

## **Construction noise and vibration Monthly Report – June 2022**

**London Borough of Hillingdon**

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# Non-Technical Summary

This Noise and Vibration Monitoring Report fulfils HS2 Limited's commitment detailed in the Environmental Minimum Requirements (EMRs), Annex 1, Code of Construction Practice, to present the results of noise monitoring carried out within the London Borough of Hillingdon during the month of June 2022.

Within this period noise and vibration monitoring was undertaken at the following worksites:

- Colne Valley Viaduct Dews Lane site (ref.: CVV-DL), where compound operation, jetty piling, invasive vegetation removal works, ground investigation works, pier construction, installation of ducts, water pumping works, maintenance of the haul road, operation of satellite welfare and generator farms, stabilisation works, earthworks, fibre-reinforced concrete works, drainage works, concrete drilling, pontoon installation, surveys, construction of compensation pond, material storage, fencing works, environmental maintenance works, construction of river crossing, excavation works, car park construction, launching girder and deck works and utility works were underway;
- Colne Valley Viaduct Moorhall Road site (ref.: CVV-MR), where piling, compound operation, ground investigation works, pier construction, installation of ducts, water pumping, maintenance of haul road, operation of satellite welfare and generator farms, material storage, concrete drilling, pontoon installation and surveys, construction of compensation pond, fencing works, environmental maintenance, excavation works, construction of river crossing, launching grinder and deck works and utility works were underway;
- West Ruislip Portal worksite (ref.: WRP) where piling, stone column installation, bulk excavations, steelworks and formworks installation, concreting works, dewatering and site set-up for tunnelling activities were underway;
- West Ruislip Retained Embankment worksite (ref.: WRRE), where piling, stone column installation, footpath construction, bulk excavations, steelworks and formworks installation, dewatering and site set-up for tunnelling activities were underway;
- South Ruislip Ventilation Shaft worksite (ref.: SRVS), where diaphragm walling works were underway;
- Harvil Road worksite (ref.: HR), where piling, road diversion works and bridge installation works were underway.

Further works, where monitoring did not take place, were also undertaken at:

- Colne Valley where power utility works were underway;

- The Greenway (West Ruislip) where sewer utility works were underway;
- Harvil Road embankment, where vegetation clearance, temporary road diversion, haul road installation, embankment construction and installation and use of conveyor system were underway;
- Copthall Retained Embankment / Trough, where main activities included vegetation clearance, haul road installation, bulk excavation, installation and use of conveyor system and works for the Copthall Tunnel West Portal (including piling, excavation and portal construction) were underway;
- Northern Sustainable Placement Area, where vegetation clearance, haul road installation, installation and use of conveyor system, stockpiling and localised service connection works were underway;
- Southern Sustainable Placement Area, where vegetation clearance, haul road installation, stockpiling and localised service connection works were underway.

There were no exceedances of the HS2 threshold levels for significant noise impacts, which are defined in Information Paper E23 (<https://www.gov.uk/government/publications/hs2-information-papers-environment>), during the reporting period.

There were no exceedances of trigger levels as defined in Section 61 consents during the reporting period at any monitoring position.

One (1) complaint was received during the monitoring period. A description of the complaint, the results of investigation and any actions taken are detailed in Table 7 of this report.

# Abbreviations and Descriptions

The abbreviations, descriptions and project terminology used within this report can be found in Table 1.

Table 1: Table of Abbreviations

Acronym/Term	Definition
$L_{Aeq,T}$	See equivalent continuous sound pressure level
Ambient sound	A description of the all-encompassing sound at a given location and time which will include sound from many sources near and far. Ambient sound can be quantified in terms of the equivalent continuous sound pressure level, $L_{pAeq,T}$
Decibel(s), or dB	Between the quietest audible sound and the loudest tolerable sound there is a million to one ratio in sound pressure (measured in Pascal (Pa)). Because of this wide range, a level scale called the decibel (dB) scale, based on a logarithmic ratio, is used in sound measurement. Audibility of sound covers a range of approximately 0-140dB.
Decibel(s) A-weighted, or dB(A)	The human ear system does not respond uniformly to sound across the detectable frequency range and consequently instrumentation used to measure sound is weighted to represent the performance of the ear. This is known as the 'A weighting' and is written as 'dB(A)'.
Equivalent continuous sound pressure level, or $L_{Aeq,T}$	An index used internationally for the assessment of environmental sound impacts. It is defined as the notional unchanging level that would, over a given period of time (T), deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating sound levels can be described in terms of an equivalent single figure value, typically expressed as a decibel level.
Exclusion of data	Measurement of noise levels can be affected by weather conditions such as prolonged periods of rain, winds speeds higher than 5m/s and snow/ice ground cover. Noise levels measured during these periods are considered not representative of normal noise conditions at the site and, for the purposes of this report, are excluded from the assessment of exceedances and calculation of typical noise levels and are also greyed out in charts. Identifiable incongruous noise and vibration events not attributable to HS2 construction noise are also excluded.
Façade	A facade noise level is the noise level 1m in front of a large reflecting surface. The effect of reflection, is to produce a slightly higher (typically +3 dB) sound level than it would be if the reflecting surface was not there.
Free-field	A free-field noise level is the noise level measured at a location where no reflective surfaces, other than the ground, lies within 3.5 metres of the microphone position.
LOAEL	Lowest Observed Adverse Effect Level - the level above which adverse effects on health and quality of life can be detected.
Peak particle velocity, or PPV	Instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position. The PPV is a simple indicator of perceptibility and risk of damage to structures due to vibration. It is usually measured in mm/s.
SOAEL	Significant Observed Adverse Effect Level - the level above which significant adverse effects on health and quality of life occur.
Sound pressure level	The parameter by which sound levels are measured in air. It is measured in decibels. The threshold of hearing has been set at 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dB at a distance of 1 metre and a change of 3dB in a time varying sound signal is commonly regarded as being just detectable. A change of 10dB is subjectively twice, or half, as loud.
Vibration dose value, or VDV	An index used to evaluate human exposure to vibration in buildings. While the PPV provides information regarding the magnitude of single vibration events, the VDV provides a measure of the total vibration experienced over a specified period of time (typically 16h daytime and 8h night-time). It takes into account the magnitude, the number and the duration of vibration events and can be used to quantify exposure to continuous, impulsive, occasional and intermittent vibration. The vibration dose value is measured in $m/s^{1.75}$ .

# 1 Introduction

1.1.1 HS2 is required to undertake noise (and vibration) monitoring as necessary to comply with the requirements of the High Speed Rail (London-West Midlands) Environmental Minimum Requirements, including specifically Annex 1: Code of Construction Practice, in addition to any monitoring requirements arising from conditions imposed through consents under Section 61 of the Control of Pollution Act, 1974 or through Undertakings & Assurances given to third parties. Such monitoring may be undertaken for the following purposes:

- monitoring the impact of construction works;
- to investigate complaints, incidents and exceedance of trigger levels; or
- monitoring the effectiveness of noise and vibration control measures.

1.1.2 Monitoring data and interpretive reports are to be provided to each relevant local authority on a monthly basis and shall include a summary of the construction activities occurring, the data recorded over the monitoring period, any complaints received, any periods in exceedance of agreed trigger levels, the results of any investigations and any actions taken or mitigation measures implemented. This report provides noise data, and interpretation thereof, for monitoring carried out by HS2 within the London Borough of Hillingdon (LBH) for the period 1<sup>st</sup> to 30<sup>th</sup> June 2022.

1.1.3 Construction sites in the local authority area where monitoring was undertaken during this period include:

- Colne Valley Viaduct Dews Lane site, ref.: CVV-DL (see Plan 1 in Appendix A), where work activities included:
  - piling including jetty piling, operation of support plant, test piling, de-sanding of pile bore, pile trimming, installation of reinforcement cages, concrete pouring and bored pile breaking out works;
  - compound operations (including de-sanding works);
  - invasive vegetation removal works;
  - ground investigation works;
  - pier construction, including yard supporting activities, leg post tensioning and tower crane mobilisation;
  - installation of ducts, including site preparation and earthworks;
  - water pumping works;
  - maintenance of the haul road;

- operation of satellite welfare and generator farms;
  - stabilisation and earthworks;
  - fibre-reinforced concrete works;
  - drainage works;
  - concrete drilling;
  - pontoon installation and condition surveys;
  - construction of compensation pond;
  - material storage;
  - fencing works;
  - environmental maintenance works;
  - construction of river crossing;
  - excavation works;
  - car park construction;
  - deck and launching grinder works; and
  - utility works.
- Colne Valley Viaduct Moorhall Road site, ref.: CVV-MR (see Plan 1 in Appendix A), where work activities included:
    - piling including operation of support plant, jetty piling, sheet piling, pile trimming, pile cap construction, installation of reinforcement cages, concrete pouring and bored pile breaking out works;
    - compound operations (including de-sanding works);
    - ground investigation works;
    - pier construction, including yard supporting activities, leg post tensioning and tower crane mobilisation;
    - installation of ducts, including site preparation and earthworks;
    - water pumping works;
    - maintenance of haul road;
    - operation of satellite welfare and generator farms ;
    - concrete drilling;
    - pontoon installation and condition surveys;

- construction of compensation pond;
  - material storage;
  - fencing works;
  - environmental maintenance;
  - construction of river crossing including emergency obstruction dismantling works;
  - excavation works;
  - launching grinder and deck works; and
  - utility works.
- West Ruislip Portal Worksite, ref.: WRP (see Plan 3 in Appendix A), where work activities included:
    - piling works, including bored and sheet piling, and pile trimming;
    - stone column installation;
    - bulk excavations;
    - steelworks and formworks installation;
    - concreting works;
    - dewatering; and
    - site set-up for tunnelling activities.
  - West Ruislip Retained Embankment Worksite, ref.: WRRE, where work activities included:
    - piling including bored piling, sheet piling and pile trimming;
    - stone column installation;
    - footpath construction;
    - bulk excavation;
    - steelworks and formworks installation;
    - dewatering; and
    - tunnelling activities set-up.
  - South Ruislip Ventilation Shaft worksite, ref.: SRVS (see Plan 4 in Appendix A), where work activities included:
    - diaphragm walling works including excavation;



- slurry fill;
- installation of cages; and
- concrete pour and pumping out of slurry.
- Harvil Road worksite, ref.: HR (see Plan 2 in Appendix A), where work activities included:
  - piling including bored piling, sheet piling and pile trimming;
  - road diversion works; and
  - bridge installation.

1.1.4 Further works, where monitoring did not take place, were also undertaken at the following location:

- Colne Valley where power utility works were underway;
- The Greenway (West Ruislip) where sewer utility works were underway;
- Harvil Road embankment, where vegetation clearance, temporary road diversion, haul road installation, embankment construction and installation and use of conveyor system were underway;
- Cophall Retained Embankment / Trough, where main activities included vegetation clearance, haul road installation, bulk excavation, installation and use of conveyor system and works for the Cophall Tunnel West Portal (including piling, excavation and portal construction) were underway;
- Northern Sustainable Placement Area, where vegetation clearance, haul road installation, installation and use of conveyor system, stockpiling and localised service connection works were underway;
- Southern Sustainable Placement Area, where vegetation clearance, haul road installation, stockpiling and localised service connection works were underway.

1.1.5 The applicable standards, guidance, and monitoring methodology are outlined in the construction noise and vibration monitoring methodology report which can be found at the following location <https://www.gov.uk/government/collections/monitoring-the-environmental-effects-of-hs2>. Noise and vibration monitoring reports for previous months can also be found at this location.

## 1.2 Measurement Locations

- 1.2.1 Thirteen (13) noise and two (2) vibration monitoring installations were active in June in the LBH area. Table 2 summarises the position of noise and vibration monitoring installations within the LBH area in June 2022.
- 1.2.2 On Tuesday 14<sup>th</sup> June 2022, the vibration monitor ref.: HL-V001, worksite ref.: WRRE, was removed following discussions with the local authority. A replacement vibration monitor is to be installed at an alternative location.
- 1.2.3 Maps showing the position of noise monitoring installations are presented in Appendix B.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
Colne Valley Viaduct Dews Lane (CVV-DL)	CVV-DL-NMP2	Highway Farm House, Harvil Rd, Harefield, Uxbridge
	CVV-DL-NMP3	Dew's Farm Cottages, Dews Lane, Harefield, Uxbridge
Colne Valley Viaduct Moorhall Road (CVV-MR)	CVV-MR-NMP1	Weir Cottage, Denham Garden Village, Denham, Buckinghamshire
	CVV-MR-NMP2	Harefield Marina, Moorhall Road, London Borough of Hillingdon, London, Greater London
	CVV-MR-NMP3	Peerless Drive, Harefield, Uxbridge
West Ruislip Portal (WRP)	N048	Ruislip Golf Course, Ickenham Rd, Ruislip
	N056	83 The Greenway, Ickenham, Ruislip
	N057	123 The Greenway, Ickenham, Ruislip
West Ruislip Retained Embankment (WRRE)	N065	Breakspear Road South, Harefield, Uxbridge
	N066	Hoylake Crescent, Ickenham, Uxbridge
	HL-V001	152 Hoylake Crescent, Ickenham, Uxbridge
South Ruislip Ventilation Shaft (SRVS)	N061	Cineworld South Ruislip car park, Ruislip
	SRVS-V001	Braintree Industrial Estate - Building D4
Harvil Road (HR)	N067	Harvil Road worksite south boundary
	HR-N002	Certas Energy Bunker Site - Harefield

## 2 Summary of Results

### 2.1 Summary of Measured Noise and Vibration Levels

2.1.1 Table 3 presents a summary of the measured noise levels at each monitoring location over the reporting period. The  $L_{Aeq,T}$  is presented for each of the relevant time periods averaged over the calendar month, along with the highest single period  $L_{Aeq,T}$  that was found to occur within the month.

Table 3: Summary of Measured dB LAeq Data over the Monitoring Period

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekday Average LAeq,T (highest day LAeq,T)					Saturday Average LAeq,T (highest day LAeq,T)					Sunday / Public Holiday Average LAeq,T (highest day LAeq,T)	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
CVV-DL	CVV-DL-NMP2	Highway Farm House, Harvil Rd, Harefield, Uxbridge	Free-field	52.8 (56.8)	53.7 (62.6)	51.6 (55.5)	51.0 (55.3)	51.1 (76.2)	54.1 (54.8)	55.3 (56.5)	54.4 (55.7)	53.5 (55.6)	56.9 (76.6)	54.4 (64.2)	52.9 (55.7)
	CVV-DL-NMP3	Dew's Farm Cottages, Dews Lane, Harefield, Uxbridge,	Free-field	54.8 (61.6)	57.0 (68.5)	48.0 (53.2)	47.0 (64.2)	45.6 (56.2)	54.5 (59.0)	56.1 (59.9)	53.5 (56.2)	49.8 (57.2)	47.4 (58.7)	48.3 (55.6)	47.6 (54.3)
CVV-MR	CVV-MR-NMP1	Weir Cottage, Denham Garden Village, Denham, Buckinghamshire	Free-field	48.8 (54.1)	51.1 (58.3)	48.4 (52.9)	47.3 (53.0)	44.3 (55.5)	50.6 (55.2)	51.2 (52.4)	51.1 (52.9)	50.3 (53.2)	48.3 (60.3)	49.7 (52.7)	47.3 (54.8)
	CVV-MR-NMP2	Harefield Marina, Moorhall Road, London, Greater London	Free-field	48.5 (58.0)	58.0 (71.1)	45.1 (50.1)	44.9 (57.5)	42.2 (51.2)	48.5 (55.6)	50.3 (56.3)	49.8 (53.3)	47.6 (51.5)	45.2 (57.0)	47.6 (55.8)	44.3 (50.8)
	CVV-MR-NMP3	Peerless Drive, Harefield, Uxbridge	Free-field	49.4 (55.7)	53.7 (61.8)	46.3 (52.3)	45.9 (59.0)	45.2 (58.1)	52.2 (53.2)	53.6 (57.7)	50.5 (52.0)	49.3 (52.4)	49.4 (61.4)	51.0 (67.2)	47.5 (56.2)
WRP	N048	West Ruislip Golf Club, Ickenham Rd, Ruislip	Free-field	57.0 (65.0)	60.5 (66.2)	53.2 (57.5)	50.8 (65.3)	47.9 (54.2)	53.5 (54.0)	57.7 (60.7)	56.4 (61.8)	52.4 (59.0)	47.5 (50.6)	51.2 (58.0)	48.6 (53.4)
	N056	83 The Greenway, Ickenham, Ruislip	Free-field	58.6 (62.2)	59.2 (60.5)	59.7 (62.6)	58.6 (61.3)	52.8 (68.1)	53.2 (58.9)	57.9 (59.7)	57.9 (60.5)	57.9 (62.5)	49.2 (57.7)	59.0 (67.0)	55.2 (62.0)

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Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$ )					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$ )					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$ )	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
	N057	123 The Greenway, Ickenham, Ruislip	Free-field	54.7 (58.1)	55.5 (56.5)	56.1 (59.1)	55.5 (59.2)	49.8 (57.6)	50.8 (55.0)	56.0 (58.2)	55.9 (58.3)	55.2 (63.1)	47.5 (53.5)	55.3 (58.4)	52.1 (58.4)
WRRE	N065	Breakspear Road South, Harefield, Uxbridge	Free-field	64.6 (67.1)	64.2 (65.6)	64.7 (66.6)	62.9 (67.7)	58.5 (67.3)	62.1 (62.6)	64.1 (65.4)	64.1 (64.9)	64.1 (65.7)	58.3 (62.7)	63.5 (66.7)	60.2 (67.3)
	N066	Hoylake Crescent, Ickenham, Uxbridge	Free-field	55.6 (61.4)	55.1 (56.9)	54.9 (57.5)	53.9 (57.8)	54.7 (68.5)	52.7 (55.9)	54.4 (55.6)	55.1 (56.8)	53.4 (57.1)	52.5 (65.4)	54.4 (60.8)	56.2 (66.6)
SRVS	N061	Cineworld South Ruislip car park, Ruislip	Free-field	58.6 (61.5)	61.8 (63.1)	61.6 (63.7)	61.6 (65.9)	55.2 (63.5)	58.6 (60.0)	62.0 (63.0)	62.9 (63.9)	62.1 (64.6)	55.3 (60.7)	61.2 (66.7)	55.7 (61.6)
HR	N067	Harvil Road worksite south boundary	Free-field	53.8 (56.7)	57.2 (64.3)	53.7 (59.8)	56.3 (65.8)	50.3 (61.0)	51.0 (53.0)	55.3 (60.4)	54.7 (57.7)	55.9 (63.0)	50.5 (56.1)	54.4 (63.1)	50.4 (59.9)
	HR-N002	Certas Energy Bunker Site – Harefield	Free-field	62.8 (65.1)	64.8 (74.1)	60.9 (63.1)	58.7 (61.7)	57.3 (68.1)	62.1 (62.1)	61.4 (61.7)	61.5 (61.8)	59.7 (61.7)	55.2 (58.4)	60.2 (66.7)	61.1 (68.3)

2.1.2 Table 4: Summary of Measured PPV Data over the Monitoring Period presents a summary of the measured vibration levels at each monitoring location over the reporting period. The highest PPV measured during the monitoring along any axis is presented in the table.

Table 4: Summary of Measured PPV Data over the Monitoring Period

Worksite Reference	Measurement Reference	Monitor Address	Highest PPV measured in any axis, mm/s
WRRE	HL-V001	152 Hoylake Crescent, Ickenham, Uxbridge	0.51 (Z-axis)
SRVS	SRVS-V001	Braintree Industrial Estate - Building D4	0.85 (Z-axis)

2.1.3 Appendix C presents graphs of the noise and vibration monitoring data over the month for each of the measurement locations. Noise data presented consists of the hourly  $L_{Aeq}$  values and, where relevant, the  $L_{Aeq,T}$  values (where the time period T has been taken to be the averaging period as specified in Table 1 of HS2 Information Paper E23). Vibration data presented consist of hourly PPV values. The full data set for the monitoring equipment can be found at the following location:

<https://data.gov.uk/dataset/24542ae7-dd44-444f-b259-871c4cc43b5e/environmental-monitoring-data>.

## 2.2 Exceedances of the LOAEL and SOAEL

2.2.1 The lowest observed adverse effect level (LOAEL) is defined in the Planning Practice Guidance – Noise (PPG) as the level above which "noise starts to cause small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life".

2.2.2 The significant observed adverse effect level (SOAEL) is defined in the 'Planning Practice Guidance – Noise' as the level above which "noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area."

2.2.3 HS2 Phase One Information Paper E23: Control of Construction Noise and Vibration sets out the LOAELs and SOAELs for construction noise.

2.2.4 Where reported construction noise levels exceed the LOAEL and SOAEL, relevant periods will be identified. Summary statistics to evaluate ongoing qualification for noise insulation and temporary rehousing are also presented where relevant.

2.2.5 Table 5 presents a summary of recorded exceedances of the LOAEL and SOAEL at each measurement location over the reporting period, including the number of exceedances during each time period.

Table 5: Summary of Exceedances of LOAEL and SOAEL

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
CVW-DL	CVW-DL-NMP2	Highway Farm House, Harvil Rd, Harefield, Uxbridge	All days	All periods	No exceedance	No exceedance
	CVW-DL-NMP3*	Dew's Farm Cottages, Dews Lane, Harefield, Uxbridge	All days	All periods	No exceedance	No exceedance
CVW-MR	CVW-MR-NMP1	Weir Cottage, Denham Garden Village, Denham, Buckinghamshire	All days	All periods	No exceedance	No exceedance
	CVW-MR-NMP2	Harefield Marina, Moorhall Road, London, Greater London	Weekdays	0800-1800	8	No exceedance
	CVW-MR-NMP3	Peerless Drive, Harefield, Uxbridge	All days	All periods	No exceedance	No exceedance
WRP	N048	West Ruislip Golf Club, Ickenham Rd, Ruislip	Weekdays	0800-1800	1	No exceedance
			Nights	2200-0800	2	No exceedance
	N056	83 The Greenway, Ickenham, Ruislip	Weekdays	1900-2200	1	No exceedance
			Saturdays	1400-2200	5	No exceedance
			Sundays	0700-2200	6	No exceedance
			Nights	2200-0700	4	No exceedance
	N057	123 The Greenway, Ickenham, Ruislip	Saturdays	1400-2200	1	No exceedance
			Nights	2200-0700	30	No exceedance
WRRE	N065	Breakspear Road South, Harefield, Uxbridge	Weekdays	0800-1800	21	No exceedance
			Saturdays	0800-1300	3	No exceedance

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
WRRE	N066	Hoylake Crescent, Ickenham, Uxbridge	All days	All periods	No exceedance	No exceedance
SRVS	N061	Hoylake Crescent, Ickenham, Uxbridge	All days	All period	Not applicable**	Not applicable**
HR	N067	Harvil Road worksite south boundary	Nights	2200-0800	2	No exceedance
	HR-N002	Certas Energy Bunker Site – Harefield	Weekdays	0800-1800	10	No exceedance

\*A distance correction has been applied when calculating exceedances of the LOAEL and SOAEL.

\*\* The defined LOAEL and SOAEL criteria are not applicable to non-residential receptors

2.2.6 No exceedances of the SOAEL were recorded due to HS2 construction works during June 2022. LOAEL exceedances have been recorded at noise monitoring location ref.: CVV-MR-NMP2, ref.: N048, ref.: N065, ref.: HR-N002 during core hours, at noise monitoring location ref.: N048, ref.: N056, ref.: N057, ref.: N067 during night periods, at noise monitoring location ref.: N056, ref.: N057, ref.: N065 during Saturdays and at noise monitoring location ref.: N056 during Sundays.



## 2.3 Exceedances of Trigger Level

2.3.1 Table 6 provides a summary of exceedances of the Section 61 trigger noise levels determined to be due to HS2 related construction noise measured during the reporting period, along with the findings of any investigation.

Table 6: Summary of Exceedances of Trigger Levels

Complaint Reference Number (if applicable)	Worksite Reference	Date and Time Period	Identified Source	Results of Investigation (including noise monitoring results)	Actions Taken
-	-	-	-	-	-

## 2.4 Complaints

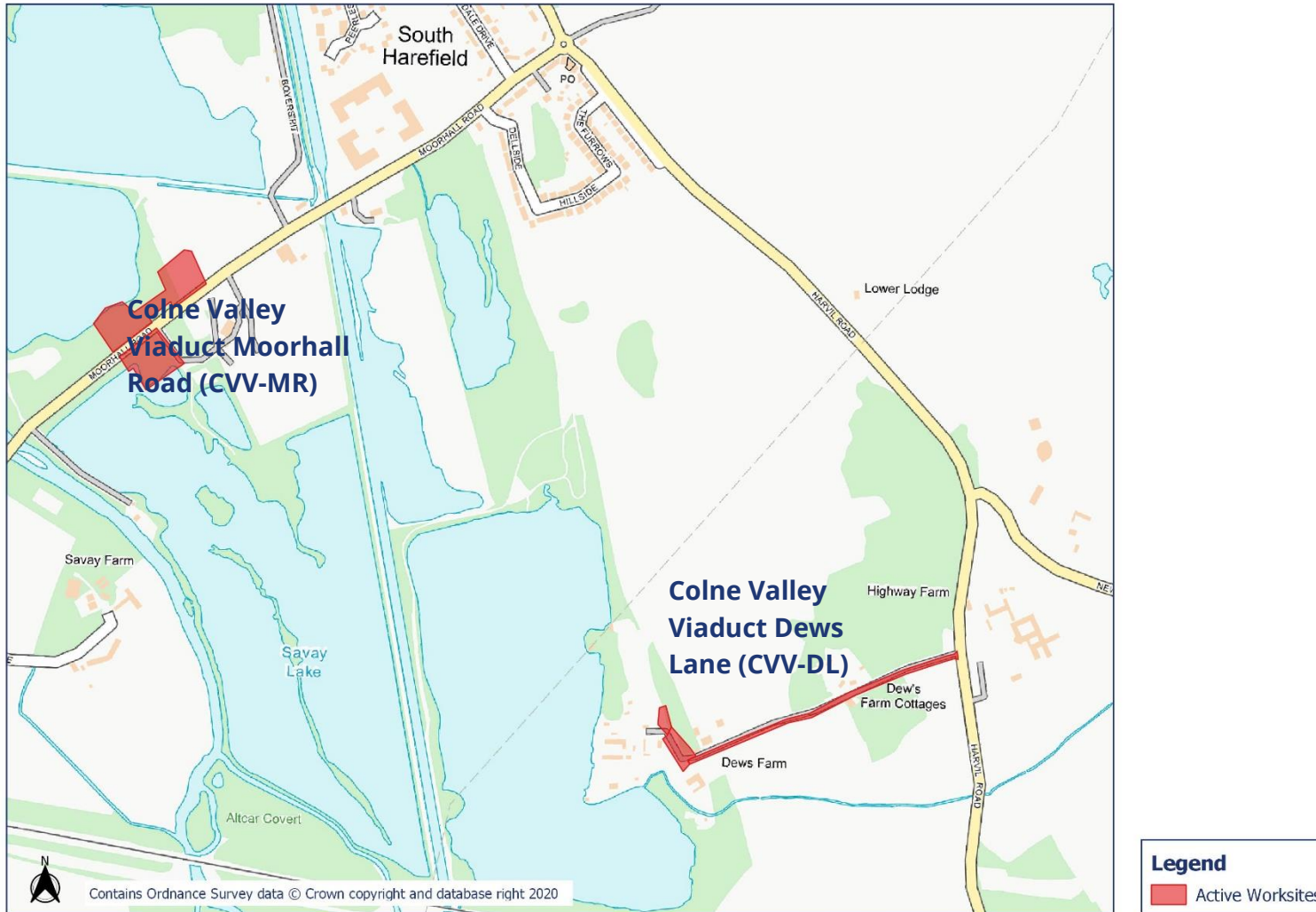
2.4.1 Table 7 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

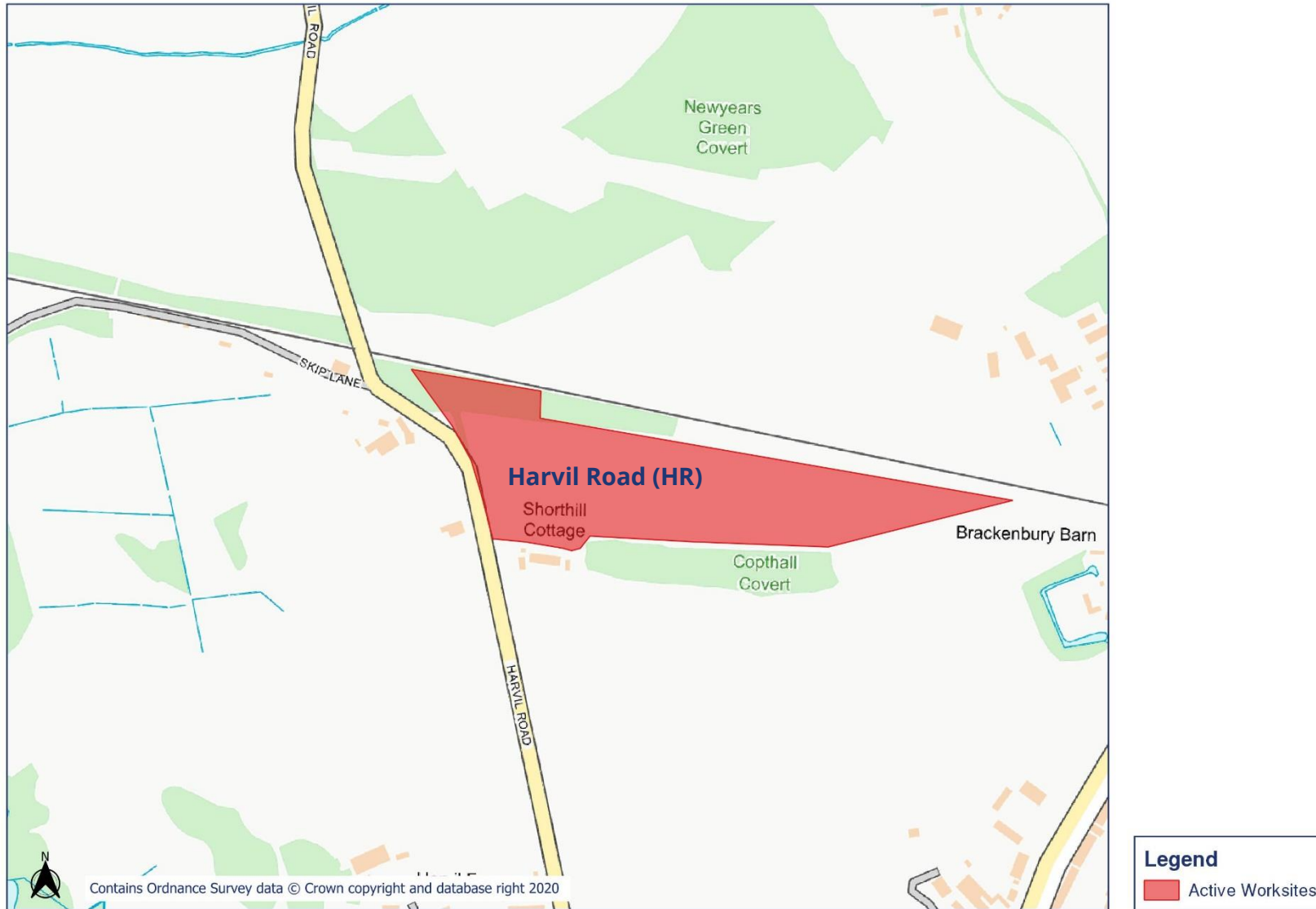
Table 7: Summary of Complaints

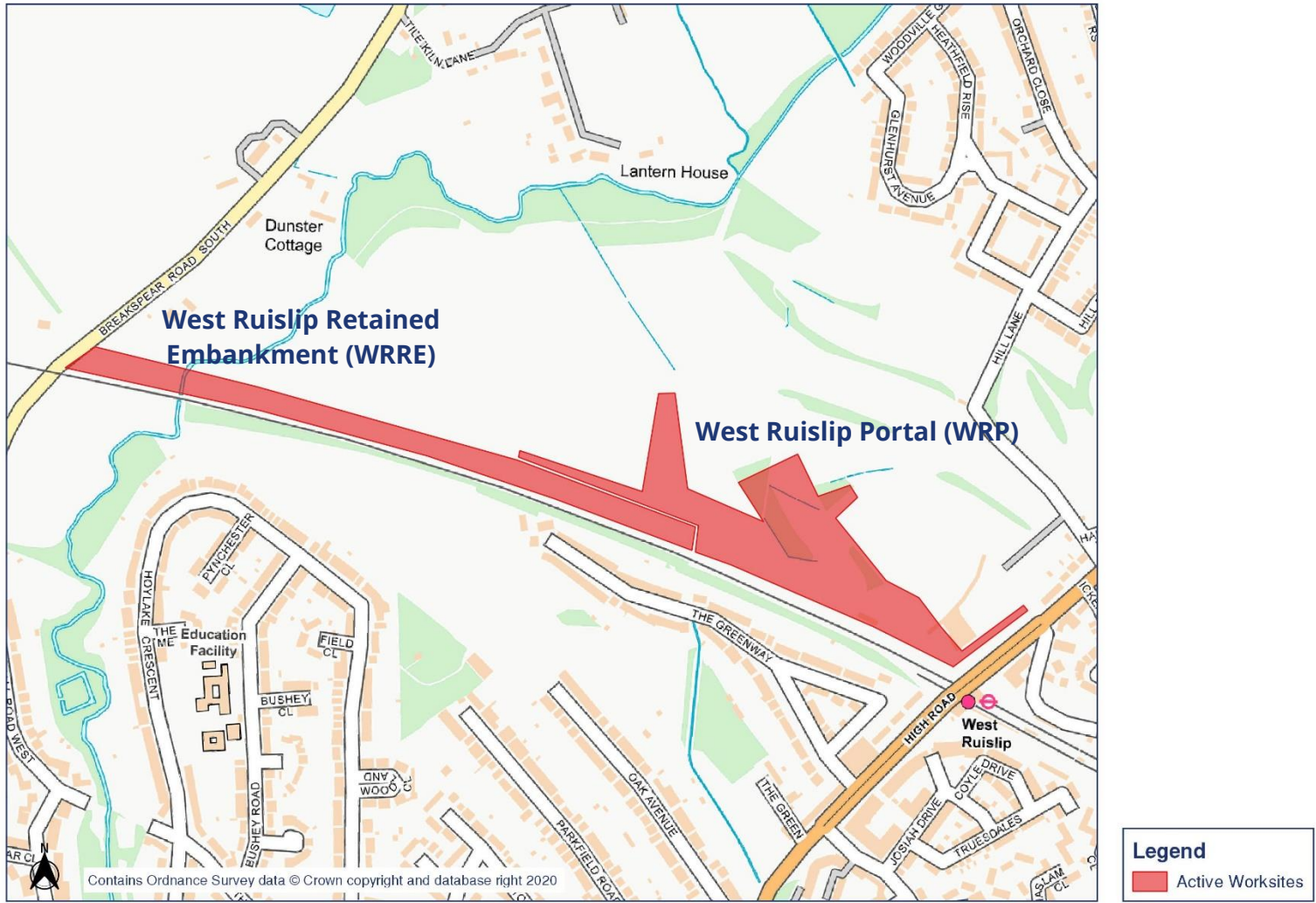
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-22-43754-C	WRP/WRRE	Complaint about noise from machinery.	The source of noise is believed to have been from archaeological works. Monitoring data demonstrates compliance with Section 61 requirements.	The complainant has been contacted and updated with details following investigation.

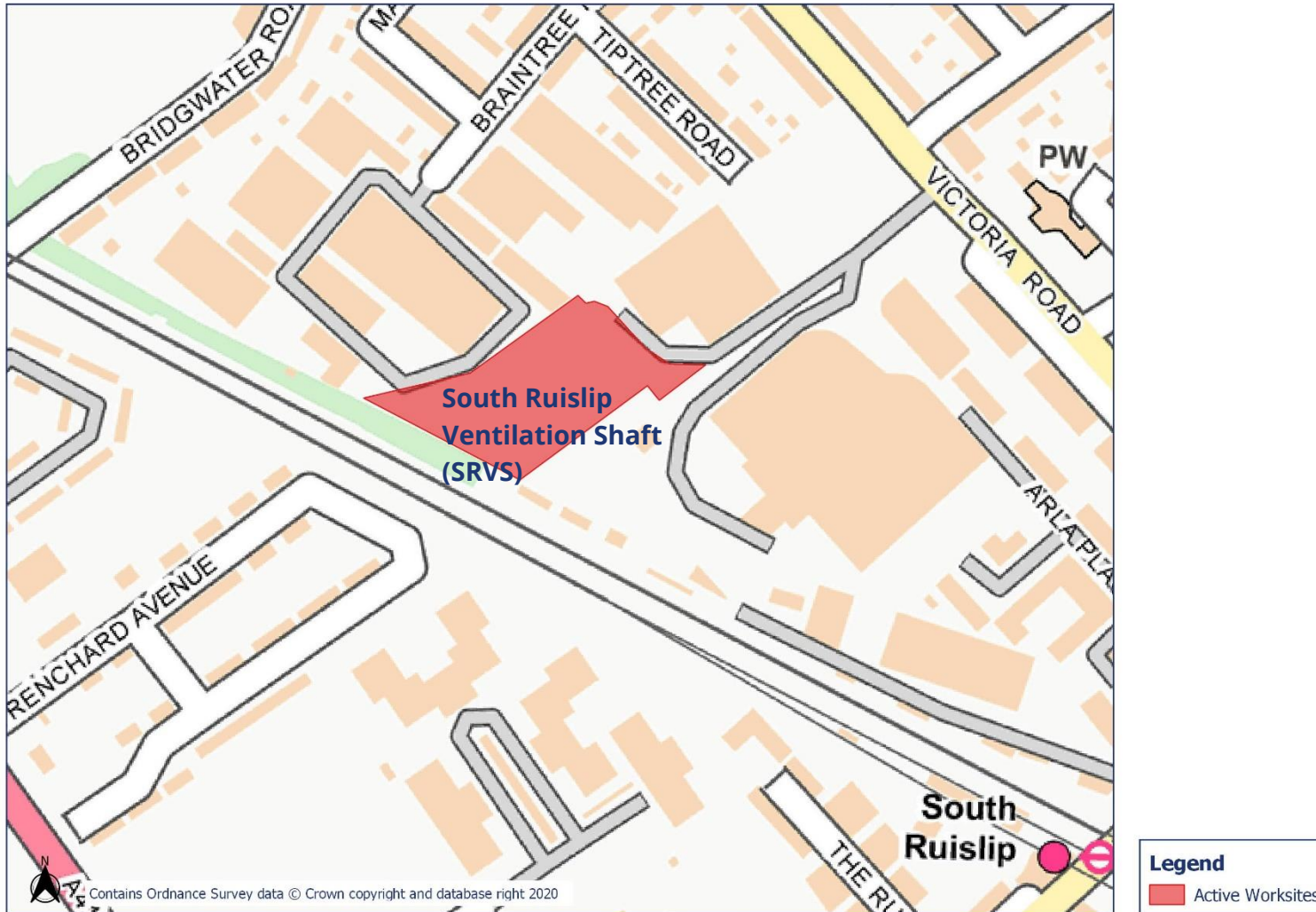
# Appendix A Site Locations





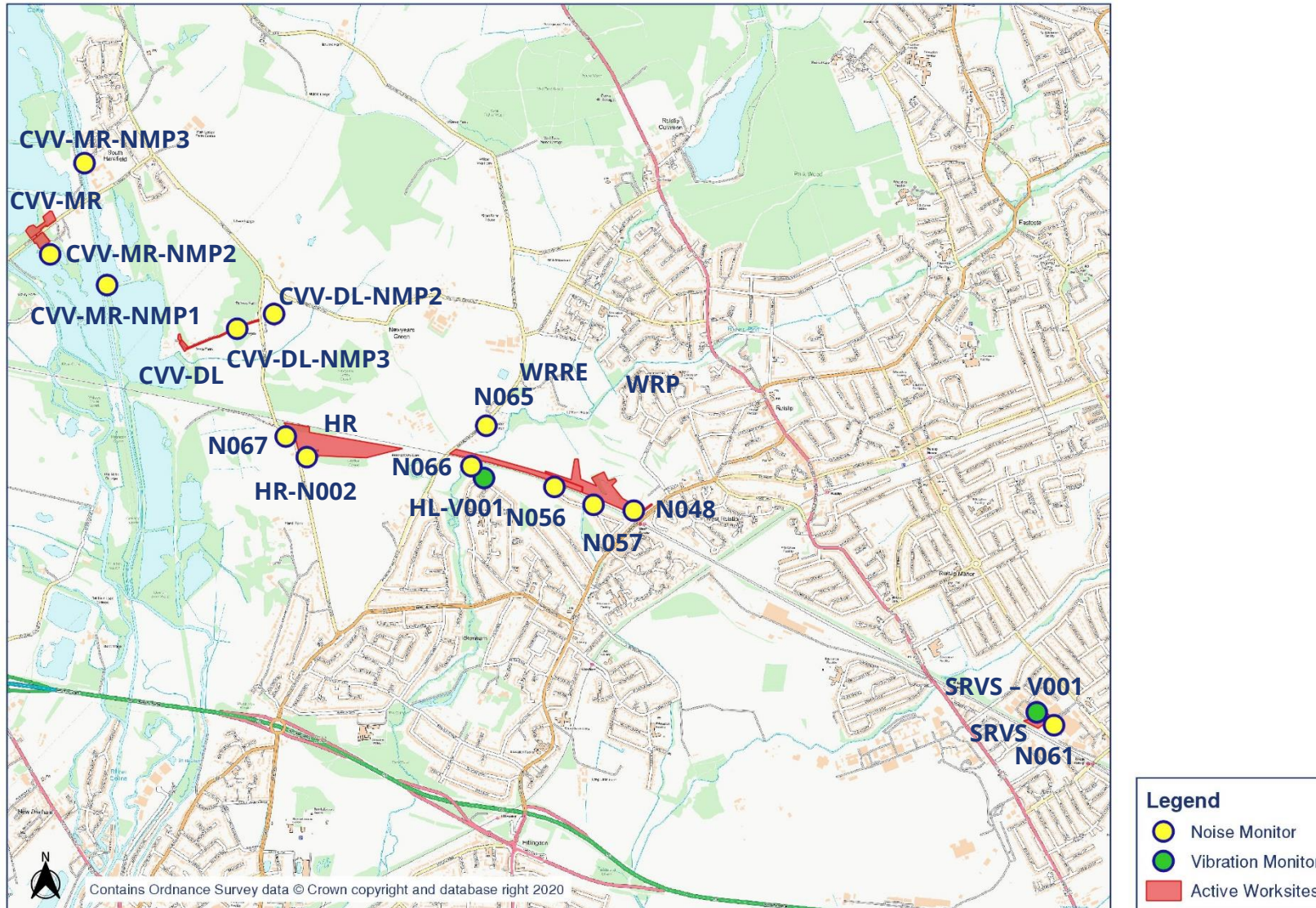


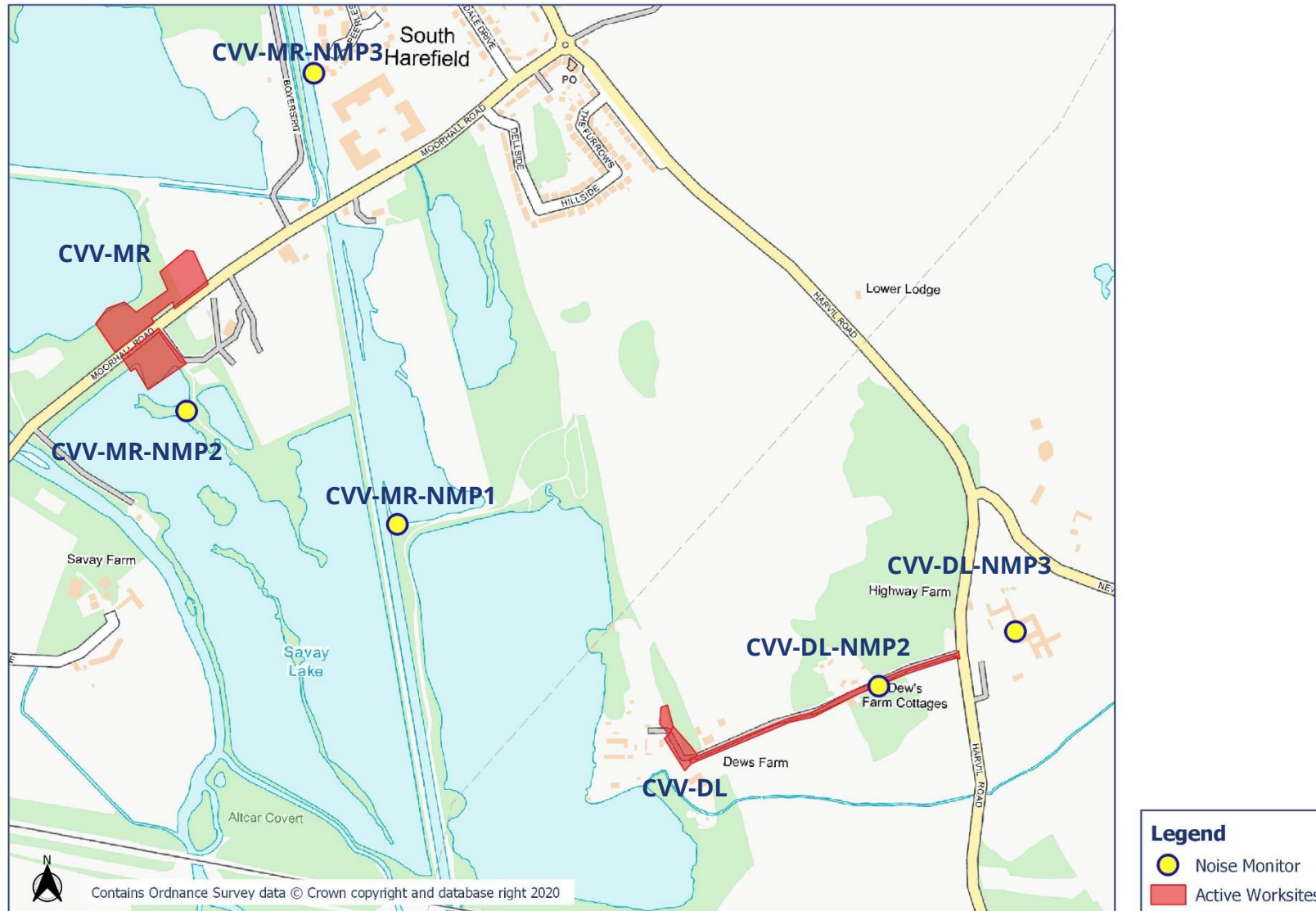


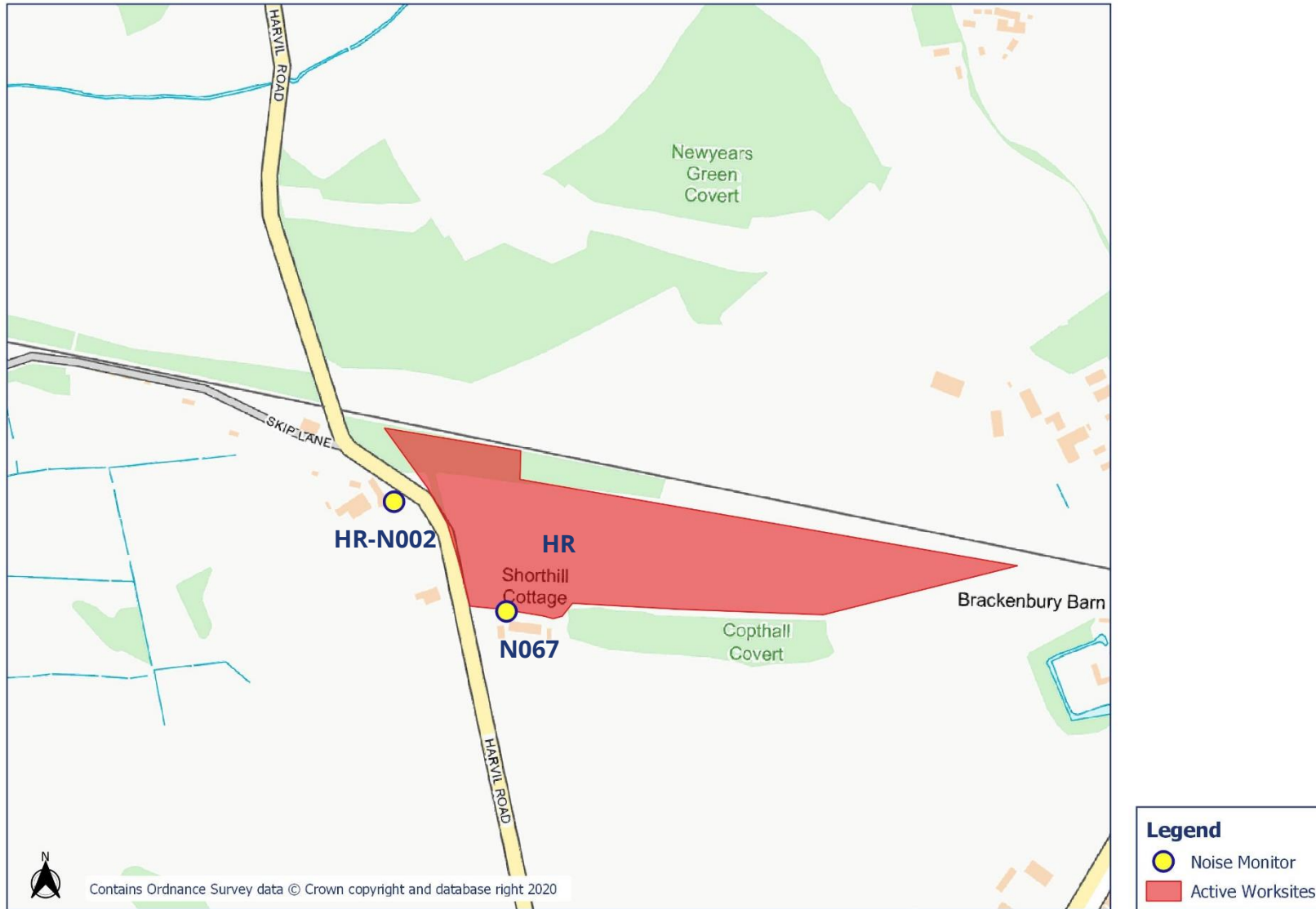


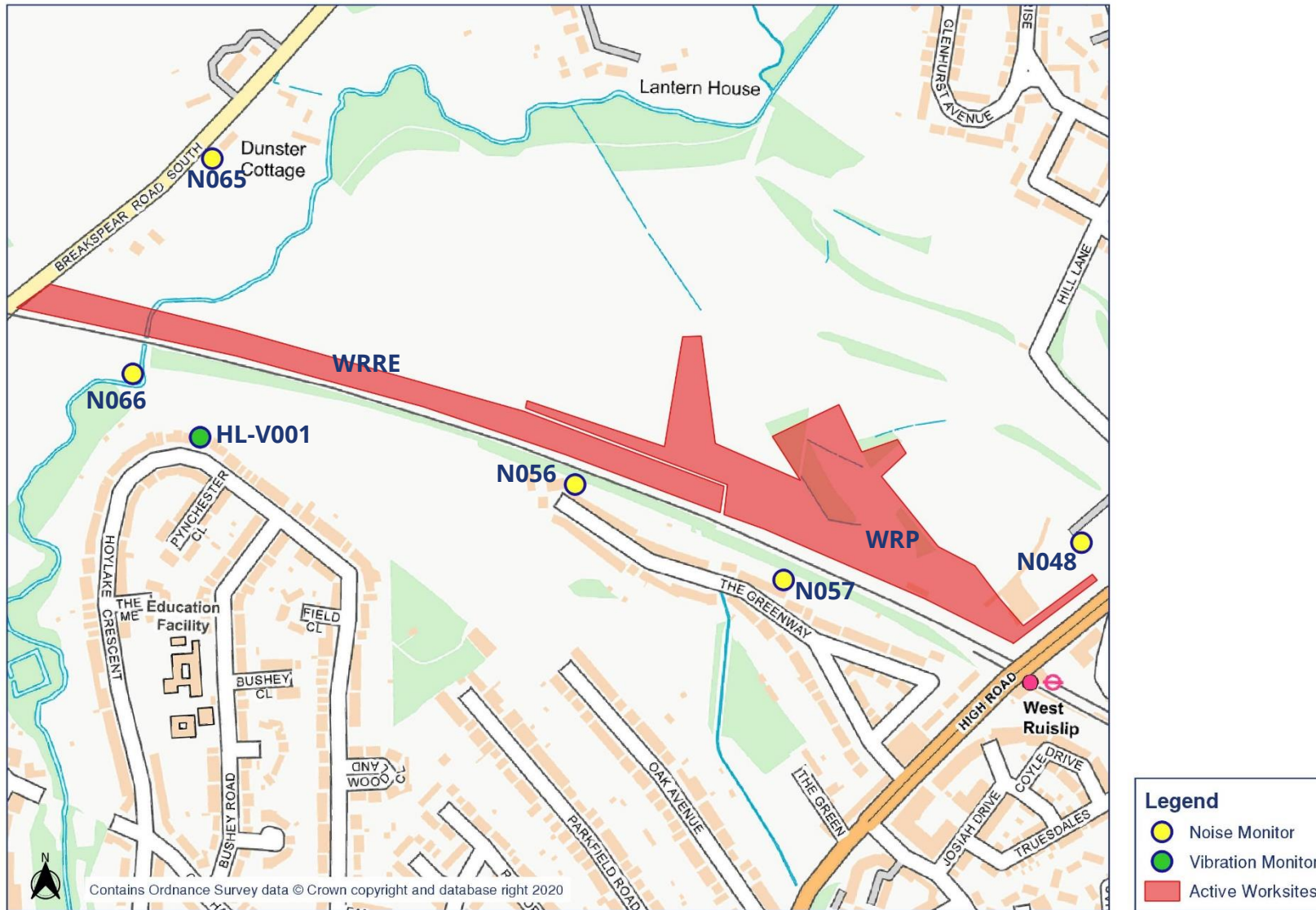
# Appendix B Monitoring Locations

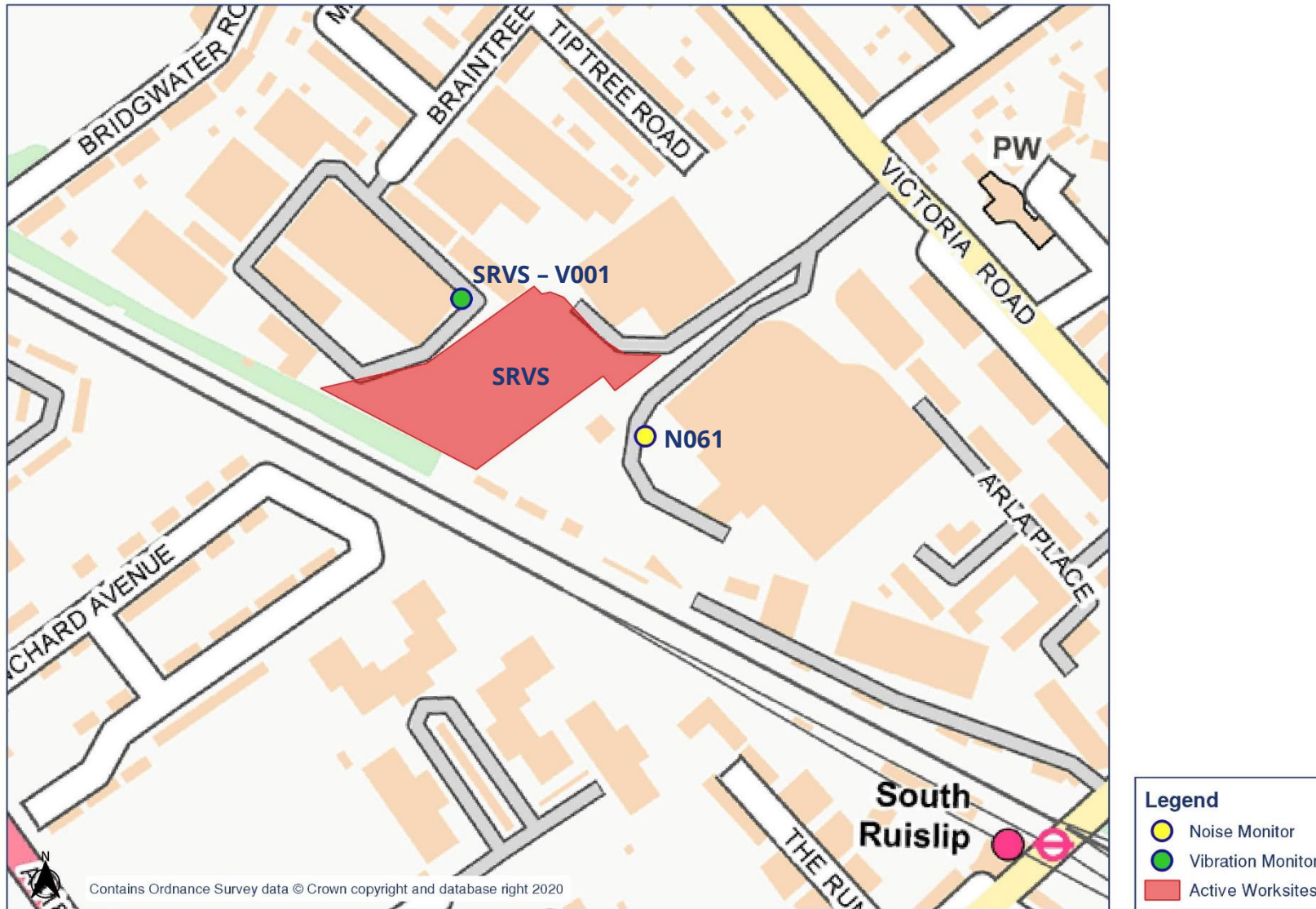












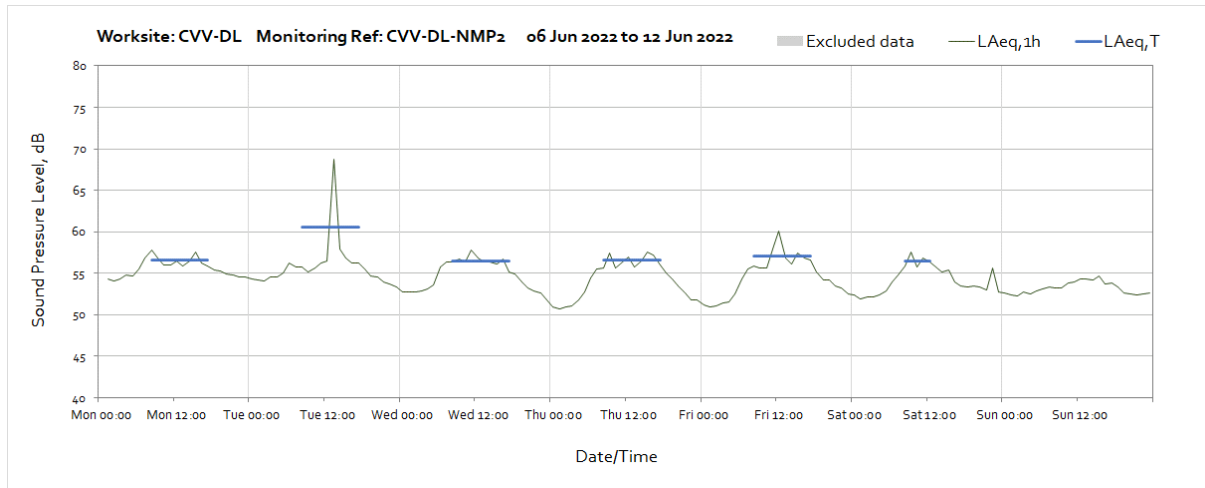
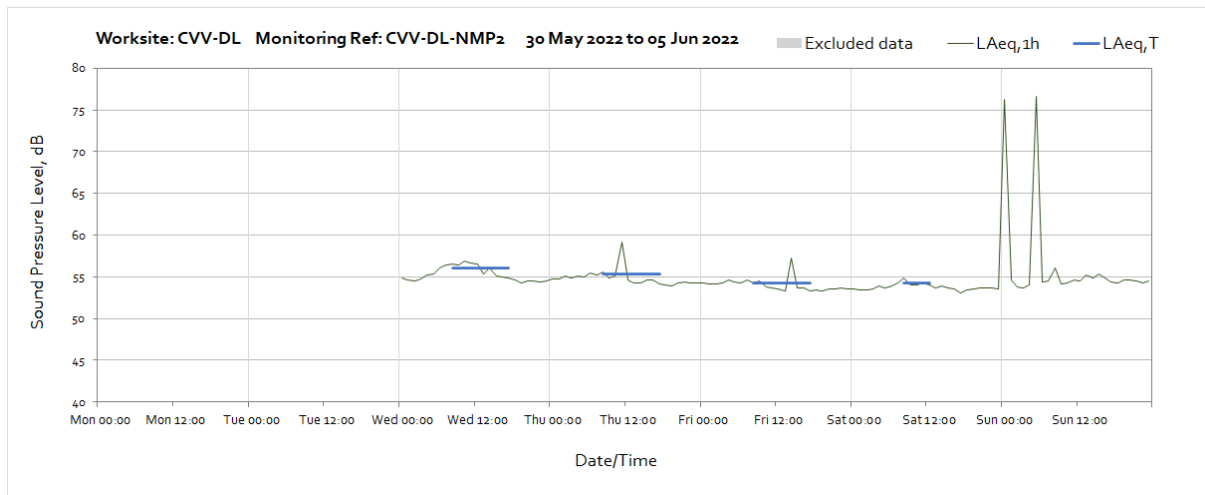
# Appendix C Data

## Noise

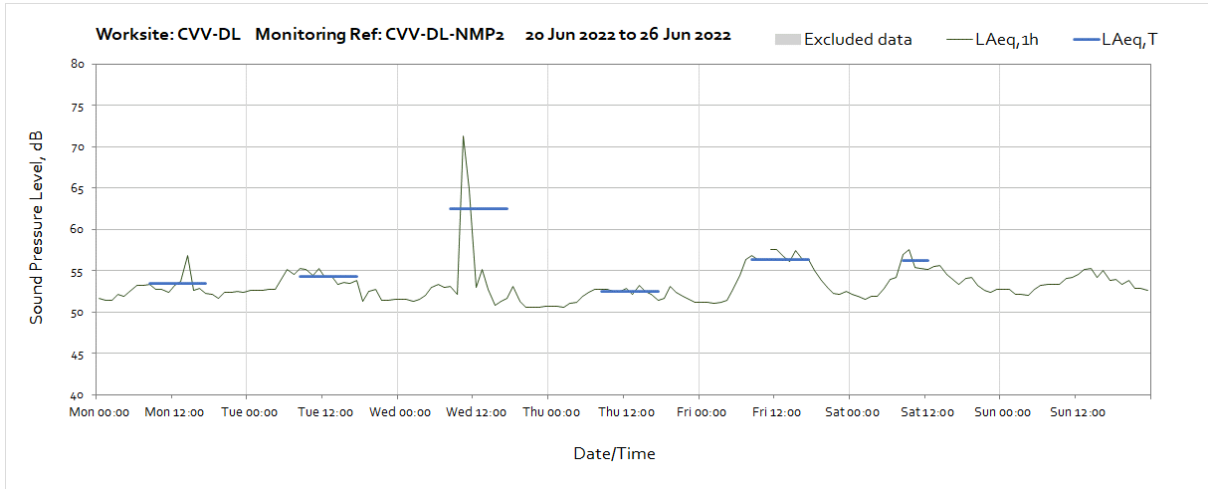
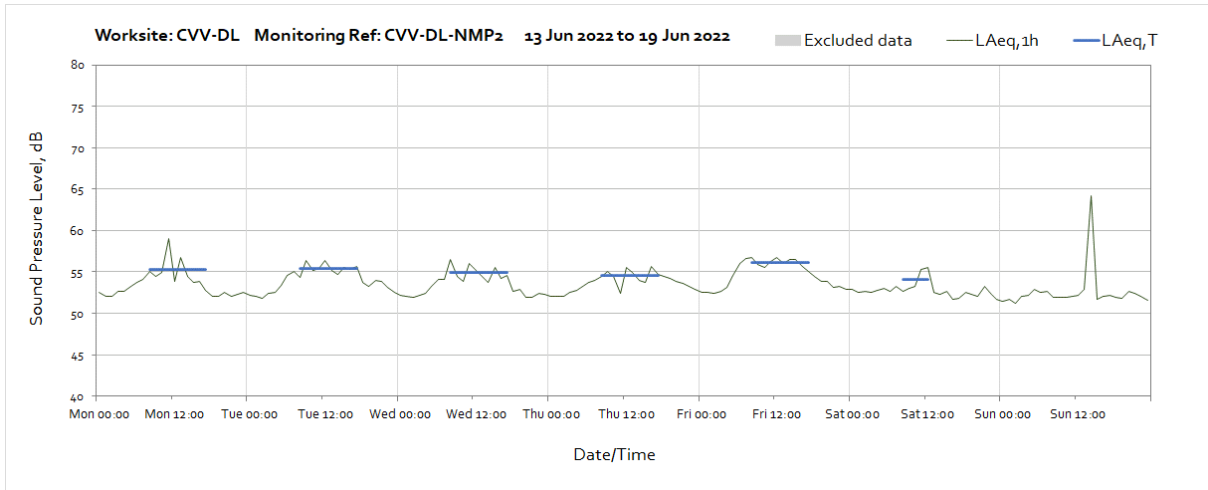
The following graphs show the hourly measured ambient noise level  $L_{Aeq,1h}$  and, where relevant, the averaged noise level  $L_{Aeq,T}$  values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have been excluded from the calculation of the  $L_{Aeq,T}$  values in Table 3 of the main report.

### Worksite: Colne Valley Viaduct Dews Lane (CVV-DL)

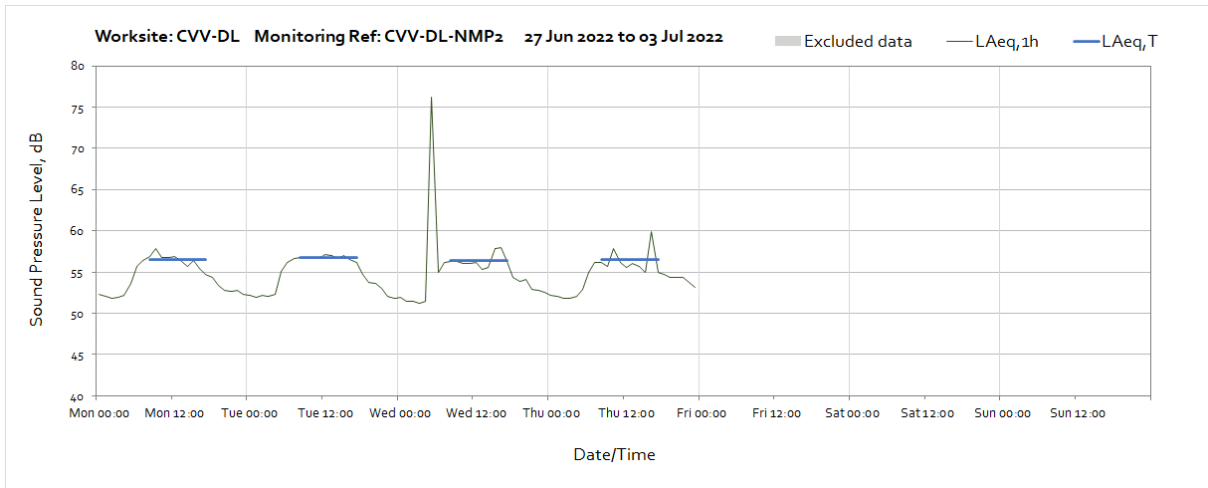
#### Monitoring Ref: CVV-DL-NMP2



Note: Missing data at 00:00 on Monday 6<sup>th</sup> June 2022 were due to monitor settings update.

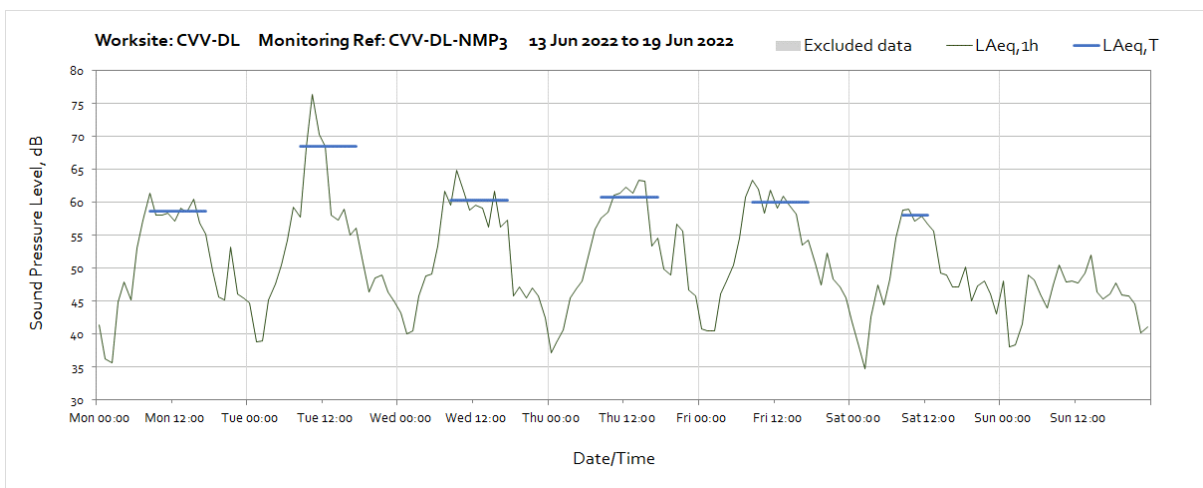
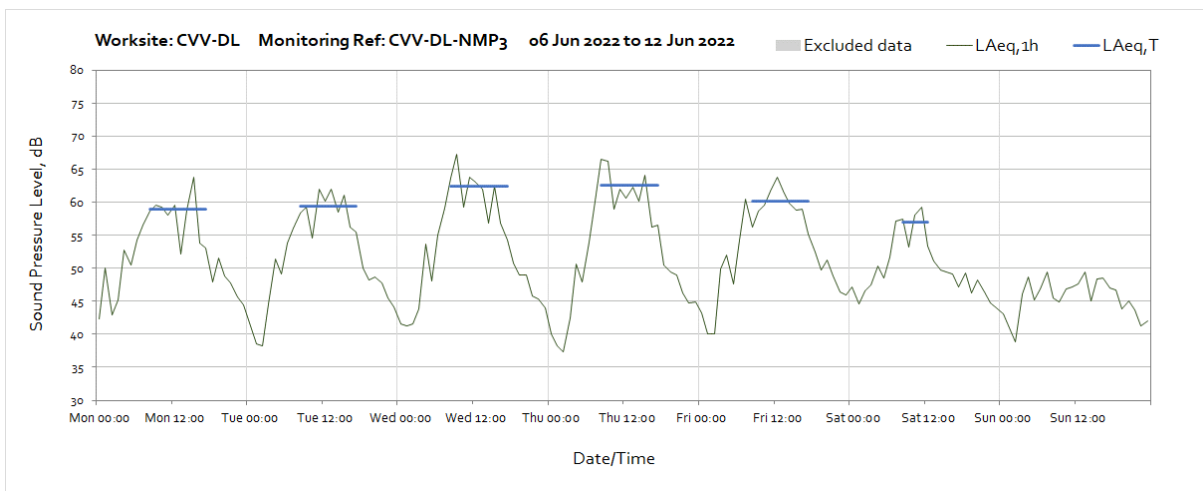
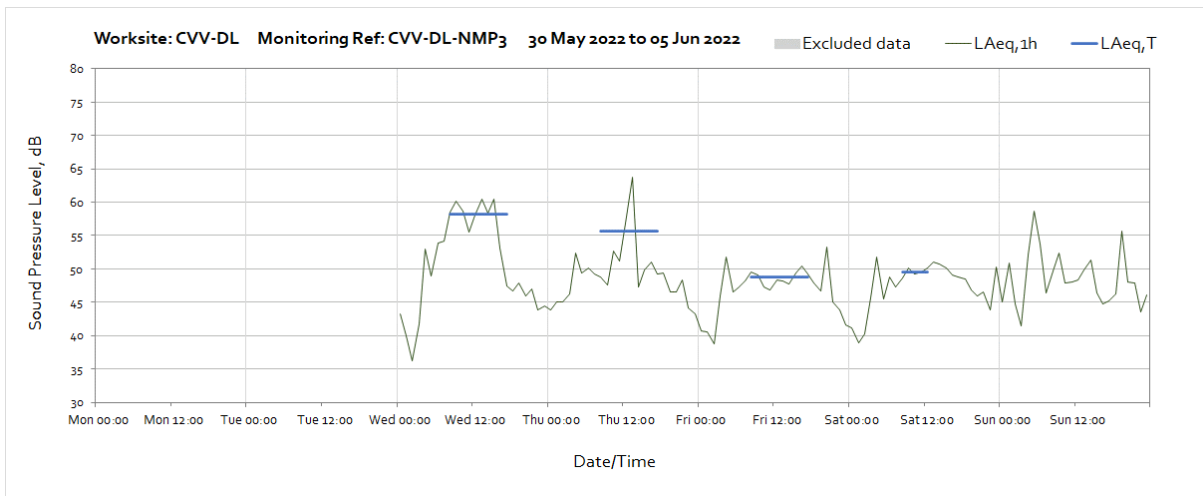


Note: Missing data at 10:00 on Friday 24<sup>th</sup> June 2022 were due to field calibration of the monitoring station.

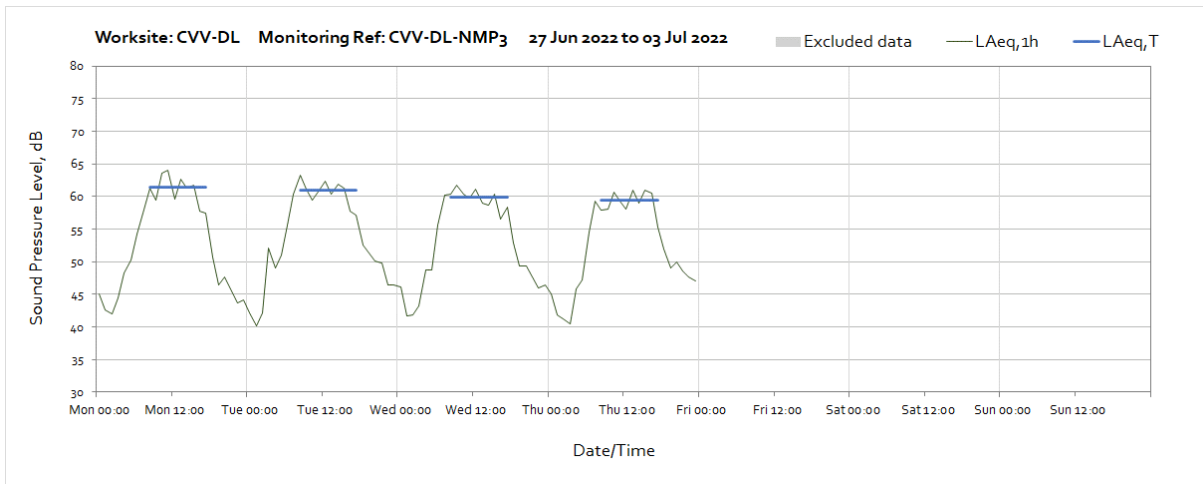
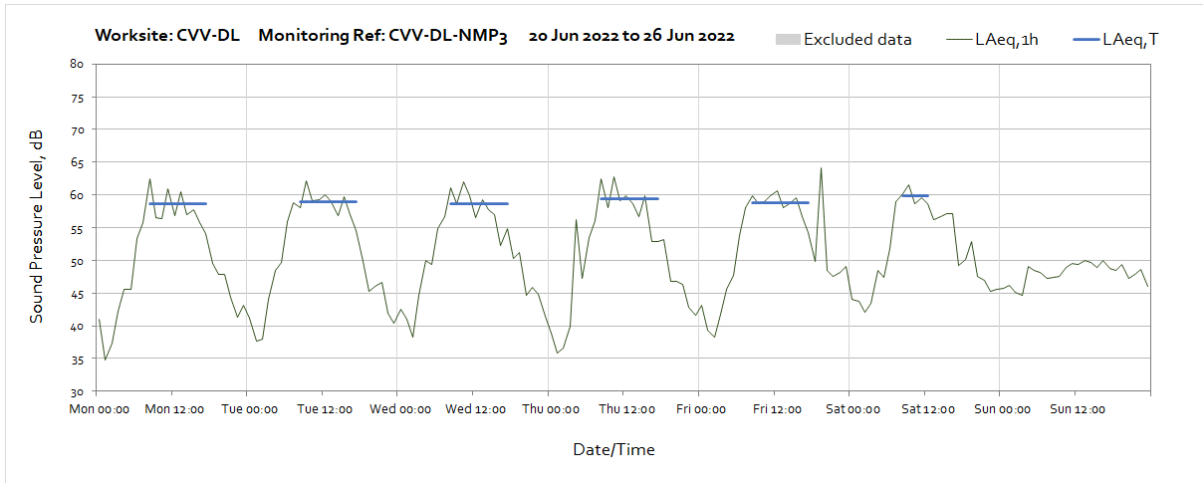


# Worksite: Colne Valley Viaduct Dews Lane (CVV-DL)

## Monitoring Ref: CVV-DL-NMP3

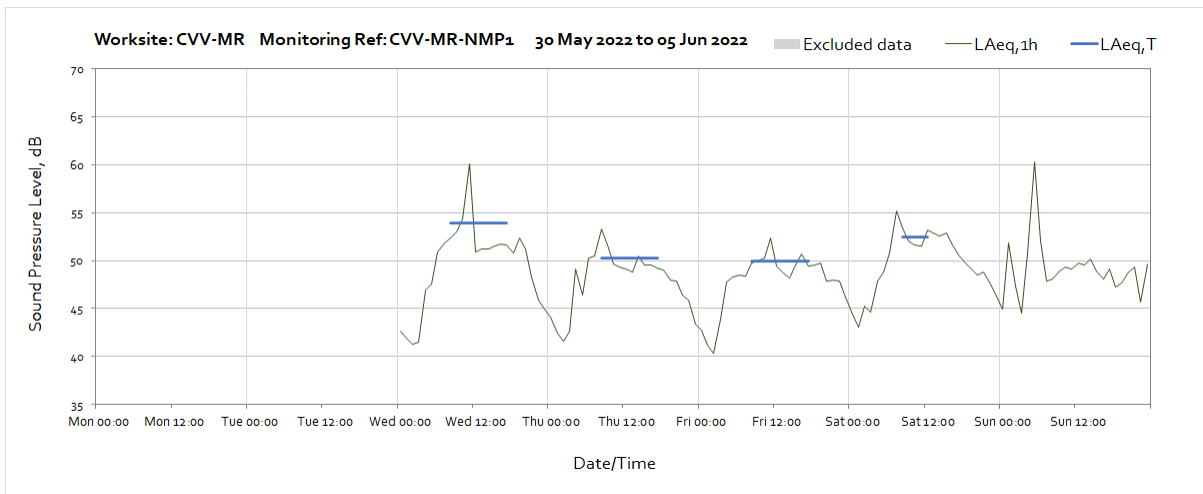


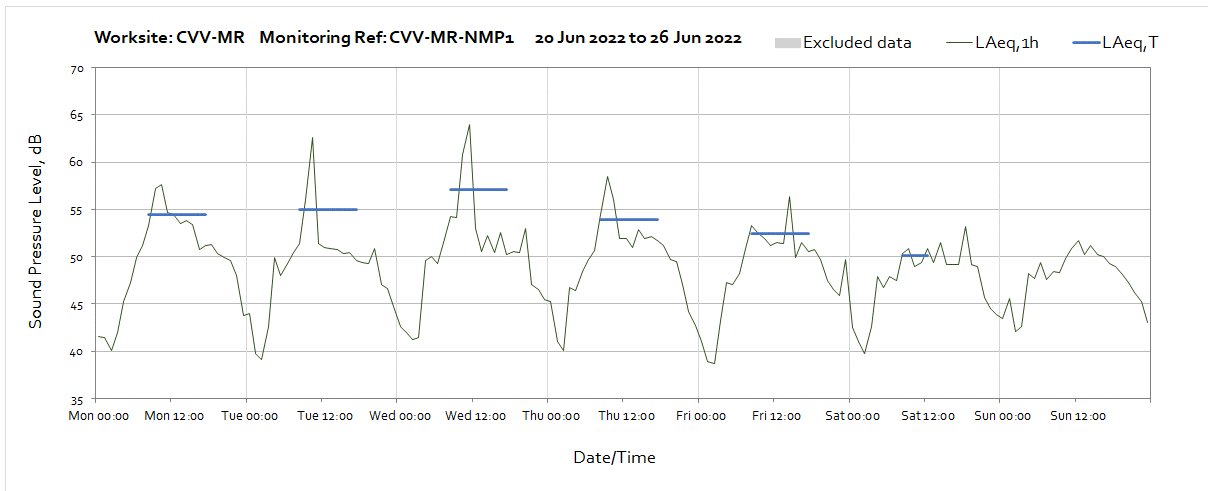
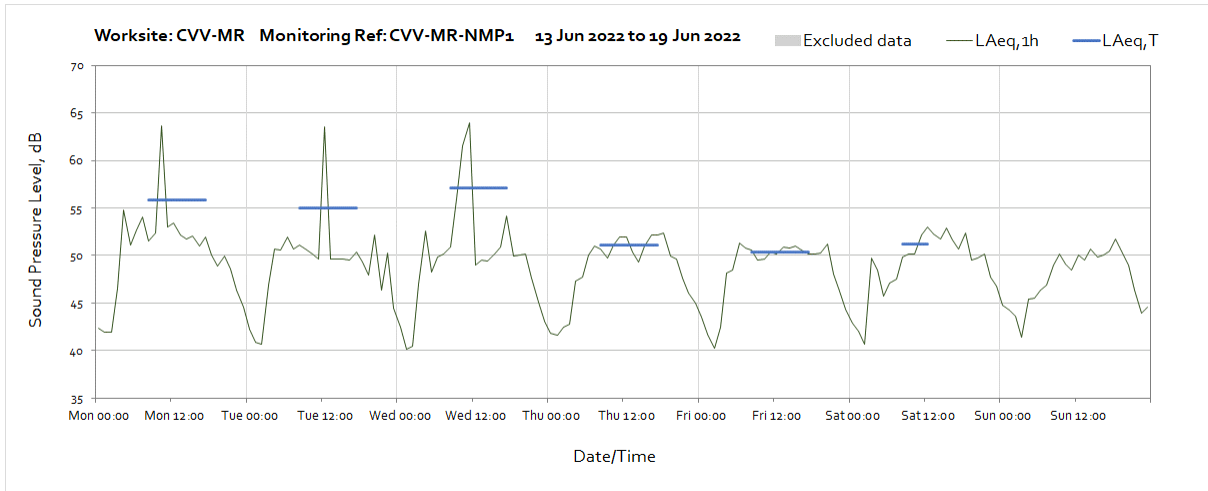
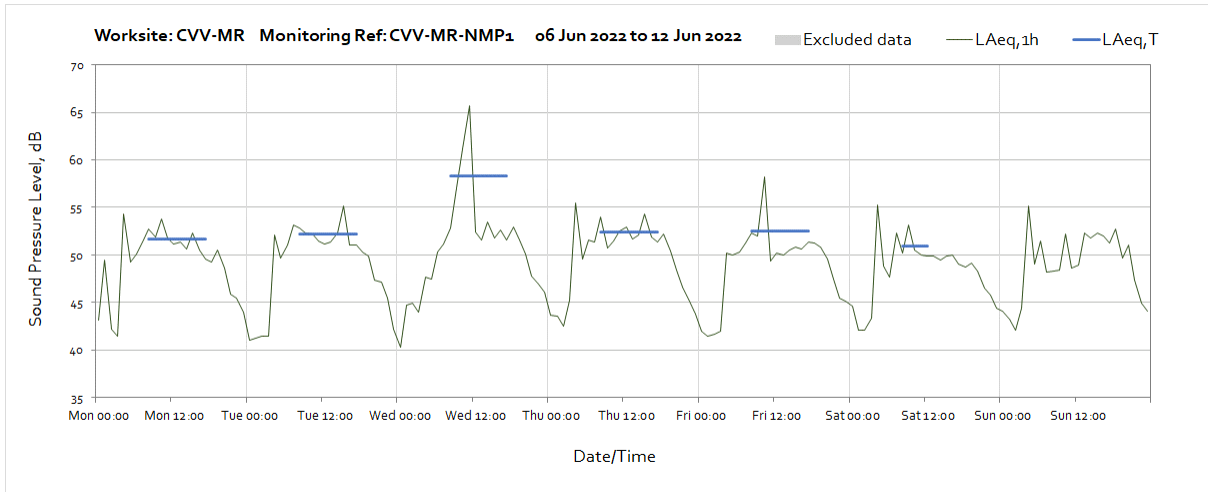


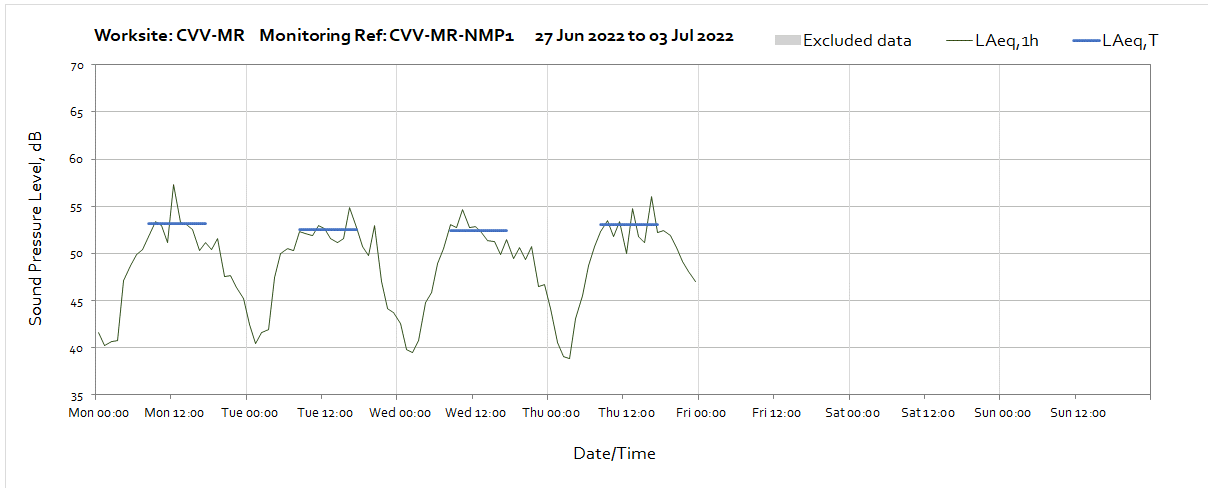


**Worksite: Colne Valley Viaduct Moorhall Road (CVV-MR)**

**Monitoring Ref: CVV-MR-NMP1**

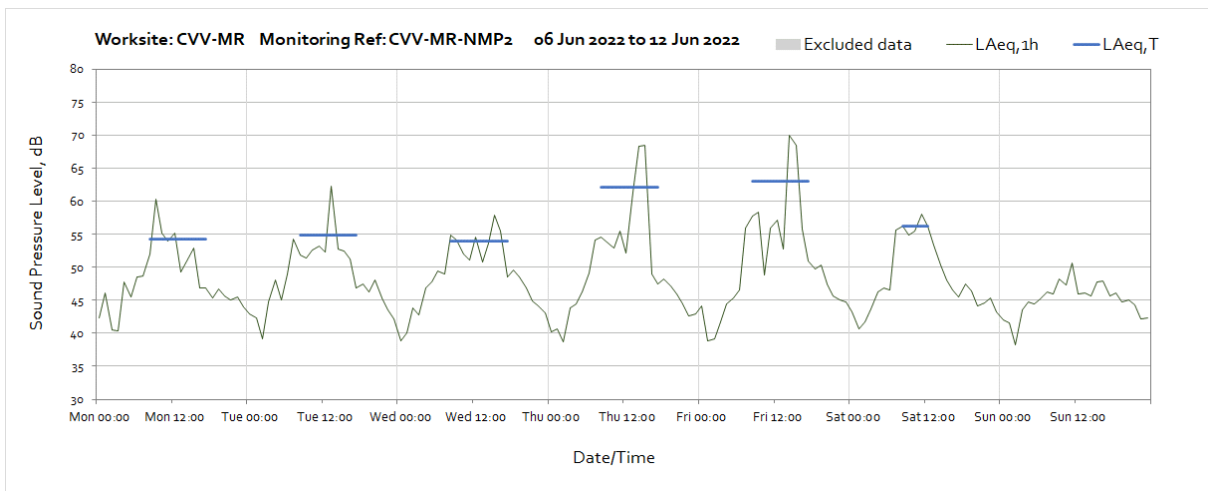
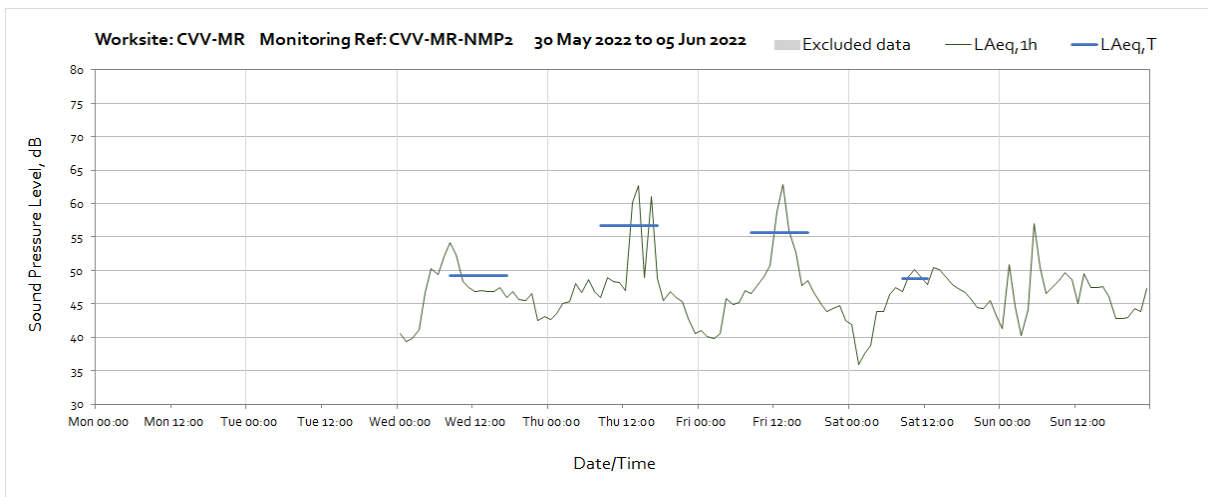


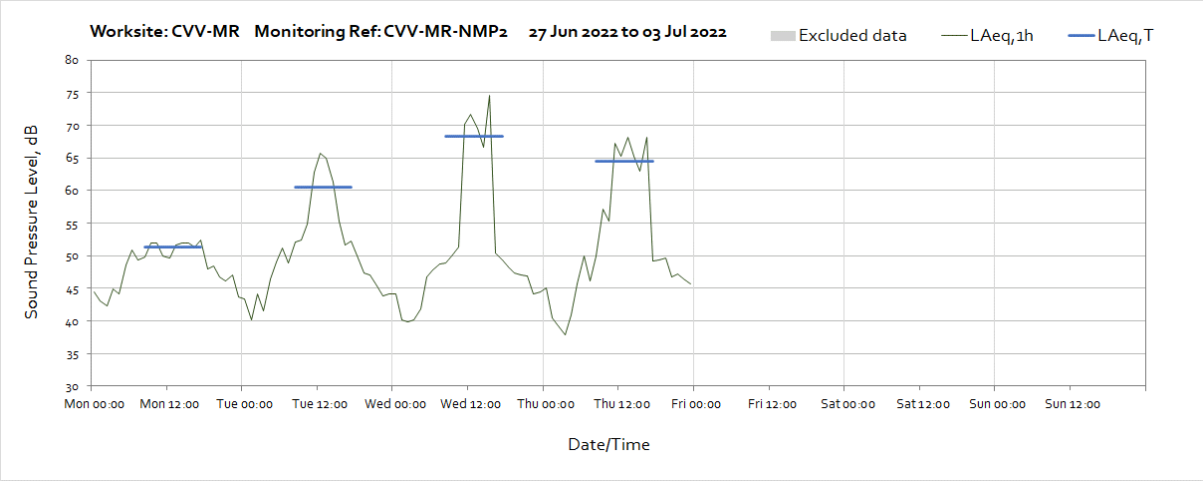
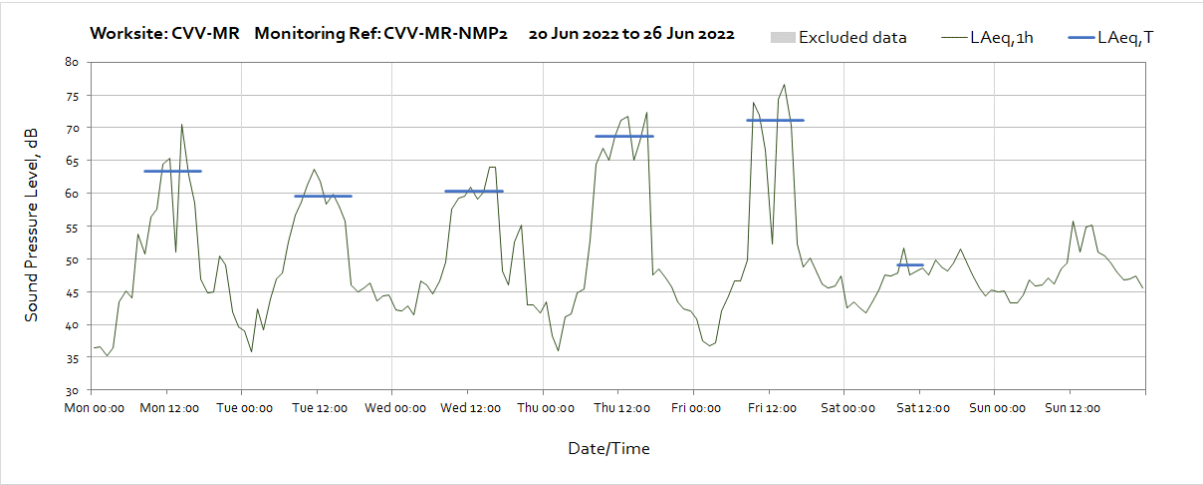
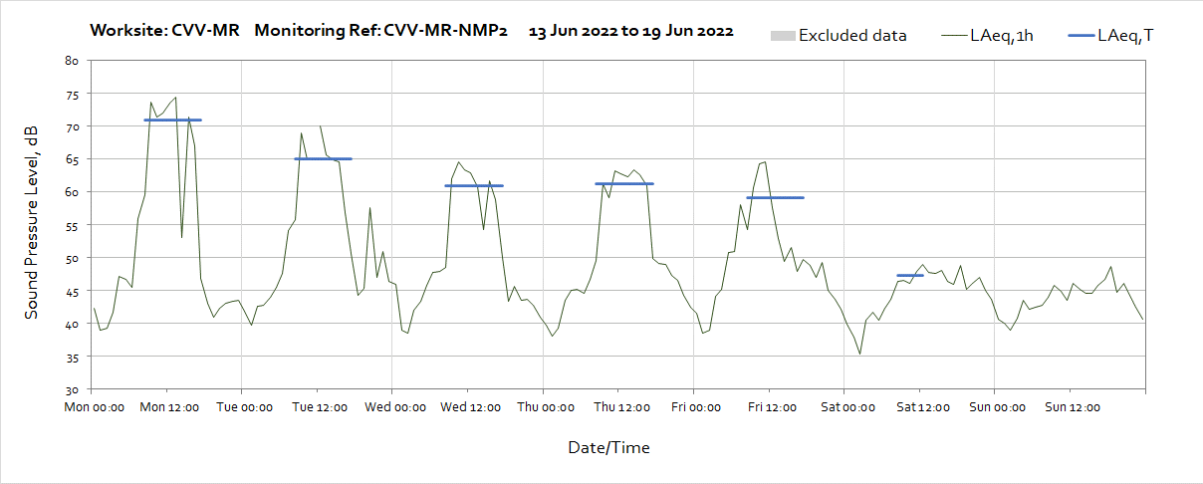




**Worksite: Colne Valley Viaduct Moorhall Road (CVV-MR)**

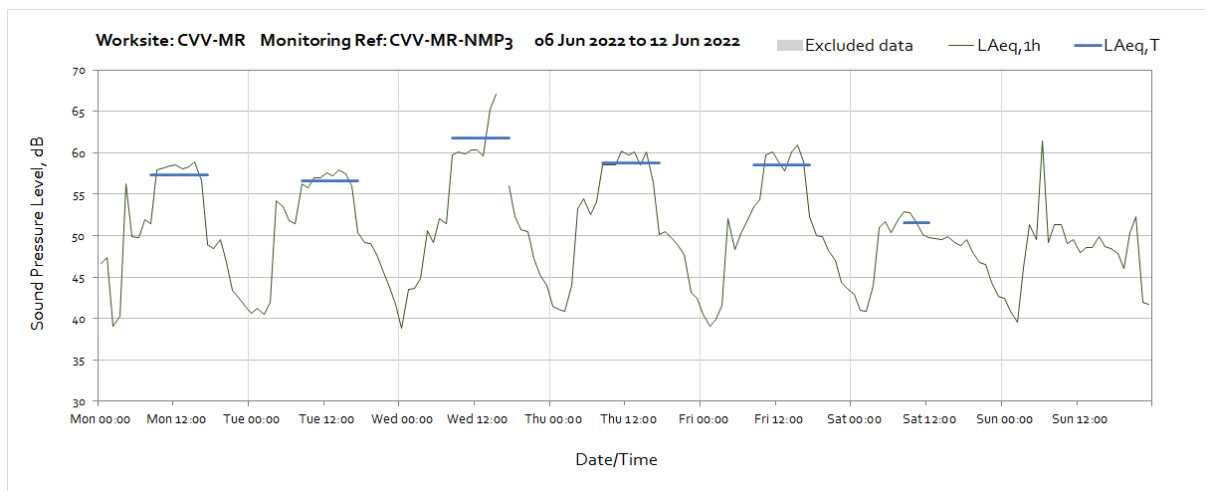
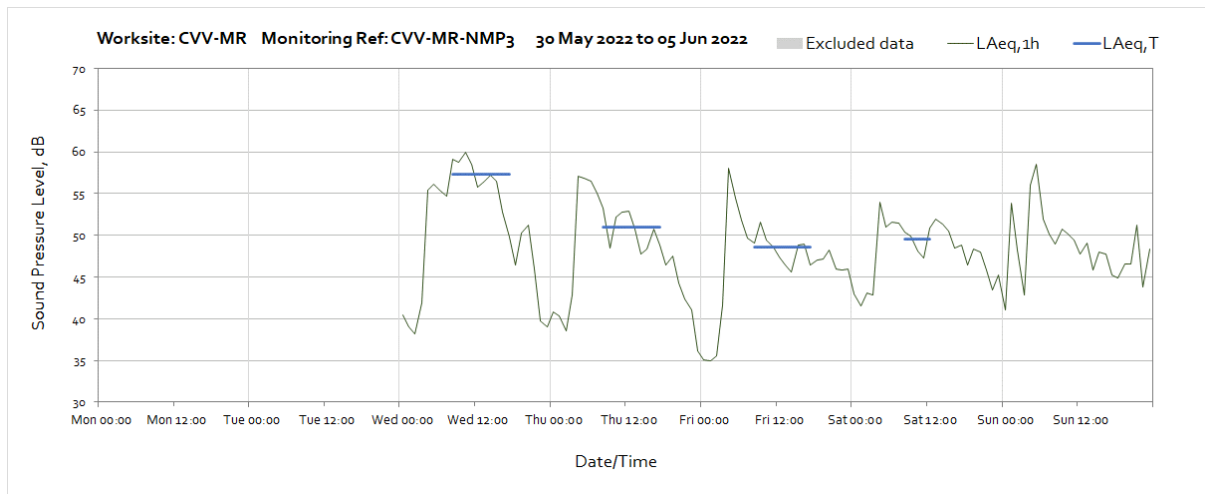
**Monitoring Ref: CVV-MR-NMP2**



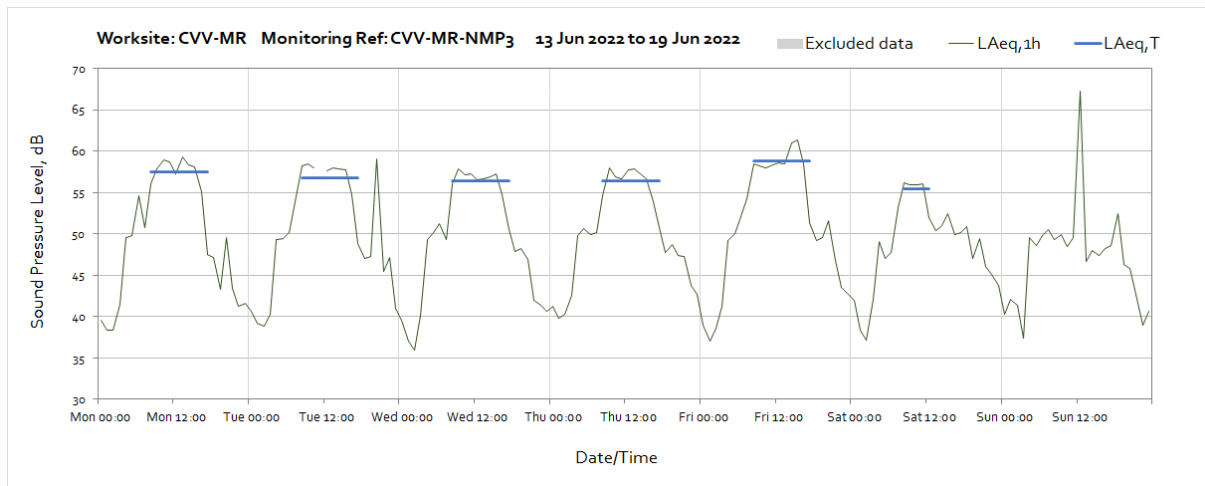


## Worksite: Colne Valley Viaduct Moorhall Road (CVV-MR)

### Monitoring Ref: CVV-MR-NMP3

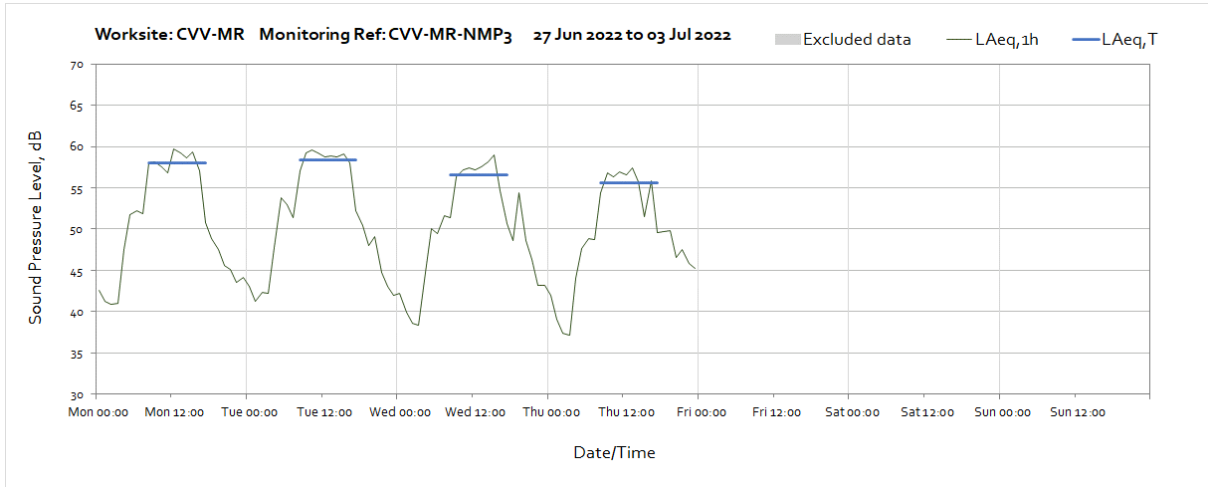
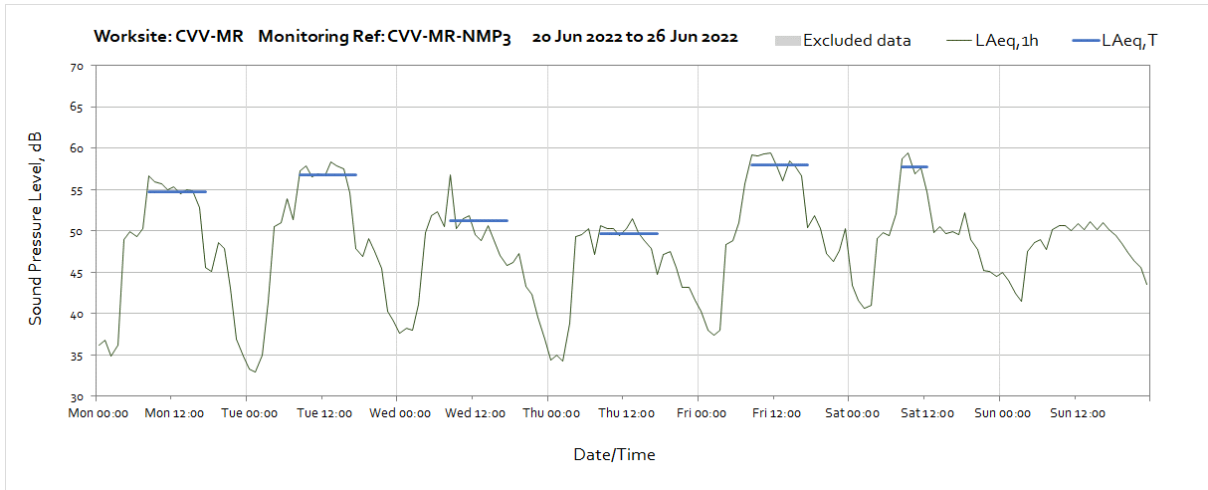


Note: Missing data at 16:00 on Wednesday 8<sup>th</sup> June 2022 were due to monitoring station maintenance.

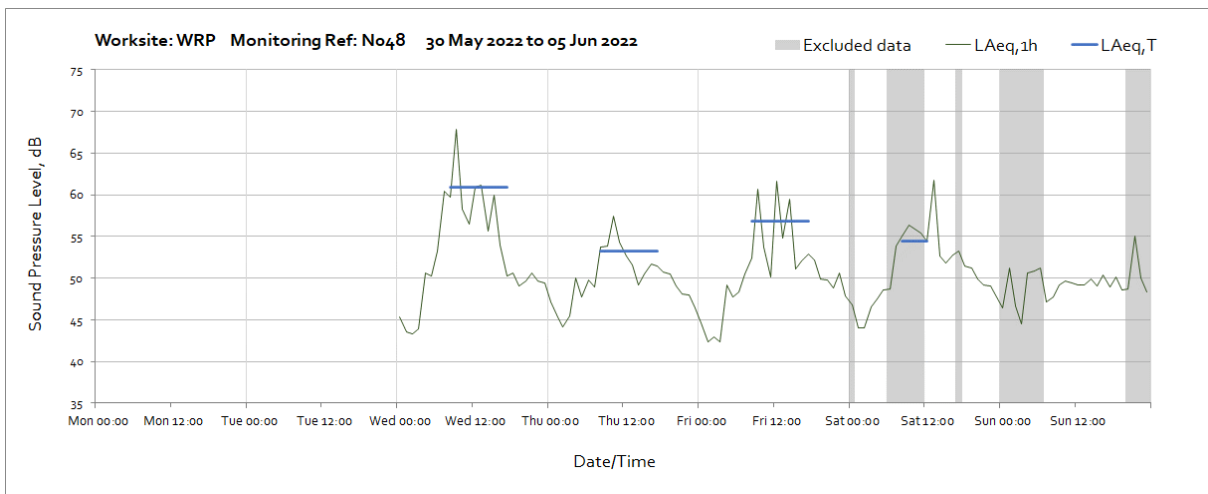


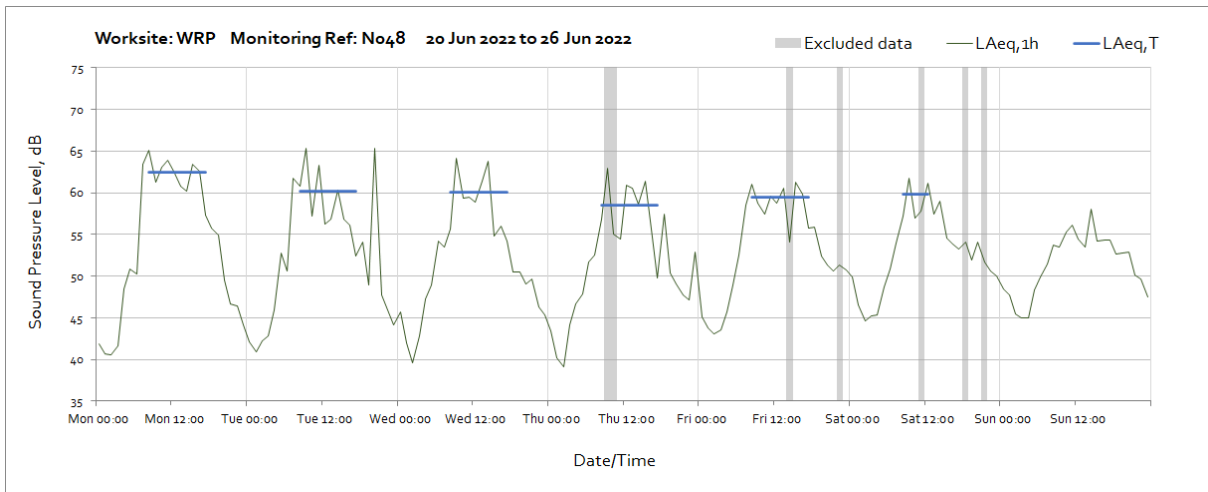
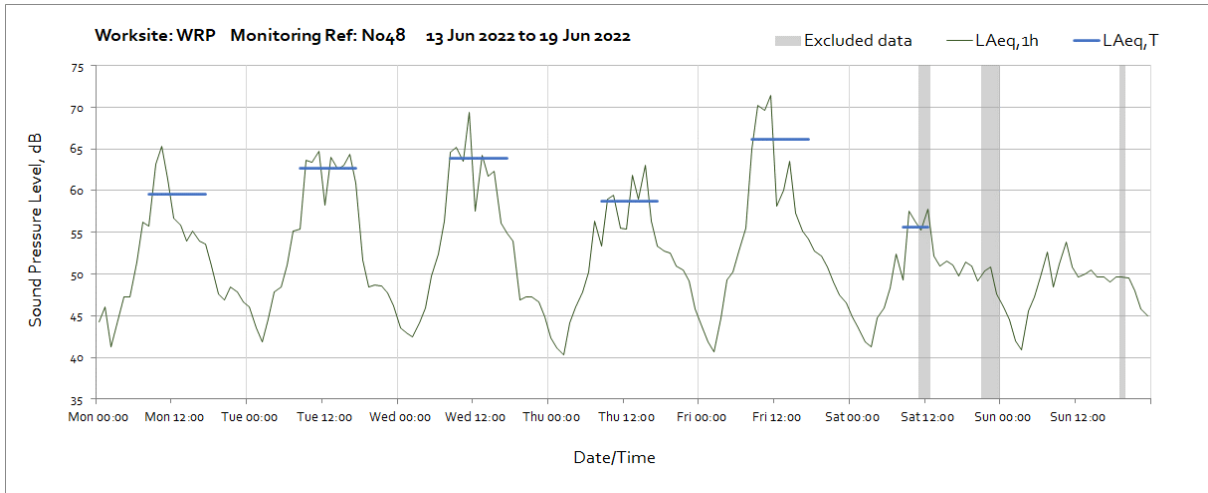
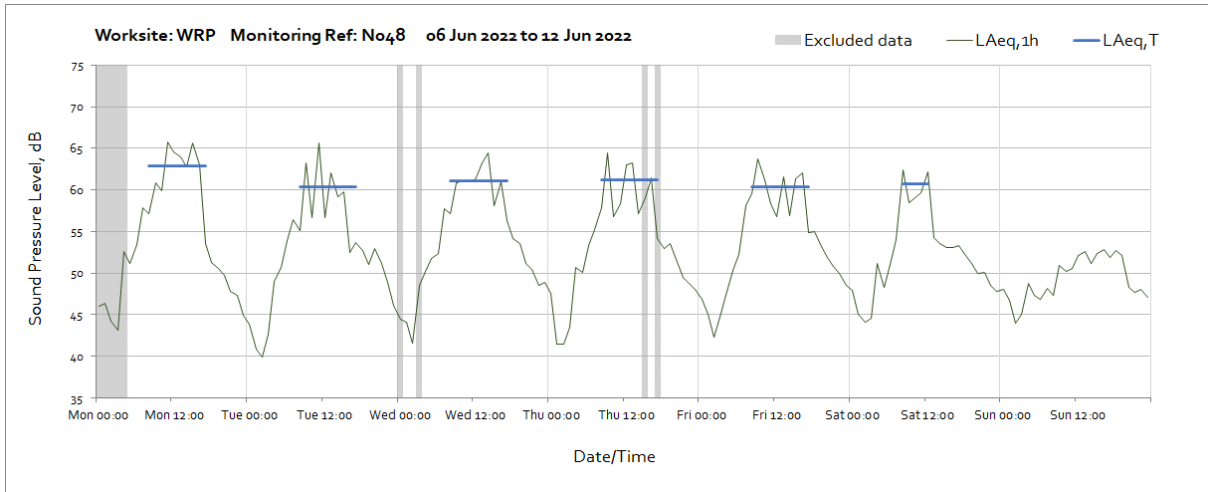
Note: Missing data at 11:00 on Tuesday 14<sup>th</sup> June 2022 were due to field calibration of the monitoring station.

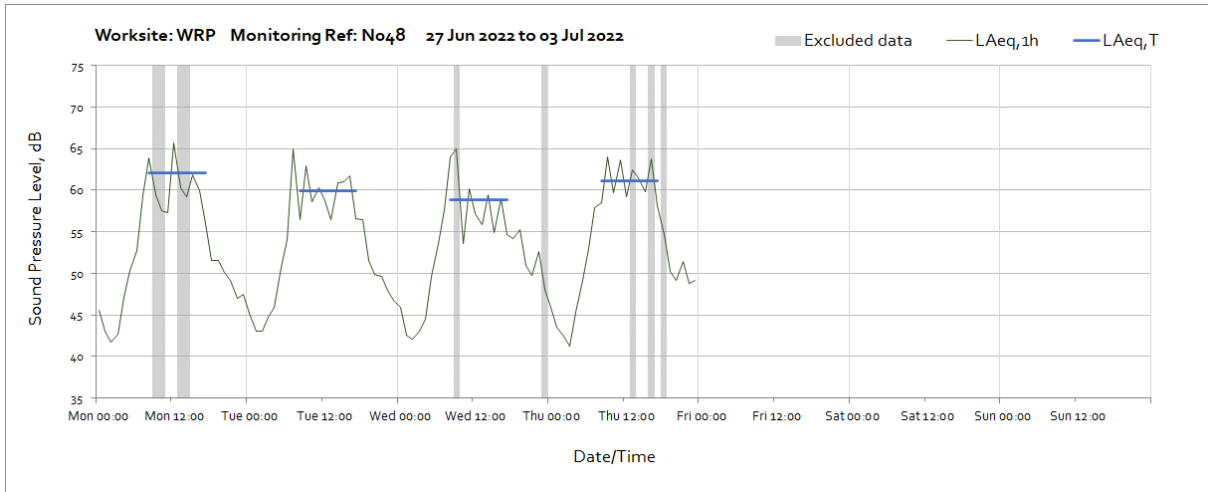
OFFICIAL



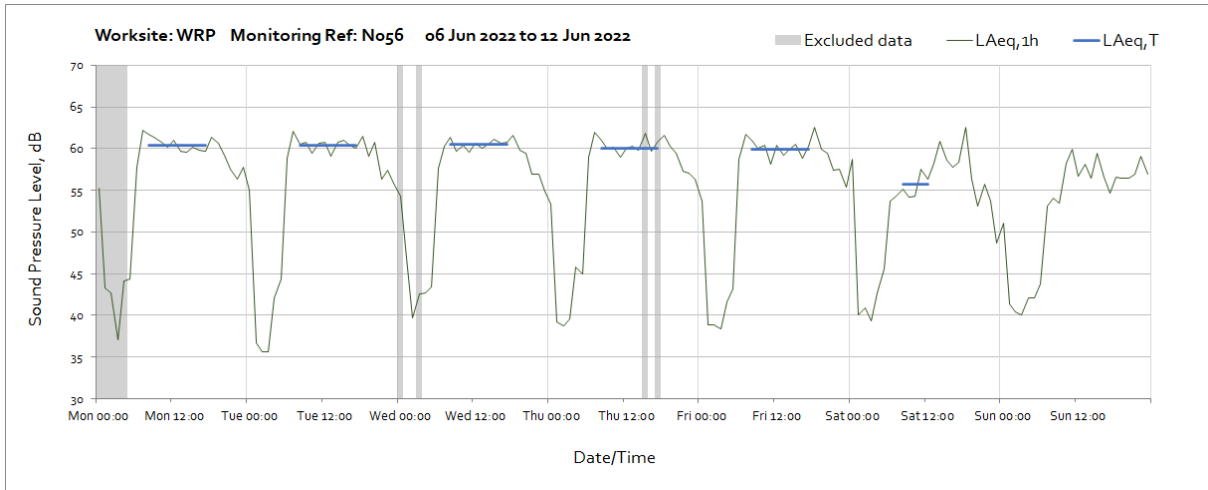
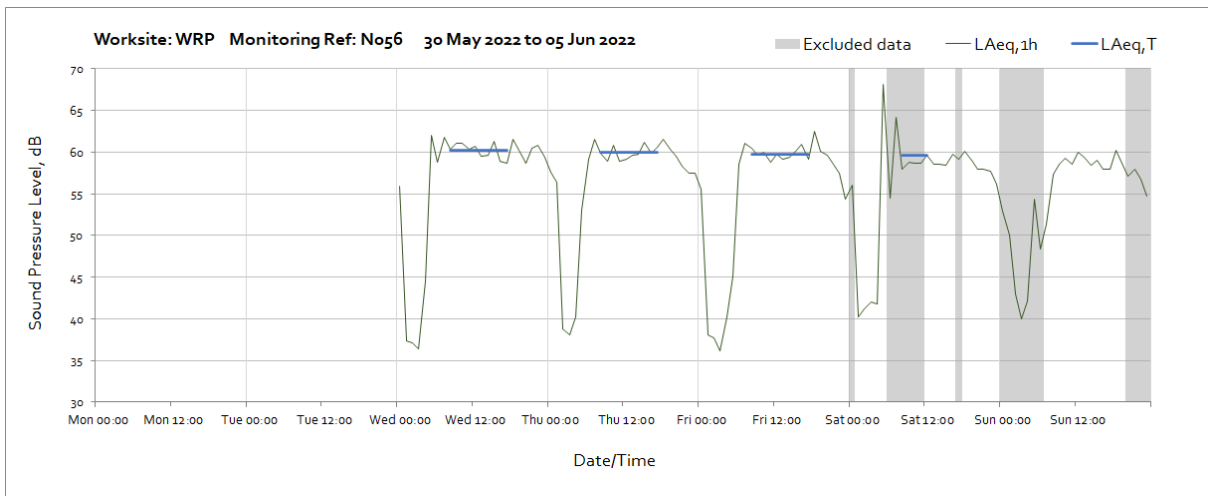
**Worksite: West Ruislip Portal (WRP) - Monitoring Ref: N048**



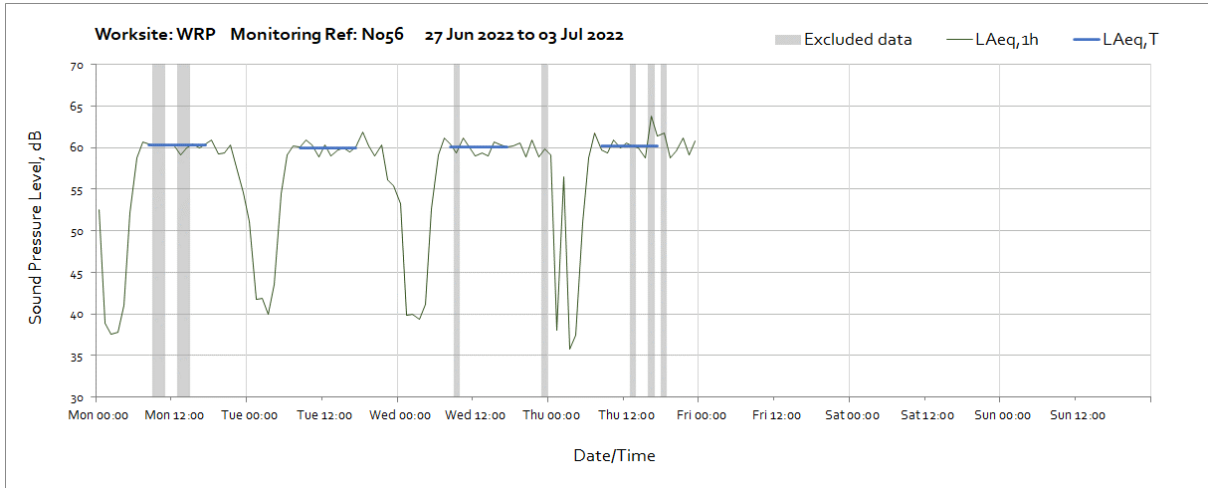
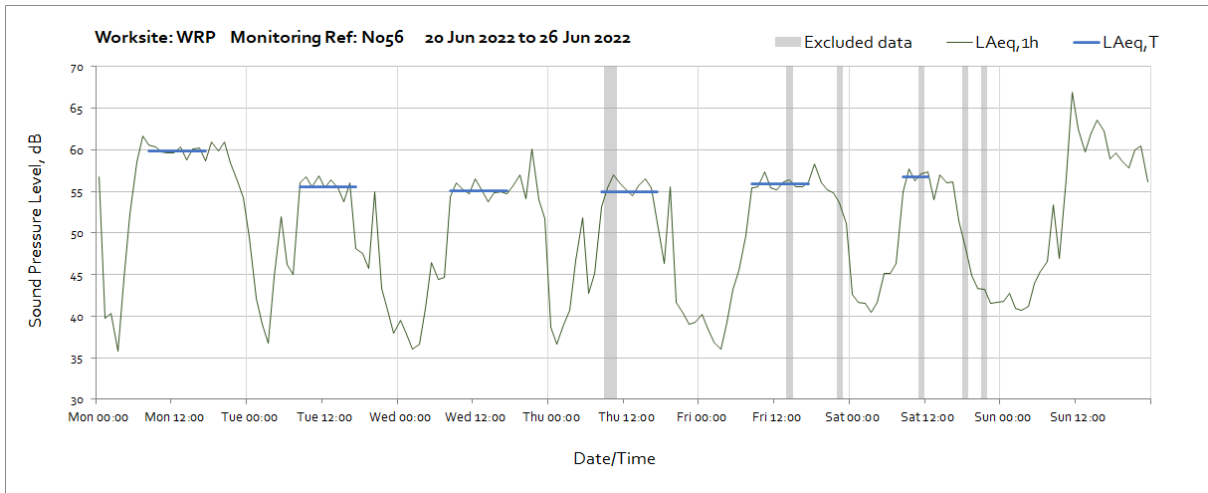
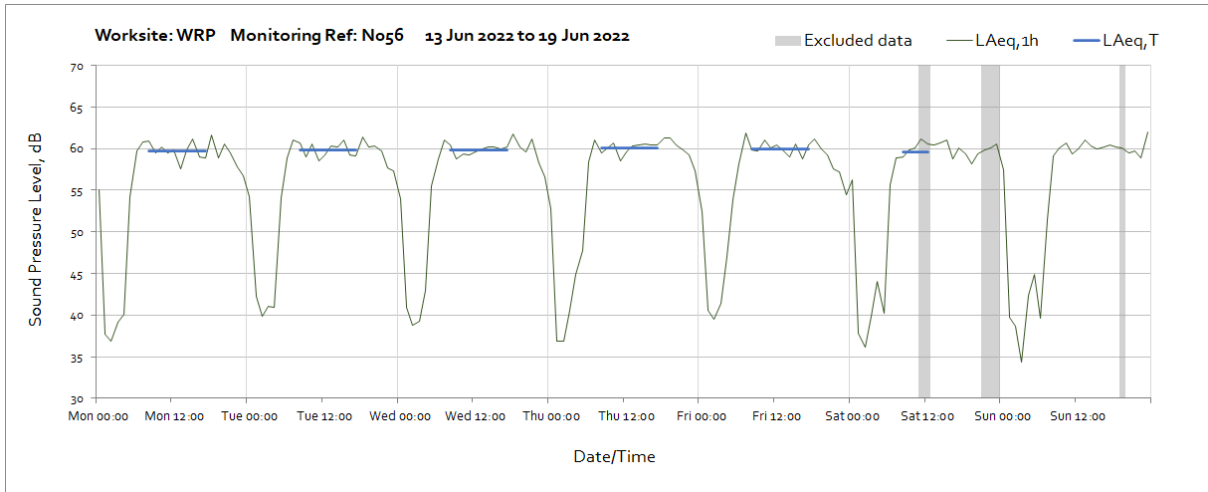




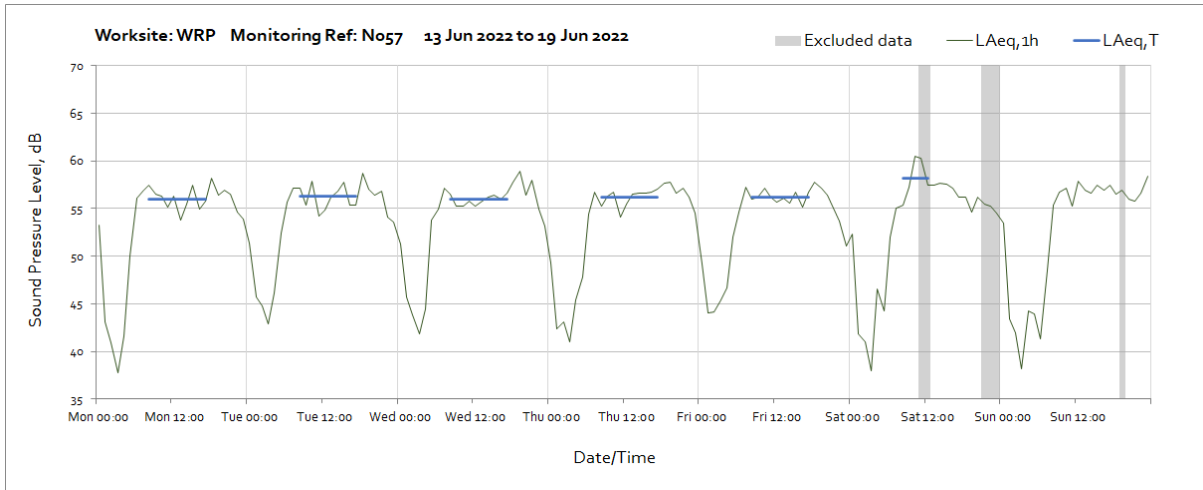
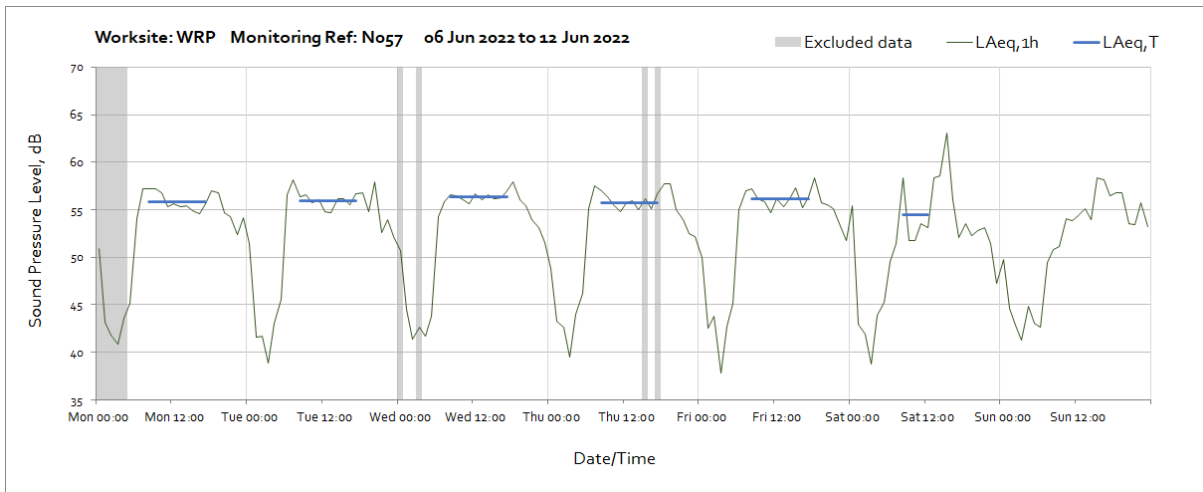
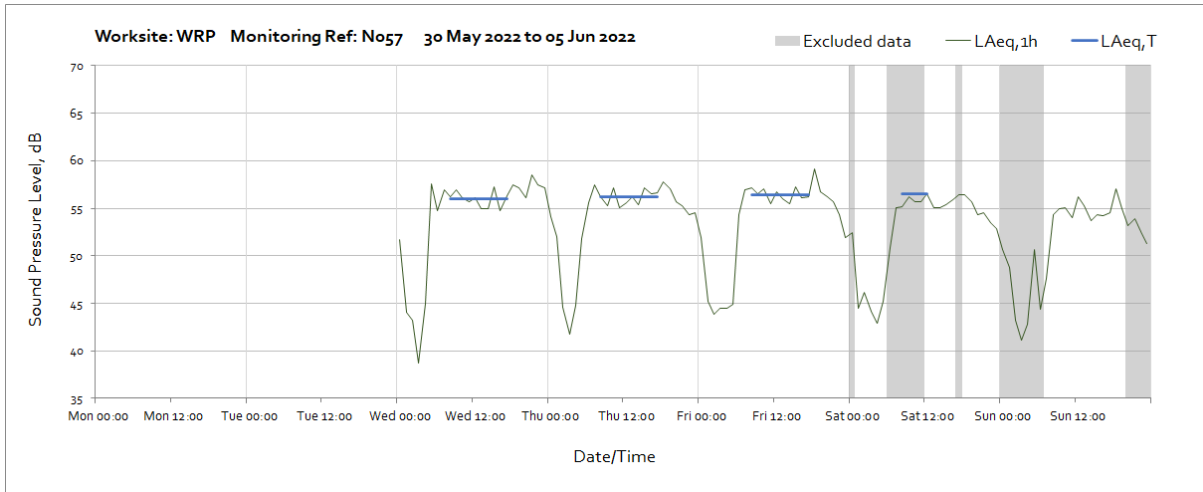
**Worksite: West Ruislip Portal (WRP) – Monitoring Ref: N056**

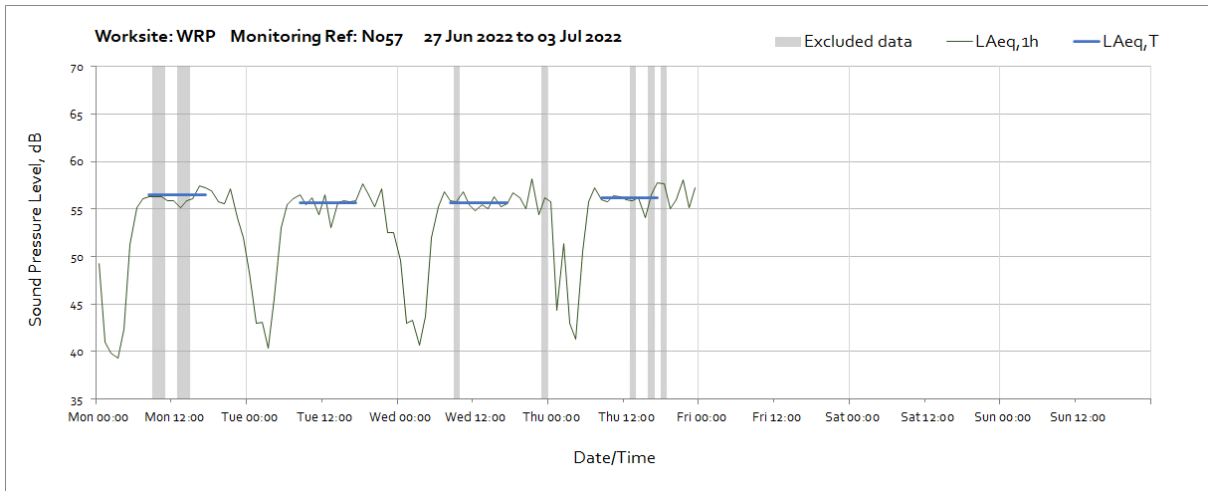
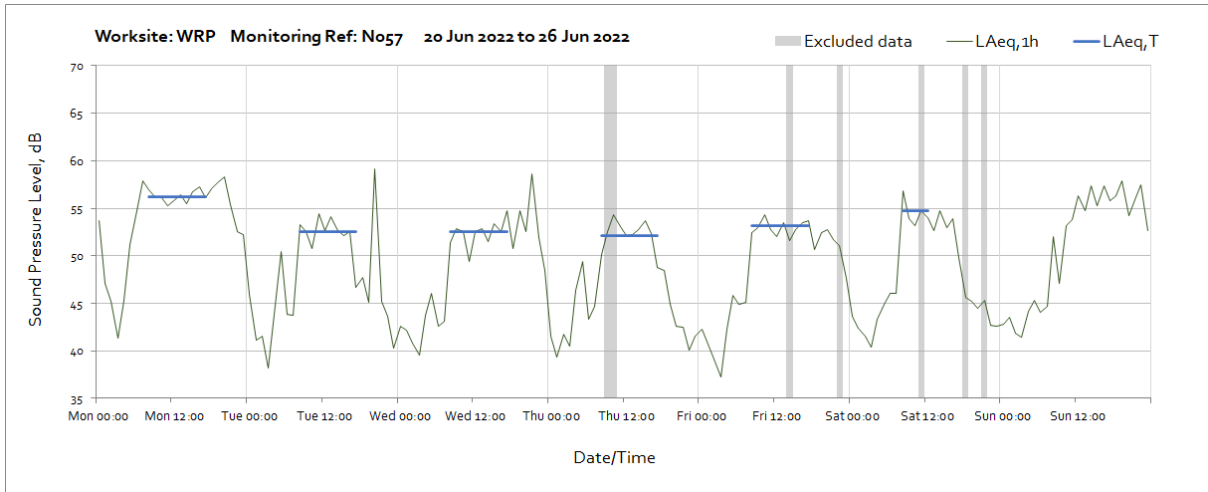




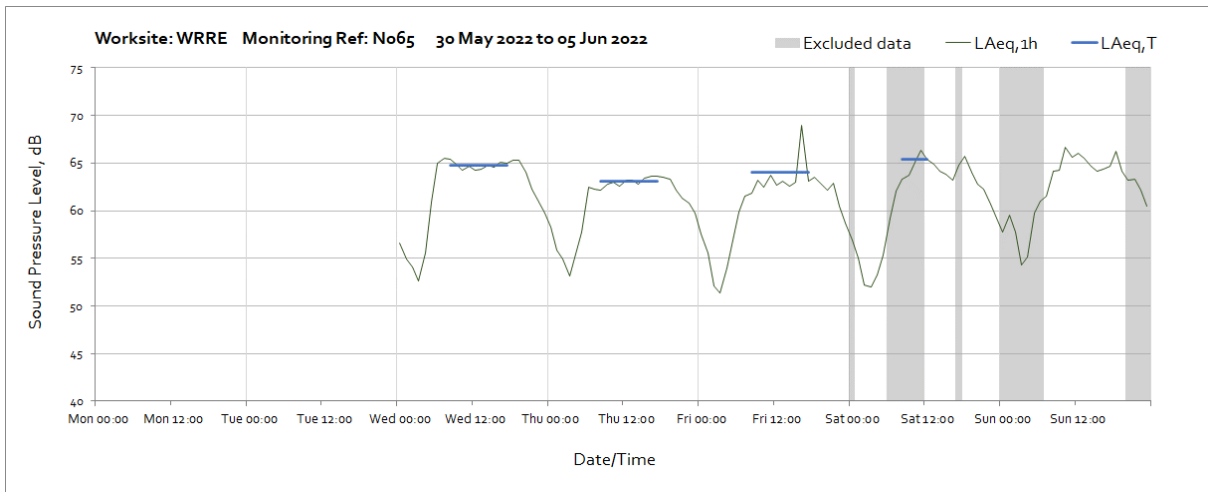


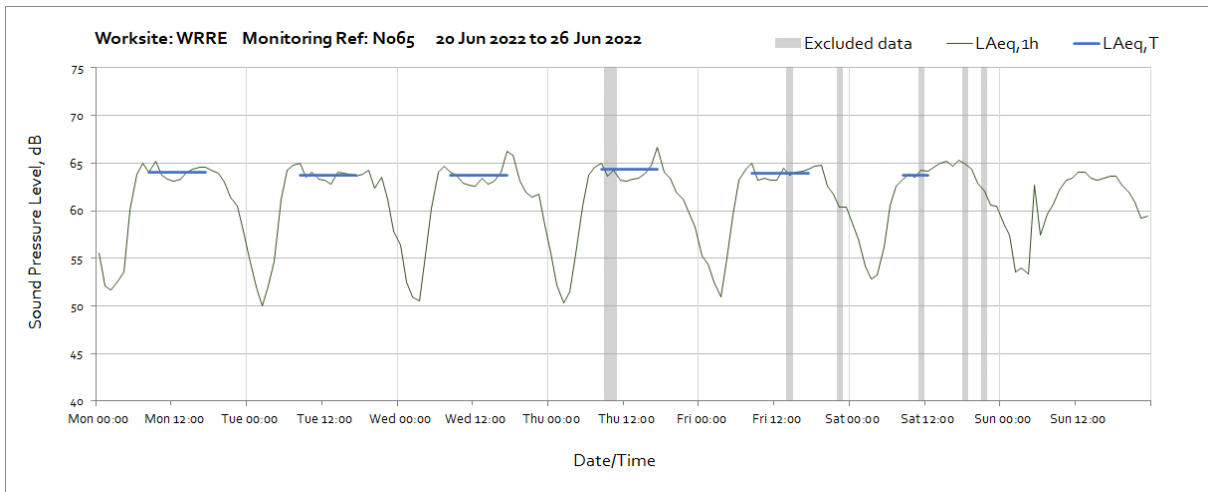
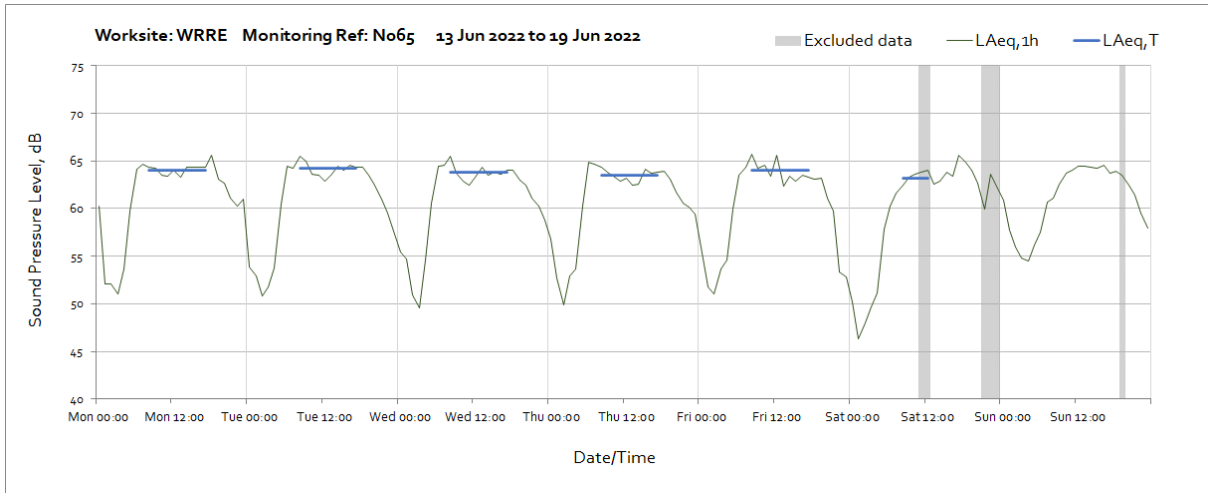
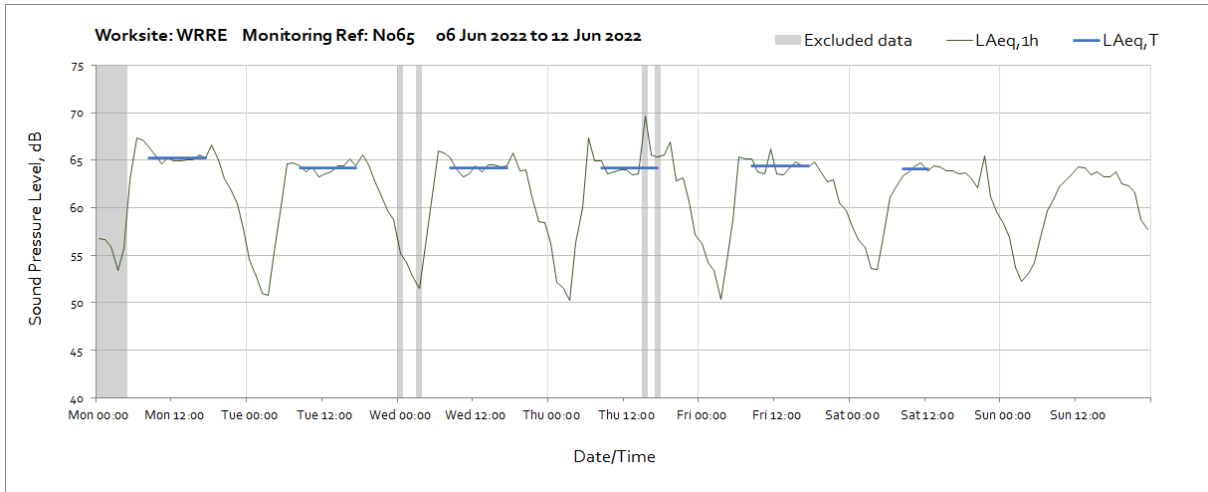
# Worksite: West Ruislip Portal (WRP) - Monitoring Ref: N057

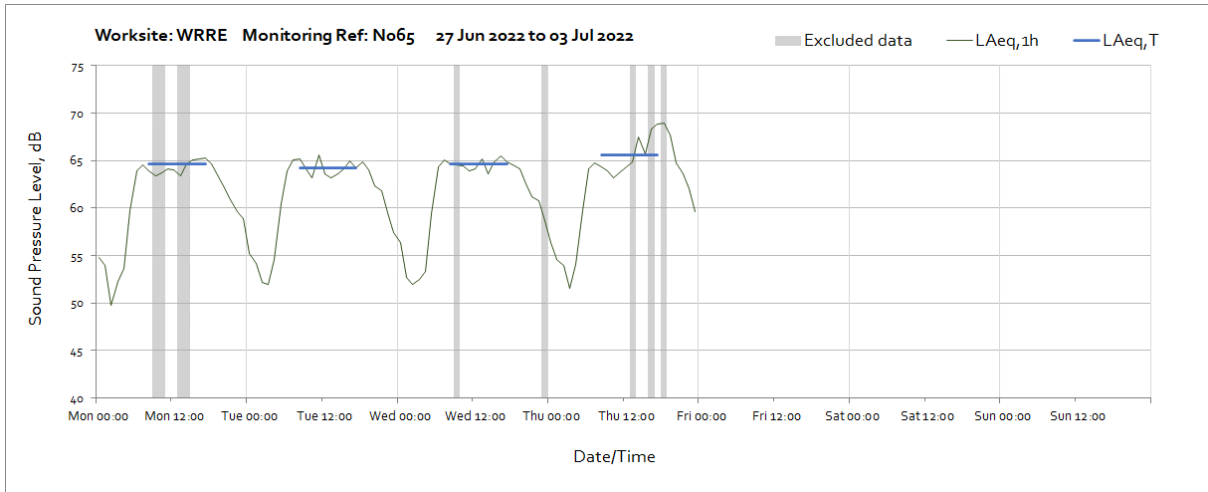




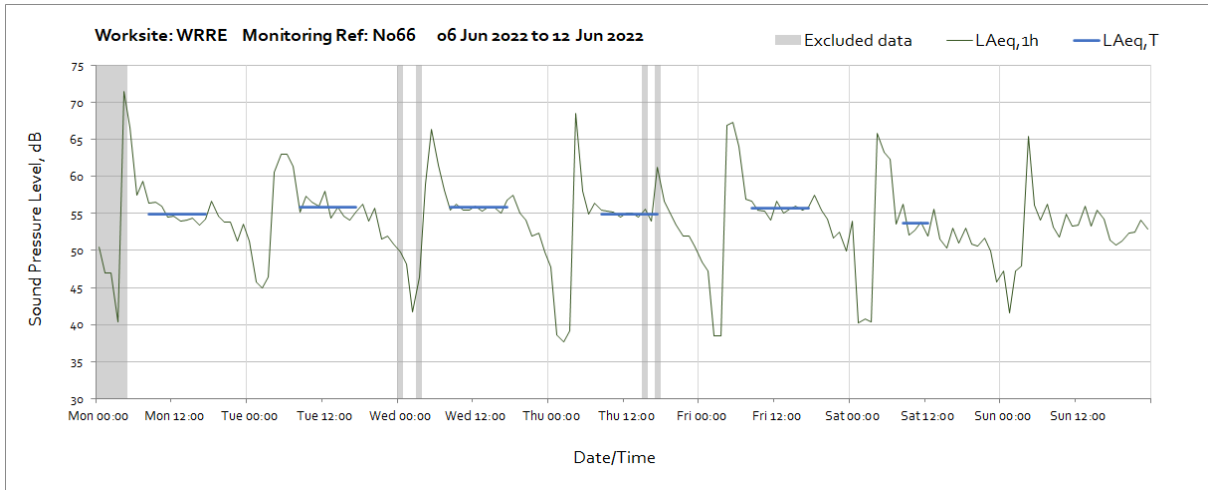
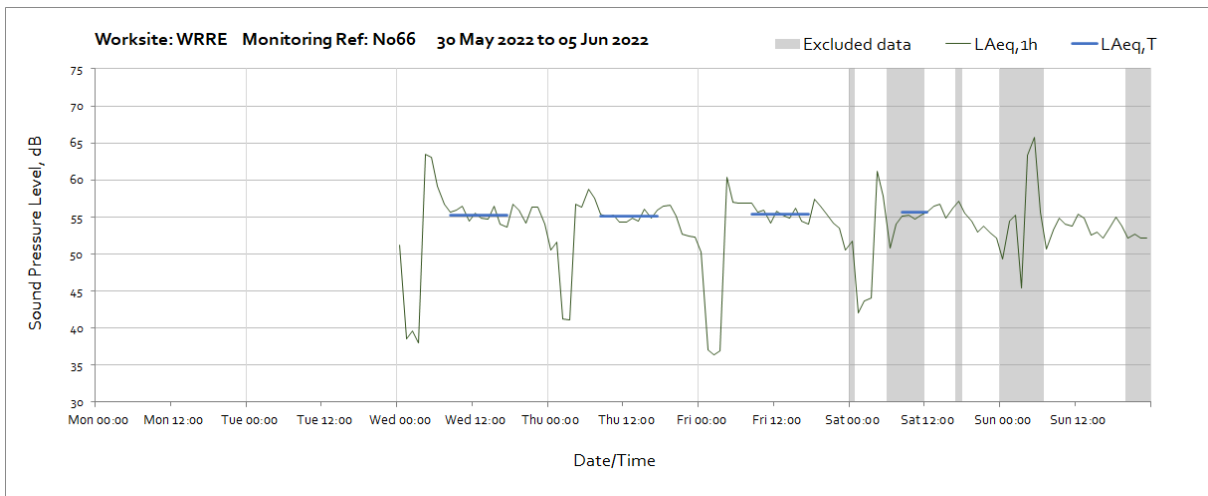
**Worksite: West Ruislip Retained Embankment (WRRE) – Monitoring Ref: N065**

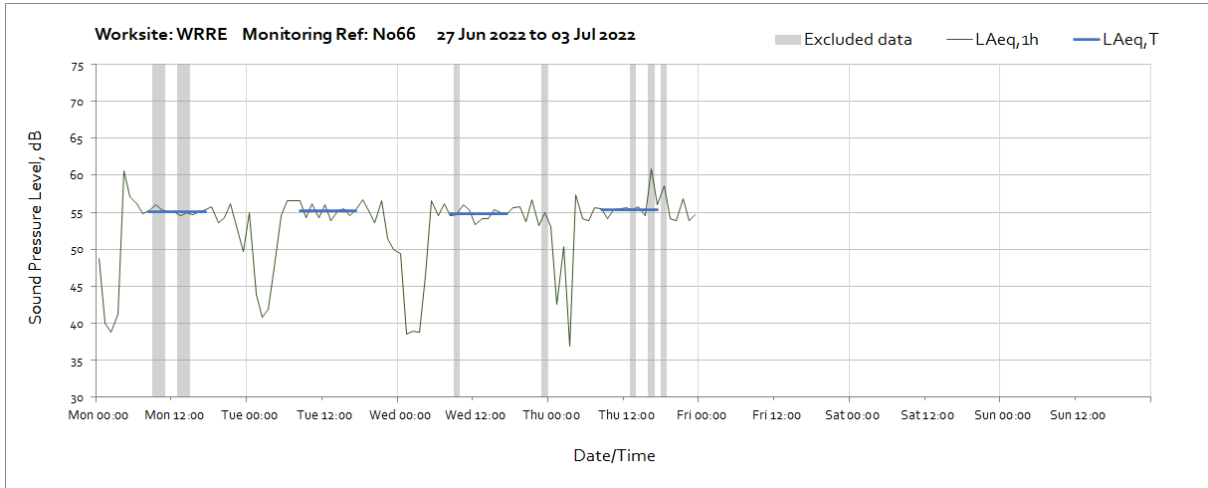
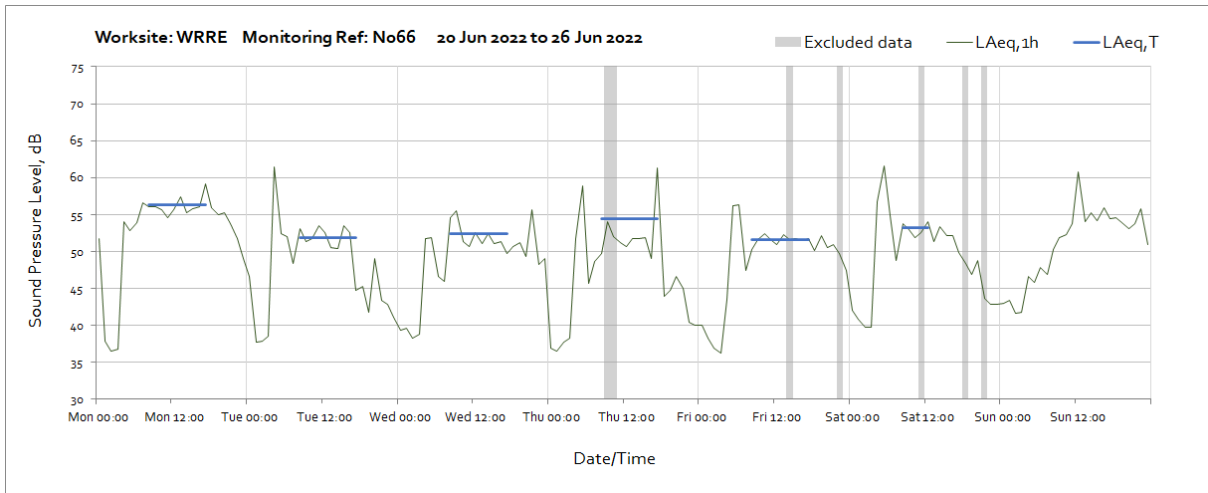
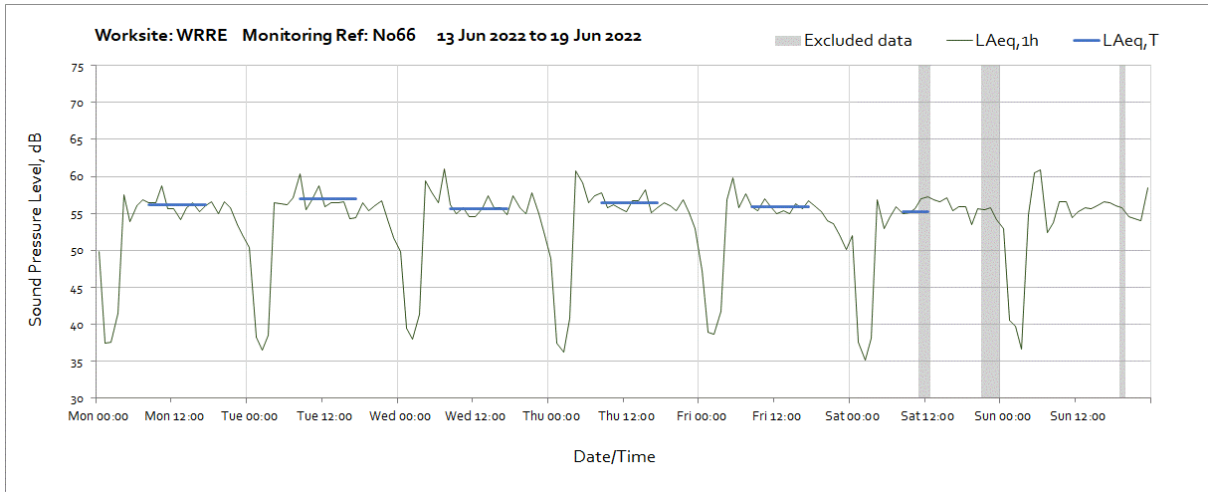




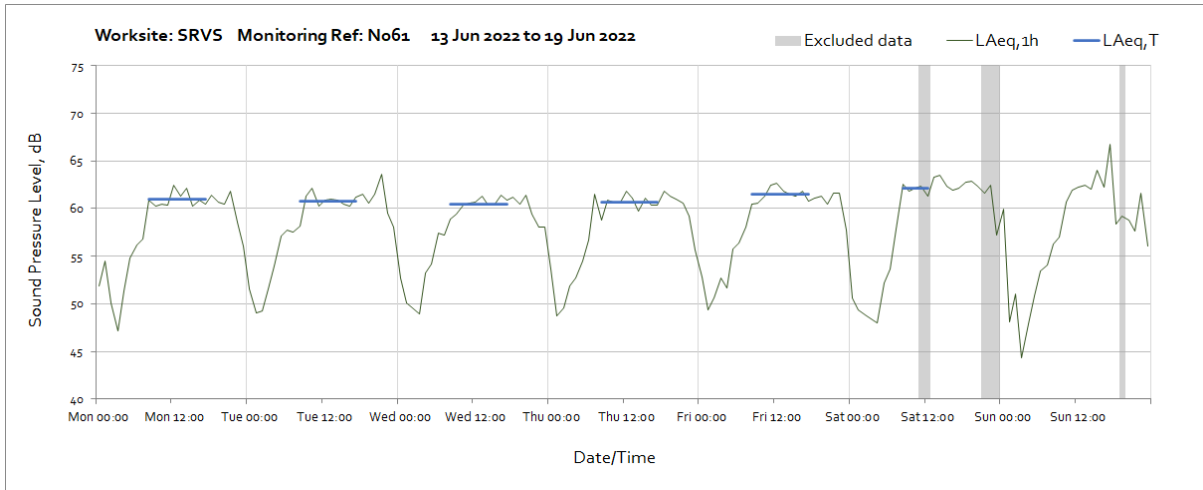
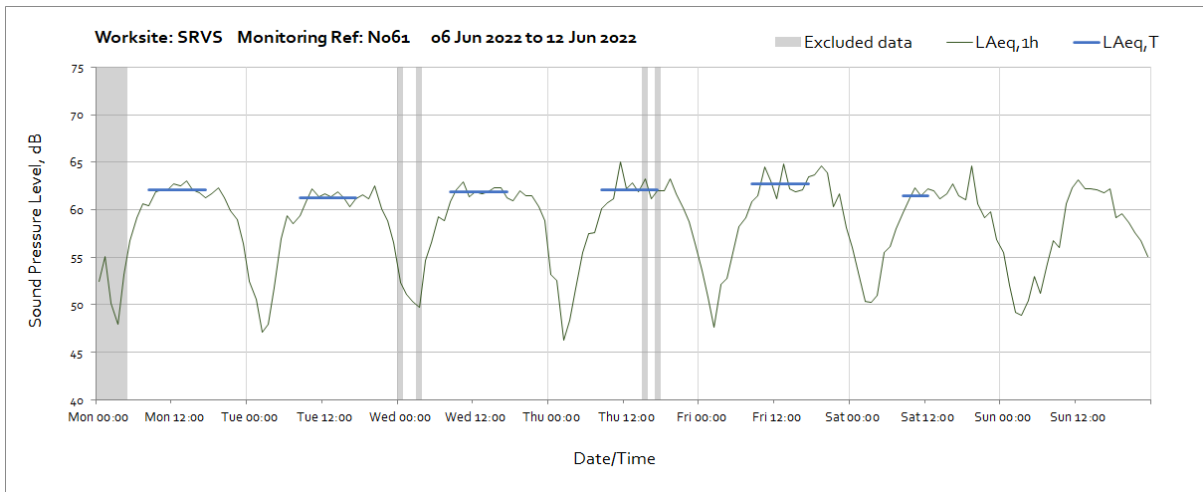
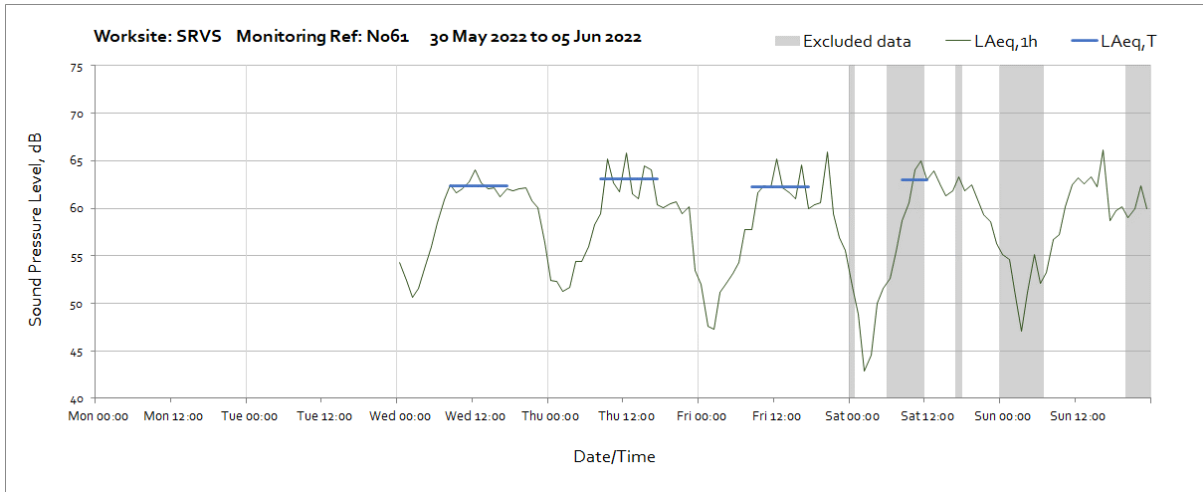


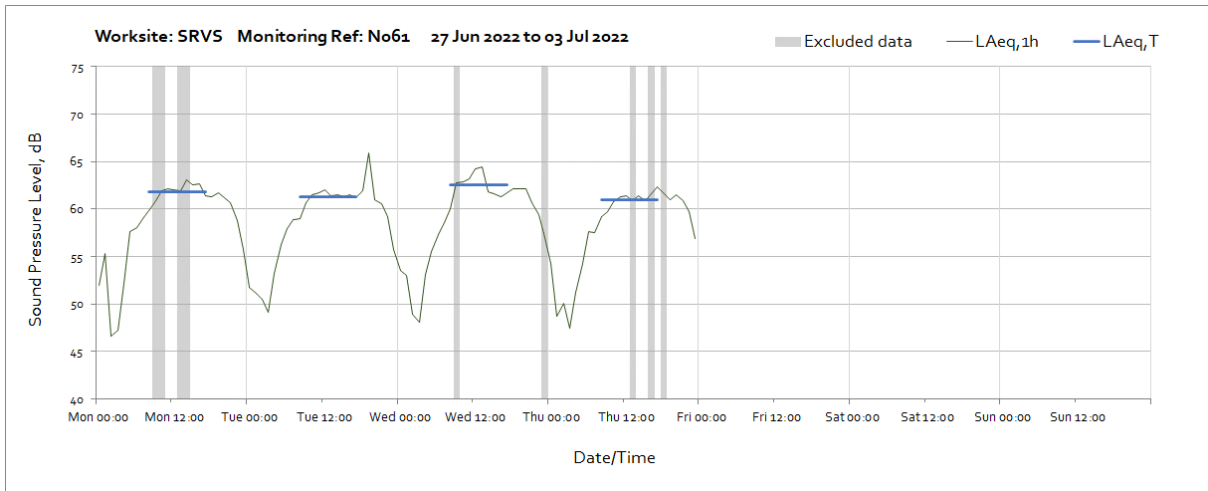
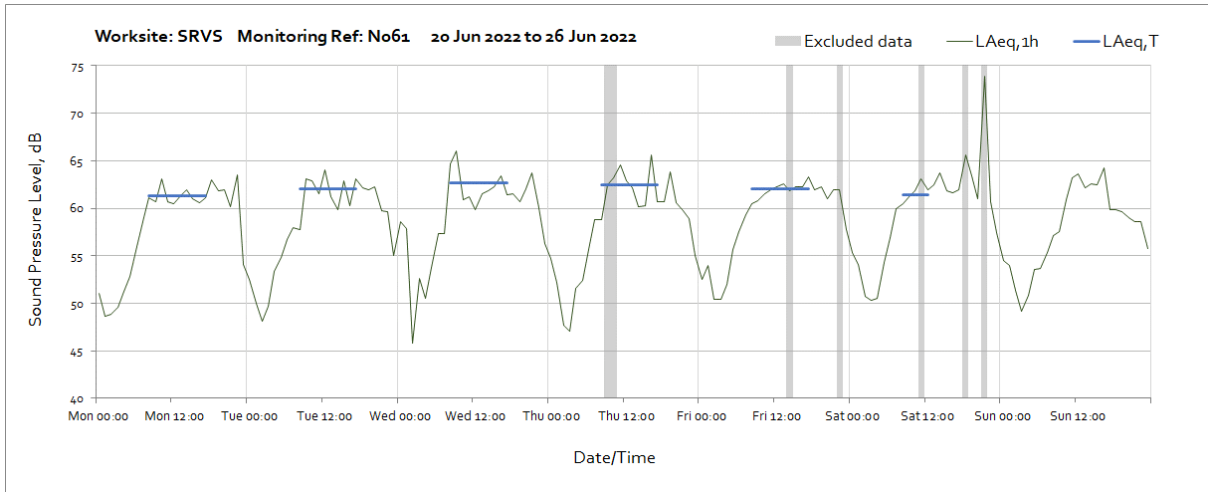
**Worksite: West Ruislip Retained Embankment (WRRE) – Monitoring Ref: N066**



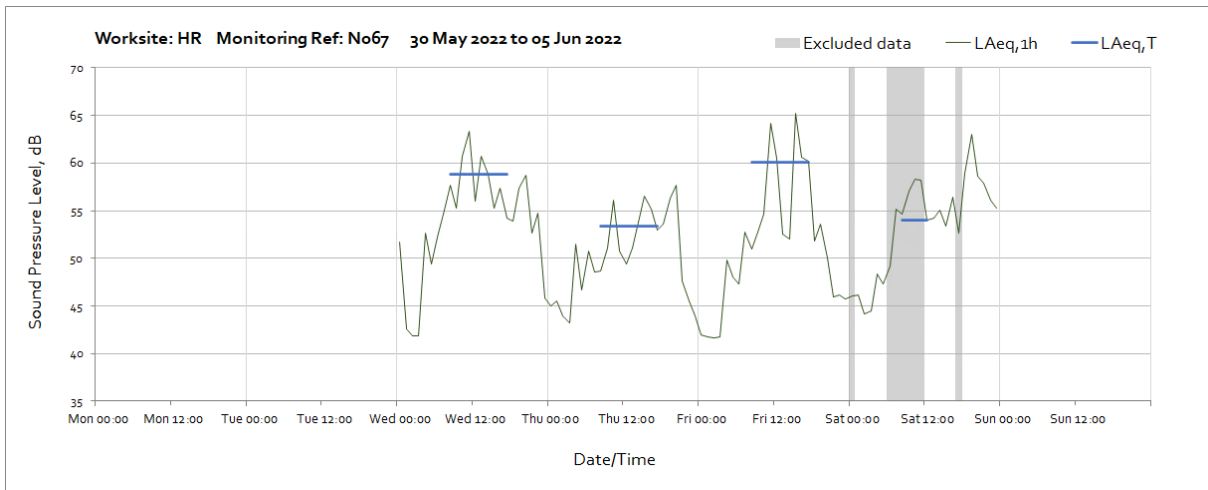


## Worksite: South Ruislip Ventilation Shaft (SRVS) – Monitoring Ref: N061



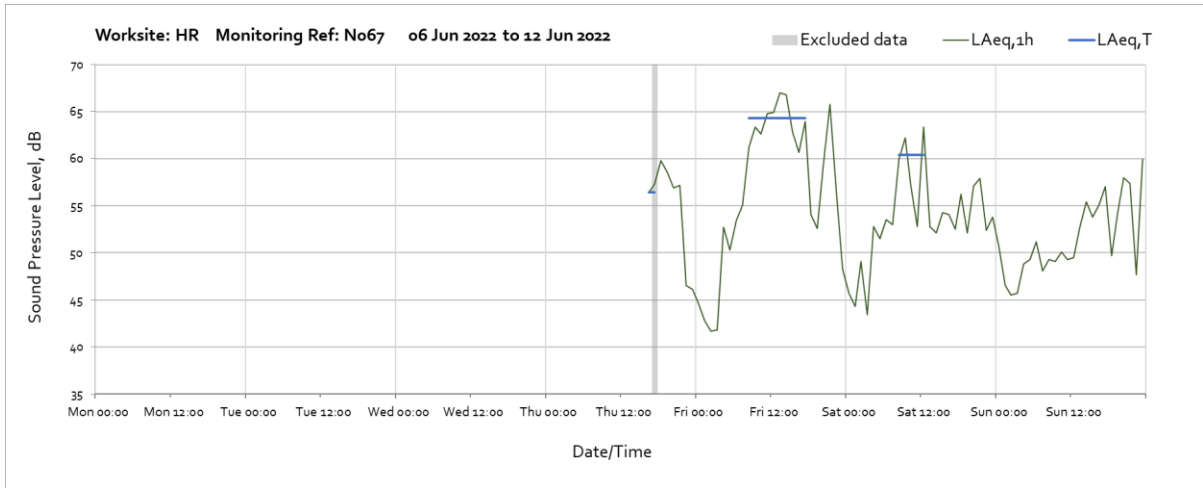


**Worksite: Harvil Road (HR) - Monitoring Ref: N067**

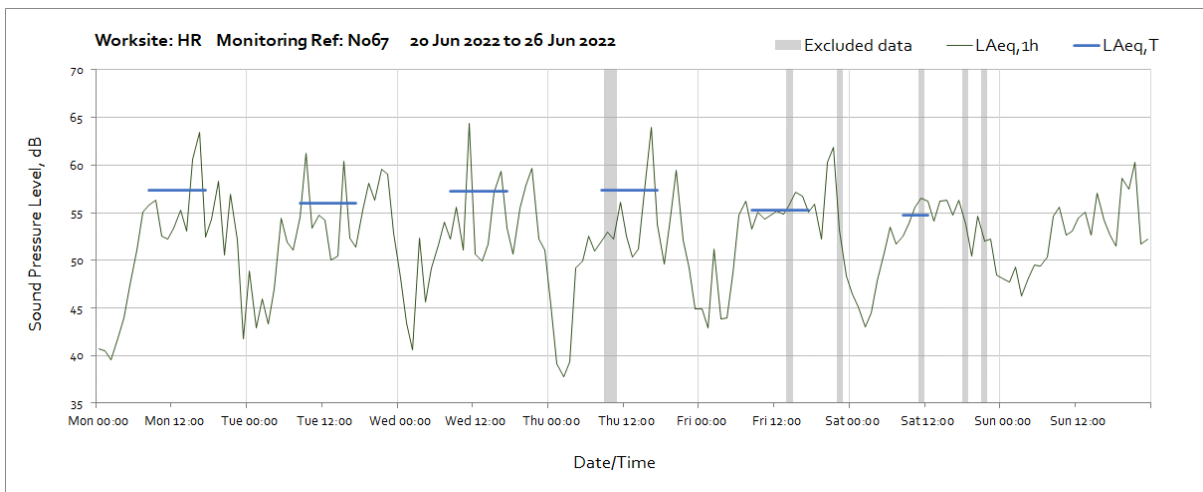
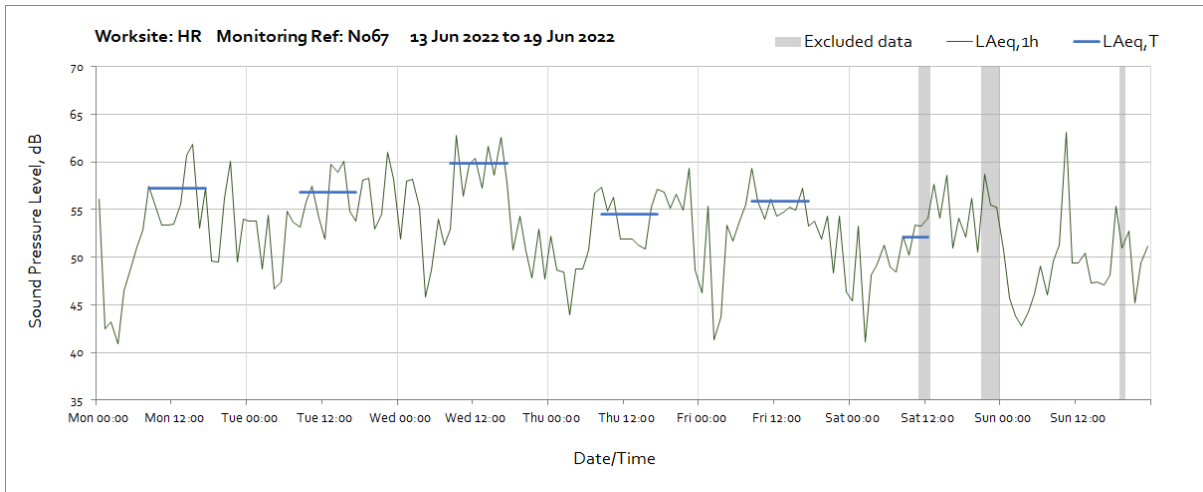


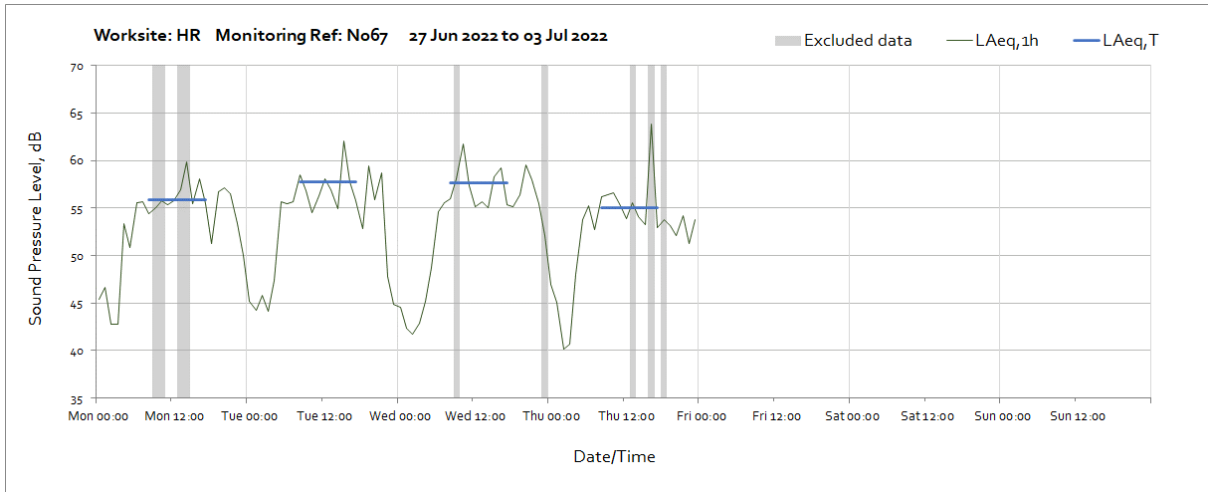
Note: Missing data between 00:00 on Sunday 5<sup>th</sup> June and 16:00 on Thursday 9<sup>th</sup> June were due to loss of continuous site power at the monitoring station.



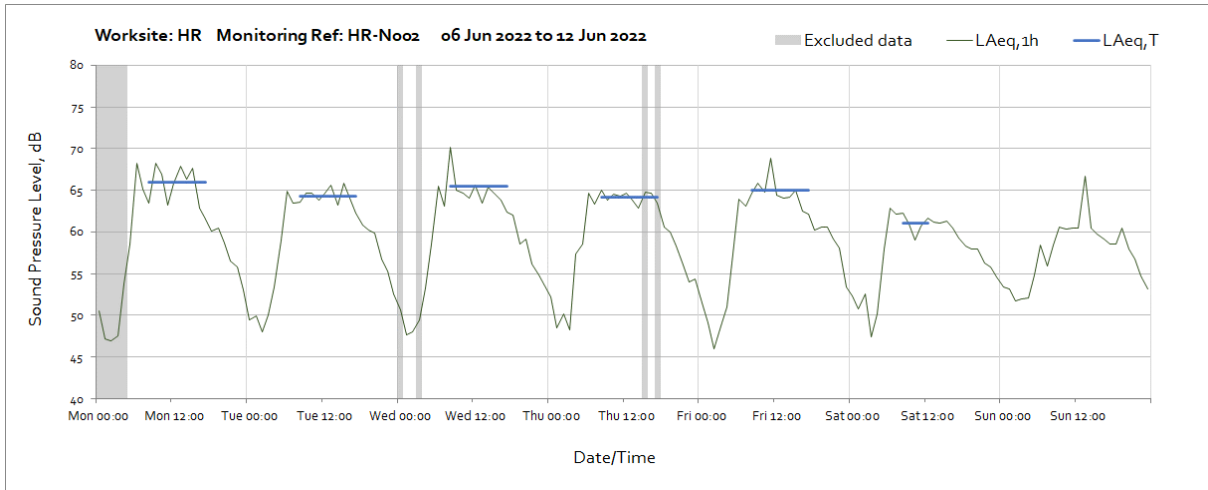
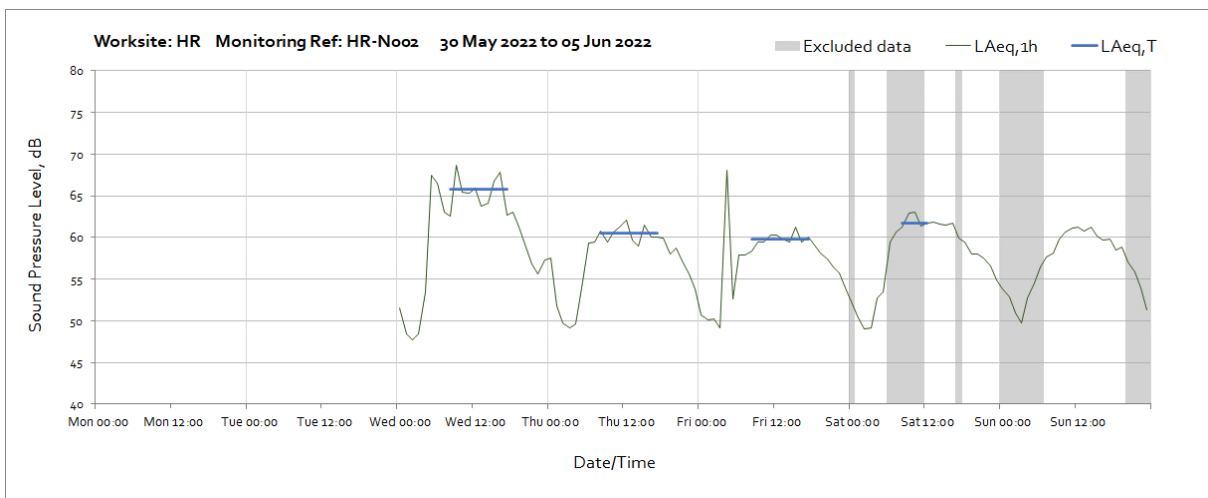


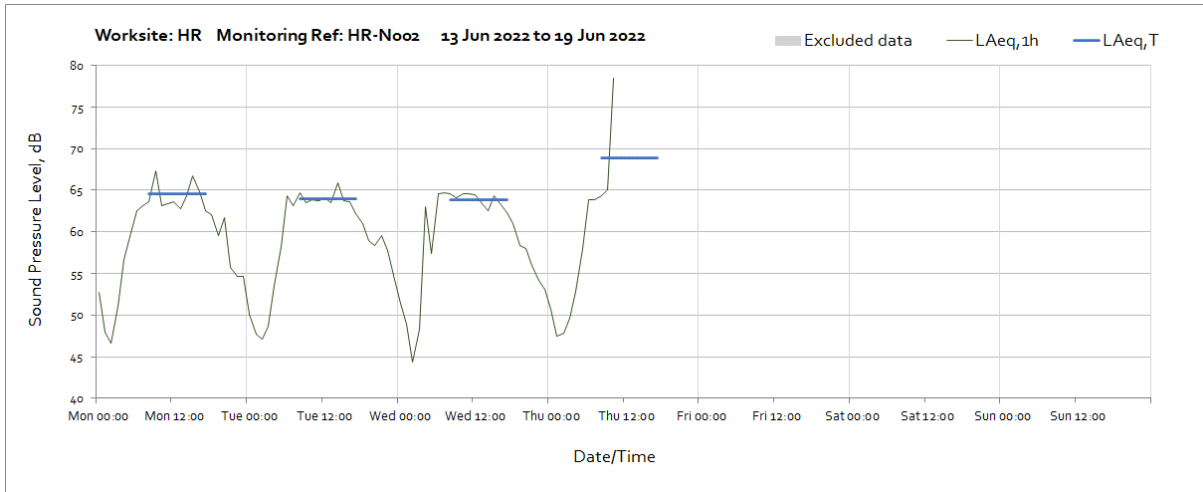
Note: Missing data between 00:00 on Sunday 5<sup>th</sup> June and 16:00 on Thursday 9<sup>th</sup> June were due to loss of continuous site power at the monitoring station.





**Worksite: Harvil Road (HR) - Monitoring Ref: HR-N002**



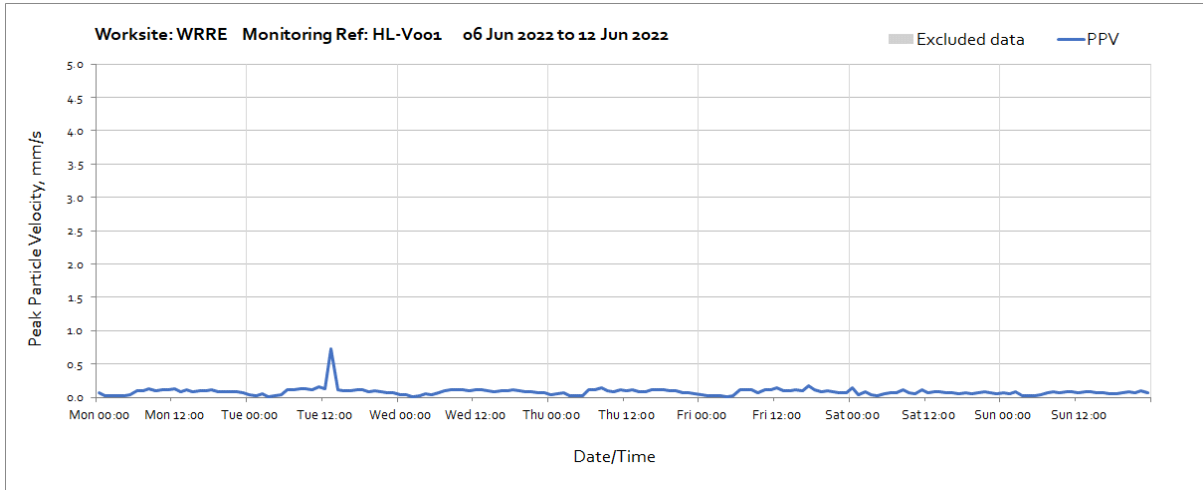
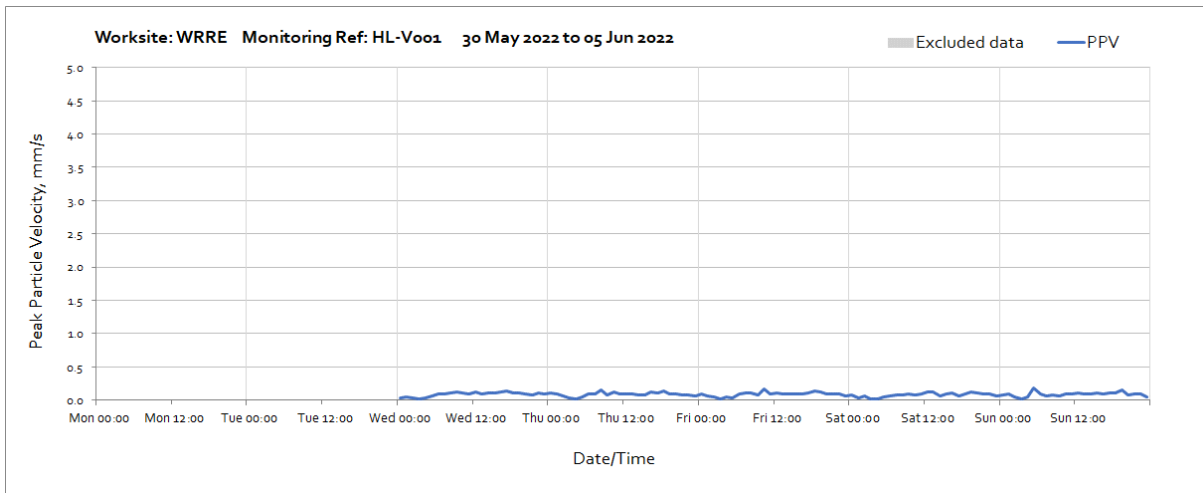


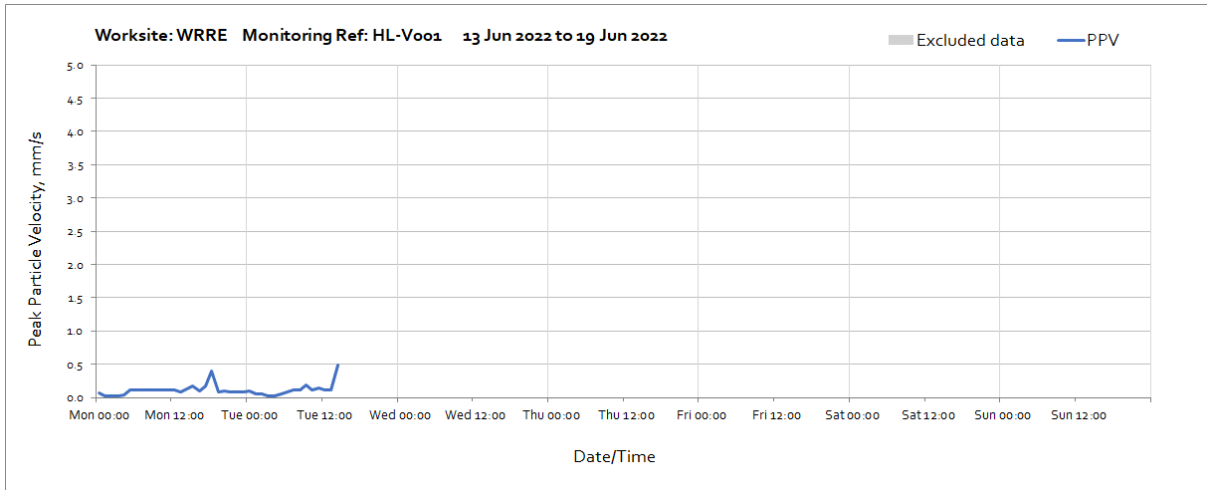
Note: Missing data from 11:00 on Thursday 16<sup>th</sup> June until the end of the month were due to loss of continuous site power at the monitoring station.

## Vibration

The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the highest PPV of the three orthogonal axis x, y and z. Where high values of PPV were caused by local interference with the vibration monitor, which are not representative of HS2 construction works, these values have been greyed out in the following charts and have been excluded to calculate values in Table 4 of the main report.

### Worksite: West Ruislip Retained Embankment (WRRE) – Monitoring Ref: HL-V001





Note: The vibration monitor was removed at 15:00 on Tuesday 14<sup>th</sup> June 2022 following discussions with the local authority.

### Worksite: South Ruislip Ventilation Shaft (SRVS) - Monitoring Ref: SRVS-V001

