

Application for Residential Development at Mitton Road, Whalley

Noise Assessment

July 2012



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David Wilson Homes

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**PROPOSED RESIDENTIAL DEVELOPMENT
ON LAND AT MITTON ROAD/BROAD LANE, WHALLEY:
ASSESSMENT AND CONTROL OF ROAD TRAFFIC & RAILWAY NOISE IMPACT**

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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Limited was commissioned by David Wilson Homes North West to assess the impact of road and railway noise on a proposed residential development on land off Mitton Road/Broad Lane, Whalley and, if necessary, to advise on noise mitigation measures.
- 1.2 The site is currently unused open land, which is bounded by a mixture of roads, a railway line and existing housing. The location of the proposed development site is shown in Figure 1.
- 1.3 The site is bounded by the A59 to the west which is heavily trafficked throughout the daytime and night; Mitton Road to the north which is moderately trafficked during the day time and lightly trafficked at night; and Broad Lane to the east which is sparsely trafficked throughout the daytime and at night.
- 1.4 Approximately 130m beyond the southern boundary of the site there is an industrial estate. We were unable to determine the nature of the business during the survey. Some noise from the site was noted during the surveys, but it did not have any distinguishable tonal components.
- 1.5 The Ribble Valley railway line runs along Whalley Viaduct parallel to the eastern boundary of the site with the station located beyond the North-Eastern corner of the site. The railway line is used exclusively by passenger trains between Clitheroe and Manchester. The line is only lightly used, with one train per hour in each direction in the daytime. The daily numbers of passing passenger trains on a weekday are shown in Table 1.

Table 1 : Daily Number of Passing Trains (Total 2-way Flow)

Daytime (0700-2300 hrs)	Night-time (2300-0700 hrs)
36	4

- 1.6 The proposed layout of the development is shown in Figure 1 of this report.
- 1.7 The various noise units and indices referred to in this report are described in Appendix I. All results referred to in the text are rounded to the nearest decibel as fractions of decibels are imperceptible.

2.0 NOISE SURVEY & ASSESSMENT

- 2.1 A noise measurement survey has been carried out. Noise levels were measured on the development site between 11:00 – 15:10 hours on Wednesday 16th May and between 04:00 – 07:00 on Wednesday 23rd May 2012.
- 2.2 Noise levels were measured at the following locations (as shown in Figure 2):
- i. Location 1 – Nearest proposed façade to Mitton Road/A59
 - ii. Location 2 – Nearest proposed façade to Southern Boundary
 - iii. Location 3 – Nearest proposed façade to Railway Line.
- 2.3 The noise monitoring was carried out using a Brüel & Kjær 2260 ‘Type 1’ sound level meter (Serial numbers 2467015). The meter was mounted onto a tripod with a microphone height of approximately 1.4 metres above the ground. A windshield was fitted to the microphone during all noise measurements. All measurements were carried out in ‘free-field’ conditions. Calibration checks were carried out before and after the noise survey with no variance in levels observed.

Road Traffic Noise Survey

- 2.4 The traffic noise monitoring was carried out for representative periods of the daytime at Location 1, as described above. The daytime noise levels have been evaluated generally on the basis of the ‘shortened measurement method’ described in the Department of Transport document ‘Calculation of Road Traffic Noise’ (CRTN), 1988. The CRTN shortened measurement method involves taking traffic noise measurements over representative sampling time periods within any three consecutive hours between 10:00 hours and 17:00 hours. CRTN uses L_{A10} which can be converted to L_{Aeq} , however we have used the averaged L_{Aeq} hour values as an estimate of the $L_{Aeq(16\text{ hour})}$ values.
- 2.5 The night-time $L_{Aeq(15\text{min})}$ values at Locations 1 and 2 have been averaged logarithmically. The resulting values have been taken as being representative of the night-time $L_{Aeq(8\text{ hour})}$ values.
- 2.6 Location 2 was used to measure any noise from the industrial premises beyond the southern boundary in addition to distant road traffic noise upon the nearest proposed residential properties to the southern facade. At Location 2 the $L_{Aeq,15\text{ Min}}$ values have been averaged logarithmically. The resulting value has been taken as being representative of the day-time L_{Aeq} value.

- 2.7 The results of the noise surveys at Locations 1 and 2 are shown in Appendices II and III and the daytime L_{Aeq} (16 hour) and night-time L_{Aeq} (8 hour) noise exposure values are summarised in Table 2. The implications of the results are discussed in section 3.0.

Table 2: Daytime and Night-time Noise Exposure Levels

Location	Daytime L_{Aeq} (0700-2300 hrs)	Night-time L_{Aeq} (2300-0700 hrs)
1. Nearest proposed façade to Mitton Road/A59	62 dB	55 dB
2. Nearest proposed façade to Southern Boundary	55 dB	48 dB

- 2.8 Maximum noise levels at Location 1 at night were generally in the range 68-72 dB L_{AMax} , with one peak of 79 dB L_{AMax} , resulting from passing vehicles on Mitton Road and the A59 including HGV's. Maximum noise levels at Location 2 at night were in the range 53-58 dB L_{AMax} .
- 2.9 Noise from the nearby industry was not significant during the daytime, and while it was audible it did not have any tonal or impulsive characteristics. No industrial noise was audible at night.

Railway Noise Survey

- 2.10 Noise levels from a sample of passing trains were measured at Location 3 near the eastern boundary of the site (i.e. the nearest part of the site to the railway) as indicated in Figure 1.
- 2.11 Additional measurements were taken in line with Location 3 at increased distances of 25m & 50m from the railway line to assess the effect of the railway line's elevation on distance attenuation. There was no significant difference in levels measured at these increased distances.
- 2.12 Noise levels were measured during the passage of each train in terms of the 'sound exposure level' (SEL) and the maximum sound pressure level, L_{AMax} .
- 2.13 The results of the railway noise survey are detailed in Appendix III and the data has been used in the analysis below.

Calculation of Railway Noise Exposure

- 2.14 Railway noise is evaluated in terms of the ‘equivalent continuous noise level’, L_{Aeq} . Period L_{Aeq} values for the site have been calculated from the results of the noise survey using the formula:

$$L_{Aeq}(T) = SEL_{Average} + 10 \log N - 10 \log T$$

where $L_{Aeq}(T) = L_{Aeq}$ over time period T
 $SEL_{Average}$ = Average ‘Sound Exposure Level’
 N = Number of train passes in time period T
 T = Time period in seconds

- 2.15 The railway noise calculations have been undertaken for the daytime and night-time periods using the average SEL value of 70dB(A). The results are shown in Table 3.

Table 3 : Railway Noise Exposure Values

Location	Daytime L_{Aeq} (0700-2300 hrs)	Night-time L_{Aeq} (2300-0700 hrs)
3. Eastern Boundary	38	32

- 2.16 Table 3 shows that the daytime and night-time L_{Aeq} railway noise exposure levels on the site are very low.
- 2.17 The National Planning Policy Framework (NPPF) 2012 provides some general guidance to local authorities on taking noise in to 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*’. However, there is as yet no specific guidance on acoustic assessment/design criteria provided in the NPPF or the accompanying Technical Guidance document; therefore, established national guidance which carries the full weight of an adopted British Standard has been used to determine acceptable noise criteria, as described in Section 3.0

3.0 RECOMMENDATIONS FOR NOISE MITIGATION

3.1 Guidance on acoustic design goals for residential development is set out in British Standard 8233: 1999, ‘Sound insulation and noise reduction for buildings – Code of Practice’. The criteria are summarised in Table 4.

Table 4: BS 8233 Recommended Acoustic Design Criteria

Location	Noise Criteria
Living Rooms	Good Standard 30dB L_{Aeq} Reasonable Standard 40dB L_{Aeq}
Bedrooms	Good Standard 30dB L_{Aeq} Reasonable Standard 35dB L_{Aeq}
Gardens	Below 55dB L_{Aeq}

3.2 For this development we recommend the following noise criteria be adopted: daytime levels not exceeding 35dB L_{Aeq} inside living rooms; and night-time noise levels not exceeding 30dB L_{Aeq} , with windows closed and trickle ventilation provided, and below 55dB L_{Aeq} in gardens. We have also taken account of guidance in BS8233 that recommends that peaks of noise at night should generally not exceed 45dB L_{Amax} in bedrooms.

Gardens

3.3 The housing layout drawing, provided by Urban Design, (Drawing No. NW-09-05) shows that the majority of the plots will have rear gardens that are below 55dB $L_{Aeq, 16hr}$ as they will be screened effectively from the noise sources by the houses themselves. Only the rear garden of plot 5 will be exposed directly to noise from the A59. We would recommend that an acoustic fence be installed along the western boundary of this plot (as shown in Figure 1).

- 3.4 To provide the required attenuation, the fence in addition to being at least 2.0m high, should be constructed from at least 20mm thick timber with no holes or gaps. Suppliers of proprietary acoustic fences include Jacksons Fencing (www.jacksons-fencing.co.uk), Guardian Fencing (www.guardianfencing.com) and Ransfords (www.ransfords.co.uk).

Houses

- 3.5 For the majority of houses on the site, the adopted internal noise criteria will be achieved with the installation of well fitted standard thermal double glazing (i.e. 4mm glass – nominal cavity – 4mm glass) and standard in-frame trickle vents. However, there is a section of the site that will require an increased specification of ventilation to meet the internal noise criteria, which are as follows:

Houses immediately facing Mitton Road (Plots 1-5)

- 3.6 All bedrooms in these houses should, instead of standard slot vents, have ventilation provided by an acoustically treated alternative such as the Aereco EAR System comprising EAR 206 humidity sensitive indoor unit, and acoustic sleeve, with outdoor AEA851 acoustic canopy ($D_{n,e,w}$ 42dB).

Houses most exposed to railway noise

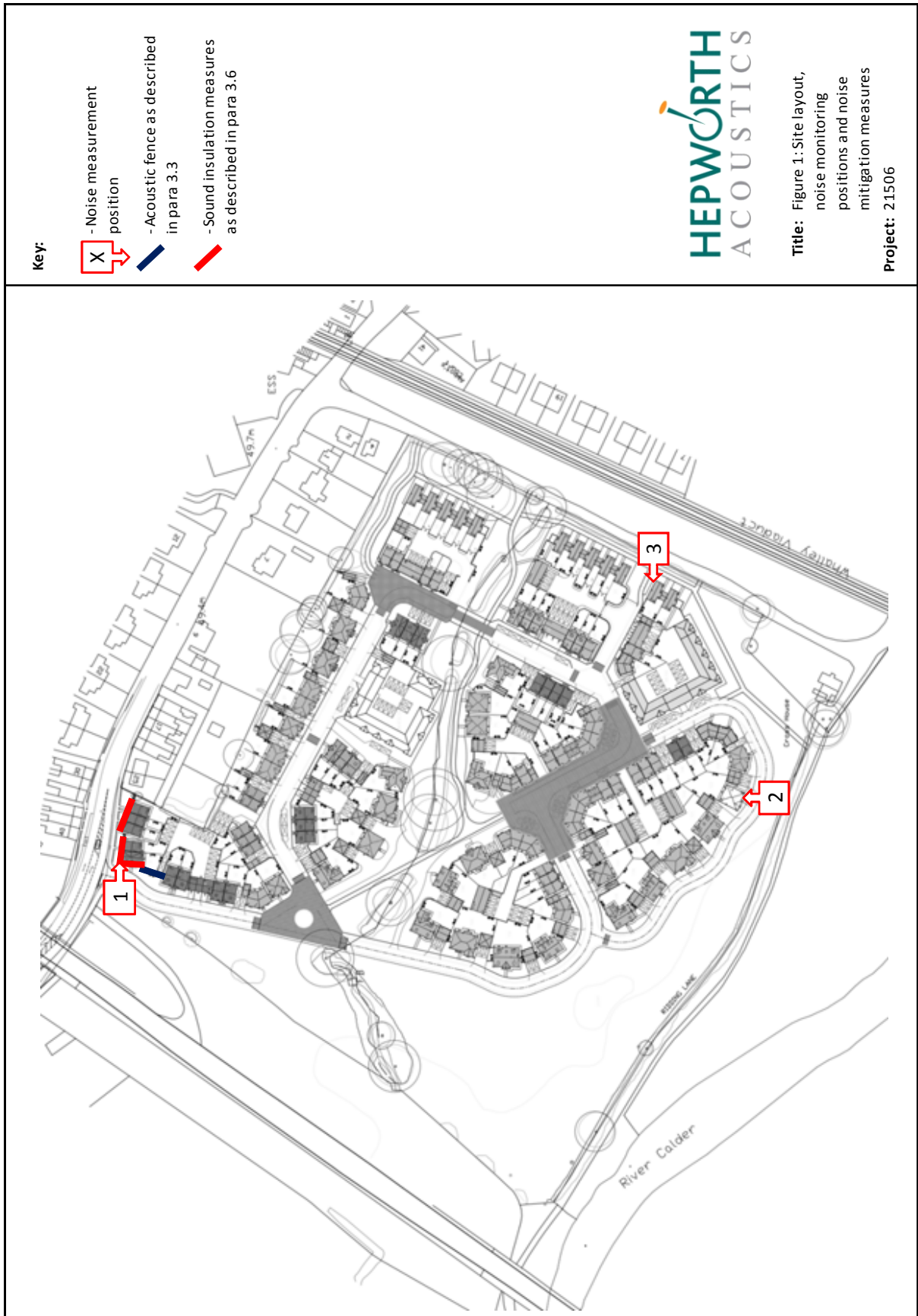
- 3.7 The low levels of noise from the railway line mean that no specific measures are required to meet the internal noise criteria due to noise from the railway.

Planning Condition

- 3.8 The need to ensure that an adequate scheme of noise mitigation is implemented can be formalised by an appropriately worded planning condition that requires a scheme of noise mitigation measured to be submitted to, and approved by, the local planning authority prior to commencement of building works.

4.0 SUMMARY AND CONCLUSIONS

- 4.1 A noise assessment has been carried out for a proposed residential development on land at Mitton Road/Broad Lane, Whalley.
- 4.2 Noise measurement surveys have been carried out on the site and the daytime and night-time road traffic and railway noise exposure values have been evaluated
- 4.3 Where necessary, we have recommended appropriate noise mitigation measures in order to achieve acceptable noise levels as defined in BS8233:1999. The implementation of an adequate scheme of noise mitigation measures can be ensured by the use of an appropriately worded planning condition.



APPENDIX I – NOISE UNITS AND INDICES

a) **Sound Pressure Level and the decibel (dB)**

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).

b) **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 20,000 Hz. However, the upper frequency limit gradually reduces as a person gets older.

c) **A-weighting**

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 dBL_A.

d) 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_{A10} This is the A-weighted noise level exceeded for 10% of the time period. L_{A10} is usually used as a measure of traffic noise.

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.

SEL This is the A-weighted 'Sound Exposure Level' which is used for measuring discrete noise events. Essentially it is a measure of the sound energy of the whole noise event normalised to a period of 1 second. The SEL value can be used to calculate the actual L_{Aeq} value for a given time period if the number of noise events is known.

APPENDIX II – RESULTS OF ROAD TRAFFIC NOISE SURVEY [in dB(A)]

Dates: Daytime - Wednesday 16th May 2012; Night Time – Wednesday 23rd May 2012

Weather: Daytime - Dry, cold, overcast, gusts; Night Time – Mild, calm, some mist

Equipment: Brüel & Kjær 2260 sound level meter (Serial No. 2467015), tripod, calibrator.

Daytime**Location 1 – Nearest Proposed Façade to Mitton Road/A59**

Time		L _{AMax}	L _{A10}	L _{Aeq}	L _{A90}	Comments
11:04	11:19	78.9	65.4	62.1	53.4	Road Traffic
12:00	12:15	75.8	65.8	62.0	52.2	Road Traffic
13:00	13:15	80.4	64.6	61.4	51.0	Road Traffic, Distant Lawnmower
Average		-	65.3	61.8	52.2	

Location 2 – Nearest Proposed Façade to the Southern Boundary

Time		L _{AMax}	L _{A10}	L _{Aeq}	L _{A90}	Comments
11:26	11:41	67.9	56.4	54.5	51.2	Distant Road Traffic, Distant Industrial Noise
12:20	12:35	63.6	58.0	55.7	51.2	Distant Road Traffic, Distant Industrial Noise, Car on Broad Lane
13:21	13:36	63.9	58.0	55.6	50.8	Distant Road Traffic, Some Birdsong
Average		-	57.5	55.3	51.1	

Night Time**Location 1 – Nearest Proposed Façade to Mitton Road/A59**

Time		L _{AMax}	L _{A10}	L _{Aeq}	L _{A90}	Comments
04:00	04:05	68.7	54.4	53.1	40.0	Road Traffic Noise (A59 Only)
04:05	04:10	59.1	51.8	47.4	38.6	
04:10	04:15	68.7	51.8	49.1	38.6	
05:05	05:10	67.8	58.2	54.9	39.6	Road Traffic Noise (Mostly A59)
05:10	05:15	69.1	58.2	54.3	42.8	
05:15	05:20	70.4	56.6	53.2	38.0	
06:04	06:09	71.5	60.6	56.1	39.4	Road Traffic Noise
06:09	06:14	79.8	61.8	59.2	40.4	
06:14	06:19	70.3	62.4	58.9	44.2	
Average		-	57.3	55.4	40.2	

Location 2 – Nearest Proposed Façade to the Southern Boundary

Time		L _{AMax}	L _{A10}	L _{Aeq}	L _{A90}	Comments
04:27	04:32	58.0	50.6	47.7	42.4	Distant Road Traffic, Birdsong
04:32	04:37	55.5	48.0	45.6	41.0	
04:37	04:42	58.3	50.8	48.4	44.2	
05:25	05:30	54.7	50.4	47.6	41.2	
05:30	05:35	55.0	49.4	46.3	40.2	
05:35	05:40	54.6	50.4	47.8	42.6	
06:23	06:28	52.6	48.6	45.7	40.0	Distant Road Traffic, Birdsong, Distant Industry
06:28	06:33	54.8	51.0	48.3	42.6	
06:33	06:38	58.0	52.4	49.7	44.4	
Average		-	50.2	47.6	42.1	

APPENDIX III – RESULTS OF RAILWAY NOISE SURVEY [in dB(A)]

Dates: Wednesday 16th May 2012

Weather: Dry, cold, overcast, gusts.

Equipment: Brüel & Kjær 2260 sound level meter (Serial No. 2467015), tripod, calibrator.

Location 3- Nearest Proposed Façade to the Eastern Boundary

Time	Train Type	Direction	L_{Amax}	SEL
11:45	3-car Passenger	S	58.8	68.6
12:45	3-car Passenger	S	60.7	69.9
15:04	2-car Passenger	N	59.5	69.3
13:45	3-car Passenger	S	59.9	72.5
14:46	3-car Passenger	S	59.1	70.6

(Log) Average SEL = 70.4