Environmental Impact Assessment Report
Volume 3, Appendix 25.2: Baseline Noise Survey

MarramWind Offshore Wind Farm

December 2025

MarramWind

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Contents

1. Introduction

1.1.1.1 This Appendix of the Environmental Impact Assessment (EIA) Report presents the methodology and results of the baseline noise surveys for the onshore infrastructure of the proposed MarramWind Offshore Wind Farm (hereafter referred to as 'the Project').

1.1.1.2 There is potential for noise effects during the construction, operation and maintenance (O&M) and decommissioning stages of the onshore infrastructure of the Project. The purpose of the baseline noise surveys was to determine robust and accurate baseline data to inform the assessments within this EIA Report. This Appendix sets out the measured baseline data used to inform the assessment of likely significant noise effects.

1.1.1.3 This Appendix should be read in conjunction with the project description provided in **Volume 1, Chapter 4: Project Description** and the relevant parts of the following Chapter and Appendix:

- **Volume 1, Chapter 25: Onshore Noise and Vibration**; and
- **Appendix 25.1: Noise and Vibration Relevant Legislation, Policy and Technical Guidance**.

1.1.1.4 The Appendix is supported by the following figure:

- **Volume 2, Figure 25.1: Baseline Noise Monitoring Locations**.

2. Baseline Noise Survey Methodology

2.1 Identification of receptor locations

2.1.1.1 Noise monitoring locations were selected to be representative of Noise Sensitive Receptors (NSRs) with the greatest potential to be affected by noise from the construction and O&M stages of the Project. The NSRs and noise monitoring locations were identified using aerial imagery and Ordnance Survey mapping.

2.1.1.2 Section 25.4.4 of **Volume 1, Chapter 25: Onshore Noise and Vibration** of this EIA Report identifies NSRs where baseline noise levels are required and have been taken forward when selecting monitoring locations.

2.2 Details of monitoring undertaken

Data collection methodology

2.2.1.1 Baseline noise monitoring was undertaken to determine the existing acoustic environment. Noise surveys were undertaken at receptor locations most likely to be affected by construction, O&M and decommissioning stages of the Project.

2.2.1.2 Environmental noise monitoring equipment was set up to take continuous unattended measurements. The unattended noise monitoring equipment was set to measure for intervals of 15 minutes in accordance with British Standard (BS) 4142 (see **Appendix 25.1**), which states:

> *"8.1.3 Ensure that the measurement time interval is sufficient to obtain a representative value of the background sound level for the period of interest. This should comprise continuous measurements of normally not less than 15 min intervals, which can be continuous or disaggregated."*

2.2.1.3 All sound level measurements were undertaken in accordance with BS 4142 and BS 7445-1, i.e., with microphones mounted to a height of 1.2 metres (m) to 1.5m above ground level and no less than 3.5m from any reflecting surface other than the ground.

2.2.1.4 At each location sound levels were measured using integrating averaging Sound Level Meters (SLMs) conforming to Class 1 as defined by BS European Norm (EN) 61672-1:2013. The SLMs were field calibrated before and at the end of each survey period by applying an acoustic calibrator to the microphone to check the sensitivity of the measuring equipment. The calibrators conformed to BS EN International Electrotechnical Commission 60942:2018. Any drift in calibration levels was noted at the end of the survey period. No significant deviation (less than +/- 0.5 decibel (dB) change) was found at any location. Copies of the calibration certification for the equipment are available on request.

2.2.1.5 The meteorological conditions during the survey period have been used in the analysis of the sound level data to ensure that only data collected during appropriate weather conditions has been used when determining representative sound levels to be used in the assessment.

Data collection locations

2.2.1.6 Two noise surveys were conducted. The first survey took place from 1 October to 10 October 2024 and included measurements at locations considered representative of residences nearest to the onshore substation site, including residences around Longside

Airfield, to inform the construction, O&M and decommissioning stage assessments. The second survey was conducted from 22 May to 3 June 2025 and included measurements at locations considered representative of residential receptors nearest to trenchless crossings along the onshore export cable corridor and close to the strategic road network to further inform the construction stage assessment.

2.2.1.7 Environmental noise monitoring equipment were set up to take continuous measurements at nine locations as summarised in **Table 2.1** and shown in **Volume 2, Figure 25.1**. The noise monitoring locations of the survey were informed by earlier stages of the design which has since been superseded, therefore not all of the locations are required to inform the O&M stage noise assessment but have been included for completeness.

Table 2.1 Unattended noise monitoring locations

Measurement reference	British National Grid coordinates (X,Y)	Location	Survey period	Installation description and commentary
Long-term monitoring location (LT)1	NK 08600 46865	Downiehills Farm.	1 October to 10 October 2024.	Measurement taken in free-field conditions at a height of 1.5m.
LT2	NK 08602 46036	Residential dwelling adjacent to William Coutts Transport Peterhead Ltd.	1 October to 10 October 2024.	Measurement taken in free-field conditions at a height of 1.5m.
LT3	NK 08119 45438	Garden of residential dwelling off Howemuir Road.	1 October to 10 October 2024.	Measurement taken in free-field conditions at a height of 1.5m.
LT4	NK 07478 46238	East Thunderton, residential dwelling south of Longside Road (A950).	1 October to 10 October 2024.	Measurement taken in free-field conditions at a height of 1.5m.
LT5	NK 09584 45123	Callieburn Cottage, south of Blackhills nature reserve.	1 October to 3 October 2024.	Measurement taken in free-field conditions at a height of 1.5m. The measurement was foreshortened to two days due to a fault. The results have been analysed and compared with the results from the similarly located measurement position of LT6 and the data for LT5 is considered valid.

Measurement reference	British National Grid coordinates (X,Y)	Location	Survey period	Installation description and commentary
LT6	NK 08980 44534	Hillhead of Cocklaw, north of Blackhills Road.	1 October to 10 October 2024.	Measurement taken in free-field conditions at a height of 1.5m.
LT7	NK 10335 51121	Farmland west of the A90, north of Lunderton.	22 May to 3 June 2025.	Measurement taken in free-field conditions at a height of 1.3m. Installed on hedge line of the field.
LT8	NK 10700 49575	Drumlinne, Lunderton, east of the A90.	22 May to 3 June 2025.	Measurement taken in free-field conditions at a height of 1.2m. Installed in back garden fence boundary.
LT9	NK 08742 46500	At the end of Tortorston Drive.	22 May to 3 June 2025.	Measurement taken in free-field conditions at a height of 1.3m. Installed on field boundary on fence line.

2.2.1.8 **Table 2.2** presents the details of the measurement equipment.

Table 2.2 Noise monitoring equipment

Measurement ref	Equipment description	Manufacturer and type no.	Serial number
LT1	SLM	Rion NL52.	01121377
	Pre-amplifier	NH25	21421
	Microphone	UC 59.	4388
	Calibrator	Larson Davis CAL200.	9091
LT2	SLM	Rion NL52.	00821129
	Pre-amplifier	NH25	21170
	Microphone	UC 59.	4129

Measurement ref	Equipment description	Manufacturer and type no.	Serial number
	Calibrator	Rion NC-74.	35281140
LT3	SLM	Rion NL52.	00821104
	Pre-amplifier	NH25	21145
	Microphone	UC 59.	14726
	Calibrator	Larson Davis CAL200.	9091
LT4	SLM	Rion NL52.	00821130
	Pre-amplifier	NH25	21171
	Microphone	UC 59.	4130
	Calibrator	Cirrus CR:515.	67437
LT5	SLM	Rion NL52.	510145
	Pre-amplifier	NH25	10138
	Microphone	UC 59.	02850
	Calibrator	Rion NC-74.	34615220
LT6	SLM	Rion NL52.	01021290
	Pre-amplifier	NH25	21332
	Microphone	UC 59.	04346
	Calibrator	01dB-Stell Cal 21.	34924015
LT7	SLM	01dB-METRAVIB Black Solo.	65811
	Pre-amplifier	01dB-Metravib PRE 21 S.	16554
	Microphone	01dB Metravib MCE 212.	166394
	Calibrator	01dB-Stell Cal 21.	34634224
LT8	SLM	Rion NL52.	01021290
	Pre-amplifier	NH25	21332

Measurement ref	Equipment description	Manufacturer and type no.	Serial number
	Microphone	UC 59.	04346
	Calibrator	01dB-Stell Cal 21.	34924015
LT9	SLM	01dB-METRAVIB Blue Solo.	060845
	Pre-amplifier	01dB-MATRAVIB PRE 21 S.	13164
	Microphone	01dB MCE212.	182024
	Calibrator	01dB-Stell Cal 21.	51031216

Meteorological conditions

2.2.1.9 Meteorological data obtained from a weather station approximately 2.4 kilometres to the north-east of LT1 (NK 10460 48440) has been sourced for the October 2024 survey data to filter the sound level data. During the 2025 survey, simultaneous measurements of the meteorological conditions throughout the duration of the survey carried out in 2025 were taken using a weather station installed at LT8.

2.2.1.10 Subsequent analyses of the sound level data were performed to omit periods where the windspeed exceeds 5 metres per second and periods of recorded rainfall.

3. Noise Survey Results

3.1.1.1 **Table 3.1** presents a summary of the results from the unattended noise level monitoring conducted in October 2024 used to inform the O&M stage assessment. The ambient noise level is taken as the logarithmic average of the measured 15-minute L_{Aeq} sound level over the daytime and night-time period separately. The representative background noise levels L_{A90} correspond to the 25th percentile for the daytime and night-time periods separately.

Table 3.1 Noise survey results

Location	Period, T	Measured sound level, dB[1]		
		Ambient noise level[2] $L_{Aeq,T}$	Range L_{AFmax}	Representative[3] $L_{A90,T}$
LT1	Weekday daytime (07:00-23:00 hrs).	53	41-84	41
	Night-time (23:00-07:00 hrs).	44	37-72	34
LT2	Weekday daytime (07:00-23:00 hrs).	50	47-83	38
	Night-time (23:00-07:00 hrs).	42	45-76	33
LT3	Weekday daytime (07:00-23:00 hrs).	45	40 -77	33
	Night-time (23:00-07:00 hrs).	37	35-69	28
LT4	Weekday daytime (07:00-23:00 hrs).	52	45-80	40
	Night-time (23:00-07:00 hrs).	44	40-75	32
LT5[4]	Weekday daytime (07:00-23:00 hrs).	49	44-84	36
	Night-time (23:00-07:00 hrs).	37	36-84	32
LT6	Weekday daytime (07:00-23:00 hrs).	48	40-82	34
	Night-time (23:00-07:00 hrs).	42	32-73	31

[1] Excluding periods with unfavourable weather conditions and unrepresentative events.
[2] Logarithmic average of measured 15-minute L_{Aeq} sound levels.
[3] 25th percentile of measured $L_{A90,T}$ sound levels.
[4] Measurement ran from the 1 October to the 3 October 2024 – no weekend period was captured.

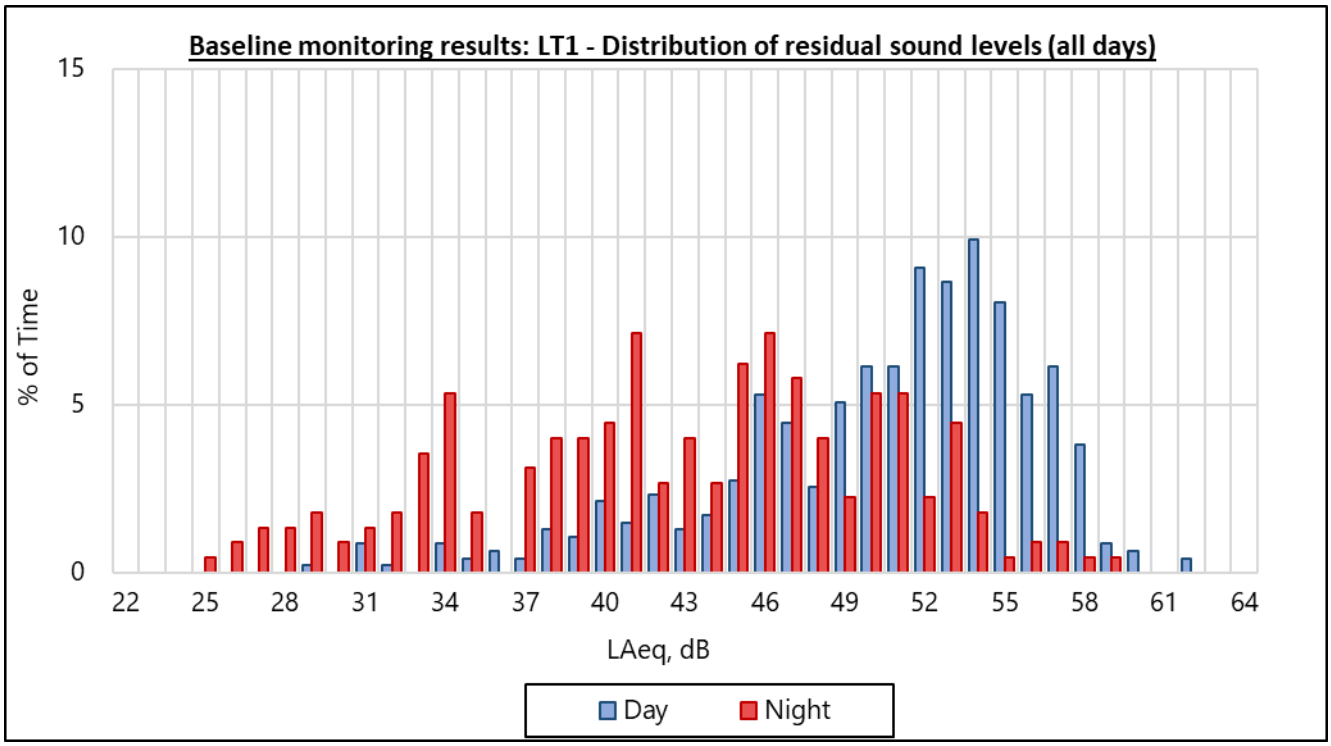
3.1.1.2 **Table 3.2** presents a summary of the weekday ambient noise levels at locations LT1 to LT9 used to inform the construction stage assessment. Whilst this does not include measurements taken during the Saturday morning period, i.e. between 07:00 and 13:00 hours, it is considered that ambient noise levels for this period would generally be similar to those presented in **Table 3.2** and would not result in any changes to the daytime assessment criteria for the construction stage assessment.

Table 3.2 Long term summary of weekday ambient noise levels

Location	Measured log. average sound level, dB $L_{Aeq,T}$		
	Daytime (07:00-19:00 hrs)	**Evening (19:00-23:00 hrs)**	**Night-time (23:00-07:00 hrs)**
LT1	54	51	46
LT2	51	48	48
LT3	46	42	42
LT4	52	49	49
LT5	50	45	47
LT6	49	44	46
LT7	53	50	46
LT8	54	52	49
LT9	52	51	48

3.1.1.3 Plate 3.1 to **Plate 3.6** present the statistical analyses of the distribution of measured noise levels at LT1 to LT6 during daytime and night-time periods. The analysis focuses on ambient noise levels (dB L_{Aeq}) and background noise levels (L_{A90}), i.e. the parameters used for the O&M stage noise assessments.

Plate 3.1 LT1 Histograms of measured data



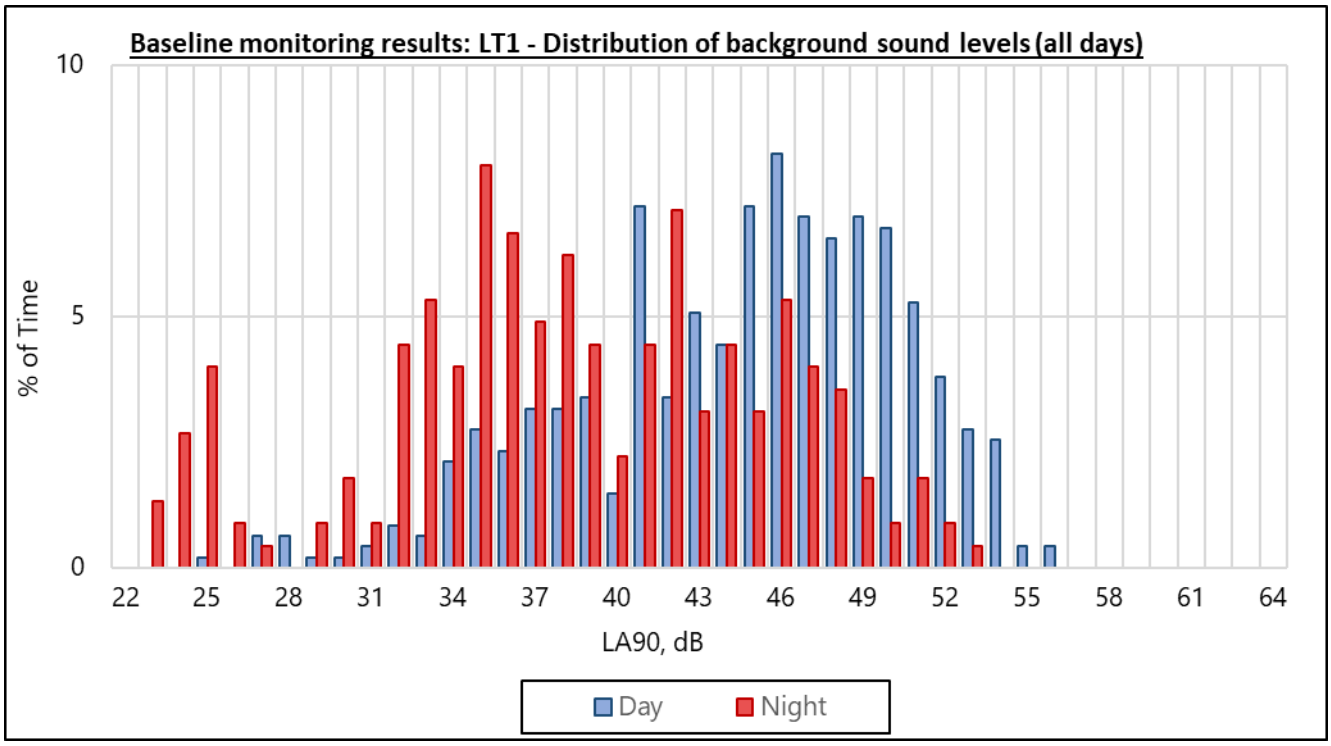
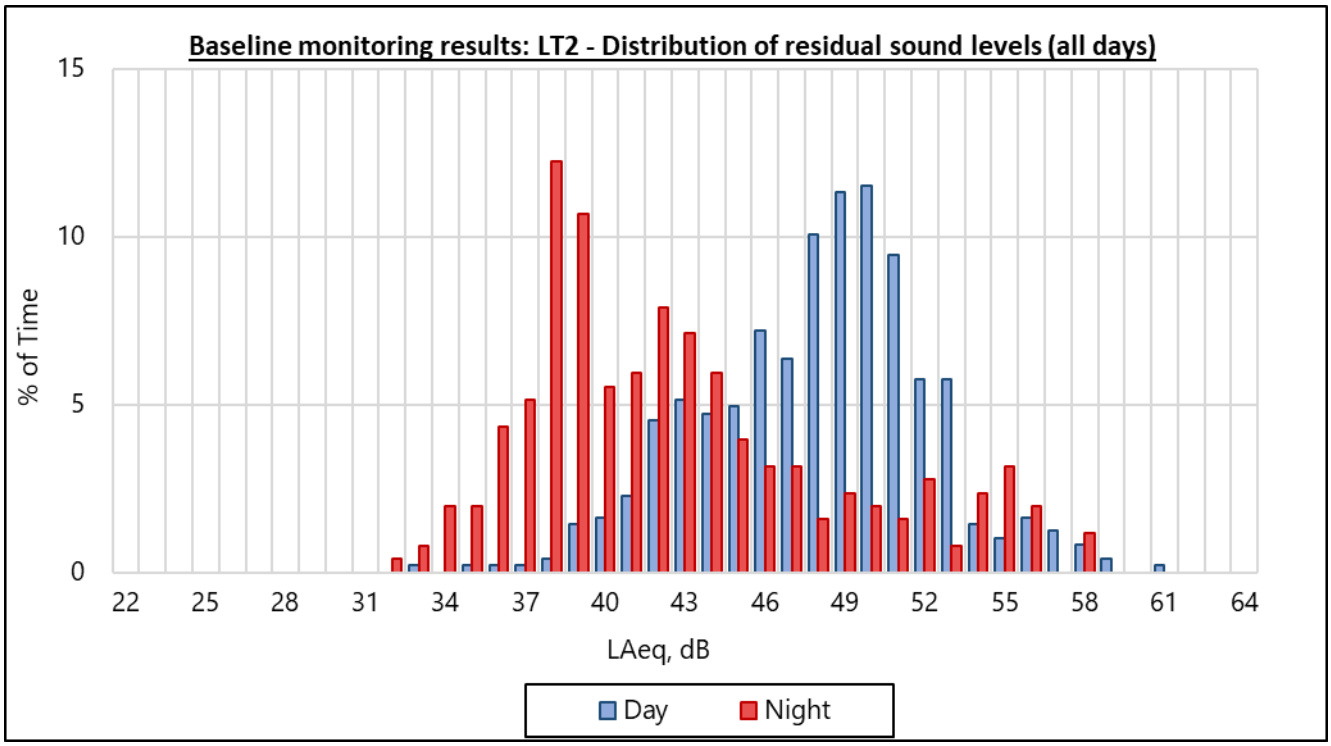


Plate 3.2 LT2 Histograms of measured data



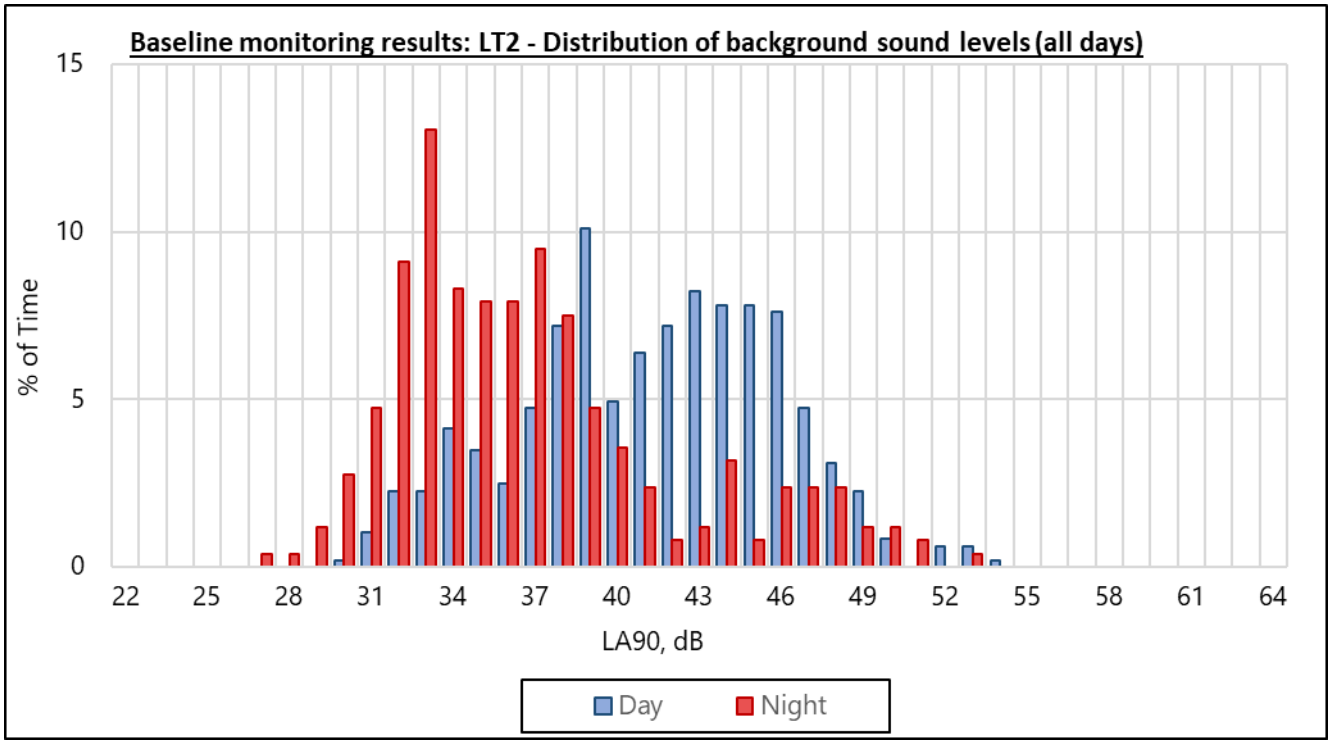
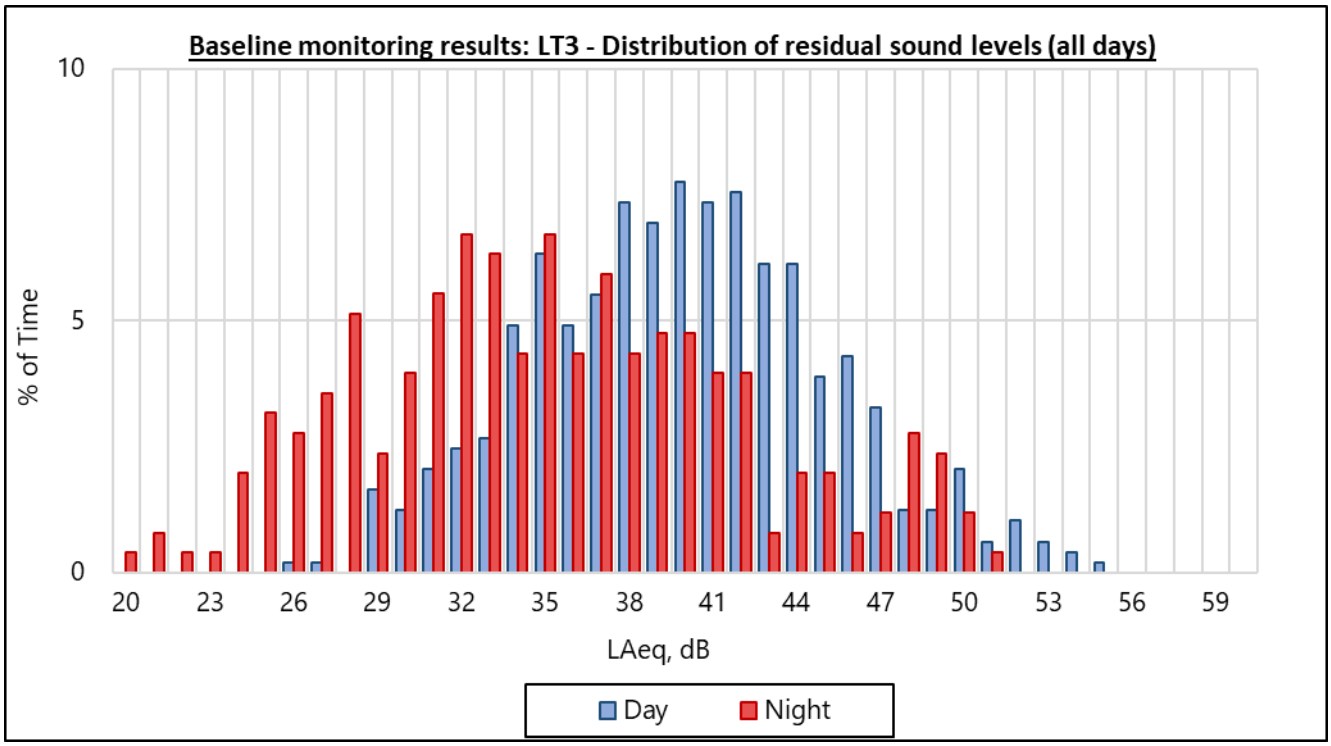


Plate 3.3 LT3 Histograms of measured data



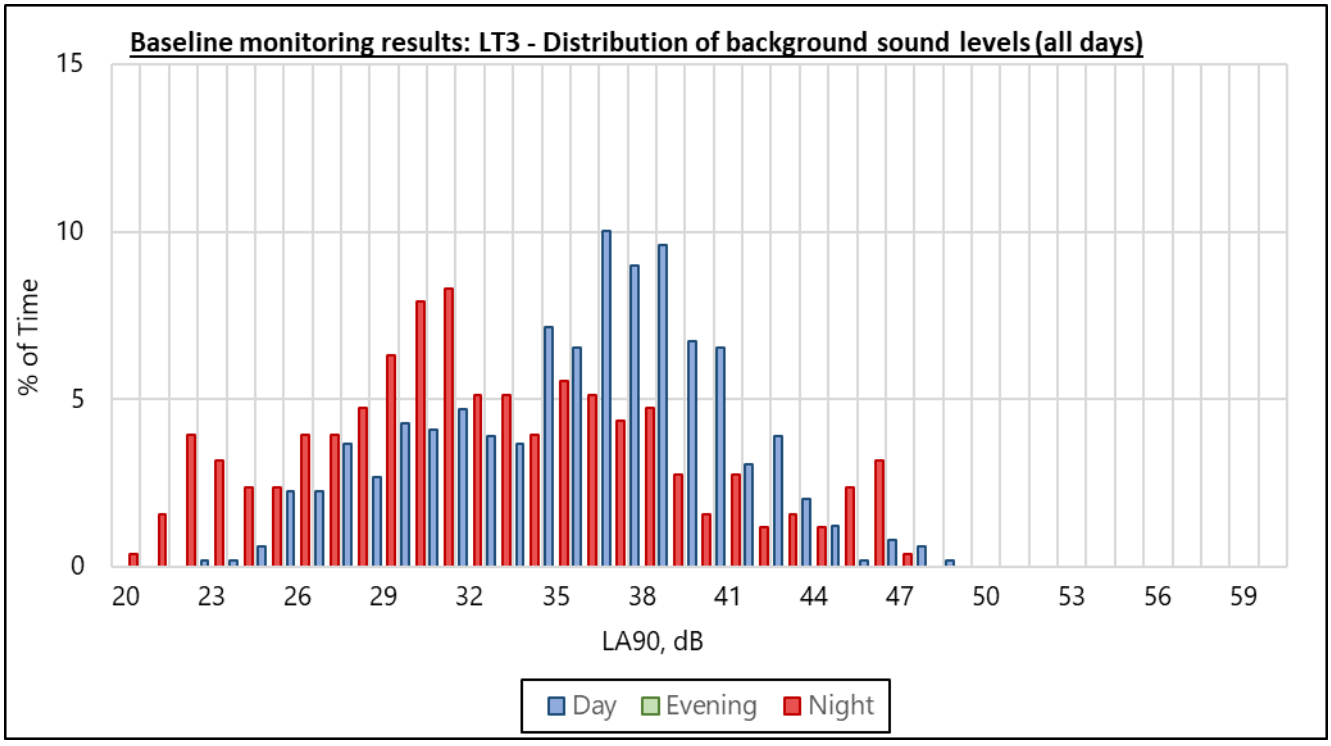
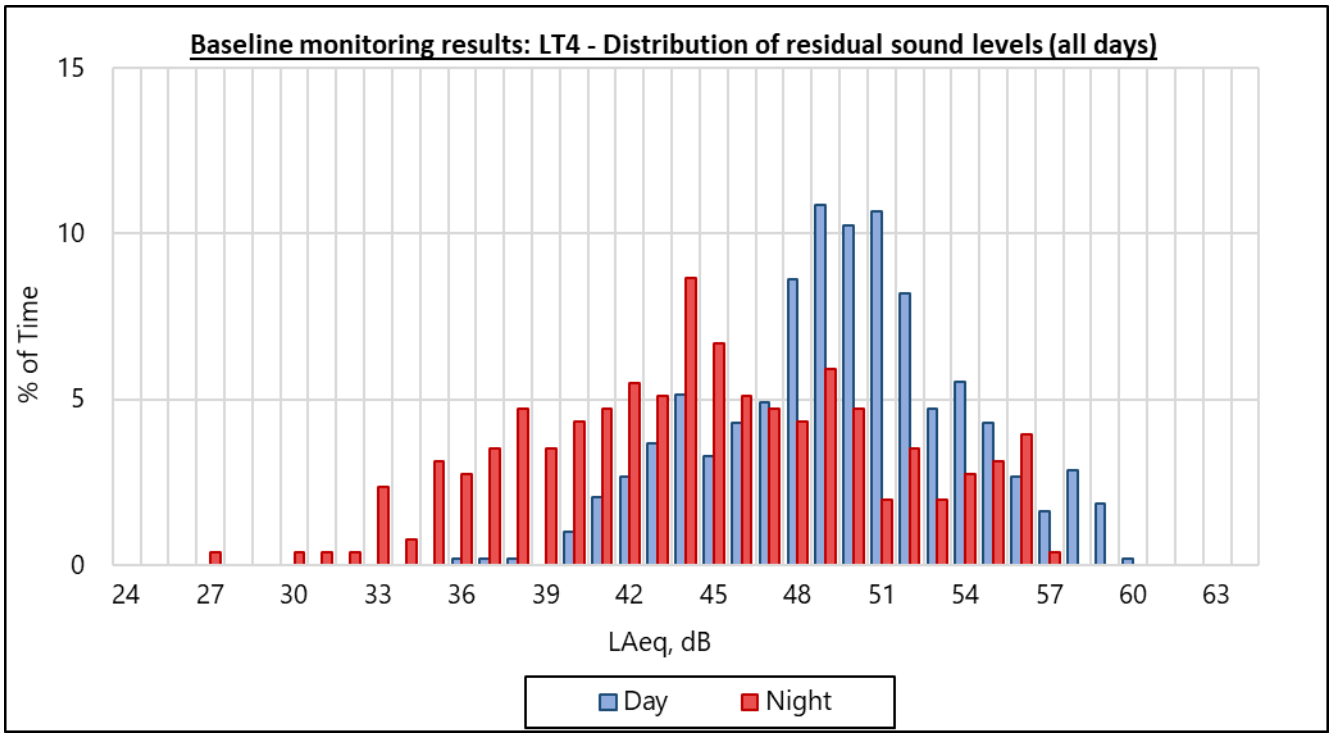


Plate 3.4 LT4 Histograms of measured data



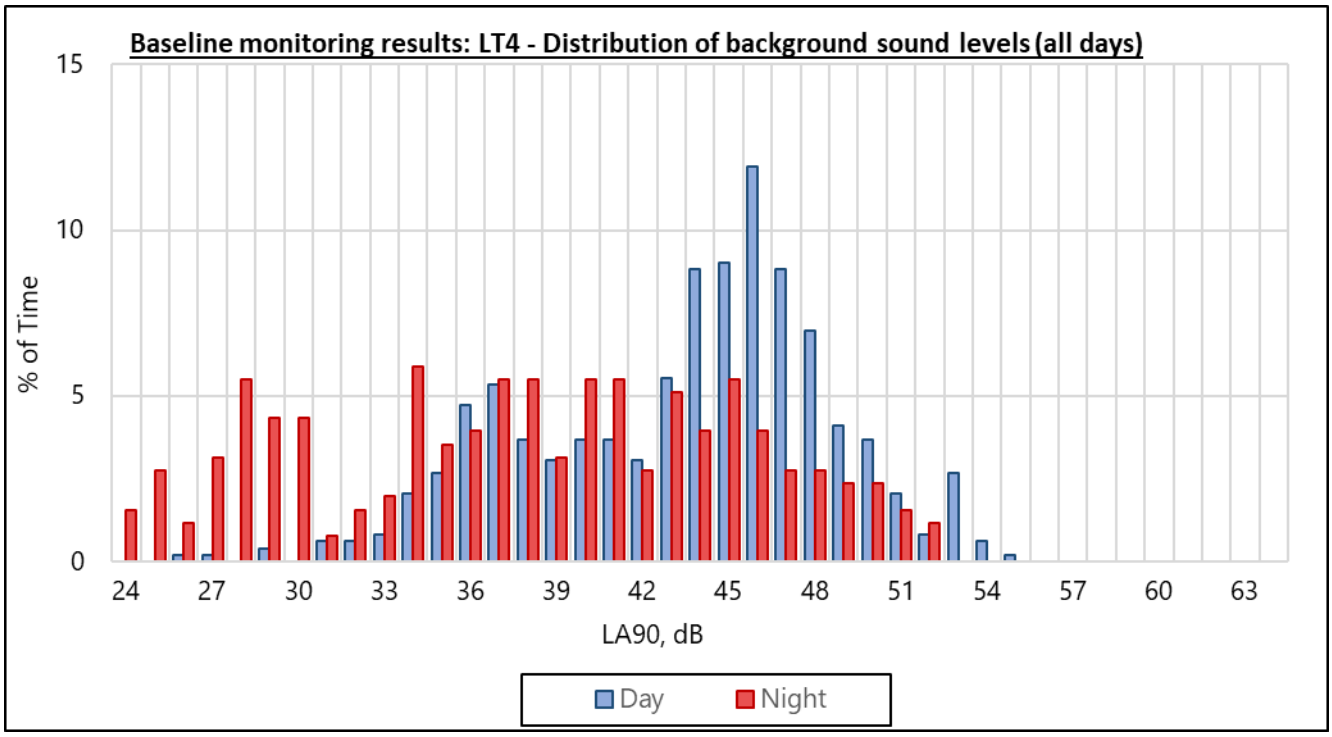
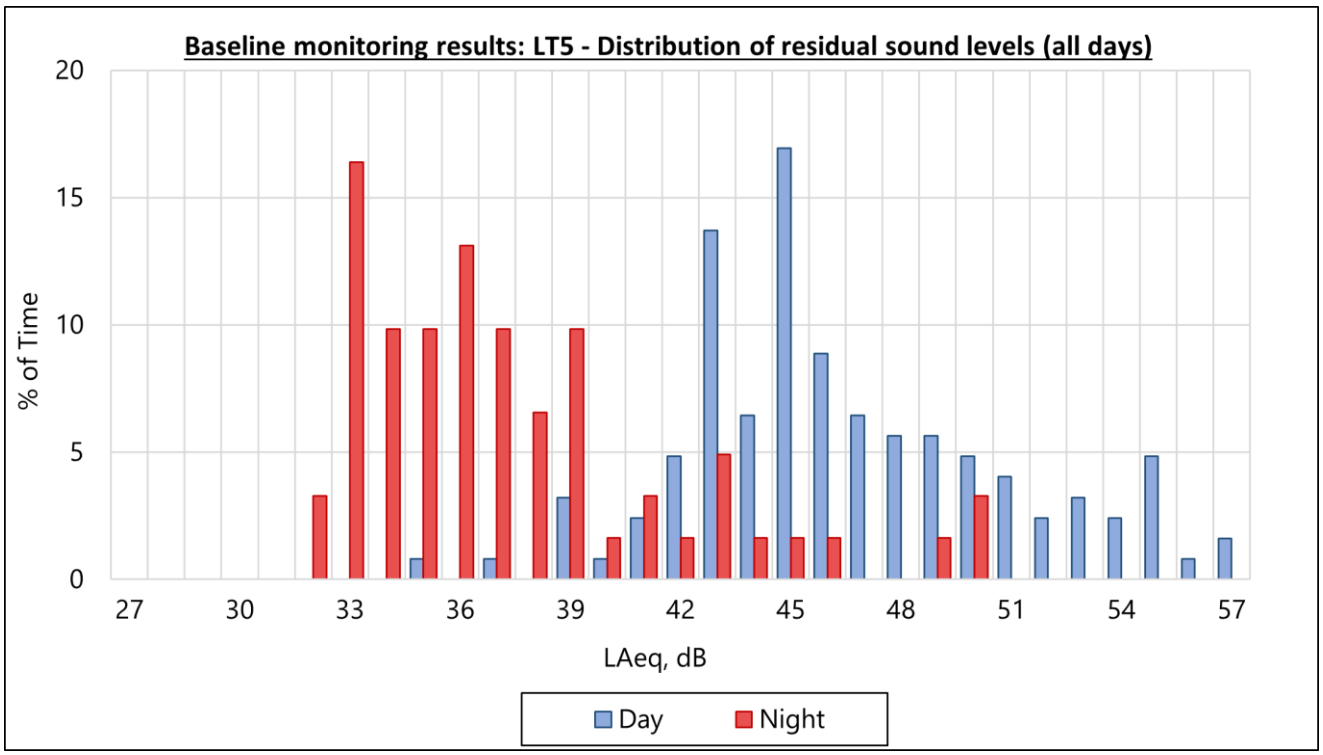


Plate 3.5 LT5 Histograms of measured data



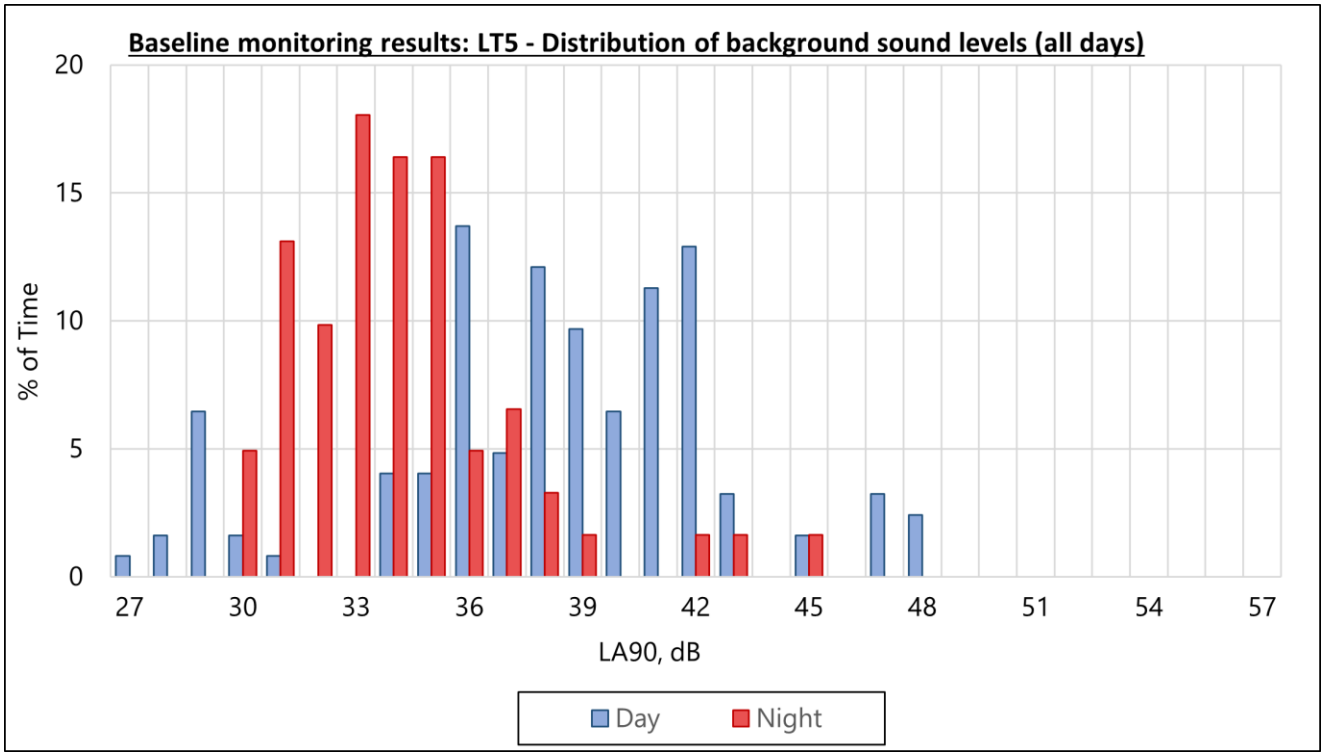
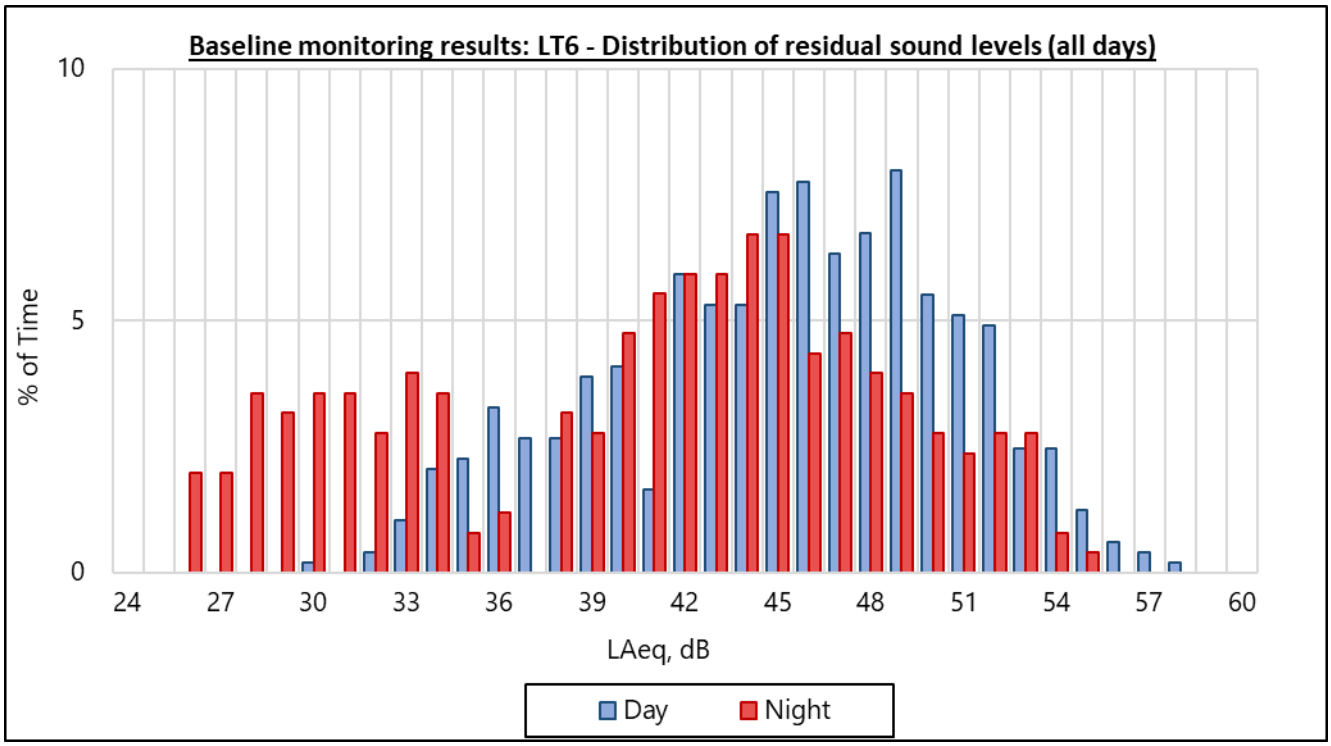
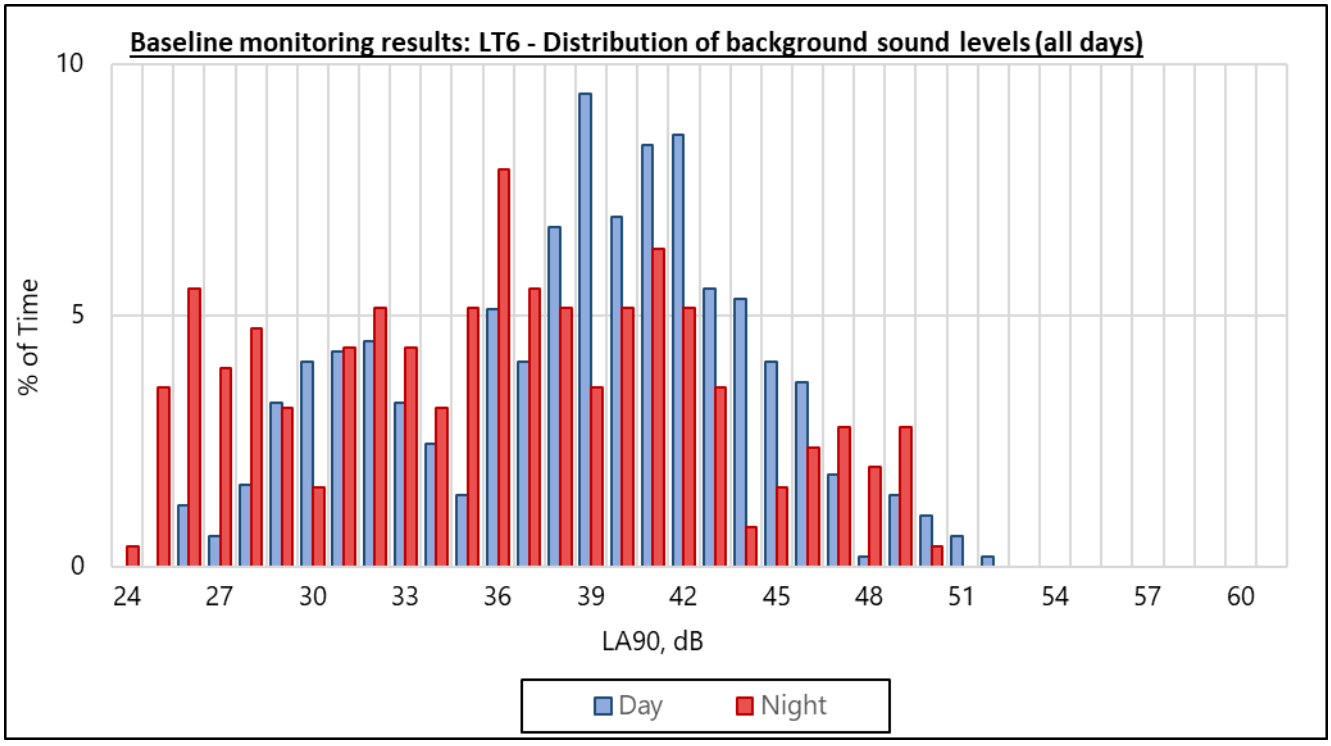


Plate 3.6 LT6 Histograms of measured data





3.1.1.4 **Plate 3.7** to Plate 3.9 present the statistical analyses of the distribution of measured noise levels at LT7 to LT9 during day, evening and night-time periods. The analysis focuses on ambient noise levels dB L_{Aeq}, i.e. the parameter used for the construction stage noise assessments.

Plate 3.7 LT7 Histograms of measured data

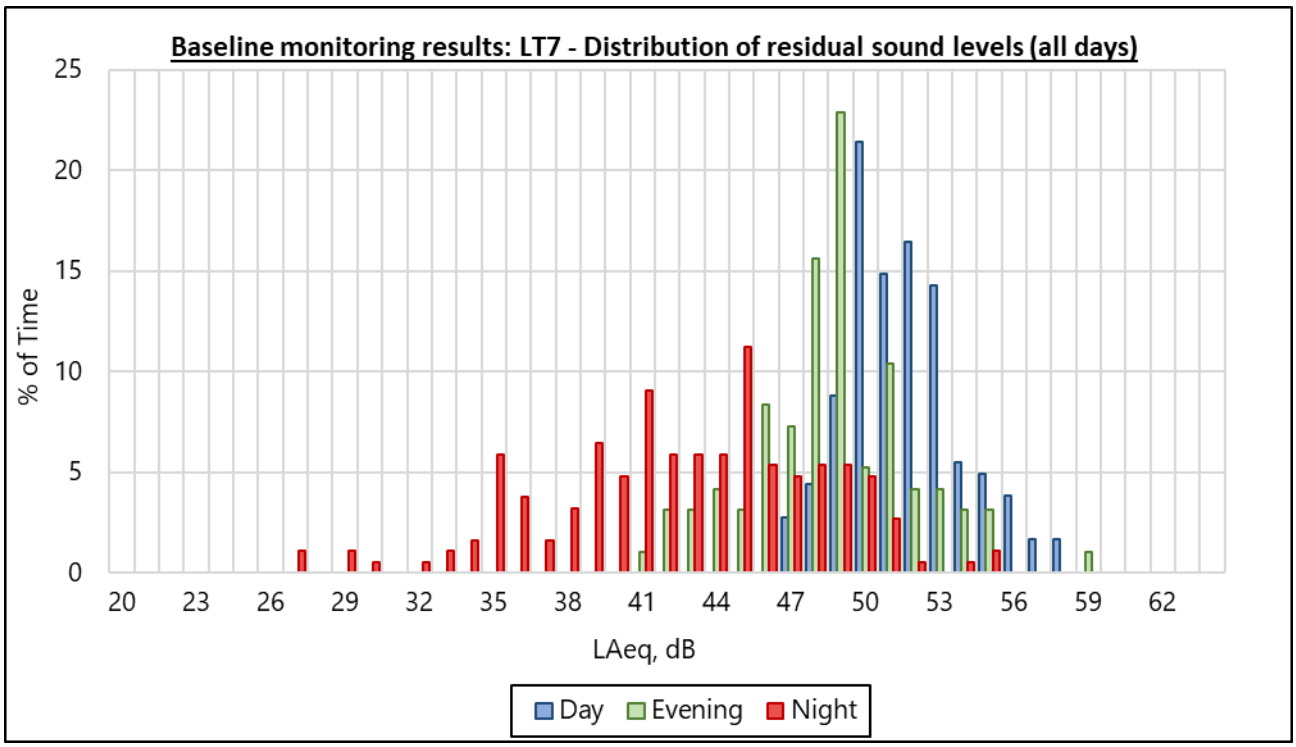


Plate 3.8 LT8 Histograms of measured data

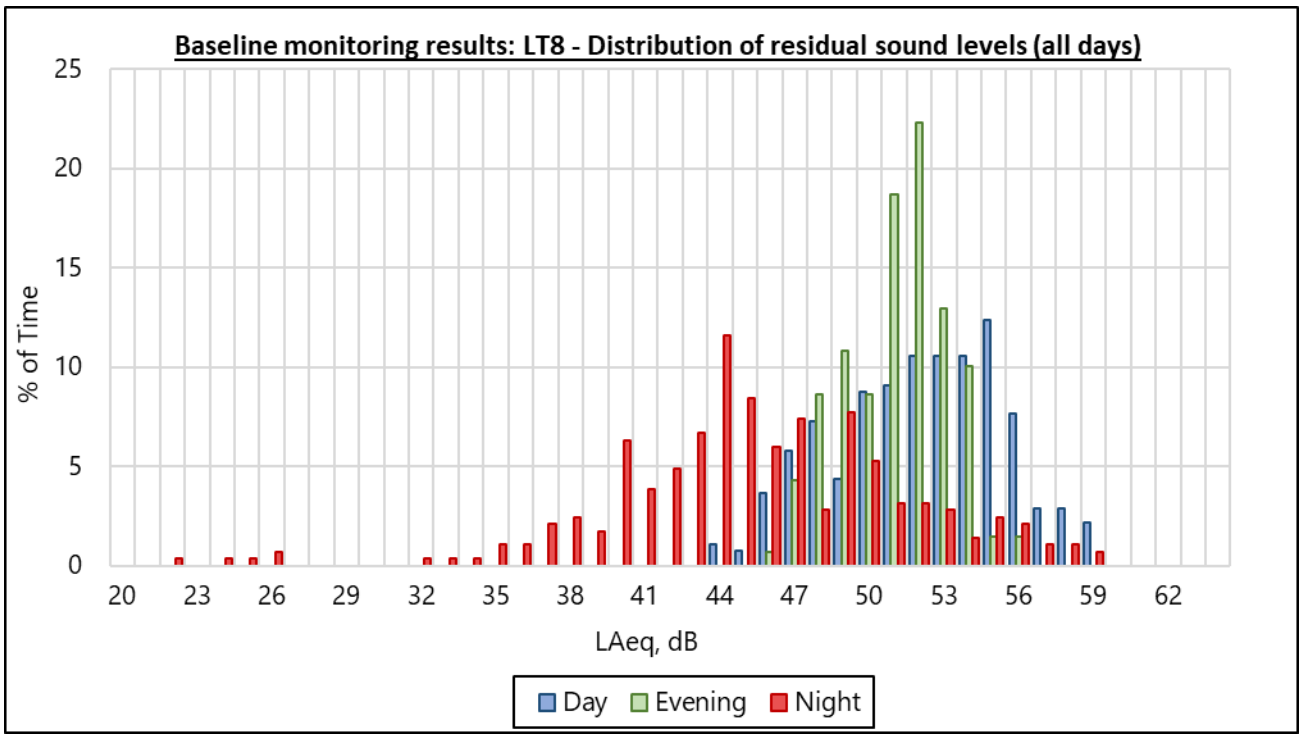
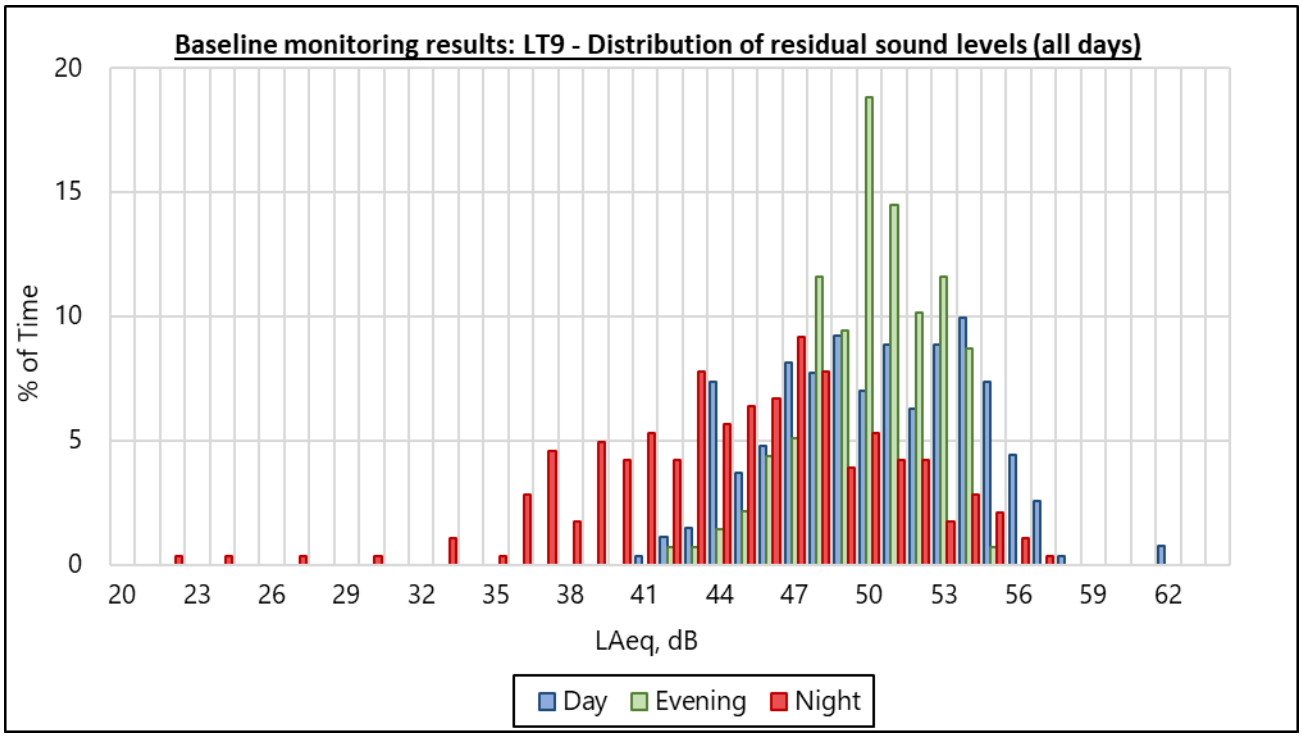


Plate 3.9 LT9 Histograms of measured data



4. References

British Standards Institution, (2003). *BS 7445-1:2003 Description and measurement of environmental noise. Part 1: Guide to quantities and procedures.* BSI, London. [online] Available at: https://landingpage.bsigroup.com/LandingPage/Standard?UPI=000000000030098820 [Accessed: 21 August 2025].

British Standards Institution, (2013). *BS EN 61672-1:2013 Electroacoustics - Sound level meters. Part 1: Specifications.* BSI, London. [online] Available at: https://landingpage.bsigroup.com/LandingPage/Standard?UPI=000000000030208586 [Accessed: 21 August 2025].

British Standards Institution, (2018). *BS EN IEC 60942:2018 Electroacoustics – Sound calibrators.* BSI, London. [online] Available at: https://landingpage.bsigroup.com/LandingPage/Undated?UPI=000000000030090951 [Accessed: 21 August 2025].

British Standards Institution, (2019). *BS 4142:2014 + A1:2019 Methods for rating and assessing industrial and commercial sound.* BSI, London. [online] Available at: https://landingpage.bsigroup.com/LandingPage/Standard?UPI=000000000030382132 [Accessed: 21 August 2025].

5. Glossary of Terms and Abbreviations

5.1 Abbreviations

Acronym	Definition
BS	British Standard
dB	Decibels
EIA	Environmental Impact Assessment
EN	European Norm
LT	Long-term monitoring location
NSR	Noise Sensitive Receptor
O&M	Operation and maintenance
SLMs	Sound Level Meters

5.2 Glossary of terms

Term	Definition
Acoustic environment	Sound from all sources as modified by the environment.
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.
Ambient sound level	The $L_{Aeq,T}$, of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
Baseline	Refers to existing conditions as represented by latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of development.
Background sound level	The underlying level of sound over a period, T, and is represented by $L_{A90,T}$, the level exceeded for 90% of the measurement interval T.
dB	A unit used to measure the intensity of a sound or the power level of an electrical signal by comparing it with a given level on a logarithmic scale.
Free-field level	Resulting level from a measurement that is undertaken away from the acoustic influence of a reflective façade (i.e., at least 3.5m away from any reflective source, not including the ground).
Frequency in Octave Bands	A range of frequencies where the upper frequency limit is twice that of the lower frequency limit. For example, the 1000Hertz octave band contains acoustic energy at all frequencies from 707 to 1414Hertz.

Term	Definition
Frequency in One Third Octave Bands	Octave bands that are sub-divided into three parts, equal to 23% of the centre frequency. Used when octave analysis does not provide sufficient detail. Divides the audio spectrum into 33 or more equal parts where the cut-off frequencies have a ratio of 21/3, which is approximately 1.26. For example, a 1kHz third-octave band filter has a centre frequency of 1000Hz with lower and upper frequencies of 891Hz and 1112Hz, respectively.
Hertz	The number of waves per second. The unit of measurement for frequency of a sound wave.
$L_{A10,18h}$	The LA10,18h is the A-weighted sound pressure level that is exceeded for 10% of an 18-hour measurement.
$L_{A90,T}$	The A-weighted sound pressure level that is exceeded for 90% of a given time interval, T. Known as the 'background sound level'.
$L_{Aeq,T}$	The A-weighted equivalent continuous sound level. It is the notional continuous level that, over the defined time period, T, contains the same sound energy as the actual fluctuating sound that occurred over the same time period.
$L_{AFmax,T}$	The maximum recorded sound level within a given time period, T, measured using a fast time weighting.
$L_{AN,T}$	The level of A-weighted noise exceeded for N% of the measurement time T. Note that the time weighting (usually Fast) is sometimes included, denoted by 'F' (for example, $L_{AFN,T}$)
Noise	A term used to describe 'unwanted sound' or any sound that is undesired by the recipient.
Root mean square	Root Mean Square of a time-varying quantity is obtained by squaring the amplitude at each instant, obtaining the average of the squared values over the interval of interest, and then taking the Square Root of this average.
Sound	A term used to describe airborne waves that can be heard.
Sound level meter	SLM is the instrument used for acoustic (sound that travels through air) measurements. It is commonly a hand-held instrument with a microphone. The diaphragm of the microphone responds to changes in air pressure caused by sound waves.
Sound pressure level	Sound pressure level is the RMS value of the Instantaneous Sound Pressures measured over a specified period of time, measured in decibels (dB) to a given reference pressure level.
Specific sound level	An equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr.
Time weighting	Time weightings determine how quickly the SLM responds to changes in sound pressure level. Fast time weighting: the SLM samples over a few discrete 125ms periods, with all parameters calculated from these 125ms measurements. For example, a 15-minute measurement period is actually 432,000 individual measurements. Slow time weighting: the SLM samples over several

Term	Definition
	discrete 1 second periods, with all parameters calculated from these 1 second measurements.
Weighting network	An electronic filter in a SLM, which approximates, under defined conditions, the frequency response of the human ear. The A- weighting network is most commonly used.

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