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damian brosnan acoustics

2017 annual noise compliance survey at Killarney Waste Disposal, Aughacurreen, Killarney, Co. Kerry

Licence ref. W0217-01

Client **Killarney Waste Disposal**

Prepared by **Damian Brosnan BSc MSc MIOA MIEI**

Report no	Date	Status
058.3.1	20.12.17	Release 1

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Summary

On 04.12.17, Damian Brosnan Acoustics carried out a daytime environmental noise survey in the vicinity of the Killarney Waste Disposal facility at Aughacurreen, Killarney, Co. Kerry. The survey is a requirement of waste licence W0217-01 issued by the EPA in respect of the facility.

Noise levels were measured at one boundary station and three offsite stations. Operations, consisting of internal and external activity, were underway at the facility throughout the survey.

Site emissions were audible to varying degrees at all four stations. Facility emissions did not exceed the 55 dB daytime limit considered applicable to the three offsite stations. No tones or impulses were noted in site emissions. Overall, emissions were considered subjectively and objectively satisfactory.

1 Introduction

1.1 Damian Brosnan Acoustics was instructed by Killarney Waste Disposal Ltd. (**KWD**) to carry out an environmental noise survey in the vicinity of the KWD waste management installation at Aughacurreen, Killarney, Co. Kerry. The survey is a requirement of waste licence W0217-01 issued 01.08.06 by the Environmental Protection Agency (**EPA**) in respect of the facility. The objectives of the survey were as follows:

- Undertake noise monitoring in accordance with *International Standard ISO 1996-2:2007 Acoustics – Description, measurement and assessment of environmental noise, Part 2: Determination of environmental noise levels* (2007) and EPA document *NG4 Guidance note for noise: Licence applications, surveys and assessments in relation to scheduled activities* (2016).
- Measure noise levels at one boundary station (NML1) and three offsite stations (NML2-NML4) used previously as described in **appendix 1**.
- Assess measured levels in the context of noise conditions specified in waste licence W0217-01, reproduced in **appendix 2**.

1.2 The survey was undertaken during daytime hours Monday 04.12.17. Night-time monitoring was not required as the facility does not operate at night, and there are no onsite noise sources during night-time hours. As licence W0217-01 predates guidance note NG4, evening monitoring was not required. Survey methodology, equipment specifications and weather conditions are listed in **appendix 3**.

1.3 Operations were underway at the KWD facility throughout the survey. Noise emissions arose from several sources as follows:

- Waste processing operations in main building, including use of front end loader.
- Grab in building and on yard.
- Forklift truck around yards.
- Workshop activities.
- Occasional truck movements around site.
- Occasional vehicle movements through gate, carpark and weighbridge.

2 Results

2.1 Noise data recorded are presented in **appendix 4**, and summarised in **table 1** over. Frequency spectra and time history profiles are shown in **appendix 5**. Tabulated frequency data are presented in **appendix 6**.

Table 1: Noise data summary.

Station	NML1	NML2	NML3	NML4
Period	Daytime	Daytime	Daytime	Daytime
Ambient $L_{Aeq\ 30\ min}$ (dB)	58-63	48-57	53-62	42-43
Facility specific $L_{Aeq\ 30\ min}$ (dB)	58-63	34-47	<35	<33
Tone objectively detected	x	x	x	x
Tone attributable to facility	x	x	x	x
Facility audibly tonal	x	x	x	x
Facility audibly impulsive	x	x	x	x
Facility rated $L_{AReq\ 30\ min}$ (dB)	58-63	34-47	<35	<33
Limit (dB)	-	55	55	55
Compliance	N/A	✓	✓	✓

2.2 Condition 4.3 of waste licence W0217-01 specifies that site emissions shall not exceed a daytime noise limit of 55 dB at the site boundary. However, most waste licences currently issued by the EPA state that specified noise limits are to apply to noise sensitive locations (**NSL**s) only. In this regard it is noted that licence W0217-01 is now over 11 years old, and may be considered out of date in light of recent revisions in EPA noise guidance. Moreover, as there are no NSLs bordering the KWD facility, it is considered impractical to enforce limits at the facility boundary. It is therefore considered that noise limits specified in the licence are not relevant to station NML1 located at the facility gate. The limits are considered more relevant to the three offsite stations NML2, NML3 and NML4, all of which are situated in proximity to nearby dwellings.

2.3 KWD noise emissions were audible to varying degrees at all four stations during the survey. Given its location adjacent to the site entrance, the loudest emissions were measured at NML1. Vehicle movements through the gate dominated the noise environment here, resulting in site specific $L_{Aeq\ 30\ min}$ levels of 58-63 dB during the daytime. As noted above, site noise limits are not considered relevant to this station.

2.4 At the three remaining stations, KWD activities were audible to varying degrees throughout the survey. Emissions were generally slightly audible only, although were more clearly audible during one interval at NML2 due to operation of an excavator near the southern boundary. The site specific $L_{Aeq\ 30\ min}$ level during this interval was 47 dB. Specific levels during all other intervals were lower. KWD emissions were thus significantly lower than the 55 dB daytime noise limit specified by licence W0217-01.

2.5 No audible tones or impulses were noted in site emissions, thus complying with schedule B.4 of waste licence W0217-01. Acoustic energy detected in the 16 Hz band during several intervals, traced to KWD operations, was not tonal, and was below hearing threshold (see **appendix 6**).

3 Conclusions

3.1 KWD noise emissions did not exceed the 55 dB daytime limit considered applicable to the three offsite stations.

3.2 No tones or impulses were noted in site emissions. Overall, emissions were considered subjectively and objectively satisfactory.

Appendix 1: Noise stations

Station	ITM NGR*	Location	Propagation route terrain
NML1	493716 593998	N side of site gate	Free field; clear line of sight; terrain level; route over paved surfaces
NML2	493569 593878	45 m S of main building, adjacent to gateway to detached dwelling 100 m SW of site	Free field; site almost entirely screened by dense hedging; terrain level; route over overgrown ground with trees & shrubs
NML3	493824 594080	Site access road, 20 m from junction with local secondary road, 140 m NE of site gate	Free field; partial line of sight through hedgerow trees; terrain level; route over roadway & overgrown ground with trees
NML4	493663 594150	100 m NE of site, on S end of track between dwellings, leading to field on NE side of facility **Relocated 100 m W of usual position due to construction of dwelling at original position**	Free field; partial line of sight through hedgerow vegetation; terrain level; route over rough pasture and hedgerows

*Not verified onsite.

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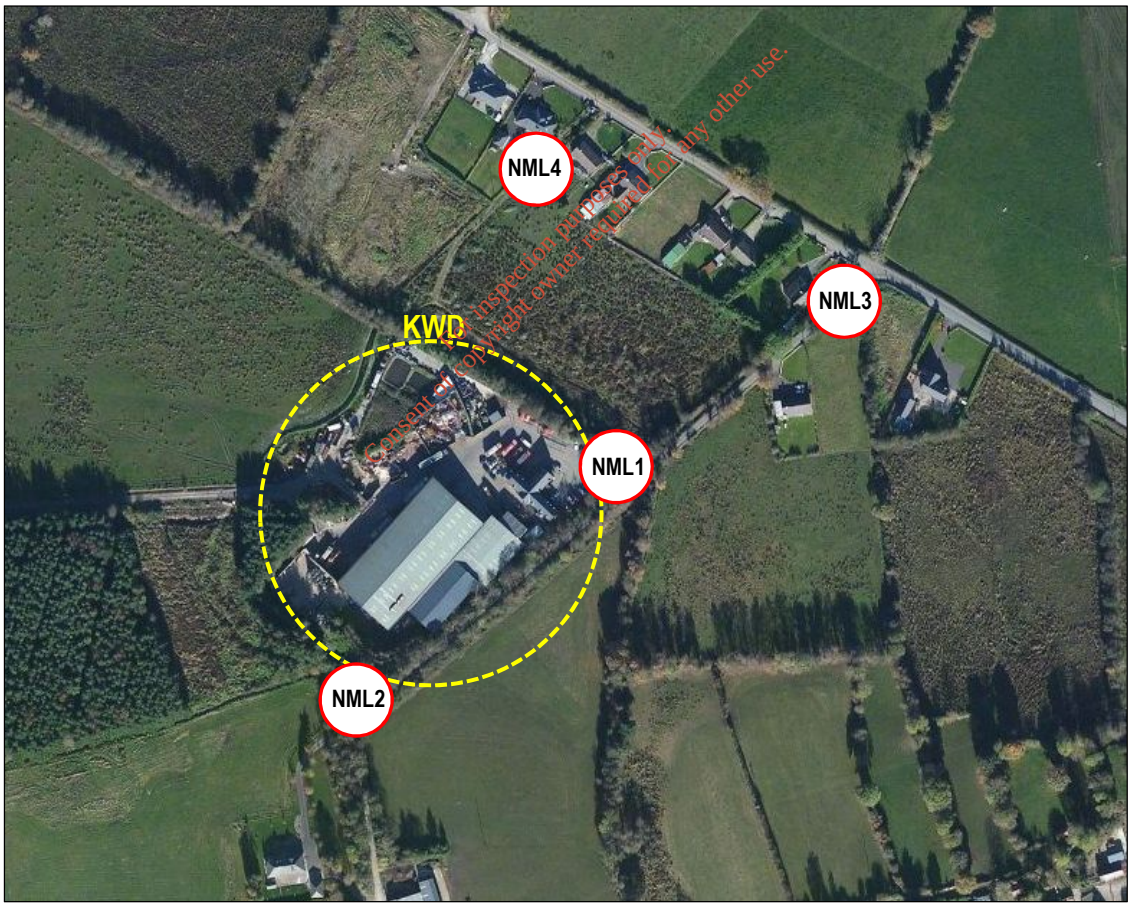


Appendix 2: W0217-01 noise conditions

1.8 Waste Acceptance Hours and Hours of Operation

1.8.1 With the exception of emergencies or as may be agreed by the Agency, waste shall be accepted at or despatched from the facility only between the hours of 0730 hrs to 1930 hrs Monday to Saturday inclusive.

1.8.2 The facility shall be operated only during the hours of 0700 hrs to 2000 hrs Monday to Saturday inclusive.

1.8.3 The facility shall not operate or accept/despatch waste on Sundays or on Bank Holidays without the agreement of the Agency.

4.3 Noise

Noise from the facility shall not give rise to sound pressure levels (Leq, 30 minutes) measured at the boundary of the facility which exceed the limit value(s).

6.12 Noise

6.12.1 The licensee shall carry out a noise survey of the site operations biannually. The survey programme shall be undertaken in accordance with the methodology specified in the 'Environmental Noise Survey Guidance Document' as published by the Agency.

6.12.2 The licensee shall establish and maintain best work practices for the control of noise emissions from the site.

6.12.3 The licensee shall within 13 months of the date of grant of this licence prepare a programme, based on the findings of the surveys referred to in Condition 6.12.1 above, to the satisfaction of the Agency, for the identification and reduction of noise emissions. This programme shall be included in the Environmental Management Programme.

B.4. Noise Emissions

Daytime dB $L_{(A)eq}$(30 minutes)	Night-time dB $L_{(A)eq}$(30 minutes)
55 Note 1	45 Note 1

Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at noise sensitive locations.

C.5 Noise Monitoring

There is no additional noise monitoring required in this schedule.

Appendix 3: Survey details

File	Project ref.	058
	Client	Killarney Waste Disposal
	Location	KWD facility Aughacurreen Killarney
	Stations	Onsite: NML1 Offsite: NML2 NML3 NML4
	Purpose	Waste licence compliance survey
	Comment	Facility operating NML4 relocated 100 m W
Event	Period	Daytime
	Date	04.12.17
	Day	Monday
	Time	0930-1815
	Operator	Damian Brosnan BSc MSc MIOA MIEI
	Sound level meter	2250
Conditions	Cloud cover	Varying 90-100 %
	Precipitation	0 mm
	Temperature	6 rising to 7 °C
Wind	Direction	SW airflow
	Speed	0 m/s
	Measurement	Anemo anemometer 2 m above ground level
Sound level meter	Instrument	Bruel & Kjaer Type 2250
	Instrument serial no.	2506594
	Microphone serial no.	2529531
	Application	BZ7224 Version 2.5
	Bandwidth	Broadband & 1/3 octaves
	Max. input level	141.16 dB
	Broadband weightings	Time: Fast Frequency: AC
	Spectrum weightings	Time: Fast Frequency: Z
	Windscreen correction	UA-1650
	Sound field correction	Free-field
	UKAS calibration	08.02.16
	Calibrating laboratory	Bruel & Kjaer Denmark
	Calibration certificate	Available on request
Onsite calibration	Time	04/12/2017 09:51:32
	Type	External
	Sensitivity	47.40 mV/Pa
	Post survey check	93.9 dB
Onsite calibrator	Instrument	Bruel & Kjaer Type 4231
	Instrument serial no.	3017723
	UKAS calibration	20.01.17
	Calibrating laboratory	Bruel & Kjaer Denmark
	Calibration certificate	Available on request
Methodology	Standards	ISO 1996 (2007 & 2016) EPA NG4 (2016)
	Microphone position	Free field, 1.5 m above ground level
	Intervals	30 min logging at 10 s
Uncertainty	Instrumentation	±1 dB (IEC 61672:2002 Class 1)
	External	±0-3 dB (station & weather dependent, estimated)
	Total	±5 dB (estimated, including expanded uncertainty)

Appendix 4: Noise data

See glossary at end of report for definition of parameters

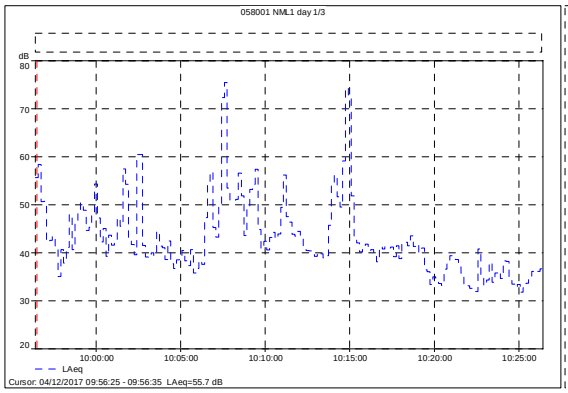
Station	Date	Time	Wind vector	$L_{Aeq\ 30\ min}$ dB	$L_{AF10\ 30\ min}$ dB	$L_{AF90\ 30\ min}$ dB	Specific $L_{Aeq\ 30\ min}$ dB
NML1 day 1/3	04.12.17	0956-1026	0	58	52	33	58
	Facility: Occasional vehicle movements through adjacent site entrance dominant when present. Activity on nearest yard clearly audible, including truck movements through weighbridge. Plant operations deeper in site quite audible almost continuously. **Extraneous**: Bird song/calls, aircraft, and intermittent traffic movements in distance. Tractor and excavator occasionally slightly audible in distance to E. No local road traffic. **Specific $L_{Aeq\ T}$ determination**: Leq representative of site emissions including gate traffic.						
NML1 day 2/3	04.12.17	1329-1359	0	63	57	36	63
	Facility: As previous. **Extraneous**: Bird song/calls, aircraft, and intermittent traffic movements in distance. Dog barking to NW repeatedly quite audible. **Specific $L_{Aeq\ T}$ determination**: As previous. Several passing cars on access road insufficient to render Leq unrepresentative.						
NML1 day 3/3	04.12.17	1554-1624	0	61	59	39	61
	Facility: As previous, with yard activity less frequent. **Extraneous**: As previous. Crow calls at 100 m significant. **Specific $L_{Aeq\ T}$ determination**: As previous.						
NML2 day 1/3	04.12.17	1033-1103	0	48	50	41	47
	Facility: Tracked excavator operating at S end of site continuously clearly audible. Loader floor-scrape also audible at low level in building. **Extraneous**: Bird song/calls, aircraft, and intermittent traffic movements in distance. Tractor occasionally slightly audible in distance to NE. Passing local road traffic movements 1039 1041 1043 1058. **Specific $L_{Aeq\ T}$ determination**: Leq outside of local traffic movements representative.						
NML2 day 2/3	04.12.17	1405-1435	0	57	58	39	<47
	Facility: Site activity audible on occasion, chiefly loader operation in building, with audibility varying from slightly audible to quite audible. Energy detected in 16 Hz band from building process. **Extraneous**: Bird song/calls, aircraft, and intermittent traffic movements in distance. Passing local road traffic movement 1412. Crow calls continuously clearly audible. Regular dog barking at nearby dwelling clearly audible. Chainsaw in distance audible at low level continuously. **Specific $L_{Aeq\ T}$ determination**: Leq unrepresentative due to crows and chainsaw. Specific Leq less than earlier level.						
NML2 day 3/3	04.12.17	1628-1658	0	56	50	34	34
	Facility: Grab in building continuously audible at low level. 16 Hz signal detected from 1650. **Extraneous**: Bird song/calls, aircraft, and intermittent traffic movements in distance. Passing local road traffic movements 1644 1653 1657. Crow calls remaining clearly audible. **Specific $L_{Aeq\ T}$ determination**: Grab emissions sufficiently clear continuously to render L90 representative.						
NML3 day 1/3	04.12.17	1254-1324	0	62	55	35	<35
	Facility: Yard activity regularly audible, varying from slight to low level. **Extraneous**: Intermittent passing road traffic dominant when present. Sporadic vehicle movements on adjacent access road also dominant. Bird song/calls, aircraft, distant dog barking. Distant traffic almost continuously slightly audible. Boiler quite audible at nearby dwelling from 1314. **Specific $L_{Aeq\ T}$ determination**: Emissions amplitude and duration insufficient to influence L90. <L90 determination possible only (particularly L90 prior to 1314).						

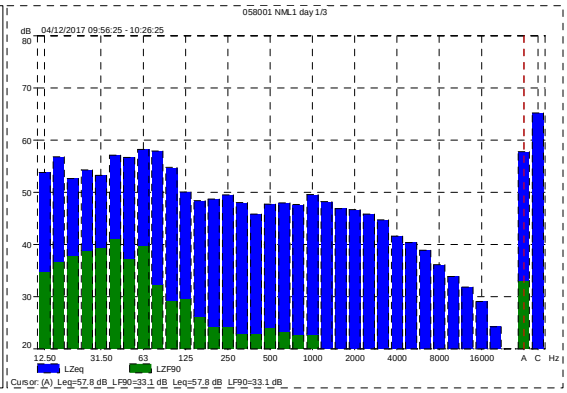
Audibility scale: Inaudible; faintly discernible; slightly audible; audible at low level; quite audible; clearly audible; dominant; intrusive; excessive.

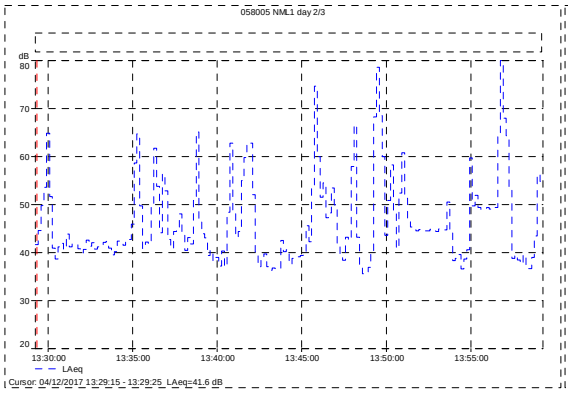
Station	Date	Time	Wind vector	$L_{Aeq\ 30\ min}$ dB	$L_{AF10\ 30\ min}$ dB	$L_{AF90\ 30\ min}$ dB	Specific $L_{Aeq\ 30\ min}$ dB
NML3 day 2/3	04.12.17	1519-1549	0	61	52	31	<31
	Facility: As previous. **Extraneous**: As previous, minus boiler. Chainsaw regularly audible at low level to SE. Local residents talking at 20 m quite audible to 1520. **Specific $L_{Aeq\ T}$ determination**: As previous.						
NML3 day 3/3	04.12.17	1740-1810	0	53	53	35	<35
	Facility: As previous. **Extraneous**: Intermittent passing road traffic dominant when present. Sporadic vehicle movements on adjacent access road also dominant. Bird song/calls almost absent. Aircraft and distant dog barking. Distant traffic almost continuously slightly audible. **Specific $L_{Aeq\ T}$ determination**: Emissions <L90.						
NML4 day 1/3	04.12.17	1136-1206	0	42	43	32	<32
	Facility: Operations regularly audible at low level throughout interval, chiefly from mobile plant on yards and in building. Sporadic truck movements also audible at low level. **Extraneous**: Intermittent passing traffic clearly audible, and audible in distance. Dwelling construction activity at 50 m regularly quite audible. Dog barking in surrounding area regularly clearly audible. Distant traffic continuously slightly audible. Bird song/calls and aircraft. **Specific $L_{Aeq\ T}$ determination**: Emissions amplitude and duration insufficient to influence L90. <L90 determination possible only.						
NML4 day 2/3	04.12.17	1442-1512	0	43	43	33	<33
	Facility: As previous. **Extraneous**: As previous. Chainsaw regularly audible at low level to SE. **Specific $L_{Aeq\ T}$ determination**: As previous.						
NML4 day 3/3	04.12.17	1704-1734	0	43	47	31	<31
	Facility: Prior to 1710, no emissions audible. From 1710, occasional yard activity audible at low level. 16 Hz signal discernible throughout. **Extraneous**: Boiler operating at adjacent dwelling continuously clearly audible to 1710, masking all sources except intermittent passing traffic clearly audible and bird song/calls. From 1710, distant traffic, barking and crow calls audible. Car movement at adjacent dwelling 1712. **Specific $L_{Aeq\ T}$ determination**: <L90 after 1710.						

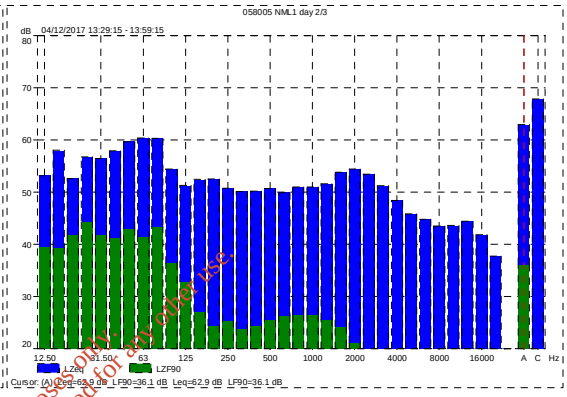
Audibility scale: Inaudible; faintly discernible; slightly audible; audible at low level; quite audible; clearly audible; dominant; intrusive; excessive.

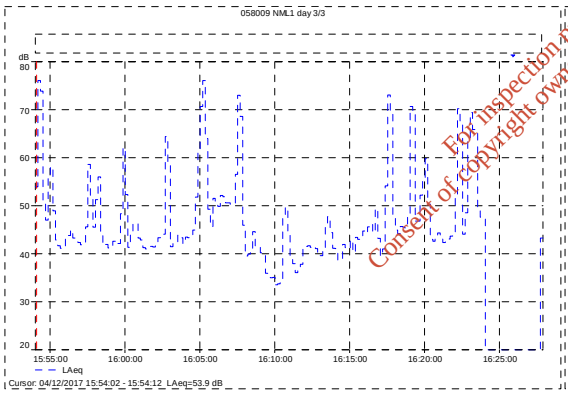
Appendix 4: Profiles & spectra

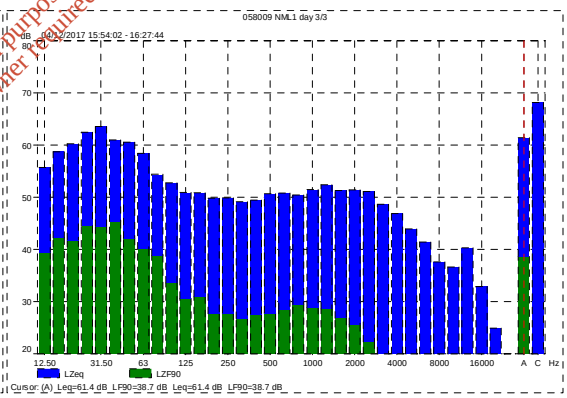


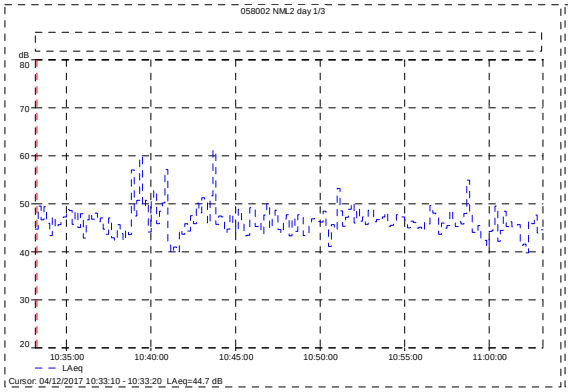


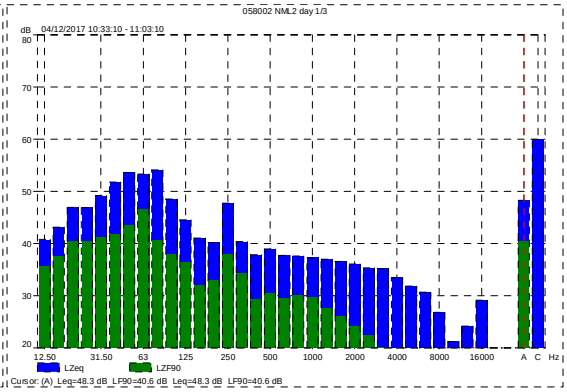


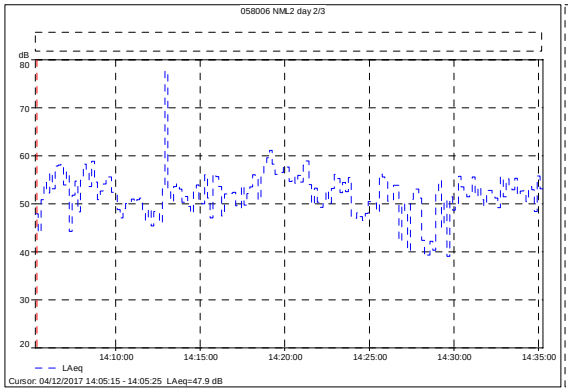


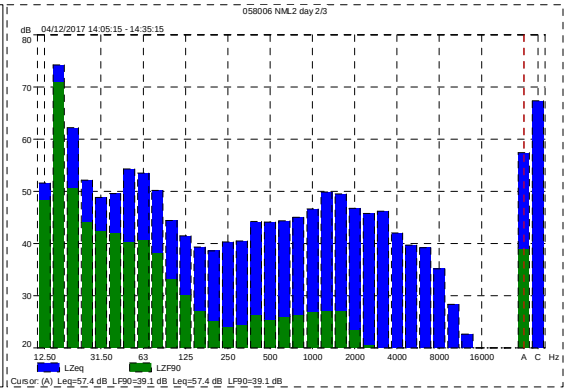


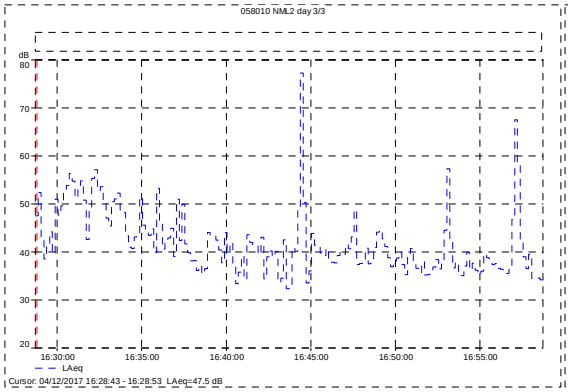


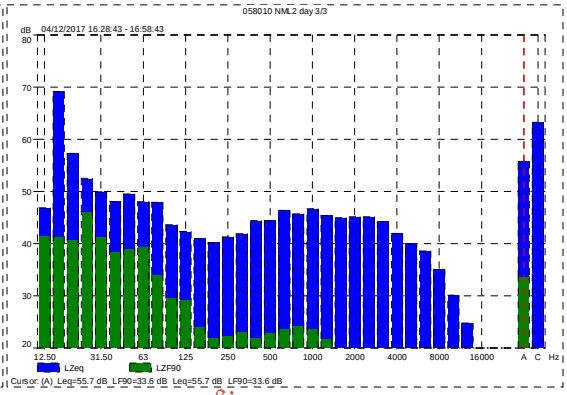


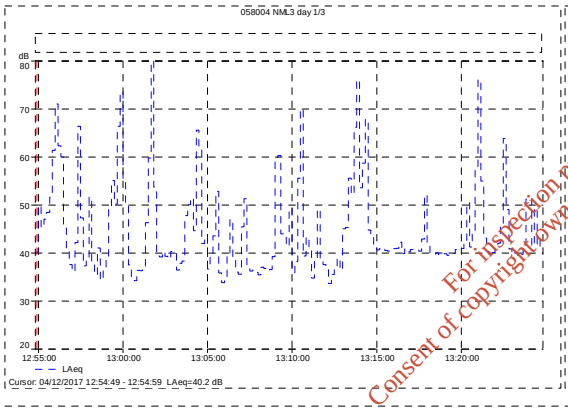


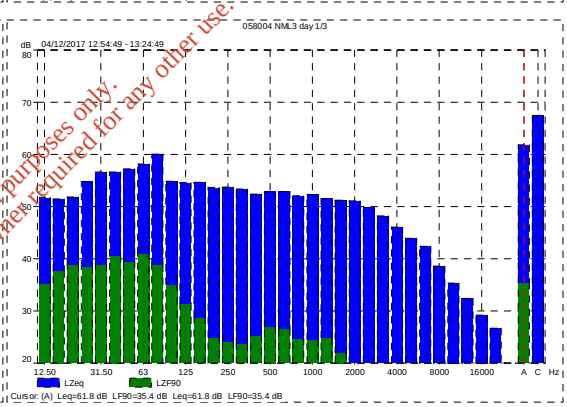


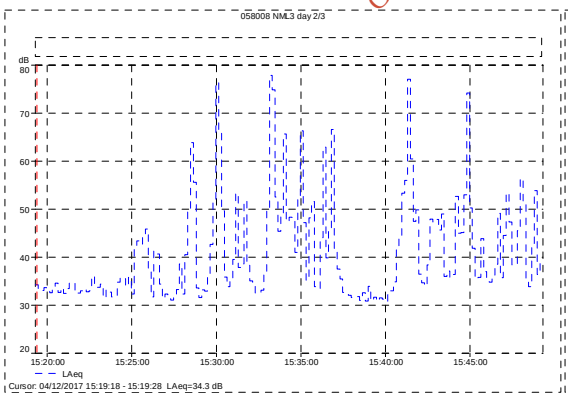


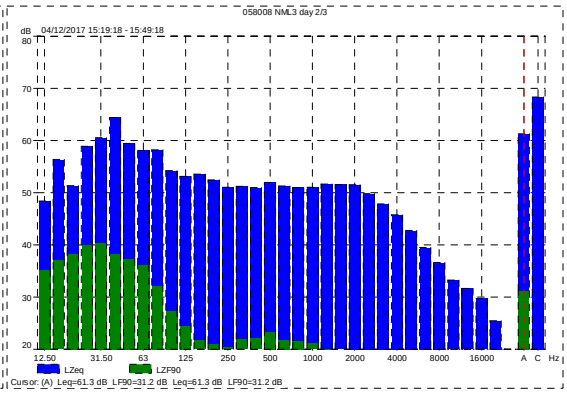


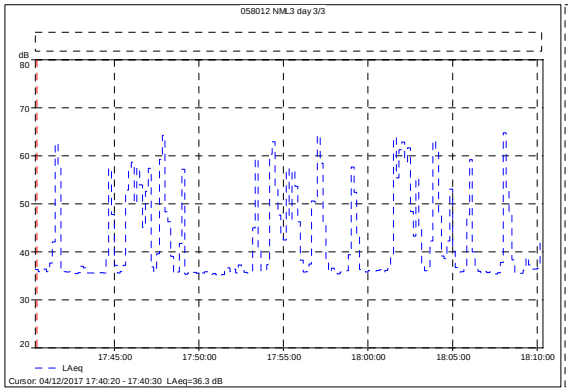


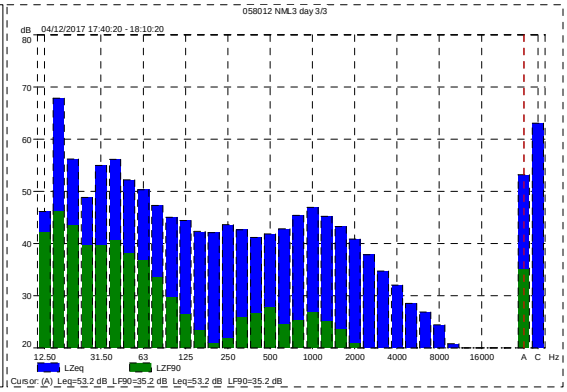


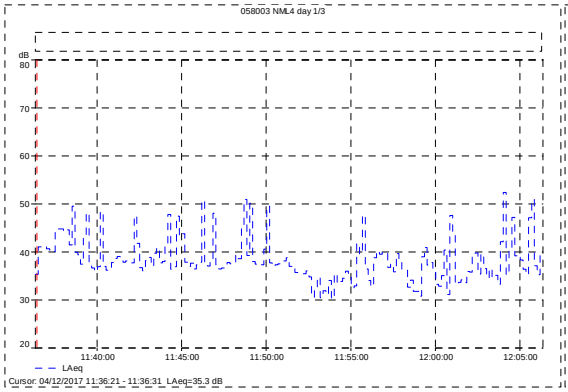


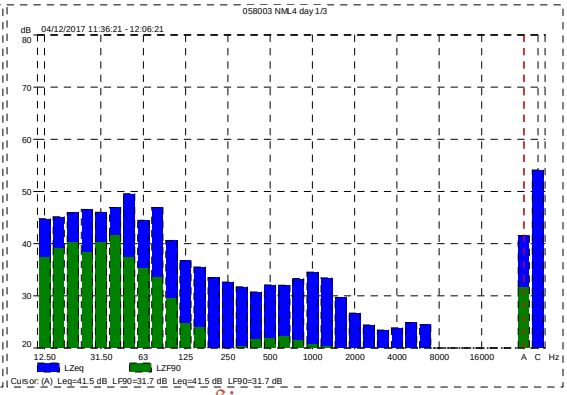


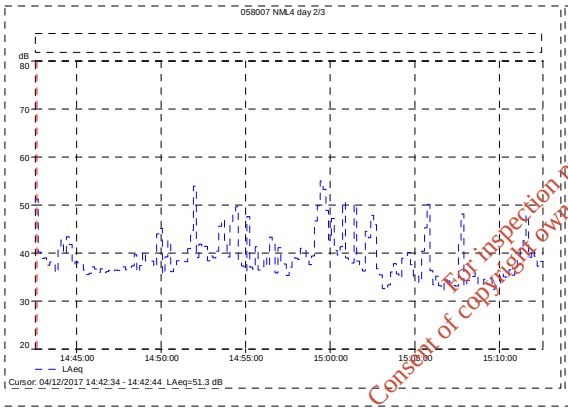


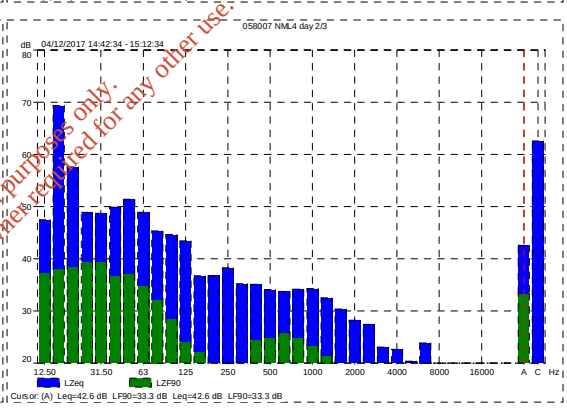


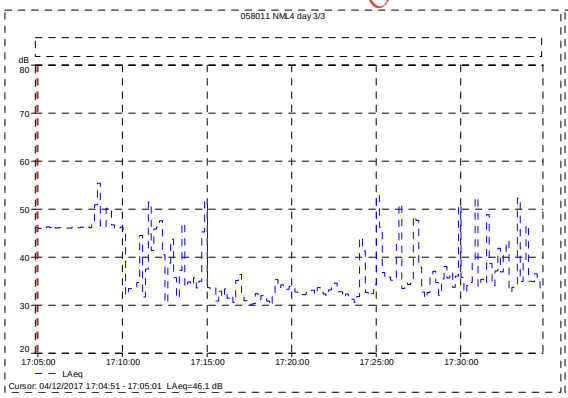


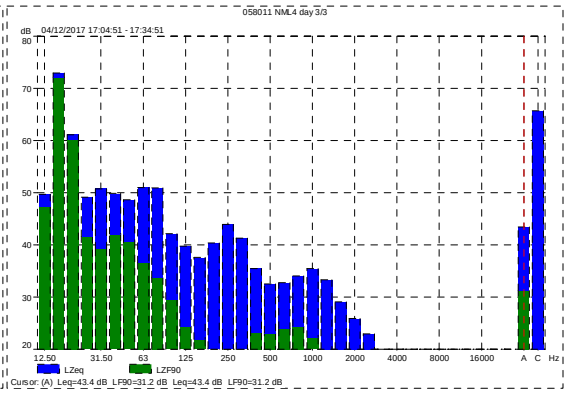












Appendix 6: Frequency data

$L_{Zeq\ 30\ min}$ data are tabulated over as required by Environmental Protection Agency document *NG4 Guidance note for noise: Licence applications, surveys and assessments in relation to scheduled activities* (2016). Spectra are shown in **appendix 5**.

Tonality may be assessed using level differences suggested by annex D of *International Standard ISO 1996-2 Acoustics – Description, measurement and assessment of environmental noise, Part 2: Determination of environmental noise levels* (2007) as follows:

- 15 dB in the third octave bands 25-125 Hz.
- 8 dB in the third octave bands 160-400 Hz.
- 5 dB in the third octave bands 500-10000 Hz.

Level differences in the 10-160 Hz range which exceed the above criteria will not be of tonal significance if L_{Zeq} values in those bands are lower than hearing threshold levels as follows:

Band (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
L_{Zeq} (dB)	92	87	83	74	64	56	49	43	42	40	38	36	34

No tones were detected. Third octave band analysis detected acoustic energy in certain bands during several intervals as follows, none of which was tonal when assessed using annex D:

Station	Interval	Band	Comment
NML2	1/3	250 Hz	Present throughout. Source not identified. Possibly linked to excavator operating at KWD facility. Not tonal.
NML2 & NML4	2/3 & 3/3	16 Hz	Present throughout. Traced to onsite KWD equipment. Not tonal, and below hearing threshold.
NML3	3/3	16 Hz	Present throughout. Traced to onsite KWD equipment. Not tonal, and below hearing threshold.

Band (Hz)	NML1			NML2			NML3			NML4		
	1/3	2/3	3/3	1/3	2/3	3/3	1/3	2/3	3/3	1/3	2/3	3/3
	L_{Zeq} 30 min	L_{Zeq} 30 min	L_{Zeq} 30 min	L_{Zeq} 30 min	L_{Zeq} 30 min	L_{Zeq} 30 min	L_{Zeq} 30 min	L_{Zeq} 30 min	L_{Zeq} 30 min	L_{Zeq} 30 min	L_{Zeq} 30 min	L_{Zeq} 30 min
12.5	54	53	56	41	52	47	52	48	46	45	47	50
16	57	58	59	43	74	69	51	56	68	45	69	73
20	53	53	60	47	62	57	52	51	56	46	58	61
25	54	57	62	47	52	53	55	59	49	47	49	49
31.5	53	56	64	49	49	50	57	61	55	46	49	51
40	57	58	61	52	50	48	57	64	56	47	50	50
50	57	60	61	54	54	49	57	59	52	50	51	49
63	58	60	58	53	53	48	58	58	50	44	49	51
80	58	60	54	54	50	48	60	58	47	47	45	51
100	55	54	53	49	44	44	55	54	45	41	45	42
125	50	51	51	45	42	42	55	53	44	37	43	40
160	48	52	51	41	39	41	55	54	42	36	37	38
200	49	53	50	40	39	40	54	52	42	34	37	40
250	50	51	50	48	40	41	54	51	44	33	38	44
315	48	50	49	40	41	42	53	51	43	32	35	41
400	46	50	49	38	44	44	52	51	41	31	35	35
500	48	51	51	39	44	44	53	52	42	32	34	33
630	48	50	51	38	44	46	53	51	43	32	34	33
800	48	51	50	38	45	46	52	51	45	33	34	34
1000	50	51	51	37	47	47	52	51	47	35	34	35
1250	48	52	52	37	50	45	52	52	45	33	33	33
1600	47	54	51	37	49	45	51	52	43	30	30	29
2000	47	54	51	36	47	45	51	52	41	27	28	26
2500	46	53	51	35	46	45	50	50	38	24	27	23
3150	45	51	49	35	46	44	48	48	35	23	23	19
4000	42	48	47	34	42	42	46	46	32	24	23	17
5000	40	46	44	32	40	40	44	43	29	25	20	14
6300	39	45	41	31	39	39	42	39	27	24	24	12
8000	36	44	38	27	35	35	39	37	24	16	20	10
10000	34	44	37	21	28	30	35	33	21	9	11	8
12500	32	44	40	24	23	25	32	32	17	8	9	8
16000	29	42	33	29	17	18	29	30	15	8	8	8
20000	24	38	25	10	11	12	27	25	10	8	8	8
A	58	63	61	48	57	56	62	61	53	42	43	43

Appendix 7: Glossary

Ambient	Total noise environment at a location, including all sounds present.
Amplitude	Maximum extent of oscillation in a noise signal. Greater amplitude results in louder signal.
A-weighting	Weighting or adjustment applied to sound level to approximate non-linear frequency response of human ear. Denoted by suffix A in parameters such as $L_{Aeq\,T}$, $L_{AF10\,T}$, etc.
Background level	A-weighted sound pressure level of residual noise exceeded for 90 % of time interval T. Denoted $L_{AF90\,T}$.
Broadband	Noise which contains roughly equal energy across frequency spectrum. Does not contain tones, and is generally less annoying than tonal noise.
Decibel (dB)	Unit of noise measurement scale. Based on logarithmic scale so cannot be simply added or subtracted. 3 dB difference is smallest change perceptible to human ear. 10 dB difference is perceived as doubling or halving of sound level. Examples of decibel levels are as follows: 20 dB: very quiet room; 30-35 dB: night-time rural environment; 55-65 dB: conversation; 80 dB: busy pub; 100 dB: nightclub. **Throughout this report noise levels are presented as decibels relative to 20 µPa**.
Fast response	0.125 seconds response time of sound level meter to changing noise levels. Denoted by suffix F in parameters such as $L_{AF10\,T}$, $L_{AF90\,T}$, etc.
Free field	Noise environment away from all surfaces other than ground ie. outside near field.
Frequency	Number of cycles per second of a sound or vibration wave. Low frequency noise may be perceived as hum, while whine represents higher frequency. Range of human hearing approaches 20-20,000 Hertz.
Hertz (Hz)	Unit of frequency measurement.
Impulse	Noise which is of short duration, typically less than one second, sound pressure level of which is significantly higher than background.
Interval	Time period T over which noise parameters are measured at position. Denoted by T in $L_{Aeq\,T}$, $L_{AF90\,T}$, etc.
$L_{Aeq\,T}$	Equivalent continuous sound pressure level during interval T, effectively representing average A-weighted noise level of ambient noise environment.
L_{AF}	Sound pressure level averaged over one second, and changing each second in fluctuating noise environment.
$L_{AF10\,T}$	Sound pressure level exceeded for 10% of interval T, usually used to quantify traffic noise.
$L_{AF90\,T}$	Sound pressure level exceeded for 90% of interval T, usually used to quantify background noise. May also be used to describe noise level from continuous steady or almost-steady source, particularly where local noise environment fluctuates.
$L_{AReq\,T}$	Rating noise level, derived from $L_{Aeq\,T}$ plus specified adjustments for tonal and impulsive characteristics. Equivalent to $L_{Ar\,T}$ used by EPA.
Masking	The rendering inaudible of one noise source by another noise source(s) which may be louder, or may contain significant acoustic energy in the same part of the frequency spectrum. In the latter case, any tone(s) in the original source emissions may become inaudible.
Near field	Noise levels recorded near walls or other surfaces, artificially increased due to reflections. Levels near walls may be increased by up to 3 dB, and up to 6 dB near corners. Free field conditions may be achieved by maintaining separation distance of at least 3.5 m from walls.
Noise sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.
1/3 octave band	Frequency spectrum may be divided into octave bands. Upper limit of each octave is twice lower limit. Each octave may be subdivided into thirds, allowing greater analysis of tones.

Residual level	Noise level remaining when specific source is absent or does not contribute to ambient.
Specific level	$L_{Aeq\ T}$ level produced by specific noise source under consideration during interval T, measured directly or by estimation or calculation.
Tone	Character of noise caused by dominance of one or more frequencies which may result in increased noise nuisance.
Wind vector	May be positive (+), negative (-), neutral (0) or crosswind (x). Positive wind vector blows from source to receptor, within angular range of ±45°, creating conditions more favourable to propagation. During certain conditions, this range may increase to ±60° by day and ±90° at night. Negative wind vector occurs when receptor is upwind of source. Neutral vector arises during still conditions, or upwind when in close proximity to source. Crosswinds typically result in negative vector.
Z-weighting	Standard weighting applied by sound level meters to represent linear scale. Denoted by suffix Z in parameters such as $L_{Zeq\ T}$, $L_{ZF90\ T}$, etc. used to describe 1/3 octave band levels in frequency spectra.

In this report units are generally presented using US National Institute Of Standards & Technology guidelines.