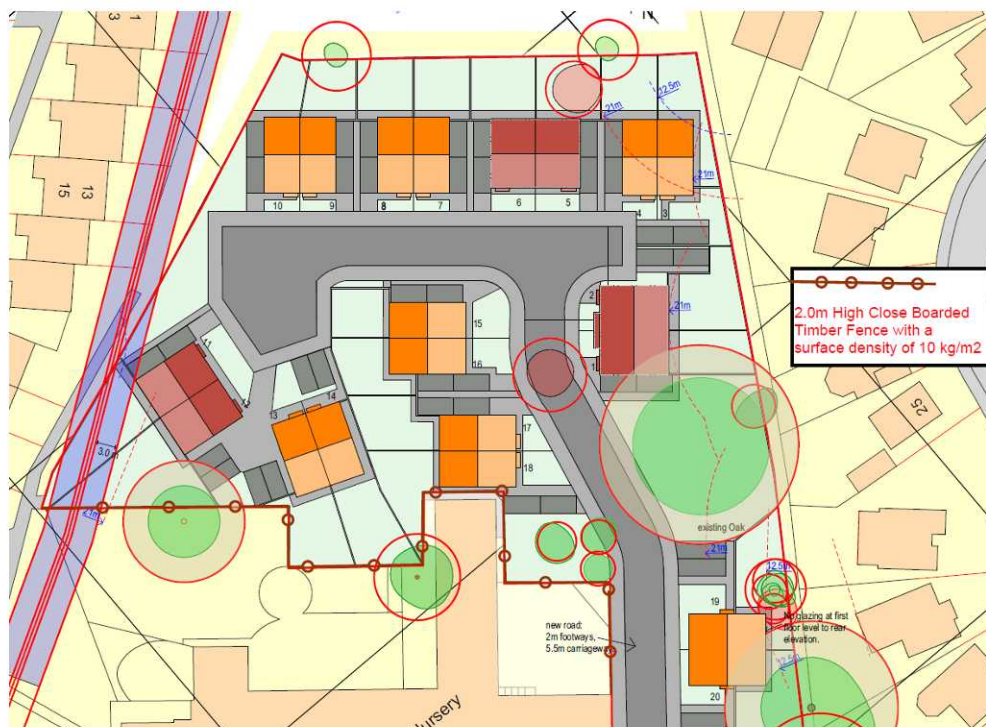


Figure 6
Site layout showing proposed 2m close boarded timber fence on southern boundary.

6 CONCLUSION

An acoustic survey has taken place at Oakwood Lodge, Wythenshawe to support a planning application for residential dwellings.

The main issue of noise was noise from the nearby nursery and, to a lesser extent, noise from passing vehicles on Longley Lane . Noise levels overall were modest, although there was a temporary increase of noise when the children were being picked up around 17:00. Because of this, it has been recommended to install a 2.0m high close boarded timber fence, with a surface density of 10 kg/m² on the southern boundary of the site. No other acoustic mitigation is required.

The assessment revealed that all windows will achieve adequate internal noise levels with standard double glazing.

7 REFERENCES

- [1] BS8233: 2014
Guidance on sound insulation and noise reduction for buildings
British Standards Institute, 2014.
- [2] BS 4142: 1997
Method for Rating industrial noise affecting mixed residential and industrial areas
British Standards Institute, 1997.



[3] BS 4142: 2014
Methods for rating and assessing industrial and commercial sound
British Standards Institute, 2014.



Appendix

A1 Glazing spec

 SAINT-GOBAIN												 SAINT-GOBAIN			
GLASS												GLASS			
Glass	Thicknes	R _w	R _a	R _{a,fr}	63Hz	125H	250H	500H	1000H	2000H	4000H	R _w	R _{w+C}	R _{w+C,T}	R (C;C _t)
4 (20) 4	28	30	30	26	15	22	20	27	38	41	37	30	30	26	30(-0;-4)

