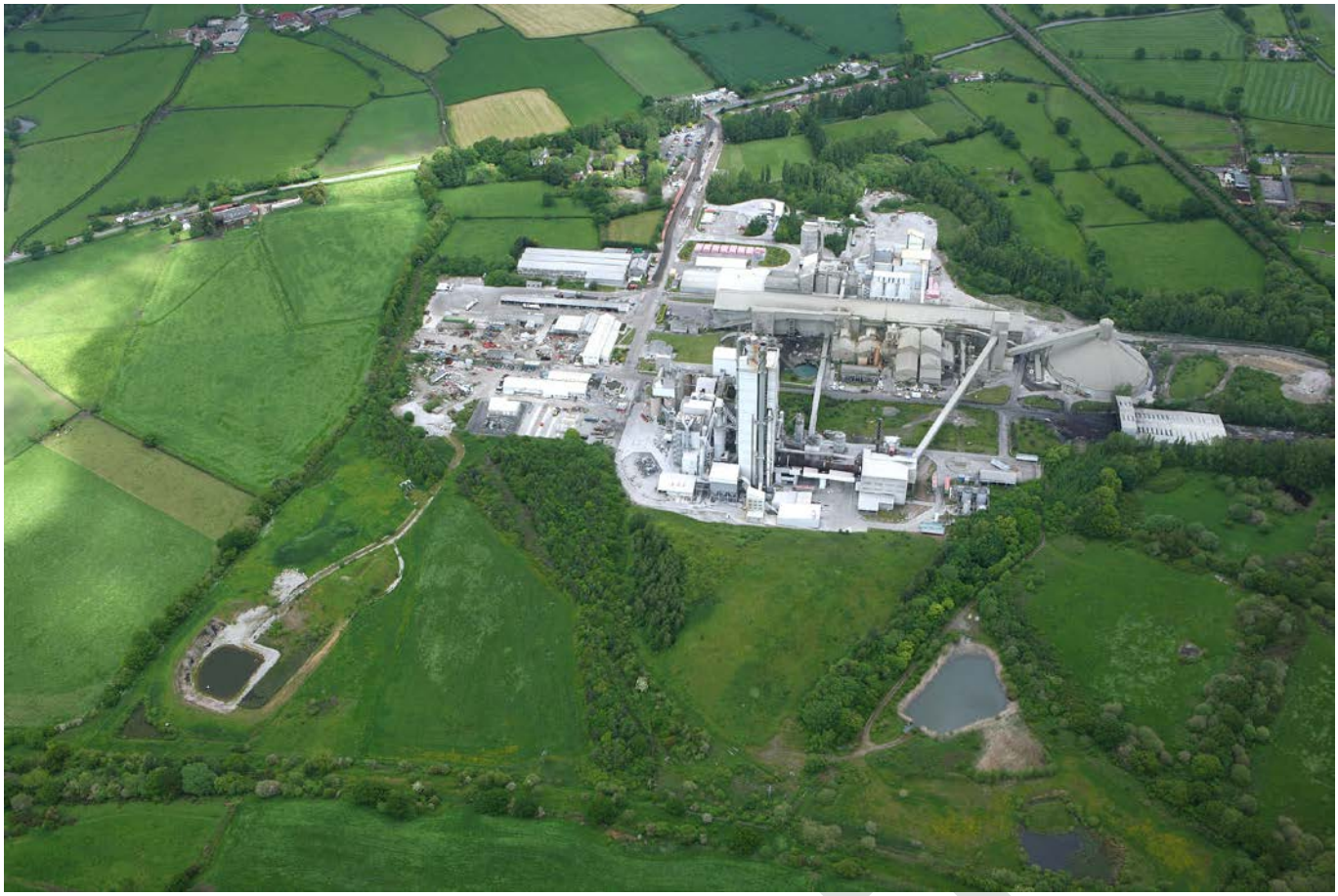

Castle Cement Limited

Carbon Capture Storage Project – Padeswood, North Wales

Volume 4, Draft Technical Appendix 10.1

Baseline Noise Survey Technical Note

RSK

JUNE 2024

Technical Note

Title:	Padeswood Baseline Noise Survey		
Client:	Heidelberg Materials UK		
Reference:	2060956-RSKA-TN-001-(03)		
Date:	28 June 2024		
Prepared:	Ceri Jones Acoustic Consultant	Approved:	Matthew Thomson Principal Acoustic Consultant

1 Introduction

1.1 Instruction

RSK Acoustics (RSKA) has been instructed by Heidelberg Materials UK to undertake a baseline noise survey to quantify the existing noise levels at the Padeswood Cement facility, located in Padeswood, North Wales.

A noise survey has been carried out by RSKA in September 2023 comprising four unattended noise measurements at the closest noise sensitive receptors at the existing site.

A glossary of acoustic terms used within this technical note is appended to this document.

1.2 Site Description and Location

The Padeswood Cement Works site is located on A5518 (Mold Road), Padeswood (329031E, 362298N). The site us currently an existing operational cement production facility. The proposed development includes the installation of a post combustion carbon capture and compression plant (PCCC) and combined heat and power plant (CHP) associated with the site.

2 Baseline Noise Survey

A baseline noise survey has been undertaken to define the existing sound levels at the closest noise sensitive receptors to the site location. The resulting measurement data set will be used to inform the assessment. It is understood that the site was operating normally throughout the duration of the survey.

2.1 Noise Monitoring Methodology

RSK Acoustics installed four unattended noise meters at the closest properties to the existing site in Padeswood. The unattended noise measurements were carried out between 7 September 2023 and 15 September 2023.

The site location along with the unattended noise monitoring positions are presented in Figure 2.1. Photographs showing the measurement locations are presented in Appendix 1.

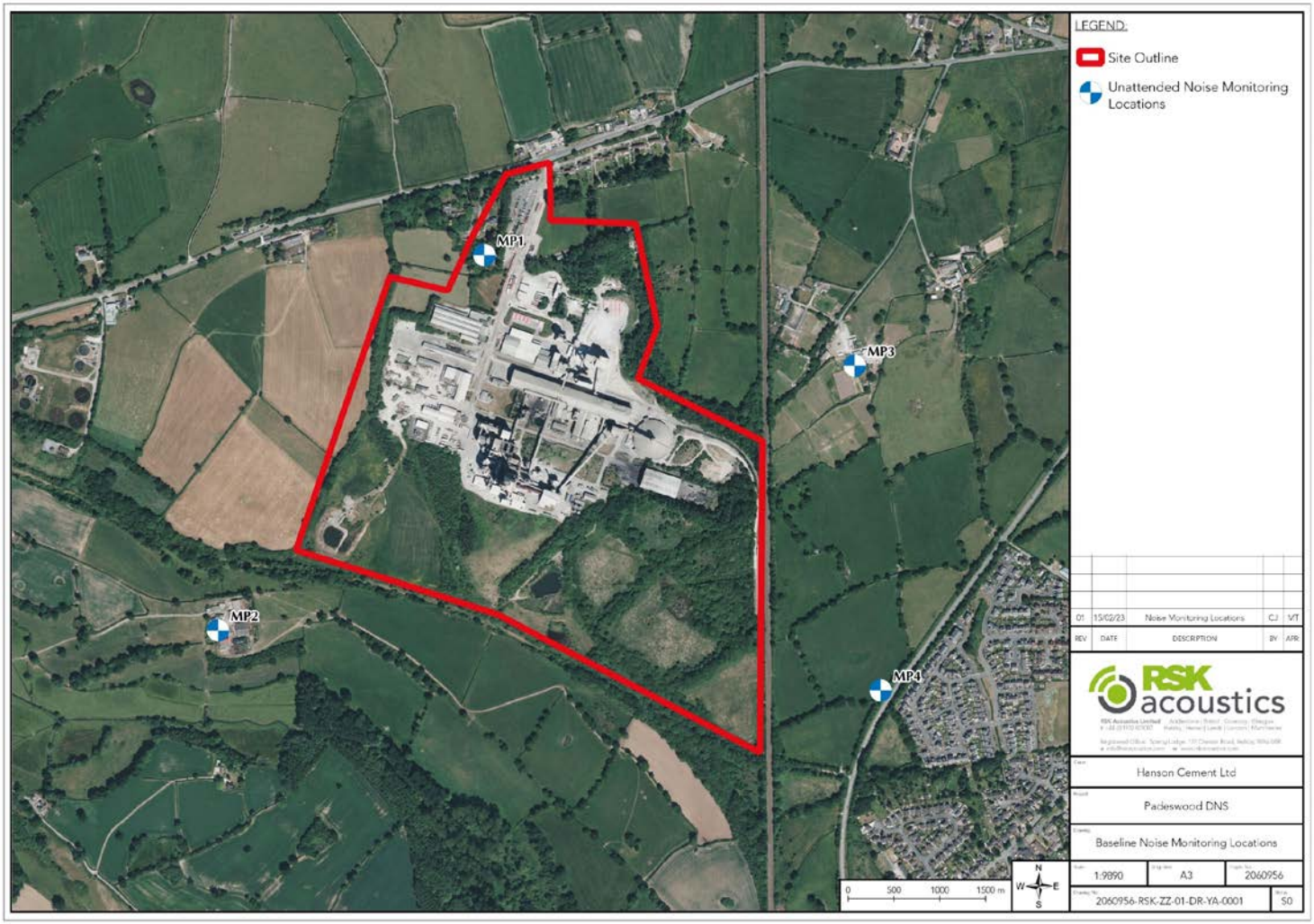

Figure 2.1 Noise Monitoring Locations

2.2 Noise Monitoring Locations

The noise monitoring locations have been presented in Table 2.1.

Noise Monitoring Location	Property Address	Co-ordinates	Notes
MP1	Field to west of the site (covering Castle Cement Limited owned properties)	53.154795, -3.06277	Installed in free-field conditions[1]
MP2	Dyke Farm	53.148569, -3.070141	Installed 1m from the façade of the property
MP3	Oak Tree Farm	53.152962, -3.052522	Installed 1m from the façade of the property
MP4	Agricultural land to SE of the cement works	53.147572, -3.051802	Installed in free-field conditions[1]

Table 2.1 Noise Monitoring Locations

2.3 Noise Monitoring Equipment

The noise monitoring equipment and the calibration information has been presented below in Table 2.2. Calibration of the noise equipment was completed before and after the noise survey, with the calibration drift for each meter noted below.

Equipment	Brand / Model	Serial No.	Calibration Date	Noise Monitoring Location	Calibration Drift
Sound Level Meter	Rion NL-52	00976247	25/08/2023	MP1	0.0 dB
Sound Level Meter	Rion NL-52	01021276	30/11/2021	MP2	+0.1 dB
Sound Level Meter	Rion NL-52	01054197	28/01/2022	MP3	0.0 dB
Sound Level Meter	Rion NL-52	00197783	24/01/2023	MP4	0.0 dB
Calibrator	Rion NC-75	34524164	15/08/2023	-	-

Table 2.2 Noise Monitoring Equipment

Calibration certificates can be provided upon request.

The sound level meters used conform to the Class 1 requirements of BS EN 61672-1:2013 *Electroacoustics. Sound level meter, Specifications.* The calibrator used conforms to the Class 1 requirements of BS EN IEC 60942:2018 *Electroacoustics, Sound calibrators.*

[1] Sound level meter was installed at least 3.5m from any reflective surfaces (excluding the ground).

2.4 Weather Conditions

Weather information has been obtained through a Davis Vantage Pro 2 weather station installed on site for the duration of the noise survey. The weather information has been summarised in Figure 2.2 below. Detailed hourly weather information can be provided upon request.

Throughout the measurement period, wind speeds were noted to be less than 5m/s in a predominantly SW wind direction. Some precipitation was measured during the night time period between 23:00 on 11 September 2023 and 04:45 on 12 September 2023. All other weather conditions were generally considered conducive to noise monitoring.

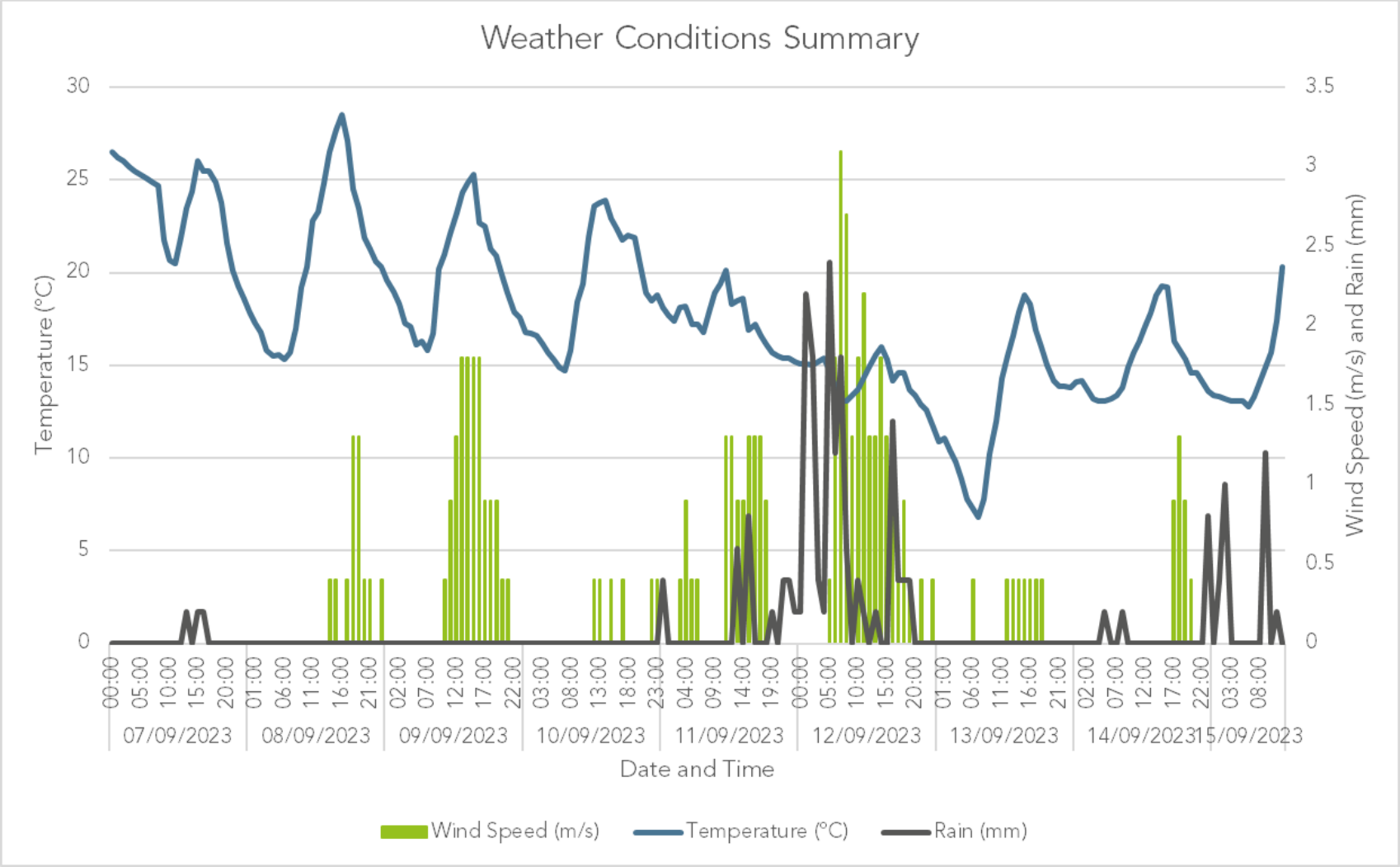

Figure 2.2 Weather Conditions Summary

2.5 Observations

The following observations were noted with regards to the dominant noise sources at each noise monitoring location:

- MP1 – Site activities and vehicle movements accessing the site were dominant at this location. *Note: A5118 is not audible at this location.*
- MP2 – A combination of both operational activities and local farming activities adjacent to this location were noted to be dominant.
- MP3 – Livestock from an adjacent field, an outdoor horse riding area and barking dogs were noted during the noise equipment installation. Site activities from Heidelberg Materials UK were not noted to be dominant at this location.
  Although, no passbys were observed during the site visit, it should be highlighted that there is a trainline directly west of the noise monitoring location. Train operations are approximately every 30 minutes between 06:00-00:00. The A550 road is also situated to the east of the monitoring location, which could have had influence during the rush hour morning periods.
- MP4 – Road traffic noise from the A550 (Wrexham Road) was noted to be the dominant noise source at this location. Site activities were not noted to be dominant at this location.

3 Noise Monitoring Results

A summary of measured noise levels throughout the monitoring period have been presented below. The noise measurements have also been presented in graph form Appendix 3.

3.1 MP1 Unattended Noise Measurement Summary

A summary of noise levels at MP1 is presented in Table 3.1 below.

Date	MP1 Measurement Summary				
	Time Considered	$L_{Aeq,T}$, dB	L_{AFMAX}, dB	L_{A90}, dB	L_{A10}, dB
07/09/2023	13:30-23:00	55.4	85.1	51.0	57.5
	23:00-07:00	55.4	84.2	50.6	57.0
08/09/2023	07:00-23:00	56.3	83.3	51.6	58.2
	23:00-07:00	53.7	77.7	49.4	55.5
09/09/2023	07:00-23:00	53.3	76.6	49.0	55.2
	23:00-07:00	51.0	72.5	48.0	52.6
10/09/2023					

Date	MP1 Measurement Summary				
	Time Considered	$L_{Aeq,T}$, dB	L_{AFMAX}, dB	L_{A90}, dB	L_{A10}, dB
	07:00-23:00	53.4	92.5	49.9	54.5
	23:00-07:00	54.6	73.8	50.4	55.8
11/09/2023	07:00-23:00	56.4	86.3	52.0	58.3
	04:45-07:00*	58.3	71.7	54.9	60.4
12/09/2023	07:00-23:00	57.5	83.4	53.7	59.5
	23:00-07:00	55.4	79.2	50.9	57.0
13/09/2023	07:00-23:00	57.3	86.0	53.7	58.9
	23:00-07:00	55.3	80.1	52.0	56.9
14/09/2023	07:00-23:00	55.9	79.9	51.8	57.9
	23:00-07:00	54.4	78.3	50.3	56.6
15/09/2023	07:00-07:45	57.1	78.6	54.0	59.1

Table 3.1 Unattended Noise Measurement Summary MP1

**Considers data between 04:45-07:00 due to adverse weather conditions.*

3.2 MP2 Unattended Noise Measurement Summary

A summary of noise levels at MP2 is presented in Table 3.2 below.

Date	MP2 Measurement Summary				
	Time Considered	$L_{Aeq,T}$, dB	L_{AFMAX}, dB	L_{A90}, dB	L_{A10}, dB
07/09/2023	12:45-23:00	70.7	86.7	41.9	47.1
	23:00-07:00	44.0	70.7	40.8	44.7
08/09/2023	07:00-23:00	47.6	83.3	40.8	46.2
	23:00-07:00	43.7	80.9	39.4	43.8

Date	MP2 Measurement Summary				
	Time Considered	$L_{Aeq,T}$, dB	L_{AFMAX}, dB	L_{A90}, dB	L_{A10}, dB
09/09/2023					
	07:00-23:00	50.5	84.6	40.6	46.0
	23:00-07:00	42.6	78.3	38.5	42.0
10/09/2023	07:00-23:00	47.1	85.4	40.4	45.8
	23:00-07:00	42.6	77.4	34.3	38.6
11/09/2023	07:00-23:00	48.1	83.0	39.6	46.0
	04:45-07:00*	47.4	66.2	45.3	48.8
12/09/2023	07:00-23:00	50.3	83.8	45.5	50.0
	23:00-07:00	46.1	83.9	40.5	43.9
13/09/2023	07:00-23:00	49.7	89.6	41.1	47.2
	23:00-07:00	43.2	75.6	37.4	41.8
14/09/2023	07:00-23:00	48.0	86.0	40.2	45.5
	23:00-07:00	44.3	67.2	42.4	45.4
15/09/2023	07:00-07:45	49.7	86.5	42.5	50.3

Table 3.2 Unattended Noise Measurement Summary MP2

**Considers data between 04:45-07:00 due to adverse weather conditions*

3.3 MP3 Unattended Noise Measurement Summary

A summary of noise levels at MP3 is presented in Table 3.3 below.

Date	MP3 Measurement Summary				
	Time Considered	$L_{Aeq,T}$, dB	L_{AFMAX}, dB	L_{A90}, dB	L_{A10}, dB
07/09/2023	14:45-23:00	60.4	97.8	48.7	53.8
	23:00-07:00	51.7	86.2	46.3	52.1
08/09/2023	07:00-23:00	59.0	98.8	48.7	54.4
	23:00-07:00	50.3	83.4	45.8	51.3
09/09/2023	07:00-23:00	69.2	101.3	46.0	53.6
	23:00-07:00	50.6	82.7	47.2	51.7
10/09/2023	07:00-23:00	60.7	101.3	49.3	55.4
	23:00-07:00	51.9	84.1	48.1	52.9
11/09/2023	07:00-23:00	58.2	100.4	48.2	54.4
	04:45-07:00*	55.7	80.5	49.9	56.3
12/09/2023	07:00-23:00	54.4	95	47.1	52.8
	23:00-07:00	51.7	81.6	46.7	51.4
13/09/2023	07:00-23:00	64.8	101.8	51.6	58.1
	23:00-07:00	50.9	88.6	46.2	52.3
14/09/2023	07:00-23:00	67.2	102.9	47.7	54.5
	23:00-07:00	50.6	72.2	42.4	49.1
15/09/2023	07:00-07:45	59.7	81.4	56.7	61.3

Table 3.3 Unattended Noise Measurement Summary MP3

**Considers data between 04:45-07:00 due to adverse weather conditions.*

3.4 MP4 Unattended Noise Measurement Summary

A summary of noise levels at MP4 is presented in Table 3.4 below.

Date	MP4 Measurement Summary				
	Time Considered	$L_{Aeq,T}$, dB	L_{AFMAX}, dB	L_{A90}, dB	L_{A10}, dB
07/09/2023	15:30-23:00	67.5	84.7	57.2	70.5
	23:00-07:00	61.8	80.5	40.2	61.4
08/09/2023	07:00-23:00	67.9	99.3	58.4	70.7
	23:00-07:00	59.6	82.0	39.4	61.7
09/09/2023	07:00-23:00	67.5	99.7	57.4	70.5
	23:00-07:00	59.0	79.6	39.7	60.9
10/09/2023	07:00-23:00	66.6	100.1	54.5	69.8
	23:00-07:00	61.4	80.0	42.6	60.1
11/09/2023	07:00-23:00	68.1	86.9	58.1	71.1
	04:45-07:00*	66.7	78.7	55.0	69.7
12/09/2023	07:00-23:00	69.2	83.9	60.8	72.1
	23:00-07:00	62.8	80.8	44.1	62.1
13/09/2023	07:00-23:00	68.4	92.7	58.8	71.4
	23:00-07:00	61.8	79.2	39.8	60.7
14/09/2023	07:00-23:00	68.4	90.0	59.1	71.4
	23:00-07:00	61.9	79.9	40.2	61.4
15/09/2023	07:00-08:15	70.5	80.4	64.1	73.4

Table 3.4 Unattended Noise Measurement Summary MP4

**Considers data between 04:45-07:00 due to adverse weather conditions.*

4 Statistical Analysis

A statistical analysis has been undertaken on the measured background noise levels ($L_{A90,T}$) undertaken at all noise monitoring locations to establish a representative value for the BS 4142 assessment which will be undertaken during the next phase of work.

It should be noted that extraneous events associated with local farming activities with particular consideration to MP3 have been removed from the statistical analysis to provide a background noise level that is also representative of dwellings in the vicinity of this monitoring location that are unlikely to be exposed to these sources of noise.

Figure 4. 1 to Figure 4. 4 presents the result of the final background noise levels that will be utilised as part of the BS 4142 assessment for the considered receptors.

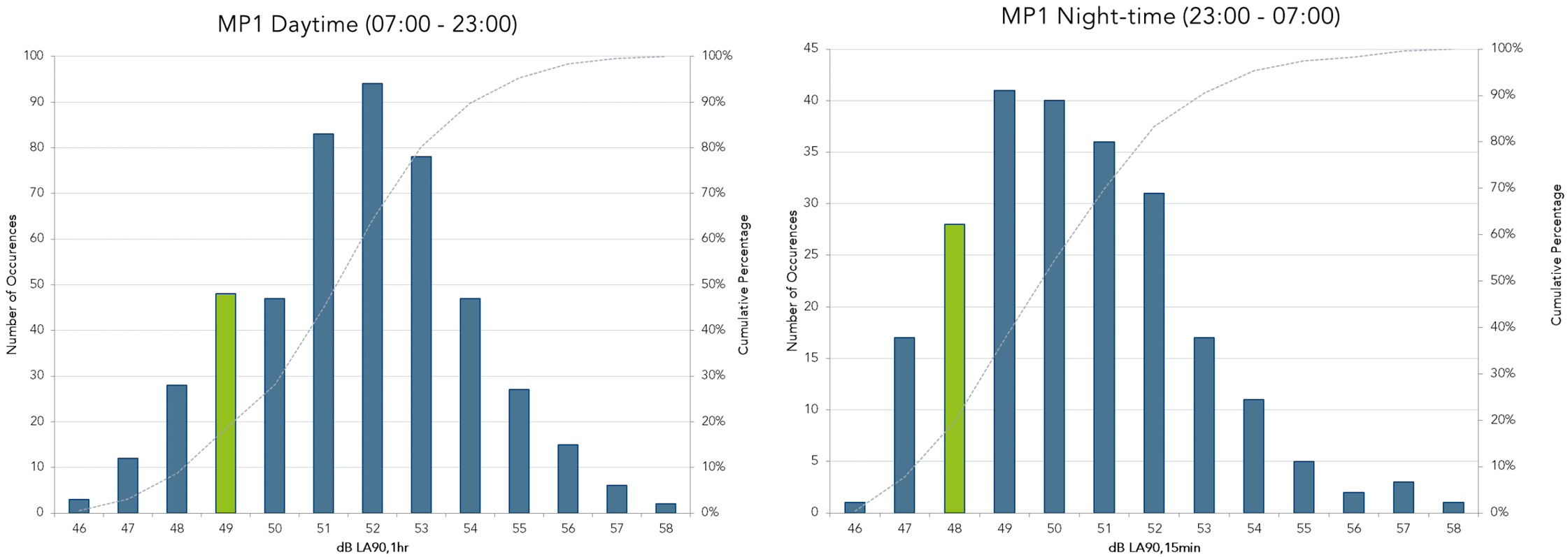

Figure 4. 1 Statistical Analysis MP1

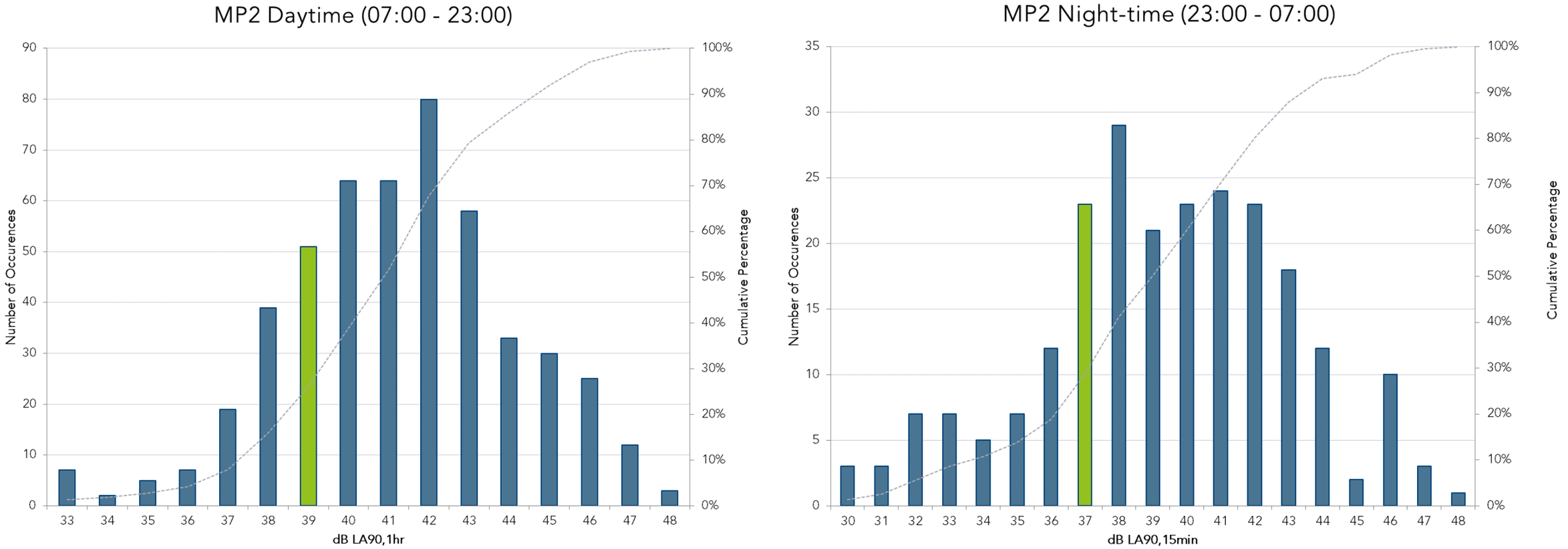

Figure 4. 2 Statistical Analysis MP2

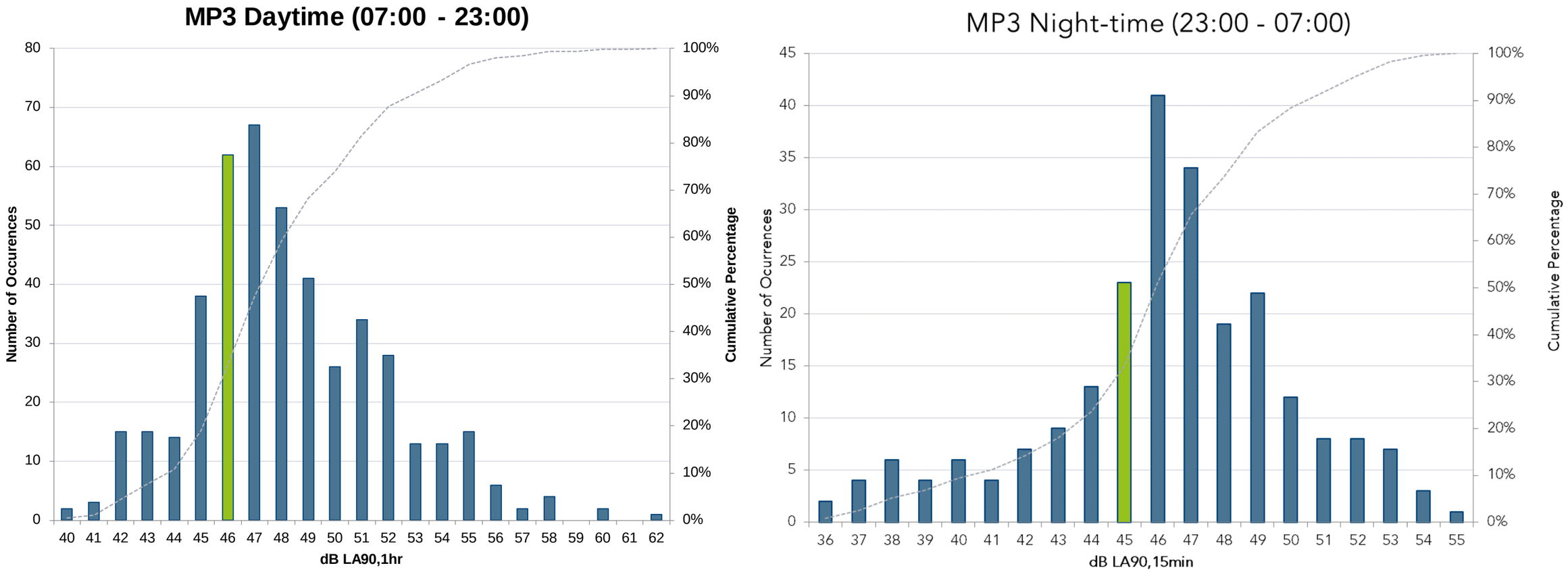

Figure 4. 3 Statistical Analysis MP3

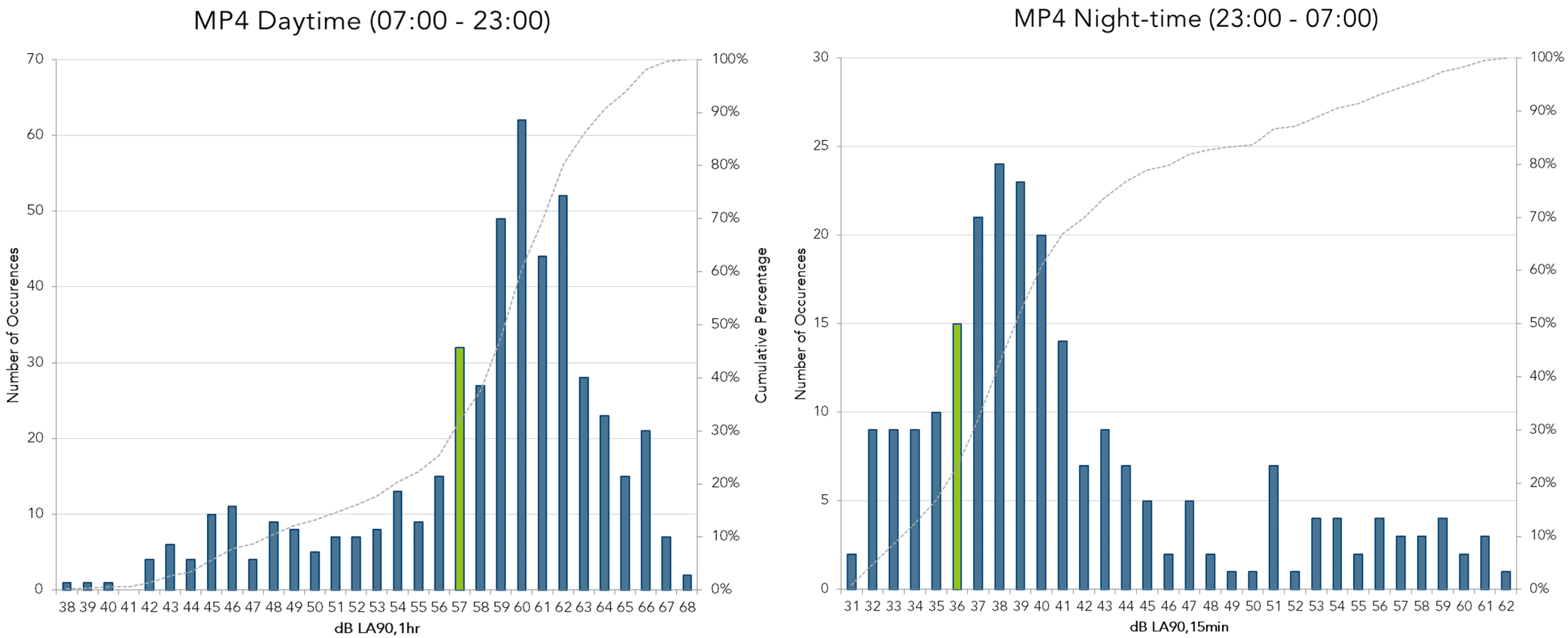

Figure 4. 4 Statistical Analysis MP4

4.1 Background Noise Levels at Receptors

The adopted background noise levels (from measurement locations MP1-MP4) at the considered noise sensitive receptors can be found in **Note: free field correction has been applied.*

Table 4.1 below. All background noise levels have been given as free field noise levels. Where façade measurements have been undertaken a -3 dB correction has been applied as advised by BS 4142.

Noise Sensitive Receptor	Daytime (07:00 – 23:00) $L_{Aeq,T}$, dB / Free Field Level	Night-time (23:00 – 07:00) $L_{Aeq,T}$, dB / Free Field Level
Field west of site	49	48
Dyke Farm*	36	34
Oak Tree Farm*	43	42
Agricultural land to SE of the cement works	57	36

**Note: free field correction has been applied.*

Table 4.1 Background Noise Levels at Receptors

5 Conclusion

RSK Acoustics was instructed by Heidelberg Materials UK. to undertake a baseline noise survey to quantify the existing noise levels at the closest properties surrounding the operational site.

Noise measurements were undertaken at four properties closest to the operational site between 07 September 2023 and 15 September 2023. It has been noted that noise measurements were undertaken during typical operational conditions.

The measured noise levels have been quantified above with the resultant statistical analysis dataset to be used to inform the subsequent noise impact assessment in support of the proposed development.

Glossary

Terms	Definitions
dB(A)	A-weighted decibel. This provides a measure of the overall level of sound across the audible spectrum with a frequency weighting to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq,T}$	"Equivalent continuous A weighted sound pressure level" – the level of a notional steady sound which has the same acoustic energy as the fluctuating sound over a specified time period. It is often used for measuring all sources of noise in the environment, which can be referred to as the ambient noise.
$L_{A10,T}$	Noise level exceeded for 10% of the measurement period – provides an indication of the upper limit of fluctuating noise.
$L_{A90,T}$	Noise level exceeded for 90% of the measurement period – provides a measurement of the quieter 'lull' periods in between noise events. It is often referred to as the background noise level.
$L_{Amax,F}$	This is the maximum sound pressure level measured in a given time period with the sound level meter set to 'fast' response.

Appendix A – Noise Monitoring Installation Photographs

Figure A 1 Noise Monitoring Location MP1

Figure A 2 Noise Monitoring Location MP2

Figure A 3 Noise Monitoring Location MP3

Figure A 4 Noise Monitoring Location MP4

Appendix B – Unattended Noise Measurement Data Graphs

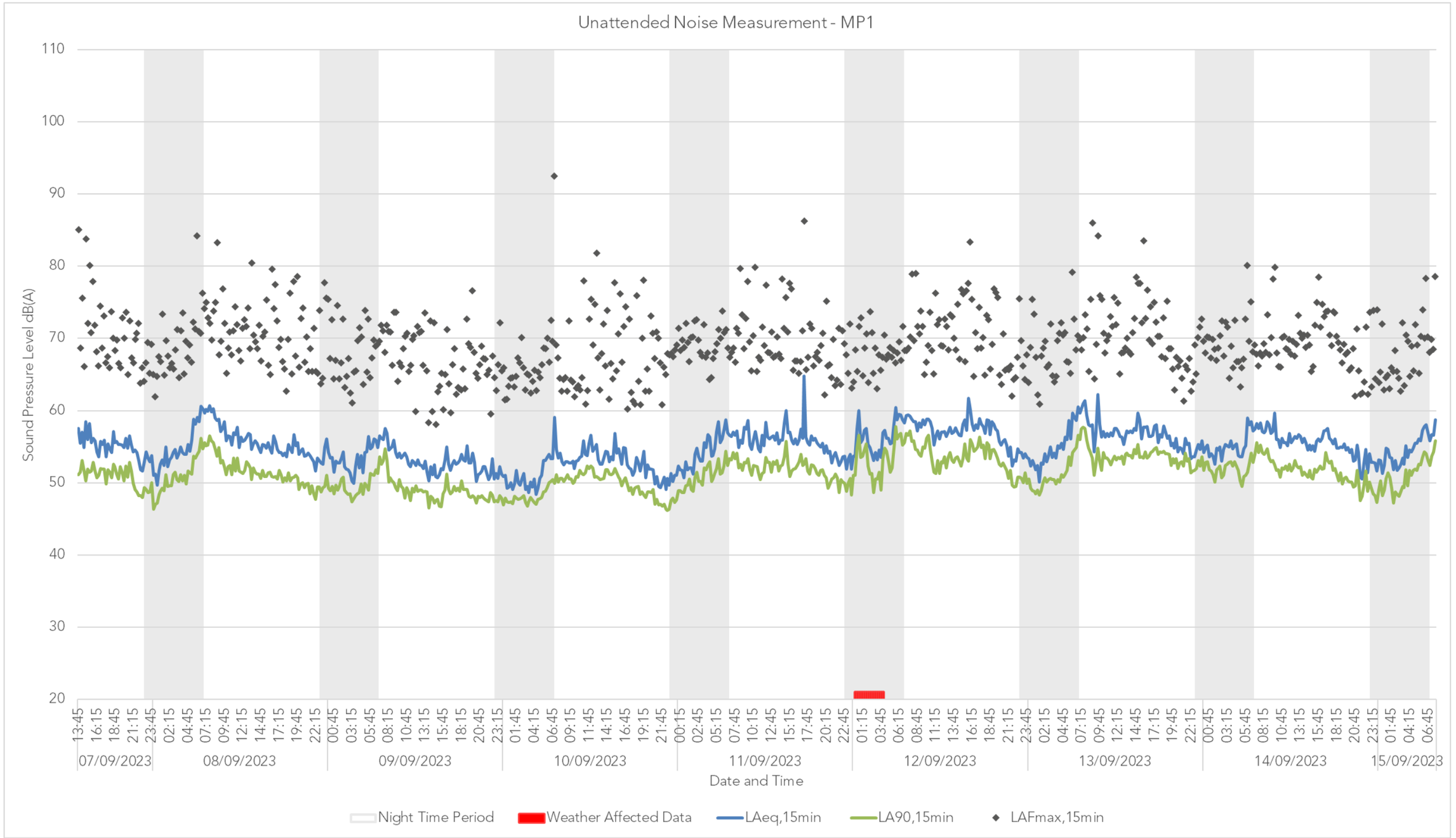

Figure B 1 Unattended Noise Monitoring Summary MP1

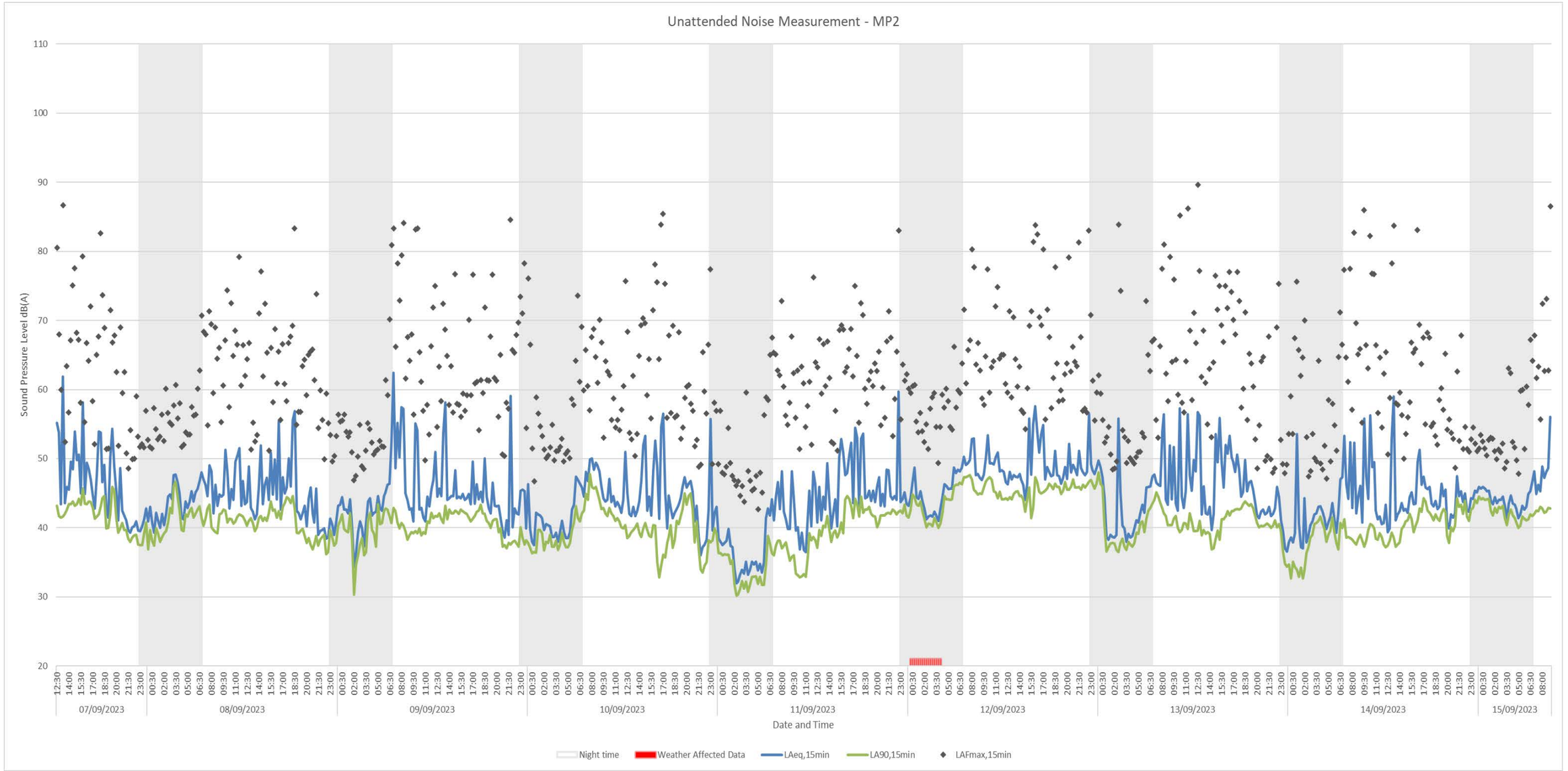

Figure B 2 Unattended Noise Monitoring Summary MP2

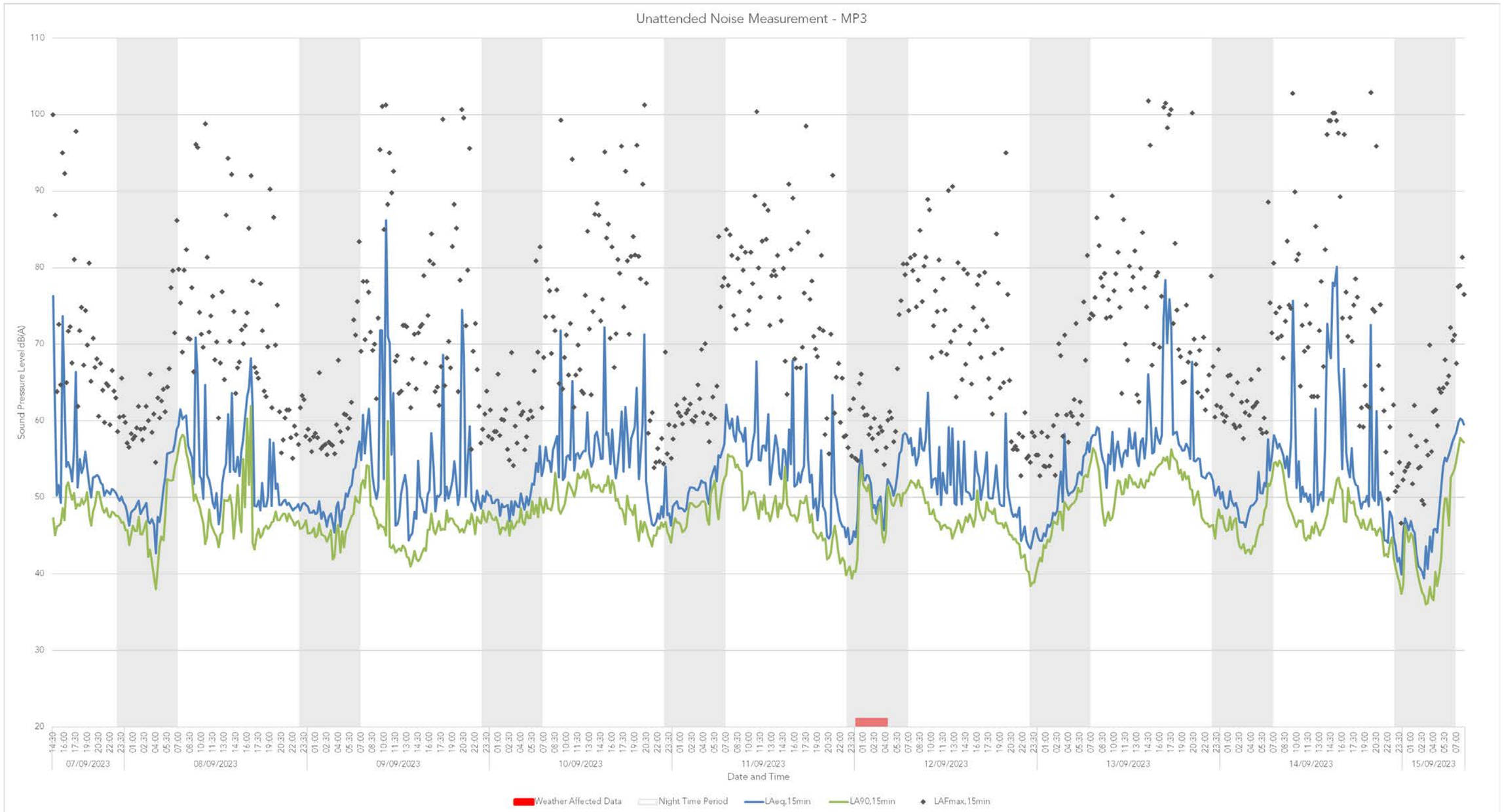

Figure B 3 Unattended Noise Monitoring Summary MP3

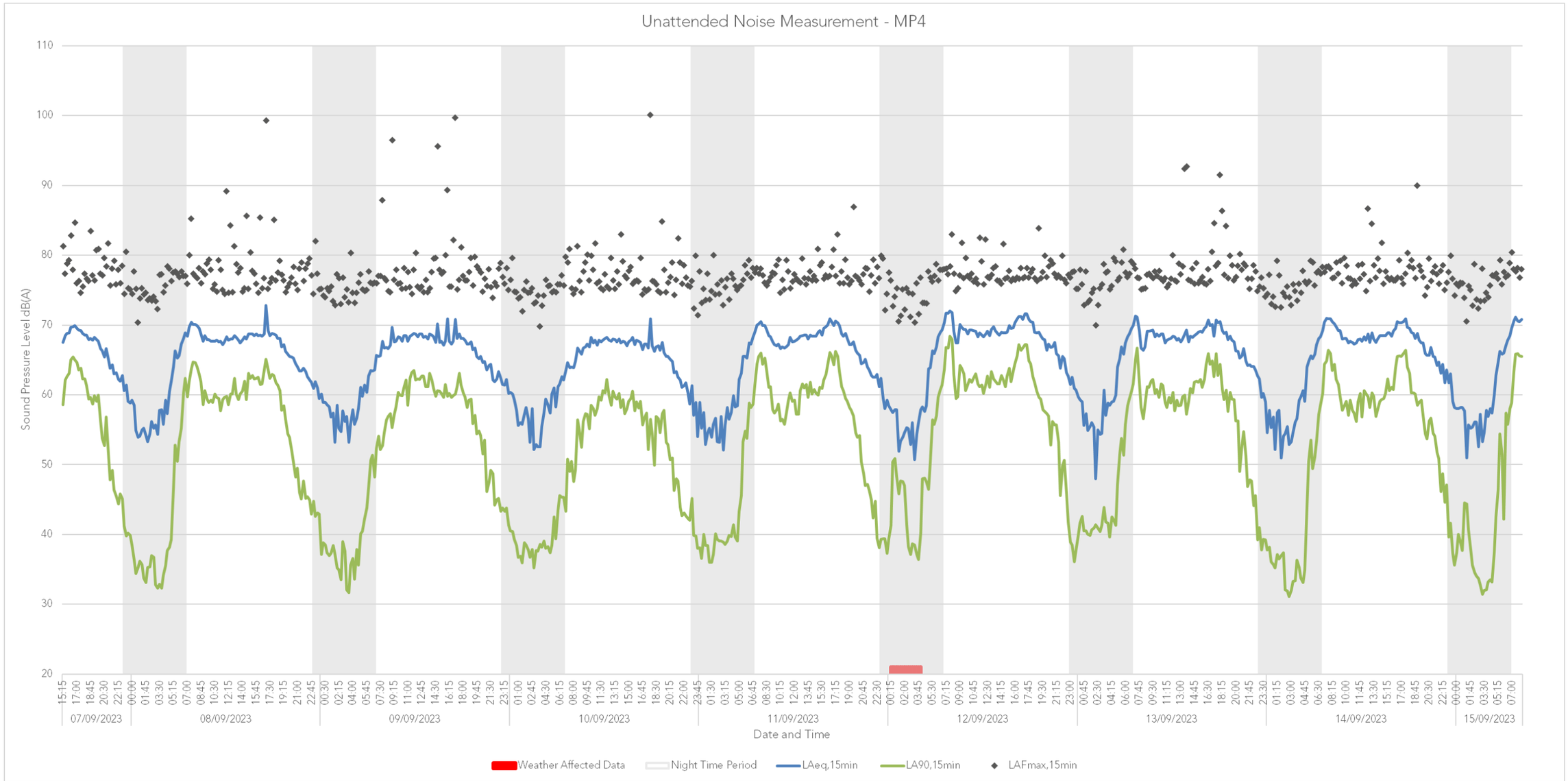

Figure B 4 Unattended Noise Monitoring Summary MP4

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