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# Residential New Build Development

# Land Adjacent to Ledgard Bridge Mills, Back Station Road, Mirfield, WF14 8NZ

# Noise Impact Assessment

**For:**

**Robert Halstead Chartered Surveyors and Town Planners**

**08 November 2023**

Ref: NIA-11149-23-11388-v1

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# Contents

# 1 Introduction

1.1.1 Environmental Noise Solutions Ltd (ENS) has been commissioned by Robert Halstead Chartered Surveyors and Town Planners (the client) to undertake a noise impact assessment for a residential new build development (with small coffee shop) on land adjacent to Ledgard Bridge Mills, Back Station Road, Mirfield, WF14 8NZ (hereafter referred to as 'the site').

1.1.2 This noise impact assessment is intended to accompany a planning application to be submitted to Kirklees Council for the proposed residential development of the site.

1.1.3 Comments from the LPA regarding noise impacting on the site are as follows:

*"The proposed development is near to an existing railway line noise from which is likely to have an adverse impact on future occupiers of the site. We will therefore expect a noise impact assessment to be provided with any future application before the application can be determined.*

*The assessment should determine the existing noise climate taking all likely noise sources into consideration and then detail how this will affect the proposed development. It should also detail any noise mitigation measures that will be required so that satisfactory sound levels will be achieved both indoors and at any outdoor amenity areas at the development. If windows need to be kept closed to achieve satisfactory indoor sound levels, then the mitigation measures will also need to include specific details of the alternative ventilation that will be provided as a substitute to opening windows. This needs to provide more than just background ventilation from trickle vent and in particular, needs to be capable of providing sufficient ventilation to give adequate cooling during hot weather to minimise the risks of overheating."*

1.1.4 The objectives of this noise impact assessment are to:

- Determine external ambient and background noise levels in the vicinity of the application site during relevant time periods.
- Assess the potential impact of the existing ambient noise climate on the proposed residential development with reference to relevant guidelines
- Provide recommendations for a scheme of sound attenuation works, as necessary

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

1.1.6 It has been prepared for Robert Halstead Chartered Surveyors and Town Planners for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult the aforementioned and ENS as to the extent to which the findings may be appropriate for their use.

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

# 2 Site Layout and Development Proposals

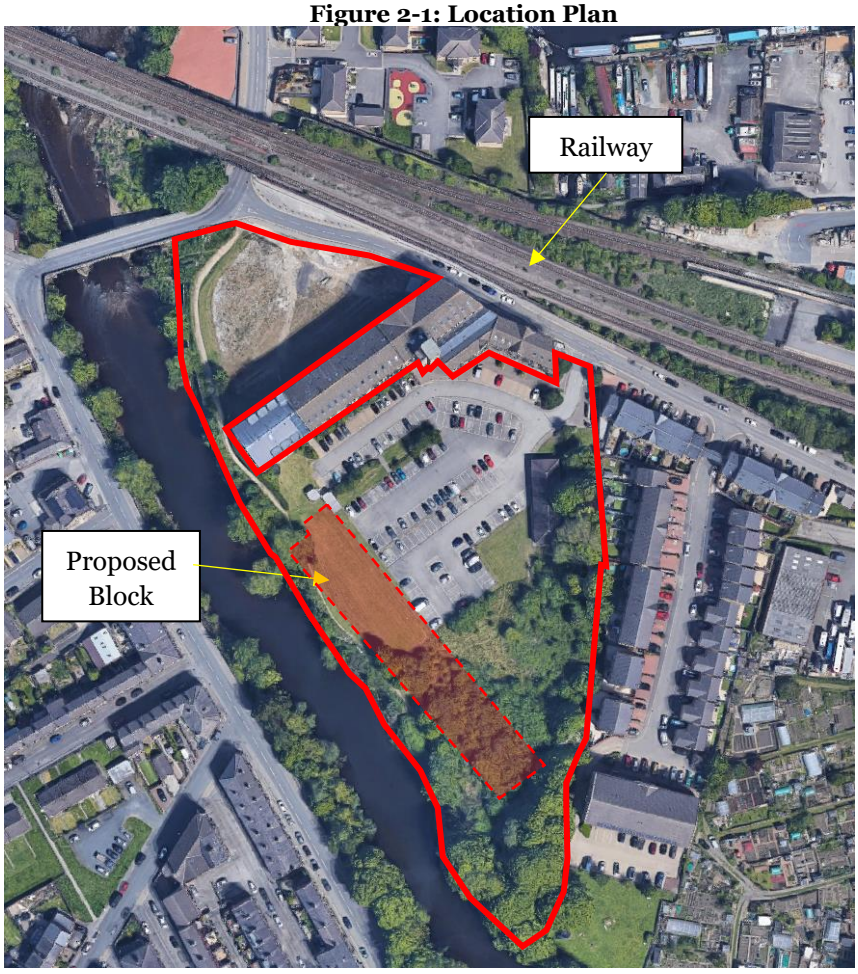
2.1.1 The proposals are for a 4-storey block of circa 92 apartments on a site off Back Station Road on the edge of the River Calder. The proposal is for the erection of a new build block running alongside the river with associated parking spaces and exterior landscaping.

2.1.2 The noise environment at the site is controlled by various local sources, with road traffic noise from Back Station Road to the north and Calder Road to the west, and Mirfield Station and railway line (circa 95 metres) to the northeast running at an elevated position.

2.1.3 Consultation with the online resource 'Realtime Trains' has determined that there are circa 204 no. passenger trains during the daytime (0700–2300 hrs) and 27 no. at night (2300–0700 hrs). Freight traffic is circa 16 no. passes during the daytime, and 5 no. at night.

2.1.4 An indication of the location of the site boundary is given in Figure 2-1 below with the site layout shown in Appendix C.

**Figure 2-1: Location Plan**



# 3 Assessment Guidance

## 3.1 National Planning Policy Framework

3.1.1 The National Planning Policy Framework (NPPF)[1] was updated in September 2023 and sets out the Government's planning policies for England and how these are expected to be applied.

3.1.2 Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 174 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'.*

3.1.3 Paragraph 185 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'.*

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

## 3.2 Noise Policy Statement for England

3.2.1 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

3.2.2 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

3.2.3 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.'*

[1] National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2023)
[2] Noise Policy Statement for England. Government Department for Environment, Food and Rural Affairs (2010)

## 3.3 Planning Practice Guidance on Noise

3.3.1 Planning Practice Guidance[3] (PPG) is an online resource (last updated 2019) 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

3.3.2 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'.*

3.3.3 Table 3-1 summarises the PPG noise exposure hierarchy.

Table 3-1: PPG Noise Exposure Hierarchy

| Perception | Examples of Outcomes | Increasing Effect Level | 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; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported 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. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. 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 |

[3] Planning Practice Guidance on Noise, 2014: http://planningguidance.planningportal.gov.uk/blog/guidance/noise/

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'.*

## 3.4 ProPG Planning and Noise: New Residential Development

3.4.1 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.

3.4.2 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' (BS 8233), see Table 3.2.

Table 3.2: Indoor Ambient Noise Levels in Dwellings

| Activity | Location | 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 $L_{Aeq\ (2300\text{-}0700)}$<br>45 dB $L_{AMax,F\ (2300\text{-}0700)}$ |

3.4.3 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.'*

3.4.4 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'.*

3.4.5 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'.*

3.4.6 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 residential development and considered to represent good resting and sleeping conditions:

- ≤ 35 dB $L_{Aeq\ (0700\text{-}2300)}$ during the daytime
- ≤ 30 dB $L_{Aeq\ (2300\text{-}0700)}$ and 45 dB $L_{AMax,F}$ not regularly exceeded 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)

## 3.5 Approved Document O

3.5.1 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.

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

3.5.3 '*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).*

3.5.4 *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)'*

# 4 Noise Survey and Results

## 4.1 Overview

4.1.1 To assess the noise levels impacting on the subject site, a noise survey was undertaken on Tuesday 17th and Wednesday 18th October 2023.

4.1.2 As the railway line is elevated, noise measurements were undertaken at a height of 10 metres above ground level. The following measurement location was adopted (also shown in Appendix B):

- MP1 was at a height of 10 metres at the approximate middle location of the proposed block.

4.1.3 Noise measurements were made in free field conditions using a Bruel & Kjaer 2250 Type 1 integrating sound level meter. A windshield was fitted for all measurements. The calibration of each measurement system was verified immediately before and after the survey using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration level was noted. Weather conditions throughout the survey periods were appropriate for monitoring with dry weather and average windspeeds below 5 $ms^{-1}$.

## 4.2 Summary

4.2.1 Measurements consisted of A–weighted broadband parameters, together with linear octave band $L_{eq}$ levels. Table 4-1 presents a summary of the measurement data for each measurement session, rounded to the nearest decibel.

**Table 4-1 – Summary of Noise Measurement Data**

| Location | Date | Time (hh:mm) | Length (hh:mm) | Measured sound pressure level (dB) | | | | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | $L_{Aeq,T}$ | $L_{Amax,F}$ | $L_{A90,T}$ | $L_{A10,T}$ | |
| MP1 | 17/10/2023 | 09:39 | 01:00 | 48 | 68 | 43 | 51 | Road Traffic Noise from Calder Road Dominant, Train Nose audible but at subtle level, low level of activity within carpark. No noise was audible from commercial units. |
| | | 10:39 | 01:00 | 48 | 67 | 43 | 51 | |
| | | 11:39 | 01:00 | 48 | 65 | 44 | 51 | |
| | 18/10/2023 | 05:00 | 01:00 | 43 | 59 | 39 | 45 | Road traffic noise dominant with noise gradually building over early morning to peak during rush hour period (0700-0800). Train noise noted at low level. |
| | | 06:00 | 01:00 | 47 | 59 | 41 | 50 | |
| | | 07:00 | 01:00 | 50 | 68 | 46 | 53 | |

4.2.2 Noise levels at the site were predominantly controlled by road traffic noise from Calder Road, with a lesser contribution from Back Station Road and the surrounding road network. The contribution of railway noise was noted to be low during the midday and early morning periods. No other noise sources were noted, other than the low level of activity within the adjacent car park.

4.2.3 Daytime noise levels were in the range of 48 to 50 dB $L_{Aeq\ (1\ hour)}$ at MP1 with night-time levels up to 47 dB $L_{Aeq\ (1\ hour)}$ with peak events of up to 59 dB $L_{Amax,F}$ within the night-time rush hour period (0500-0700).

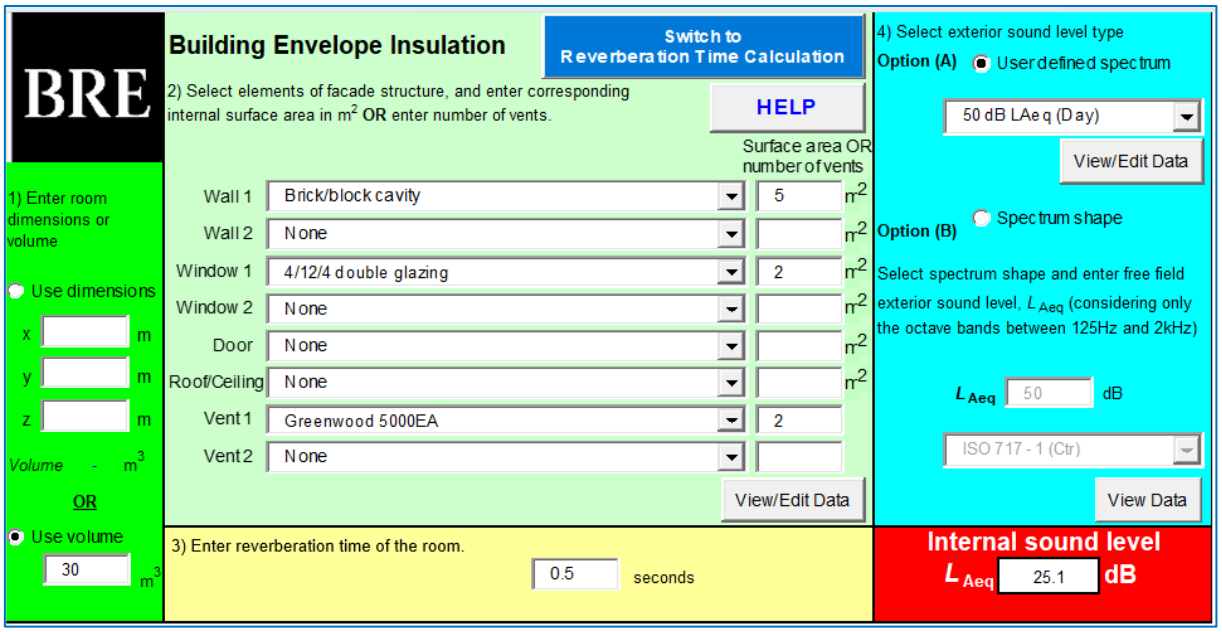
# 5 Noise Assessment

5.1.1 Design noise levels throughout the site are as follows:

- ≤ 50 dB $L_{Aeq\ (1\ hour)}$ during the daytime
- ≤ 47 dB $L_{Aeq\ (1\ hour)}$ during the night-time
- ≤ 59 dB $L_{AMax,F}$ during the night-time

5.1.2 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).

5.1.3 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.




5.1.4 With regard to internal noise levels when windows are open, the World Health Organisation (WHO) Guidelines for Community Noise (1999) states: 'the noise reduction from outside to inside with the window partly open is 15 decibels'.

5.1.5 The resultant internal noise levels are set out in Table 5-1 below.

Table 5-1: Predicted internal noise levels

| External Noise Level | Reduction | Resultant Internal Level |
|---|---|---|
| ≤ 50 dB $L_{Aeq\ (0700-2300)}$<br>≤ 47 dB $L_{Aeq\ (2300-0700)}$<br>≤ 59 dB $L_{Amax,F\ (2300-0700)}$ | –25 dB (closed windows) | ≤ 25 dB $L_{Aeq\ (0700-2300)}$ |
| | | ≤ 22 dB $L_{Aeq\ (2300-0700)}$ |
| | | ≤ 35 dB $L_{Amax\ (2300-0700)}$ |
| | –15 dB (open windows) | ≤ 35 dB $L_{Aeq\ (0700-2300)}$ |
| | | ≤ 32 dB $L_{Aeq\ (2300-0700)}$ |
| | | ≤ 44 dB $L_{Amax\ (2300-0700)}$ |

5.1.6 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.

5.1.7 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.

- 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.

- 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.

5.1.8 On the basis of the low external noise levels measured at the site, windows can remain open in bedrooms during sleeping hours (2300 to 0700 hours) as part of an overheating mitigation strategy.

# 6 Summary and Conclusions

6.1.1 A noise impact assessment has been undertaken for a proposed residential development at Ledgard Bridge Mills, Back Station Road, Mirfield, WF14 8NZ.

6.1.2 A noise survey was undertaken on Tuesday 17th and Wednesday 18th October 2023 to assess noise levels impacting on the development.

6.1.3 The noise environment at the subject site is chiefly controlled by road traffic noise from Calder Road to the southwest, with the contribution from the railway to the north at a relatively lower level.

6.1.4 Ambient noise levels throughout the site are relatively low. As a consequence, standard double glazing and standard trickle vents are appropriate throughout the development.

# Appendix A – 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 B – Noise Measurement Positions

# Appendix C – Proposed Site Layout