

Construction noise and vibration Monthly Report – September 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 September 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, piling works, invasive vegetation removal works, ground investigation works, pier construction, installation of ducts, water pumping works, maintenance of the haul road, installation of satellite welfare and generator farms, earthworks, concrete drilling, pontoon installation, condition surveys, compensation pond construction, material storage, fencing works, environmental maintenance works, cofferdam excavation dewatering, base slab construction, river crossing construction, 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 management, maintenance of haul road, installation of satellite welfare and generator farms, concrete drilling, compensation pond construction, material storage, cofferdam excavation, base slab construction, river crossing construction, launching girder and deck works, fencing works, utility diversion works and environmental maintenance were underway;
- West Ruislip Portal worksite (ref.: WRP) where installation of conveyor belt, installation and commissioning of grouting plant, soil treatment area works, installation of conveyor base, topsoil stripping, tunnel boring machine works, redevelopment of Golf Course and reinforcement of concrete floor slab were underway;
- Breakspear Road worksite (ref.: BR), where bore piling, soil removal, earthworks and backfilling, bridge construction, fabrication of conveyor base and topsoil works were underway;
- South Ruislip Ventilation Shaft worksite (ref.: SRVS), where jet grouting works, road sweeping operations, excavation works, removal of waste materials, platform and concrete breaking works were underway;
- Harvil Road worksite (ref.: HR), where construction of treatment silos and tunnel bore machine material testing area, assembly of conveyor belt, construction of haul

road and attenuation pond, earthworks, topsoil stripping, vegetation clearance, installation of hoarding and bridge construction were underway.

Further works, where monitoring did not take place, were also undertaken at The Greenway (West Ruislip) where sewer utility works were underway.

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>) were exceeded ten (10) times during the reporting period.

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

Thirteen (13) complaints were received during the monitoring period. A description of the complaint, the results of investigation and any actions taken are detailed in Table 8 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 1st to 30th September 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 works, including jetty piling, stockpiling, sheet piling, operation of support plant for the cofferdam construction, pile trimming, de-sanding of pile bore, installation of reinforcement cages, concrete works and 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 and demobilisation.
 - Installation of ducts, including site preparation and earthworks.
 - Water pumping works.

- Maintenance of the haul road.
- Installation of satellite welfare and generator farms.
- Stabilisation, earthworks and drainage works.
- Concrete drilling.
- Pontoon installation and condition surveys.
- Construction of compensation pond.
- Material storage.
- Fencing works.
- Environmental maintenance works.
- Base slab construction.
- Cofferdam excavations.
- Dewatering works.
- Construction of river crossing including emergency obstruction dismantling works.
- Car park construction.
- Deck and launching girder works.
- Utility works.
- Colne Valley Viaduct Moorhall Road site, ref.: CVV-MR (see Plan 1 in Appendix A), where work activities included:
 - Piling works, including jetty piling, sheet piling, pile trimming, pile bore, 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.
 - Installation of satellite welfare and generator farms.

- Concrete drilling.
- Construction of compensation pond.
- Material storage.
- Fencing works.
- Environmental maintenance.
- Construction of river crossing including emergency obstruction dismantling works.
- Excavation works.
- Base slab construction.
- Launch girder and deck works.
- Utility diversion works.
- West Ruislip Portal Worksite, ref.: WRP (see Plan 3 in Appendix A), where work activities included:
 - Installation of conveyor belt.
 - Grouting plant installation and commissioning.
 - Soil treatment area works including haul road construction.
 - Topsoil stripping.
 - Installation of conveyor base.
 - Tunnel boring machine works including assembly and construction.
 - Redevelopment of Golf Course including hoarding installation, ecological works and vegetation clearance.
 - Reinforcement of concrete floor slab for gantry crane installation.
- Breakspear Road Worksite, ref.: BR (see Plan 2 in Appendix A), formerly West Ruislip Retained Embankment, where work activities included:
 - Bored piling.
 - Earthworks including backfill works.
 - Bridge construction.
 - Fabrication of the conveyor base.
 - Topsoil works including removal and relocation works.

- South Ruislip Ventilation Shaft worksite, ref.: SRVS (see Plan 4 in Appendix A), where work activities included:
 - Jet grouting works.
 - Road sweeping operations.
 - Excavation works.
 - Removal of waste materials.
 - Concrete breaking works.
- Harvil Road worksite, ref.: HR (see Plan 2 in Appendix A), where work activities included:
 - Construction of treatment silos and tunnel bore machine material testing area.
 - Assembly of conveyor belt.
 - Construction of haul road and attenuation pond.
 - Earthworks.
 - Topsoil stripping.
 - Vegetation clearance.
 - Installation of hoarding.
 - Bridge construction.

1.1.4 Further works, where monitoring did not take place, were also undertaken at The Greenway (West Ruislip) where sewer utility 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 Fifteen (15) noise and two (2) vibration monitoring installations were active in September in the LBH area. Table 2 summarises the position of noise and vibration monitoring installations within the LBH area in September 2022.

1.2.2 No data was measured at the noise monitor ref.: TKL-N001 during September 2022 due to monitoring station being vandalised.

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
	GW-V001	95 The Greenway, Ickenham, Uxbridge
Breakspears Road (BR)	N065	Breakspears Road South, Harefield, Uxbridge
	N066	Hoylake Crescent, Ickenham, Uxbridge
	TKL-N001	Tile Kiln Lane, Harefield, 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
	SSPA-HR	Harvil Road
	SSPA-BSR	Breakspears Road

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	56.2 (66.5)	57.5 (67.2)	54.4 (59.5)	53.6 (58.3)	53.6 (65.4)	54.8 (56.2)	55.7 (57.5)	54.4 (56.8)	54.0 (59.9)	52.4 (59.5)	53.9 (58.0)	52.7 (57.1)
	CVV-DL-NMP3	Dew's Farm Cottages, Dews Lane, Harefield, Uxbridge,	Free-field	56.7 (66.3)	60.9 (64.3)	52.4 (56.1)	51.0 (58.0)	49.2 (65.4)	53.4 (55.3)	56.9 (57.1)	51.2 (56.0)	51.5 (69.1)	43.9 (50.8)	49.8 (63.1)	47.3 (58.2)
CVV-MR	CVV-MR-NMP1	Weir Cottage, Denham Garden Village, Denham, Buckinghamshire	Free-field	51.7 (53.5)	53.4 (56.2)	51.1 (56.3)	48.7 (55.5)	46.4 (58.9)	51.0 (51.8)	51.9 (53.9)	52.3 (54.1)	50.0 (53.6)	44.3 (47.8)	49.1 (52.9)	46.2 (56.0)
	CVV-MR-NMP2	Harefield Marina, Moorhall Road, London, Greater London	Free-field	54.5 (64.0)	60.9 (67.0)	57.2 (67.7)	54.4 (66.7)	47.9 (59.4)	50.5 (52.6)	52.7 (54.4)	49.0 (52.5)	47.8 (51.4)	43.6 (51.2)	47.9 (52.7)	45.8 (55.2)
	CVV-MR-NMP3	Peerless Drive, Harefield, Uxbridge	Free-field	50.8 (54.7)	55.4 (59.9)	49.9 (66.9)	46.1 (54.0)	43.4 (57.2)	49.2 (50.7)	48.7 (50.0)	47.5 (52.0)	47.3 (54.9)	42.6 (53.1)	47.6 (54.1)	44.8 (55.0)
WRP	N048	West Ruislip Golf Club, Ickenham Rd, Ruislip	Free-field	59.0 (63.5)	59.2 (66.8)	52.1 (55.9)	50.8 (57.4)	47.7 (57.3)	54.4 (56.9)	54.3 (60.2)	50.8 (53.9)	51.1 (53.5)	47.1 (51.4)	52.4 (59.7)	48.2 (55.7)
	N056	83 The Greenway, Ickenham, Ruislip	Façade	61.5 (62.8)	60.8 (61.7)	62.0 (63.6)	60.6 (65.1)	54.5 (63.5)	58.9 (60.3)	60.3 (63.3)	60.4 (61.8)	59.3 (61.5)	52.3 (59.5)	59.6 (68.1)	54.8 (60.4)

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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	Façade	57.1 (58.2)	57.1 (68.3)	58.2 (65.8)	56.3 (58.9)	51.1 (59.2)	54.2 (55.6)	56.9 (57.8)	56.5 (58.6)	59.2 (74.4)	48.5 (55.9)	54.9 (62.5)	50.8 (56.3)
BR	N065	Breakspear Road South, Harefield, Uxbridge	Free-field	64.8 (67.2)	65.1 (71.1)	65.1 (67.0)	63.5 (67.5)	59.0 (66.1)	63.4 (66.0)	62.5 (65.4)	63.3 (65.9)	63.3 (67.1)	56.7 (67.1)	63.5 (67.2)	58.3 (65.3)
	N066	Hoylake Crescent, Ickenham, Uxbridge	Free-field	54.9 (56.2)	55.4 (57.8)	57.7 (72.8)	55.7 (72.1)	49.5 (57.6)	52.7 (52.9)	53.9 (55.5)	56.9 (58.1)	55.1 (61.0)	47.0 (53.7)	52.2 (57.4)	49.6 (54.6)
	TKL-N001*	Tile Kiln Lane, Harefield, Uxbridge	Free-field	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SRVS	N061	Cineworld South Ruislip car park, Ruislip	Free-field	58.4 (62.3)	61.5 (63.6)	61.9 (64.0)	62.0 (67.9)	55.7 (63.7)	58.4 (58.9)	62.1 (62.6)	61.3 (61.5)	61.7 (65.6)	54.9 (66.2)	60.9 (65.5)	54.2 (58.7)
HR	N067	Harvil Road worksite south boundary	Free-field	55.2 (58.6)	57.7 (60.1)	59.0 (69.7)	56.7 (67.7)	47.3 (55.9)	50.8 (51.6)	56.2 (58.2)	53.5 (55.2)	58.9 (65.9)	47.7 (57.3)	57.5 (68.1)	49.5 (58.8)
	SSPA-HR	Harvil Road	Free-field	69.1 (70.8)	68.5 (70.7)	67.3 (70.1)	64.9 (68.5)	62.2 (70.6)	66.7 (68.1)	68.1 (69.6)	67.6 (70.0)	66.3 (69.8)	59.7 (63.2)	66.0 (72.4)	61.5 (70.5)
	SSPA-BSR	Breakspear Road	Free-field	64.8 (67.4)	65.0 (68.3)	64.3 (66.7)	61.3 (65.0)	57.3 (65.6)	61.3 (63.0)	62.6 (66.2)	62.7 (65.4)	61.4 (67.4)	54.4 (60.1)	62.2 (65.5)	57.4 (65.5)

*No data was measured during September 2022 due to monitoring station being vandalised.

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2.1.2 Table 4 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
WRP	GW-V001	95 The Greenway, Ickenham, Uxbridge	0.45 (Z-axis)
SRVS	SRVS-V001	Braintree Industrial Estate - Building D4	2.18 (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	Weekdays Nights	0800-1800 2200-0700	1 12	No exceedance No exceedance
	CVW-DL-NMP3*	Dew's Farm Cottages, Dews Lane, Harefield, Uxbridge	All days	All period	No exceedance	No exceedance
CVW-MR	CVW-MR-NMP1	Weir Cottage, Denham Garden Village, Denham, Buckinghamshire	All days	All period	No exceedance	No exceedance
	CVW-MR-NMP2	Harefield Marina, Moorhall Road, London, Greater London	Weekdays	0800-1800	9	No exceedance
			Weekdays Weekdays Nights	1800-1900 1900-2200 2200-0700	9 31 35	1 2 21
CVW-MR-NMP3	Peerless Drive, Harefield, Uxbridge	All days	All period	No exceedance	No exceedance No exceedance	
WRP	N048	West Ruislip Golf Club, Ickenham Rd, Ruislip	Weekdays	0800-1800	5	No exceedance
	N056	83 The Greenway, Ickenham, Ruislip	Weekdays	1800-1900	6	No exceedance
			Weekdays Saturdays Saturdays	1900-2200 0800-1300 1400-2200	52 1 18	No exceedance No exceedance No exceedance
N057	123 The Greenway, Ickenham, Ruislip	Weekdays Sundays Nights	1800-1900 0700-2200 2200-0700	1 5 15	No exceedance No exceedance No exceedance	
BR	N065	Breakspear Road South, Harefield, Uxbridge	Weekdays	0800-1800	11	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
	N066	Hoylake Crescent, Ickenham, Uxbridge	Weekdays	0800-1800	1	No exceedance
	TKL-N1	Tile Kiln Lane, Harefield, Uxbridge	All days	All period	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	Weekdays	1800-1900	3	No exceedance
			Nights	1900-2200 2200-0700	6 2	No exceedance No exceedance
	SSPA-HR	Harvil Road	Weekdays Saturdays	0800-1800 0800-1300	21 4	No exceedance No exceedance
	SSPA-BSR	Breakspear Road	Weekdays Saturdays	0800-1800 0800-1300	11 1	No exceedance 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 Exceedances of the LOAEL were recorded at ten (10) monitoring locations. The LOAEL exceedances were recorded during weekdays, Saturdays, Sundays and night-time working hours.

2.2.7 For the purpose of assessing eligibility for noise insulation or temporary rehousing, multiple exceedances of the SOAEL in a 24-hour period would be counted as a single exceedance during that day. Over the reporting period, the overall number of SOAEL exceedances at each measurement location is shown in Table 6 and may be lower than the total sum of individual exceedances reported in Table 5 for each location.

Table 6: Summary of Total Exceedances of SOAEL

Worksite Reference	Measurement Reference	Monitor Address	Total of SOAEL exceedances in the month
CVV-MR	CVV-MR-NMP2	Harefield Marina, Moorhall Road, London, Greater London	10

- 2.2.8 Ten (10) exceedances of the SOAEL was recorded due to HS2 construction works during September 2022. Exceedances occurred at noise monitor CVV-MR-NMP2 during weekday evenings and night-time periods.
- 2.2.9 Exceedances of the SOEAL did not meet the temporal criteria contained within HS2 information paper E23 for triggering noise insulation eligibility, whereby the SOAEL must be exceeded for at least 10 days during any 15 day period.

2.3 Exceedances of Trigger Level

- 2.3.1 Table 7 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 7: 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

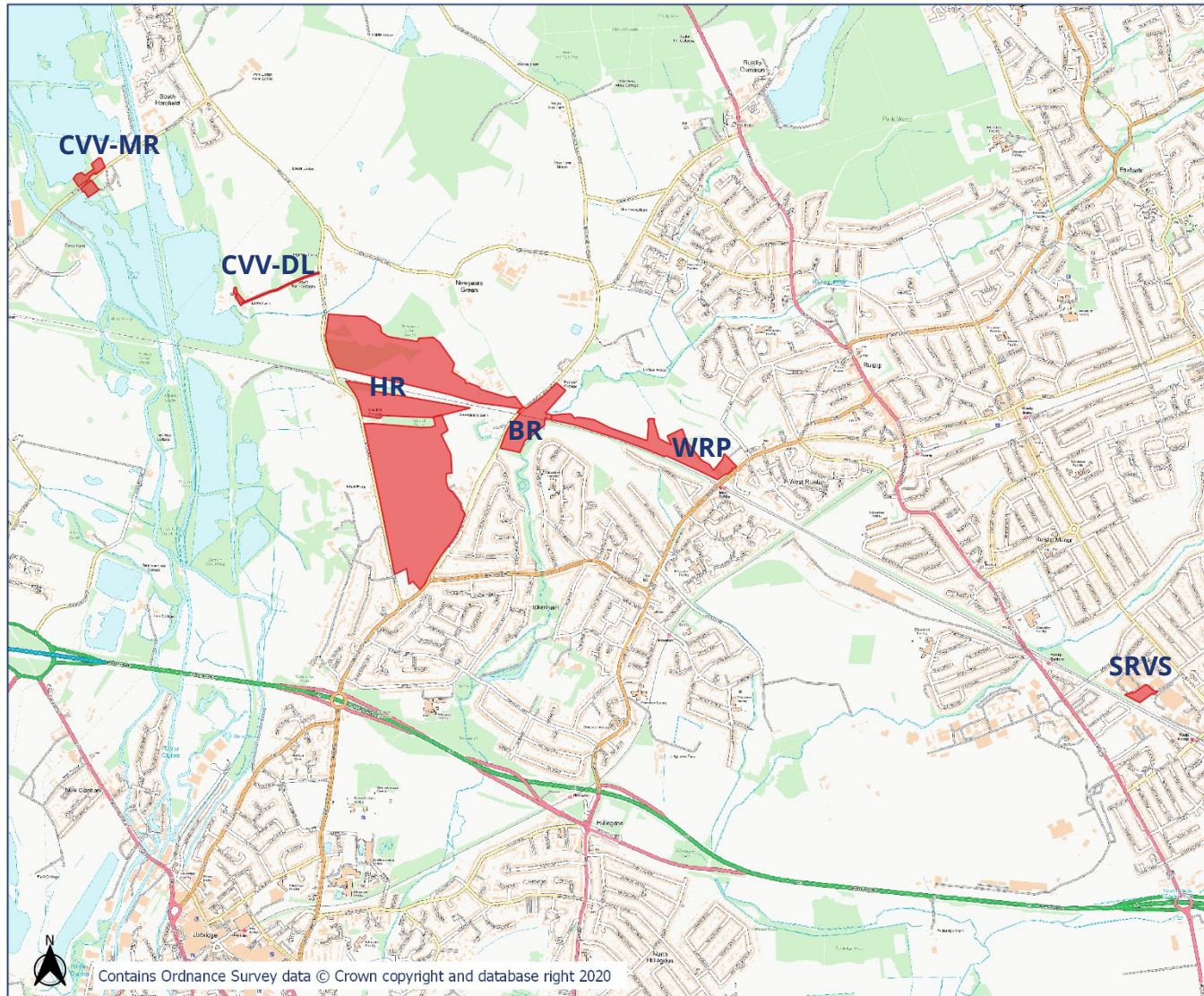
- 2.4.1 Table 8 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

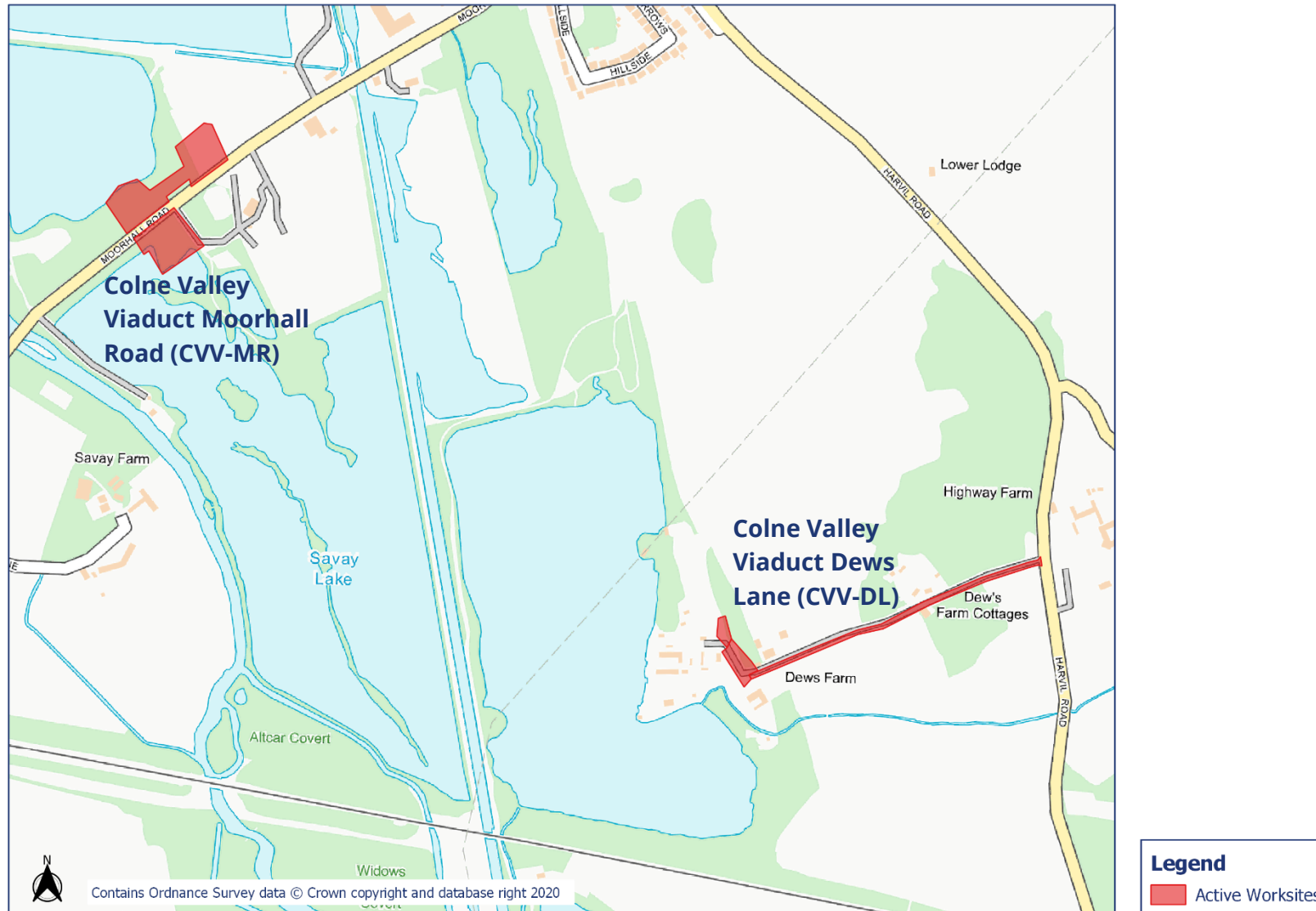
Table 8: Summary of Complaints

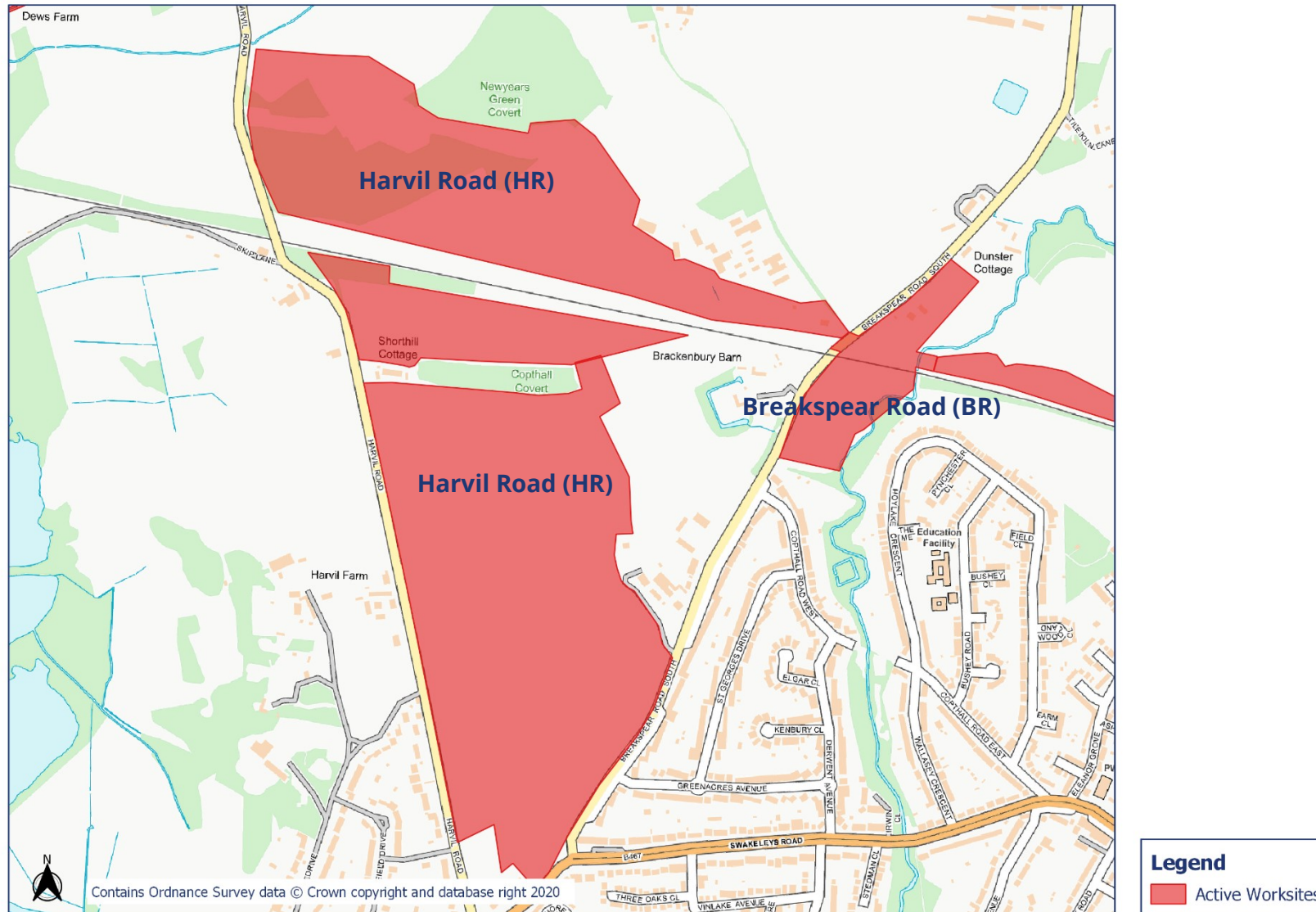
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-22-43955-C HS2-22-43959-C HS2-22-43960-C HS2-22-43961-C HS2-22-43962-C HS2-22-43965-C HS2-22-81944-E-C HS2-22-82463-E-C HS2-22-82524-E	WRP	Complaint about construction noise during the night with reference to a constant beeping sound, most likely from vehicles reversing, and banging early in the morning.	The noise issue was investigated, and it was concluded that the areas of site in which bolting and welding were being undertaken did not have an adequate level of noise attenuation. Consents for works were in place.	Stakeholder informed of the investigation results and further noise attenuation applied to the identified source of noise impact. Warning signals has been changed with lower signals and urgent directivities to amend working practices were issued.
HS2-22-43990-C	WRP	Complaint due to noise disturbance	The noise was caused by the lifting plant	The works with the machine were stopped

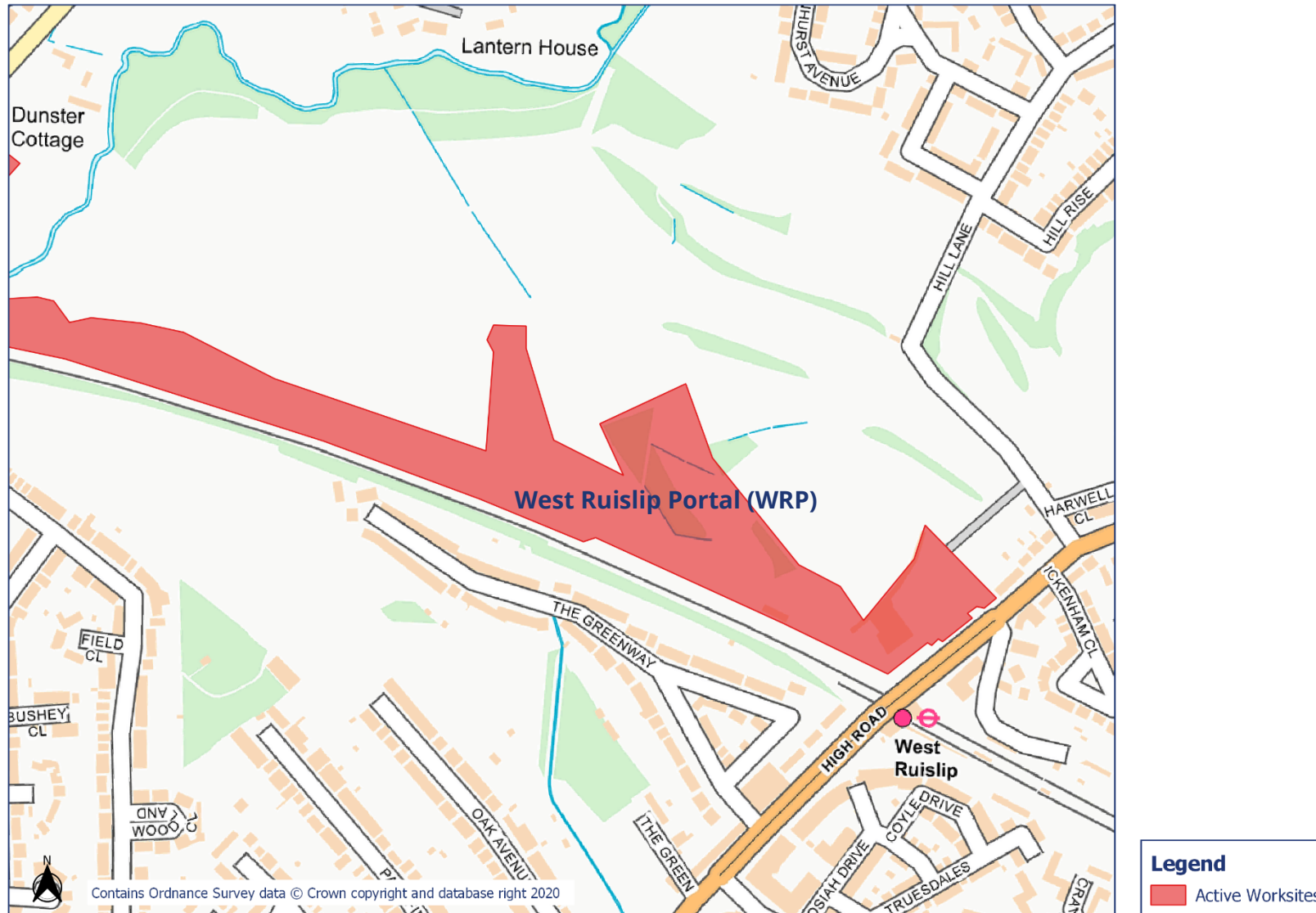
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
		during the night affecting stakeholder's sleep, even with windows shut.	machinery that was fitted with louder alarm in error.	until quieter alarm could be sourced and fitted. Resident was contacted and apology given.
HS2-22-82621-E	WRP	Complaint about sleep being disrupted for four consecutive nights by loud noises from vehicles during the night.	Stakeholder has been contacted confirming that there will be no vehicle movements after 21:00.	Stakeholder has been contacted confirming that there will be no vehicle movements after 21:00.
HS2-22-82676-E	WRP	Complaint due to noise disturbance during the night affecting the sleep.	On-going investigation.	On-going.
HS2-22-83069-E	WRP	Complaint regarding reversing alarms from vehicles at night affecting the sleep.	The location of the current complaint is 1.5km away from the nearest HS2 worksite. The noise is not related to HS2 works.	The complainant was contacted and informed about the results of investigation.

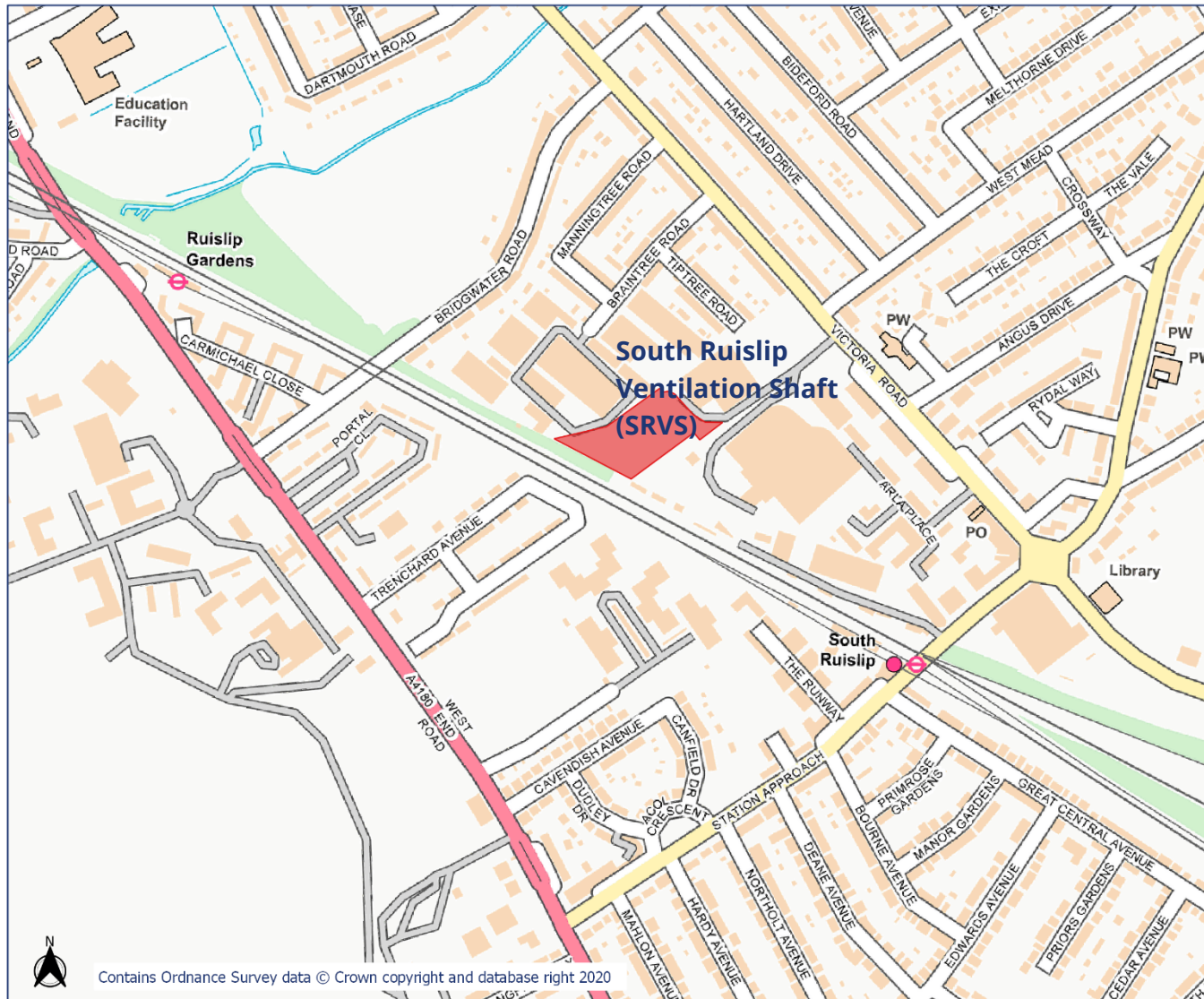
Appendix A Site Locations







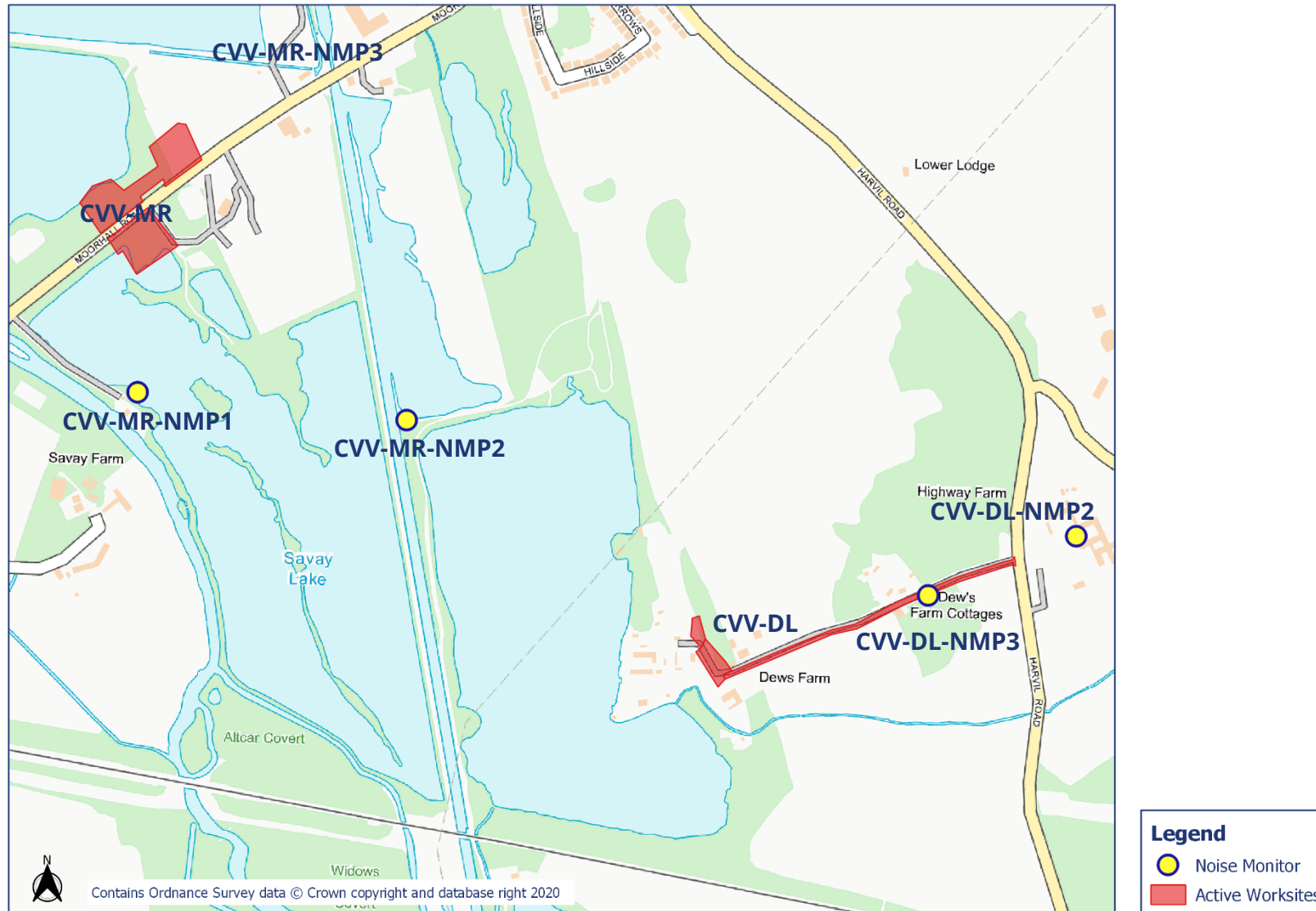


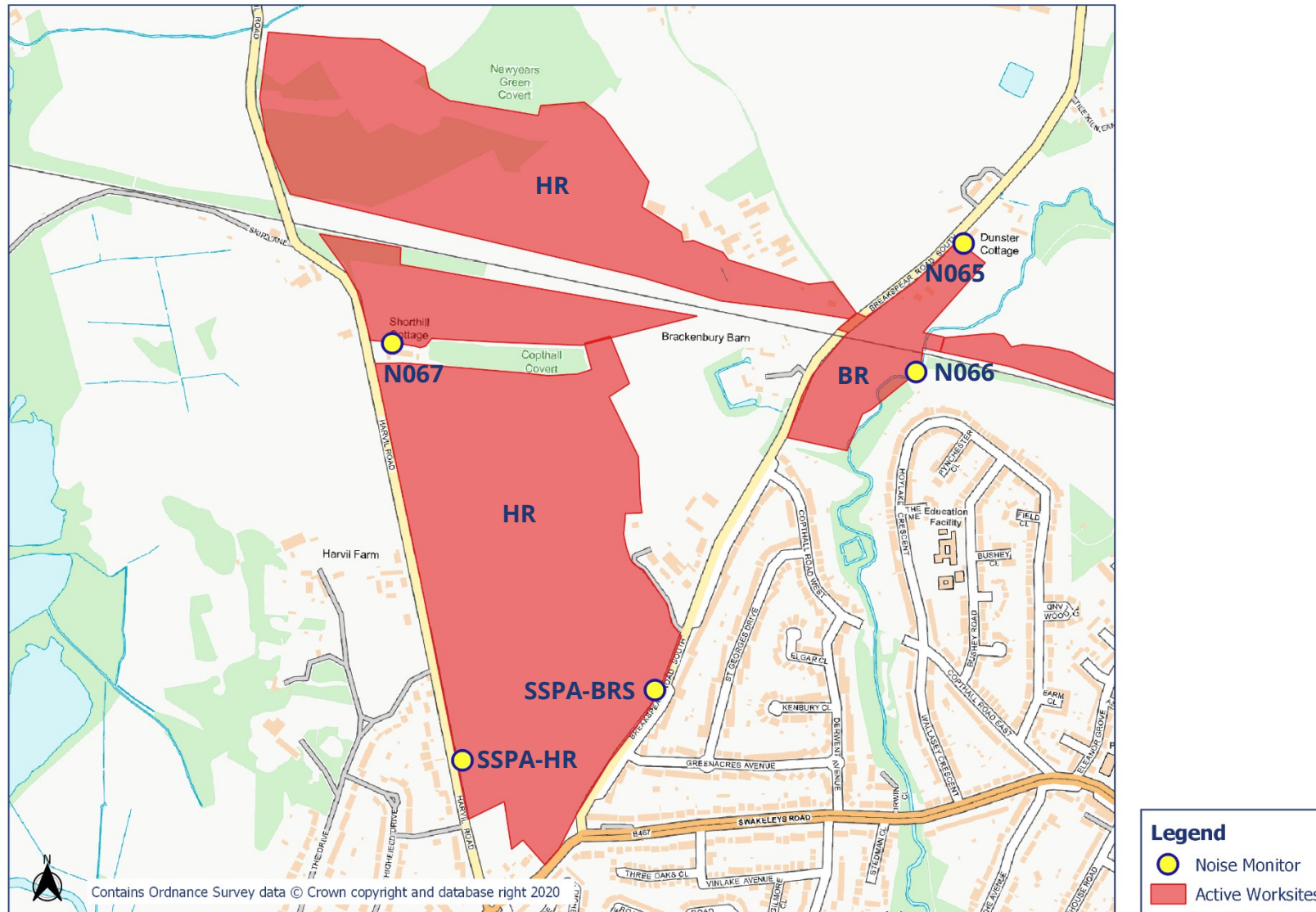


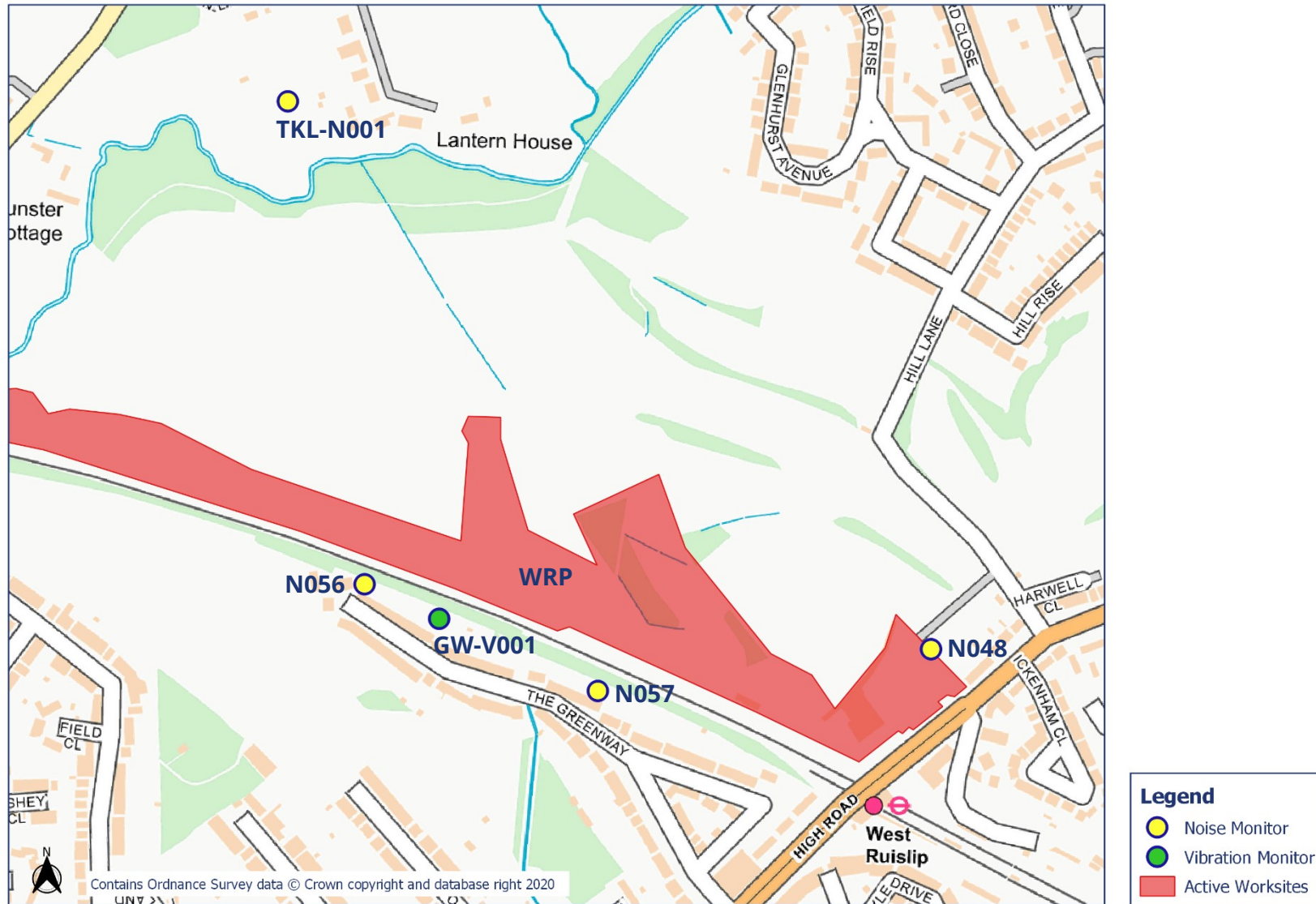
Legend

- Active Worksites

Appendix B Monitoring Locations









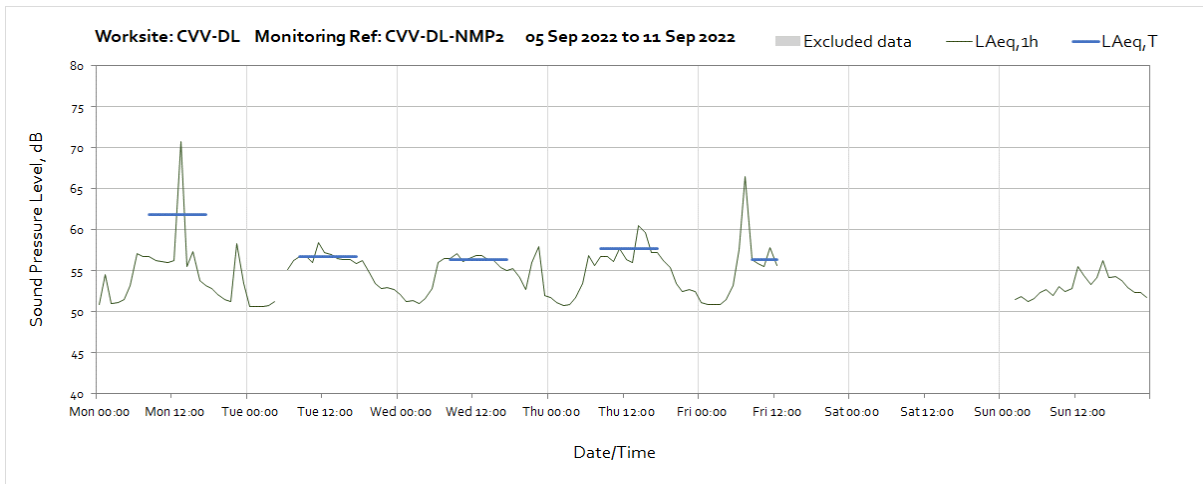
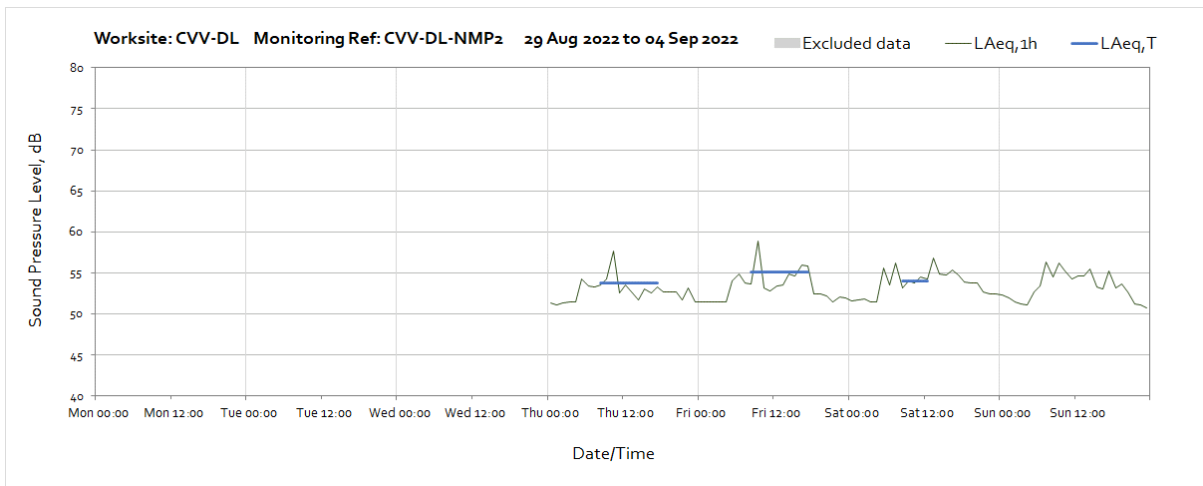
Appendix C Data

Noise

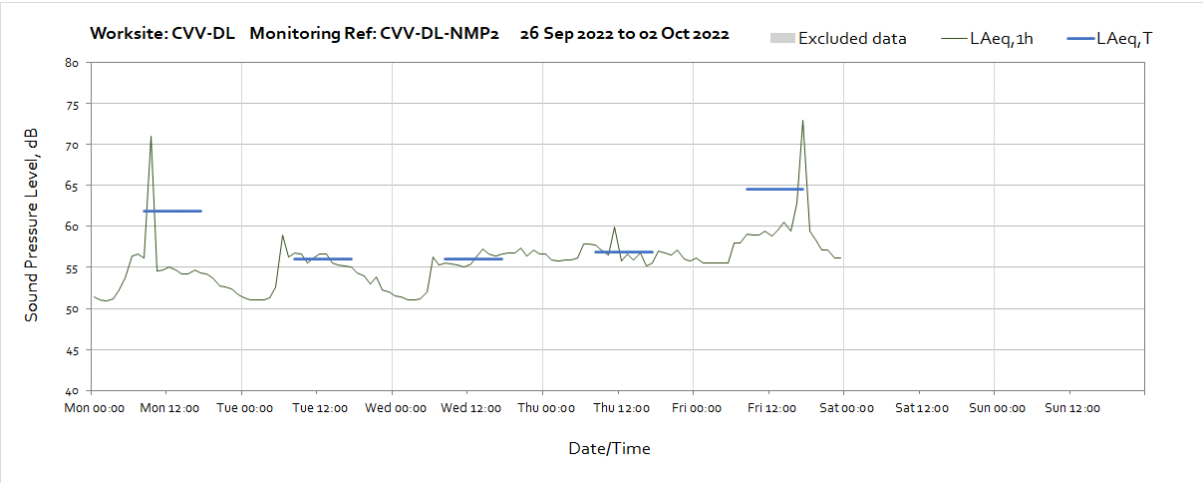
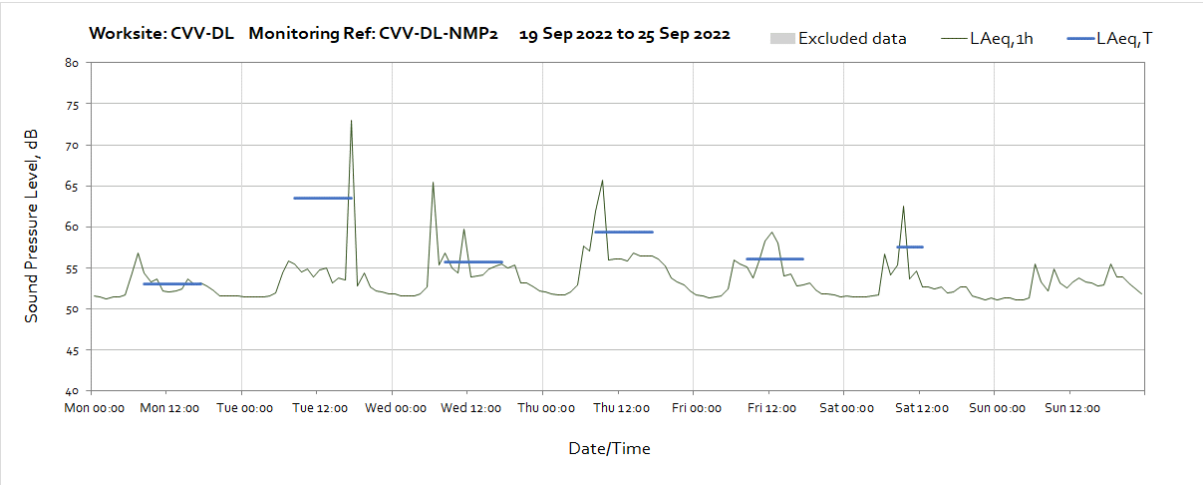
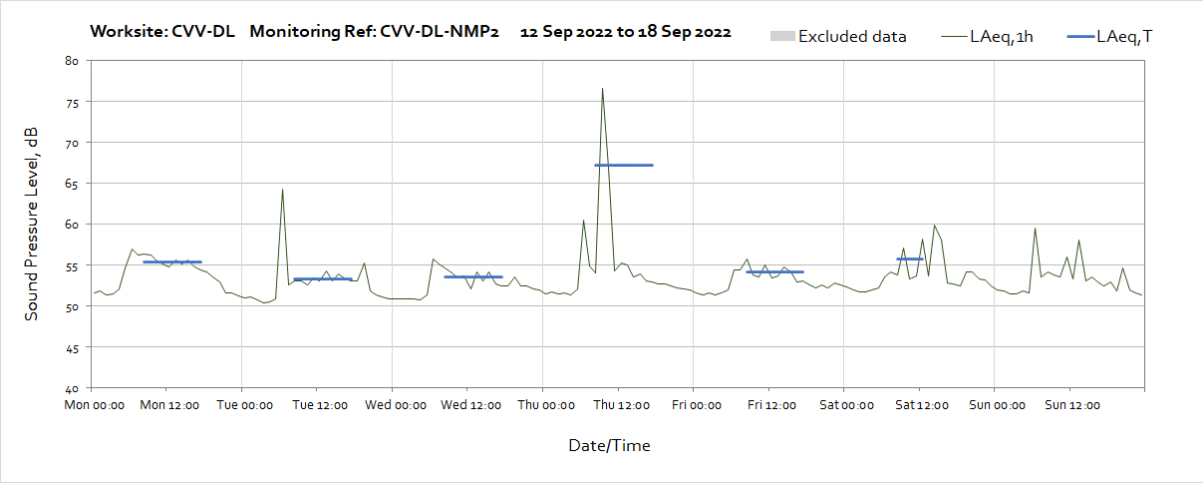
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have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

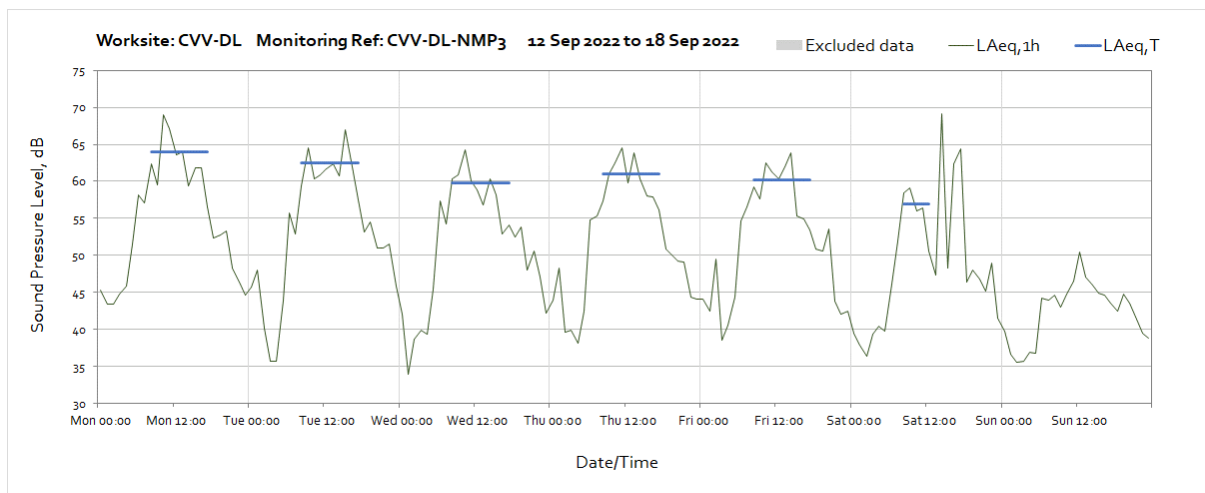
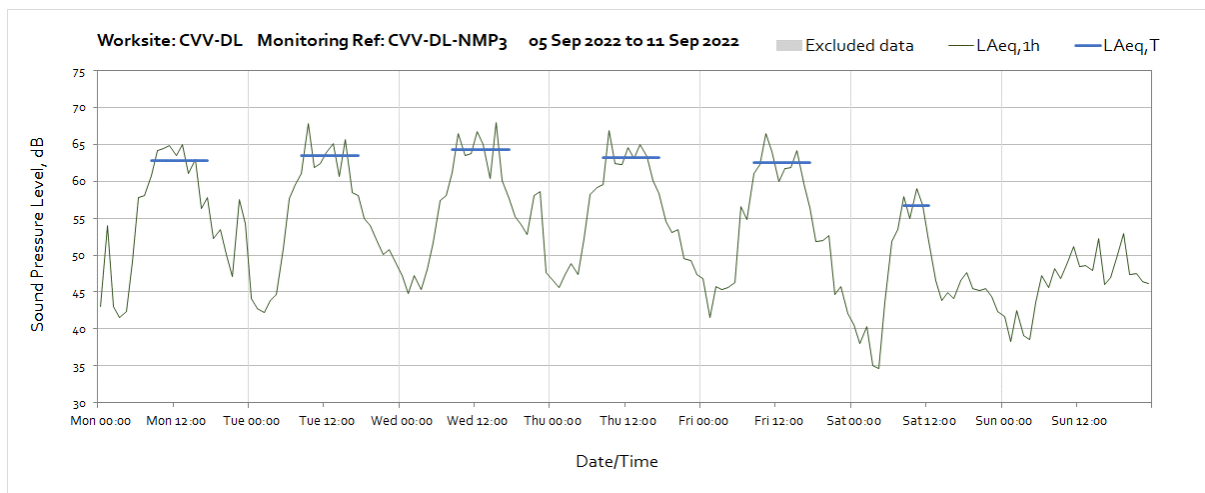
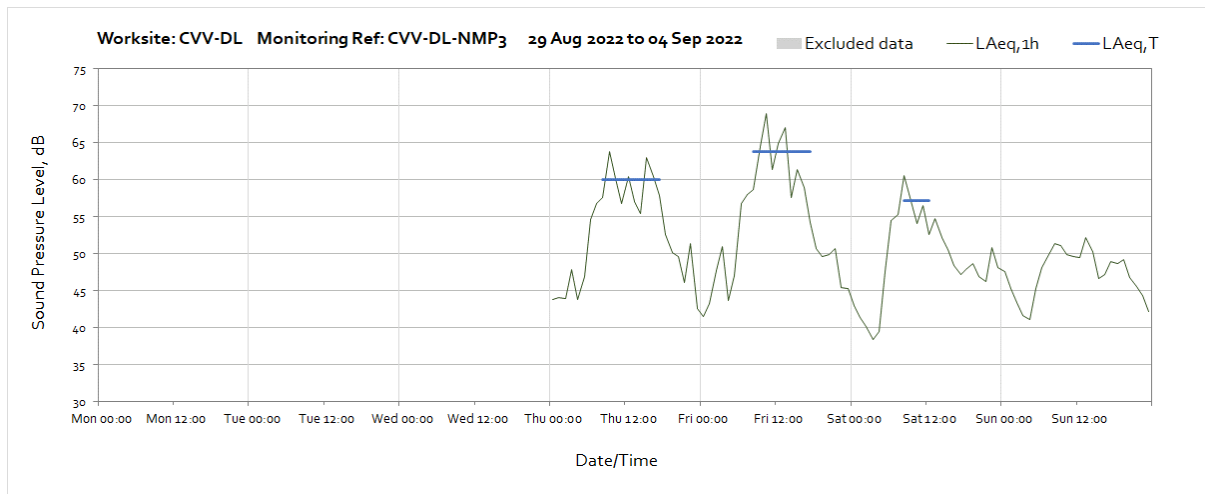


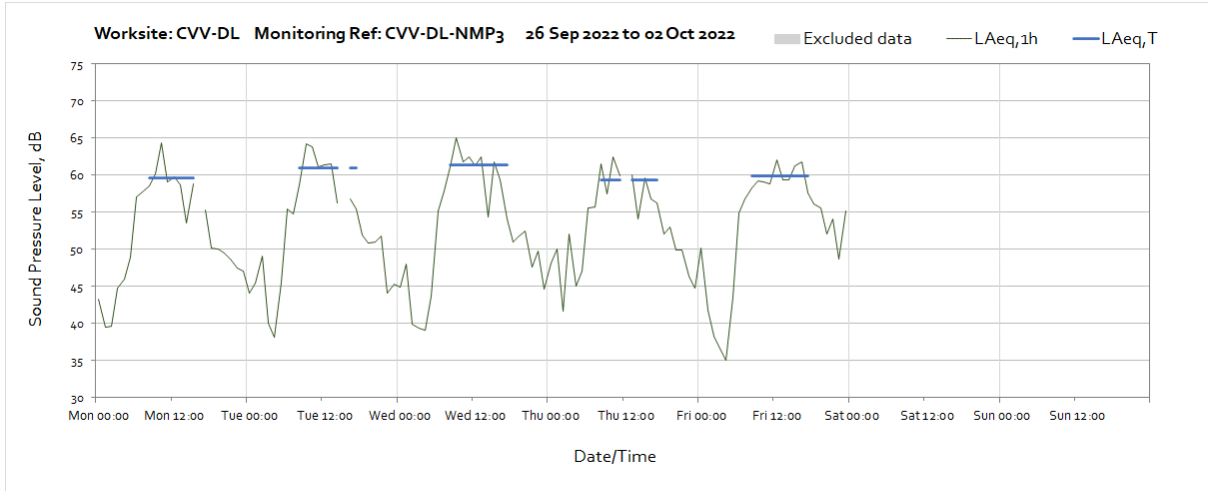
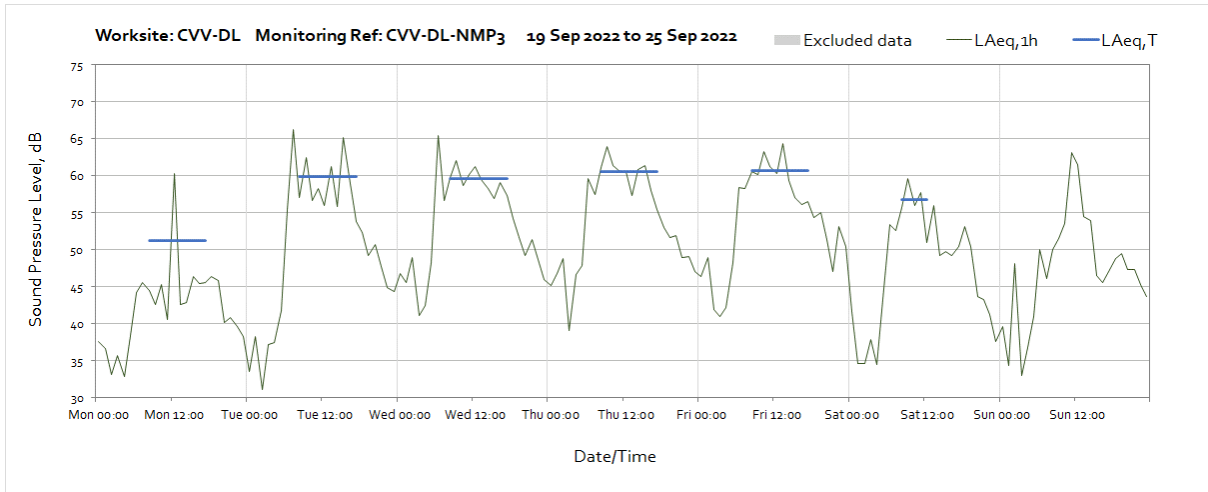
Note: Missing data throughout the week was due to server communication issues at the monitoring station.



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

Monitoring Ref: CVV-DL-NMP3

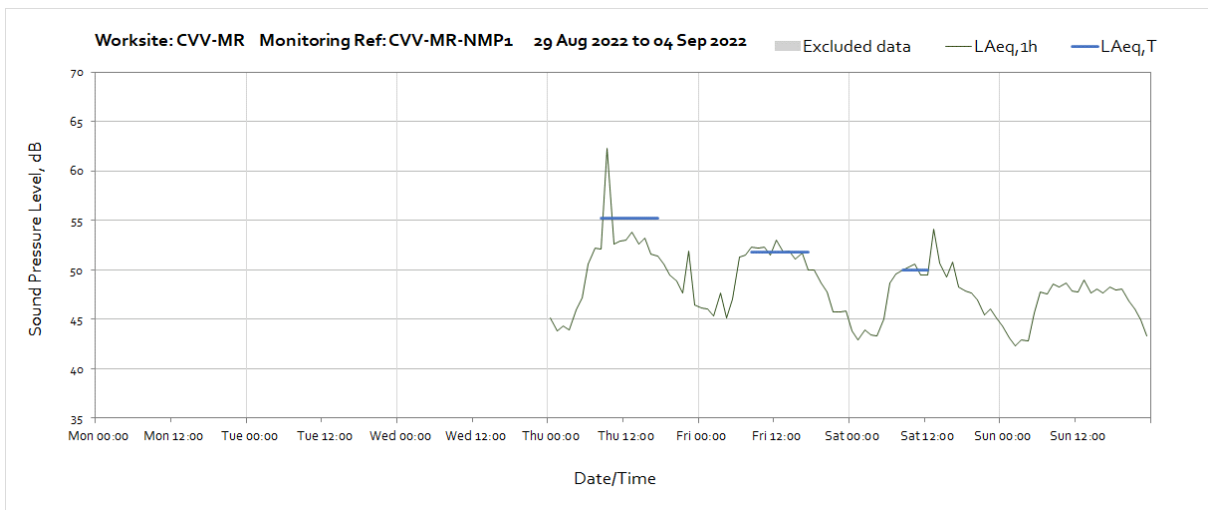


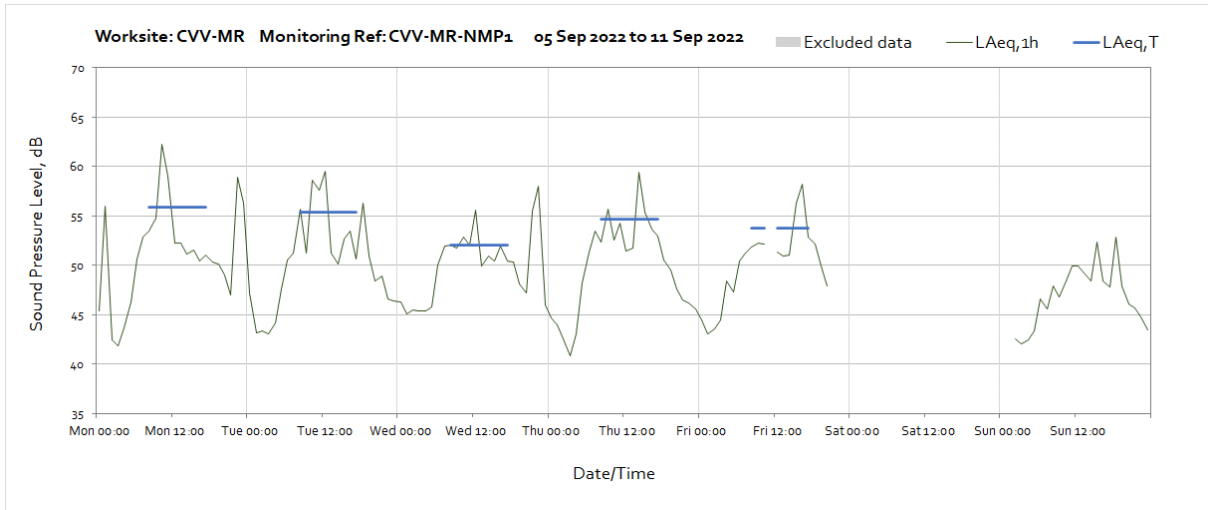


Note: Missing data throughout the week was due to monitor alert setting updates.

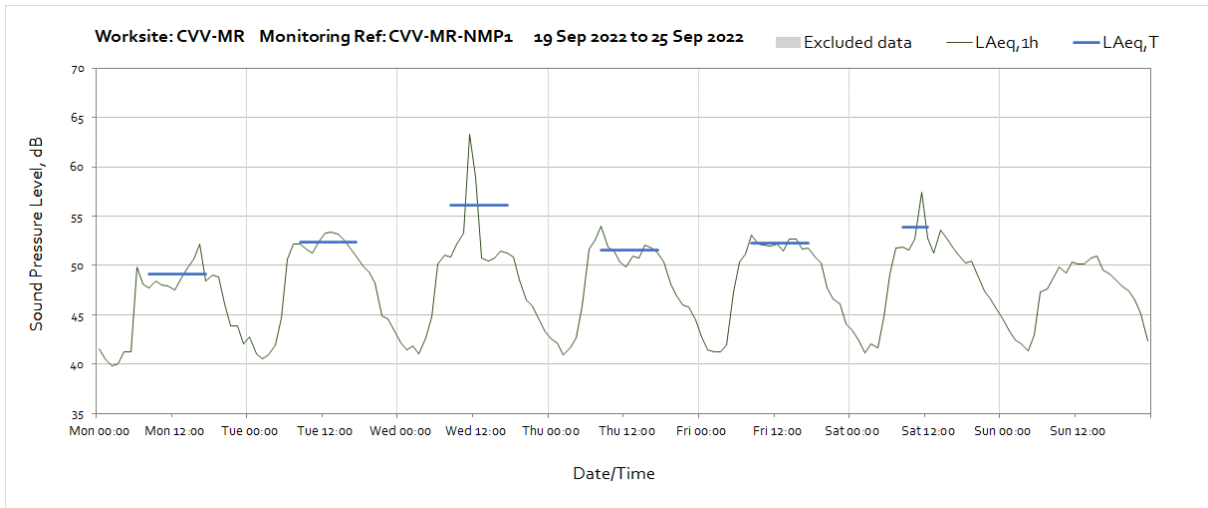
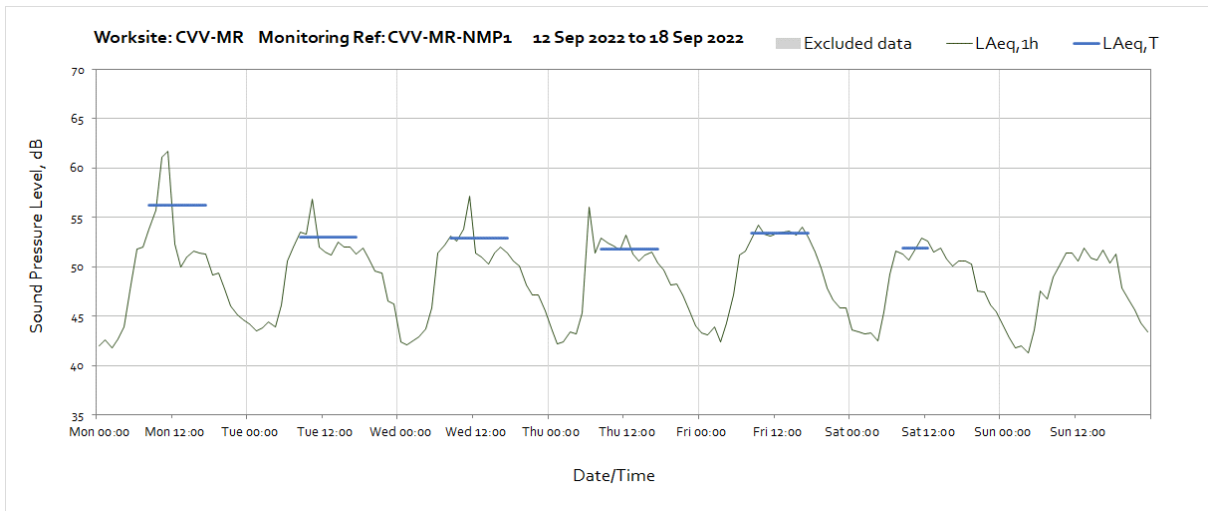
Worksite: Colne Valley Viaduct Moorhall Road (CVV-MR)

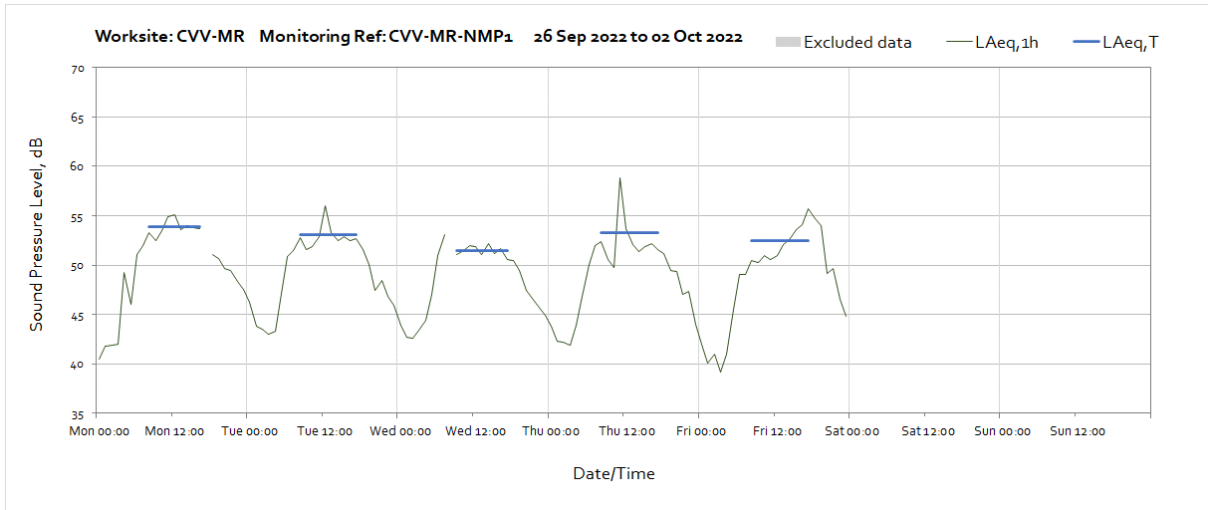
Monitoring Ref: CVV-MR-NMP1





Note: Missing data throughout the week was due to server communication issues at the monitoring station.

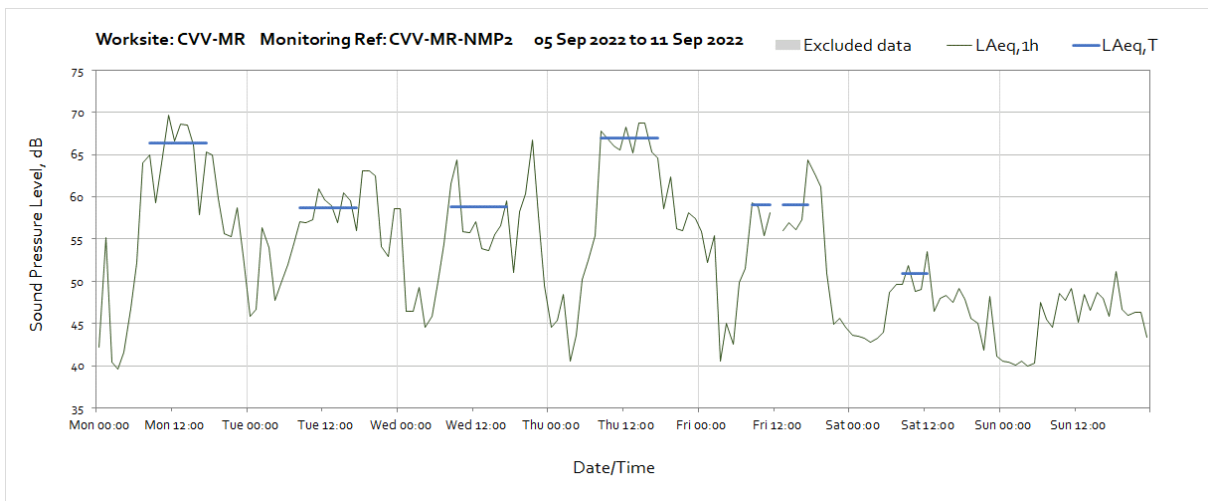
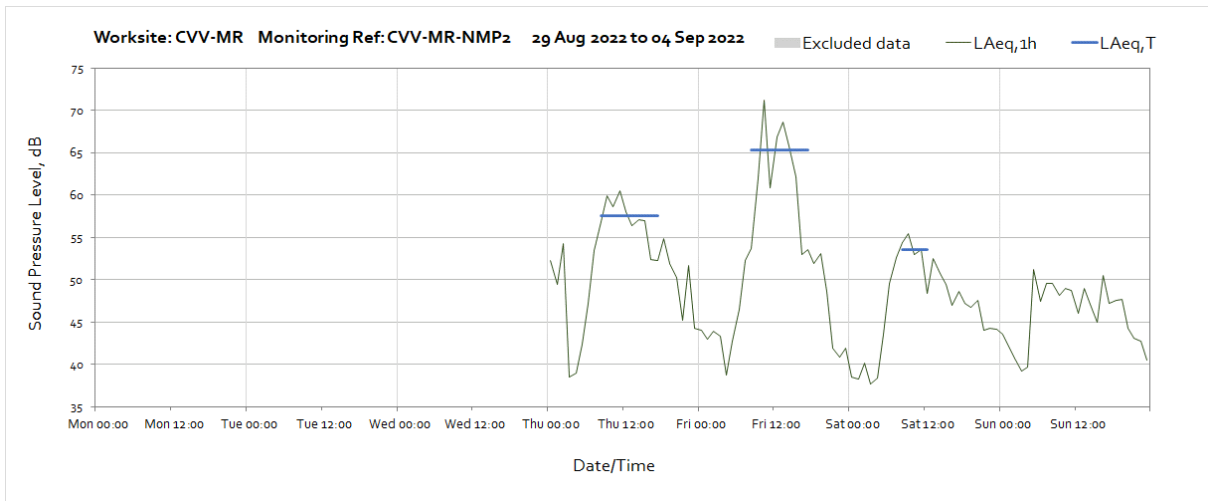




Note: Missing data throughout the week was due to monitor alert setting updates.

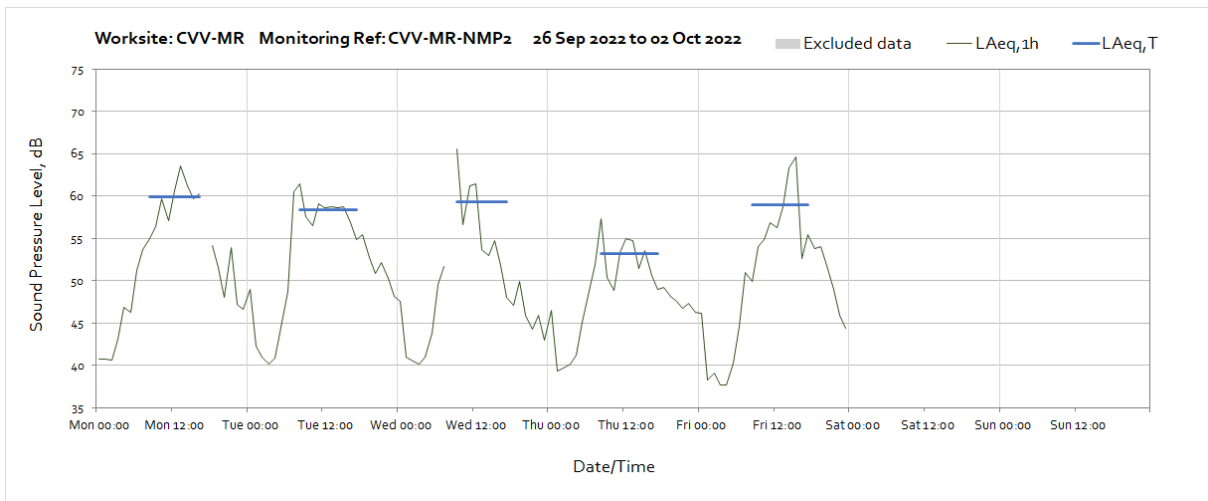
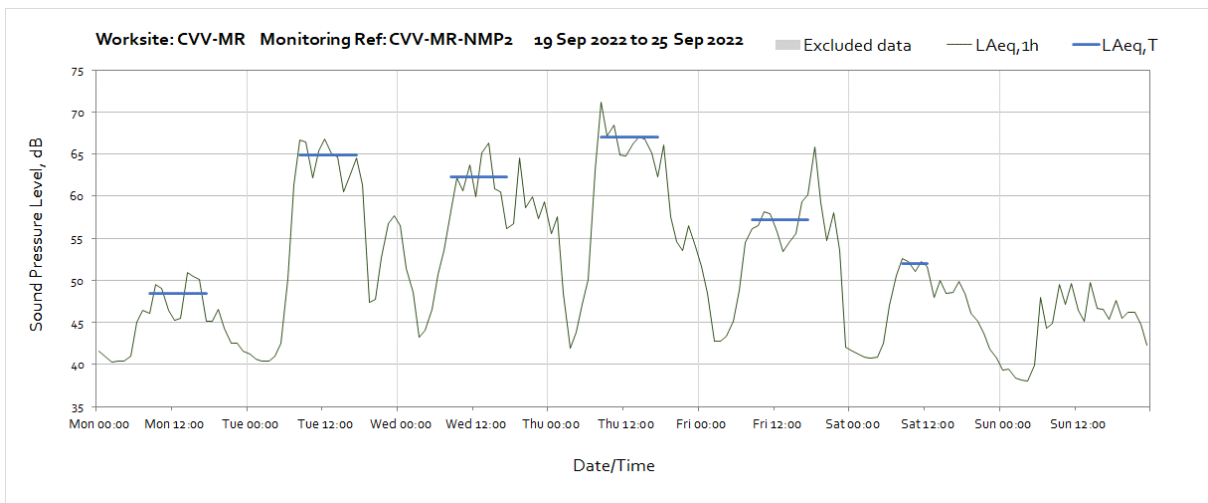
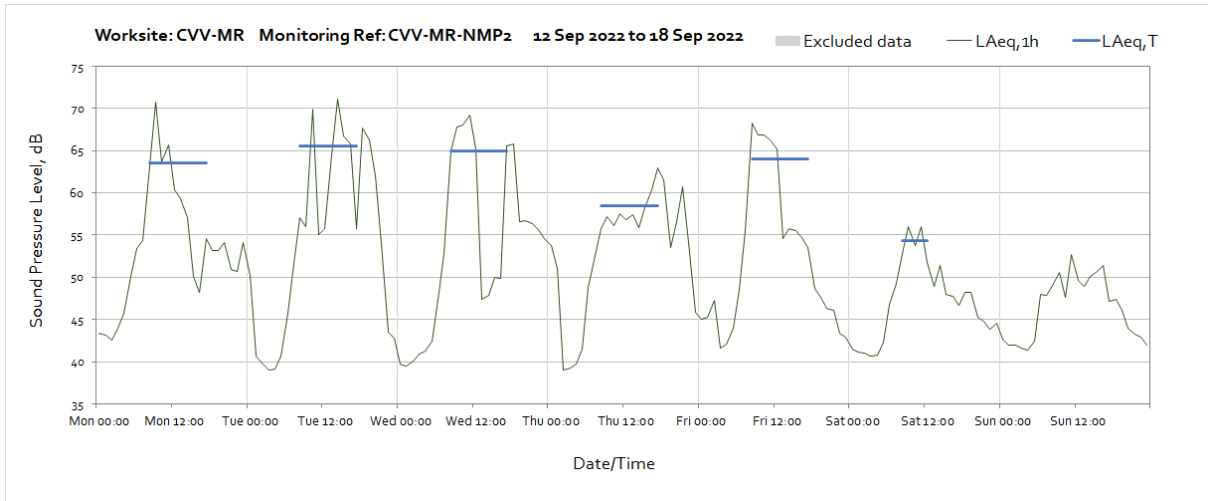
Worksite: Colne Valley Viaduct Moorhall Road (CVV-MR)

Monitoring Ref: CVV-MR-NMP2



Note: Missing data at 12:00 on Friday 9th September was due do field calibration.

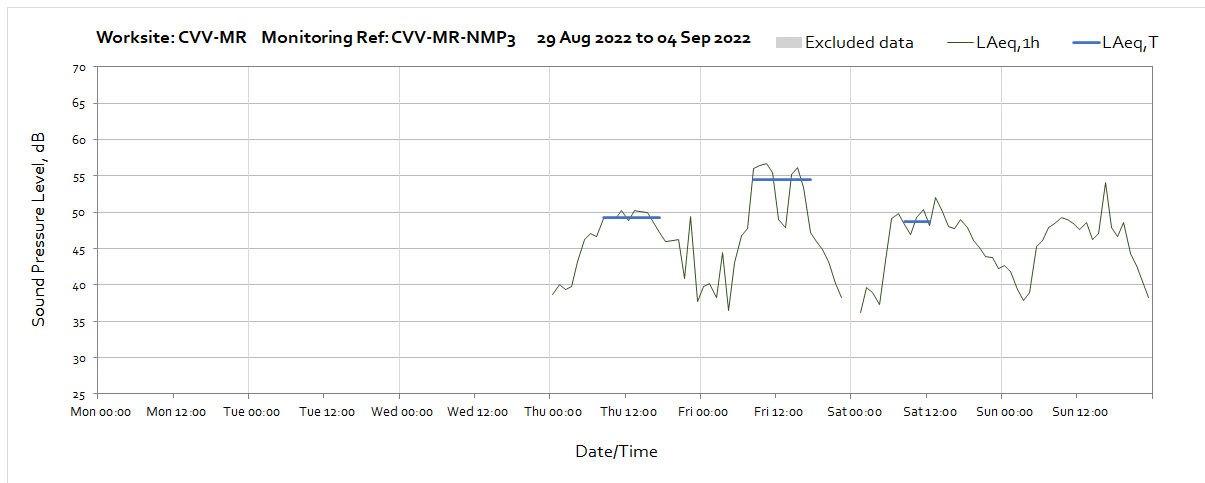
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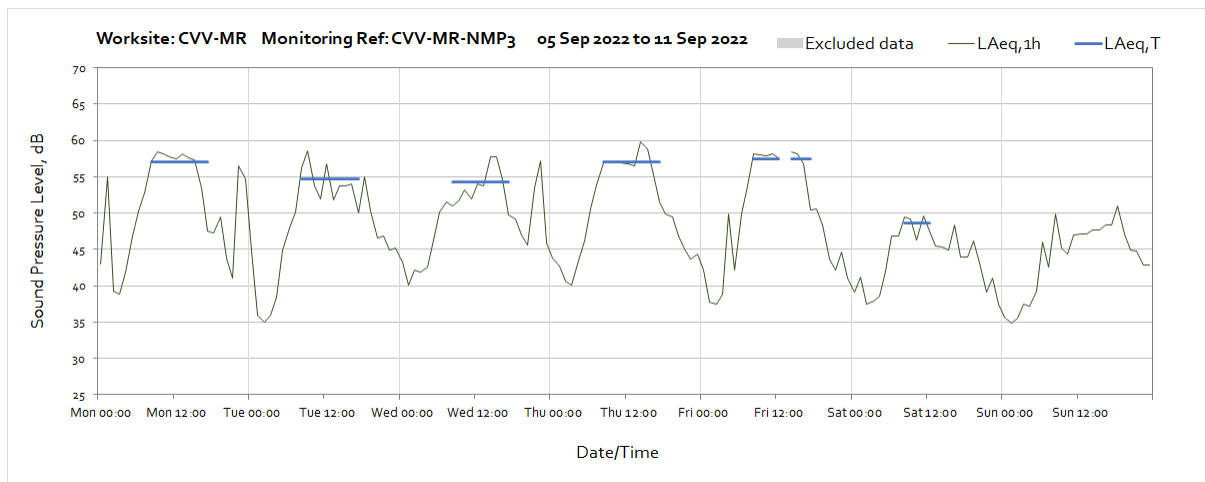
Note: Missing data throughout the week was due to monitor alert setting updates.

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

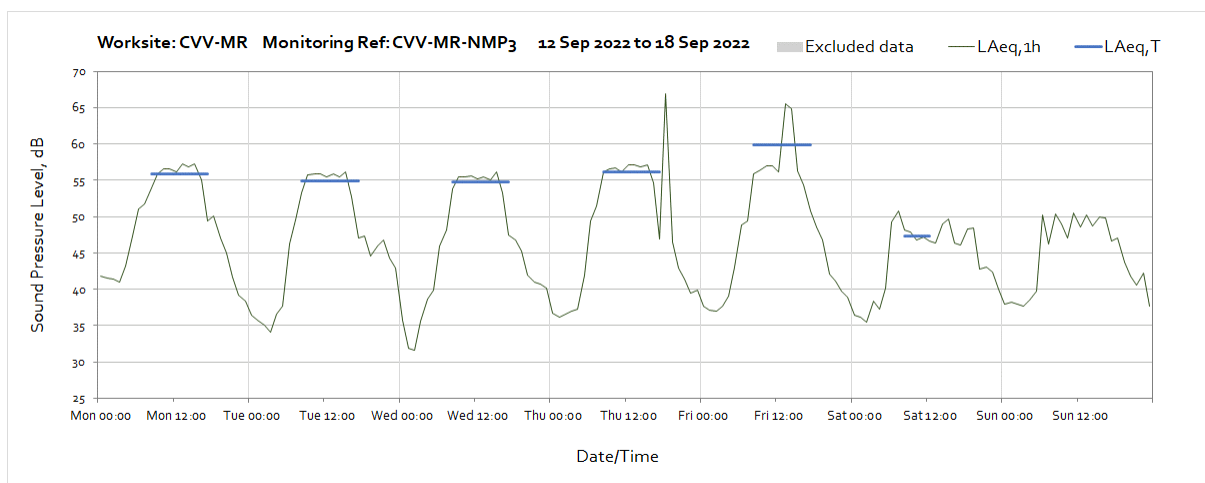
Monitoring Ref: CVV-MR-NMP3

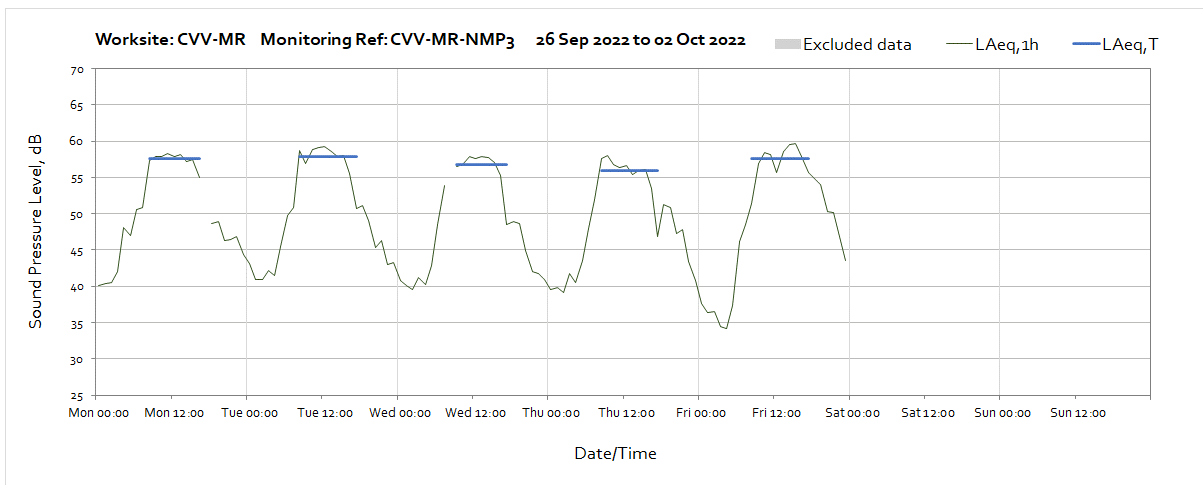
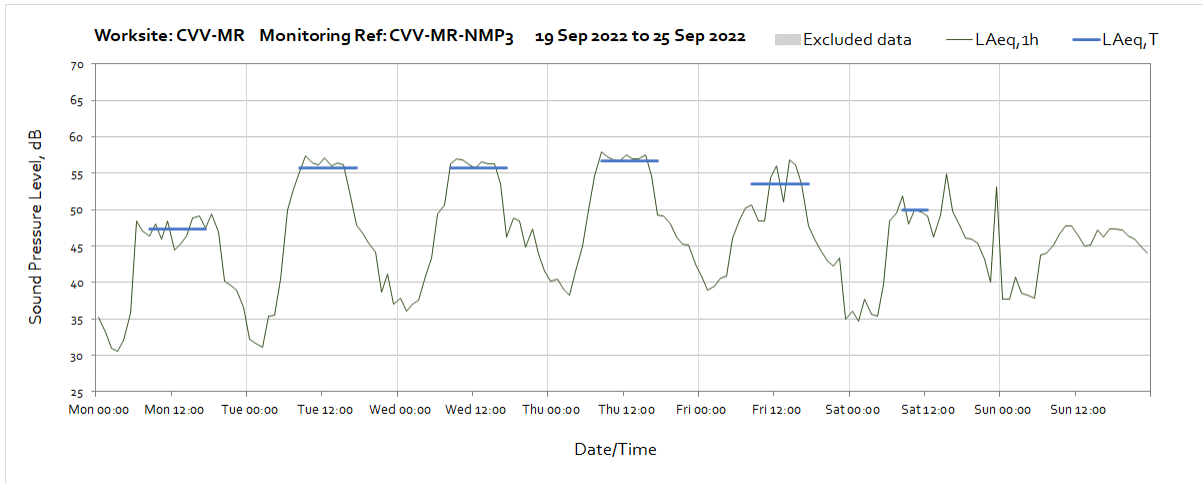


Note: Missing data between 23:00 on Friday 2nd September and 01:00 on Saturday 3rd September was due to server communication issues at the monitoring station.



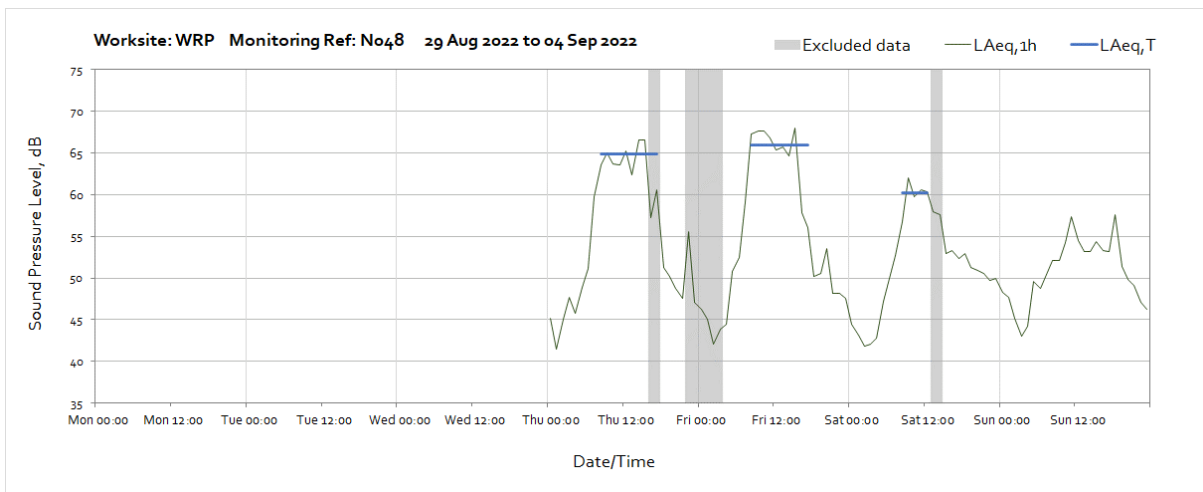
Note: Missing data at 13:00 on Friday 9th September was due do field calibration.

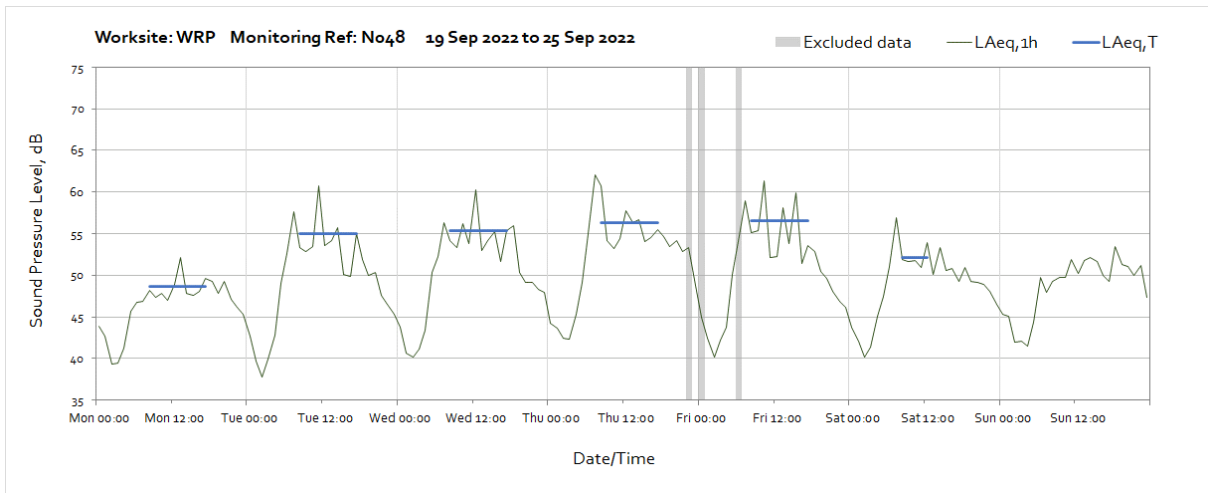
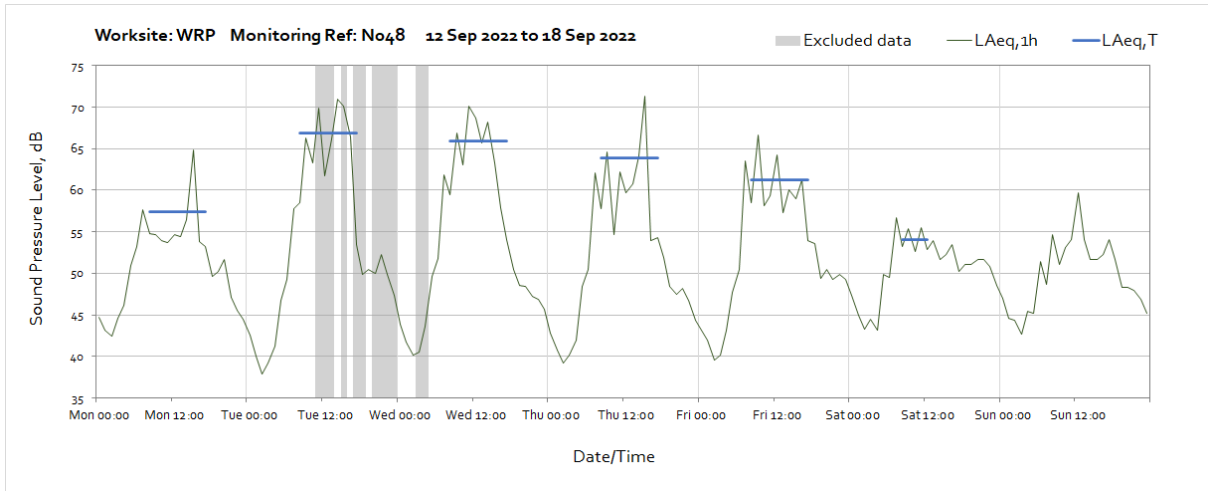
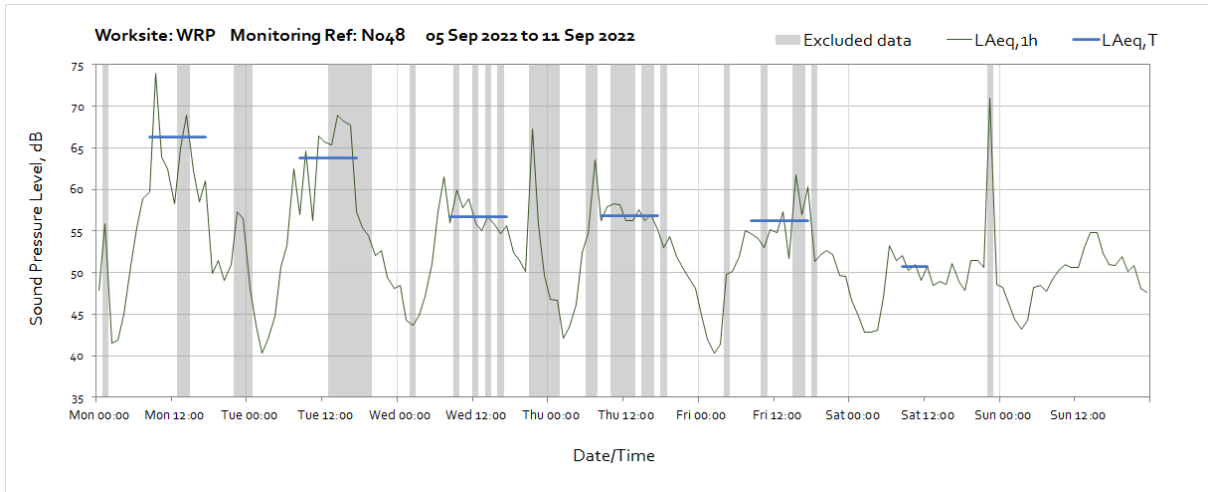


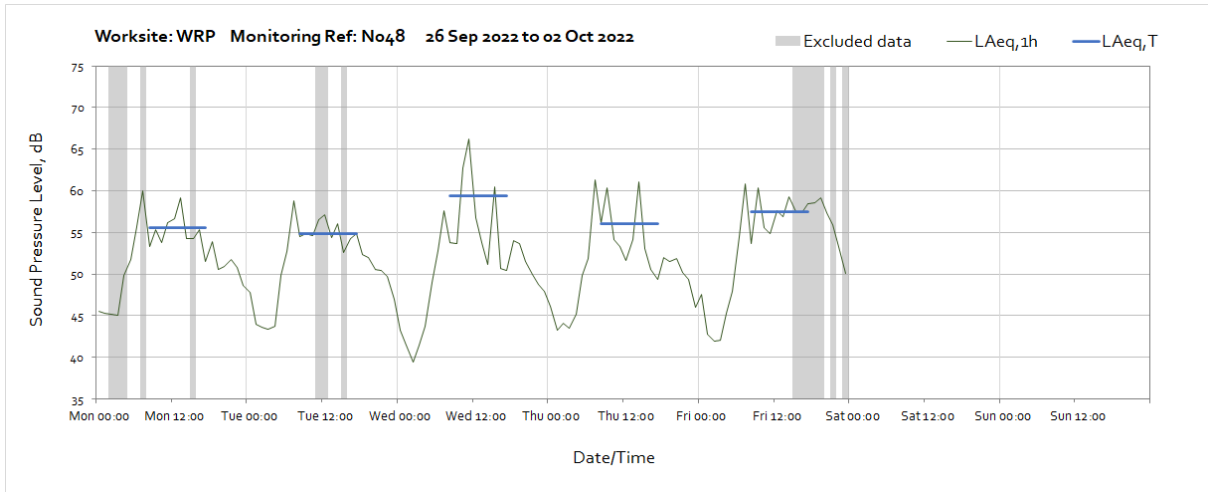


Note: Missing data throughout the week was due to monitor alert setting updates.

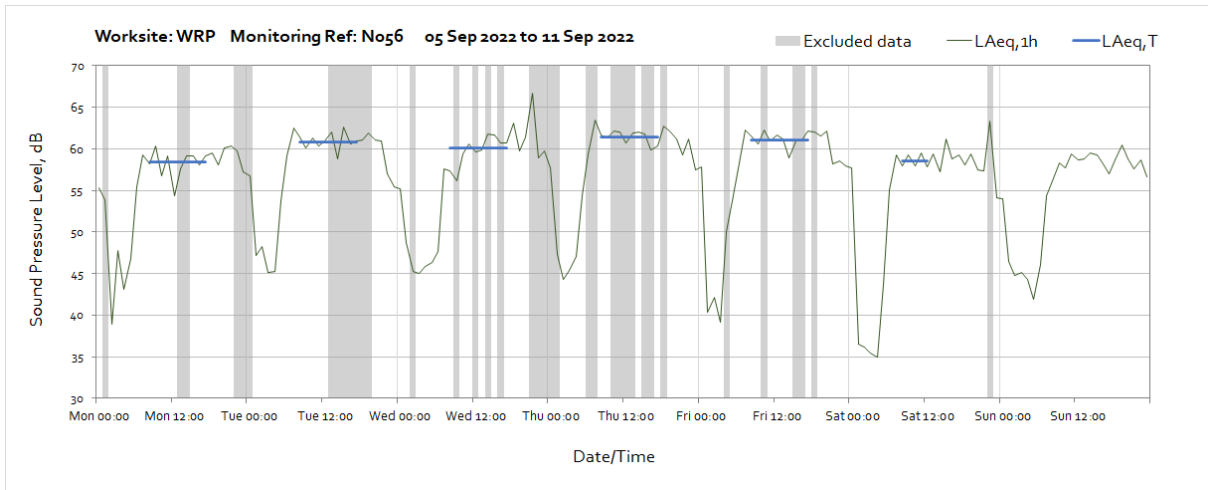
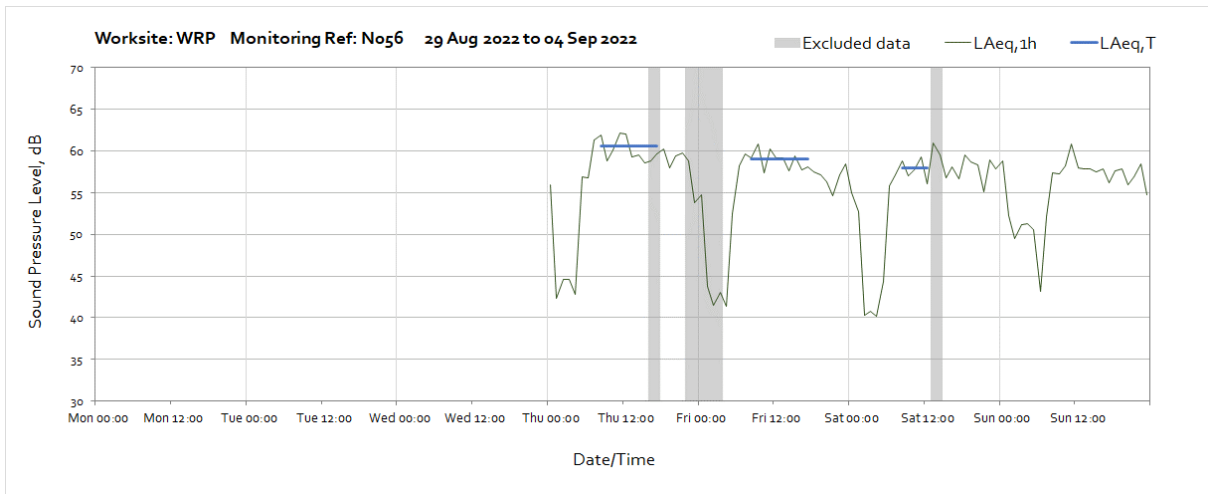
Worksite: West Ruislip Portal (WRP) - Monitoring Ref: N048

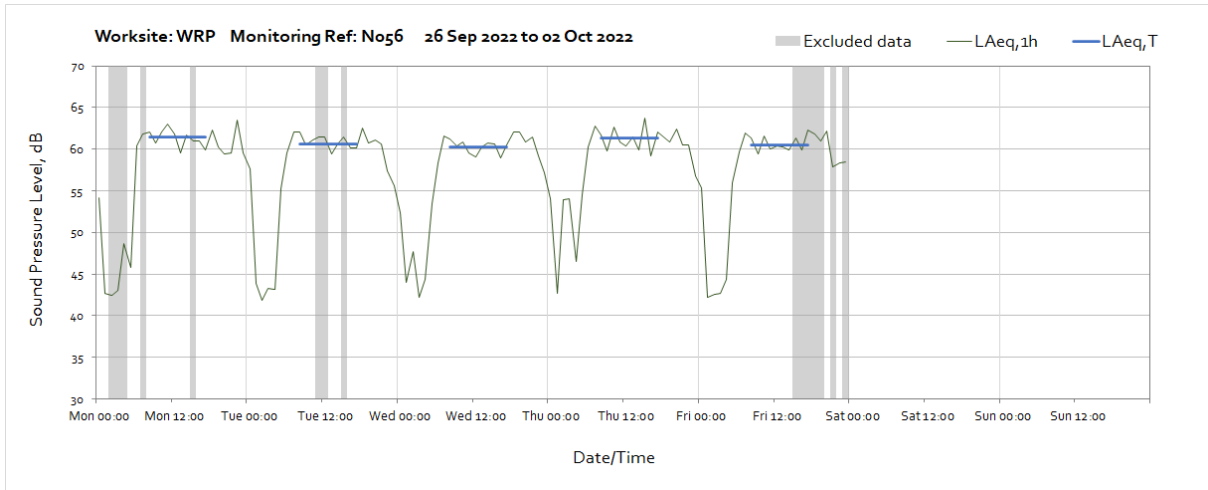
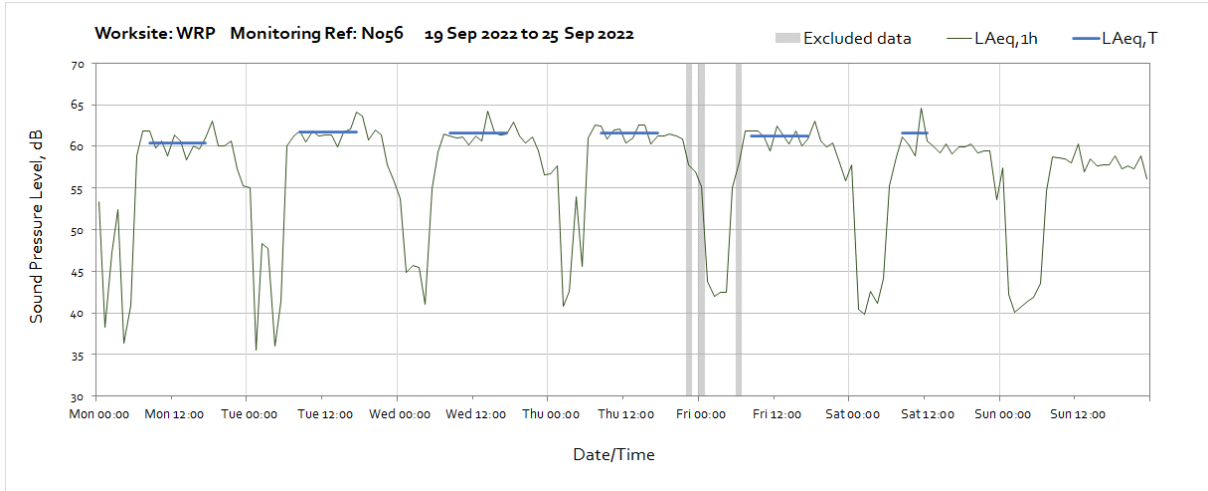
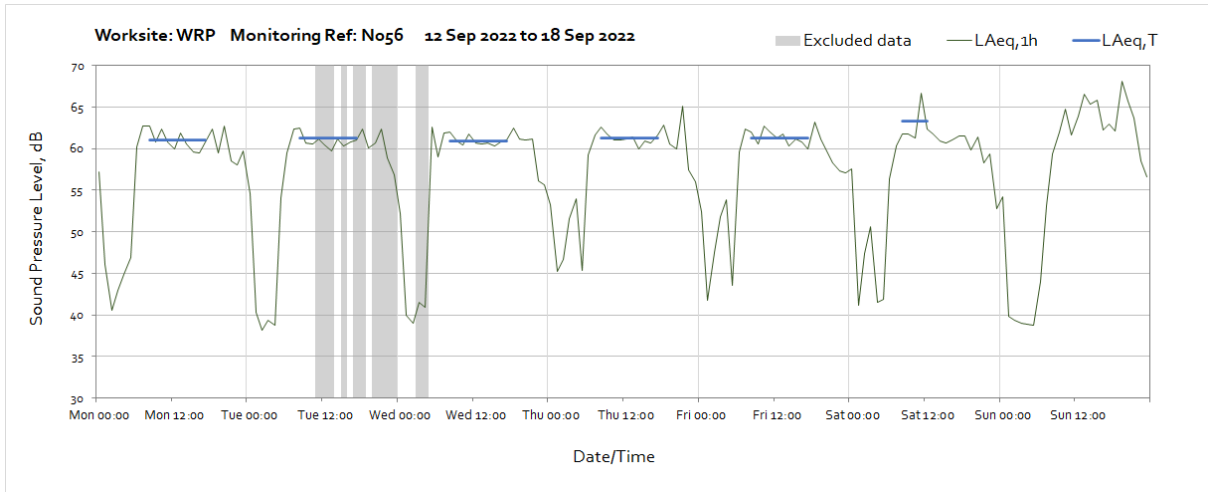




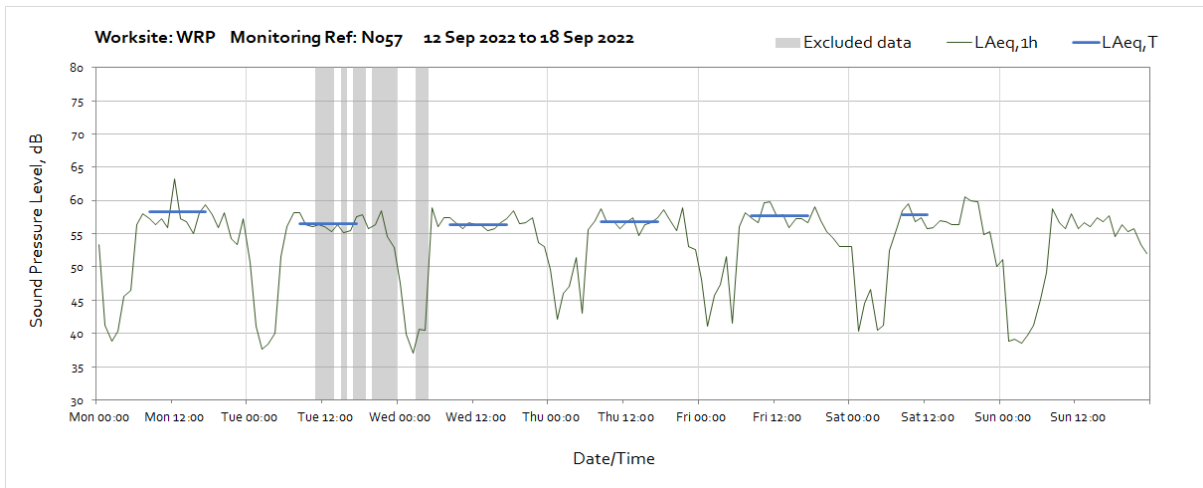
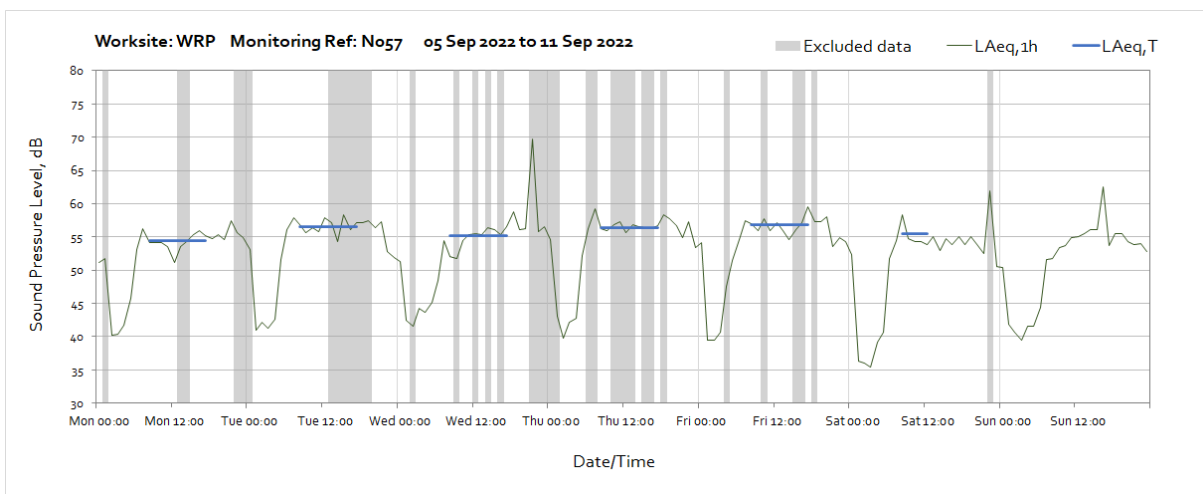
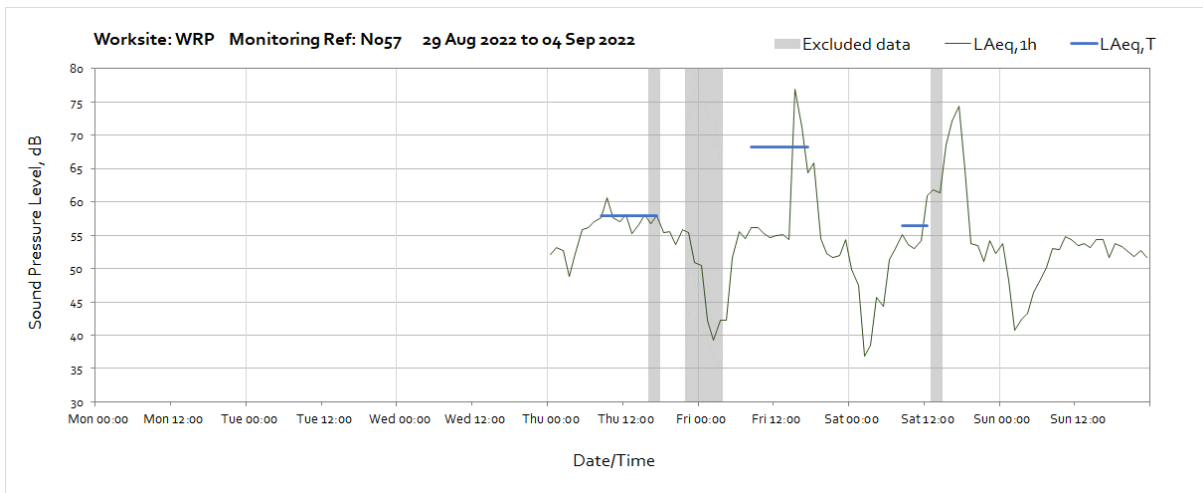


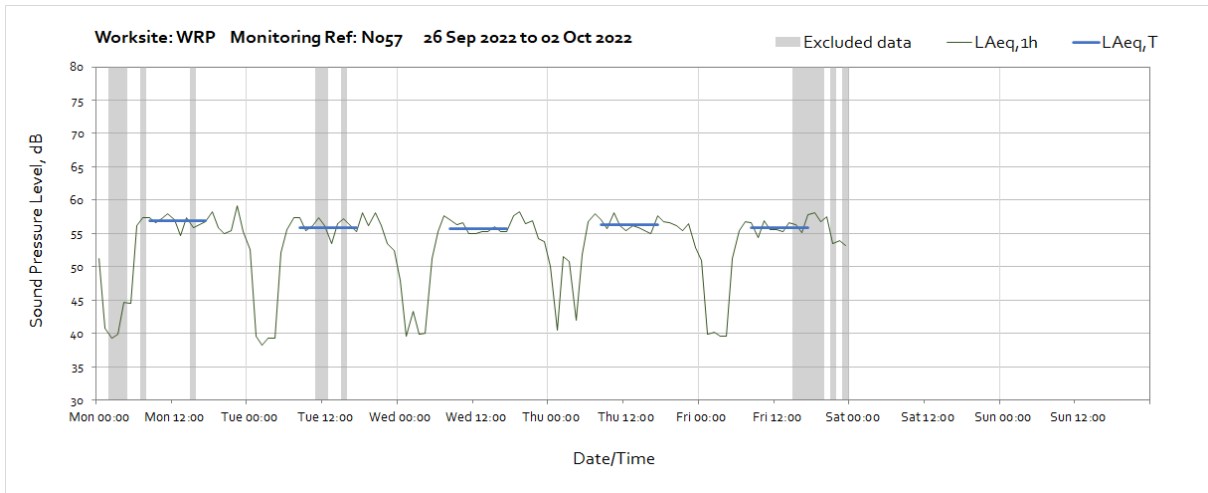
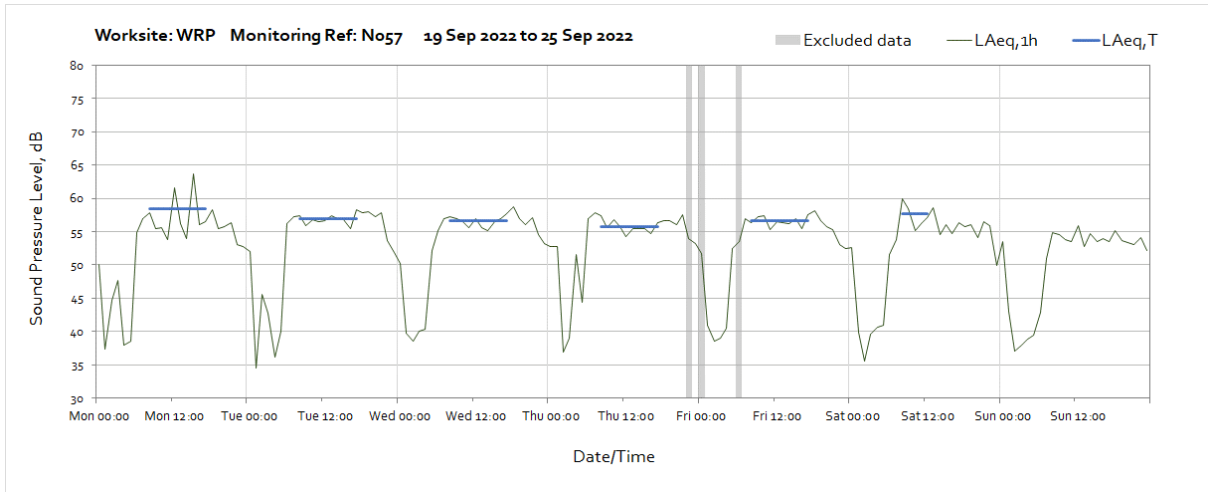
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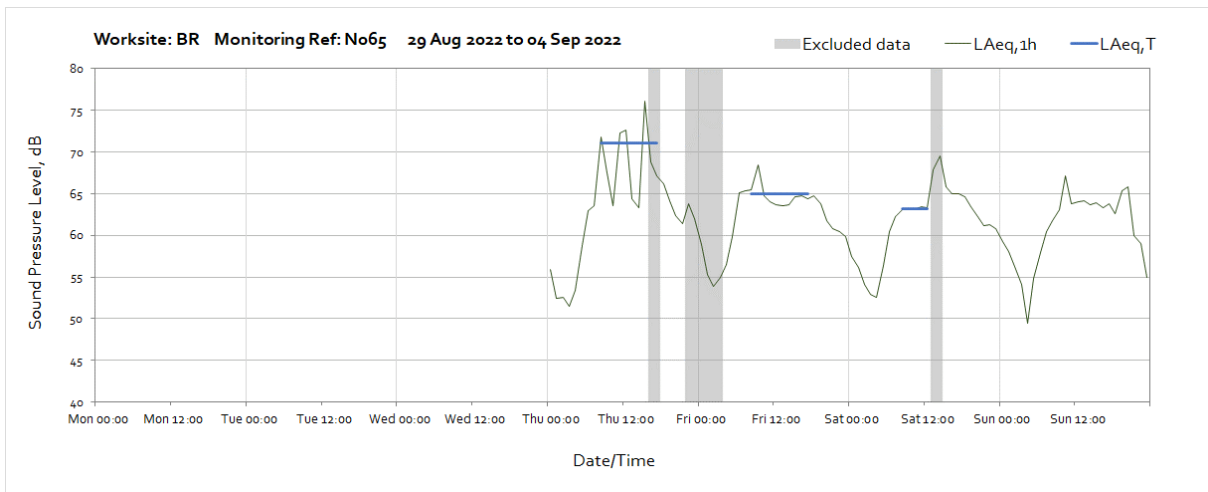


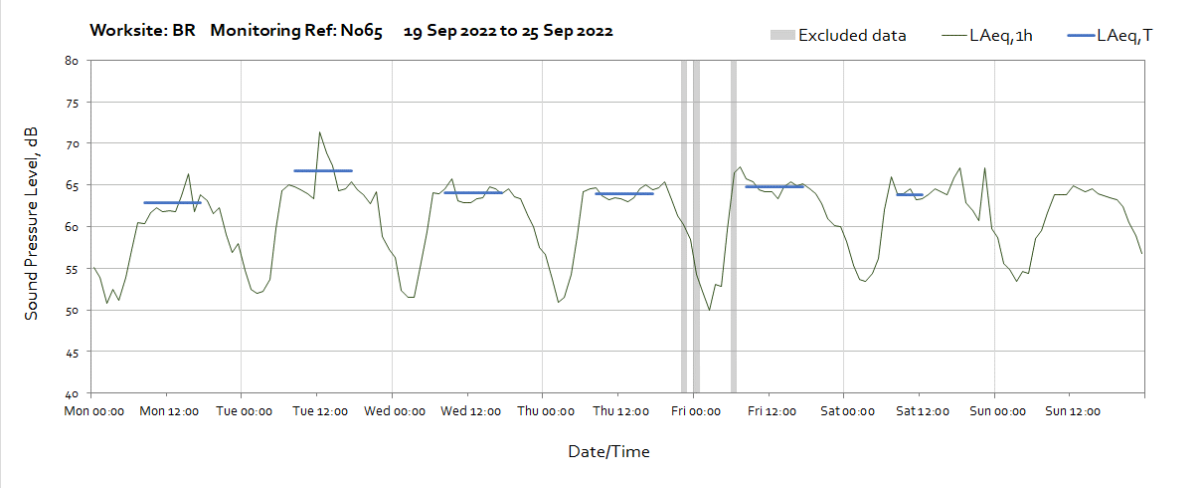
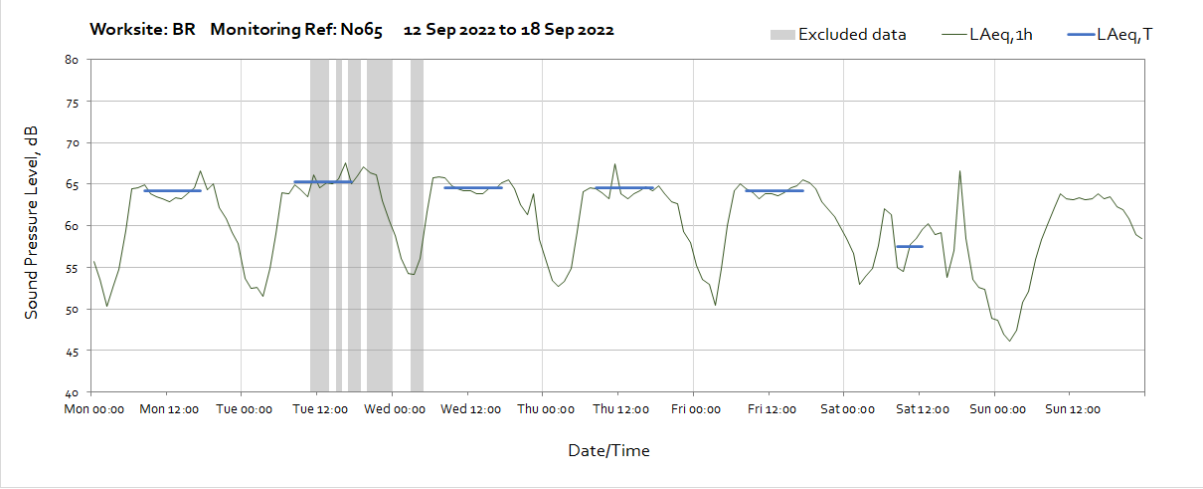
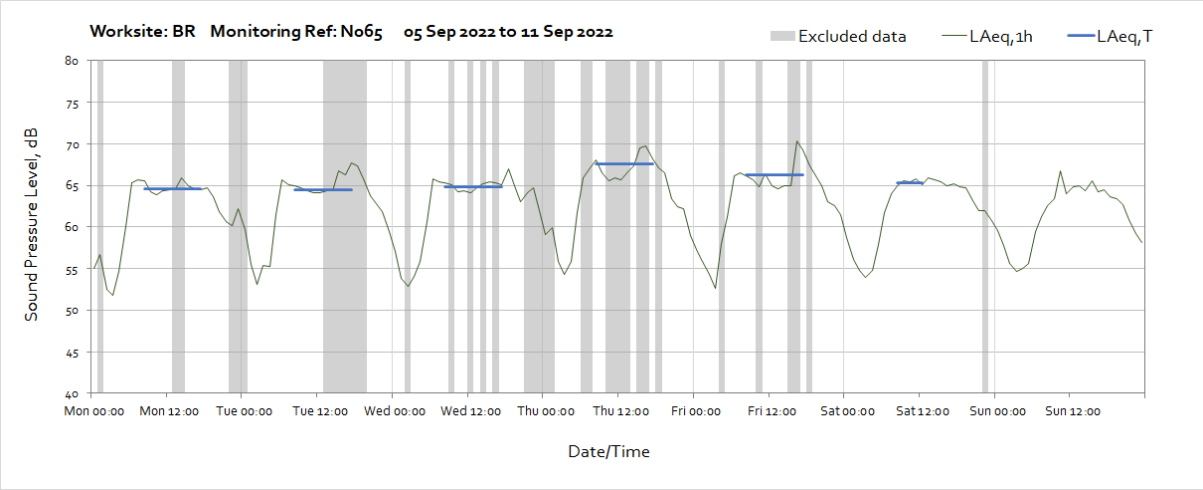
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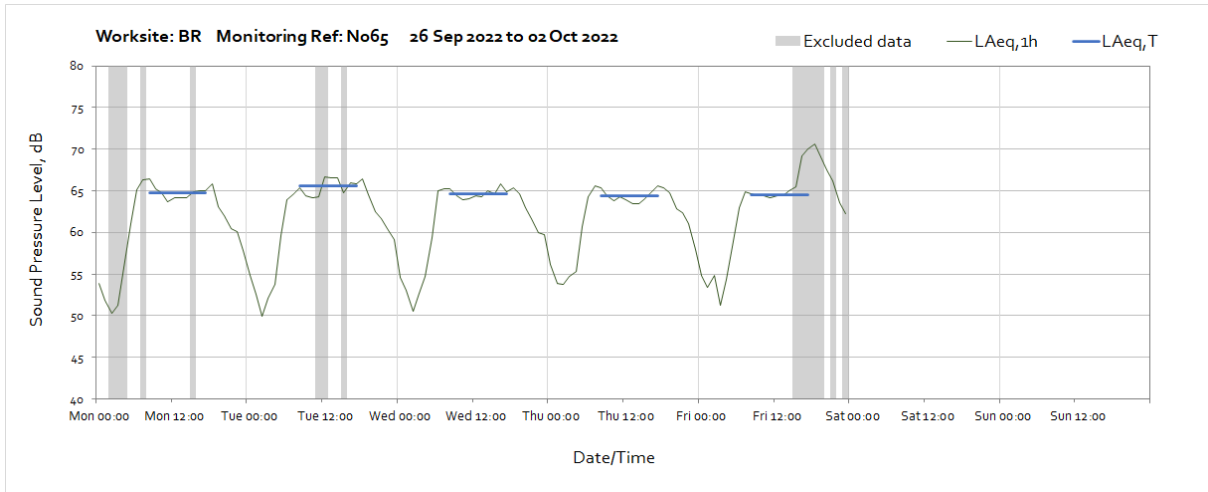




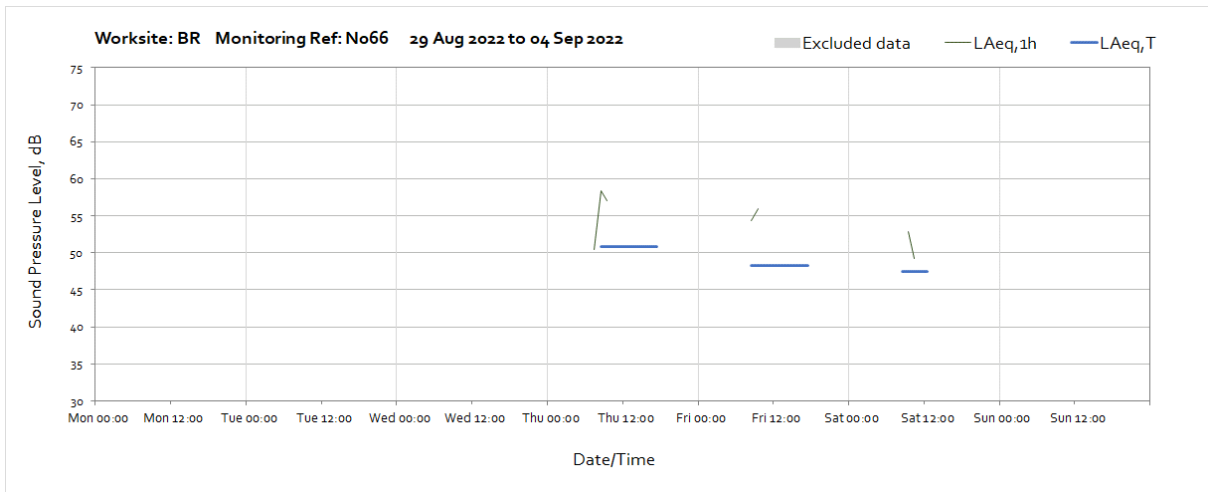
Worksite: Breakspear Road (BR) – Monitoring Ref: N065



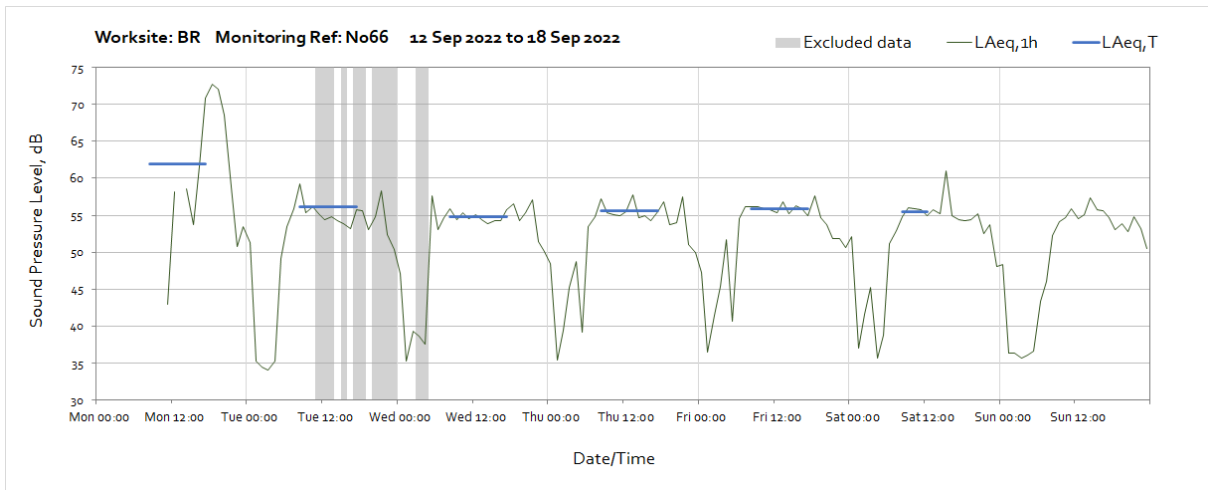




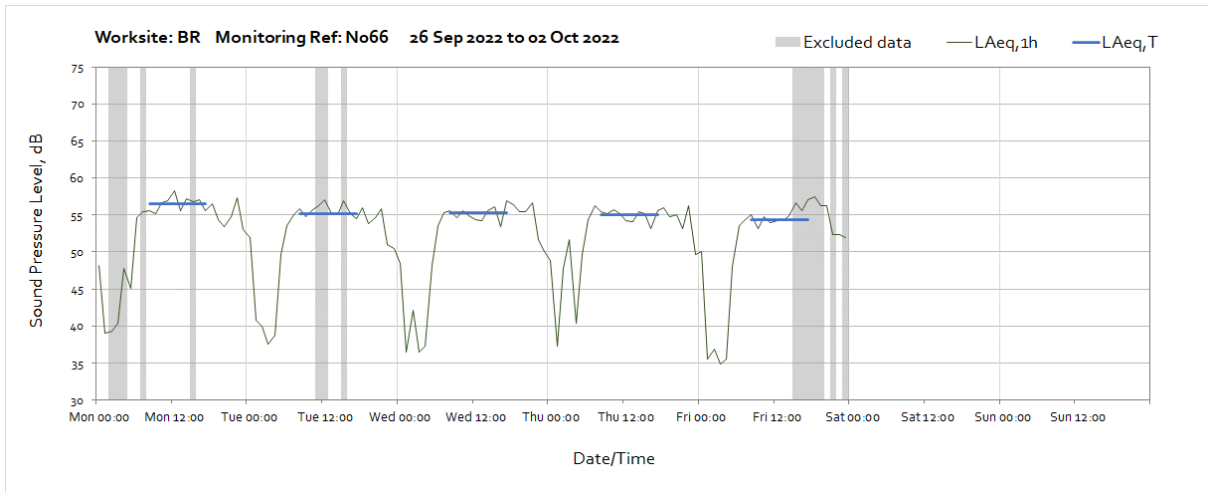
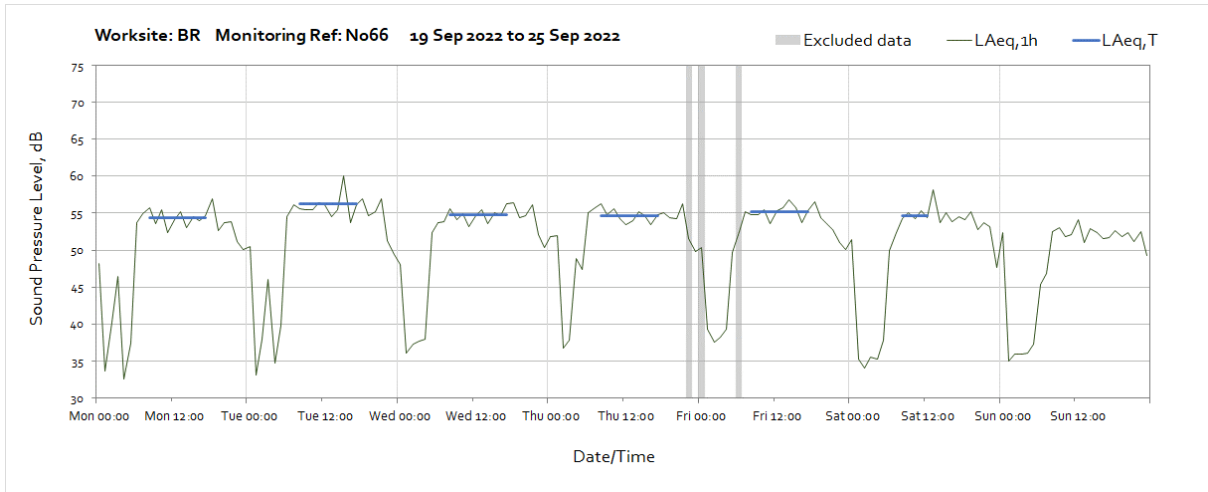
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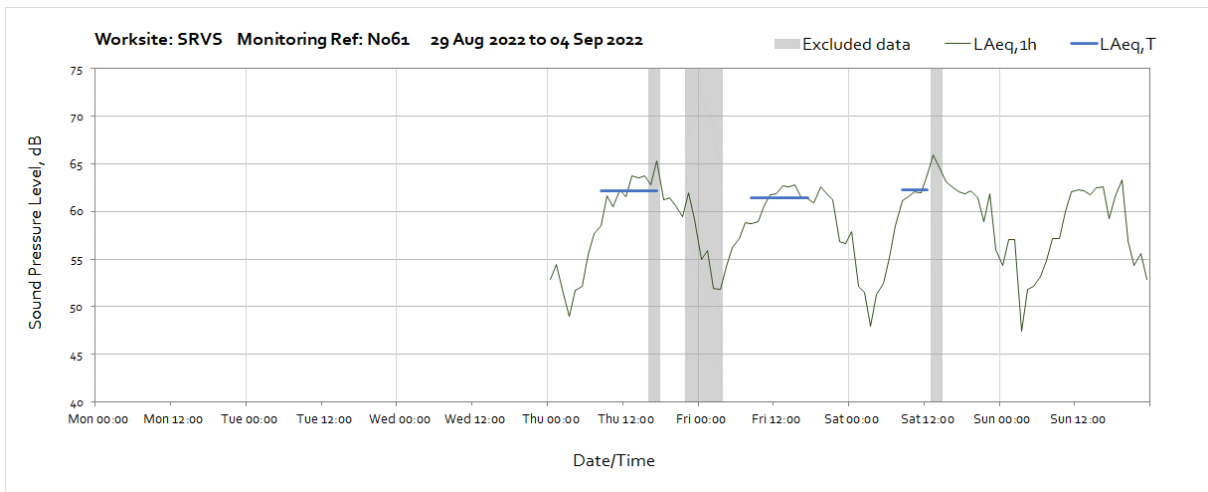
Note: Missing data throughout the week was due to loss of battery power at the monitoring station.

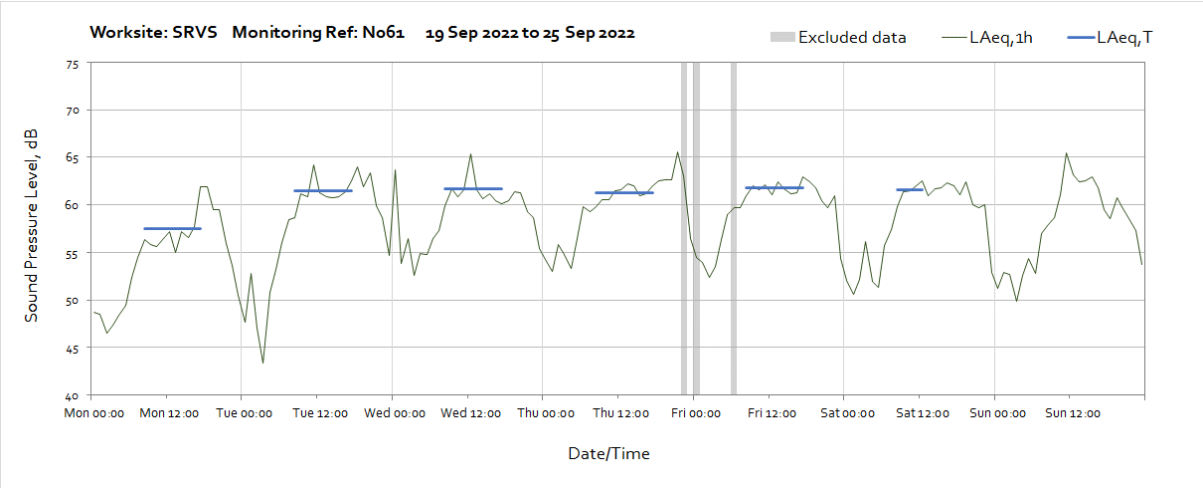
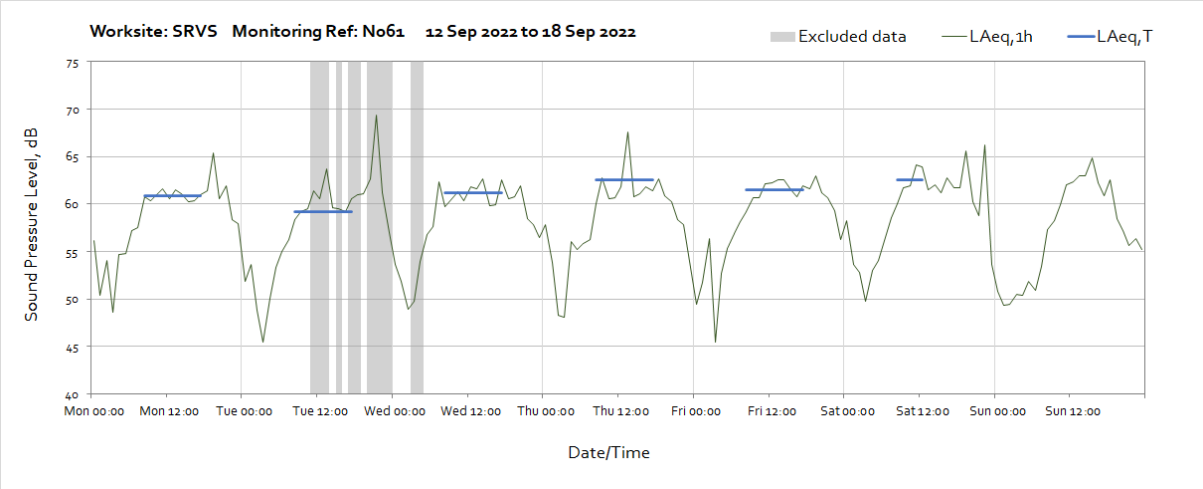
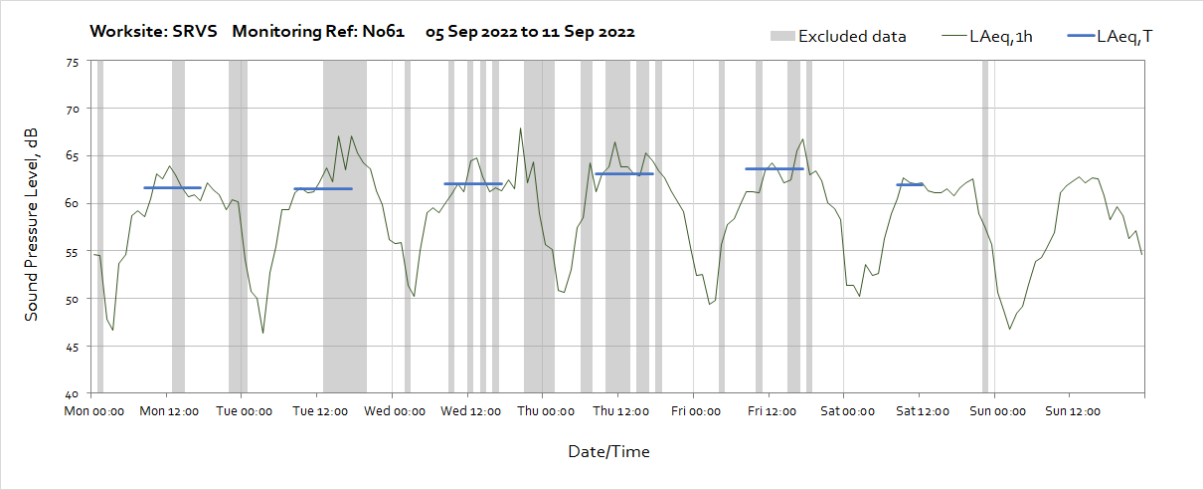


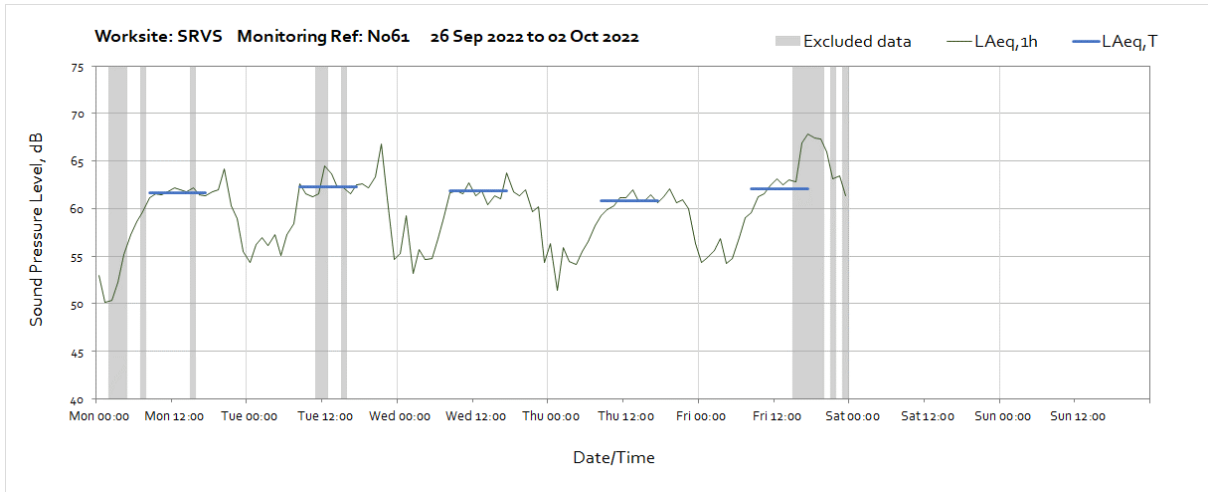
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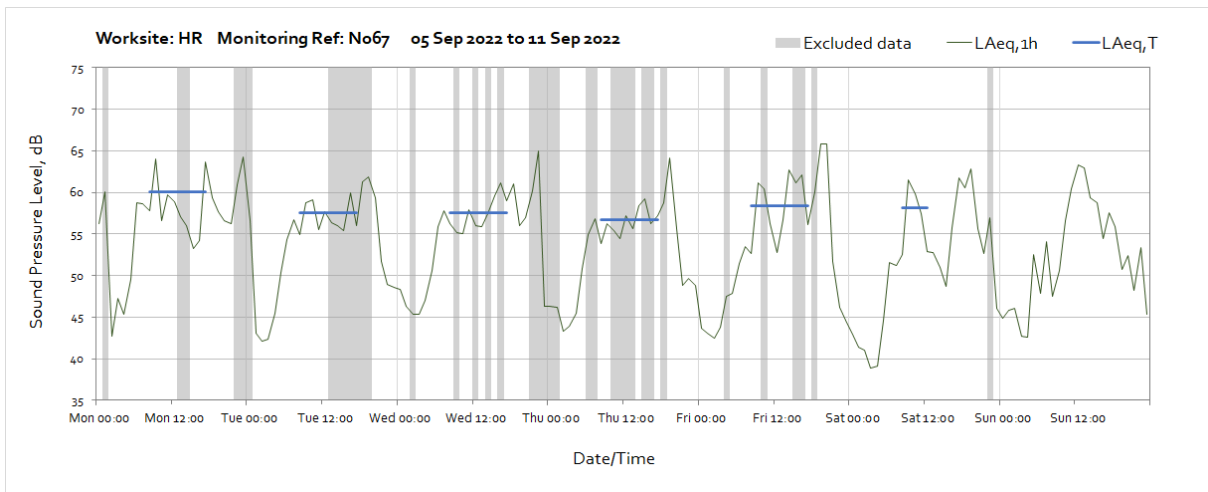
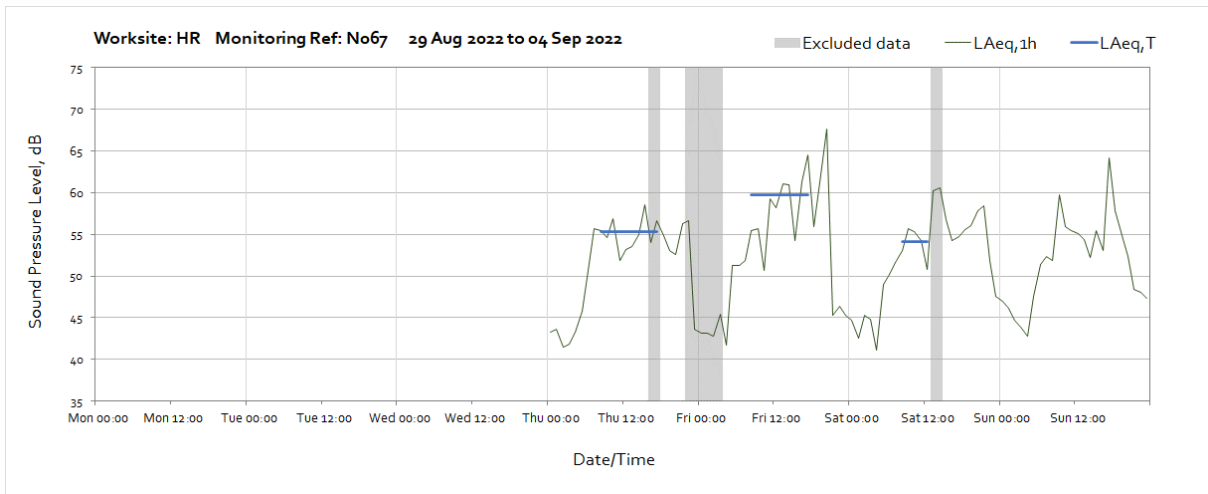
Worksite: South Ruislip Ventilation Shaft (SRVS) - Monitoring Ref: N061

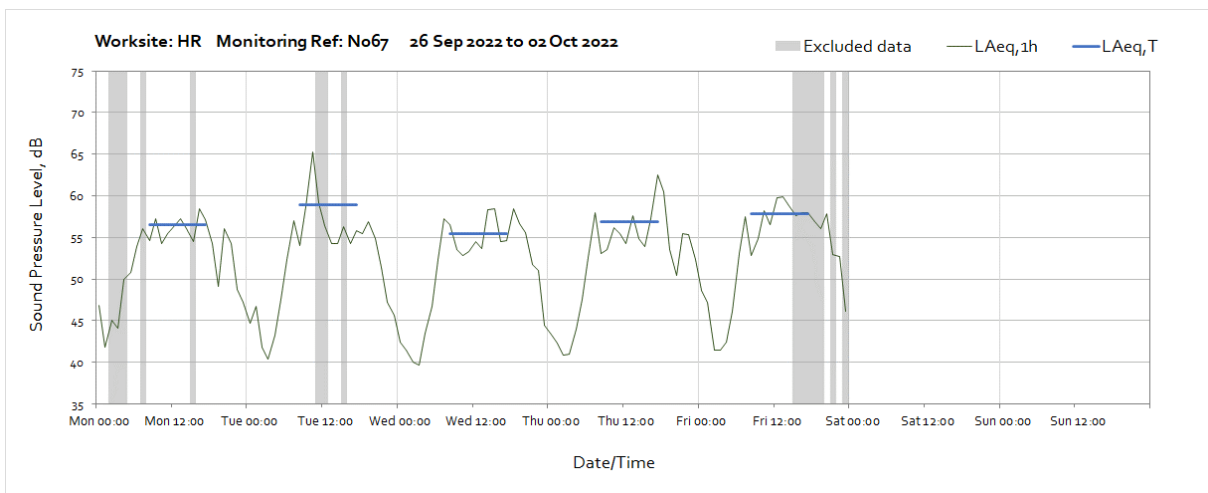
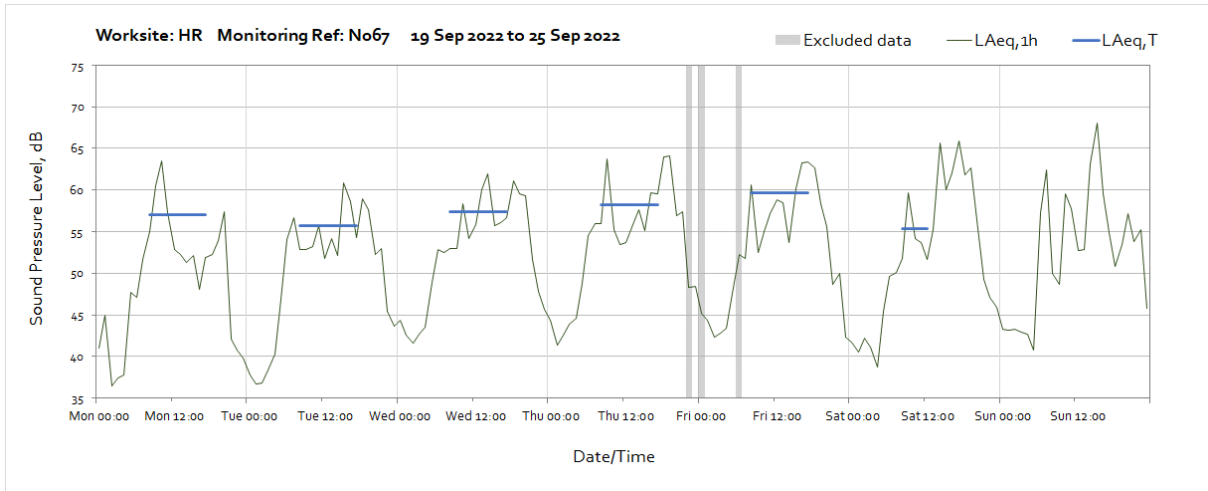
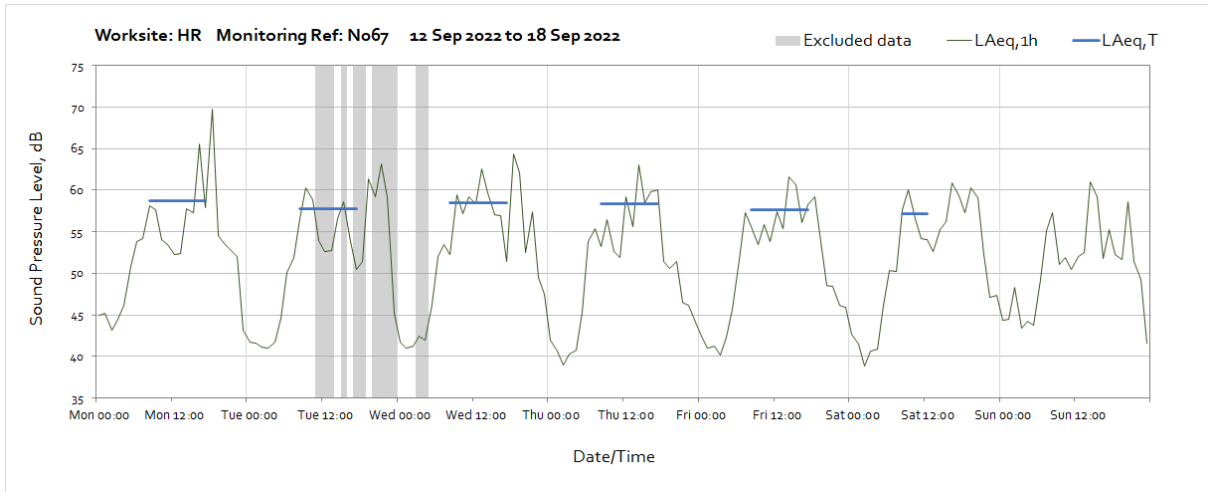




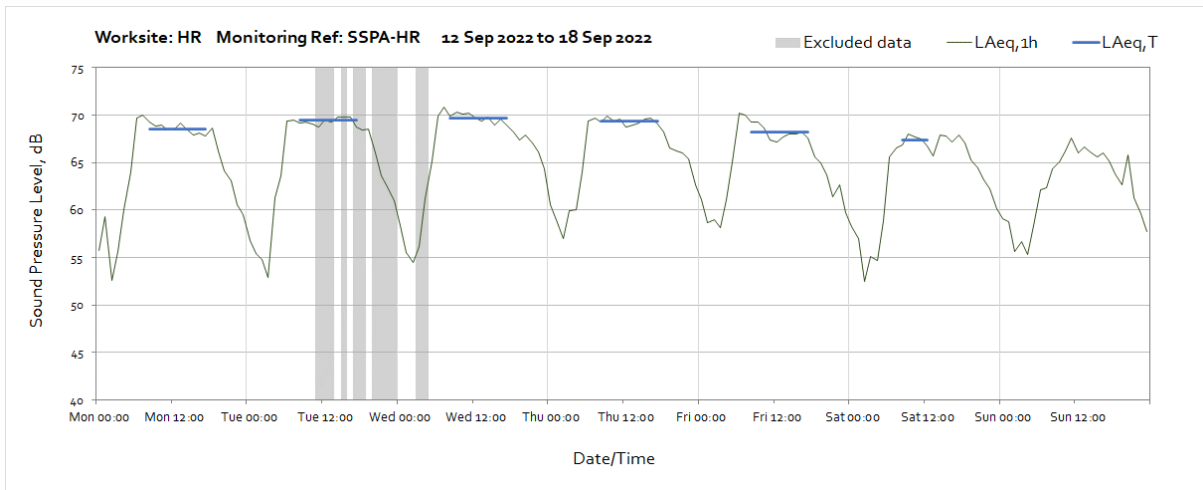
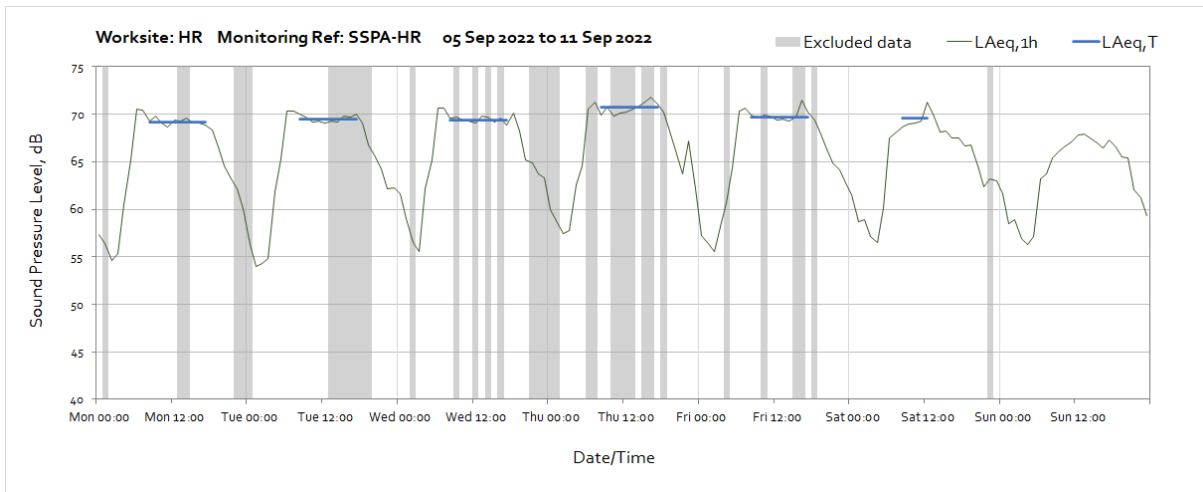
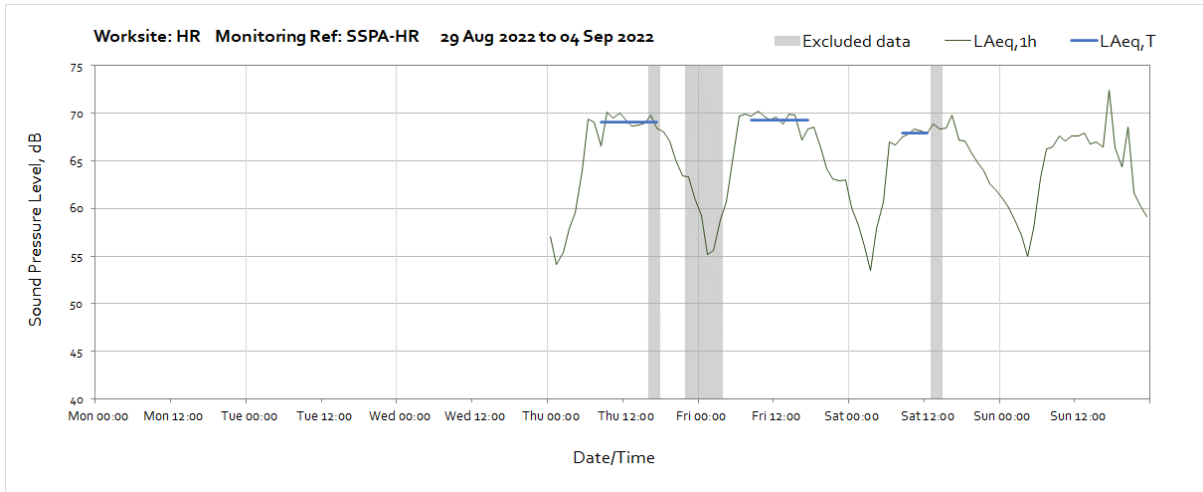


Worksite: Harvil Road (HR) – Monitoring Ref: N067

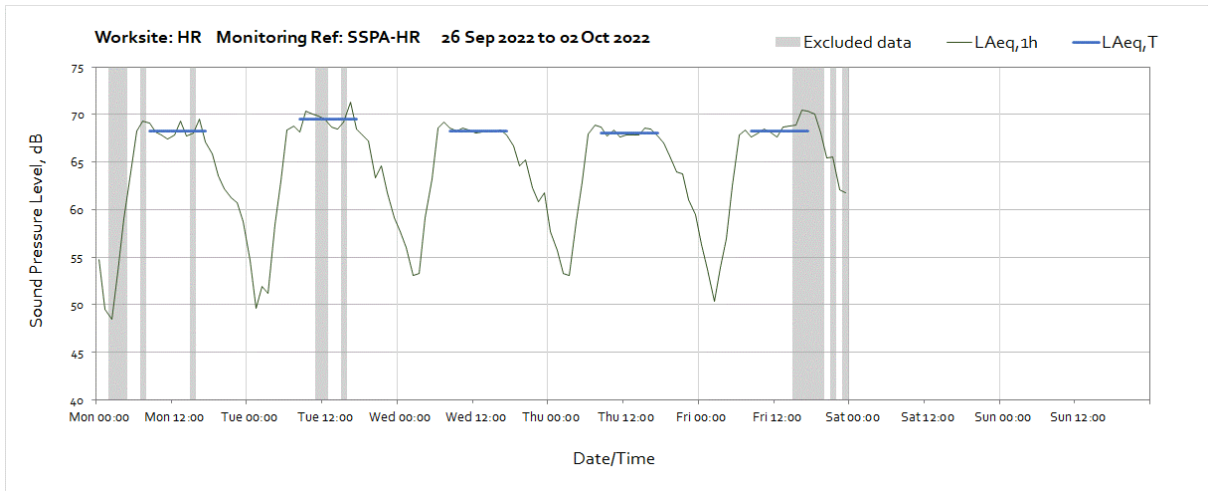
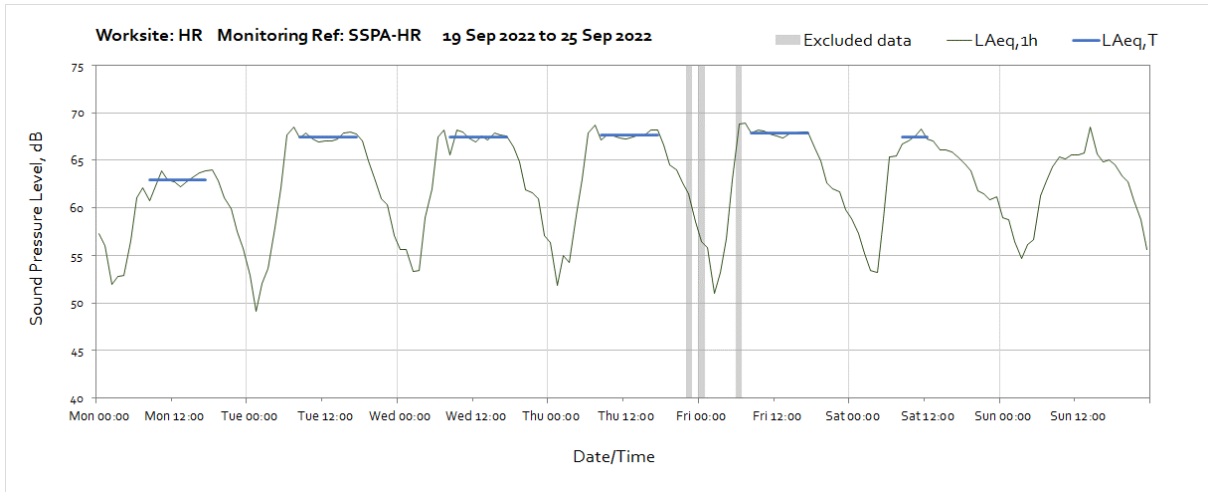




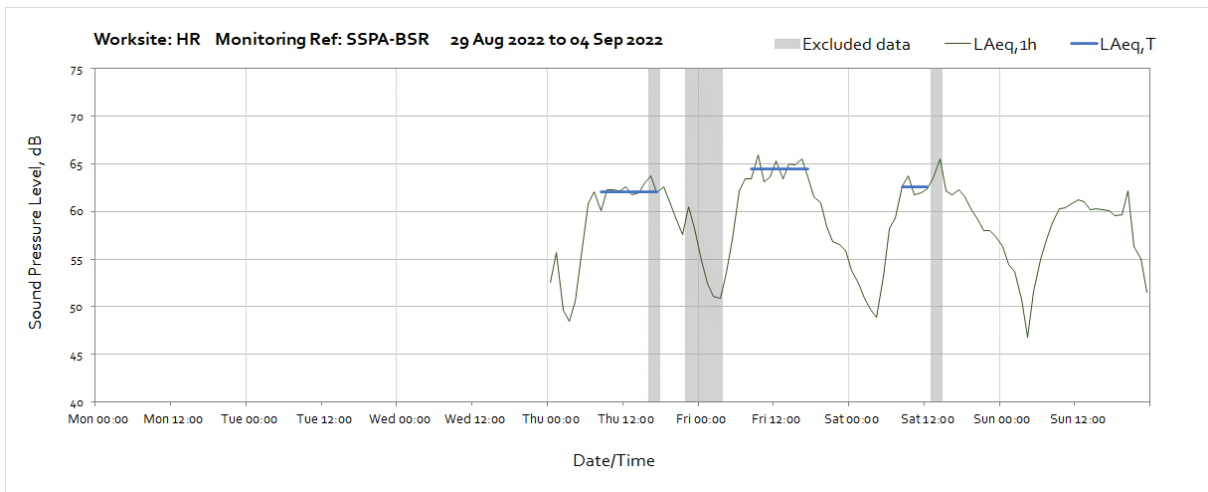
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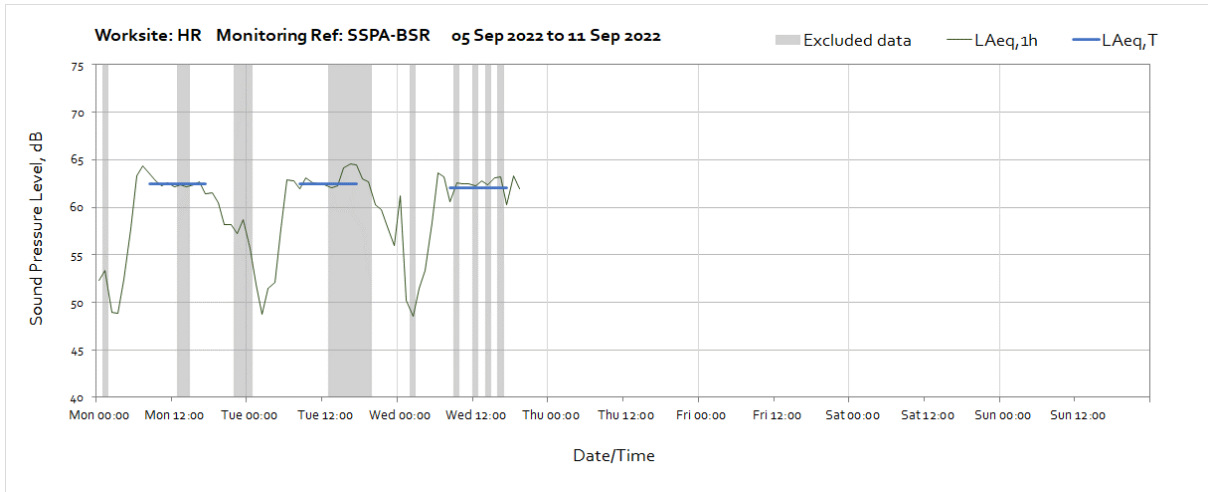


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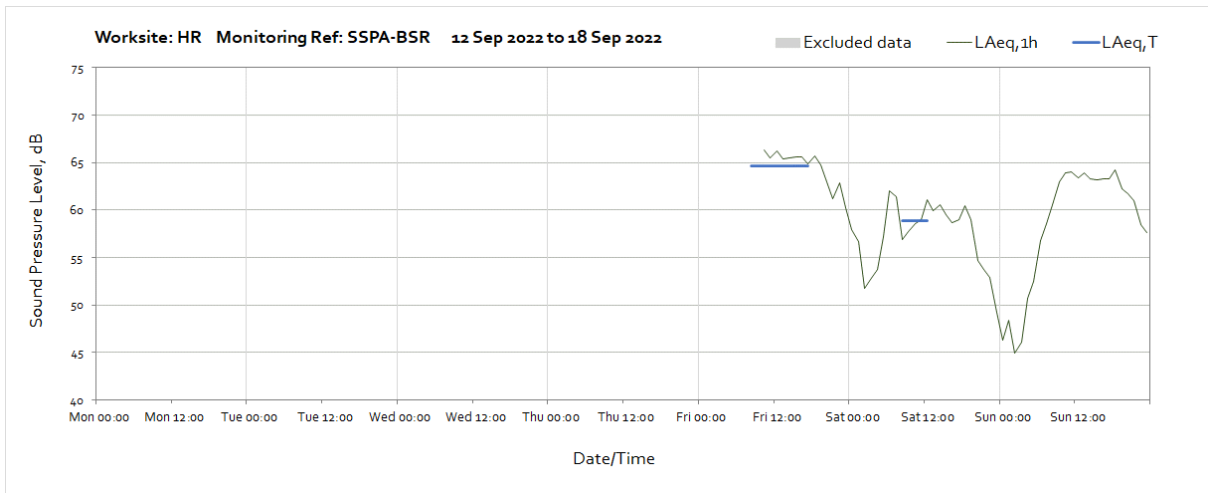


Worksite: Harvil Road (HR) – Monitoring Ref: SSPA-BSR

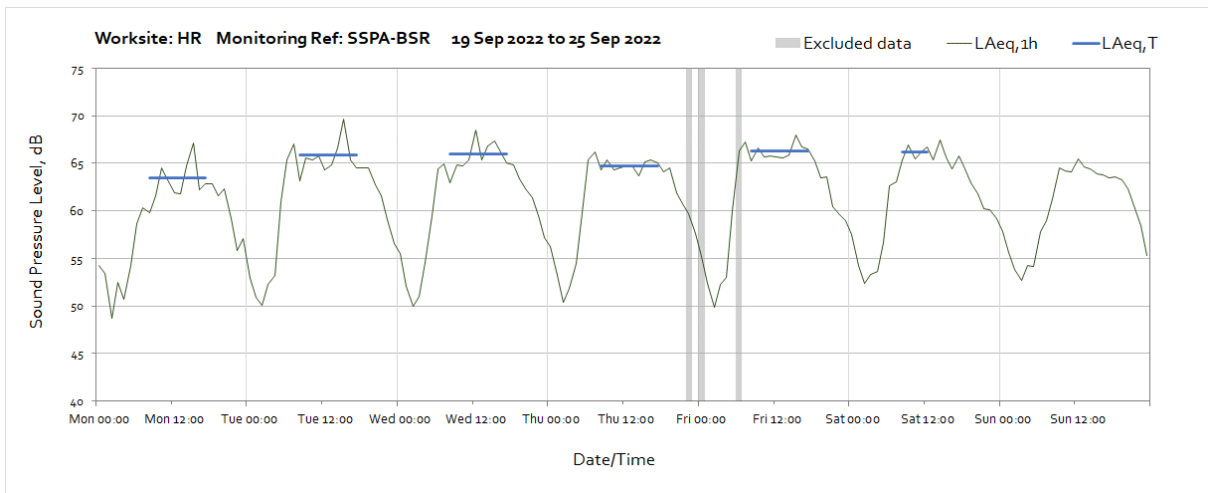


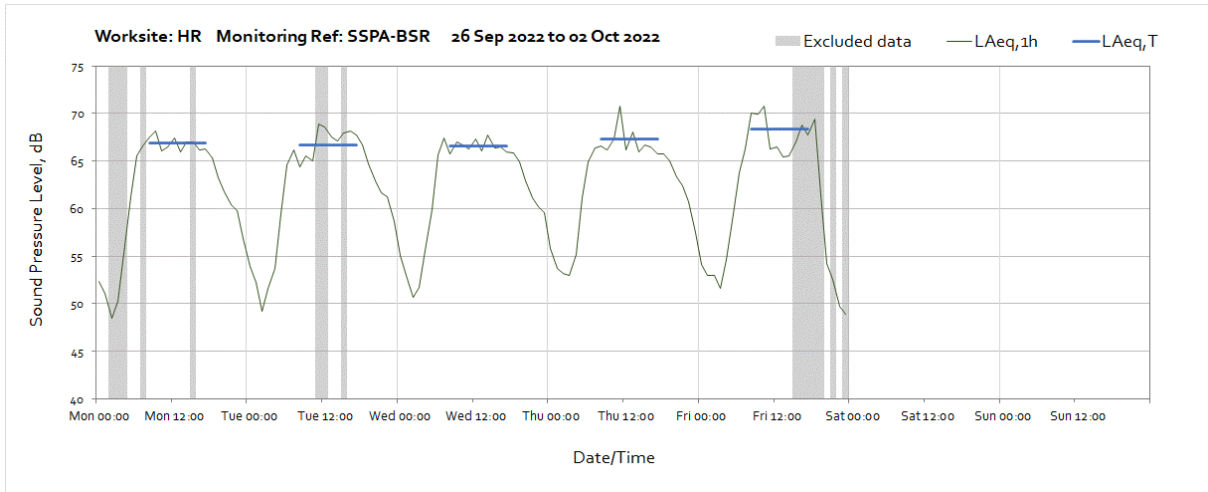


Note: Missing data between 20:00 on Wednesday 7th September and 10:00 on Friday 16th September was due to loss of battery power at the monitoring station.



Note: Missing data between 20:00 on Wednesday 7th September and 10:00 on Friday 16th September was due to loss of battery power at the monitoring station.

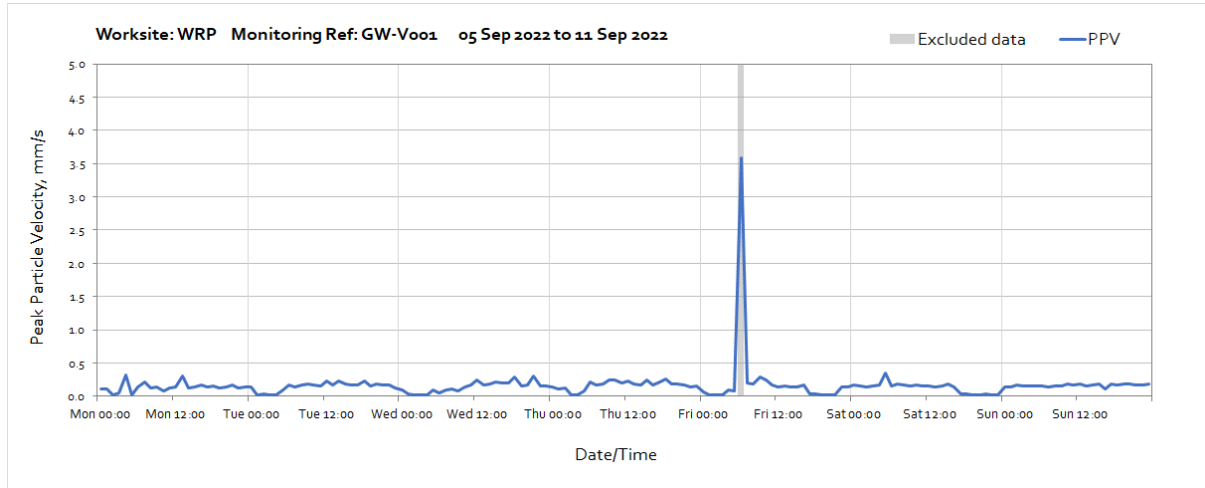
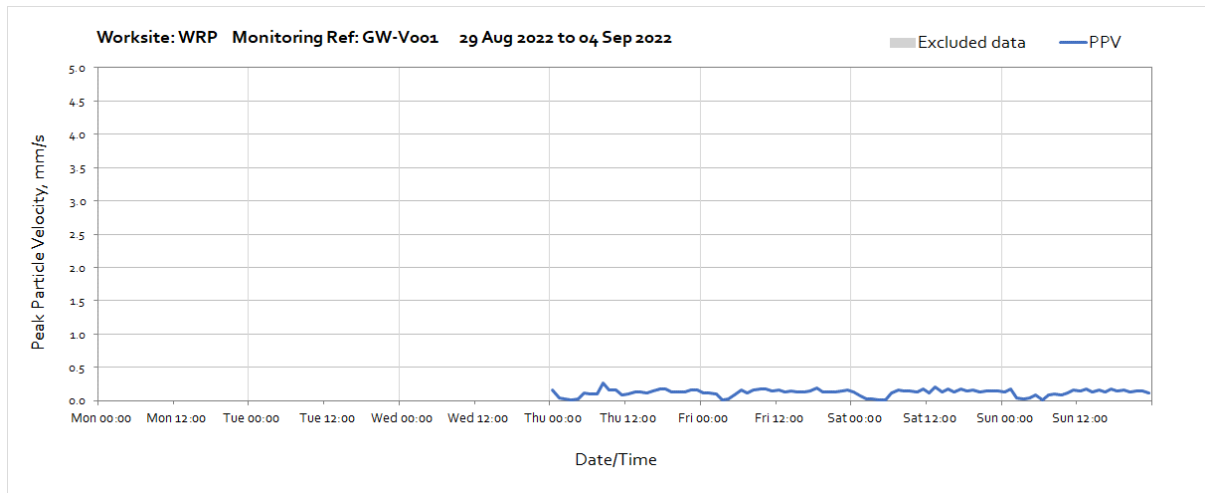


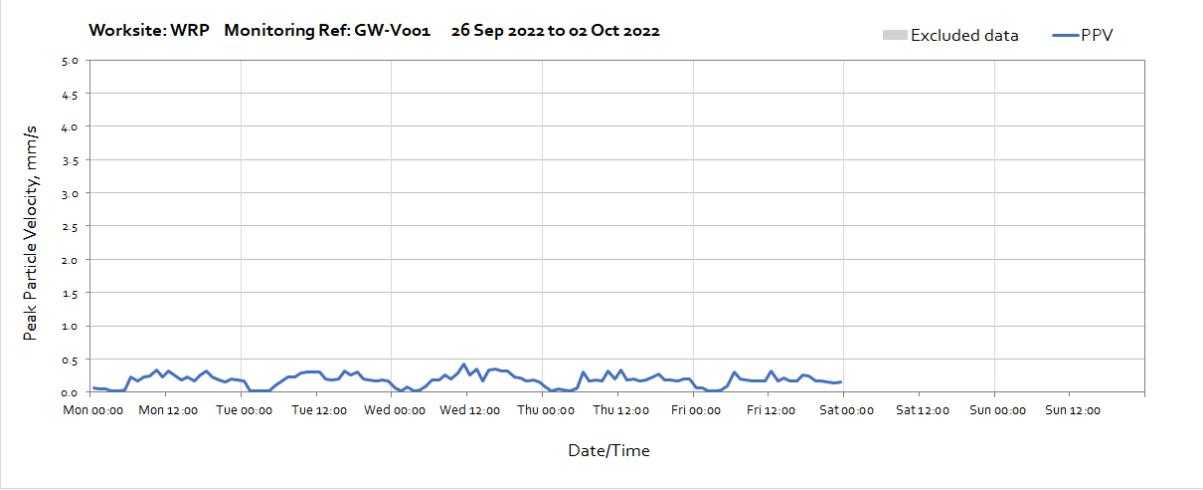
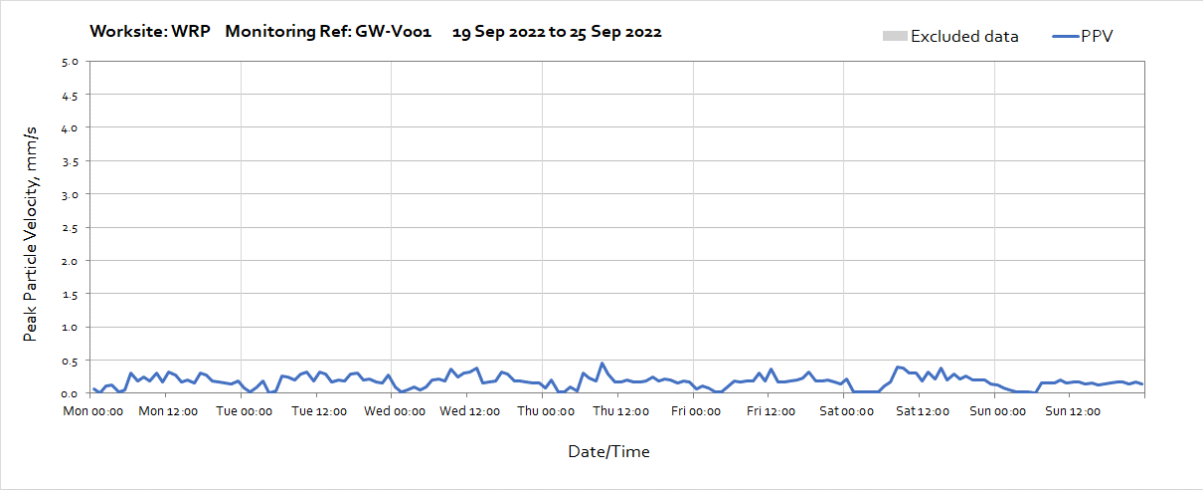
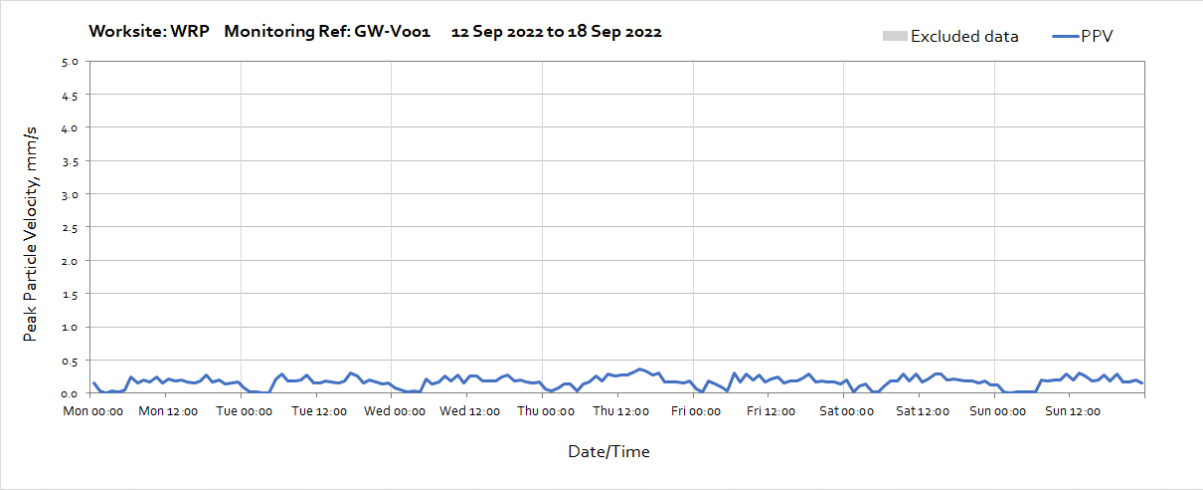


Vibration

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 (WRP) – Monitoring Ref: GW-V001





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

