

# **A46 Newark Bypass**

**TR010065/APP/6.3**

## **6.3 Environmental Statement**

### **Appendix 11.2 Baseline Noise Survey Results**

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and  
Procedure) Regulations 2009

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Planning Act 2008

**The Infrastructure Planning  
(Applications: Prescribed Forms  
and Procedure) Regulations 2009**

A46 Newark Bypass

Development Consent Order 202[x]

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**ENVIRONMENTAL STATEMENT**

**APPENDIX 11.2 BASELINE NOISE SURVEY RESULTS**

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<b>Regulation Number:</b>	Regulation 5(2)(a)
<b>Planning Inspectorate Scheme Reference</b>	TR010065
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<b>Author:</b>	A46 Newark Bypass Project Team, National Highways

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# 1 Introduction

## 1.1 Purpose of Report

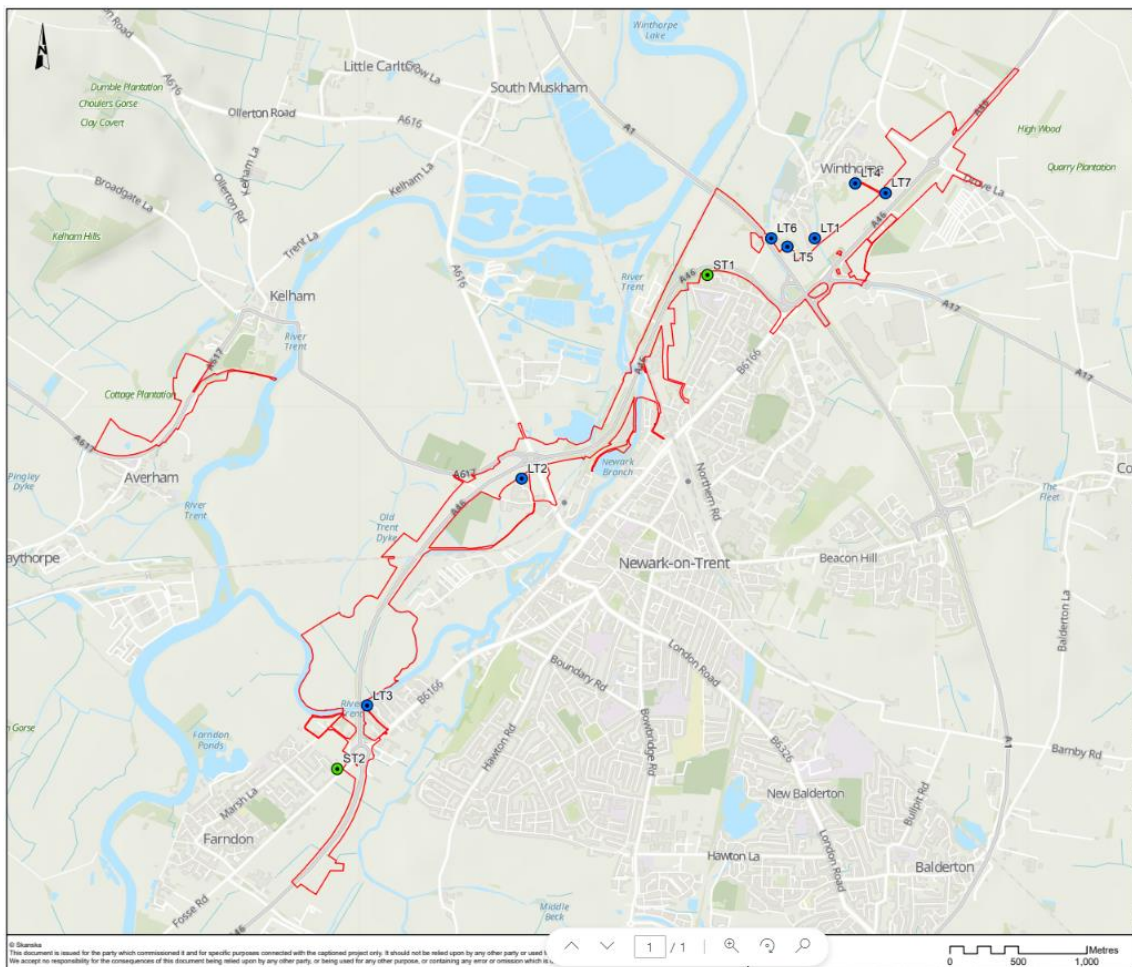
- 1.1.1 This technical appendix documents the findings of the baseline noise monitoring undertaken for the scheme used to inform Chapter 11 (Noise and Vibration) of the Environmental Statement (ES) **(TR010065/APP/6.1)**.

## 2 Methodology

### 2.1 Measurement locations

- 2.1.1 The noise survey was undertaken between 29 March and 8 April 2022 and between 5 May and 13 May 2022, comprising long term (LT) and short term (ST) measurements.
- 2.1.2 The measurement locations are shown in Figure 2.1 and detailed in Table 2-1. Measurement locations were selected to be representative of key areas in the vicinity of the proposed road alignment changes and/or facilitate a more complete understanding of the local noise environment in relation to anticipated traffic flow changes. All monitoring locations are considered to be directly affected by noise from the existing road network in their vicinity. Photographs for each measurement location are included in Appendix A of this Report.

**Figure 2.1: Noise measurement locations**



**Table 2-1: Noise measurement location details**

Measurement ID	Closest address	'what3words' <sup>1</sup> location reference	Measurement type	Microphone height from existing ground (metres, m)
LT1	2-19 The Spinney, Winthorpe, Newark-on-Trent, NG24 2NT	<u><a href="#">playfully.entitle.editor</a></u>	Free field	1.5m
LT2	4 Sandhills Close, Newark-on-Trent, NG24 1FH	<u><a href="#">plus.coping.hillsides</a></u>	Free field	2.2m
LT3	30 The Ivies, Farndon Road, Newark-on-Trent, NG24 4SR	<u><a href="#">fuse.estimated.suffice</a></u>	Free field	2m
LT4	18 Hargon Lane, Winthorpe, Newark-on-Trent, NG24 2NP	<u><a href="#">states.flinch.strutting</a></u>	Free field	1.5m
LT5	Low Wood Winthorpe, Newark-on-Trent, NG24 2NR	<u><a href="#">grounding.intruders.toys</a></u>	Free field	1.8m
LT6	79 Gainsborough Rd, Winthorpe, Newark-on-Trent NG24 2NR	<u><a href="#">rugs.strongman.clashes</a></u>	Free field	1.2m
LT7	Pine Cottage, Hargon Lane, Winthorpe, Newark-on-Trent NG24 2NP	<u><a href="#">remit.cleanser.passing</a></u>	Free field	1.2m

<sup>1</sup> <https://what3words.com> - Location referencing system that is based on dividing the globe into 3 metre squares and assigning a unique combination of three words to each square.

Measurement ID	Closest address	'what3words' <sup>1</sup> location reference	Measurement type	Microphone height from existing ground (metres, m)
ST1	8 Robert Dukeson Ave, Newark-on-Trent, NG24 2FF	<u>quite.little.masses</u>	Free field	1.3m
ST2	34 Fosse Road, Farndon, Newark-on-Trent NG24 4ST	<u>decent.powering.chess</u>	Free field	1.2m

Source: Mott MacDonald and <https://what3words.com>

## 2.2 Equipment and Setup

- 2.2.1 All equipment used for baseline noise measurements complies with Class 1 requirements given in British Standard (BS) EN 61672<sup>2</sup>. The sound level meters (SLM) were fitted with a microphone and windshield which is suitable for the outdoor environment. All short term noise measurements were taken at a height of between 1.2 metres and 1.5 metres above local ground level, whereas long term were taken at a height of between 1.5 metres and 2.2 metres above local grade level.
- 2.2.2 All measurement locations were 'free field', i.e. at least 3.5 metres from an acoustically reflective façade. Measurements were completed by a qualified acoustician competent in environmental noise monitoring and completed in accordance with the principles of BS 7445-1<sup>3</sup>.
- 2.2.3 The calibration level of all equipment was checked before and after the measurement periods and no significant changes were noted in relation to the data reported.
- 2.2.4 A full inventory of this equipment is shown in Table 2-2.

<sup>2</sup> BS EN 61672-1:2013 Electroacoustics. Sound level meters. Specifications.

<sup>3</sup> BS 7445-1:2003 Description and measurement of environmental noise. Part 1: Guide to quantities and procedures

**Table 2-2: Inventory of noise measurement equipment**

Item	Model	Serial Number	Calibrated until
LT	Rion NL-52	1143539	26/04/2023
	Rion NL-52	1143538	01/02/2024
	Rion NL-52	754168	01/02/2024
	Rion NL-52	1265461	17/01/2024
	Rion NL-52	1176426	04/05/2024
	Rion NL-52	231672	17/01/2024
ST	Rion NL-52	1176427	21/02/2024
	Rion NL-52	1143539	26/04/2023
Calibrator	Rion NC75	34913591	21/02/2023

Source: Mott MacDonald

2.2.5 Noise levels were measured in decibels for a range of stated descriptors as appropriate (e.g.  $L_{Aeq}$ ,  $L_{A10}$ ,  $L_{A90}$ , and  $L_{Amax,f}$ ). Equipment was configured to measure  $L_{p,100ms}$  samples using the fast time weighting and 'A' frequency weighting in 15-minute intervals both for long term and short term. Long term measurements have been analysed to determine the period values in accordance with relevant standards.

## 2.3 Weather conditions

2.3.1 The weather conditions during the survey (ST measurements and installation and collection of LT measurements) were considered suitable to undertake noise measurements. Historic meteorological data have been supplied by the Met Office © Crown copyright 2018, at <https://www.metoffice.gov.uk/> from Cranwell observation site, except for rain information which has been supplied from Newark Notts UK registered weather site in Newark-On-Trent. Actual wind speeds at the site would be expected to be lower than those recorded at the meteorological station as the microphone was located closer to the ground. Table 2-3 presents details of the weather conditions.

**Table 2-3: Weather summary**

Date	Condition	Wind speed range (m/s)*	Temperature range (°C)	Notes
29/03/2022	Dry, 100% cloud cover (late afternoon only)	0.5-1.4	7-9	Survey data
	Dry	1.3-3.6	3.8-9	Historic data



Date	Condition	Wind speed range (m/s)*	Temperature range (°C)	Notes
30/03/2022	Dry, 100% cloud cover, occasional light rain	0.5-2.2	4-6	Survey data
	Dry	0-8.2	0.7-7.5	Historic data
31/03/2022	Rain (morning and afternoon)	3.6-11.6	-0.6-4.7	Historic data
01/04/2022	Rain	3.1-8.2	-0.1-6.6	Historic data
Sat 02/04/2022	Dry	2.3-4.9	0-6.7	Historic data
Sun 03/04/2022	Dry	2.7-8.5	-0.8-10.1	Historic data
04/04/2022	Rain	12.3-12.5	4.7-13.1	Historic data
05/04/2022	Dry	6.7-11.6	9.3-12.7	Historic data
06/04/2022	Rain (afternoon and evening)	7.2-13.4	8.2-12.9	Historic data
07/04/2022	Dry, occasional drizzle, 50-70% cloud cover	0.5-3.0	8	Survey data
	Rain (afternoon only)	5.8-16.1	2.6-9.4	Historic data
08/04/2022	Dry, 0% cloud cover	0.3-0.5	3-5	Survey data
	Dry	3.1-7.6	0.6-9.8	Historic data
05/05/2022	Dry, 70-100% cloud cover, sunny	0.2-1.5	9-18	Survey data
	Dry	0-8.7	6.8-18.3	Historic data
06/05/2022	Rain (evening only)	2.2-8.0	9.6-18	Historic data
Sat 07/05/2022	Rain (night only)	2.2-7.2	8.3-16	Historic data
Sun 08/05/2022	Dry	1.3-4.9	5.8-16.2	Historic data
09/05/2022	Dry	3.1-10.8	4.5-20.2	Historic data
10/05/2022	Dry	4.9-11.2	13.4-19.4	Historic data
11/05/2022	Rain (morning and afternoon)	4.5-8.2	8.7-14.9	Historic data
12/05/2022	Dry, 50-80% cloud cover	0.5-1.5	16	Survey data
	Dry	4.0-8.5	7.4-16.1	Historic data
13/05/2022	Dry, 80% cloud cover	1.5	14	Survey data
	Dry	4.9-10.8	9.9-14.8	Historic data

Source: <https://www.metoffice.gov.uk/> (Met Office © Crown copyright 2019) and site notes; \* Measured daily noise levels remain consistent with the general noise trends therefore considered to be unaffected by wind speed

## 2.4 Limitations

- 2.4.1 Inevitably there is a degree of variation in measured noise levels. Contributory factors to this variation include tolerances in instrumentation readings, meteorological conditions and the inherent difference in the acoustic environment during the course of a day and indeed over longer periods as the noise sources influencing a given location vary. Any acoustic measurement is a snapshot of the noise climate at the time of the measurement. Every effort has been made to limit variation in the measurements reported. Measures taken to limit variation include:
- Undertaking surveys with appropriately qualified and trained acoustic engineers;
  - Use of measurement equipment calibrated to appropriate standards by accredited bodies and checked on site using calibrated reference sound sources;
  - Following best practice methodology for environmental noise measurement set out in BS7445;
  - Measuring under appropriate meteorological conditions; and,
  - Measuring at times and locations that are representative of the noise climate at any particular location.

## 2.5 Consultation

- 2.5.1 Contact was made with the Environmental Health Officer (EHO) at Nottinghamshire County Council by e-mail on 17 February 2022 to consult on the proposed survey locations and methodology. No comments or requests to amend the monitoring approach were received.

## 3 Measurement results

### 3.1 Short term

#### ST1

- 3.1.1 Position ST1 was located in front of 8 Robert Dukeson Avenue, Newark, NG24 2FF. Fields occupy the area to the north, sewage treatment plant is to the west and residential properties are to the south and east. The A46 is to the west, north and east (closest point is approximately 30 metres), the junction between A1-A46-A17 is to the east, the A1 is further to the north and east. The Nottingham-Lincoln railway line is to the north and west.
- 3.1.2 Road traffic noise from A46 and bird songs dominated the noise climate with occasional contribution from aircraft noise and people talking. Table 3-1 shows the measurement results.

**Table 3-1: Summary of free field ST1 data**

Location	Date	Start time	L <sub>Aeq,15min</sub> dB	L <sub>Amax,15min</sub> dB	L <sub>A10,15min</sub> dB	L <sub>A90,15min</sub> dB
ST1	30/03/2022	09:30	64	70	67	59
	30/03/2022	11:00	65	72	67	61
	30/03/2022	11:20	66	73	68	61
	07/04/2022	15:25	65	71	67	61
	07/04/2022	15:45	64	71	67	60
	08/04/2022	09:43	65	71	67	59
	08/04/2022	10:01	64	72	67	58

#### ST2

- 3.1.3 Position ST2 was located in front of 34 Fosse Road, Farndon, Newark-on-Trent NG24 4ST. Fields occupy the area to the north, south and east and residential properties are to the north and west. The A46 is to the east (closest point is approximately 155 metres), the Farndon roundabout which is the junction between A46-B6166 is to the north-east. The Nottingham-Lincoln railway line is to the north.
- 3.1.4 Road traffic noise from Fosse Road and bird songs dominated the noise climate with occasional contribution from people talking and tree rustling. Table 3-2 shows the measurement results.

**Table 3-2: Summary of free field ST2 data**

Location	Date	Start time	L <sub>Aeq,15min</sub> dB	L <sub>Amax,15min</sub> dB	L <sub>A10,15min</sub> dB	L <sub>A90,15min</sub> dB
ST2	05/05/2022	13:53	67	85	71	48
	05/05/2022	14:10	68	83	72	51
	13/05/2022	09:20	69	81	73	55
	13/05/2022	09:36	68	82	73	55

## 3.2 Long term

- 3.2.1 Long term measurements have been analysed to determine the following parameters:
- $L_{A10,18\text{hour}}$  in accordance with Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration<sup>4</sup>.
  - $L_{Aeq,T}$  daytime, evening and night-time (8hour) values in accordance with BS 5228-1:2009+A1:2014<sup>5</sup>.
- 3.2.2 All levels have been rounded to the nearest whole number. Partial measurements of periods at the start and end of the survey have been included.
- 3.2.3 DMRB LA 111 defines  $L_{A10,18\text{hour}}$  as the noise level (in dB) that is exceeded 10% of the time between 06:00 and 24:00, where  $L_{A10}$  is the A-weighted sound level standard index used within the UK to describe traffic noise.
- 3.2.4 BS 5228-1:2009+A1:2014 presents example methods for the assessment of noise impacts due to construction activities. BS5228-1 also provides relevant time periods for example methods relating to these impacts. Time periods refer to different times of the day, and days of the week to reflect the differences in the sensitivity of receptors. Measurement data has been analysed to consider the time periods accordingly:
- $L_{Aeq,daytime}$ 
    - $L_{Aeq,12h\text{ daytime}}$  - between 07:00 and 19:00 from Monday to Friday; and,
    - $L_{Aeq,6h\text{ daytime}}$  - between 07:00 and 13:00 on Saturday.
  - $L_{Aeq,evening\text{ time and weekends}}$ 
    - $L_{Aeq,4h\text{ evening}}$  - between 19:00 and 23:00 from Monday to Friday;
    - $L_{Aeq,10h\text{ weekend}}$  - between 13:00 and 23:00 on Saturday; and,
    - $L_{Aeq,16h\text{ weekend}}$  - between 07:00 and 23:00 on Sunday.
  - $L_{Aeq,8h\text{ night time}}$  - between 23:00 and 07:00.
- 3.2.5 Table 3-3 summarises LT measurement data for each position; partial measurements have been excluded from the assessment.

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<sup>4</sup> Highways England (2020) LA111 - Noise and Vibration (Revision 2) [online] available at: [cc8cfcf7-c235-4052-8d32-d5398796b364 \(standardsforhighways.co.uk\)](https://standardsforhighways.co.uk) (last accessed December 2022).

<sup>5</sup> British Standard (BS) 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise'.

**Table 3-3: Summary of free field LT data**

Location	Range LA <sub>10,18</sub> h dB	Range LA <sub>eq,12</sub> h daytime dB	Range LA <sub>eq,4h</sub> evening dB	Range LA <sub>eq,8h</sub> night dB	LA <sub>eq,6</sub> h daytime dB	LA <sub>eq,10</sub> h weekend dB	LA <sub>eq,8</sub> h night dB	LA <sub>eq,16</sub> h weekend dB	LA <sub>eq,8</sub> h night dB
		Weekdays			Saturday			Sunday	
LT1	55-60	55-59	52-58	49-56	54	53	51	54	56
LT2	62-67	63-66	59-63	58-61	61	59	57	63	61
LT3	66-71	67-69	63-67	60-64	64	62	57	65	62
LT4	52-57	51-56	47-59	45-54	50	50	49	51	52
LT5	62-69	62-69	59-64	60-64	61	60	58	64	64
LT6	66-70	67-69	64-65	62-64	67	64	59	64	63
LT7	56-59	55-60	52-57	50-54	53	54	49	57	53

### LT1

3.2.6 Position LT1 was located in the rear garden of 2-19 The Spinney, Winthorpe, Newark-on-Trent, NG24 2NT. Fields occupy the area to the east and south and other residential properties are to the north and west. The A46 is to the east, the junction between A1-A46-A17 is to the south, the A1 is to the west. The Nottingham-Lincoln railway line is to the west.

3.2.7 Road traffic noise from A46 and bird songs dominated the noise climate. Table 3-4 and Figure 3.1 show the time history. LT1 was installed on 29 March 2022 15:15 and collected on 7 April 2022 14:01.

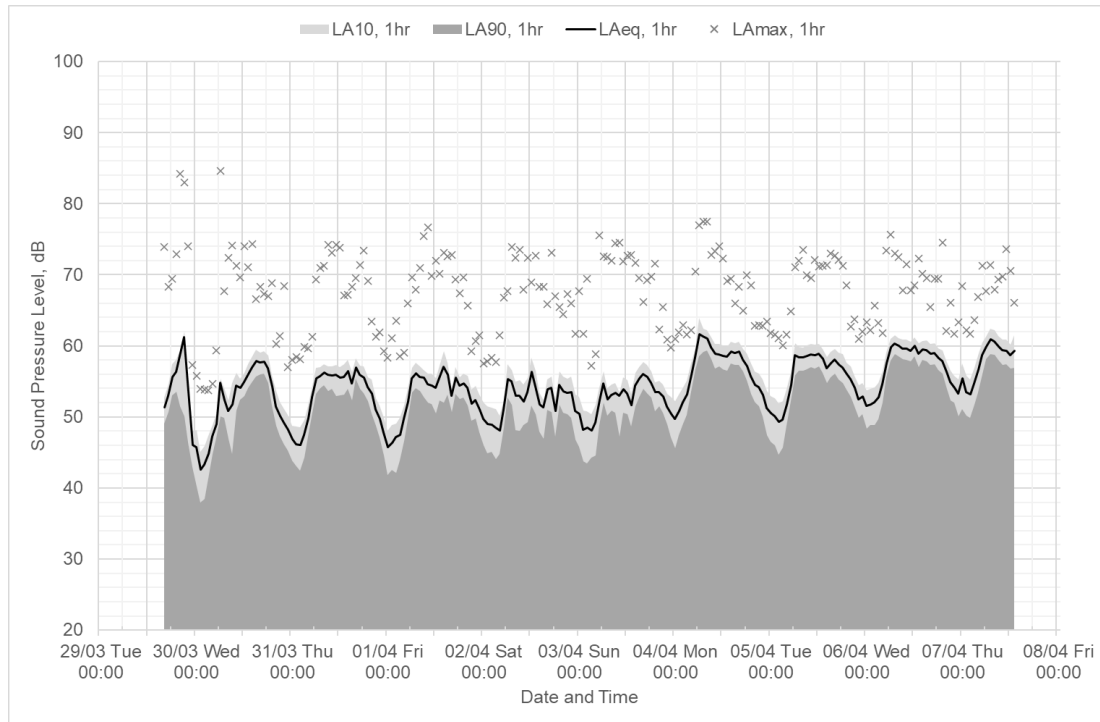
**Table 3.4: Summary of free field LT1 data**

Date	LA <sub>10,18</sub> h dB	LA <sub>eq,12</sub> h daytime dB	LA <sub>eq,4</sub> h evening dB	LA <sub>eq,8</sub> h night dB	LA <sub>eq,6</sub> h daytime dB	LA <sub>eq,10</sub> h weekend dB	LA <sub>eq,8</sub> h night dB	LA <sub>eq,16</sub> h weekend dB	LA <sub>eq,8</sub> h night dB
		Weekdays			Saturday			Sunday	
29/03/2022	56 <sup>A</sup>	53 <sup>B</sup>	58	49					

Date	L <sub>A10,18</sub> h dB	L <sub>Aeq,12</sub> h daytime dB	L <sub>Aeq,4</sub> h evening dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,6</sub> h daytime dB	L <sub>Aeq,10</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,16</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB
30/03/2022	56	56	52	50					
31/03/2022	56	56	52	50					
01/04/2022	56	55	53	51					
02/04/2022	55				54	53	51		
03/04/2022	55							54	56
04/04/2022	59	59	54	53					
05/04/2022	59	58	55	55					
06/04/2022	60	59	56	56					
07/04/2022	61 <sup>C</sup>	60 <sup>D</sup>	---	---					

partial periods: <sup>A</sup> 8h, <sup>B</sup> 3h, <sup>C</sup> 6h, <sup>D</sup> 5h

**Figure 3.1: LT1 plot of results**



## LT2

3.2.8 Position LT2 was located in the rear garden of 4 Sandhills Close, Newark, NG24 1FH. Fields occupy the area to the north and west and other residential properties are to the east and south. An industrial area that includes Newark Cattle Market and a lorry park is to the east too. The A46 is to the north and west, and the B6326-Great North Road is to the east. The Nottingham-Lincoln railway line is to the south and east.

3.2.9 Road traffic noise from A1 and bird songs dominated the noise climate. Table 3-5 and Figure 3.2 show the time history. LT2 was installed on 30 March 2022 12:15 and collected on 7 April 2022 14:26.

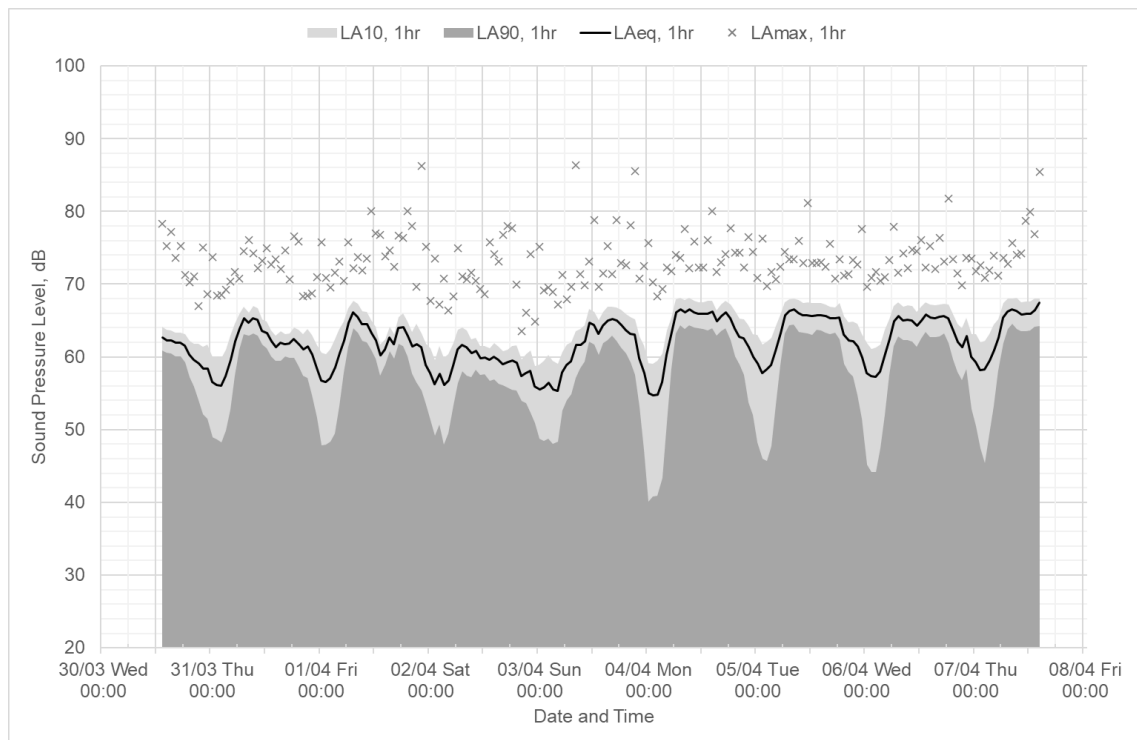
**Table 3.5: Summary of free field LT2 data**

Date	L <sub>A10,18</sub> h dB	L <sub>Aeq,12</sub> h daytime dB	L <sub>Aeq,4</sub> h evening dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,6</sub> h daytime dB	L <sub>Aeq,10</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,16</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB
		Weekdays			Saturday		Sunday		
30/03/2022	63 <sup>A</sup>	62 <sup>B</sup>	59	60					
31/03/2022	64	63	61	60					
01/04/2022	65	64	62	58					

Date	L <sub>A10,18</sub> h dB	L <sub>Aeq,12</sub> h daytime dB	L <sub>Aeq,4</sub> h evening dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,6</sub> h daytime dB	L <sub>Aeq,10</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,16</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB
02/04/2022	62				61	59	57		
03/04/2022	65							63	61
04/04/2022	67	66	63	61					
05/04/2022	67	66	62	61					
06/04/2022	66	65	63	61					
07/04/2022	68 <sup>C</sup>	66 <sup>D</sup>	---	---					

partial periods: <sup>A</sup> 11h, <sup>B</sup> 6h, <sup>C</sup> 8h, <sup>D</sup> 7h

**Figure 3.2: LT2 plot of results**



### LT3

3.2.10 Position LT3 was located in the rear garden of 30 The Ivies, Farndon Road, Newark, NG24 4SR. The River Trent and a footpath is immediately to the north, fields are to the north and west and other residential properties are to the east and south. The A46 is to the west and north, the Farndon



roundabout which is the junction between A46-B6166 is to the south and the B6166-Farndon Road is to the south and west. The Nottingham-Lincoln railway line is to the north.

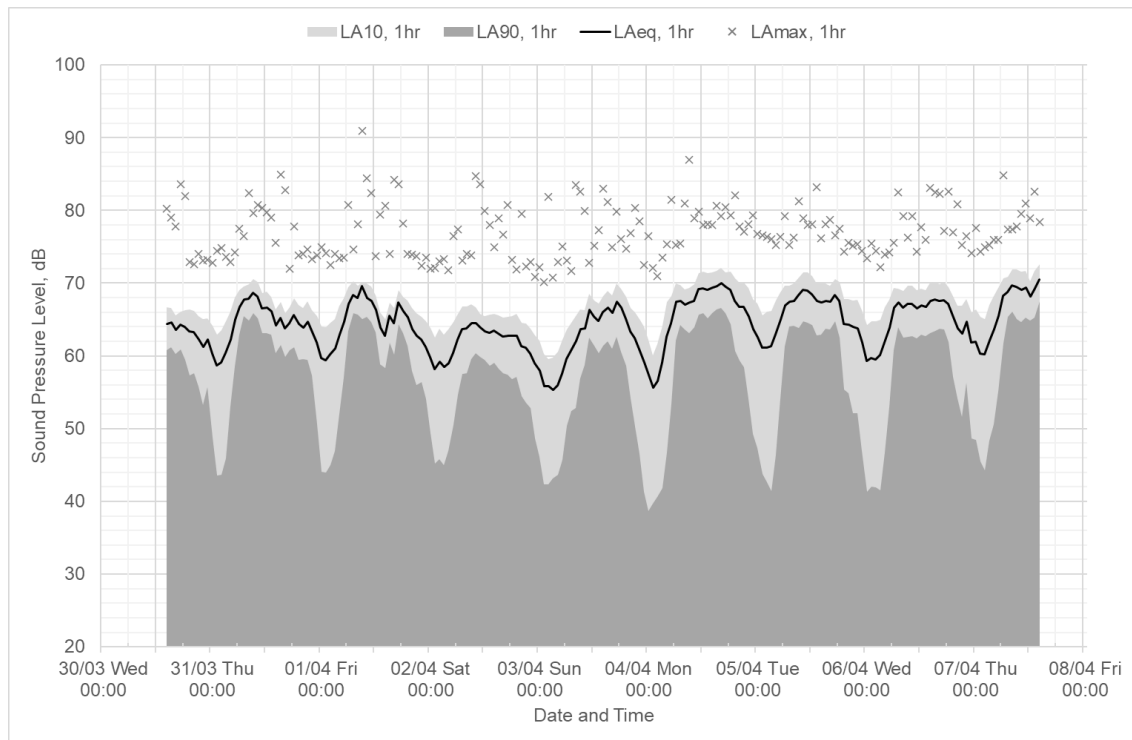
3.2.11 Road traffic noise from A46 dominated the noise climate. Table 3-6 and Figure 3.3 show the time history. LT3 was installed on 30 March 2022 13:00 and collected on 7 April 2022 14:45.

**Table 3-6: Summary of free field LT3 data**

Date	L <sub>A10,18h</sub> dB	L <sub>Aeq,12h</sub> daytime dB	L <sub>Aeq,4h</sub> evening dB	L <sub>Aeq,8h</sub> night dB	L <sub>Aeq,6h</sub> daytime dB	L <sub>Aeq,10h</sub> weekend dB	L <sub>Aeq,8h</sub> night dB	L <sub>Aeq,16h</sub> weekend dB	L <sub>Aeq,8h</sub> night dB
		Weekdays			Saturday			Sunday	
30/03/2022	66 <sup>A</sup>	64 <sup>B</sup>	63	63					
31/03/2022	68	67	64	63					
01/04/2022	68	67	64	60					
02/04/2022	66				64	62	57		
03/04/2022	67							65	62
04/04/2022	71	69	67	64					
05/04/2022	70	68	64	62					
06/04/2022	69	67	64	64					
07/04/2022	71 <sup>C</sup>	69 <sup>D</sup>	---	---					

partial periods: <sup>A</sup> 10h, <sup>B</sup> 5h, <sup>C</sup> 7h, <sup>D</sup> 6h

**Figure 3-3: LT3 plot of results**



**LT4**

- 3.2.12 Position LT4 was located in the rear garden of 20 Hargon Lane, Winthorpe, Newark, NG24 2NP. Fields occupy the area to the east and south and other residential properties are to the north and west. The A46 is to the south and east, the junction between A1-A46-A17 is to the south, the A1 is to the west and the A1133 is to the north. The Nottingham-Lincoln railway line is to the west.
- 3.2.13 Road traffic noise from A46 and bird songs dominated the noise climate. Table 3-7 and Figure 3.4 show the time history. LT4 was installed on 29 March 2022 14:00 and collected on 7 April 2022 13:38.

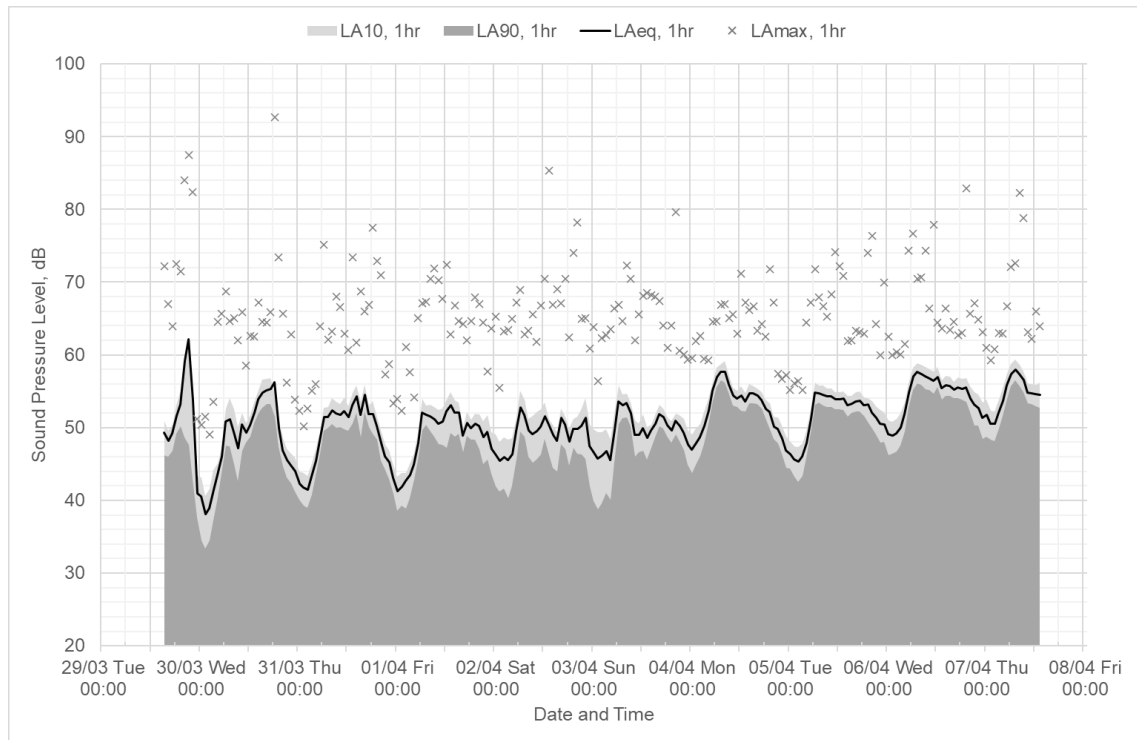
**Table 3-7: Summary of free field LT4 data**

Date	LA10,18 h dB	LAeq,12 h daytime dB	LAeq,4 h evening dB	LAeq,8 h night dB	LAeq,6 h daytime dB	LAeq,10 h weekend dB	LAeq,8 h night dB	LAeq,16 h weekend dB	LAeq,8 h night dB
		<b>Weekdays</b>			<b>Saturday</b>		<b>Sunday</b>		
29/03/2022	53 <sup>A</sup>	50 <sup>B</sup>	59	45					
30/03/2022	52	53	47	46					
31/03/2022	52	53	48	46					

Date	L <sub>A10,18</sub> h dB	L <sub>Aeq,12</sub> h daytime dB	L <sub>Aeq,4</sub> h evening dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,6</sub> h daytime dB	L <sub>Aeq,10</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,16</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB
01/04/2022	52	51	50	48					
02/04/2022	52				50	50	49		
03/04/2022	52							51	52
04/04/2022	55	55	50	49					
05/04/2022	55	54	52	52					
06/04/2022	57	56	54	54					
07/04/2022	57 <sup>C</sup>	56 <sup>D</sup>	---	---					

partial periods: <sup>A</sup> 9h, <sup>B</sup> 4h, <sup>C</sup> 6h, <sup>D</sup> 5h

**Figure 3-4: LT4 plot of results**



LT5

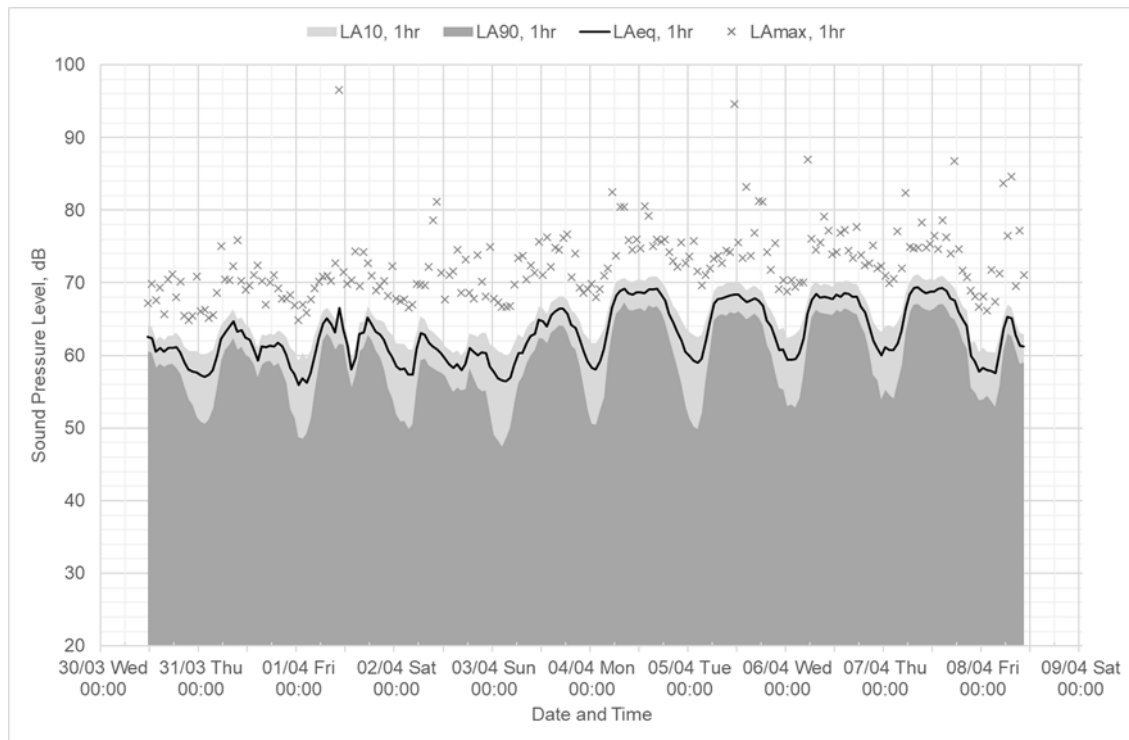
- 3.2.14 Position LT5 was located in the rear garden of Low Wood Winthorpe, Newark, NG24 2NR. Fields occupy the area to the east and south and other residential properties are to the north and west. The A46 is to the east, the junction between A1-A46-A17 is to the south, the A1 is to the west. The Nottingham-Lincoln railway line is to the west.
- 3.2.15 Road traffic noise from A1 and bird songs dominated the noise climate. Table 3-8 and Figure 3.5 show the time history. LT5 was installed on 30 March 2022 10:30 and collected on 8 April 2022 10:35.

**Table 3-8: Summary of free field LT5 data**

Date	L <sub>A10,18</sub> h dB	L <sub>Aeq,12</sub> h daytime dB	L <sub>Aeq,4</sub> h evening dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,6</sub> h daytime dB	L <sub>Aeq,10</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,16</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB
		Weekdays			Saturday			Sunday	
30/03/2022	62 <sup>A</sup>	61 <sup>B</sup>	59	60					
31/03/2022	64	62	60	60					
01/04/2022	64	64	62	60					
02/04/2022	62				61	60	58		
03/04/2022	66							64	64
04/04/2022	69	69	64	62					
05/04/2022	68	68	63	63					
06/04/2022	69	68	64	64					
07/04/2022	68	69	63	61					
08/04/2022	65 <sup>C</sup>	63 <sup>D</sup>	---	---					

partial periods: <sup>A</sup> 13h, <sup>B</sup> 8h, <sup>C</sup> 3h, <sup>D</sup> 2h

**Figure 3.5: LT5 plot of results**



**LT6**

3.2.16 Position LT6 was located in the garden of 79 Gainsborough Rd, Winthorpe, Newark-on-Trent, NG24 2NR. Fields occupy the area to the west and south, other residential properties are to the north, east and south. The A1 is to the west and south (closest point is approximately 35m), the A46 is to the south and east and the junction between A1-A46-A17 is to the south. The Nottingham-Lincoln railway line is to the west.

3.2.17 Road traffic noise from A1 dominated the noise climate. Table 3-9 and Figure 3.6 show the time history. LT6 was installed on 5 May 2022 13:15 and collected on 12 May 2022 16:12.

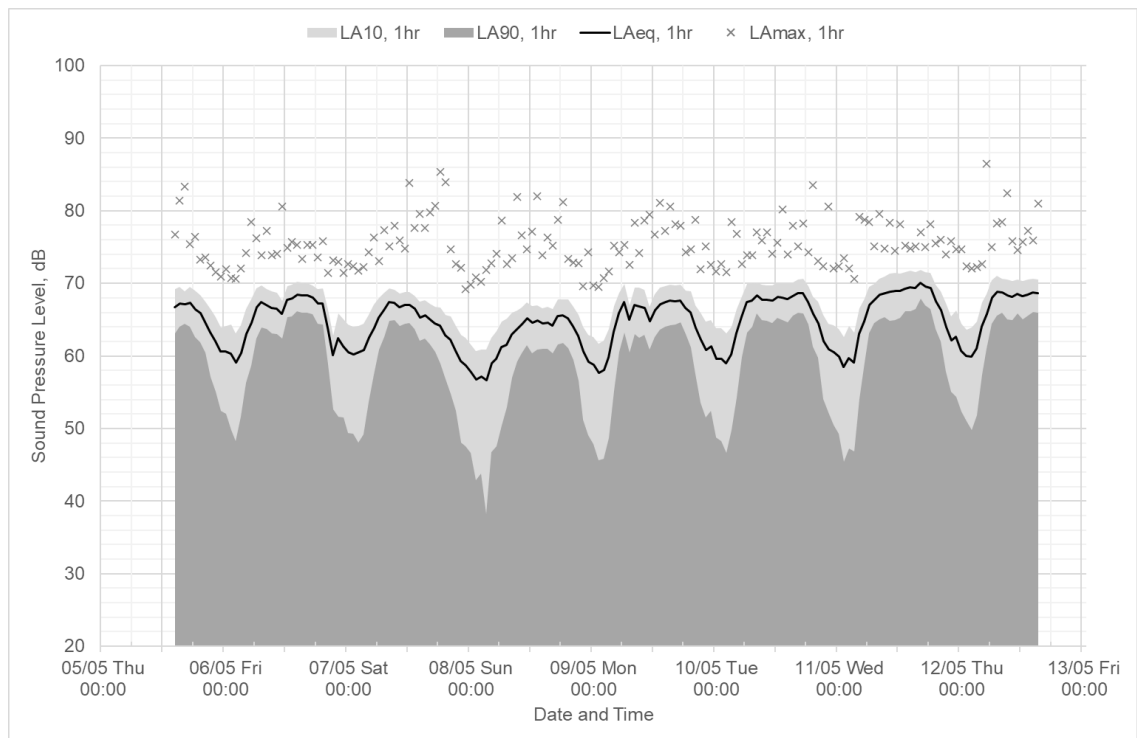
**Table 3-9: Summary of free field LT6 data**

Date	LA10,18 h dB	LAeq,12 h daytime dB	LAeq,4 h evening dB	LAeq,8 h night dB	LAeq,6 h daytime dB	LAeq,10 h weekend dB	LAeq,8 h night dB	LAeq,16 h weekend dB	LAeq,8 h night dB
		<b>Weekdays</b>			<b>Saturday</b>		<b>Sunday</b>		
05/05/2022	68 <sup>A</sup>	67 <sup>B</sup>	64	63					
06/05/2022	68	67	64	62					
07/05/2022	67				67	64	59		

Date	L <sub>A10,18</sub> h dB	L <sub>Aeq,12</sub> h daytime dB	L <sub>Aeq,4</sub> h evening dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,6</sub> h daytime dB	L <sub>Aeq,10</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,16</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB
08/05/2022	66							64	63
09/05/2022	68	67	64	63					
10/05/2022	69	68	64	63					
11/05/2022	70	69	65	64					
12/05/2022	71 <sup>C</sup>	68 <sup>D</sup>	---	---					

partial periods: <sup>A</sup> 10h, <sup>B</sup> 5h, <sup>C</sup> 9h, <sup>D</sup> 8h

**Figure 3.6: LT6 plot of results**



## LT7

3.2.18 Position LT7 was located in the rear garden of Pine Cottage, Hargon Lane, Winthorpe, Newark-on-Trent NG24 2NP. Fields occupy the area to the north and south, other residential properties are to the west and the Newark Showground (that includes the golf centre and some businesses) is to the east. The A46 runs south-east/north-east, the A1133 is to the north, the roundabout between A46-A1133 is to the north-east, the junction between A1-

A46-A17 is to the south-west and the A1 is to the south-west. The Nottingham-Lincoln railway line is to the west.

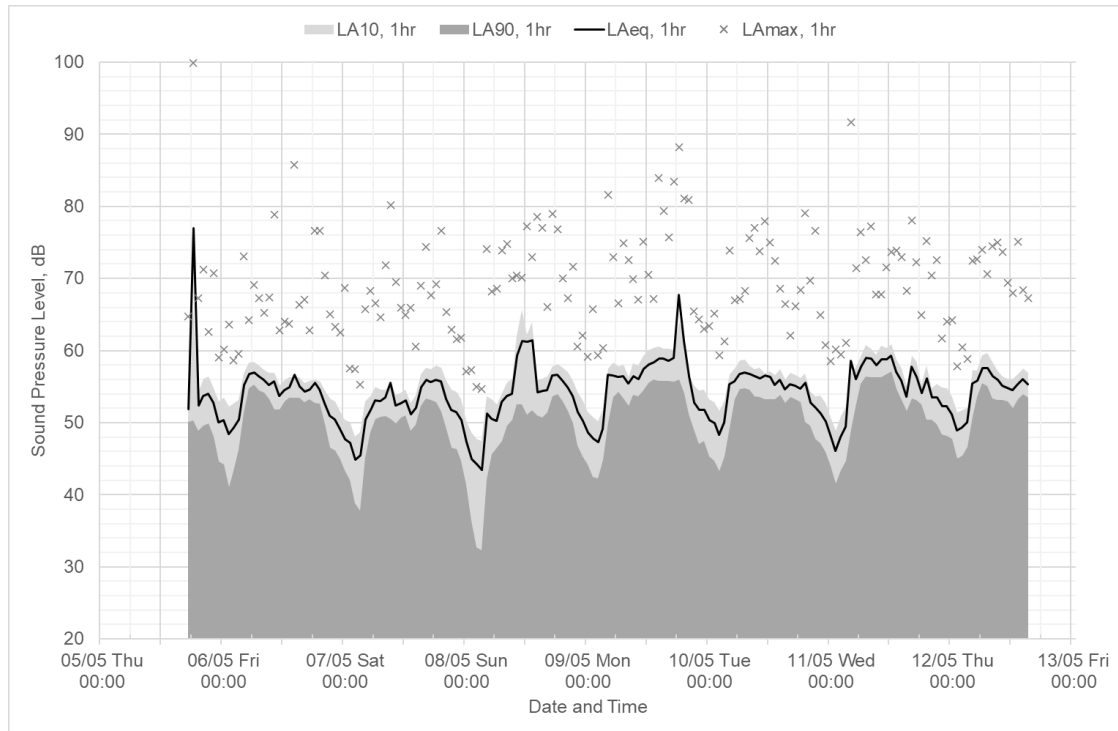
3.2.19 Road traffic noise from A46 dominated the noise climate. Table 3-10 and Figure 3.7 show the time history. LT7 was installed on 5 May 2022 16:15 and collected on 12 May 2022 16:37.

**Table 3-10: Summary of free field LT7 data**

Date	L <sub>A10,18</sub> h dB	L <sub>Aeq,12</sub> h daytime dB	L <sub>Aeq,4</sub> h evening dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,6</sub> h daytime dB	L <sub>Aeq,10</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB	L <sub>Aeq,16</sub> h weekend dB	L <sub>Aeq,8</sub> h night dB
		Weekdays			Saturday			Sunday	
05/05/2022	56 <sup>A</sup>	73 <sup>B</sup>	53	53					
06/05/2022	56	55	52	50					
07/05/2022	55				53	54	49		
08/05/2022	57							57	53
09/05/2022	59	60	57	53					
10/05/2022	57	56	53	54					
11/05/2022	58	58	54	54					
12/05/2022	58 <sup>C</sup>	56 <sup>D</sup>	---	---					

partial periods: <sup>A</sup> 7h, <sup>B</sup> 2h, <sup>C</sup> 9h, <sup>D</sup> 8h

**Figure 3.7: LT7 plot of results**





## 4 Concluding remarks

- 4.1.1 A comprehensive noise survey has been undertaken across the route realignment of the Scheme to inform the baseline.
- 4.1.2 Contributors to the noise climate have been identified, with road traffic noise confirmed as the main contributor at all locations.

## 5 References

<sup>1</sup> [REDACTED] Location referencing system that is based on dividing the globe into 3 metre squares and assigning a unique combination of three words to each square.

<sup>2</sup> BS EN 61672-1:2013 Electroacoustics. Sound level meters. Specifications.

<sup>3</sup> BS 7445-1:2003 Description and measurement of environmental noise. Part 1: Guide to quantities and procedures

<sup>4</sup> Highways England (2020) LA111 - Noise and Vibration (Revision 2) [online] available at: [cc8cfcf7-c235-4052-8d32-d5398796b364 \(standardsforhighways.co.uk\) \(standardsforhighways.co.uk\)](https://standardsforhighways.co.uk/standardsforhighways.co.uk) (last accessed December 2023).

<sup>5</sup> British Standard (BS) 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise'.

## Appendix A - Photographs of Measurement Locations

Figure A.1: Long term





## Appendix B - Acoustic Glossary

<b>A-weighting</b>	The human ear also has a non-linear frequency response, being most sensitive in the frequency range 1 kHz to 4 kHz and is less sensitive at higher and lower frequencies. The A-weighting is a frequency function commonly applied to the linear output of a microphone to simulate the subjective response of the ear. A-weighted levels are usually indicated by a subscript A or postscript (A).
<b>Z-weighting</b>	A flat frequency response between 10Hz and 20kHz excluding microphone response.
<b>Decibel</b>	Sound and noise are commonly described using the decibel (dB) scale, which is logarithmic in nature to relate to the response of the human ear. The range of human hearing commonly varies from the threshold of audibility (0 dB) to the threshold of pain (120 dB). Such limits are seldom experienced in practice and typical levels might vary between 30 dB in a quiet bedroom at night to 90 dB at the kerbside of a busy road.
<b>Free field</b>	Referring to measurements undertaken at least 3.5 m from an acoustically reflective surface.  In the context of baseline noise monitoring, this typically implies measurements undertaken at least 3.5 m from an acoustically reflective façade.
<b>Sound Pressure Level (<math>L_p</math>)</b>	The logarithmic measure of the root mean square sound pressure relative to a reference sound pressure. The reference sound pressure in air is 20 micro Pascals and represents the threshold of hearing in a healthy young person.
<b>Equivalent continuous noise level <math>L_{eq}</math></b>	The equivalent continuous noise level, $L_{Aeq,T}$ , is the notional level of a steady sound which, at a given position and over the same period of time (T), would deliver the same sound energy as the fluctuating one. Used to quantify time-varying noise from industrial sources.
<b>Maximum sound pressure level <math>L_{max}</math></b>	The highest sound pressure level reached within the measurement period.
<b>Minimum sound pressure level <math>L_{min}</math></b>	The lowest sound level reached within the measurement period.

<b>L<sub>n</sub></b>	A statistical parameter where the sound pressure level exceeded for a 'n' percentage of the measurement period.
<b>Fast weighting</b>	The sound pressure level is weighted to the response time of the ear (125ms).
<b>Slow weighting</b>	The sound pressure level is weighted to the response time of 1 second.