



## Kintore Hydrogen Plant

### Environmental Impact Assessment Report Appendix 10.1: Baseline Sound Monitoring Report

Date: July 2024

## Environmental Impact Assessment Report

Volume 3

Appendix 10.1

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### Qualifications

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This report is also downloadable from the Kintore Hydrogen website at:  
<https://www.kintorehydrogen.co.uk/>

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## 1 Introduction

- 1.1.1 The Savills Acoustics Team has been commissioned by Kintore Hydrogen Ltd to undertake baseline sound monitoring to inform the noise impact assessment for a proposed hydrogen generation plant near Kintore (Kintore Hydrogen Plant, the proposed development).
- 1.1.2 This report provides the results of baseline sound measurements undertaken to characterise the sound environment in the vicinity of the nearest Noise and Vibration Sensitive Receptors (NVSRs) to the proposed development. These baseline levels have been used in the assessment of effects for the operational and construction noise and vibration assessments in Chapter 10 of the Environmental Impact Assessment Report (EIAR).
- 1.1.3 Access to all survey locations was agreed with the landowners. The surveys were undertaken between Wednesday 18 October and Tuesday 31 October 2023 as well as Thursday 1 February and Friday 2 February 2024 for additional surveys.
- 1.1.4 This appendix provides a summary of the survey data for each survey location. Survey sheets indicating details and locations of noise monitoring equipment are provided in Annex A.

## 2 Baseline Survey Methodology

### 2.1 Survey locations

2.1.1 Survey locations were chosen to characterise baseline conditions in the vicinity of the nearest noise sensitive receptors to the proposed development and based on their proximity to the site. The proposed monitoring were as follows:

- LT1 – Dewsford: this location is approximately 5 m east of the proposed development boundary. Long term monitoring was undertaken here in October 2023.
- LT2 – North Leylodge: this location is approximately 230 m east of the proposed development boundary and is representative of the residential properties in this area. Long term monitoring was deployed here in October 2023 but failed to log data and a repeat 24-hour survey was undertaken in February 2024.
- LT3 – Leylodge Schoolhouse: this location is approximately 16 m to the south of the proposed development boundary and is representative of the residential properties in this area. Long term monitoring was undertaken here in October 2023.
- LT4 – The Knock: this location is approximately 400 m to the west of the proposed development and is representative of the residential properties in this area. Long term monitoring was undertaken here in October 2023.
- LT5 – South Womblehill: this location is approximately and is representative of the residential properties in this area where the gas national transmission system connection will be. Long term monitoring was undertaken here in October 2023.
- LT6 – Kingsfield Road: this location is representative of the residential properties in the area where the water abstraction point will be. Long term monitoring was undertaken here in October 2023.

2.1.2 Table 2.1 provides a summary of the baseline survey locations and grid co-ordinates of where the survey equipment was positioned. All survey locations are identified in Figure 2.1 overleaf.

**Table 2.1: Baseline survey locations**

Ref	Representative address	Coordinates	
		Easting	Northing
LT1	Dewsford	376496	814057
LT2	North Leylodge	376955	813753

Ref	Representative address	Coordinates	
		Easting	Northing
LT3	Leylodge Schoolhouse	376240	812970
LT4	The Knock	375985	813416
LT5	South Womblehill	378228	813417
LT6	Kingsfield Road	380983	815121

### 2.2 Baseline survey procedure

2.2.1 Long term unattended baseline sound level monitoring was undertaken between Wednesday 18 October and Tuesday 31 October 2023 at six locations in closest proximity to the proposed development.

2.2.2 All sound level monitoring was carried out using 'Class 1' Rion NL-52 sound level meters (SLM). Each SLM was checked for calibration prior to and immediately following the survey with no significant deviation found. At the long term monitoring locations, continuous data was logged of the fast time weighted, A-weighted, broadband sound pressure levels in 100 ms periods.

2.2.3 The long term surveys were established during the day and observations made of sources and other conditions in accordance with the requirements of British Standard BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (British Standards Institution (BSI), 2019). As a minimum,  $L_{Aeq}$ ,  $L_{Amax}$ ,  $L_{A10}$  and  $L_{A90}$  parameters were recorded.

2.2.4 Long term surveys were undertaken following guidance contained in BS 7445 2:1991 'Description and measurement of environmental noise, Part 2: Guide to the acquisition of data pertinent to land use' (BSI, 1991).

2.2.5 Meteorological conditions were monitored during the long term surveys. The first two days of surveying were impacted by a mild storm that hit the area. Background  $L_{A90}$  levels from this period were compared with levels from periods unaffected by rain. Levels were very similar and thus data is still deemed to be robust and representative; so no data have been excluded.

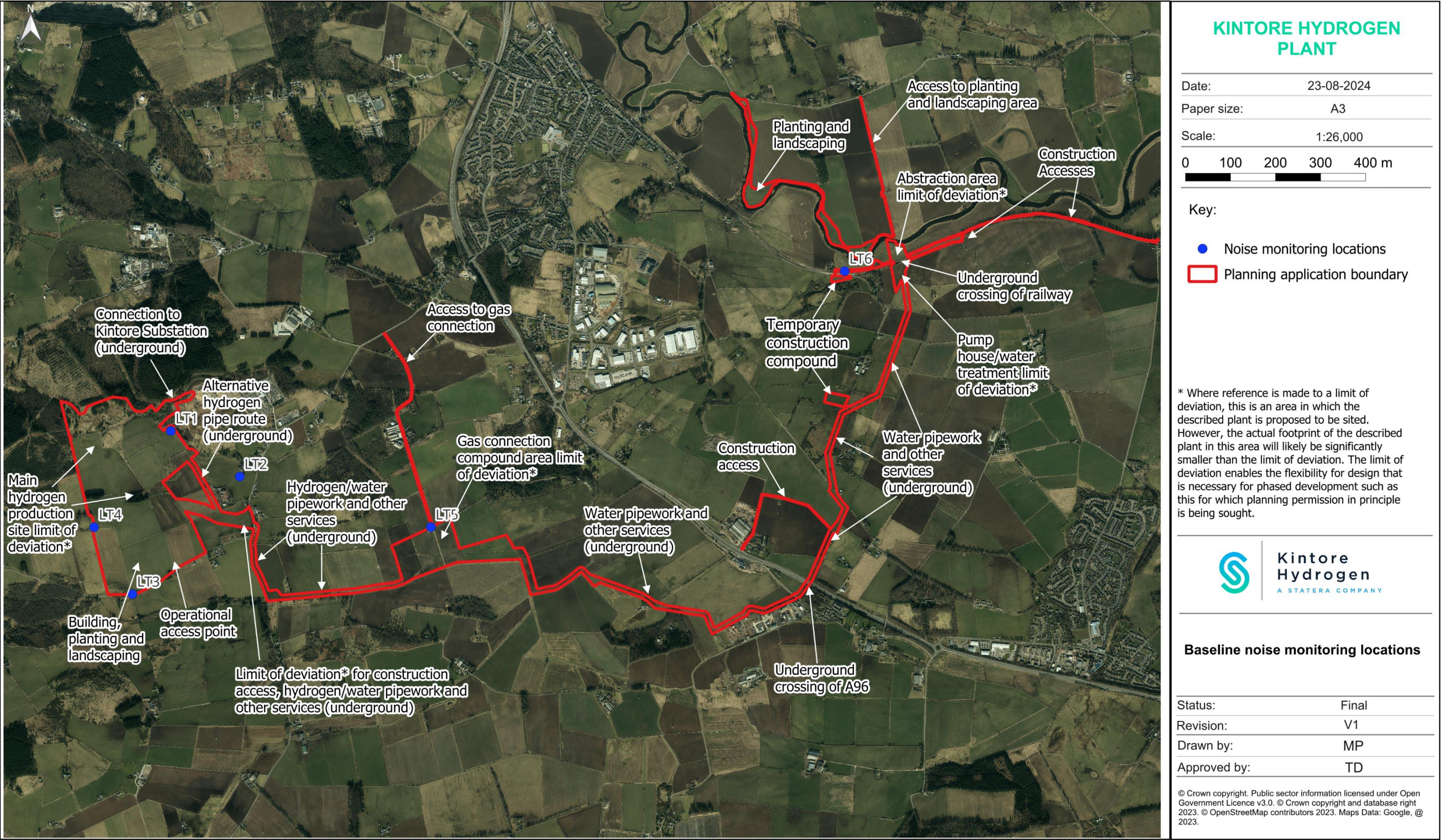


Figure 2.1: Baseline noise monitoring locations

## 3 Discussion of Results

### 3.1 Baseline survey details and results

3.1.1 Survey record sheets for each location detailing the position of the noise monitors are presented in Annex A. Time histories of the measured sound levels and meteorological conditions during the survey period are presented in Annex B.

### 3.2 Determining representative baseline levels

3.2.1 To ascertain the typical sound levels at the measurement locations, time history plots have been produced and presented for each long term monitoring position. These are presented with the summary results tables in Annex B. The summaries of results in Annex B are based on analysis of the measured sound level processed into 15 minute samples.

3.2.2 Representative baseline sound levels have been determined, where possible, from long term monitoring survey locations. The data obtained have been analysed and compared against other datasets in order to obtain a representative baseline sound level.

### 3.3 Operational noise assessment

3.3.1 BS 4142:2013+A1:2019 requires that the background sound levels adopted for the assessment are representative for the period being assessed. The Standard recommends that the background sound level should be derived from continuous

measurements of normally not less than 15-minute intervals, which can be contiguous or disaggregated. However, the standard states that there is no 'single' background sound level that can be derived from such measurements. It is particularly difficult to determine what is 'representative' of the night time period because it can be subject to a wide variation in background sound levels between the shoulder night periods. The accompanying note states that:

*"a representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or model value".*

3.3.2 In determining representative baseline noise levels for receptors identified within the Environmental Statement, it will be necessary to analyse each location individually to ensure the most representative level is considered. BS 4142:2014+A1:2019 states that:

*"In using the background sound level in the method for rating and assess industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods."*

### 3.4 Construction noise assessment

3.4.1 To determine the most representative ambient sound levels, the equivalent continuous A-weighted sound pressure level,  $L_{Aeq}$ , was calculated based on standard construction hours and presented as a logarithmic average of the 15 minute period data over the relevant time period.

## References

British Standards Institution. British Standard 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound.

British Standards Institution. British Standard 7445-2:1991 Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use.



**Annex A: Survey Record Sheets**

Project Name and Number		Kintore Hydrogen	
Location		East of Site	
Purpose of Monitoring		Baseline	
Relevant Guidance / Standard		BS 4142:2019	
<b>Sound Measurement System</b>			
ID	Manufacturer / Model	Serial Number	
-	Rion NL-52	LT1	
Microphone Height	Façade / Freefield	Measurement Interval	Filename
1.5	Freefield	125 ms	1
		<b>START</b>	<b>END</b>
Personnel		JT	JT
Date / time		18/10/2023 14:30	31/10/2023 09:45
Calibrator	Reference level	94.0	94.0
	Meter reading	94.0	93.8
Photographs of Measurement Location			



Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))
Long term by the by the side of the road, grass between SLM and road
Description of sound environment (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise. Occasional air traffic noise and some sporadic noise from the sub-station
Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise. Occasional air traffic noise and some sporadic noise from the sub-station

Project Name and Number		Kintore Hydrogen	
Location		East of Site	
Purpose of Monitoring		Baseline	
Relevant Guidance / Standard		BS 4142:2019	
<b>Sound Measurement System</b>			
ID	Manufacturer / Model	Serial Number	
-	Rion NL-52	LT2	
Microphone Height	Façade / Freefield	Measurement Interval	Filename
1.5	Freefield	125 ms	1
		<b>START</b>	<b>END</b>
Personnel		JT	JT
Date / time		01/02/2024 12:30	02/02/2024 11:45
Calibrator	Reference level	94.0	94.0
	Meter reading	94.0	93.9
Photographs of Measurement Location			



Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))
Long term in the corner of a field, adjacent to nearby back garden. Across the field from a barn
Description of sound environment (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise. Occasional air traffic noise and some sporadic noise from the sub-station. Occasional noise from the nearby barn - movement of hay etc.
Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise. Occasional air traffic noise and some sporadic noise from the sub-station. Occasional noise from the nearby barn - movement of hay etc.

Project Name and Number		Kintore Hydrogen	
Location		South of Site	
Purpose of Monitoring		Baseline	
Relevant Guidance / Standard		BS 4142:2019	
<b>Sound Measurement System</b>			
ID	Manufacturer / Model	Serial Number	
-	Rion NL-52	LT3	
Microphone Height	Façade / Freefield	Measurement Interval	Filename
1.5	Freefield	125 ms	1
		<b>START</b>	<b>END</b>
Personnel		JT	JT
Date / time		18/10/2023 15:00	31/10/2023 09:15
Calibrator	Reference level	94.0	94.0
	Meter reading	94.0	93.8
Photographs of Measurement Location			



Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))
Long term near a fence - fairly close to a nearby minor road
Description of sound environment (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise. Wind and local animal (cows) activity
Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise. Wind and local animal (cows) activity

Project Name and Number		Kintore Hydrogen	
Location		West of Site	
Purpose of Monitoring		Baseline	
Relevant Guidance / Standard		BS 4142:2019	
<b>Sound Measurement System</b>			
ID	Manufacturer / Model	Serial Number	
-	Rion NL-52	LT4	
Microphone Height	Façade / Freefield	Measurement Interval	Filename
1.5	Freefield	125 ms	1
		<b>START</b>	<b>END</b>
Personnel		JT	JT
Date / time		18/10/2023 15:15	31/10/2023 09:30
Calibrator	Reference level	94.0	94.0
	Meter reading	94.0	93.8
Photographs of Measurement Location			



Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))
Long term near a wall - fairly isolated field
Description of sound environment (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise and wind noise
Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise and wind noise

Project Name and Number		Kintore Hydrogen	
Location		East of Site	
Purpose of Monitoring		Baseline	
Relevant Guidance / Standard		BS 4142:2019	
<b>Sound Measurement System</b>			
ID	Manufacturer / Model	Serial Number	
-	Rion NL-52	LT5	
Microphone Height	Façade / Freefield	Measurement Interval	Filename
1.5	Freefield	125 ms	1
		<b>START</b>	<b>END</b>
Personnel		JT	JT
Date / time		18/10/2023 14:15	31/10/2023 09:15
Calibrator	Reference level	94.0	94.0
	Meter reading	94.0	93.8
Photographs of Measurement Location			



Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))
Long term adjacent to small 3 way junction
Description of sound environment (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise and wind noise
Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise and wind noise

Project Name and Number		Kintore Hydrogen	
Location		East of Site	
Purpose of Monitoring		Baseline	
Relevant Guidance / Standard		BS 4142:2019	
<b>Sound Measurement System</b>			
ID	Manufacturer / Model	Serial Number	
-	Rion NL-52	LT6	
Microphone Height	Façade / Freefield	Measurement Interval	Filename
1.5	Freefield	125 ms	1
		<b>START</b>	<b>END</b>
Personnel		JT	JT
Date / time		18/10/2023 13:45	31/10/2023 10:15
Calibrator	Reference level	94.0	94.0
	Meter reading	94.0	93.9

Photographs of Measurement Location



Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))
Long term located in proximity to a railway line - grass and stone between SLM and railway
Description of sound environment (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise and wind noise
Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
Distant road traffic noise and wind noise

## Annex B: Baseline Survey Results With Summary Tables and Time Histories

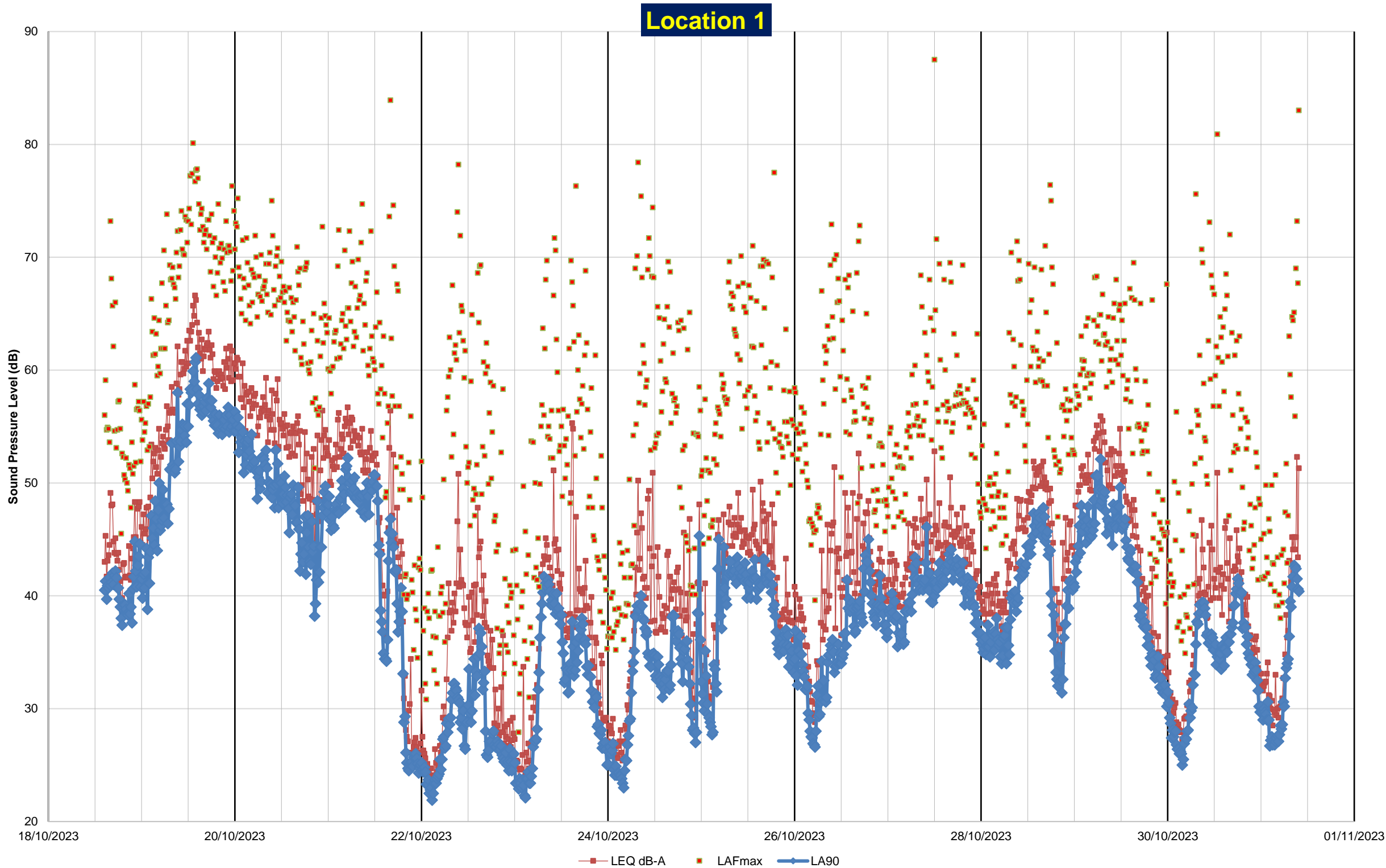


Figure B1: LT1 Baseline Survey Results – Time History Graph

Table B1: LT1 Baseline Survey Results Summary

Location 1										
Period	Background Sound Levels (dB LA90,15min)					Residual Sound Levels (dB LAeq,15min)				
	Min	25th %ile	50th %ile	75th %ile	Max	Min	25th %ile	50th %ile	75th %ile	Max
07:00 to 23:00	25	35	40	44	61	26	40	44	49	67
23:00" to 07:00	22	27	35	45	56	23	30	38	49	62

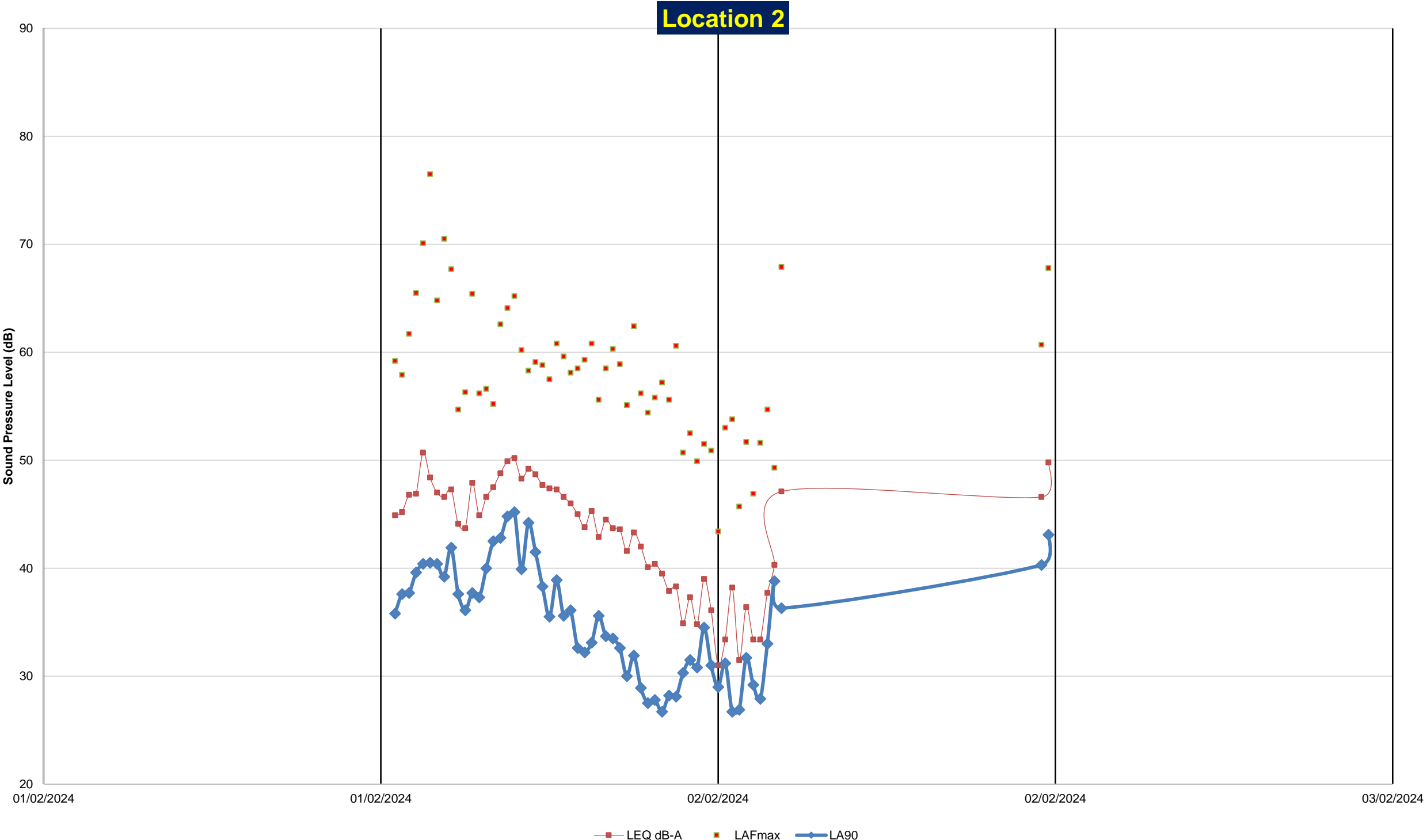


Figure B2: LT2 Baseline Survey Results – Time History Graph



Table B2: LT2 Baseline Survey Results Summary

Location 2										
Period	Background Sound Levels (dB LA90,15min)					Residual Sound Levels (dB LAeq,15min)				
	Min	25th %ile	50th %ile	75th %ile	Max	Min	25th %ile	50th %ile	75th %ile	Max
07:00 to 23:00	27	33	37	40	45	35	44	46	48	51
23:00" to 07:00	27	29	31	33	39	31	33	36	38	47

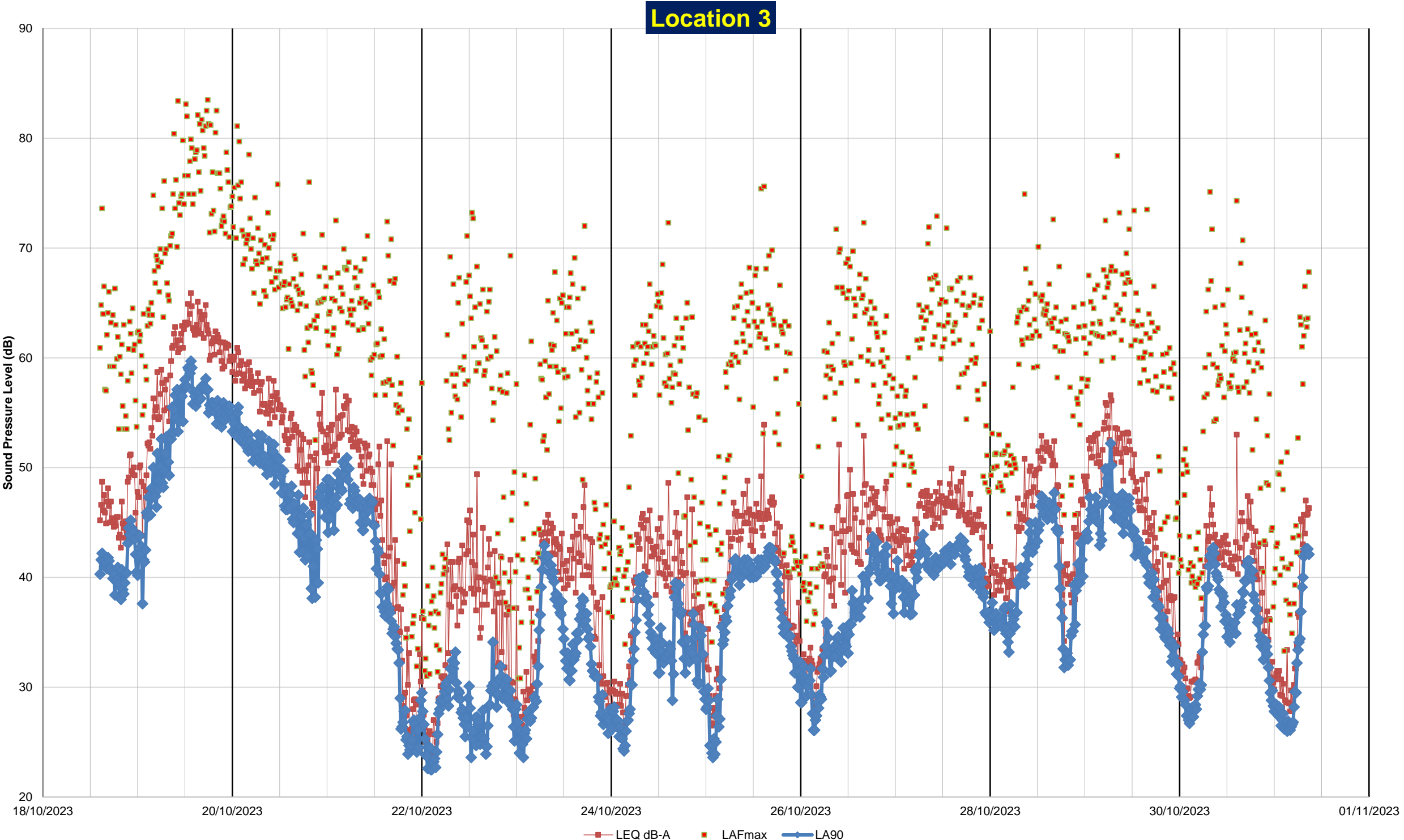


Figure B3: LT3 Baseline Survey Results – Time History Graph

Table B3: LT3 Baseline Survey Results Summary

Location 3										
Period	Background Sound Levels (dB LA90,15min)					Residual Sound Levels (dB LAeq,15min)				
	Min	25th %ile	50th %ile	75th %ile	Max	Min	25th %ile	50th %ile	75th %ile	Max
07:00 to 23:00	24	35	40	43	60	26	41	45	49	66
23:00" to 07:00	23	28	35	44	56	23	31	38	50	61

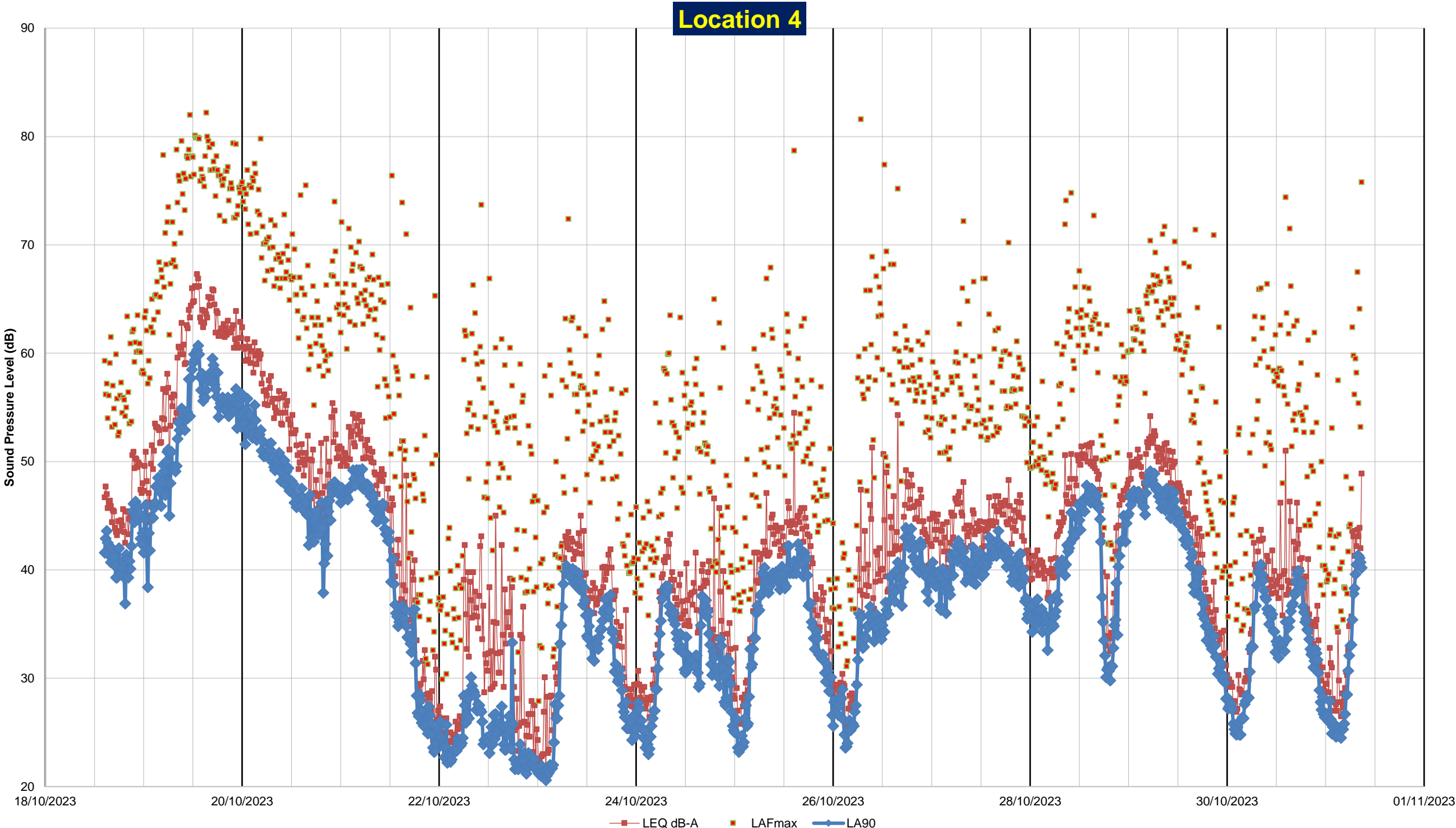


Figure B4: LT4 Baseline Survey Results – Time History Graph

Table B4: LT4 Baseline Survey Results Summary

Location 4										
Period	Background Sound Levels (dB LA90,15min)					Residual Sound Levels (dB LAeq,15min)				
	Min	25th %ile	50th %ile	75th %ile	Max	Min	25th %ile	50th %ile	75th %ile	Max
07:00 to 23:00	21	34	39	44	61	23	38	38	38	67
23:00" to 07:00	21	26	32	45	57	22	29	35	50	64

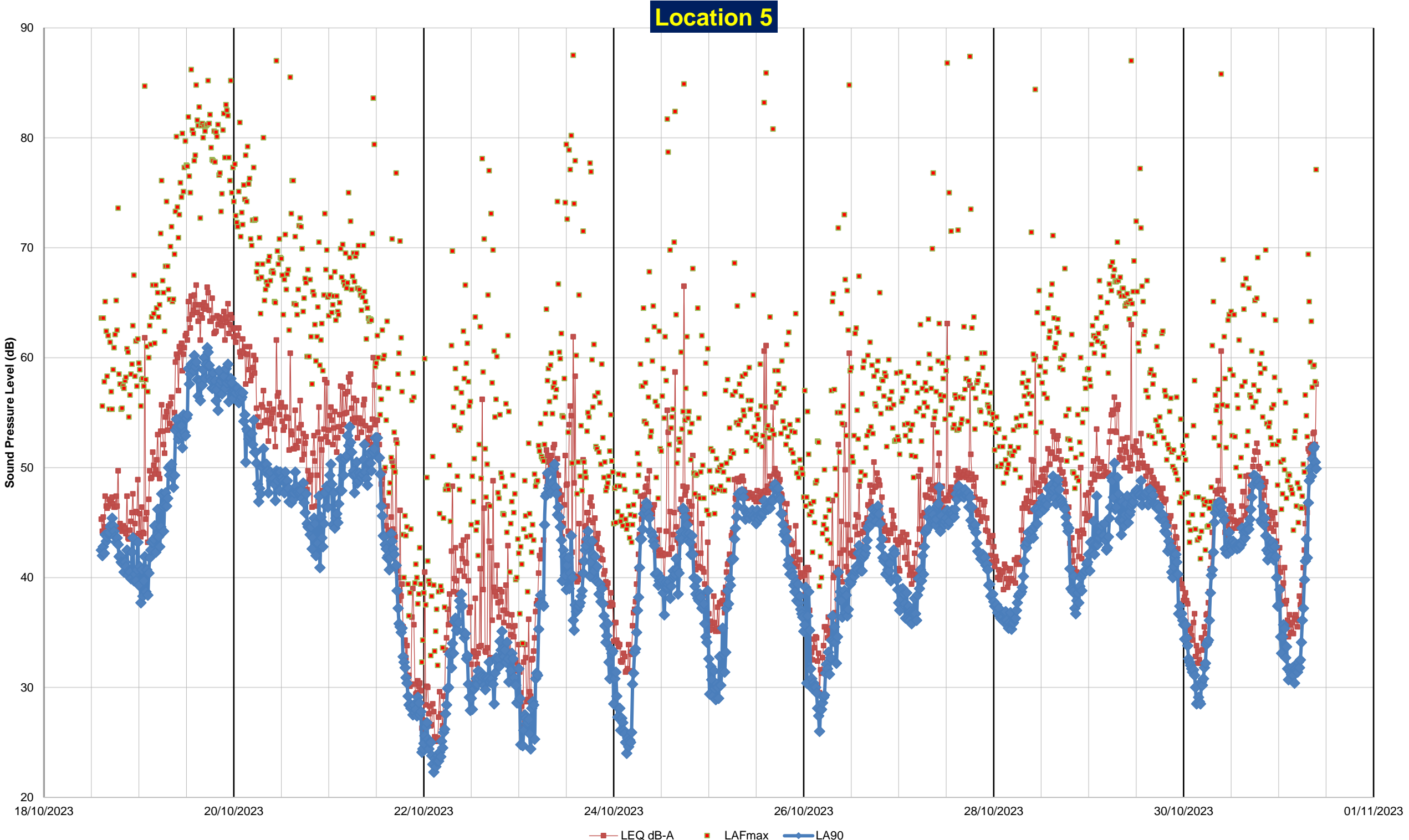


Figure B5: LT5 Baseline Survey Results – Time History Graph

Table B5: LT5 Baseline Survey Results Summary

Location 5										
Period	Background Sound Levels (dB LA90,15min)					Residual Sound Levels (dB LAeq,15min)				
	Min	25th %ile	50th %ile	75th %ile	Max	Min	25th %ile	50th %ile	75th %ile	Max
07:00 to 23:00	27	40	44	47	61	29	44	44	44	67
23:00" to 07:00	22	31	37	44	58	25	36	41	49	64

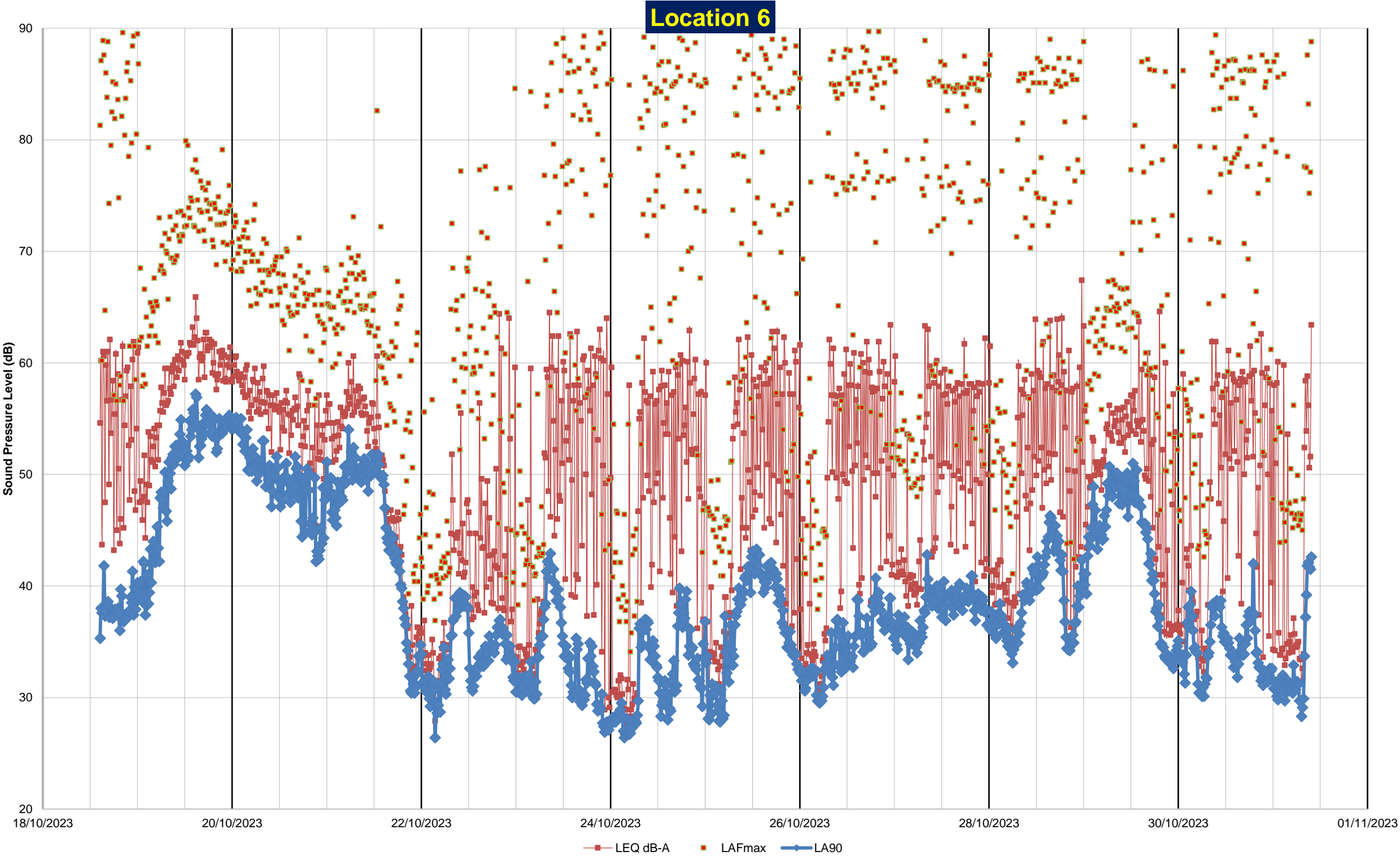


Figure B6: LT6 Baseline Survey Results – Time History Graph



Table B6: LT6 Baseline Survey Results Summary

Location 6										
Period	Background Sound Levels (dB LA90,15min)					Residual Sound Levels (dB LAeq,15min)				
	Min	25th %ile	50th %ile	75th %ile	Max	Min	25th %ile	50th %ile	75th %ile	Max
07:00 to 23:00	27	35	38	44	57	29	47	47	47	67
23:00" to 07:00	26	31	35	43	55	28	34	40	54	63