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ST PAUL'S ROAD, MIRFIELD - PROPOSED RESIDENTIAL DEVELOPMENT

ASSESSMENT OF POTENTIAL NOISE IMPACT FROM PLANT ASSOCIATED WITH ADJACENT APPROVED DEVELOPMENT

On behalf of:

Connect Housing

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Report No: P19-503-R01v1
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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Connect Housing to carry out a noise impact assessment in connection with a proposed planning application for a residential development at St Paul's Road, Mirfield.

1.2 The proposed residential development is to be located off St Paul's Road as indicated in Figure 1 and the proposed layout is shown in Figure 2.

1.3 The assessment has been requested as part of the pre-application process to address the local planning authority's (LPA's) concerns regarding potential noise impact upon the proposed residential development from the adjacent approved mixed-use development.

1.4 We understand that the approved adjacent mixed-use development (indicated in Figure 1) once completed will have commercial units at ground floor level and residential apartments on the first-floor level. Clearly, there is a need for any noise from the commercial units (including any mechanical services plant) to be adequately controlled as there will be people living in the apartments directly above.

1.5 There are currently no publicly available proposals for the externally mounted plant nor extract duct termination for the approved mixed-use development and no information on potential installation is available. However, it is considered likely that any plant associated with the approved development would be located on the rear elevations of the building away from Huddersfield Road.

1.6 The planning approval (ref. 2018/62/92172/E) for the adjacent mixed-use development includes a condition related to plant noise (Condition 9) which is as follows:

'Any A3 (restaurant/café), A4 (drinking establishment) and A5 (hot food take-away) use hereby permitted shall not commence until details of the installation and/or erection of any extract ventilation system, including details of the methods of treatments of emissions and filters to remove odours and control noise emissions, have been submitted to and approved in writing by the Local Planning Authority and the works specified in the approved scheme have been installed. Such works shall thereafter be retained, operated at all times when the takeaway/restaurant is in use and maintained in accordance with the manufacturer's instructions.

Reason: To safeguard the residential amenity of the occupiers of adjoining properties from undue noise and odours, in accordance with Policy PLP52 (as modified) of the Kirklees Local Plan as well as Chapter 15 of the National Planning Policy Framework.'

1.7 Whilst planning Condition 9 for the adjacent development does not specify criteria for the noise levels to be achieved by the treatments to control noise emissions, nor a methodology for determining appropriate design targets, the appropriate methodology for assessment of plant noise from commercial premises is provided in British Standard 4142:2014 '*Methods for rating and assessing industrial and commercial sound*'.

1.8 BS 4142:2014 requires a 'rating' level ($L_{Ar, Tr}$) calculated from the operation of the noise sources to be compared with the background sound level (L_{A90}) which is measured in the absence of the plant noise, evaluated over a 1-hour period for daytime operations and 15-minute period for night-time operations.

1.9 The rating level ($L_{Ar, Tr}$) is based on the 'specific' sound level ($L_{Aeq, Tr}$) attributed to the operating noise source, with 'character corrections' added for sound sources where 'certain acoustic features can increase the significance of impact'.

1.10 The character correction applied to the specific sound level in order to obtain the rating level can take into account tonality, intermittency, impulsivity and characteristics otherwise distinctive against the prevailing noise climate in the area.

1.11 Potential noise impact from the proposed plant is then determined by comparing the difference between the background level and the rating level. In design situations it is generally considered that controlling the rating level to no more than the background sound level is appropriate as BS 4142 states that this would amount to low impact.

1.12 Therefore, as details of the plant are not currently available to directly assess we have based our assessment on the reasonable assumption that any plant noise associated with the approved mixed-use development will by design be controlled to within the existing background sound levels in order to satisfy planning Condition 9.

1.13 This noise assessment has included:

- An inspection of the site and surrounding area;
- Measurement of existing background noise levels in the area;

- Determination of the representative background sound levels;
- Calculation of likely plant noise break-in levels; and,
- Recommendations for appropriate noise mitigation measures.

1.14 The purpose of the noise mitigation measures recommended in this report is twofold; firstly, to adequately protect the amenity of the new dwellings from noise, and secondly (in respect of noise from the approved adjacent development), in so doing, to safeguard the commercial interests of the business now and in the future.

1.15 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 ACOUSTIC DESIGN CRITERIA FOR NEW DWELLINGS

2.1 The National Planning Policy Framework (NPPF) February 2019 states in paragraph 180 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:*

a) 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[60];"

2.2 The Noise Policy Statement for England (NPSE) 2010, which is referred to the in NPPF, includes three aims:

i. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

i. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

ii. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2.3 However, there is as yet no specific guidance on numerical acoustic assessment/design criteria for proposed new housing developments provided in the NPPF and accompanying on-line guidance, nor in the NPSE document.

2.4 Therefore, it is necessary to refer to established national guidance such as the acoustic design goals for residential development that are set out in BS 8233: 2014, 'Guidance on sound insulation and noise reduction for buildings', which carries the full weight of an adopted British Standard. The design criteria recommended in BS 8233 for daytime periods (07:00 - 23:00) and night-time periods (23:00 - 07:00) are summarised in Table 1 overleaf for inside habitable rooms of new dwellings:

Table 1: BS 8233:2014 Recommended Internal Acoustic Design Criteria

Activity	Location	Daytime (07:00 - 23:00)	Night-time (23:00 - 07:00)
Resting	Living room	35 dB $L_{Aeq, 16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16hr}$	30 dB $L_{Aeq, 8hr}$

2.5 The BS8233 criteria presented in Table 1 are for sources of noise that do not have a specific character, such as road traffic noise. For commercial noise that may have specific characteristics, BS 8233 suggests that lower noise criteria may be appropriate, although no further advice is given.

2.6 It is therefore considered that the acoustic design criteria for commercial noise sources in this case should be at least 5 dB(A) lower than those recommended in Table 1.

2.7 However, from a pragmatic viewpoint, the potential noise impact of the neighbouring commercial premises should be minimised by appropriate implementation of noise mitigation measures as part of the proposed new residential development.

2.8 This is due to a requirement of Paragraph 182 of the NPPF 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.*"

2.9 For this development, we therefore recommend the following noise criteria for commercial noise sources are adopted with windows closed and trickle ventilation provided:

- Daytime noise within 30 dB $L_{Aeq, T}$ inside bedrooms and living rooms, and within 35 dB $L_{Aeq, T}$ in dining rooms; and,
- Night-time noise levels within 25 dB $L_{Aeq, T}$ inside bedrooms.

3.0 NOISE SURVEY

3.1 A noise survey was carried out to determine the existing background noise levels in the area.

3.2 The location of the noise measurements is shown in Figure 1 which is considered to be representative of the background noise levels both at the proposed residential development and at the rear of the approved mixed-use development where any plant is likely to be positioned.

3.3 The noise survey was carried out between 15:21 on Wednesday 18 and 14:21 on Thursday 19 December 2019, in consecutive 5 minute periods, using fully calibrated auto-logging noise monitoring instrumentation.

3.4 The noise measurements were taken in 'free-field' conditions and at a microphone height of approximately 1.4m above the ground. Acoustic calibration checks were carried out both before and after the measurements were taken with no variance in calibration level.

3.5 Weather conditions during the noise survey were suitable for noise measurements, full details of the weather conditions and the equipment used can be seen in Appendix II.

3.6 Full results of the noise survey are shown in Appendix II and a summary of the range of measured noise levels is shown in Table 2 below.

Table 2: Range of Measured Noise Levels (dB)

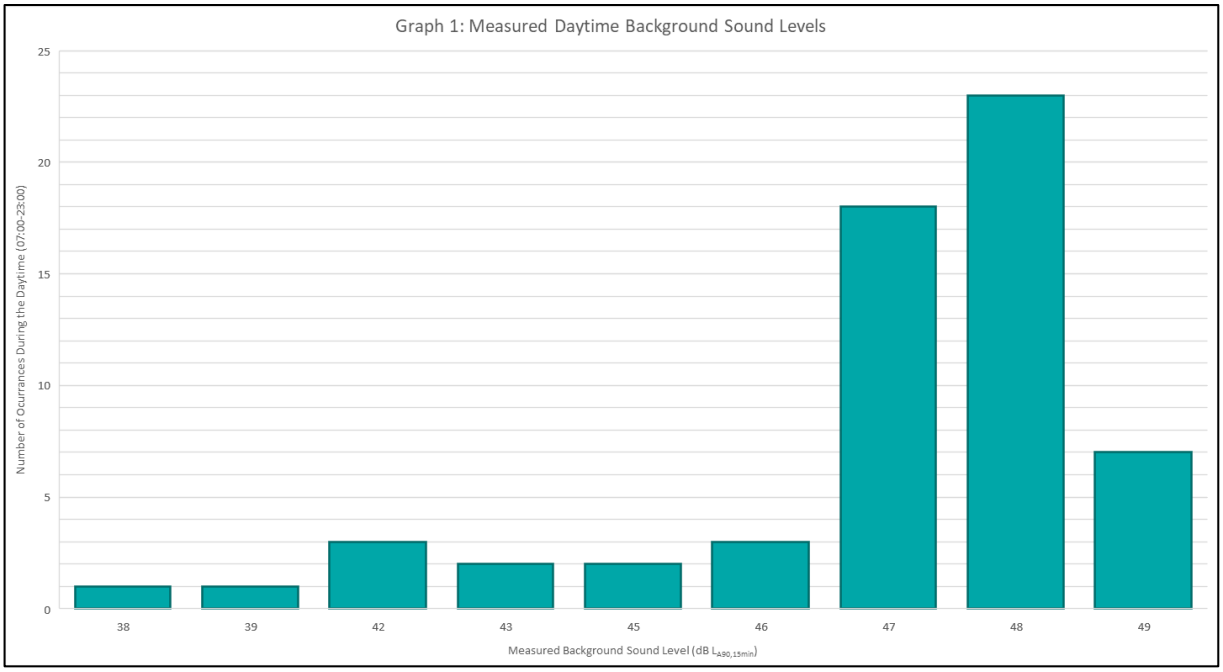
Period	$L_{Aeq, 5min}$	$L_{A90, 5min}$
Daytime (07:00-23:00)	47-55	38-49
Night-time (23:00-07:00)	42-52	35-47

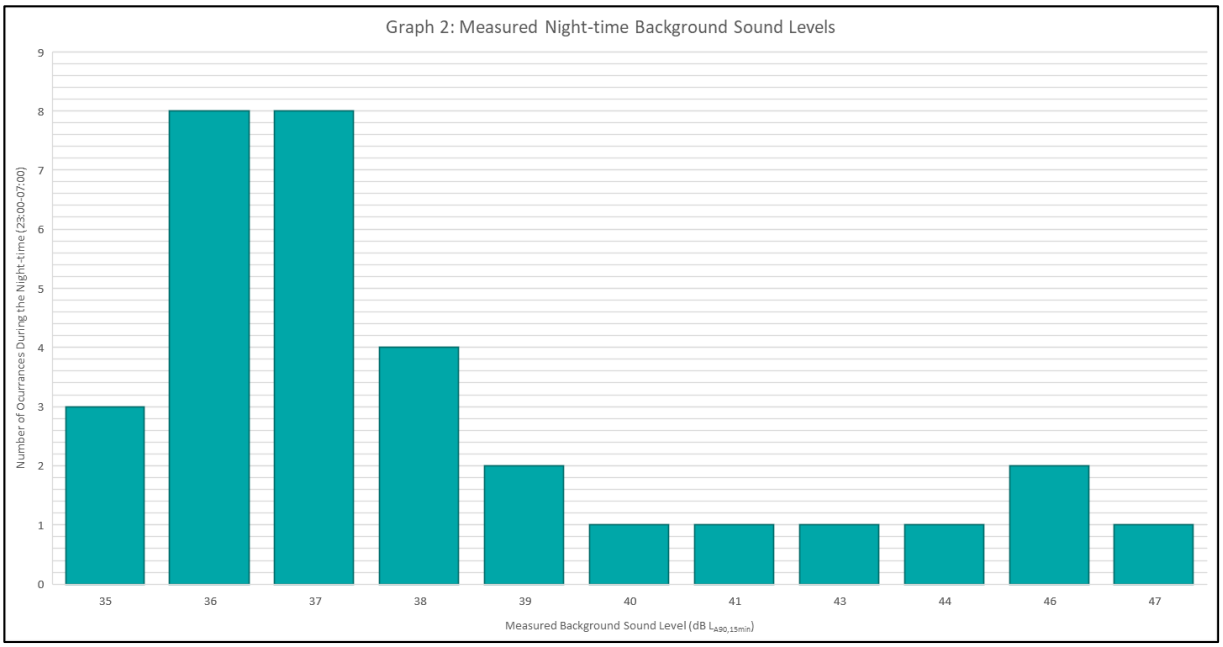
3.7 The results of the noise survey in Table 2 show that the noise levels in the area are moderate and no special noise mitigation measures are required for the proposed residential development with respect to noise break-in from the existing ambient noise climate.

4.0 NOISE ASSESSMENT

4.1 In order to determine what the likely plant noise levels will be from the adjacent approved premises, we have analysed the measured background sound levels in line with BS 4142:2014 guidance to obtain the representative background level.

4.2 Graph 1 and Graph 2 below show the statistical distribution for of the measured background sound levels during the daytime (07:00-23:0 hours) and night-time periods respectively.





4.3 Based on the results of the noise survey, in our view the representative background sound levels would be 47 dB $L_{A90,1hr}$ for the daytime and 36 dB $L_{A90,15min}$ for the night-time.

4.4 However, in order to provide a robust assessment of the potential noise from plant, for the purpose of this assessment we have assumed that the plant noise control at the adjacent approved development will be carried out to what would be considered to be the highest background sound levels which could arguably considered to be representative: 48 dB $L_{A90,1hr}$ for the daytime and 37 dB $L_{A90,15min}$ for the night-time.

4.5 On this basis and assuming that the plant noise is controlled to within rating levels of 48 dB $L_{Ar,1hr}$ during the daytime and 37 dB $L_{Ar,15min}$ during the night-time outside the apartments at the adjacent approved development, it can reasonably be concluded that the plant noise levels at the proposed residential development should also be within 48 dB $L_{Ar,1hr}$ during the daytime and 37 dB $L_{Ar,15min}$ during the night-time, as the residential aspects of the adjacent approved mixed-use development would be closer to the plant than the proposed residential development.

4.6 Windows of standard well-sealed thermal double glazing (4mm glass - 4mm glass) with associated standard trickle ventilation have a typical sound reduction performance of 25 dB $R_w + C_{tr}$. Therefore, the anticipated plant noise levels would be controlled to within the adopted internal noise level criteria set out in Section 2 without any special noise mitigation measures.

4.7 Nevertheless, in order to provide additional protection for the most potentially exposed elevations of the proposed residential development, we recommend installing acoustic trickle ventilation with a minimum performance of 40 dB $D_{n,e,w} + C_{tr}$ such as Aereco EHA - Acoustic Trickle Ventilator with external acoustic canopy and acoustic sleeve, in bedrooms and living rooms in the elevations indicated in green on Figure 3.

5.0 SUMMARY AND CONCLUSION

5.1 Hepworth Acoustics Ltd was commissioned by Connect Housing to carry out a noise impact assessment in connection with a proposed planning application for a residential development at St Paul's Road, Mirfield.

5.2 Appropriate acoustic design criteria have been adopted based on BS 8233:2014 guidance.

5.3 A noise survey has been carried out to determine the prevailing background sound levels in the area.

5.4 The assessment has been based on reasonable assumptions about the potential noise from plant at the approved mixed-use development the control of which is secured by Condition 9 of the planning approval for that development.

5.5 Whilst the findings of the assessment indicate that no special noise mitigation measured would be specifically warranted, we have recommended acoustic trickle ventilation for the most potentially exposed elevations of the proposed residential development. This approach is compliant with the requirements of paragraph 182 of the NPPF.

Do not scale from this figure
Key:
Illustrutive proposed development site boundary
Location of approved adjacent development
Noise survey location
N
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Title: Figure 1: Development Location & Noise survey Location
Project: P19-503
St Paul's Road
Hudderfield Road (A644)
Google Earth
© 2018 Google

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Title: Figure 2: Proposed Development Layout
Project: P19-503

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Acoustic trickle ventilation
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Title: Figure 2: Proposed Layout
Plans
Project: P19-503

Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

R — This is the 'Sound Reduction Index' as measured in a laboratory, and is a measure of the sound insulation properties of an building element in a stated frequency band.

R_w — This is the 'Weighted Sound Reduction Index' (L_w), and is a single figure quantity of R, the laboratory measured Sound Reduction Index.

TL — The Transmission loss is another name for Sound Reduction Index, (R)

C_{tr} — This is an A-weighted urban traffic noise spectrum, which can be added to $D_{nT,w}$ or R_w in some standards to take into account different source spectra such as low frequency sound.

D — This is the Level Difference and is a field measurement of the airborne sound insulation between adjacent spaces. As well as being field measurement, this term and all other D terms below therefore include on-site conditions other than direction noise transmission through, for example, a wall (flanking transmission).

D_n — This is the Normalized Level Difference and is a field measurement of the airborne sound insulation between adjacent spaces.

L_{Aeq} — This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, LAeq is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

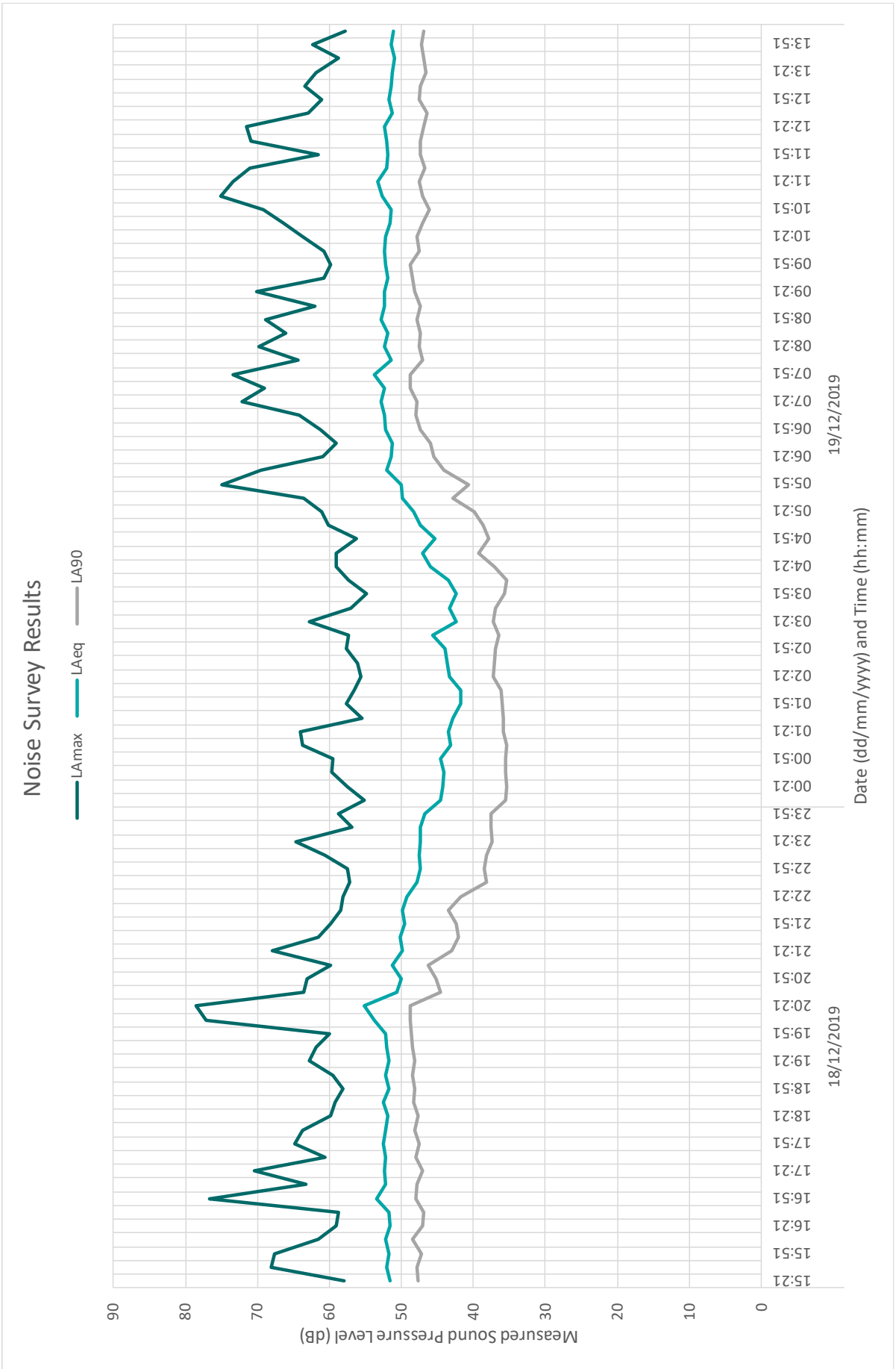
L_{Amax} — This is the maximum A–weighted noise level that was recorded during the monitoring period.

L_{A90} — This is the A–weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

Appendix II: Noise Survey Results

Date(s):	Wednesday 18 to Thursday 19 December 2019
Equipment:	B&K 2260 'Type 1' sound analyser (serial no. 02554023) with tripod and
Weather:	Dry, cool temperatures ~4°C with low winds <4m/s and moderate cloud coverage

Please see the results of the noise survey in the graph overleaf.


Noise Survey Results
LAmax
LAeq
LA90
Measured Sound Pressure Level (dB)
0
10
20
30
40
50
60
70
80
90
Date (dd/mm/yyyy) and Time (hh:mm)
18/12/2019
19/12/2019
15:21
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