

Construction Noise and Vibration Monthly Report – November 2023

London Borough of Ealing

Non-Technical Summary	1
Abbreviations and Descriptions	3
1 Introduction	4
1.2 Measurement Locations	8
2 Summary of Results	10
2.1 Summary of Measured Noise and Vibration Levels	10
2.2 Exceedances of the SOAEL	14
2.3 Exceedances of Trigger Level	16
2.4 Complaints	17
Appendix A Site Locations	19
Appendix B Monitoring Locations	25
Appendix C Data	31

List of tables

Table 1: Table of Abbreviations	3
Table 2: Monitoring Locations	8
Table 3: Summary of Measured dB L_{Aeq} Data over the Monitoring Period	11
Table 4: Summary of Measured PPV Data over the Monitoring Period	14
Table 5: Summary of Exceedances of SOAEL	15
Table 6: Summary of Total Exceedances of SOAEL	16
Table 7: Summary of Exceedances of Trigger Levels	17
Table 8: Summary of Complaints	17

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 and vibration monitoring carried out within the London Borough of Ealing (LBE) (including one monitoring location on the boundary with the London Borough of Hammersmith and Fulham) during the month of November 2023.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken in proximity of the Mandeville Road Ventilation Shaft worksite (ref.: MRVS), where excavations, installation of props, steel fixing, concrete pours, installation of reinforcement bars, jet washing, shuttering, water management, sprayed concrete lining works and utility works were underway.
- Noise and vibration monitoring were undertaken in proximity of the Green Park Way Ventilation Shaft worksite (ref.: GPWVS), where general site operations, electrical works, shaft construction, waterproofing, steel fixing, shuttering, piling, installation of wells and excavation were underway.
- Noise monitoring was undertaken in proximity of the Westgate Ventilation Shaft (ref.: WVS), where dismantling and lifting operations, installation of staircase, sprayed concrete lining works, excavations, remedial works, piling, removal of plant, dry mix silos, demolition works, steel fixing and shuttering were underway.
- Noise monitoring was undertaken in the vicinity of the Atlas Road worksite (ref.: AR) where installation of concrete blocks, installation of blinding, workshop fit-out, excavation, concrete works, backfilling, barrier installation and maintenance, tunnelling, back grouting, installation of conveyor sections, maintenance works, installation of chamber, material deliveries, scaffolding, installation of earthing rods, electrical testing and commissioning works were underway.
- Noise and vibration monitoring were undertaken in the vicinity of the Willesden EuroTerminal worksite (ref.: WET), where utility works, internal fit-out, landscaping, installation of barriers, refurbishment works, deliveries and material loading were underway.
- Noise monitoring was undertaken in the vicinity of the Victoria Road Crossover Box worksite (worksite ref.: VRCB), where excavation, diaphragm wall hydro-demolition, wire sawing, steel fixing, shuttering, installation of props, hydrophilic strip and re-injectable hose points, drilling, concrete works, jet grouting, drainage works, installation of staircase and fencing, tunnel boring machine assembly, construction of concrete slabs, installation of tunnel boring machine cooling plant, earthing rods and secondary lining, removing of items, concrete casting and cleaning of tunnel inverts were underway.

- Noise monitoring was undertaken in the vicinity of the Flat Iron compound (worksite ref.: FIC), where cabling works, operation of conveyors and general site set-up were underway.
- Noise and vibration monitoring were undertaken in proximity of the Old Oak Common depot worksite (ref.: OOC), where concrete works, drainage, kerb installation, diaphragm wall breakdown, steel fixing, excavation, piling platform construction, road sweeping, pile mat construction, piling and slit trench excavation, pile operation and cropping were underway.

1.1.1 Further works, where monitoring did not take place, were undertaken at Atlas Road Sub-Station where excavations, ducting, backfilling, cabling, civil engineering works and tunnelling 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>), was exceeded one (1) time during the reporting period.

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

Six (6) complaints were received during the monitoring period. A description of complaints, 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 Ealing (LBE) (including one monitoring location on the boundary with the London Borough of Hammersmith and Fulham) during the month for the period 1st to 30th November 2023.

1.1.3 Active construction sites in the local authority area, where noise and vibration monitoring were conducted during this period, include:

- Mandeville Road Ventilation Shaft worksite, reference MRVS (see plan 1 in Appendix A), where work activities included:
 - Excavations.
 - Installation of props.
 - Steel fixing.
 - Concrete pours.
 - Installation of reinforcement bars.
 - Jet washing.
 - Shuttering.
 - Water management, including lifting operations.
 - Sprayed concrete lining works.

- Utility works.
- Green Park Way Ventilation Shaft worksite, reference GPWVS (see plan 2 in Appendix A), where work activities included:
 - General site operations, including housekeeping works and road sweeping.
 - Electrical works.
 - Shaft construction works, including excavations and installation of sprayed concrete lining.
 - Waterproofing.
 - Steel fixing and shuttering.
 - Piling works.
 - Installation of wells.
 - Excavation.
- Westgate Ventilation Shaft worksite, reference WVS (see plan 3 in Appendix A), where work activities included:
 - Dismantling and lifting operations.
 - Installation of staircase.
 - Sprayed concrete lining works, including waterproofing and construction of concrete slabs.
 - Excavations.
 - Remedial works.
 - Piling works, including pile trimming.
 - Removal of plant.
 - Dry mix silos.
 - Demolition works.
 - Steel fixing.
 - Shuttering.
- Atlas Road worksite, ref. AR (see plan 4 in Appendix A), where work activities included:
 - Installation of concrete blocks.
 - Installation of blinding.

- Workshop fit out, including electrical maintenance.
- Excavation.
- Concrete works.
- Backfilling.
- Barrier installation and maintenance.
- Tunnelling works, including pre-cast tunnel segment installation.
- Back grouting.
- Installation of conveyor sections.
- Maintenance works including existing conveyers, substations and gantry cranes.
- Tunnel boring machine maintenance.
- Installation of chamber.
- Material deliveries.
- Scaffolding works.
- Electrical testing and commissioning works.
- Installation of earthing rods.
- Willesden EuroTerminal worksite, ref. WET (see plan 4 in Appendix A), where work activities included:
 - Utility works, including installation of site lighting and cabling works.
 - Internal fit-out works.
 - Landscaping, including installation of decking, hoarding and turnstile.
 - Installation of barriers gantry crane bases.
 - Refurbishment works.
 - Deliveries and material loading.
- Victoria Road Crossover Box worksite, ref. VRCB (see plan 4 in Appendix A), where work activities included:
 - Excavation.
 - Diaphragm wall hydro-demolition.
 - Wire sawing.
 - Steel fixing.

- Shuttering.
- Installation of props, including grouting.
- Installation of hydrophilic strip.
- Installation of re-injectable hose points.
- Drilling.
- Concrete works, including pours.
- Jet grouting.
- Drainage works.
- Installation of staircase.
- Installation of fencing.
- Tunnel boring machine assembly, including welding.
- Construction of concrete base slabs.
- Installation of tunnel boring machine water cooling plant.
- Installation of earthing rods.
- Installation of secondary lining.
- Removing of items from tunnel pit bottoms.
- Concrete casting within tunnels.
- Cleaning of tunnel inverts.
- Flat Iron compound, worksite ref. FIC (see plan 4 in Appendix A), where work activities included:
 - Cabling works.
 - Operation of conveyors.
 - General site set-up.
- Old Oak Common depot worksite, located in the London Borough of Hammersmith and Fulham (LBHF), ref. OOC (see plan 4 in Appendix A), where work activities included:
 - Concrete works.
 - Drainage.
 - Kerb installation.
 - Diaphragm wall breakdown.

- Steel fixing.
- Excavation.
- Piling platform construction.
- Piling operations.
- Road sweeping.
- Pile mat construction.
- Piling and slit trench excavation.
- Pile cropping.

1.1.4 Further works, where monitoring did not take place, were undertaken at Atlas Road Sub-Station where excavations, ducting, backfilling, cabling, civil engineering works and tunnelling 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 Twenty-one (21) noise and eight (8) vibration monitoring installations were active in November in the LBE area. Table 2 summarises the position of noise and vibration monitoring installations within the LBE area in November 2023.

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

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
MRVS	N040	Badminton Close
	N058	Mandeville Road North hoarding, Northeast Part of Site
	N063	Mandeville Road, North Hoarding, Northwest part of Site
	BLV-N001	45 Belvue Road
	V055	Mandeville Road North hoarding, Northeast Part of Site
	V056	Mandeville Road, North Hoarding, Northwest part of Site

Worksite Reference	Measurement Reference	Address
GPWVS	N059	Greenpark Way East boundary on hoarding
	N064	Greenpark Way outside Tetris building
	V053	Greenpark Way Eastern boundary
	V054	Greenpark Way outside Tetris building (West of Site)
WVS	N062	Westgate Ventilation Shaft, on site hoarding in Northeast corner of site.
AR	N032	Shaftesbury Gardens
	N033	Outside The Collective, Atlas Road / Victoria Road
	N060	Atlas Road next to Bashey Road
WET	N034	Stephenson Street (north)
	N035	Stephenson Street (south)
	N041	Junction of Stephenson Street / Goodhall Street
	V057	37, Stephenson Street
	V052	63, Stephenson Street
VRCB	N031	School Road, outside Acton Business Centre
	N050	Acton Square, outside North Acton Station
FIC	N029	Braitrim House, Victoria Road
	N042	Boden House Car Park
	N049	Flat Iron compound railway fence, Victoria Rd North Acton
OOC	OOC-N01	Adjacent to 205 Old Oak Common Lane
	OOC-N02	Old Oak Common Lane, Hilltop Works
	OOC-N03	Wycombe Triangle at the rear of 63 Wells House Road
	OOC-V02	Kildun Court, Old Oak Common Lane
	OOC-V03	Wells House Road Alleyway

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
MRVS	N040	Badminton Close	Free field	54.1 (56.6)	55.8 (62.4)	55.4 (65.7)	55.3 (59.7)	52.4 (58.3)	55.7 (57.8)	55.4 (57.0)	53.9 (55.5)	55.5 (63.2)	52.0 (57.6)	58.0 (72.4)	56.8 (68.6)
	N058	Mandeville Road	Free field	60.9 (64.8)	64.6 (71.0)	61.9 (81.8)	62.9 (81.4)	61.8 (70.6)	60.6 (62.7)	62.5 (63.9)	63.2 (65.1)	62.2 (67.7)	58.2 (64.3)	65.9 (76.4)	62.5 (69.1)
	N063	Mandeville Road	Free field	59.6 (65.7)	64.6 (69.1)	59.7 (70.0)	59.5 (68.5)	57.6 (70.3)	64.4 (66.3)	64.6 (68.2)	61.9 (67.8)	60.7 (66.7)	55.7 (59.5)	60.7 (75.6)	59.6 (71.7)
	BLV-N001	45 Belvue Road	Free field	57.8 (59.6)	59.5 (60.8)	58.8 (69.7)	58.3 (61.5)	56.2 (60.1)	57.4 (59.3)	57.2 (59.7)	57.7 (59.9)	58.2 (65.8)	54.7 (58.6)	61.2 (78.5)	57.9 (68.8)
GPWVS	N059	Green Park Way Ventilation Shaf	Free field	59.9 (64.7)	63.2 (66.0)	57.9 (71.4)	59.3 (66.9)	56.7 (62.6)	59.6 (60.4)	61.6 (66.8)	60.1 (68.3)	60.1 (65.7)	56.9 (65.0)	58.3 (65.6)	56.4 (63.8)
	N064	Green Park Way Ventilation Shaft	Façade	57.4 (59.7)	62.5 (67.7)	60.0 (73.2)	58.8 (68.3)	55.9 (61.1)	59.0 (61.0)	65.0 (82.0)	57.1 (59.6)	58.4 (64.3)	54.4 (59.8)	57.4 (64.7)	55.4 (63.1)
WVS	N062	Westgate Ventilation Shaft	Free field	67.1 (72.8)	70.3 (73.9)	61.2 (66.9)	64.0 (70.6)	62.4 (69.3)	68.0 (74.1)	72.2 (74.4)	64.9 (69.3)	62.2 (72.0)	58.5 (61.9)	64.4 (75.7)	59.7 (66.7)
AR	N032	Shaftesbury Gardens	Free field	65.2 (70.0)	65.7 (66.8)	63.5 (68.2)	62.6 (67.8)	59.3 (64.1)	61.6 (62.1)	65.9 (70.5)	64.9 (67.6)	63.1 (65.2)	58.6 (63.0)	63.1 (70.9)	59.7 (63.8)

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
	N033	Outside The Collective, Atlas Road/Victoria Road	Free field	68.3 (70.1)	68.5 (70.0)	66.0 (69.8)	65.2 (72.5)	61.7 (70.4)	63.9 (64.8)	65.7 (66.4)	67.6 (73.2)	65.7 (74.0)	60.7 (65.2)	65.1 (74.8)	62.2 (67.3)
	N060	Atlas Road next to Bashey Road	Free field	58.0 (66.1)	67.9 (72.6)	57.0 (64.6)	60.5 (67.8)	59.0 (68.8)	59.3 (63.4)	62.7 (67.0)	59.3 (65.2)	58.8 (66.5)	57.7 (67.3)	61.8 (71.8)	61.4 (70.7)
WET	N034	Stephenson Street (north)	Free field	55.1 (62.3)	57.9 (60.2)	56.0 (58.4)	56.3 (59.5)	52.7 (61.5)	53.2 (53.8)	54.4 (54.6)	52.2 (53.4)	51.7 (55.8)	47.5 (52.0)	54.7 (60.8)	50.7 (57.6)
	N035	Stephenson Street (south)	Free field	56.4 (60.9)	58.6 (72.9)	53.5 (58.0)	53.5 (58.0)	50.4 (55.0)	52.4 (53.6)	54.7 (55.3)	51.7 (53.5)	50.9 (55.9)	47.2 (51.7)	54.3 (63.8)	50.3 (57.1)
	N041	Junction of Stephenson Street/Goodhall Street	Free field	55.2 (59.9)	57.0 (59.7)	55.0 (57.7)	55.2 (60.1)	51.3 (59.0)	51.0 (51.5)	55.0 (56.2)	54.0 (56.1)	53.1 (56.4)	48.6 (53.6)	55.6 (66.8)	50.7 (55.5)
VRCB	N031	School Road, outside Acton Business Centre	Free field	60.5 (63.5)	64.7 (72.0)	60.7 (63.1)	58.9 (61.6)	55.8 (61.5)	56.9 (57.6)	63.6 (65.3)	63.7 (66.4)	61.2 (65.2)	53.8 (58.1)	60.5 (67.4)	55.1 (59.7)
	N050	Acton Square, outside North Acton Station	Free field	63.8 (66.9)	65.2 (65.9)	63.5 (64.7)	62.7 (65.7)	59.1 (64.4)	63.0 (63.9)	64.8 (66.0)	63.6 (64.2)	63.1 (65.6)	58.6 (62.3)	63.2 (68.5)	60.3 (67.2)
FIC	N029	Braitrim House, Victoria Road	Free field	60.8 (66.9)	66.2 (72.3)	55.1 (62.7)	56.6 (62.5)	56.3 (67.8)	50.5 (50.5)	58.8 (61.4)	56.1 (60.6)	54.2 (60.6)	49.7 (56.9)	53.9 (59.0)	54.3 (62.9)
	N042	Bodens car park	Free field	60.0 (60.9)	62.1 (63.4)	57.4 (61.5)	57.3 (62.6)	56.1 (60.6)	58.2 (58.6)	60.4 (61.1)	60.1 (61.2)	57.8 (61.9)	55.5 (57.7)	58.3 (61.9)	55.6 (60.7)

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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
	N049	Flat Iron compound	Free field	64.0 (70.5)	76.3 (78.9)	58.0 (61.7)	59.1 (65.4)	58.4 (63.4)	56.5 (58.2)	60.0 (62.1)	59.2 (63.6)	58.9 (65.6)	55.0 (67.2)	57.8 (70.7)	56.1 (62.1)
OOC	OOC-N01	Adjacent to 205 Old Oak Common Lane	Free-field	68.1 (73.5)	70.9 (73.7)	65.7 (70.0)	64.7 (72.8)	62.5 (68.7)	66.6 (70.7)	68.4 (70.6)	69.8 (71.0)	68.3 (70.8)	63.1 (69.4)	66.9 (71.8)	62.8 (67.8)
	OOC-N02	Old Oak Common Lane, Hilltop Works	Free-field	68.2 (70.2)	72.8 (74.3)	69.1 (71.3)	67.4 (74.6)	62.3 (67.8)	65.1 (66.2)	67.4 (68.9)	68.4 (69.3)	68.1 (70.4)	62.8 (71.2)	66.5 (72.1)	61.8 (66.9)
	OOC-N03	Old Oak Lane Halt, Wells House Road	Free-field	59.0 (65.7)	63.4 (69.9)	57.4 (59.9)	57.6 (60.9)	54.1 (61.2)	57.8 (60.6)	60.3 (66.5)	57.5 (59.8)	58.8 (69.7)	53.7 (59.9)	57.8 (73.8)	54.2 (60.4)

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
GPWVS	V053	Green Park Way, Greenford	2.27 (X-axis)
	V054	Green Park Way Ventilation Shaft	1.39 (Z-axis)
MRVS	V055	Mandeville Road	2.12 (Y-axis)
	V056	Mandeville Road	1.02 (Z-axis)
WET	V052	63, Stephenson Street	2.91 (Y-axis)
	V057	37, Stephenson Street	1.64 (Z-axis)
OOC	OOC-V02	Kildun Court, Old Oak Common Lane	0.96 (Z-axis)
	OOC-V03	Wells House Road Alleyway	1.15 (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 SOAEL

2.2.1 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."

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

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

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

Table 5: Summary of Exceedances of SOAEL

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
MRVS	N040	Badminton Close	All days	All periods	No exceedance
	N058	Mandeville Road	All days	All periods	No exceedance
	N063	Mandeville Road	All days	All periods	No exceedance
	BLV-N001	45 Belvue Road	All days	All periods	No exceedance
GPWVS	N059	Green Park Way Ventilation Shaft	All days	All periods	Not applicable*
	N064	Green Park Way Ventilation Shaft	All days	All periods	Not applicable*
WVS	N062	Westgate Ventilation Shaft	All days	All periods	Not applicable*
AR	N032	Shaftesbury Gardens	All days	All periods	No exceedance
	N033	Outside The Collective, Atlas Road / Victoria Road	All days	All periods	No exceedance
	N060	Atlas Road next to Bashey Road	All days	All periods	No exceedance
WET	N034	Stephenson Street (north)	All days	All periods	No exceedance
	N035	Stephenson Street (south)	All days	All periods	No exceedance
	N041	Junction of Stephenson Street / Goodhall Street	All days	All periods	No exceedance
VRCB	N031	School Road, outside Acton Business Centre	All days	All periods	Not applicable*
	N050	Acton Square, outside North Acton Station	All days	All periods	No exceedance

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
FIC	N029	Braitrim House, Victoria Road	All days	All periods	No exceedance
	N042	Bodens Car Park	All days	All periods	No exceedance
	N049	Flat Iron compound	All days	All periods	No exceedance
OOC	OOC-N01	Adjacent to 205 Old Oak Common Lane	All days	All periods	No exceedance
	OOC-N02	Old Oak Common Lane, Hilltop Works	Weekday	0800-1800	1
	OOC-N03	Old Oak Lane Halt, Wells House Road	All days	All periods	No exceedance

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

2.2.5 For the purpose of reporting the number of days where the SOAEL is exceeded, 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
OOC	OOC-N02	Old Oak Common Lane, Hilltop Works	1

2.2.6 SOAEL exceedances were recorded at one (1) monitor, OOC-N02. One (1) 24-hour periods that experienced an exceedance of the SOAEL was recorded due to HS2 construction works during November 2023. The SOAEL exceedance was recorded during weekday core hours.

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

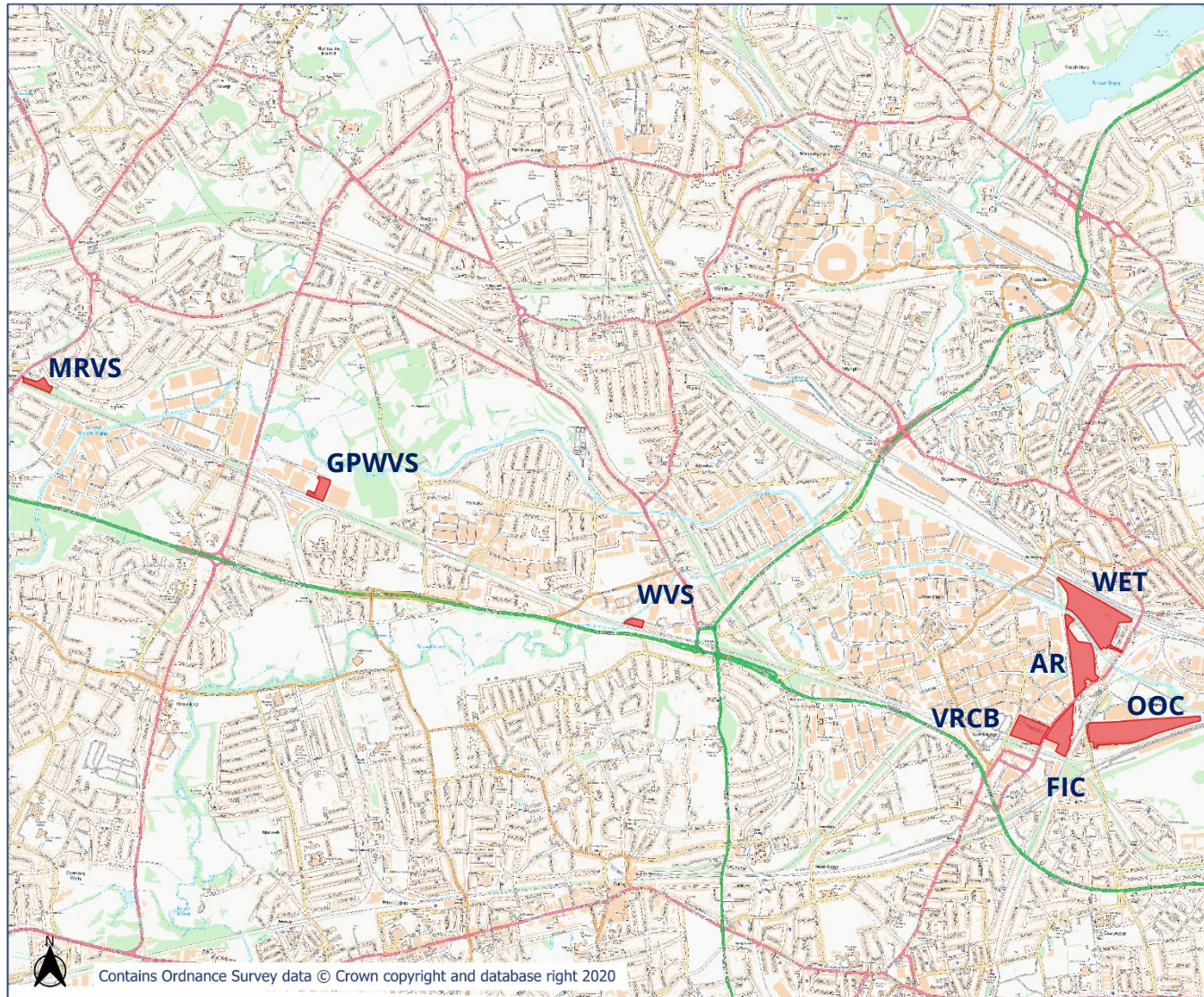
2.4.1 Table 8 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

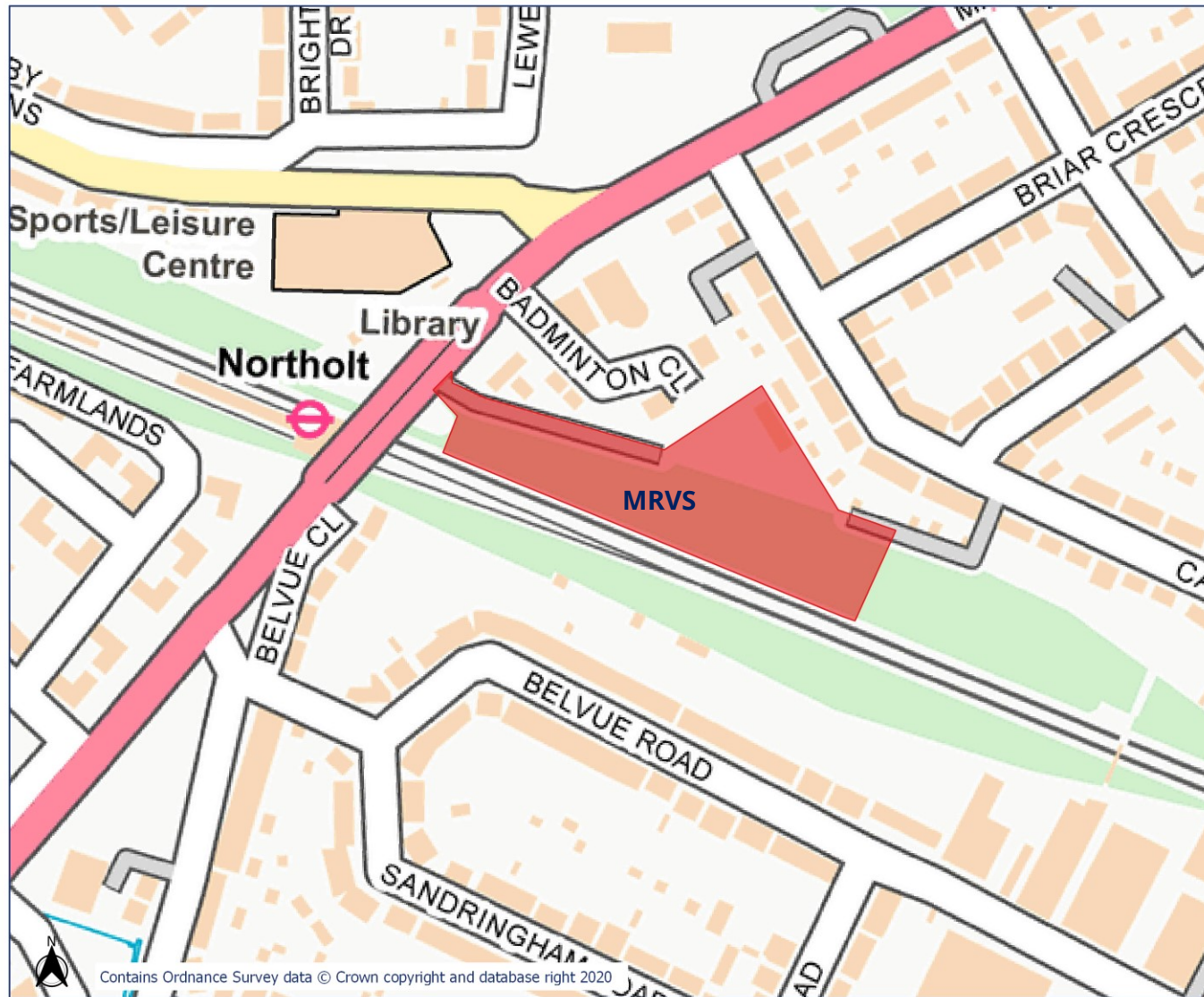
Table 8: Summary of Complaints

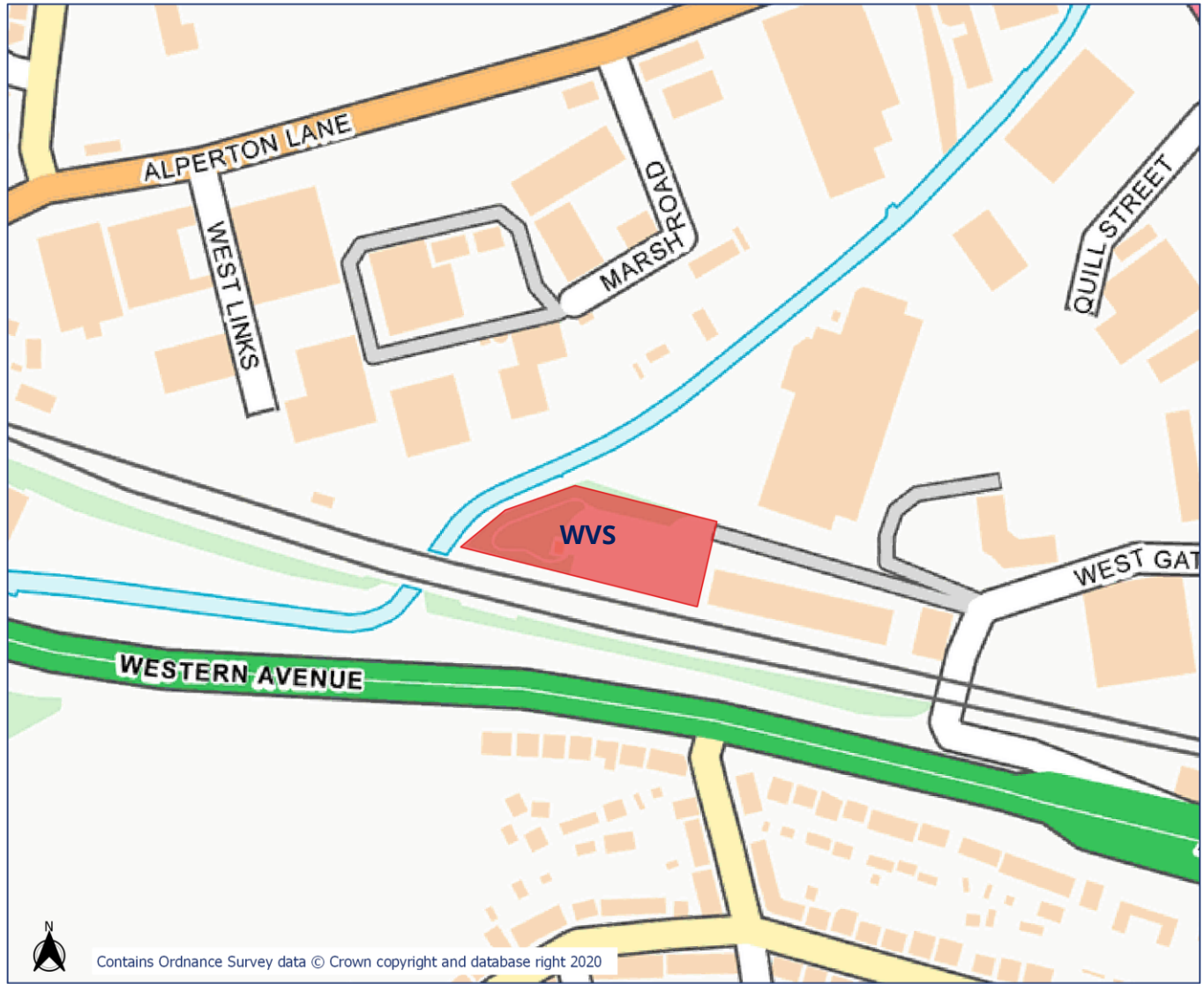
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-23-103150-E-C	WET	Complaint due to loud banging bucket noise at night.	Noise cause by increased night-time works. The noise levels measured at fixed monitors were checked and no noise exceedances were reported. All measures are in place to mitigate noise.	Findings were reported to the resident.
HS2-23-103148-E-C	WVS	Complaint about drilling noise and vibration experienced at property.	Noise and vibration on site were reviewed.	Site teams was advised to keep noise to a minimum to avoid disruption. The resident has received updates via engagement team.
HS2-23-45054-C	OOC	Complaint regarding high pitched squeaking noise coming from nearby conveyor.	The new rollers installed on conveyor are believed to be the cause of disruption.	Meeting has been arranged with the resident by the engagement team to update.
HS2-23-103248-E-C	MRVS	Complaint due to shouting from HS2 workers close to property.	Feedback has been given to site team and they have been reminded to keep the noise to a minimum	Resident has been updated.

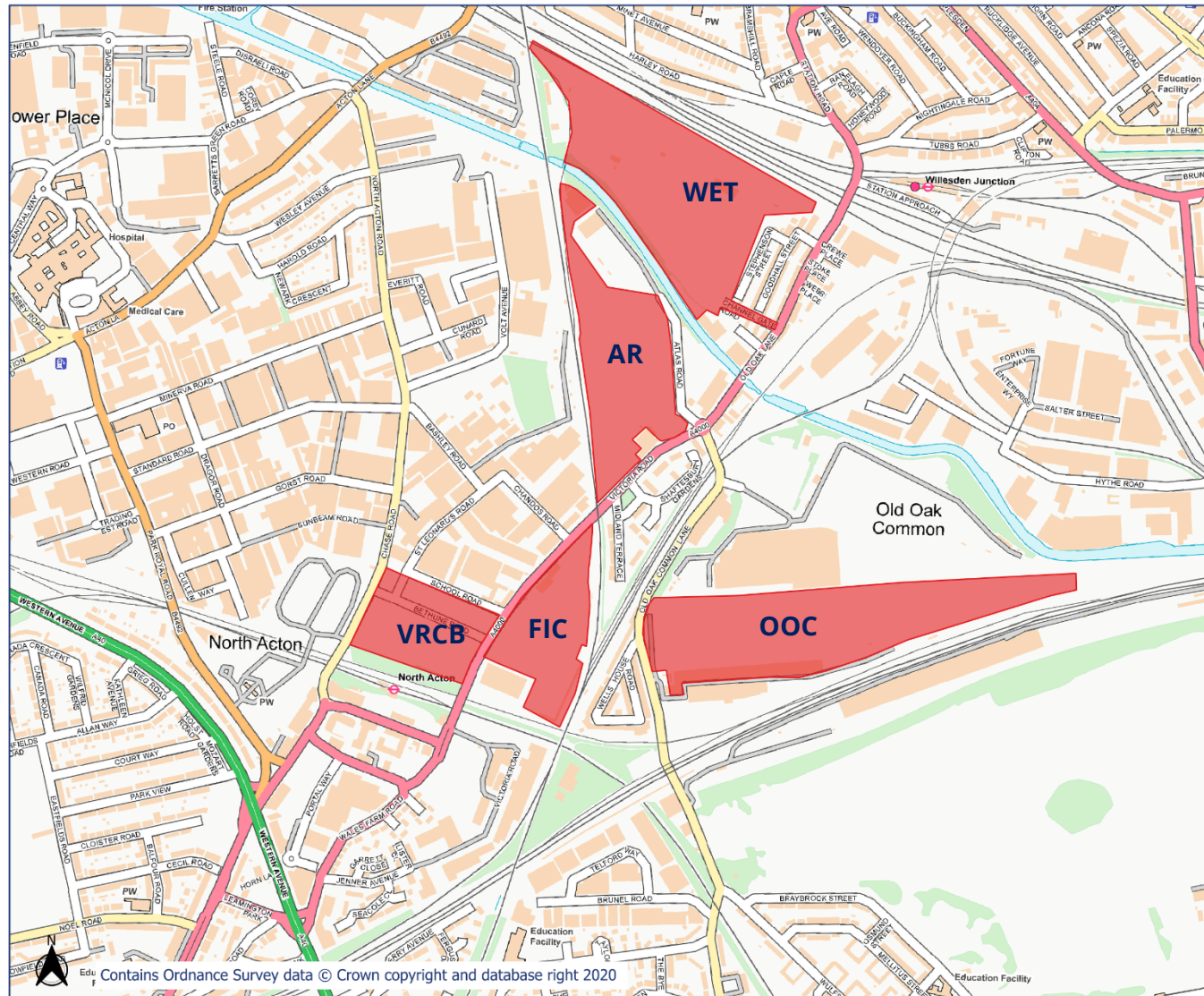
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-23-103419-E-C	VRCB/FIC	Complaint regarding generator noise at night.	Noise caused by generator powering lighting towers for overnight utility work, which are now complete.	Findings were reported to the resident.
HS2-23-103483-E-C	WET	Complaint due to banging noise from nearby site.	The noise levels measured at fixed monitors were checked and no noise exceedances were reported. Works are due to finish shortly.	Resident has been updated.

Appendix A Site Locations

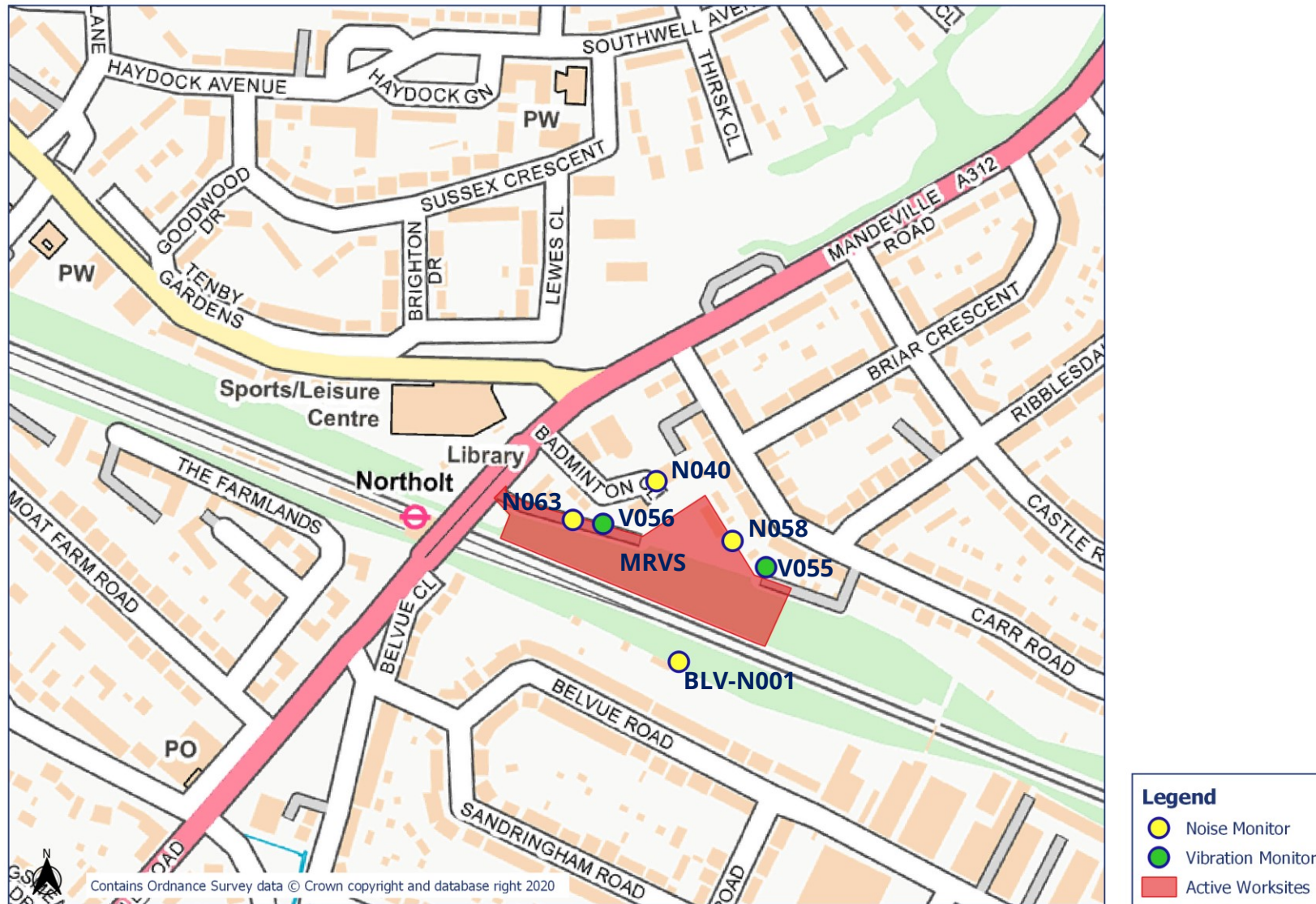


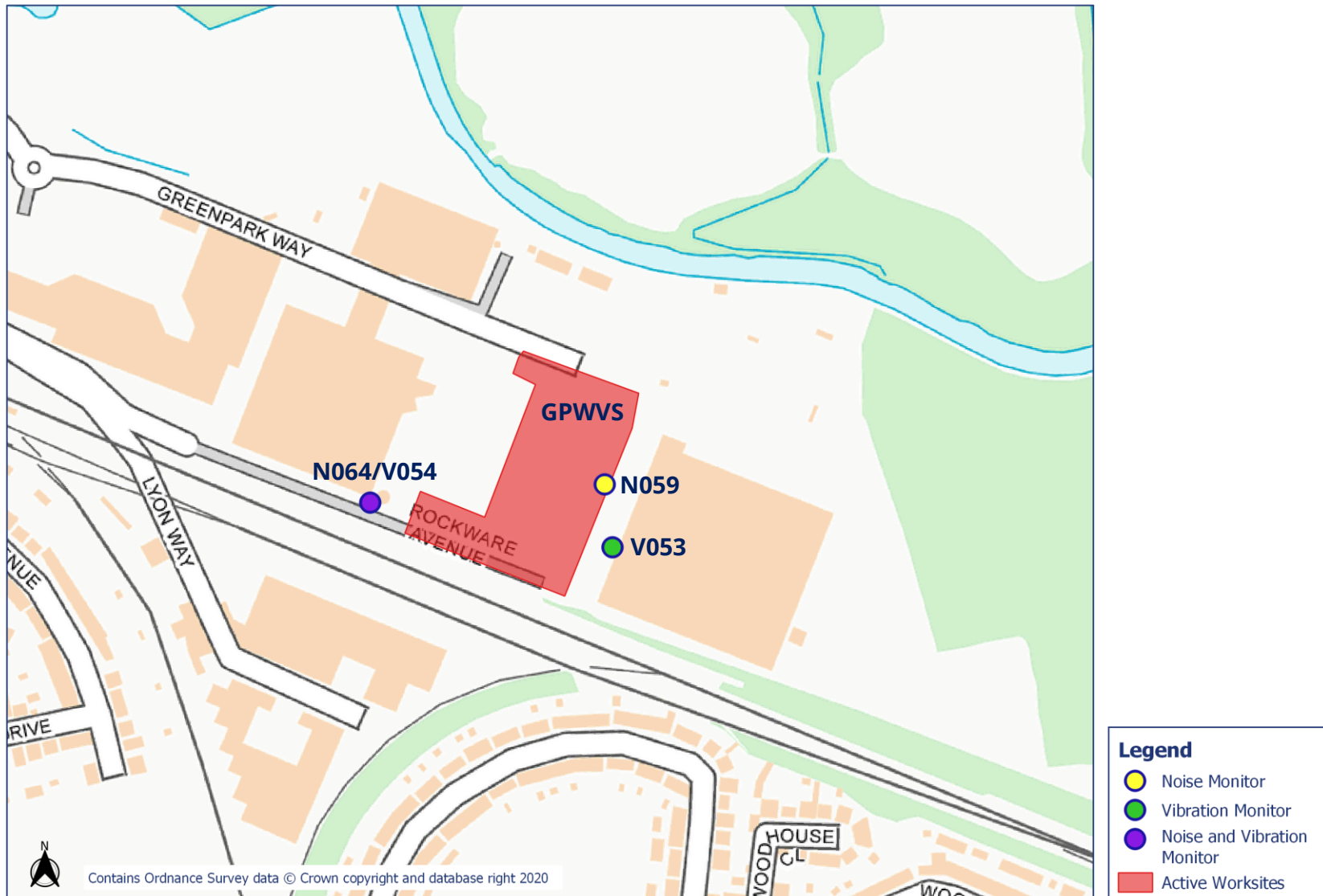


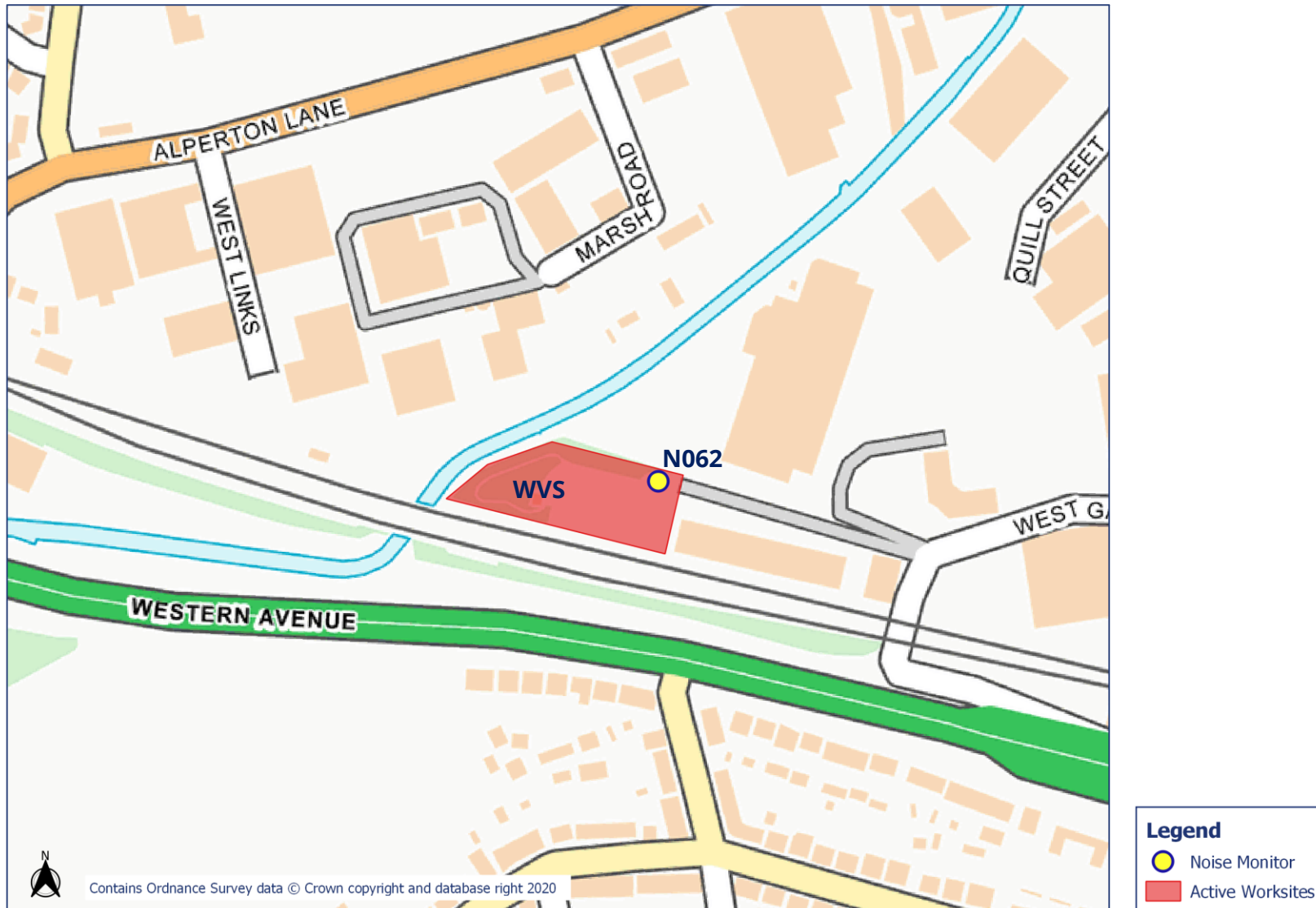


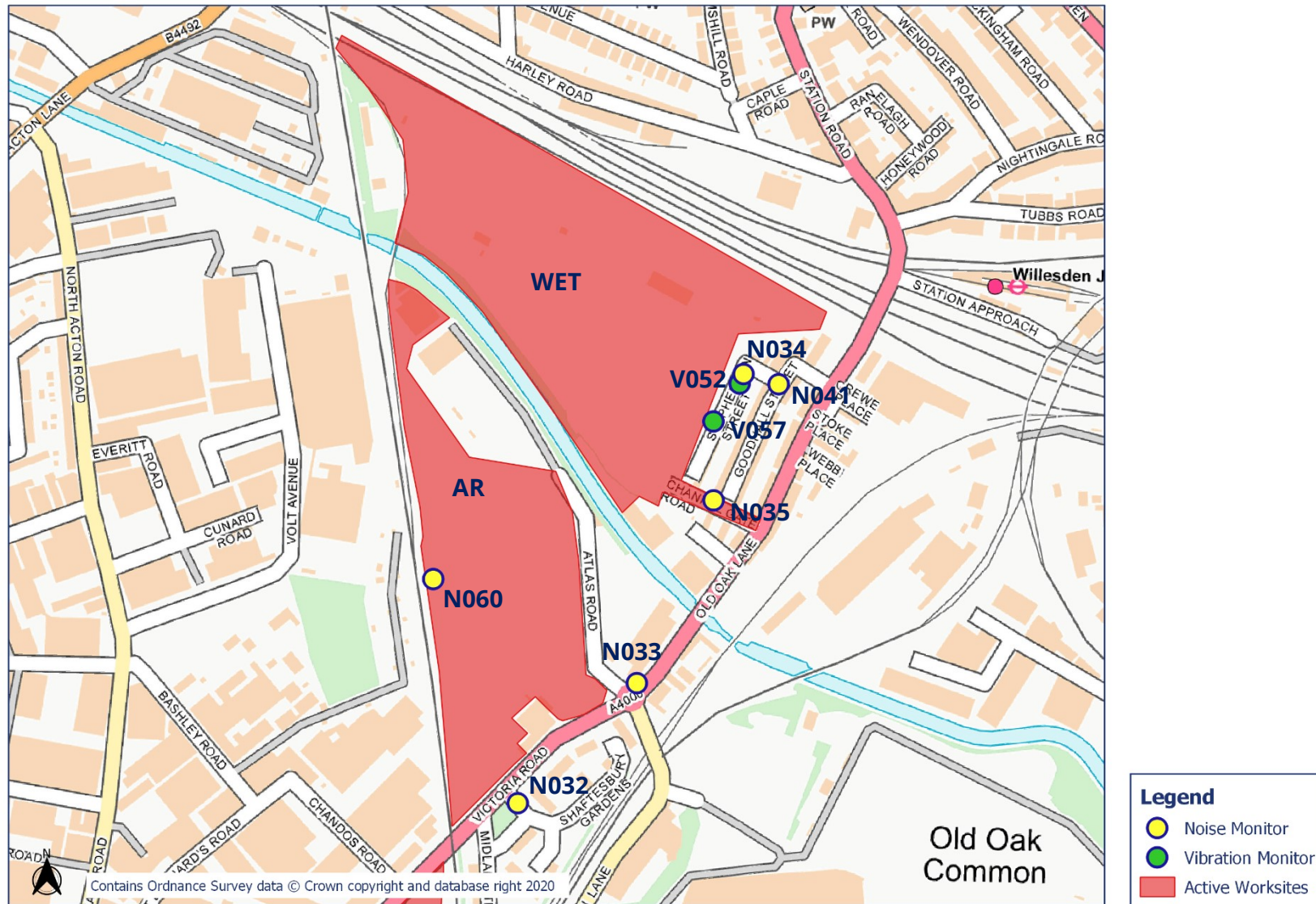


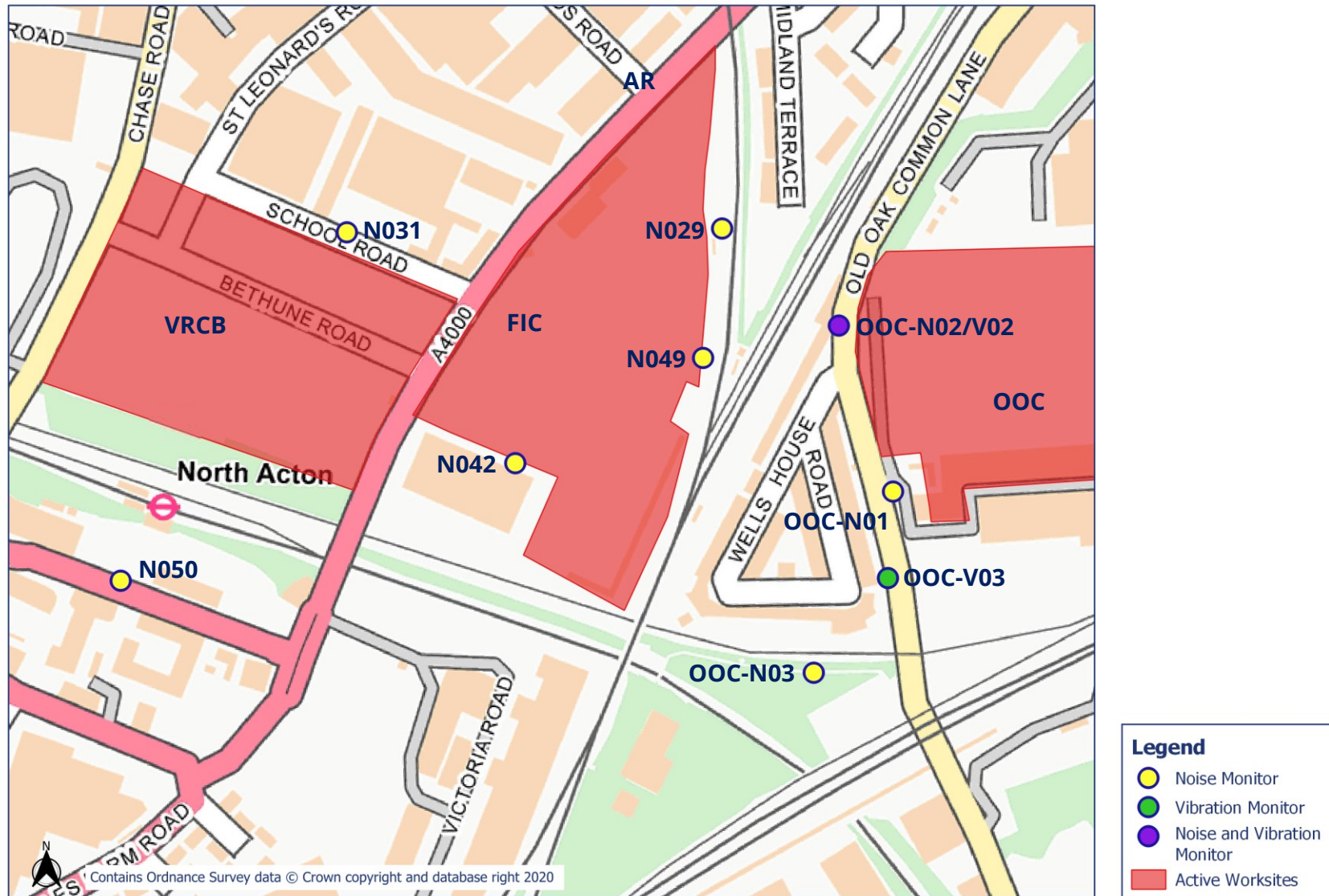
Appendix B Monitoring Locations









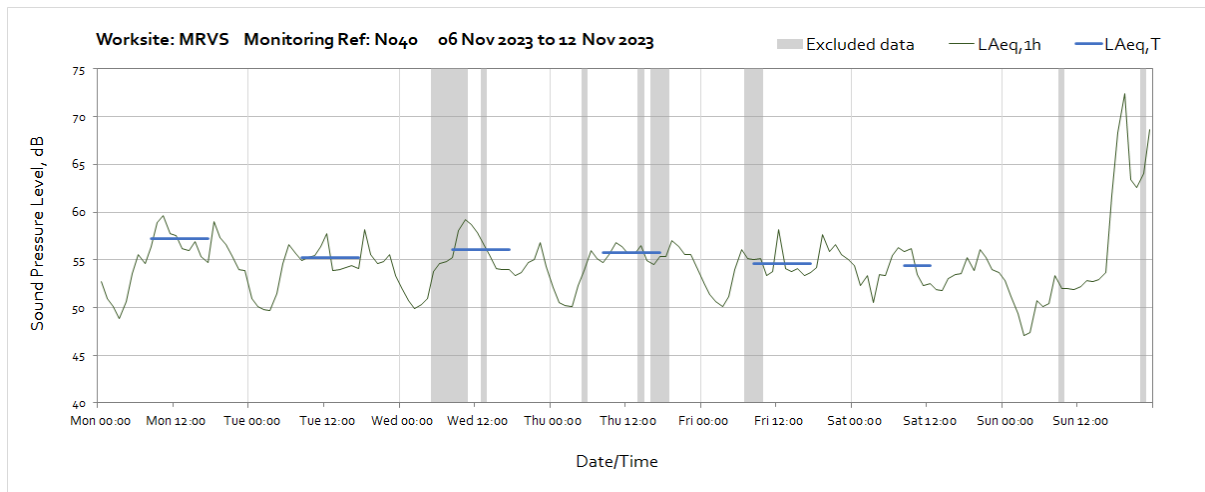
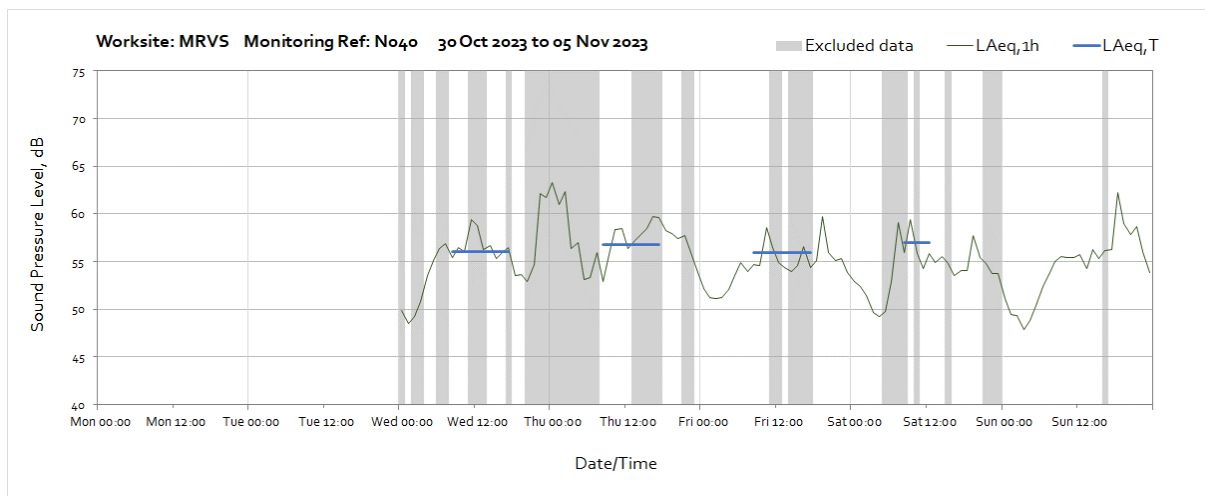


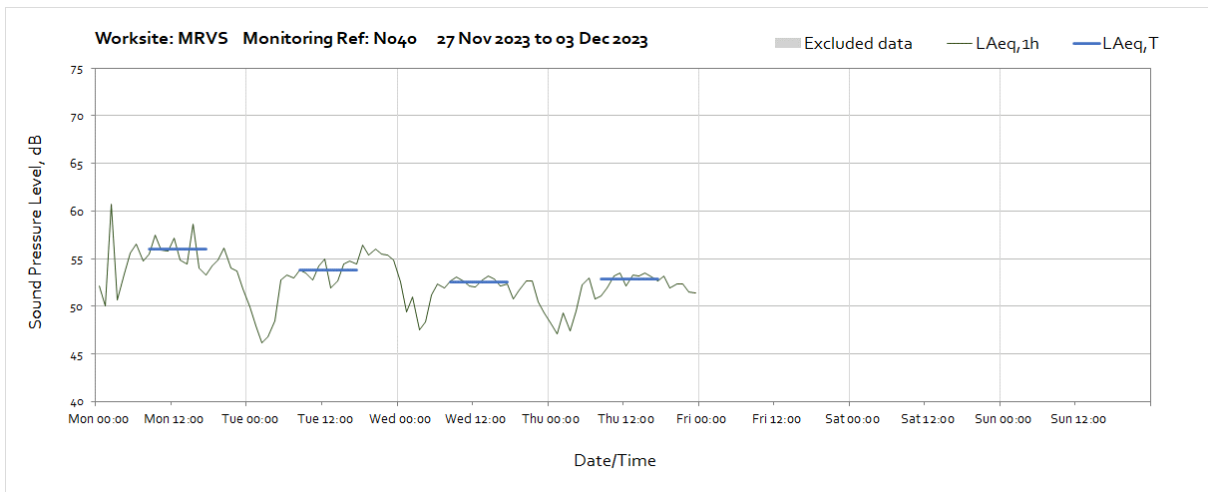
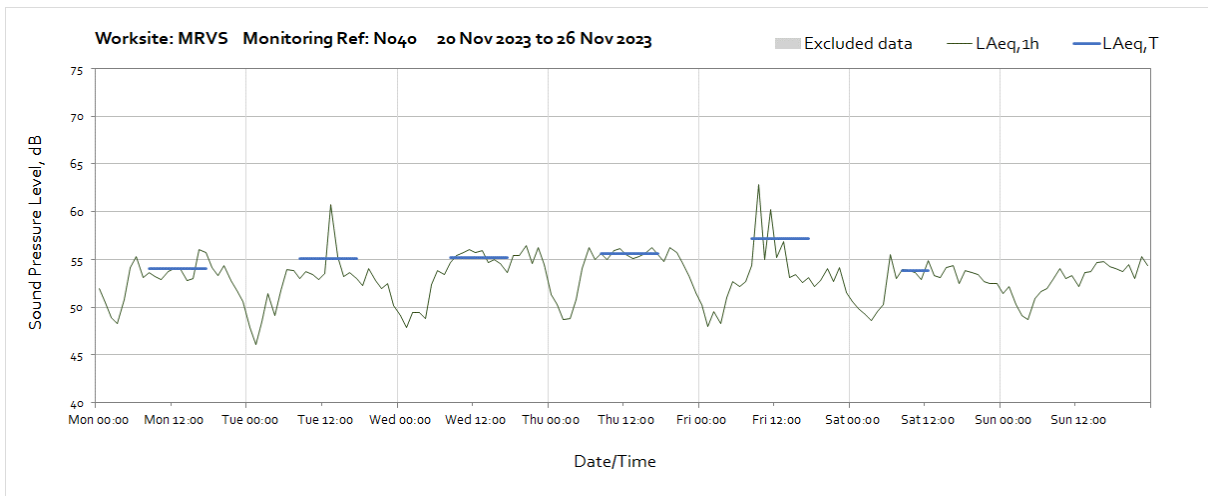
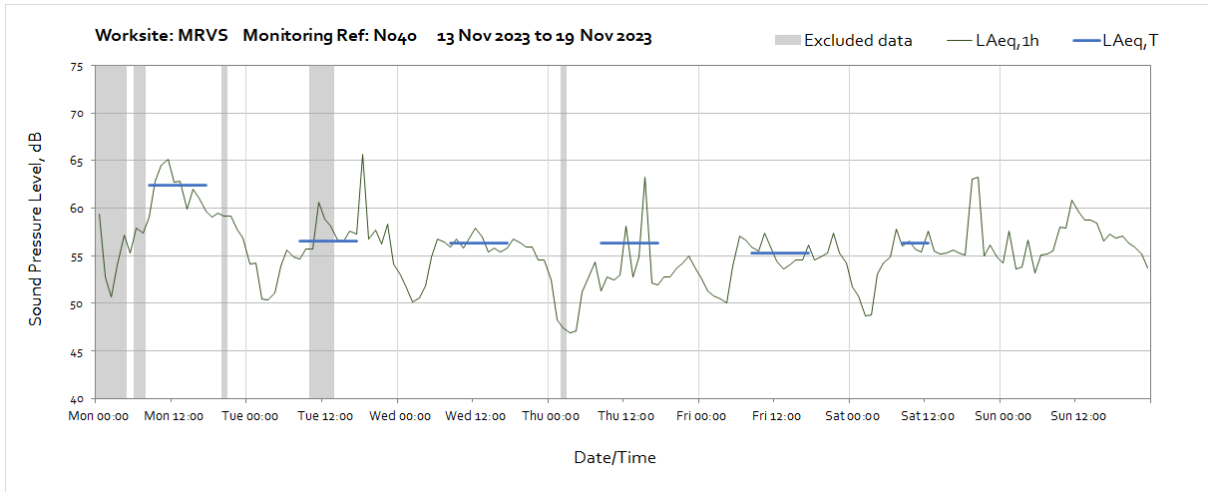
Appendix C Data

Noise

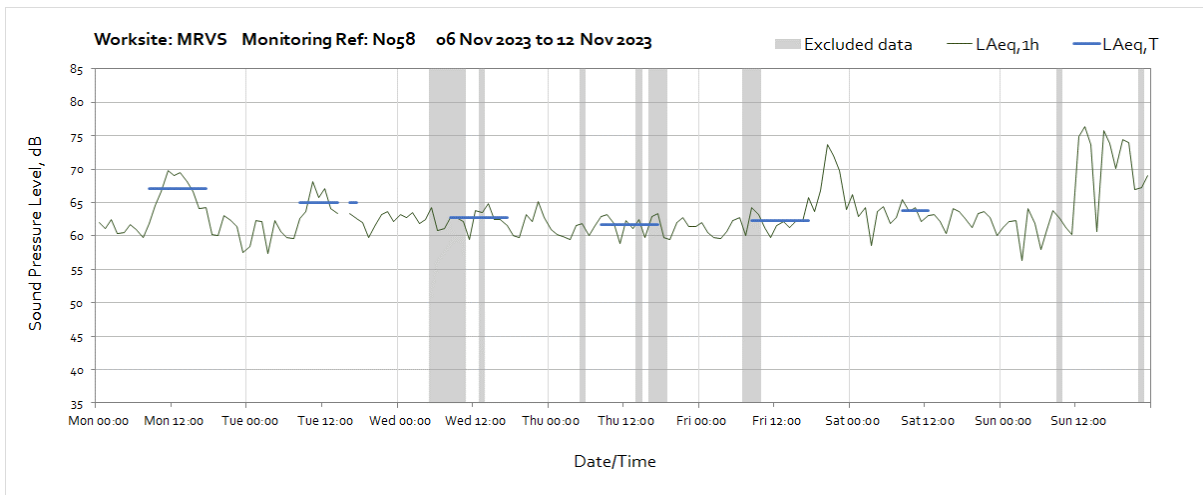
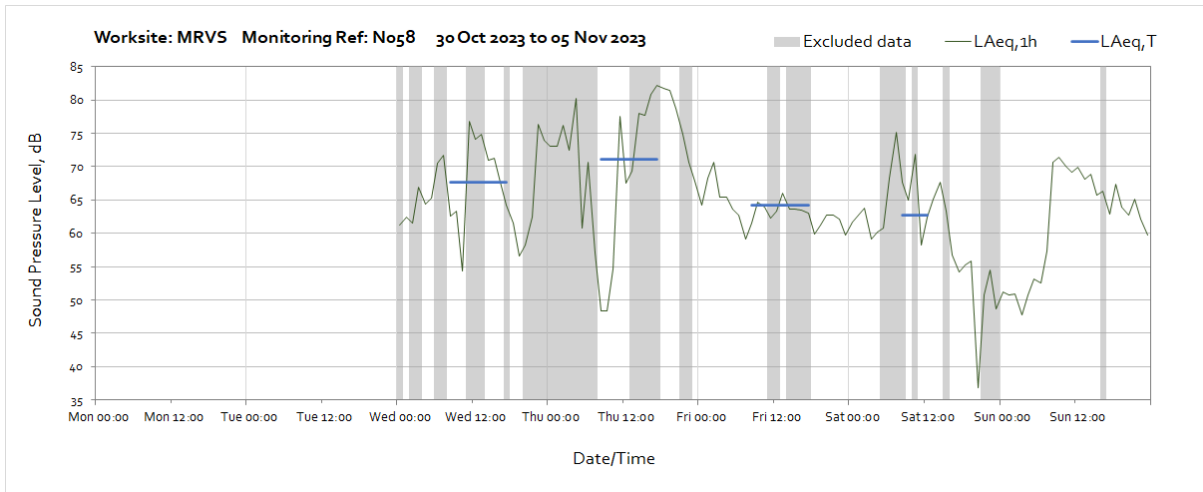
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods where noise levels are adversely affected by weather or only measured for part of the period, which are not representative of HS2 construction works, have been greyed out and excluded from the calculation of the $L_{Aeq,T}$ values in Table 3 of the main report.

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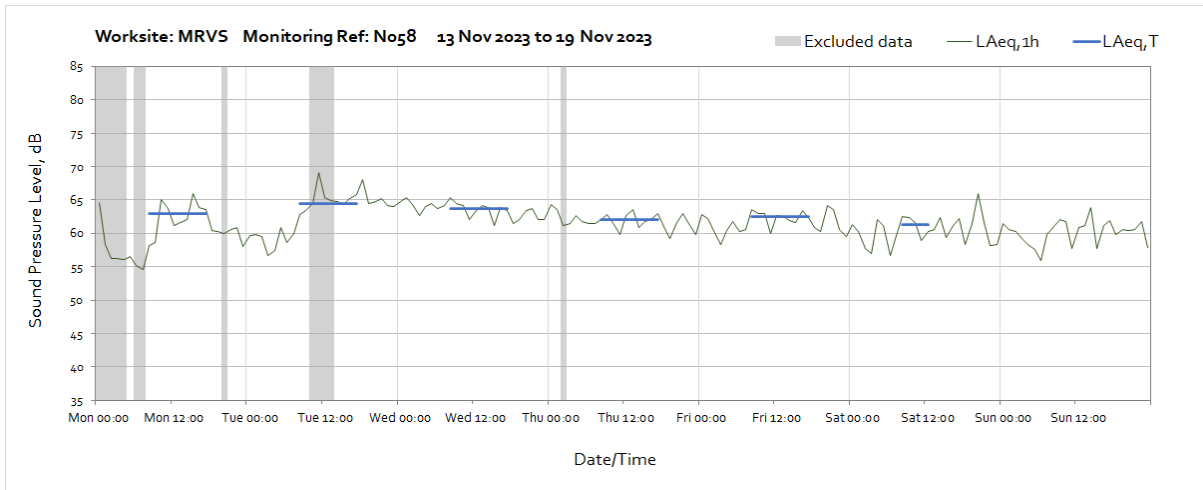


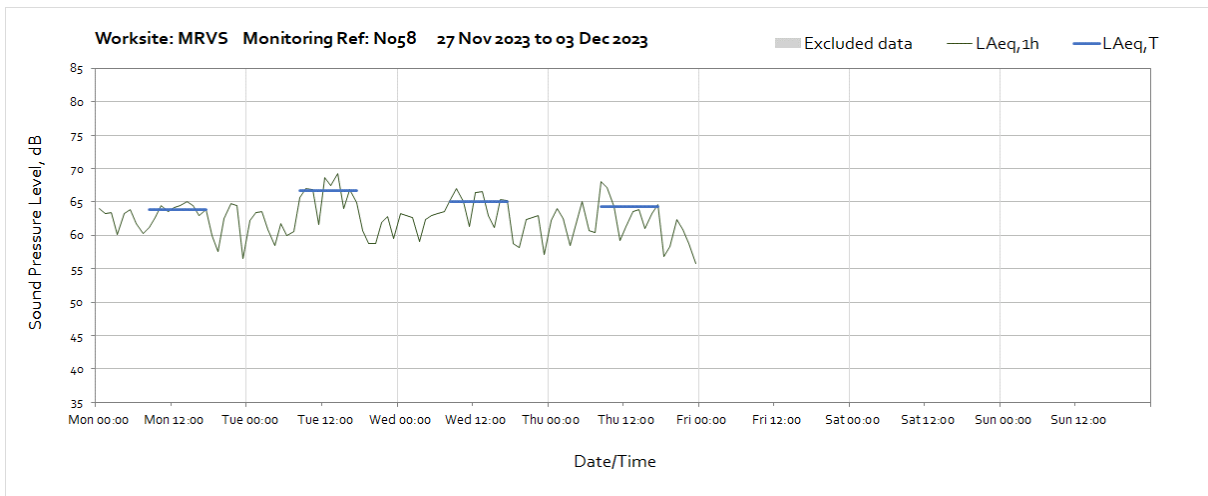
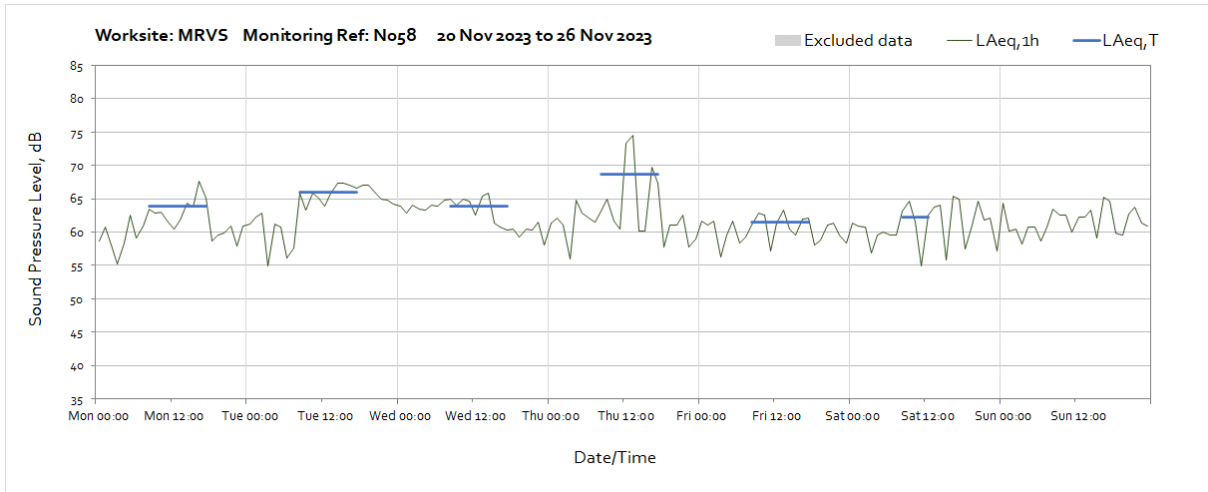


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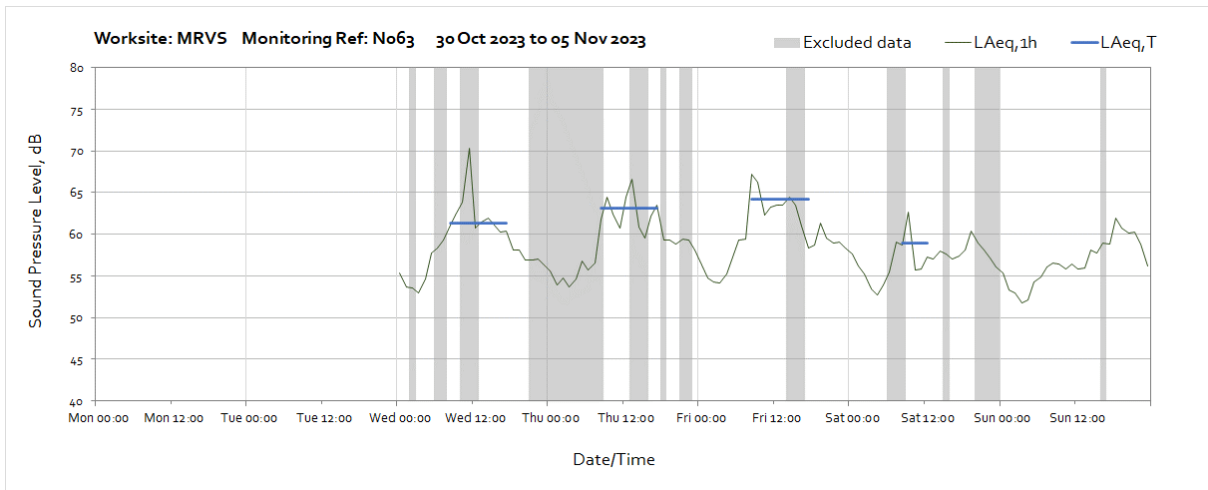


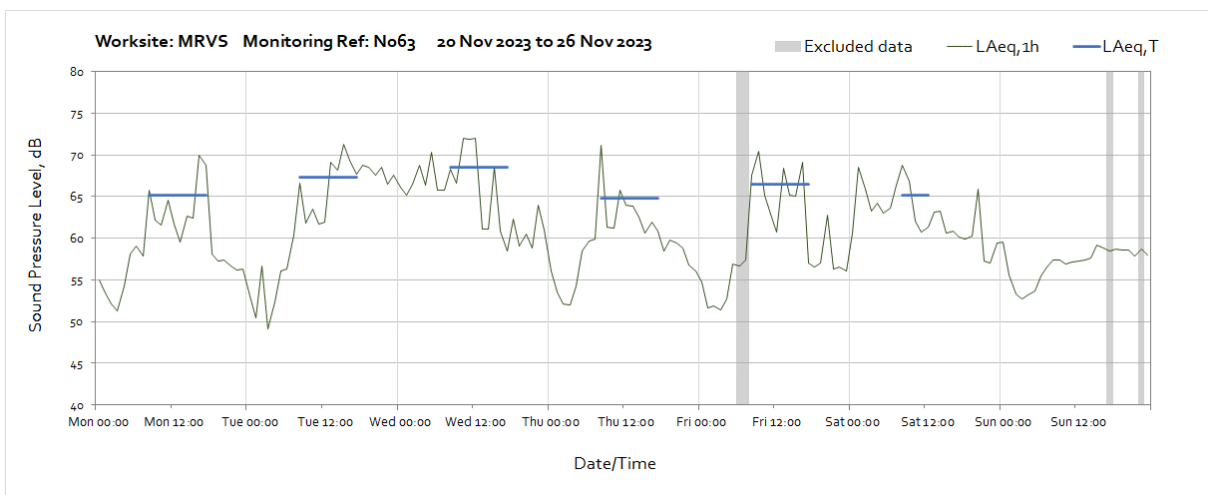
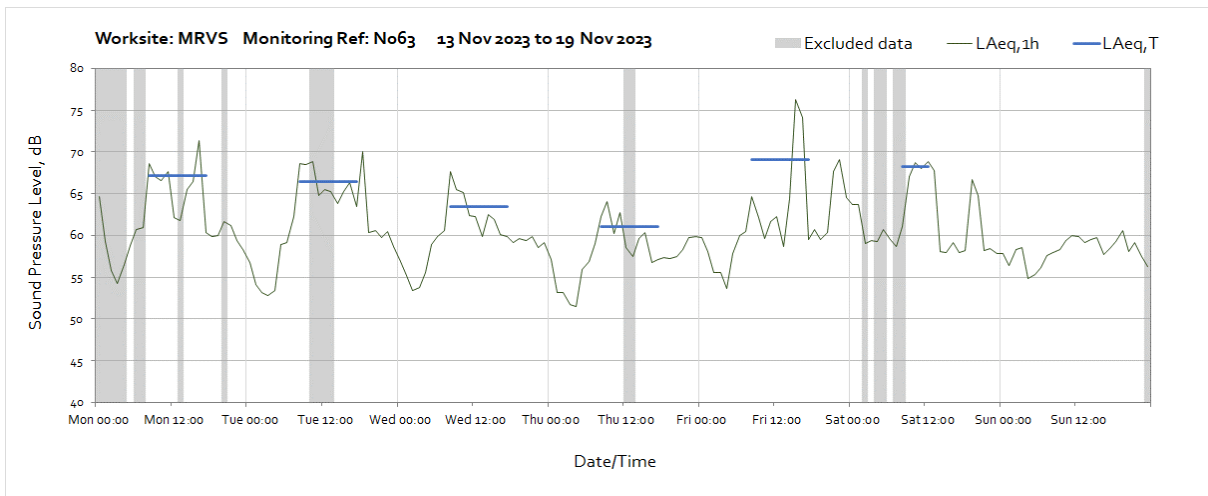
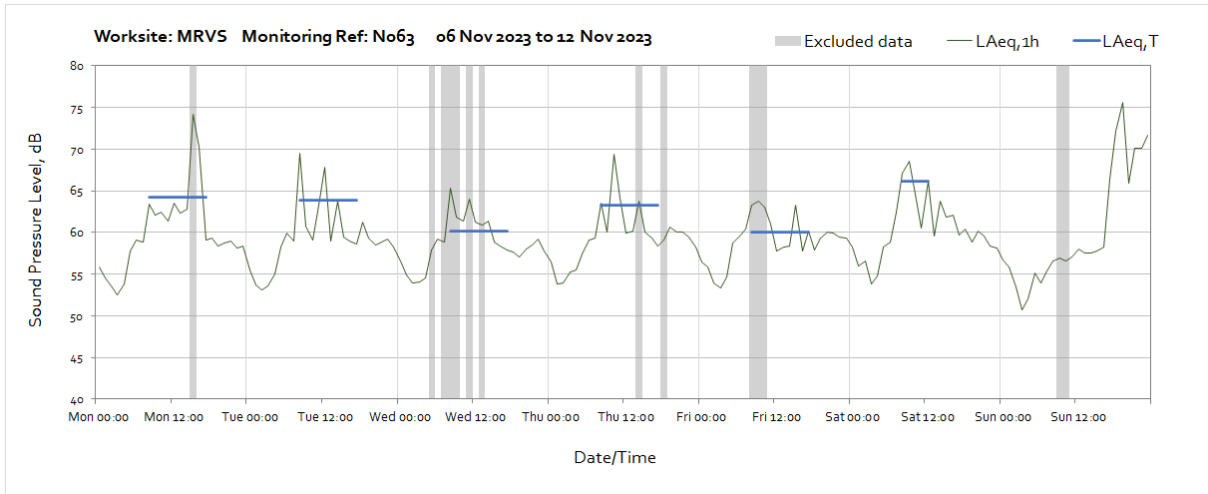
Note: Missing data between 15:00 and 16:00 on Tuesday 7th November was due to maintenance works on the monitor.

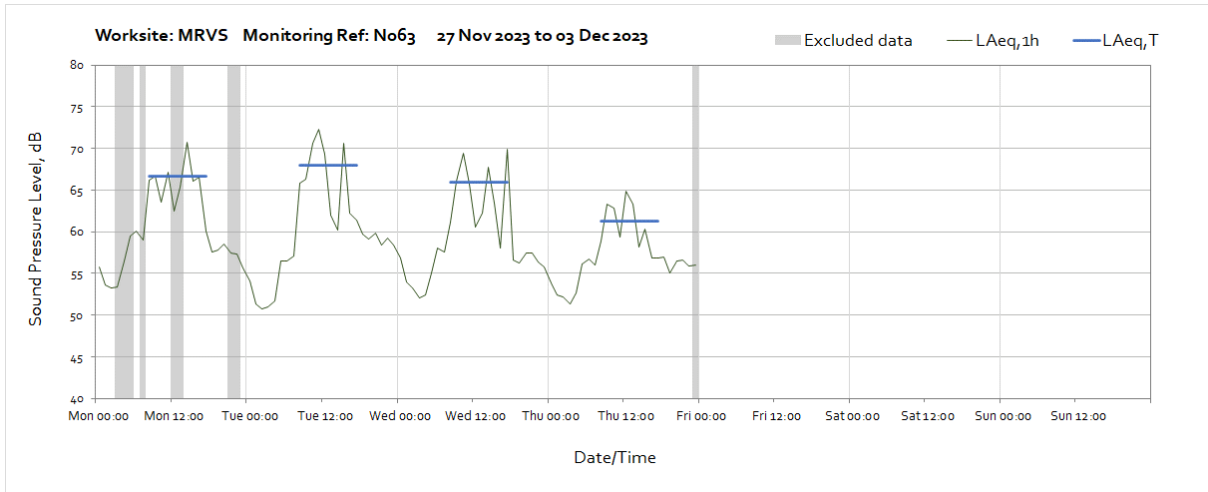




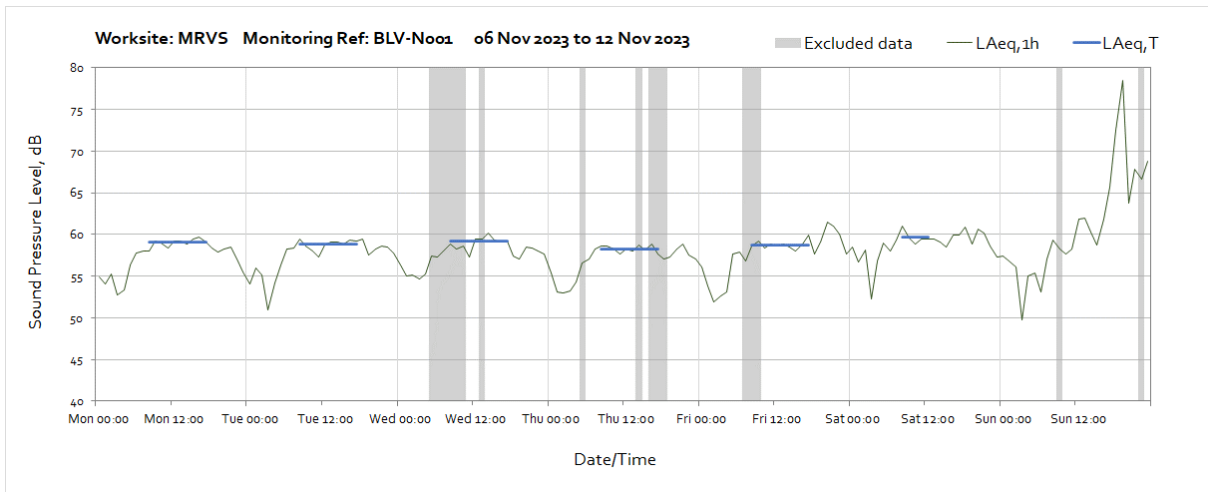
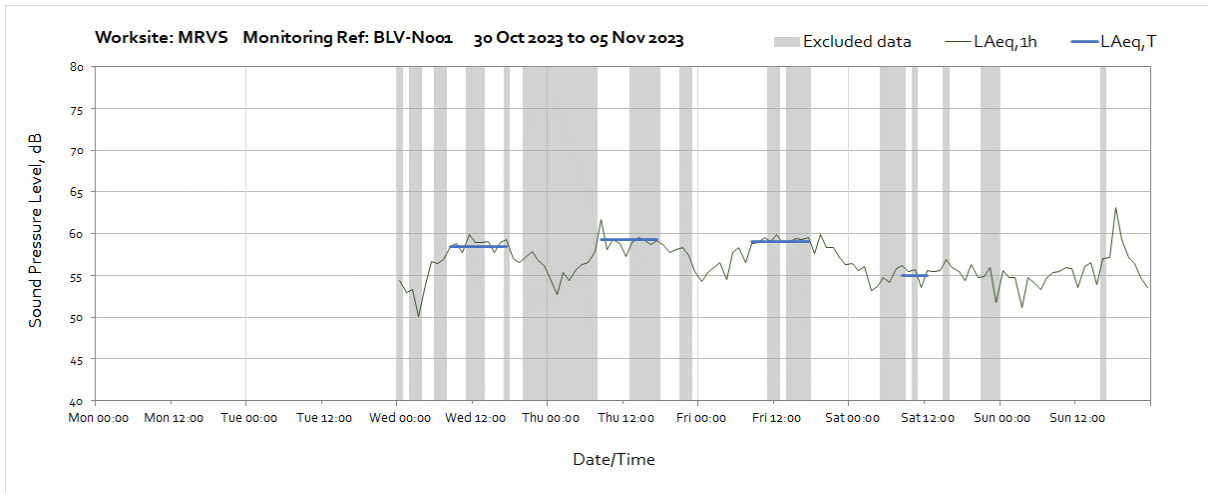
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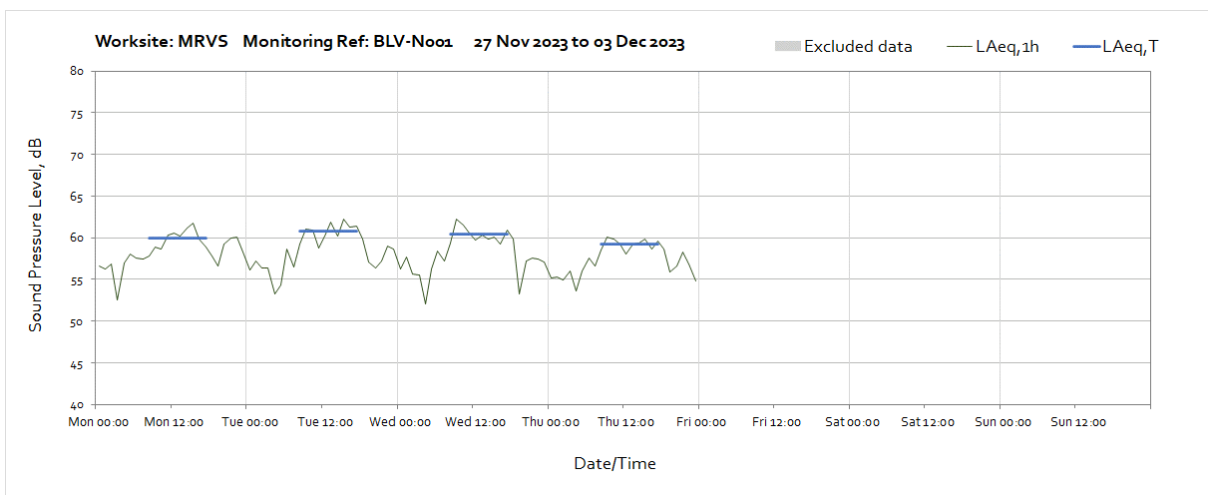
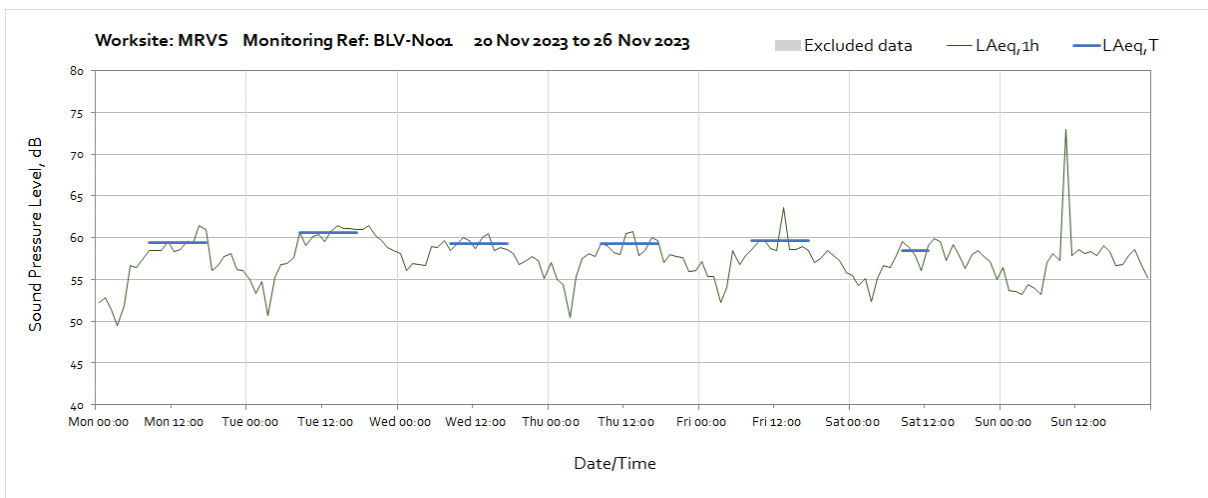
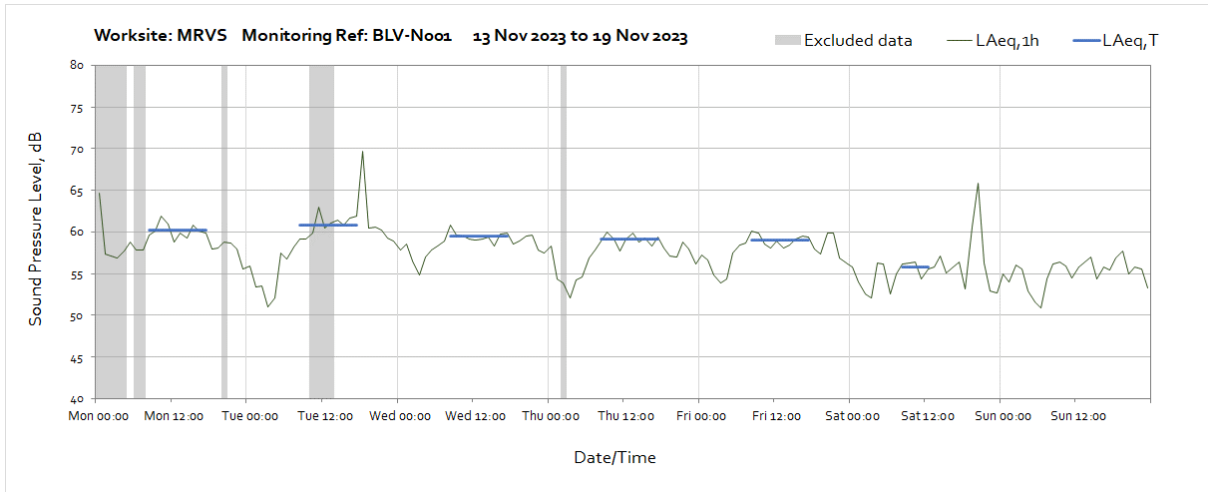




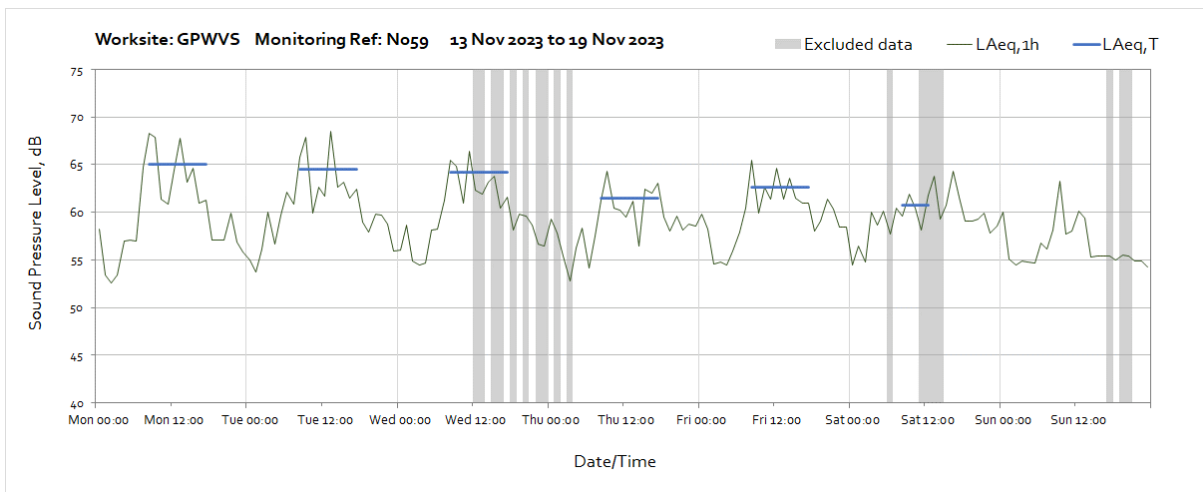
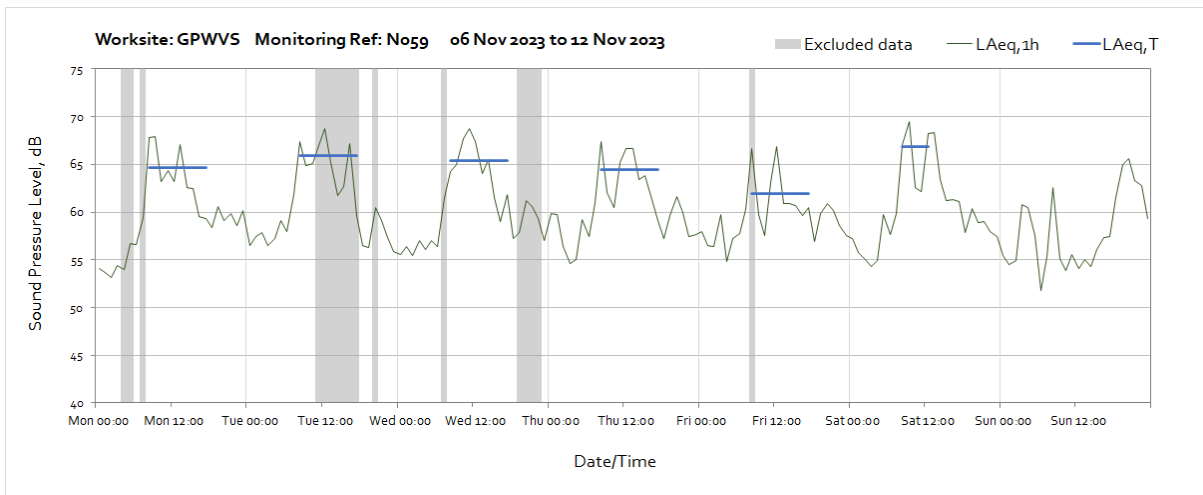
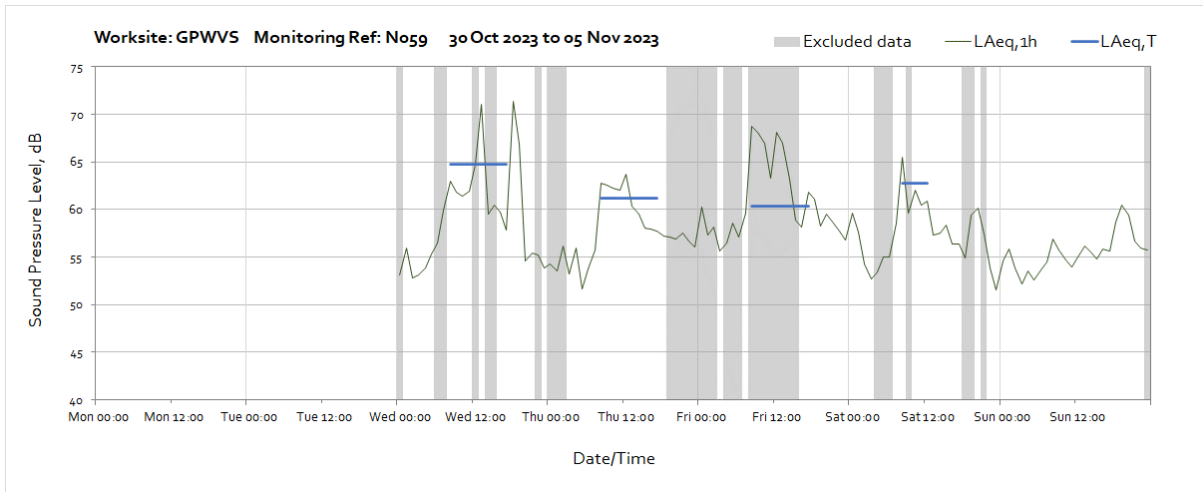


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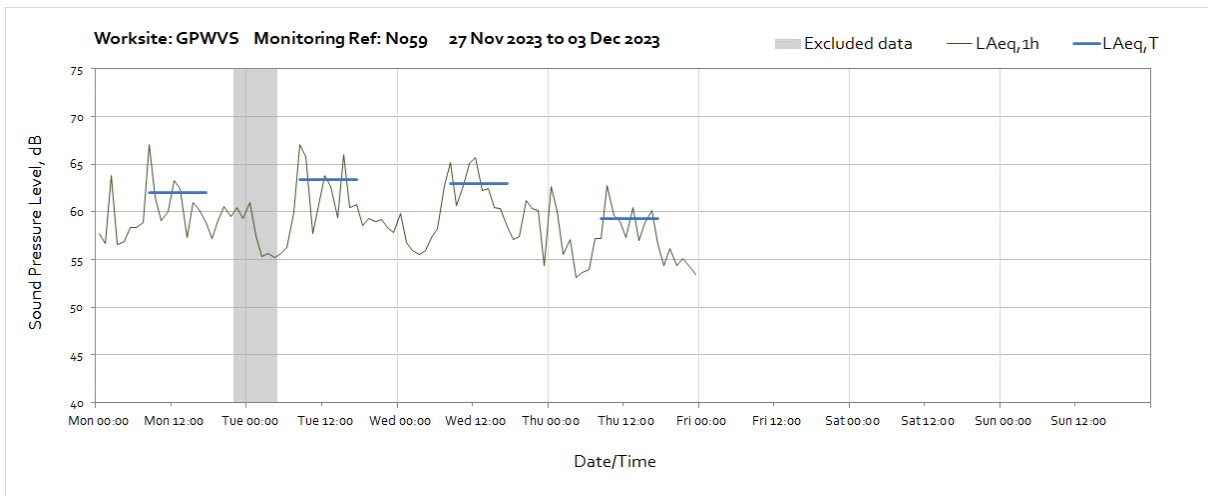
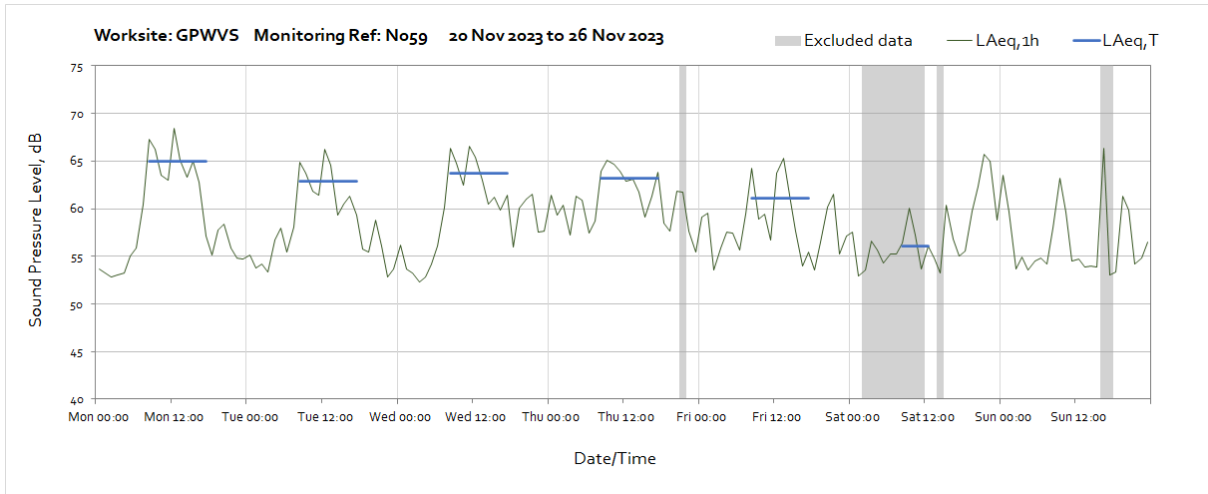




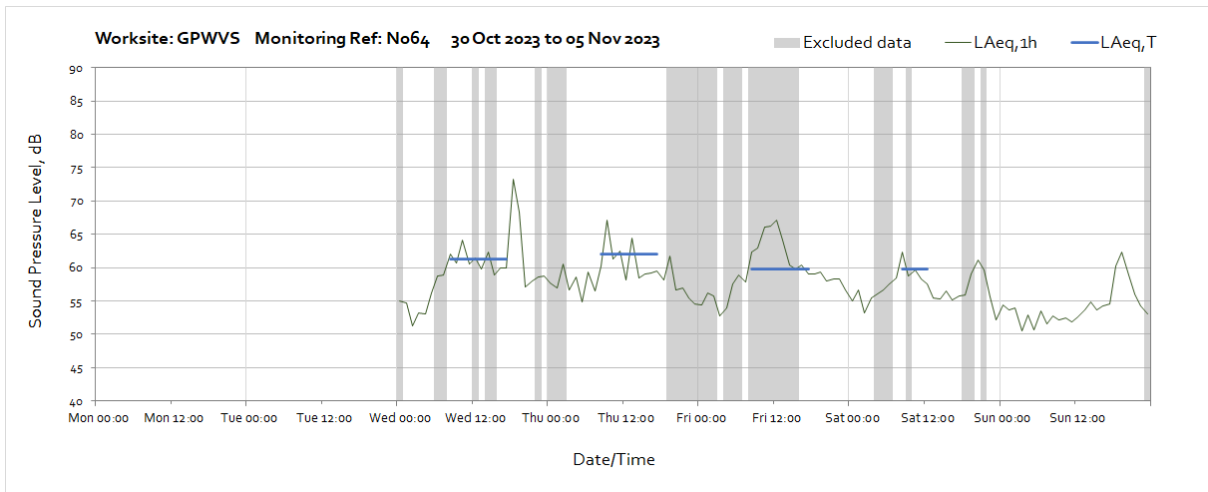
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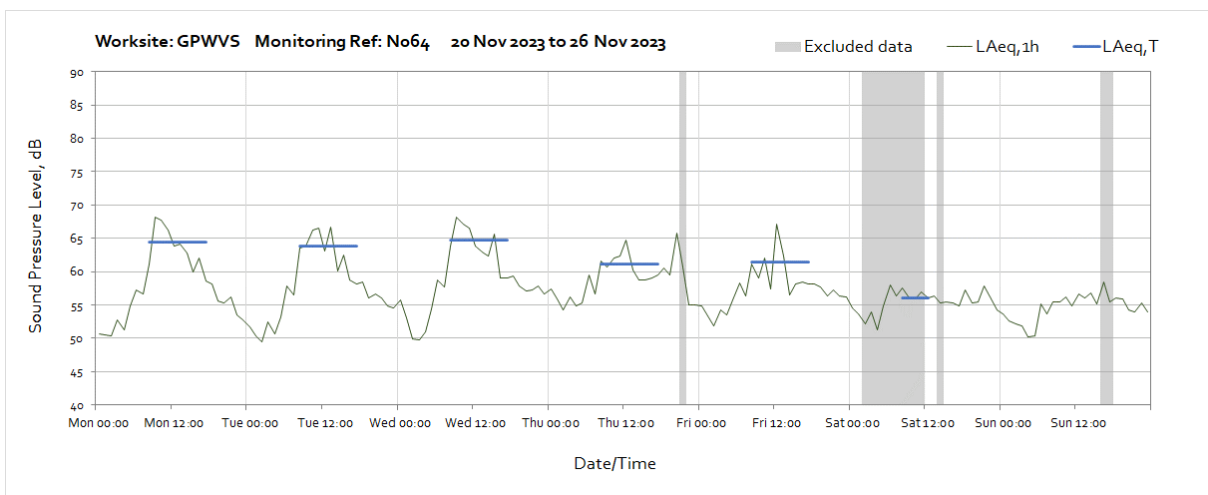
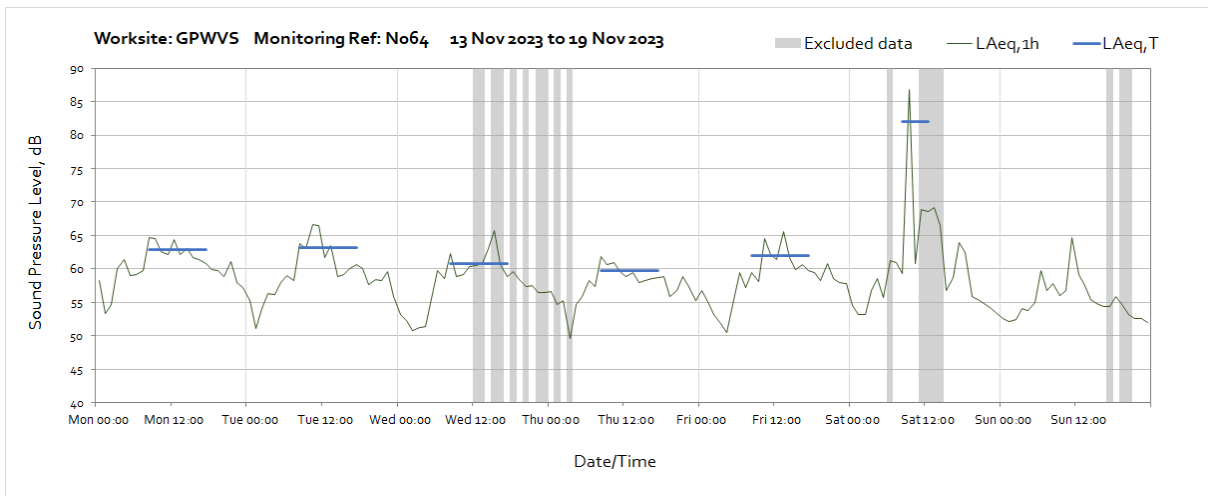
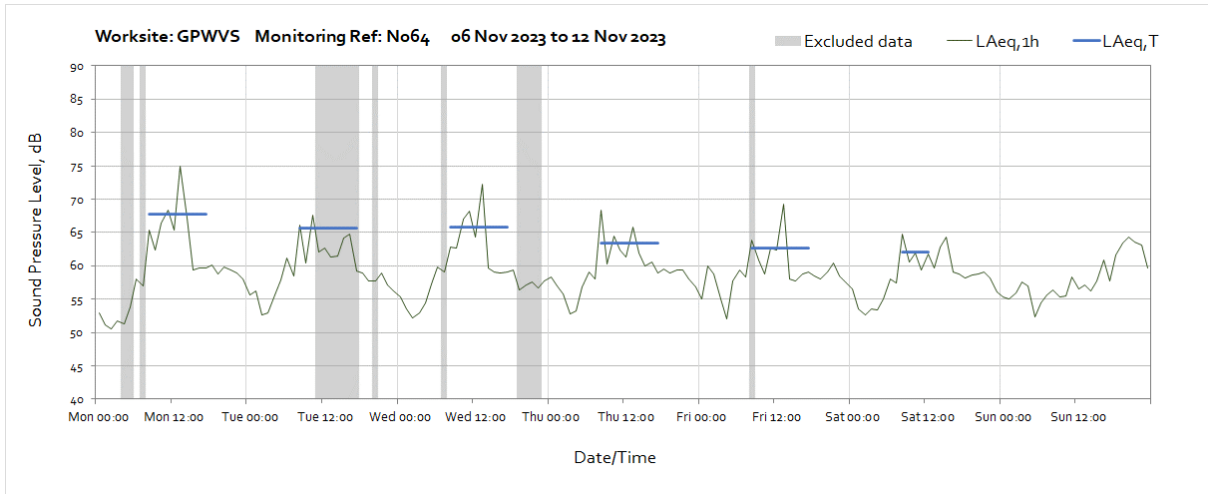


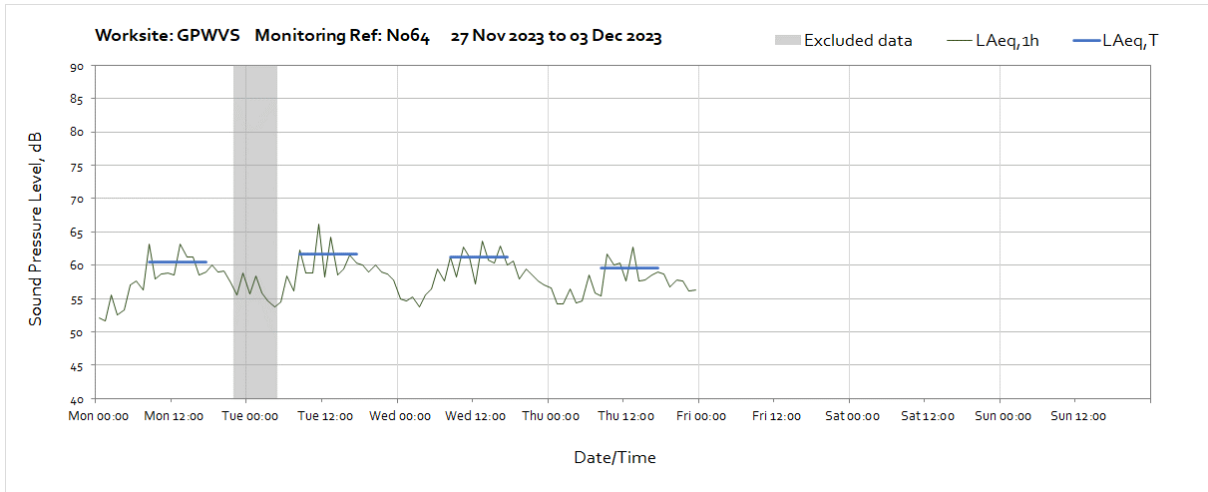
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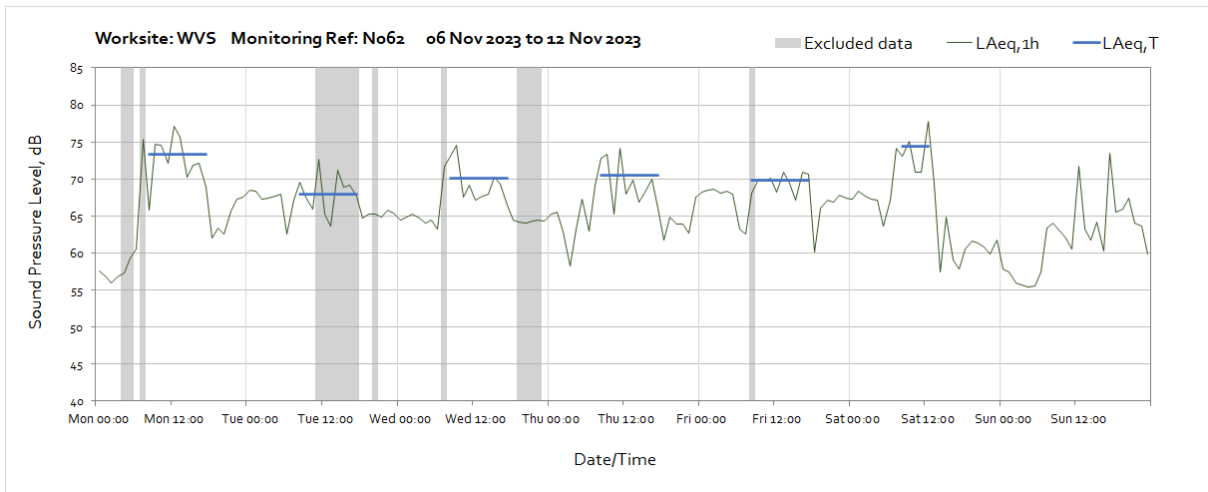
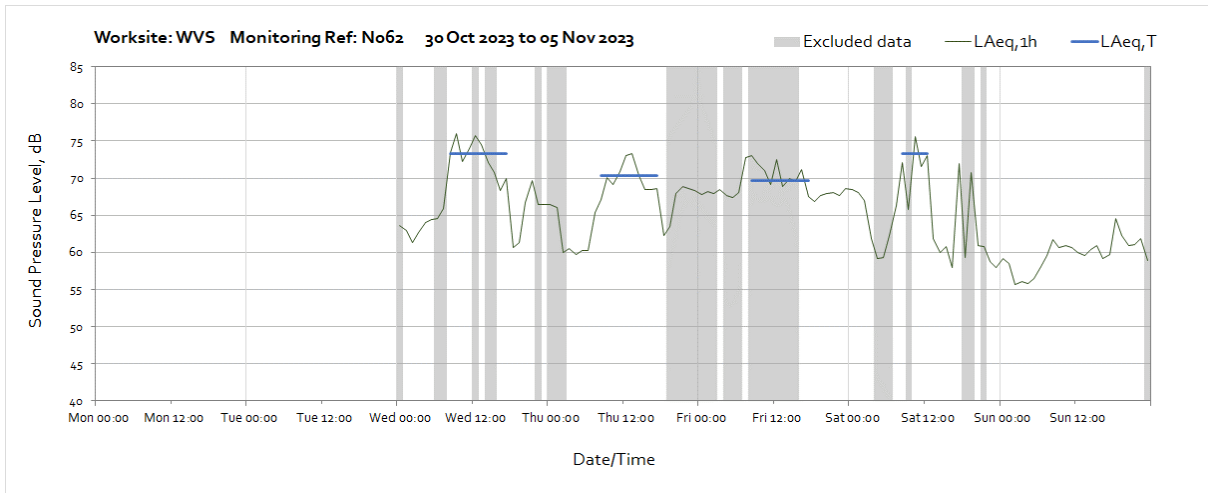
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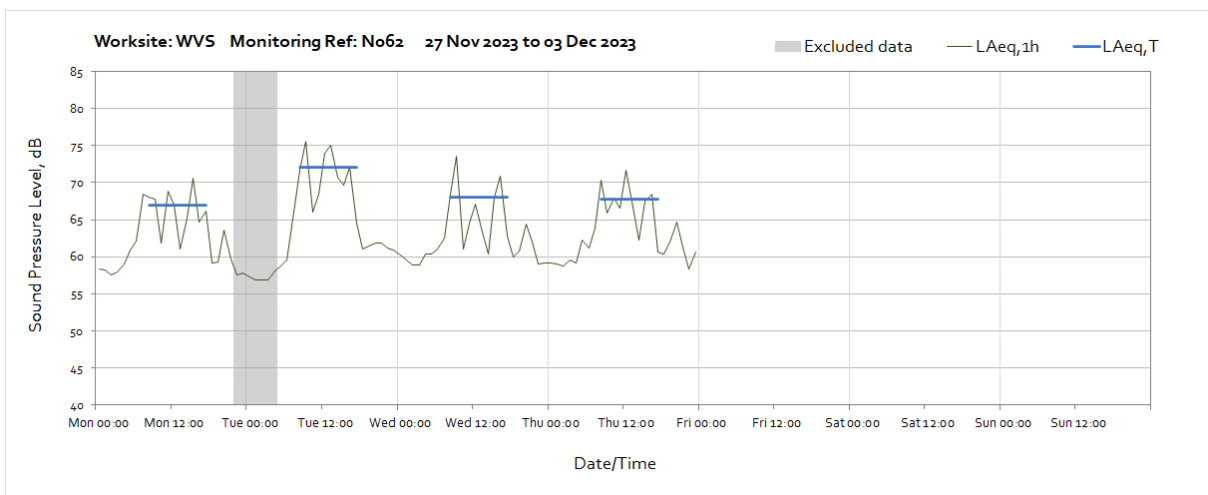
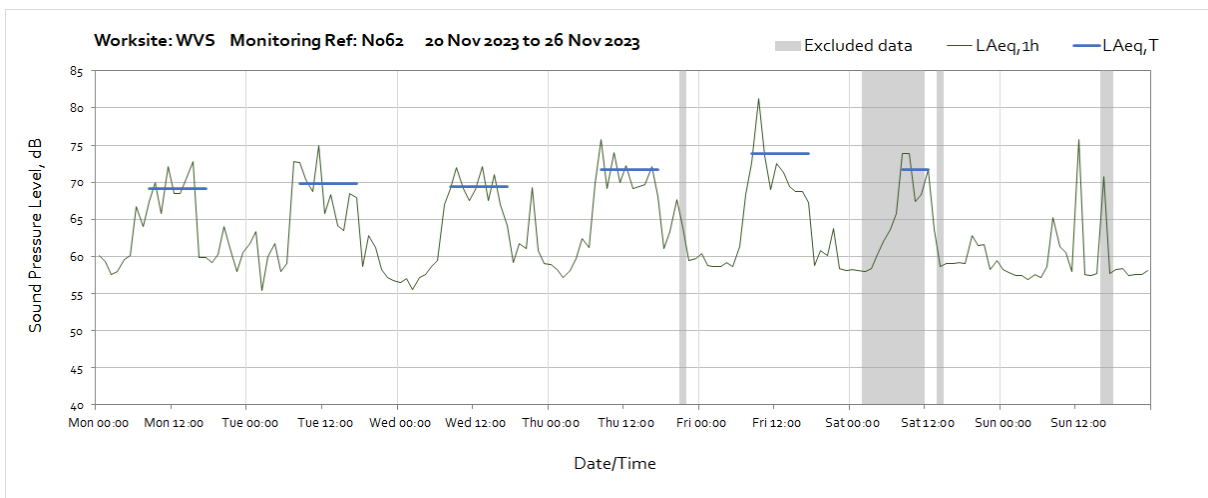
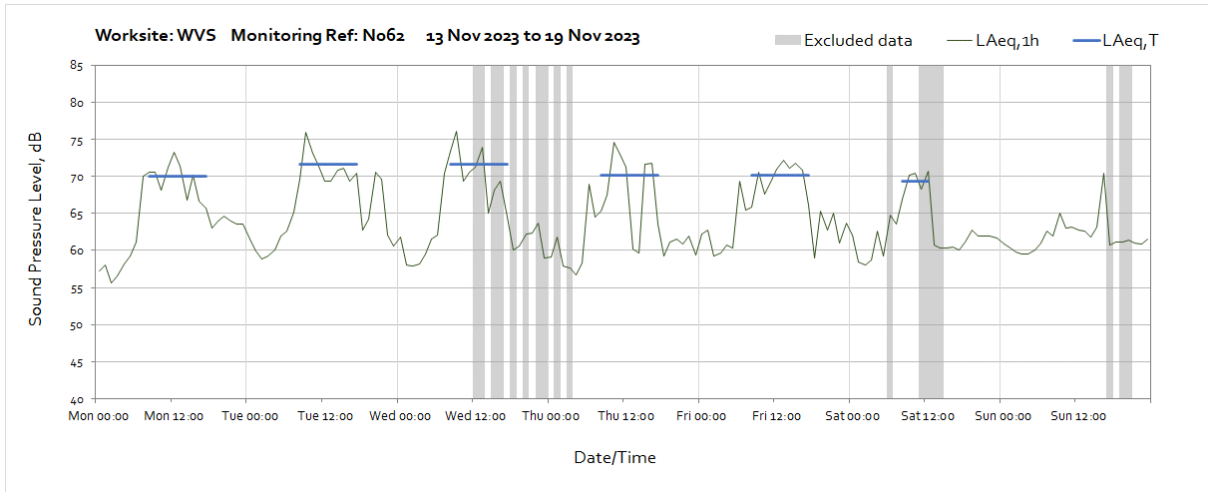




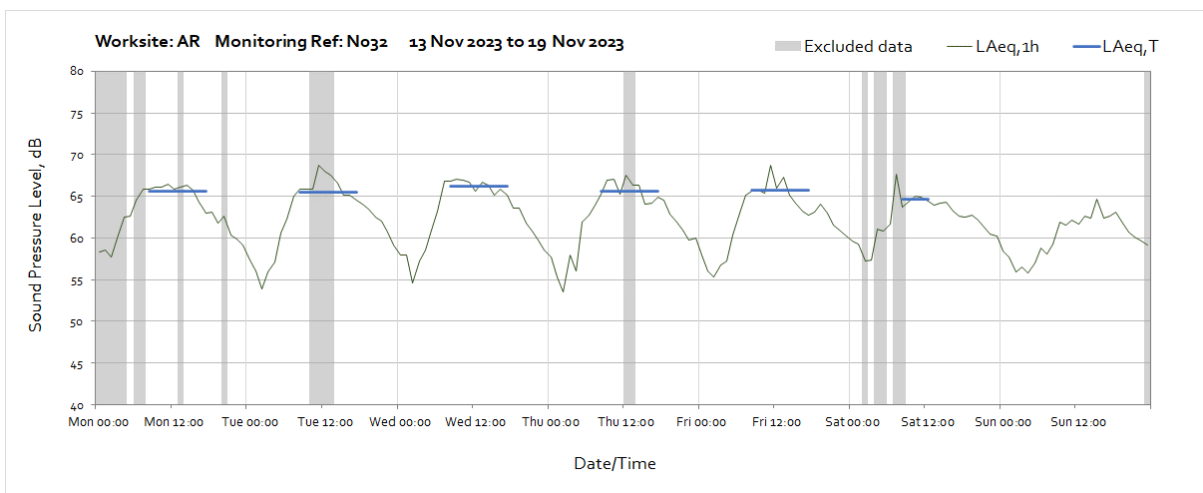
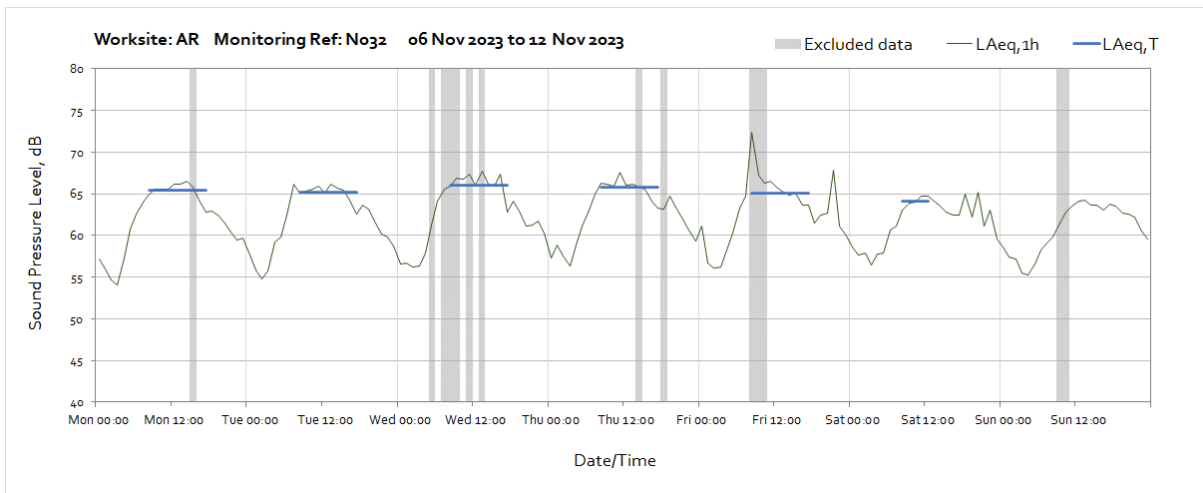
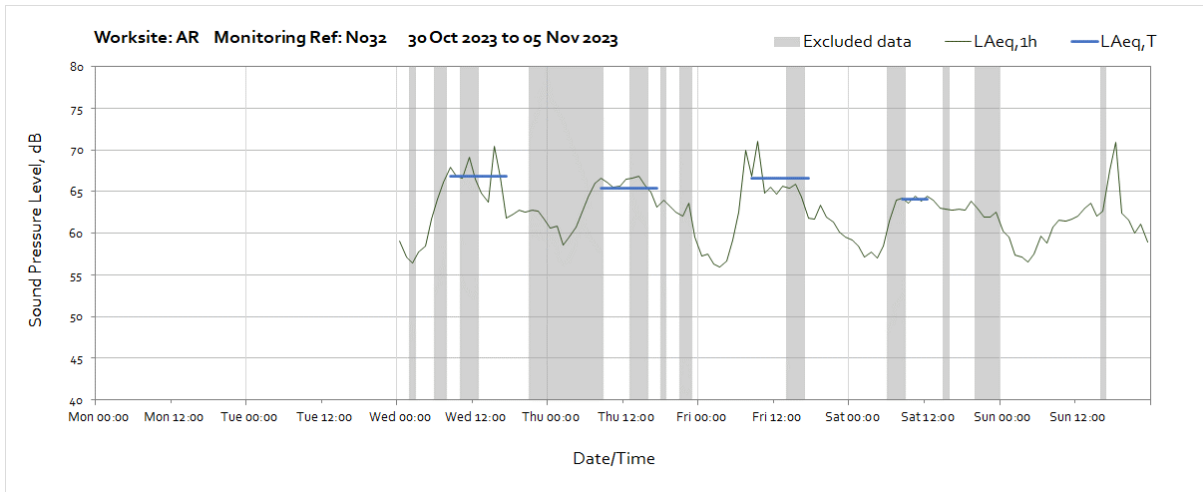


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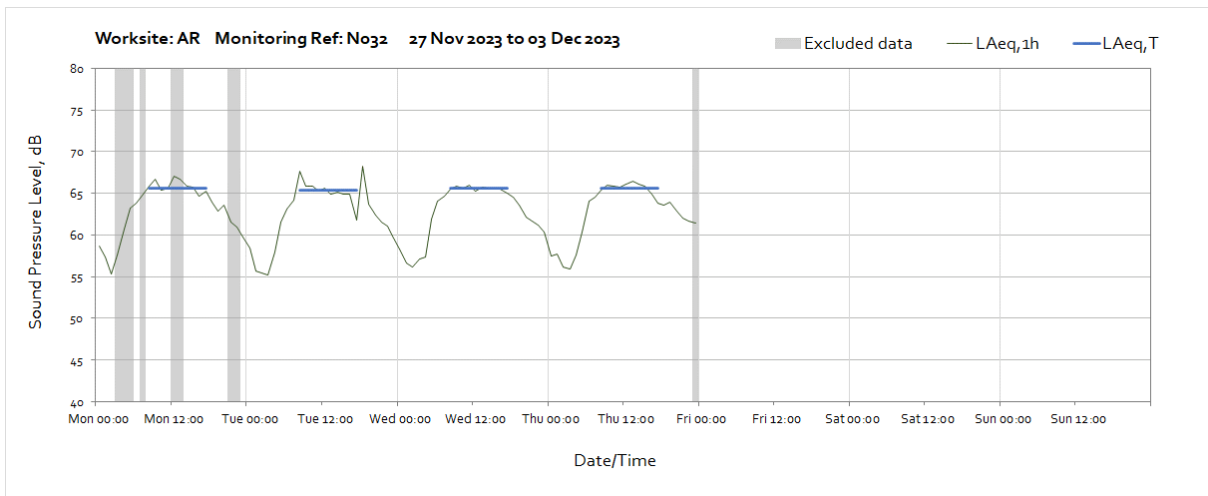
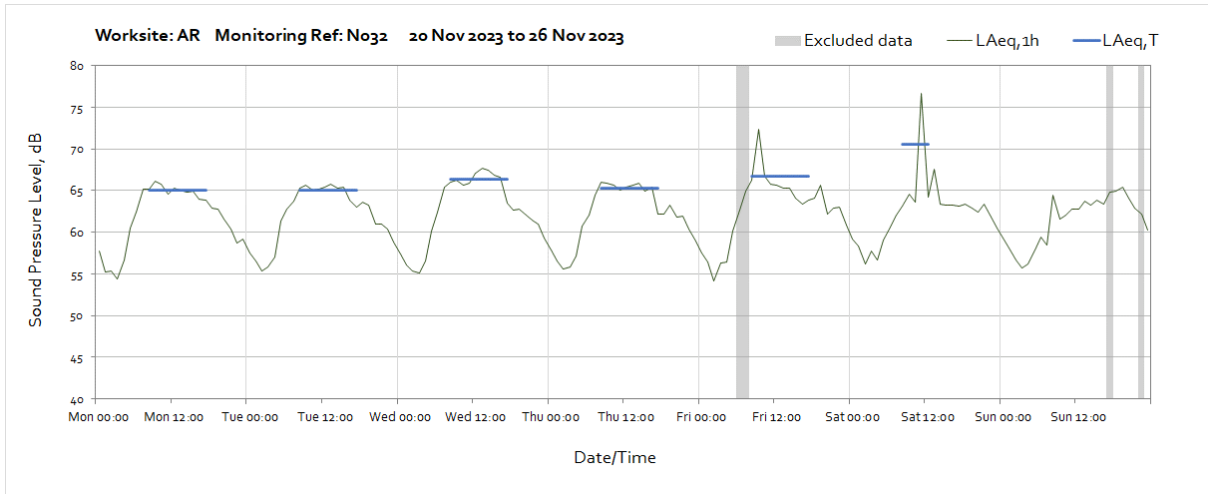




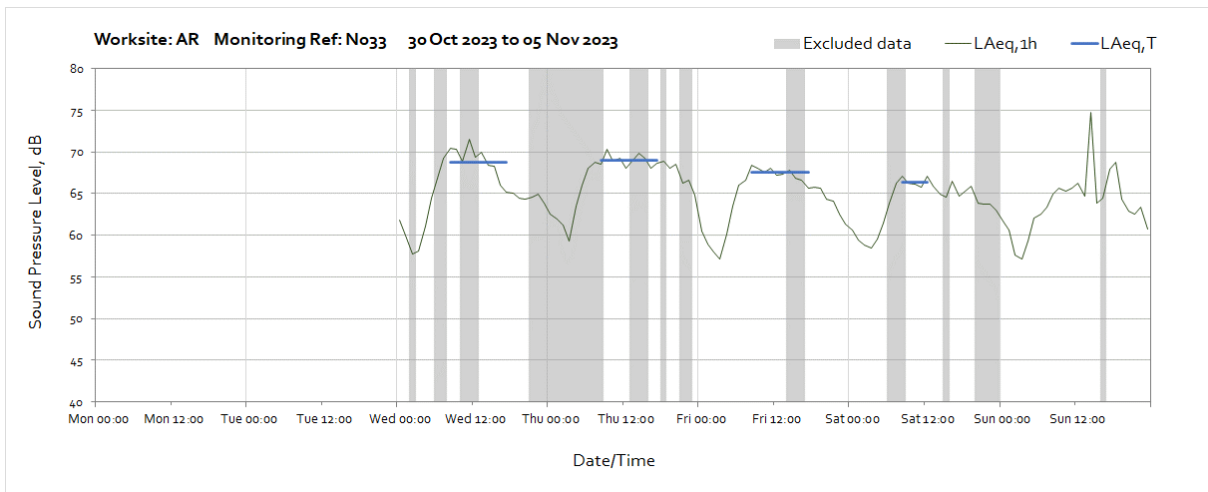
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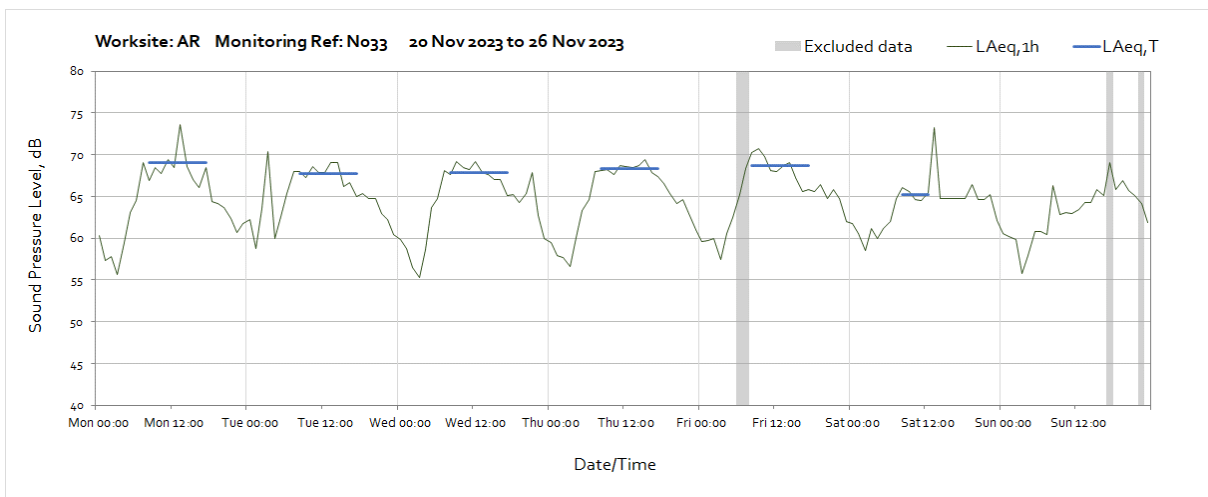
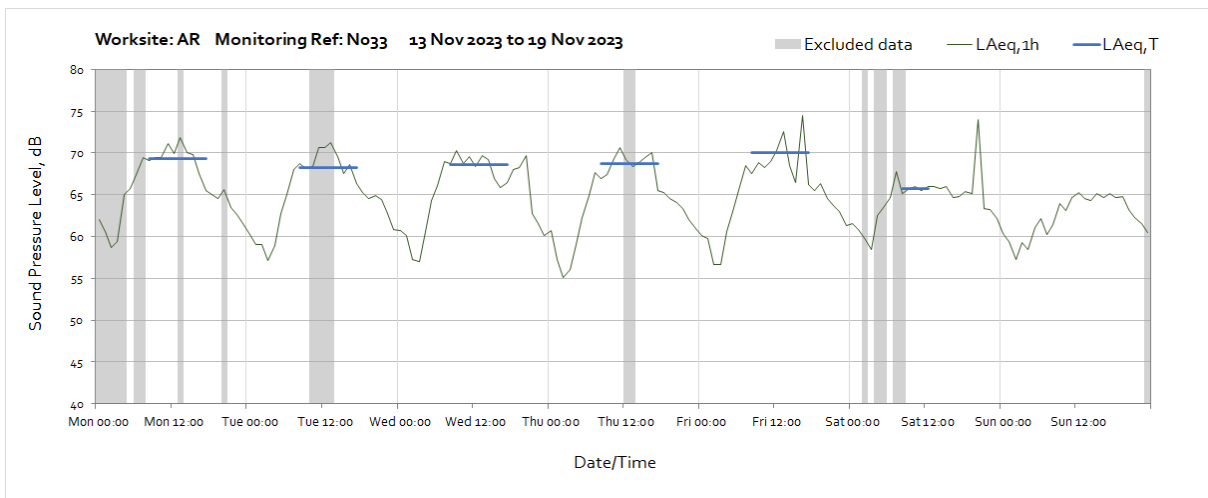
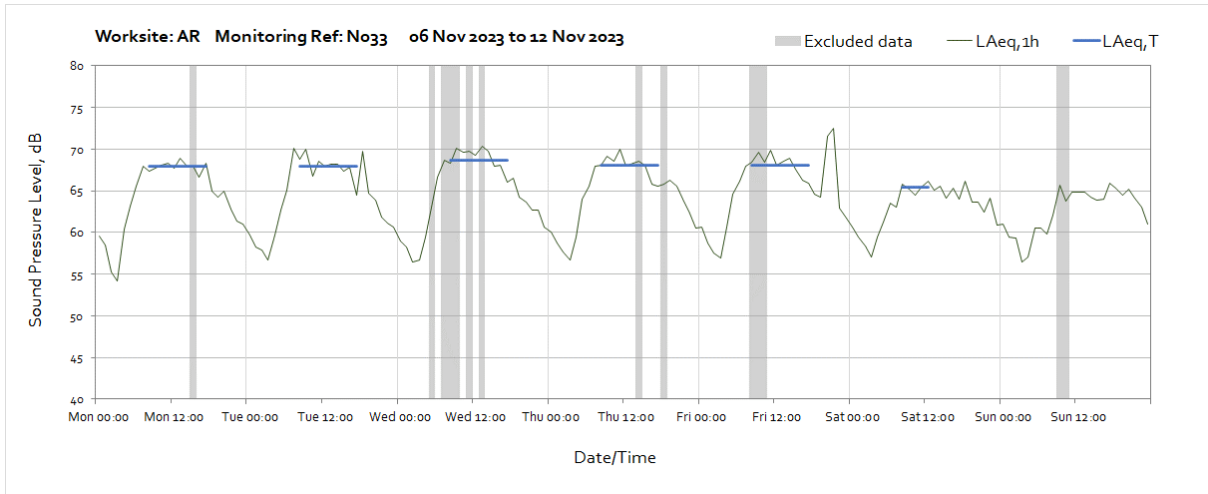


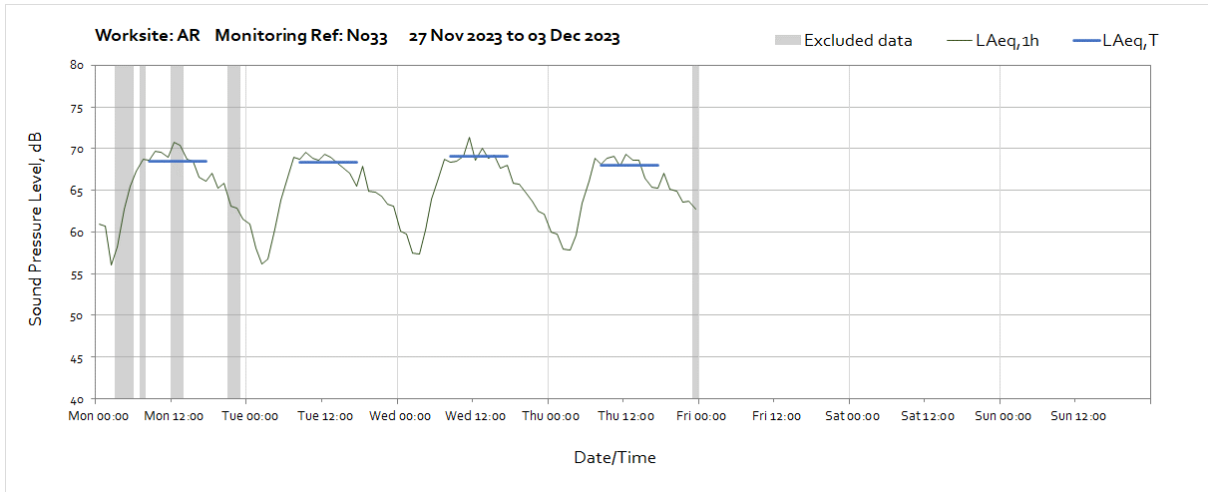
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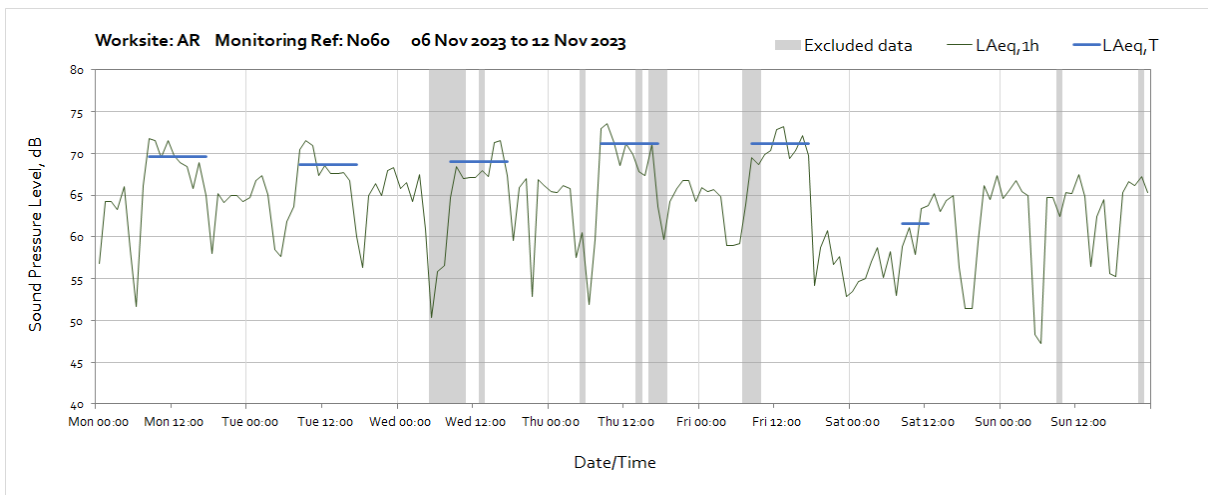
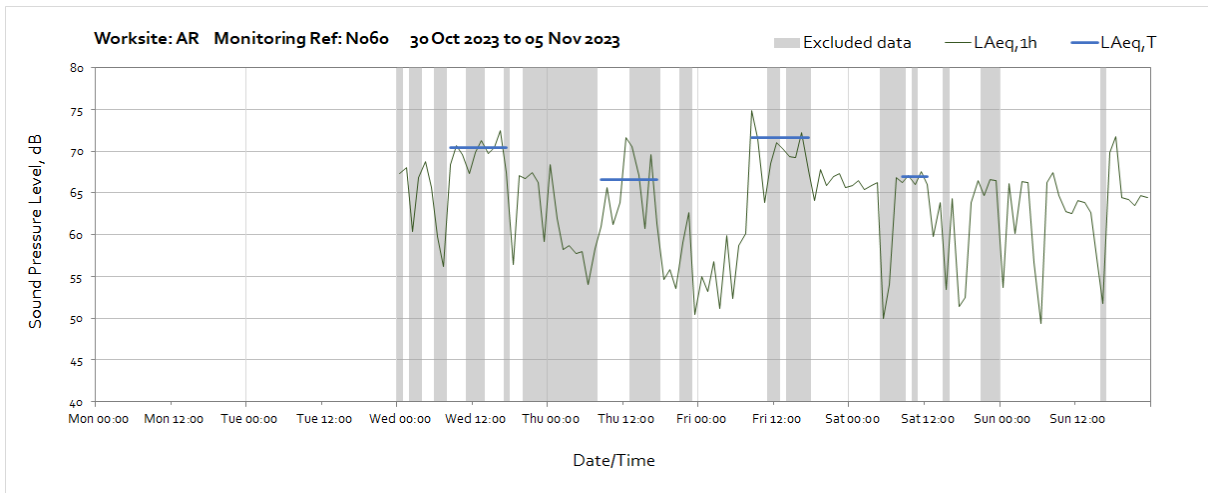
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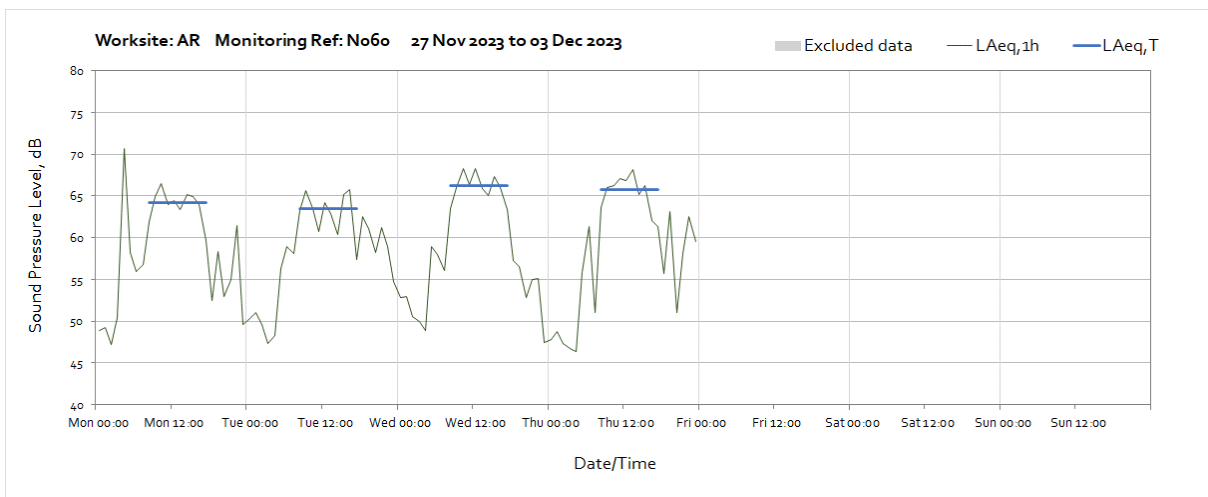
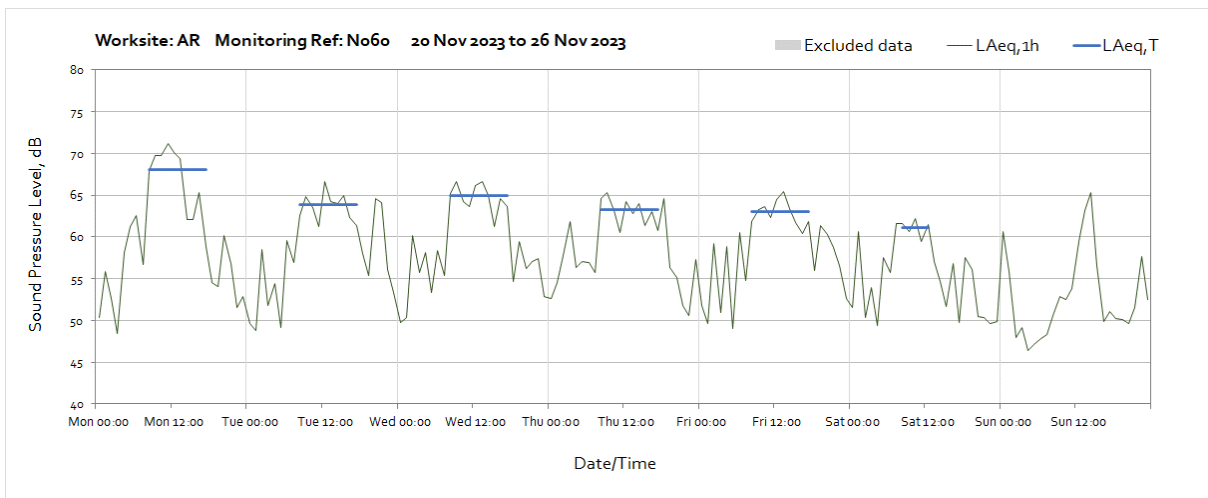
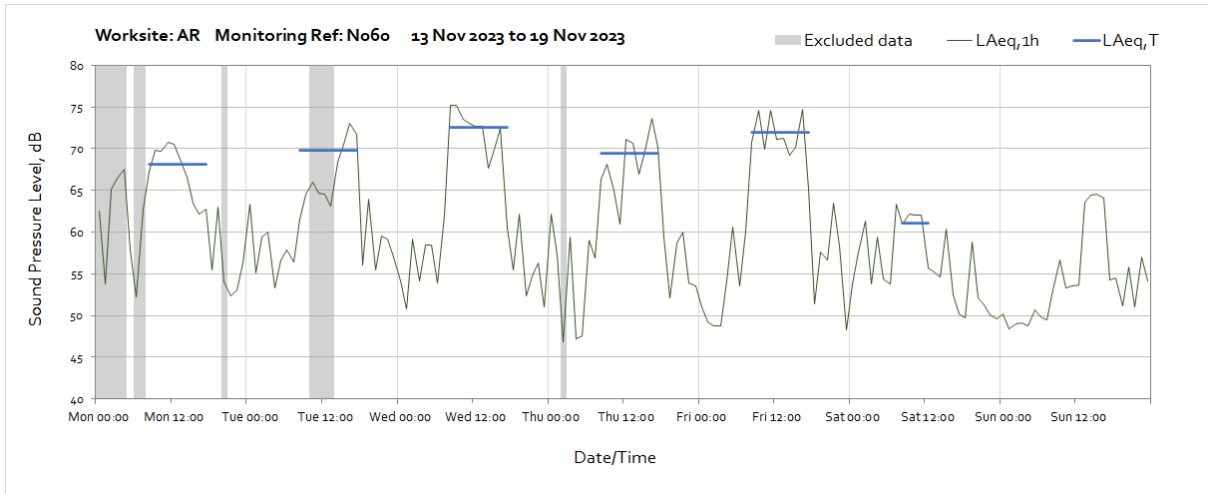




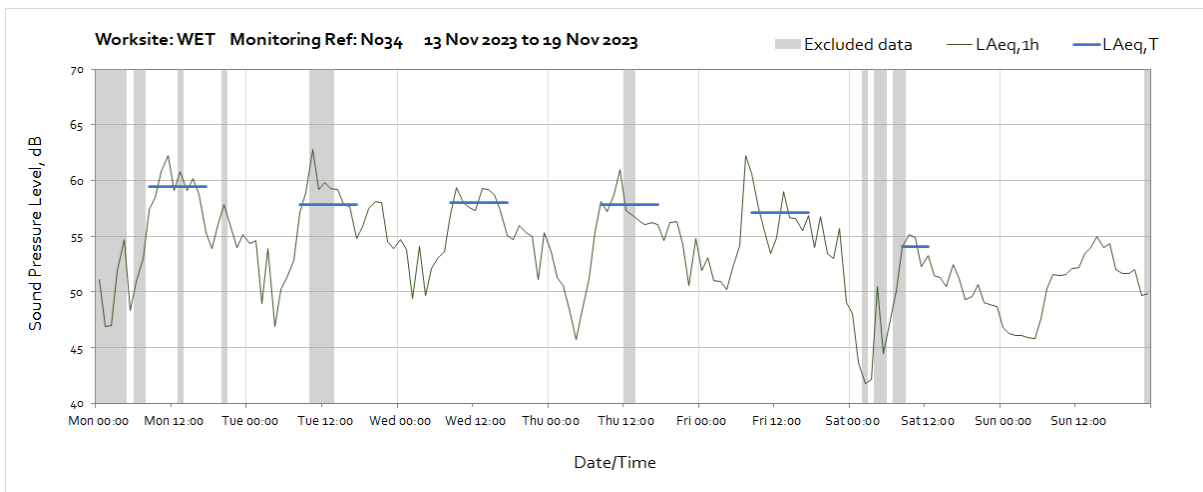
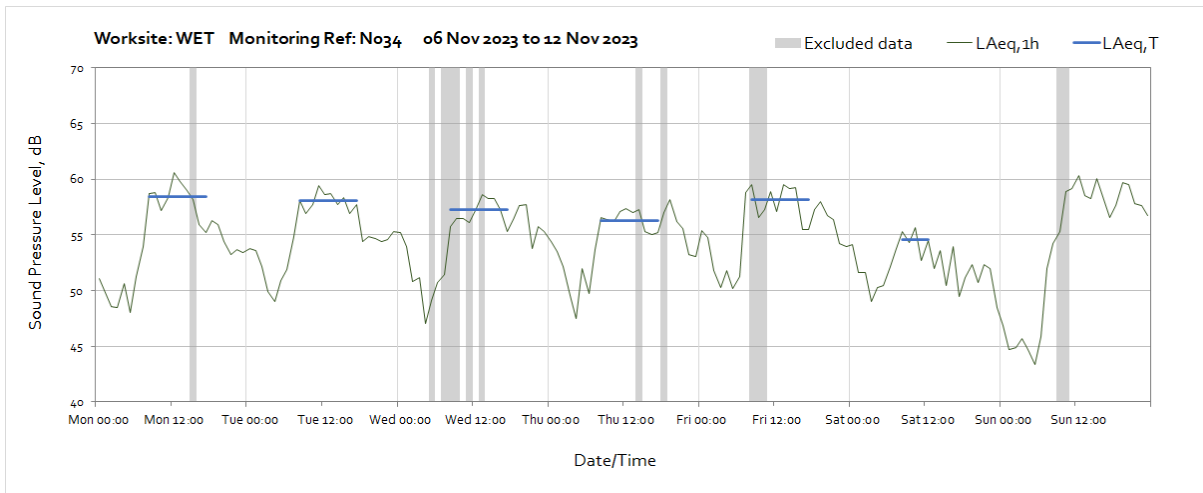
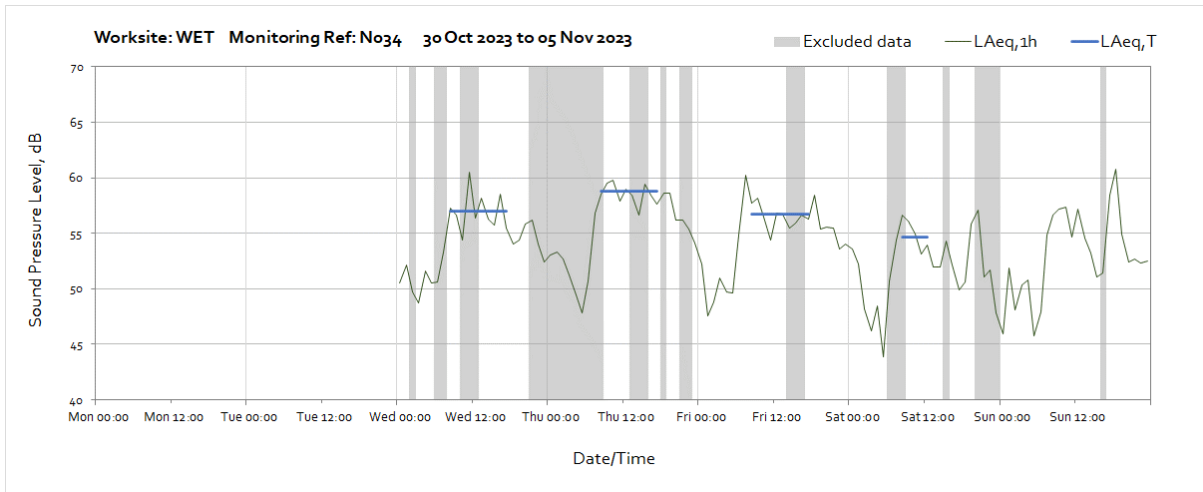


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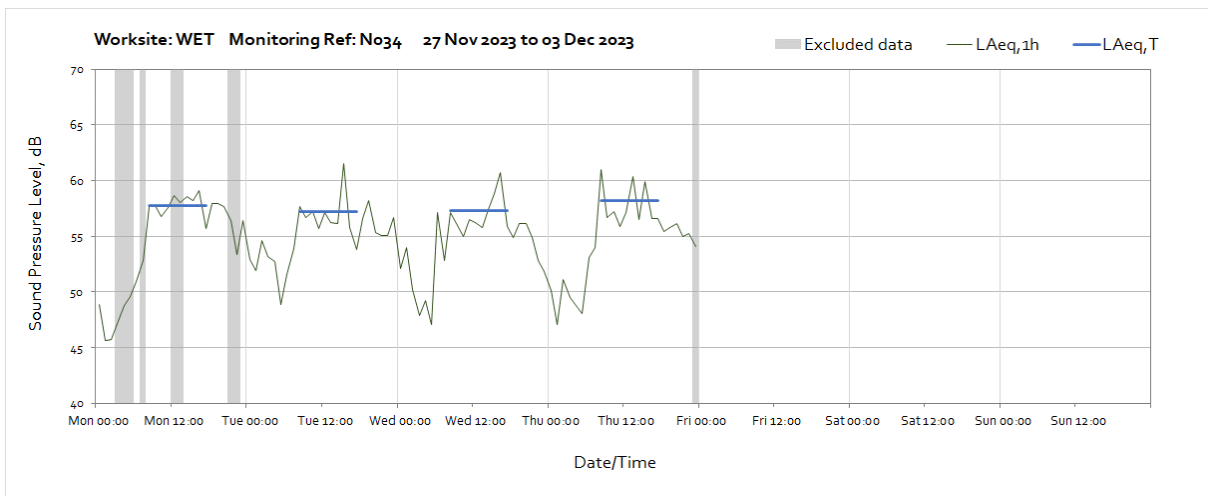
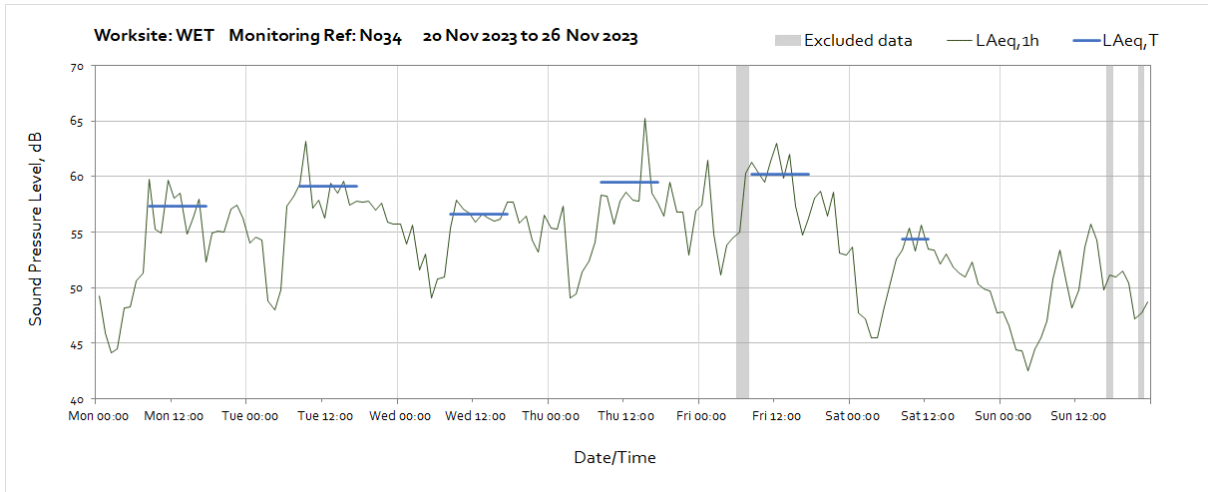




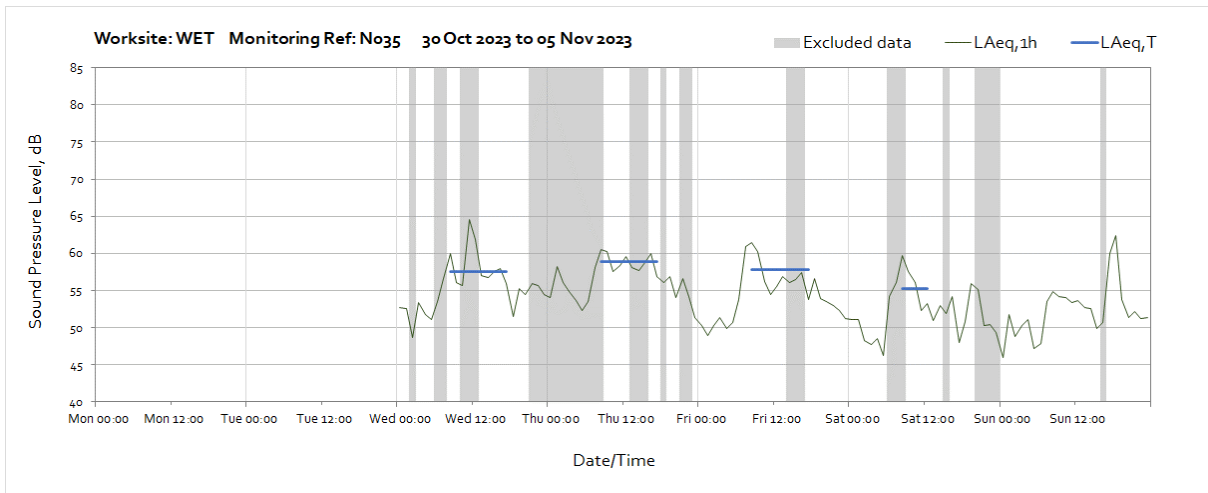
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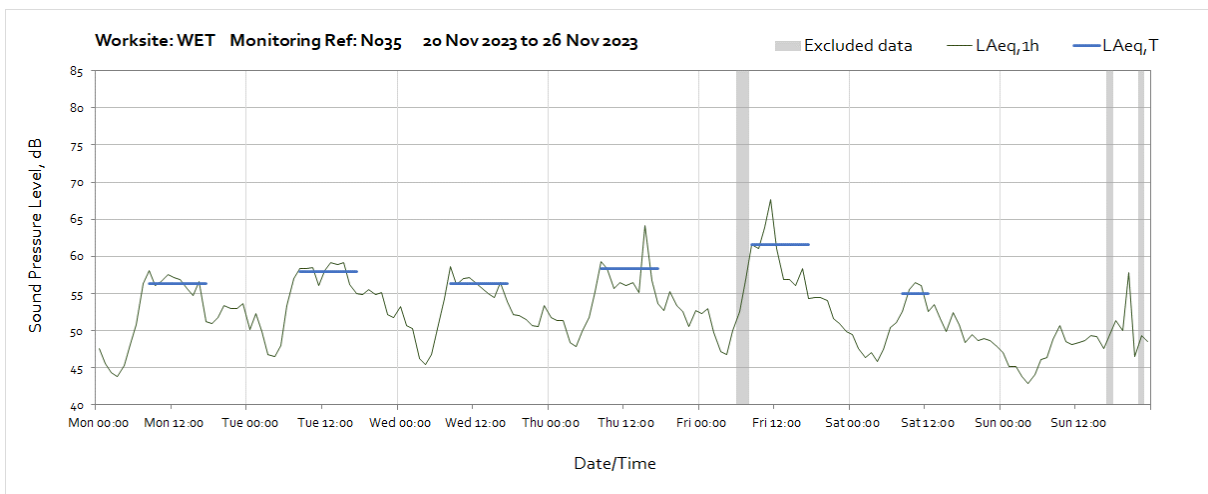
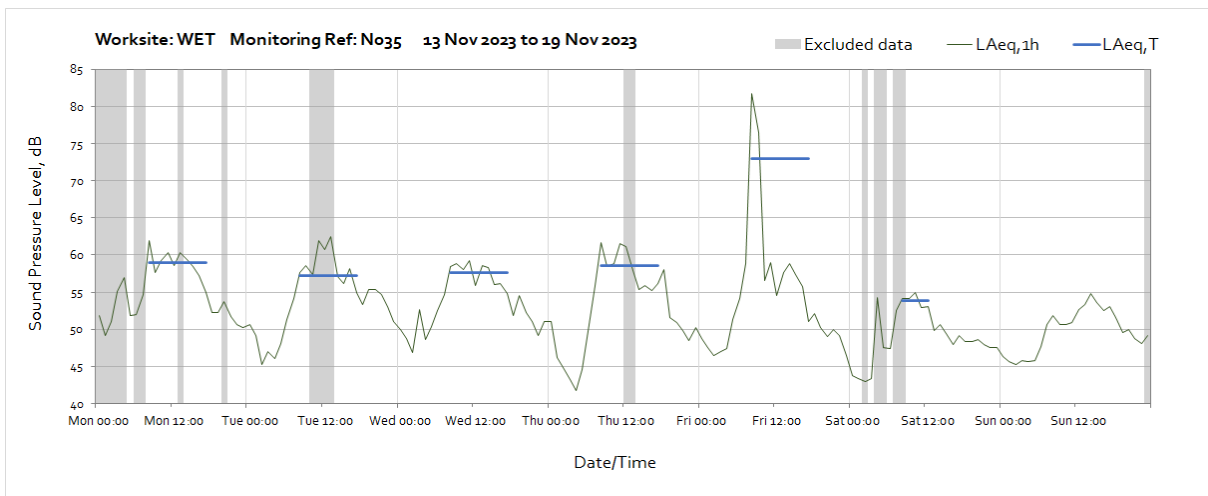
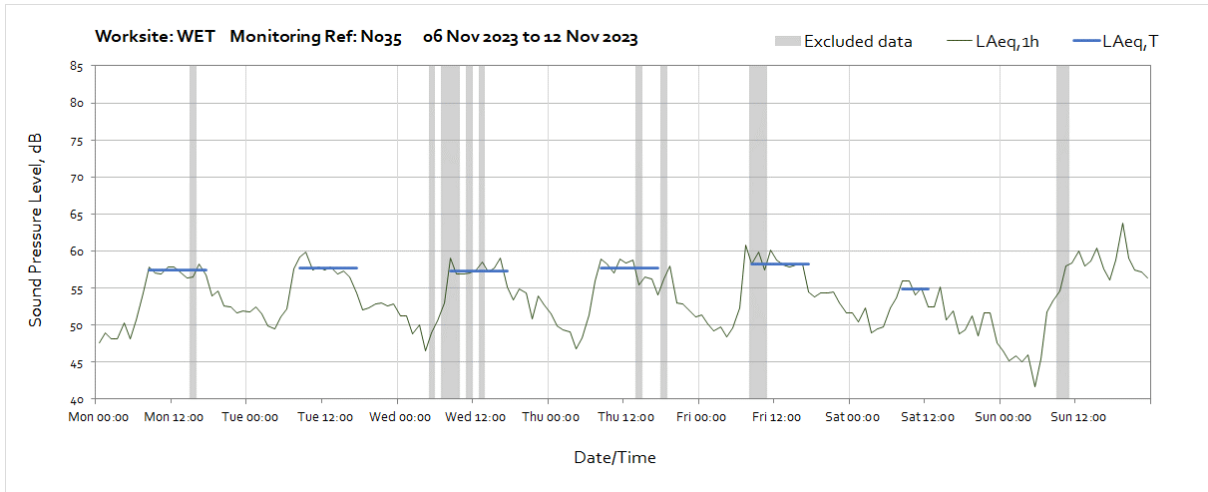


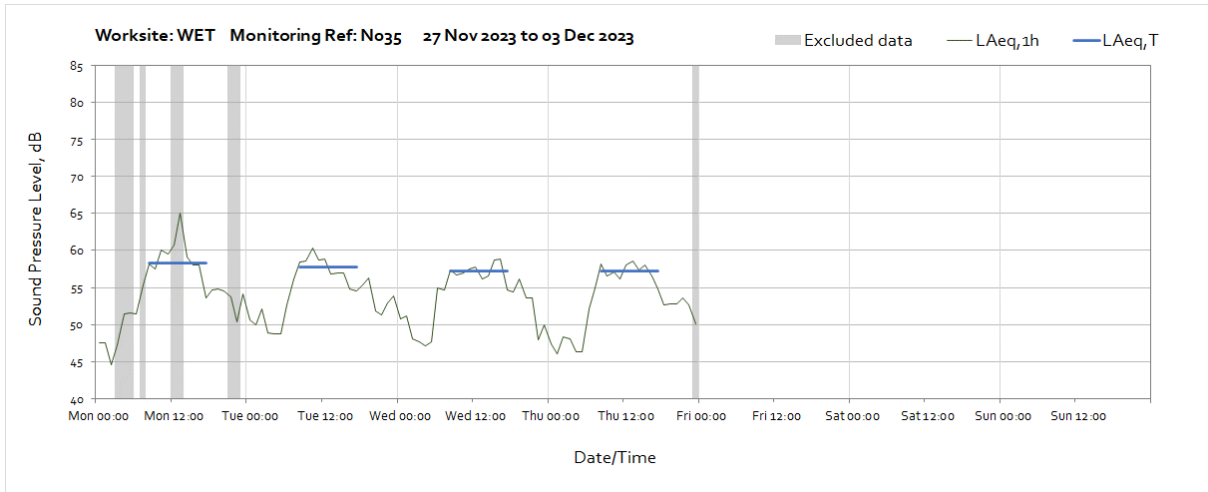
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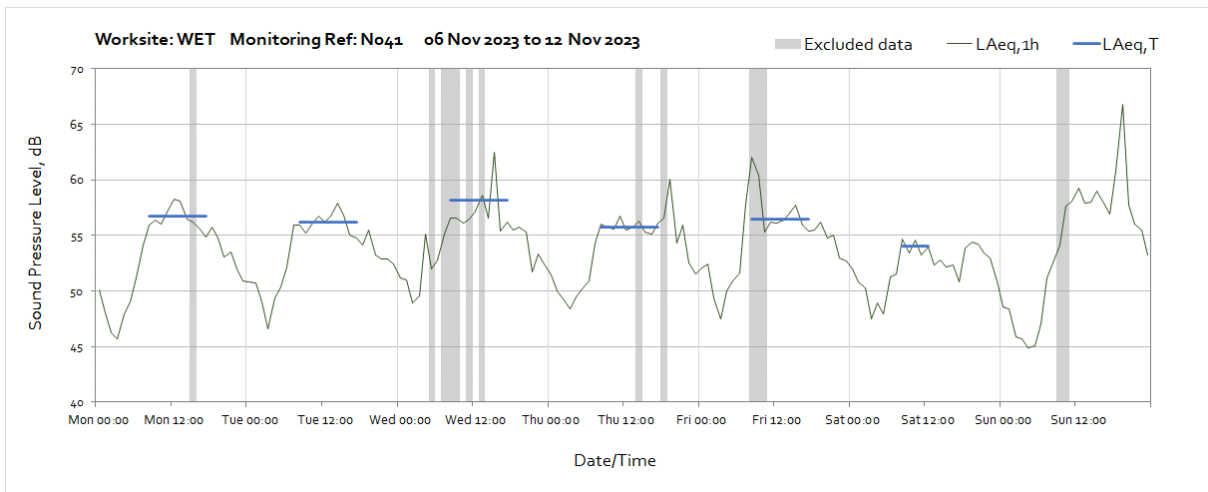
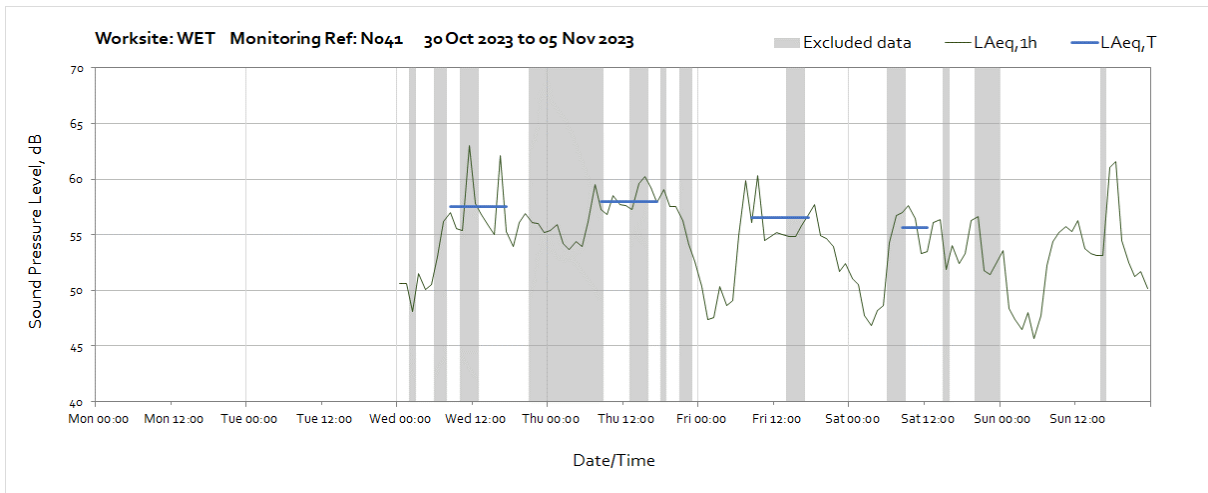
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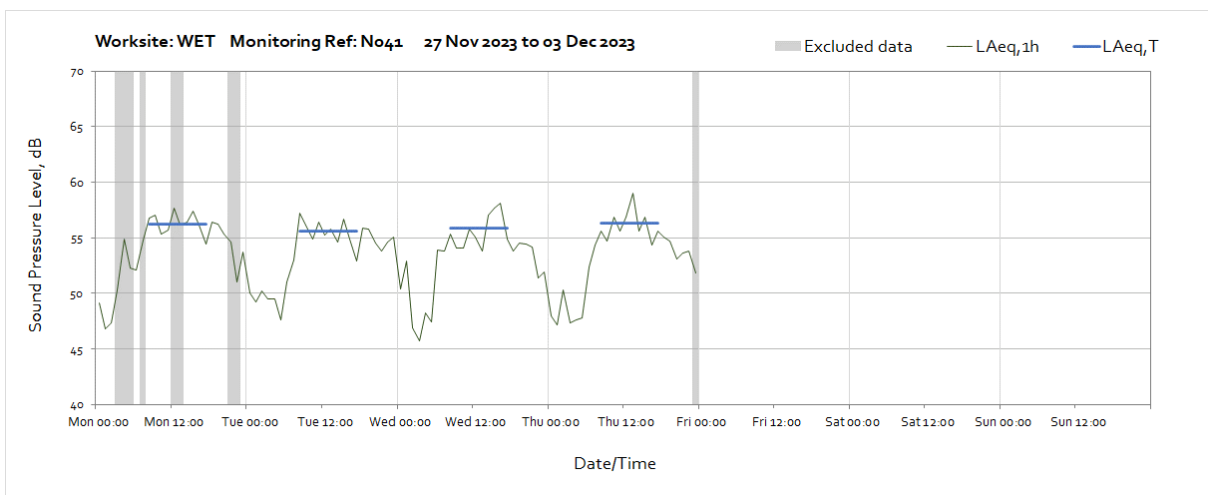
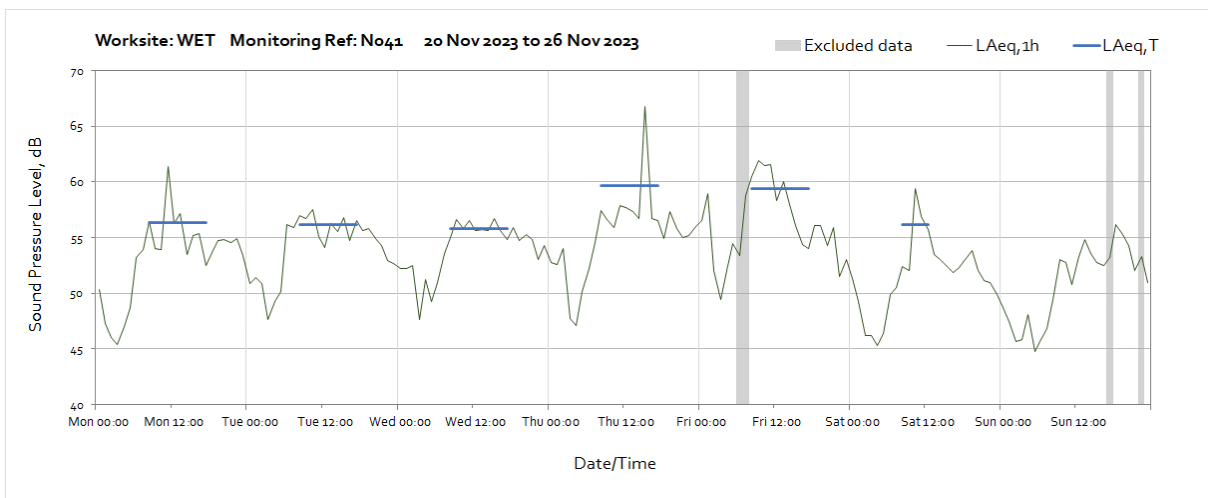
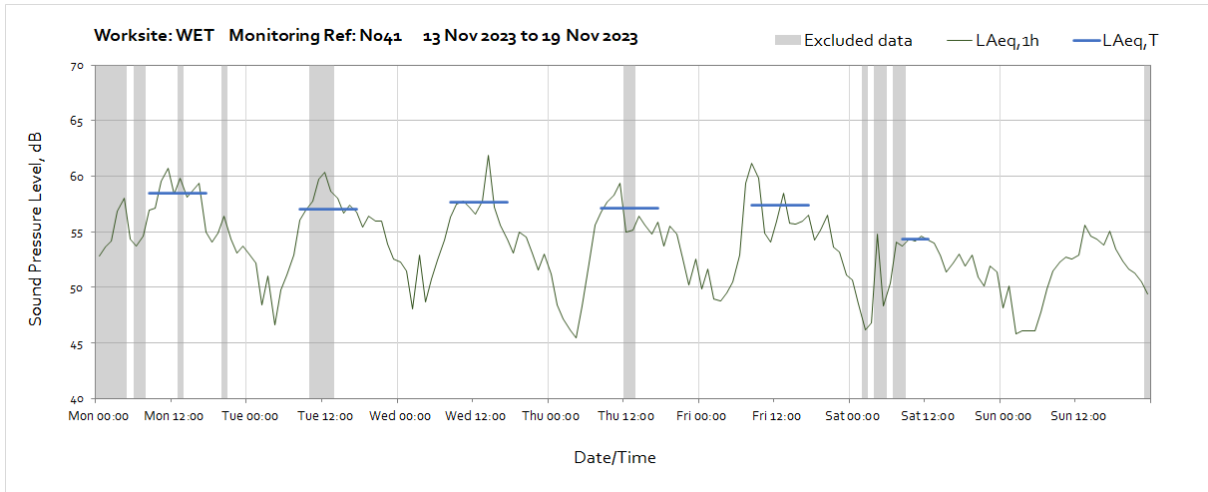




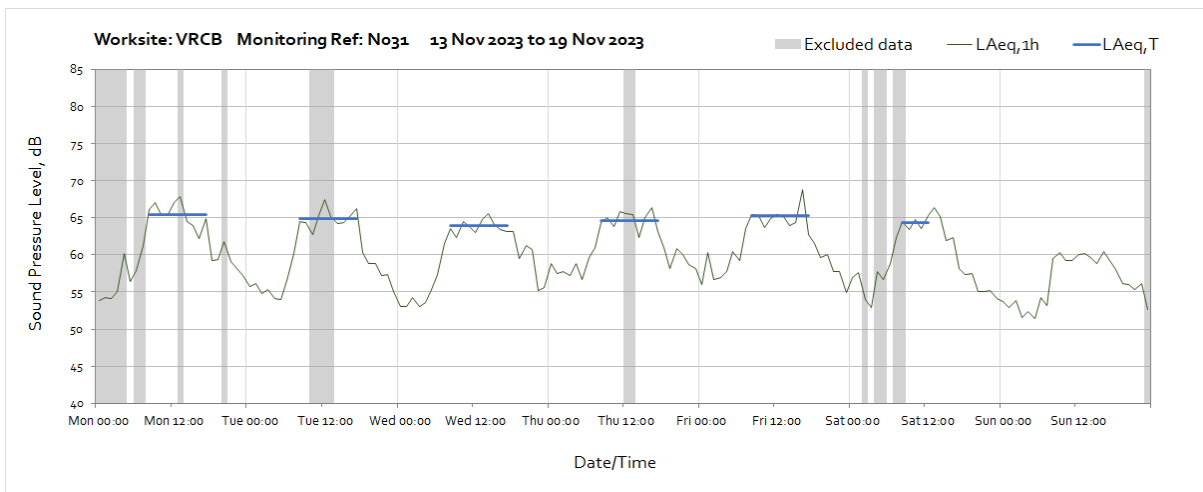
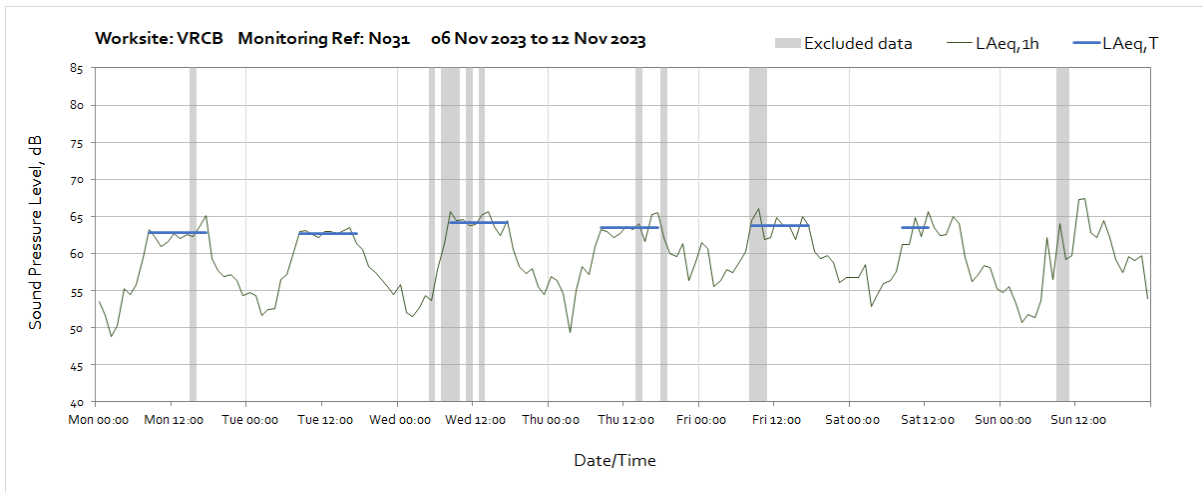
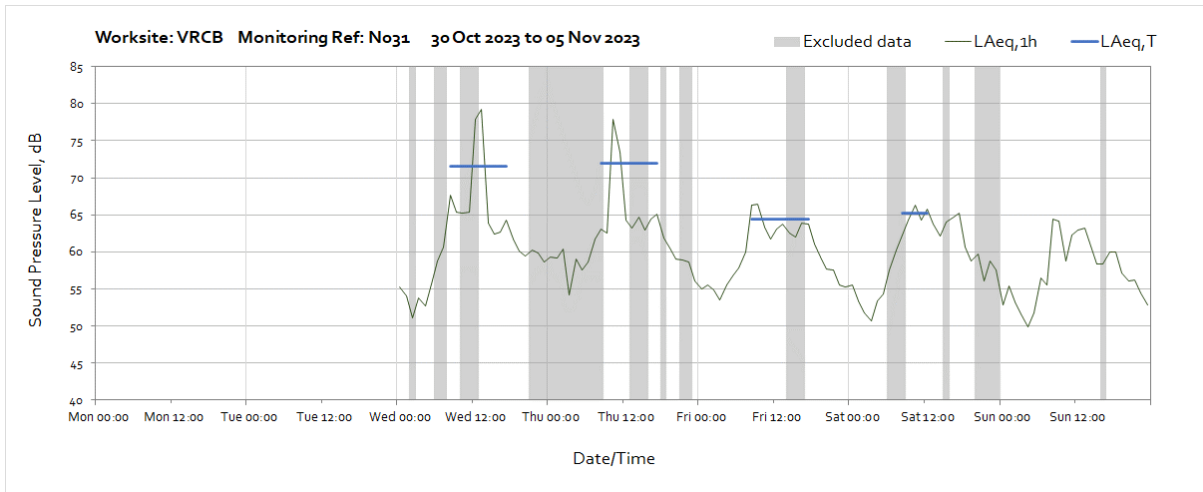


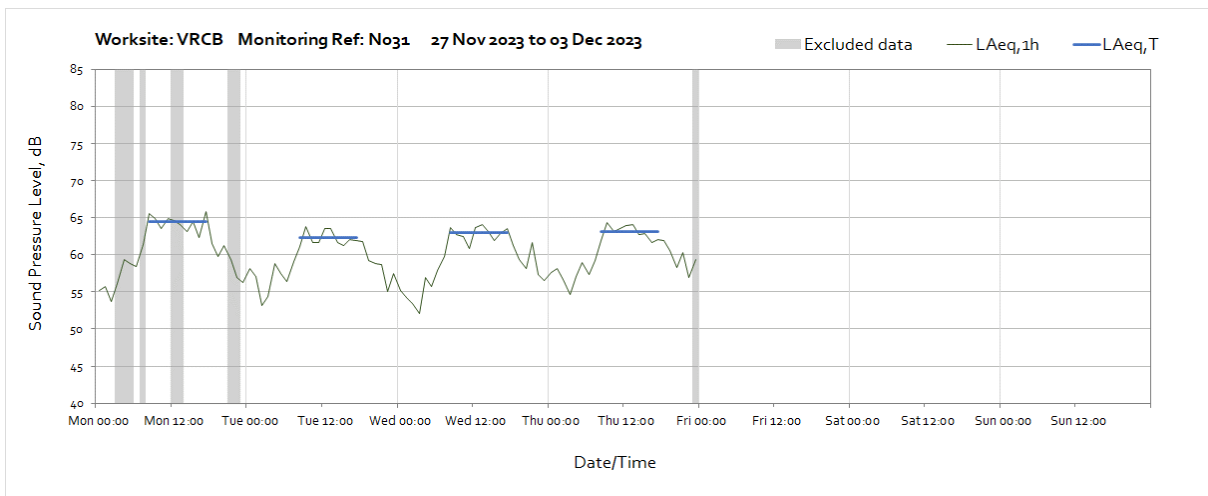
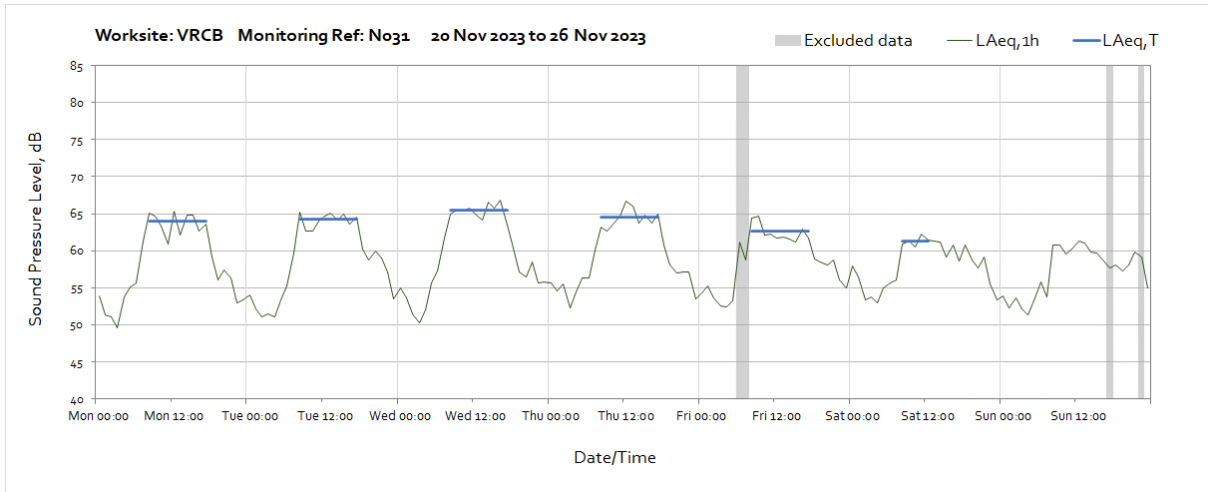
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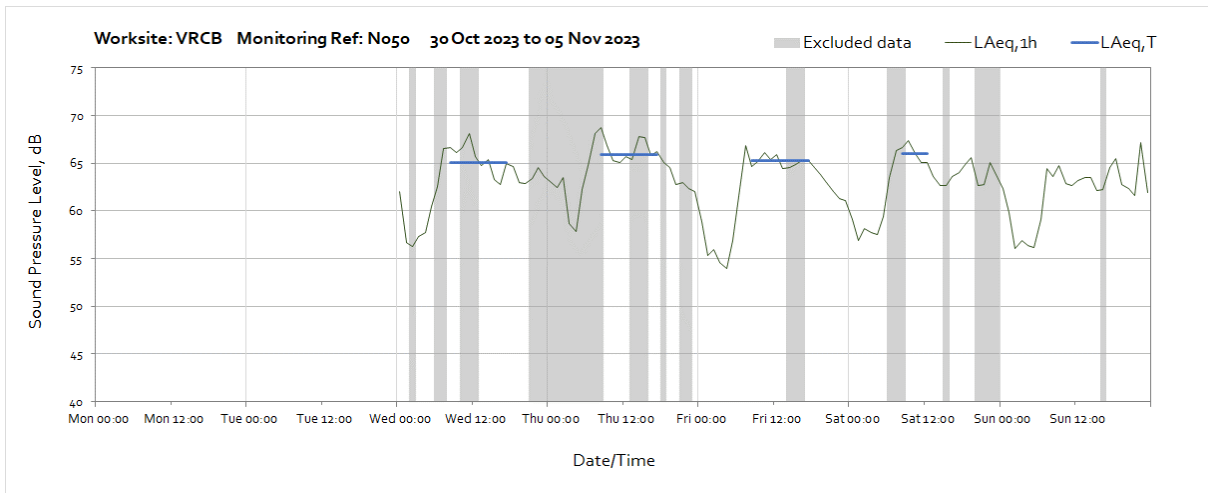


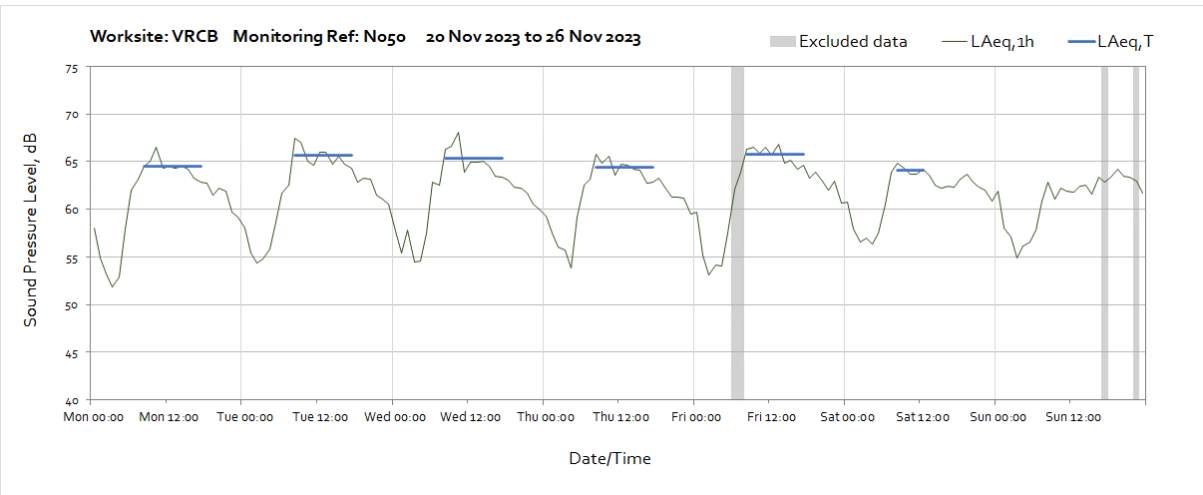
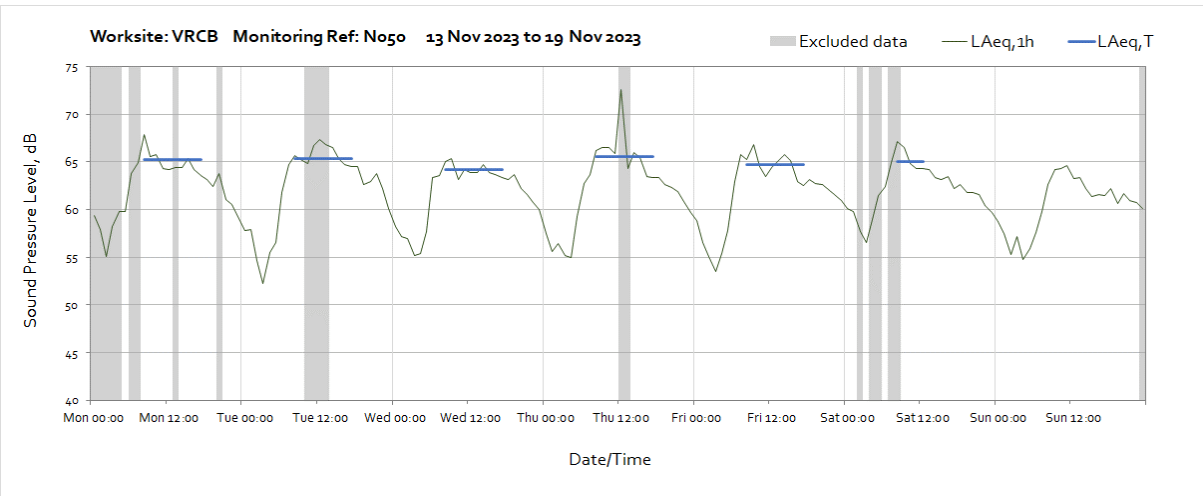
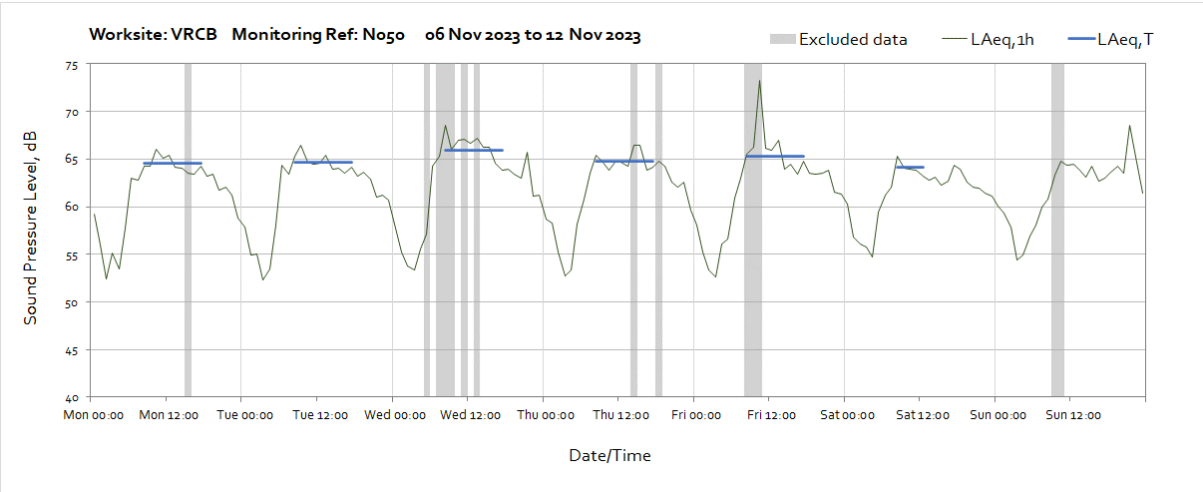
Worksite: VRCB – Monitoring Ref: N031

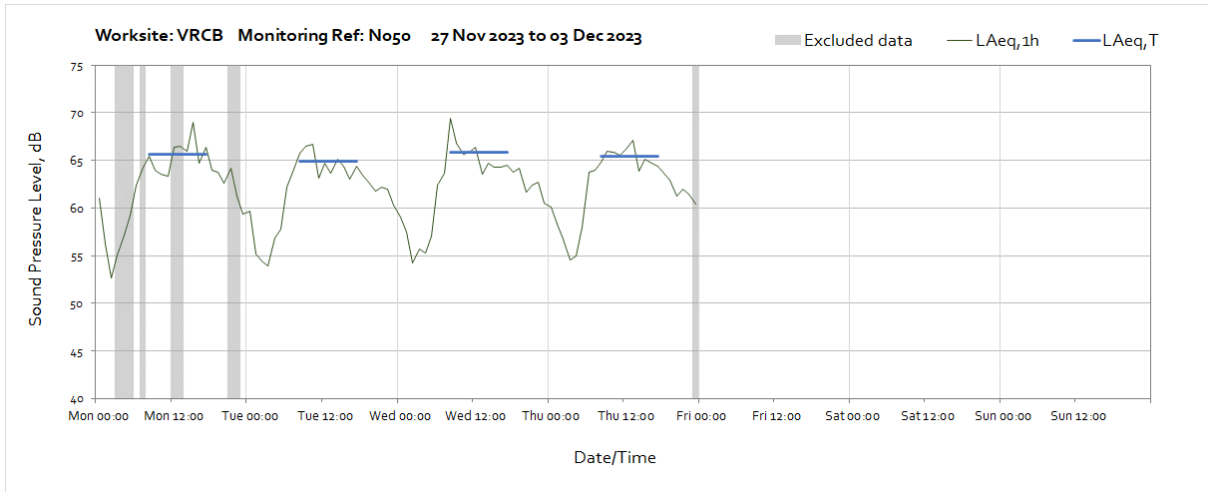




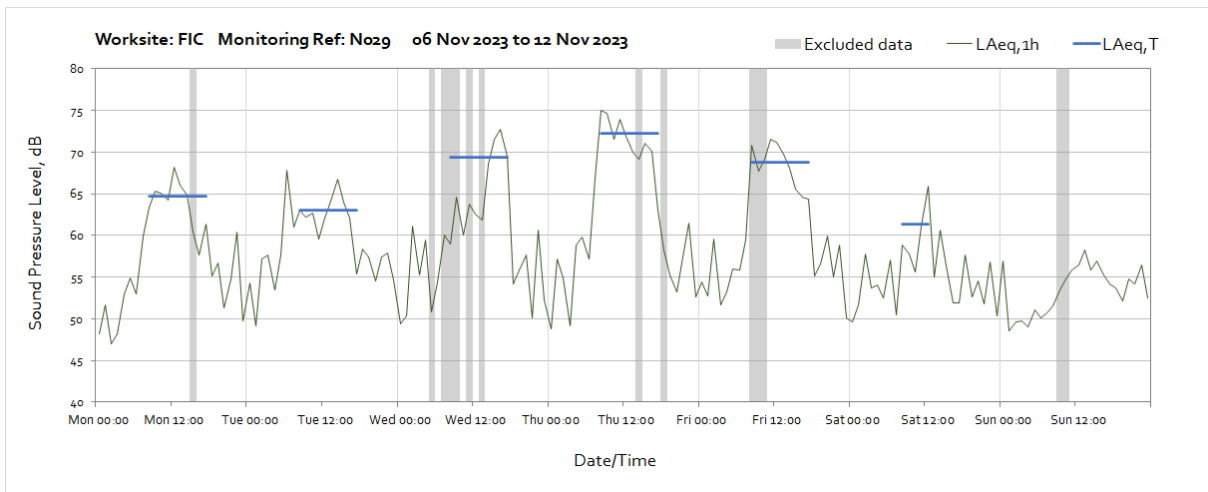
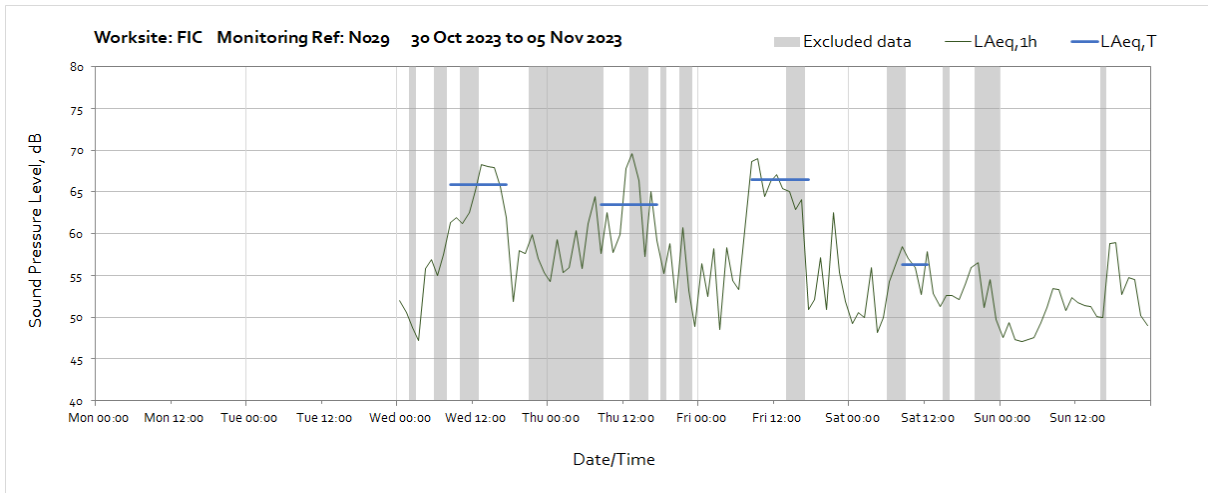
Worksite: VRCB – Monitoring Ref: N050

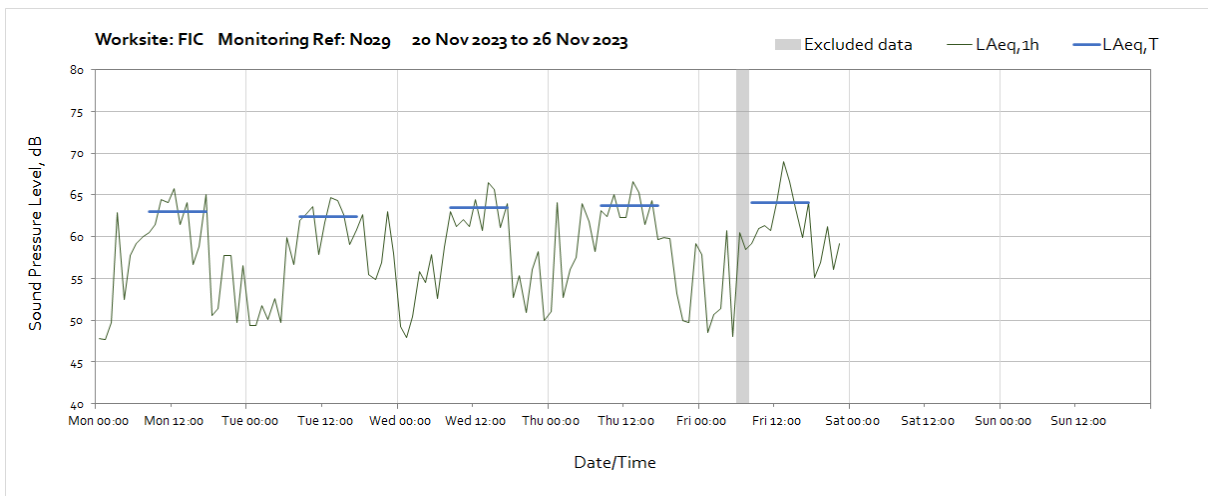
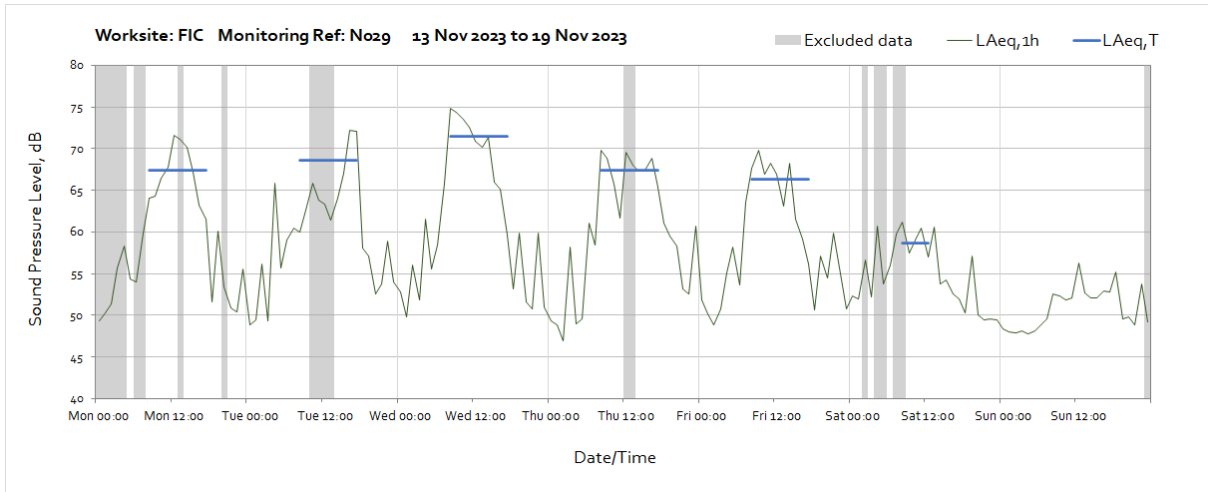






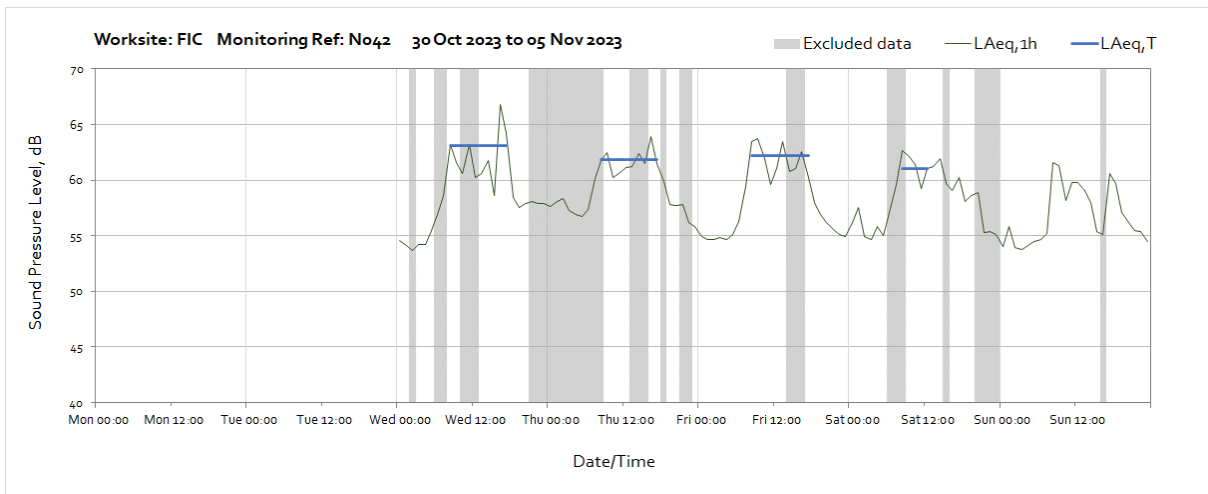
Worksite: FIC – Monitoring Ref: N029

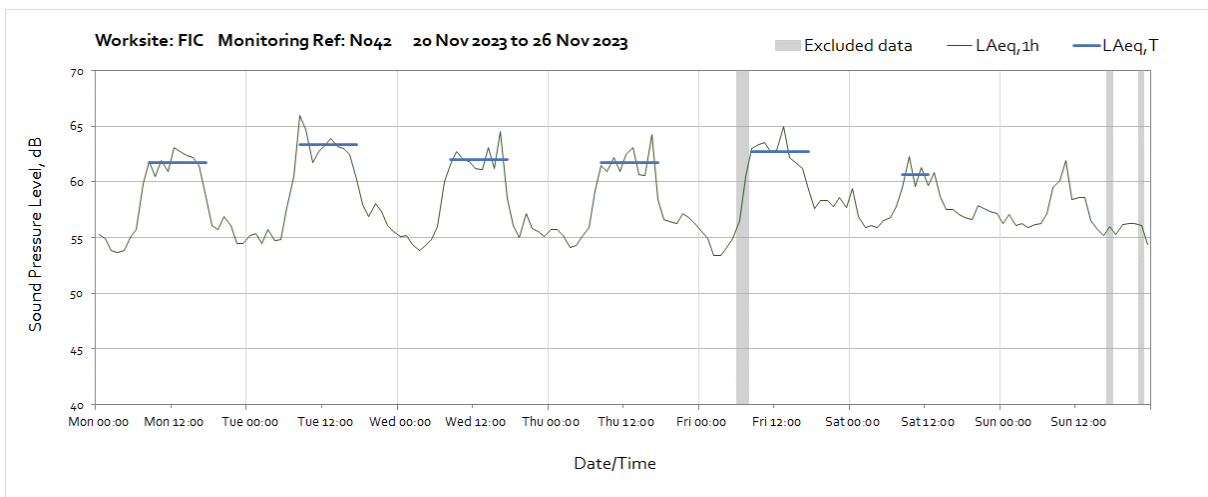
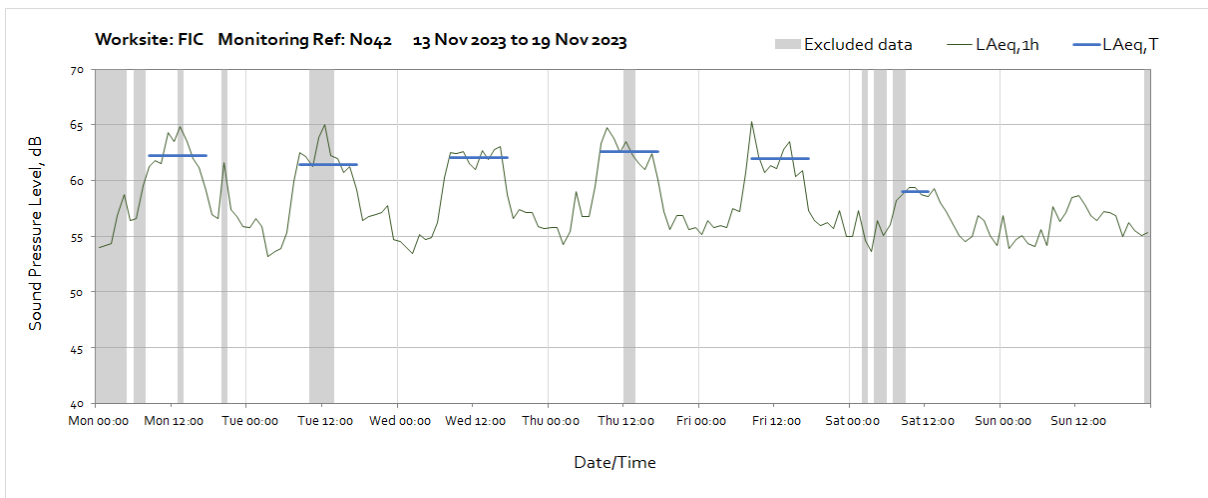
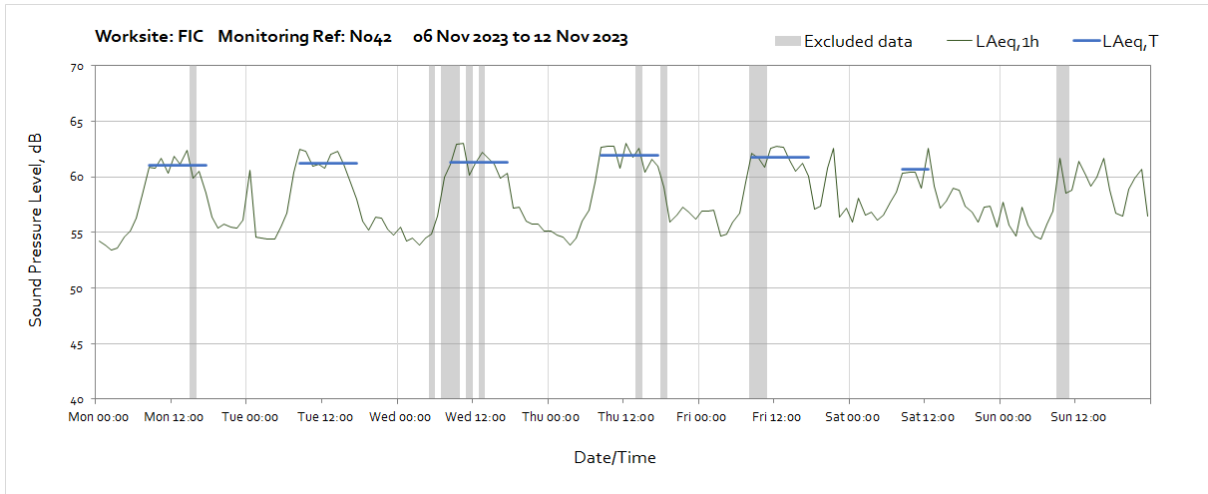


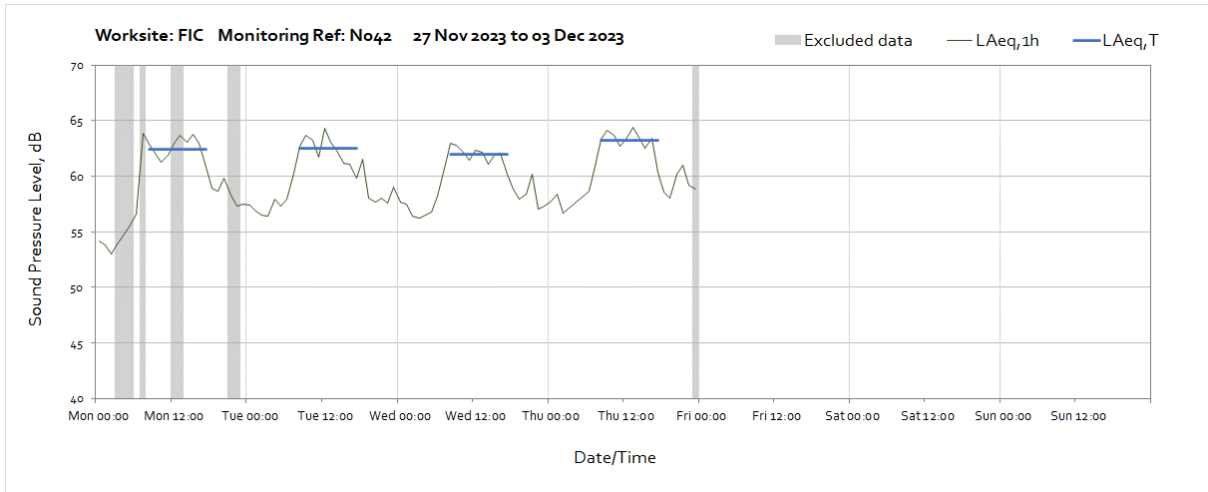


Note: Missing data from 23:00 on Friday 24th November until the end of the month was due to loss of continuous power at the monitoring station.

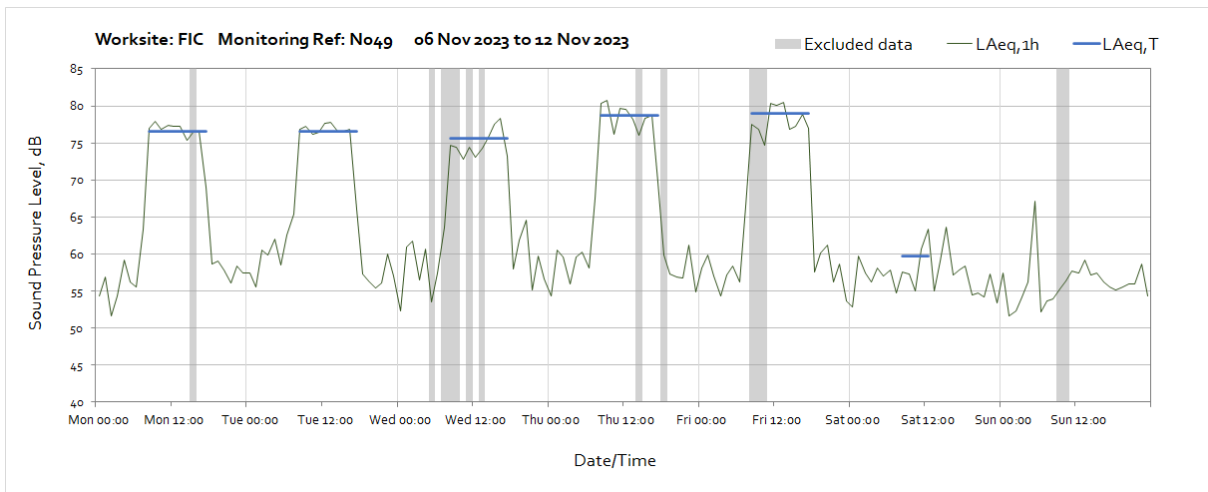
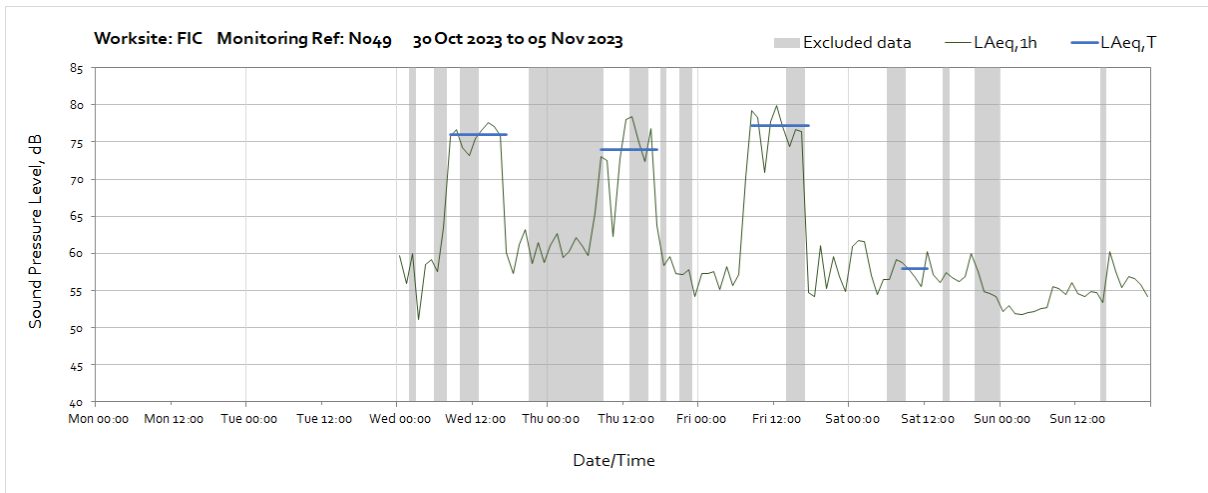
Worksite: FIC – Monitoring Ref: N042

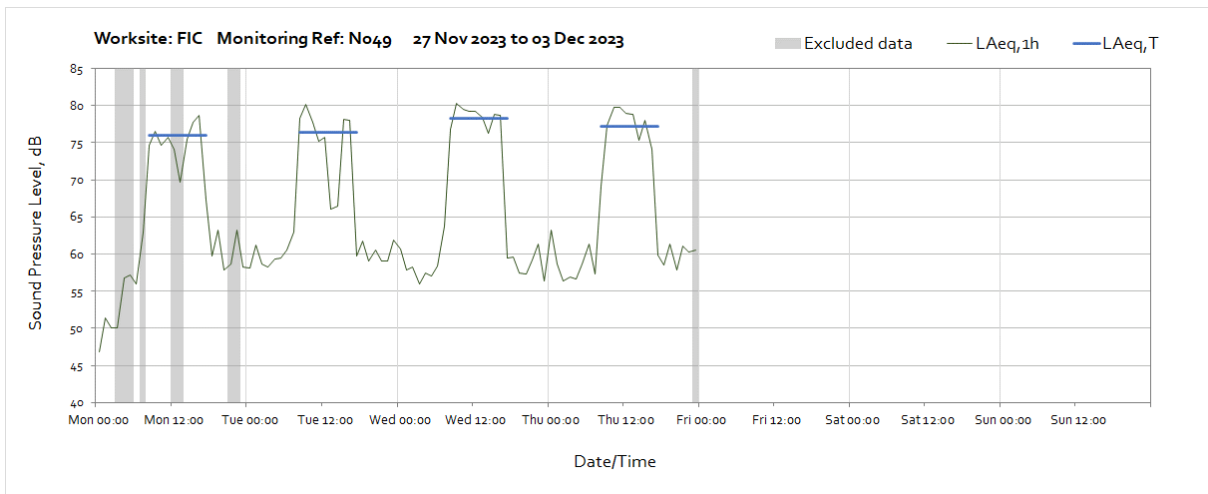
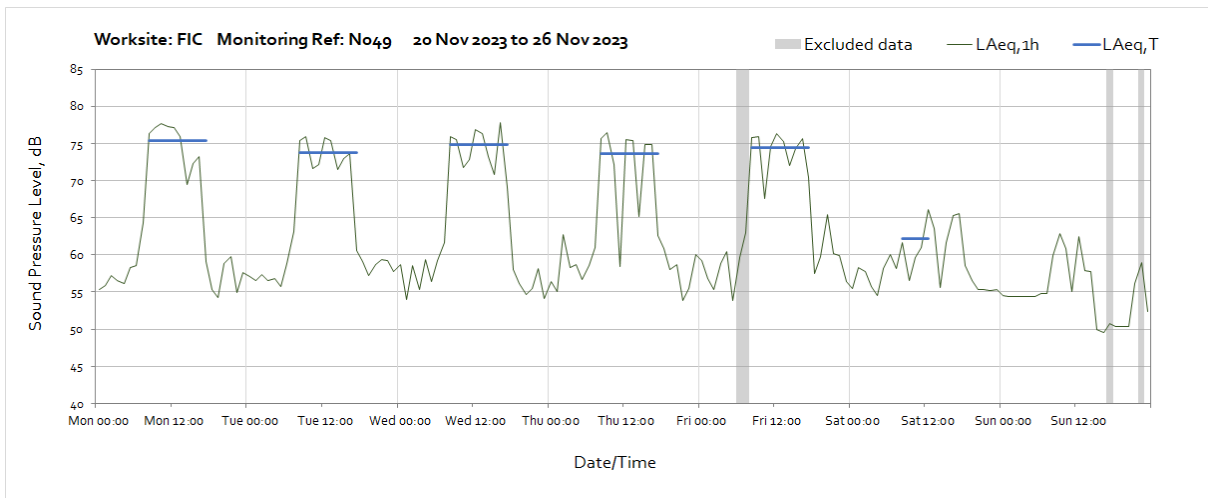
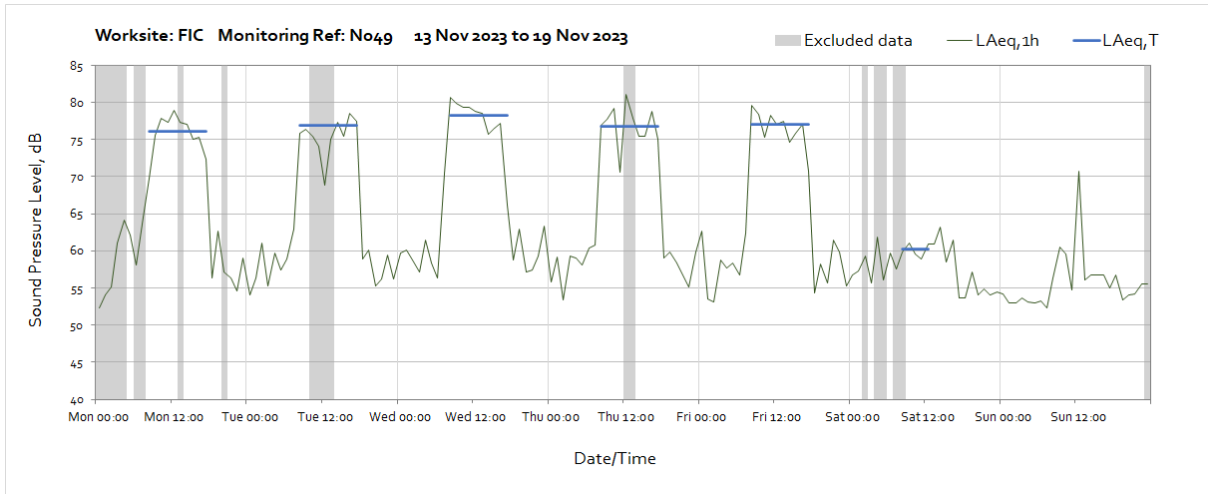




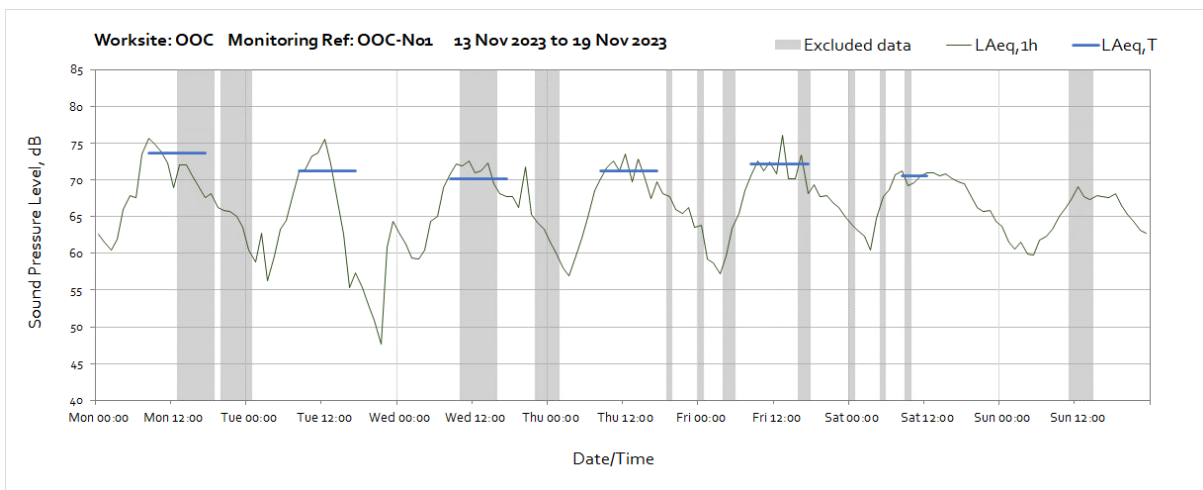
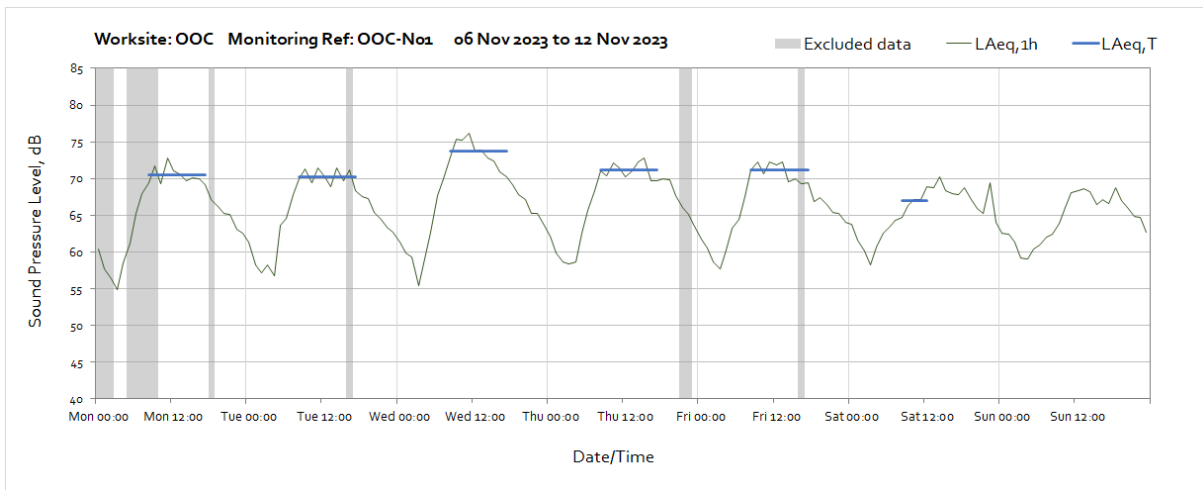
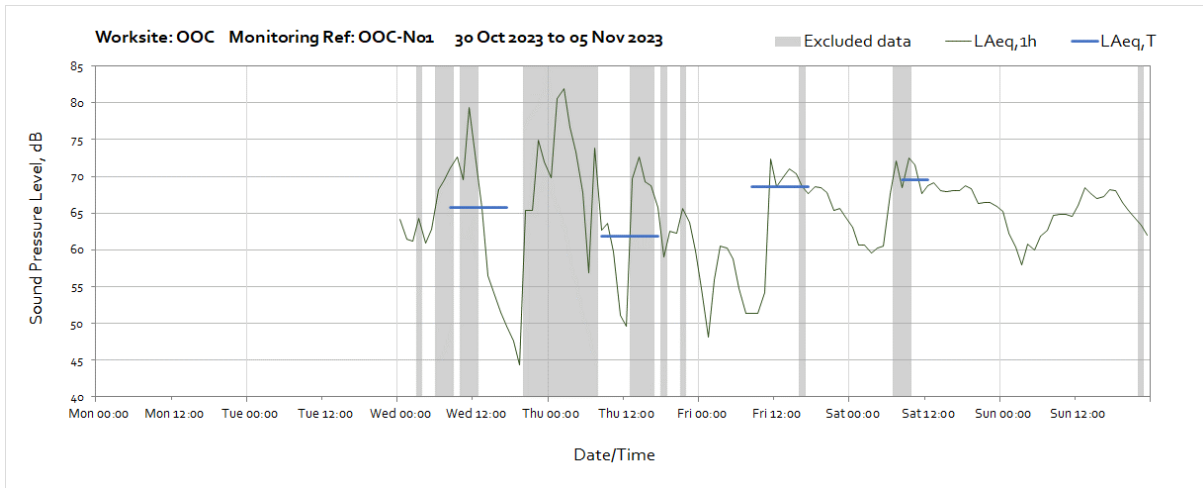


Worksite: FIC – Monitoring Ref: N049

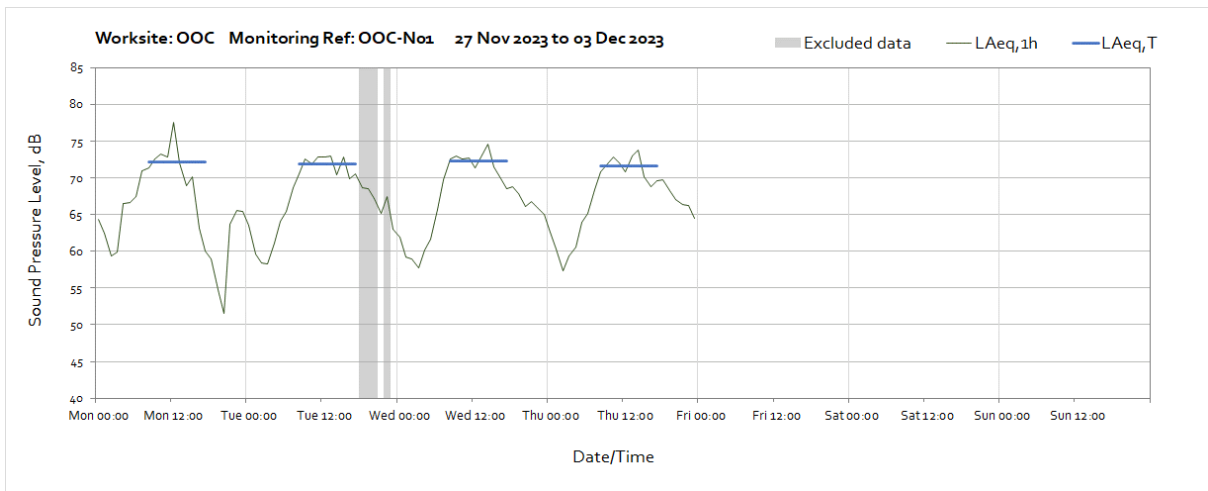
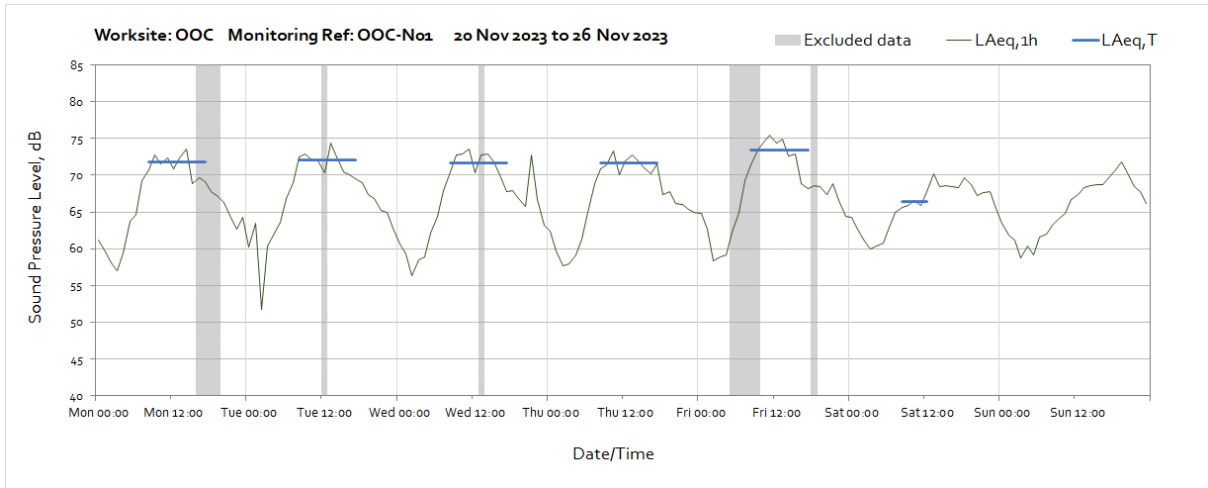




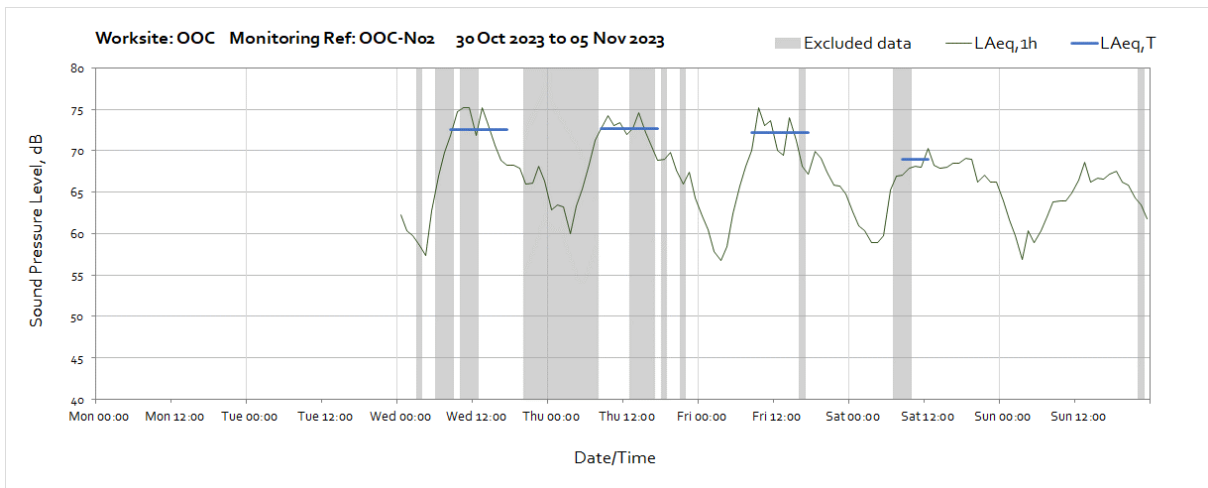
Worksite: OOC – Monitoring Ref: OOC-N01

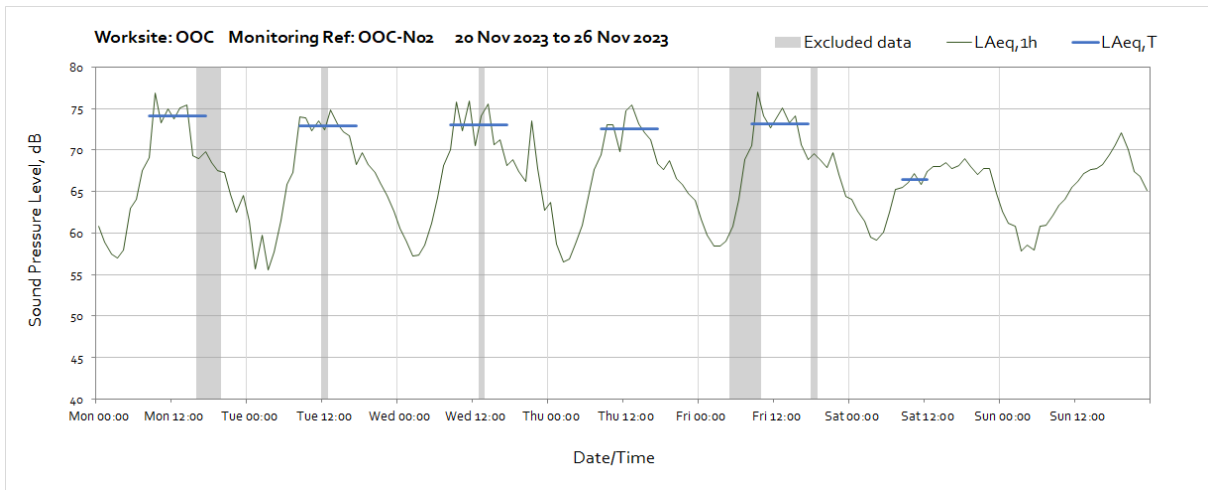
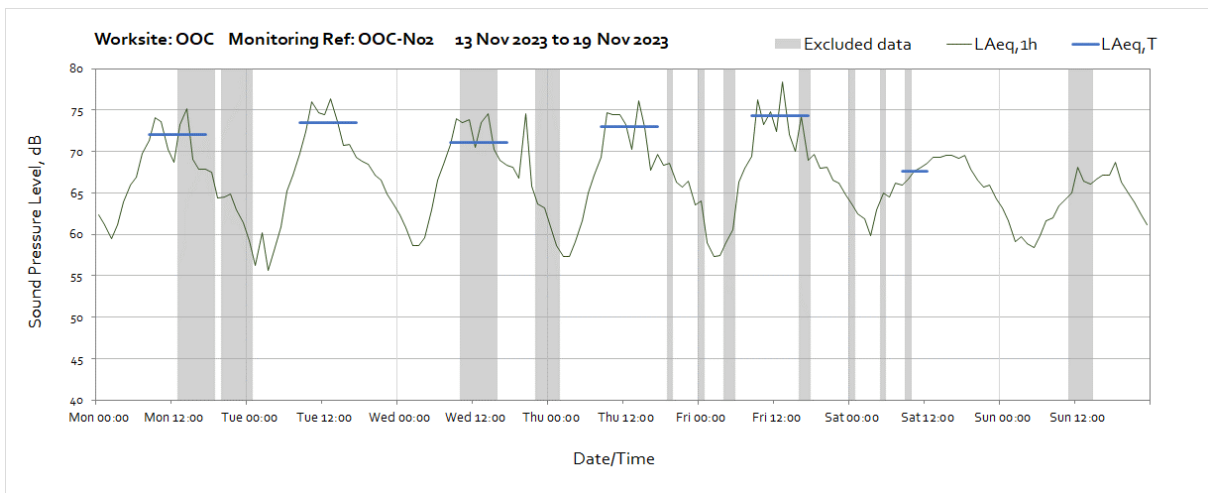
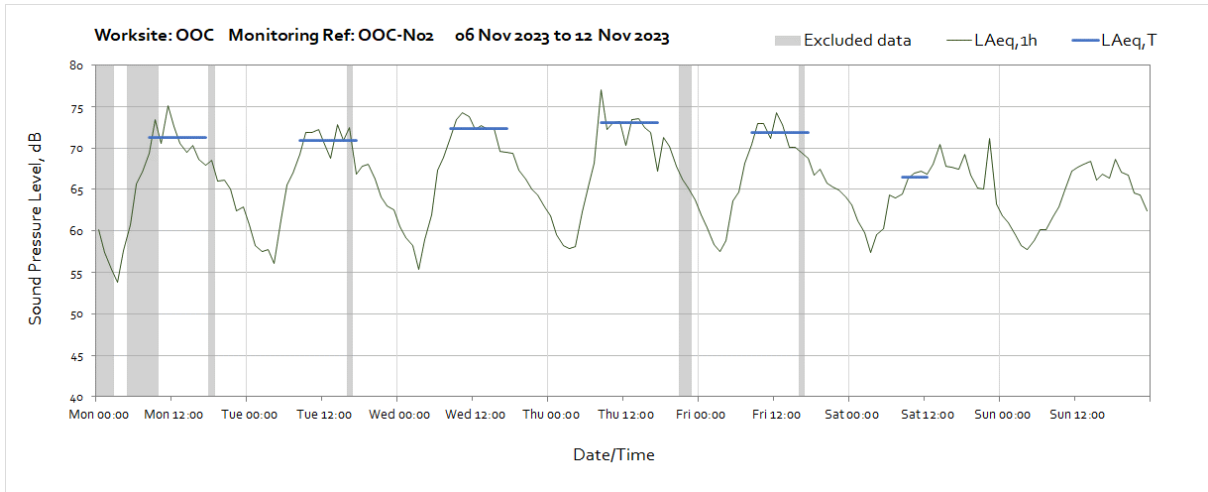


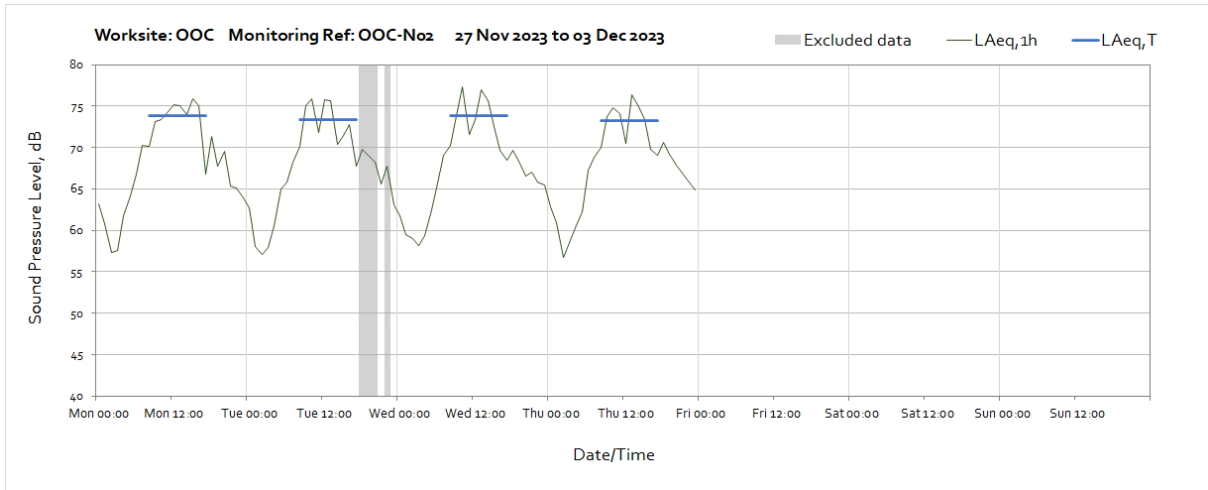
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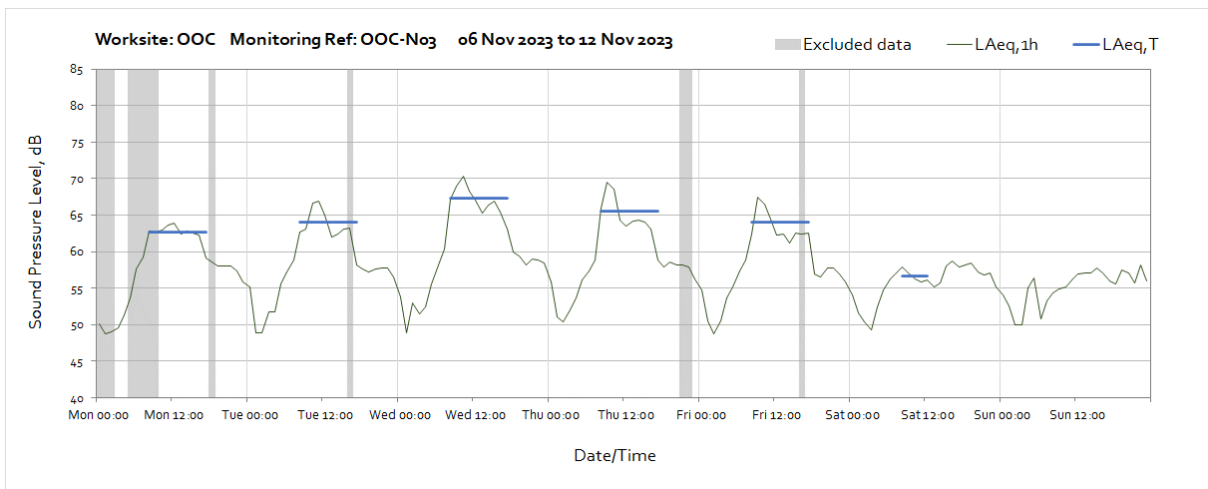
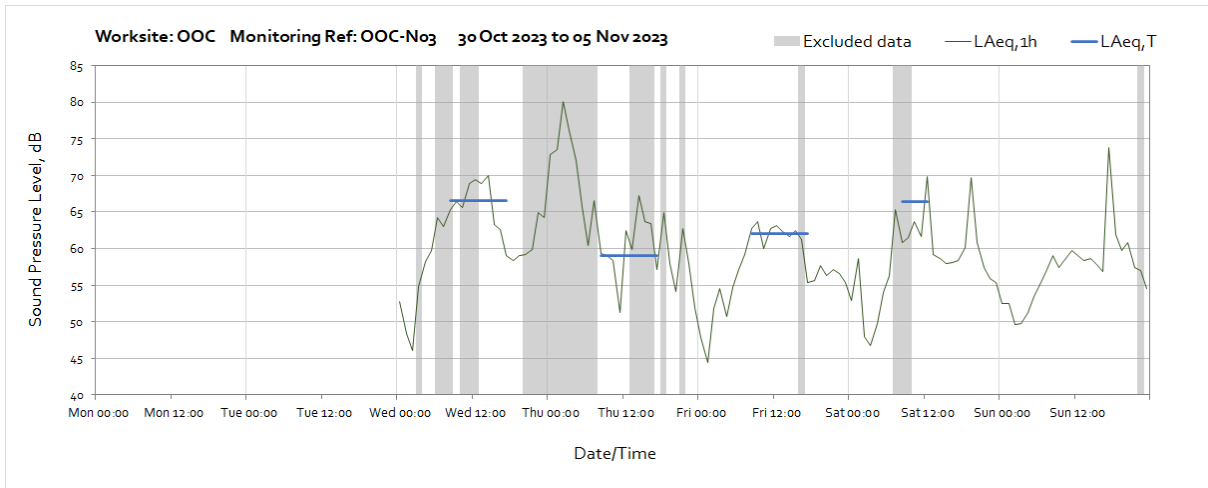
Worksite: OOC - Monitoring Ref: OOC-N02

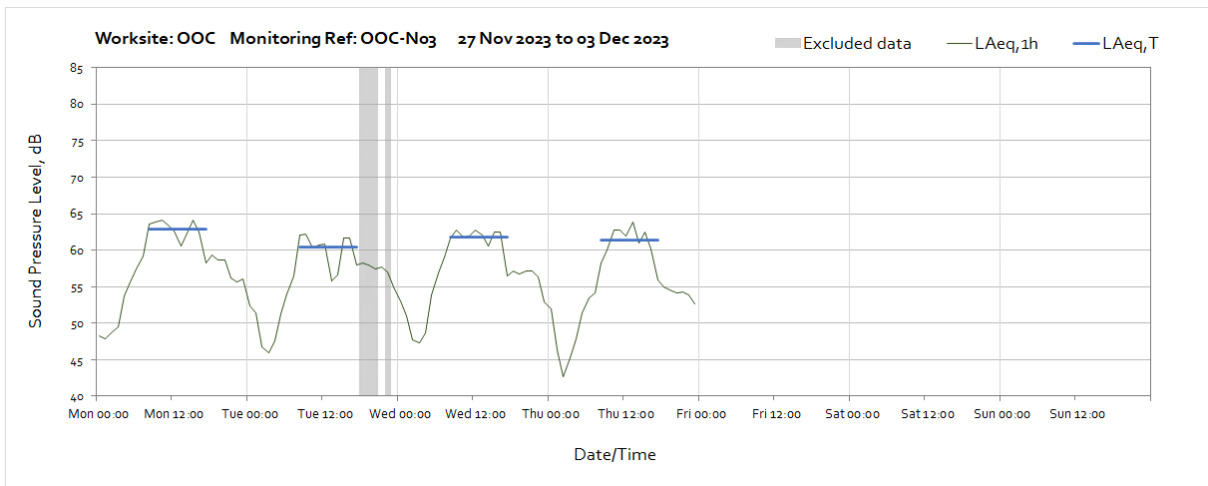
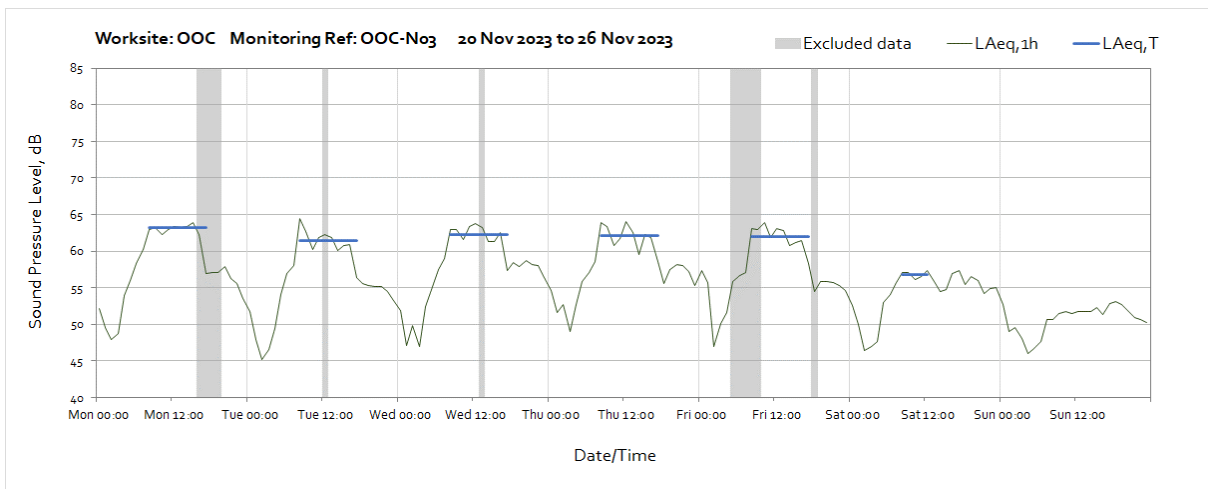
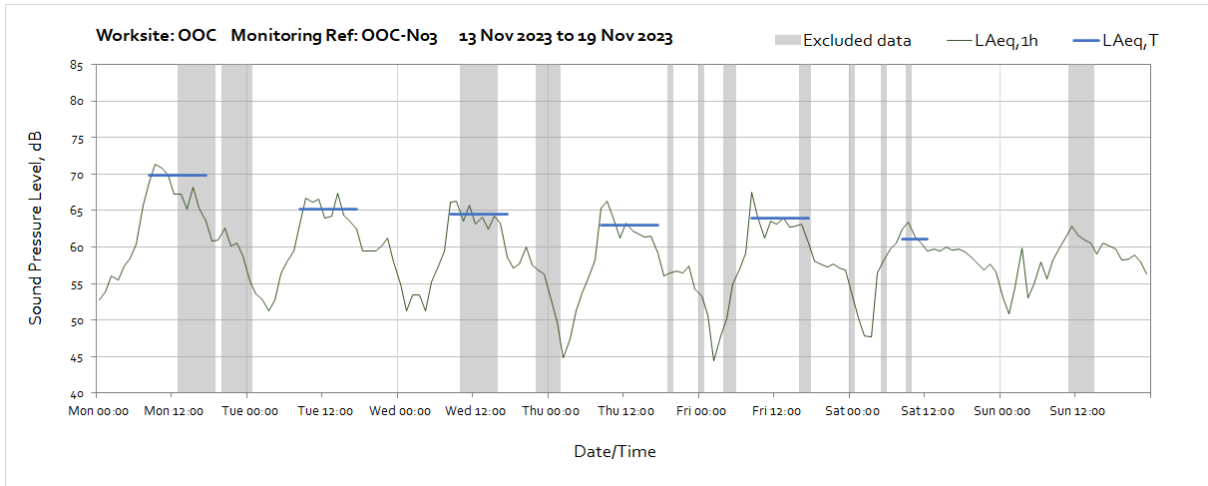






Worksite: OOC - Monitoring Ref: OOC-N03

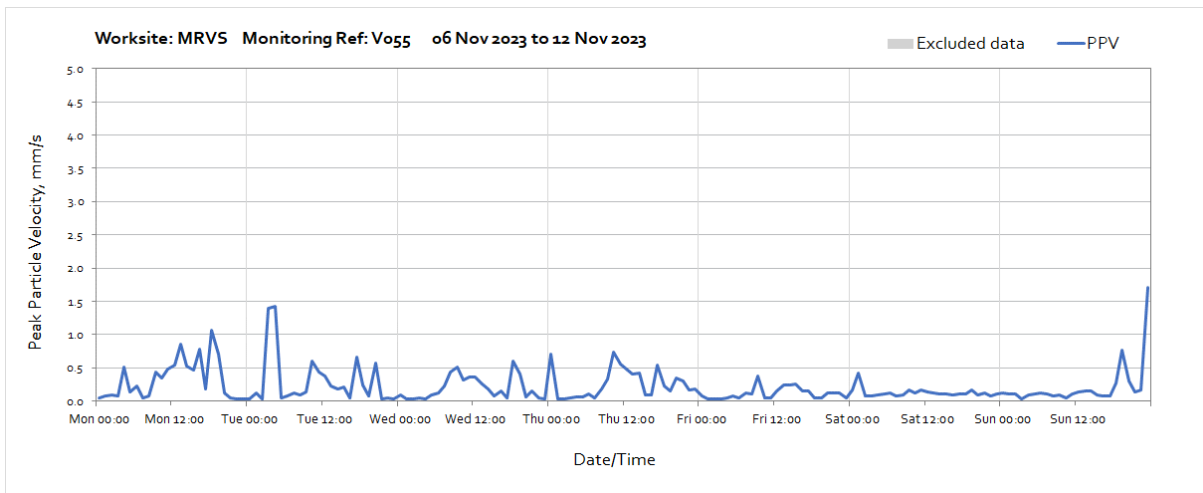
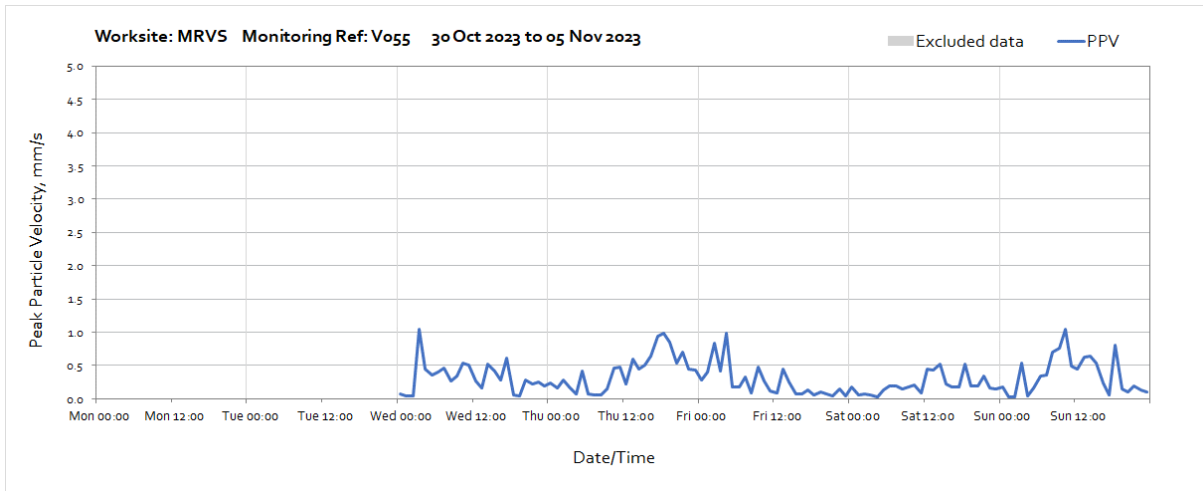


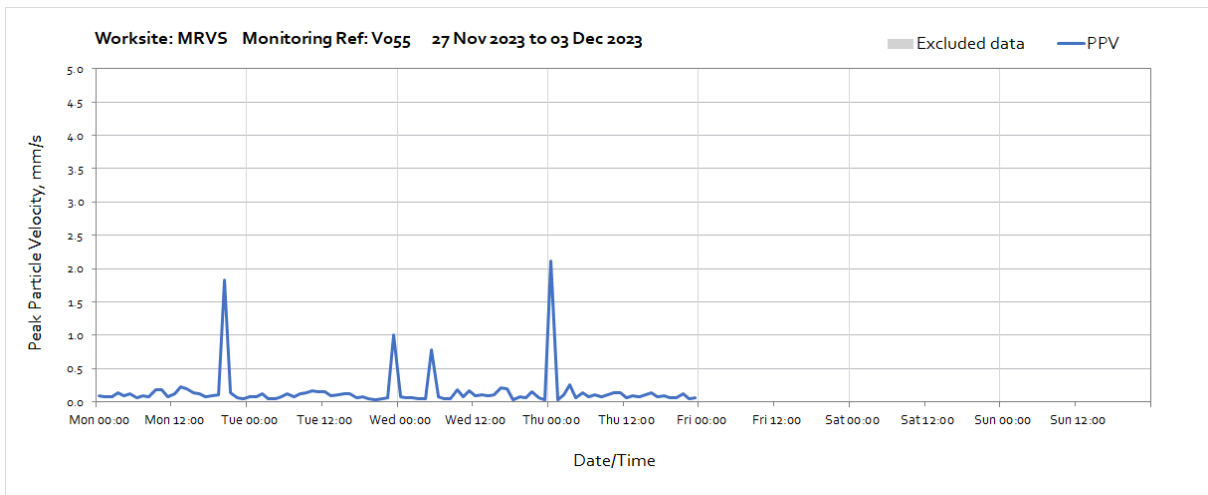
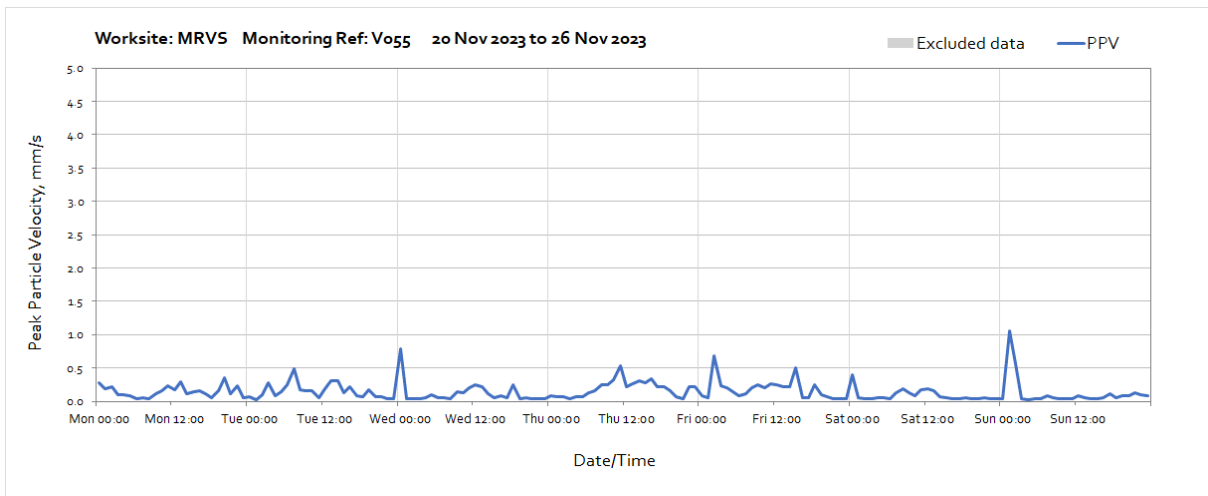
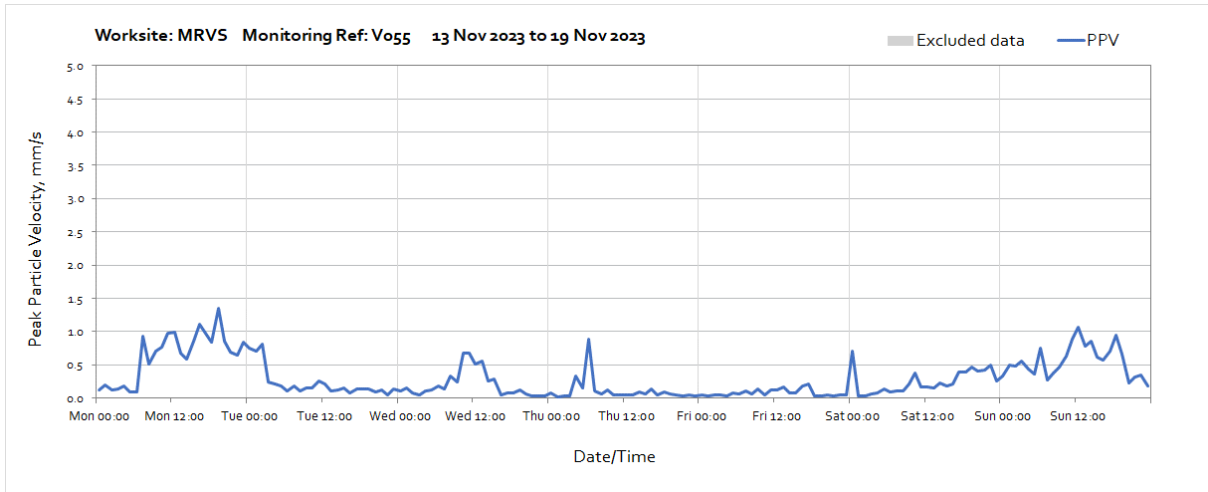


Vibration

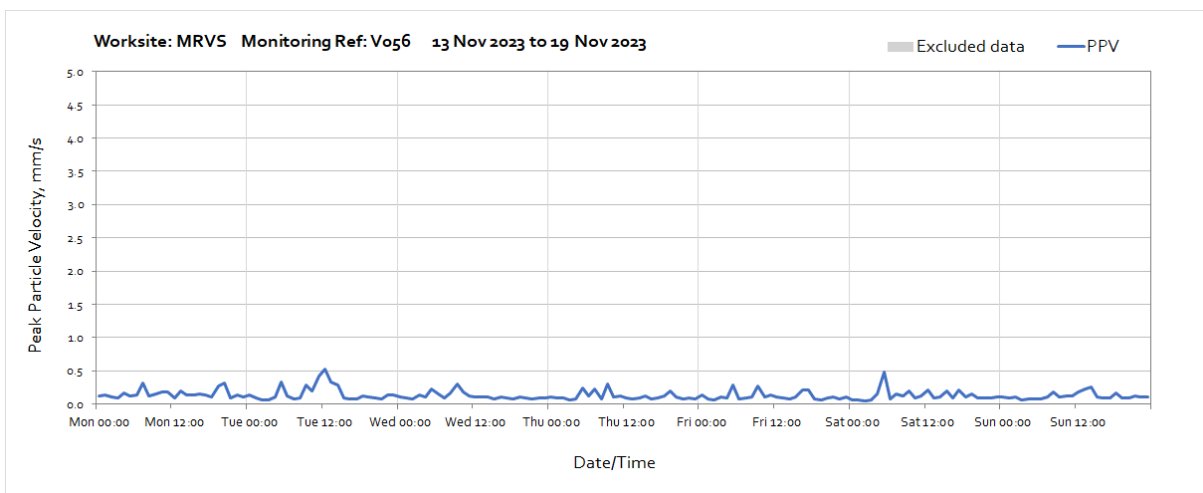
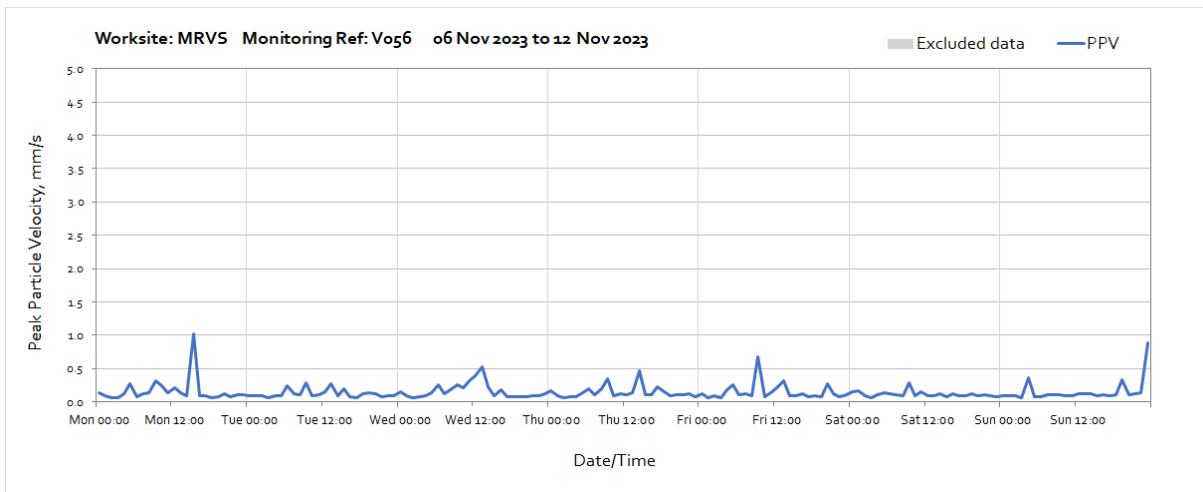
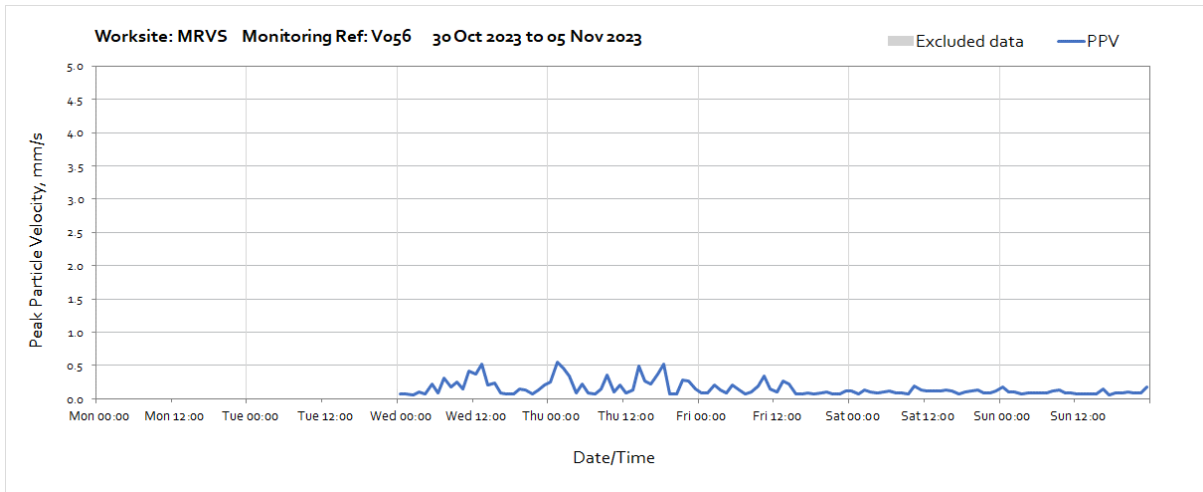
The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the highest PPV of the three orthogonal axis x, y and z. Periods where PPV values have been affected by local interference with the vibration monitor or only measured for part of the period, which are not representative of HS2 construction works, have been greyed out and excluded when calculating values in Table 4 of the main report.

Worksite: MRVS – Monitoring Ref: V055

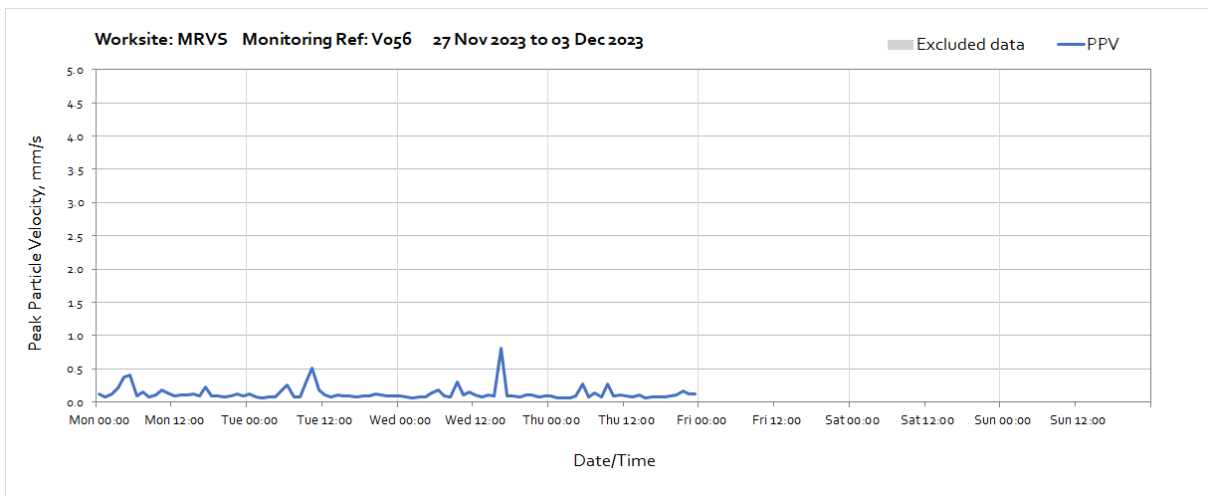
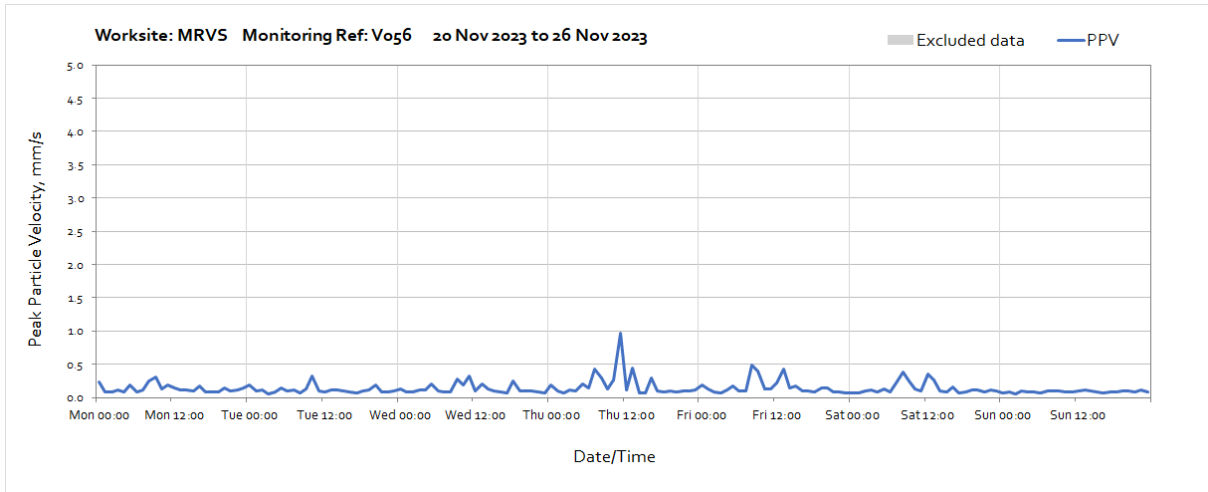




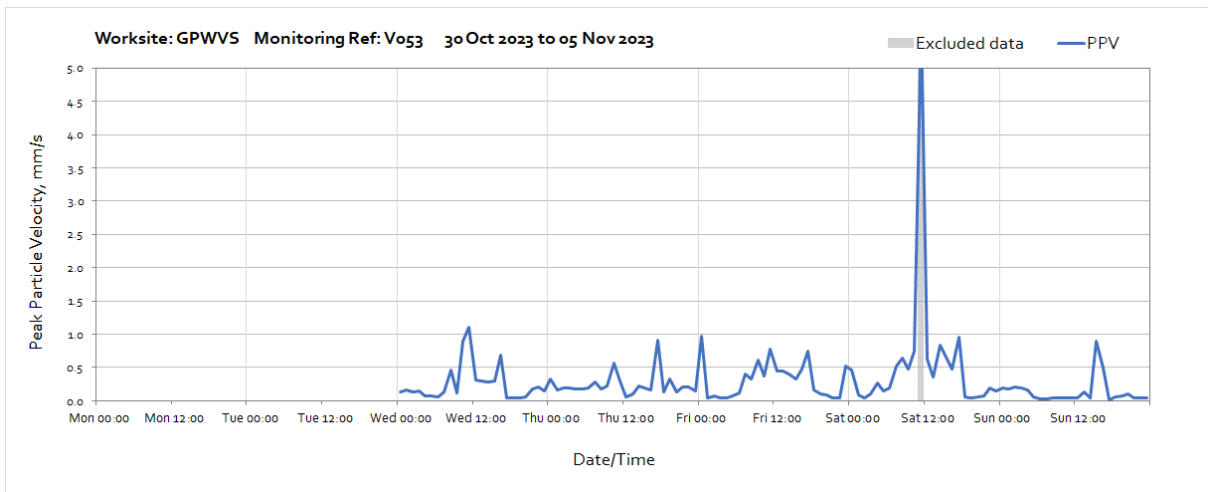
Worksite: MRVS – Monitoring Ref: V056

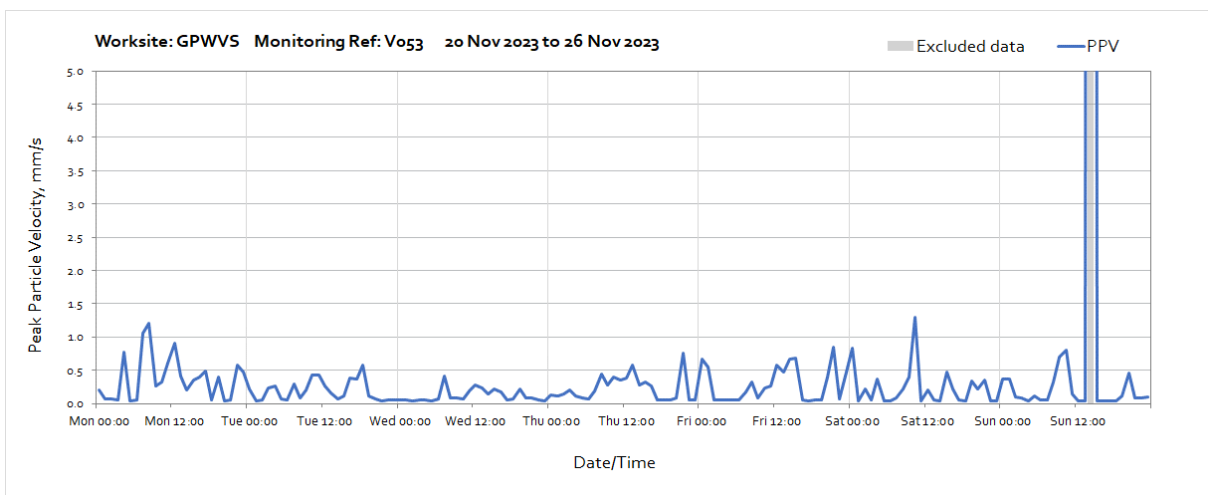
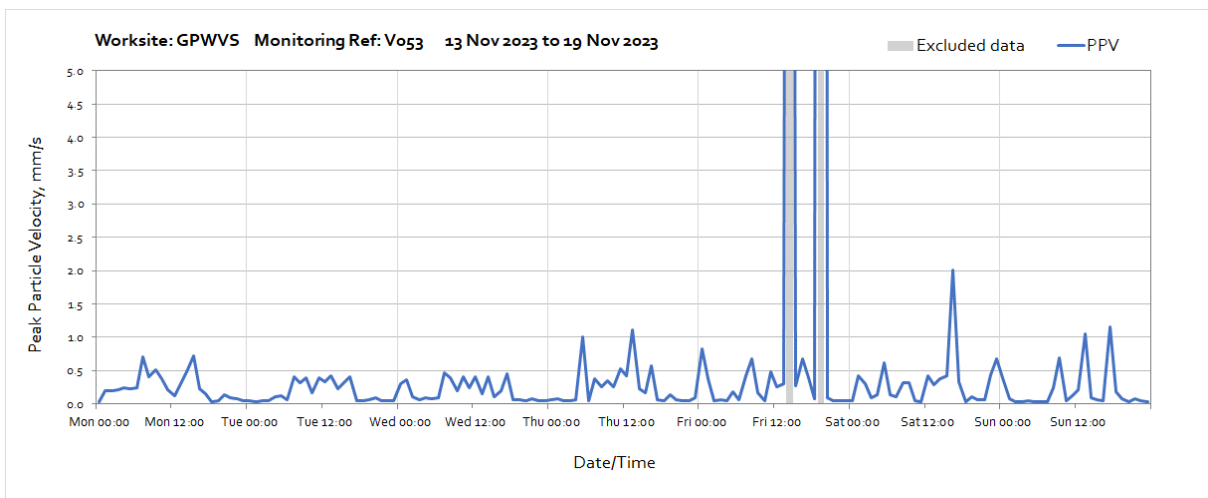
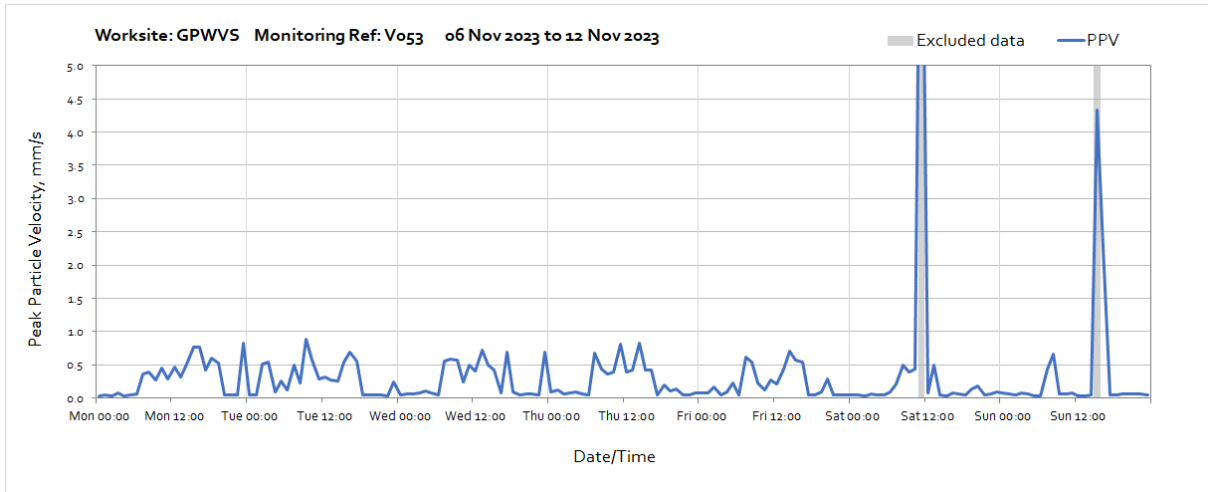


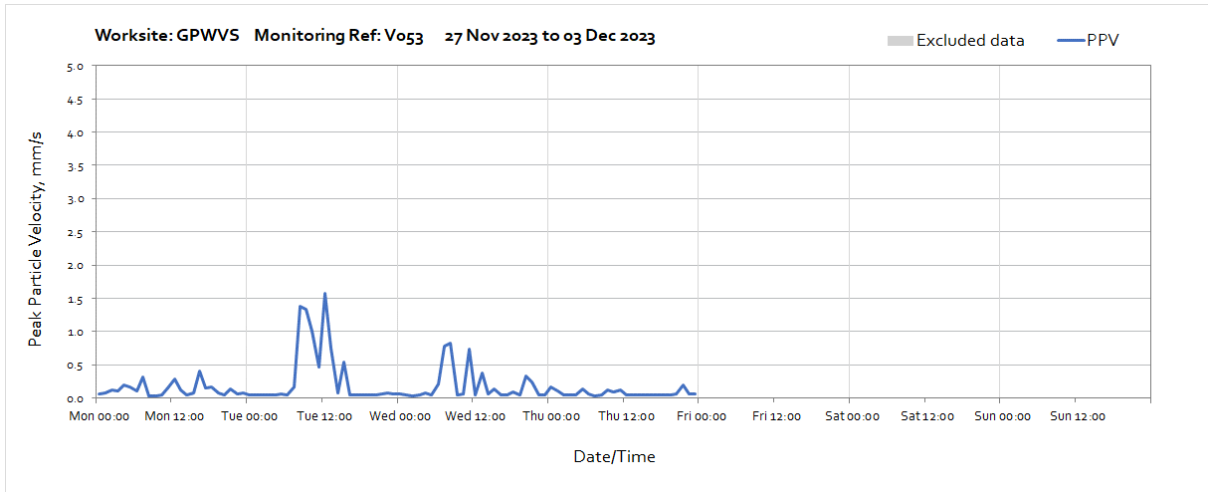
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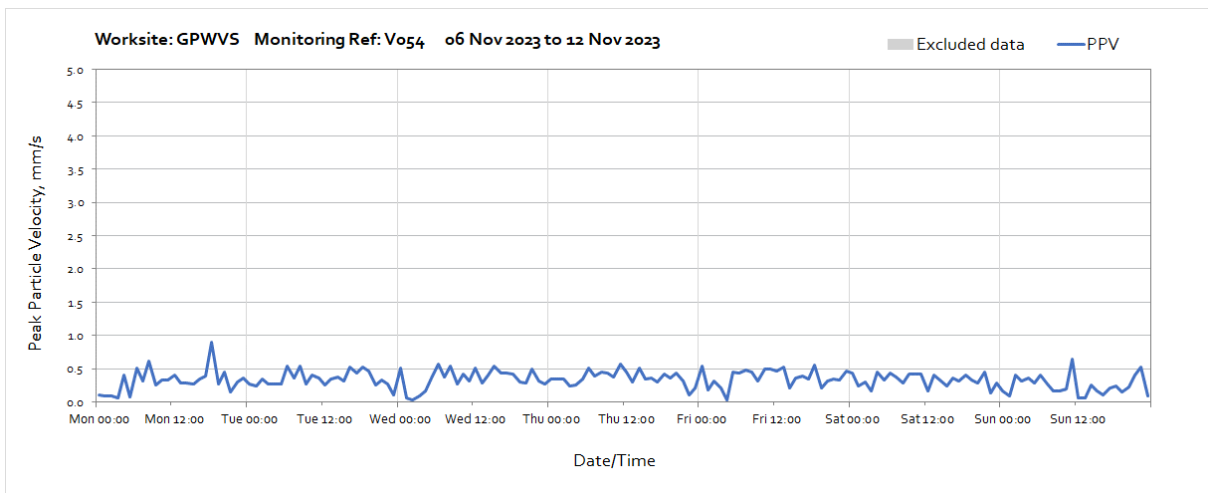
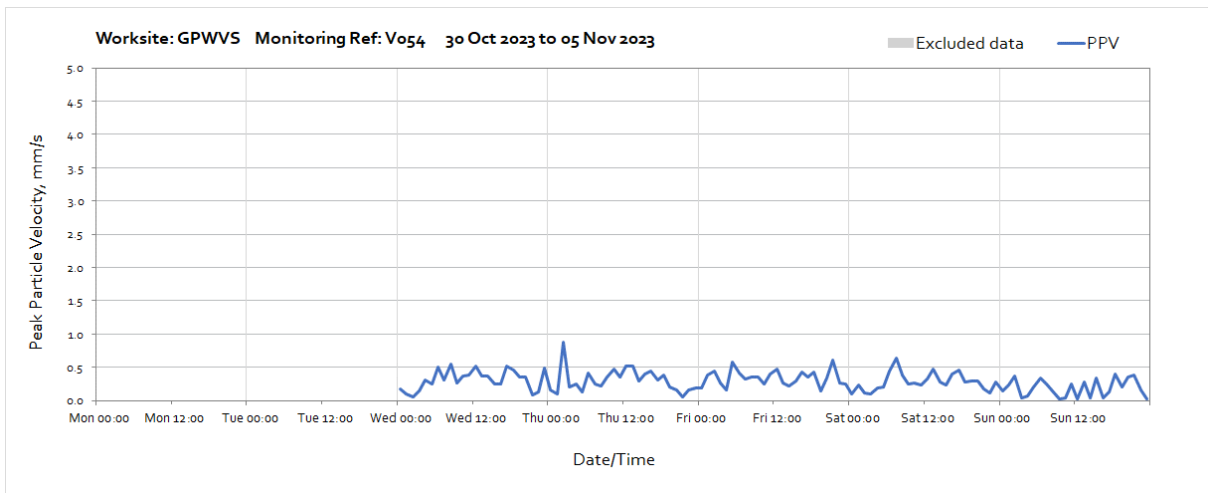
Worksite: GPWVS – Monitoring Ref: V053

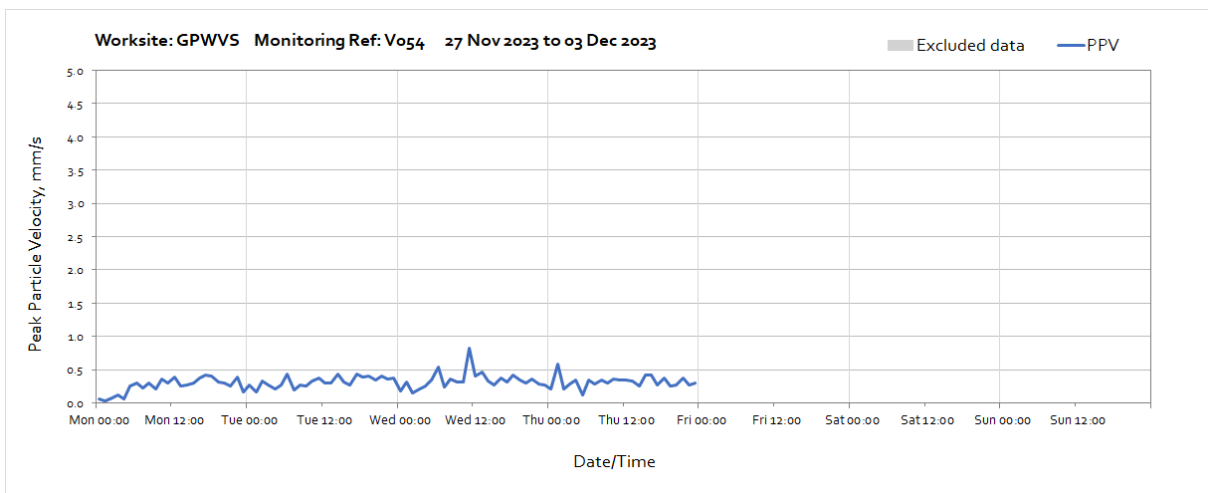
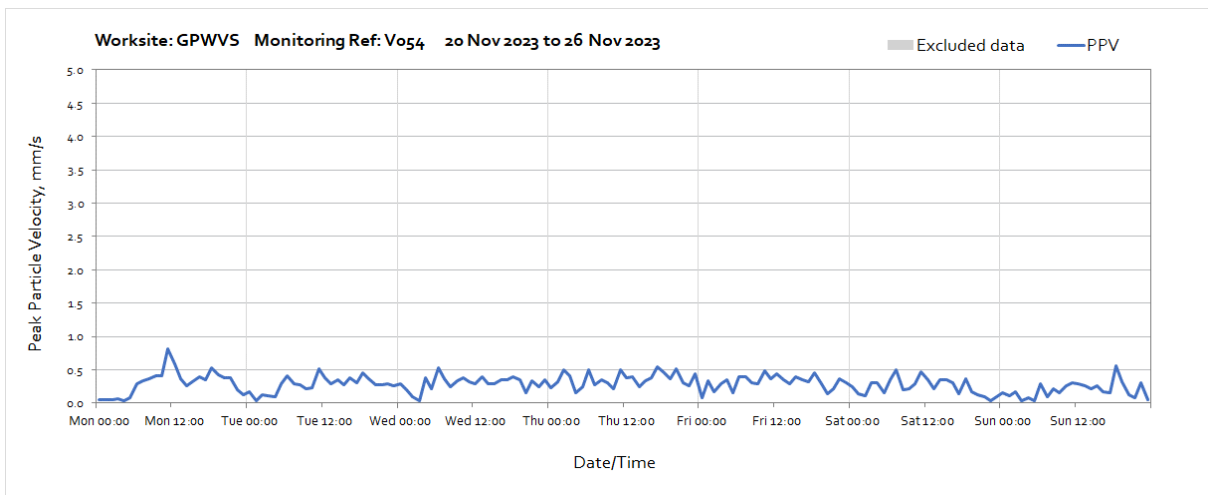
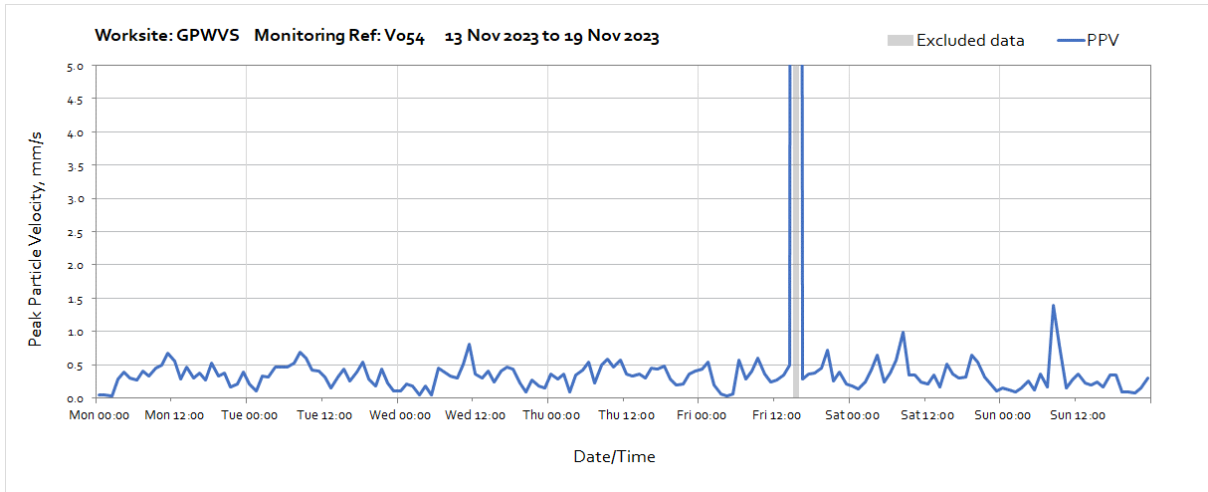




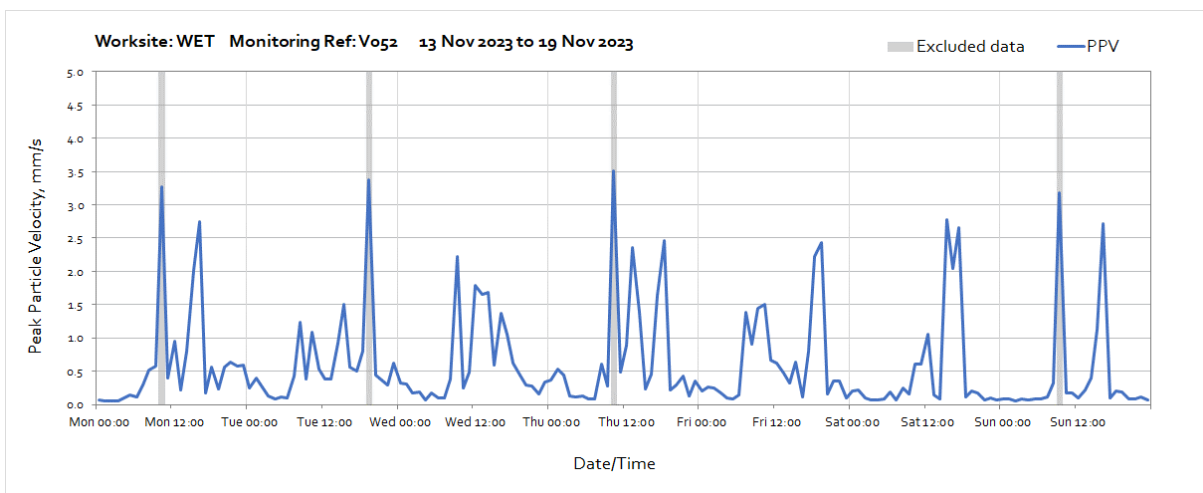
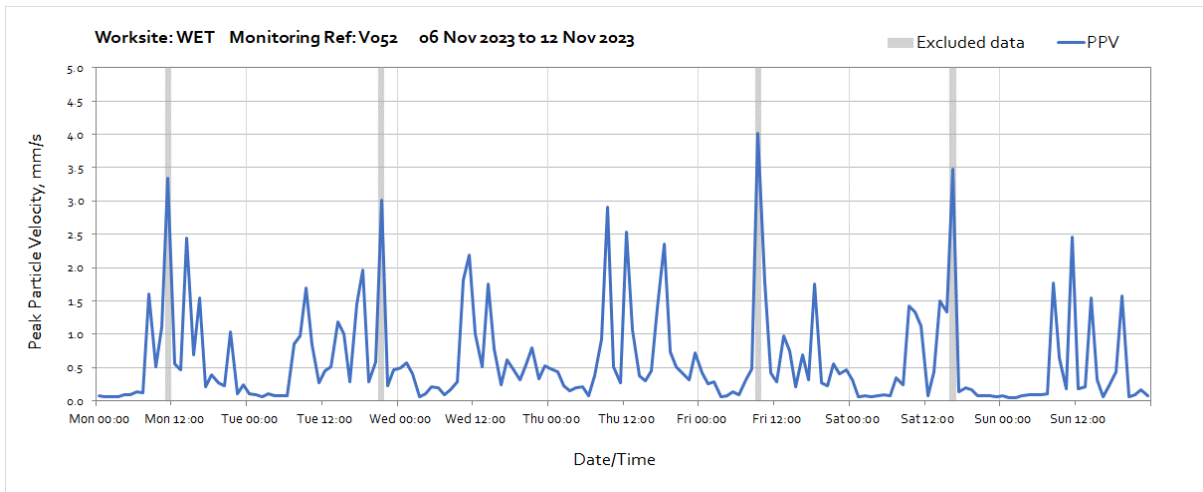
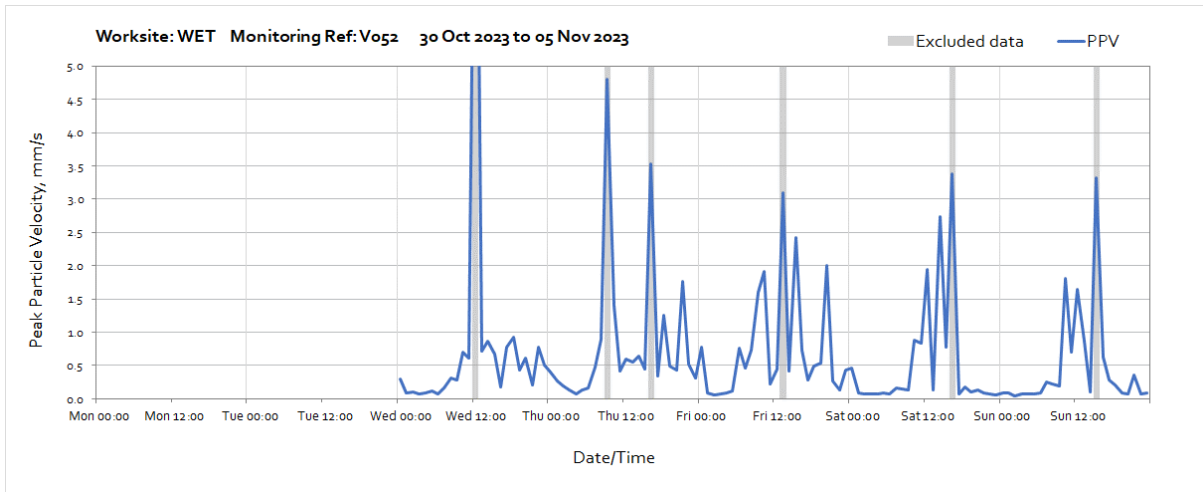


Worksite: GPWVS – Monitoring Ref: V054

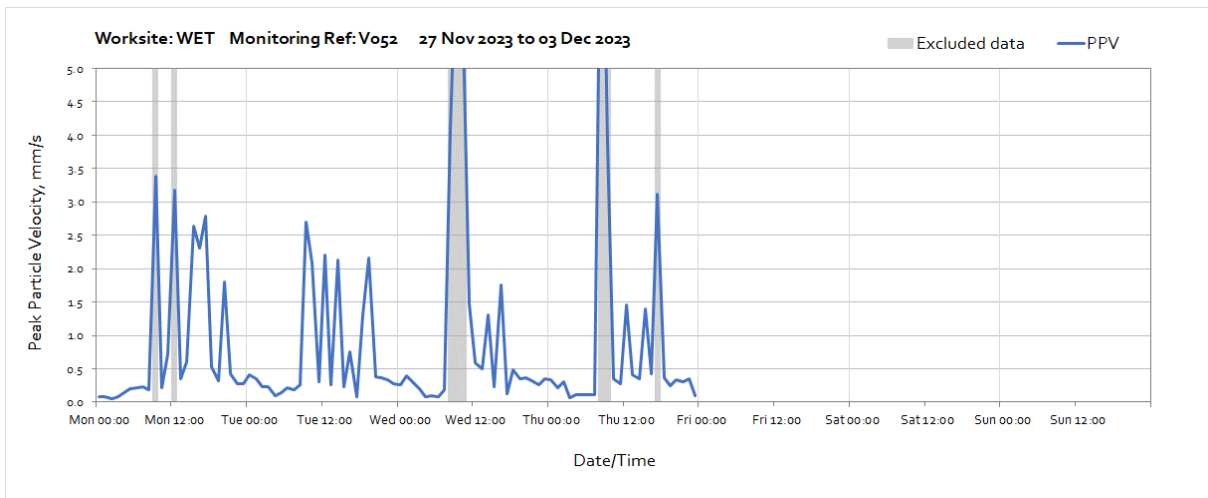
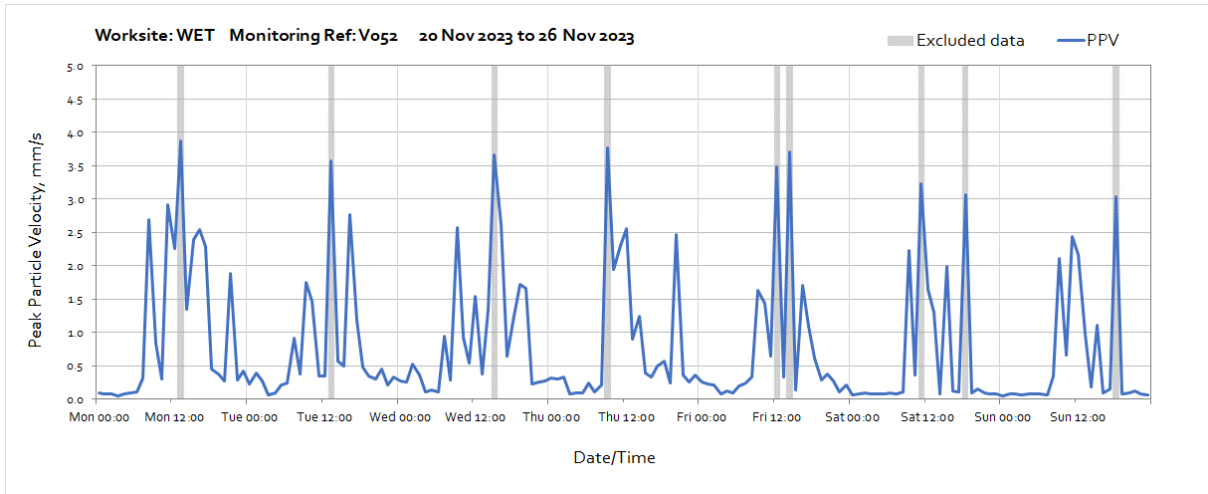




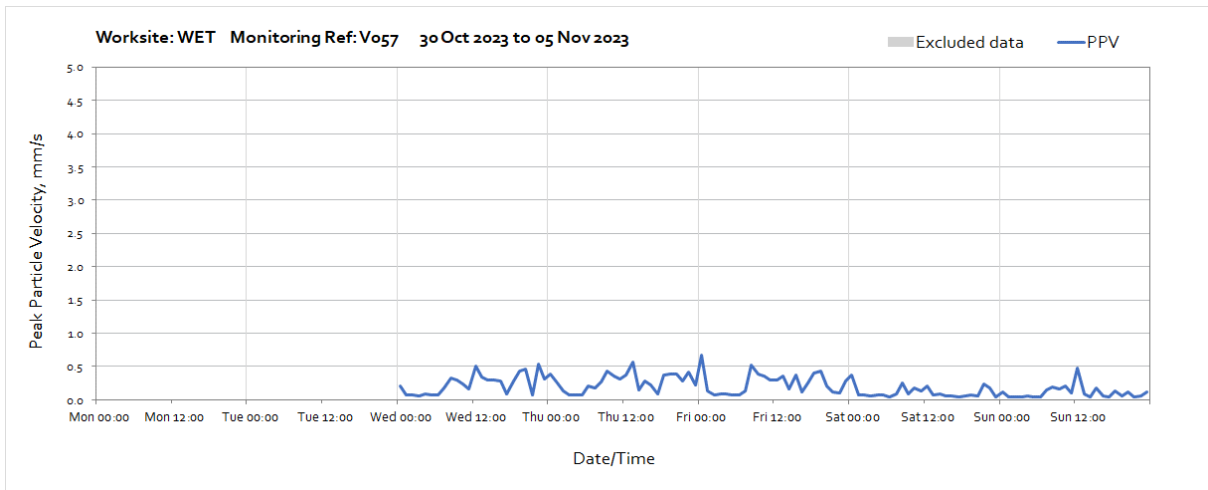
Worksite: WET – Monitoring Ref: V052

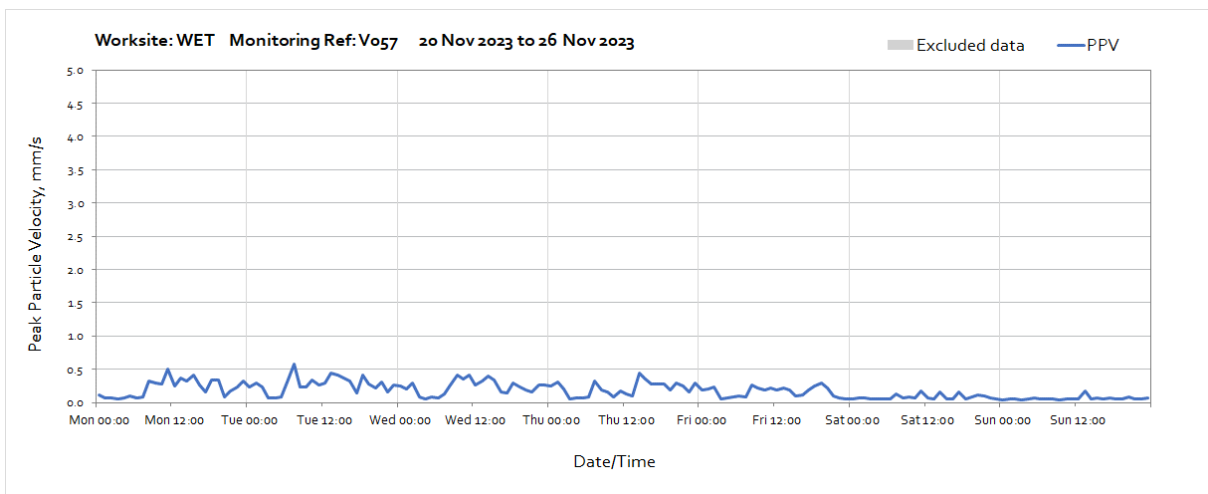
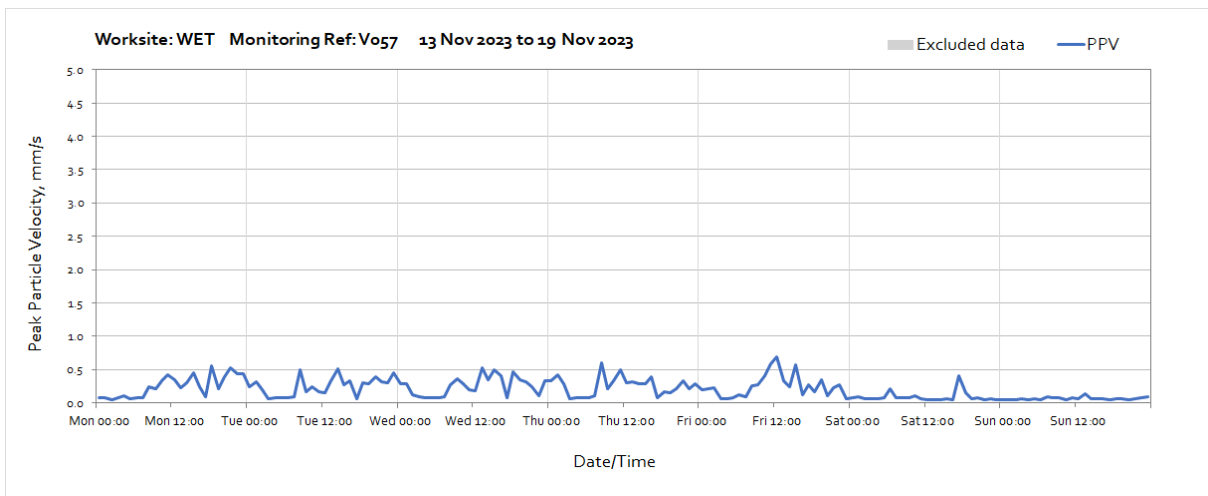
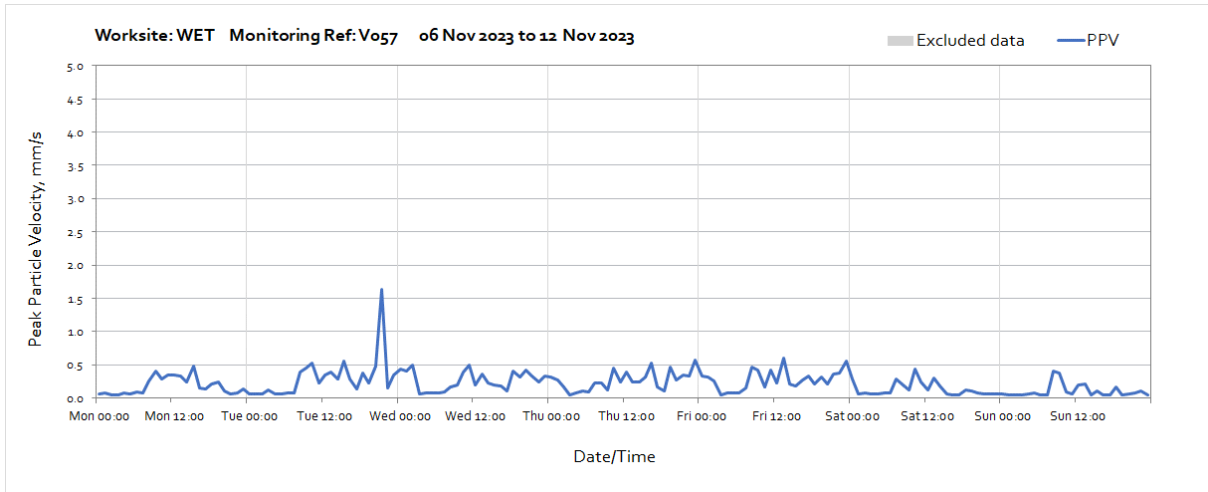


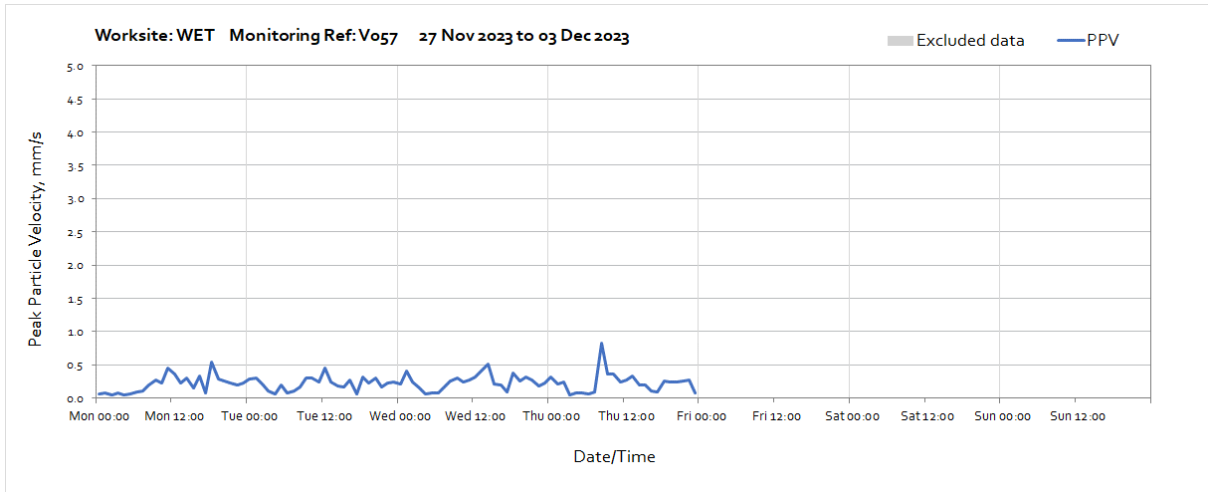
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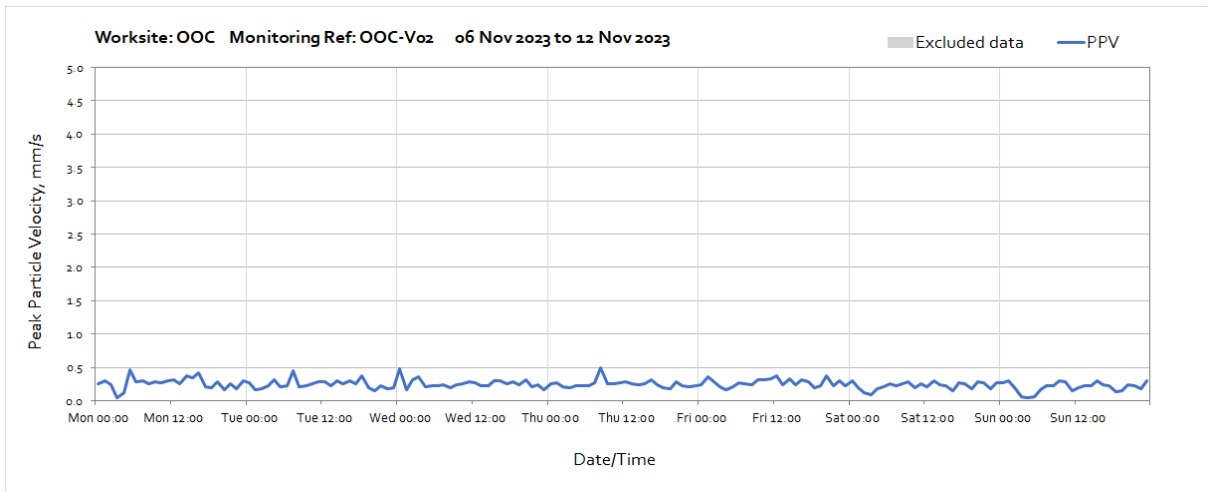
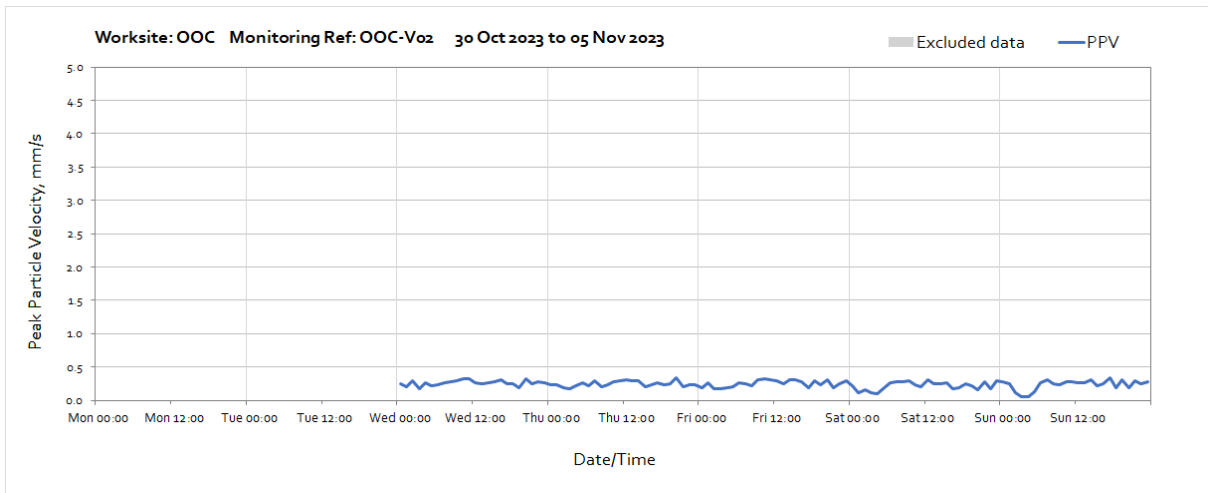
Worksite: WET – Monitoring Ref: V057

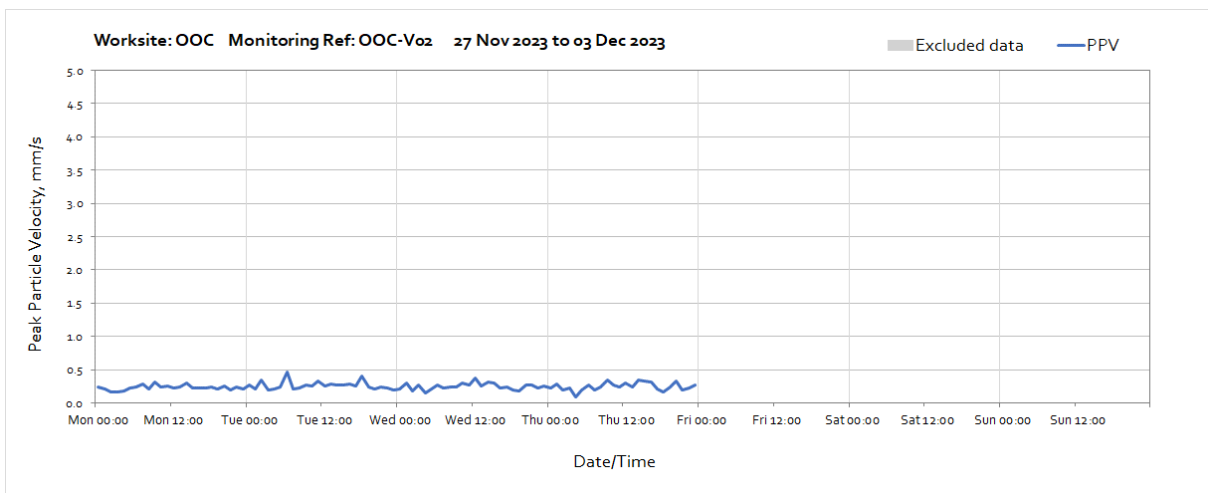
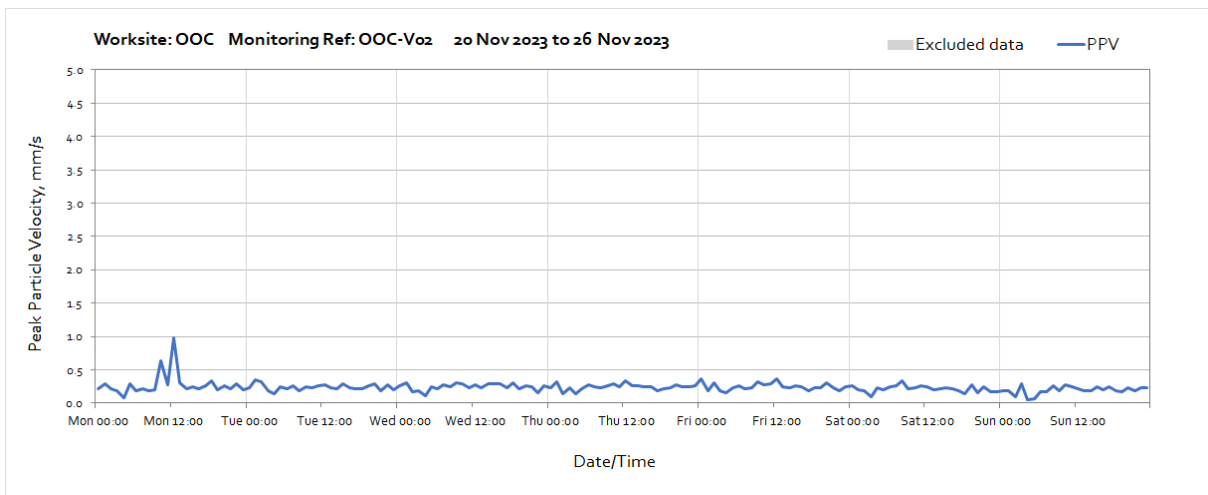
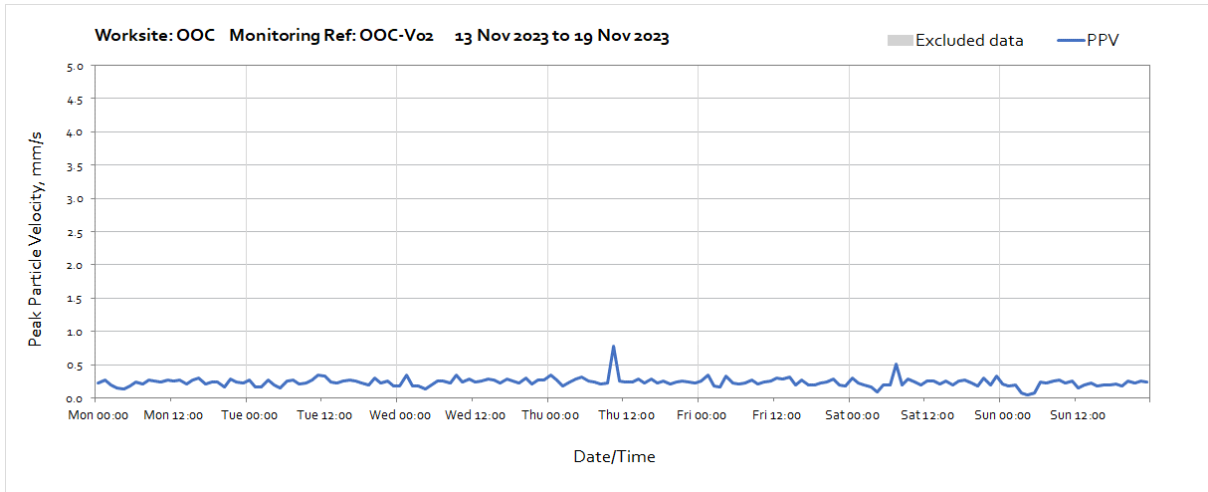




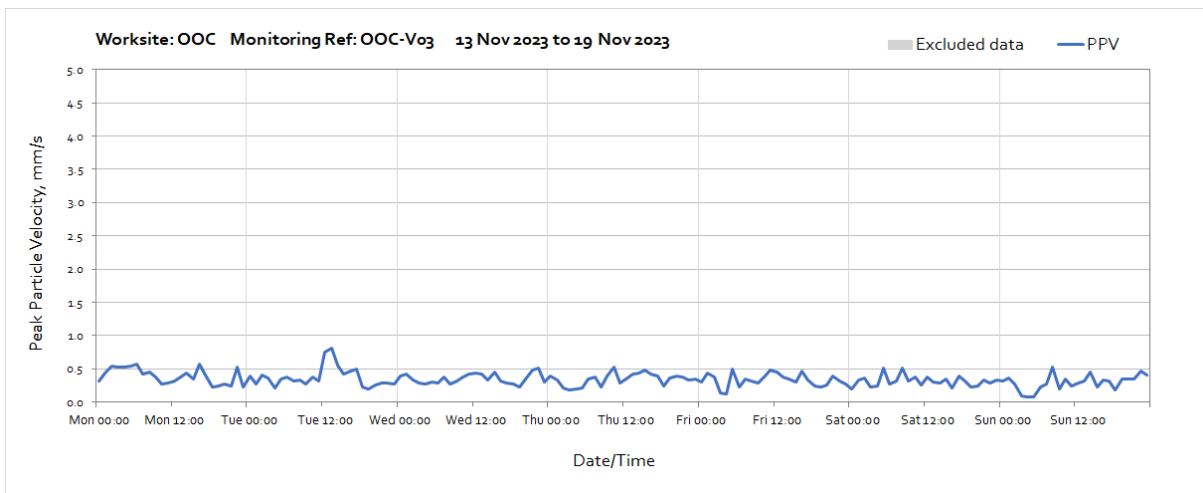
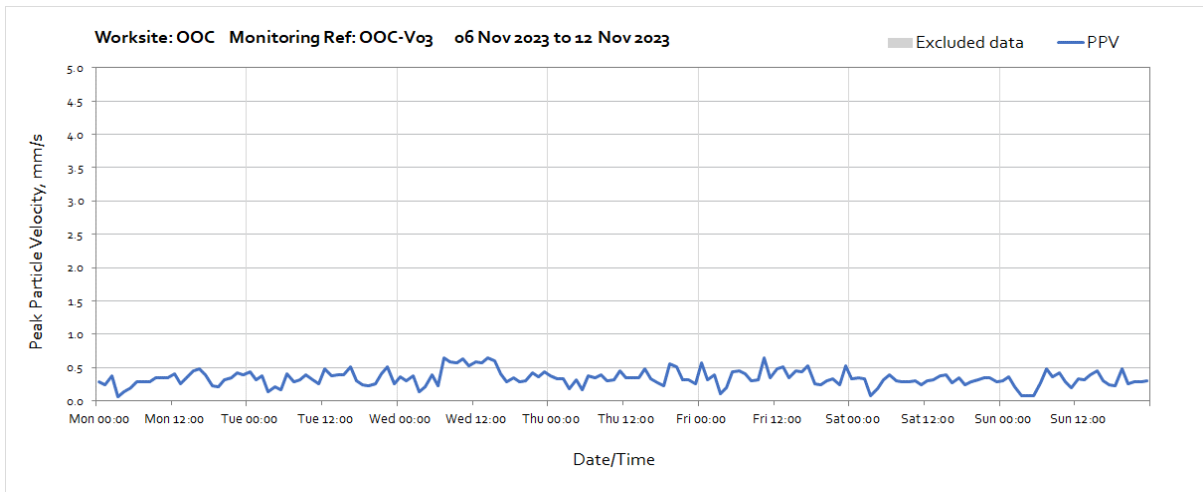
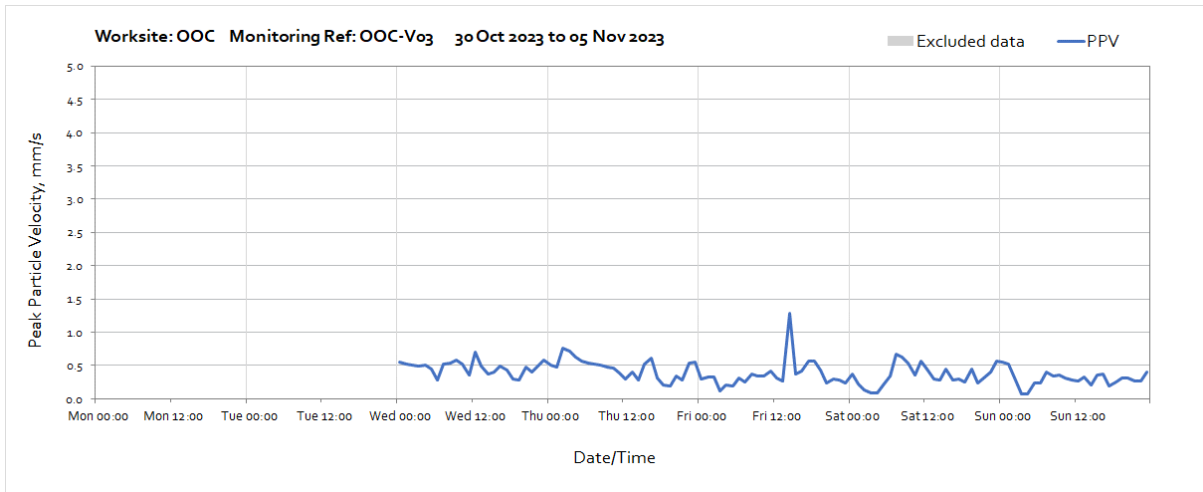


Worksite: OOC – Monitoring Ref: OOC-V02





Worksite: OOC – Monitoring Ref: OOC-V03



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