adrian james acoustics limited

TECHNICAL REPORT

HEATH CRESCENT, NORWICH

Initial Site Noise Risk Assessment

Adrian James Acoustics Document Control Sheet

Report prepared for:	Jarrold and Sons St James Mill Whitefriars Norwich NR3 1SH
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QA Control

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Revision History

Rev	Details

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1 INTRODUCTION

1.1 Background

We have been appointed by Jarrold & Sons to undertake a noise assessment for a proposed residential development on land off Heath Crescent, Norwich. This assessment is in accordance with Stage 1 of ProPG: Planning and Noise (ProPG), which is a method of determining a 'risk assessment' of the suitability of the site for residential development.

The site is currently occupied by a now disused sports complex including playing fields, tennis courts and a bowling green. The general area is residential-led mixed-use and the site is bordered to the north, west and south by existing residential properties. A mixture of industrial and commercial uses borders the site to the east which is understood not to contain any heavy industrial uses.

The northern end of the site narrows to an access point on Fifers Lane. The other main road next to the site is the A140 Cromer Road approximately 175m from the western site boundary but is screened by intervening residential areas. Norwich Airport is approximately 500m from the northern site boundary.

The location of the proposal site and surroundings are indicated in Figure 1.

Figure 1 – Location of proposal site and surroundings

1.2 Structure of this report

The structure of this report is as follows:

- Section 2 describes relevant noise policy and the guidance contained in ProPG.
- Section 3 sets out our noise survey methodology and summarises the results.
- Section 4 presents our initial site noise risk assessment.
- Section 5 presents our conclusions.
- An explanation of the technical terms used in this report is given in Appendix A
- Noise measurement equipment and calibration are described in Appendix B

2 PROPG: PLANNING AND NOISE

The Professional Practice Guidance on Planning and Noise (ProPG) was published in May 2017 to help inform planning decisions in general accordance with the National Planning Policy Framework (NPPF) and was produced jointly by the Association of Noise Consultants, the Institute of Acoustics and the Chartered Institute of Environmental Health.

ProPG adopts a two-stage approach to assessing noise from transport sources affecting proposed residential development. Stage 1 is an initial risk assessment to indicate whether prevailing noise levels pose a negligible, low, medium or high risk (risk in this context refers to the general acoustic suitability for residential development.

The Stage 1 daytime ($L_{Aeq,16hr}$) and night-time ($L_{Aeq,8hr}$) noise levels and corresponding risk categories from ProPG are reproduced in Figure 2. Regardless of the L_{Aeq} levels, ProPG advises that if there are more than 10 individual noise events at night exceeding 60 dB L_{AFmax} then this means the site should not be regarded as a negligible noise risk.

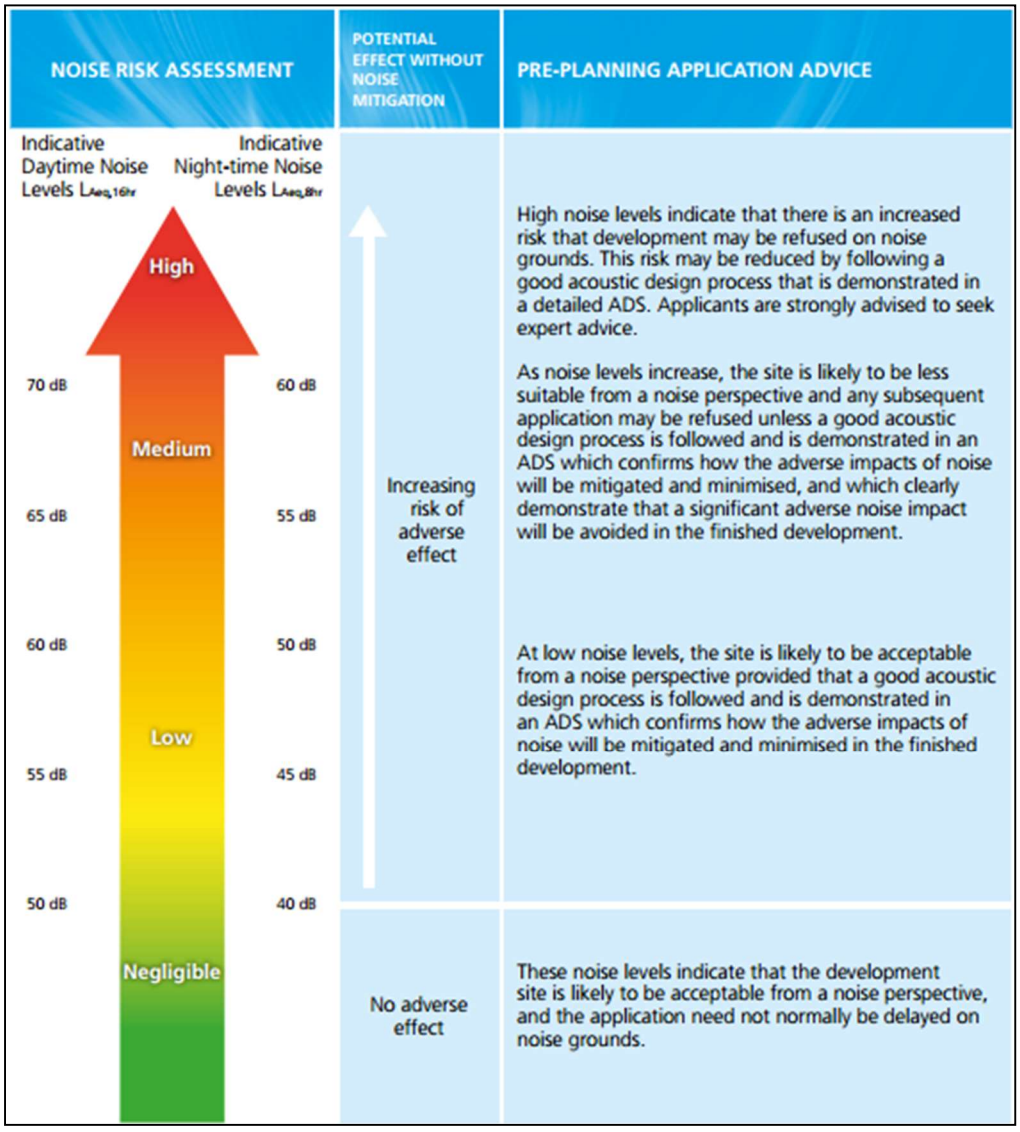

Figure 2 – ProPG Stage 1 Initial Noise Risk Assessment

3 SITE NOISE SURVEY

3.1 Survey methodology

An unattended noise monitor was installed at the site from 13 January to 21 January 2020 to record average and maximum noise levels incident on the site. Measurements were taken in free-field conditions with the microphone approximately 1.5m above the ground. This location is indicated in Figure 3 as U1.

Additional measurements were undertaken at four other locations to determine the spread of noise around the site from the various incident noise sources. The attended measurements were synchronised with the unattended noise monitor for reference.

Details of the measuring equipment and personnel are set out in Appendix B.

3.2 Meteorological conditions

Meteorological information for the survey period was taken from published data from the permanent weather station at Norwich City Airport (via Weather Underground).

Weather conditions during the survey were variable and were not always optimal for acoustic measurement, particularly between 13 and 16 January 2020 when there were high winds well in excess of 5 m/s and some rain. As a result, some measurement periods are unlikely to be entirely representative of the typical noise levels at the site.

Where necessary, these periods were excluded from the subsequent data analysis. Despite several periods being affected, this still provided ample measurement data to provide a representative indication of the typical noise environment. Affected periods are clearly indicated in the measurement results summary presented in Section 3.3.2.

Meteorological conditions were otherwise appropriate, with wind speeds not exceeding 5 m/s, minimal rain and average temperatures typically ranging between 2°C and 10°C.

Unattended (U1) and attended measurement (A1-A4) positions are shown in Figure 3.

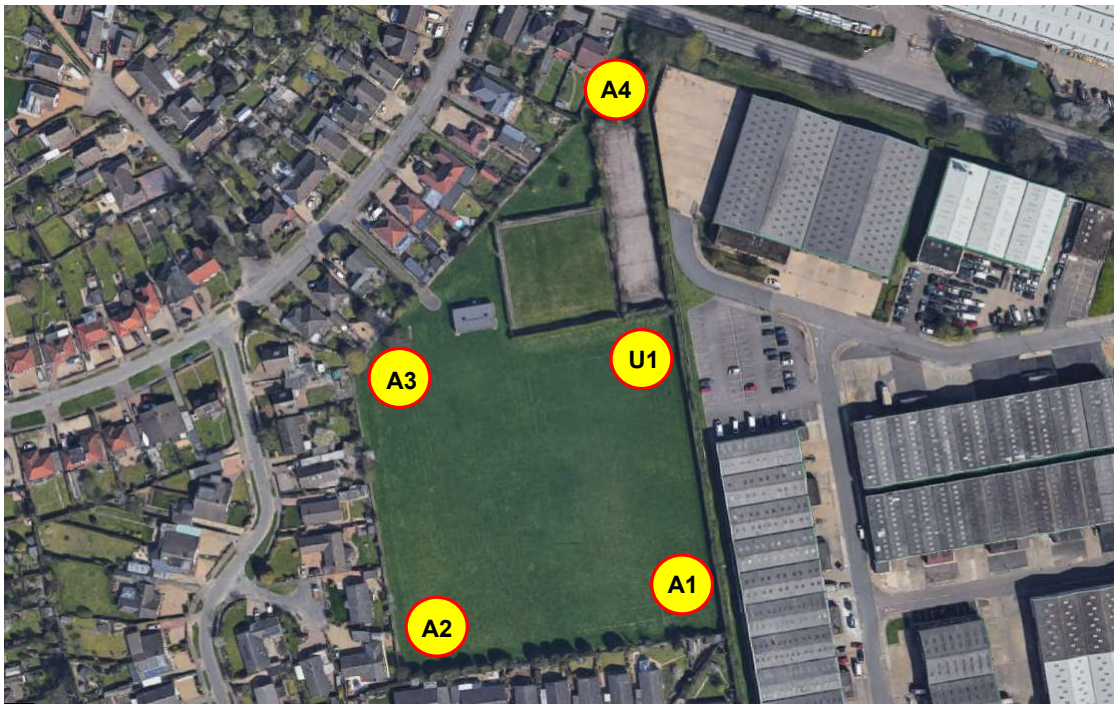

Figure 3: Locations of Measurement Positions © Google 2020

3.3 Results

3.3.1 General observations

At all locations except Position A4, the dominant noise source was road traffic on the A140. At position A4, road traffic on Fifers Lane was the dominant noise source.

Noise from the commercial and industrial uses to the west and north was occasionally audible but the measured average noise levels were predominantly dictated by road traffic noise on Fifers Lane and A140 Cromer Road. Noise events associated with the commercial and industrial uses to the east were audible at times and did occasionally contribute to measured maximum noise levels during the daytime, but during the night the measured maximum noise levels were generally dictated by distant road traffic.

Other noise sources observed on site include birdsong and sporadic overhead aircraft.

3.3.2 Unattended noise measurements

The day and night-time $L_{Aeq,T}$ levels from position U1 are presented in Table 1. Periods which were unacceptably influenced by adverse weather are highlighted in red and incomplete periods at the start and end of the survey are highlighted in green.

Date	Daytime dB $L_{Aeq,0700-2300hrs}$	Night-Time dB $L_{Aeq,2300-0700hrs}$
13-January	52	44
14-January	56	50
15-January	52	42
16-January	54	43
17-January	51	45
18-January	52	46
19-January	53	43
20-January	51	45
21-January	50	N/A

Note 1: Figures in red were affected by adverse weather (winds above 5 m/s)
Note 2: Figures in green are incomplete periods at the start and end of the survey

Table 1: Summary of unattended noise measurement results

Excluding the periods affected by adverse weather, noise levels at Position U1 were between 51-53 dB $L_{Aeq,0700-2100hrs}$ during the day and 42-46 dB $L_{Aeq,2300-0700hrs}$ at night.

Maximum noise levels at Position U1 during the night-time typically ranged between 45-55 dB $L_{AFmax,15min}$ with occasional events outside this range. Measured maximum noise levels did not exceed 60 dB L_{AFmax},15min more than 10 times on any one night.

3.3.3 Attended noise measurements

Synchronised attended measurements were also carried out at Positions A1-A4 to determine the typical spread of noise levels around the site. The identified differential between these locations and the unattended position U1 are summarised in Table 2, alongside the corrected 16-hour day and 8-hour night-time noise level at each position.

Position	Correction to U1	Resultant Corrected Noise Levels	
	dB	Daytime dB $L_{Aeq,0700-2300hrs}$	Night-Time dB $L_{Aeq,2300-0700hrs}$
A1	+1	50-54	43-47
A2	-2	49-51	40-44
A3	-2	49-51	40-44
A4	+10	61-63	52-56

Table 2: Summary of corrected day and night-time noise levels at Positions A1-A4

4 INITIAL SITE NOISE RISK ASSESSMENT

4.1 Initial risk assessment

ProPG requires an initial Stage 1 *'risk assessment'* of environmental noise affecting the proposed development site without the benefits (or otherwise) of any specific noise mitigation measures. The assessment should provide an indication of the likely risk of adverse effects from noise were no subsequent mitigation to be included as part of the development proposal, should planning permission for the site ultimately be granted.

Using the criteria presented in Figure 2, an initial site noise risk assessment has been completed in accordance with ProPG and the results are summarised in Table 3 below.

Position reference (see Figure 3)	Daytime		Night-time	
	$L_{Aeq,16hour}$	ProPG Risk assessment	$L_{Aeq,16hour}$	ProPG Risk assessment
U1	51-53	Low-Negligible	42-46	Low-Negligible
A1	50-54	Low-Negligible	43-47	Low-Negligible
A2	49-51	Low-Negligible	40-44	Low-Negligible
A3	49-51	Low-Negligible	40-44	Low-Negligible
A4	61-63	Low-Medium	52-56	Low-Medium

Table 3 – Summary of ProPG Stage 1 Initial Site Noise Risk Assessment

ProPG also advises that if there are more than 10 noise events at night which exceed 60 dB L_{AFmax} then the site should not be regarded as a negligible noise risk. This is believed to be the case across most of the site (except for the northerly end) but is not relevant in this case as the Stage 1 assessment indicates low-medium risk.

4.2 Discussion

The results of the risk assessment can be summarised as follows:

- Daytime and night-time average noise levels (dB $L_{Aeq,T}$) across most of the site are in the lower end of the range denoting low risk.
- Daytime and night-time average noise levels (dB $L_{Aeq,T}$) in the northern extremity of the site (closest to Fifers Lane) are at the lower end of the medium risk scale.

For areas of a site at low risk, ProPG states:

> *"At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development"*

For areas of a site at medium risk, ProPG states:

> *"As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development."*

5 CONCLUSIONS

- We have measured and assessed prevailing environmental noise levels on land off Heath Crescent, Norwich in accordance with Stage 1 of ProPG. The purpose of the measurements is to establish a noise 'risk assessment' to determine whether the site is suitable for residential development.
- The assessment indicates a low-to-negligible risk of adverse effects from noise across most of the site. ProPG advises that noise levels within this category are likely to be suitable for residential use provided a good acoustic design process is followed.
- The assessment also identifies a low-to-medium risk of adverse effects from noise in the northern extremity of the site, close to Fifers Lane. ProPG advises that this part of the site is less suitable from a noise perspective, and that planning permission may be refused if dwellings are proposed in this area unless a good design process is demonstrated in an Acoustic Design Statement. This could be negated by designing the development layout such that there are no dwellings in the part of the site closest to Fifers Lane, by ensuring there are no habitable rooms facing Fifers Lane and/or using land buffers or non-sensitive uses to reduce road traffic noise incident on the nearest proposed dwellings to that road.
- The scope of this assessment is limited to an initial site noise risk assessment and does not include the Acoustic Design Statement (ADS) that would be required to support any planning application for residential development on this site. However, it is our view that the ADS should be relatively straightforward to produce as it is only one isolated area of the site where anything above standard construction methods and materials are likely to be required to control external noise ingress.

APPENDIX A - TECHNICAL TERMS AND UNITS RELEVANT TO THIS REPORT

Decibel (dB) - This is the unit used to measure sound level. The range of human hearing from the quietest detectable sound to the threshold of pain is very large. If a normal linear scale of measurement were used, it would have to range from 20 µPa to 200,000,000 µPa. Using such large figures would be unmanageable and for this reason sound pressure levels are expressed on a logarithmic scale, which corresponds to the almost logarithmic response of the ear and which compresses the range to a manageable 0dB to140dB.

Sound Pressure Level (L_p or SPL) - This is a function of the source and its surroundings and is a measure in decibels of the total instantaneous sound pressure at a point in space. The SPL can vary both in time and in frequency. Different measurement parameters are therefore required to describe the time variation and frequency content of a given sound. These are described below.

Frequency - This refers to the number of complete pressure fluctuations or cycles that occur in one second. Frequency is measured in Hertz (Hz). The rumble of thunder has a low frequency, while a whistle has a high frequency. The sensitivity of the ear varies over the frequency range and is most sensitive between 1KHz and 5KHz.

Octave and One-Third Octave Bands - The human ear is sensitive to sound over a frequency range of approximately 20 Hz to 20,000 Hz and is more sensitive to medium and high frequencies than to low frequencies. To define the frequency content of a sound, the spectrum is divided into frequency bands, the most common of which are octave bands. Each band is referred to by its centre frequency, and the centre frequency of each band is twice that of the band below it. Where it is necessary for a more detailed analysis octave bands may be divided into one-third octave bands.

'**A' Weighting** - The sensitivity of the human ear varies with frequency, some frequencies sound louder than others. The 'A'-weighting curve represents the non-linear frequency response of the human ear and is incorporated in an electronic filter used in sound level meters. Measurements using an 'A'-weighting filter makes the meter more sensitive to the middle range of frequencies, which approximates to the response of the ear and the subjective loudness of the sound. Sound level measurements using 'A'-weighting will include the subscript A, e.g. dB(A).

Statistical Analysis - These figures are normally expressed as LN, where L is the sound pressure level in dB and N is the percentage of the measurement period. The LN figure represents the sound level that is exceeded for that percentage of the measurement period. L_{90} is commonly used to give an indication of the background level or the lowest level during the measurement period. L_{10} may be used to measure road traffic noise. See Figure A1.

L_{Amax} - The highest A weighted sound pressure level recorded during the measurement period. The time constant used (Fast or Slow) should be stated. See Figure A1.

$L_{eq,T}$ - The equivalent continuous sound level is used to measure sound that varies with time. The $L_{eq,T}$ is the notional equivalent steady sound level, which contains the same acoustic energy as the actual varying sound level over the period of measurement. Because the averaging process used is logarithmic, the $L_{eq,T}$ level tends to be dominated by the higher sound levels measured. See Figure A1 overleaf.

APPENDIX B – MEASURING EQUIPMENT AND CALIBRATION

Job reference and title: 12449 – Heath Crescent, Norwich

Measurement location: See Section 3 of this report

Measurement date(s): 13 – 21 January 2020

Measuring equipment used:

Equipment description / serial number	Type number	Manufacturer	Date of calibration expiration	Calibration certificate number
Kit 3				
Precision sound level meter serial no. A2A-10758-E0	XL2-TA	NTi Audio	24/10/2021	33189
Microphone serial no. 8133	MC230	NTi Audio	24/10/2021	33188
Microphone pre-amplifier serial no. 5308	MA220	Neutrik	24/10/2021	33189
Microphone calibrator serial no. 34541	NOR-1251	Norsonic	24/10/2021	33187
Kit 6				
Precision sound level meter serial no. A2A-13211-E0	XL2-TA	NTi Audio	14/08/2021	32575
Microphone serial no. A14465	MC230A	NTi Audio	14/08/2021	32575
Microphone pre-amplifier serial no. 6869	MA220	Neutrik	14/08/2021	32575
Microphone calibrator serial no. 9022	CAL200	Larson Davis	14/08/2021	U32573

Calibration level Kit 3: 114.0 dB @ 1 kHz

Calibration level Kit 6: 113.9 dB @ 1 kHz

Person in charge of measurements: George Moore AMIOA

Assisted by: Gary Percival MIOA

Measurement parameters: Octave band $L_{eq,\ 15\ min.}$