

**Kellogg's Company
Of
Great Britain Ltd
Wrexham**



**Boundary Noise Measurements Survey
October 2014**

Report prepared for & on behalf of:

**Kellogg Company of Great Britain Ltd
Bryn Lane
Wrexham Industrial Estate
Wrexham
LL13 9UT**

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Executive Summary

QES Ltd has been commissioned by Kellogg's Company of Great Britain Ltd to conduct two separate noise surveys based on BS 4142: 1997, BS 8233:1999 and WHO guidelines.

1. Internal noise measurements covering the Kellogg's plant site perimeter; as shown in **Appendix 3**
2. External noise measurements, as shown in **Appendix 4**

1.0 Introduction

QES Ltd has been commissioned by Kellogg's Company of Great Britain to conduct two separate noise survey assessments which cover the internal perimeter of the plant and the external part surrounding the plant.

As part of the noise assessment survey QES Ltd has undertaken the task to quantify the noise levels emitted from the site and measured at the receptors as indicated in Appendices 3 and 4.

The final report will detail the approach and the findings of the assessment which will be submitted to the Regulatory body namely National Resources Wales (NRW) as part of the Environmental Permitting conditions.

This noise assessment is made up of two parts:

Part1: Covers the internal perimeter of the plant as carried out in previous noise surveys as shown in appendix 3. The total number of measured locations around the site is fifty five points.

Part 2: Covers the external area surrounding the plant as shown in Appendix 2. This noise assessment survey covers seven specifically selected points located in the vicinity of the plant.

The noise assessment survey was carried out in the month of October 2014 which represents a typical operational month at the kellogg's plant in Wrexham.

The noise assessment survey was carried out over 5 consecutive days and nights starting on 4th October, 2014 and was completed on 9th October, 2014.

2.0 Project Brief

The main objectives of the noise survey were based on the following assessment guidelines:

- All the noise measurements were taken at the various locations as indicated by Appendices 3 and 4. These noise measurements were taken in order to quantify the noise levels likely to be experienced at the nearest receptor points.
- All the noise measurements were taken in accordance to the guidelines BS 4142 :1997 Method for rating Industrial Noise affecting Mixed Residential and Industrial Areas.

BS 4142:1997 (BSI 1997) is intended to be used to assess whether noise from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises.

All the noise measurements were taken over a period of 5 consecutive nights and day starting on 4th October, 2014 and completed on 9th October, 2014 in order to give a reasonable representation for the assessment.

- Noise measurements recorded internally and externally to the manufacturing plant were in accordance with the World Health Organization (BS 8233:1999) Sound Insulation and Noise Reduction for Buildings – Code of Practice.
- Noise Measurements were recorded internally and externally using 1/3 Octave shown in Appendices 7 and 8

3.0 Policy and Guidance Documentation

- 3.1 BS 8233:1999 Sound Insulation and noise Reduction for Buildings – code of Practice.
- 3.2 Section 7.6.1.2 of BS 8233 – Design criteria and limits for intrusive external noise, states that:
“For dwellings the main criteria are reasonable resting/sleeping conditions in bedrooms and good listening conditions in other rooms”.
- 3.3 These recommended criteria are given in Table 1.

Criterion	Typical Situation	Design range $L_{Aeq,T}$ dB	
		Good	Reasonable
Reasonable resting/sleeping conditions f f	Living rooms	30	40
	Bedrooms	30	35
For reasonable standard in bedrooms at night, individual noise events (measured with F time-weighting) should not normally exceed 45 dB L_{Amax} .			

Table1: BS 8233 recommended indoor ambient noise levels in spaces when they are unoccupied.

- 3.4 BS 8233 states, in respect of external noise in gardens or on balconies, that ‘it is desirable that the steady noise level does not exceed 50 $L_{Aeq,T}$ dB and 55 $L_{Aeq,T}$ should be regarded as the upper limit.
- 3.5 The design standards above apply to the appropriate time period for the activity involved. The WHO document on which the standards are based identifies that the daytime noise standard applies to a 16 –hour day while the night-time applies to an 8-hour night. In BS 8233 night-time is classified as 23:00 to 07:00.
- 3.6 To achieve a good standard of internal amenity a high quality design should ensure that night-time noise levels inside bedrooms with windows closed will not exceed 30dB $L_{Aeq, 8h}$.
- 3.7 Daytime noise levels would normally be expected to be higher than night-time noise levels, therefore achieving a good stand of amenity does not require that the same noise level should apply in living rooms or bedrooms during the daytime. However, good amenity will only be maintained providing the daytime internal noise levels in habitable rooms do not exceed 40dB $L_{Aeq,16h}$, which is defined in BS 8233:1999 as reasonable standard for living rooms.

4.0 Measurements

- 4.1 The sound level meter was calibrated before use See Appendix 5.
- 4.2 Measurements were logged, over continuous 1 – minute periods using the fast-time weighting throughout the entire noise assessment survey.
- 4.3 For the purpose of this report all sound pressure levels are in dB.
- 4.4 For the purposes of this report all measured values are rounded to the nearest whole number with 0.5 being rounded up.
- 4.5 The measurements recorded were Overall L_{eq} , L_{max} , L_{min} , L_{90} and P_{max} .
- 4.6 The noise measurement survey was carried out from 4th October, 2014 and was completed on 9th October, 2014.
- 4.7 Measurements were made with reference to:
 - BS 4142: 1997
 - BS 8233: 1999

5.0 Internal and External Layouts covering the Noise Survey

The Kellogg's manufacturing facility is located on Bryn Lane on the Wrexham Industrial Estate, Wrexham. The noise assessment carried sound levels measurements covering the internal perimeter of the plant and an external assessment covering the surrounding area including some selected residential properties located nearby.

6.0 Sound Level Measuring Instrument

6.1 Instrument Specifications

Castle PRO – DX VOCIS Sound Level Meter

M (GA131M) – Type 1, 1/1 and 1/3 Octave, L_n 's

Applicable Standards

IEC 61672 -1:2002 (Integrating Sound Level Meter), IEC 1260:1995 (Octave Bands)

IEC 60651:2001 (Sound Level Meter), IEC 60804:2000 (Integrating Function)

Calibration Certificate See: Appendix 5

7.0 General Weather Conditions and Measurement Times (Table: 2)

Part A: Noise Measurements taken Externally to the plant as referred to in Appendix: 2

Day	Start time	Sky	Temperature (deg. C)	Wind Speed (mph)	Humidity (%)
4 th October, 2014	03:26 pm	Clear	15	1	82
5 th October, 2014	10:00 pm	Clear	9	5	80
6 th October, 2014	11:00 pm	Cloudy	7	4	82
7 th October, 2014	11:00 pm	Cloudy	7	3	84
8 th October, 2014	11:00 pm	Clear	7	3	83

Part B: Noise Measurements Taken Internally around the site perimeter as per Appendix 2

Day	Start time	Sky	Temperature (deg. C)	Wind Speed (mph)	Humidity (%)
8 th October, 2014	09:30 am	Clear	8	14	84
8 th October, 2014	08:55 pm	Heavy Clouds	4	5	88
9 th October, 2014	11:20 am	Slightly covered	12	16	86

8.0 Noise Survey Results

8.1 Noise levels presented in Appendix: 7 in terms of daytime and night-time levels have been derived from the logarithmic average of the measured 1 minute continuous.

9.0 Evaluation

o WHO Guidelines

9.2 *"If negative effects on sleep are to be avoided the equivalent sound pressure level should not exceed 30dBA indoors for continuous noise".*

9.3 The night-time 1/3 octave results were predominantly below the reference curve however there were some instances where the 1/3 Octave results were above the reference curve and this is due primarily to other emitting noise sources in and around the Wrexham Industrial Estate and are extremely difficult to screen out.

9.4 The measurement positions for locations 2, 3 and 4 were taken:

- On the ground floor of each respective position in the back garden;
- 4m from the properties wall or other reflecting surfaces;
- 1.2m to 1.5m above the floor, and
- 5m from window.

9.5 "For a good night's sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10 -15 times per night"

9.6 Based on the criterion curve for assessment of low frequency noise the results for all the 7 points assessed externally to the Kellogg's manufacturing facility as referred to in Appendix: 4 are as follow:

External Noise Results Evaluation: See Appendix: 4

Ridley Wood (1):

- The daytime and night-time results were 68 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 73 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

B5130 Bowling Bank (2):

- The daytime and night-time results were 74 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 71 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

B5130 Bowling Bank (3):

- The daytime and night-time results were 70 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 69 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

B5130 Bowling Bank (4):

- The daytime and night-time results were 72 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 71 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

Oak Road (5):

- The daytime and night-time results were 73 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 73 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

Bryn Lane (6):

- The daytime and night-time results were 66 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 67 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

Bryn Lane (7):

- The daytime and night-time results were 69 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 71 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

Internal Noise Results Evaluation: See Appendix: 3

Location Point 4:

- The daytime and night-time results were 61 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 73 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

Location Point 12:

- The daytime and night-time results were 67 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 73 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

Location Point 19:

- The daytime and night-time results were 58 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 73 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

Location Point 25:

- The daytime and night-time results were 54 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 73 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

Location Point 35:

- The daytime and night-time results were 54 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 73 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

Location Point 42:

- The daytime and night-time results were 54 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 73 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

Location Point 46:

- The daytime and night-time results were 54 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment;
- The night-time results were 73 % of the time below the curve for the assessment of low noise frequency for the entire period of the assessment.

10.0 Observations

External Noise Results Observations

- 10.1 The criterion curve for assessment of low frequency noise was exceeded a number of times during the night but it is quite feasible that this could be due to noises emitted from other industrial facilities on the Wrexham Industrial Estate as they were several units operating through the night time. In any case the criterion as shown in the reference curve was not exceeded more than 30% of the time during the night-time assessment.

Internal Noise Results Observations

- 10.2 The criterion curve for assessment of low frequency noise was exceeded a number of times during the night but it is quite feasible that this could be due to noises emitted from other industrial facilities on the Wrexham Industrial Estate as they were several units operating through the night time. In any case the criterion as shown in the reference curve was not exceeded more than 27 % of the time during the night-time assessment.

10.3 It is however important to bear in mind that in view of the above statement it is virtually impossible to screen out all the noise emitted from various other industrial facilities located on the Wrexham Industrial Estate so that an absolute observation can be made based on the recommendations from both BS 8233 and the WHO guidelines.

In order to assess the absolute compliance with the BS 8233 and WHO guidelines it is critically important to screen any third party interference from the noise emitted from the Kellogg manufacturing facility, and based on the results obtained during the assessment we feel that the Kellogg manufacturing facility does meet the legal criteria.

Conclusion

The noise measurement review carried out in accordance to BS 4142: 1997 and according to the World Health Organization BS 8233 concluded that the recorded noise level were in compliance with the current regulations and there is no evidence to suggest any adverse noise increase from previous years. The noise measurements externally as shown in **Appendix 2** demonstrates fully such compliance and bearing in mind the Kellogg manufacturing in Wrexham is located and operates in a very large industrial complex as shown in **Appendix: 6** which invariably will have an effect on the noise level in and around the industrial estate.

The comparison of the noise levels recorded with a third octave internally and externally as shown in **Appendices 7 and 8** also indicate the noise levels recorded were of an acceptable level according to BS 4142: 1997 and the WHO BS 8233 guidelines.

In addition to the above statement it is important to note that the Kellogg maintenance have in place a very robust Planned Maintenance Program 'PPM'.

Appendix 1: Noise Measurements												
Project:		Noise Survey			Job N:		2					
Location:		Kelloggs Plant Wrexham			Date:		8th October 2014					
Equipment:		Castle Pro - DX VOCIS Sound Level Meter			Engineer : S Belkiri		General weather conditions: Clear sky, Humidity 84%					
		Certificate No: 042248/61147										
Measurement Period				Weather Conditions			Statistical noise Levels dBA					Description of Audible Noise
Location	Start	Elapsed	End	Speed (mph)	Direction from	Temp C	Overall Leq	Lmax	Lmin	L90	Pmax	
1	09:30	1 min	09:31:00	14	SSE	8	53.3	65.2	47.90	48.30	84.1	Light road traffic noise in the background
2	09:33	1 min	09:34	14	SSE	8	53.1	61.9	51.00	51.40	75.5	Light road traffic noise in the background
3	09:36	1 min	09:37	14	SSE	8	47.4	49.8	46.30	47.30	63.2	Light road traffic noise in the background
4	09:38	1 min	09:38	14	SSE	8	46.7	50	44.10	44.70	62.9	Light road traffic noise in the background
5	09:40	1 min	09:41	14	SSE	8	48.4	52.5	46.90	47.30	67.3	Light road traffic noise in the background
6	09:42	1 min	09:43	14	SSE	8	51.7	53.6	49.50	51.10	79.4	Light road traffic noise in the background
7	09:45	1 min	09:46	14	SSE	8	52.7	52.7	56.30	56.90	67.4	Light road traffic noise in the background
8	09:47	1 min	09:48	14	SSE	8	48.9	51.5	47.00	47.50	63.4	Light road traffic noise in the background plus recycling yard
9	09:50	1 min	09:51	14	SSE	8	47.4	50.9	46.10	46.70	67.4	Light road traffic noise in the background plus recycling yard
10	09:53	1 min	09:54	14	SSE	8	51.1	57.7	50.20	50.80	75.1	Light road traffic noise in the background plus recycling yard
11	09:56	1 min	09:57	14	SSE	8	52.8	54.8	51.70	52.10	78	Light road traffic noise in the background plus recycling yard
12	09:59	1 min	10:00	14	SSE	8	51.0	51.7	50.20	50.60	64.8	Light road traffic noise in the background plus recycling yard
13	10:02	1 min	10:03	14	SSE	8	51.8	53.7	50.90	52.30	66.4	Fairly quiet
14	10:05	1 min	10:06	14	SSE	8	59.8	60.8	58.40	59.00	73.6	Light personnel road traffic
15	10:08	1 min	10:09	14	SSE	8	58.8	61.3	57.90	58.50	73.1	Light personnel road traffic
16	10:11	1 min	10:12	14	SSE	8	58.9	61.2	56.40	56.90	76.8	Light personnel road traffic
17	10:14	1 min	10:15	14	SSE	8	53.4	61.0	50.70	51.10	83.9	Light personnel road traffic
18	10:17	1 min	10:18	14	SSE	8	56.4	63.5	48.60	49.10	94.0	Light personnel road traffic
19	10:20	1 min	10:21	14	SSE	8	52.8	66.7	45.50	46.10	87.9	Light personnel road traffic
20	10:23	1 min	10:24	14	SSE	8	56.3	65.1	51.80	52.30	78.3	Light personnel road traffic
21	10:26	1 min	10:27	14	SSE	8	59.3	70.6	57.30	57.80	85.9	Lorry passing
22	10:29	1 min	10:30	14	SSE	8	66.3	68.7	62.20	62.70	77.7	Lorry passing
23	10:32	1 min	10:33	14	SSE	8	56.7	57.8	55.30	53.90	74.1	Light road traffic
24	10:35	1 min	10:36	14	SSE	8	53.1	57.1	51.30	51.80	74.8	Light road traffic
25	10:38	1 min	10:39	14	SSE	8	54.2	65.6	48.70	49.20	84.7	Light road traffic
27	10:41	1 min	10:42	14	SSE	8	50.3	58.2	47.80	48.50	77.6	Light road traffic
28	10:44	1 min	10:45	14	SSE	8	50.2	50.1	48.50	49.10	68.4	Light road traffic

Appendix 1: Noise Measurements												
Project: Noise Survey			Job N: 2									
Location: Kelloggs Plant Wrexham			Date: 8th October 2014									
Equipment: Castle Pro - DX VOCIS Sound Level Meter			Engineer : S Belkiri									
Certificate No: 042248/61147			General weather conditions: Clear sky, Humidity 84%									
Measurement Period			Weather Conditions			Statistical noise Levels dBA				Description of Audible Noise		
Location	Start	Elapsed	End	Speed (mph)	Direction from	Temp C	Overall Leq	Lmax	Lmin	Leq	Pmax	
29	10:47	1 min	10:48	14	SSE	8	52.30	71.40	50.80	51.30	86.10	Noise from nearby industrial estate
30	10:50	1 min	10:51	14	SSE	8	52.10	58.20	50.50	50.90	77.00	Noise from nearby industrial estate
31	10:53	1 min	10:54	14	SSE	8	51.30	52.30	49.70	50.20	64.80	Noise from nearby industrial estate
32	10:56	1 min	10:57	14	SSE	8	52.50	53.70	51.40	51.80	66.60	Noise from nearby industrial estate
33	10:59	1 min	11:00	14	SSE	8	52.70	54.00	51.00	51.50	65.60	Noise from nearby industrial estate
34	11:02	1 min	11:03	14	SSE	8	53.50	55.10	52.20	52.60	67.00	Noise from nearby industrial estate
35	11:05	1 min	11:06	14	SSE	8	50.30	52.10	49.30	50.40	65.80	Fairly quiet
36	11:08	1 min	11:09	14	SSE	8	50.20	61.50	47.40	48.10	73.40	Fairly quiet
37	11:11	1 min	11:12	14	SSE	8	52.40	55.50	50.30	50.90	74.10	Fairly quiet
38	11:14	1 min	11:15	12	SSE	8	62.50	63.30	61.60	62.10	75.90	Noise from nearby industrial estate
39	11:16	1 min	11:17	12	SSE	9	61.50	63.50	59.80	60.30	88.40	Noise from nearby industrial estate
40	11:18	1 min	11:19	12	SSE	9	56.40	64.40	55.50	55.90	90.50	Noise from Silos area lorries unloading
41	11:21	1 min	11:22	12	SSE	9	52.00	69.90	49.60	50.20	82.20	Road traffic
42	11:24	1 min	11:25	12	SSE	9	53.40	53.90	51.50	52.10	67.50	Road traffic
43	11:27	1 min	11:28	12	SSE	9	50.80	62.30	50.20	50.70	71.90	Road traffic
44	11:30	1 min	11:31	12	SSE	9	56.30	58.40	54.70	55.20	70.80	Road traffic
45	11:33	1 min	11:34	12	SSE	9	50.90	55.10	52.80	53.40	60.80	Road traffic
46	11:36	1 min	11:37	12	SSE	9	54.10	63.40	52.30	52.80	72.60	Road traffic
47	11:39	1 min	11:40	12	SSE	9	55.10	70.30	48.30	48.90	92.30	Road traffic
48	11:42	1 min	11:43	12	SSE	9	49.90	58.50	45.70	46.20	83.20	Road traffic
49	11:45	1 min	11:46	12	SSE	9	53.10	66.40	51.10	51.70	89.30	Shunting vehicle engine on
50	11:48	1 min	11:49	12	SSE	9	60.30	62.90	57.10	57.50	83.10	Lorries loading
51	11:51	1 min	11:52	12	SSE	9	60.70	62.00	59.30	59.80	75.80	Lorries loading
52	11:54	1 min	11:55	12	SSE	9	65.20	60.5	62.90	63.30	77.30	Noise from the WWTP
53	11:57	1 min	11:58	12	SSE	9	54.00	68.20	52.00	52.40	90.00	Noise from the WWTP
54	12:00	1 min	12:01	12	SSE	9	66.40	72.20	64.90	65.30	81.30	Noise from extract fan under the animal feed canopy
55	12:03	1 min	12:04	12	SSE	9	65.60	77.90	61.50	61.80	93.30	Noise from extract fan under the animal feed canopy

Appendix 1: Noise Measurements												
Project: Noise Survey			Job N: 2									
Location: Kelloggs Plant Wrexham			Date: 8th, October 2014									
Equipment: Castle Pro - DX VOC/IS Sound Level Meter			Engineer: S Belkiri									
Certificate No: 042248/61147			General weather conditions: Heavy clouds		Humidity 88%							
Measurement Period				Weather Conditions			Statistical noise Levels dBA					Description of Audible Noise
Location	Start	Elapsed	End	Speed (mph)	Direction from	Temp C	Overall Leq	Lmax	Lmin	L90	Pmax	
1	20:55	1 min	20:56:00	5	SSW	4	51.20	60.10	49.20	40.70	78.50	Road traffic onto the site
2	20:58	1 min	20:59	5	SSW	4	57.20	65.80	46.80	47.10	82.40	Road traffic onto the site
3	21:01	1 min	21:02	5	SSW	4	55.80	67.60	45.40	45.90	94.60	Road traffic onto the site
4	21:04	1 min	21:05	5	SSW	4	65.90	77.30	44.70	45.30	89.90	Lorry passing
5	21:07	1 min	21:08	5	SSW	4	48.50	52.70	47.70	48.50	71.80	Fairly quiet
6	21:10	1 min	21:11	5	SSW	4	49.80	56.40	44.10	44.80	78.50	Fairly quiet
7	21:13	1 min	21:14	5	SSW	4	52.9	70.70	45.80	46.00	94.50	Fairly quiet
8	21:16	1 min	21:17	5	SSW	4	48.40	60.10	43.00	43.50	86.70	Fairly quiet
9	21:19	1 min	21:20	5	SSW	4	48.80	56.50	44.20	44.80	68.10	Fairly quiet
10	21:21	1 min	21:22	5	SSW	4	50.50	58.40	46.30	46.90	82.10	Fairly quiet
11	21:24	1 min	21:25	5	SSW	4	51.80	58.70	48.70	49.20	79.40	Fairly quiet
12	21:27	1 min	21:28	5	SSW	4	53.60	55.90	52.20	52.60	73.40	Noise from the WWTP
13	21:30	1 min	21:31	5	SSW	4	56.00	65.70	53.20	53.80	89.10	Noise from the WWTP
14	21:33	1 min	21:34	5	SSW	4	65.40	79.40	60.10	60.90	103.00	Noise from WWTP plus two lorries passing by
15	21:36	1 min	21:37	5	SSW	4	57.40	63.90	55.00	55.60	86.60	Light road traffic
16	21:39	1 min	21:40	5	SSW	4	51.80	57.40	49.50	50.20	73.50	Light road traffic
17	21:42	1 min	21:43	5	SSW	4	49.60	61.70	45.20	45.80	82.60	Light road traffic
18	21:45	1 min	21:46	5	SSW	4	48.50	58.20	45.30	47.00	73.40	Light road traffic
19	21:48	1 min	21:49	5	SSW	4	49.20	60.60	44.70	45.10	79.60	Light road traffic
20	21:51	1 min	21:52	5	SSW	4	55.20	57.70	53.60	54.00	71.00	Light road traffic
21	21:53	1 min	21:54	5	SSW	4	57.30	60.70	55.30	55.90	70.20	Light road traffic
22	21:55	1 min	21:56	5	SSW	4	57.50	60.90	55.80	56.30	75.90	Light road traffic
23	21:58	1 min	21:59	5	SSW	4	56.20	57.10	55.70	56.10	67.90	Light road traffic
24	22:01	1 min	22:02	5	SSW	4	57.00	72.60	53.00	53.50	95.40	Light road traffic
25	22:04	1 min	22:05	5	SSW	4	52.90	53.30	50.00	50.70	78.80	Light road traffic
26	22:07	1 min	22:08	5	SSW	4	56.30	71.90	50.30	50.80	73.60	Light road traffic
27	22:10	1 min	22:11	5	SSW	4	56.40	75.70	49.70	50.20	97.30	Light road traffic
28	22:12	1 min	22:13	5	SSW	4	58.30	79.10	51.20	51.50	107.50	Light road traffic

Appendix 1: Noise Measurements

Project: Noise Survey		Job N: 2										
Location: Kelloggs Plant Wrexham		Date: 8th October, 2014										
Equipment: Castle Pro - DX VOCIS Sound Level Meter		Engineer : S Belkiri										
Certificate No: 042248/61147		General weather conditions: Heavy clouds										
		Humidity= 88%										
Measurement Period												
		Weather Conditions										
		Statistical noise Levels dBA										
		Description of Audible Noise										
Location	Start	Elapsed	End	Speed (mph)	Direction from	Temp C	Overall Leq	Lmax	Lmin	L90	Pmax	
29	23:59	1 min	00:00	3	SSW	4	51.60	64.60	48.20	48.90	90.80	Light road traffic
30	00:02	1 min	00:03	3	SSW	4	51.00	59.50	46.20	46.70	86.30	Fairly quiet
31	00:04	1 min	00:05	3	SSW	4	47.00	57.80	40.40	40.80	86.60	Fairly quiet
32	00:06	1 min	00:07	3	SSW	4	52.00	65.40	46.80	47.30	87.30	Light road traffic
33	00:09	1 min	00:10	3	SSW	4	53.30	60.20	51.10	51.60	81.90	Light road traffic
34	00:12	1 min	00:13	3	SSW	4	51.30	61.10	48.80	49.30	81.60	Light road traffic
35	00:15	1 min	00:16	3	SSW	4	55.90	59.30	54.90	55.20	74.70	Light road traffic
36	00:18	1 min	00:19	3	SSW	4	51.20	60.30	49.20	49.70	81.60	Light road traffic
37	00:21	1 min	00:22	3	SSW	4	51.60	68.20	48.20	48.80	91.20	Light road traffic
38	00:24	1 min	00:25	3	SSW	4	54.40	61.90	51.20	51.70	76.00	Light road traffic
39	00:27	1 min	00:28	3	SSW	4	51.40	54.70	50.00	50.40	73.50	Light road traffic
40	00:30	1 min	00:31	3	SSW	4	49.60	57.50	47.00	47.00	76.20	Light road traffic
41	00:33	1 min	00:34	3	SSW	4	48.60	54.10	42.00	42.50	72.00	Light road traffic
42	00:36	1 min	00:37	3	SSW	4	52.60	66.10	40.50	40.90	88.50	Light road traffic
43	00:39	1 min	00:40	3	SSW	5	52.30	56.50	50.70	51.10	81.50	Light road traffic
44	00:42	1 min	00:43	3	SSW	5	53.50	55.70	52.10	52.60	80.10	Light road traffic
45	00:45	1 min	00:46	3	SSW	5	54.80	57.80	53.70	54.10	80.10	Light road traffic
46	00:48	1 min	00:49	3	SSW	5	54.10	56.70	52.80	53.20	76.30	Light road traffic
47	00:51	1 min	00:52	3	SSW	5	49.60	54.00	47.40	47.90	71.40	Light road traffic
48	00:54	1 min	00:55	3	SSW	5	51.50	56.50	47.50	48.00	82.70	Light road traffic
49	00:57	1 min	00:58	3	SSW	5	55.80	73.70	45.50	45.90	103.40	Light road traffic
50	01:00	1 min	01:01	3	SSW	5	56.60	67.30	48.50	49.10	92.20	Light road traffic
51	01:03	1 min	01:04	3	SSW	5	58.10	67.40	55.00	55.50	90.00	Noise from the Waste Water Treatment Plant
52	01:06	1 min	01:07	3	SSW	5	67.30	87.60	60.90	61.30	108.00	Noise from the Waste Water Treatment Plant
53	01:09	1 min	01:10	3	SSW	5	56.70	68.80	52.50	52.90	93.50	Noise from the Waste Water Treatment Plant
54	01:12	1 min	01:13	3	SSW	5	67.30	71.80	62.40	62.70	86.40	Noise from extract fan under the animal feed canope
55	01:15	1 min	01:16	3	SSW	5	65.80	73.40	54.90	55.30	97.40	Noise from extract fan under the animal feed canope

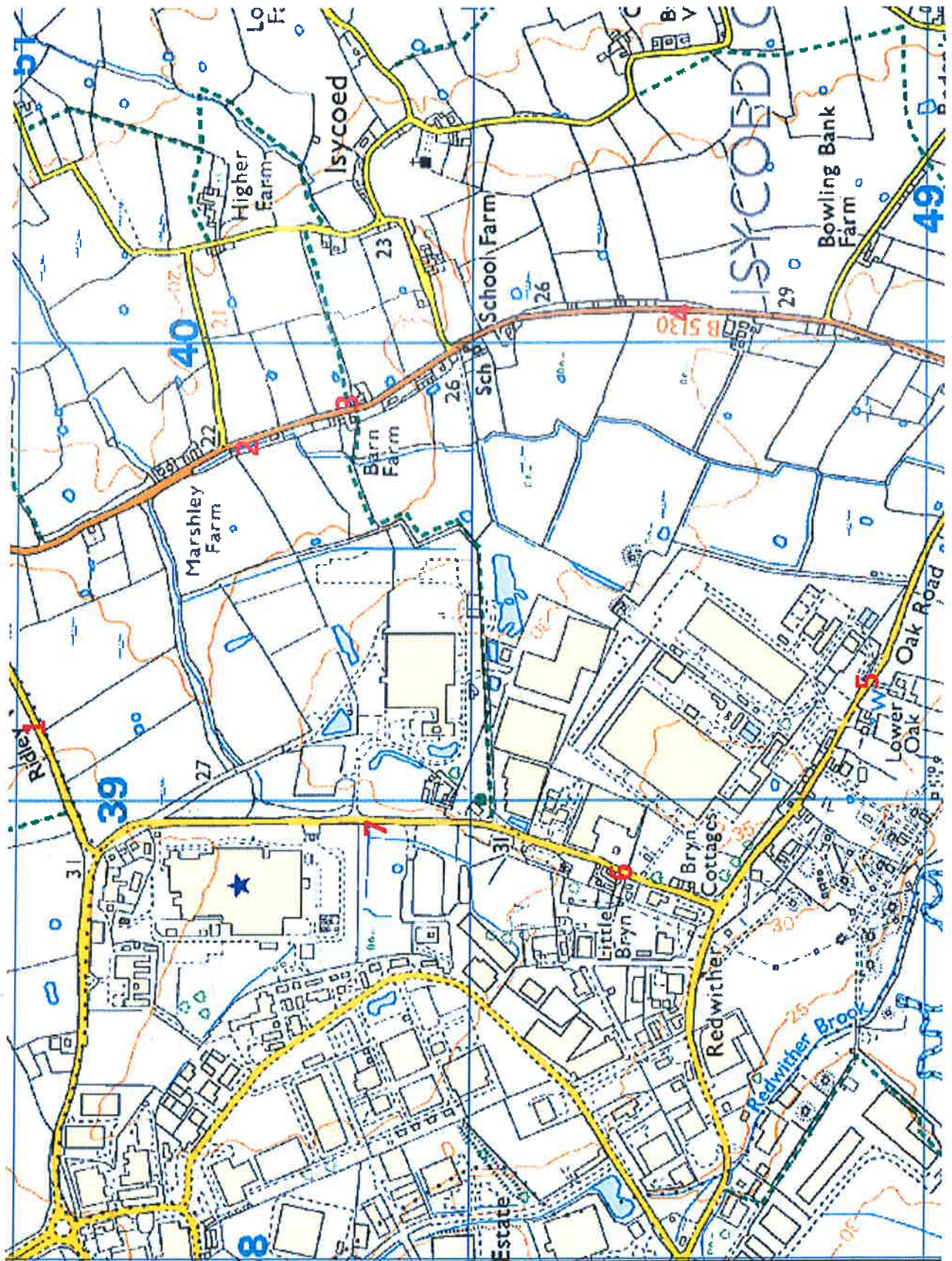
Appendix 1: Noise Measurements												
Project: Noise Survey			Job N:		2							
Location: Kelloggs Plant Wrexham			Date:		9th October, 2014							
Equipment: Castle Pro - DX VOCIS Sound Level Meter			Engineer: S Belkiri									
Certificate No: 042248/61147			General weather conditions: Sky slightly covered									
			Humidity = 86%									
Measurement Period				Weather Conditions				Statistical noise Levels dBA				Description of Audible Noise
Location	Start	Elapsed	End	Speed (mph)	Direction from	Temp C	Overall Leq	Lmax	Lmin	L90	Pmax	
1	11:20	1 min	11:21	16	WSW	12	58.5	73.5	51.9	52.5	100.2	Light road traffic noise
2	11:23	1 min	11:24	16	WSW	12	57.4	65.3	52.1	52.9	84.5	Light road traffic noise
3	11:15	1 min	11:26	16	WSW	12	57.9	64.3	50.6	51.4	80.4	Light road traffic noise
4	11:28	1 min	11:29	16	WSW	12	62.5	71.8	49.3	51.2	92.2	Road traffic noise
5	11:31	1 min	11:32	16	WSW	12	55.4	71.4	45.9	46.4	42.1	Road traffic noise
6	11:34	1 min	11:35	16	WSW	12	55.4	68	46.9	47.5	95.5	Road traffic noise
7	11:36	1 min	11:37	16	WSW	12	54.1	68.6	49.1	50.4	92.4	Road traffic noise
8	11:39	1 min	11:40	16	WSW	12	62.3	83	56.6	57.2	104.4	Lorry with an engine running in the background
9	11:41	1 min	11:42	16	WSW	12	54	65.4	51.4	52.0	88.9	Lorry with an engine running in the background
10	11:44	1 min	11:45	16	WSW	12	62.2	71	52.3	53.1	85.8	Noise from the recycling centre and WWTP
11	11:47	1 min	11:48	16	WSW	12	52.3	49.9	50.1	50.9	90.6	Noise from the recycling centre and WWTP
12	11:50	1 min	11:51	16	WSW	12	55	65.5	52	53.3	83.4	Noise from the recycling centre and WWTP
13	11:53	1 min	11:54	16	WSW	12	52.6	55.8	51.2	52.1	72.2	Noise from the WWTP in the background
14	11:55	1 min	11:57	16	WSW	12	54.4	55.7	53.4	54.5	69.4	Noise from the WWTP in the background
15	11:59	1 min	12:00	16	WSW	12	59	62.2	58.1	59.2	82.6	Noise from the WWTP in the background
16	12:01	1 min	12:02	16	WSW	12	60.1	61	59.1	60.1	73.9	Humming noise from a high voltage sub station
17	12:04	1 min	12:05	16	WSW	12	60	61.6	58.9	59.5	73.8	Light road traffic noise
18	12:07	1 min	12:09	16	WSW	12	53.4	54.9	51.5	52.2	67.6	Light road traffic noise
19	12:11	1 min	12:12	16	WSW	12	51.3	56.6	49	49.9	82.7	Light road traffic noise
20	12:14	1 min	12:15	16	WSW	12	52.2	55.8	50.6	51.3	70.1	Light road traffic noise
21	12:16	1 min	12:17	16	WSW	12	56.8	59.2	55.2	56.2	77.8	Noise from an adjacent industrial estate
22	12:18	1 min	12:19	16	WSW	12	65.8	69.6	61.6	62.3	91.4	Noise from an adjacent industrial estate
23	12:21	1 min	12:22	16	WSW	12	54.3	57.4	50.9	51.7	73.4	Road traffic noise
24	12:24	1 min	12:25	16	WSW	12	55.2	61.1	52.6	53.5	86.7	Road traffic noise
25	12:27	1 min	12:28	16	WSW	12	52.2	56.1	50.3	51.3	77.9	Road traffic noise
26	12:30	1 min	12:31	16	WSW	12	54.2	70.5	49.7	50.8	96.9	Two lorries drove past
27	12:33	1 min	12:34	16	WSW	12	56.1	72.3	50.7	51.3	93.5	lorry passing
28	12:36	1 min	12:37	16	WSW	12	54.8	69.3	51	51.9	93.8	lorry passing

Appendix 1: Noise Measurements												
Project: Noise Survey				Job N: 2								
Location: Kelloggs Plant Wrexham				Date: 9th October, 2014								
Equipment: Castle Pro - DX VOCIS Sound Level Meter Certificate No: 042248/61147												
Measurement Period				Weather Conditions			Statistical noise Levels dBA					Description of Audible Noise
Location	Start	Elapsed	End	Speed (mph)	Direction from	Temp C	Overall Leq	Lmax	Lmin	L90	Pmax	
29	12:39	1 min	12:40	16	WSW	12	55.10	63.80	52.40	52.80	80.80	
30	12:41	1 min	12:42	16	WSW	12	49.80	55.70	47.90	48.30	76.60	Road traffic lorry passing by
31	12:43	1 min	12:44	16	WSW	12	54.20	57.10	52.80	53.50	76.50	Dog barking and light road traffic
32	12:46	1 min	12:47	16	WSW	12	57.30	59.70	56.30	56.90	79.00	Light road traffic
33	12:49	1 min	12:50	16	WSW	12	51.50	56.30	49.30	49.70	74.70	Light road traffic
34	12:52	1 min	12:53	16	WSW	12	52.80	59.00	50.90	51.30	78.00	Light road traffic
35	12:54	1 min	12:55	16	WSW	12	52.40	55.00	51.10	51.50	70.50	Light road traffic
36	12:57	1 min	12:58	16	WSW	12	53.70	55.10	52.60	52.10	67.60	Light road traffic
37	13:00	1 min	13:01	16	WSW	12	68.80	74.90	66.20	66.70	88.80	Noise from silo area and the cooling towers.
38	13:04	1 min	12:05	16	WSW	12	69.30	70.50	68.30	68.90	83.10	Noise from silo area and the cooling towers.
39	12:07	1 min	12:08	16	WSW	12	71.90	74.80	71.10	71.60	86.40	Background noise from lorries unloading in silo area
40	12:10	1 min	12:11	16	WSW	12	67.70	69.30	66.40	66.80	82.00	Background noise from lorries unloading in silo area
41	12:13	1 min	12:14	16	WSW	12	64.90	74.50	53.60	54.00	86.00	Background noise from lorries unloading in silo area
42	12:16	1 min	12:17	16	WSW	12	67.90	72.50	55.60	56.10	85.60	Heavy road traffic noise
43	12:19	1 min	12:20	16	WSW	12	67.80	75.10	57.00	57.80	87.20	Heavy road traffic noise
44	12:22	1 min	21:23	16	WSW	12	61.60	71.00	53.80	54.60	82.60	Heavy road traffic noise
45	12:24	1 min	12:25	16	WSW	12	65.60	72.00	57.70	58.40	90.30	Heavy road traffic noise
46	12:27	1 min	12:28	16	WSW	12	69.80	75.20	53.30	54.10	86.70	Heavy road traffic noise
47	12:30	1 min	12:31	16	WSW	12	58.30	67.00	55.90	56.50	80.40	Traffic noise in the background
48	12:33	1 min	12:34	16	WSW	12	61.50	74.80	53.70	54.40	95.60	Traffic noise in the background
49	12:36	1 min	12:37	16	WSW	12	58.90	62.70	52.80	53.50	77.90	Alarm ringing and lorry traffic
50	12:39	1 min	12:40	16	WSW	12	55.30	58.30	53.10	53.80	69.50	Alarm ringing and lorry traffic
51	12:42	1 min	12:43	16	WSW	12	56.30	60.60	55.10	52.00	80.40	Noise from loading of lorries
52	12:45	1 min	12:46	16	WSW	12	57.10	68.20	53.80	54.40	86.80	Noise from loading lorries and WWTP
53	12:48	1 min	12:49	16	WSW	12	53.70	57.70	51.00	51.90	81.70	Noise from WWTP
54	12:51	1 min	12:52	16	WSW	12	73.60	69.50	77.40	75.10	84.70	Noise from extract fan under the animal feed canopy
55	12:54	1 min	12:55	16	WSW	12	69.60	80.70	63.30	63.70	92.80	Noise from extract fan under the animal feed canopy

External Noise Measurements

	Date & Time	Date & Time	Date & Time	Date & Time	Date & Time	Date & Time	Date & Time
Date & Start time	4th October, 2014 [start:15:26 hrs]	4th October, 2014 [Start: 22:00 hrs]	5th October, 2014 [Start:09:15 hrs]	5th October, 2014 [Satrt:22:57 hrs]	6th October, 2014 [Start: 23:00 hrs]	7th October, 2014 [Start: 23 :00 hrs]	8th October, 2014 [start: 23 :00 hrs]
LOCATION	Sky= Clear Temp= 16 C Wind= 14 mph Humidity= 86%	Sky= Clear Temp= 9 C Wind= 4 mph Humidity= 82%	Sky= Cloudy Temp= 17 C Wind= 15 mph Humidity= 84%	Sky= Clear Temp= 8 C Wind= 3 mph Humidity= 80%	Sky= Cloudy Temp= 7 C Wind= 4 mph Humidity= 82%	Sky= Cloudy Temp= 5 C Wind= 2 mph Humidity= 80%	Sky= Clear Temp= 9 C Wind= 3 mph Humidity= 83%
Ridley Wood Road (1)	47.2 dB (A)	46.4 dB(A)	44.8 dB(A)	49.1 dB(A)	47.8 dB(A)	47.6 dB(A)	49.3 dB(A)
B5130 Bowling Bank (2)	43 dB(A)	47.1 dB(A)	37.9 dB(A)	39.3 dB(A)	41.2 dB(A)	44.1 dB(A)	37.4dB(A)
B5130 Bowling Bank (3)	43.6 dB(A)	47.1 dB(A)	42.5 dB(A)	34.8 dB(A)	41.9 dB(A)	37.5 dB(A)	37.8 dB(A)
B5130 Bowling Bank (4)	37.6 dB(A)	46.1 dB(A)	36.8 dB(A)	33.4 dB(A)	37.9 dB(A)	32.5 dB(A)	36.6 dB(A)
Oak Road (5)	41.5 dB(A)	45.9 dB(A)	34.6 dB(A)	34.8 dB(A)	40.9 dB(A)	34.9 dB(A)	30.8 dB(A)
Bryn Lane (1) - (6)	61.5 dB(A)	50.1 dB(A)	38.9 dB(A)	44.3 dB(A)	49.0 dB(A)	39.9 dB(A)	48.5 dB(A)
Bryn Lane (2) - (7)	38.6 dB(A)	46.1 dB(A)	39.9dB(A)	42.2dB(A)	46.8dB(A)	46.0dB(A)	44.9 dB(A)

Appendix 4: External Site Layout



Calibration Certificate

Issued By: Castle Group Ltd

Date Of Issue : 30/09/14

Certificate No : 042248/61147



All instruments are tested to check compliance with particular specifications. These specifications may be appropriate British Standards; or if the instrument was not originally designed to meet any British Standard, or when the instrument was originally manufactured a relevant British Standard did not exist, the instrument will be tested to the manufacturer's original specification.

Absolute acoustic calibration of acoustic calibrators and sound level meters is checked at one or more standard frequencies against an independent sound source with calibration directly traceable to the National Physical Laboratory (NPL) in the United Kingdom. The NPL reference applicable for the calibration of the test equipment is shown below.

The performance of the instrument was determined by comparison with the manufacturers' specification as found in the instrument handbook or other technical publication. Any significant uncertainty of the measuring system will also be included.

The instrument was allowed to stabilise for a period of 30 minutes prior to measurements made.

The ambient temperature and relative humidity throughout calibration were 22 ± 2 °C and 29% RH respectively.

Instruments used to carry out this calibration are as follows: -

Multifunction Calibrator 4226 Serial No: 1551589

Applicable Reference: S6312.

Sound Level Meter 2260 Serial No: 1875415

Applicable Reference: 07428

Subject of Calibration: GA607

Instrument: Dual level Calibrator with Barometer

Serial No: 042248

Supplied Barometer Data (If applicable)

Barometer Type: GA690

Barometer Serial No: 066556

Output Data Corrected for test conditions at 1kHz.

Reference Level (dB): 94.0 & 104.0

Refer to calibrator handbook for any applicable microphone cavity insertion correction.

Basis Of Test: Compliance to IEC 60942: 2003 Class 1/C

Calibrated By:

M. Mann

(Approved Signatory)

Checked By:

O. L. Wrightson

(Approved Signatory)

Date of Calibration: 30 Sep 2014

Recalibration Due: 01 Nov 2015

Completed Status: Pass

Client: CastleRent
Address: Castle Group
Salter Road
Scarborough
North Yorkshire
YO11 3UZ

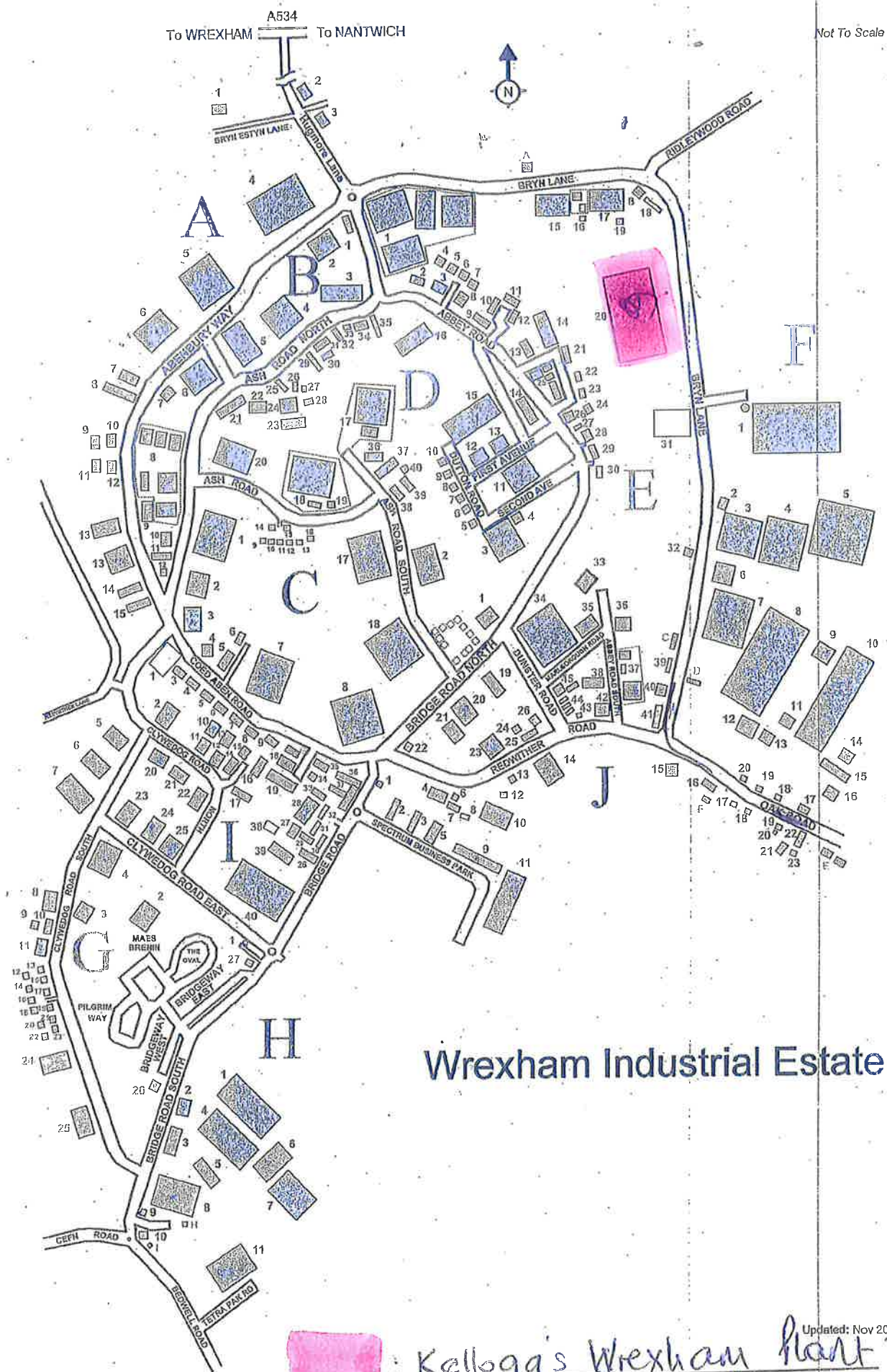
Client Reference: KIT 32

— Indicates item or information not available

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Updated: Nov 2007

Kellogg's Wrexham Plant
Geographical location.

Comparison of the Level of recorded sound with a third octave band criterion curve

4th October, 2014

Time: 15:26

Note: Measurement duration per point = 1 min

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	64	50.2	49	46	43	42	39	38	36	33	28

4th October, 2014

Time: 22:00

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	61	50	48	46	45	44	42	40	38	34	29

5th October, 2014

Time: 09:15

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	63	52	49	47	48	42	40	39	34	31	28

5th October, 2014

Time: 22:57

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	62	55	52	49	47	43	40	38	35	30	27

6th October, 2014

Time: 23:00

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	60	54	53	45	42	40	38	35	34	31	28

7th October, 2014

Time: 23:00

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	58	56	54	43	41	39	37	34	31	28	26

8th October, 2014

Time: 23:00

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	59	58	56	42	40	38	36	33	32	29	27

Proposed Reference curve

Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, Leq	92	87	83	74	64	56	49	43	42	40	38	36	34

Note: Highlighted area indicates above proposed reference curve.

Comparison of the Level of recorded sound with a third octave band criterion curve

4th October, 2014
Time: 15:45

Note: Measurement duration per point = 1 min

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	57	49	44	43	41	40	37	35	33	30	27	

4th October, 2014
Time: 22:08

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	58	51	46	42	40	38	36	34	32	28	26	

5th October, 2014
Time: 09:22

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	59	51	46	44	41	40	36	34	33	30	27	

5th October, 2014
Time: 23:06

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	52	49	47	45	41	39	35	32	30	28	26	

6th October, 2014
Time: 23:08

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	55	53	51	47	45	43	40	36	34	30	28	

7th October, 2014
Time: 23:06

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	61	58	56	51	47	45	41	39	37	32	28	

8th October, 2014
Time: 23:08

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	60	57	54	51	45	42	40	38	36	31	27	

Proposed Reference curve

Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, Leq	92	87	83	74	64	56	49	43	42	40	38	36	34

Note: Highlighted area indicates above proposed reference curve.

Comparison of the Level of recorded sound with a third octave band criterion curve

B5130 Bowling Bank (3)

4th October, 2014
Time: 15:52

Appendix: 7
Measurement duration per point = 1 min

External Noise Measurements

Note:

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	27
dB, Leq	55	53	49	45	40	38	36	33	32	29	160	27

4th October, 2014
Time: 22:14

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	28
dB, Leq	56	51	49	47	43	40	38	35	32	30	160	28

5th October, 2014
Time: 09:26

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	27
dB, Leq	54	51	49	46	40	39	36	34	33	29	160	27

5th October, 2014
Time: 23:11

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	29
dB, Leq	57	53	51	48	46	41	40	37	34	31	160	29

6th October, 2014
Time: 23:15

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	27
dB, Leq	55	52	50	47	43	40	37	35	33	30	160	27

7th October, 2014
Time: 23:12

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	28
dB, Leq	59	57	53	49	46	42	39	36	35	32	160	28

8th October, 2014
Time: 23:14

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	27
dB, Leq	57	55	53	51	48	43	40	37	34	0	160	27

Proposed Reference curve

Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, Leq	92	87	83	74	64	56	49	43	42	40	38	36	34

Note: Highlighted area indicates above proposed reference curve.

Comparison of the Level of recorded sound with a third octave band criterion curve

4th October, 2014

Time:15:57

Note: Measurement duration per point = 1 min

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	56	54	51	47	45	41	37	34	33	30	27	

4th October, 2014

Time:22:19

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	59	56	53	49	45	41	38	36	34	31	28	

5th October, 2014

Time:09:34

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	57	55	53	49	44	40	37	35	32	29	26	

5th October, 2014

Time:23:17

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	55	53	51	47	43	39	36	34	33	30	27	

6th October, 2014

Time:23:21

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	57	55	53	50	47	42	37	35	33	29	27	

7th October, 2014

Time:23:21

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	56	54	52	48	44	40	38	36	35	32	29	

8th October, 2014

Time:23:22

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160	
dB, Leq	54	52	49	46	43	41	39	35	34	31*	28	

Proposed Reference curve

Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, Leq	92	87	83	74	64	56	49	43	42	40	38	36	34

Note: Highlighted area indicates above proposed reference curve.

Comparison of the Level of recorded sound with a third octave band criterion curve

4th October, 2014
Time: 16:05

Note: Measurement duration per point = 1 min

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	54	52	50	47	43	40	37	36	34	30	28

4th October, 2014

Time: 22:24

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	53	50	49	47	45	41	39	37	35	31	29

5th October, 2014

Time: 09:39

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	55	53	51	47	44	39	37	36	33	29	27

5th October, 2014

Time: 23:25

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	53	51	49	46	43	40	38	36	34	31	28

6th October, 2014

Time: 23:27

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	56	55	53	50	47	42	39	37	35	32	29

7th October, 2014

Time: 23:27

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	57	55	53	52	48	45	41	39	36	33	30

8th October, 2014

Time: 23:29

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	53	51	48	45	43	40	38	37	35	31	29

Proposed Reference curve

Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, Leq	92	87	83	74	64	56	49	43	42	40	38	36	34

Note: Highlighted area indicates above proposed reference curve.

Comparison of the Level of recorded sound with a third octave band criterion curve

4th October, 2014

Time:16:10

Note: Measurement duration per point = 1 min

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	59	57	55	53	50	44	40	37	36	32	30

4th October, 2014

Time:22:28

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	57	54	51	49	45	41	38	36	35	31	29

5th October, 2014

Time:09:45

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	58	55	54	52	49	44	40	38	36	32	29

5th October, 2014

Time:23:31

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	56	54	55	50	47	42	40	38	35	31	28

6th October, 2014

Time:23:35

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	58	56	63	51	47	43	40	38	37	33	30

7th October, 2014

Time:23:35

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	55	54	51	49	45	40	37	35	33	30	27

8th October, 2014

Time:23:36

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	59	57	55	51	47	43	40	39	37	32	28

Proposed Reference curve

Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, Leq	92	87	83	74	64	56	49	43	42	40	38	36	34

Note: Highlighted area indicates above proposed reference curve.

Comparison of the Level of recorded sound with a third octave band criterion curve

4th October, 2014

Time:16:17

Note: Measurement duration per point = 1 min

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	59	56	54	51	47	44	40	38	35	32	29

4th October, 2014

Time:22:34

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	58	56	53	51	47	42	40	39	37	33	30

5th October, 2014

Time:09:52

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	59	55	53	51	50	45	41	39	36	31	28

5th October, 2014

Time:23:37

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	57	55	53	50	47	41	38	36	34	30	27

6th October, 2014

Time:23:44

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	59	57	55	52	48	43	40	38	36	32	29

7th October, 2014

Time:23:42

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	56	53	52	49	45	40	38	36	35	31	28

8th October, 2014

Time:45

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	58	55	53	50	47	42	40	37	35	31	29

Proposed Reference curve

Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, Leq	92	87	83	74	64	56	49	43	42	40	38	36	34

Note: Highlighted area indicates above proposed reference curve.

Comparison of the Level of recorded sound with a third octave band criterion curve

Internal Noise Measurements

Location: 4	Date:	08/10/2014	Time	09:38	Note: Measurement duration per point = 1 min					Appendix: 8				
Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160			
dB, Leq	63	60	57	54	50	45	41	38	36	32	29			

Location 4	Date:	08/10/2014	Time	21:04										
Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160			
dB, Leq	57	55	52	49	45	40	38	36	35	31	28			

Location 4	Date	09/10/2104	Time	11:28										
Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160			
dB, Leq	63	59	57	54	51	46	42	39	37	33	30			

Location 12	Date	08/10/2104	Time	09:59										
Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160			
dB, Leq	61	59	57	54	51	43	40	38	36	31	29			

Location: 12	Date	08/10/2014	Time	21:27										
Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160			
dB, Leq	58	56	53	51	47	41	38	36	34	30	27			

Location: 12	Date	09/10/2014	Time	11:50										
Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160			
dB, Leq	61	59	57	54	51	46	43	39	36	32	29			

Location: 19	Date	08/10/2014	Time	10:20										
Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160			
dB, Leq	63	60	58	56	52	47	43	40	38	34	31			

Location: 19	Date	08/10/2014	Time	21:48										
Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160			
dB, Leq	57	53	51	47	43	40	38	37	34	31	28			

Location: 19	Date	09/10/2014	Time	12:11										
Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160			
dB, Leq	63	61	59	56	53	49	45	41	38	34	30			

Location:														
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160	
dB, Leq	92	87	83	74	64	56	49	43	42	40	38	36	34	

Note: Highlighted area indicates above proposed reference curve.

Comparison of the Level of recorded sound with a third octave band criterion curve

Internal Noise Measurements

Location: 25		Date			08/10/2014			Time			10:38			Note:			Measurement duration per point = 1 min			Appendix: 8		
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160										
dB, Leq		67	62	59	56	54	51	47	44	39	34	30										

Location 25		Date			08/10/2014			Time			22:04								
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160							
dB, Leq		58	56	53	49	45	41	38	35	34	30	27							

Location 25		Date			09/10/2014			Time			12:27								
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160							
dB, Leq		68	65	61	58	55	51	48	44	39	34	30							

Location 33		Date			08/10/2014			Time			10:59								
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160							
dB, Leq		69	64	61	57	53	49	46	41	38	33	30							

Location: 33		Date			08/10/2014			Time			00:09								
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160							
dB, Leq		56	54	51	49	46	40	37	35	33	30	27							

Location: 33		Date			09/10/2014			Time			12:49								
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160							
dB, Leq		67	64	61	59	57	54	47	44	39	35	31							

Location: 42		Date			08/10/2014			Time			11:24								
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160							
dB, Leq		69	66	62	58	54	51	47	42	38	34	30							

Location: 42		Date			08/10/2014			Time			00:36								
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160							
dB, Leq		57	54	51	47	43	40	38	36	34	31	28							

Location: 42		Date			09/10/2014			Time			12:16								
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160							
dB, Leq		65	62	59	56	53	49	45	41	38	34	30							

Location:		Frequency (Hz)													
		10	12.5	16	20	25	31.5	40	50	63	80	100	125	160	
		92	87	83	74	64	56	49	43	42	40	38	36	34	

Note: Highlighted area indicates above proposed reference curve.

Comparison of the Level of recorded sound with a third octave band criterion curve

Internal Noise Measurements

Appendix: 8

Location: 25		Date	08/10/2014			Time		10:38		Note: Measurement duration per point = 1 min				
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160		
dB, Leq		67	62	59	56	54	51	47	44	39	34	30		
Location: 25		Date	08/10/2014			Time		22:04						
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160		
dB, Leq		58	56	53	49	45	41	38	35	34	30	27		
Location: 25		Date	09/10/2014			Time		12:27						
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160		
dB, Leq		68	65	61	58	55	51	48	44	39	34	30		
Location: 33		Date	08/10/2014			Time		10:59						
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160		
dB, Leq		69	64	61	57	53	49	46	41	38	33	30		
Location: 33		Date	08/10/2014			Time		00:09						
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160		
dB, Leq		56	54	51	49	46	40	37	35	33	30	27		
Location: 33		Date	09/10/2014			Time		12:49						
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160		
dB, Leq		67	64	61	59	57	54	47	44	39	35	31		
Location: 42		Date	08/10/2014			Time		11:24						
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160		
dB, Leq		69	66	62	58	54	51	47	42	38	34	30		
Location: 42		Date	08/10/2014			Time		00:36						
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160		
dB, Leq		57	54	51	47	43	40	38	36	34	31	28		
Location: 42		Date	09/10/2014			Time		12:16						
Frequency (Hz)		30	40	50	60	70	80	90	100	110	125	160		
dB, Leq		65	62	59	56	53	49	45	41	38	34	30		
Location:														
Frequency (Hz)		10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, Leq		92	87	83	74	64	56	49	43	42	40	38	36	34

Note: Highlighted area indicates above proposed reference curve.

Comparison of the Level of recorded sound with a third octave band criterion curve

Internal Noise Measurements

Appendix: 8

Location: **46** Date: 08/10/2014 Time: 11:36 Note: Measurement duration per point = 1 min

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	67	64	61	57	54	51	48	44	39	35	31

Location: **46** Date: 08/10/2014 Time: 00:48

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	58	54	51	48	45	41	38	36	34	31	28

Location: **46** Date: 09/10/2104 Time: 12:33

Frequency (Hz)	30	40	50	60	70	80	90	100	110	125	160
dB, Leq	68	65	61	58	55	51	48	43	38	34	30

Location:

Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, Leq	92	87	83	74	64	56	49	43	42	40	38	36	34

