voltalia

Technical Appendix 12.1: Baseline Noise

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INDEX

1 BASELINE NOISE SURVEY

1.1 Introduction

1.1.1.1 Baseline noise monitoring was carried out between 20/03/25 and 27/03/25, to quantify the noise environment at the Noise Sensitive Receptors (NSRs) identified in **Chapter 12: Noise and Vibration** for Springfield Solar Farm and BESS.

1.1.1.2 Noise measurements were undertaken at four monitoring locations. This enabled background noise levels, representative of all assessment locations to be established.

1.1.1.3 This Appendix presents details of the data recorded during the survey and the analysis that has been carried out to derive the Representative Background Sound Level (RBSL) according to British Standard (BS) 4142:2014+A1:2019: Methods for rating and assessing industrial and commercial sound (BS 4142).

1.1.1.4 This appendix also presents measurement data used to inform the construction assessment in accordance with BS 5228:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites (BS 5228).

1.1.1.5 A summary of the results has been provided in **Table 1.1**.

TABLE 1.1 SUMMARY OF REPRESENTATIVE BACKGROUND SOUND LEVELS

NOISE MONITORING LOCATION	RBSL, dB (L_{A90})		RANGE OF FACADE LEVELS USED TO INFORM CONSTRUCTION ASSESSMENT, dB L_{Aeq}		
	DAY	NIGHT	DAY	EVENING	NIGHT
NML1	35	34	50-59	34-55	40-47
NML2	28	29	41-54	34-42	36-41
NML3	33	25	44-58	34-50	37-48
NML4	33	33	51-64	43-59	43-59

1.1.1.6 This appendix is set out as follows:

- Section 2 presents the survey methodology.
- Section 3 presents an overview of weather conditions.
- Section 4 presents the monitoring results at **NML1**.
- Section 5 presents the monitoring results at **NML2**.
- Section 6 presents the monitoring results at **NML3**.
- Section 7 presents the monitoring results at **NML4**.

2 METHODOLOGY

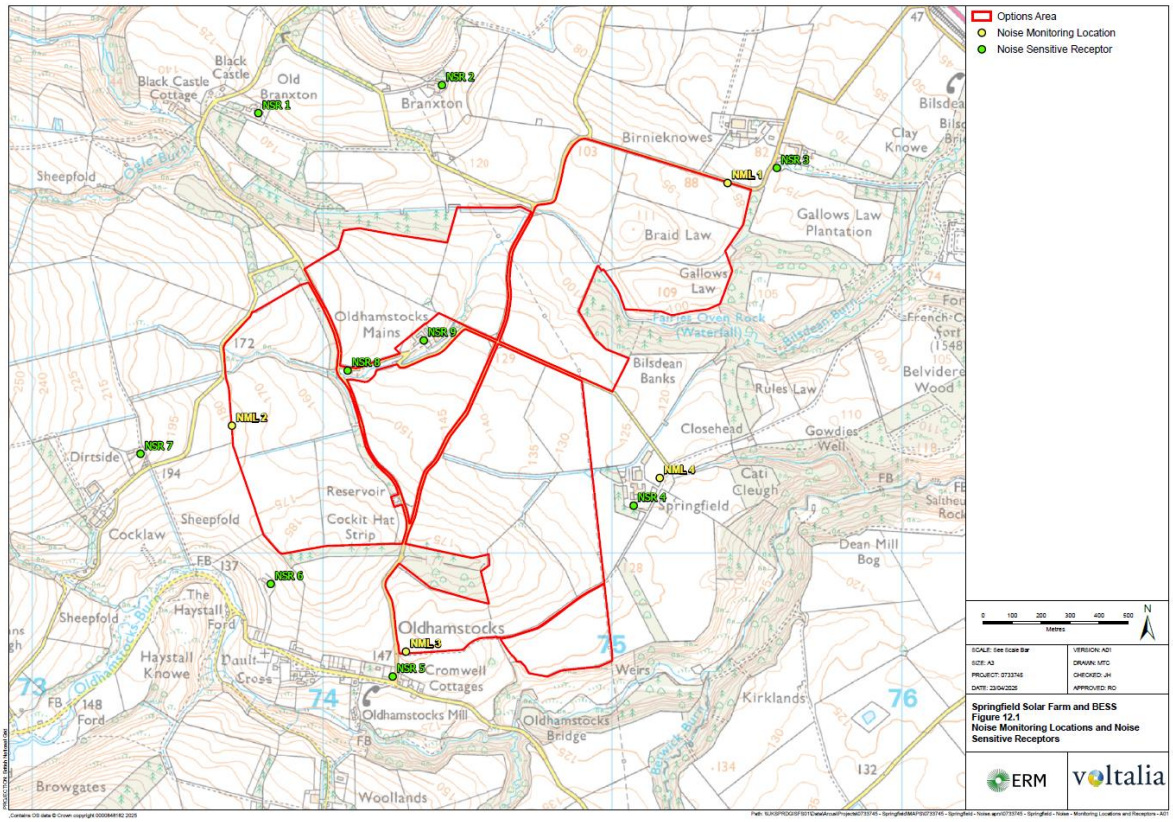
2.1 Equipment and Setup

2.1.1.1 The monitoring locations are shown in **Figure 2.1** and also in **Chapter 12** in **Figure 12.1**. Monitoring was carried out using four Class 1 sound level meters (two **Rion NL-52** and two **Brüel & Kjær 2250**) set-up as noise loggers at four monitoring locations, one Class 1 acoustic calibrator (**Rion NC-74**) and two weather station (**Davies Vantage Vue 6250UK**). Noise equipment was calibrated to traceable standards and copies of calibration certificates are available on request. Additional meters were installed for redundancy; however, the data of these meters was not used.

2.1.1.2 The equipment was housed in all-weather cases with long-life batteries. Microphones were set at a height of approximately 1.5 m above the ground, and monitoring was carried out in free-field conditions (i.e., at least 3.5 m from the nearest hard reflective surface). The sound level meters were field calibrated at the start and end of the survey period, with no calibration drift greater than 0.2 dB experienced at any location during the monitoring period.

2.1.1.3 Weather stations were set-up at location **NML2** and **NML4** to record weather data throughout the survey period. As the weather stations were in a flat, non-built-up area, weather conditions are likely to be similar in nearby locations due to the proximity of the locations to each other and the open nature of the terrain.

FIGURE 2.1 NOISE MONITORING LOCATIONS AND NOISE SENSITIVE RECEPTORS



2.1.2 Data Recording

2.1.2.1 The noise meters were installed and left in-situ to log noise levels continuously for a period of approximately 8 days, where they recorded standard metrics including L_{Aeq}, L_{A90} and L_{Amax}. In addition, meteorological data such as precipitation, wind speed, and wind direction were also logged.

2.1.2.2 To minimise the influence on the measurements from sources of interference such as wind passing over the diaphragm of the microphone or rain falling on top of the microphone windshield, measurements made during rainfall events and strong wind speeds were discarded during data analysis. This follows the guidance given in BS 4142.

3 WEATHER CONDITIONS

3.1.1.1 Temperature ranged between 2 and 16 degrees °C, with an average temperature of 8 degrees, and with small periods of precipitation throughout the survey. **Figure 3.1** details the measurements of wind and rainfall recorded during the survey period, and **Figure 3.2** presents the recorded wind direction.

FIGURE 3.1 WIND AND RAINFALL MEASUREMENTS DURING THE SURVEY AT **NML2**

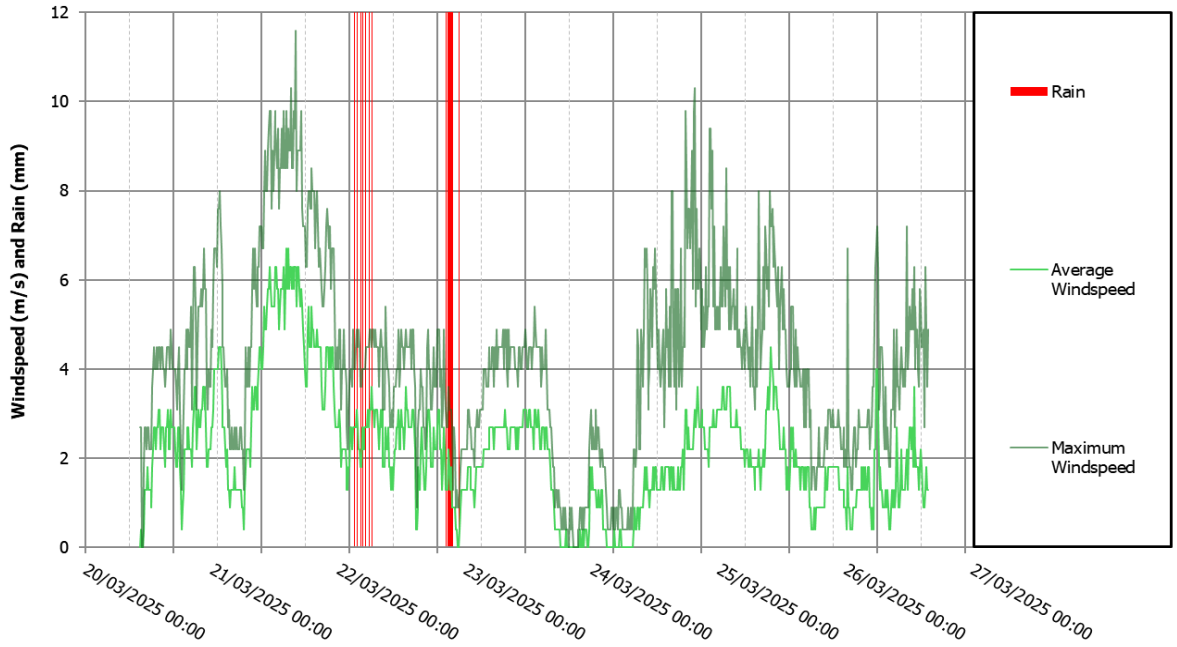


FIGURE 3.2 WIND DIRECTION MEASUREMENTS DURING THE SURVEY PERIOD AT **NML2**

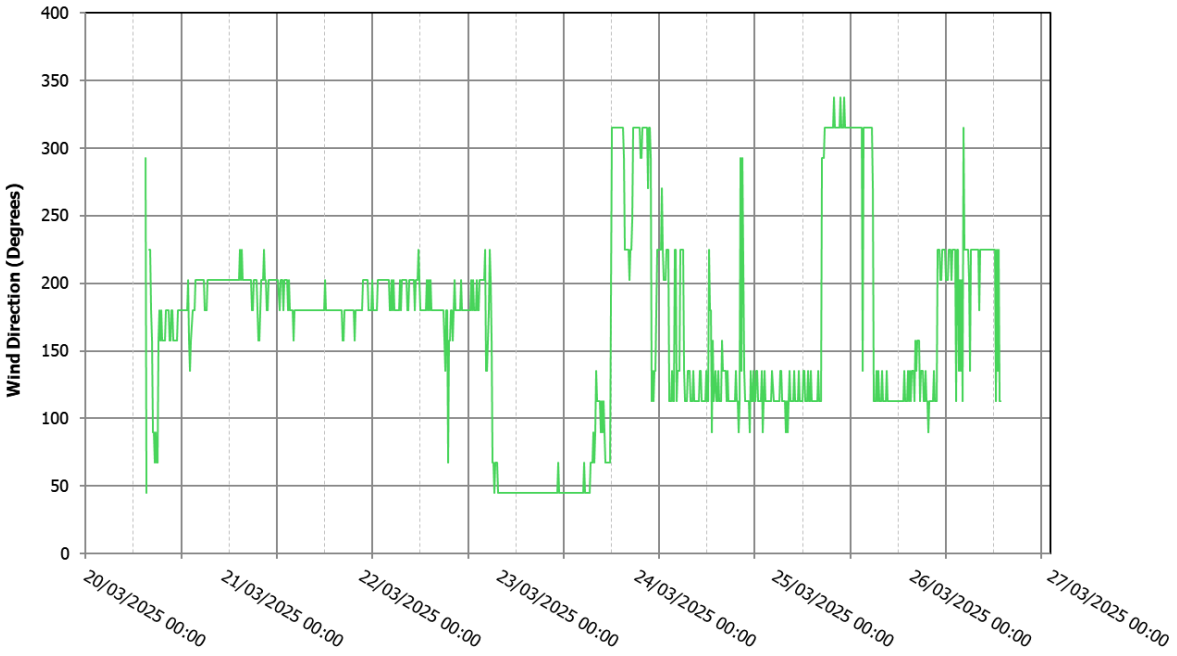


FIGURE 3.3 WIND AND RAINFALL MEASUREMENTS DURING THE SURVEY AT **NML4**

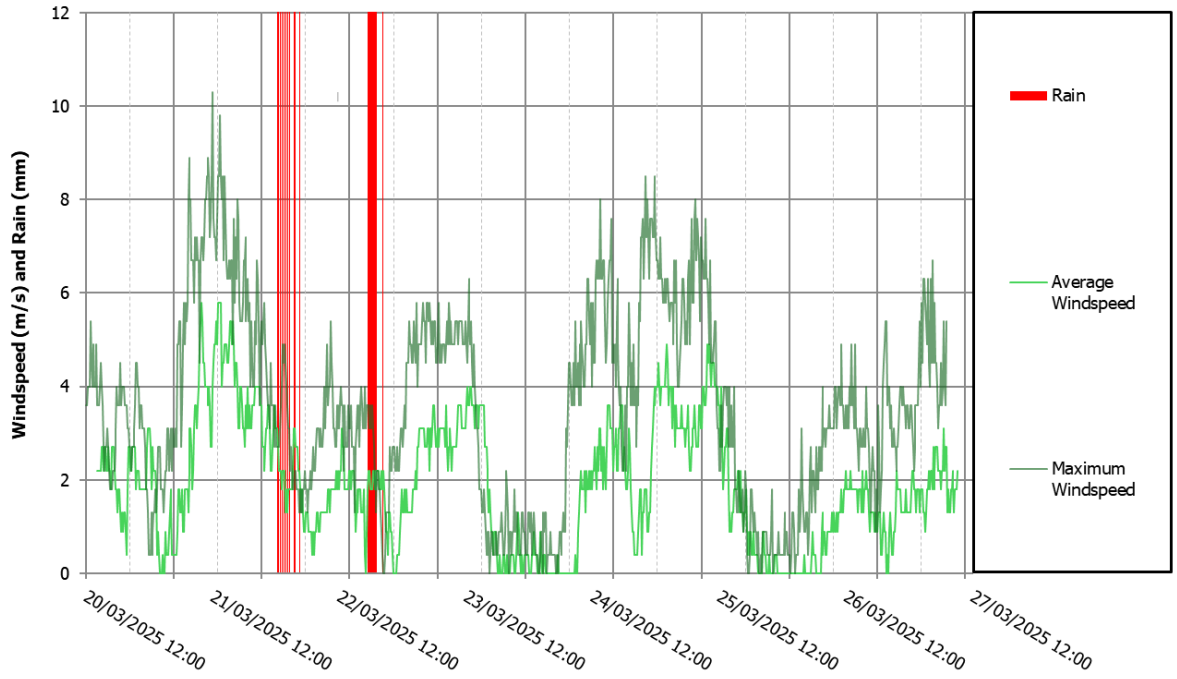
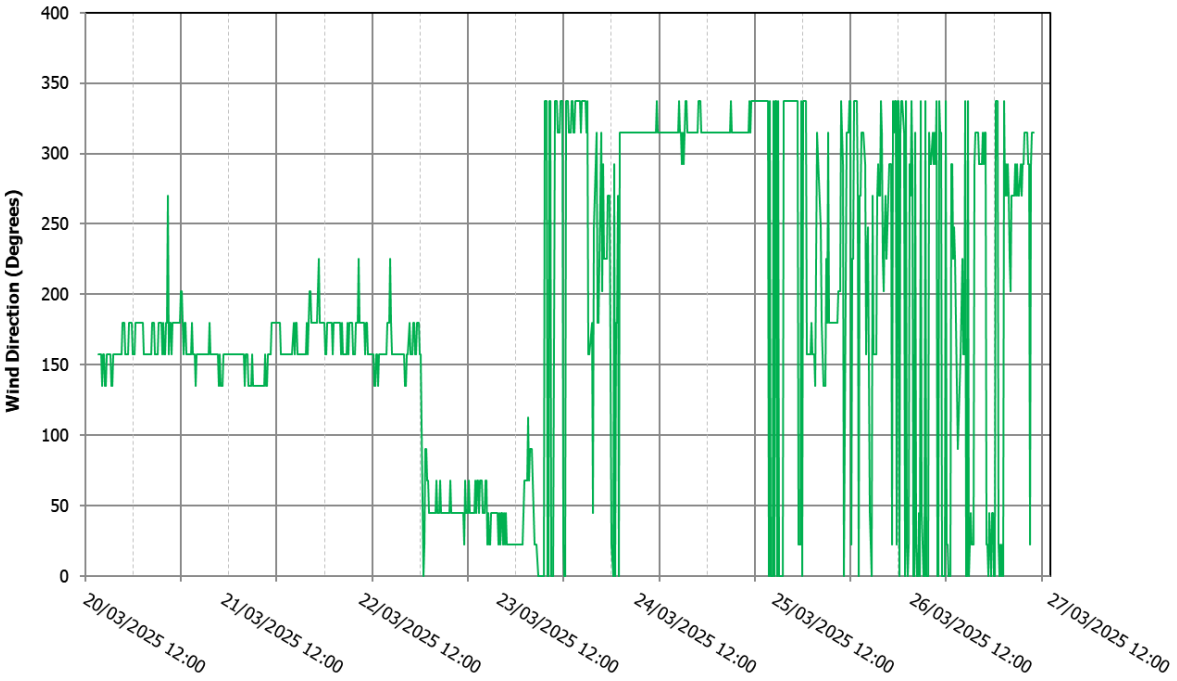


FIGURE 3.4 WIND DIRECTION MEASUREMENTS DURING THE SURVEY PERIOD AT **NML4**



4 NML1: NORTH OF THE SITE BOUNDARY

4.1.1.1 The monitor at this location was installed at 13:20 on 19/03/2025 and collected at 17:30 on 26/03/2025. The noise monitoring location can be characterised as agricultural land. The noise environment was dominated by road traffic noise in the distance and wind. Other audible sources include occasional noise from the power station nearby, birdsong and horses. Weather data was derived from weather monitoring at location **NML2**, approximately 1.1km from this location. This location was chosen to represent Receptor **NSR3: Birnieknowes Cottages**.

Figures and tables present the following information for NML1:

- **Figure 4.1** shows the monitoring equipment set-up at **NML1**.
- **Figure 4.2** presents the 10-minute noise measurements logged over the survey period for the key noise metrics; $L_{Aeq, 10\text{-}min}$, L_{Amax} and $L_{A90, 10\text{-}min}$.
- **Figure 4.3** presents the distribution of daytime background $L_{A90, 10\text{-}min}$ noise levels over the survey period.
- **Figure 4.4** presents the distribution of the total night-time background $L_{A90, 10\text{-}min}$ noise levels over the survey period.
- **Table 4.1** presents the mean, median, mode and representative values for the daytime and night-time background measurements.
- **Table 4.2** presents L_{Aeq} values used to inform the construction assessment.

FIGURE 4.1 NOISE MONITORING SETUP AT **NML1**

FIGURE 4.2 RESULTS OF THE NOISE MONITORING AT **NML1**

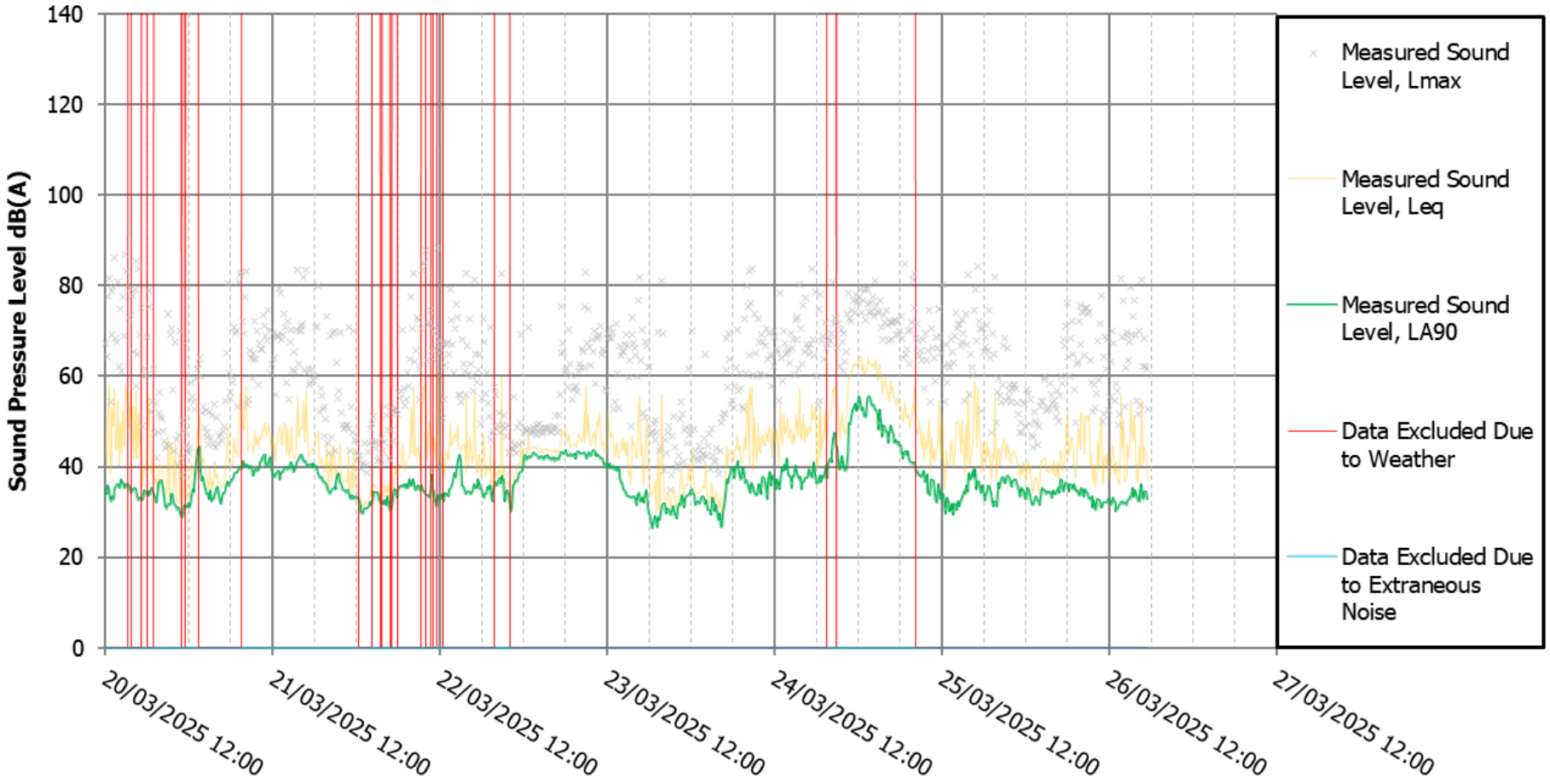


FIGURE 4.3 DISTRIBUTION OF DAYTIME RBSL AT **NML1** $L_{A90,10\text{-MIN}}$

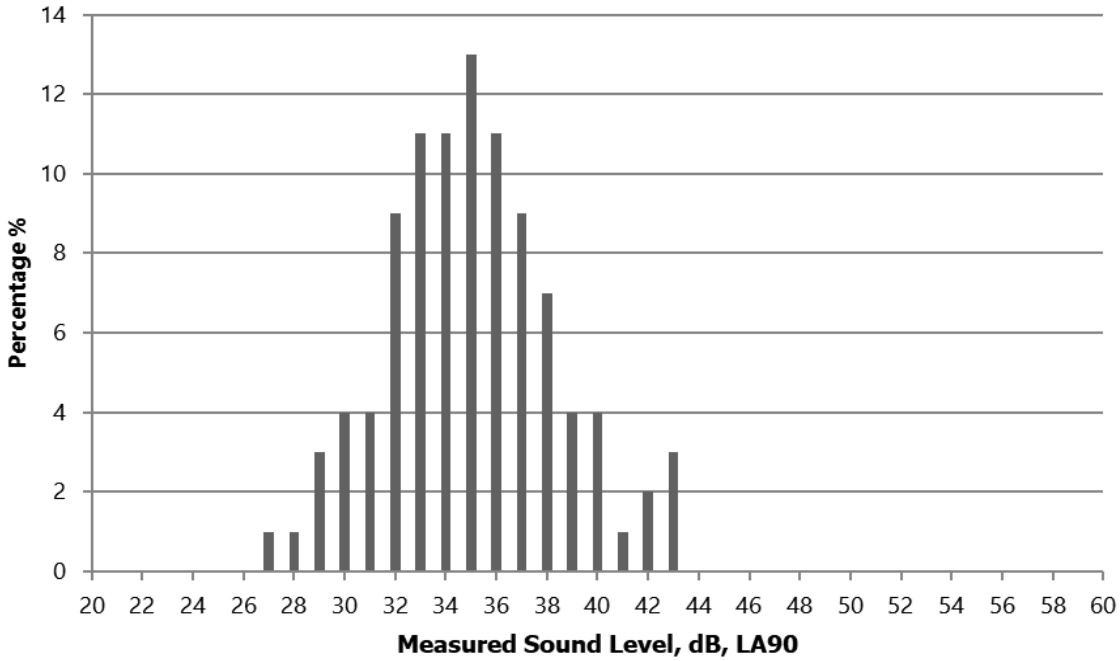


FIGURE 4.4 DISTRIBUTION OF NIGHT-TIME RBSL AT **NML1** $L_{A90,10\text{-MIN}}$

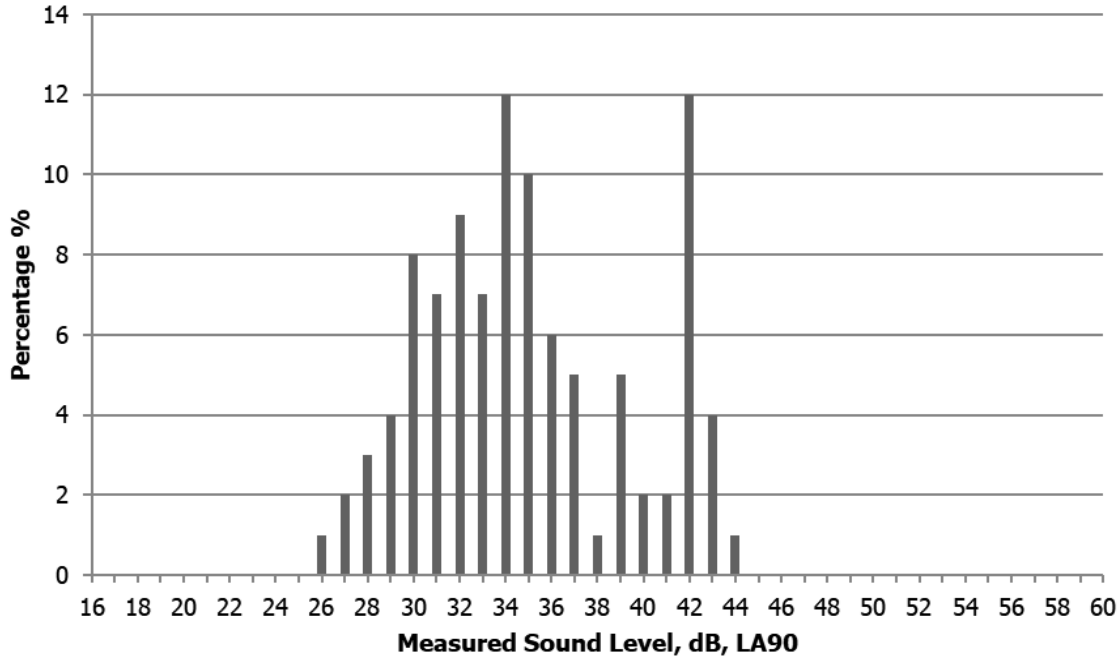


TABLE 4.1 BACKGROUND DATA ANALYSIS **NML1**

PERIOD	MODE	MEDIAN	MEAN	REPRESENTATIVE
Daytime (0700-2300) $L_{A90,\ 10\text{-}min}$	35 dB	35 dB	35 dB	35 dB
Night-Time (2300-0700) $L_{A90,\ 10\text{-}min}$	34 dB	34 dB	35 dB	34 dB

4.1.1.2 Based upon the results presented in **Table 4.1**, along with the spread of data presented in **Figure 4.3** and **Figure 4.4**, a daytime background sound level of 35 dB, $L_{A90,\ 10\text{-}min}$ and a night-time background sound level of 34 dB, $L_{A90,\ 10\text{-}min}$ are considered appropriate for the purposes of this assessment.

4.1.1.3 **Table 4.2** presents the L_{Aeq} noise levels measured in the survey period at NML1.

TABLE 4.2 PERIOD AVERAGE FAÇADE NOISE LEVELS TO INFORM THE CONSTRUCTION ASSESSMENT

SURVEY PERIOD		FAÇADE NOISE LEVEL, L_{Aeq}		
Date	Weekday	Daytime(1)	Evening(1)	Night-Time(1)
19/03/2025	Wed	59 dB	47 dB	43 dB
20/03/2025	Thu	55 dB	34 dB	44 dB
21/03/2025	Fri	56 dB	-(2)	40 dB
22/03/2025	Sat	50 dB	42 dB	47 dB
23/03/2025	Sun	50 dB	46 dB	42 dB
24/03/2025	Mon	53 dB	55 dB	-(2)
25/03/2025	Tue	52 dB	48 dB	45 dB
26/03/2025	Wed	50 dB	-(3)	-(3)

1) 'Day' encompasses 07:00 to 19:00, 'Evening' encompasses 19:00 to 23:00 and 'Night' encompasses 23:00 to 07:00.
2) Period values have not been calculated where less than half of the data were available (e.g. due to poor weather).
3) Monitoring had been terminated.

5 NML2: WEST OF THE SITE BOUNDARY

5.1.1.1 The monitor at this location was installed at 11:00 on 20/03/2025 and collected at 15:20 on 26/03/2025. The noise monitoring location can be characterised as agricultural land. Significant sources included road traffic noise in the distance and wind. Less significant sources that were also audible include, the occasional car pass by and birdsong. Weather data was obtained from a weather station at this location. This location was chosen to represent **NSR1 2 Old Branxton Cottages**, **NSR2 2. Branxton Farmhouse**, **NSR7 Cocklaw Cottages**, **NSR8 Oldhamstock Mains Cottages,** and **NSR9 Oldhamstocks Mains Farmhouse**.

Figures and tables present the following information for NML2:

- **Figure 5.1** shows the monitoring equipment set-up at **NML2**.
- **Figure 5.2** presents the 10-minute noise measurements logged over the survey period for the key noise metrics; $L_{Aeq, 10\text{-}min}$, L_{Amax} and $L_{A90, 10\text{-}min}$.
- **Figure 5.3** presents the distribution of daytime background $L_{A90, 10\text{-}min}$ noise levels over the survey period.
- **Figure 5.4** presents the distribution of the total night-time background $L_{A90, 10\text{-}min}$ noise levels over the survey period.
- **Table 5.1** presents the mean, median and mode for the daytime and night-time background measurements.
- **Table 5.2** presents L_{Aeq} values used to inform the construction assessment.

FIGURE 5.1 NOISE MONITORING SETUP AT **NML2**

FIGURE 5.2 RESULTS OF THE NOISE MONITORING AT **NML2**

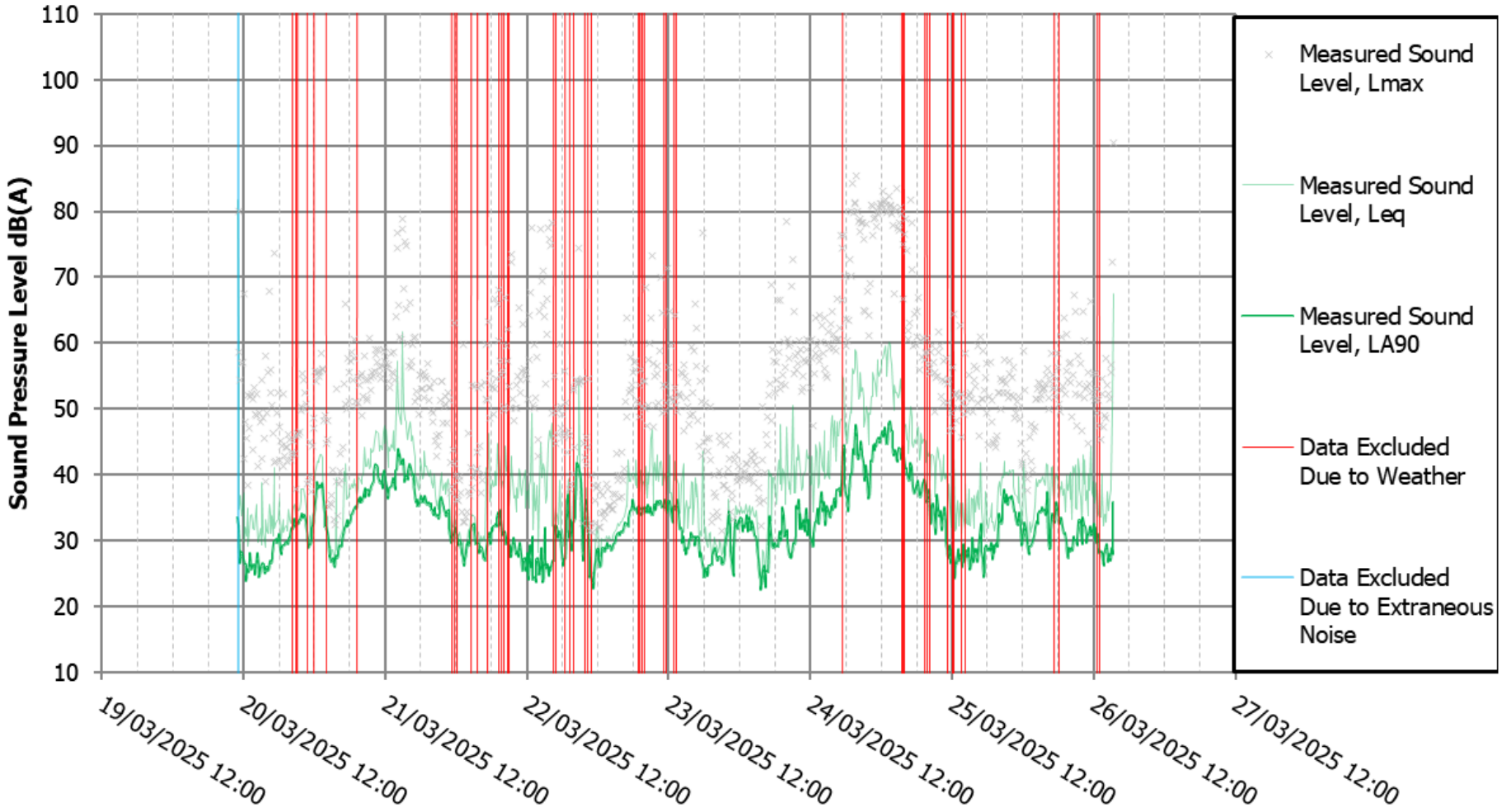


FIGURE 5.3 DISTRIBUTION OF DAYTIME RBSL AT **NML2** $L_{A90,10MIN}$

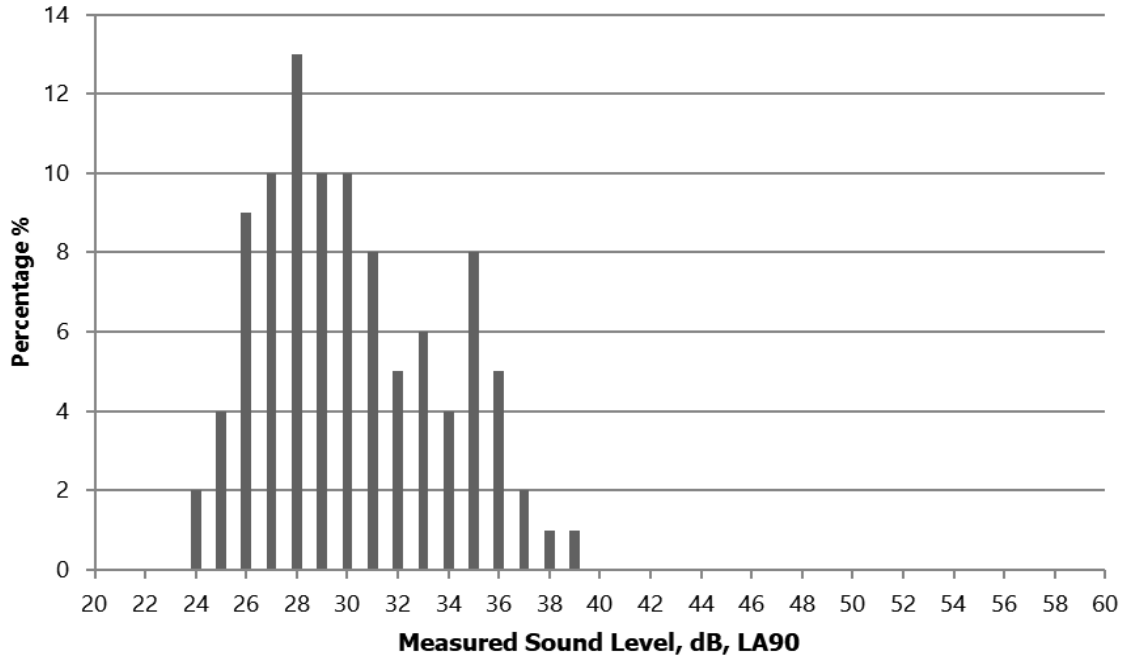


FIGURE 5.4 DISTRIBUTION OF NIGHT-TIME RBSL AT **NML2** $L_{A90,10MIN}$

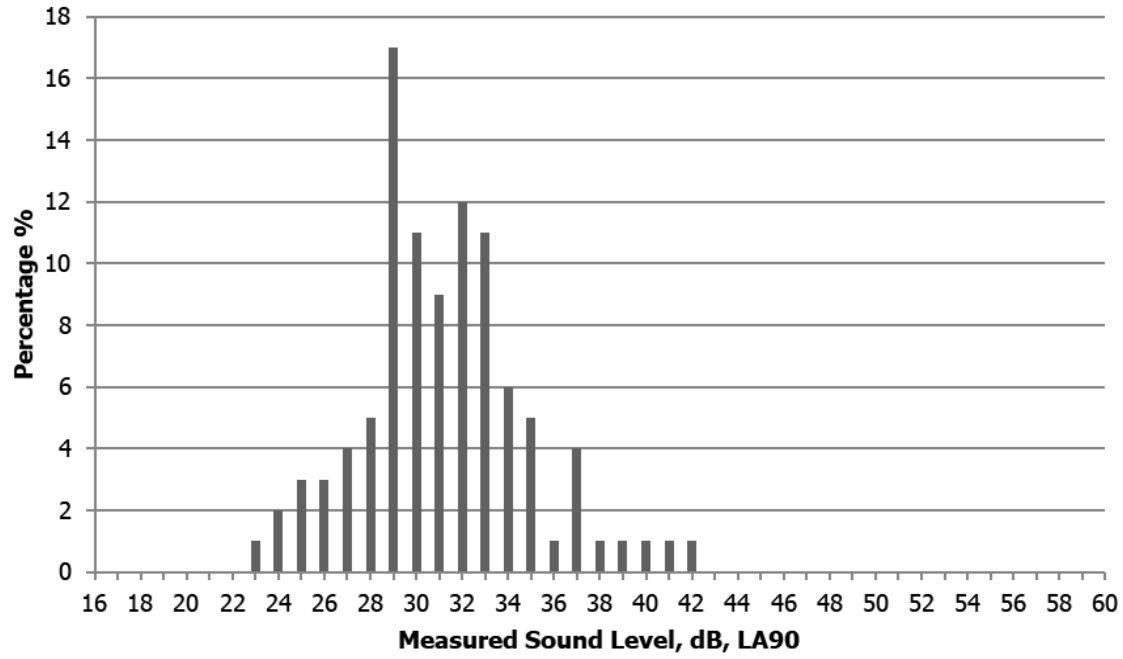


TABLE 5.1 BACKGROUND DATA ANALYSIS **NML2**

PERIOD	MODE	MEDIAN	MEAN	REPRESENTATIVE
Daytime (0700-2300) $L_{A90,\ 10\text{-}min}$	28 dB	30 dB	30 dB	28 dB
Night-Time (2300-0700) $L_{A90,\ 10\text{-}min}$	29 dB	31 dB	31 dB	29 dB

5.1.1.2 Based upon the results presented in **Table 5.1**, along with the spread of data presented in **Figure 5.3** and **Figure 5.4**, daytime background sound level of 28 dB, $L_{A90,\ 10\text{-}min}$ and a night-time background sound level of 29 dB, $L_{A90,\ 10\text{-}min}$ are considered appropriate for the purposes of this assessment.

5.1.1.3 **Table 5.2** presents the L_{Aeq} noise levels measured in the survey period at NML2.

TABLE 5.2 PERIOD AVERAGE FAÇADE NOISE LEVELS TO INFORM THE CONSTRUCTION ASSESSMENT

SURVEY PERIOD		FAÇADE NOISE LEVEL, L_{Aeq}		
Date	Weekday	Day(1)	Evening(1)	Night(1)
20/03/2025	Thu	45 dB	36 dB	39 dB
21/03/2025	Fri	41 dB	-(2)	36 dB
22/03/2025	Sat	43 dB	39 dB	38 dB
23/03/2025	Sun	42 dB	34 dB	39 dB
24/03/2025	Mon	48 dB	-(2)	-(2)
25/03/2025	Tue	41 dB	42 dB	41 dB
26/03/2025	Wed	54 dB	-(3)	-(3)

1) 'Day' encompasses 07:00 to 19:00, 'Evening' encompasses 19:00 to 23:00 and 'Night' encompasses 23:00 to 07:00.
2) Period values have not been calculated where less than half of the data were available (e.g. due to poor weather).
3) Monitoring had been terminated.

6 NML3: SOUTH OF THE SITE BOUNDARY

6.1.1.1 The monitor at this location was installed at 15:20 on 19/03/2025 and collected at 15:30 on 26/03/2025. The noise monitoring location can be characterised as agricultural land, with some residential properties nearby. The noise environment was dominated by road traffic noise in the distance and wind. Other audible sources include birdsong and farming equipment in the distance. Weather data was derived from weather monitoring at location **NML2**, approximately 1 kilometre from this location. This location was chosen to represent, **NSR5 October Cottages** and **NSR6 St. Michael's View.**

Figures and tables present the following information for NML3:

- **Figure 6.1** shows the monitoring equipment set-up at **NML3**.
- **Figure 6.2** presents the 10-minute noise measurements logged over the survey period for the key noise metrics; $L_{Aeq, 10\text{-}min}$, L_{Amax} and $L_{A90, 10\text{-}min}$.
- **Figure 6.3** presents the distribution of daytime background $L_{A90, 10\text{-}min}$ noise levels over the survey period.
- **Figure 6.4** presents the distribution of the total night-time background $L_{A90, 10\text{-}min}$ noise levels over the survey period.
- **Table 6.1** presents the mean, median and mode for the daytime and night-time background measurements.
- **Table 6.2** presents $L_{Aeq, 10\text{-}min}$ values used to inform the construction assessment.

FIGURE 6.1 NOISE MONITORING AT **NML3**

FIGURE 6.2 RESULTS OF THE NOISE MONITORING AT **NML3**

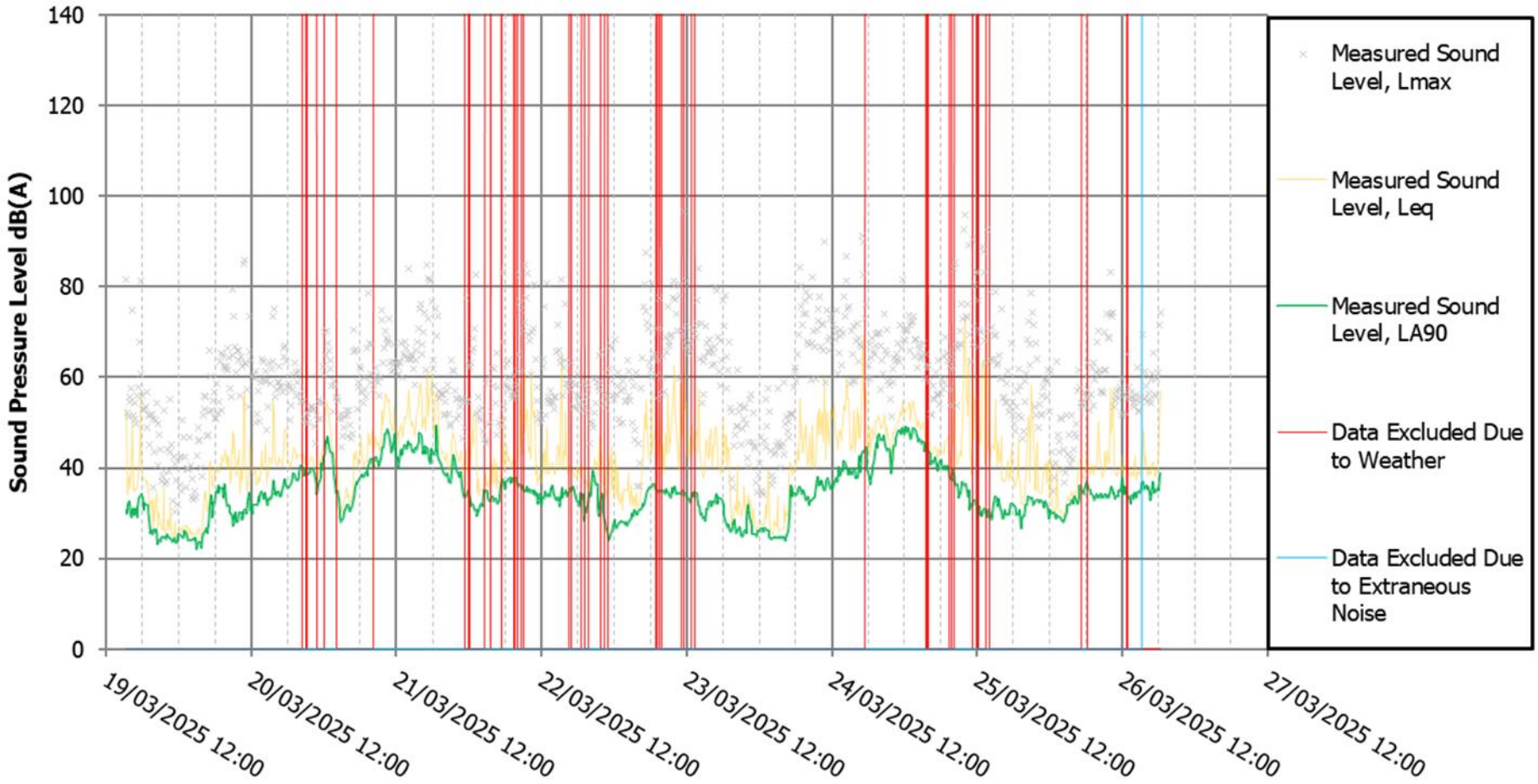


FIGURE 6.3 DISTRIBUTION OF DAYTIME RBSL $L_{A90,10MIN}$

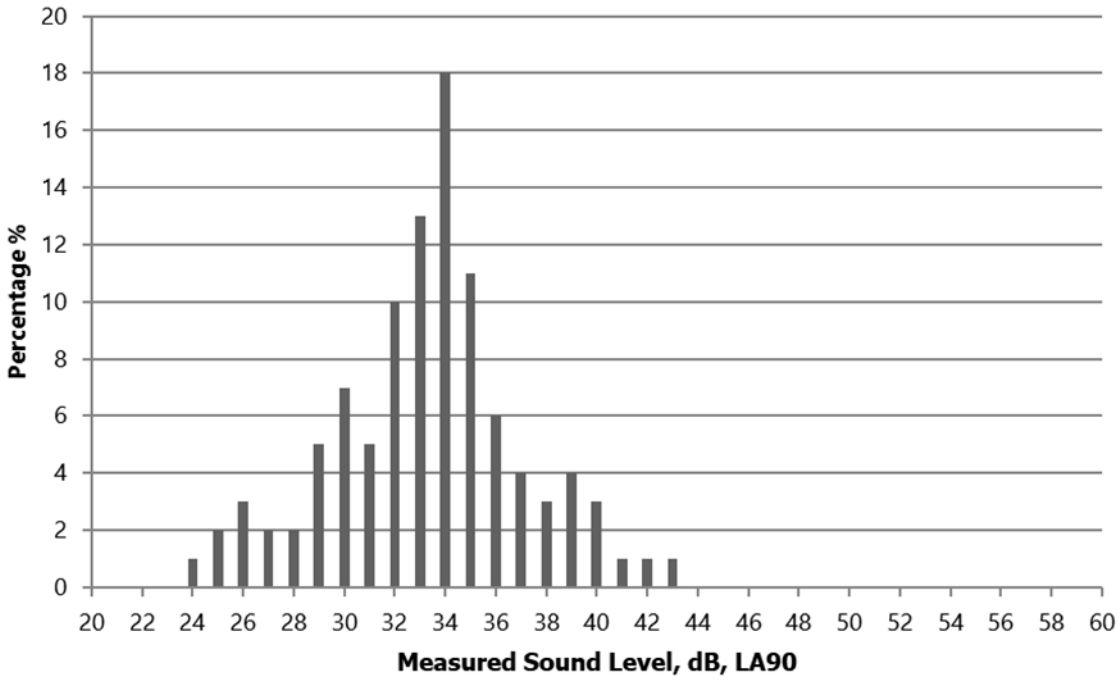


FIGURE 6.4 DISTRIBUTION OF NIGHT-TIME RBSL $L_{A90,10MIN}$

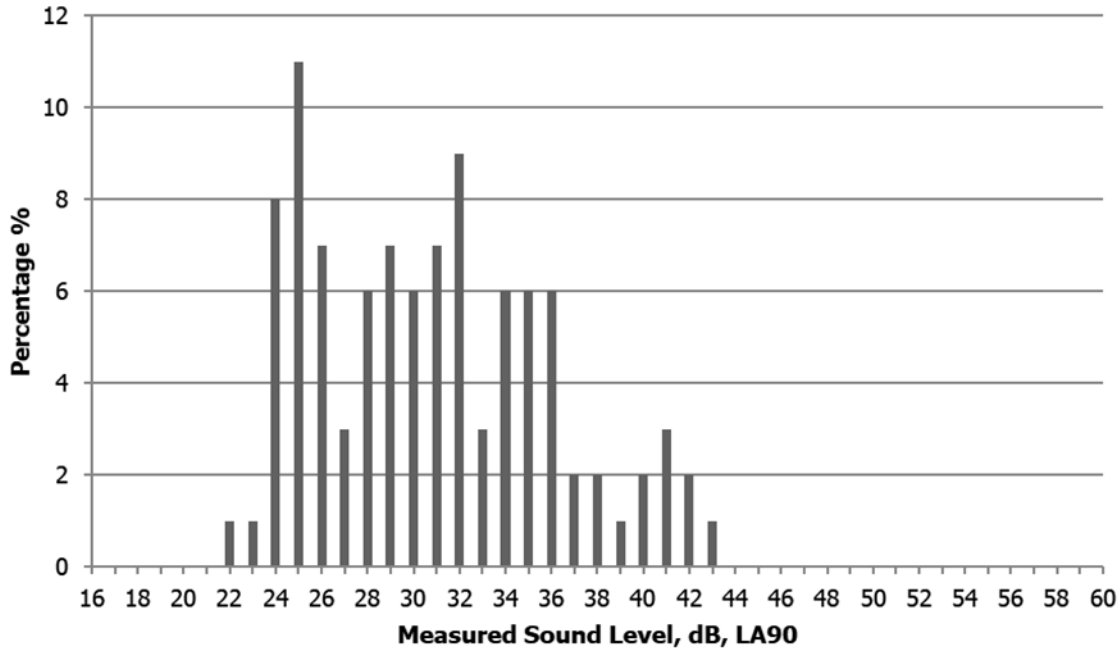


TABLE 6.1 BACKGROUND DATA ANALYSIS **NML3**

PERIOD	MODE	MEDIAN	MEAN	REPRESENTATIVE
Daytime (0700-2300) $L_{A90,\ 10\text{-}min}$	34 dB	34 dB	33 dB	33 dB
Night-Time (2300-0700) $L_{A90,\ 10\text{-}min}$	25 dB	31 dB	31 dB	25 dB

6.1.1.2 Based upon the results presented in **Table 6.1**, along with the spread of data presented in **Figure 6.3** and **Figure 6.4**, a daytime background sound level of 33 dB, $L_{A90,\ 10\text{-}min}$ and a night-time background sound level of 25 dB, $L_{A90,\ 10\text{-}min}$ are considered appropriate for the purposes of this assessment.

6.1.1.3 **Table 6.2** presents the L_{Aeq} noise levels measured in the survey period at **NML3**.

TABLE 6.2 PERIOD AVERAGE FAÇADE NOISE LEVELS TO INFORM THE CONSTRUCTION ASSESSMENT

SURVEY PERIOD		FAÇADE NOISE LEVEL, L_{Aeq}		
Date	Weekday	Day(1)	Evening(1)	Night(1)
20/03/2025	Thu	49 dB	34 dB	37 dB
21/03/2025	Fri	48 dB	46 dB	43 dB
22/03/2025	Sat	44 dB	-(2)	48 dB
23/03/2025	Sun	55 dB	42 dB	48 dB
24/03/2025	Mon	56 dB	38 dB	44 dB
25/03/2025	Tue	58 dB	-(2)	48 dB
26/03/2025	Wed	58 dB	50 dB	41 dB
27/03/2025	Thu	49 dB	-(3)	-(3)

1) 'Day' encompasses 07:00 to 19:00, 'Evening' encompasses 19:00 to 23:00 and 'Night' encompasses 23:00 to 07:00.
2) Period values have not been calculated where less than half of the data were available (e.g. due to poor weather).
3) Monitoring had been terminated.

7 NML4: EAST OF THE SITE BOUNDARY

7.1.1.1 The monitor at this location was installed at 17:30 on 19/03/2025 and collected at 16:15 on 26/03/2025. The noise monitoring location can be characterised as agricultural land. The noise environment was dominated by road traffic noise in the distance and wind. Other audible sources include cattle and sheep as well as birdsong. Weather data was derived from weather monitoring at this location. This location was chosen to represent **NSR4: Springfield Farm**.

Figures and tables present the following information for NML4:

- **Figure 7.1** shows the monitoring equipment set-up at **NML4**.
- **Figure 7.2** presents the 10-minute noise measurements logged over the survey period for the key noise metrics; $L_{Aeq, 15\text{-}min}$, L_{Amax} and $L_{A90, 15\text{-}min}$.
- **Figure 7.3** presents the distribution of daytime background $L_{A90, 15\text{-}min}$ noise levels over the survey period.
- **Figure 7.4** presents the distribution of the total night-time background $L_{A90, 15\text{-}min}$ noise levels over the survey period.
- **Table 7.1** presents the mean, median and mode for the daytime and night-time background measurements.
- **Table 7.2** presents L_{Aeq} values used to inform the construction assessment.

FIGURE 7.1 NOISE MONITORING AT **NML4**

FIGURE 7.2 RESULTS OF THE NOISE MONITORING AT **NML4**

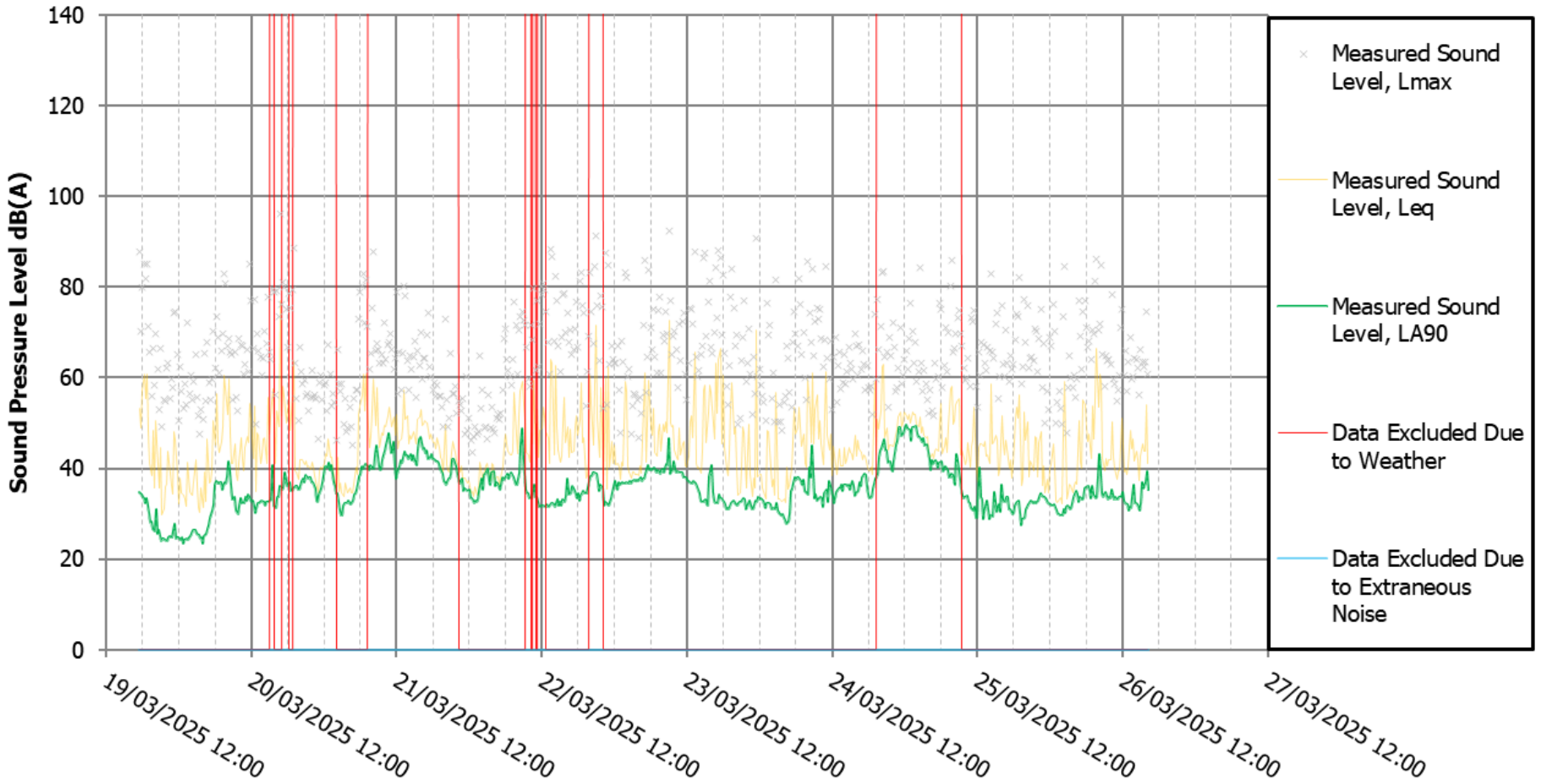


FIGURE 7.3 DISTRIBUTION OF DAYTIME RBSL $L_{A90,15\text{-}MIN}$

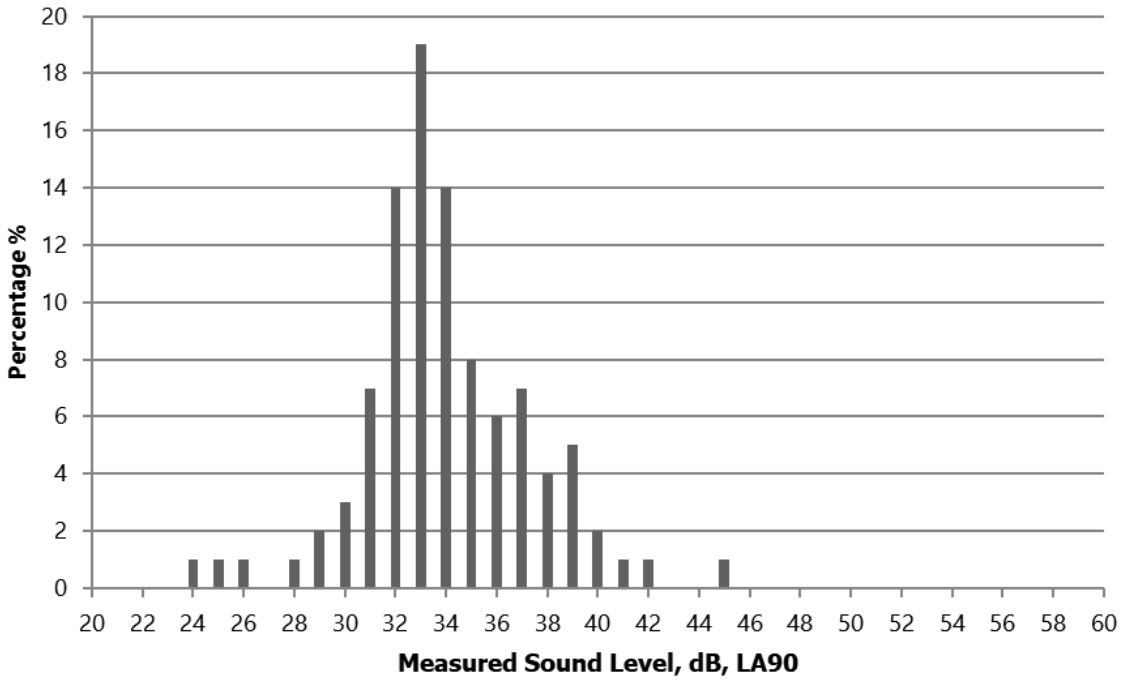


FIGURE 7.4 DISTRIBUTION OF NIGHT-TIME RBSL $L_{A90,15\text{-}MIN}$

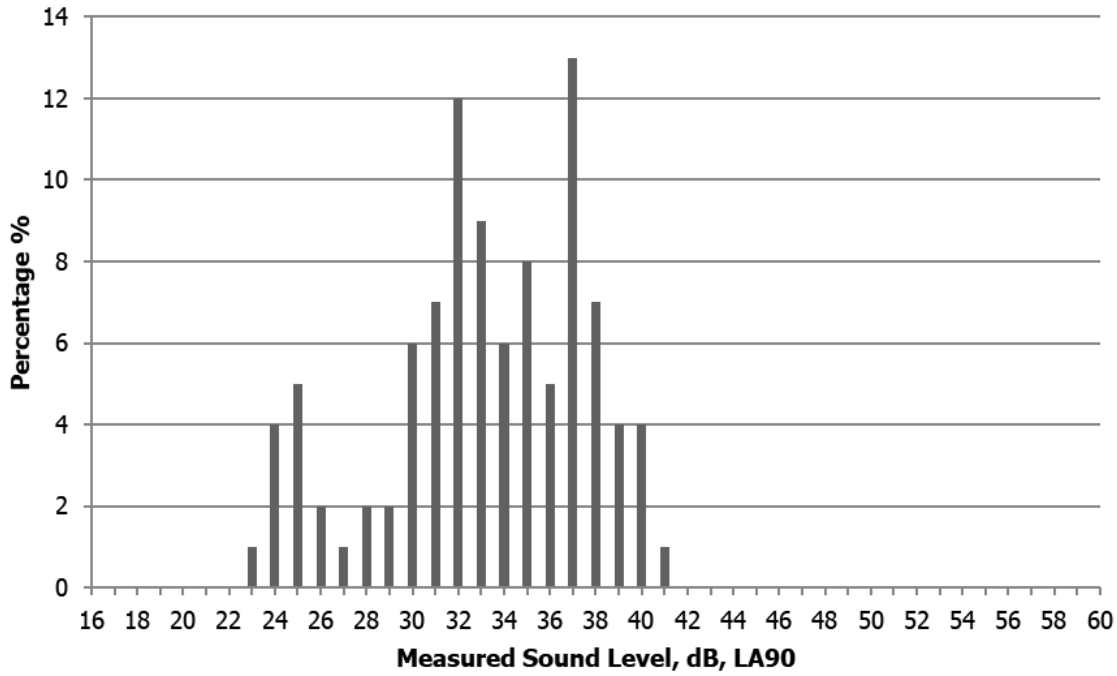


TABLE 7.1 BACKGROUND DATA ANALYSIS **NML4**

PERIOD	MODE	MEDIAN	MEAN	REPRESENTATIVE
Daytime (0700-2300) $L_{A90,\ 15\text{-}min}$	33 dB	34 dB	34 dB	33 dB
Night-Time (2300-0700) $L_{A90,\ 15\text{-}min}$	37 dB	33 dB	33 dB	33 dB

7.1.1.2 Based upon the results presented in **Table 7.1**, along with the spread of data presented in **Figure 7.3** and **Figure 7.4**, a daytime background sound level of 33 dB, $L_{A90,\ 15\text{-}min}$ and a night-time background sound level of 33 dB, $L_{A90,\ 15\text{-}min}$ are considered appropriate for the purposes of this assessment.

7.1.1.3 **Table 7.2** presents the L_{Aeq} noise levels measured in the survey period at **NML4**.

TABLE 7.2 PERIOD AVERAGE FAÇADE NOISE LEVELS TO INFORM THE CONSTRUCTION ASSESSMENT

SURVEY PERIOD		FAÇADE NOISE LEVEL, L_{Aeq}		
Date	Weekday	Day(1)	Evening(1)	Night1)
19/03/2025	Wed	61 dB	47 dB	47 dB
20/03/2025	Thu	55 dB	-(2)	53 dB
21/03/2025	Fri	61 dB	43 dB	43 dB
22/03/2025	Sat	58 dB	55 dB	56 dB
23/03/2025	Sun	62 dB	53 dB	59 dB
24/03/2025	Mon	54 dB	59 dB	-(2)
25/03/2025	Tue	51 dB	51 dB	51 dB
26/03/2025	Wed	56 dB	-(3)	-(3)

1) 'Day' encompasses 07:00 to 19:00, 'Evening' encompasses 19:00 to 23:00 and 'Night' encompasses 23:00 to 07:00.
2) Period values have not been calculated where less than half of the data were available (e.g. due to poor weather).
3) Monitoring had been terminated.