dBA
damian brosnan acoustics

project

Environmental noise survey in vicinity of Starrus Eco Holdings waste management installation

where

Sarsfieldcourt Industrial Estate, Glanmire, Co. Cork

when

November 2022

why

IE licence W0136-03 compliance survey

client

O'Callaghan Moran & Associates OBO Starrus Eco Holdings

prepared by

Damian Brosnan BSc MSc MIOA MIEI

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✆ 086 813 1195
✉ damianbrosnan@gmail.com

Summary

On 24.11.22—25.11.22, Damian Brosnan Acoustics carried out an environmental noise survey in the vicinity of the Starrus Eco Holdings waste management installation at Sarsfieldcourt Industrial Estate, Glanmire, Co. Cork. The survey is an annual requirement of waste licence W0136-03 issued by the EPA in respect of the facility. Monitoring was undertaken during the daytime, evening and night-time. Operations were underway at the facility throughout the daytime, with limited evening and night-time activity.

Monitoring was undertaken at three offsite stations, representing the nearest noise receptors. Facility noise emissions were audible at a low level at one station during the night-time, and were otherwise inaudible. Facility noise levels were considerably lower than limits specified in licence W0136-03. Site operations did not give rise to tones or impulses at any of the stations, thus complying with condition 6.11.3 of the licence.

Contents

This report was prepared by Damian Brosnan, who has the following qualifications and experience:
●BSc (Honours) 1993 (University College Cork) ●Postgraduate diploma in Acoustics & Noise Control 2009 (Institute of Acoustics) ●MSc (Distinction) in Applied Acoustics 2015 (University of Derby) ●Certificate of competence in workplace noise risk assessment (Institute of Acoustics) ●Member of Institute of Acoustics (MIOA) & secretary of Irish IOA branch ●Founding member of Association of Acoustic Consultants of Ireland (AACI) ●Member of Engineers Ireland (MIEI) ●Engaged with CPD through IOA & EI ●Lead author of *Environmental noise guidance for local authority planning & enforcement departments* (AACI, 2019) ●1996-2001: Noise Officer with Cork County Council ●2001-2014: Partner with DixonBrosnan Environmental Consultants, specialising in EIA ●Since 2015, principal at Damian Brosnan Acoustics

Glossary

Ambient	Total noise environment at a location, including all sounds present.
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**.
Emissions	Noise originating from source under consideration, spreading spherically, hemispherically or otherwise into surrounding environment.
Extraneous	Noise emissions unrelated to source under consideration.
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	Measurement position removed from acoustically reflective surfaces other than ground.
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.
$L_{AF10\ T}$	A-weighted sound pressure level exceeded for 10% of interval T, usually used to quantify traffic noise.
$L_{AF90\ T}$	A-weighted 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.
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.
Sound pressure	Deviation over ambient atmospheric pressure due to passing sound wave. Human ear is sound pressure detector, and thus acoustic parameters ultimately relate to sound pressure. Sound pressure level is ratio of measured sound pressure to reference value.
Soundscape	Acoustic environment as perceived, experienced or understood by listeners, taking context into account.

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.
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. Typically used to describe spectral band levels.

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

Uncertainty

u_i	Standard uncertainty, related to instrumentation.
c_i	Coefficient of sensitivity, specifically related to individual measurement factors listed below.
Residual factor	c_i = 1 dB where source dominates, >20 dB where source becomes masked. u_i = 0.5 dB. c_iu_i range = 0.5 to >10 dB.
Weather factor	c_iu_i = 2 dB in downwind and crosswind conditions, otherwise c_iu_i >2 dB. Levels representative of contemporaneous conditions only.
Anemometer factor	2 m anemometer height may increase meteorological uncertainty. 10 m height impractical during survey.
Precipitation factor	Precipitation = 0 mm during reported intervals. c_iu_i = 0 dB.
Operations factor	Levels representative of contemporaneous operating conditions only. c_iu_i <1 dB.
Location factor	c_iu_i = 0 dB at free field positions. c_iu_i = 0.4 dB at near field and reflective field positions.
Instrument factor	IEC 61672-1 class 1 specifications. u_i = 0.5 dB.

Combined uncertainty 3 dB to >10 dB, depending on position. Variation chiefly due to meteorology and residual noise intrusion.

Expanded uncertainty 6 dB to >10 dB, 95 % coverage.

All reasonable and practical efforts were applied to minimise uncertainty throughout survey.

1 Introduction

1.1 Damian Brosnan Acoustics was instructed by O'Callaghan Moran & Associates, on behalf of their client Starrus Eco Holdings (**SEH**), to carry out an environmental noise survey in the vicinity of the SEH waste management installation at Sarsfieldcourt Industrial Estate, Glanmire, Co. Cork. The survey is an annual requirement of waste licence W0136-03, issued 14.02.14 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 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise, Part 2: Determination of environmental noise levels* (2017) and EPA document *NG4 Guidance note for noise: Licence applications, surveys and assessments in relation to scheduled activities* (2016).
- Measure daytime, evening and night-time noise levels at three offsite stations (N1, N2, N3) shown in **figure 1**, representing the nearest residential receptors.
- Assess measured levels in the context of noise criteria specified in licence W0136-03, reproduced in **appendix 1**. Daytime and evening $L_{AReq\ 30\ min}$ limits of 55 and 50 dB apply respectively at offsite noise sensitive locations, with a night-time $L_{Aeq\ 30\ min}$ limit of 45 dB.

1.2 The daytime survey was undertaken Friday 25.11.22. Evening and night-time monitoring was carried out the previous evening. Operations were underway throughout the daytime survey, with limited activity during the evening and night-time. The air management system on the eastern façade of the SEH building was running throughout.

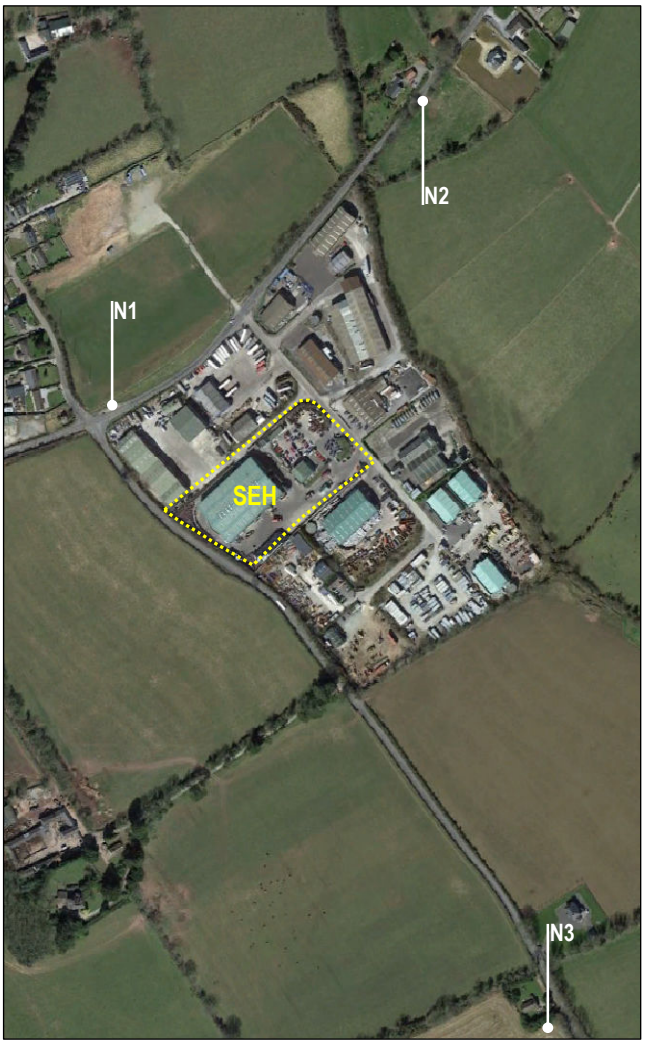


Figure 1 ⇨
Noise stations.
N

2 Results

2.1 Measured noise data are presented in **appendix 2** and summarised in **table 1**. Frequency spectra are tabulated in **appendix 3**. $L_{Aeq\ 30\ min}$ levels specific to the SEH facility were determined using guidance set out in the NG4 document. At all three stations, low audibility or inaudibility of SEH emissions precluded accurate determination of SEH noise levels, and it was possible only to derive a 'less than' result.

Table 1: Noise data summary.

Period	Station	N1	N2	N3
Daytime	Applicable parameter	$L_{AReq\ 30\ min}$	$L_{AReq\ 30\ min}$	$L_{AReq\ 30\ min}$
	Limit (dB)	55	55	55
	Facility specific level (dB)	<42	<43	<43
	Compliance	✓	✓	✓
Evening	Applicable parameter	$L_{AReq\ 30\ min}$	$L_{AReq\ 30\ min}$	$L_{AReq\ 30\ min}$
	Limit (dB)	50	50	50
	Facility specific level (dB)	<38	<45	<36
	Compliance	✓	✓	✓
Night-time	Applicable parameter	$L_{Aeq\ 30\ min}$	$L_{Aeq\ 30\ min}$	$L_{Aeq\ 30\ min}$
	Limit (dB)	45	45	45
	Facility specific level (dB)	<32	<34	<31
	Compliance	✓	✓	✓

2.2 The SEH air management system was audible at a low level at N2 during the night-time, resulting in a specific $L_{Aeq\ 30\ min}$ level of less than 34 dB. SEH emissions were inaudible during all other intervals. SEH noise levels were considerably lower than the 55 dB daytime, 50 dB evening and 45 dB night-time limits set out in licence W0136-03. Operations did not give rise to tones or impulses at the measurement stations, thus complying with condition 6.11.3 of the licence.

3 Conclusions

3.1 SEH noise emissions were inaudible during most intervals, being audible at a low level at N2 during the night-time. SEH noise levels were markedly lower than the 55 dB daytime, 50 dB evening and 45 dB night-time limits set out in licence W0136-03.

3.2 Site operations did not give rise to tones or impulses at any of the stations, thus complying with condition 6.11.3 of the licence.

Appendix 1: W0136-03 noise conditions

4.4 Noise

4.4.1 Noise from the facility shall not give rise to sound pressure levels ($L_{Aeq,\ T}$) of the installation, measured at Noise Sensitive Locations, which exceed the limit value(s).

6.11 Noise

6.11.1 The licensee shall carry out a noise survey annually. The survey programme shall be undertaken in accordance with the methodology specified in the 'Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)' as published by the Agency.

6.11.2 The licensee shall implement any noise attenuation measures as required by the Agency, having regard to the principles of BAT, to ensure compliance with the noise limits specified in this licence.

6.11.3 There shall be no clearly audible tonal component or impulsive component in the noise emissions from the activity, at any noise sensitive location.

B.2 Noise Emissions

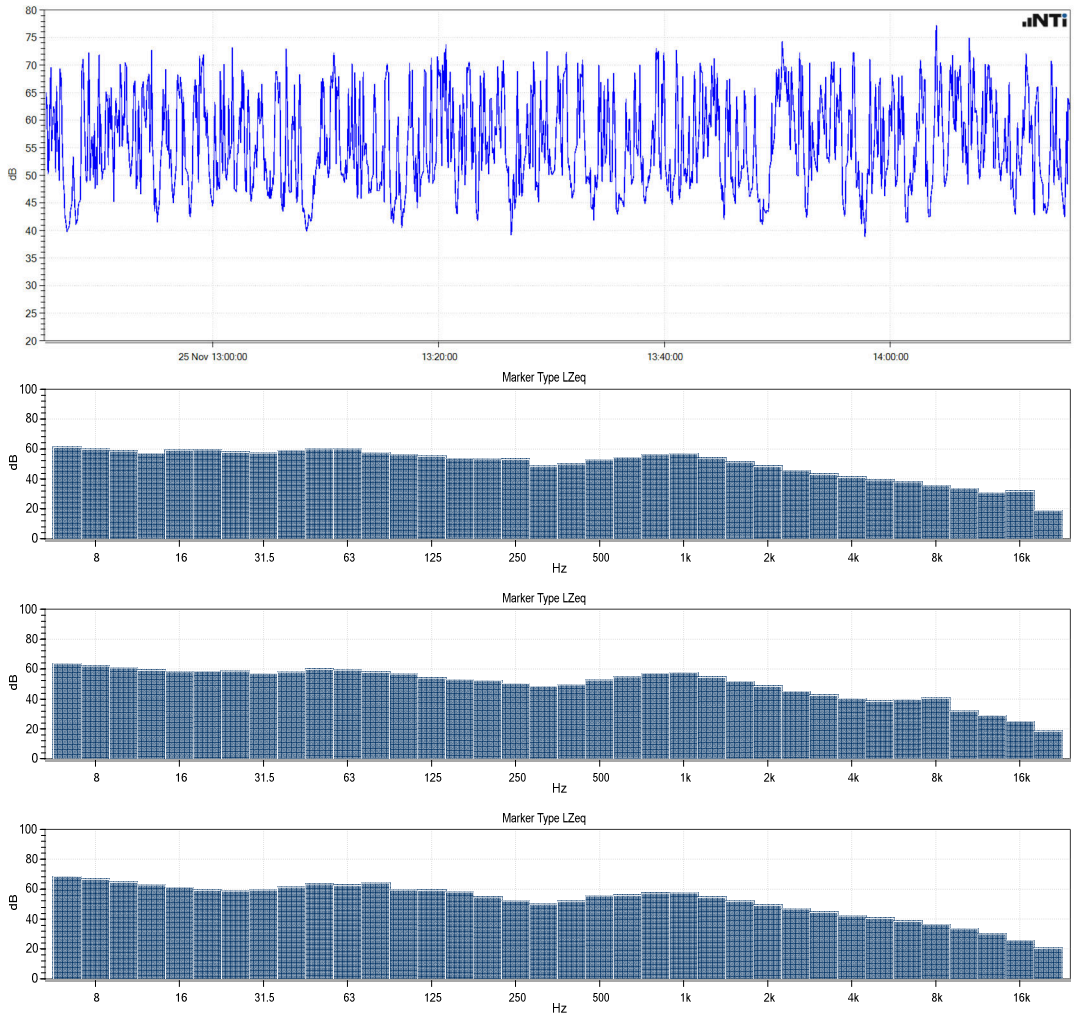
Measured at nearest noise sensitive locations, to be agreed in advance with the Agency.

Daytime dB(A) LAr (30minutes)	Evening time dB(A) LAr (30 minutes)	Night-time dB(A) LAeq (30 minutes) Note 1
55	50	45

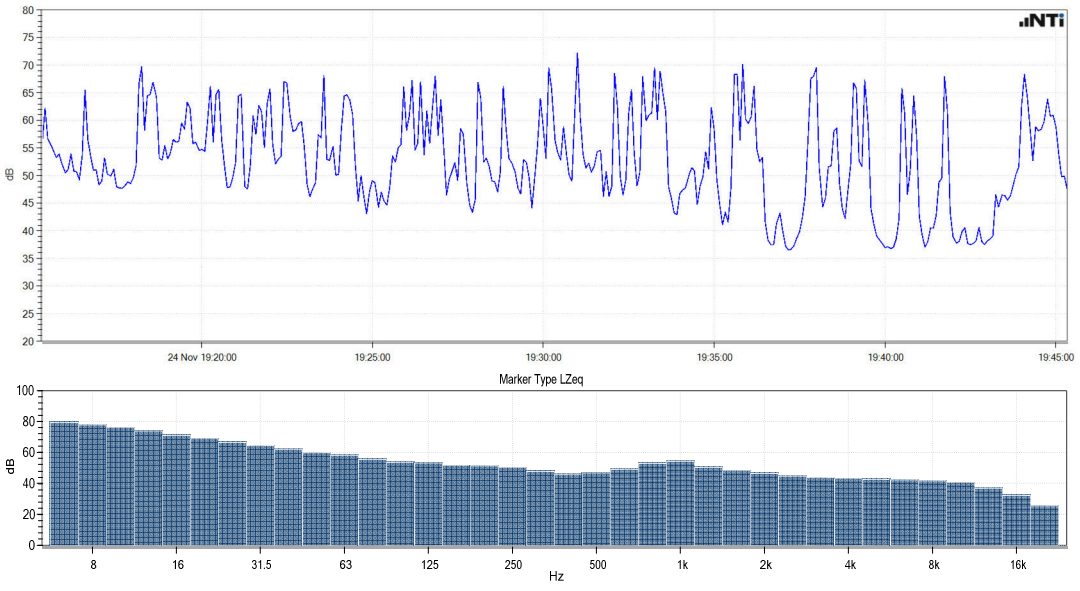
Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emissions.

Appendix 2: Data

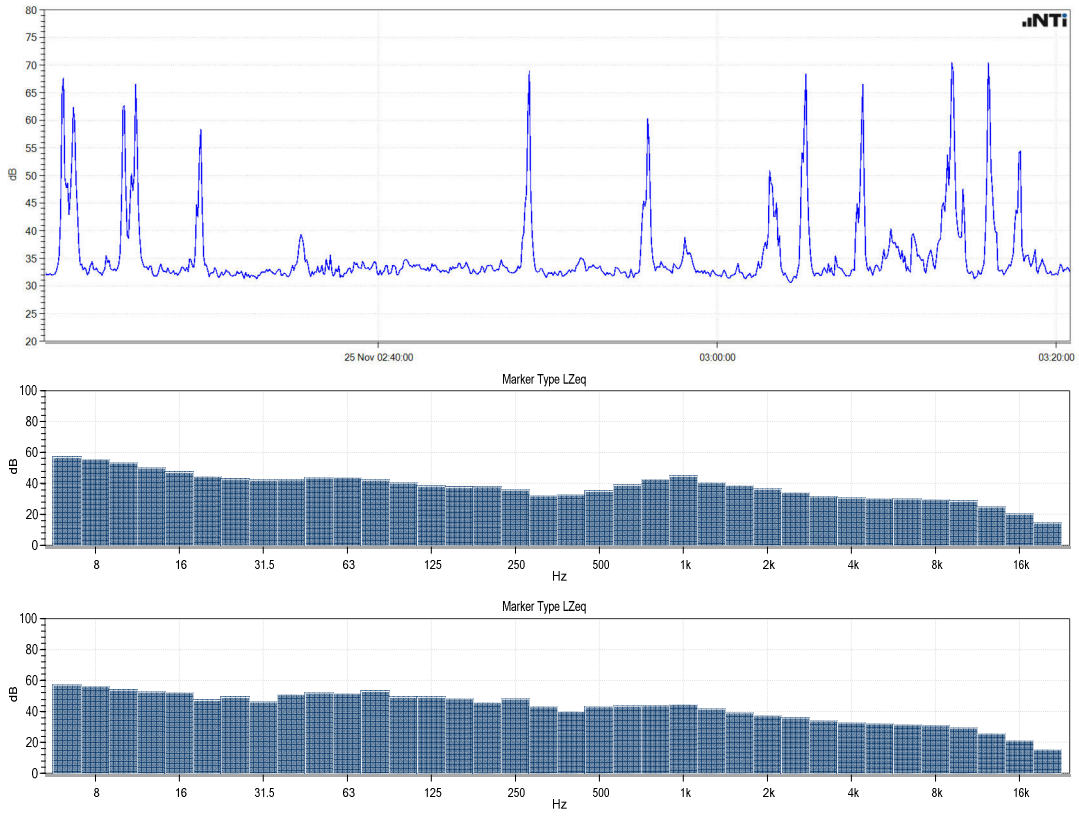
Station N1		Time	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	Specific $L_{Aeq\ T}$
Date	Fri 25.11.22	1245-1315	63	67	44	<42
Period	Daytime	1315-1345	63	68	45	<42
Survey operator	Damian Brosnan BSc MSc MIOA MIEI	1345-1415	64	68	44	<42
Acoustic field	Free field					
Microphone height	1.5 m above ground level					
Grid reference	571947 579177					
Location	Adjacent to crossroads NW of site, 50 m from nearest NSL					
Propagation route	Partial line of sight to building N façade; Route over hard ground and buildings and walls					
Wind vector	Station upwind of facility					
Weather	Cloud cover: 0 % increasing to 50 % | Precipitation: 0 mm | Temperature: 11 °C Wind: SW 0-3 m/s					
Extraneous noise	Frequent passing traffic dominant when present; Distant traffic continuously audible; Bird song/calls and aircraft; Distant barking; Activity at nearest commercial premises occasionally clearly audible					
Facility audibility	Inaudible					
Audible character	-					
Spectral analysis	No emergent energy of significance evident in any 1/3 bands					
Rating correction	0 dB					
Determination	Inaudible, thus <L95					
Comment	-					
Standard	ISO 1996 (2016 & 2017) + EPA NG4 (2016)					
SLM details	Unit: DB5 | Type: NTi XL2 | Serial: A2A-17932-E0 | Microphone: A18747 | Verification: 17.02.22					
Field calibration	Date: 25.11.22 | Time: 1242 | Sensitivity: 42.3 mV/Pa | Post survey drift check: 93.9 dB					
Calibrator	Type: Bruel & Kjaer Type 4231 | Serial: 3017723 | Verification: 16.02.22					
Verification	NSAI | Verification certificates available on request					



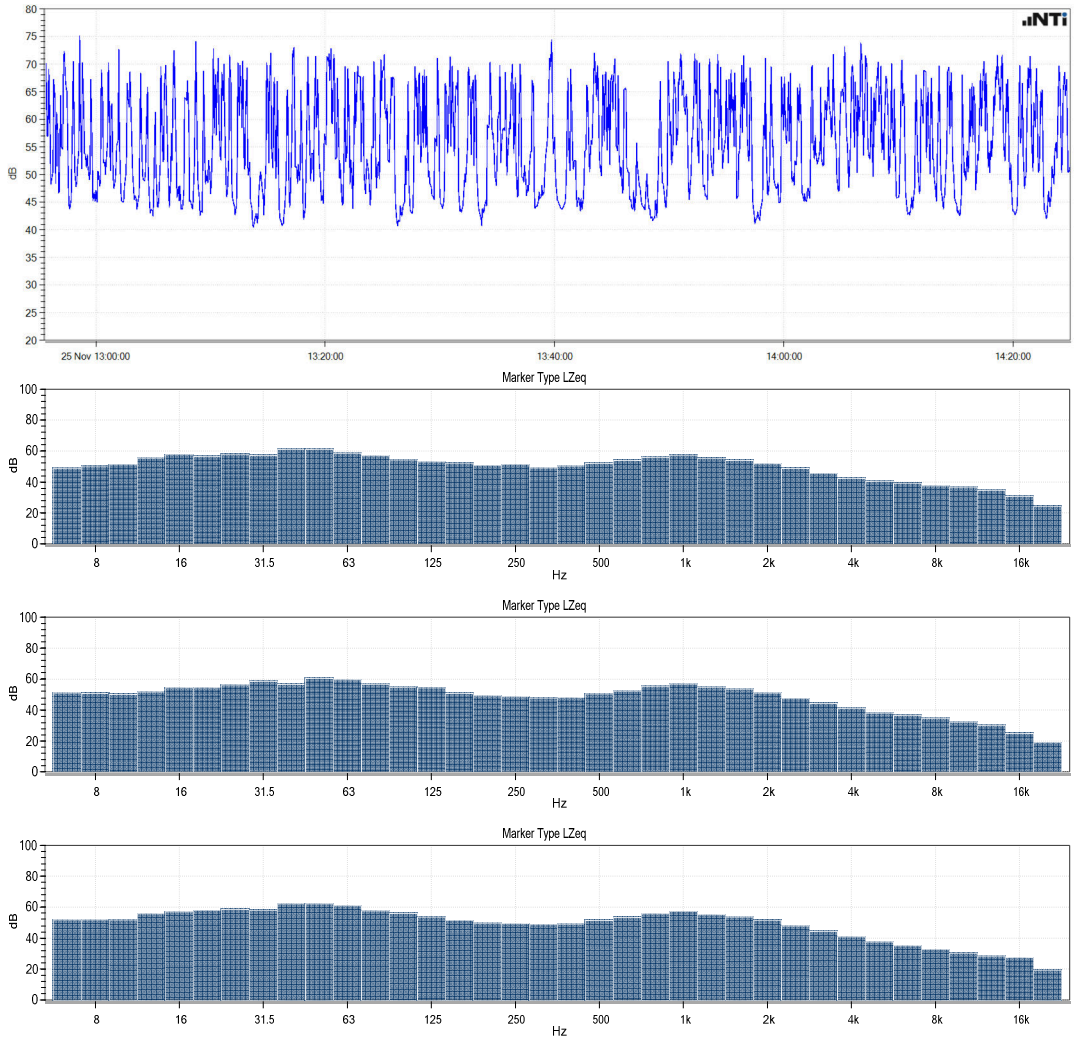
Station N1		Time	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	Specific $L_{Aeq\ T}$
Date	Thu 24.11.22	1915-1945	60	65	40	<38
Period	Evening					
Survey operator	Damian Brosnan BSc MSc MIOA MIEI					
Acoustic field	Free field					
Microphone height	1.5 m above ground level					
Grid reference	571947 579177					
Location	Adjacent to crossroads NW of site, 50 m from nearest NSL					
Propagation route	Partial line of sight to building N façade; Route over hard ground and buildings and walls					
Wind vector	Station upwind of facility					
Weather	Cloud cover: 100 % | Precipitation: 0 mm | Temperature: 7 °C | Wind: SW 2-5 m/s					
Extraneous noise	Intermittent passing traffic dominant; Breeze through nearby trees; Aircraft; Sporadic activity audible at nearest premises in industrial estate					
Facility audibility	Inaudible					
Audible character	-					
Spectral analysis	No emergent energy of significance evident in any 1/3 bands					
Rating correction	0 dB					
Determination	Inaudible, thus <L95					
Comment	-					
Standard	ISO 1996 (2016 & 2017) + EPA NG4 (2016)					
SLM details	Unit: DB5 | Type: NTi XL2 | Serial: A2A-17932-E0 | Microphone: A18747 | Verification: 17.02.22					
Field calibration	Date: 24.11.22 | Time: 1850 | Sensitivity: 42.3 mV/Pa | Post survey drift check: 93.9 dB					
Calibrator	Type: Bruel & Kjaer Type 4231 | Serial: 3017723 | Verification: 16.02.22					
Verification	NSAI | Verification certificates available on request					



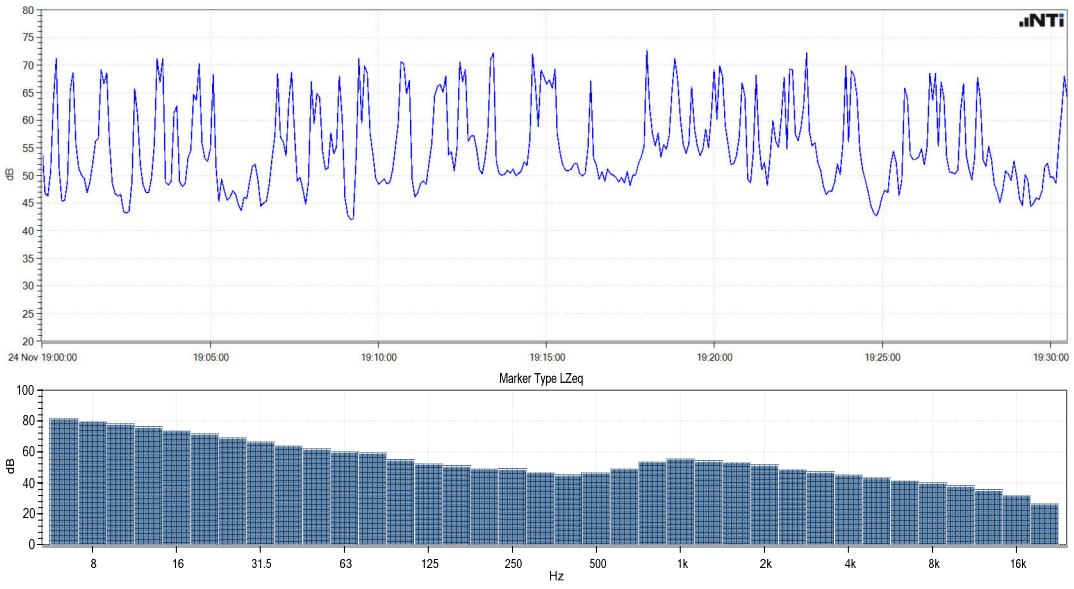
Station N1		Time	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	Specific $L_{Aeq\ T}$
Date	Fri 25.11.22	0220-0250	50	39	32	<32
Period	Night-time	0250-0320	52	44	32	<32
Survey operator	Damian Brosnan BSc MSc MIOA MIEI					
Acoustic field	Free field					
Microphone height	1.5 m above ground level					
Grid reference	571947 579177					
Location	Adjacent to crossroads NW of site, 50 m from nearest NSL					
Propagation route	Partial line of sight to building N façade; Route over hard ground and buildings and walls					
Wind vector	Station upwind of facility					
Weather	Cloud cover: 0 % | Precipitation: 0 mm | Temperature: 4 °C | Wind: SW 0-2 m/s					
Extraneous noise	Sporadic passing traffic dominant when present; Distant traffic continuously slightly audible; Distant barking; Aircraft					
Facility audibility	Inaudible					
Audible character	-					
Spectral analysis	No emergent energy of significance evident in any 1/3 bands					
Rating correction	0 dB					
Determination	Inaudible, thus <L95					
Comment	-					
Standard	ISO 1996 (2016 & 2017) + EPA NG4 (2016)					
SLM details	Unit: DB5 | Type: NTi XL2 | Serial: A2A-17932-E0 | Microphone: A18747 | Verification: 17.02.22					
Field calibration	Date: 24.11.22 | Time: 2120 | Sensitivity: 42.3 mV/Pa | Post survey drift check: 93.9 dB					
Calibrator	Type: Bruel & Kjaer Type 4231 | Serial: 3017723 | Verification: 16.02.22					
Verification	NSAI | Verification certificates available on request					



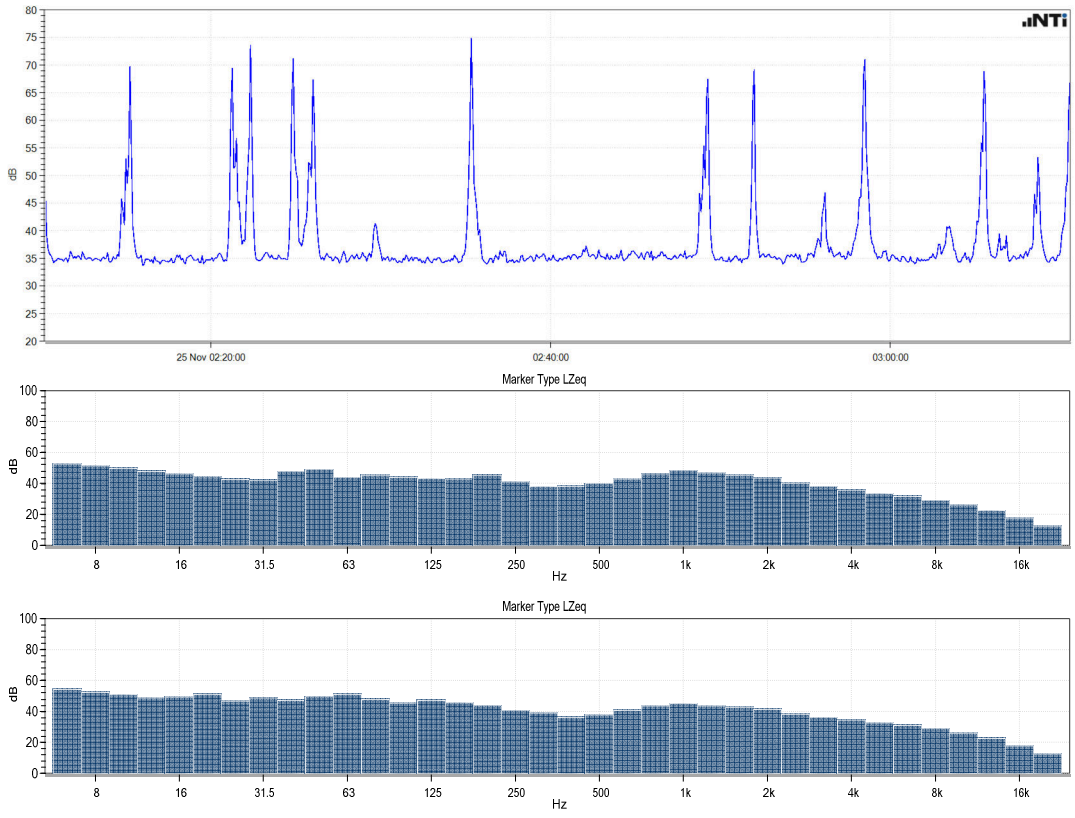
Station N2		Time	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	Specific $L_{Aeq\ T}$
Date	Fri 25.11.22	1255-1325	64	69	44	<43
Period	Daytime	1325-1355	63	68	44	<43
Survey operator	Damian Brosnan BSc MSc MIOA MIEI	1355-1425	63	69	44	<43
Acoustic field	Free field					
Microphone height	1.5 m above ground level					
Grid reference	572292 579427					
Location	10 m from roadside 310 m NE of site, 25 m from nearest NSL					
Propagation route	Line of sight to building E façade upper; Route over hard ground, buildings and grass					
Wind vector	Station downwind of facility					
Weather	Cloud cover: 0 % increasing to 50 % | Precipitation: 0 mm | Temperature: 11 °C Wind: SW 0-3 m/s					
Extraneous noise	Frequent passing traffic dominant when present; Distant traffic continuously audible; Bird song/calls and aircraft; Distant barking; Activity at industrial estate occasionally audible at low level					
Facility audibility	Inaudible					
Audible character	-					
Spectral analysis	No emergent energy of significance evident in any 1/3 bands					
Rating correction	0 dB					
Determination	Inaudible, thus <L95					
Comment	-					
Standard	ISO 1996 (2016 & 2017) + EPA NG4 (2016)					
SLM details	Unit: DB4 | Type: NTi XL2 | Serial: A2A-15429-E0 | Microphone: A16329 | Verification: 16.02.22					
Field calibration	Date: 25.11.22 | Time: 1245 | Sensitivity: 40.6 mV/Pa | Post survey drift check: 93.9 dB					
Calibrator	Type: Bruel & Kjaer Type 4231 | Serial: 3017723 | Verification: 16.02.22					
Verification	NSAI | Verification certificates available on request					



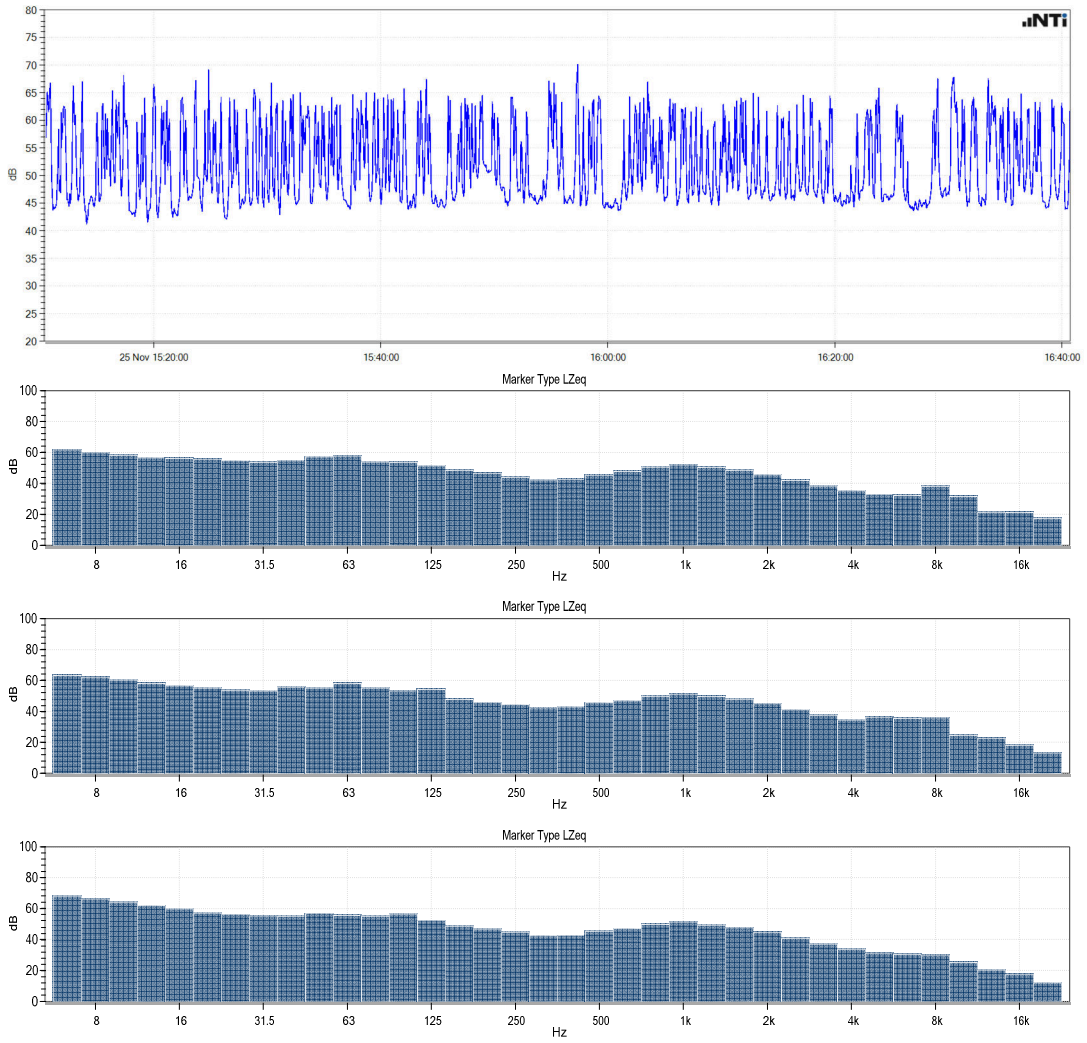
Station N2		Time	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	Specific $L_{Aeq\ T}$
Date	Thu 24.11.22	1900-1930	62	67	46	<45
Period	Evening					
Survey operator	Damian Brosnan BSc MSc MIOA MIEI					
Acoustic field	Free field					
Microphone height	1.5 m above ground level					
Grid reference	572292 579427					
Location	10 m from roadside 310 m NE of site, 25 m from nearest NSL					
Propagation route	Line of sight to building E façade upper; Route over hard ground, buildings and grass					
Wind vector	Station downwind of facility					
Weather	Cloud cover: 100 % | Precipitation: 0 mm | Temperature: 7 °C | Wind: SW 2-4 gusting to 6 m/s					
Extraneous noise	Intermittent passing traffic dominant; Breeze through nearby trees; Aircraft; Distant barking					
Facility audibility	Inaudible					
Audible character	-					
Spectral analysis	No emergent energy of significance evident in any 1/3 bands					
Rating correction	0 dB					
Determination	Inaudible, thus <L95					
Comment	-					
Standard	ISO 1996 (2016 & 2017) + EPA NG4 (2016)					
SLM details	Unit: DB4 | Type: NTi XL2 | Serial: A2A-15429-E0 | Microphone: A16329 | Verification: 16.02.22					
Field calibration	Date: 24.11.22 | Time: 1850 | Sensitivity: 40.1 mV/Pa | Post survey drift check: 93.9 dB					
Calibrator	Type: Bruel & Kjaer Type 4231 | Serial: 3017723 | Verification: 16.02.22					
Verification	NSAI | Verification certificates available on request					



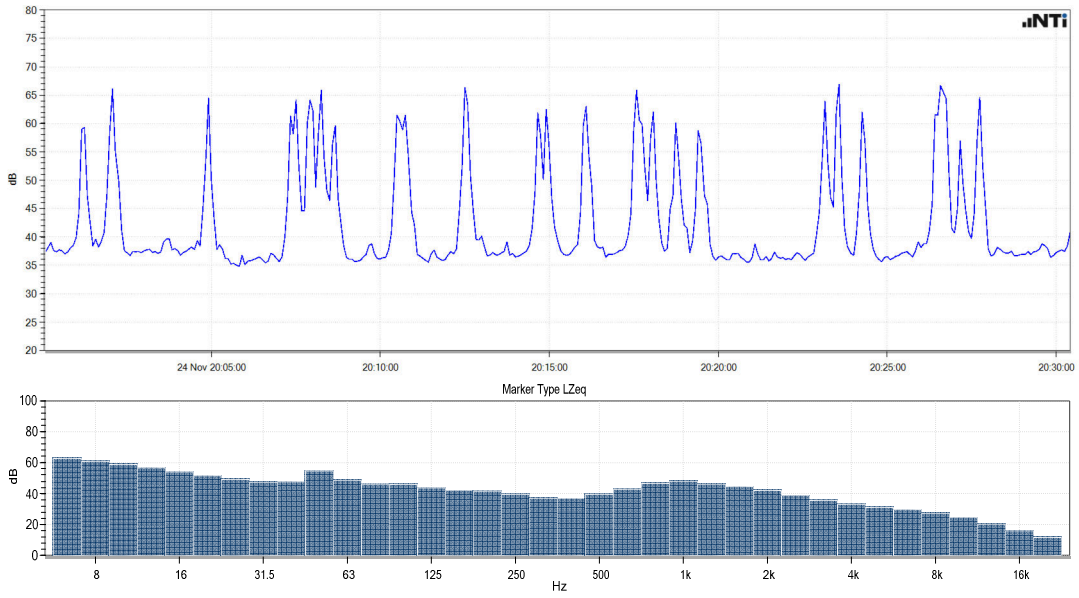
Station N2		Time	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	Specific $L_{Aeq\ T}$
Date	Fri 25.11.22	0210-0240	55	43	34	<34
Period	Night-time	0240-0310	52	42	35	<34
Survey operator	Damian Brosnan BSc MSc MIOA MIEI					
Acoustic field	Free field					
Microphone height	1.5 m above ground level					
Grid reference	572292 579427					
Location	10 m from roadside 310 m NE of site, 25 m from nearest NSL					
Propagation route	Line of sight to building E façade upper; Route over hard ground, buildings and grass					
Wind vector	Station downwind of facility					
Weather	Cloud cover: 0 % | Precipitation: 0 mm | Temperature: 4 °C | Wind: SW 0-2 m/s					
Extraneous noise	Sporadic passing traffic dominant when present; Distant traffic continuously slightly audible; Distant barking; Aircraft					
Facility audibility	Air management system continuously audible at low level					
Audible character	Broadband; No impulses of significance					
Spectral analysis	No emergent energy of significance evident in any 1/3 bands					
Rating correction	0 dB					
Determination	L90 not representative due to continuous traffic in distance; <L90 determination possible only					
Comment	-					
Standard	ISO 1996 (2016 & 2017) + EPA NG4 (2016)					
SLM details	Unit: DB4 | Type: NTi XL2 | Serial: A2A-15429-E0 | Microphone: A16329 | Verification: 16.02.22					
Field calibration	Date: 24.11.22 | Time: 1850 | Sensitivity: 40.1 mV/Pa | Post survey drift check: 93.9 dB					
Calibrator	Type: Bruel & Kjaer Type 4231 | Serial: 3017723 | Verification: 16.02.22					
Verification	NSAI | Verification certificates available on request					



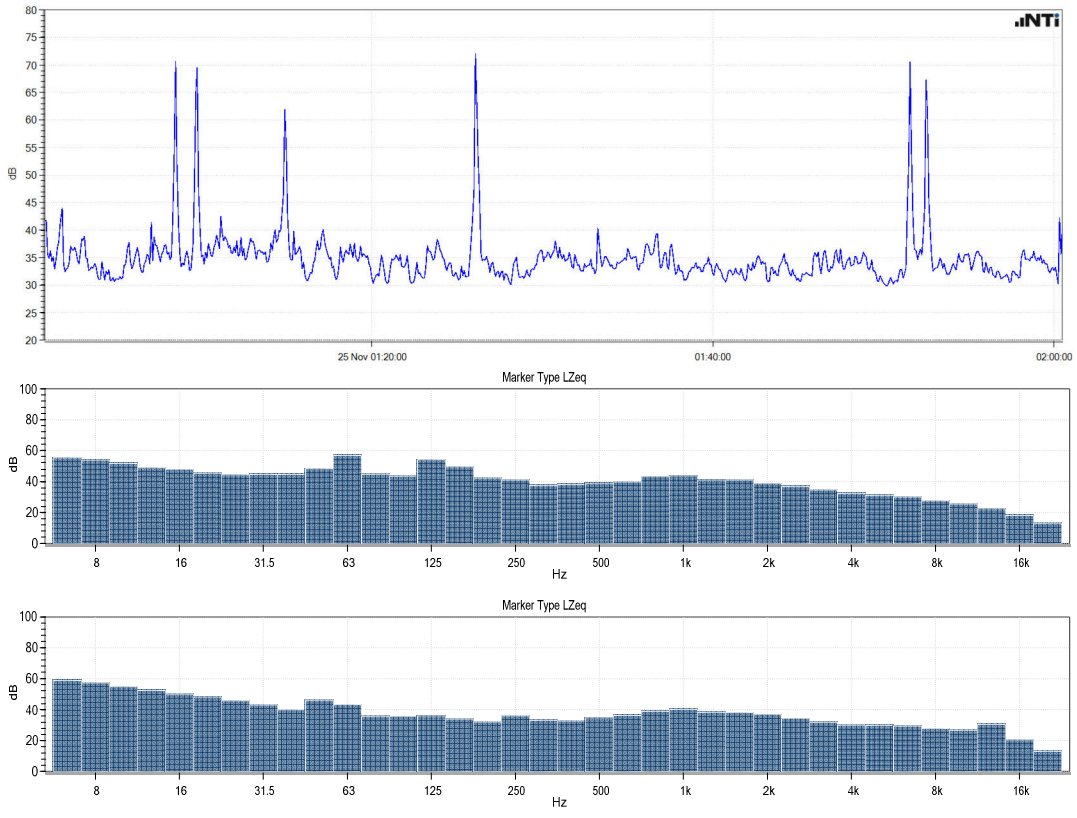
Station N3		Time	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	Specific $L_{Aeq\ T}$
Date	Fri 25.11.22	1510-1540	58	63	44	<43
Period	Daytime	1540-1610	58	62	45	<43
Survey operator	Damian Brosnan BSc MSc MIOA MIEI	1610-1640	57	62	45	<43
Acoustic field	Free field					
Microphone height	1.5 m above ground level					
Grid reference	572297 578512					
Location	Field 540 m SSE of site, 30 m from nearest NSL					
Propagation route	No line of sight; Route over agricultural land					
Wind vector	Station upwind of facility					
Weather	Cloud cover: 70 % increasing to 100 % | Precipitation: 0 mm | Temperature: 11 °C Wind: SW 0-3 m/s					
Extraneous noise	Intermittent passing traffic dominant; Distant traffic continuously audible; Bird song/calls and aircraft					
Facility audibility	Inaudible					
Audible character	-					
Spectral analysis	No emergent energy of significance evident in any 1/3 bands					
Rating correction	0 dB					
Determination	Inaudible, thus <L95					
Comment	-					
Standard	ISO 1996 (2016 & 2017) + EPA NG4 (2016)					
SLM details	Unit: DB5 | Type: NTi XL2 | Serial: A2A-17932-E0 | Microphone: A18747 | Verification: 17.02.22					
Field calibration	Date: 25.11.22 | Time: 1242 | Sensitivity: 42.3 mV/Pa | Post survey drift check: 93.9 dB					
Calibrator	Type: Bruel & Kjaer Type 4231 | Serial: 3017723 | Verification: 16.02.22					
Verification	NSAI | Verification certificates available on request					



Station N3		Time	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	Specific $L_{Aeq\ T}$
Date	Thu 24.11.22	2000-2030	54	56	36	<36
Period	Evening					
Survey operator	Damian Brosnan BSc MSc MIOA MIEI					
Acoustic field	Free field					
Microphone height	1.5 m above ground level					
Grid reference	572297 578512					
Location	Field 540 m SSE of site, 30 m from nearest NSL					
Propagation route	No line of sight; Route over agricultural land					
Wind vector	Station upwind of facility					
Weather	Cloud cover: Clearing gradually to 60 % | Precipitation: 0 mm | Temperature: 7 °C Wind: SW 1-4 m/s, quickly easing					
Extraneous noise	Intermittent passing traffic dominant; Distant traffic continuously audible in several directions; Aircraft					
Facility audibility	Inaudible					
Audible character	-					
Spectral analysis	No emergent energy of significance evident in any 1/3 bands					
Rating correction	0 dB					
Determination	Inaudible, thus <L95					
Comment	-					
Standard	ISO 1996 (2016 & 2017) + EPA NG4 (2016)					
SLM details	Unit: DB5 | Type: NTi XL2 | Serial: A2A-17932-E0 | Microphone: A18747 | Verification: 17.02.22					
Field calibration	Date: 24.11.22 | Time: 1850 | Sensitivity: 42.3 mV/Pa | Post survey drift check: 93.9 dB					
Calibrator	Type: Bruel & Kjaer Type 4231 | Serial: 3017723 | Verification: 16.02.22					
Verification	NSAI | Verification certificates available on request					



Station N3		Time	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	Specific $L_{Aeq\ T}$
Date	Fri 25.11.22	0100-0130	51	39	31	<31
Period	Night-time	0130-0200	47	36	31	<31
Survey operator	Damian Brosnan BSc MSc MIOA MIEI					
Acoustic field	Free field					
Microphone height	1.5 m above ground level					
Grid reference	572297 578512					
Location	Field 540 m SSE of site, 30 m from nearest NSL					
Propagation route	No line of sight; Route over agricultural land					
Wind vector	Station upwind of facility					
Weather	Cloud cover: 0 % | Precipitation: 0 mm | Temperature: 5 °C | Wind: SW 0-2 m/s					
Extraneous noise	Sporadic passing traffic dominant; Distant traffic continuously audible in several directions; Aircraft; Distant barking					
Facility audibility	Inaudible					
Audible character	-					
Spectral analysis	Interval 1 63 Hz signal traced to passing vehicle					
Rating correction	0 dB					
Determination	Inaudible, thus <L95					
Comment	-					
Standard	ISO 1996 (2016 & 2017) + EPA NG4 (2016)					
SLM details	Unit: DB5 | Type: NTi XL2 | Serial: A2A-17932-E0 | Microphone: A18747 | Verification: 17.02.22					
Field calibration	Date: 24.11.22 | Time: 2120 | Sensitivity: 42.3 mV/Pa | Post survey drift check: 93.9 dB					
Calibrator	Type: Bruel & Kjaer Type 4231 | Serial: 3017723 | Verification: 16.02.22					
Verification	NSAI | Verification certificates available on request					



Appendix 3: 1/3 octave band levels

Band (Hz)	N1 $L_{Zeq\,T}$ (dB)						N2 $L_{Zeq\,T}$ (dB)						N3 $L_{Zeq\,T}$ (dB)					
	Day			Eve	Night		Day			Eve	Night		Day			Eve	Night	
	1/3	2/3	3/3	1/1	1/2	2/2	1/3	2/3	3/3	1/1	1/2	2/2	1/3	2/3	3/3	1/1	1/2	2/2
6.3	61	64	68	79	57	57	49	51	52	81	53	54	62	63	68	63	55	59
8	60	62	66	78	55	56	50	51	52	80	51	52	60	62	66	61	54	57
10	58	61	65	76	53	54	51	50	52	78	50	51	58	60	64	59	52	55
12.5	57	59	63	74	50	53	56	52	56	76	48	49	57	58	62	57	49	52
16	59	58	61	71	47	52	58	54	57	74	46	50	56	57	60	54	48	50
20	59	58	59	69	44	47	57	54	58	72	44	51	56	55	57	52	45	48
25	58	59	59	67	43	49	58	56	58	69	43	47	55	54	56	49	44	46
31.5	57	57	59	64	42	46	57	59	58	67	42	49	54	53	55	47	45	43
40	59	58	61	62	42	51	61	57	62	64	48	47	55	56	55	48	45	40
50	60	60	63	60	44	52	61	60	62	62	49	50	57	55	57	55	48	46
63	60	59	62	58	44	52	59	60	61	60	44	51	58	58	56	49	57	43
80	58	58	64	56	42	53	57	57	58	59	45	48	54	55	55	46	45	36
100	56	57	59	54	40	49	54	55	56	55	44	46	54	53	57	46	44	36
125	55	54	59	53	38	49	53	54	54	52	43	47	51	54	52	44	54	36
160	54	53	58	52	37	48	52	51	51	51	43	46	48	48	49	42	50	34
200	53	52	55	51	38	46	51	49	50	49	45	44	47	46	47	42	42	32
250	53	50	52	50	36	48	51	49	49	49	41	41	44	44	45	40	41	36
315	49	48	50	48	32	43	49	48	49	47	38	39	42	42	42	37	38	33
400	50	49	52	46	33	40	50	48	49	45	38	36	43	43	43	37	38	33
500	53	53	56	47	35	43	52	50	51	46	40	38	45	46	45	40	39	35
630	54	55	56	49	39	43	54	52	53	49	43	41	48	47	47	43	40	36
800	56	57	57	53	42	44	56	55	56	54	46	44	51	50	50	47	43	39
1000	57	58	57	54	45	44	57	57	57	56	48	45	52	51	51	48	44	40
1250	54	54	55	50	40	42	55	55	55	54	47	44	50	50	49	46	41	38
1600	51	52	52	48	39	39	54	54	54	53	45	43	49	48	48	44	41	38
2000	48	48	49	46	36	37	52	51	52	51	43	41	46	45	45	42	39	37
2500	45	45	47	45	34	36	49	47	48	49	40	38	42	41	41	39	37	34
3150	43	42	44	44	31	34	46	44	44	47	38	36	38	38	37	36	35	32
4000	41	40	42	43	31	33	42	41	41	45	36	34	35	35	34	33	32	30
5000	39	38	40	42	30	32	41	38	38	43	33	33	33	36	31	31	31	30
6300	38	40	38	42	30	31	39	37	35	42	32	31	32	36	31	30	30	29
8000	35	41	36	42	29	31	38	35	33	40	29	29	38	36	30	27	28	28
10000	33	32	34	41	28	29	37	32	30	38	26	26	31	25	25	25	26	27
12500	31	29	30	37	25	26	35	30	28	35	22	23	21	23	20	20	22	30
16000	32	25	26	32	20	21	31	25	27	32	18	18	21	18	18	16	18	21
20000	19	18	20	26	14	15	24	19	19	26	12	13	17	13	12	12	13	13
Total A	**63**	**63**	**64**	**60**	**50**	**52**	**64**	**63**	**63**	**62**	**55**	**52**	**58**	**58**	**57**	**54**	**51**	**47**