NOISE MONITORING AT THE ADVANCED ENVIRONMENTAL SOLUTIONS (AES) LTD., SOLSBOROUGH, SPRINGFORT CROSS, NENAGH, CO. TIPPERARY, IN COMPLIANCE WITH WASTE LICENCE REGISTER NO. W0240-01

For the Attention of:	Ms. Mary Bannon Environmental Officer. Advanced Environmental Solutions (Ireland) Ltd., Bord na Mona Offices, Main Street, Newbridge, Co. Kildare.
Prepared by:	Mr. Shaun Russell Acoustic Consultant (IOA)
Reviewed by:	Mr. Peter Coogan Acoustic Consultant (IOA)
Report No:	ECS5322- Annual Noise
Monitoring Date:	10th & 11th July 2017
Report Date:	8th September 2017

Executive Summary

Bord na Mona Environmental was contracted by Advanced Environmental Solutions (Ireland) Ltd. to conduct annual noise monitoring at their facility in Solsborough, Springfort Cross, Nenagh, Co. Tipperary.

Advanced Environmental Solutions Ltd. is required to carry out annual noise monitoring at its facility in compliance with Waste Licence Register No. W0240-01. The site was subsequently visited by an Acoustic Consultant from Bord na Mona Environmental on the 10th & 11th July 2017 to conduct the annual monitoring survey for 2017. Noise monitoring was conducted at four boundary locations N1, N2, N3 and N4 and two noise sensitive locations NSL1 and NSL2.

The site boundary LA_{eq} levels ranged between 52 dB (A) to 61 dB(A).

The results of monitoring conducted at Noise Sensitive Locations (NSL's) ranged between 49 dB (A) to 63 dB(A). Three LA_{eq} values were above the respective limit of 55 dB(A), however this was attributed to background noise caused by offsite construction activities and road traffic.

This report is certified as accurate and representative of the sampling and associated analysis carried out.

Conclusion: **Compliant**

Respectively Submitted,

Mr. Shaun Russell
Acoustic Consultant (IOA)

Mr. Peter Coogan
Acoustic Consultant (IOA)

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1.0 INTRODUCTION

BNM Environmental was contracted by Advanced Environmental Solutions (Ireland) Ltd. to conduct annual noise monitoring at their facility in Solsborough, Springfort Cross, Nenagh, Co. Tipperary. The site was subsequently visited by an BNM Environmental Scientist on the 10th and 11th of July to conduct the annual monitoring survey for 2017.

This report details the sampling and analytical methodologies employed and also includes a broad interpretation of the results obtained.

AES Ltd. operates and manages a waste recycling facility at Solsborough, Springfort Cross, Nenagh, Co. Tipperary.

In compliance with the requirements stipulated in schedules B and C of Waste Licence No. W0240-01, AES Ltd. is required to

a) Carry out a noise survey of the site operations annually.

b) Determine ambient noise levels at locations as set out in C.5 of the waste licence. Table B.4 specifies the monitoring frequency and parameters to be determined, for noise sensitive locations, consisting of:

LA_{LEQ} (30minutes)
LA_{10} (30 minutes)
LA_{90} (30 minutes)
Frequency Analysis (1/3 Octave band analysis)

c) Ensure that activities on-site shall not give rise to noise levels off site, at any noise sensitive location, which exceed the following sound pressure limits (L_{Aeq}, 30 minute):

Daytime 55 dB A.

This report outlines both the methodologies employed; the results obtained, and include a brief interpretation of the results obtained.

2.0 METHODOLOGY

2.1 Noise Monitoring

Noise monitoring was carried in accordance with International Standard Organisation (ISO) 1996 Acoustics – Description and Measurement of Environmental Noise Part 1, 2, and 3 in addition to the Environmental Protection Agency Environmental Noise Survey Guidance Document (NG4) using Bruel & Kjaer Model 2250 with outdoor monitoring equipment that was fully calibrated before and after the monitoring event, with no significant drift in calibration noted.

2.1.1 Instrumentation Employed.

The following equipment was employed during the acoustic assessment.

Bruel & Kjaer Real–Time Noise Analyzer Type 2250–Light
Model No: 2250–Light
Serial No. 3000428
Microphone: Bruel&Kjaer4950
Certificate and Calibration:
17th November 2016

Calibrator Type: B&K 4231
Serial No: 2415925
Date of Certificate and Calibration:
17th November 2016

On Site Calibration.
Each instrument was calibrated to 94 dB (A) immediately before sampling and was subsequently checked after the measurement periods with no drift in calibration level noted.

A handheld Garmin GPS60 was used to record the grid coordinated of each environmental noise monitoring location.

A handheld anemometer (Kestrel 2500) was used to take on–site weather measurements on the day of monitoring.

Certified current annual calibration certificates are provided in Appendix III.

2.1.2 Measurement Parameters

- LAeq Values
  LAeq (t) is the A – weighted equivalent continuous sound level – the sound level of a steady sound having the same energy as a fluctuating sound over a specified measurement period.

- LA_{Max} Values
  The maximum RMS, A-Weighted sound pressure level occurring within a specified time period.

- LA_{90} and LA_{10} Values
  The LA_{90} and LA_{10} values represent the A-weighted sound levels exceeded for a percentage of the instrument measuring time. L_{10} indicates that for 10% of the monitoring period, the sound levels were greater than the quoted value. LA_{10} is a good statistical parameter for expressing event noise e.g. passing traffic. The LA_{90} represents post event sound levels and is a good indicator of background levels.

- Tonal and Impulsive Characteristics
  For the purpose of this report, tonal noise is characterised in accordance with Section 5.1 of the EPA's NG4 document, which indicates that a noise source is tonal if a 1/3 octave band exceeds adjacent bands by;

  - 15dB in low/frequency 1/3 octave bands (25Hz to 125Hz);
  - 8dB in middle/frequency bands (160Hz to 400Hz), and;
  - 5dB in high/frequency bands (500Hz to 10,000Hz).

  An impulsive noise is of short duration (typically less than one second), it is brief and abrupt, its' startling effect causes greater annoyance than would be expected from a simple measurement of sound pressure level. For example an instantaneous bang/thud that maybe associated with pile driving, hammering etc.

2.1.3 Site information

- All measurements were taken at 1.5 m height above local ground level and >3.5 m away from reflective surfaces.
- The weather was dry and bright, with a wind-speed of <5ms/sec at the time of the assessment.
- Table 2.1 describes the locations of the monitoring positions for the noise monitoring.
- All noise measurements were conducted in triplicate for the minimum time period of 30 minutes.

TABLE 2.1: LOCATION OF NOISE MEASUREMENTS

Location	Description
N1	Boundary, south-west corner of site
N2	Boundary, north-west corner of site
N3	Boundary, north-east corner of site
N4	Boundary, south-east corner of site
NSL1	Between garage and house, across the road and ca. 20m from entrance to AES
NSL2	House, ca. 150m west of AES

3.0 RESULTS

The results of the environmental noise monitoring programme carried out by BNM Environmental are presented as follows:

Table 3.1: Noise Measurement Results, taken on 10th and 11th July 2017.

3.1 Weather Data

Table 3.1 below; details the on-site weather conditions observed/recorded on the day of the monitoring event.

TABLE 3.1: WEATHER CONDITIONS ONSITE

Date	Rainfall	Mean. Temp ^{0}C Note 1	Mean Wind Speed (m/sec) Note 1	Wind direction	Pressure (hpa) Note 1
10/07/17	0mm	13	1.2	From NW	1008
11/07/17	0mm	15	0.7	From SE	1012

Note 1: Measurements taken with a calibrated Kestrel 2500 30mm Vane Anemometer (I.D. TS-K-01).

Table 3.1 shows that the on-site weather conditions were suitable for noise monitoring as it was dry, with a wind-speed was not greater than 5m/s.

3.2 Noise Measurement Results

TABLE 3.2: NOISE MEASUREMENT RESULTS

Location No.	Date	Start Time	LA_{eq} dB(A)	LA_{10} dB(A)	LA_{90} dB(A)	L_{AFMax} dB(A)	Comments / Site Observations Summary
N1 South West corner	10/07/17	11.05	56	58	44	73	**Site** – Occasional banging of skips. Engines idling at weighbridge. Voices audible form inside waste shed. Reversing alarms and machinery continuous. Power washing trucks occasionally audible. Yard sweeper operational <10m from noise meter. **Background** – Traffic on surrounding roads audible continuously. Crows cawing loudly overhead. Cars and trucks exiting adjacent facility. Shovel bangs from council workers outside facility.
		14.31	61	63	48	81	
	11/07/17	09.20	56	57	45	79	
N2 North West corner	10/07/17	10.34	57	59	51	78	**Site** – Trucks idling in yard continuously Reversing beacons intermittent. Occasional banging of skips. **Background** – Crows cawing loudly overhead. Traffic from surrounding roads continuously audible.
		13.57	60	62	49	80	
	11/07/17	10.40	52	53	43	76	
N3 North East corner	10/07/17	10.02	59	63	47	77	**Site** – Engines idling at weighbridge and passing through yard. Reversing beacons audible from trucks and machines. **Background** – Crows cawing loudly overhead in rookery.. Cutting tools and drilling continuously audible from adjacent yard. Traffic on Dark Rd. passing frequently.
		13.24	58	62	45	76	
	11/07/17	11.20	57	60	48	73	
N4 South East corner	10/07/17	09.30	55	58	48	76	**Site** – Occasional bang of chains as trucks enter yard. Revving of engines occasionally audible from yard. Reversing alarms audible at times. Occasional skip bang. **Background** – Heavy machinery and cutting tools audible from construction activity in adjacent yards Medium traffic on Kilcolman/Dark Rd. Dogs barking and crows cawing occasionally. Horn beep
		12.50	52	54	45	70	
		16.11	54	57	48	72	
NSL-1 South of Site	10/07/17	11.42	**63**	67	50	77	**Site** – Site generally inaudible apart from reversing alarms occasionally audible. **Background** – Heavy traffic on Limerick Rd. -**Intermittently dominant.** Cutting and drilling tools from construction works on adjacent dwelling. -**Intermittently dominant**
		15.37	**62**	65	51	78	
	11/07/17	11.50	**60**	62	50	79	
NSL-2 West of Site	10/07/17	12.15	54	53	43	79	**Site** – Engines idling onsite audible at times. Occasional banging of skips. **Background** – Continuous and heavy traffic on Limerick Rd. -**Intermittently dominant** Cutting tools, reversing alarms and hissing of air brakes from construction machinery. -**Intermittently dominant**
		15.04	52	52	44	75	
	11/07/17	09.59	49	51	44	69	

Note 1: Results in red **bold text** represent an exceedence of the Waste Facility Licence Limit that is primarily attributed to site activities.

Note 2: Results in black **bold text** represent an exceedance of the Waste Facility Licence Limit that is primarily attributed to external activities

4.0 COMMENT

Table 3.2 displays the results of the daytime noise event undertaken at Advanced Environmental Solutions (Ireland) Ltd., Solsborough, Springfort Cross, Nenagh, Co. Tipperary on the 10th & 11th July 2017. The Waste License issued to the site under the Waste Management Act, 1996 to 2011, state a 55dB limit for Noise locations for daytime noise.

The site boundary LA_{eq} levels ranged between 52 dB (A) to 61 dB(A). Nine noise measurements LA_{eq} values were above the respective 55 dB(A) daytime limit, however the license stipulates limits apply to NSL's only. The results of monitoring conducted at Noise Sensitive Locations (NSL's) ranged between 49 dB (A) to 63 dB(A).

Location N-1:

N-1 is situated on the south-west boundary corner of the AES site, close to the entrance, the weigh bridge and the bin wash area. The noise level (L_{eq}(A)) at N-1 ranged from ; 56-61 dB(A). Onsite noise sources included occasional banging of skips, engines idling at weighbridge and reversing alarms of machinery. Power washing of trucks and yard sweeping activates were also occasionally audible. Offsite noise sources comprised of road traffic, crows and some construction. No tonal noise was detected at this location.

Location N-2:

N-2 is situated on the north-west boundary corner of the AES site, approximately 30m from the waste storage area. The noise level (L_{eq}(A)) at N-2 ranged from 52-60 dB(A). Onsite noise sources noted were; trucks idling in the AES yard continuously, occasional reversing beacons and banging of skips. External noise sources were identified to be road traffic and crows cawing overhead. No tonal noise was detected at this location.

Location N-3:

N-3 is situated on the north-east boundary corner of the AES site, approximately 20m from the side entrance of the waste storage area. The noise level (L_{eq}(A)) at N3 ranged from 57-59 dB(A).The main source of onsite noise at this location was due to engines idling in yard and reversing beacons from trucks/machines.
Offsite noise included traffic on the Kilcolman and Limerick Road, construction activities and crows cawing overhead, these were continuously audible and dominant during each measurement period. No tonal noise was detected at this location.

Location N4:

N-4 is situated on the south-east boundary corner of the AES site, in the main car park and in close proximity to the staff entrance of the AES facility. The noise level (L_{eq}(A)) at N4 ranged from 52-55 dB(A). Noise attributed to site activity included; idling and revving of engine, reversing beacons and occasional bang of a skip dropping or chains rattling.
External construction activities and road traffic were the dominant sources of noise at this monitoring location, including; cutting tools, heavy machinery and continuous road traffic. Tonal noise was not detected at this location.

NSL-1:

NSL-1 is located across the road and ca. 20m from the truck entrance to the AES facility, between an operational garage (Comerfords) and a house. The noise levels (L_{eq}(A)) at NSL-1 ranged from 60-63 dB(A), all of which are above the respective Waste Licence limit of 55 dB(A). Noise attributed to AES activities included; occasional reversing beacons. Off-site noise sources included continuous heavy traffic on the Limerick (N52) and Kilcolman Roads and cutting/drilling tools from construction works. Offsite noise sources were dominant throughout the measurement periods, therefore the AES Nenagh facility is considered compliant with the 55 dB(A) limit set out at the NSL's. Tonal noise was not detected at this location.

NSL-2:

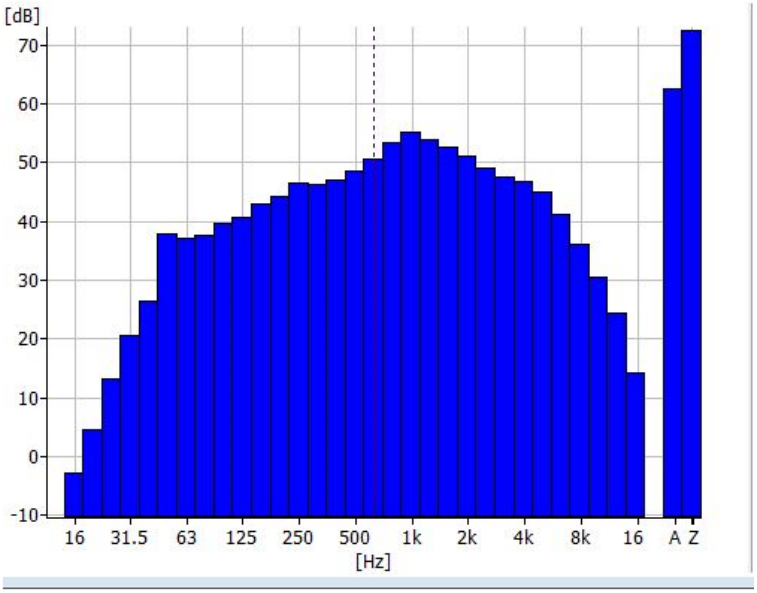
NSL-2 is located by a house on the Kilcolman road, ca. 150m west of the AES facility and Comerfords garage. The noise level (L_{eq}(A)) at NSL-2 were relatively low and ranged from (49-54 dB(A)), which are all below the Waste License limit of 55dB(A). Site activity was only faintly audible at this location and included; engines revving and the occasional bang of a skip being dropped. The dominant source of noise at this location was due to road traffic on the N52 (Limerick) and Kilcolman Roads. Construction works audibility included; air release of air brakes and beeping of reversing alarms. Tonal noise was not detected at this location.

APPENDIX 1

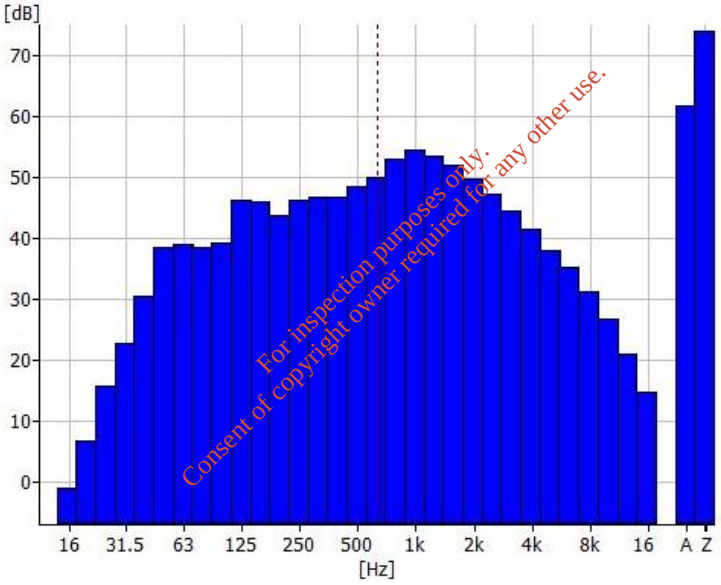
One-third Octave Frequency Spectra for NSL's

* Graphs for remaining locations are available upon request

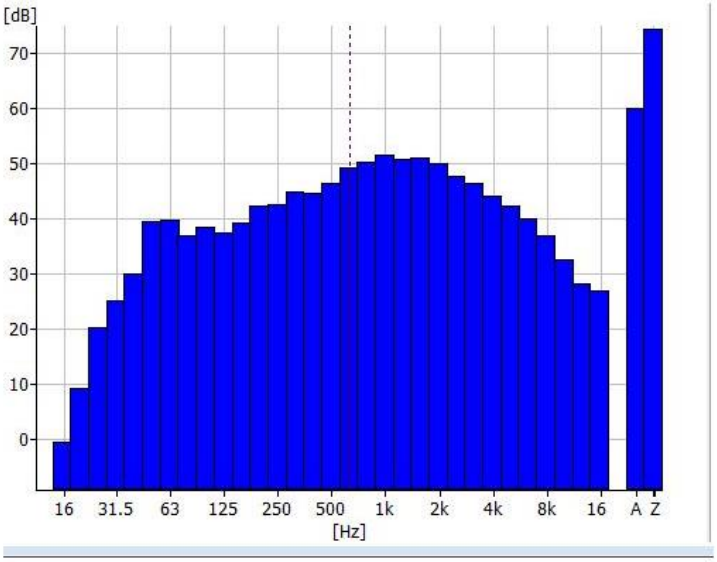
Location NSL-1 – Round 1



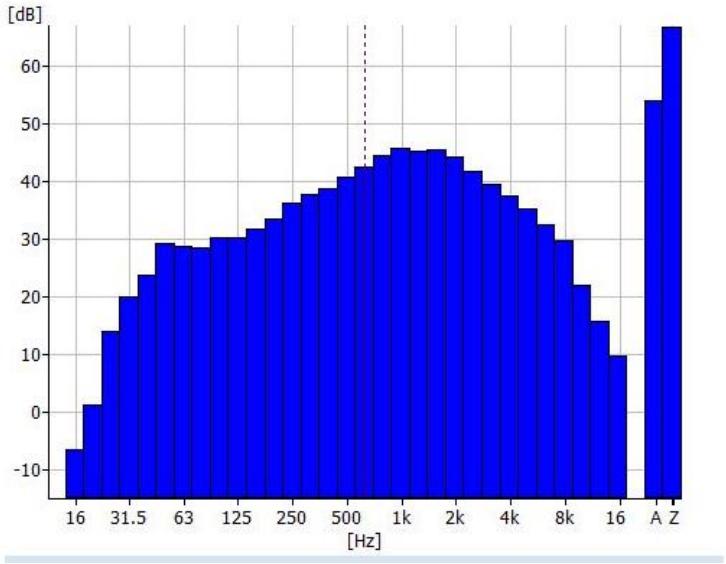
Location NSL-1 – Round 2



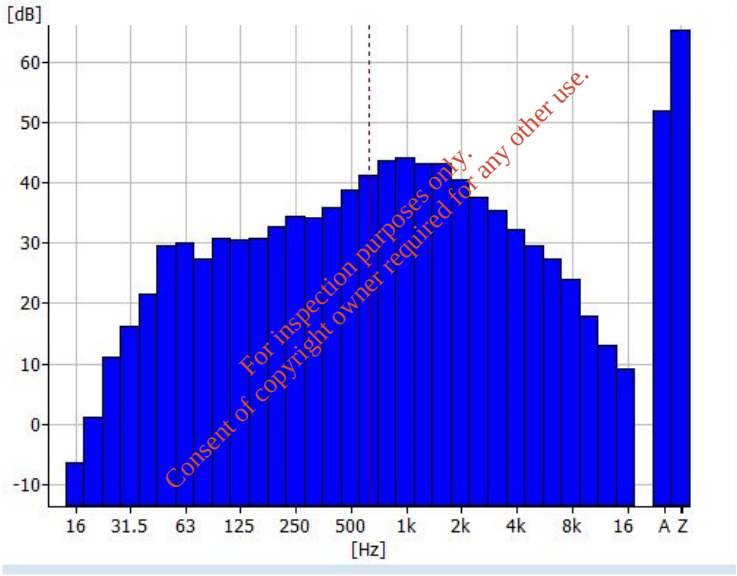
Location NSL-1 – Round 3



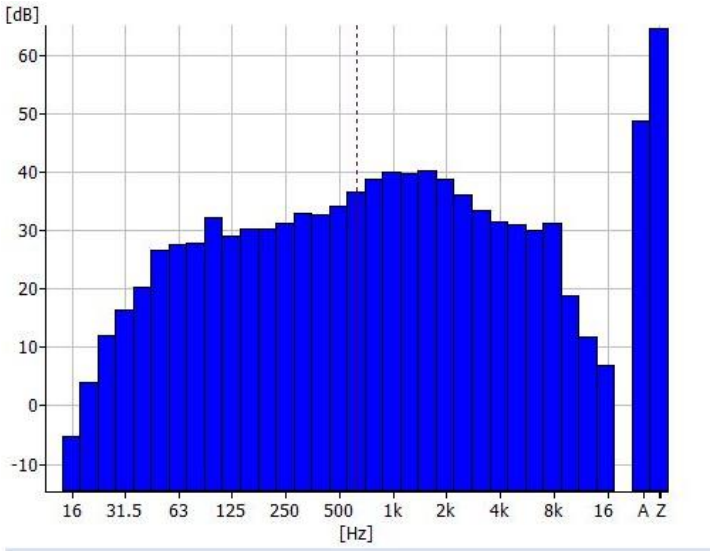
Location NSL-2 – Round 1



Location NSL-2 – Round 2

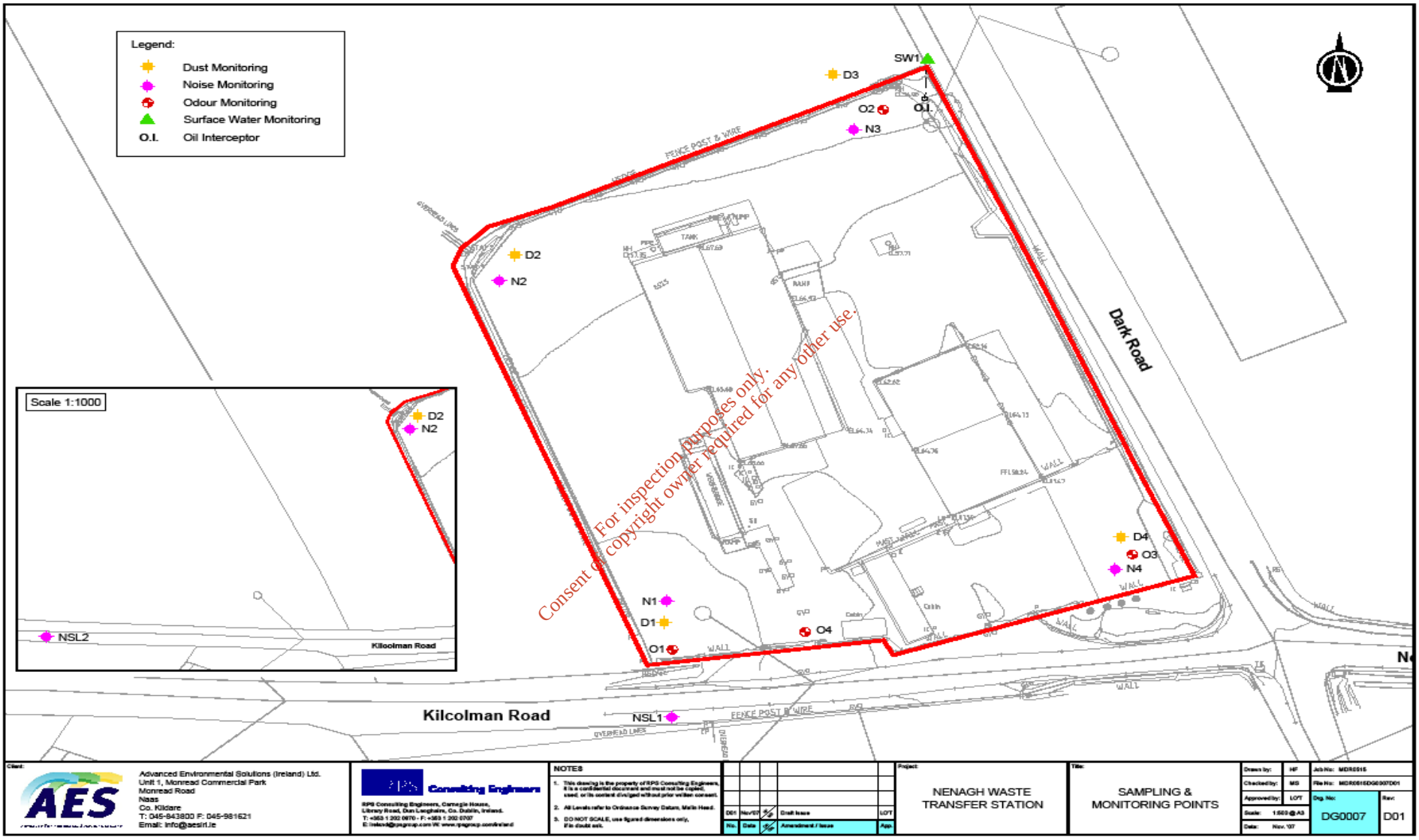


Location NSL-2 – Round 3



APPENDIX 2

Map of Monitoring Locations



APPENDIX 3

Noise Meter Calibration Certificates

NSAI
National Metrology Laboratory

Certificate of Calibration

Issued to: Bord na Mona Environmental
Main Street
Newbridge
Co. Kildare

Attention of: Stephen Stapleton

Certificate Number	163880
Item Calibrated	Bruel & Kjaer Type 2250 Light Sound Level Meter and 4950 Microphone
Serial Number	3000428 (SLM) and 2755058 (Microphone)
Client ID Number	--------
Order Number	PO3007103
Date Received	17 Nov 2016
NML Procedure Number	AP-NM-09
Method	The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. The verification checks performed are those outlined in BS 7580: Part 1 (1997), *Specification for the verification of sound level meters*. This British Standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to BS EN 60651 (1994) and I.S. EN 60804 (2000), respectively. Prior to calibration the instrument was tested, and its overall sensitivity adjusted in accordance with Clause 5.4 of BS 7580: Part 1 (1997) using a reference sound level calibrator.
Calibration Standards	Norsonic 1504A Calibration System incorporating: SR DS360 Signal Generator, No. 0735 [Cal. Due Date: 18 Nov 2017] Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 13 Sep 2017] B&K 4134 Measuring Microphone, No. 0743 [Cal Due Date: 19 Jan 2017] B&K 4228 Pistonphone, No. 0740 [Cal. Due Date: 19 Jan 2017] B&K 4226 Acoustical Calibrator, No. 0150 [Cal. Due Date: 12 May 2017]

Calibrated by: David Fleming — Date of Calibration: 22 Nov 2016

Approved by: Paul Hetherington — Date of Issue: 22 Nov 2016

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

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NSAI
National Metrology Laboratory

Certificate of Calibration

Issued to: Bord na Mona Environmental
Main St
Newbridge
Co Kildare

Attention of: Stephen Stapleton

Certificate Number	163881
Item Calibrated	Bruel & Kjaer Type 4231 Sound Calibrator
Serial Number	2415925
Client ID Number	--------
Order Number	PO3007103
Date Received	17 Nov 2016
NML Procedure Number	AP-NM-13
Method	The above calibrator was allowed to stabilize for a suitable period in laboratory conditions. It was then calibrated by measuring the sound pressure level generated in its measuring cavity (half-inch configuration). The calibrator's operating frequency was also measured.
Calibration Standards	Norsonic 1504A Calibration System incorporating: Agilent 34401A Digital Multimeter, File No. 0736 [Cal due: 13 Sep 2017] B & K 4134 Measuring Microphone, File No. 0743 [Cal due: 19 Jan 2017] B & K 4228 Pistonphone, File No. 0740 [Cal due: 12 Jan 2017]

Calibrated by: David Fleming
Approved by: Paul Hetherington
Date of Calibration: 21 Nov 2016
Date of Issue: 21 Nov 2016

CIPM MRA

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