

# A47 North Tuddenham to Easton Dualling

**Scheme Number: TR010038**

**Volume 6**

## **6.3 Environmental Statement Appendices**

### **Appendix 11.3 - Baseline noise survey**

APFP Regulation 5(2)(a)

Planning Act 2008

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

March 2021

Infrastructure Planning

Planning Act 2008

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

The A47 North Tuddenham to Easton  
Development Consent Order 202[x]

---

**ENVIRONMENTAL STATEMENT APPENDICES**  
**Appendix 11.3 - Baseline noise survey**

---

<b>Regulation Number:</b>	5(2)(a)
<b>Planning Inspectorate Scheme Reference</b>	TR010038
<b>Application Document Reference</b>	TR010038/APP/6.3
<b>BIM Document Reference</b>	HE551489-GTY-ENV-000-RP-LA-30005
<b>Author:</b>	A47 North Tuddenham to Easton Dualling Project Team, Highways England

<b>Version</b>	<b>Date</b>	<b>Status of Version</b>
Rev 0	March 2021	Application Issue

## Table of contents

11.1. Baseline noise survey	2
-----------------------------	---

## Appendix 11.3

### 11.1. Baseline noise survey

#### Study area

- 11.1.1. The priority for undertaking noise measurements was given to residential properties considered to have the potential to be adversely affected by the Proposed Scheme. The closest accessible position where access had been granted at each property was used.
- 11.1.2. Long-term (LT) measurements one and two were conducted over a week from Tuesday 8 September 2020 to Tuesday 15 September 2020. Long-term measurements three and four were conducted over six days from Wednesday 9 September 2020 to Tuesday 15 September 2020. Short-term (ST) measurements were conducted during Tuesday 8, Wednesday 9 and Wednesday 16 September 2020 between the hours of 10:00 and 17:00. Each short-term measurement was 3 hours in duration in accordance with the CRTN shortened method of road traffic noise measurement.
- 11.1.3. The positions used for the measurements are indicated in Figure 11.1 (Noise location plan) (**TR010038/APP/6.2**).

#### Methodology

##### *Measurement procedure*

- 11.1.4. Table 11-3.1 presents details of the noise measurement equipment used. The sound level meters were designed to conform to Class 1 standard as defined within International Electro-technical Commission IEC 61672-1:2013. Electroacoustics-Sound level meters: Specifications
- 11.1.5. All sound level meters were calibrated by an UKAS accredited laboratory, traceable to national and international standards and no more than two years before the period of all measurements.
- 11.1.6. The field calibrator used was designed to be in compliance with International Electro-technical Commission (2003) IEC 60942:2003 Electroacoustics-Sound calibrators. The field calibrator was calibrated by an UKAS accredited laboratory, traceable to national and international standards and no more than one year before the period of all measurements.
- 11.1.7. Before and after each measurement session, the reference calibration of all sound level meters was checked using the field calibrator. Variations of no greater than 0.2 dB were noted over all the measurement periods.

Table 11-3.1: Summary of equipment used for surveys

Equipment type	Position	Sound level meter	
		Model	Serial number
Sound level meter	LT1	Rion NL-52	00620900
	LT2	Rion NL-52	00620901
	LT3	Rion NL-52	01143558
	LT4	Rion NL-52	00976153
	ST1, ST5	Rion NL-52	00586905
	ST2	Rion NL-52	00620900
	ST3	Rion NL-52	00620901
	ST4, ST6	Rion NL-52	01143558
	ST7	Rion NL-52	00976153
Calibrator	All	Brüel & Kjær 4231	2615249

- 11.1.8. Each microphone was fitted with a windshield suitable for outdoor use at all measurement locations. For all short-term measurements, the microphones were supported using a tripod at a height of 1.2 to 1.5 metres above the ground. With the exception of measurement at position ST2, measurements were conducted in the acoustic free field i.e. more than 3.5 metres away from any walls or vertical reflecting surfaces. Measurements at position ST2 were undertaken in close proximity to a building (a façade measurement). In this instance the horizontal distance between the microphone and the façade was 1 metre.
- 11.1.9. For long-term measurements at positions LT1 and LT2, the microphones were supported using a tripod at a height of 1.2 to 1.5 metres above the ground. For long-term measurements at positions LT3 and LT4, the microphones were supported using a pole at a height of 3 metres above the ground. All long-term measurements were conducted in the acoustic free-field.
- 11.1.10. For all long-term measurements, the A-weighted equivalent continuous noise level ( $L_{Aeq,8hr}$  and  $L_{A10,18hr}$ ) were obtained along with a number of statistical indices ( $L_{Amax}$ ,  $L_{A10}$ ,  $L_{A90}$ ) over contiguous 15 minute intervals.
- 11.1.11. Photographs of the measurement locations are presented in Figures 11.3.5 to 11.3.48 and descriptions of the site, noise climate and weather conditions were

noted at each measurement position. All measurements were undertaken during dry conditions. Wind speeds were measured using a hand-held anemometer.

- 11.1.12. All measurements were undertaken by a consultant competent in environmental noise monitoring and completed in accordance with the principles of BS 7445-1: 2003 *Description and measurement of environmental noise. Guide to quantities and procedures*.

### *Weather conditions*

- 11.1.13. The weather conditions during the survey (installation and collection of equipment at all measurement locations) were considered suitable to undertake noise measurements. Historic meteorological data have been supplied by the Met Office © Crown copyright 2020, the Met Office, at <https://www.metoffice.gov.uk/> from the Costessey observation site. Actual wind speeds at the site would be expected to be less than those recorded at the meteorological station as the microphones were located closer to the ground.
- 11.1.14. According to meteorological data collected at site, on 8 September 2020 the weather was dry and cloud cover varied between 20% and 95%. Wind speeds varied between 0 m/s and 0.2 m/s and wind direction was mainly from the south-west. Temperatures were between 25°C and 27°C.
- 11.1.15. According to meteorological data collected at site, on 9 September 2020 the weather was dry and cloud cover varied between 15% and 85%. Wind speeds varied between 0.3 m/s and 3.5 m/s and direction was mainly from the west. Temperatures were between 22°C and 24°C.
- 11.1.16. On 10 September 2020, historic meteorological data indicates that the weather was fair and dry. Wind speed varied between 0.9 m/s and 4.0 m/s and wind direction was mainly from the west. Temperatures were between 10°C and 17°C.
- 11.1.17. On 11 September 2020, historic meteorological data indicates that the weather was fair and dry. Wind speed varied between 2.2 m/s and 9.4 m/s and wind direction was mainly from the south-west. Temperatures were between 8°C and 18°C.
- 11.1.18. On 12 September 2020, historic meteorological data indicates that the weather was fair and dry. Wind speed varied between 1.3 m/s and 7.2 m/s and wind direction was mainly from the south-west. Temperatures were between 12°C and 15°C.
- 11.1.19. On 13 September 2020, historic meteorological data indicates that the weather was fair and dry. Wind speed varied between 2.2 m/s and 7.2 m/s and wind

direction was mainly from the south-west. Temperatures were between 14°C and 25°C.

11.1.20. On 14 September 2020, historic meteorological data indicates that the weather was fair and dry. Wind speed varied between 0.4 m/s and 5.4 m/s and direction was mainly from the south-south-west. Temperatures were between 12°C and 26°C.

11.1.21. According to meteorological data collected at site, on 15 September 2020 the weather was mainly dry with some wet ground at long-term measurement location two. It was noted that road surfaces were dry. Cloud cover varied between 10% and 25%. Wind speed varied between 0.0 m/s and 0.3 m/s. Temperatures were between 26°C and 28°C.

11.1.22. According to meteorological data collected at site, on 16 September 2020 the weather was mainly dry with some wet grass (i.e. dew) noted at short-term measurement locations three, four and seven. The soil underneath the grass was dry. Cloud cover varied between 45% and 95%. Wind speed varied between 0.0 m/s and 1.9 m/s. Temperatures were between 20°C and 26°C.

## Results

11.1.23. A summary of all the results from the baseline noise survey is provided in Table 11-3.2 for the short term measurements and in Table 11-3.3 for the long term measurements. Detailed results obtained at each position are within Table 11-3.4 to Table 11-3.19. Additionally, the results of the long-term noise measurement are presented graphically within Figure 11.3.1 to Figure 11.3.4.

### Summary results

11.1.24. Table 11-3.2 summarise the short-term data collected for each of the measurement positions. All levels have been rounded to the nearest whole number.

Table 11-3.2: Summary of all short-term noise measurement data

Position	Dates	Range of LAeq,15min dB	Range of LAmax,15min dB	Range of LA10,15min dB
ST1	09 September 2020	58-59	64-74	60-61
ST2	16 September 2020	51-65	61-87	53-68
ST3	16 September 2020	65-66	72-81	68-69
ST4	16 September 2020	61-63	71-80	64-66

Position	Dates	Range of L <sub>Aeq,15min</sub> dB	Range of L <sub>Amax,15min</sub> dB	Range of L <sub>A10,15min</sub> dB
ST5	08 September 2020	58-60	66-77	61-63
ST6	08 September 2020	66-69	73-92	69-70
ST7	16 September 2020	60-62	67-74	63-64

11.1.25. Table 11-3.3 summarises the free field values of the long-term data per each of the measurement positions for representative weekdays only (8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 14<sup>th</sup>, 15<sup>th</sup> and 16<sup>th</sup> September 2020). All levels have been rounded to the nearest whole number. The time range of each parameter is:

- L<sub>A10,18hr</sub> - between 06:00 and 24:00;
- L<sub>night</sub> - between 23:00 and 07:00;
- L<sub>day</sub> - between 07:00 and 19:00; and
- L<sub>evening</sub> - between 19:00 and 23:00.

11.1.26. Partial measurements at the start and end of the survey and periods where the wind speed was above 5m/s have been excluded.

Table 11-3.3: Summary of free field LT data for representative weekdays only

Position	Location	L <sub>A10,18hr day</sub> time dB	L <sub>day</sub> dB	L <sub>evening</sub> dB	L <sub>night</sub> dB
LT1	Mattishall Lane, Hockering	50	50	50	47
LT2	Rotten Row, East Tuddenham	49	49	49	46
LT3	Church Lane, East Tuddenham	54	53	52	51
LT4	Berry's Lane, East Tuddenham	50	49	48	47

### Short-term measurement results

11.1.27. The duration of each short-term measurement was 3 hours. Measurements were carried out in accordance with the CRTN shortened measurement procedure. In Tables 11-3.4 to 11-3.10 below; the L<sub>Aeq,3hr</sub> is the logarithmic average of the measured L<sub>Aeq,15min</sub>, the L<sub>Amax</sub> is the highest measured L<sub>Amax,15min</sub>, the L<sub>A10,3hr</sub> and the L<sub>A90,3hr</sub> are the arithmetic averages of the measured L<sub>A10,1hr</sub> and L<sub>A90,15min</sub> respectively.



11.1.28. Short-term measurement position ST1 was located in an agricultural field approximately 50 m south of the A47 and approximately 35 m east of Acorn Barn, Lyng Road, North Tuddenham, NR20 3HF (microphone coordinates: 606267, 313447).

Table 11-3.4: ST1 data summary

Date	Start time	L <sub>Aeq,3hr</sub> dB	L <sub>Amax</sub> dB	L <sub>A10,3hr</sub> dB	L <sub>A90,3hr</sub> dB
09/09/20	10:00	58.4	74.4	60.5	54.8

11.1.29. Short-term measurement position ST2 was located 1m north of the north-facing façade at Ash Lodge, Low Road, North Tuddenham, NR20 3HF (microphone coordinates: 606388, 313212).

Table 11-3.5: ST2 data summary

Date	Start time	L <sub>Aeq,3hr</sub> dB	L <sub>Amax</sub> dB	L <sub>A10,3hr</sub> dB	L <sub>A90,3hr</sub> dB
16/09/20	10:30	57.6	86.6	57.4	50.8

11.1.30. Short-term measurement position ST3 was located 20 m north of the existing A47 and 14 m south of Prelude, Mill Lane, Hockering, NR20 3HH (microphone coordinates: 607330, 312983).

Table 11-3.6: ST3 data summary

Date	Start time	L <sub>Aeq,3hr</sub> dB	L <sub>Amax</sub> dB	L <sub>A10,3hr</sub> dB	L <sub>A90,3hr</sub> dB
16/09/20	10:00	65.3	80.6	68.6	54.9

11.1.31. Short-term measurement position ST4 was located in the rear garden of Hill House, Albatross Road, Hockering. The microphone was situated approximately 15 m north of the existing A47 and 35 m to the south of Hill House NR20 3JN (microphone coordinates: 608504, 312689).

Table 11-3.7: ST4 data summary

Date	Start time	L <sub>Aeq,3hr</sub> dB	L <sub>Amax</sub> dB	L <sub>A10,3hr</sub> dB	L <sub>A90,3hr</sub> dB
16/09/20	10:00	61.7	80.4	64.8	52.2

11.1.32. Short-term measurement position ST5 was located at The Bowling Green, The Street, Honingham. The microphone was situated approximately 8 m north of the bowling green perimeter and approximately 3.4 m east of the Bowling Green perimeter wall (microphone coordinates: 610295, 311920).

Table 11-3.8: ST5 data summary

Date	Start time	L <sub>Aeq,3hr</sub> dB	L <sub>Amax</sub> dB	L <sub>A10,3hr</sub> dB	L <sub>A90,3hr</sub> dB
08/09/20	14:00	58.9	76.9	61.5	52.6

11.1.33. Short-term measurement position ST6 was located close to Noise Important Area 6287 in the grounds of Church Farm Cottage, Taverham Road, Honingham, NR9 5BT. The microphone was situated approximately 10.8 m north of the garden wall (microphone coordinates: 611678, 311207).

Table 11-3.9: ST6 data summary

Date	Start time	L <sub>Aeq,3hr</sub> dB	L <sub>Amax</sub> dB	L <sub>A10,3hr</sub> dB	L <sub>A90,3hr</sub> dB
08/09/20	13:00	67.3	91.5	69.7	61.2

11.1.34. Short-term measurement position ST7 was located in the garden of 94 Dereham Road, Easton, NR9 5DF. The microphone was situated approximately 5.4 m from the western-facing wall and 7.1 m from the tanker to the east (microphone coordinates: 613383, 310995).

Table 11-3.10: ST7 data summary

Date	Start time	L <sub>Aeq,3hr</sub> dB	L <sub>Amax</sub> dB	L <sub>A10,3hr</sub> dB	L <sub>A90,3hr</sub> dB
16/09/20	10:00	60.7	74.1	63.2	55.4

### Long-term measurement results

11.1.35. L<sub>Aeq,8hr</sub> night time is between 23:00-07:00, whilst L<sub>A10,18hr</sub> day time is 06:00-24:00. Partial measurements of periods at the start and end of the survey have not been included.

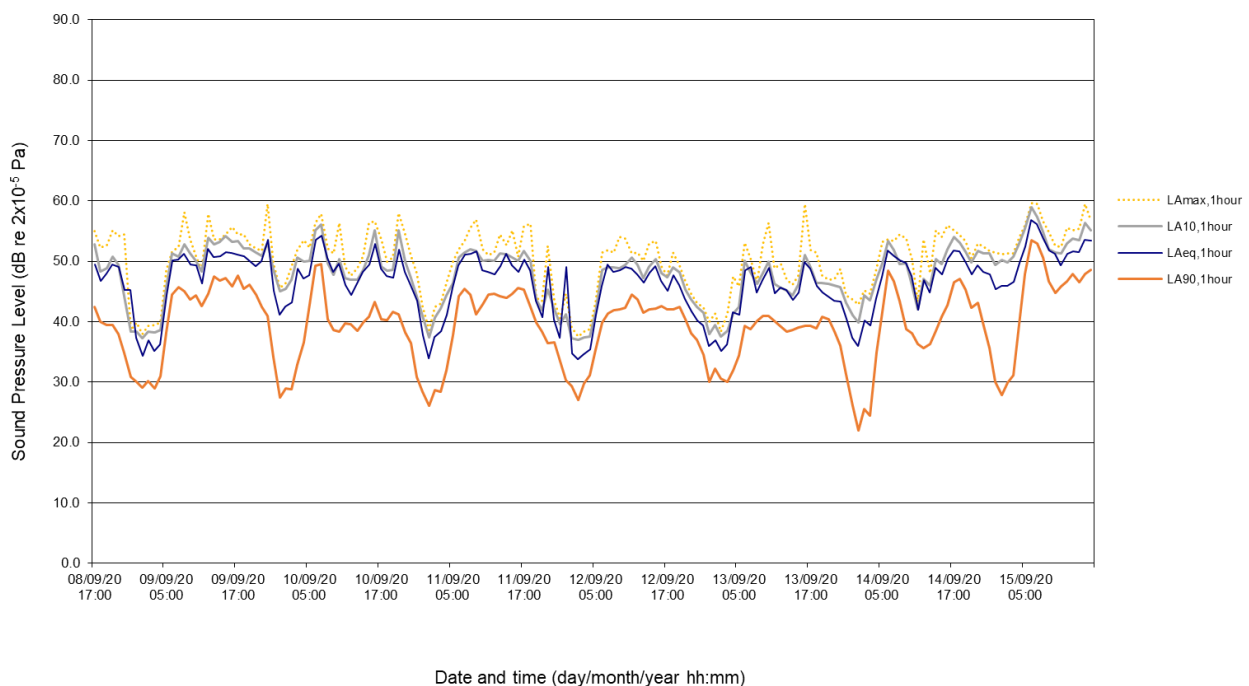
11.1.36. Long-term measurement position LT1 was located in scrubland approximately 30 metres south of Mattishall Lane. The microphone was situated approximately 100 metres to the east of caravan receptors on Mattishall Lane; The Yard, Mobile Home and Plot 2. The closest detached residential dwelling (Hillview) was located approximately 170 m to the east (microphone coordinates: 606928, 312946).

Table 11-3.11: LT1 data summary

Date	L <sub>Aeq,8h</sub> night time dB	L <sub>A10,18h</sub> day time dB
08/09/20	43.7	49.1
09/09/20	47.9	51.2

Date	L <sub>Aeq,8h</sub> night time dB	L <sub>A10,18h</sub> day time dB
10/09/20	43.5	49.7
11/09/20	42.7	50.9
12/09/20	41.9	49.4
13/09/20	45.3	47.4
14/09/20	50.8	47.7
15/09/20	-	53.3

Figure 11.3.1: LT1 plot of results

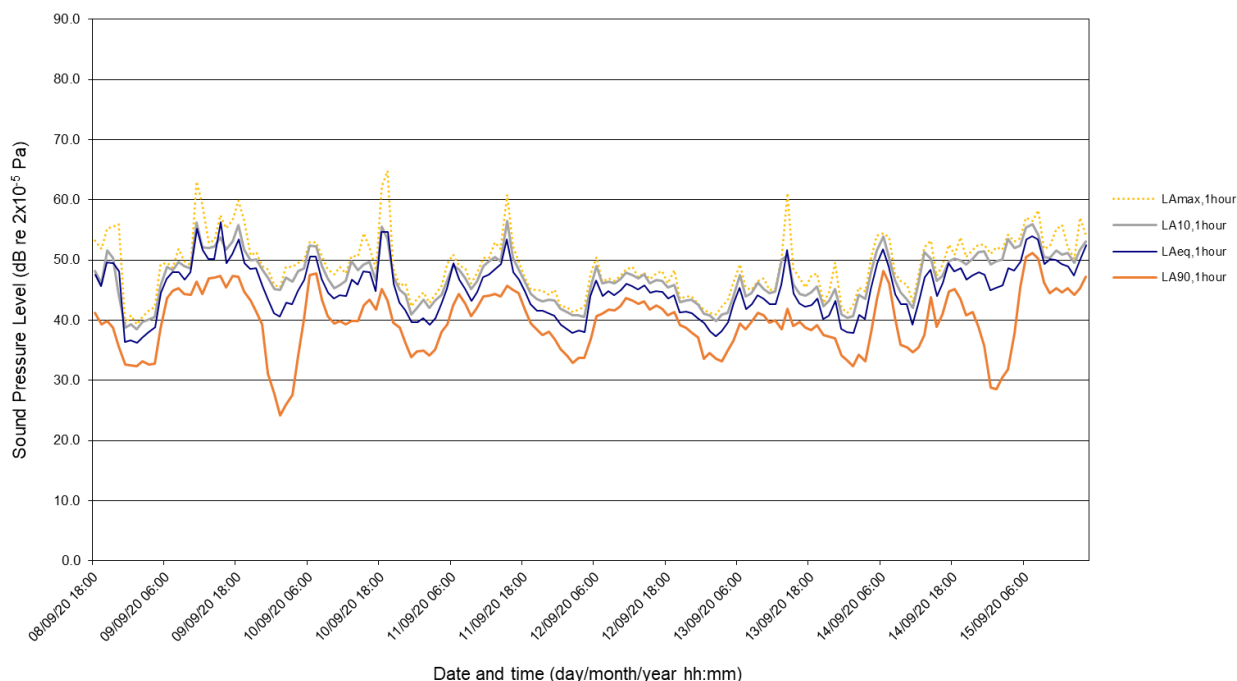


11.1.37. Long-term measurement position LT2 was located approximately 70 metres south of the River Tud and 100 m north of Rotten Row. The microphone was situated approximately 100 m to the north-east of Willow Farm and approximately 130 m south of Traps End (microphone coordinates: 611678, 311207).

Table 11-3.12: LT2 data summary

Date	L <sub>Aeq,8h</sub> night time dB	L <sub>A10,18h</sub> day time dB
08/09/20	41.4	46.5
09/09/20	45.3	51.0
10/09/20	43.7	48.2
11/09/20	41.7	47.5
12/09/20	41.0	46.0
13/09/20	45.9	45.2
14/09/20	48.8	48.6
15/09/20	---	52.2

Figure 11.3.2: LT2 plot of results

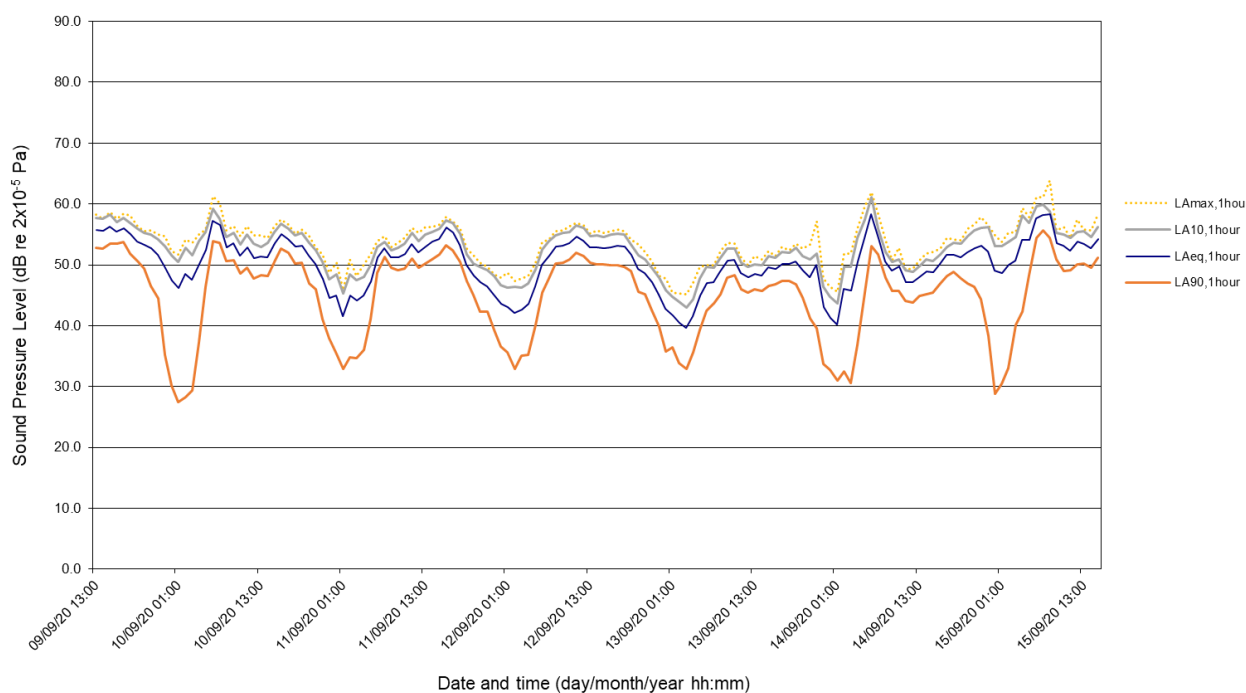


11.1.38. Long-term measurement position LT3 was located in an agricultural field to the east of Church Lane. The microphone was situated approximately 165 m east of Sycamore Farm and 265 m west of Hillcrest (microphone coordinates: 608888, 312360).

Table 11-3.13: LT3 data summary

Date	L <sub>Aeq,8h</sub> night time dB	L <sub>A10,18h</sub> day time dB
09/09/20	51.5	56.2
10/09/20	46.4	54.3
11/09/20	45.4	53.3
12/09/20	43.6	53.7
13/09/20	51.7	50.9
14/09/20	53.1	53.0
15/09/20	---	56.5

Figure 11.3.3: LT3 plot of results



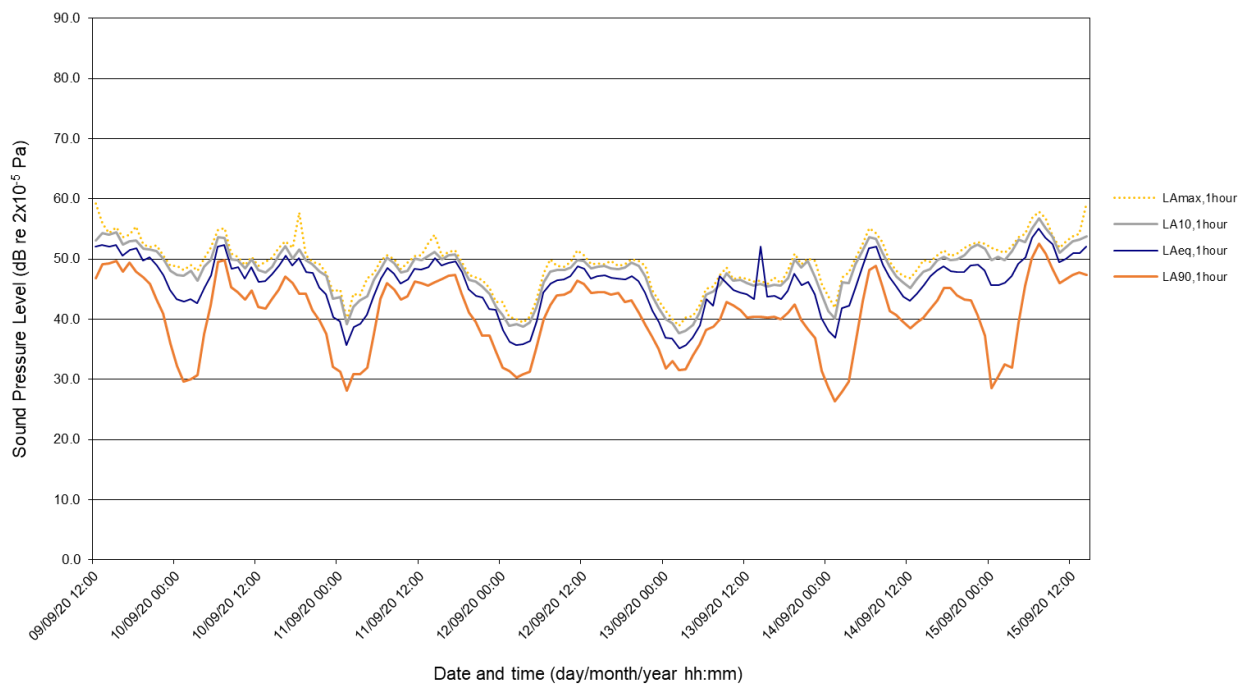
11.1.39. Long-term measurement position LT4 was located in an agricultural field within the grounds of Berry Hall. The microphone was situated approximately 100

metres east of Berry Hall and 160 m west of Merrywood House (microphone coordinates: 609665, 311946).

Table 11-3.14: LT4 data summary

Date	L <sub>Aeq,8h</sub> night time dB	L <sub>A10,18h</sub> day time dB
09/09/20	46.5	52.3
10/09/20	41.9	49.6
11/09/20	39.7	48.3
12/09/20	38.7	47.9
13/09/20	45.9	46.4
14/09/20	49.1	49.7
15/09/20	---	53.7

Figure 11.3.4: LT4 plot of results



## Photographs

### *Short-term measurement positions*

Figure 11.3.5: ST1 (from the north)



Figure 11.3.6: ST1 (from the east)





Figure 11.3.7: ST1 (from the south)



Figure 11.3.8: ST1 (from the west)





Figure 11.3.9: ST2 (façade measurement, from the north)



Figure 11.3.10: ST2 (façade measurement, from the east)





Figure 11.3.11: ST2 (façade measurement, from the south)



Figure 11.3.12: ST2 (façade measurement, from the west)





Figure 11.3.13: ST3 (from the north)





Figure 11.3.14: ST3 (from the east)



Figure 11.3.15: ST3 (from the south)



Figure 11.3.16: ST3 (from the west)



Figure 11.3.17: ST4 (from the north)



Figure 11.3.18: ST4 (from the east)





Figure 11.3.19: ST4 (from the south)



Figure 11.3.20: ST4 (from the west)



Figure 11.3.21: ST5 (from the north)



Figure 11.3.22: ST5 (from the east)





Figure 11.3.23: ST5 (from the south)



Figure 11.3.24: ST5 (from the west)





Figure 11.3.25: ST6 (from the north)



Figure 11.3.26: ST6 (from the east)





Figure 11.3.27: ST6 (from the south)





Figure 11.3.28: ST6 (from the west)



Figure 11.3.29: ST7 (from the north)



Figure 11.3.30: ST7 (from the east)



Figure 11.3.31: ST7 (from the south)





Figure 11.3.32: ST7 (from the west)



*Long-term measurement positions*

Figure 11.3.33: LT1 (from the north)



Figure 11.3.34: LT1 (from the east)



Figure 11.3.35: LT1 (from the south)





Figure 11.3.36: LT1 (from the west)



Figure 11.3.37: LT2 (from the north)





Figure 11.3.38: LT2 (from the east)



Figure 11.3.39: LT2 (from the south)





Figure 11.3.40: LT2 (from the west)



Figure 11.3.41: LT3 (from the north)



Figure 11.3.42: LT3 (from the east)



Figure 11.3.43: LT3 (from the south)





Figure 11.3.44: LT3 (from the west)



Figure 11.3.45: LT4 (from the north)



Figure 11.3.46: LT4 (from the east)



Figure 11.3.47: LT4 (from the south)





Figure 11.3.48: LT4 (from the west)

