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Project:

The Friendship Inn, Barnsley

Title:

**Plant Noise Impact Assessment
Planning Report**

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1 INTRODUCTION

- 1.01 Environmental Equipment Corporation Limited has been commissioned by Walbrook Management LLP to undertake an ambient noise survey at The Friendship Inn, Barnsley, with a view to ascertaining prevailing background noise levels for the immediate vicinity.
- 1.02 Proposals are being submitted to Barnsley Metropolitan Borough Council to develop the site of an existing public house into a new food retail store. As part of the development it is proposed to install items of external mechanical services plant. Noise levels from the plant need to be assessed as part of the planning application and are therefore addressed in this report.
- 1.03 This report is prepared solely for Walbrook Management LLP. Environmental Equipment Corporation Ltd accepts no responsibility for its use by any third party.

2 SITE

- 2.01 The proposed store is to occupy the detached and currently vacant building of the Friendship Inn public house in Barnsley. The site is situated in a predominantly residential area on Redbrook Road, in between Limes Avenue and Intake Lane.
- 2.02 The proposed store is to occupy the ground floor of the building, divided between the sales floor and back of house area. A small proportion of the ground floor and the upper floors are to remain as the Landlord's demise.
- 2.03 It is proposed that the mechanical services and refrigeration plant is to be located in a weld mesh enclosure against the rear wall of the store, as shown in Photo 2.1. There is a small area of garden to the rear of the site which is overlooked by several residential dwellings, as shown in Photo's 2.2 and 2.3. These dwellings will have a direct line of site to the plant location and will form the nearest noise sensitive properties, the closest of which will be approximately 18m from the plant location.
- 2.04 Appendix A shows a plan of the site and indicates the proposed plant location and properties in the surrounding area.



Photo 2.1: The plant location on the rear of the building

Nearest
residential
windows



Residential
windows



Photo's 2.2 and 2.3: A view from the plant location to the nearest residential dwellings

3 MEASUREMENTS

- 3.01 Background noise levels have been measured over an extended period at a suitable location, representative of the immediate noise environment, as shown on the site plan in Appendix A.
- 3.02 The equipment was set up to integrate sound levels over 5 minute intervals for 24 hours between 1435hrs, Thursday 23rd and 0815hrs, Friday 24th February 2012. Levels were recorded as A weighted L_{eq} , L_{10} and L_{90} .
- 3.03 Weather conditions during the survey were calm and dry throughout.

4 EQUIPMENT

4.01 Equipment for the survey was as follows:-

- Brüel & Kjær type 2250 Light Integrating Sound Level Meter conforming to Class 1 BS EN 61672, Type 1 BS EN 60804 & BS EN 60651: 1994.
- Brüel & Kjær Condenser Microphone type 4950.
- Brüel & Kjær Outdoor Microphone, type 4952/UA1679.
- Tripod.

4.02 The equipment holds current UKAS or equivalent accreditation and serial numbers as follows:

Sound Level Meter B&K2250	Serial No.	2766725
	Calibration Date	14.6.11
	Cal Certificate No.	C1104527
Outdoor Microphone B&K 4952	Serial No.	2751633
	Calibration Date	17.6.11
	Cal Certificate No.	C1104663
Calibrator B&K4231	Serial No.	1761563
	Calibration Date	18 th October 2011
	Cal. Certificate No.	00577/1

N.B. Copies of calibration certificates are available upon request.

4.03 The equipment was calibrated both before and after the survey with no difference noted in the levels.

5 RESULTS

5.01 A list of the levels measured is included in Appendix B and represented graphically in Appendix C.

5.02 A summary of the time averaged ambient level and lowest measured background levels are shown in Table 5.1, below.

Period	$L_{Aeq,T}$ – dB	L_{A90} – dB
Day time (0700-1900 hrs)	59.8	48.1
Evening (1900-2300 hrs)	50.3	39.1
Night-time (2300-0700 hrs)	46.0	35.1

Table 5.1: Measured Ambient and Lowest Background Noise Levels

6 DISCUSSION

- 6.01 Informal discussions have taken place with Steve Billcliffe, an Environmental Health Officer (EHO) with Barnsley Metropolitan Borough Council who advises the Local Planning Authority (LPA) on matters of noise from fixed plant. Subsequently it has been established that the LPA's general noise policy is based on the guidance given by the World Health Organisation (WHO).
- 6.02 The WHO provide guidance as to suitable internal and external noise levels in and around residential properties. They state that noise levels should not exceed 35 dB L_{Aeq} in living rooms during the daytime, and 30 dB L_{Aeq} in bedrooms through the night-time period. Allowing for a nominal 10-15 dB of attenuation afforded by a partially open window this corresponds to a maximum external noise level at 1m from the residential windows of 45 dB(A) during the daytime and 40 dB(A) during the night-time.
- 6.03 There is, however, a potential risk of noise complaints from the local residents as a result of adopting the LPA guidance since it will lead to a substantial cumulative increase in the existing background noise level. To reduce the likelihood of complaints it is proposed that more stringent criteria is enforced such that the noise levels generated by the mechanical services plant shall be designed to a level that does not exceed the lowest measured background level during the proposed period of operation, as measured at the nearest residential windows. The relevant criteria are summarised in Table 6.1 below:

Period	Location	Design basis	L_{Aeq} – dB
Day time (0700-2300 hrs)	Outside residential window	WHO guidelines (LPA criteria)	45
Night-time (2300-0700 hrs)			40
Day time (0700-2300 hrs)	Outside residential window	Existing background (Proposed criteria)	39
Night-time (2300-0700 hrs)			35

Table 6.1: Project Design Noise Criteria

- 6.04 The proposed design criteria are more stringent than that issued by the LPA and consequently satisfying them will also satisfy the Local Authorities requirements and ensure the likelihood of complaints is of less than marginal significance.
- 6.05 It is understood that plant will operate 24 hours a day, however, there will be a reduced operational load through the night-time period, as detailed in Section 7.

7 PLANT ASSESSMENT

- 7.01 The proposed plant consists of 1 No MGB134H-EC355 refrigeration condenser unit, located at the rear of the store as shown in Appendix A. The manufacturer's published noise levels for the unit are 36 and 28 dB(A) at 10m free-field for the respective daytime and night-time operational periods.
- 7.02 The plant area will also include 3 No wall mounted Mitsubishi air conditioning condenser units. These are 2 No PUHZ-RP125VHA2 units, with a manufacturer's published noise level of 52 dB(A) each at 1m free-field, and 1 No MUZ-GE25 unit, with a manufacturer's published noise level of 48 dB(A) at 1m free-field. During the night-time, only the single smaller AC unit will operate.

7.03 Allowing for distance attenuation, the cumulative plant noise level outside the nearest residential windows has been calculated as indicated in Tables 7.1 – 7.3 below:

Element	Daytime Level	Night-time Level	Comments
Refrigeration Condenser Source Noise	36 dB(A)	28 dB(A)	Based on 1 No unit at 10m
Distance Correction	- 5 dB		Conformal area losses over 18m
Directivity	+ 3 dB		1 No additional reflective surface
Propagated Noise	34 dB(A)	26 dB(A)	1m outside nearest residential windows

Table 7.1: Refrigeration Condenser Noise Calculation

Element	Daytime Level	Night-time Level	Comments
AC Unit Source Noise	56 dB(A)	48 dB(A)	Based on 3 No units daytime / 1 No unit night-time at 1m
Distance Attenuation	- 21 dB		Conformal area losses over 18m
Directivity	+ 3 dB		1 No additional reflective surface
Propagated Noise	38 dB(A)	30 dB(A)	1m outside nearest residential windows

Table 7.2: AC Condenser Plant Noise Calculation

Element	Daytime Level	Night-time Level	Comments
Propagated Refrigeration Condenser Noise	34 dB(A)	26 dB(A)	1m outside nearest residential windows
Propagated AC unit Noise	38 dB(A)	30 dB(A)	1m outside nearest residential windows
Cumulative Propagated Noise	39 dB(A)	32 dB(A)	1m outside nearest residential windows

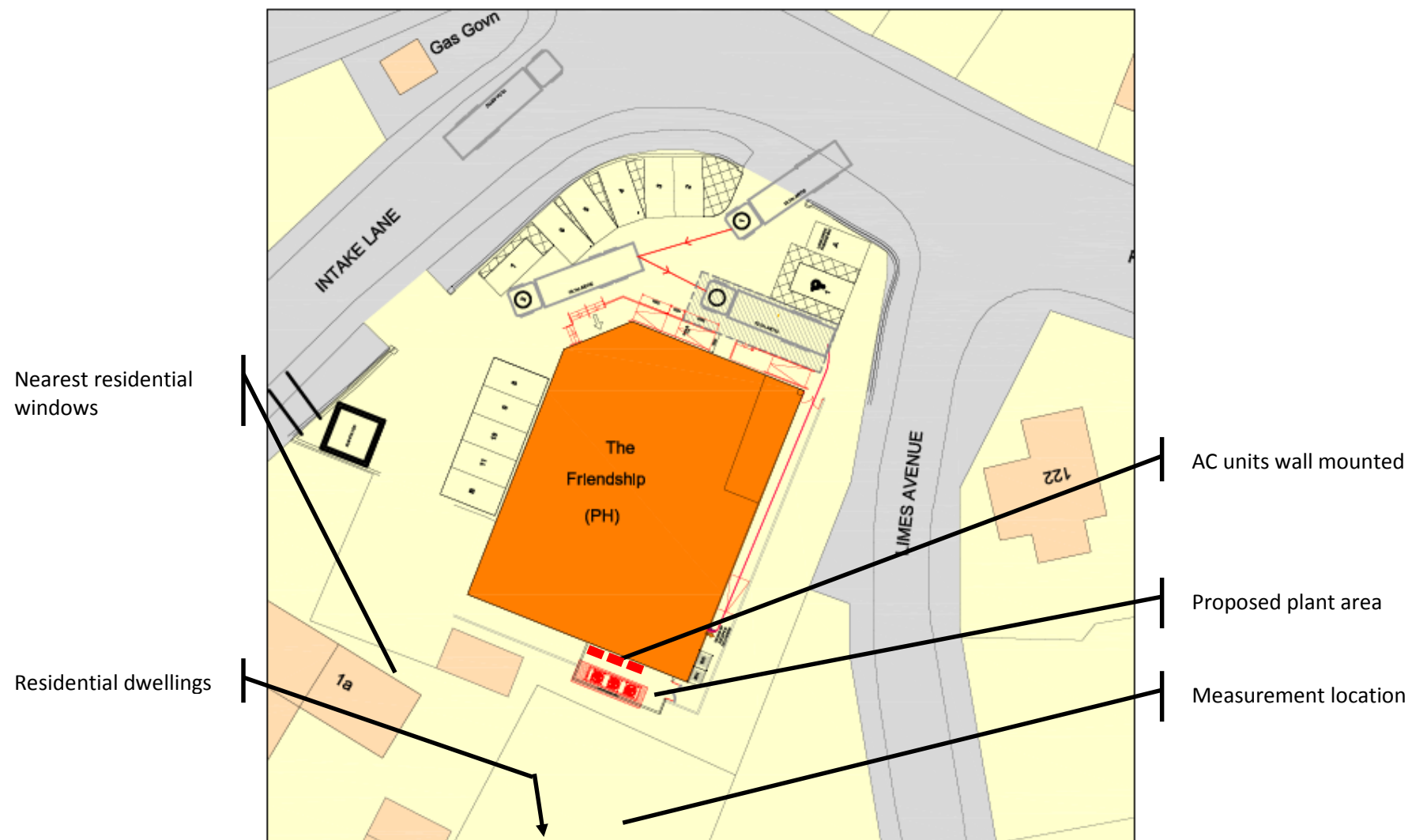
Table 7.3: Cumulative Plant Noise Calculation

7.04 As discussed in section 6 of this report, the applicable noise level design criterion for the proposed plant has been set at 39 and 35 dB(A) for the respective daytime and night-time periods outside the nearest noise sensitive windows.

7.05 The calculated plant noise levels are within the proposed design criterion and are also within the guidance provided by the WHO. Consequently the planning requirements of Barnsley Metropolitan Borough Council are satisfied.

APPENDIX A

**SITE PLAN
&
MEASUREMENT LOCATION**



APPENDIX B
SURVEY RESULTS
(TABULAR)

EC 12043 - The Friendship Inn, Barnsley

Walbrook Management LLP

24 Hour Noise data

Sheet 1 of 3

Time	L _{Aeq}	L _{A10}	L _{A90}
14:35	74	55	49
14:40	51	52	49
14:45	52	53	50
14:50	52	53	50
14:55	54	54	50
15:00	51	52	50
15:05	52	54	49
15:10	52	53	50
15:15	51	53	49
15:20	52	53	50
15:25	53	54	50
15:30	53	54	51
15:35	52	53	50
15:40	52	53	50
15:45	51	53	50
15:50	53	54	51
15:55	52	54	50
16:00	52	54	50
16:05	52	53	50
16:10	53	55	50
16:15	52	54	50
16:20	53	54	50
16:25	52	54	50
16:30	54	53	50
16:35	51	53	50
16:40	54	55	51
16:45	61	64	51
16:50	62	64	60
16:55	62	64	60
17:00	59	62	52
17:05	52	53	51
17:10	52	53	51
17:15	53	54	51
17:20	52	53	51
17:25	52	52	51
17:30	53	53	50
17:35	53	54	50
17:40	52	53	50
17:45	53	53	50
17:50	52	52	49
17:55	52	54	49
18:00	51	53	49
18:05	55	54	50
18:10	52	54	50
18:15	52	54	50
18:20	51	52	50
18:25	52	53	51
18:30	52	53	51

Time	L _{Aeq}	L _{A10}	L _{A90}
18:35	52	53	51
18:40	60	56	51
18:45	52	53	50
18:50	51	52	49
18:55	51	52	49
19:00	52	53	50
19:05	52	54	51
19:10	53	54	51
19:15	53	54	52
19:20	53	54	52
19:25	53	54	51
19:30	52	53	51
19:35	52	53	51
19:40	53	55	51
19:45	52	53	50
19:50	52	54	50
19:55	51	52	50
20:00	51	52	49
20:05	50	51	49
20:10	50	51	48
20:15	50	51	48
20:20	49	51	48
20:25	50	51	48
20:30	50	51	48
20:35	50	52	48
20:40	50	51	48
20:45	50	52	48
20:50	50	51	48
20:55	50	51	47
21:00	49	51	47
21:05	50	51	48
21:10	50	51	48
21:15	49	50	47
21:20	48	50	47
21:25	49	50	46
21:30	49	51	47
21:35	49	51	46
21:40	49	51	47
21:45	50	51	47
21:50	48	49	46
21:55	47	49	45
22:00	47	49	45
22:05	49	51	45
22:10	49	52	45
22:15	58	50	44
22:20	44	46	42
22:25	44	45	42
22:30	44	46	41

EC 12043 - The Friendship Inn, Barnsley

Walbrook Management LLP

24 Hour Noise data

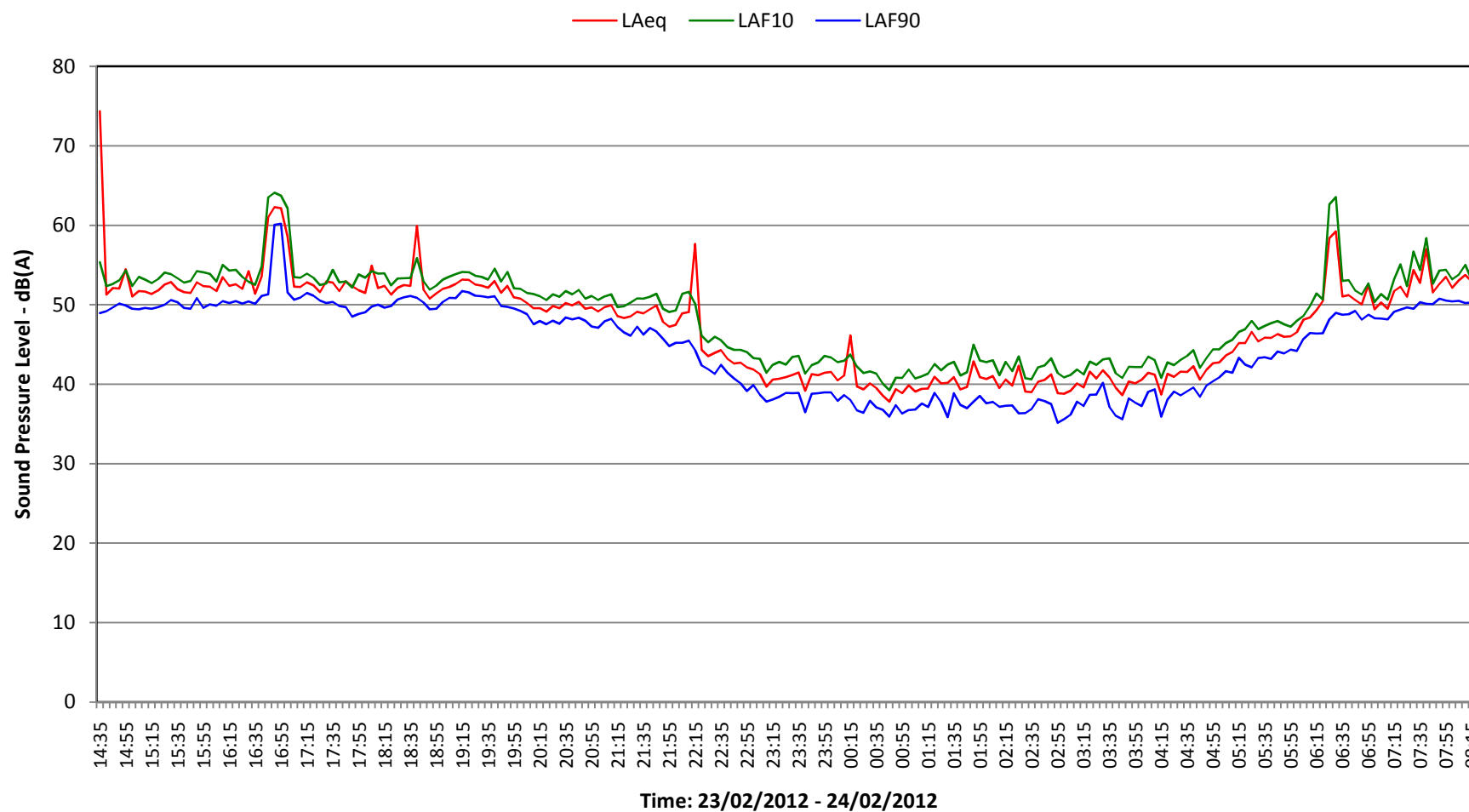
Sheet 2 of 3

Time	L _{Aeq}	L _{A10}	L _{A90}
22:35	44	46	42
22:40	43	45	41
22:45	43	44	41
22:50	43	44	40
22:55	42	44	39
23:00	42	43	40
23:05	41	43	39
23:10	40	41	38
23:15	41	42	38
23:20	41	43	38
23:25	41	42	39
23:30	41	43	39
23:35	41	44	39
23:40	39	41	36
23:45	41	42	39
23:50	41	43	39
23:55	41	44	39
00:00	42	43	39
00:05	40	43	38
00:10	41	43	39
00:15	46	44	38
00:20	40	42	37
00:25	39	41	36
00:30	40	42	38
00:35	40	41	37
00:40	39	40	37
00:45	38	39	36
00:50	39	41	37
00:55	39	41	36
01:00	40	42	37
01:05	39	41	37
01:10	39	41	38
01:15	39	41	37
01:20	41	43	39
01:25	40	42	38
01:30	40	42	36
01:35	41	43	39
01:40	39	41	37
01:45	40	42	37
01:50	43	45	38
01:55	41	43	39
02:00	41	43	38
02:05	41	43	38
02:10	40	41	37
02:15	41	43	37
02:20	40	42	37
02:25	42	44	36
02:30	39	41	36

Time	L _{Aeq}	L _{A10}	L _{A90}
02:35	39	41	37
02:40	40	42	38
02:45	41	42	38
02:50	41	43	37
02:55	39	41	35
03:00	39	41	36
03:05	39	41	36
03:10	40	42	38
03:15	40	41	37
03:20	42	43	39
03:25	41	42	39
03:30	42	43	40
03:35	41	43	37
03:40	40	41	36
03:45	39	41	36
03:50	40	42	38
03:55	40	42	38
04:00	41	42	37
04:05	41	43	39
04:10	41	43	39
04:15	39	41	36
04:20	41	43	38
04:25	41	42	39
04:30	42	43	39
04:35	42	44	39
04:40	42	44	40
04:45	41	42	38
04:50	42	43	40
04:55	43	44	40
05:00	43	44	41
05:05	44	45	42
05:10	44	46	41
05:15	45	47	43
05:20	45	47	42
05:25	47	48	42
05:30	45	47	43
05:35	46	47	43
05:40	46	48	43
05:45	46	48	44
05:50	46	48	44
05:55	46	47	44
06:00	47	48	44
06:05	48	49	46
06:10	48	50	46
06:15	49	51	46
06:20	50	51	46
06:25	58	63	48
06:30	59	64	49

APPENDIX C
SURVEY RESULTS
(GRAPHICAL)

Noise Level Time History at The Friendship Inn, Barnsley



APPENDIX D

GLOSSARY OF TECHNICAL TERMS

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TECHNICAL TERMS AND UNITS

Decibel (dB) - This is the unit used to measure sound. The human ear has an approximately logarithmic response to sound over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). We therefore use a logarithmic scale to describe sound pressure levels, intensities and power levels. The logarithms used are to base 10; hence, an increase of 10 dB in sound pressure level corresponds to a doubling in perceived loudness of the sound.

Sound Power Level (SWL) - This is a function of the noise source alone and is independent of its surroundings. It is a measure of the amount of sound power output measured in decibels.

Sound Pressure Level (SPL) - This is a function of the source and its surroundings and is a measure of the sound pressure at a point in space. For example, a sound pressure level measured at 1 metre from a sound source of certain sound power in reverberant room will not be the same as the sound pressure level a 1 metre from the sound source measured in open space.

Octave and One-Third Octave Bands - The human ear is sensitive to sound over a range of approximately 20 Hz to 20 KHz and is generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum is divided into frequency bands and the sound pressure level is measured in each band. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For finer analysis, each octave band may be split into one-third octave bands.

"A" Weighting - A number of frequency weightings have been developed to imitate the ear's varying sensitivity to sound of different frequencies. The most commonly used weighting is the "A" weighting. The "A" weighted SPL can be measured directly or derived from octave or one-third octave band SPLs. The result is a single figure index which gives some idea of the subjective loudness of the sound, but which contains no information as to its frequency content.

Noise Rating (NR) Curves - The "A" weighted sound pressure level cannot be used to define a spectrum or to compare sounds of different frequencies. NR curves convey frequency information in a single-figure index. This is done by defining the maximum permissible sound pressure level at each frequency for each curve. To measure the noise rating of a given environment, the SPL is measured in octave or one-third octave bands and the noise rating is then the highest NR curve touched by the measured levels.

Intermittency and Time-Weighting - The degree of annoyance caused by a noise also depends on its duration and intermittency of a noise. Intermittent, impulsive or repetitive noises tend to be more annoying than continuous noises. Various time-weightings have been derived to measure sounds of differing intermittences and these can be measured directly on modern equipment. The most common time-weightings in use are as follows:-

L_{90} This is the sound pressure level exceeded for 90% of the measurement period. It is widely used to measure background noise levels.

L_{10} This is the sound pressure level exceeded for 10% of the measurement period. It is widely used to measure traffic noise. For a given measurement period, the L_{10} level is by definition greater than or equal to the L_{90} level.

L_{eq} The equivalent continuous noise level is often used to measure intermittent noise. It is defined as the notional steady noise level that would contain the same acoustic energy as the varying noise. Because the averaging process used is logarithmic, the L_{eq} level tends to be dominated by the higher noise levels measured.