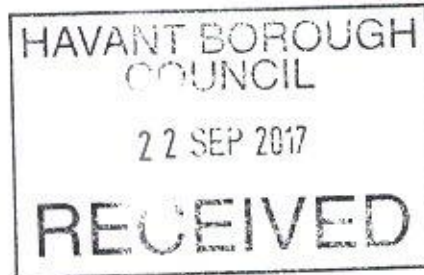




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**NORTHNEY MARINA
HAYLING ISLAND**

NOISE ASSESMENT

Technical Report: R7086-1 Rev 0

Date: 15th September 2017

For: Luken Beck
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24 Acoustics Document Control Sheet**Project Title:** Northney Marina, Hayling Island – Noise Assessment**Report Ref:** R7086-1 Rev 0**Date:** 15th September 2017

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Document Status and Approval Schedule

Revision	Description	Prepared By	Approved By
0	Approved for issue	Kiel Edwards	Stephen Gosling

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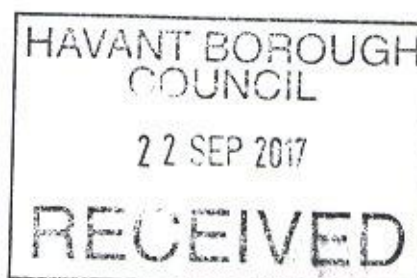
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1.0 INTRODUCTION

- 1.1 National Regional Property Group are to develop residential accommodation at Northney Marina in Hayling Island. 24 Acoustics has been appointed by Lucken Beck, on behalf of National Regional Property Group, to undertake a noise assessment for the office to residential permitted development.
- 1.2 An explanation of acoustical terms used in this report is provided in Appendix A. All sound pressure levels in this report are given in dB re: 20 μ Pa.

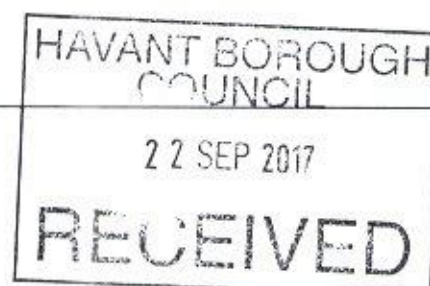
2.0 SITE DESCRIPTION

- 2.1 The building is located at Northney Marina, Hayling Island, an industrial harbour with main uses as storage for privately owned yachts and boats. Distant road traffic and industrial noise are the dominant sources in the vicinity.
- 2.2 The development will consist of 21 flats, retaining existing entrances, stairwells and windows.
- 2.3 The northern and south-eastern boundaries of the building overlook car parking and boat storage areas. Industrial units lie to the south with the main access road to Northney Marina to the south west. The site location is shown in Figure 1.

3.0 ASSESSMENT CRITERIA

National Planning Policy Framework and Noise Policy Statement for England

- 3.1 The National Planning Policy Framework (NPPF) [Reference 1] was published by the Department for Communities and Local Government in 2012. For noise the NPPF policy states that planning policies and decisions should aim to:
 - Avoid noise giving rise to significant adverse impacts on health and quality of life as a result of new development;
 - Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions, while recognising that many developments will create some noise.



3.2 The NPPF also refers to the Noise Policy Statement for England (NPSE) [Reference 2] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term vision to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development' which 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;

3.3 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'. The following guidance is provided within the NPSE:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

3.4 The Planning Practice Guidance (PPG) [Reference 3] is written to support the NPPF with more specific planning guidance. The PPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also states that opportunities should be taken, where practicable, to achieve improvements to the acoustic environment. The NPPG states that noise can over-ride other planning concerns but should not be considered in isolation from the other economic, social and environmental dimensions of the proposed development.

3.5 The PPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system.



- 3.6 The documents described above do not refer to specific noise criteria. For residential developments 24 Acoustics considers that the spirit of the requirements of the NPPF and NPSE will be complied with if relevant criteria from British Standard 8233 'Guidance on sound insulation and noise reduction for buildings', 2014 [Reference 4] and the World Health Organisation, Guidelines for Community Noise, 2000 [Reference 5] are adopted for internal noise within dwellings.

BS 4142: 2014

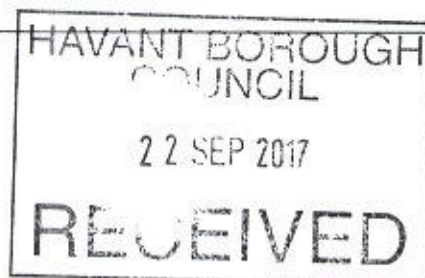
- 3.7 BS 4142: 2014 is similar in its approach to BS 4142:1997, however, its scope has been widened to include commercial sound (noise). Like BS 4142:1997 the standard advocates a comparison between the typical measured LA90 background noise level and LAeq noise level from the source being considered. For rating purposes if the noise source is tonal, or impulsive in character, a rating correction is applied. The standard states that a difference between the rating level and the background level of around +10 dBA is an indication of a 'significant adverse impact', depending on the context and a difference of around +5 dBA is likely to be an indication of an adverse impact again depending on the context. Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact (depending upon the context).
- 3.8 There are several technical inconsistencies with the latest revision of BS 4142 which make a detailed study inappropriate (a corrigendum picking up these errors is expected shortly). Further it is beyond the scope of this report to provide an assessment of the rating and frequency of use of equipment used by the boatyard. This is because of the approach to use alternative standards via Section 8.5 of BS 4142 (such as BS 8233: 2014) is considered appropriate.

BS 8233: 2014

- 3.9 BS 8233 provides internal design sound levels for desirable conditions inside habitable rooms due to external noise sources. Table 1 shows a summary of the maximum noise levels recommended in BS 8233 for habitable rooms.

Criterion	Typical Situation	Design Noise Levels	
		07:00 to 23:00 Hours (dB LAeq, 16 hour)	23:00 to 07:00 Hours (dB LAeq, 8 hour)
Resting	Living room	35	-
Sleeping (daytime resting)	Bedroom	35	30

Table 1 - Indoor Ambient Noise Levels BS 8233: 2014



WHO Guidelines for Community Noise

- 3.10 The World Health Organisation (WHO) provides guidance on desirable internal noise levels to minimise the risk of sleep disturbance. The WHO 2000 Guidelines for Community Noise suggest internal noise levels not exceeding 30 dB $L_{Aeq, 8hr}$ or regularly exceeding 45 dB $L_{Amax,f}$ for 'a good night's sleep'.
- 3.11 Further studies referenced in the WHO publication indicate that 10 - 15 events per night (with a noise level greater than 45 dB $L_{Amax,f}$) are required to cause interference with sleep. 24 Acoustics' interpretation is to base the design on the typical (tenth highest measured event) $L_{Amax,f}$ sound pressure level.

Summary

- 3.12 Based on the guidance of BS 8233: 2014, the WHO guidance and the industrial nature of the observed noise sources in the area, maximum internal noise levels for habitable rooms of 30 dB $L_{Aeq, 16\text{ hour}}$ for daytime periods and 25 dB $L_{Aeq, 8\text{ hour}}$ (40 dB $L_{Amax, 8\text{ hour}}$) for night-time periods have been used in this assessment. These values are 5 dB lower (better) than the targets given in BS 8233.

4.0 ENVIRONMENTAL NOISE MEASUREMENTS

Instrumentation and Procedure

- 4.1 Ambient noise measurements were undertaken between 21st and 30th September 2017 at the location shown in Figure 1.
- 4.2 Equipment was set up on the southern boundary of the building (free field, approximately 3 metres above ground level) and is representative of the façades most affected by noise from industrial sources and vehicle movements.
- 4.3 The instrumentation was set up to monitor noise levels continuously and store the L_{eq} , L_{90} and L_{max} parameters in 5 minute intervals using fast time weighting. Octave band data was obtained to inform the acoustic design and the following instrumentation was used:

- Rion Type NL52 precision grade Type 1 sound level meter;
- Brüel & Kjær type 4231 acoustic calibrator.



- 4.4 Calibration of the equipment was verified before and on completion of the measurements and no drift was recorded. Noise measurements were made with reference to BS 7445: 1991 'Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use' [Reference 6].

Measurement Results

- 4.5 The results of the environmental noise measurements at Location 1 are described in Figure B and summarised in Table 2.

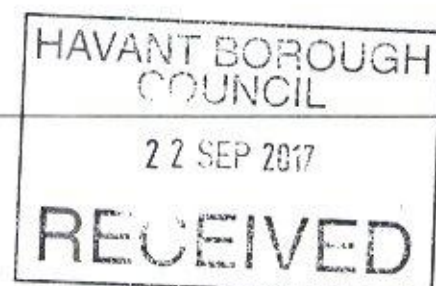
Measured Daytime Level, dB LAeq 16 hour (07:00 - 23:00)	Measured Night Time Level, (23:00 - 07:00)	
	dB LAeq, 8 hour	Typical dB LAmax,f
49	43	47

Table 2 Location 1 – Measured Noise Levels

- 4.6 24 Acoustics assumes the representative maximum (L_{Amax}) value as the tenth highest over the night-time period.
- 4.7 Calculations have been made to determine the influence of industrial noise across the building. These calculations take into consideration distance losses and screening.

5.0 ANALYSIS & RECCOMENDATIONS

- 5.1 Calculations have been undertaken to determine the glazing performance requirements to achieve the internal noise criteria given in BS 8233: 2014.
- 5.2 For calculation purposes, it has been assumed that both the roof and wall constructions are likely to achieve a minimum sound insulation performance of 50 dB R_w . This assumption should be verified through site surveys during detailed design. Further advice can be provided on request.
- 5.3 In the absence of room layout plans, calculations have been based on total unit size from current drawings available. Further calculations will be required once internal room layouts are known.
- 5.4 The required glazing types for habitable rooms are described in Appendix C and the relevant glazing specifications are provided in Table 3.



Glazing Type	Minimum Octave (Hz) Band Sound Reduction Index, dB					
	125	250	500	1k	2k	4k
GL1	21	17	25	35	37	31

Table 3 Glazing Sound Insulation Specification

- 5.5 In making a comparison with the glazing acoustic specification in Table 3, it is important that the sound insulation values used are the result of tests in accordance with ISO 10140, Part 2: 2010. The quoted minimum sound reduction specifications should be met by the entire glazing system as a whole, including frames, seals, any insulated panels and not just the glass.
- 5.6 For guidance, the following glazing configuration would be capable of achieving the required sound reduction performance if installed correctly (i.e. with appropriate frames and seals, etc.):
- Glazing Type GL1 (approximately 29 dB R_w):
4 mm glass / 16 mm air cavity / 4 mm glass.
- 5.7 Please note that the sound insulation requirements in Table 3 also apply to external doors to habitable rooms.
- 5.8 Due to the industrial nature of the surrounding environment and associated noise sources it is recommended to provide alternative forms of ventilation in all habitable rooms (bedrooms and living rooms).
- 5.9 For guidance, the following ventilator would be suitable if installed correctly, further guidance can be provided on request:
- SonAir F+ VKC242 tube, mineral wool in wall cavity.



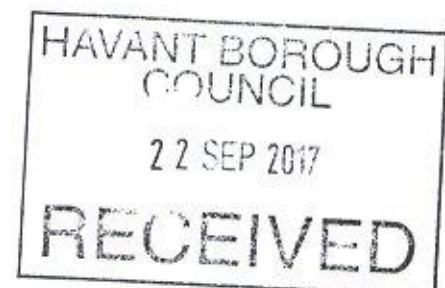
6.0 CONCLUSIONS

- 6.1 Lucken Beck, on behalf of National Regional Property Group, has instructed 24 Acoustics Ltd to undertake a noise impact assessment for a development at Northney Marina, Hayling Island. This report has addressed the impact of local noise on the proposed dwellings.
- 6.2 Environmental noise measurements have been undertaken at the site to determine existing noise levels during daytime and night-time periods.
- 6.3 Recommendations have been provided for glazing performances to habitable rooms. It is concluded that, with the recommended measures given, noise within habitable rooms, would comply with the maximum internal levels established with reference to BS 8233: 2014.



REFERENCES

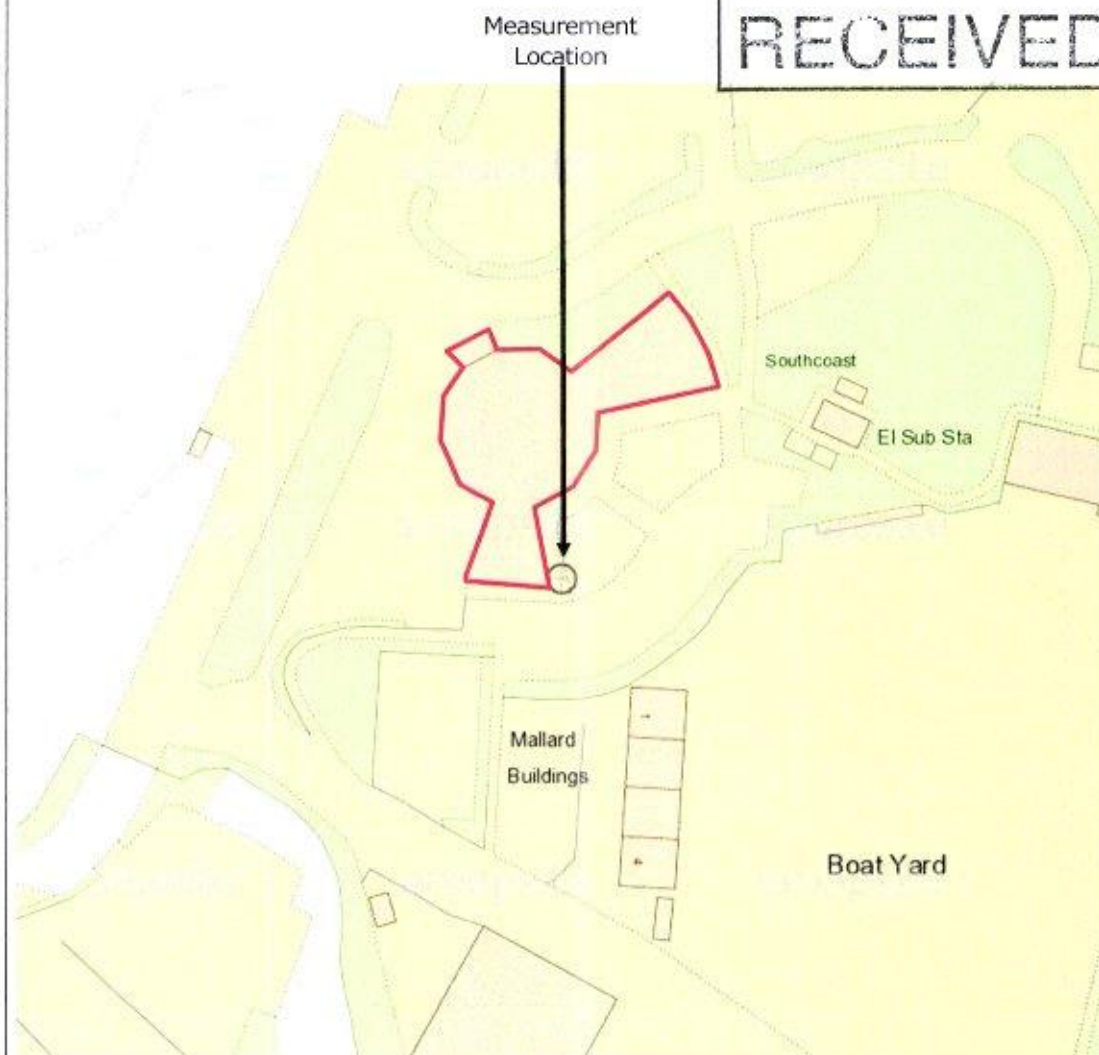
1. Department for Communities and Local Government. National Planning Policy Framework, March 2012.
2. DEFRA, Noise Policy Statement for England, March 2010.
3. Planning Practice Guidance, Department of Communities and Local Government (revised December 2014).
4. British Standards Institution. British Standard 8233: Guidance on sound insulation and noise reduction for buildings, 2014.
5. World Health Organisation, Guidelines for Community Noise, 2000.
6. British Standards Institution. British Standard 7445: 1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use.



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Project: Northney Marina, Hayling Island.	Title: Existing Site Layout and Measurement Location.		 24Acoustics
DWG No: Figure 1	Scale: N.T.S.	Rev: A	
Date: September 2017	Drawn By: KE	Job No: 7086	

APPENDIX A: ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dBA is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dBA. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dBA corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

- i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

- ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

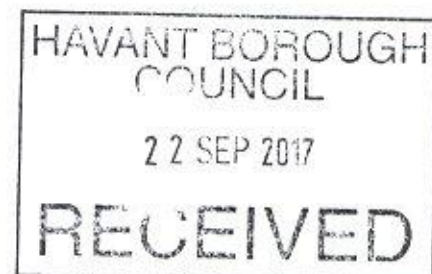


iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

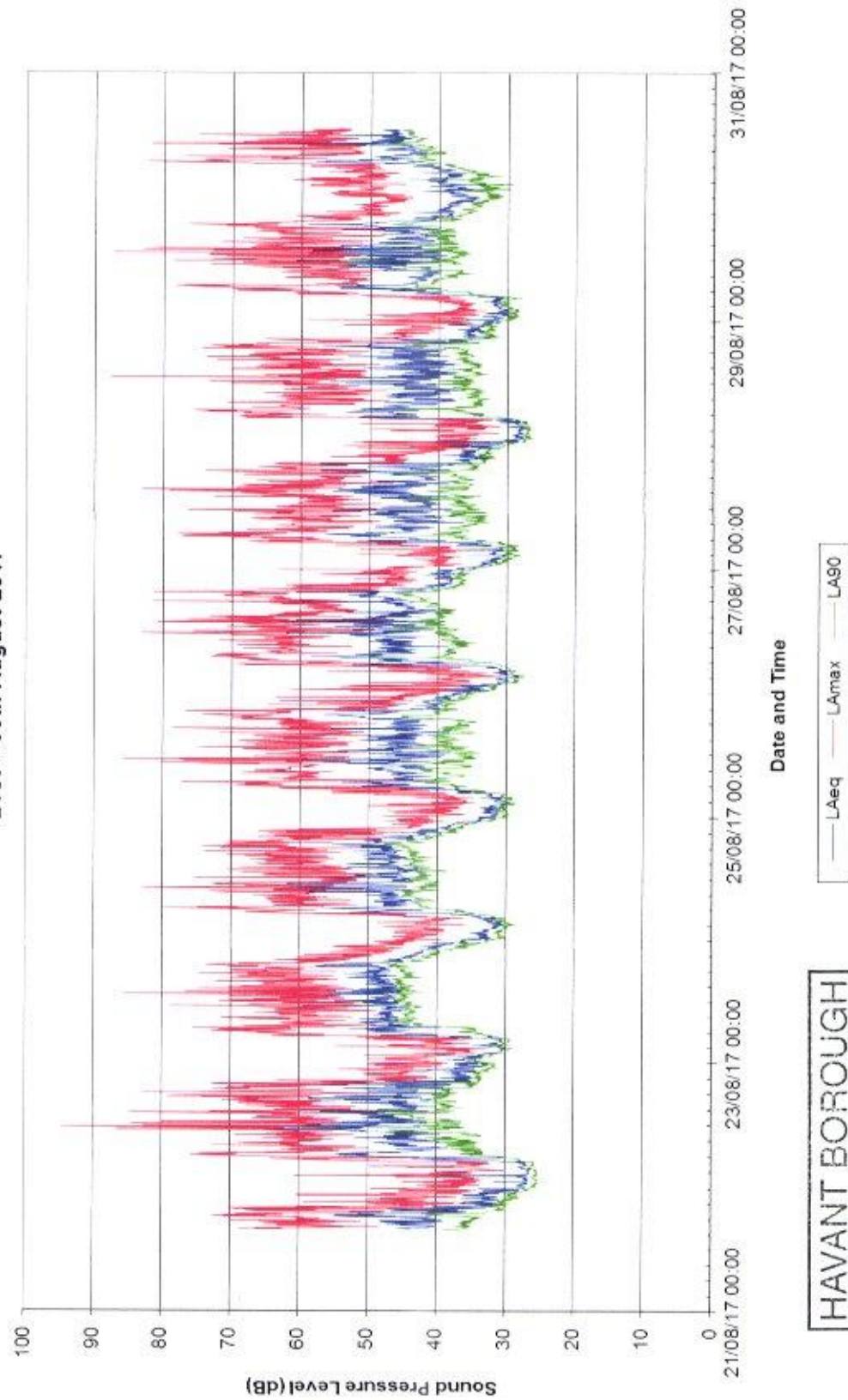
iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.



APPENDIX B: ENVIRONMENTAL NOISE MEASUREMENTS

Northney Marina Measurement Results
21st - 30th August 2017



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APPENDIX C: SOUND INSULATION REQUIREMENTS

