



Report No. 17115/EN

An Environmental Noise Survey undertaken at Hydro Aluminium,
Deeside, in accordance with accordance
with BS4142:2014

Client Name: Hydro Aluminium
Contact: Joel Priest
Survey Date: 17th and 18th July 2017
Report Date: 6th September 2017

Address: Bridge Road
Wrexham Industrial Estate
Wrexham
LL13 9PS

Consultant:

Daniel Cottam
BSc (Hons) Cert.Occ.Hyg. LFOH

Reviewed by:

Matthew Parkinson
BSc (Hons) MSc Cert.Occ.Hyg. LFOH

	<u>CONTENTS</u>	<u>Page No.</u>
	Executive Summary	3
1	Introduction	4
2	BS4142:2014	4
3	Measurement Procedure	4
4	Observations	6
5	Results	7
6	Conclusion and Discussion	8
7	Recommendations	8
	 <u>APPENDICES</u>	
	Appendix 1 – Results of Noise Measurements	9
	Appendix 2 – Octave Band Analysis	13
	Appendix 3 – Noise Rating Curves	16
	Appendix 4 – Noise Monitoring Locations	19
	Appendix 5 – Acoustic Terminology / Calibration Data	20

Executive Summary

Cottam Parkinson Consulting (CPC) Limited were commissioned to undertake an environmental noise survey at Hydro Aluminium Deeside Ltd., Wrexham. The survey was undertaken in accordance with the Company's IPPC Permit and BS4142:2014.

Under the guidance given in BS4142, the results of the survey indicated that the likelihood of complaints, during both the day and night time, would be of marginal significance at the nearest residential property on The Oval. However, it was considered unlikely that the Company would receive complaints during the daytime, due to the current construction work being undertaken, directly opposite the factory, on Bridge Road.

During the daytime and night time, the noise rating level was +7 dB over the background noise level.

1 Introduction

Hydro Aluminium Deeside Ltd., Wrexham, operate an aluminium recycling facility, where scrap aluminium is recycled to form aluminium extrusion ingots. Mr Joel Priest, of Hydro Aluminium Ltd., requested that Cottam Parkinson Consulting (CPC) Ltd undertake an annual environmental noise survey to comply with their IPPC Permit.

Section 3.4.3 "Noise and vibration" of the Permit states that, *"The operator shall carry out noise monitoring and assessment exercise on annual basis from the site at the nearest sensitive receptors during day and night as per BS4142:1997"*.

In addition, the measurements were compared to a noise rating (NR) curve of 40 for the night time readings and NR curve of 50 for the daytime. NR curves are an alternative method of evaluating the background noise, based on un-weighted sound level measurements in octave frequency bands.

The day and night time assessments were performed on 17th and 18th July 2017 by Daniel Cottam of CPC.

2 BS4142:2014

This standard, *Methods for rating and assessing industrial and commercial sound* has recently been updated to include a number of important changes. The new scope of the methodology is to assess the "likely impact" of commercial and industrial noise, and brings BS4142:2014 in line with other guidance including the Noise Policy Statement for England and the National Policy Framework.

BS4142:2014 states that, for commercial or industrial noise with no distinguishable features:

- The louder the commercial/industrial noise is compared to the background noise, the greater the magnitude of the impact;
- If the commercial/industrial noise is 10 dB or more higher than the background noise level then this is an indication of a significant adverse impact (i.e. this is not normally acceptable);
- If the commercial/industrial noise is around 5 dB higher than the background noise level then this is an indication of an adverse impact (i.e. this should be avoided if possible);

- If the commercial/industrial noise is lower than the background noise level, this is an indication of a low impact (i.e. this is normally acceptable). The lower the commercial noise level is, the lower the likely impact.

Corrections for tonality, impulsivity, intermittency and other sound characteristics have been introduced and are detailed below:

Noise Characteristic	Perceptibility		
	Just Perceptible	Clearly Perceptible	Highly Perceptible
Tonality	+2	+4	+6
Impulsivity	+3	+6	+9
Intermittency	0	+3	+3
Other Sound	0	+3	+3

The new standard also includes a new section on uncertainty, that requires the level of uncertainty to be taken into account and the level and effects reported.

Although there have been changes to the previous standard, it is likely that the principles of the assessment will remain the same.

3 Measurement Procedure

The measurements were taken using a CEL 490 precision integrating 'real-time' sound level meter (SLM) serial number 035526, which complied with the Type 1 Standard. The SLM was calibrated both prior to and after monitoring to 114dB (1kHz) using a CEL-110/1 acoustic calibrator, serial number 064395.

The SLM was attached to a tripod at a height of 1½ metres and was positioned more than 3½ metres from any reflecting surface. A foam windshield was fitted to the microphone to prevent the effects of wind noise. Weather conditions, including wind speed and temperature were noted at all monitoring locations.

To perform the BS4142 calculation, daytime readings for the factory not operating were taken a distance away from the factory where the noise generated by Hydro Aluminium was not audible. This position was adjacent to The Oval and behind disused garages off Bridgeway East. It was possible for Hydro Aluminium to shut down their factory operations for the night time assessment, to enable the background noise to be established.

4 Observations

Daytime – 18/07/17

The noise was measured at approximately fifteen (15) metres from the boundary fence of the nearest property on The Oval.

During the monitoring period, there was only very minimal audible noise from processes that occurred within the main Hydro factory, such as faint crashing noises from loading of charger with scrap material and pushing of the material into the melter. This was due to a large amount of heavy construction traffic noise that was generated during the building of new prison across the road from Hydro's facility (on Bridge Road). There were very audible reversing sirens from the construction traffic, as well as noise from machines and vehicles themselves.

Other noises sources that were noticeable was the persistent traffic on Bridge Road.

The weather was dry, partly cloudy, very little breeze (<1 m/s) and very warm with temperatures ranging between 20 and 25°C.

Night time – 17/07/17

During the night measurements, there was an audible noise from a cooling tower fan located on the outside of the factory. In addition, the 'stripping the pit' activity occurred, with associated noises generated by the automated movements on the lay down station and a barely perceptible 'chiming' noise from the occasional coming together of the aluminium logs. Bundles of aluminium was also placed onto the charger during the monitoring period, however, this did not generate a significant noise at the measurement location.

Other noise sources included other factory noise from the industrial estate and occasional, light traffic on Bridge Road. The weather was clear, with no noticeable breeze and a temperature of 15°C.

5 **Results**

5.1 **BS4142 Assessment**

The full results are presented in Appendix 1 of this report.

Daytime readings:

Measured noise (Factory operating)	$L_{eq} (60 \text{ min}) = 50 \text{ dB(A)}$
Residual noise (Factory not operating)	$L_{eq} (45 \text{ min}) = 47 \text{ dB(A)}$

Calculated specific noise = 47 dB(A)

Night time readings:

Measured noise (Factory operating)	$L_{eq} (5 \text{ min}) = 46 \text{ dB(A)}$
Residual noise (Factory not operating)	$L_{eq} (5 \text{ min}) = 42 \text{ dB(A)}$

Calculated specific noise = 44 dB(A)

Specific Noise at the Nearest Property

The nearest property was one hundred and eighty five (185) metres from Hydro and the noise monitoring location was one hundred and seventy (170) metres from Hydro, therefore the noise will be reduced by 1 dB, thus giving:

Daytime specific noise:	46 dB(A)
Night time specific noise:	43 dB(A)

Table to show BS4142 calculation

	Day (dB(A))	Night (dB(A))
Specific noise (L_{eq})	46	43
Acoustic feature correction	+6	+6
Rating level	52	49
Background noise level (L_{90})	45	42
BS4142 Difference	+7	+7
Likelihood of complaints	Marginal	Marginal

5.2 Noise Rating (NR) Curve

The full results of the noise rating curve conformance are presented in Appendix 3.

During the daytime, the NR curve indicated a noise rating of 45 dB. This conformed to the NR curve of 50 dB.

During the night time, the NR curve indicated a noise rating of 41 dB. This result was just outside the NR curve of 40 dB.

6 Conclusion and Discussion

The results of the BS4142 assessment indicated that, at the nearest property on The Oval, the likelihood of complaints during the daytime and night time would be of marginal significance. However, it was considered unlikely that the Company would receive complaints during the daytime, due to the significant amount of construction work in the immediate area, also on Bridge Road.

Both the day and night time results indicated a difference of +7 dB over the background noise level.

It was also noted that 'chiming' noise generated by the logs during the stripping of the pit activity appeared to have less of an impact due to the changes made at the lay down station. There were fewer 'chiming' noises generated and the noise was only just perceptible.

7 Recommendations

It would be beneficial for Hydro to investigate any alternative methods of loading the furnace with scrap aluminium, such that the use of the charger can be minimised.

Appendix 1

Results of Noise Measurements

The following tables show the noise measurements taken during the daytime, on 18th July 2017

Table 1 – Daytime readings (Factory in operation)

Position 1 – On boundary of nearest property on The Oval				
Time Period	L _{eq} (60 min)	L ₉₀	L ₁₀	L _{Max}
14.09 – 15.09	49	46	52	77
15.18 – 16.18	50	47	53	71
Noise sources – Construction traffic, vehicles and reversing beacons mainly audible from the construction work associated with the building of the prison on Bridge Road. Hydro factory, noise was audible occasionally during the monitoring period and activities included: Loading of the charger with scrap material. Pushing the scrap material into the melter. Stripping the pit.				

Table 2 – Daytime readings (Factory NOT in operation)

Position 2 – Behind disused garages on Bridgeway East opposite The Oval				
Time Period	L _{eq} (45 min)	L ₉₀	L ₁₀	L _{Max}
12.45 – 13.30	47	45	49	71
Noise sources – Persistent construction noise from building of prison on Bridge Road.				

All noise levels were measured in dB(A).

The following tables show the noise measurements taken during the night time, on 17th July 2017

Table 3a – Night time readings (Factory in operation)

Position 1 – On boundary of nearest property on The Oval				
Time Period	L _{eq} (5 min)	L ₉₀	L ₁₀	L _{Max}
23.17 – 23.22	45	44	46	59
23.23 – 23.28	44	43	45	55
Noise sources: Cooling tower noises audible from the Hydro factory and other distant 'factory noise' from other premises on the estate.				

Table 3b – Night time readings (Factory in operation)

Position 1 – On boundary of nearest property on The Oval				
Time Period	L _{eq} (5 min)	L ₉₀	L ₁₀	L _{Max}
23.30 – 23.35	46	45	47	50
23.38 – 23.43	45	44	46	54
Noise sources: Automated movements on the lay down station from the 'stripping the pit' activity. Only just perceptible chiming of logs on the lay down table. Bundles of aluminium being placed onto the charger.				

Table 4 – Night time readings (Factory NOT in operation)

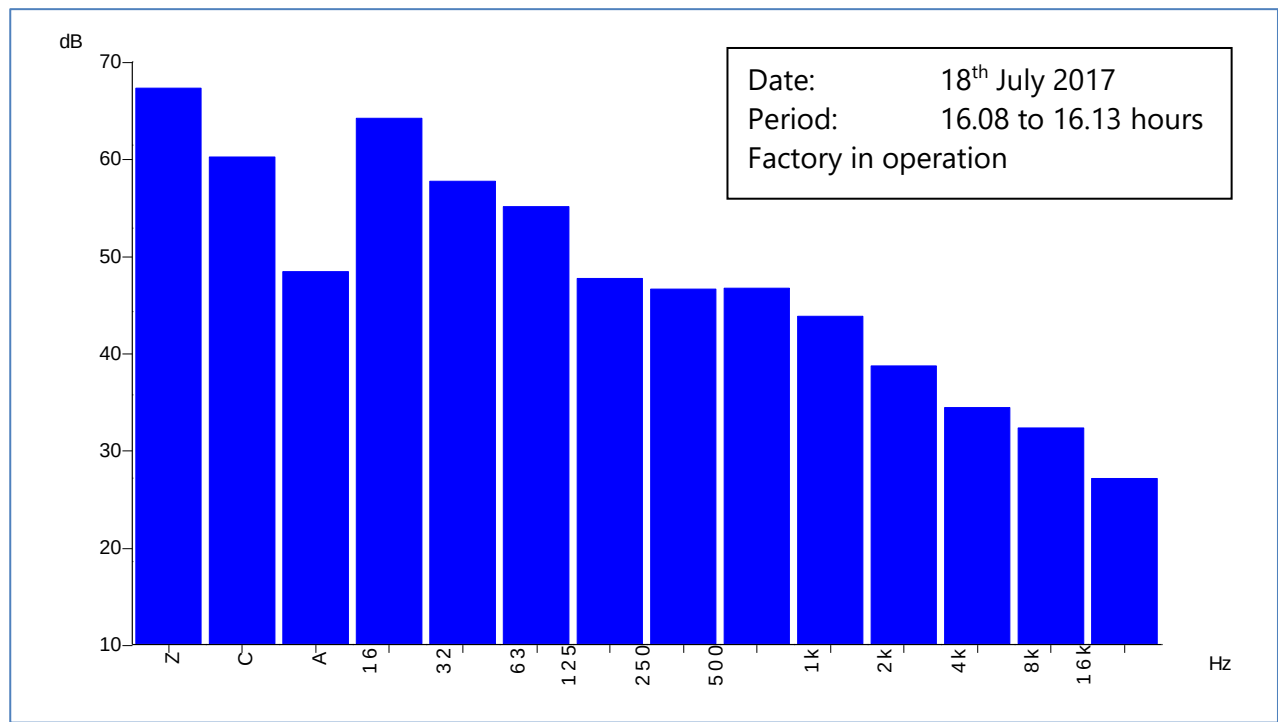
Position 1 – On boundary of nearest property on The Oval				
Time Period	L _{eq} (5 min)	L ₉₀	L ₁₀	L _{Max}
23.00 – 23.05	42	42	43	45
23.07 – 23.12	43	42	43	58
Noise sources – Distant road traffic				

All noise levels were measured in dB(A).

Appendix 2

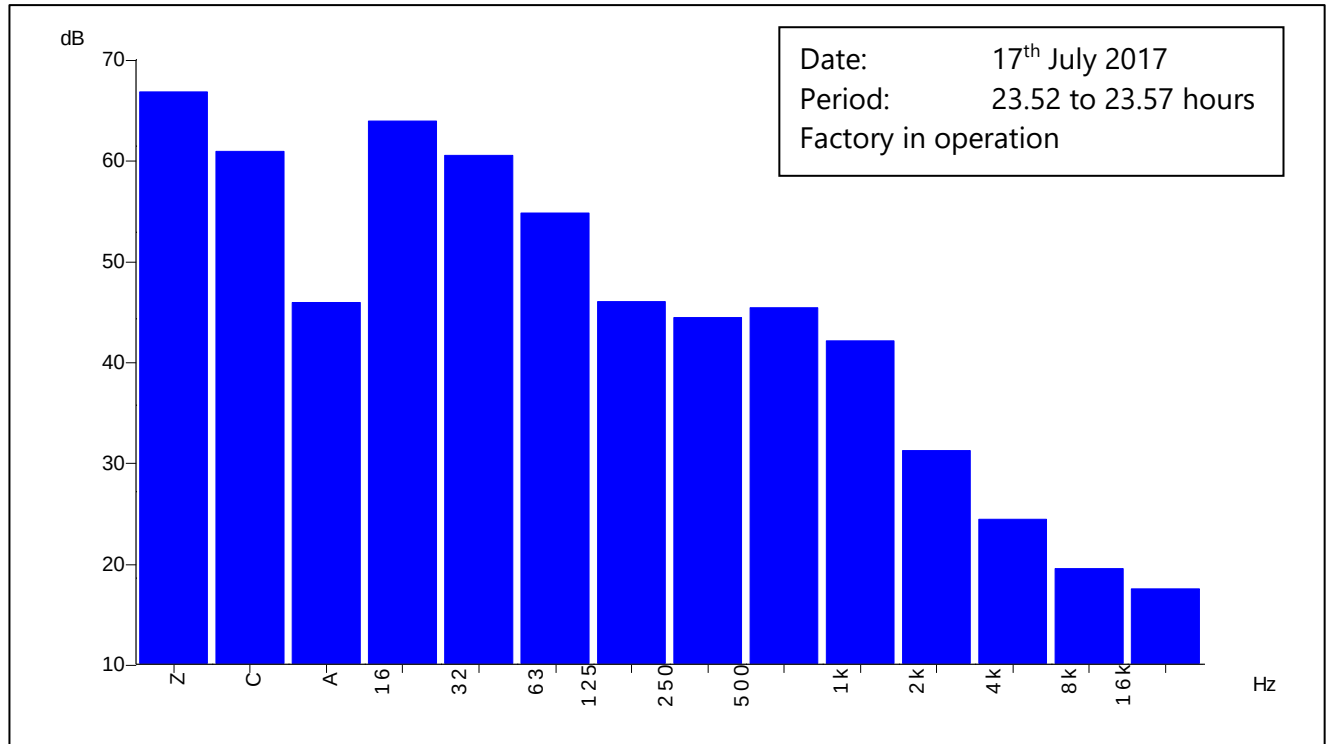
Octave Band Analysis

Figure 1 Octave Band Analysis undertaken at Hydro Aluminium Deeside, during the daytime, on 18th July 2017



OCTAVE BAND CENTRE FREQUENCIES, Hz / dB lin								
31.5	63	125	250	500	1k	2k	4k	8k
57.7	55.1	47.7	46.6	46.7	43.8	38.7	34.4	32.3

Figure 2 Octave Band Analysis undertaken at Hydro Aluminium Deeside, during the night time, on 17th July 2017

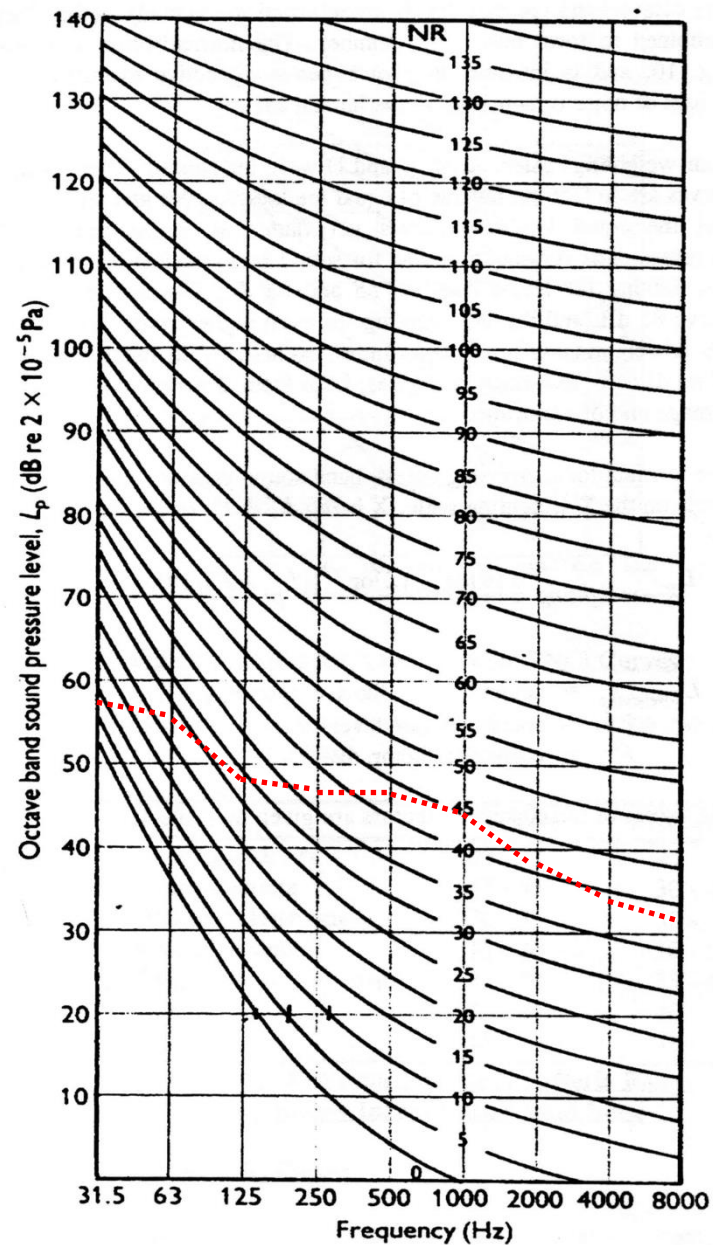


OCTAVE BAND CENTRE FREQUENCIES, Hz / dB lin								
31.5	63	125	250	500	1k	2k	4k	8k
60.5	54.8	46.0	44.4	45.4	42.1	31.2	24.4	19.5

APPENDIX 3

Noise Rating Curves

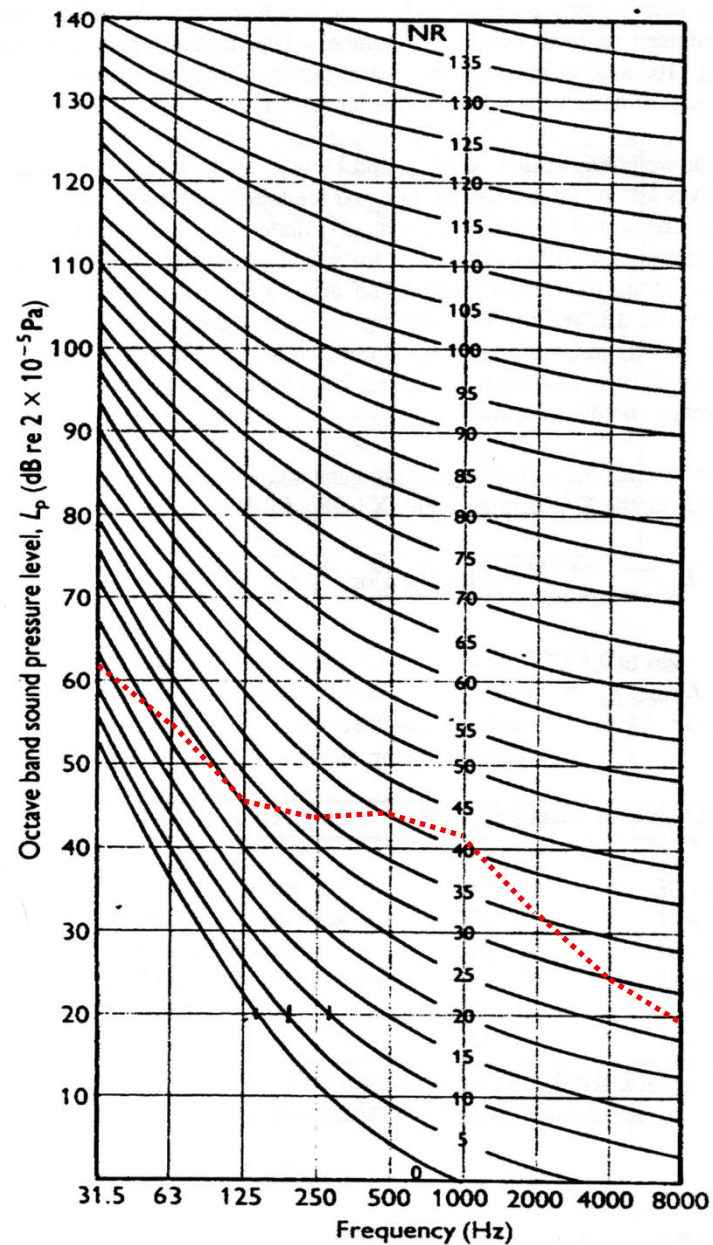
Figure 1 Noise Rating Diagram for the daytime readings with the factory in operation, on 18th July 2017



	OCTAVE BAND CENTRE FREQUENCIES, Hz / dB lin								
	31.5	63	125	250	500	1k	2k	4k	8k
NR 50	89.4	76.0	65.5	58.5	53.5	50.0	47.2	45.2	43.5
Results	57.7	55.1	47.7	46.6	46.7	43.8	38.7	34.4	32.3

Based on Figure 1 above, the estimated noise rating = 45 dB.

Figure 2 Noise Rating Diagram for the night time readings with the factory in operation, on 17th July 2017



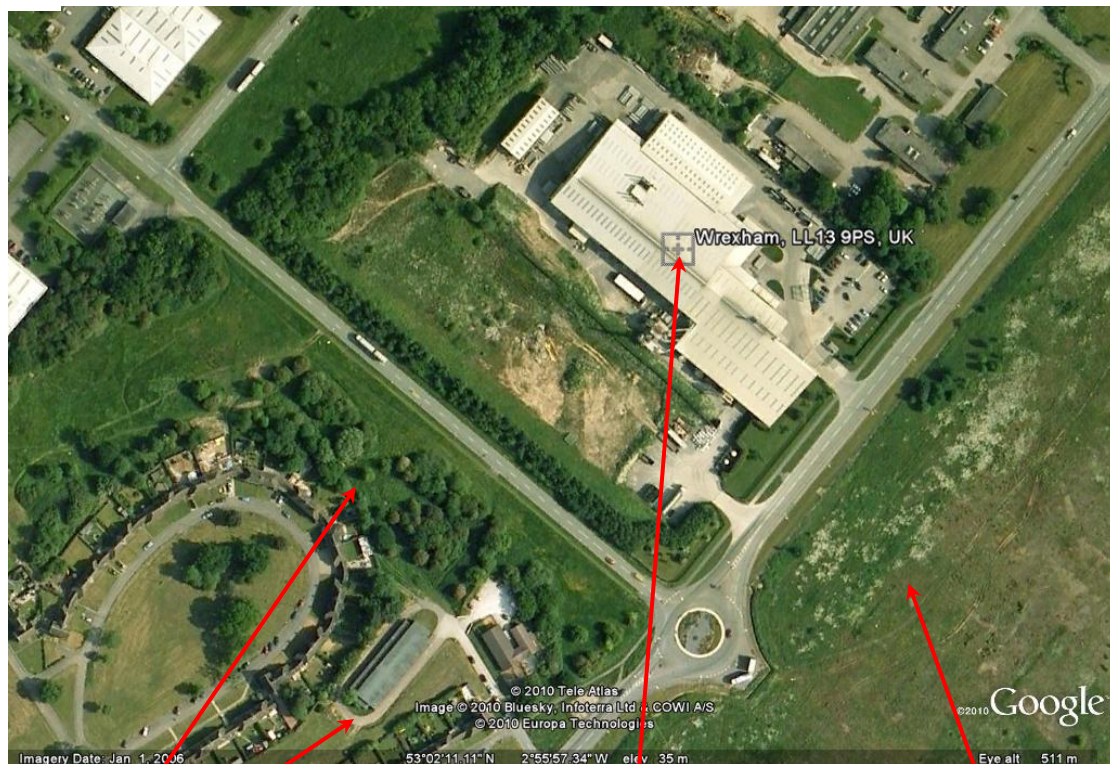
	OCTAVE BAND CENTRE FREQUENCIES, Hz / dB lin								
	31.5	63	125	250	500	1k	2k	4k	8k
NR 40	82.6	67.1	56.8	49.2	43.8	40.0	37.1	34.9	33.2
Results	60.5	54.8	46.0	44.4	45.4	42.1	31.2	24.4	19.5

Based on Figure 2 above, the estimated noise rating = 41 dB.

APPENDIX 4

Noise Monitoring Locations

Photograph showing the monitoring location and the facility



Noise Monitoring
Locations

Hydro Aluminium
Deeside Ltd.

Construction site

Appendix 5

Acoustic Terminology

'A' Weighting

A frequency weighting curve used in sound level meters. The A – weighting curve is used to measure noise to replicate how the human ear would respond to the noise.

Specific Noise Level (L_{eq})

The equivalent continuous A – weighted sound pressure level at the assessment position produced by the specific noise source over a given time interval.

Ambient Noise

The total sound at a given position composed of sound from many sources near and far.

Residual Noise

The ambient noise remaining at the assessment position when the specific noise source is suppressed to a degree that it does not contribute to the ambient noise.

Background Noise Level (L_{90})

This is the 'A' weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of the time.

Calibration Data

Instrument

Calibration

CEL 490.C – Type 1
Integrating Sound Level Meter

Serial No. 035526
Calibrated 16/03/17

CEL 110/1
Acoustic Calibrator

Serial No. 064395
Calibrated 16/03/17