

Construction noise and vibration Monthly Report – January 2023

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 January 2023.

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, maintenance and operation of the haul road and jetty, ground investigation works, pier construction, water pumping works, installation of satellite welfare and generator farms, concrete drilling, stabilisation works, earthworks, drainage works, canal works, material storage, fencing works, utility diversion works, environmental maintenance works, cofferdam excavation, demolition of slabs, river crossing construction, launching girder and deck works were underway.
- Colne Valley Viaduct Moorhall Road site (ref.: CVV-MR), where compound operation, piling works, maintenance and operation of the haul road and jetty, ground investigation works, pier construction, water pumping works, installation of satellite welfare and generator farms, concrete drilling, construction of the compensation pond, material storage, fencing works, utility diversion works, environmental maintenance works, cofferdam excavation, demolition of bentonite slabs, river crossing construction, launching girder and deck works were underway.
- West Ruislip Portal worksite (ref.: WRP) where tunnel boring machine operations, conveyor belt operation and extension, material delivery, segment yard operation, grouting plant installation and commissioning, soil treatment works, construction of tunnel boring machine water treatment plant, redevelopment of Golf Course, concrete works and construction of bridge were underway.
- Breakspear Road worksite (ref.: BR), where bored piling works, earthworks, construction of bridges, construction of protection slab, soil removal, granular filling works, stockpiling, crane operations, installation of roadside signage and road markings were underway.
- South Ruislip Ventilation Shaft worksite (ref.: SRVS), where removal of waste materials, heavy vehicles movement, road sweeping, concrete works, dewatering works and waterproofing works were underway.
- Harvil Road worksite (ref.: HR), where road works, installation of drainage and hoarding, water management works, construction of attenuation pond, earthworks, concrete works, utility works, assembly of conveyor belt, vegetation clearance, soil compacting works, ditches digging works, material storage, construction of bridges,

construction of treatment silos, bridges and tunnel boring machine material testing area were underway.

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

- The Greenway (West Ruislip) where sewer utility works were underway.
- Copthall North, where excavation works, material movement, construction of haul road, sheet piling, steel fixing, waterproof works for construction of Copthall Tunnel, drainage works, walls and soffit installation, earthworks, filling works, construction of site access gate, construction of footpath, bell mouth construction and concrete pours were underway.
- Northern Sustainable Placement Area, Copthall North, where construction of placement area was underway.
- Bridgewater Road, Great Central Avenue, where enabling works for sewer lining were underway.
- Bridgewater Road, West End Road, where bridge strengthening 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 not exceeded during the reporting period.

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

Four (4) complaints were received during the monitoring period. A description of the complaint, the results of investigation and any actions taken are detailed in Table 7: Summary of Complaints 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 1st to 31st January 2023.

1.1.3 Active 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, piling platform relocation, boring pile, de-sanding of pile bore, installation of reinforcement cages and concrete pile, grout curtain, plant maintenance and clean up and pile trimming.
 - Compound operations, including de-sanding works.
 - Maintenance and operation of the haul road and jetty.
 - Ground investigation works.
 - Pier construction, including formwork, reinforcement and concrete works and tower crane mobilisation and demobilisation.
 - Water pumping management works.
 - Installation of satellite welfare and generator farms.
 - Concrete drilling.

- Stabilisation, earthworks and drainage works.
- Canal works, including operation and maintenance.
- Material storage.
- Fencing works.
- Utility diversion works.
- Environmental maintenance works.
- Cofferdam excavations.
- Demolition of bentonite slabs.
- Construction of river crossing including emergency obstruction dismantling works.
- Launching girder works, including grouting works, steel structure erection works and dismantling works.
- Deck works, including preparation and operation of storage yards, installation of access provision, traffic management, noise barriers, troughs, pipes, carrier drainpipe and access ramps, steel works, filling of voids and concrete 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, piling platform relocation works, boring pile, de-sanding of pile bore, installation of reinforcement cages and concrete pile, grout curtain, plant maintenance and clean up and pile trimming.
 - Compound operations, including de-sanding works.
 - Maintenance and operation of the haul road and jetty.
 - Ground investigation works.
 - Pier construction, including formwork, reinforcement and concrete works tower crane mobilisation and demobilisation.
 - Water pumping management works.
 - Installation of satellite welfare and generator farms.
 - Concrete drilling.
 - Construction of compensation pond.
 - Material storage.

- Fencing works.
- Utility diversion works.
- Environmental maintenance works.
- Cofferdam excavations.
- Demolition of bentonite slabs.
- Construction of river crossing including emergency obstruction dismantling works.
- Launching girder works, including grouting works, steel structure erection works and dismantling works.
- Deck works, including preparation and operation of storage yards, installation of access provision, traffic management, noise barriers, troughs, pipes, carrier drainpipe and access ramps, steel works, filling of voids and concrete works.
- West Ruislip Portal Worksite, ref.: WRP (see Plan 3 in Appendix A), where work activities included:
 - Tunnel boring machine operations.
 - Conveyor belt operation and extension.
 - Material delivery.
 - Segment yard operation.
 - Grouting plant installation and commissioning.
 - Soil treatment works, including construction of haul road, topsoil and stripping works and conveyor base installation.
 - Construction of tunnel boring machine water treatment plant.
 - Redevelopment of Golf Course, including vegetation clearance, tree pruning, setting up security fence and hoarding, archaeology works and ecological mitigation works.
 - Concrete works, including placement of material and creation of railway extension.
 - Construction of internal bridge, including steel fixing.
- Breakspear Road Worksite, ref.: BR (see Plan 2 in Appendix A), formerly West Ruislip Retained Embankment, where work activities included:
 - Bored piling works.
 - Earthworks, including backfill.

- Construction of bridges, including concrete pours, installation of deck, steel fixing, waterproofing, installation of formworks and shutters.
- Construction of protection slab.
- Soil removal.
- Stockpiling.
- Granular filling works.
- Installation of roadside signage and road markings.
- Crane operations.
- South Ruislip Ventilation Shaft worksite, ref.: SRVS (see Plan 4 in Appendix A), where work activities included:
 - Removal of waste materials.
 - Heavy vehicle movements.
 - Road sweeping.
 - Dewatering works.
 - Waterproofing works.
 - Concrete works, including secondary lining and foam concreting.
- Harvil Road worksite, ref.: HR (see Plan 2 in Appendix A), where work activities included:
 - Road works, including haul road, drainage and excavation works, installation of traffic lights, temporary traffic management works and construction of road realignment.
 - Installation of hoarding and drainage.
 - Water management works.
 - Construction of attenuation pond, including drainage works and silt buster operation.
 - Earthworks.
 - Concrete works.
 - Utility works.
 - Assembly of conveyor belt.
 - Vegetation clearance.
 - Soil compacting works.

- Ditches digging works.
- Construction of treatment silos and tunnel boring machine testing area.
- Construction of bridges, including concreting and backfill works.
- Material storage.

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

- The Greenway (West Ruislip) where sewer utility works were underway.
- Copthall North, where excavation works, material movement, construction of haul road, sheet piling, steel fixing, waterproof works for construction of Copthall Tunnel, drainage works, walls and soffit installations, earthworks, filling works, construction of site access gate, construction of footpath, bell mouth construction and concrete pours were underway.
- Northern Sustainable Placement Area, Copthall North, where construction of placement area was underway.
- Bridgewater Road, Great Central Avenue, where enabling works for sewer lining were underway.
- Bridgewater Road, West End Road, where bridge strengthening 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 Sixteen (16) noise and one (1) vibration monitoring installations were active in January in the LBH area. Table 2 summarises the position of noise and vibration monitoring installations within the LBH area in January 2023.

1.2.2 Maps showing the position of noise monitoring installations are presented in Appendix B.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
CVV-DL	CVV-DL-NMP2	Highway Farm House, Harvil Rd, Harefield, Uxbridge

Worksite Reference	Measurement Reference	Address
	CVV-DL-NMP3	Dew's Farm Cottages, Dews Lane, Harefield, Uxbridge
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
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
BR	N065	Breakspear Road South, Harefield, Uxbridge
	N066	Hoylake Crescent, Ickenham, Uxbridge
	TKL-N001	Tile Kiln Lane, Harefield, Uxbridge
SRVS	N061	Cineworld South Ruislip car park, Ruislip
	TCA-N001	Trenchard Avenue, Ruislip
HR	N067	Harvil Road worksite south boundary
	SSPA-HR	Harvil Road
	BSR-N001	Breakspear 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	Façade	58.8 (67.5)	58.6 (60.4)	57.6 (58.7)	57.0 (61.8)	56.6 (60.3)	57.5 (58.0)	58.1 (58.9)	57.6 (58.8)	57.3 (58.9)	56.6 (59.4)	58.5 (71.4)	56.3 (58.9)
	CVV-DL-NMP3	Dew's Farm Cottages, Dews Lane, Harefield, Uxbridge,	Façade	60.6 (65.4)	62.9 (65.5)	54.5 (63.5)	51.0 (55.8)	49.7 (59.7)	54.4 (56.8)	61.3 (63.0)	54.1 (56.6)	50.9 (55.5)	47.0 (56.0)	51.5 (59.9)	49.0 (58.2)
CVV-MR	CVV-MR-NMP1	Weir Cottage, Denham Garden Village, Denham	Free-field	53.5 (54.8)	53.4 (55.3)	51.9 (53.6)	49.4 (53.1)	47.0 (53.8)	50.9 (51.5)	52.8 (53.3)	52.1 (53.3)	50.6 (53.8)	47.2 (64.3)	51.0 (57.1)	46.7 (53.0)
	CVV-MR-NMP2	Harefield Marina, Moorhall Road, London, Greater London	Free-field	54.4 (59.6)	58.8 (64.6)	52.2 (54.7)	51.3 (60.7)	50.4 (56.0)	52.9 (54.5)	60.3 (68.3)	54.2 (57.2)	51.9 (54.4)	50.2 (60.4)	52.3 (58.3)	50.1 (52.9)
	CVV-MR-NMP3	Peerless Drive, Harefield, Uxbridge	Façade	55.0 (57.5)	57.6 (61.8)	50.3 (53.0)	48.2 (58.0)	46.2 (55.4)	52.1 (54.8)	53.1 (55.1)	52.3 (52.9)	51.4 (60.4)	47.3 (65.4)	51.8 (56.0)	45.7 (53.0)
WRP	N048	West Ruislip Golf Club, Ickenham Rd, Ruislip	Free-field	63.0 (68.6)	58.8 (62.1)	53.9 (56.2)	52.8 (60.4)	51.1 (65.6)	63.1 (63.4)	60.0 (62.4)	55.1 (56.8)	53.3 (59.1)	51.1 (63.0)	53.1 (56.0)	49.7 (56.8)
	N056	83 The Greenway, Ickenham, Ruislip	Façade	59.3 (62.3)	60.1 (63.5)	59.1 (63.2)	57.9 (62.6)	55.2 (68.3)	60.3 (60.8)	59.6 (61.3)	59.5 (59.8)	58.9 (62.0)	53.9 (62.8)	57.3 (61.0)	53.9 (62.0)
	N057	123 The Greenway, Ickenham, Ruislip	Façade	55.7 (58.6)	56.2 (59.5)	55.5 (58.7)	53.9 (57.8)	51.0 (65.5)	55.7 (56.2)	56.3 (58.0)	55.4 (55.8)	54.5 (57.6)	51.1 (70.5)	53.5 (56.5)	49.6 (58.0)

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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
BR	N065	Breakspear Road South, Harefield, Uxbridge	Free-field	66.4 (68.5)	66.6 (68.3)	66.6 (68.9)	64.9 (67.9)	60.1 (66.8)	64.7 (65.0)	67.5 (69.0)	67.9 (68.9)	66.4 (69.2)	59.9 (64.7)	65.9 (68.5)	60.6 (67.3)
	N066	Hoylake Crescent, Ickenham, Uxbridge	Free-field	55.7 (58.0)	56.2 (58.0)	55.1 (58.5)	53.7 (56.6)	51.1 (64.4)	54.3 (55.2)	55.5 (57.4)	54.1 (55.4)	54.1 (57.2)	48.8 (55.8)	53.6 (57.8)	49.8 (57.0)
	TKL-N001	Tile Kiln Lane, Harefield, Uxbridge	Free-field	51.4 (57.7)	52.3 (55.5)	50.1 (54.0)	49.2 (53.5)	47.4 (54.0)	49.8 (53.0)	52.5 (54.0)	50.7 (52.5)	50.0 (54.3)	48.0 (59.0)	50.0 (53.5)	45.8 (51.8)
SRVS	N061	Cineworld South Ruislip car park, Ruislip	Free-field	59.3 (62.4)	63.4 (65.7)	63.1 (65.2)	62.3 (66.6)	57.1 (70.2)	60.0 (61.8)	64.5 (65.4)	64.0 (65.1)	63.2 (66.1)	56.0 (65.4)	62.2 (67.7)	56.4 (61.4)
	TCA-N001	Trenchard Avenue, Ruislip	Free-field	57.9 (59.8)	58.8 (60.8)	57.8 (62.0)	57.0 (60.9)	53.9 (58.2)	57.4 (57.9)	58.5 (61.4)	58.3 (62.6)	57.2 (62.1)	52.3 (62.7)	56.3 (60.7)	52.2 (58.3)
HR	N067	Harvil Road worksite south boundary	Free-field	56.5 (59.5)	61.9 (65.7)	54.9 (63.5)	53.6 (66.9)	50.6 (59.8)	55.5 (56.9)	59.7 (60.8)	58.2 (59.2)	60.5 (67.7)	52.3 (60.0)	58.7 (65.9)	50.6 (56.7)
	SSPA-HR	Harvil Road	Free-field	59.8 (62.5)	60.8 (62.8)	58.0 (61.1)	56.0 (59.6)	53.5 (62.1)	59.4 (59.4)	61.6 (61.8)	62.1 (62.1)	58.5 (61.3)	54.9 (66.2)	58.3 (61.2)	52.2 (62.5)
	BSR-N001	Breakspear Road	Free-field	69.1 (71.7)	67.8 (69.1)	68.0 (70.0)	65.9 (68.6)	61.5 (68.7)	67.0 (68.3)	69.0 (70.1)	68.6 (70.1)	67.5 (70.8)	61.1 (68.1)	66.9 (69.7)	62.2 (69.7)

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	0.59 (Y-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 period	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	All days	All period	No exceedance	No exceedance
	CVW-MR-NMP2	Harefield Marina, Moorhall Road, London	Weekdays Saturdays	0800-1800 0800-1300	5 2	No exceedance No exceedance
	CVW-MR-NMP3	Peerless Drive, Harefield, Uxbridge	All days	All period	No exceedance	No exceedance
WRP	N048	West Ruislip Golf Club, Ickenham Rd, Ruislip	Nights	2200-0700	3	No exceedance
	N056	83 The Greenway, Ickenham, Ruislip	Weekdays Weekdays Weekdays Saturdays Nights	0800-1800 1800-1900 1900-2200 1400-2200 2200-0700	2 3 29 12 4	No exceedance No exceedance No exceedance No exceedance No exceedance
	N057	123 The Greenway, Ickenham, Ruislip	All days	All period	No exceedance	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
BR	N065	Breakspear Road South, Harefield, Uxbridge	Weekdays Weekdays Weekdays Saturdays	0800-1800 1800-1900 1900-2200 0800-1300	10 7 7 3	No exceedance No exceedance No exceedance No exceedance
	N066	Hoylake Crescent, Ickenham, Uxbridge	All days	All period	No exceedance	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*
	TCA-N001	Trenchard Avenue, Ruislip	All days	All period	No exceedance	No exceedance
HR	N067	Harvil Road worksite south boundary	Saturdays Sundays	1400-2200 0700-2200	4 9	No exceedance No exceedance
	SSPA-HR	Harvil Road	Weekdays Saturdays Saturdays Sundays	0700-0800 1300-1400 1400-2200 0700-2200	5 1 6 13	No exceedance No exceedance No exceedance No exceedance
	BSR-N001	Breakspear Road	Weekdays Saturdays Saturdays	0800-1800 0800-1300 1300-1400	19 4 3	No exceedance No exceedance No exceedance

* The defined SOAEL criteria are not applicable to non-residential properties.

2.2.6 Exceedances of the LOAEL were recorded at seven (7) monitoring locations. The LOAEL exceedances were recorded during weekdays, Saturdays, Sundays and night-time working hours.

2.2.7 No SOAEL exceedances were recorded due to HS2 construction works during reporting period.

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

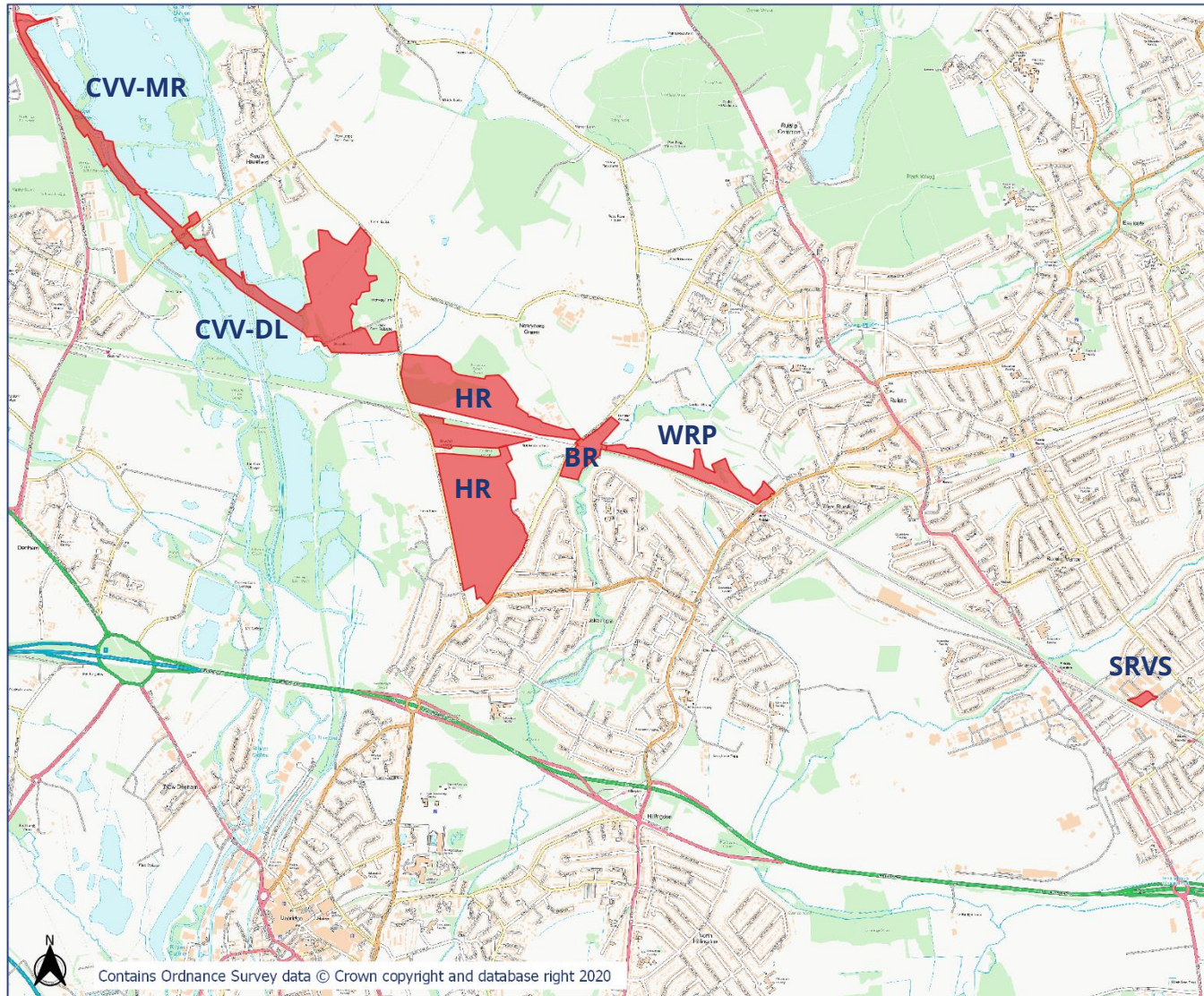
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-23-44254-C	CVV-DL	Complaint regarding general noise disturbance during night.	Monitored noise levels were checked and no exceedances were observed. The noise levels were observed to be below the threshold for noise insulation eligibility.	Best Practical Means (BPM) in continual review, attended noise surveys taken on several occasions, community engagement stepped up, working with managers/engineers to find further methods of mitigation.
HS2-23-88972-E-C	WRP	Complaint due to plant noise during night.	Stakeholder did not provide specific enough detail regarding their own location. This was needed to ensure an adequate investigation could be completed.	Stakeholder was asked for more detail on their location, which they have not provided. Complaint closed and stakeholder advised to come back to HS2 should they wish to provide the info requested.
HS2-23-44283-C	CVV-MR	Complaint regarding loud noise and unbearable vibration level felt inside the property causing significant disturbance for the last 12 months during evenings and nights.	Permitted work outside of core hours. Consents in place.	Confirmed to stakeholder that works are permitted and that noise levels are monitored.

Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-23-89274-E-C	HR	Complaint about noise during night disturbing sleep.	On-going.	On-going.

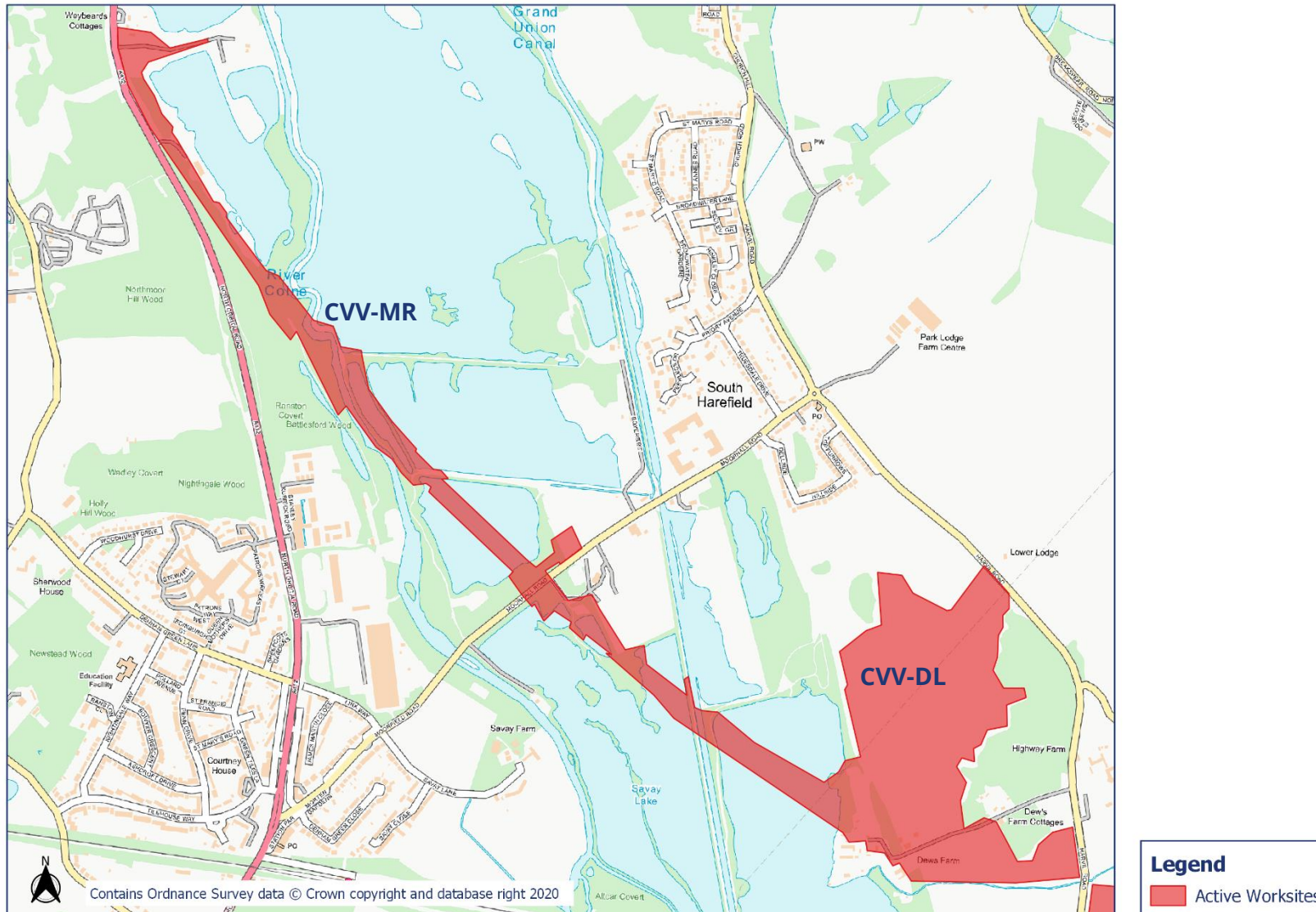
Appendix A Site Locations

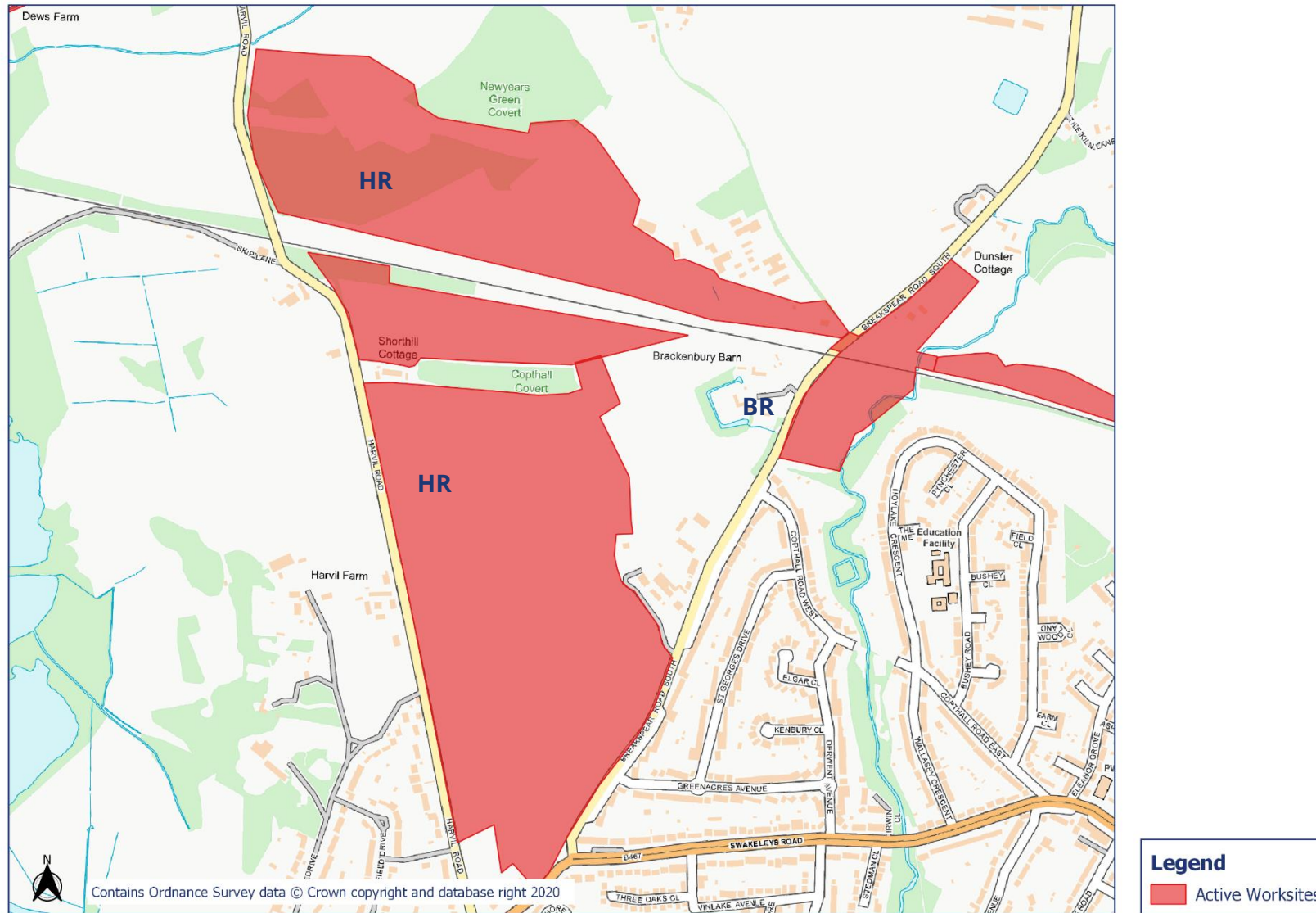
HS2

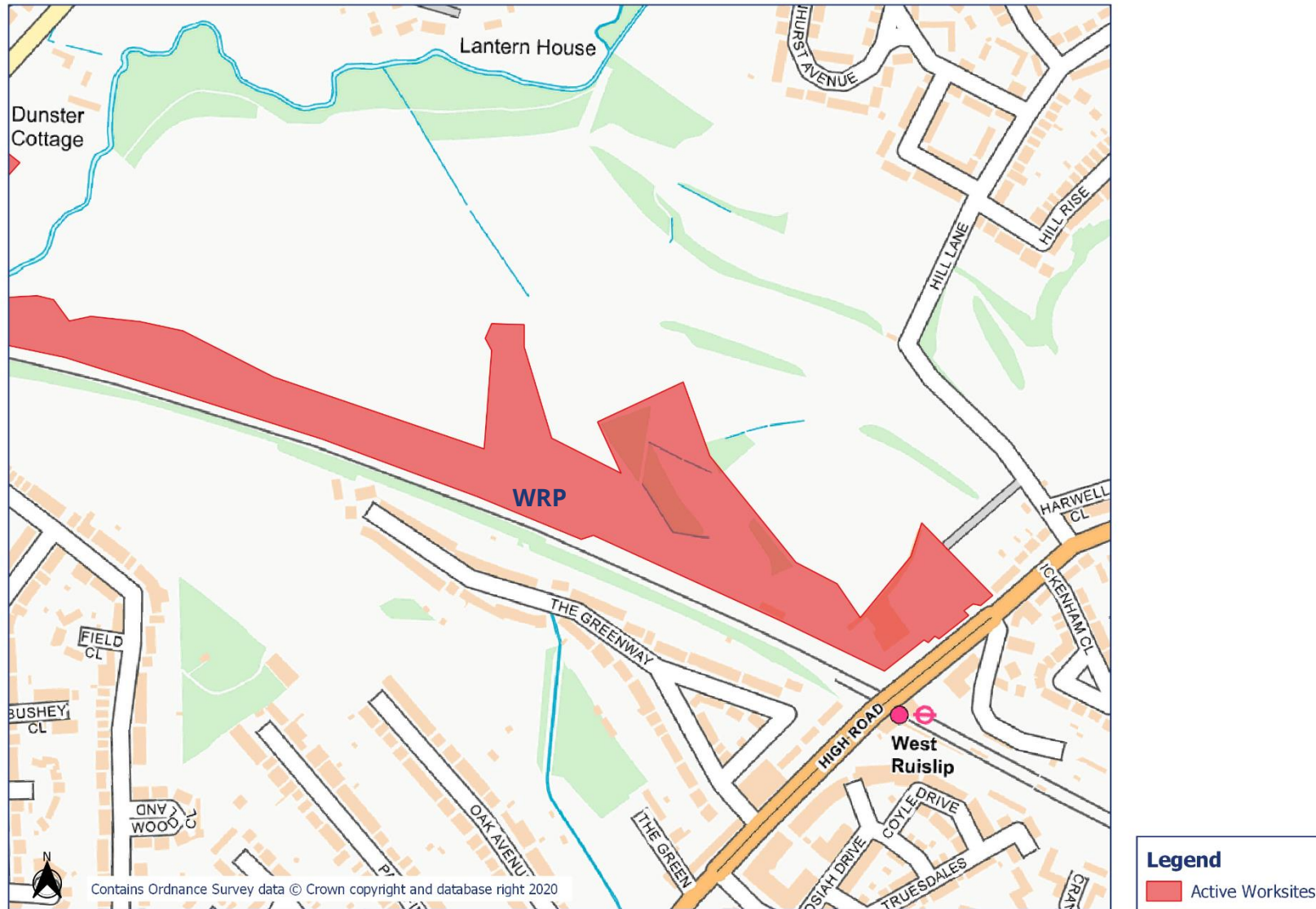
Worksite Identification Plan - Overview

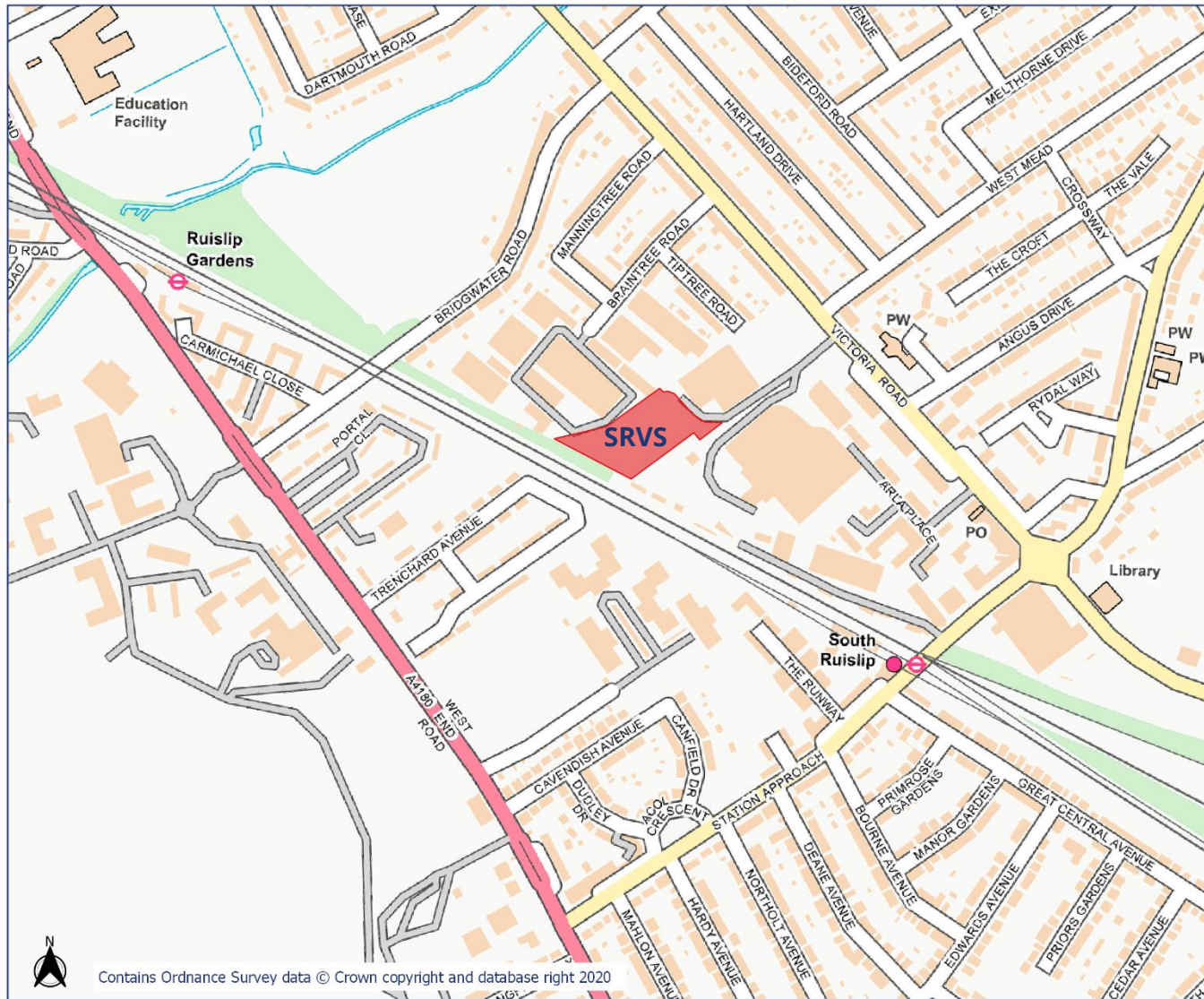


OFFICIAL

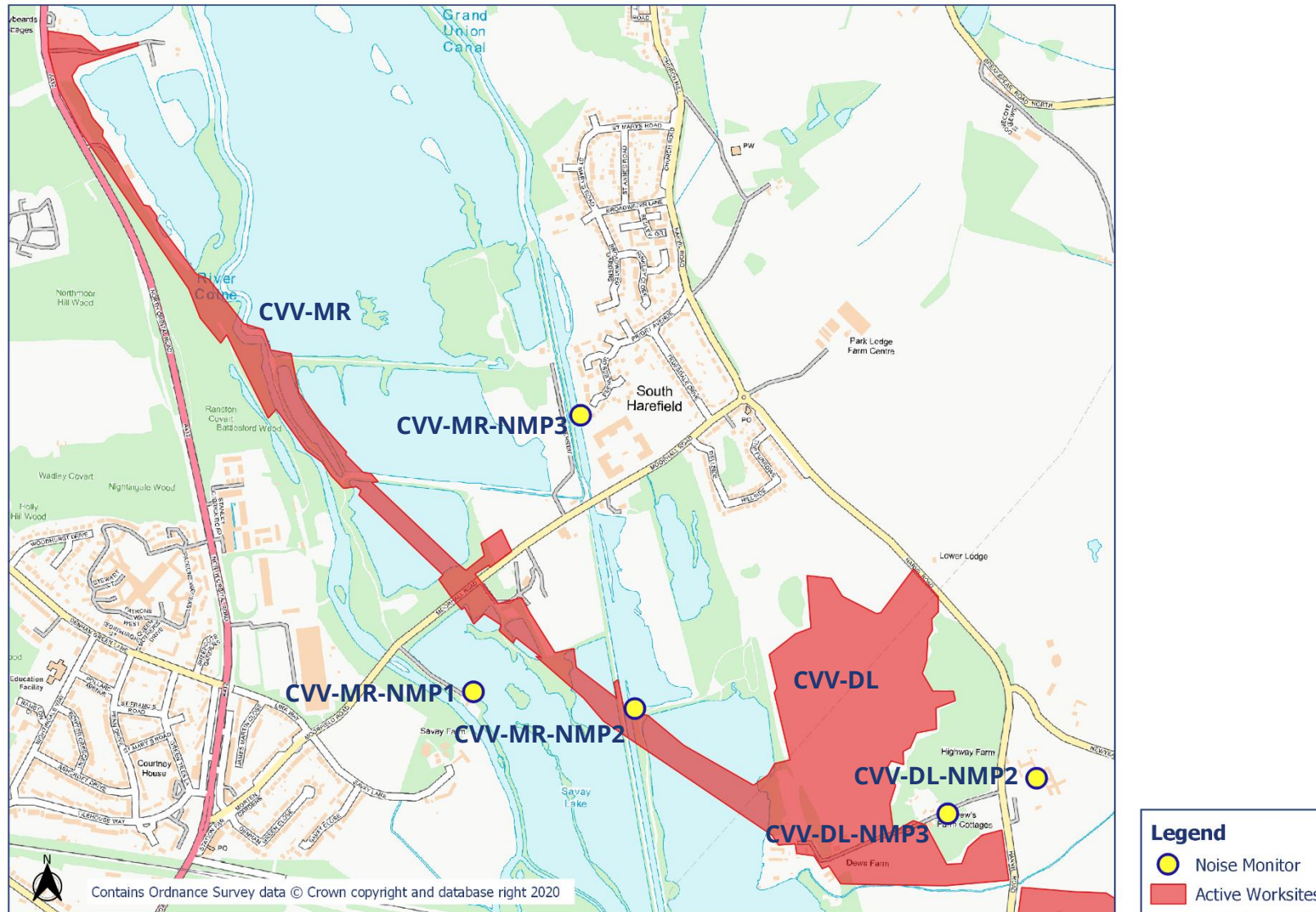


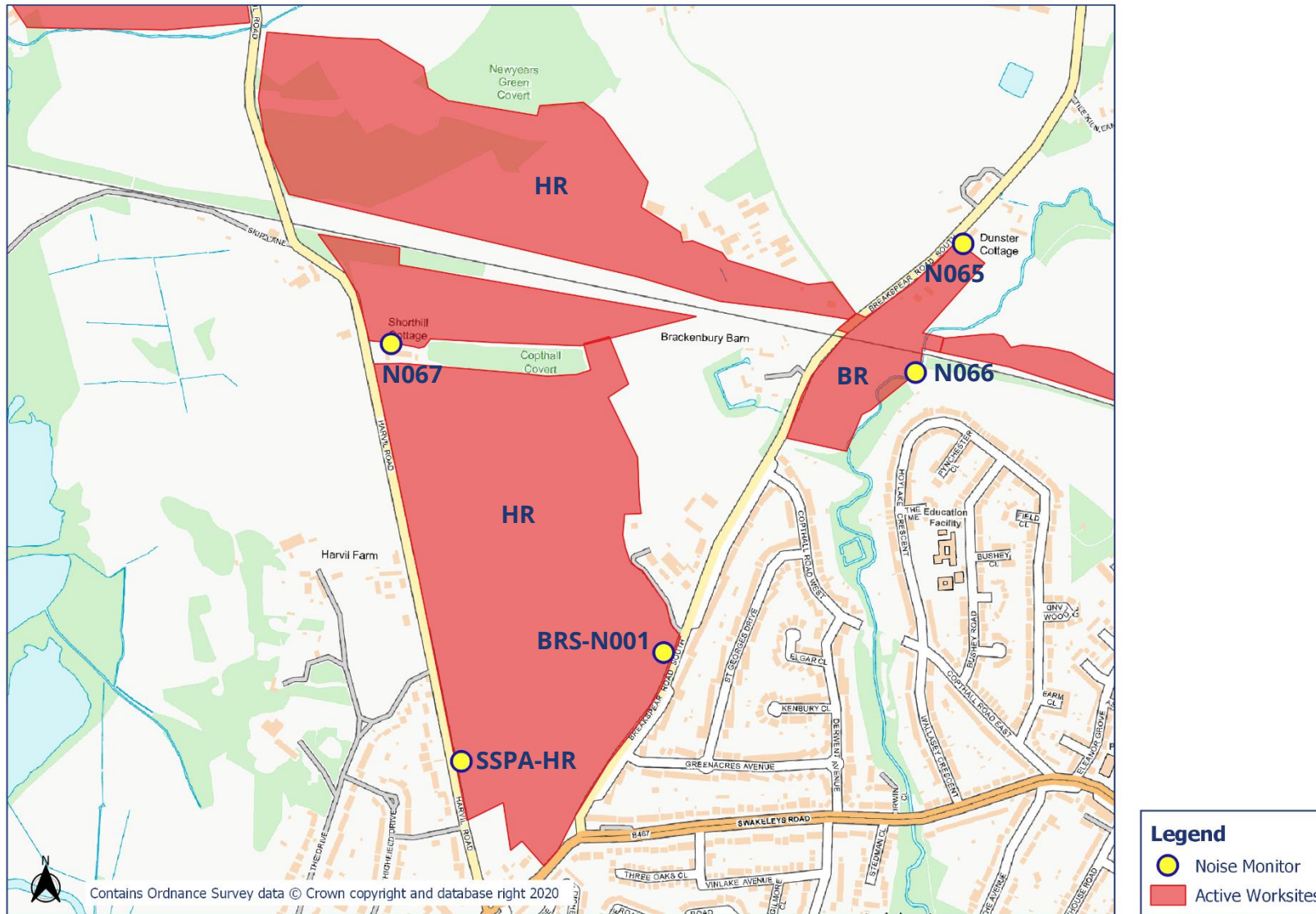


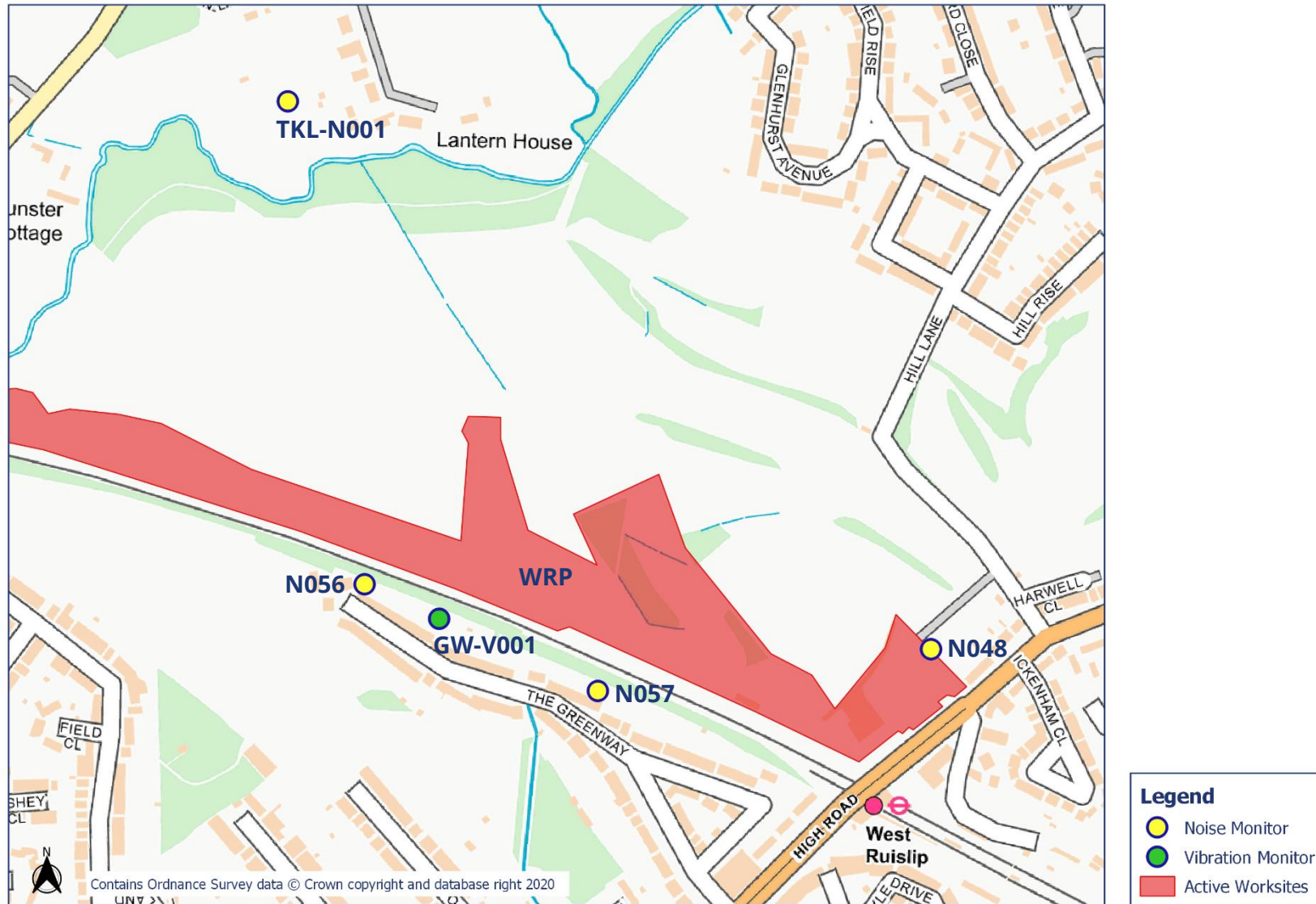


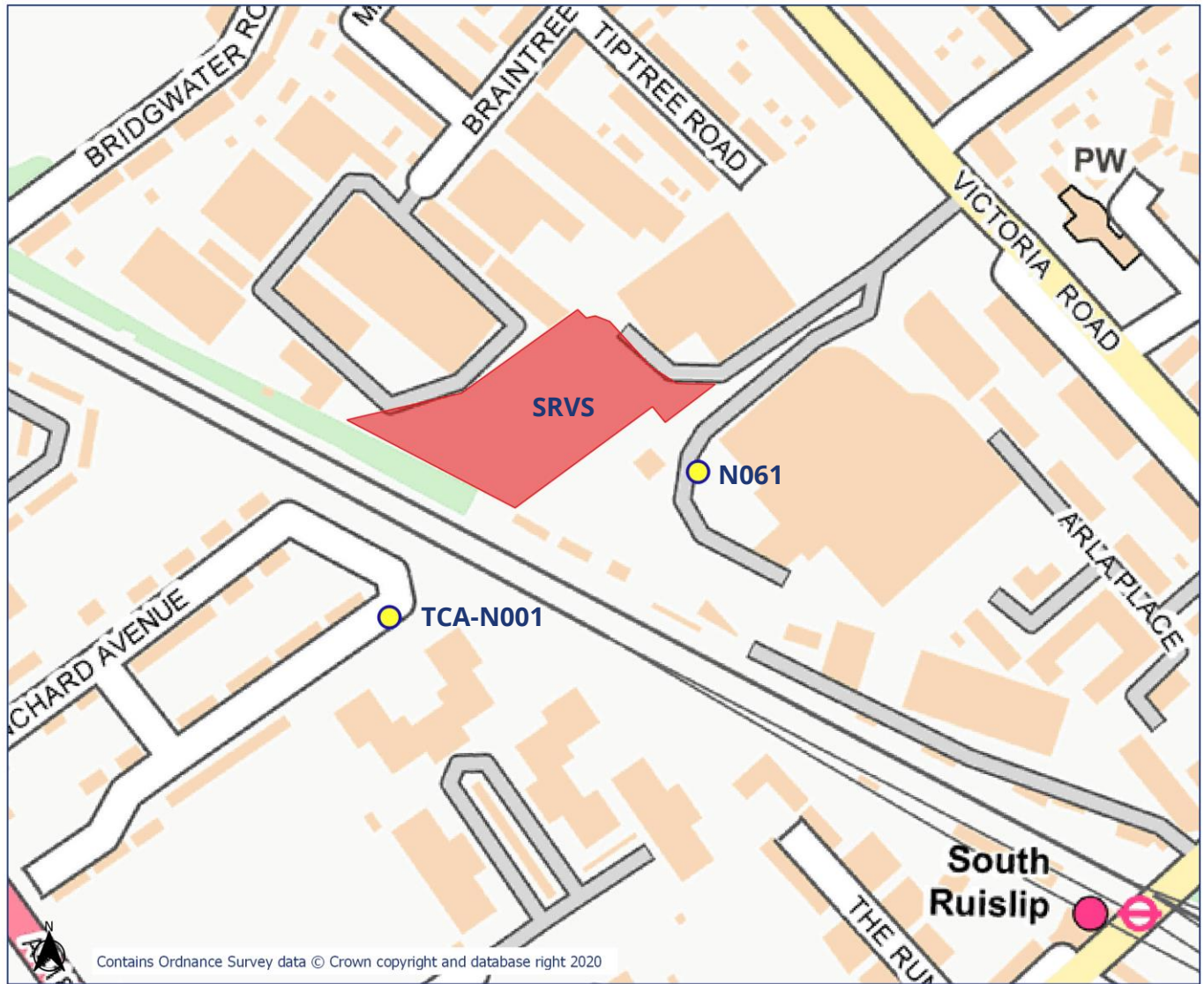


Appendix B Monitoring Locations









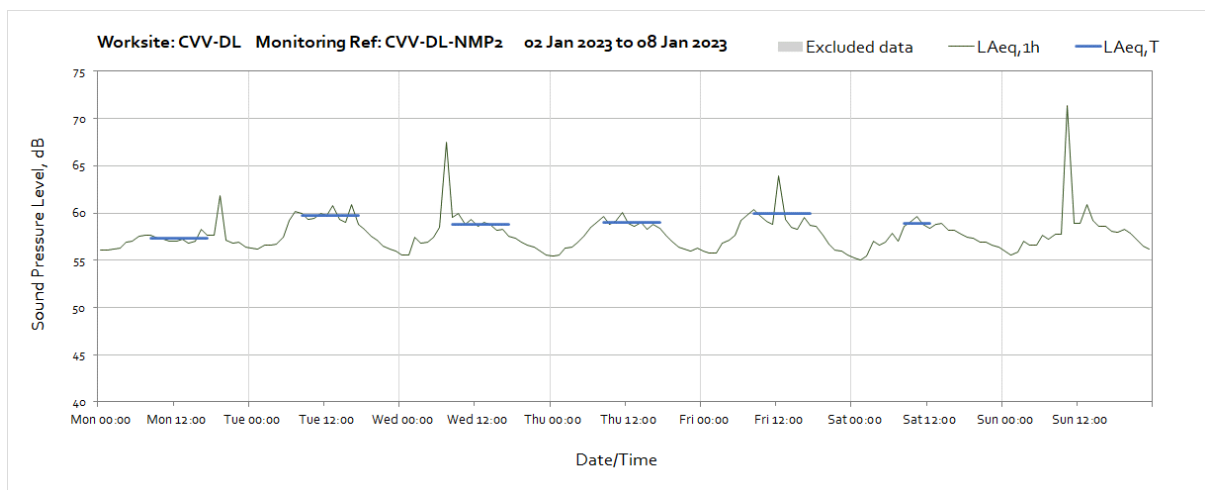
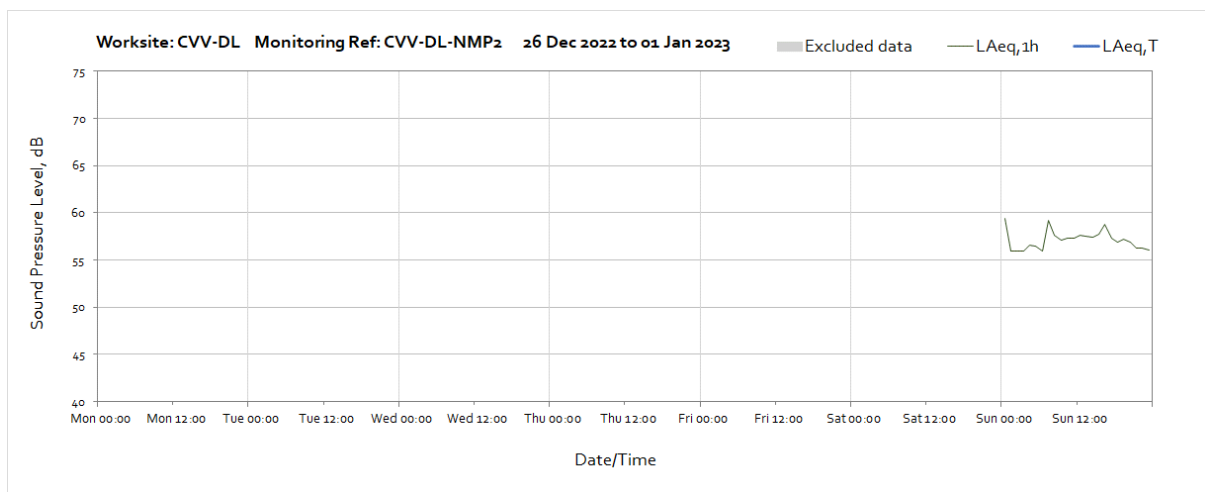
Appendix C Data

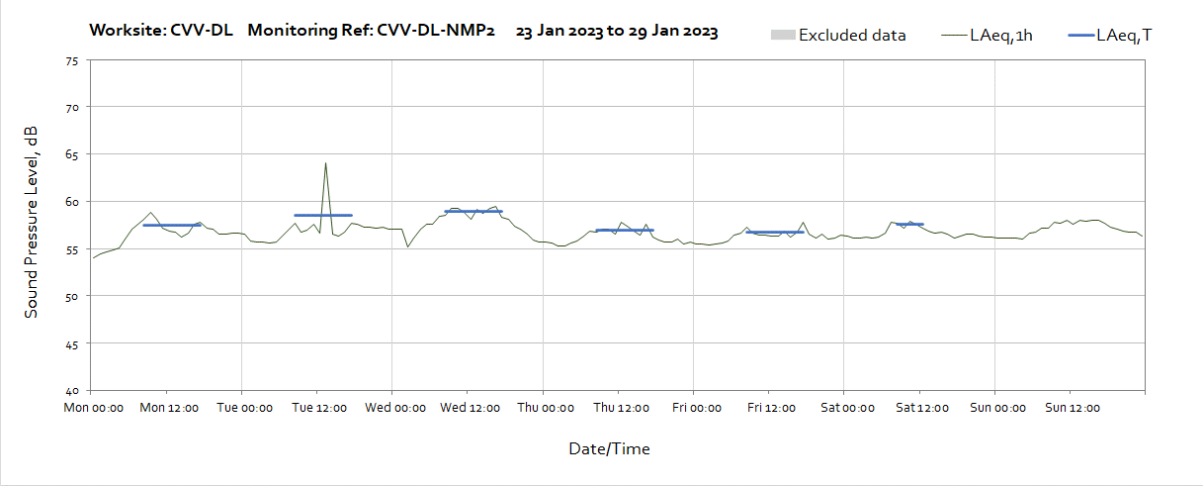
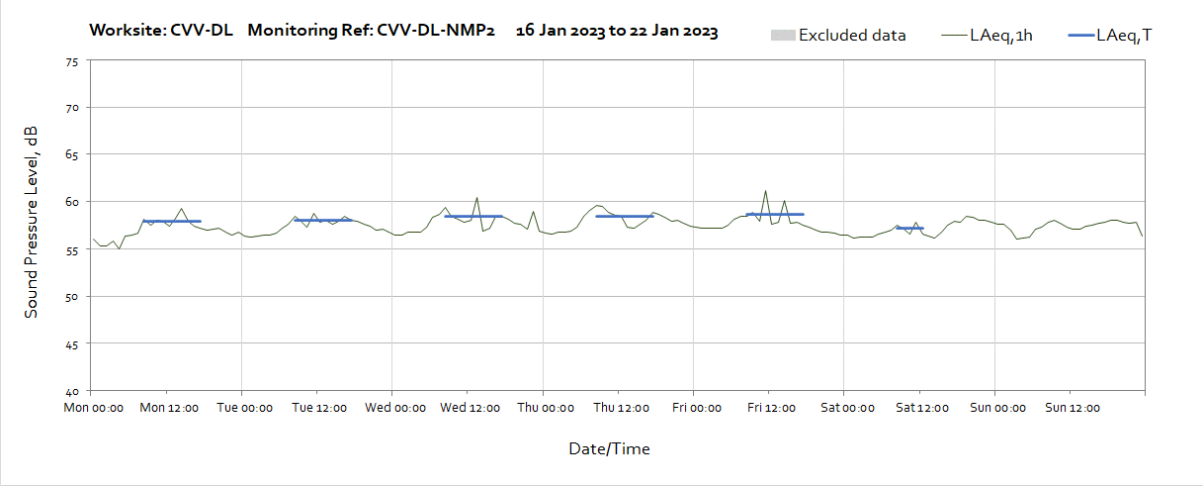
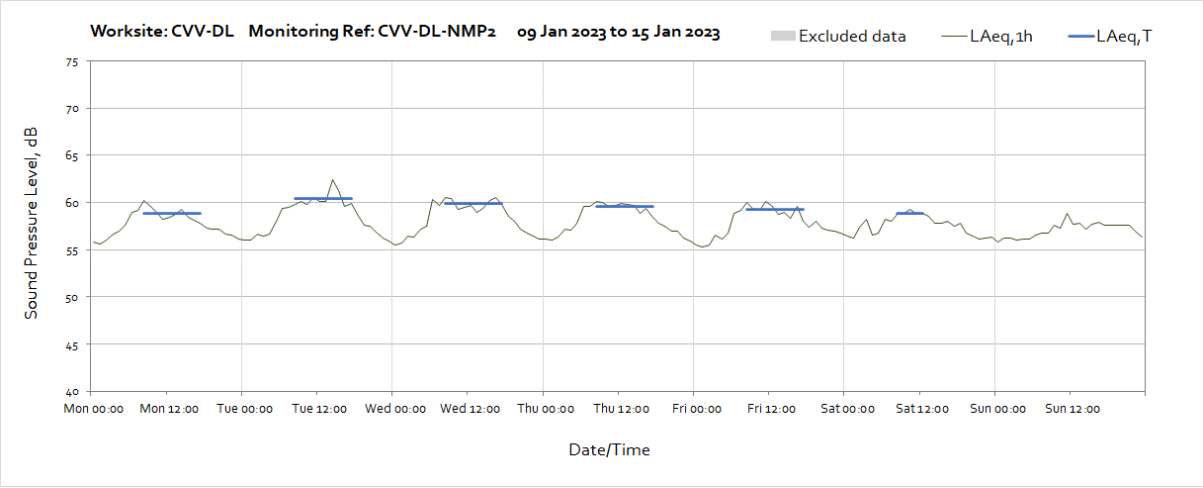
Noise

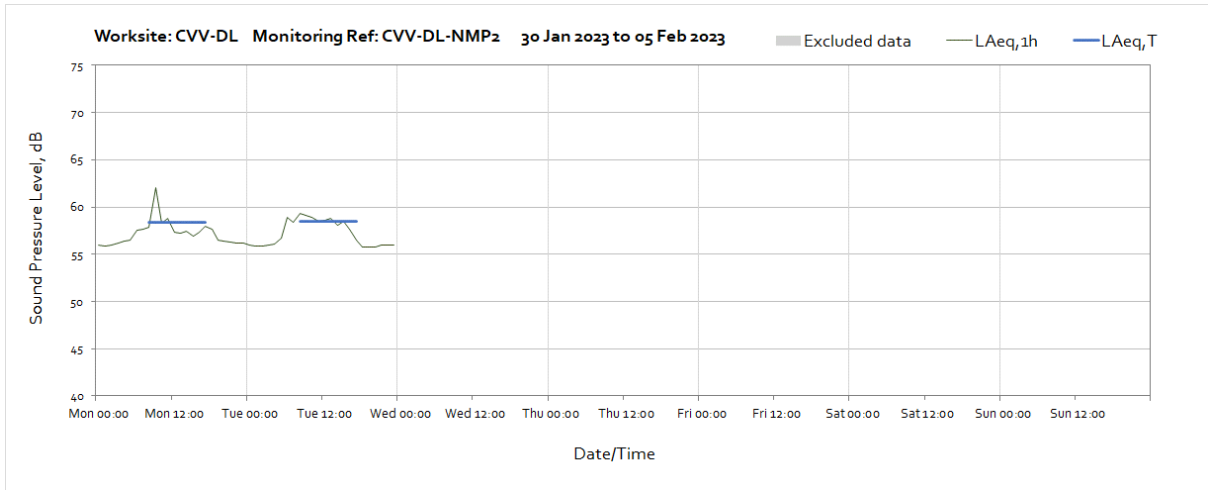
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have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

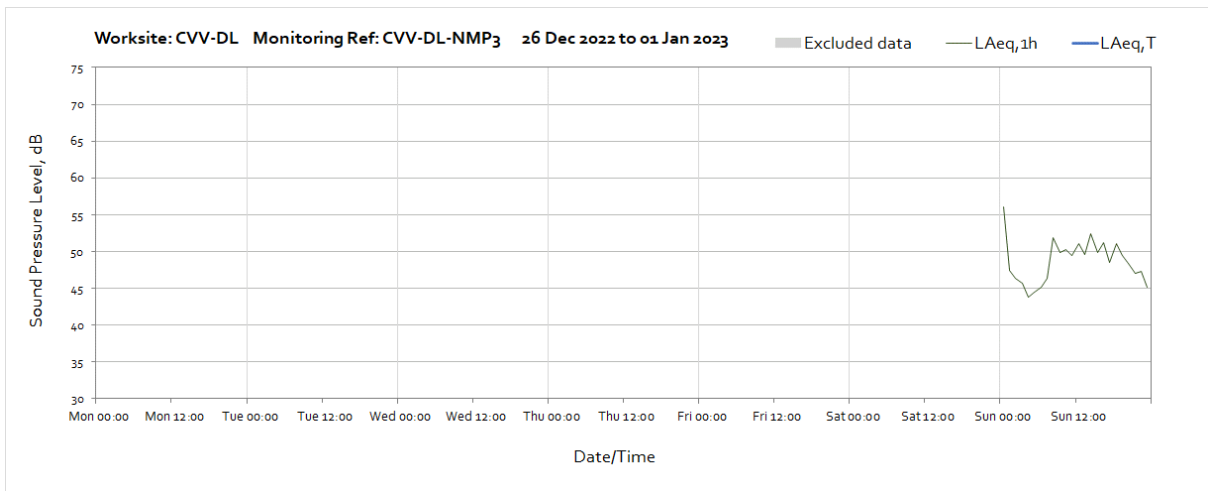
Monitoring Ref: CVV-DL-NMP2



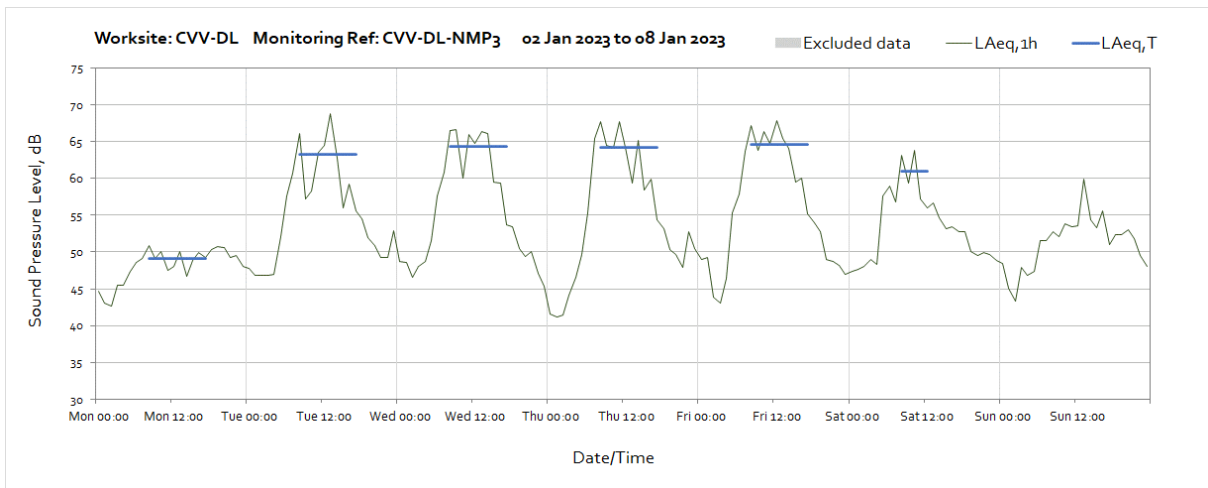


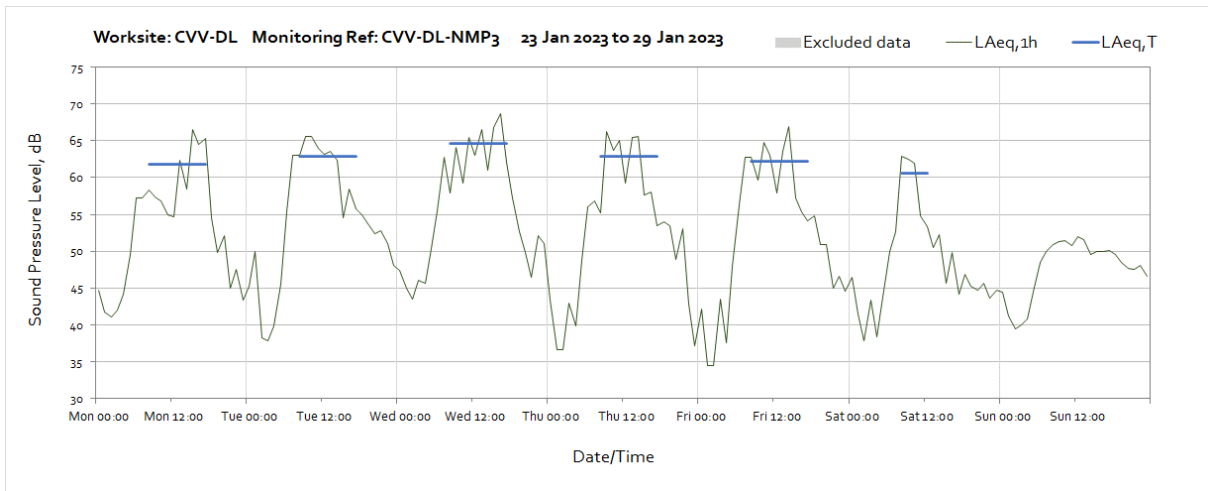
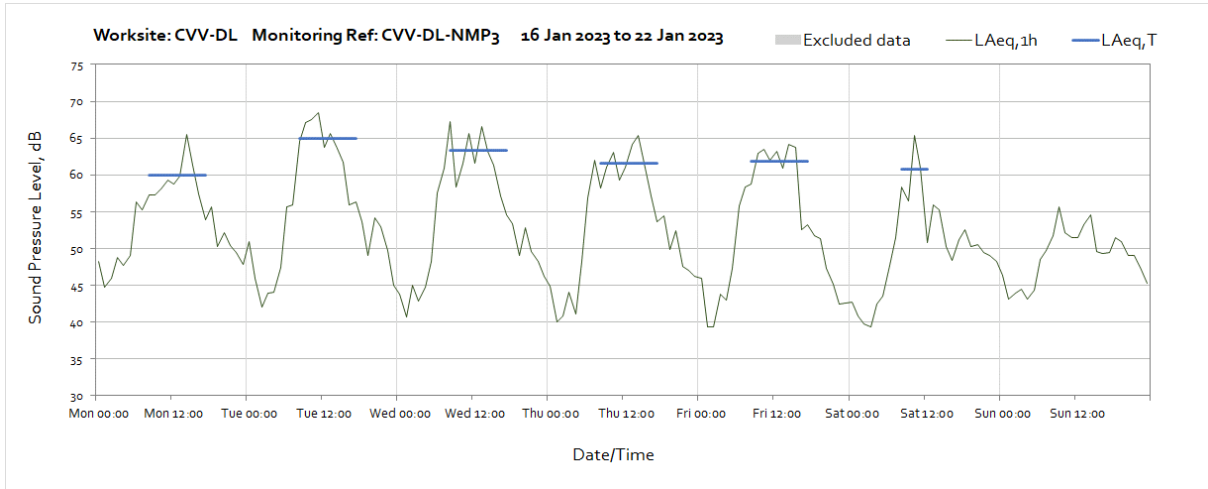
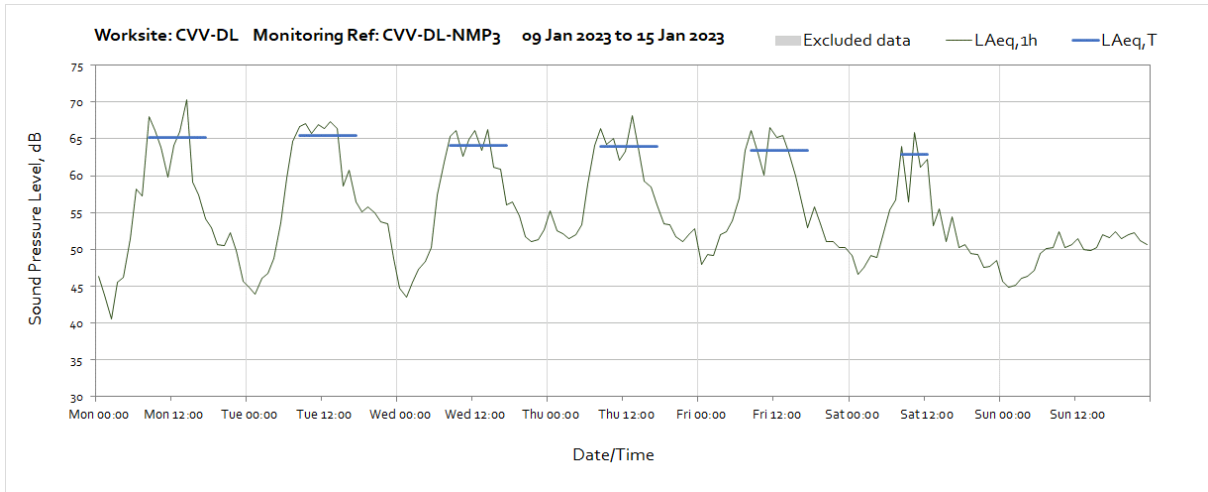


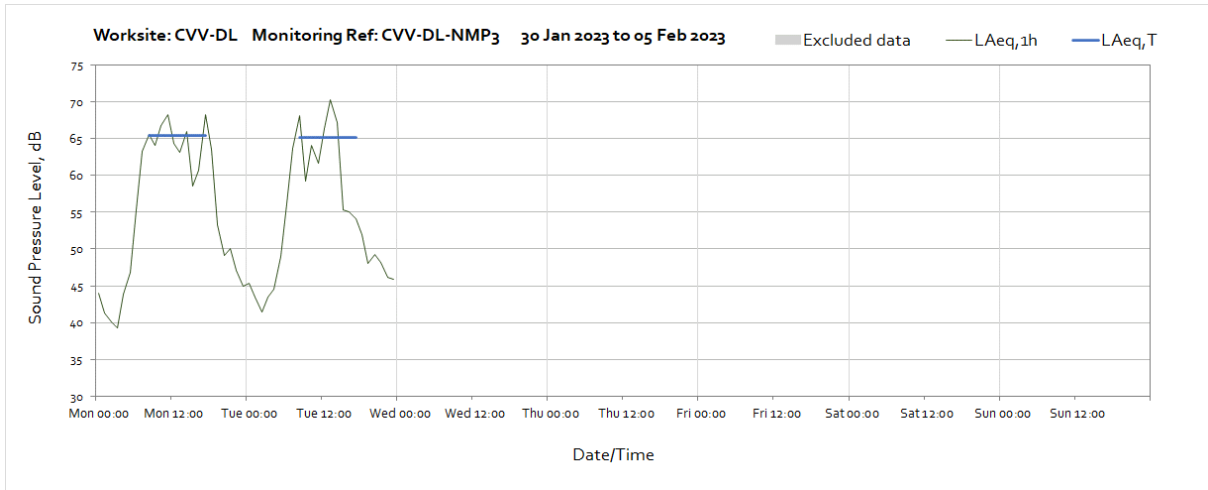
Worksite: Colne Valley Viaduct Dews Lane (CVV-DL)
Monitoring Ref: CVV-DL-NMP3



Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.

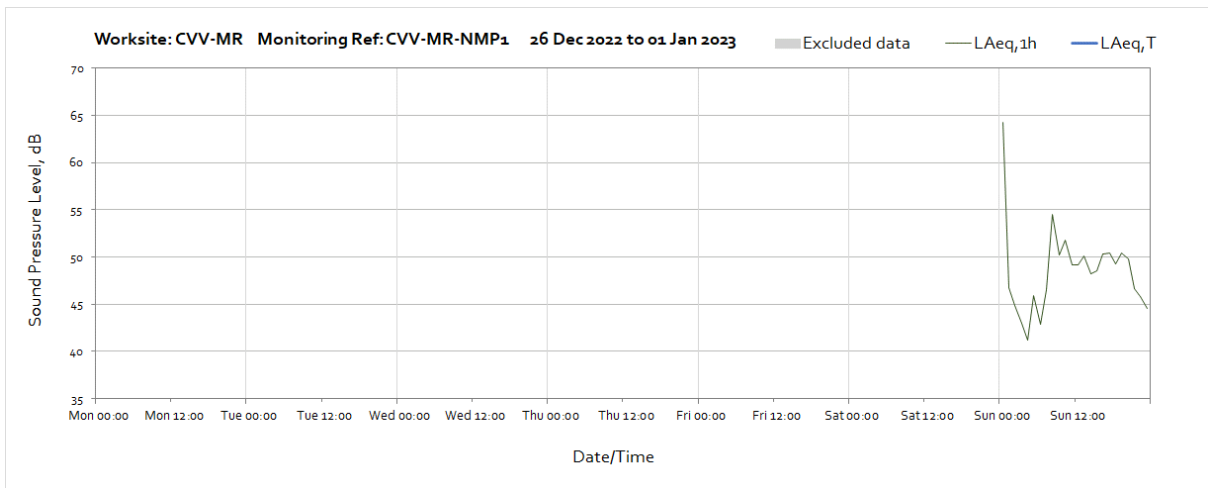




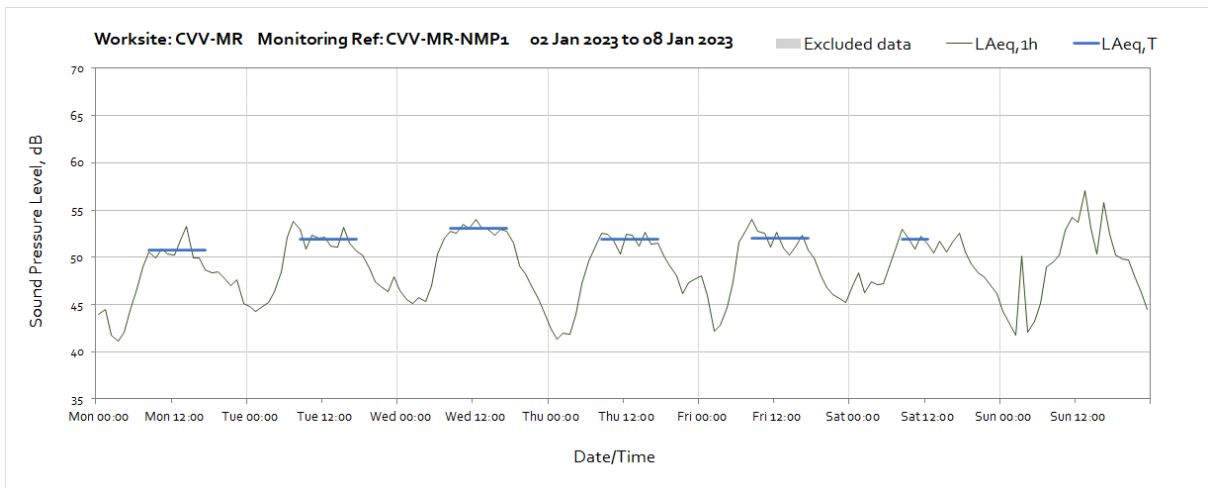


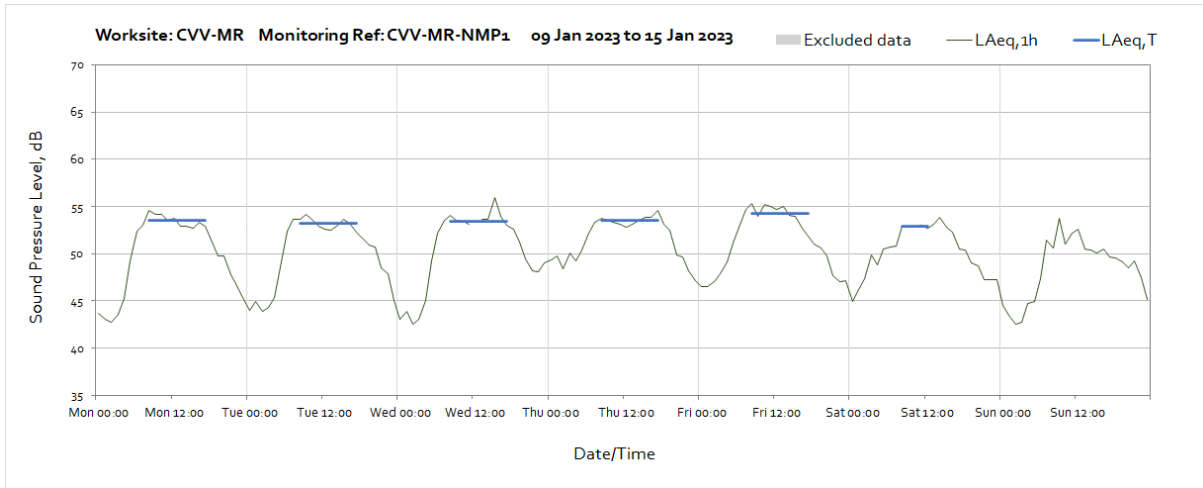
Worksite: Colne Valley Viaduct Moorhall Road (CVV-MR)

Monitoring Ref: CVV-MR-NMP1

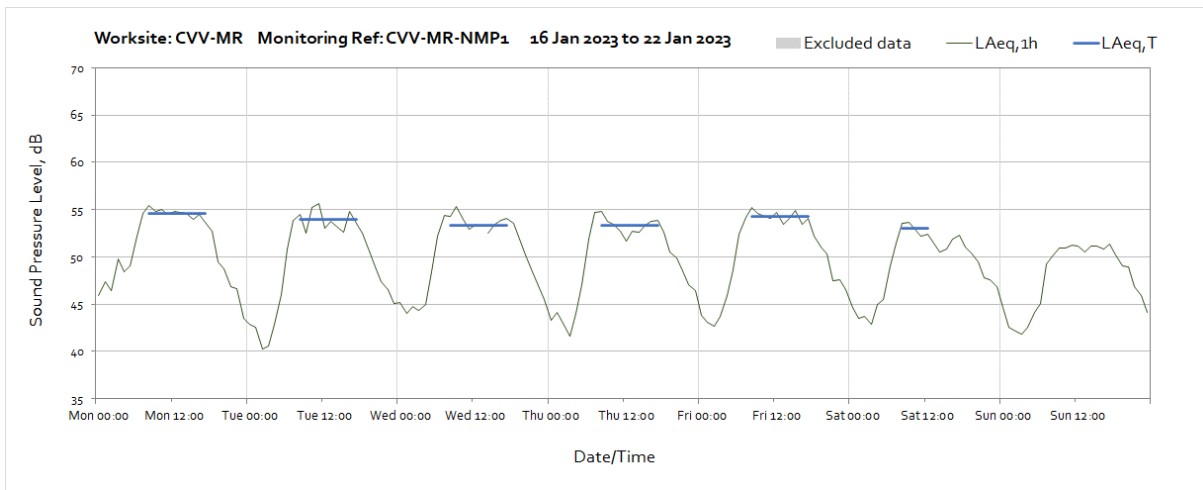


Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.

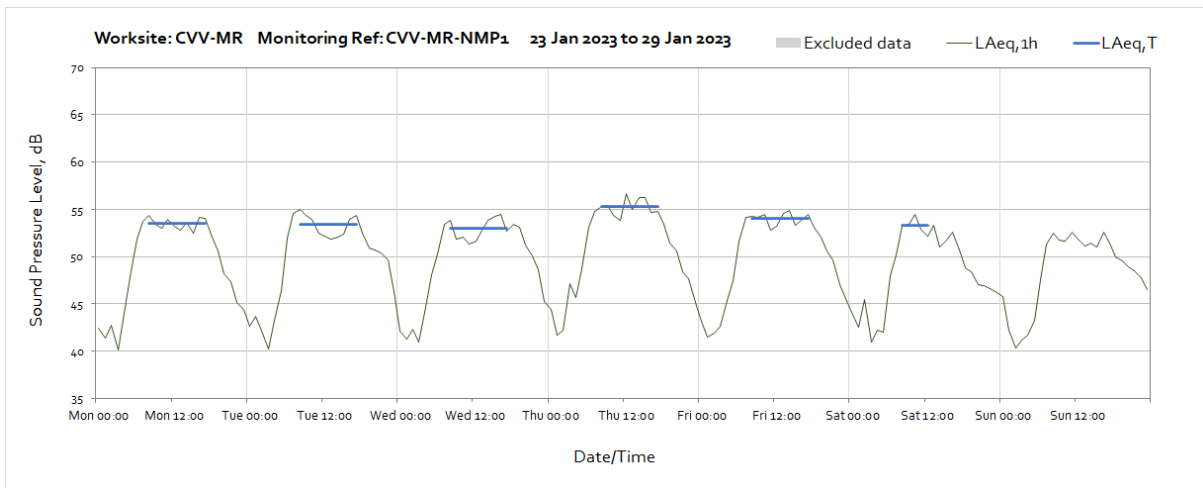


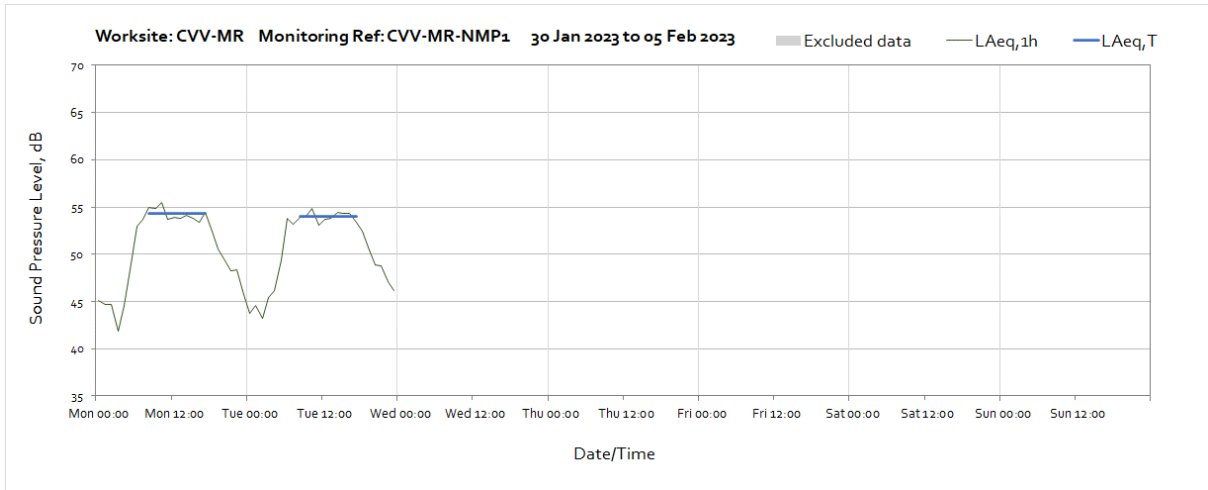


Note: Missing data at 12:00 on Wednesday 11th January was due to monitoring station being stopped for maintenance.



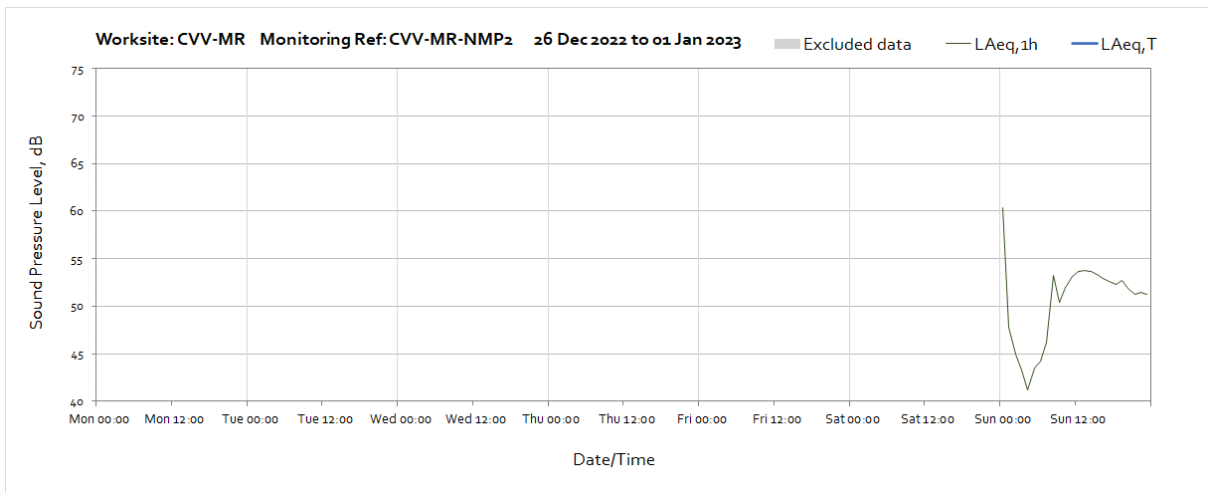
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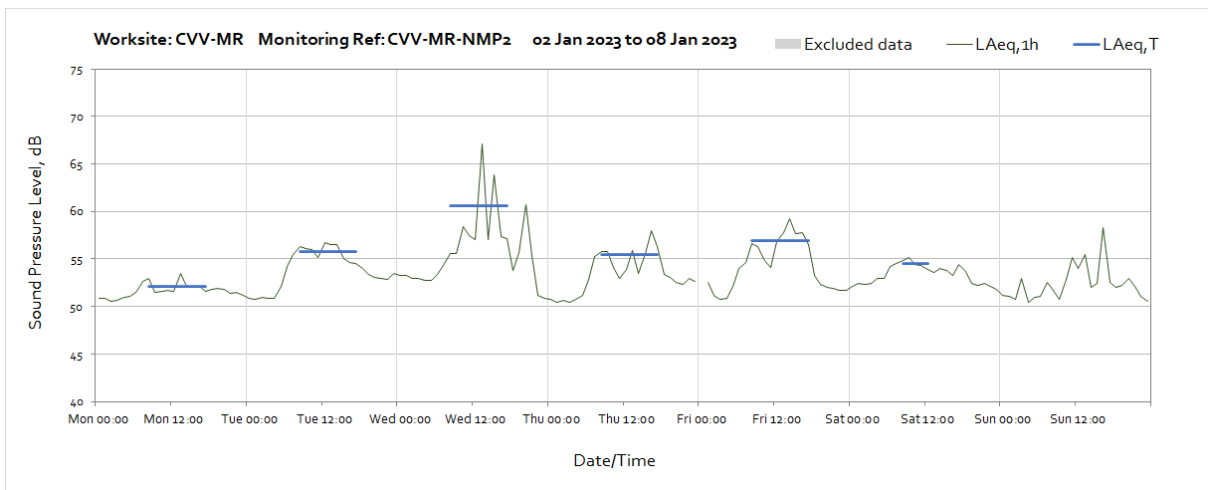


Worksite: Colne Valley Viaduct Moorhall Road (CVV-MR)

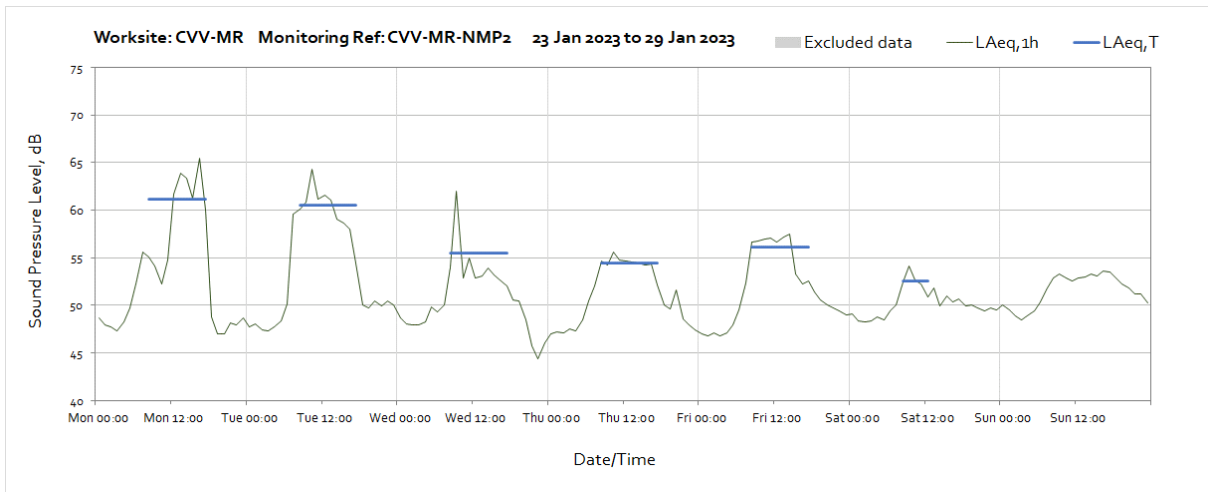
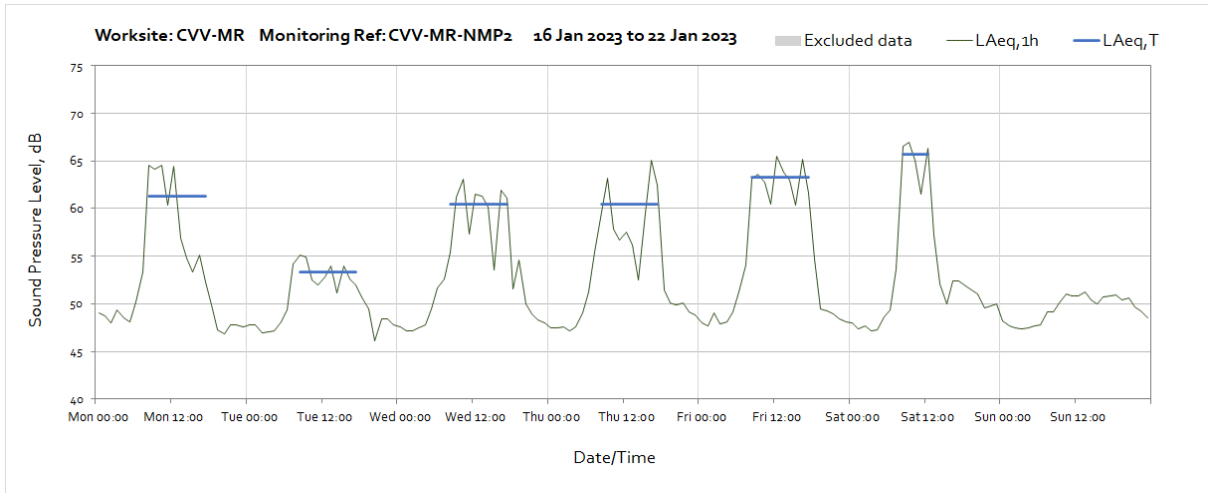
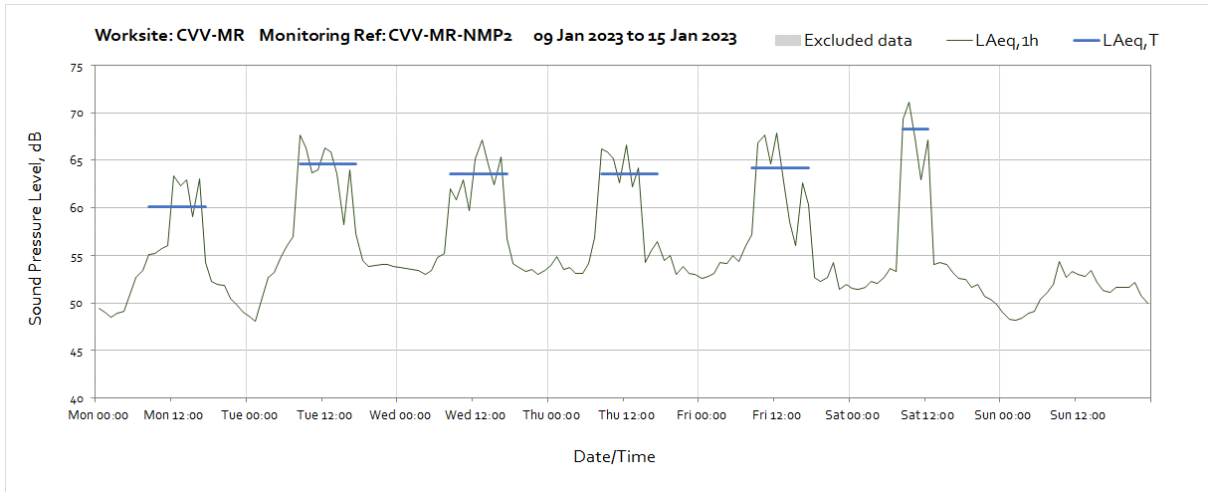
Monitoring Ref: CVV-MR-NMP2

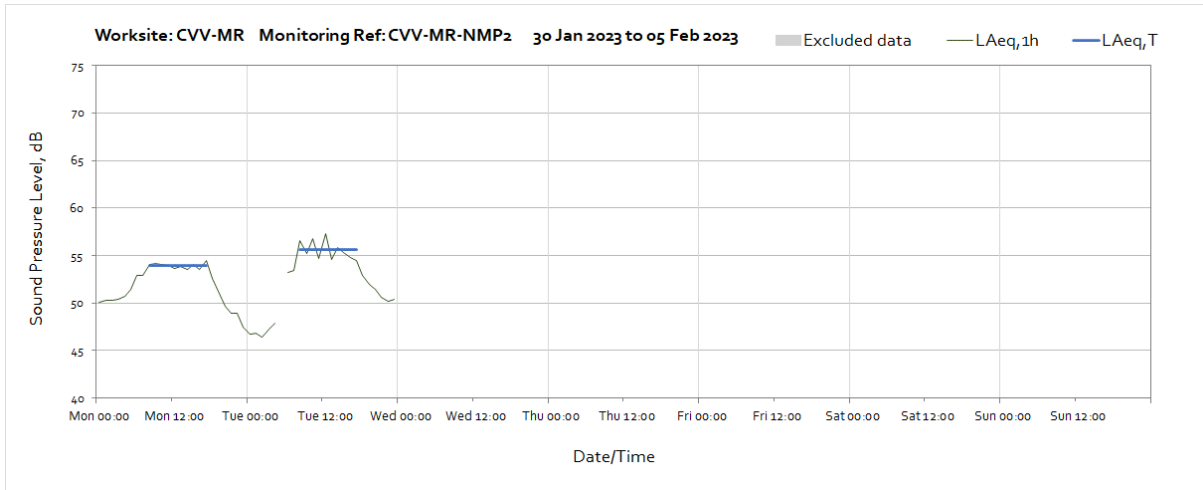


Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.



Note: Missing data at 00:00 on Friday 6th January was due to remote connection issues.

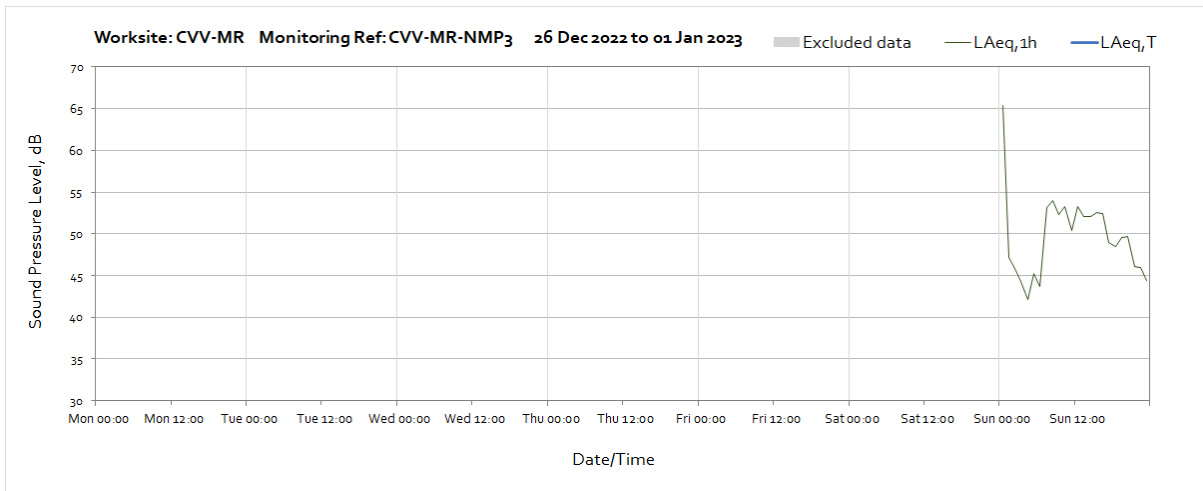




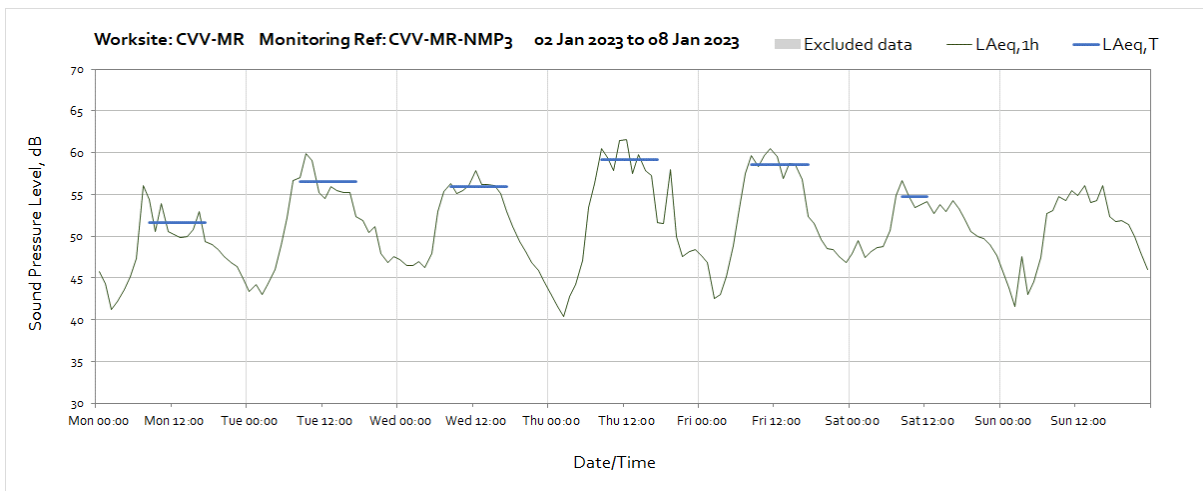
Note: Missing data at 05:00 on Tuesday 31st January was due to monitoring station being stopped for maintenance.

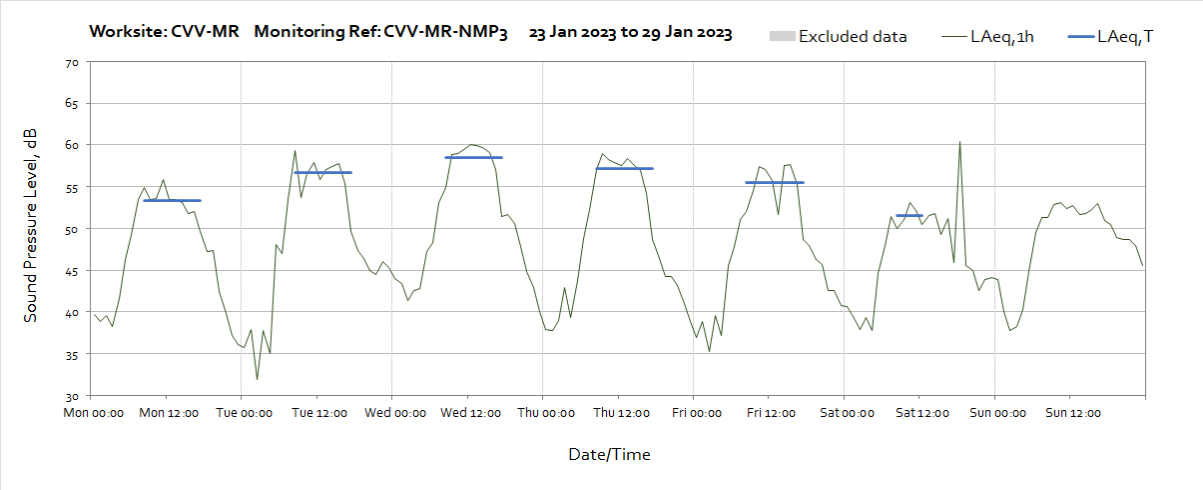
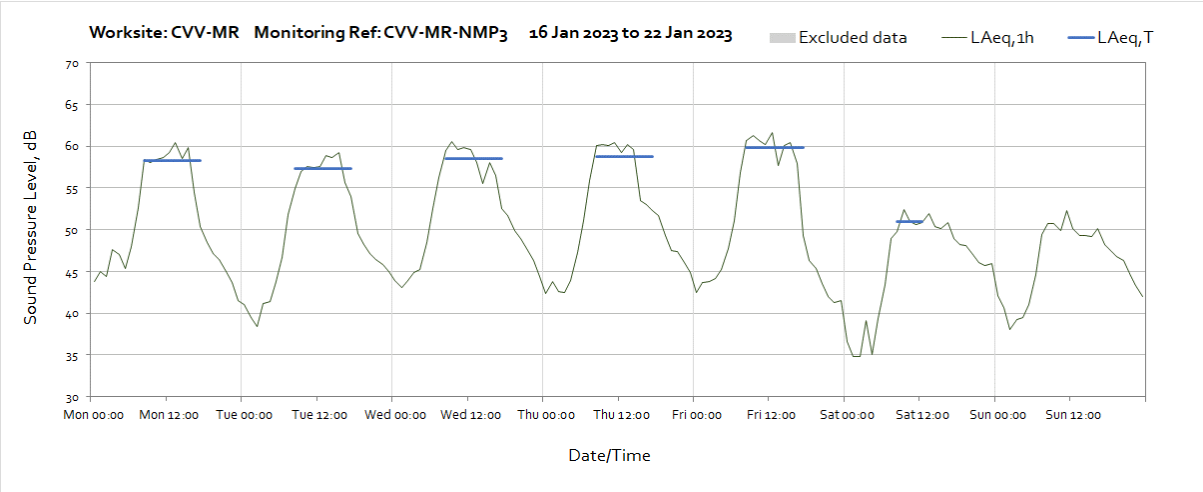
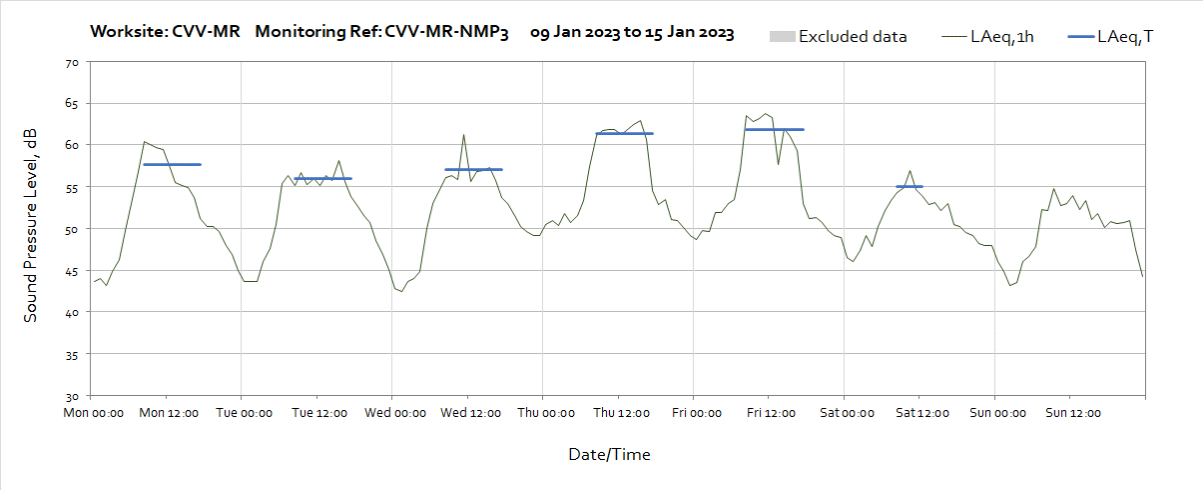
Worksite: Colne Valley Viaduct Moorhall Road (CVV-MR)

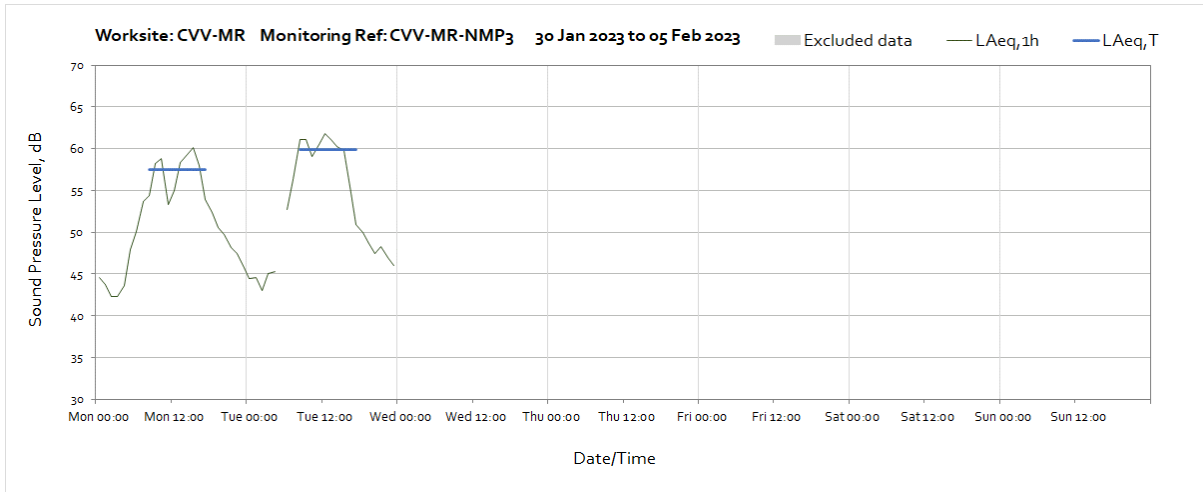
Monitoring Ref: CVV-MR-NMP3



Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.

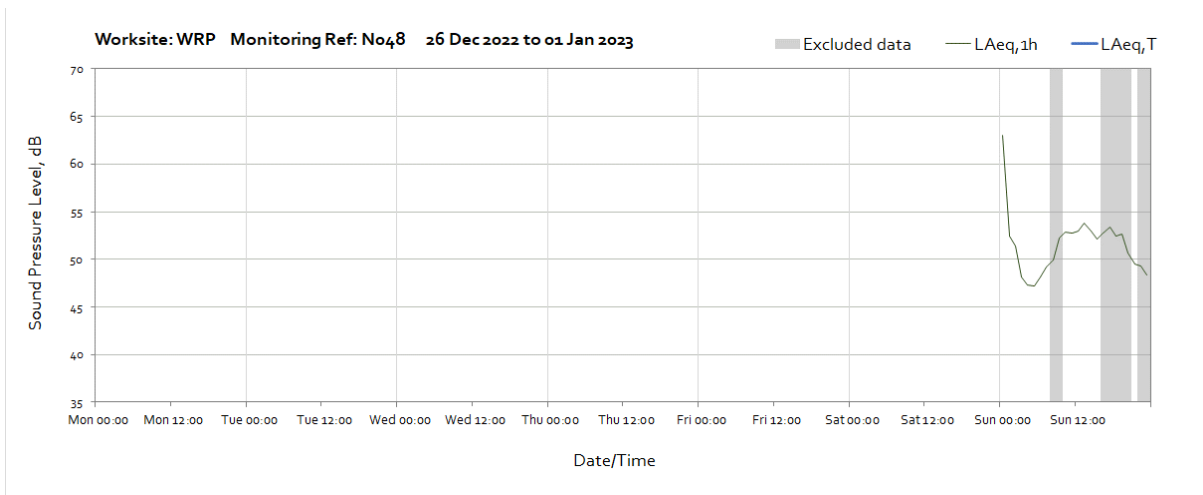




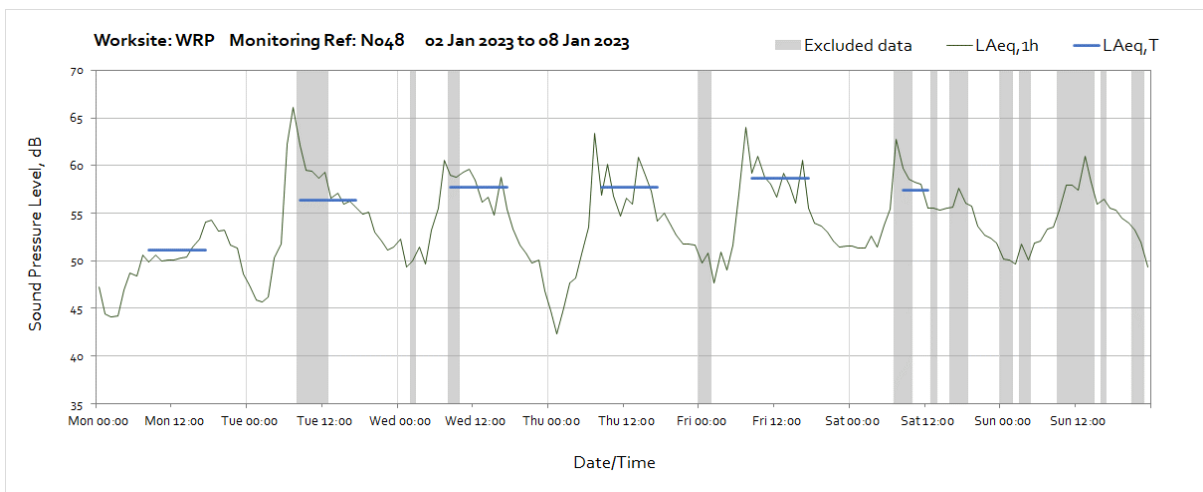


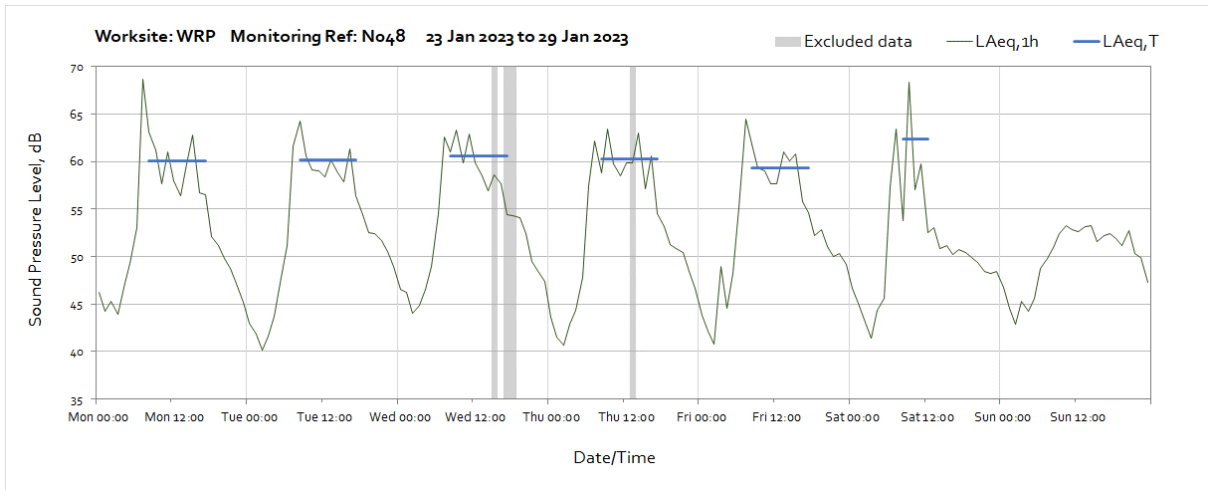
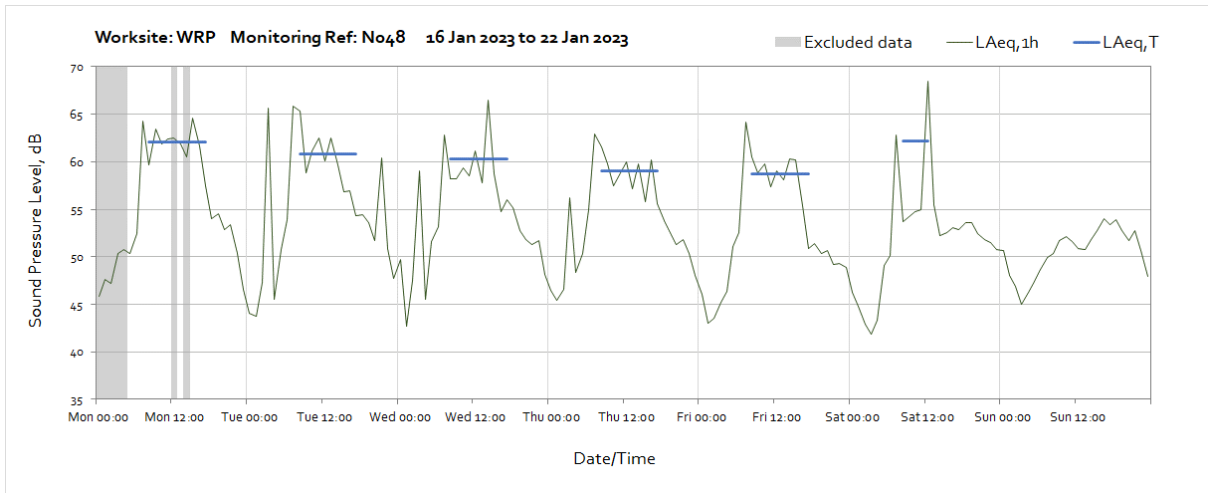
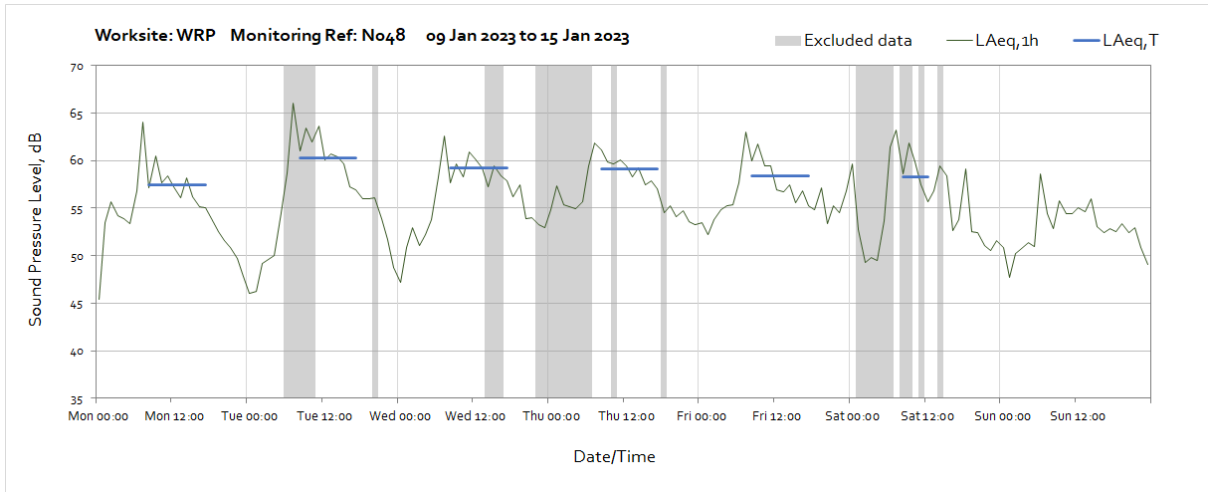
Note: Missing data at 05:00 on Tuesday 31st January was due to monitoring station being stopped for maintenance.

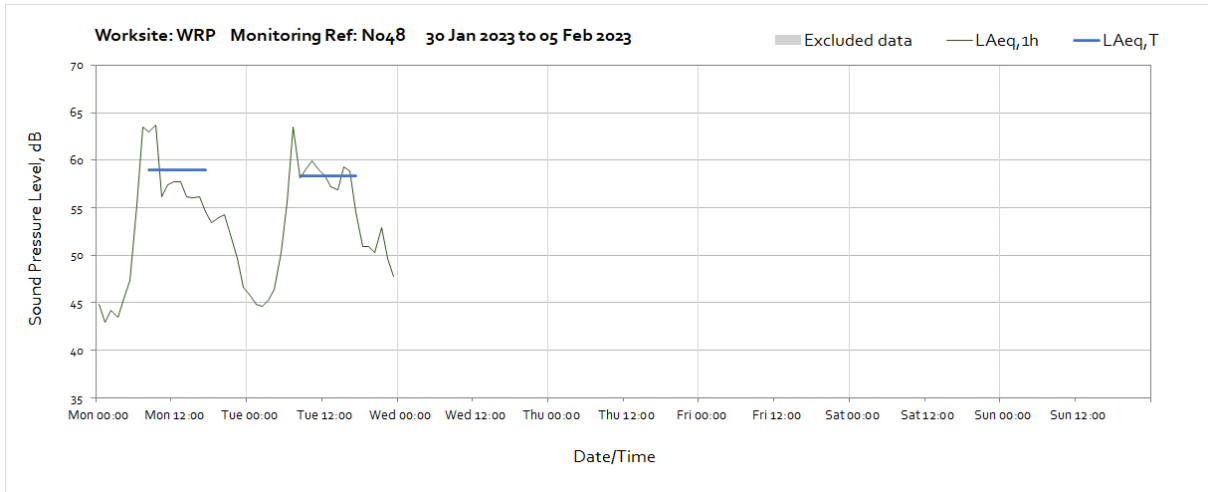
Worksite: West Ruislip Portal (WRP) – Monitoring Ref: N048



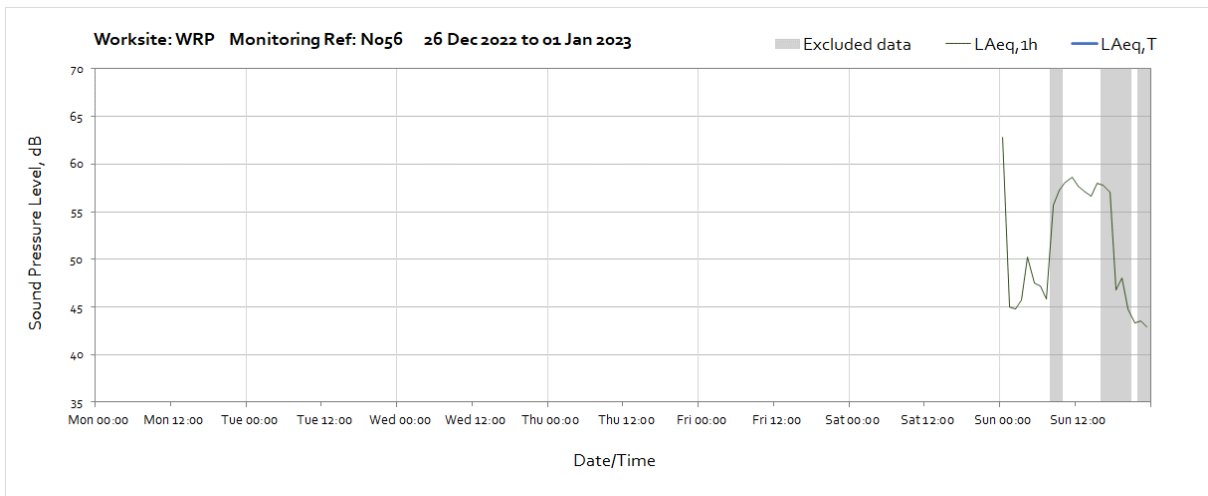
Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.



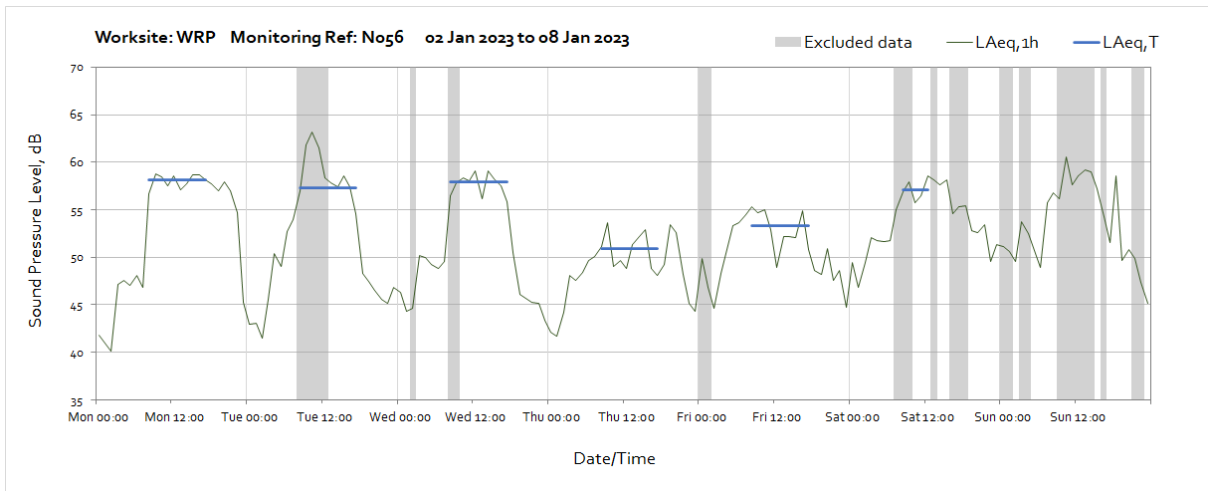


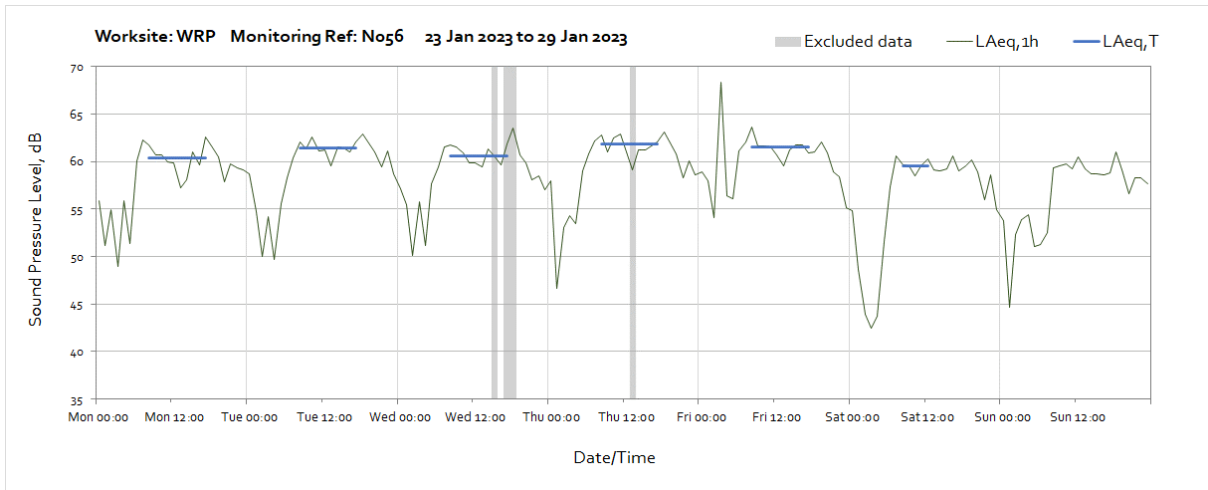
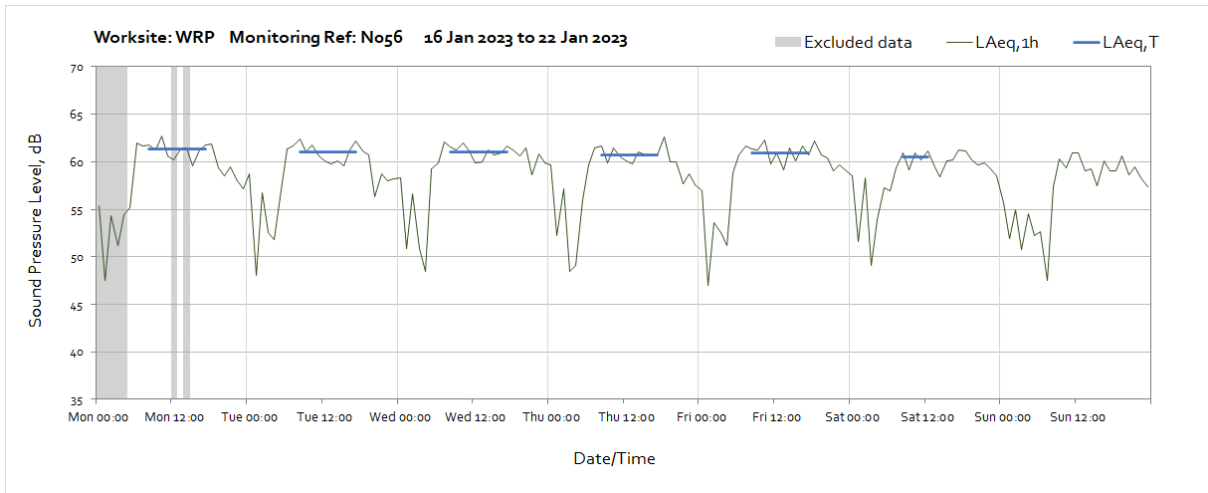
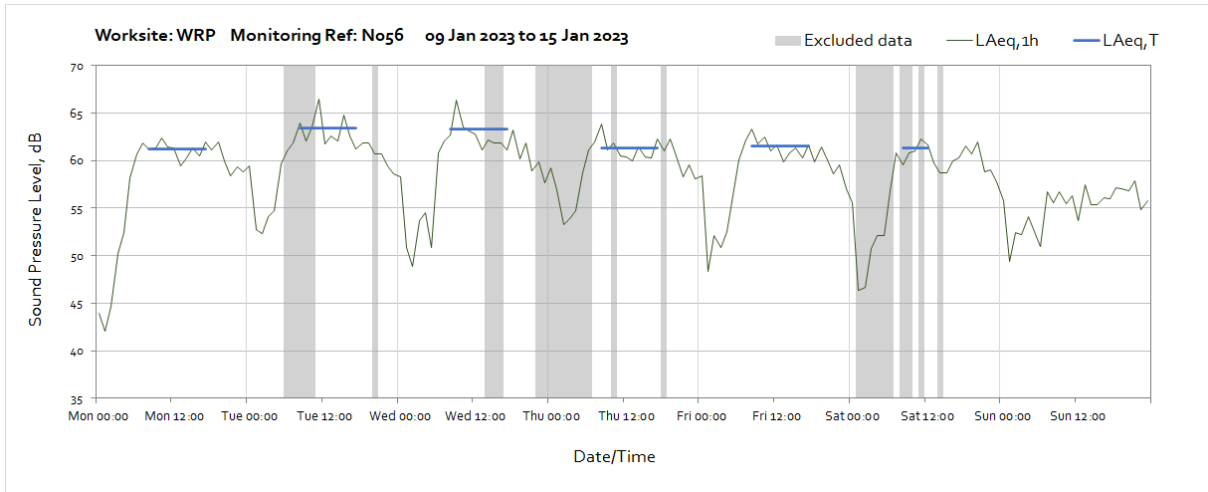


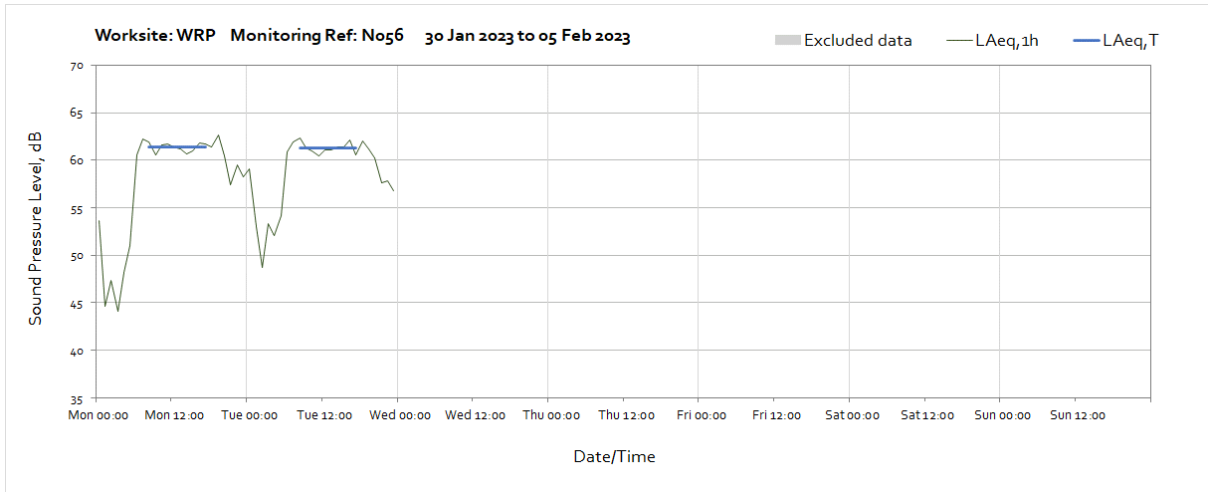
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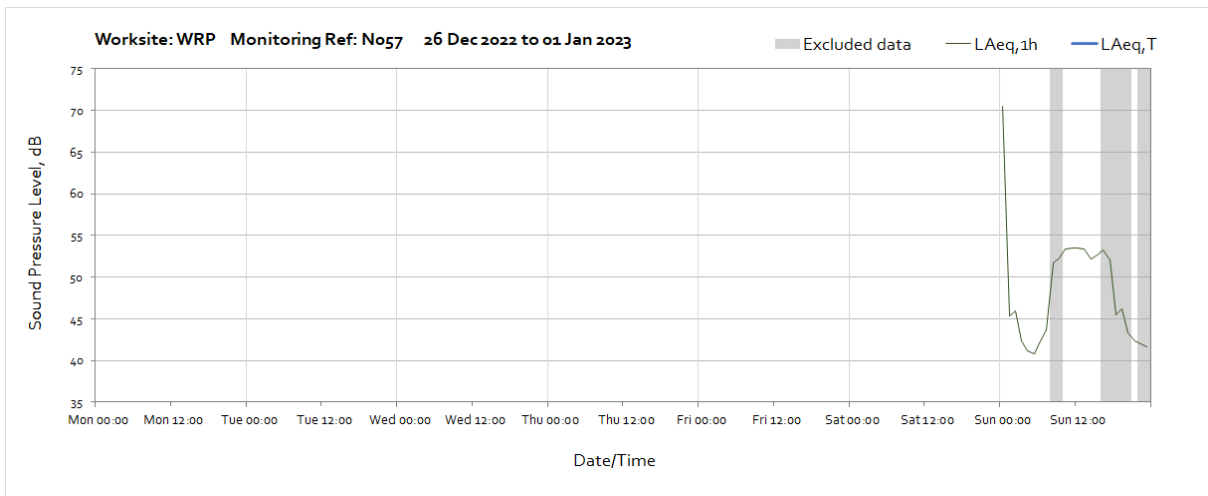
Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.



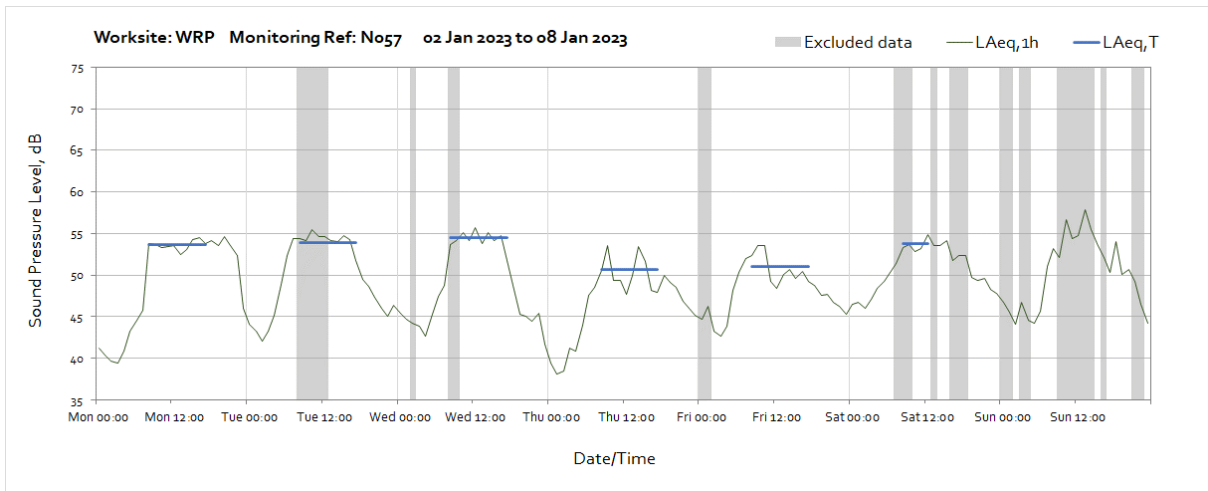


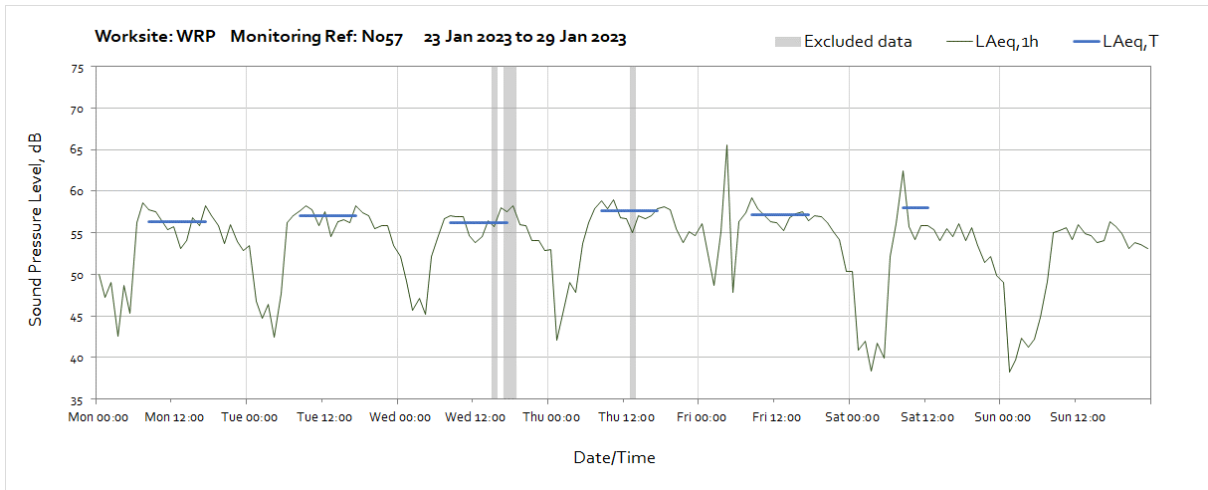
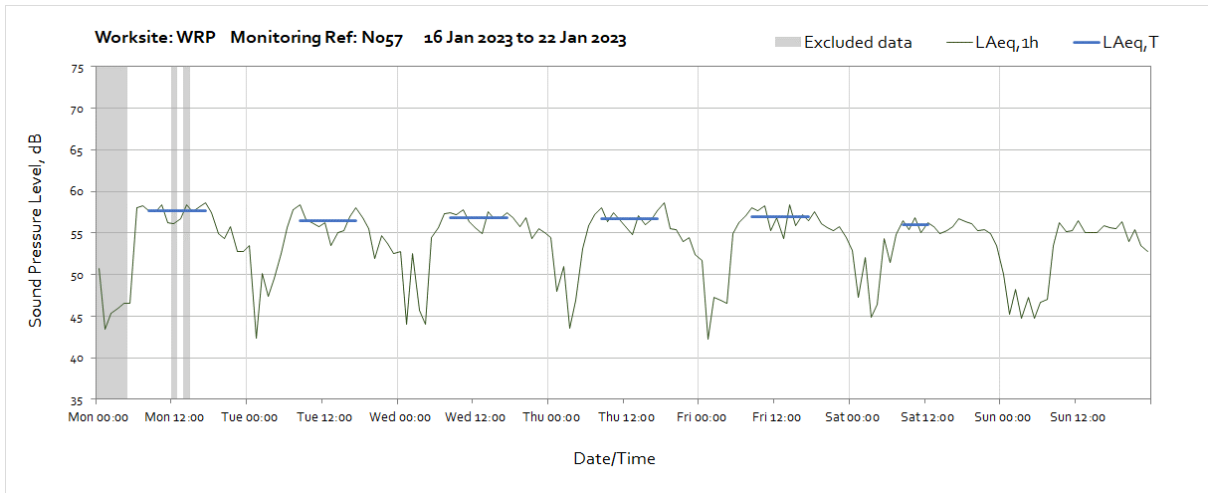
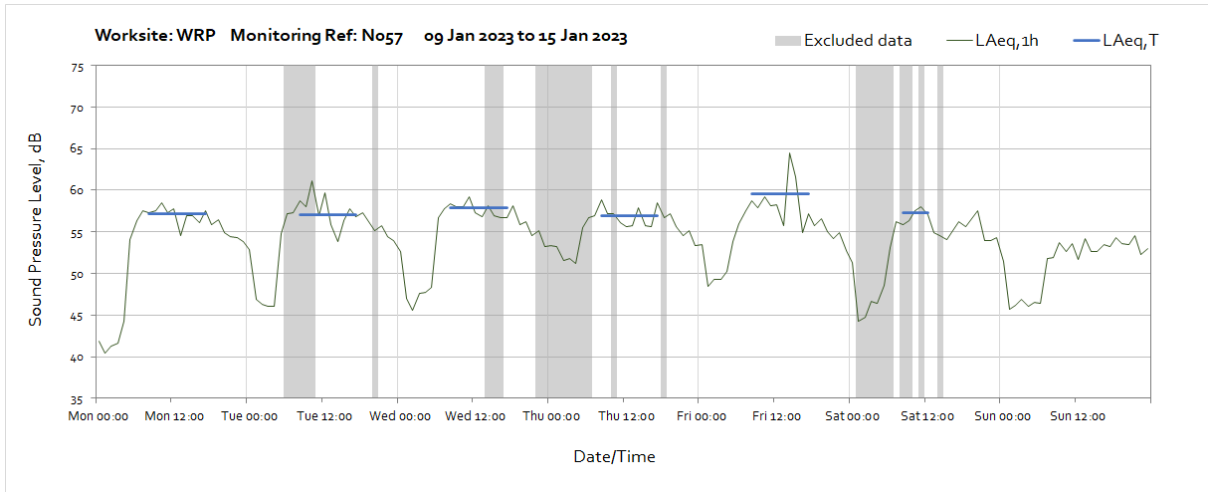


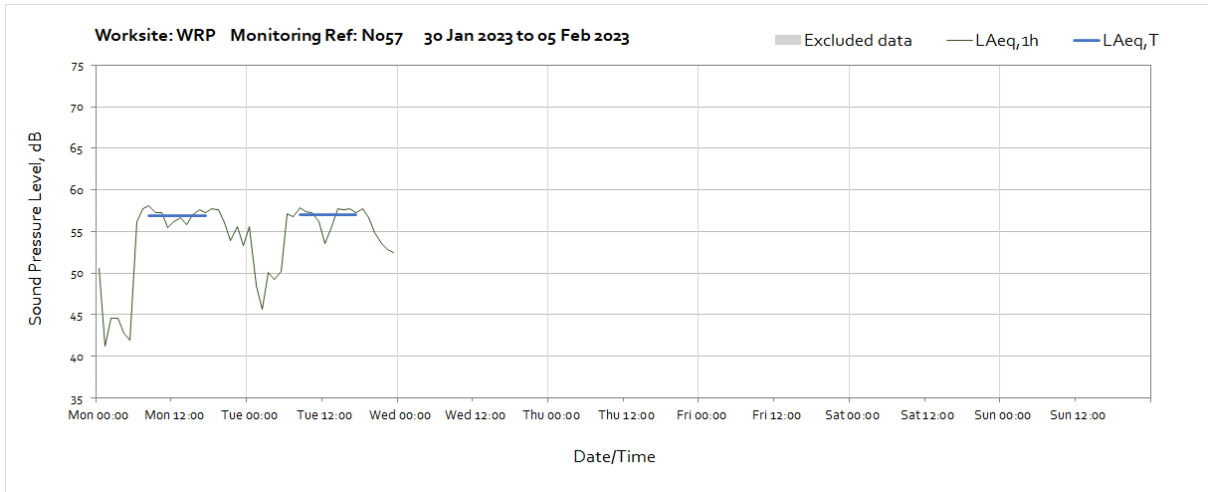
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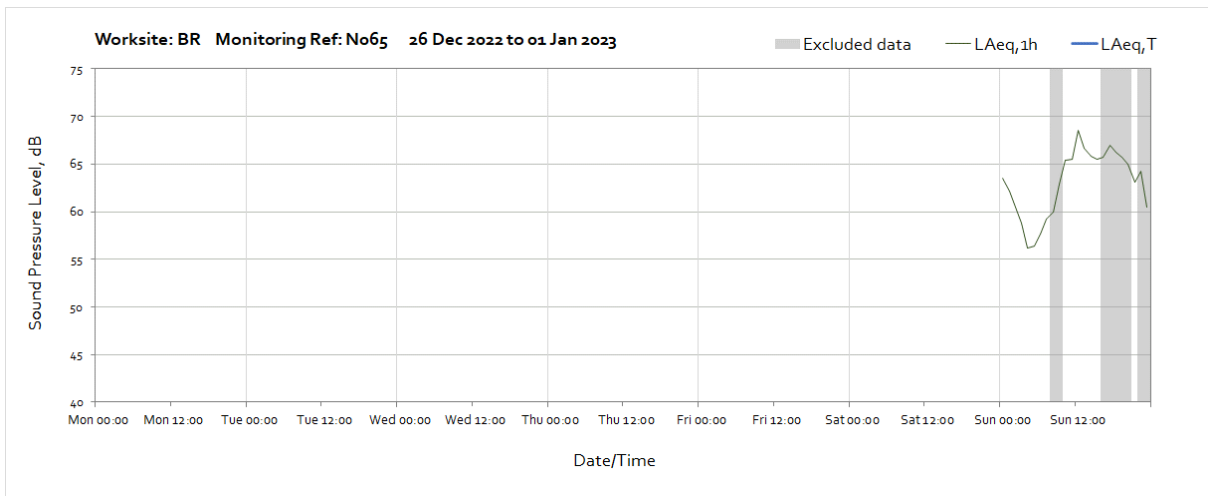
Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.



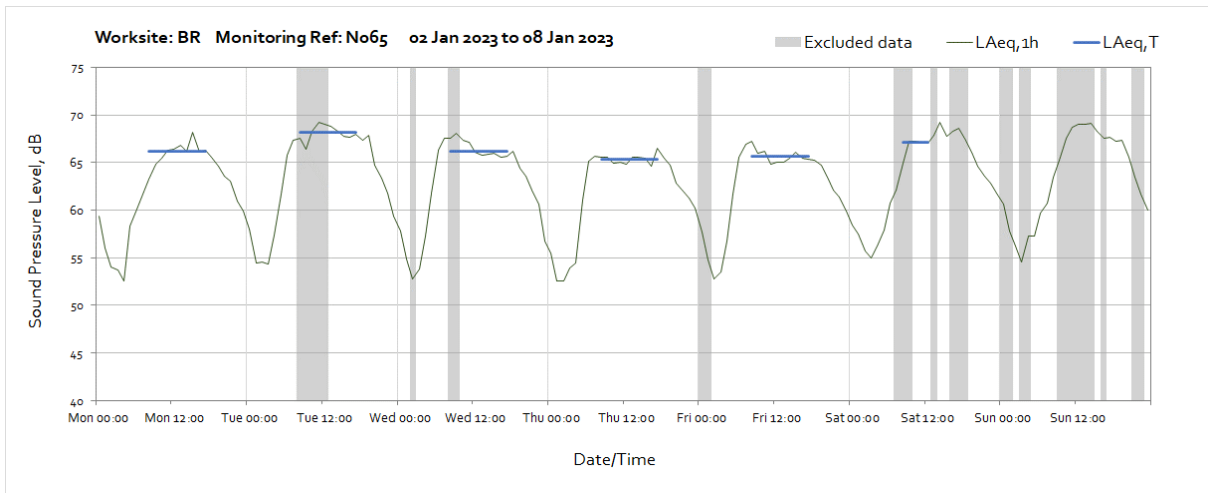


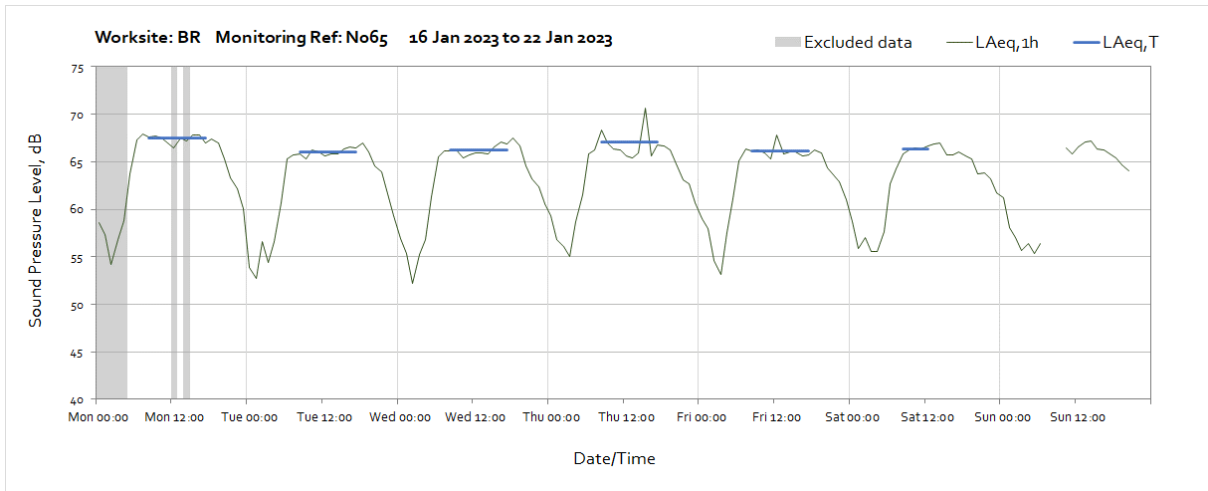
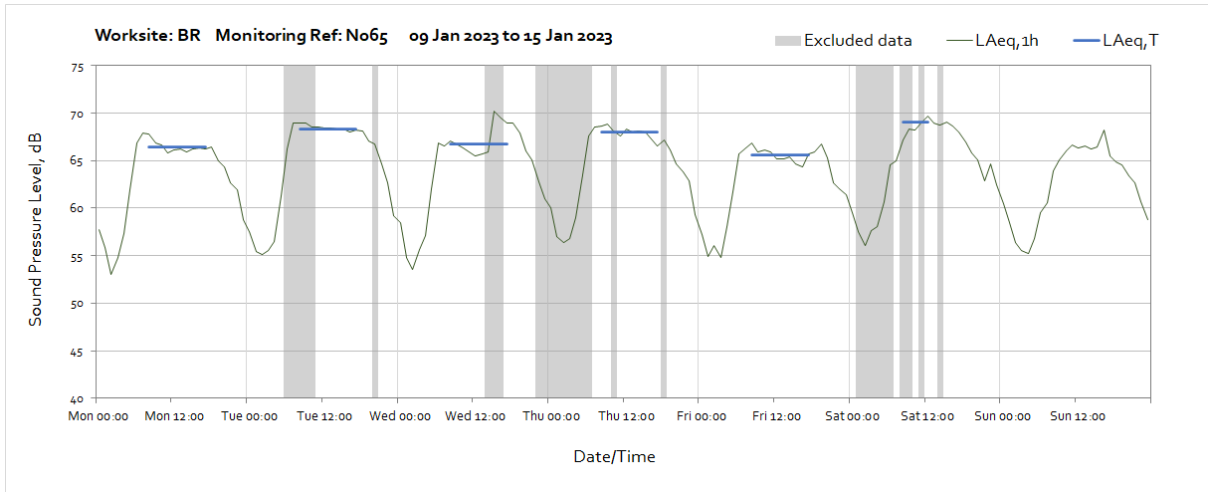


Worksite: Breakspear Road (BR) – Monitoring Ref: N065

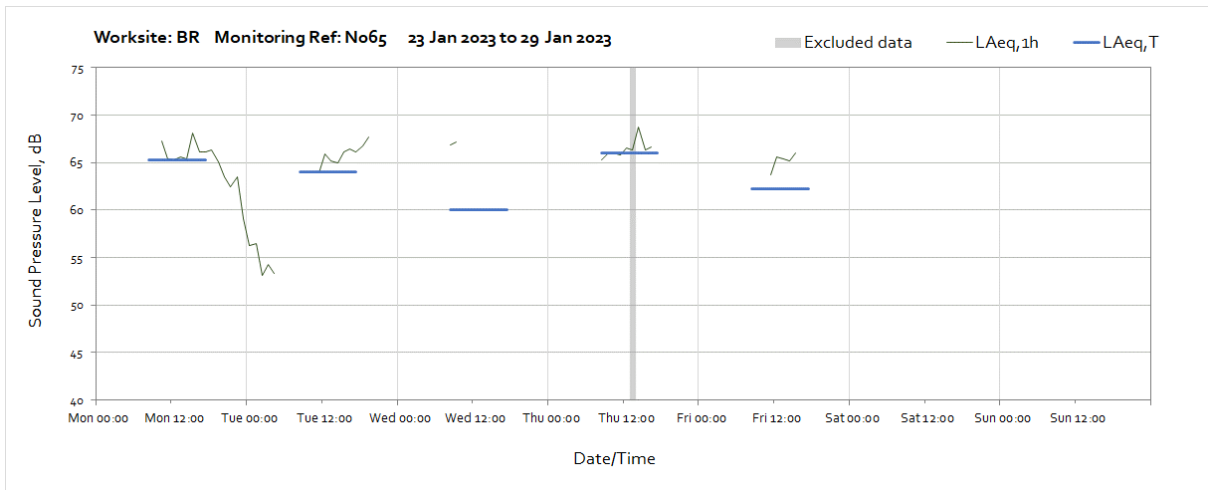


Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.

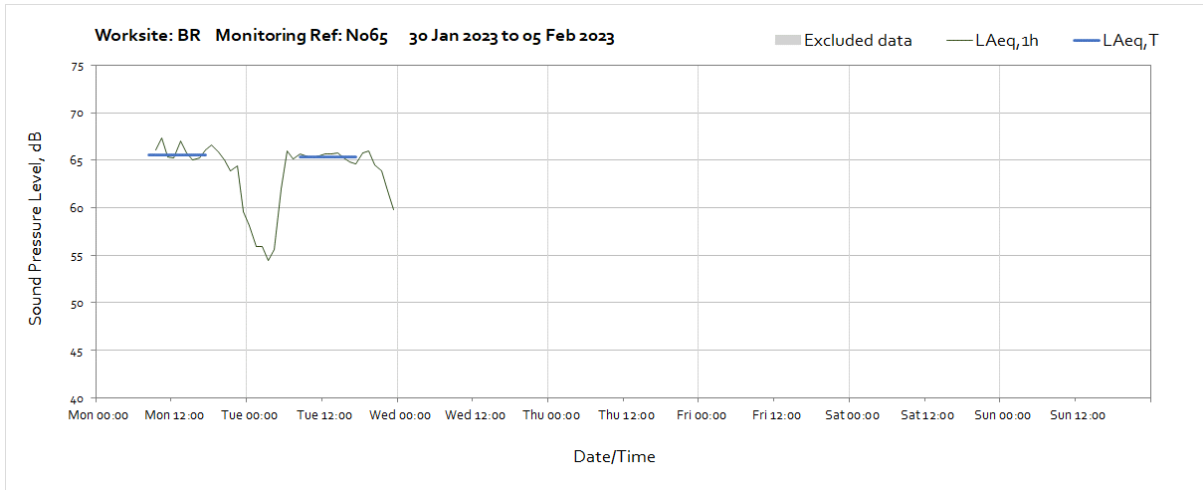




Note: Missing data on Sunday 22nd January was due to loss of battery power at the monitoring station.

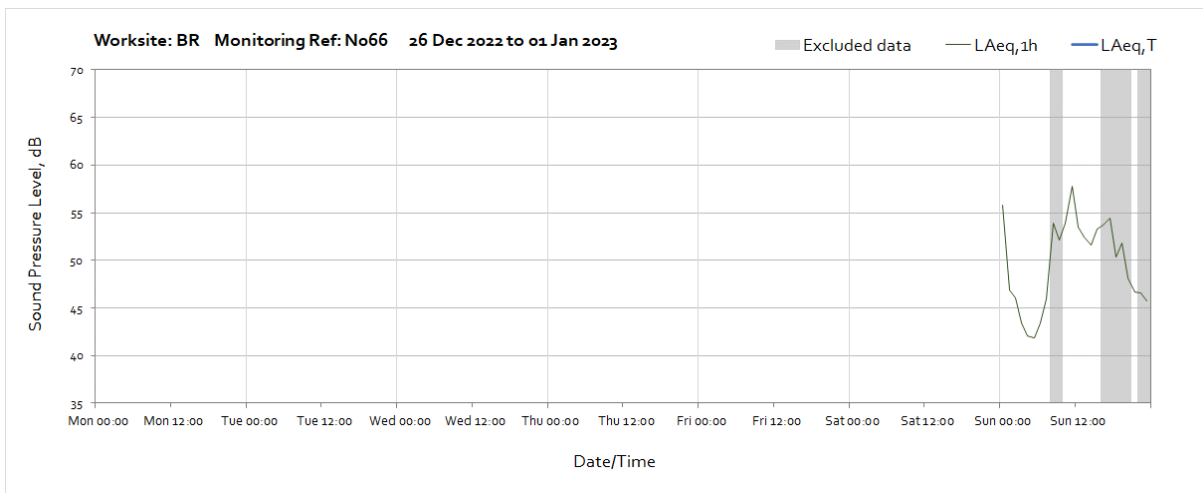


Note: Missing data throughout the week was due to loss of battery power at the monitoring station.

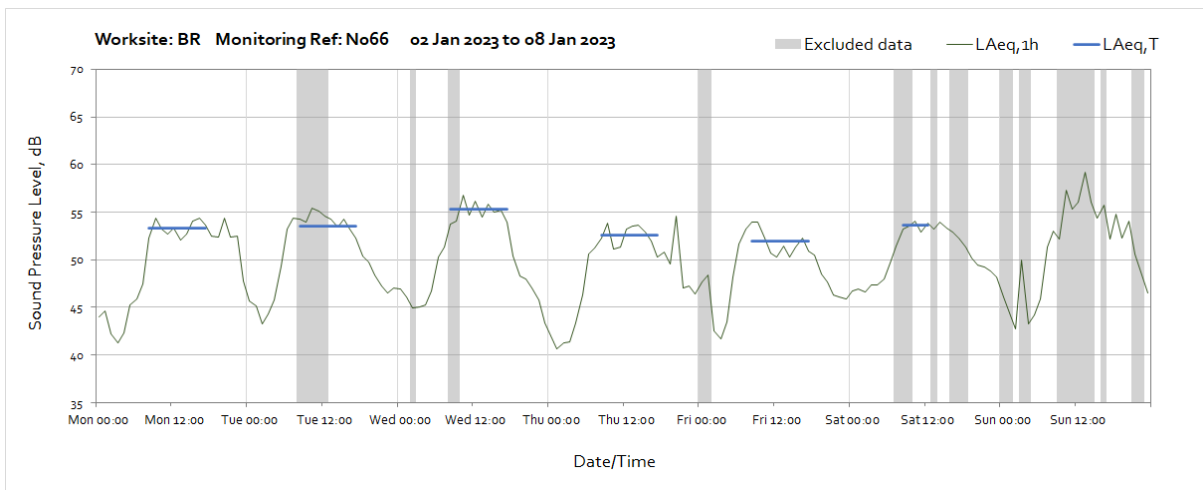


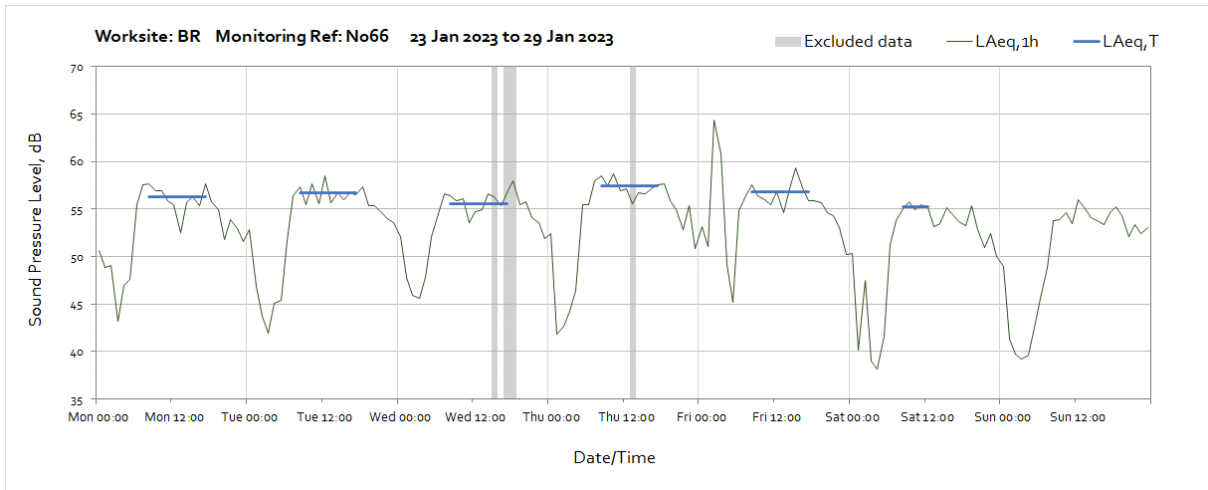
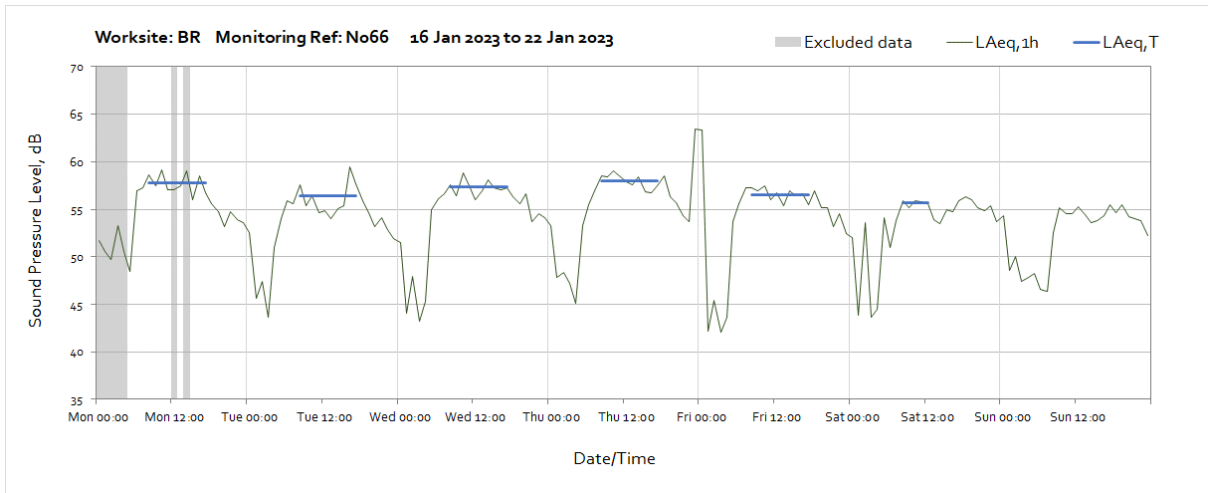
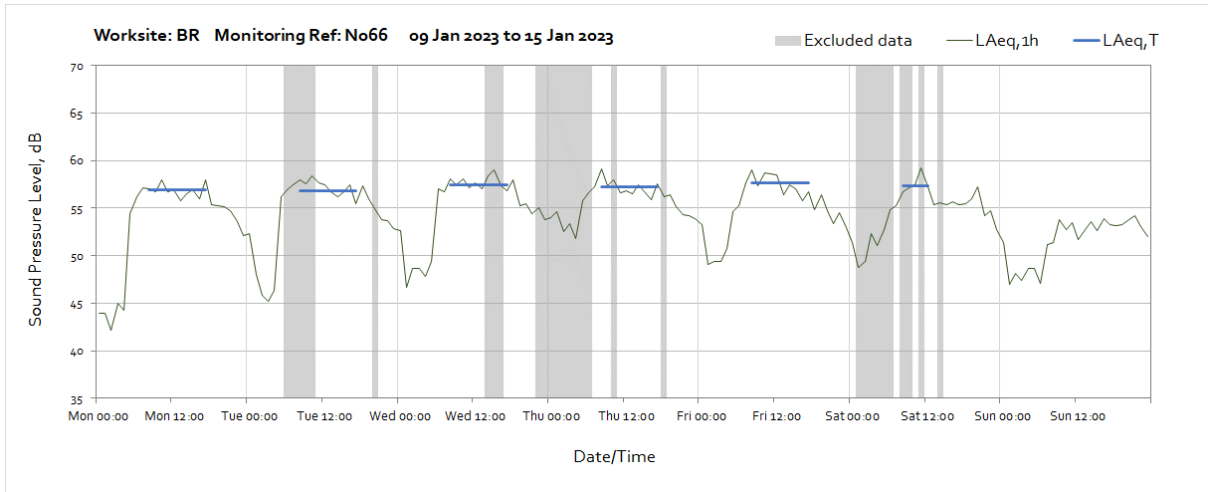
Note: Missing data between 00:00 and 08:00 on Monday 30th January was due to loss of battery power at the monitoring station.

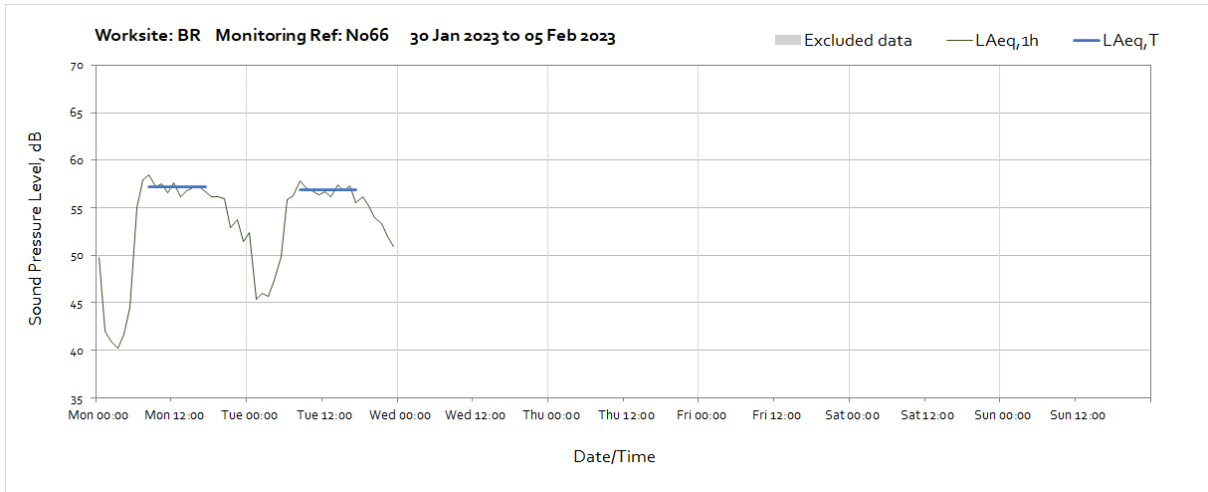
Worksite: Breakspear Road (BR) – Monitoring Ref: N066



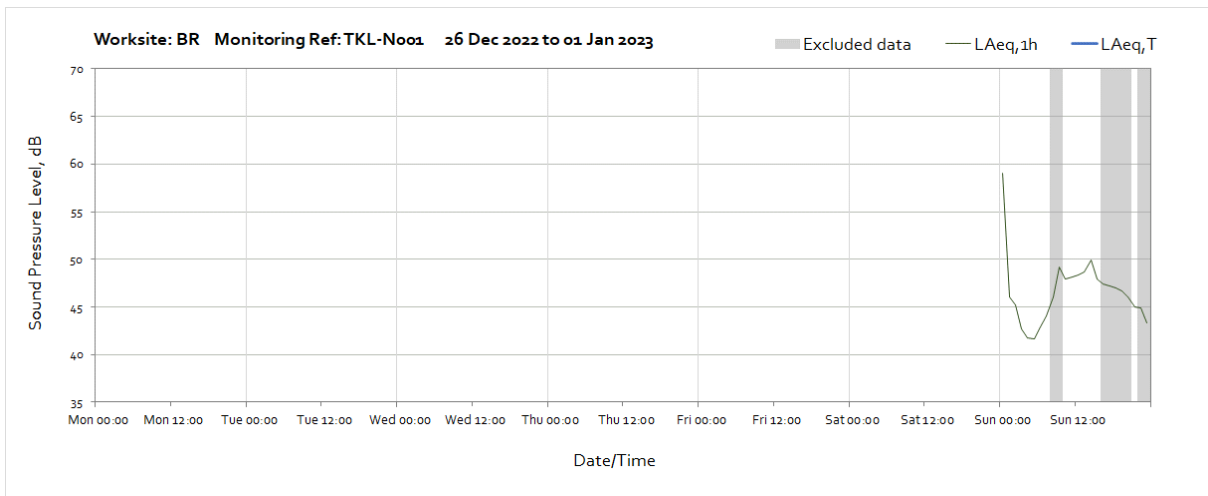
Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.



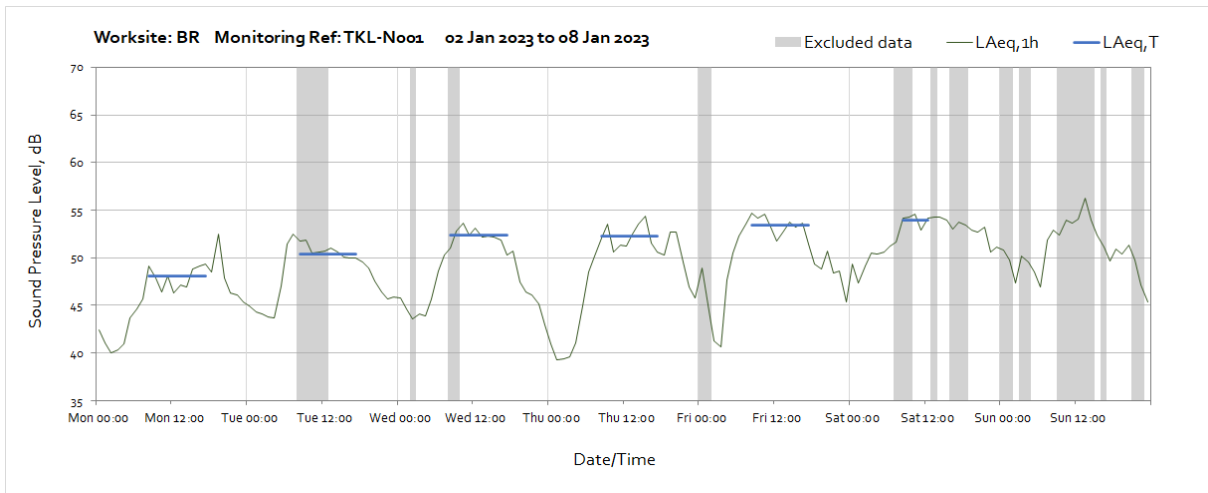


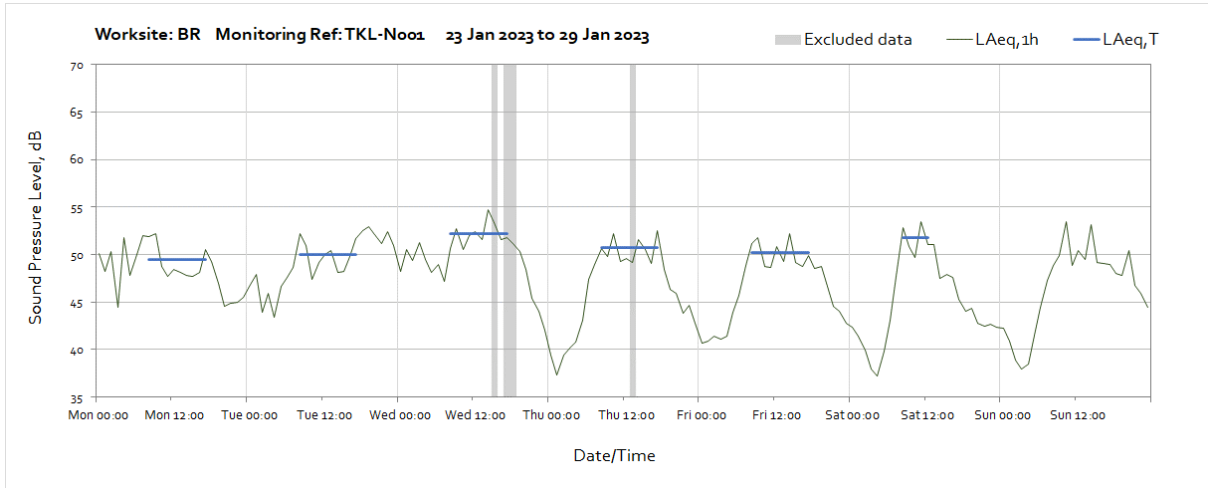
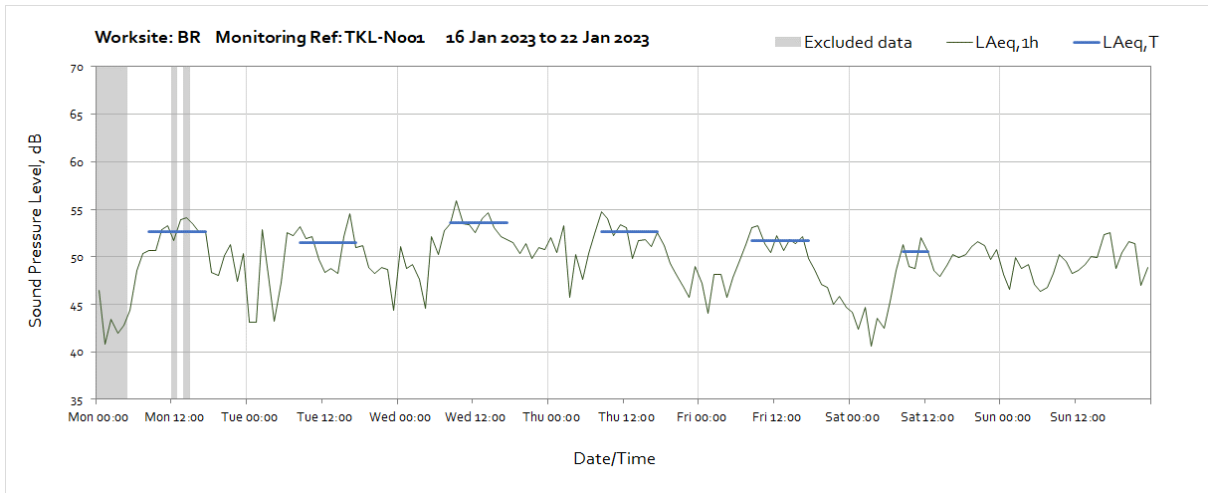
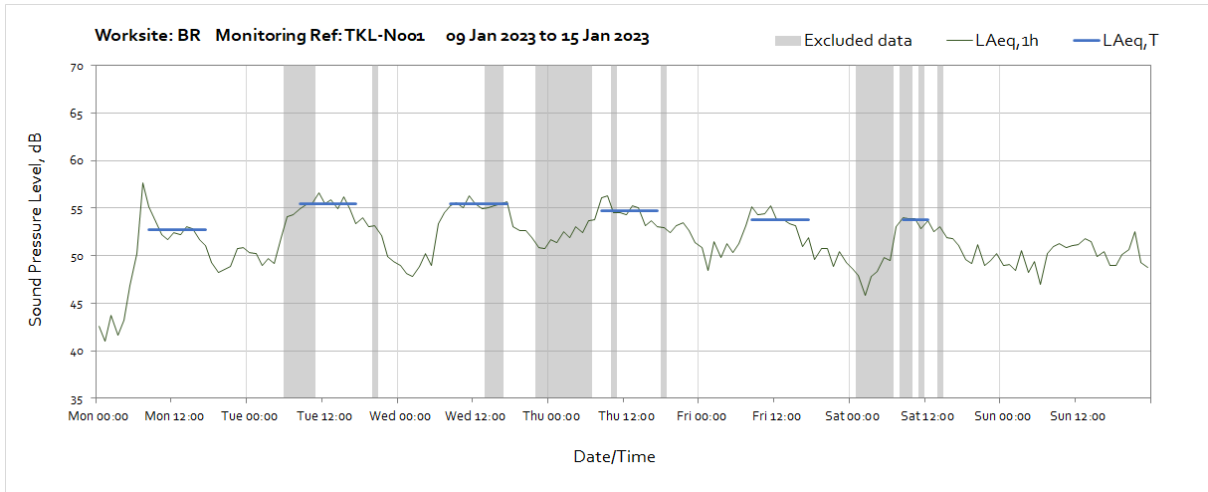


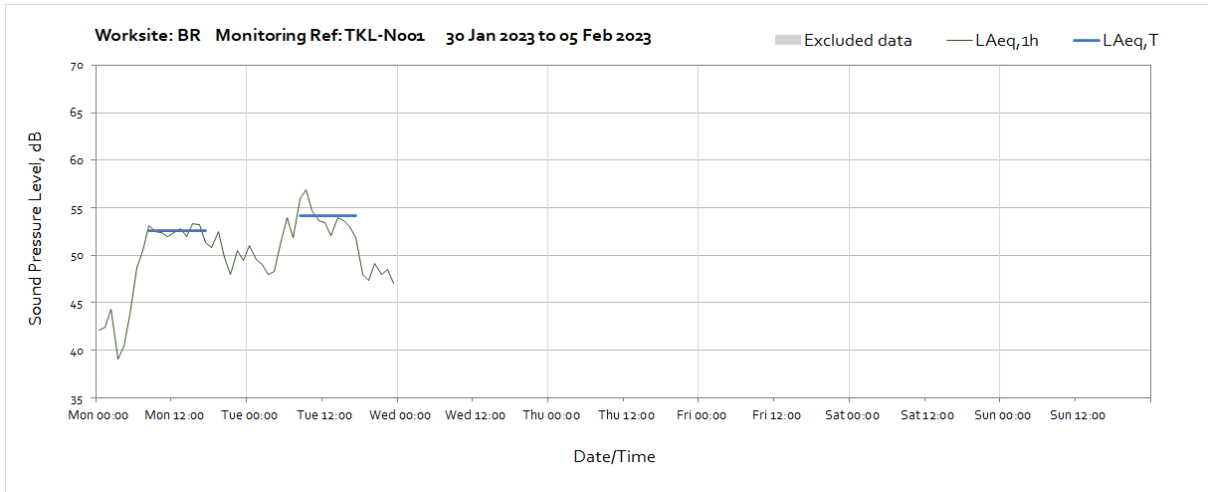
Worksite: Breakspear Road (BR) – Monitoring Ref: TKL-N001



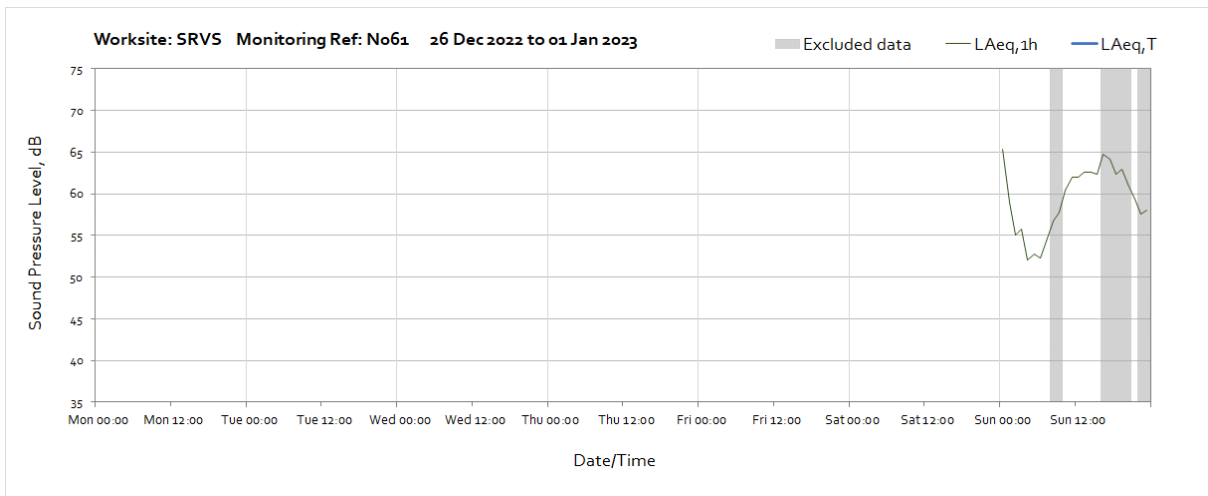
Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.



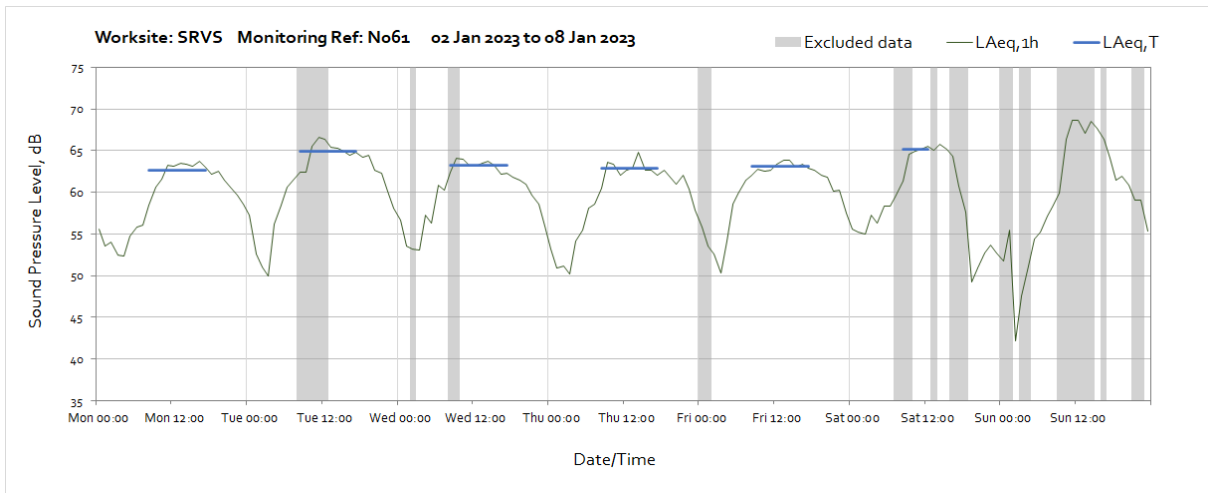


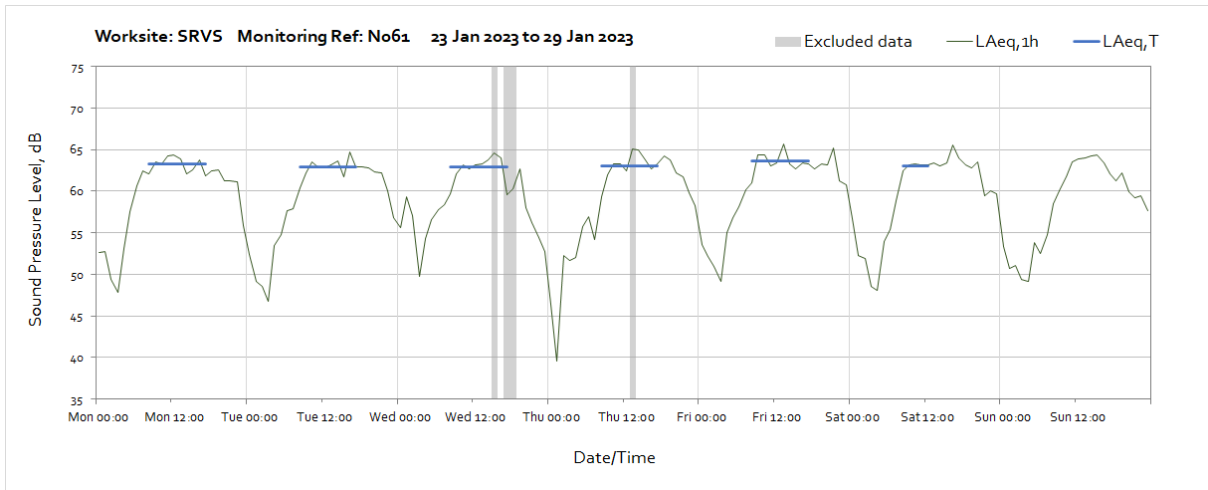
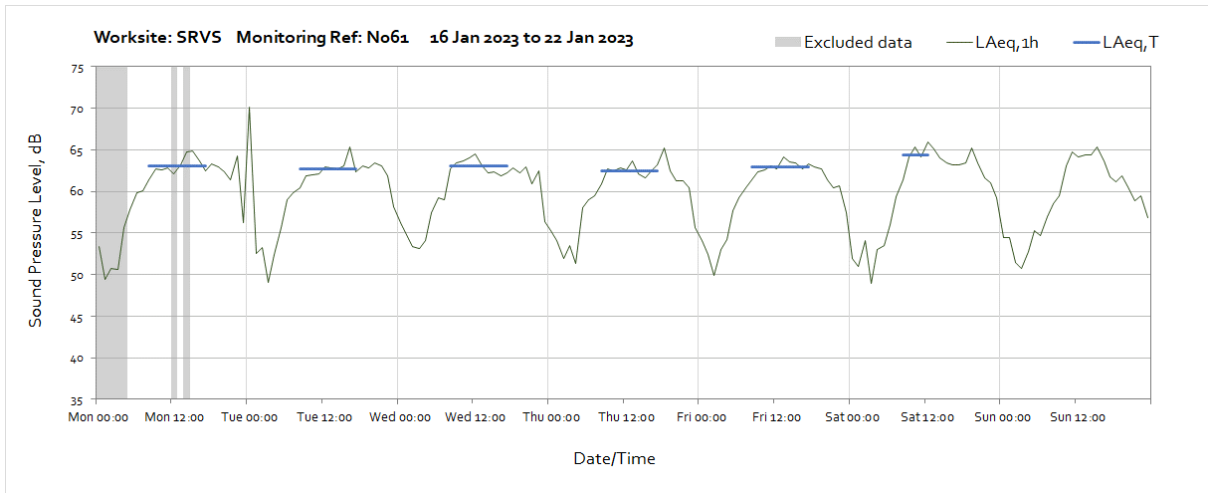
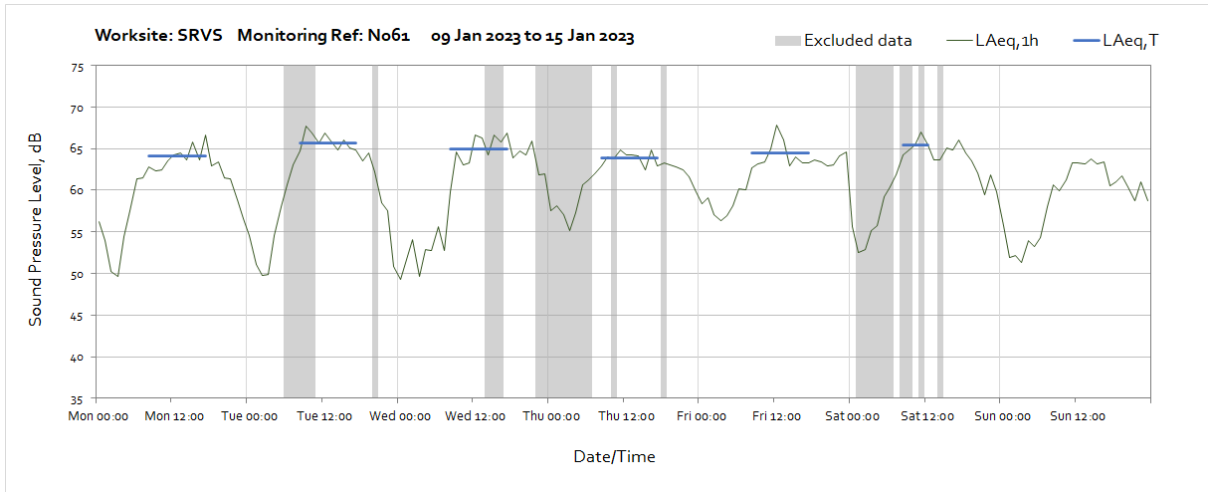


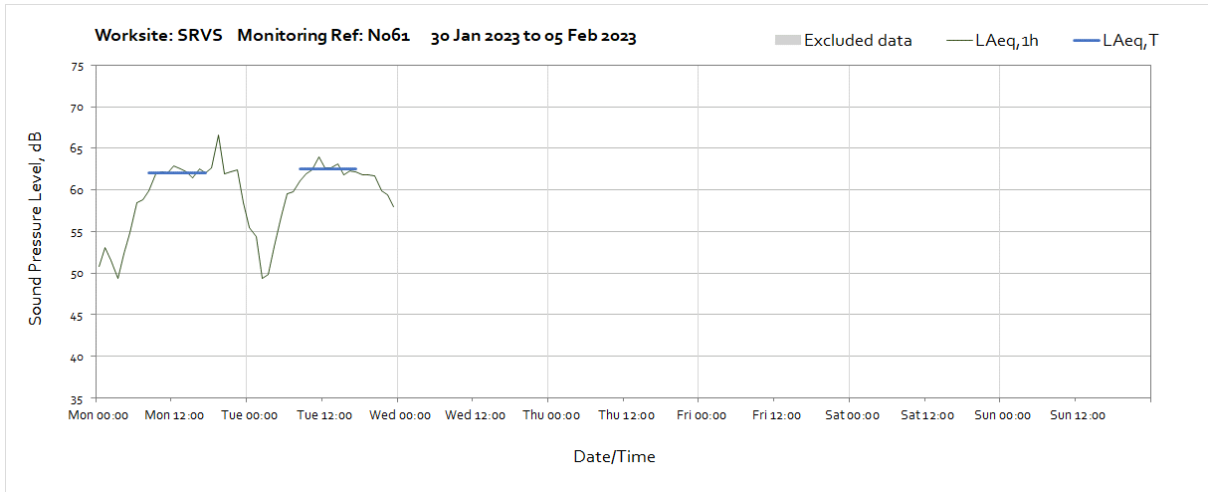
Worksite: South Ruislip Ventilation Shaft (SRVS) – Monitoring Ref: N061



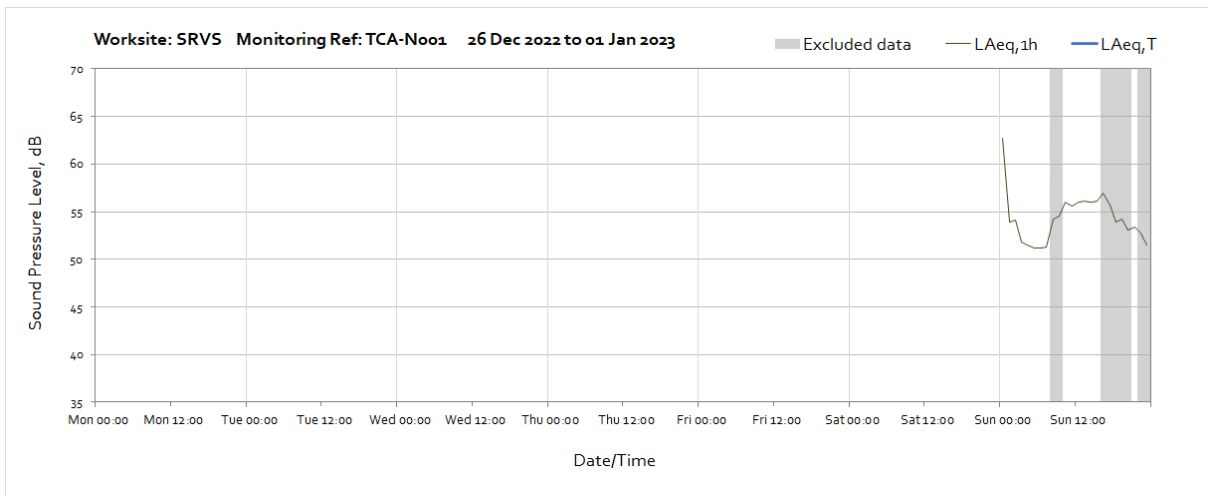
Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.



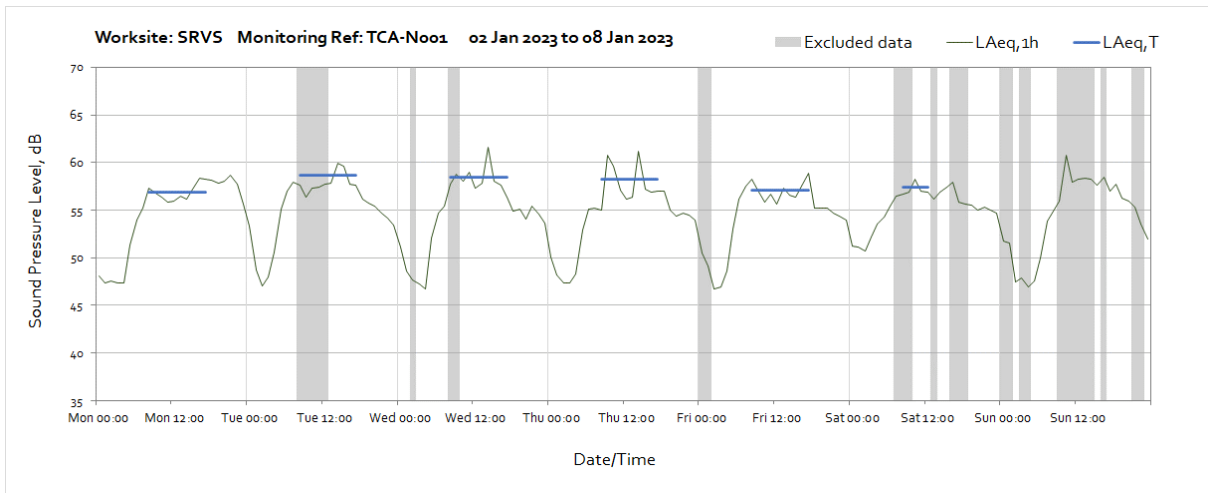


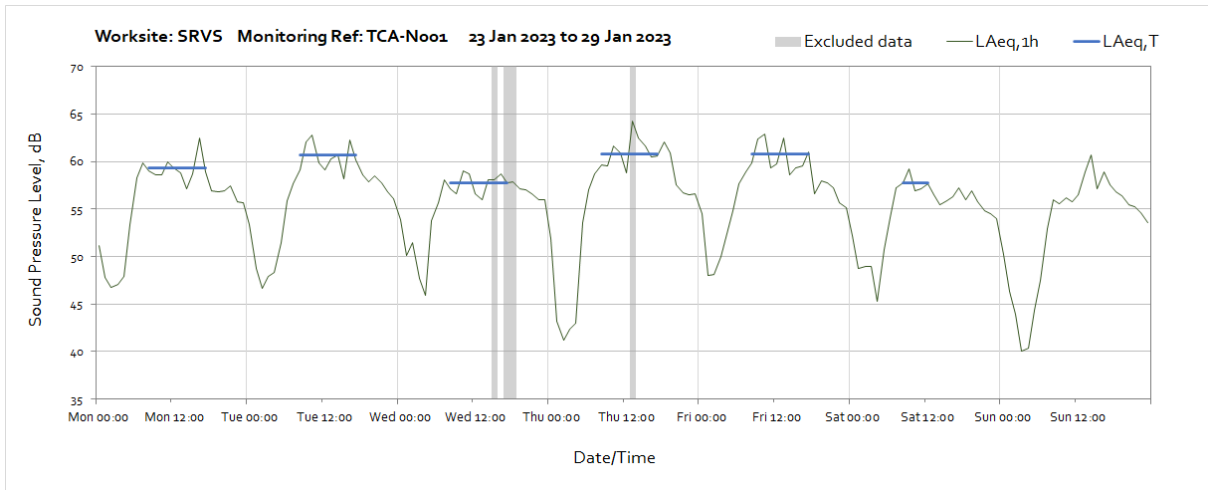
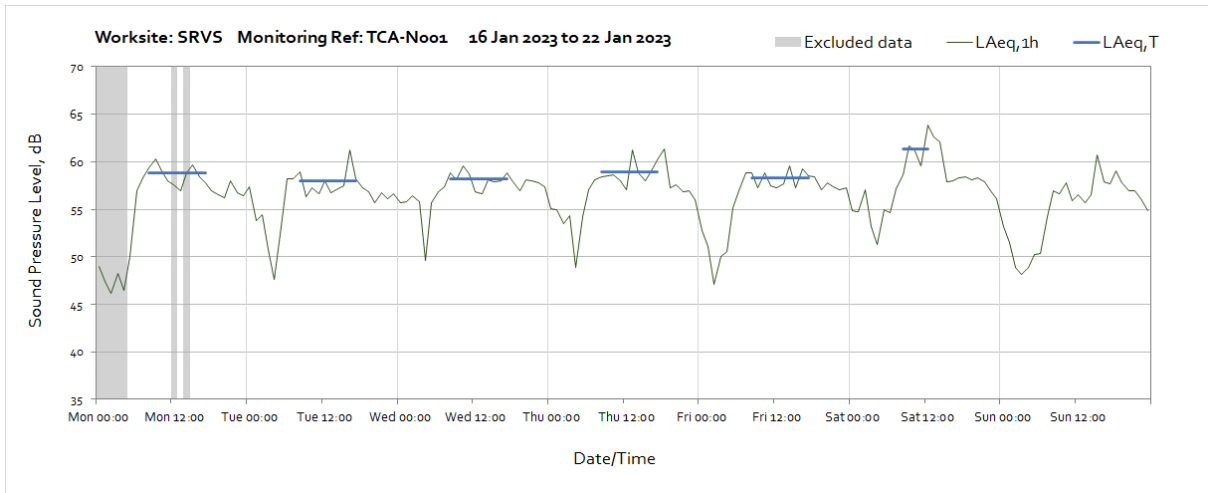
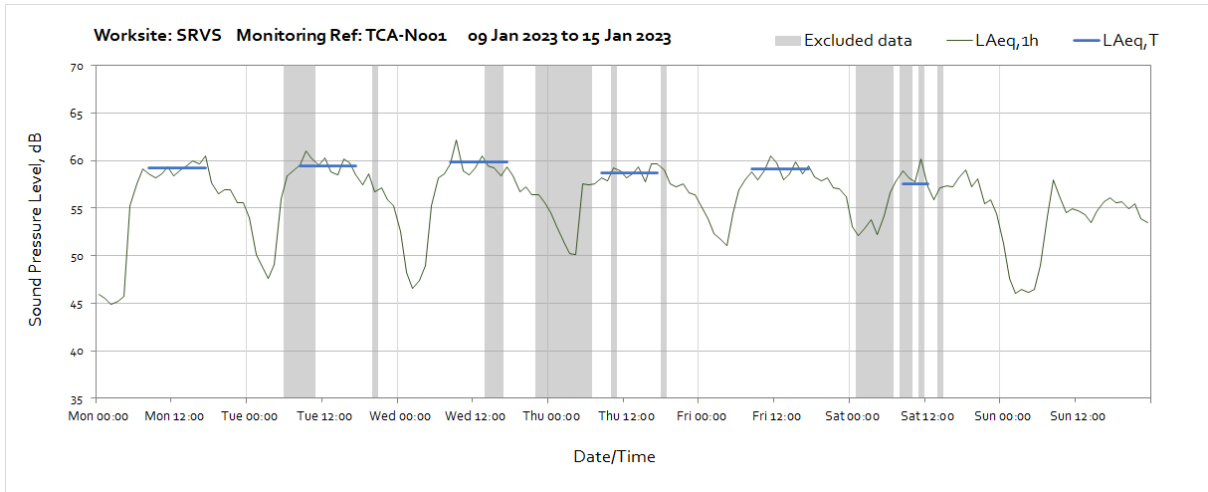


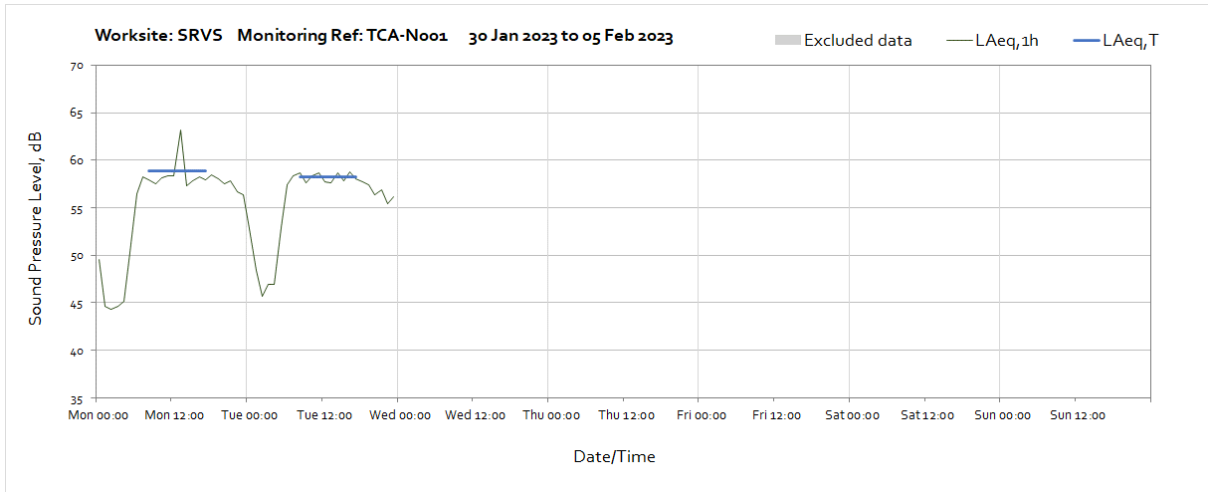
Worksite: South Ruislip Ventilation Shaft (SRVS) – Monitoring Ref: TCA-N001



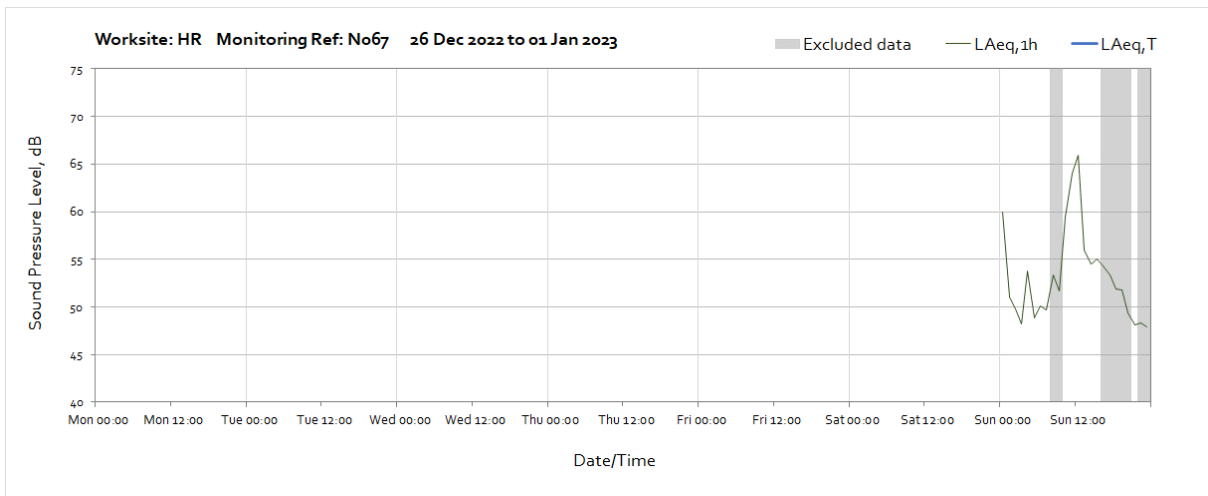
Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.



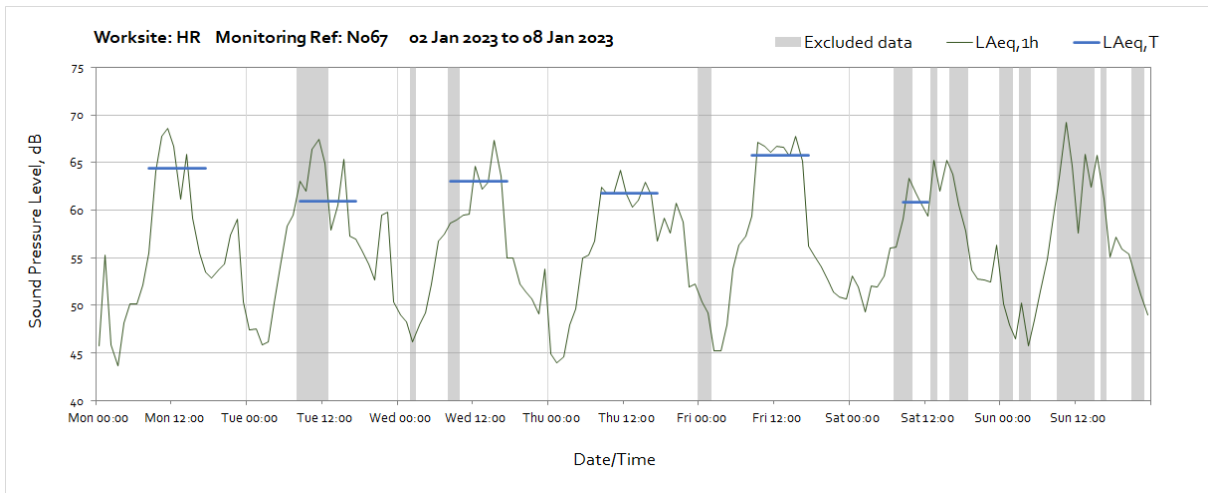


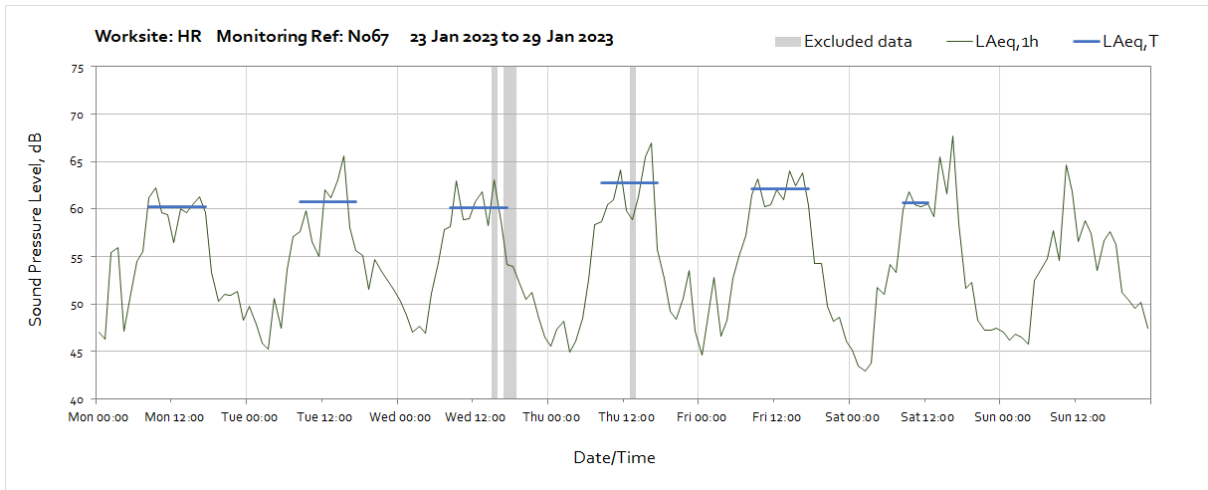
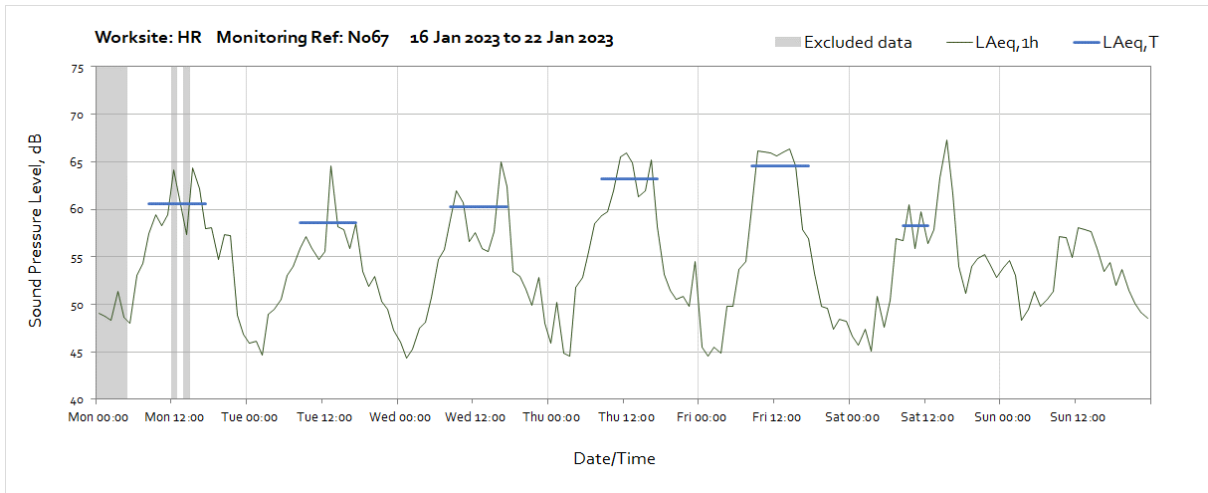
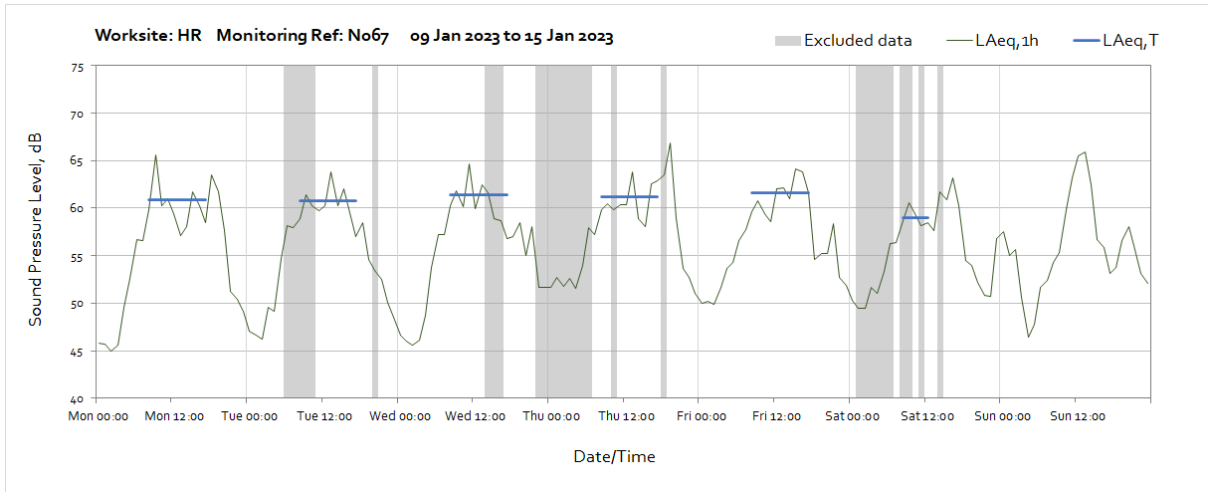


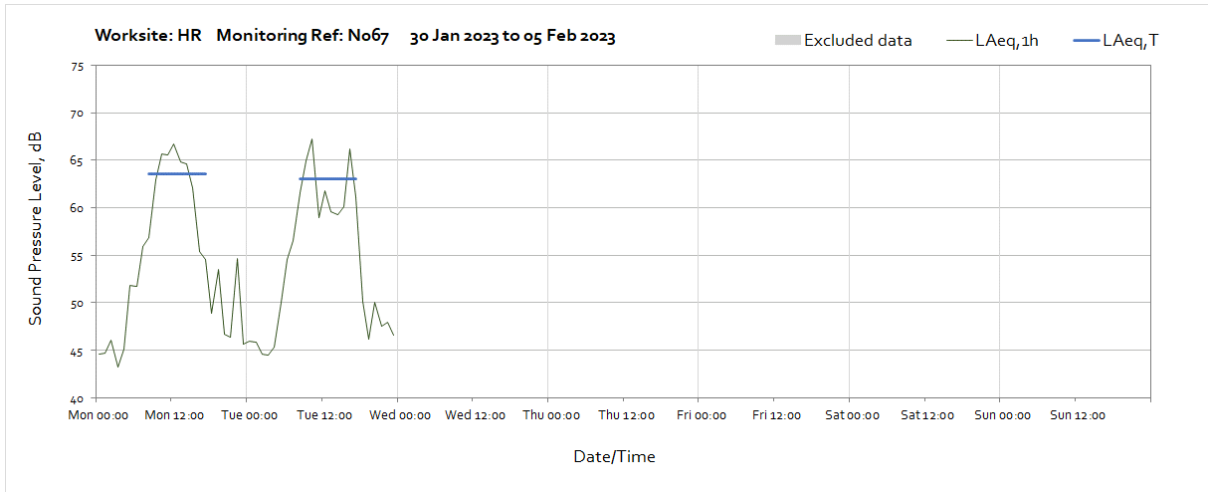
Worksite: Harvil Road (HR) – Monitoring Ref: N067



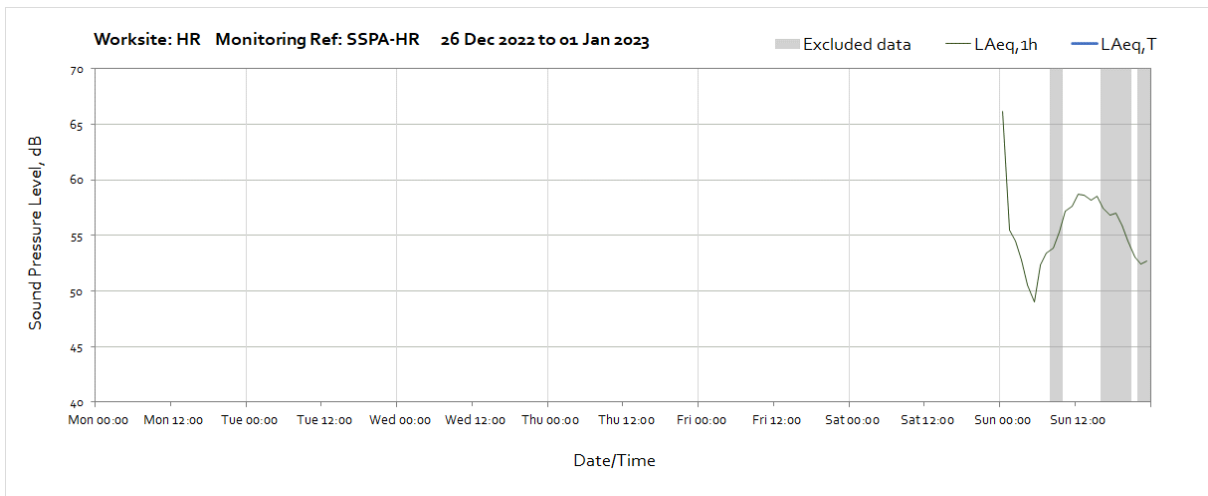
Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.



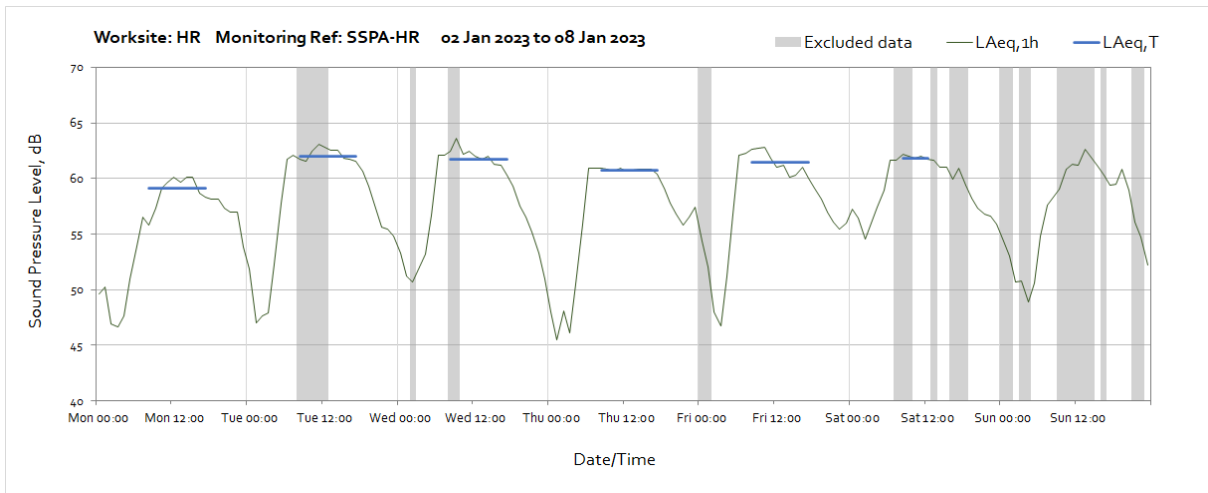


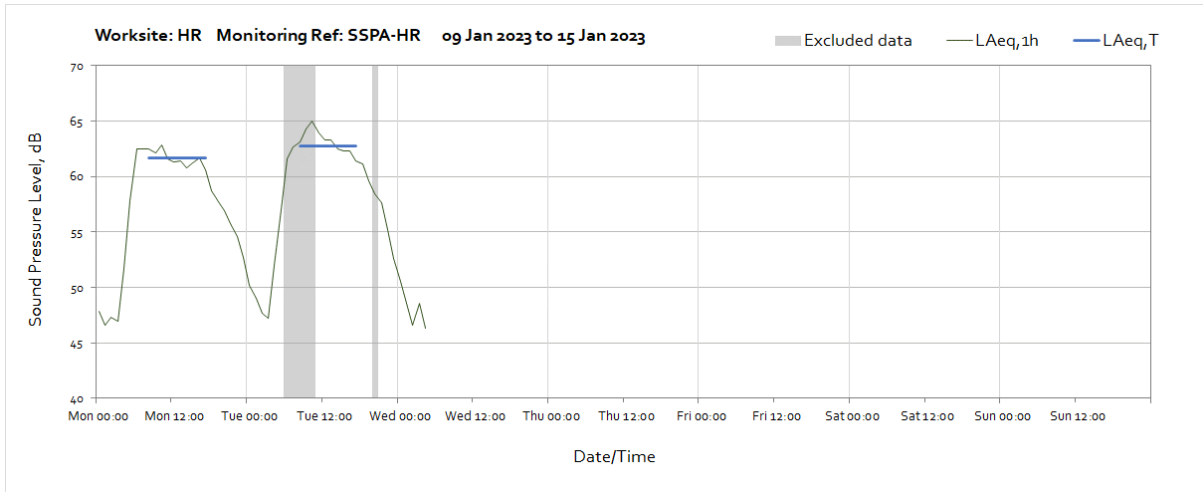


Worksite: Harvil Road (HR) – Monitoring Ref: SSPA-HR

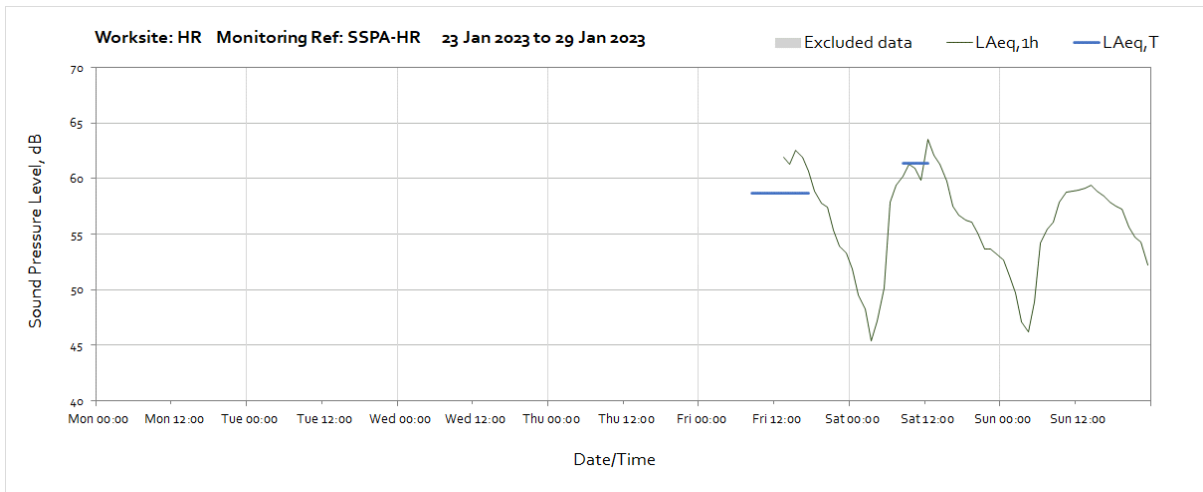


Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.

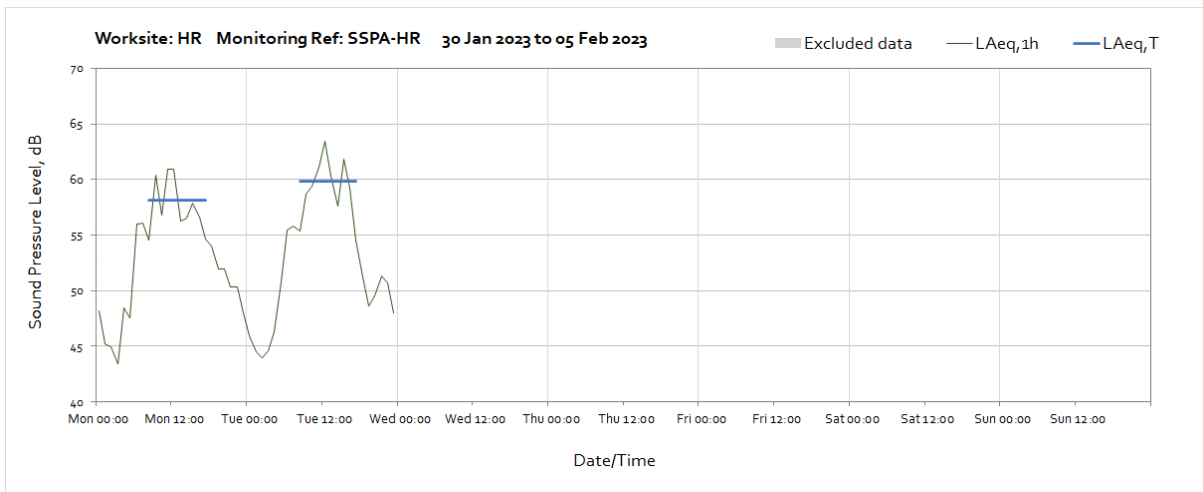




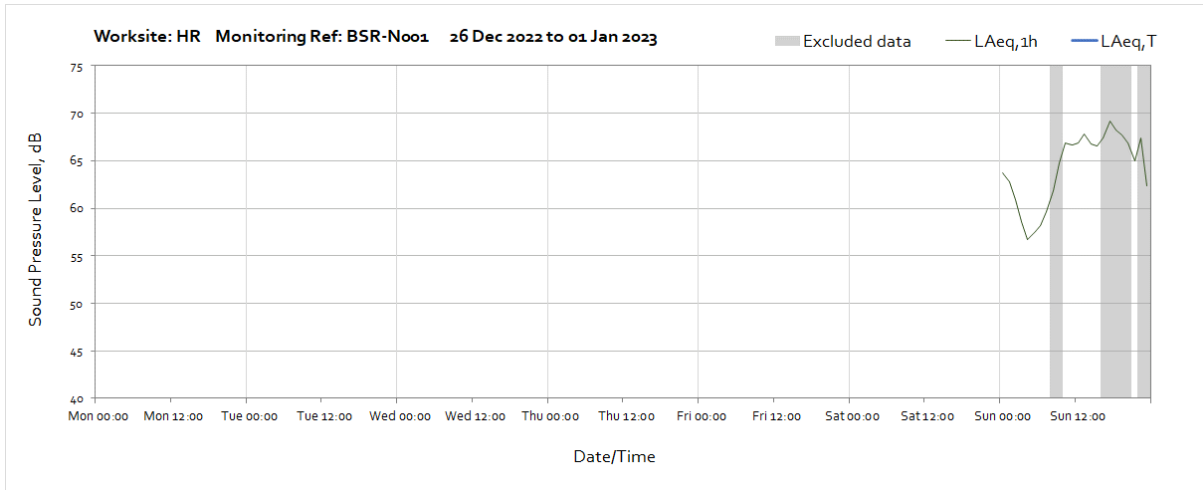
Note: Missing data between 05:00 on Wednesday 11th January and 12:00 on Friday 27th January was due to loss of battery power at the monitoring station.



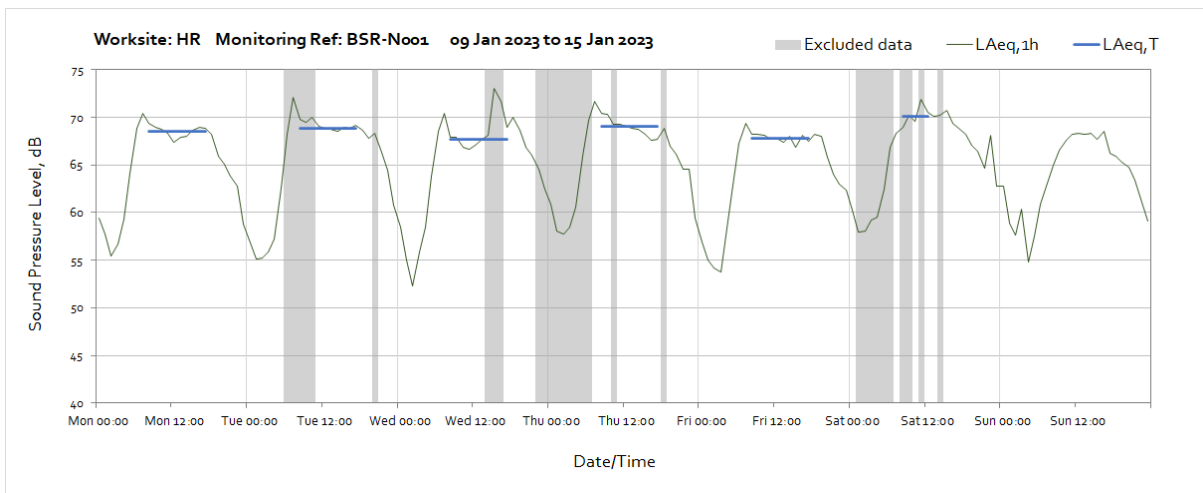
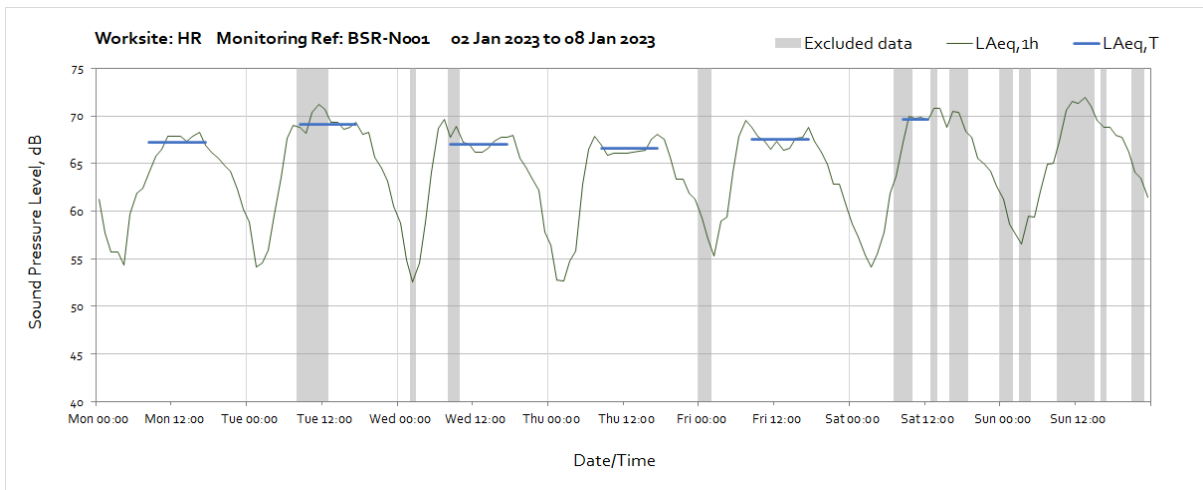
Note: Missing data between 05:00 on Wednesday 11th January and 12:00 on Friday 27th January was due to loss of battery power at the monitoring station.

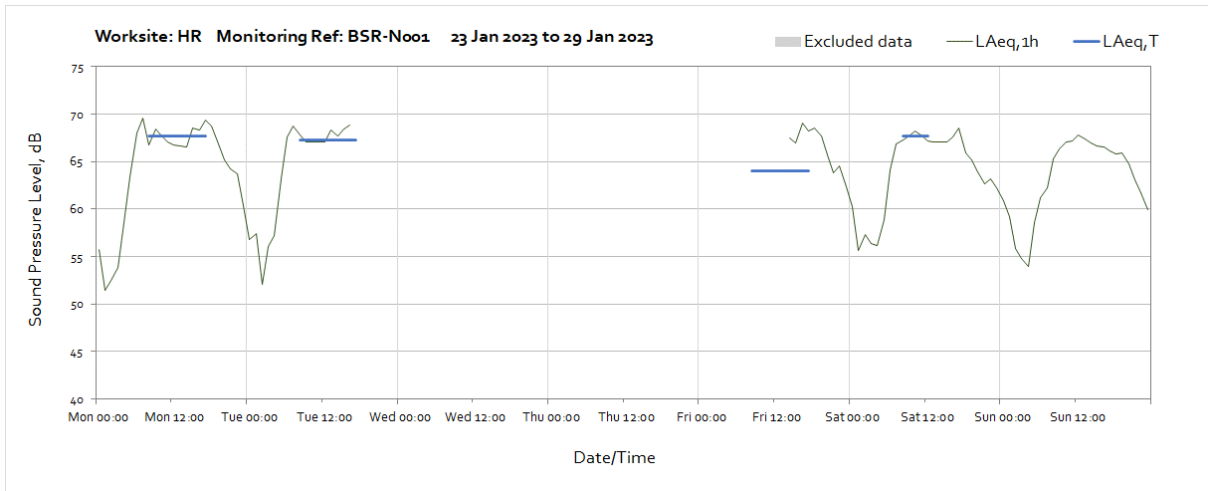
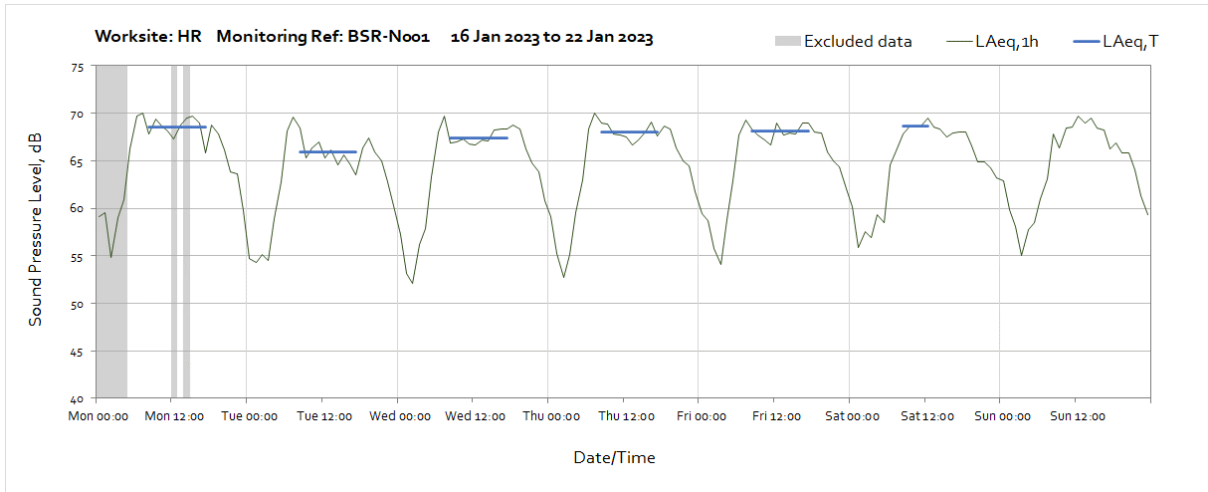


Worksite: Harvil Road (HR) – Monitoring Ref: BSR-N001

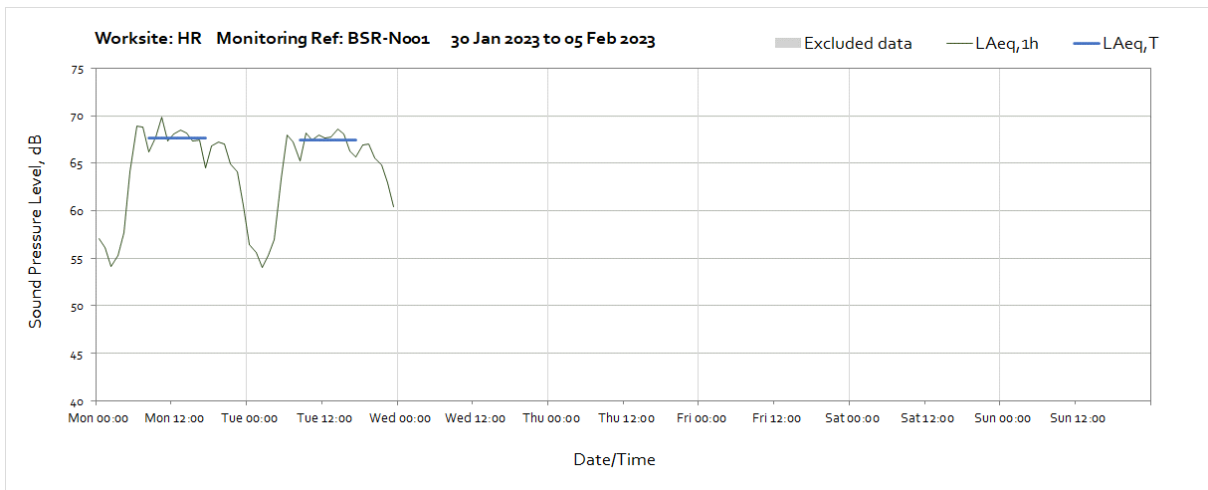


Note: High noise levels measured at 00:00 on Sunday 1st January were due to New Year Night celebration.





Note: Missing data between 17:00 on Tuesday 24th January and 13:00 on Friday 27th January 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 Portal (WRP) – Monitoring Ref: GW-V001

