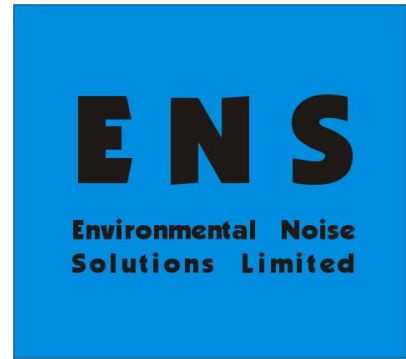




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Proposed New-Build Care Home

**Land at the corner of Irwell Street
and Lower Bank Street, Bury,
Lancashire, BL9 0HE**

Noise Impact Assessment

For:
Exemplar Health Care Services Ltd

18th March 2024

Ref: NIA-11288-24-11502-v2 Irwin Street, Bury
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1 Introduction

1.1 Overview

Environmental Noise Solutions Limited (ENS) has been commissioned by Exemplar Health Care Services Ltd to carry out a noise impact assessment for a proposed new-build care home development at land at the corner of Irwell Street and Lower Bank Street, Bury, Lancashire, BL9 0HE (hereafter referred to as ‘the site’).

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 new-build care home with reference to relevant guidelines
- Provide recommendations for a scheme of sound attenuation works, as necessary, to protect future occupants of the proposed new-build care home 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). It has been prepared to accompany a hybrid planning application to be submitted to Bury Council.

The report has been prepared for Exemplar Health Care Services Ltd 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 Exemplar Health Care Services Ltd 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

The site is located in a mixed-use setting in Bury town centre, as shown highlighted in red in Figure 1.1.

Figure 1.1: Location of Proposed Development



The site is bound by:

- The A58 Jubilee Way to the south
- Lower Bank Street to the north with residential dwellings beyond
- Irwell Street to the west with residential dwellings beyond
- Castle Leisure Centre to the east, with the East Lancashire Railway line further beyond

The ambient noise climate at the site is characterised (dominated) by road traffic on the A58 Jubilee Way, with a lesser contribution from vehicles on Lower Bank Street accessing Castle Leisure Centre.

For reference, Castle Leisure Centre operates between 0615–2200 hours Monday to Friday and 0800–1800 Saturday and Sunday. No significant noise was noted from the leisure centre, with only low-level car park activity faintly audible (but not measurable) during lulls in road traffic on the A58.

For reference, the East Lancashire Railway line is a seasonal heritage railway line with very limited use (circa 6 journeys per day between Bury and Rawtenstall during peak summertime use) and operating during daytime hours only. By virtue of the extremely limited use of the line during non-sensitive hours, the impact of the line is considered to be negligible and is not considered further.

The closest noise sensitive receptors (NSRs) to the site are considered to be:

- Existing residential dwellings on Lower Bank Street to the north (NSR1)
- Irwell Street (existing residential dwellings) to the west (NSR2)

1.3 Development Proposals

Development proposals are for a hybrid scheme as follows (see Figure 1.2):

- Outline planning application for Site 1 (2/3-storey, 40-bed care home)
- Detailed planning application for Site 2 (3-storey, 40-bed care home)

Figure 1.2: Location of Site 1 (outline) and Site 2 (detailed)



2 Policy Context and Assessment Guidance

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)¹ was updated in December 2023 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 180 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 191 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 193 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 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 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 (2023)

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 Guidance³ (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 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 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 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} (0700-2300)	-
Dining	Dining Room/Area	40 dB L _{Aeq} (0700-2300)	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq} (0700-2300)	30 dB L _{Aeq} (2300-0700) 45 dB L _{AFMax} (2300-0700)

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’.

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} (0700-2300) in habitable rooms during the daytime
- ≤ 30 dB L_{Aeq} (2300-0700) in bedrooms during the night-time
- 45 dB L_{AFMax} not regularly exceeded in bedrooms during the night-time

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*.

2.5 British Standard BS 4142:2014+A1:2019

BS 4142:2014+A1-2019 'Methods for Rating and Assessing Industrial and Commercial Sound' (BS 4142)⁶ describes methods for determining, at the outside of a building, noise levels from factories or industrial premises and a method for assessing whether the noise is likely to give rise to adverse impacts, and states:

'The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. Typically, the greater this difference, the greater the magnitude of the impact. For example:

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 described as the specific sound level (the equivalent continuous A-weighted sound pressure level at the assessment position (NSR) produced by the specific sound source over the given reference time interval) plus any adjustment for the characteristic features of the sound. The character correction relates to whether and to what degree the specific sound is assessed to have an element of tonality, impulsivity and/or characteristics that are readily distinctive against the residual acoustic environment.

The background noise level is the A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 percent of a given time interval, T, measured using time weighting 'F' and quoted to the nearest whole number of decibels.

The reference time interval of the specific sound is 1 hour during the daytime and 15 minutes during the night-time.

3 Noise Survey

3.1 Overview

In order to determine the level of external noise affecting the proposed development, noise monitoring was carried out during the daytime and night-time on Monday 15th January through to Tuesday 16th January 2023.

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

- MP1 was located along the southern boundary of the site, at 24 metres from the nearside kerb of the A58 (considered representative of the southern footprint of Site 1)
- MPA was located along the southern boundary of the site, at 48 metres from the nearside kerb of the A58 (to assess attenuation due to distance)
- MP2 was located along the northern boundary of the site, at 4 metres from the nearside kerb of Lower Bank Street
- MP3 was located at the western boundary of the site, at 5 metres from the nearside kerb of Irwell Street
- MP4 was located at the eastern boundary of the site, adjacent to the Castle Leisure Centre car park

Noise measurements were undertaken in free field conditions at 4 metres above ground level using NTi XL3 and Bruel & Kjaer 2250 Type 1 integrating sound level meters 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. Measurements consisted of A-weighted broadband parameters including L_{Aeq} , L_{A10} , L_{A90} , and L_{AFmax} together with linear octave band data.

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

Table 3.1 overleaf presents a summary of the noise data for each measurement session, at each monitoring location, 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)	L _{AFMax} (dB)	Comment
MP1	15/01/24	1311–2300	65	54	68	-	Road traffic on the A58
	16/01/24	0700–1001	63	57	66	-	
	15–16/01/24	2300–0700	58	33	63	73*	
MP1A	15/01/24	1322–1402	62	58	65	-	Road traffic on the A58
MP2	15/01/24	1409–2300	60	50	65	-	Road traffic on the A58 with vehicles along Lower Bank Street
	16/01/24	0700–1107	55	51	58	-	
	15–16/01/24	2300–0700	48	34	53	63*	
MP3	15/01/24	1145–1251	57	54	60	-	Road traffic on the A58 dominant, sporadic vehicles along Irwell Street
MP4	15/01/24	1027–1318	58	55	61	-	Road traffic on the A58, no significant noise from leisure centre
* 11 th highest L _{AFMax} during the night-time							

3.3 Analysis

Daytime and night-time noise levels at MP1 were measured at up to **65 dB L_{Aeq} (0700–2300)** and **58 dB L_{Aeq} (2300–0700)** respectively, with typical (11th highest) maximum noise levels of **73 dB L_{AFMax}** during the night-time period.

Ambient noise levels associated with the A58 decreased with increasing distance from the road, with comparative distance measurements at MP1 and MP1A illustrating line-source propagation of –3 dB per doubling of distance.

Daytime and night-time noise levels at MP2 were measured at up to **60 dB L_{Aeq} (0700–2300)** and **48 dB L_{Aeq} (2300–0700)** respectively, with typical (11th highest) maximum noise levels of **63 dB L_{AFMax}** during the night-time period.

The average background noise level in the vicinity of the nearest NSRs (MP2) was circa **51 dB L_{A90} (15 min)** in the daytime period and **37 dB L_{A90} (15 min)** in the night-time period.

4 Noise Assessment

4.1 Site 1 (Outline Application)

Indicative site plans show that site 1 is located 4 metres closer to the centre of the A58 carriageway than MP1. A distance correction of + 1 dB can be applied to the design noise levels, therefore the design levels for site 1 are as follows;

- $\leq 66 \text{ dB } L_{Aeq} (0700-2300)$ during the daytime
- $\leq 59 \text{ dB } L_{Aeq} (2300-0700)$ during the night-time
- $\leq 74 \text{ dB } L_{AFMax}$ during the night-time

Ambient noise levels towards the centre of the site (MP4) were circa 7 dB lower due to increased distance from the A58, and will be subject to screening afforded by the development itself (conservatively taken as -5 dB in accordance with BS 5228:2009 Part 1). Therefore, the design noise levels for the northern elevation of Site 1 as taken as:

- $\leq 53 \text{ dB } L_{Aeq} (0700-2300)$ during the daytime
- $\leq 46 \text{ dB } L_{Aeq} (2300-0700)$ during the night-time
- $\leq 61 \text{ dB } L_{AFMax}$ during the night-time

In order to calculate the sound insulation requirements for habitable rooms 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).

Due to the elevated noise levels at the site, it is recommended that Site 1 is provided with a system of mechanical ventilation. Appropriate solutions include:

- Mechanical Ventilation Heat Recovery (MVHR)
- Mechanical Extract Ventilation (MEV)

In dwellings where the designed air permeability is tighter than ($<$) $5 \text{ m}^3/(\text{h.m}^2)$, it is understood that 5000 mm^2 EA background ventilators are required where MEV is proposed. Background ventilators are not required where MVHR is used.

Habitable rooms (and noise-sensitive ancillary spaces) with line-of-sight to the A58 should be provided with enhanced glazing rated at least **32 dB R_w+C** , such as 8 mm glass / 6-20 mm cavity / 4 mm glass, in conjunction with acoustic wall vents rated at least **43 dB $D_{n,e,w}+C$** , such as the Ryton AAC125HP or equivalent (1 no. vent per habitable room) if required as part of an MEV system.

Remaining habitable rooms (on the northern elevation) may be provided with double glazing rated at least **28 dB R_w+C** , in conjunction with standard trickle/wall vents rated at least **32 dB $D_{n,e,w}$** per 5000 mm^2 EA (vent open) if required.

See Appendix 3 for indicative glazing/ventilation markup and Appendix 4 for selected BRE calculation spreadsheets.

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 value is achieved (rather than simply the R_w value). Published R_w values tend to be higher than corresponding R_w+C values; therefore, incorrect selection could result in an overestimation of sound reduction performance which in turn could result in higher internal noise levels
- 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 Site 2 (Detailed Application)

Indicative site plans show that site 2 is located 21 metres closer to the centre of the A58 carriageway than MP4. A distance correction of + 1 dB can be applied to the design noise levels, therefore the design levels for site 1 are as follows;

- $\leq 61 \text{ dB } L_{Aeq} (0700-2300)$ during the daytime
- $\leq 49 \text{ dB } L_{Aeq} (2300-0700)$ during the night-time
- $\leq 64 \text{ dB } L_{AFMax}$ during the night-time

As established in Section 4.1, the design noise levels elevations fronting towards the centre of the site as taken as:

- $\leq 53 \text{ dB } L_{Aeq} (0700-2300)$ during the daytime
- $\leq 46 \text{ dB } L_{Aeq} (2300-0700)$ during the night-time
- $\leq 61 \text{ dB } L_{AFMax}$ during the night-time

On the assumption that Site 2 would be provided with some form of mechanical ventilation, the target internal noise levels will be met throughout the development with standard glazing rated at least **28 dB R_w+C** , in conjunction with acoustic wall vents rated at least **43 dB $D_{n,e,w}+C$** , such as the Ryton AAC125HP or equivalent (1 no. vent per habitable room) if required as part of an MEV system.

See Appendix 3 for indicative glazing/ventilation markup and Appendix 4 for selected BRE calculation spreadsheets.

The ambient noise climate at the site is, however, suitable for the new-build care home.

4.3 Noise Associated with Fixed Installations

It is assumed that the development may include some externally sited fixed installations. However, details of the proposed type, location and number of mechanical and electrical plant items are not available at this stage. It is therefore considered appropriate to specify suitable noise limits to which any such plant items should conform.

These limits should take account of the background noise level at the nearest noise sensitive receptors. For reference, daytime and night-time background levels in the vicinity of the site were **51 dB L_{A90} (15 min)** and **37 dB L_{Aeq} (15 min)** respectively.

It is considered that the operation of any fixed installations of mechanical and electrical plant items can be controlled by a suitably worded planning condition, which would typically be as follows:

The cumulative noise rating level associated with fixed installations of mechanical and electrical plant items should not exceed the appropriate background noise level at the nearest existing residential dwelling.

5 Summary and Conclusions

A noise impact assessment has been undertaken for the proposed new-build care home at the corner of Irwell Street and Lower Bank Street, Bury, Lancashire, BL9 0HE

The ambient noise climate at the site is characterised (dominated) by road traffic on the A58 and the surrounding road network.

A scheme of sound insulation works has been developed to protect the proposed new-build care home from the ambient noise climate.

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:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = 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.

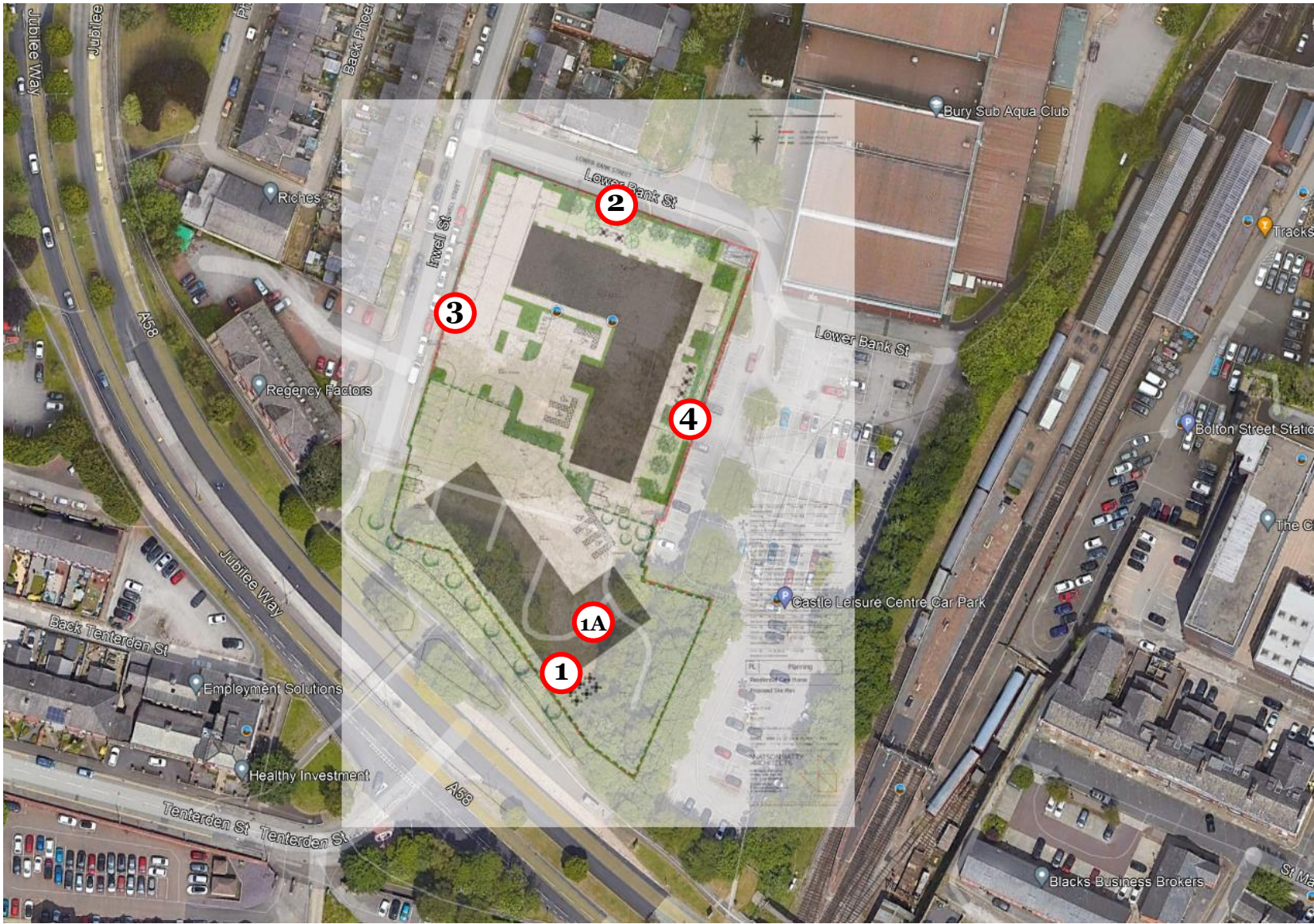
Single Event Level / Sound Exposure Level (SEL or L_{AE})

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 – Glazing/Ventilation Markup



Double glazing rated at 32 dB Rw+C with acoustic wall vents rated at least 43 dB Dn,e,w per 5000 mm2 (vent open)	Double glazing rated at 28 dB Rw+C with acoustic wall vents rated at least 43 dB Dn,e,w per 5000 mm2 (vent open)
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Appendix 4 – Selected BRE Calculation Spreadsheets

Road-Facing Habitable Rooms of Site 1 (south) – Daytime Ambient Noise Level

BRE		Building Envelope Insulation		Switch to Reverberation Time Calculation		4) Select exterior sound level type	
1) Enter room dimensions or volume ☐ Use dimensions x m y m z m Volume m ³ OR ☒ Use volume 33 m ³		2) Select elements of facade structure, and enter corresponding internal surface area in m ² OR enter number of vents.		HELP		Option (A) ☒ User defined spectrum	
		Wall 1 Brick/block cavity 5 m ² Wall 2 None Window 1 8 / (6-20) / 4 double glazing 2.4 m ² Window 2 None Door None Roof/Ceiling None Vent 1 Ryton AAC125HP 1 Vent 2 None		View/Edit Data		MP1 66 dB Daytime View/Edit Data	
		3) Enter reverberation time of the room.		0.5 seconds		Option (B) ☐ Spectrum shape	
						Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz) L_{Aeq} 66 dB ISO 717 - 1 (C) View Data	
						Internal sound level L_{Aeq} 32.4 dB	

Road-Facing Habitable Rooms of Site 1 (south) – Night-Time Maximum Noise Level

BRE		Building Envelope Insulation		Switch to Reverberation Time Calculation		4) Select exterior sound level type	
1) Enter room dimensions or volume ☐ Use dimensions x m y m z m Volume m ³ OR ☒ Use volume 33 m ³		2) Select elements of facade structure, and enter corresponding internal surface area in m ² OR enter number of vents.		HELP		Option (A) ☒ User defined spectrum	
		Wall 1 Brick/block cavity 5 m ² Wall 2 None Window 1 8 / (6-20) / 4 double glazing 2.4 m ² Window 2 None Door None Roof/Ceiling None Vent 1 Ryton AAC125HP 1 Vent 2 None		View/Edit Data		MP1 LAFMax 74 View/Edit Data	
		3) Enter reverberation time of the room.		0.5 seconds		Option (B) ☐ Spectrum shape	
						Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz) L_{Aeq} 74 dB ISO 717 - 1 (C) View Data	
						Internal sound level L_{Aeq} 38.9 dB	

Road-Facing Habitable Rooms of Site 2 (north) – Daytime Ambient Noise Level

BRE		Building Envelope Insulation		Switch to Reverberation Time Calculation	
1) Enter room dimensions or volume ☐ Use dimensions x m y m z m Volume m ³ OR ☒ Use volume 25 m ³		2) Select elements of facade structure, and enter corresponding internal surface area in m ² OR enter number of vents.		HELP	
		Surface area OR number of vents			
		Wall 1	Brick/block cavity	5	m ²
		Wall 2	None		m ²
		Window 1	4/12/4 double glazing	3	m ²
		Window 2	None		m ²
		Door	None		m ²
		Roof/Ceiling	None		m ²
		Vent 1	Ryton AAC125HP	1	m ²
		Vent 2	None		m ²
		View/Edit Data			
		3) Enter reverberation time of the room. 0.5 seconds			
		4) Select exterior sound level type Option (A) ☒ User defined spectrum MP2 Day 61 dB View/Edit Data Option (B) ☐ Spectrum shape Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz) L_{Aeq} 61 dB ISO 717 - 1 (C) View Data			
		Internal sound level L_{Aeq} 30.6 dB			

Road-Facing Habitable Rooms of Site 2 (north) – Night-Time Maximum Noise Level

BRE		Building Envelope Insulation		Switch to Reverberation Time Calculation	
1) Enter room dimensions or volume ☐ Use dimensions x m y m z m Volume m ³ OR ☒ Use volume 25 m ³		2) Select elements of facade structure, and enter corresponding internal surface area in m ² OR enter number of vents.		HELP	
		Surface area OR number of vents			
		Wall 1	Brick/block cavity	5	m ²
		Wall 2	None		m ²
		Window 1	4/12/4 double glazing	3	m ²
		Window 2	None		m ²
		Door	None		m ²
		Roof/Ceiling	None		m ²
		Vent 1	Ryton AAC125HP	1	m ²
		Vent 2	None		m ²
		View/Edit Data			
		3) Enter reverberation time of the room. 0.5 seconds			
		4) Select exterior sound level type Option (A) ☒ User defined spectrum MP2 LAFMAX 64 View/Edit Data Option (B) ☐ Spectrum shape Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz) L_{Aeq} 64 dB ISO 717 - 1 (C) View Data			
		Internal sound level L_{Aeq} 41.5 dB			