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Proposed Residential Development
Land Off Croft Street, Old Lane, Birkenshaw, BD11 2HT

Noise Impact Assessment

For:
Martin Walsh Architectural

28th January 2025

Ref: NIA-11439-24-11639-v2 Croft Street, Birkenshaw
Issue: Draft
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Contents

1 Introduction

1.1 Overview

Environmental Noise Solutions Limited (ENS) has been commissioned by Martin Walsh Architectural to carry out a noise impact assessment for a proposed residential development at land off Croft Street, Old Lane, Birkenshaw, BD11 2HT (hereafter referred to as 'the site').

This report has been written to support planning application (ref: 2024/62/91853/E) submitted to Kirklees Council in July 2024. NIA-11439-24-11639-v2 provides an update to the previous version, incorporating the updated masterplan (RHCS-MWA-XX-XX-DR-A-S2-P12-0003). There are no material changes to the scheme within the updated masterplan. Since the submission of NIA-11439-24-11639-v1, environmental health has made the following comments:

Noise
He applicant has submitted a Noise Impact Assessment authored by ENS dated 23 May 2024 Ref NIA-11439-24-11639-v1 Croft Street, Birkenshaw. It details the proposal and considers the neighbouring environment with particular emphasis on the Liberal Club both currently and proposed.
Noise monitoring was carried out on Tuesday the 26th of March 2024, and on Wednesday the 24thofApril through to Thursday the 25thofApril 2024from four monitoring positions (MPs) as shown in Appendix 2. A summary of the findings is given in table 3.1 with the report stating the noise environment at the site was dominated by distant traffic on the surrounding road network, with some birdsong. No noise was noted from the Birkenshaw Liberal Club.
Para 3.3 uses library data to model the effect the typical use of the Liberal Club may have on the proposed development, with particular reference to plot 17 which is the closest plot. Using this modelling along with reasonable assumptions for the sound insulation of the construction, a scheme of mitigation measures are recommended for the development in order to meet with the internal requirements of BS8233. A recommendation is made for plots 3-6, 14, 16 and 17 to have mechanical extract ventilation as shown in appendix 4. Whilst the issue of overheating is outside of the remit of Environmental Health, it is imperative any mechanical units do not increase the required internal noise levels.
In order to meet with the external amenity areas, a recommendation is made for plot 6 to have a 2.4m high solid brick wall or timber fence to mitigate against any noise from the proposed beer garden.
The findings of the submitted report are accepted. A condition is recommended to secure the mitigation measures in the interests of protecting amenity.

Recommended Conditions
NC1 Implement Agreed Noise Mitigation Measures –Condition
Before the development is first brought into use all works which form part of the sound attenuation scheme as specified in the Noise Impact Assessment authored by ENS dated 23 May 2024 Ref NIA-11439-24-11639-v1 Croft Street, Birkenshaw shall be completed. Any changes to the approved noise mitigation measures must be submitted to and approved in writing by the Local Planning Authority.
Reason: To protect the amenity of occupiers of the proposed development from noise or disturbance from nearby noise generating premises to accord with the aims of Policies LP24 and LP52 of the Kirklees Local Plan and Chapters 12 and 15 of the National Planning Policy Framework.

The objectives of the noise impact assessment were to:

- Determine external noise levels at the site
- Assess the potential impact of the external noise climate on the proposed residential development with reference to relevant guidelines
- Provide recommendations for a scheme of sound attenuation works, as necessary, to protect future occupants of the proposed development from a loss of amenity due to noise

This report details the methodology and results of the assessment and provides recommendations for the building envelope (fenestration and ventilation).

The report has been prepared for Martin Walsh Architectural for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult Martin Walsh Architectural and ENS as to the extent to which the findings may be appropriate for their use.

A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

1.2 Site Description and Development Proposals

The site is located on land off Croft Lane, to the west of Old Lane in the village of Birkenshaw, as shown (highlighted in red) in Figure 1.1.

Figure 1.1: Location of Proposed Development

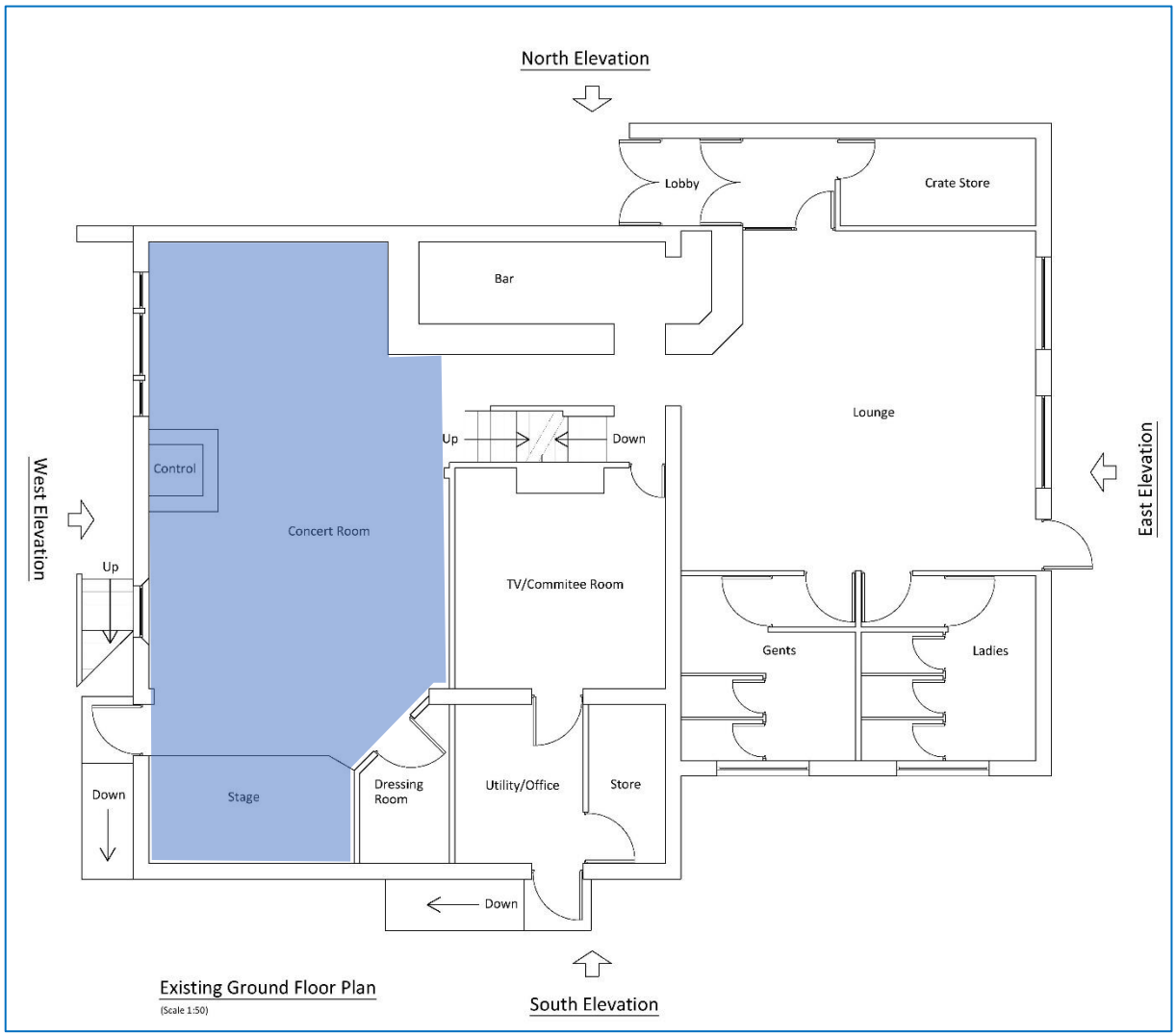
The site is bound to the north by the Birkenshaw Liberal Club to the north, with existing residential dwellings to the south, east and west.

Development proposals are for 21 no. new-build residential dwellings with associated car parking and landscaping.

The ambient noise climate at the site is predominantly due to distant road traffic noise on the surrounding road network including the A651 Bradford Road, the A58 Whitehall Road and the M62 motorway.

Birkenshaw Liberal Club operates 1600-2300 hours Monday to Thursday, 1500-2330 hours on Fridays and 1200-2330 hours on Saturday and Sunday. The club hosts occasional live music in its concert room on Saturday evenings. The concert room is located in the western half of the ground floor of the club (see Figure 1.2).

Figure 1.2: Birkenshaw Liberal Club Ground Floor



Whilst Birkenshaw Liberal Club does not currently have a beer garden, a new beer garden is to be constructed adjacent to the eastern elevation of the existing club as part of the overall proposals.

2 Policy Context and Assessment Guidance

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)[1] was updated in December 2024 and sets out the Government's planning policies for England and how these are expected to be applied.

Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 187 where it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

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

Paragraph 198 advises that:

'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 the quality of life'.

With regard to extant community noise sources and the potential to affect proposed new developments, Paragraph 200 states that:

'Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'

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

2.2 Noise Policy Statement for England

The Noise Policy Statement for England[2] (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 long-term 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 and Local Government (2021)
2 Government Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. March 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 the lowest observable adverse effect level (LOAEL) and a level which represents a significant observable adverse effect level (SOAEL):

'….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.'

2.3 Planning Practice Guidance on Noise

Planning Practice Guidance[3] (PPG) is an online resource which provides additional guidance and elaboration on the NPPF. It advises that the Local Planning Authority should consider the acoustic environment in relation to:

- 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
- 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, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although:

The PPG also provides general advice on the typical options available for mitigating noise, suggesting that Local Plans may include noise standards applicable to proposed developments within the Local Authority's administrative boundary, although it states that:

'Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed'.

The PPG acknowledges that: *'…the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.'* The following guidance documents provide some meaningful context.

3 Planning Practice Guidance on Noise: http://planningguidance.planningportal.gov.uk/blog/guidance/noise/

2.4 ProPG Planning and Noise: New Residential Development

ProPG Planning and Noise: New Residential Development (ProPG)[4] was published in 2017 by the Association of Noise Consultants, Institute of Acoustics and the Chartered Institute of Environmental Health.

Stage 2: Element 2 of ProPG sets indoor ambient noise levels for residential dwellings based on the guidance contained in British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'[5] (BS 8233), see Table 2.1.

Table 2.1: Indoor Ambient Noise Levels in Dwellings

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB $L_{Aeq\ (0700\text{-}2300)}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq\ (0700\text{-}2300)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\ (0700\text{-}2300)}$	30 dB $L_{Aeq\ (2300\text{-}0700)}$ 45 dB $L_{AFMax\ (2300\text{-}0700)}$

Note 4 to the above table states:

'A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. 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.'

Note 5 to the above table states:

'Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7'.

This is consistent with the guidance contained within the PPG, which states that:

'... consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations'.

The NPPF PPG requires that the character of the noise is taken into account. In relation to potential music noise impacting on the development, Annex B of BS 8233 describes methods for assessing the acceptability of a noise spectrum for a given application through the use of Noise Rating (NR) curves.

This is a graphical method for assigning a single-number rating to a noise spectrum, and many local authorities have a requirement to comply with NR25 in habitable rooms during the daytime and NR20 in bedrooms at night where commercial noise (in this case music) may be present.

4 'ProPG Planning and Noise: New Residential Development (ProPG)', 2017. Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH)

5 British Standards Institution (2014). *British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.*

On the basis of the above, the following criteria (with windows closed and an alternative means of ventilation provided) are considered appropriate for the proposed development and considered to represent good resting and sleeping conditions:

- ≤ 35 dB $L_{Aeq\ (0700\text{-}2300)}$ and NR30 (commercial noise) in habitable rooms during the daytime
- ≤ 30 dB $L_{Aeq\ (2300\text{-}0700)}$ and NR25 (commercial noise) in bedrooms during the night-time
- 45 dB L_{AFMax} not regularly exceeded in bedrooms during the night-time

With regard to external amenity, ProPG reflects the advice given in BS 8233 as follows:

'The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50–55 dB $L_{Aeq,16hr}$.'

'These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces.'

2.5 Approved Document O

Approved Document O, 2021 is written in support of Part O of Schedule 1 to the Building Regulations 2010. The approved document details methods of addressing overheating of residential dwellings and is applicable only across England.

The approved document has the following relevant guidance in Section 3 regarding noise ingress into buildings:

'*In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- *40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am)*
- *55dB L_{Amax}, more than 10 times a night (between 11pm and 7am)'*

3 Noise Survey

3.1 Overview

In order to determine the level of external noise affecting the proposed development, noise monitoring was carried out on Tuesday 26th March 2024, and on Wednesday 24th April through to Thursday 25th April 2024.

The adopted noise monitoring positions (shown in Appendix 2) were as follows:

- MP1 was located towards to the eastern boundary
- MP2 was located at the southern boundary
- MP3 was located at the western boundary
- MP4 was located towards the centre of the site

Noise measurements were undertaken in free field conditions at 4 metres above ground level using Bruel & Kjaer 2250 Type 1 integrating sound level meters. Each meter was connected to a windshield covered microphone positioned at the locations detailed above.

The measurement system calibration was verified immediately before and after the survey period using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration levels greater than 0.5 dB was noted. The noted weather conditions during the survey were dry with wind speeds < 5 m/s. Weather conditions were therefore considered appropriate for noise monitoring.

3.2 Summary

Measurements consisted of A–weighted broadband parameters including L_{Aeq}, L_{A10} L_{A90}, and L_{AFmax} together with linear octave band data. Table 3.1 presents a summary of the noise data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 3.1: Summary of Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	Comment
MP1	26/03/24	1210–1543	48	41	50	Distant road traffic and birdsong
MP2	26/03/24	1225–1325	45	40	48	Distant road traffic and birdsong
		1430–1500	44	40	47	
MP3	26/03/24	1328–1428	46	42	47	Distant road traffic and birdsong
		1502–1538	46	42	47	
MP4	24/04/24	1708–2300	46	39	48	Distant road traffic and birdsong, maximum noise levels up to 57 dB L_{AFMax} during the night-time
	24-25/04/24	2300–0500	45	41	48	

The noise environment at the site was dominated by distant traffic on the surrounding road network, with some birdsong. No noise was noted from the Birkenshaw Liberal Club.

Daytime and night-time ambient noise levels across the site were **≤ 48 dB $L_{Aeq\ T}$** and **≤ 45 dB $L_{Aeq\ T}$** respectively, with maximum noise levels of **≤ 57 dB L_{AFMax}** during the night-time. Such levels are relatively low.

3.3 Noise Associated with The Birkenshaw Liberal Club

Whilst no noise was noted from the Birkenshaw Liberal Club, the club does occasionally host music events within the ground floor concert room. As no events are currently scheduled, potential music noise breakout from the club has been predicted using library data.

For reference, ENS has previously measured internal reverberant music noise levels of up to **90 dB $L_{Aeq\ (15\ min)}$** within a larger function room during a busy event. This is robustly adopted as a worst-case internal reverberant noise level within the function room.

Table 3.2 presents the corresponding octave band frequency data for the measurement, rounded to the nearest decibel.

Table 3.2: Music Noise Octave Band Frequency Data (Source)

Octave Band L_{eq}								dB L_{Aeq}
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
87	93	89	88	85	80	76	70	90

The concert room is located in the western half of the ground floor of the club. The weakest acoustic element of the building envelope is considered to be the windows along the western elevations of the concert room, with circa 5 m² of glazing. It is assumed that the in-situ glazing is standard thermal glazing with a sound reduction performance of circa 30 dB R_w.

In order to assess the propagation of noise from the concert room to the nearest proposed dwellings, noise level predictions have been performed using iNoise acoustic modelling software. This is a software program specifically developed for the prediction and assessment of environmental noise.

The model calculates noise levels on horizontal and vertical grids with a user defined spacing of receiver points. From these levels, calculated at thousands of points, contour lines of constant noise levels are generated and printed as noise maps. All scaling was based on direct import from Google Earth, with absorption coefficients based on the iNoise default for brick-built structures.

A noise level contour map is contained in Appendix 3. The resultant music noise levels are predicted at up to **31 dB $L_{Aeq,\ T}$**, with the highest levels at proposed Plot 19, which is in closest proximity to the concert room. Table 3.3 presents the corresponding octave band frequency data for the worst-case music noise level, rounded to the nearest decibel.

Table 3.3: Music Noise Octave Band Frequency Data (Plot 19)

Octave Band L_{eq}								dB L_{Aeq}
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
38	40	37	28	15	8	2	0	31

4 Noise Assessment

4.1 Internal Amenity

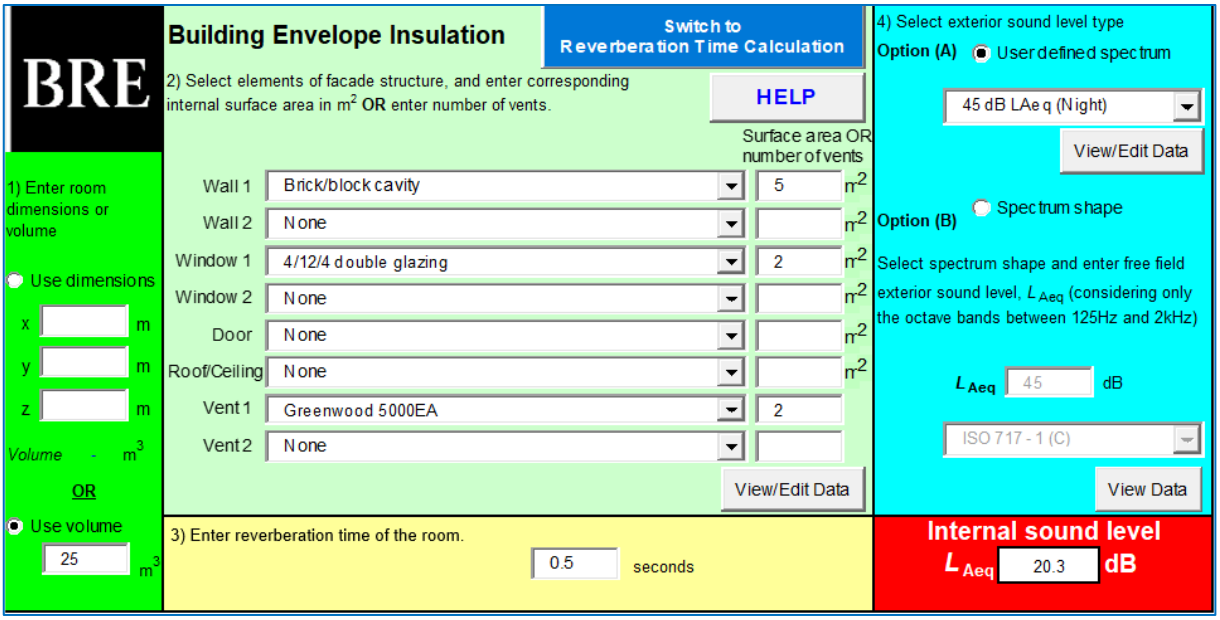
Design noise levels across the site are as follows:

- **≤ 48 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime
- **≤ 45 dB $L_{Aeq\ (2300\text{-}0700)}$** and **≤ 57 dB L_{AFMax}** during the night-time

In order to calculate the sound insulation requirements of the building envelope for habitable rooms throughout the development, the Building Research Establishment (BRE) building envelope insulation calculation spreadsheet was used. This spreadsheet is based on the calculation methodology advocated in BS 8233. The spreadsheet allows input of external noise levels, typical room dimensions and reverberation time together with parameters for the various elements of the building envelope and calculates the internal noise level in terms of the external noise level metric (L_{Aeq} and L_{AFMax} in this case).

As evidenced in the calculation sheet below, a typical standard double-glazed window rated at least **25 dB R_w+C_{tr}** (such as 4 mm glass / 12 mm cavity / 4 mm glass) in conjunction with 2 no. standard trickle vents rated at least **32 dB $D_{n,e,w}$** per 5000 mm² EA vent open (such as the Greenwood 5000EA, or equivalent) will provide circa 25 dB(A) sound insulation from external to internal at the site.

Figure 4.1: Example BRE Calculation Spreadsheet



On the basis of the above, standard double glazing (i.e. 4 mm glass / 12 mm cavity / 4 mm glass) and standard trickle vents are appropriate throughout the development.

The resultant internal noise levels are set out in the table below.

Table 4.2 – External Noise Levels and Resultant Internal Noise Levels

External Noise Level	Reduction	Resultant Internal Level	Comment
≤ 48 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 45 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 57 dB L_{AFMax}	–25 dB (closed windows)	≤ 23 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 20 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 32 dB L_{AFMax}	Very good internal noise levels with closed windows

As a precaution against potential noise from the Birkenshaw Liberal Club concert room it is recommended that Plots 17, 18, 19 and 20 are provided with a system of mechanical extract ventilation (MEV). See Appendix 4 for location of plots where MEV is recommended.

In dwellings where the air permeability is tighter than (<) 5m³/(h.m²), 5000 mm² EA background ventilators may be required where MEV are proposed.

The following BS 8233 calculation spreadsheet demonstrates that bedrooms in proximity to the Birkenshaw Liberal Club concert room will readily achieve compliance with the noise rating target of NR 25 (and also meet the more onerous NR 20 criteria) with glazing/ventilation as specified.

Figure 4.1 – NR25 Assessment for Bedroom (Volume = 25 m³)

	Octave Frequency Band (Hz)								L_{Aeq}
	63	125	250	500	1000	2000	4000	8000	
Worst-Case Music Noise Level	38	40	37	28	15	8	2	0	31
External Wall (7.6 m²)	38	41	45	45	54	58	58	58	
4 mm / 6-20 / 4 mm glazing (2 m²)	18	21	17	25	35	37	31	31	
Greenwood 5000EA (1 no.)	37	40	37	36	32	31	31	31	
Total Façade Reduction	-24.4	-27.4	-23.6	-30.1	-31.4	-30.6	-30.0	-30.0	
10 log (S/A)	+0.7	+0.7	+0.7	+0.7	+0.7	+0.7	+0.7	+0.7	
External to Internal Correction	+3	+3	+3	+3	+3	+3	+3	+3	
INTERNAL NOISE LEVEL	17	16	17	1	0	0	0	0	9
NR25	55	44	35	29	25	22	20	18	
Compliant	✓	✓	✓	✓	✓	✓	✓	✓	
NR20	51	39	31	24	20	17	14	13	
Compliant	✓	✓	✓	✓	✓	✓	✓	✓	

As a precaution against potential noise from the Birkenshaw Liberal Club beer garden, it is also recommended that Plots 3–6 are provided with an MEV system (see Appendix 4).

With the provision of mechanical ventilation as specified, it is considered that the proposed development will not place any unreasonable constraints on the Birkenshaw Liberal Club and is therefore in keeping with the aims of Paragraph 200 of the NPPF.

The following points should be noted:

- The glazing recommendations apply to the window within a sealed unit. It is the responsibility of the window supplier to ensure that the window frame does not compromise the performance of the glazing.
- When selecting a glazing system to satisfy the requirements outlined above, it is important to ensure that the $R_w + C_{tr}$ value is achieved (rather than simply the R_w value). Published R_w values tend to be higher than corresponding $R_w + C_{tr}$ values; therefore, incorrect selection could result in an overestimation of sound reduction performance which in turn could result in higher internal noise levels.
- The opening and free area of the ventilation units should be checked by a mechanical service engineer before designs are finalised. Should the equivalent open area be insufficient to meet the minimum requirements of ADF, it may be necessary to increase the number of units per habitable room. Where this applies, the required sound reduction of the ventilation units may need to be increased accordingly
- Internal noise levels due to mechanical ventilation plant should not exceed 26 dB(A) in bedrooms and 30 dB(A) in living rooms

4.2 External Amenity

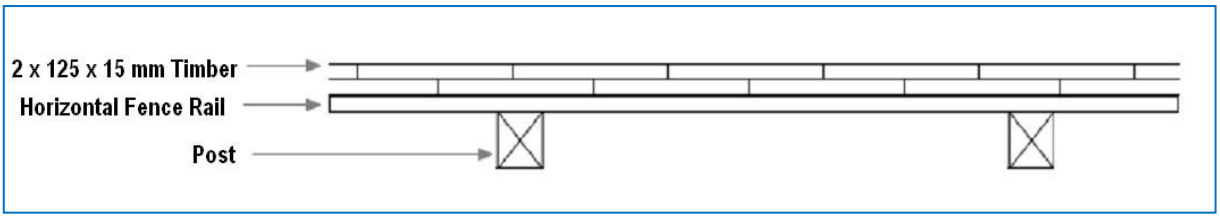
Daytime ambient noise levels throughout the site are **≤ 48 dB $L_{Aeq\ (0700–2300)}$**. Such levels are readily compliant with the lower target criteria contained in ProPG.

Notwithstanding this, it is recommended that Plot 6 is provided with circa 2400 mm high solid timber fences or brick walls along its western boundary as a precaution against potential noise from the proposed beer garden (see Appendix 3 for barrier locations).

A brick wall of any construction is appropriate, providing there are no gaps in the construction.

If a solid timber fence is installed, then it should be ensured that it has a mass per unit area of ≥ 10 kg/m2. The fence should have no gaps or holes and should be fully sealed at the ground (i.e. include a gravel board).

An indicative acoustic fence detail is illustrated below. The double-thickness solid timber construction is considered robust and appropriate.



With the provision of boundary screening as specified, it is considered that the proposed development will not place any unreasonable constraints on the Birkenshaw Liberal Club and is therefore in keeping with the aims of Paragraph 193 of the NPPF.

4.3 Consideration of Overheating

ADO states that for moderate risk locations (i.e. outside of London) the minimum free area of the open window should be at least 4% of the floor area of the room.

Building in some allowance, this equates to an assumed window opening (S_{open}) area of at least 5% of the floor area. As the open area varies as a function of the floor area, for a typical floor-to-ceiling height of 2.4m, a window open area of 5% of the floor area equates to an external to internal noise reduction of 9 dB.

With reference to the internal targets contained in ADO, it is assumed that open windows can form the overheating mitigation strategy with no additional ventilation or cooling, providing the external noise levels outside bedrooms at night do not exceed **49 dB $L_{Aeq\ (2300\text{-}0700)}$** and **64 dB L_{AFMax}** (more than 10 times).

As detailed above, external night-time noise levels at the site were ≤ **45 dB $L_{Aeq\ (2300\text{-}0700)}$** and ≤ **57 dB L_{AFMax}**.

As such, windows of plots throughout the site may be opened to the minimum open area of 5% of the floor area, meaning that the overheating mitigation strategy at the site is not constrained by acoustics.

5 Summary and Conclusions

A noise impact assessment has been undertaken for the proposed residential development at land off Croft Street, Old Lane, Birkenshaw, BD11 2HT.

The noise environment at the site is wholly due to distant road traffic noise on the surrounding road network.

Potential noise associated with music events at the Birkenshaw Liberal Club have also been considered.

A scheme of sound insulation works has been developed to protect the proposed residential development from the ambient noise climate.

NIA-11439-24-11639-v2 has been written to incorporate updated masterplan (RHCS-MWA-XX-XX-DR-A-S2-P11-0003), which contains no material changes.

With the provision of mechanical ventilation and boundary screening as specified, it is considered that the proposed development will not place any unreasonable constraints on the Birkenshaw Liberal Club and is therefore in keeping with the aims of Paragraph 200 of the NPPF.

Appendix 1 – Abbreviations and Definitions

Sound Pressure Level (L_p)
The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_o)$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_o = reference sound pressure (20 μPa).

A-weighting
A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$
The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$
The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$
The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

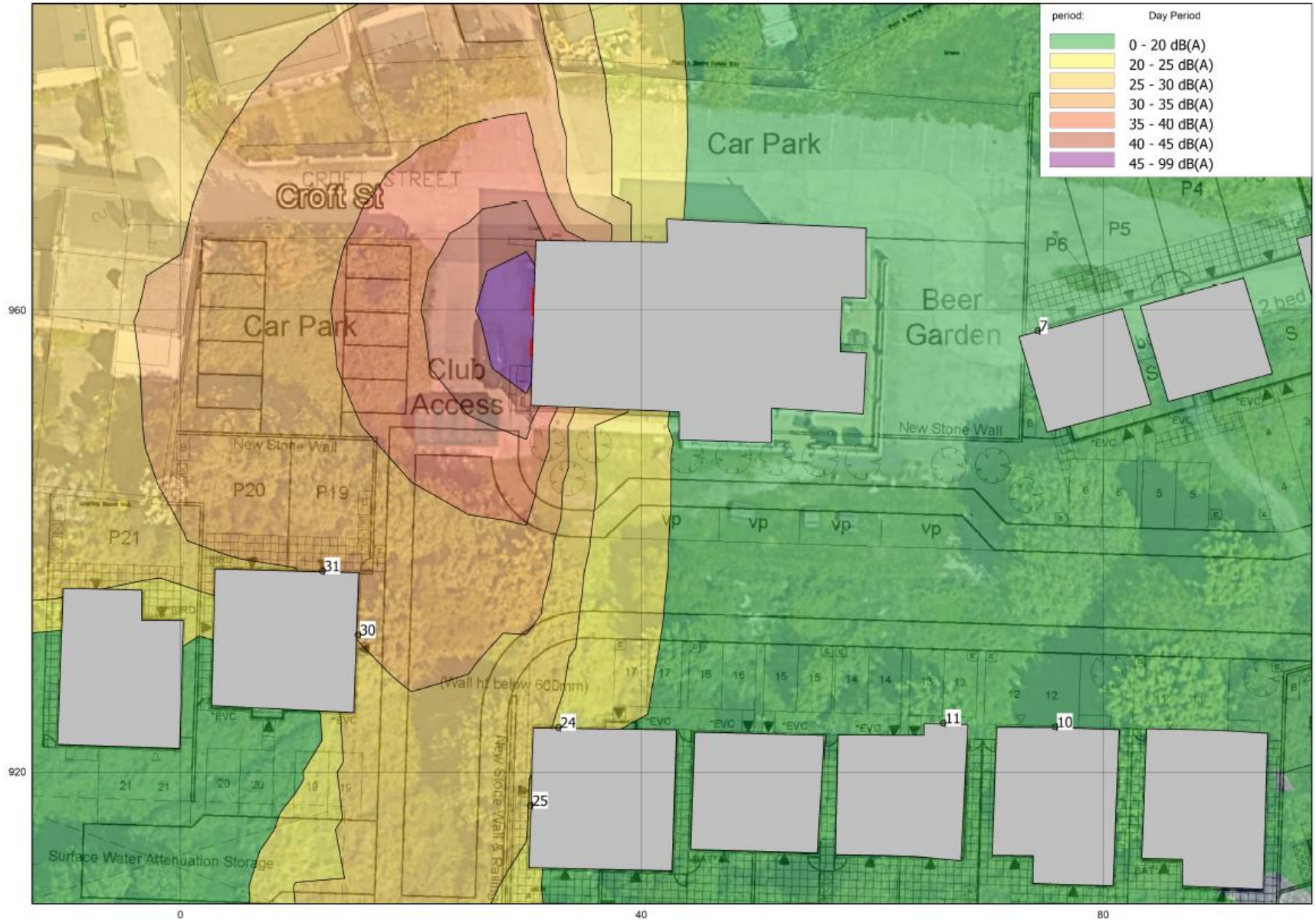
$L_{AF\ max}$
The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Single Event Level / Sound Exposure Level (SEL or L_{AE})
The energy produced by a discrete noise event averaged over one second, regardless of the event duration. This allows for comparison between different noise events which occur over different lengths of time.

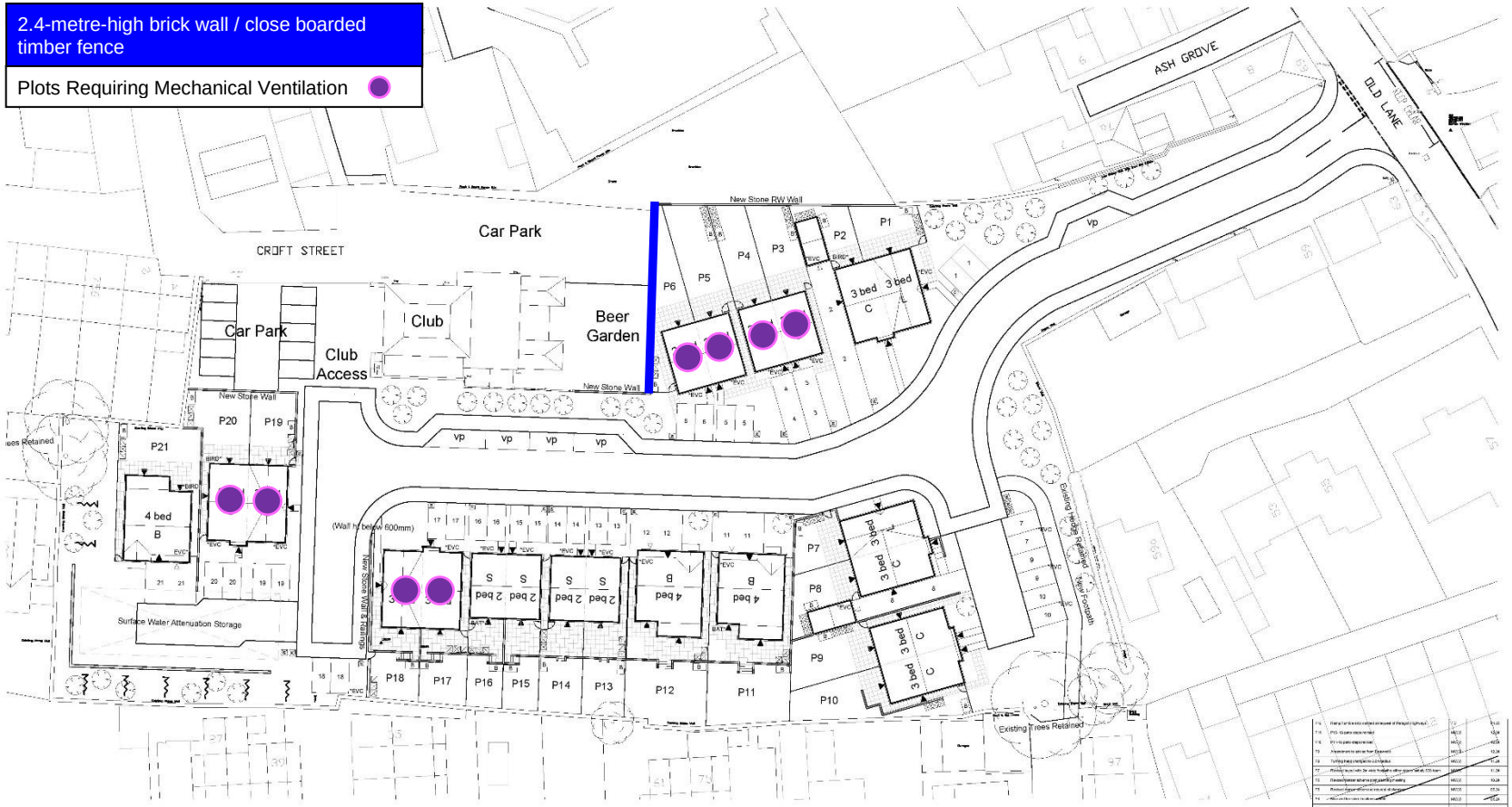
Weighted Sound Reduction Index (R_W)
Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix 2 – Noise Measurement Positions

Appendix 3 – Music Noise Breakout Contour Map



Appendix 4 – Scheme of Sound Attenuation



N

House Type Schedule

Type	Beds	No.
Langham	3	4
Carlton	3	6
Stafford	2	8
Berkeley	4	3
Total	58	21

Housing Mix

Type	No.	%	Batley & Spen %
1 and 2 beds	8	38.1	30 - 60
3 beds	10	47.6	20 - 40
4+ beds	3	14.3	15 - 35

Wildlife Habitat Specification

The development should include the following:

(1) 2 bat tubes similar to the Schweglar 1 FR boxes fitted integral to suitable elevations of the new build (southerly aspect)

(2) 2 woodcrete sparrow terrace located on a suitable (northernaspect) elevation of the new build

Key

B	Lockable bike store
	Refuse bin storage location
	Refuse bin collection point
*EVC	Electric vehicle charging point
*BAT	Bat tube location
*BIRD	Bird terrace location

S2 WORK IN PROGRESS

MARTIN WALSH ARCHITECTURAL

Proposed Residential Development on Land off Old Lane, Croft Street, Birkenshaw BD11 2HT

Proposed Site Layout

Riva Homes

RHCS - MWA - XX - XX - DR - A - 0003 P12