



BELLWAY HOMES LTD (MANCHESTER)

PROPOSED RESIDENTIAL DEVELOPMENT

LINNEY LANE MOTORS, SHAW

ENVIRONMENTAL NOISE STUDY ADDENDUM

R2180-REP02-JW

8 JANUARY 2024

REPORT DETAILS

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SUMMARY

Red Acoustics Ltd has been commissioned by Bellway Homes Ltd (Manchester) to provide an addendum to the assessment of the impact of environmental noise on the proposed development site at land off Linney Lane, Shaw.

The purpose of this addendum report is to include for the addition of 5 no. residential plots to the proposed development to be located within the area of land currently occupied by Linney Lane Motors.

While it is understood that this additional development is to be addressed by a separate application for planning approval, this report has been prepared to be read in conjunction with the noise impact assessment for the wider site (Ref: R2180-REP01E-JW dated 19 October 2023) which provides detailed assessment of noise impact across the whole of the wider proposed development.

Environmental noise surveys have been carried out to determine the existing noise climate affecting the site. Measured and predicted noise levels were then used to determine facade noise mitigation across the proposed site based on the current proposed layout plans provided by Bellway Homes Ltd. For the purpose of this addendum assessment, the recommended mitigation has been extended to include for the additional plots considered. It is however assumed that the development site will be built-out, including recommended acoustic mitigation and the additional plots are not considered in isolation.

Noise break-in calculations have been undertaken based on typical house types for the site layout provided. The break-in calculations have been used to determine the acoustic strategy in relation to facade mitigation. The aim of the strategy is to achieve the following internal and external noise levels:

- Living Rooms, Dining Rooms and Kitchens 35dB $L_{Aeq,t}$
- Bedrooms 30dB $L_{Aeq,t}$ and 45dB L_{Amax}
- Garden and Patios - up to 55dB $L_{Aeq,t}$

The results of the environmental noise survey/noise propagation modelling and subsequent noise break-in calculation conclude that the above acoustic targets can be achieved using a mixture of standard glazing and uprated acoustic glazing configurations.

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1.0 INTRODUCTION

Red Acoustics Ltd has been commissioned by Bellway Homes Ltd (Manchester) to provide an addendum to the assessment of the impact of environmental noise on the proposed development site at land off Linney Lane, Shaw.

The purpose of this addendum report is to include for the addition of 5 no. residential plots to the proposed development to be located within the area of land currently occupied by Linney Lane Motors.

While it is understood that this additional development is to be addressed by a separate application for planning approval, this report has been prepared to be read in conjunction with the noise impact assessment (Ref: R2180-REP01E-JW dated 19 October 2023) which provides detailed assessment of noise impact across the whole of the wider development.

Recommendations have been made in relation to facade noise mitigation and treatment of site boundaries to protect the proposed development against nearby noise sources.

2.0 SITE DESCRIPTION & PROPOSED DEV

The proposed development is to provide an additional 5 no. plots to the separately considered residential development at land off Linney Lane, Shaw. The proposal relates to an additional parcel of land, surrounded on three sides by the Northern boundary of the wider development site and bordered by Linney Lane to the North. Figure 2.1 below shows the proposed site location and layout. The dominant source of noise affecting the proposed development is road traffic noise from Linney Lane.

Figure 2.1: Proposed Site Layout



3.0 ENVIRONMENTAL NOISE SURVEYS

An unattended environmental noise survey has been carried out at Measurement Positions 1 - 4 (MP1 - MP4) between 3rd and 7th March 2023 to determine the existing noise climate at the proposed development site. A further measurement was undertaken at position MP5 between 3rd and 4th October 2023

Full details of the environmental noise surveys and a detailed assessment of noise impact have been presented in the above referenced noise impact assessment for the wider site. The measured data has been used for the purpose assessment.

The most relevant source of noise impact for the purpose of this addendum assessment is road traffic on Linney Lane and this is the driving factor in facade noise mitigation for the additional plots. Additional noise sources assessed included the metrolink tramway to the West and logistics and distribution business to the South. These sources have been included for the purpose of this additional assessment but are less relevant.

Noise sources have been included within a noise propagation model for the wider site without alteration and have been used to assess noise impact to all facades and external amenity areas of the proposed development. This addendum report therefore extends the existing assessment to include the additional plots to be considered.

4.0 PLANNING POLICY & DESIGN TARGETS

Planning Policy

National Planning Policy Framework

The National Planning Policy Framework (NPPF¹) was updated in 2021 and sets out the Government's planning policies for England and how these should be applied. Where issues of noise impact are relevant the NPPF provides guidance. paragraph 174 it states that planning policies and decisions should contribute to and enhance the natural and environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adverse affected by, unacceptable levels of noise pollution'.

Paragraph 185 also advises:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development - and avoid noise giving rise to significant adverse impacts on health and quality of life'.

The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NSPE) which reinforces and supplements the NPPF guidance.

Noise Policy Statement for England

The Noise Policy Statement for England² (NPSE) sets out the long term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This vision is supported by the following aims:

- Avoid Significant adverse impacts on health and quality of life.
- Mitigate and minimise adverse impacts on health and quality of life.
- Where possible, contribute to the improvement of health and quality of life.

¹ National Planning Policy Framework. Ministry of Housing, Communities & Local Government (2021)

² Noise Policy Statement for England - Department for Environment, Food & Rural Affairs (2010)

The NPSE describes the following levels at which noise impacts may be identified:

- NOEL - No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- LOAEL - Lowest Observed Adverse Effect Level : This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL - Significant Observed Adverse Effect Level : This is the level above which significant adverse effects on health and quality of life occur.

According to the explanatory notes in the statement, where a noise level falls between LOAEL and a level which represents SOAEL then:

'all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur'.

Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) - Noise³ is an online www.gov.uk resource (last updated 2019) to provide additional guidance on the NPPF. It discusses:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur and;*
- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, inline with the NPSE, no objective noise levels are provided although the PPG states that:

'the subjective nature of noise means that there is not a simple relationship between noise levels and impact on the effected. This will depend on how various factors combine in any particular situation'

Table 4.1 below summarises the PPG noise expose hierarchy.

³ Planning Practice Guidance on Noise (<https://www.gov.uk/guidance/noise--2>). Ministry of Housing, Communities & Local Government

Table 4.1: Explanation of Noise Exposure Hierarchy - PPG

Perception	Examples of Outcomes	Increasing Effect Levels	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

British Standard 4142

BS 4142:2014+A1:2019⁴ presents methods for rating and assessing the potential impact of commercial and industrial sound upon noise sensitive receptors. In order to assess impact using BS 4142, the 'rating level' of the new sound source is compared with the existing contextual 'background sound level'.

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- 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.

The 'rating level' is determined by assessing the 'ambient sound level', distinguishing the 'specific sound level' from the 'residual sound level' and applying any sound specific penalties for acoustic features that would subjectively cause the sound to be perceived differently.

The 'specific sound level' of the commercial / industrial sound source is determined by either; measurement or calculation with regard to the appropriate reference time interval (for daytime or night-time periods). The standard requires separate analysis for daytime and night-time periods, evaluating the 'rating level' over an appropriate reference time interval (T_r) of: 1hr for daytime (07:00 - 23:00 hrs) and 15min for night time (23:00 - 07:00 hrs). The 'specific sound level' is defined as equivalent continuous A weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, L_{T_r} (determined either by calculation or deducting the measured 'residual sound level' from the measured 'ambient sound level').

'Ambient sound' is defined as the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far (The ambient sound comprises the residual sound and the specific sound when present).

'Residual sound' is defined as the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

⁴ BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

Where appropriate, a rating penalty can be applied to the specific sound level to account for the character of the sound namely: tonality, impulsivity and intermittency. Such acoustic feature corrections can be added together linearly.

Tonality can be determined objectively (using adjacent third octave band analysis or the Joint Nordic method) or subjectively as described below:

- +2dB penalty: Just perceptible
- +4dB penalty: Clearly perceptible
- +6dB penalty: Highly perceptible

Impulsivity can be determined objectively (using Fast Fourier Transform analysis) or subjectively as described below:

- +3dB penalty: Just perceptible
- +6dB penalty: Clearly perceptible
- +9dB penalty: Highly perceptible

Where intermittency is present, a +3dB penalty can be applied. Where the acoustic feature characteristics are neither tonal nor impulsive, but are clearly distinguishable against the residual sound, a +3dB penalty can be applied.

BS4142:2014+A1:2019 provides limitations in its scope and states that it is not intended to be applied to assessment of sound from, people, recreational activities, shooting, music/entertainment, construction, demolition, PA systems, domestic animals and determination of noise amounting to a nuisance.

World Health Organisation, Environmental Noise Guidelines for the European Region 2018 (WHO)

The WHO (World Health Organisation) guidelines provide guidelines in relation to noise in the community and these are in line with the guidance in BS8233:2014. The WHO guidelines relate to the potential for health impacts relating to environmental noise and the impact of noise on uninterrupted speech and sleep. The suggested guideline values for the daytime in noise levels in external areas are reflected in the guidance in BS8233:2014 and typical Local Authority noise target levels.

Design Targets

The noise design targets for internal habitable spaces and gardens are detailed in Table 4.2. The targets are based on the advice provided in BS8233:2014.

Table 4.2: BS8223:2014 Design Targets

Space	L _{Aeq,16hr} (07:00 - 23:00)	L _{Aeq,8hr} (23:00 - 07:00)	L _{Amax} (23:00 - 07:00)
Living Room & Kitchen	35dB	-	-
Dining Room & Study	40dB	-	-
Bedroom	35dB	30dB	≤45dB

For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB L_{Aeq,T}, with an upper guideline value of 55dB L_{Aeq,T} which would be acceptable in noisier environments.

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

In this case, the proposed plots are predicted to achieve the target of 55dBA within garden areas with the proposed 1.8m garden boundary fencing in place.

5.0 NOISE BREAK-IN CALCULATIONS

The methodology described in BS8233:2014⁵ for break-in calculations has been used to determine a suitable glazing strategy.

The variables required to determine suitable glazing and ventilation acoustic requirements are as follows:

- Room volume in m³
- Facade element surface areas m²
- Facade element sound reduction indexes in each octave band (125Hz - 2kHz).
- Room reverberation time in seconds to determine effective absorption area in m² in the receiving room.

The room volume and facade element surface areas have been taken from typical Bellway Homes house types provided by the client. The sound reduction index levels for glazing elements are held on file and taken from manufacturers' published data. The room reverberation time is assumed to be 0.4s, 0.6s and 0.8s in each octave band for bedrooms, living rooms and kitchens respectively.

For the purpose of this assessment, and following discussions with the client regarding the preferred ventilation strategy, all plots considered in this addendum report are recommended to include a mechanical ventilation system that does not rely on passive trickle vents in the facade (such as MVHR systems). This is in line with the recommendations for plots adjacent to Linney Lane within the sider site. It is recommended that open windows are not relied on for removal of excess heat in bedrooms at night as this will likely result in non-compliance with the acoustic requirements of Approved Document O of the Building Regulations 2010.

For the purpose of noise break-in calculations, windows are assumed to be closed with ventilation to be provided mechanical means capable of complying with the Building Regulations 2010. Ventilation is assumed to be provided ensure compliance with the Building Regulations 2010, though compliance in this regard and compliance with thermal comfort criteria is outside the scope of this assessment by Red Acoustics Limited and should be checked and confirmed by others. It is recommended that an assessment of overheating be undertaken at an early design stage to ensure overheating mitigation works in conjunction with facade noise mitigation and is suitable in areas where windows cannot be relied upon for removal of excess heat. Copies of break-in calculations are available upon request.

⁵ British Standards Institute 8233:2014 *Guidance on sound insulation and noise reduction for buildings*

6.0 DISCUSSION & RECOMMENDATIONS

An assessment of noise impact on the proposed development comprising 5 no. residential dwellings adjacent to Linney Lane has found that the most significant source of noise impact is that of road traffic noise on Linney Lane. This assessment is based on measured environmental noise data, noise propagation modelling calculations and the noise b calculations discussed in Section 5.0. The target noise levels within the relevant spaces can be achieved across development with a mixture of glazing specifications with the minimum performance values outlined below. Appendix B presents the recommended glazing specification for each facade at ground and first floor levels.

Table 6.1 presents the octave band Sound Reduction Index (SRI) values for the various facade elements used in the noise break in calculations. These should be used as a minimum for specification of glazing proposals and contractor glazing proposals should be checked by Red Acoustics to ensure acoustic performance requirements will be met. Alternative proposals may be used provided that the relevant acoustic performances are met and the glazing configurations provided below are given as examples only.

Table 6.1: Minimum Facade Element Performance Requirements (Options Mapped in Appendix B)

Facade Element	Octave Band Sound Reduction Index (SRI) and Element Norm alised Level Difference ($D_{n,e}$) dB for glazing and ventilation elements					dB R_w
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	
4/16/4 Glazing (SRI) including frame	21	17	25	35	37	29
8/16/4 Glazing (SRI) including frame	22	21	28	38	40	33

Garden noise levels are expected to achieve the target noise levels for the development as proposed with standard 1.8m garden boundary fencing containing no gaps at the base or between boards.

7.0 CONCLUSIONS

This addendum noise impact assessment has been prepared to be read in conjunction with the noise impact assessment (Ref: R2180-REP01E-JW dated 19 October 2023) which provides detailed assessment of noise impact across the whole of the wider proposed development at land off Linney Lane as well as full details of the environmental noise s undertaken.

This report provides additional assessment of noise impact to the proposed development on land currently occupied b Linney Lane Motors, Linney Lane, Shaw.

An assessment of noise levels impacting on the residential facades of the proposed development has been carried out in order to determine a facade mitigation strategy to achieve indoor target noise levels.

By implementing the recommended facade mitigation strategy the internal noise levels will achieve the target crit recommended, however it is recommended that once contractor proposals are available, the noise break-in calculations be re-checked by Red Acoustics to ensure that the target noise criteria will be met.

Garden noise levels are expected to achieve the target noise levels for development as proposed with standard 1.8m garden boundary fencing containing no gaps at the base or between boards..

APPENDIX A: NOISE SURVEY DETAILS

Location

Land South of Linney Lane, Shaw, Oldham

Survey Dates

3 - 7 March 2022 MP1 - MP4

3 - 4 October 2023 MP5

Weather

Dry with cloud and wind speeds <5m/s.

Personnel Present During Measurements

Johnathan Whittle AMIOA MCIEH (Set-up)

Paul Clark Pg. Dip. IOA MIOA (Set-up & Collection)

Instrumentation

Kit No	Equipment Description	Type Number	Manufacturer	Serial Number	Date of Last Calibration	Calibration Certificate Number
RED14	Sound Level Meter	CR:171B Type 1	Cirrus	G300554	02-Dec-21	166932
MP1	Sound Calibrator	CR:515 Type 1	Cirrus	59153	12-Aug-22	1503025-7
RED09	Sound Level Meter	Type 140 Type 1	Norsonic	1402793	12-Aug-21	38709
MP2	Sound Calibrator	Type 1251 IEC 60942-1997 Class 1	Norsonic	32273	28-Mar-22	1502069-1
RED05	Sound Level Meter	CR:171B Type 1	Cirrus	G081108	30-Sep-22	1503025-12
MP3	Sound Calibrator	CR:515 Type 1	Cirrus	88023	28-Mar-22	1502069-3
RED12	Sound Level Meter	XL2	Nti Audio	A2A-16928-E0	18/11/2021	UK-21-098
MP4	Sound Calibrator	Type 1251 IEC 60942-1997 Class 1	Norsonic	32273	28-Mar-22	1502069-1
RED08	Sound Level Meter	XL2	Nti Audio	A2A-22062-F0	16/03/2023	UK-23-033
MP5	Sound Calibrator	Type 1251 IEC 60942-1997 Class 1	Norsonic	32273	17-Jul-23	44877

Methodology & Calibration

Before and after the measurements, the sound level meters were check calibrated to an accuracy of $\pm 0.3\text{dB}$ using the associated Class 1 Calibrators. No drift in the instruments' sensitivities were noted across any of the survey periods. Copies of all calibration certificates are kept on file by Red Acoustics Ltd and can be supplied if requested.

APPENDIX B: FACADE AND BOUNDARY NOISE MITIGATION RECOMMENDATIONS



B1: Recommended Facade Noise Mitigation to First Floor Bedroom Spaces (MVHR plots)

Glazing Key:

- 4(16)4 Glazing + Mech Vent (No Trickle Vent)
- 8(16)4 Glazing + Mech Vent (No Trickle Vent)

Barrier Heights:

- 1.8m Barrier

Notes:

See report Section 6.0 for required glazing octave band performance requirements.

Recommended barrier locations as indicated. Specification to be confirmed once contractor proposals are available. Barrier ground height assumed to be at nearest floor slab height or higher at any point.

Noise break-in calculation assumes mechanical ventilation system proposed by client and does not allow for trickle ventilators. Client to confirm ventilation requirements and compliance with all relevant building regulations.



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B2: Recommended Facade Noise Mitigation to Ground Floor Living Spaces (MVHR plots)

Glazing Key:

- 4(16)4 Glazing + Mech Vent (No Trickle Vent)
- 8(16)4 Glazing + Mech Vent (No Trickle Vent)

Barrier Heights:

- 1.8m Barrier

Notes:

See report Section 6.0 for required glazing octave band performance requirements.

Recommended barrier locations as indicated. Specification to be confirmed once contractor proposals are available. Barrier ground height assumed to be at nearest floor slab height or higher at any point.

Noise break-in calculation assumes mechanical ventilation system proposed by client and does not allow for trickle ventilators. Client to confirm ventilation requirements and compliance with all relevant building regulations.



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