HS2

August 2023

Construction Noise and Vibration Monthly Report – June 2023

London Borough of Ealing

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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 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 June 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 installation of dewatering wells, excavation, concrete lining, drainage, 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, road sweeping, installation of dewatering bridge and wells, shaft construction, excavation, concrete lining, water-proofing, removal of concrete plinths and pipe bridge and Plant and equipment maintenance were underway.
- Noise monitoring was undertaken in proximity of the Westgate Ventilation Shaft (ref.: WVS), where adit construction, drilling, water-proofing, steel fixing, concrete pours installation of scaffolding and shuttering, plant and equipment maintenance were underway.
- Noise monitoring was undertaken in the vicinity of the Atlas Road worksite (ref.: AR) where excavation, concrete works, backfilling, barrier installation and maintenance, tunnelling, back grouting, conveyor belt extension, removal and conveyor belt works, installation of ventilation, tunnel boring machine gantry installation, plant and equipment maintenance, utility works, substation modification and dewatering pump relocation was underway.
- Noise and vibration monitoring were undertaken in the vicinity of the Willesden EuroTerminal worksite (ref.: WET), where gantry crane installation, refurbishment works, utility works, site clearance, welfare unit installation and deliveries and material movements were underway.
- Noise monitoring was undertaken in the vicinity of the Victoria Road Crossover Box worksite (worksite ref.: VRCB), where excavation, hydro-demolition of diaphragm wall, steel fixing, shuttering, plant and batching plant maintenance and repair, concrete works, wire sawing, conveyor section installation, utility works and at the Victoria Road Ancillary Shaft tunnel construction works were underway.
- Noise monitoring was undertaken in the vicinity of the Flat Iron compound (worksite ref.: FIC), where conveyor installation, utility works, assembly of tunnel boring machines, duct installation and base slab construction 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 and piling were underway.
- Noise and vibration monitoring were undertaken in proximity of the Scheme 6 worksite (ref.: S6), where civil works, overhead line equipment works and permanent way works were underway.

1.1.1 Further works, where monitoring did not take place, were undertaken at Atlas Road Sub-Station where circuit installation and energization, sinking of shafts, ducting 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), was exceeded twenty-five (25) times during the reporting period.

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

Seven (7) 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 June 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:
  - Installation of dewatering wells.
  - Excavation.
  - Sprayed concrete lining application.
  - Drainage.
  - Utility works.
- Green Park Way Ventilation Shaft worksite, reference GPWVS (see plan 2 in Appendix A), where work activities included:
  - General site operations including plant and equipment maintenance.
  - Road sweeping.

- Installation of dewatering bridge and wells.
- Shaft construction, including excavation and concrete lining.
- Waterproofing.
- Concrete plinth removal.
- Removal of pipe-bridge.
- Plant and equipment maintenance.

- Westgate Ventilation Shaft worksite, reference WVS (see plan 3 in Appendix A), where work activities included:
  - Adit construction, including excavation and concrete lining.
  - Drilling.
  - Waterproofing.
  - Steel fixing.
  - Concrete pours.
  - Installation of scaffolding and shuttering.
  - Plant and equipment maintenance.
- Atlas Road worksite, ref. AR (see plan 4 in Appendix A), where work activities included:
  - Excavation.
  - Concrete works.
  - Backfilling.
  - Barrier installation and maintenance.
  - Tunnelling, including excavation and pre-cast tunnel segment installation'
  - Back grouting.
  - Conveyor belt extension, removal and installation.
  - Removal and installation of ventilation.
  - Tunnel boring machine gantry installation.
  - Plant and equipment maintenance.
  - Utility works including cabling and lighting.
  - Installation of site lighting

- Installation of fencing.
- Substation modification.
- Dewatering pump relocation.

- Willesden EuroTerminal worksite, ref. WET (see plan 4 in Appendix A), where work activities included:
  - Gantry crane installation.
  - Refurbishment works.
  - Utility works.
  - Site clearance.
  - Welfare unit installation.
  - Deliveries and material movements.
- Victoria Road Crossover Box worksite, ref. VRCB (see plan 4 in Appendix A), where work activities included:
  - Excavation.
  - Diaphragm wall hydro-demolition.
  - Steel fixing.
  - Shuttering.
  - Batching plant maintenance and repair.
  - Concrete works, including concrete breaking out and concrete lock removal.
  - Wire Sawing.
  - Installation of conveyor sections.
  - Installation of fencing.
  - Utility works.
  - Victoria Road Ancillary Shaft tunnel construction works.
- Flat Iron compound, worksite ref. FIC (see plan 4 in Appendix A), where work activities included:
  - Conveyor installation.
  - Utility works.
  - Assembly of tunnel boring machines.
  - Duct installation.

- Base slab construction.

- 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, including concrete cutting, backfilling and breaking.
  - Drainage.
  - Kerb installation.
  - Diaphragm wall breakdown.
  - Steel fixing.
  - Excavation, including slit trenches.
  - Piling platform construction.
  - Road sweeping.
  - Pile mat construction.
  - Piling.
- Scheme 6 worksite, which is partly located in the London Borough of Hammersmith and Fulham (LBHF), ref. S6 (see plan 4 in Appendix A), where work activities included:
  - Civil works.
  - Overhead line equipment works.
  - Permanent way works including, track bed and drainage.

1.1.4 Further works, where monitoring did not take place, were undertaken at Atlas Road Sub-Station where circuit installation and energization, sinking of shafts, ducting 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 Twenty-two (22) noise and eight (8) vibration monitoring installations were active in June in the LBE area. Table 2 summarises the position of noise and vibration monitoring installations within the LBE area in June 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
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	Old Oak Common Lane, Hilltop Works
	OOC-N02	Old Oak Common Lane, Hilltop Works

Worksite Reference	Measurement Reference	Address
	OOC-N03	Old Oak Common Lane, Hilltop Works
	OOC-V02	Kildun Court, Old Oak Common Lane
	OOC-V03	Wells House Road Alleyway
S6	WT-N01	Old Oak Common Lane & Wells house Rd

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 L_{Aeq} Data over the Monitoring Period

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
MRVS	N040	Badminton Close	Free field	52.3 (56.5)	53.9 (56.5)	52.5 (54.6)	52.5 (55.3)	50.6 (62.6)	55.4 (58.3)	52.1 (53.5)	52.2 (53.5)	53.5 (66.9)	49.6 (54.5)	52.4 (55.9)	50.4 (54.0)
	N058	Mandeville Road	Free field	64.2 (67.7)	66.4 (68.7)	64.9 (69.8)	65.5 (70.5)	66.0 (72.6)	64.5 (65.8)	65.5 (66.7)	64.7 (66.1)	65.3 (70.0)	65.0 (69.4)	65.7 (70.6)	64.8 (70.4)
	N063	Mandeville Road	Free field	59.7 (63.9)	67.9 (72.0)	56.5 (58.7)	56.9 (59.1)	54.9 (62.9)	62.1 (65.5)	67.2 (71.6)	64.5 (72.7)	57.6 (66.8)	53.7 (56.6)	57.0 (60.7)	54.3 (58.1)
	BLV-N001	45 Belvue Road	Free field	58.5 (60.0)	59.6 (61.8)	57.9 (60.2)	58.1 (59.7)	57.5 (62.3)	58.5 (59.1)	59.0 (59.8)	58.5 (59.5)	57.6 (58.9)	56.5 (58.6)	58.2 (63.6)	55.9 (59.1)
GPWVS	N059	Green Park Way Ventilation Shaf	Free field	56.2 (60.3)	61.0 (63.5)	53.6 (61.7)	55.7 (64.5)	53.6 (62.3)	52.3 (58.9)	53.1 (57.7)	54.9 (60.1)	55.8 (65.1)	51.3 (60.1)	56.7 (73.4)	50.7 (58.3)
	N064	Green Park Way Ventilation Shaft	Façade	54.9 (63.7)	59.2 (72.8)	55.0 (58.0)	55.5 (59.8)	53.1 (58.8)	52.5 (53.6)	53.4 (54.3)	53.7 (54.9)	54.1 (58.9)	51.5 (57.2)	53.8 (57.5)	50.5 (54.6)
WVS	N062	Westgate Ventilation Shaft	Free field	65.4 (73.0)	67.5 (76.8)	57.9 (63.6)	58.9 (67.0)	57.6 (64.3)	64.8 (70.5)	67.8 (74.3)	60.2 (64.8)	58.7 (65.8)	56.8 (61.7)	63.9 (78.1)	56.7 (64.3)
AR	N032	Shaftesbury Gardens	Free field	64.1 (65.0)	64.1 (65.0)	63.1 (69.3)	62.1 (66.4)	59.3 (72.3)	61.0 (62.5)	61.9 (62.9)	62.2 (62.9)	62.2 (64.7)	58.5 (63.6)	61.2 (64.9)	58.6 (62.5)

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	68.0 (69.9)	68.1 (74.6)	65.5 (68.4)	64.3 (73.7)	61.5 (68.3)	63.1 (63.6)	63.9 (65.6)	66.3 (72.7)	65.1 (71.6)	60.2 (64.6)	63.5 (68.8)	61.3 (66.1)
	N060	Atlas Road next to Bashey Road	Free field	56.6 (63.9)	63.9 (67.5)	54.1 (61.5)	59.1 (68.4)	57.6 (67.9)	56.7 (62.4)	58.5 (65.6)	54.4 (65.2)	52.0 (64.0)	48.7 (58.5)	50.9 (56.3)	53.7 (60.0)
WET	N034	Stephenson Street (north)	Free field	54.8 (64.5)	56.6 (63.6)	56.4 (76.1)	55.9 (73.9)	51.5 (62.6)	49.5 (52.6)	51.0 (52.9)	52.2 (54.6)	53.7 (60.2)	46.8 (55.0)	53.4 (62.5)	47.8 (54.6)
	N035	Stephenson Street (south)	Free field	56.0 (64.4)	57.1 (63.8)	53.8 (58.6)	52.2 (62.4)	48.7 (59.8)	50.5 (53.5)	52.9 (58.0)	50.5 (54.4)	51.8 (58.8)	45.5 (53.7)	50.6 (55.2)	47.3 (53.9)
	N041	Junction of Stephenson Street/Goodhall Street	Free field	55.5 (61.7)	57.8 (68.6)	56.4 (73.3)	56.2 (69.3)	51.2 (59.9)	51.7 (53.2)	55.4 (60.7)	56.9 (61.4)	55.4 (60.3)	50.1 (56.4)	55.3 (66.6)	50.1 (56.4)
VRCB	N031	School Road, outside Acton Business Centre	Free field	62.4 (66.0)	64.0 (66.1)	63.1 (68.7)	61.4 (66.1)	57.8 (62.2)	58.2 (59.3)	63.3 (64.2)	63.3 (64.6)	60.9 (65.1)	55.5 (60.9)	59.6 (68.9)	56.4 (60.8)
	N050	Acton Square, outside North Acton Station	Free field	63.8 (67.1)	65.0 (67.5)	63.2 (70.8)	62.5 (65.4)	59.2 (69.4)	63.3 (65.2)	62.8 (63.6)	62.5 (63.2)	62.0 (66.1)	59.4 (71.1)	61.8 (66.1)	58.3 (64.2)
FIC	N029	Braitrim House, Victoria Road	Free field	59.2 (64.7)	62.5 (65.4)	52.9 (57.3)	57.3 (67.6)	56.9 (67.9)	56.5 (61.3)	56.6 (61.2)	53.9 (60.8)	51.1 (57.5)	48.2 (57.7)	50.5 (58.1)	54.9 (67.5)
	N042	Bodens car park	Free field	62.0 (66.0)	64.5 (69.6)	58.0 (60.6)	57.8 (64.5)	55.9 (63.4)	58.3 (61.8)	61.3 (62.0)	60.2 (61.8)	57.7 (63.2)	54.1 (60.1)	55.5 (58.0)	54.5 (59.1)

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	58.1 (65.2)	75.3 (76.4)	56.8 (61.2)	62.2 (72.9)	59.8 (69.1)	59.4 (63.4)	61.2 (64.5)	57.5 (65.9)	54.8 (62.4)	50.7 (62.1)	52.9 (62.9)	55.5 (64.8)
OOC	OOC-N01	Old Oak Common Lane, Hilltop Works	Free-field	65.5 (69.0)	68.2 (69.5)	65.9 (69.3)	63.1 (68.6)	59.3 (65.4)	61.3 (62.0)	63.9 (66.7)	64.9 (68.5)	64.7 (70.8)	61.8 (74.8)	63.1 (68.9)	61.0 (71.9)
	OOC-N02	Old Oak Common Lane, Hilltop Works	Free-field	68.0 (71.2)	71.1 (74.6)	68.0 (74.9)	64.9 (69.7)	61.2 (71.3)	63.5 (63.6)	65.5 (67.5)	68.0 (74.9)	66.2 (72.0)	63.3 (72.7)	64.7 (74.6)	62.4 (72.7)
	OOC-N03	Old Oak Common Lane, Hilltop Works	Free-field	56.5 (58.7)	61.5 (63.0)	57.4 (59.9)	56.6 (59.9)	52.5 (58.6)	53.4 (55.2)	55.3 (57.3)	55.9 (59.4)	57.2 (62.4)	51.6 (58.0)	56.9 (64.6)	53.3 (61.4)
S6	WT-N01	Old Oak Lane Halt, Wells House Road	Free-field	54.9 (57.6)	61.5 (62.8)	57.6 (61.0)	56.9 (59.6)	52.7 (60.0)	52.2 (54.3)	54.6 (57.0)	55.6 (57.5)	56.6 (64.2)	52.7 (62.4)	55.9 (60.1)	53.6 (61.5)

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	2.03 (X-axis)
	V054	Green Park Way Ventilation Shaft	1.39 (Z-axis)
MRVS	V055	Mandeville Road	0.79 (Z-axis)
	V056	Mandeville Road	1.88 (Z-axis)
WET	V052	63, Stephenson Street	3.30 (Y-axis)
	V057	37, Stephenson Street	0.65 (Z-axis)
OOC	OOC-V02	Kildun Court, Old Oak Common Lane	1.49 (Z-axis)
	OOC-V03	Wells House Road Alleyway	2.53 (X-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	Weekdays Nights Sundays	1900-2200 2200-0700 0700-2200	3 15 1
	N063	Mandeville Road	Saturdays	1300-1400	1
	BLV-N001	45 Belvue Road	Sundays Nights	0700-2200 2200-0700	1 48
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)	Weekdays	1800-1900 1900-2200	1 1
	N035	Stephenson Street (south)	All days	All periods	No exceedance
	N041	Junction of Stephenson Street / Goodhall Street	All days	All periods	No exceedance

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
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
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	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
S6	WT-N01	Old Oak Lane Halt, Wells House Road	Nights	2200-0700	6

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

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

Table 6: Summary of Total Exceedances of SOAEL

Worksite Reference	Measurement Reference	Monitor Address	Total of SOAEL exceedances in the month
MRVS	N058	Mandeville Road	20
	N063	Mandeville Road	1
	BLV-N001	45 Belvue Road	20
OOC	OOC-N03	Old Oak Common Lane, Hilltop Works	1
S6	WT-N01	Old Oak Lane Halt, Wells House Road	6

2.2.6 SOAEL exceedances were recorded at five (5) monitors, N058, N063, BLV-N001, OOC-N03 and WT-N01. Twenty-five (25) 24-hour periods that experienced an exceedance

of the SOAEL were recorded due to HS2 construction works during June 2023. The SOAEL exceedances were recorded during weekday, weekend and night periods.

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

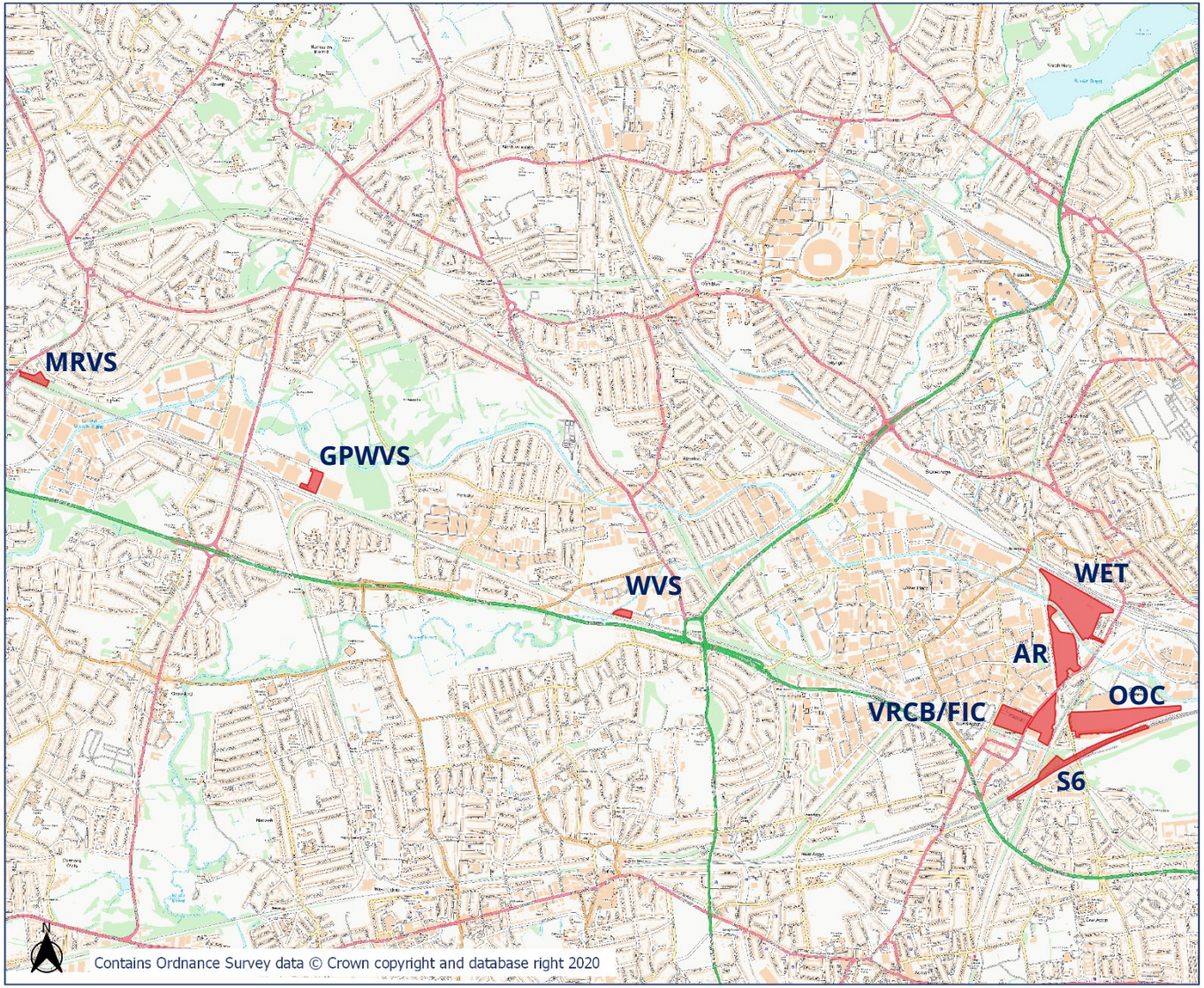
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-23-96735-E-C HS2-23-96676-E-C	VRCB	Complaint due to night-time noise disturbance from worksite.	Investigation showed no HS2 works were ongoing at the time of the complaints	A response was provided to the complainant detailing the results of the investigation.
HS2-23-96775-E-C HS2-23-44774-C HS2-23-96851-E-C HS2-23-96866-E-C HS2-23-96127-E-C	OOCth	Complaint regarding banging noise from site at night.	Disturbance caused by conveyor belt which was required to be in use during that period. Mitigation measures are currently in place.	Additional monitoring of use of conveyor belt outside of core hours is now in place. Meeting with stakeholders will take place to address additional mitigation measures which can be put in place to reduce disturbance.'
HS2-23-96126-E-C	OOC	Complaint regarding banging noises and alarm from noises site.	Disturbance caused by conveyor belt which was required to be in use during that period.	The complainant did not wish to be updated on the results of the investigation.

Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-23-44706-C	OOC	Complaint regarding loud machinery in front of residents property causing noise and vibration.	Disturbance caused by heavy roller.	A response was provided to the complainant detailing the results of the investigation, works ceased on 30/6/23. Resident to be informed when works involving this equipment will take place in future.
HS2-23-44740-C	FIC	Complaint regarding banging noises, described as stones in a mixer.	Disturbance expected to be caused by site but no specific source was identified.	Communications between the contractor and the complainant occurred and discussions on mitigation methods were had.
HS2-23-44776-C	OOC	Complaint due to noise disturbance from worksite.	Disturbance is predicted to be due to material breaking. Roller to be removed from site.	A response was provided to the complainant detailing the results of the investigation.
HS2-23-96497-E-C	OOC	Complaint regarding drilling noise from site in evening.	Disturbance due to screw and bolt tightening after 10pm curfew.	A response and apology was provided to the complainant detailing the results of the investigation.
HS2-23-96724-E-C	FIC	Complaint regarding banging metal noises from site at night.	Disturbance due to works, however noise levels within consented threshold.	A response was provided to the complainant detailing the results of the investigation.
HS2-23-96014-E-C	AR	Complaint regarding motor noise from the work site during the night.	Disturbance was due to noise from an on site generator.	The complainant did not wish to be updated on the results of the investigation.
HS2-23-96133-E-C	AR & WET	Complaint regarding noise from work site during the night.	Disturbance could be from either site but expected to be due to conveyor belt start up. Monitors were reviewed and the levels during this period were within consented threshold.	A response was provided to the complainant detailing the results of the investigation.
HS2-23-44729-C	WET	Complaint regarding general site noise and beeping assumed to be caused by a cherry picker.	Disturbance due to conveyor belt start up, no cherry picker reported on site at time of complaint.	Alarm system has since been turned down and a response was provided to the complainant detailing the results of the investigation.

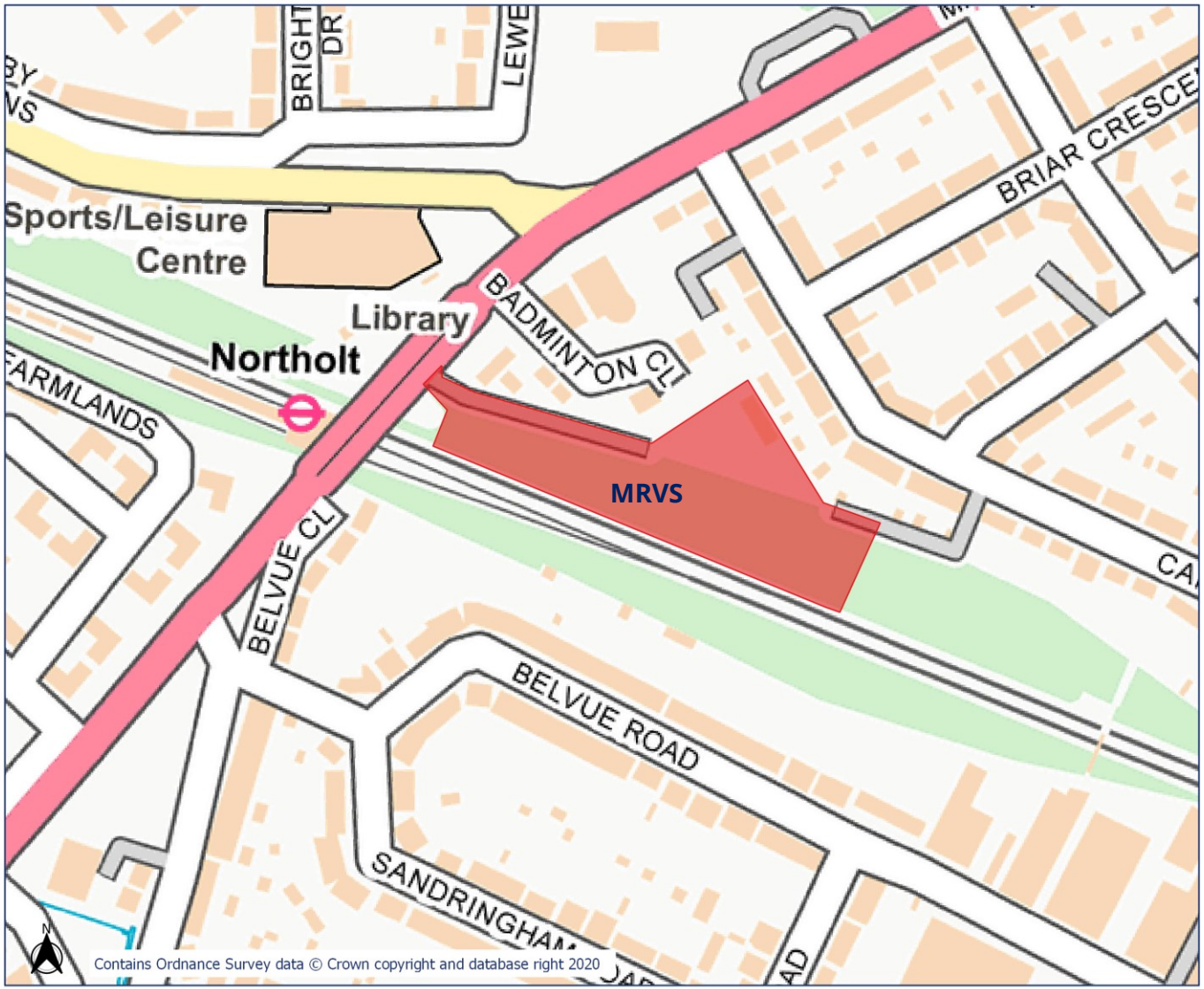
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-23-96355-E-C	OOC	Complaint regarding motor noise from the work site during the night.	Investigation showed disturbance was not due to HS2 works.	A response was provided to the complainant detailing the results of the investigation.

Appendix A Site Locations

Worksite identification plan - Overview



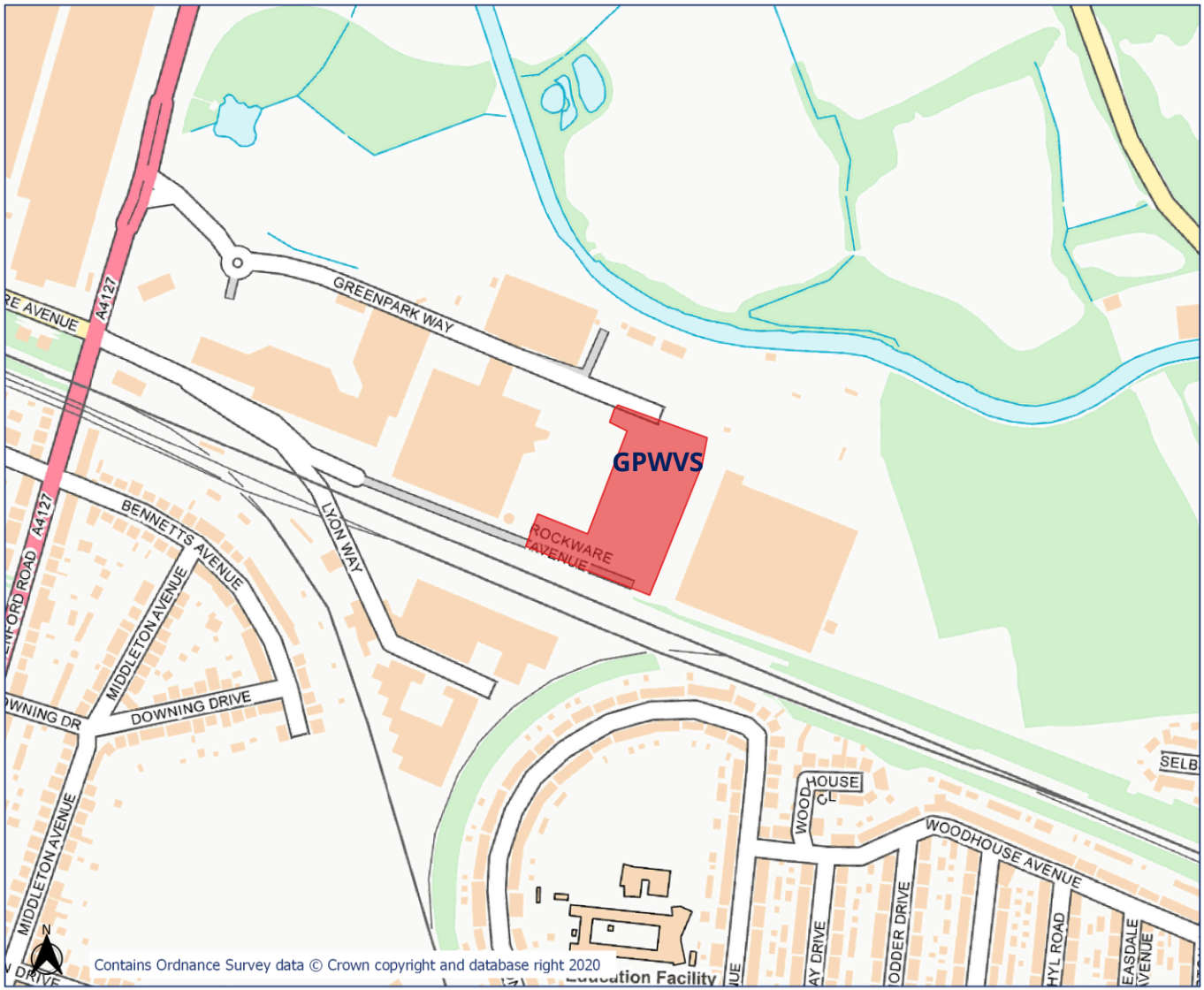
Worksite Identification Plan - 1



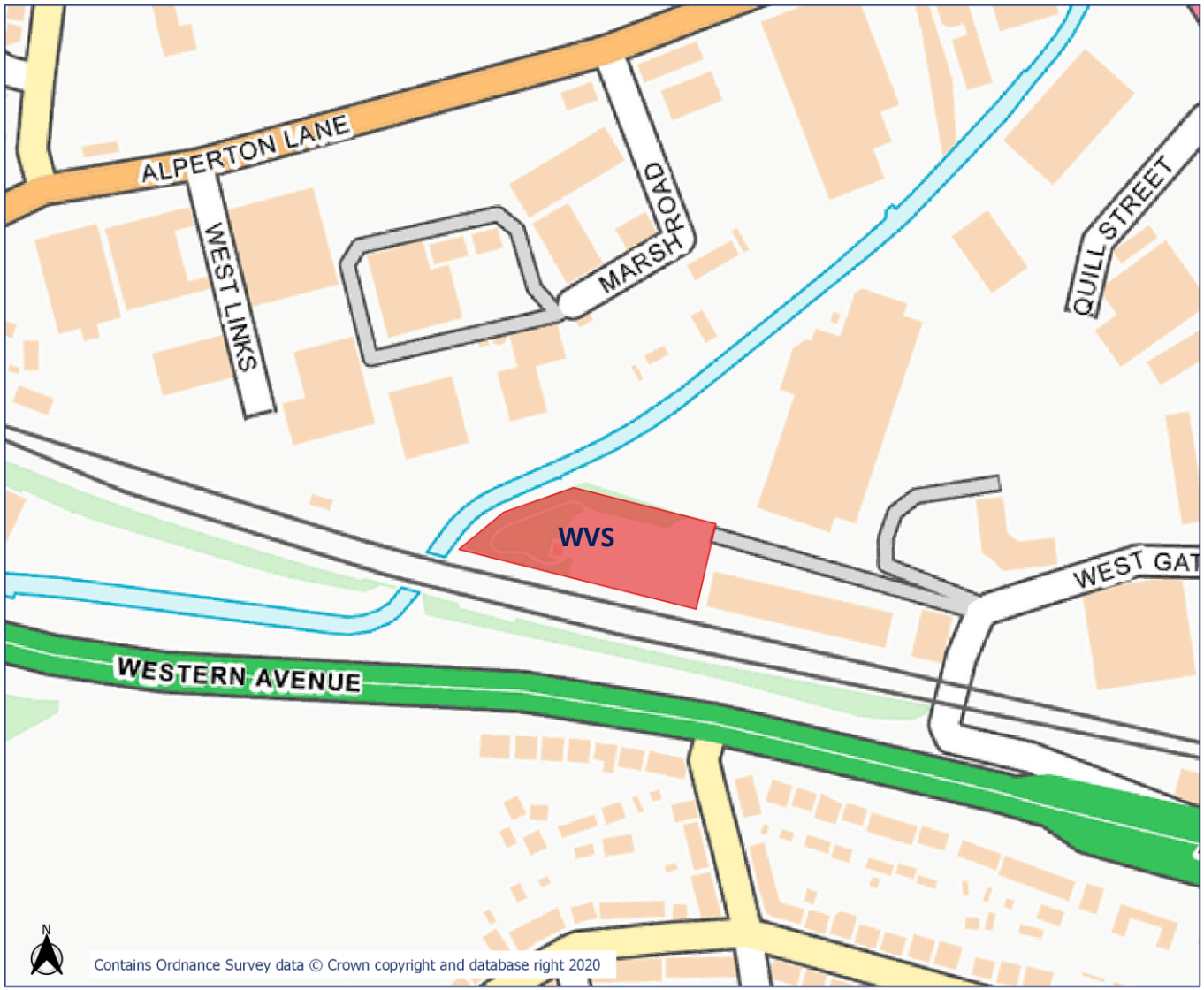
Legend

Active Worksites

Worksite Identification Plan - 2

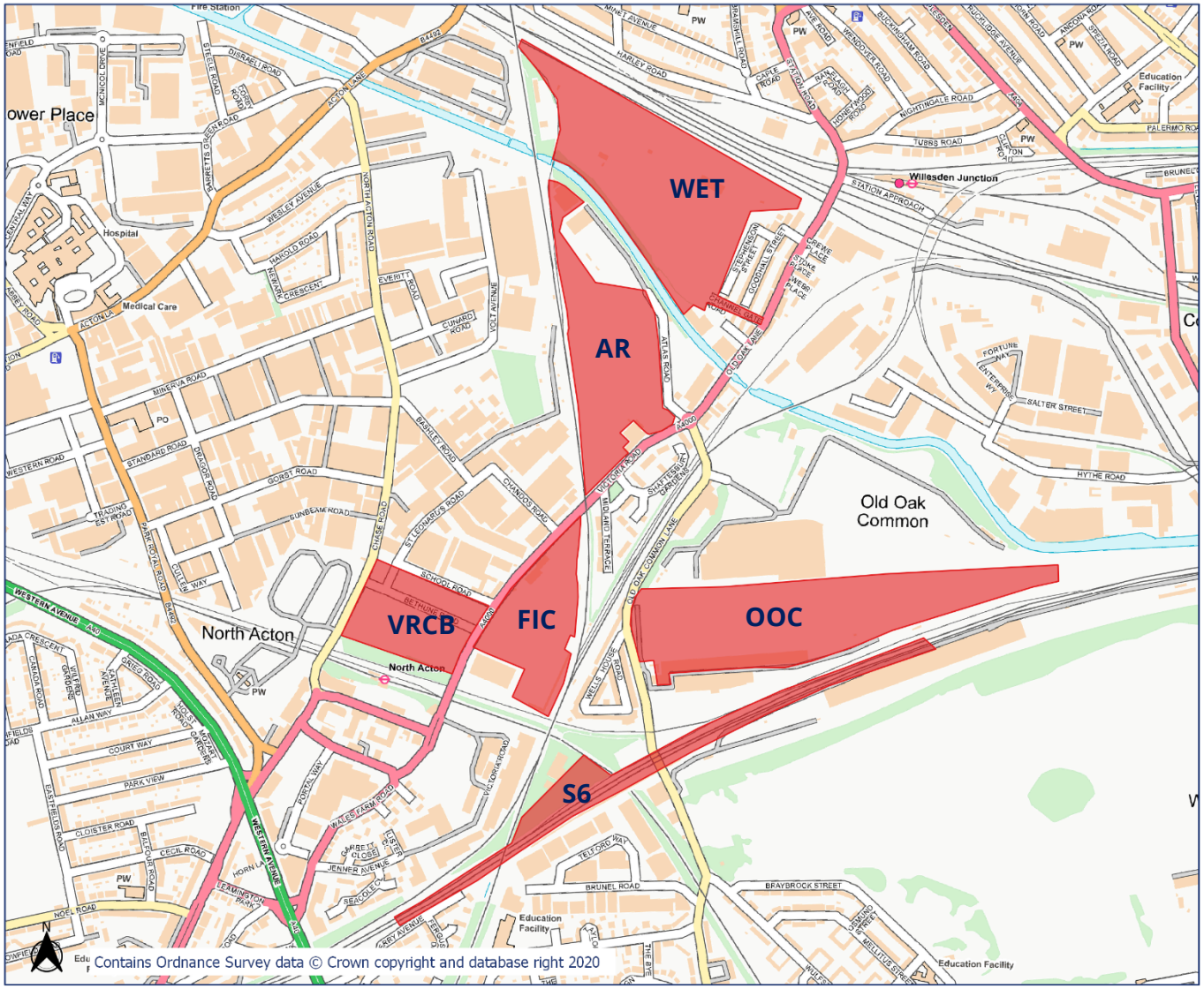


Worksite Identification Plan - 3



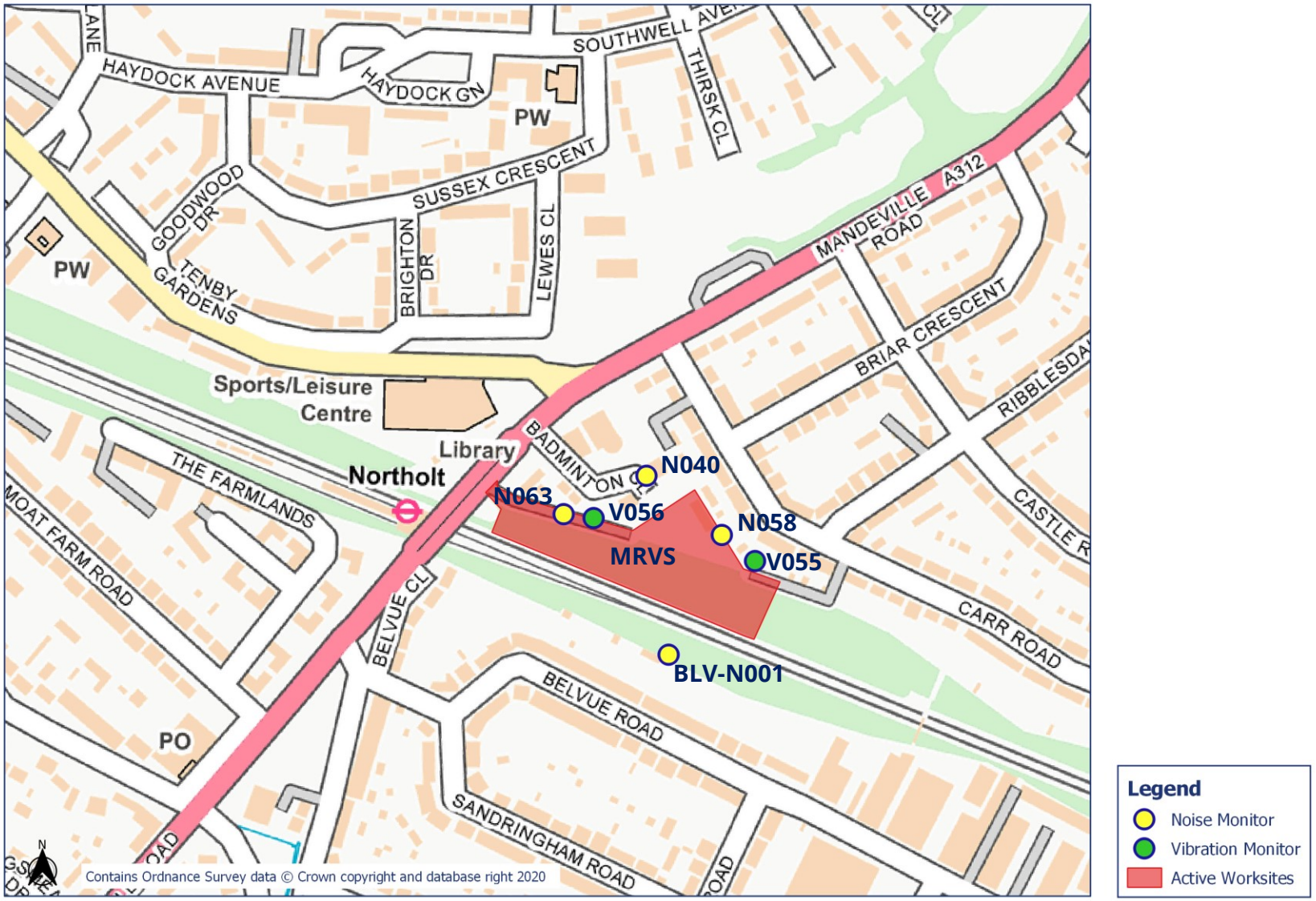
Legend
Active Worksites

Worksite Identification Plan - 4

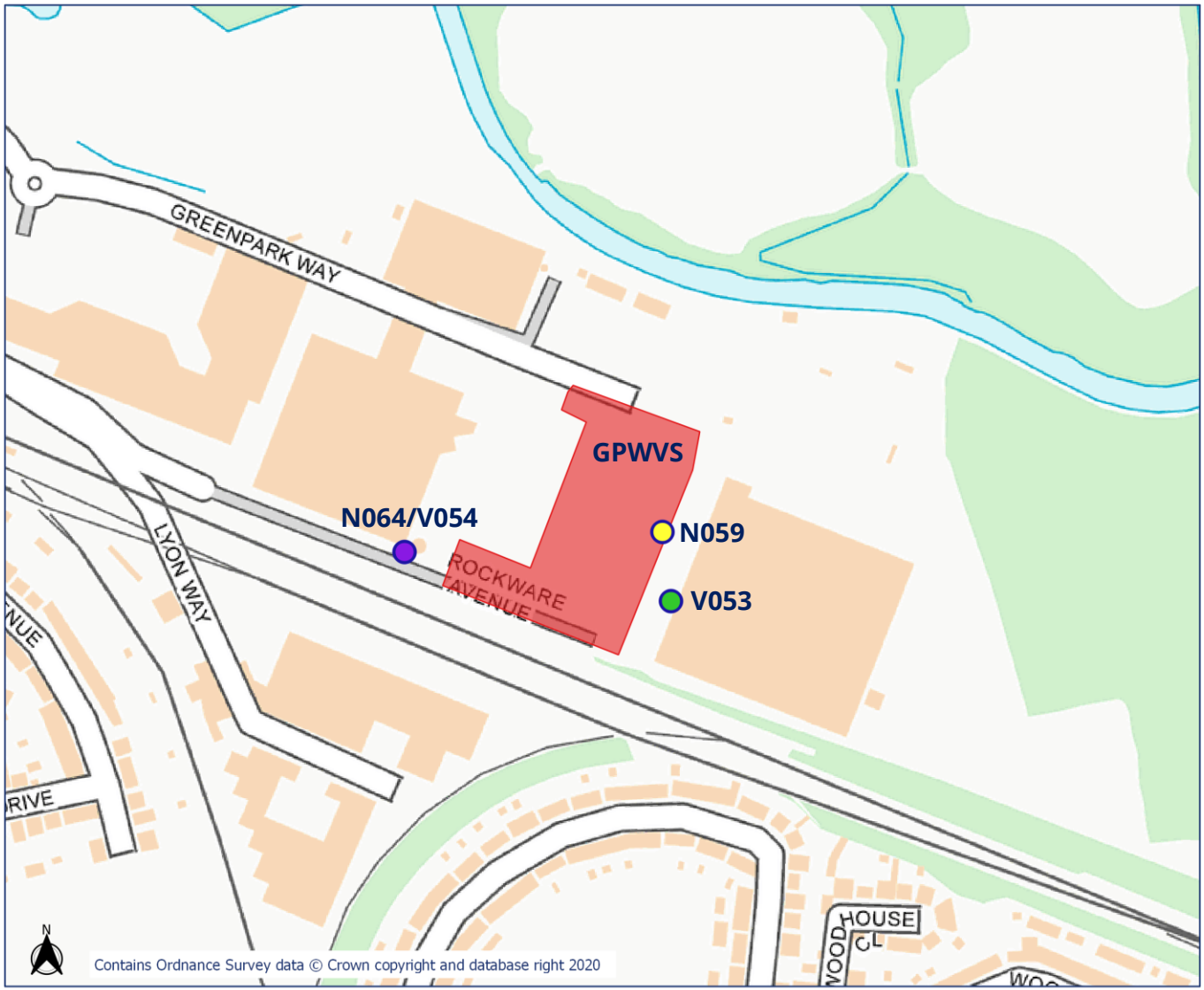


Appendix B Monitoring Locations

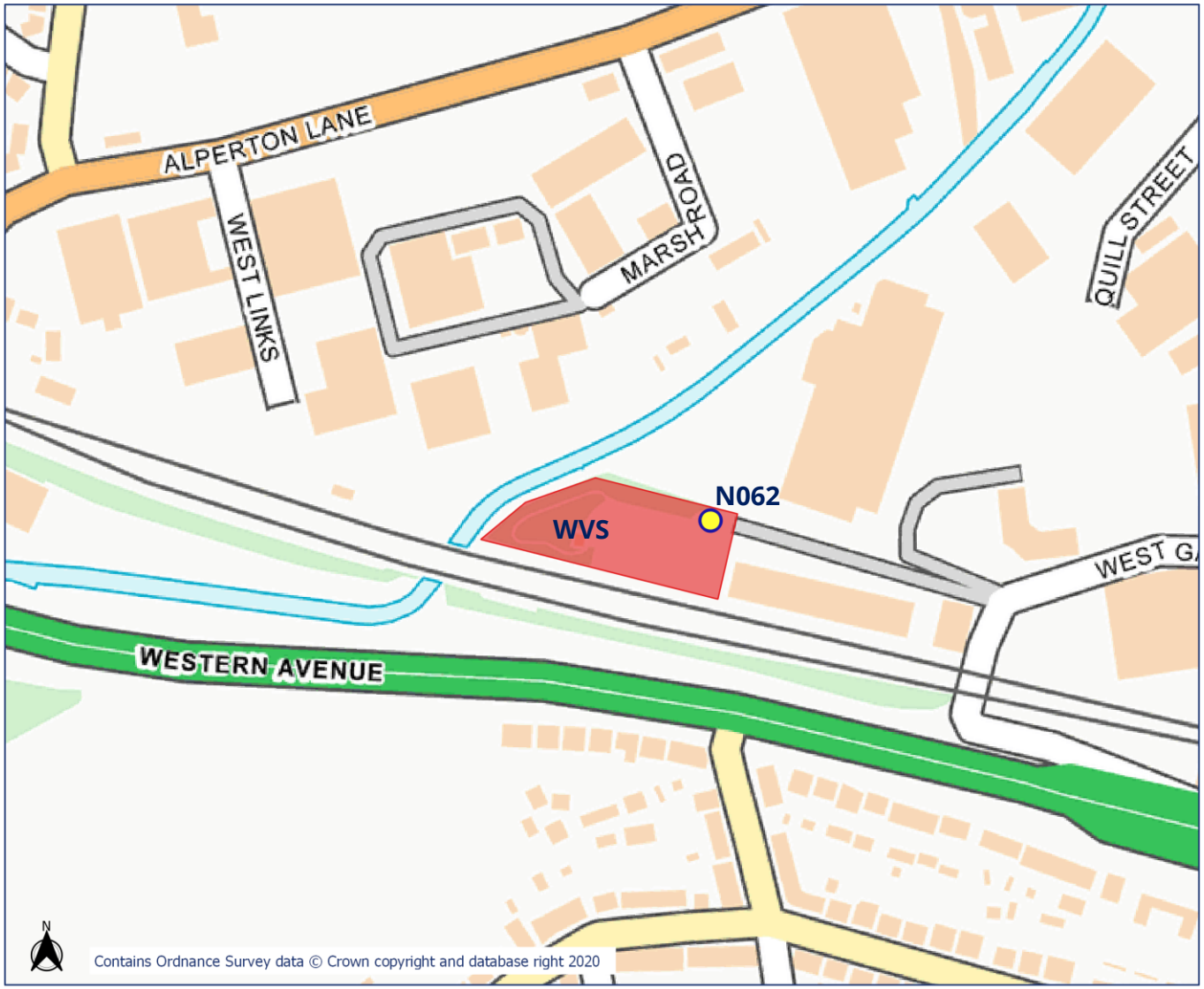
HS2 Noise and Vibration Monitoring Plan - 1



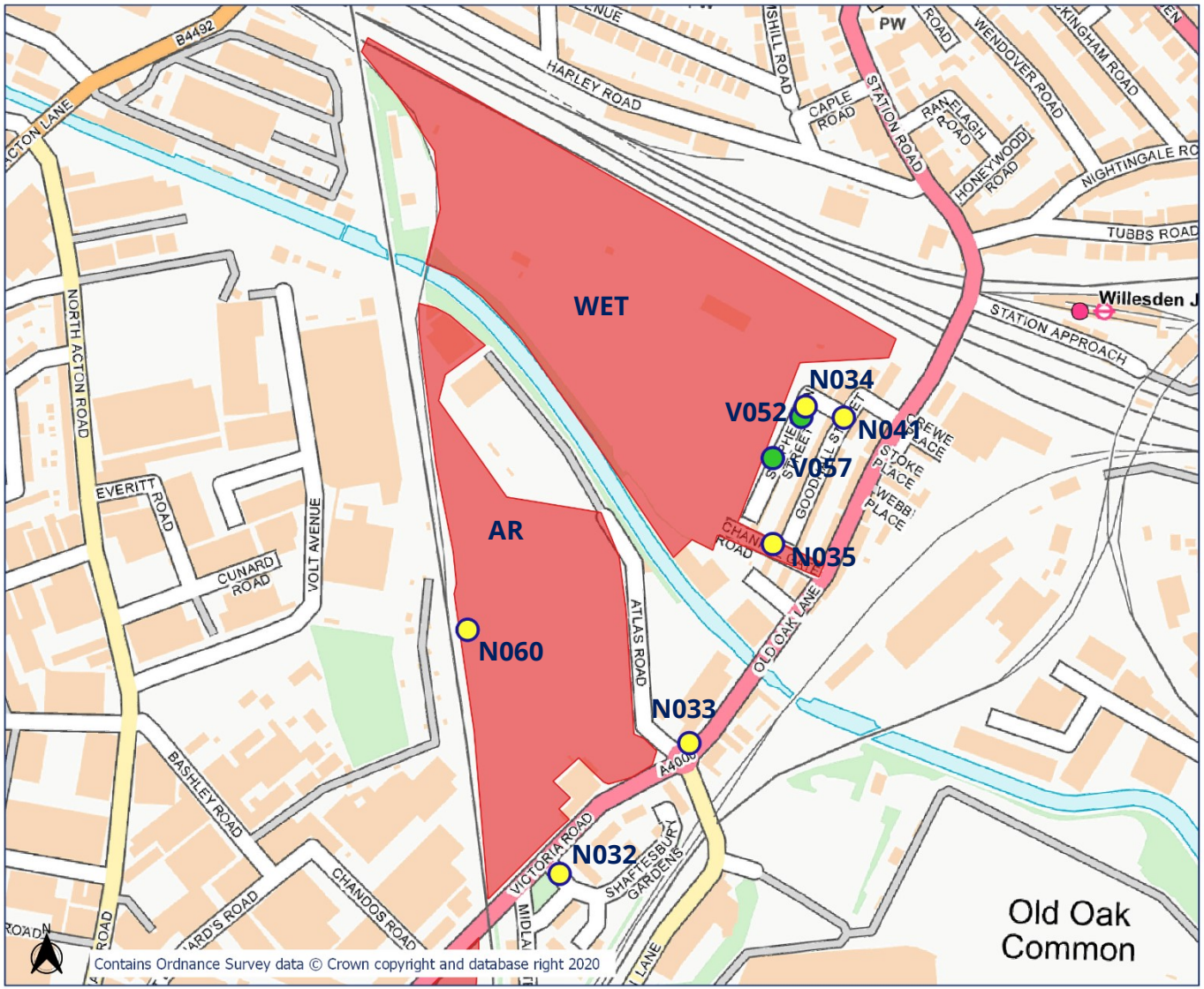
Noise and Vibration Monitoring Plan - 2



Noise and Vibration Monitoring Plan - 3



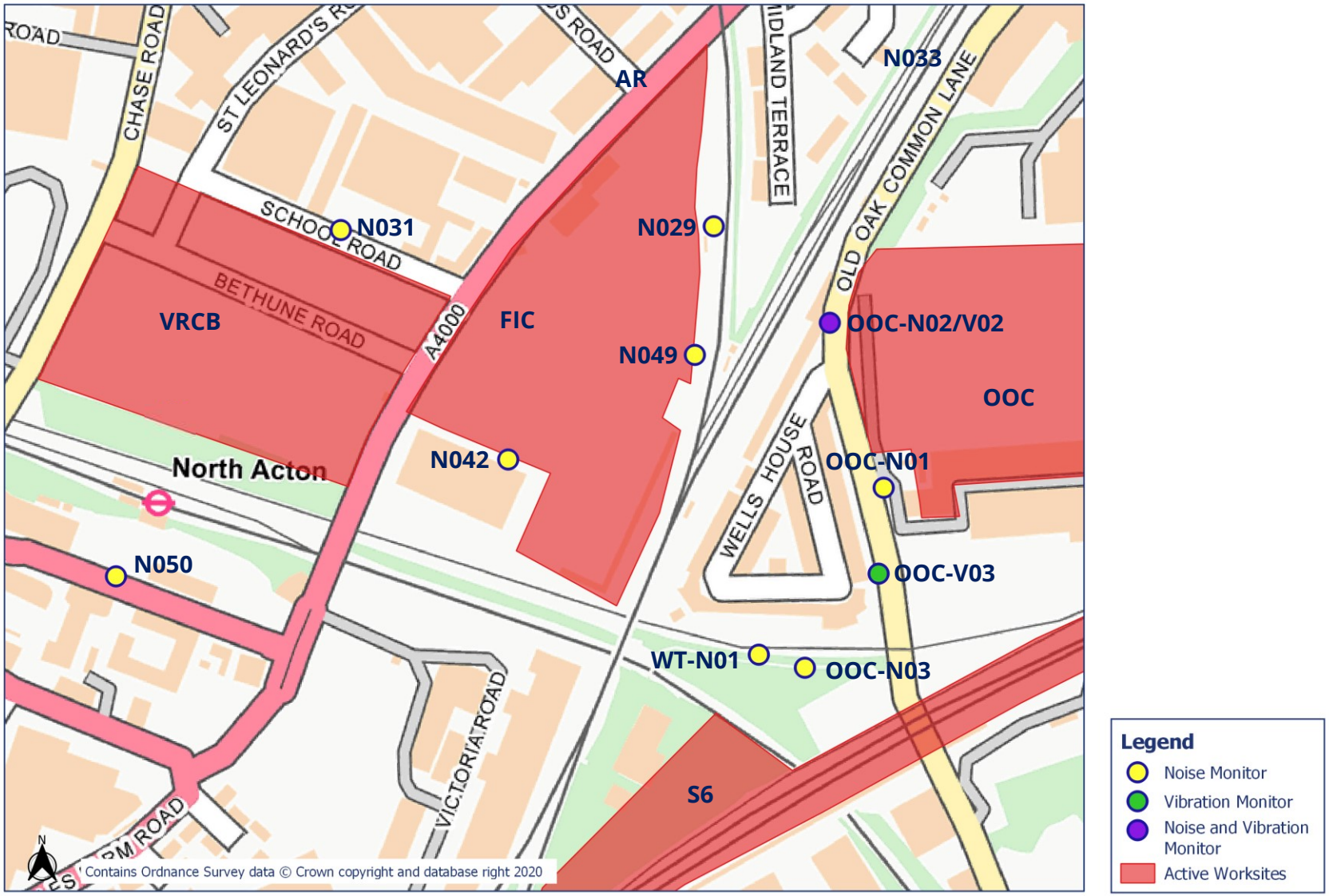
Noise and Vibration Monitoring Plan - 4



Legend

- Noise Monitor
- Vibration Monitor
- Active Worksites

Noise and Vibration Monitoring Plan - 5



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.

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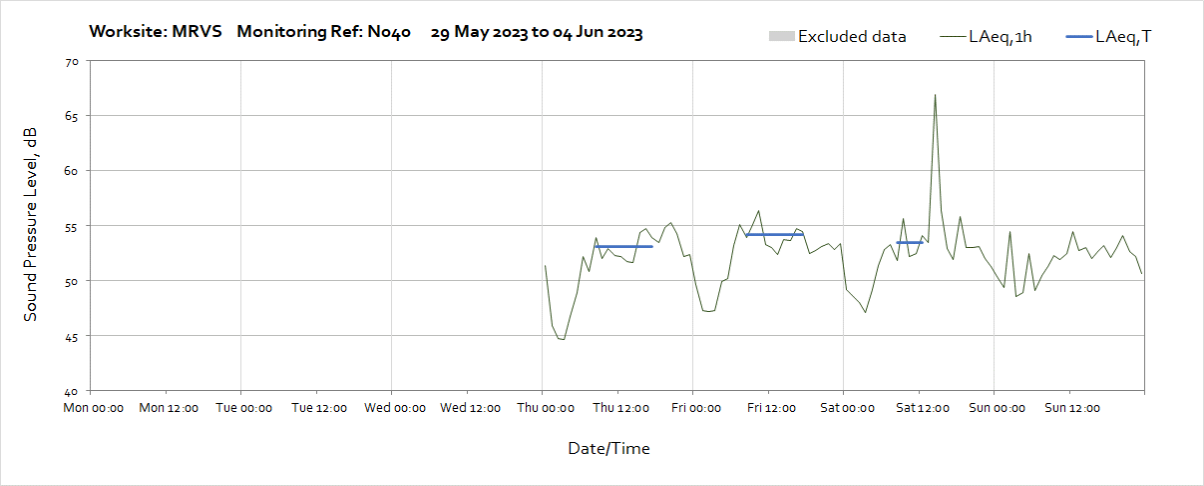

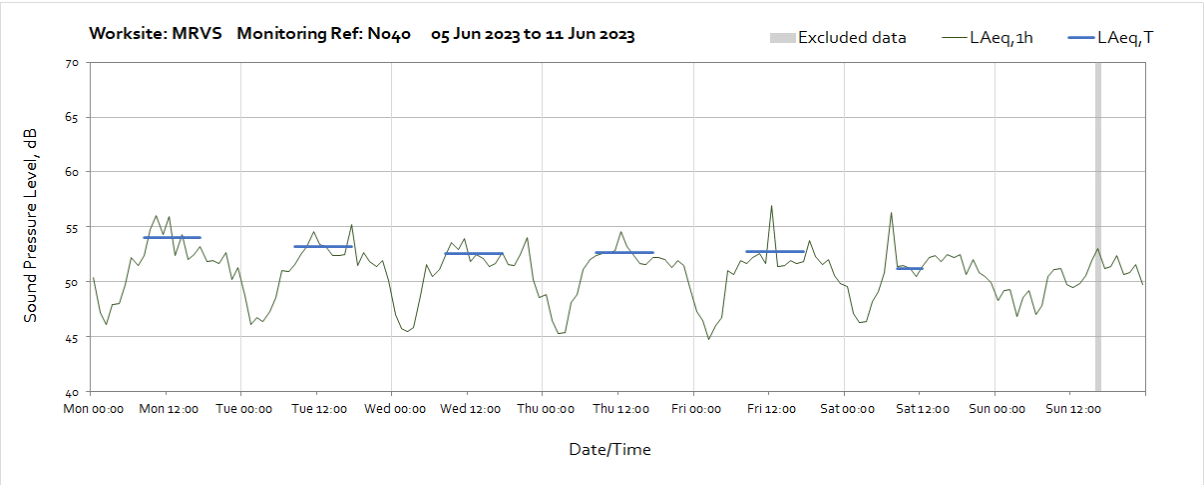

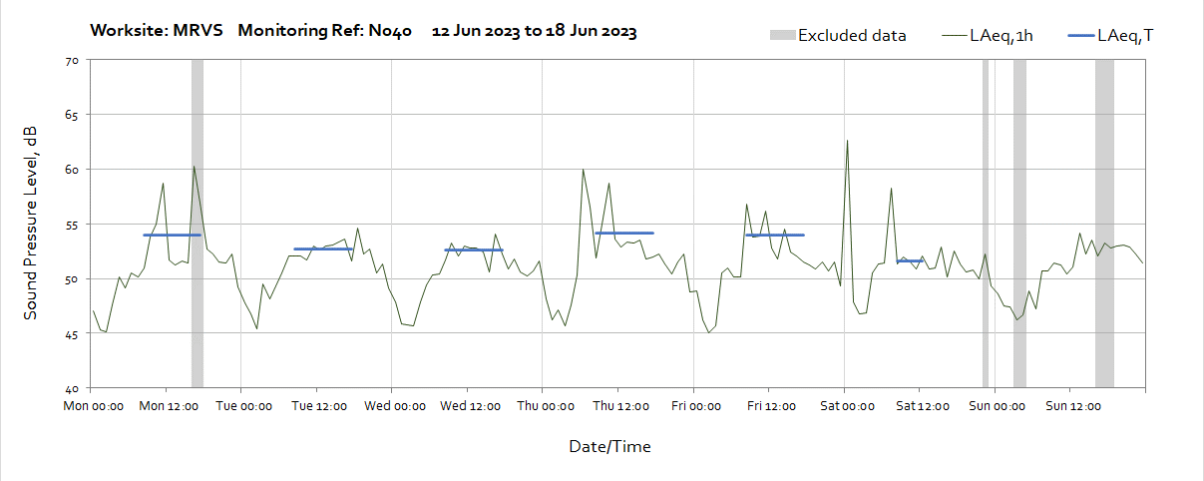
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60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
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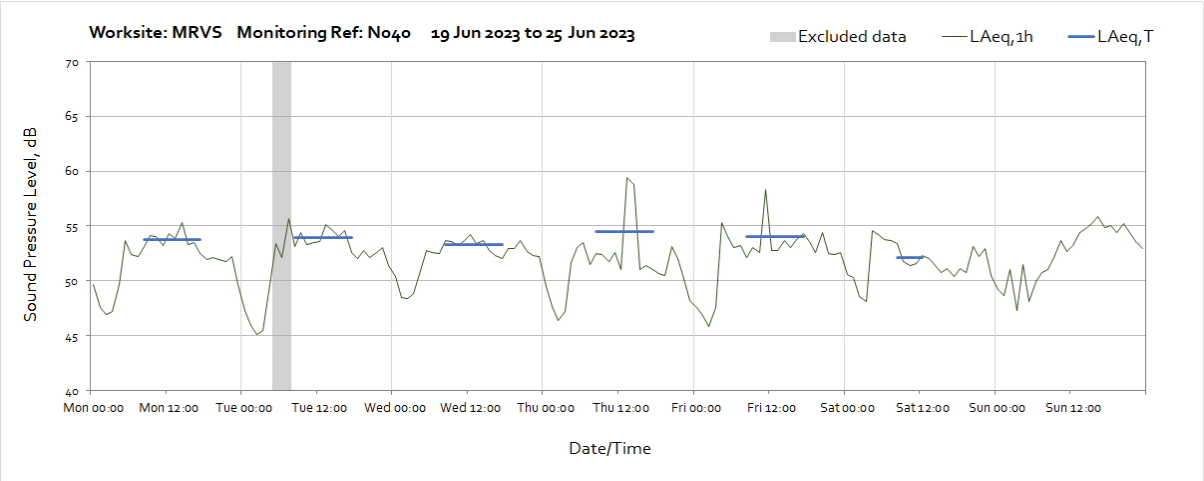
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time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55
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Sat 12:00
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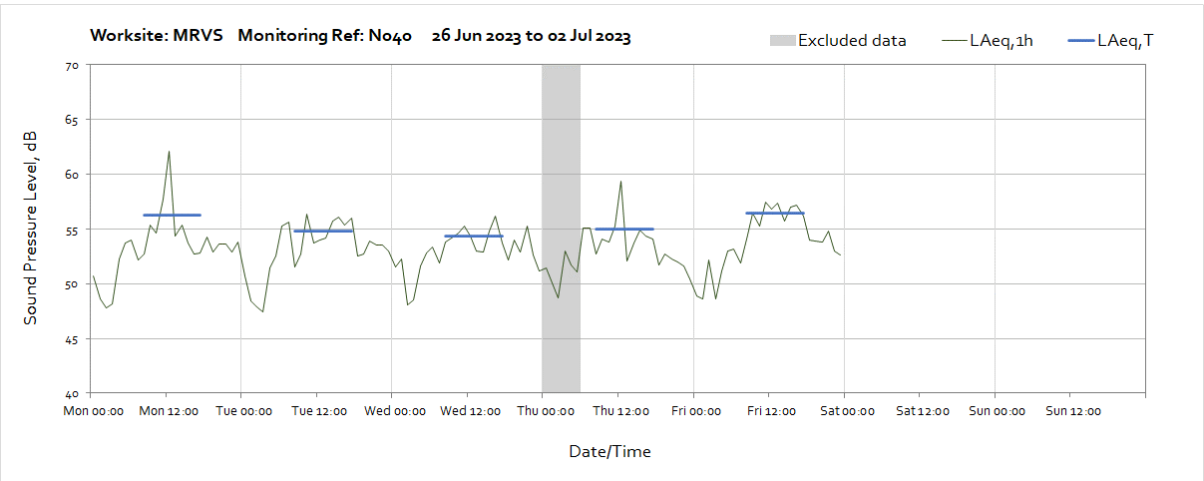
Sun 12:00
Date/Time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Tue 12:00
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Wed 12:00
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Date/Time

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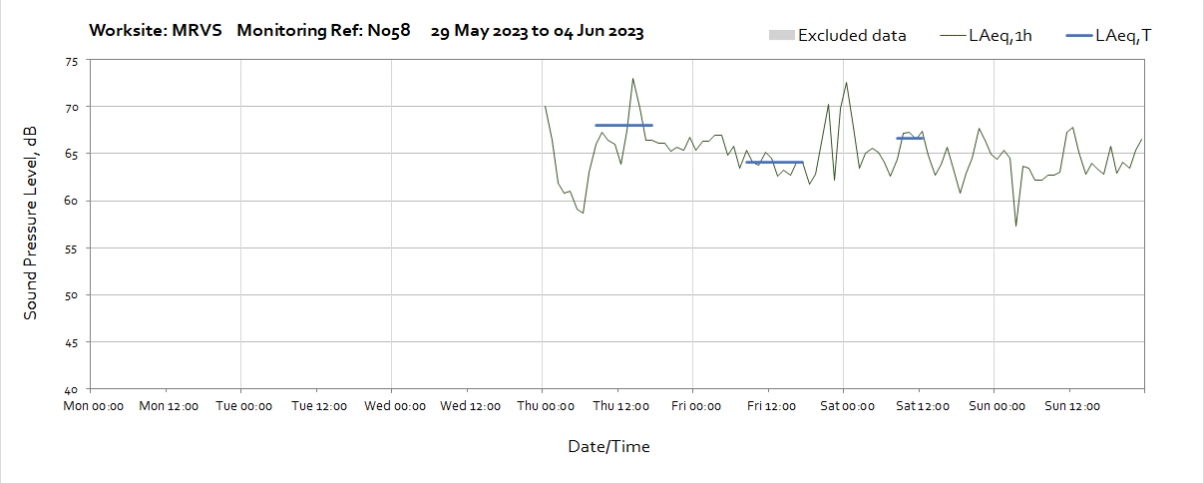

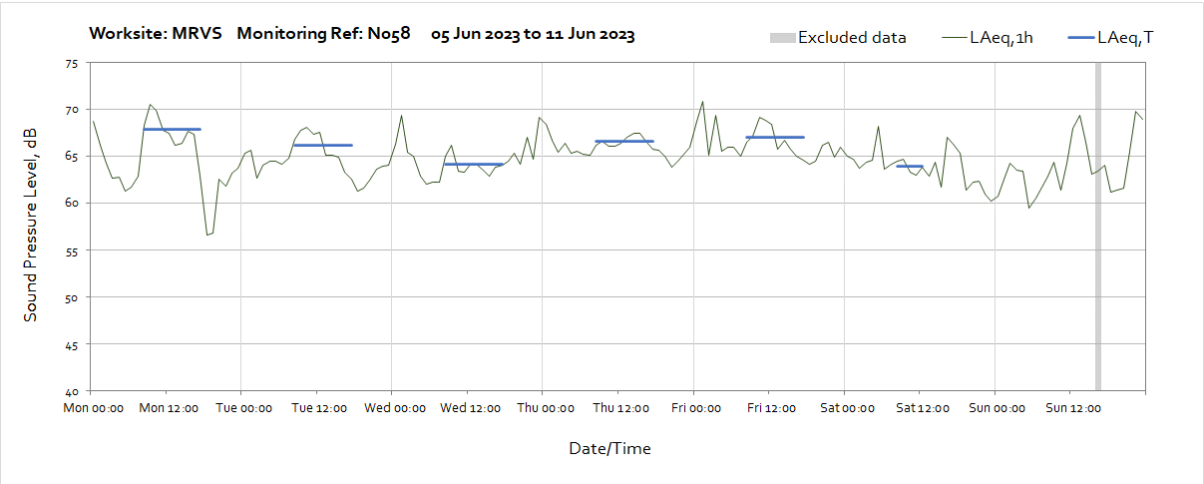

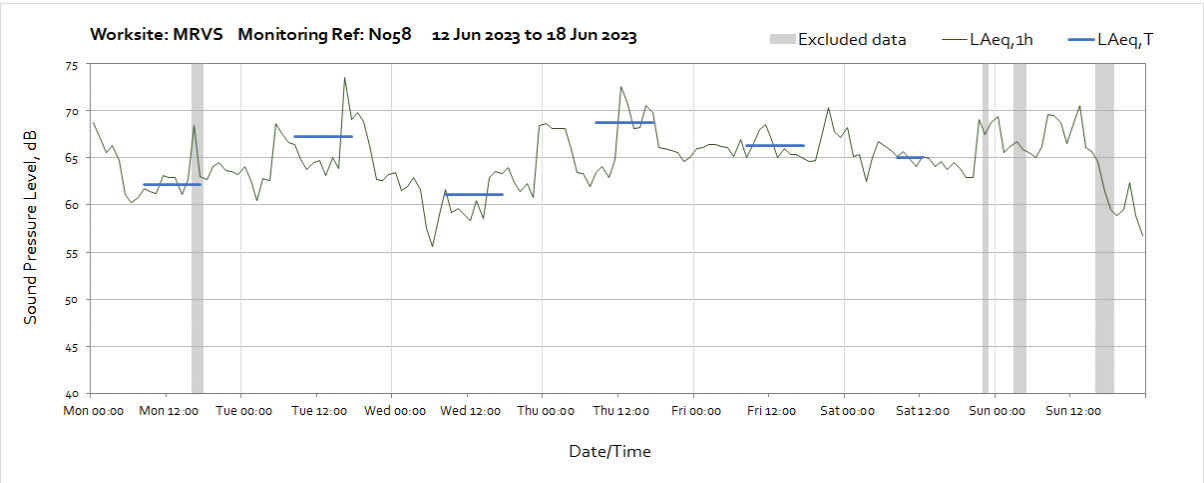

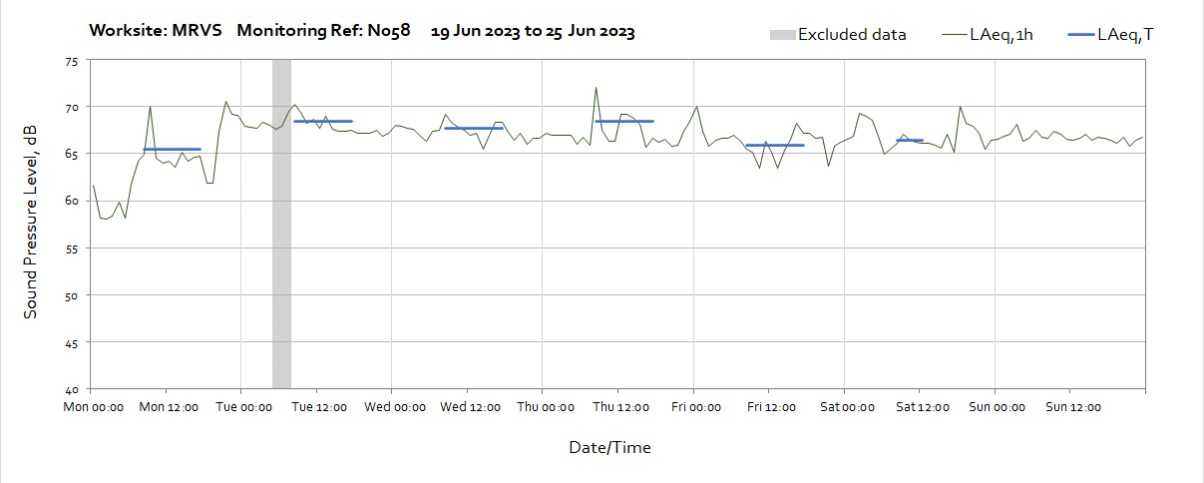

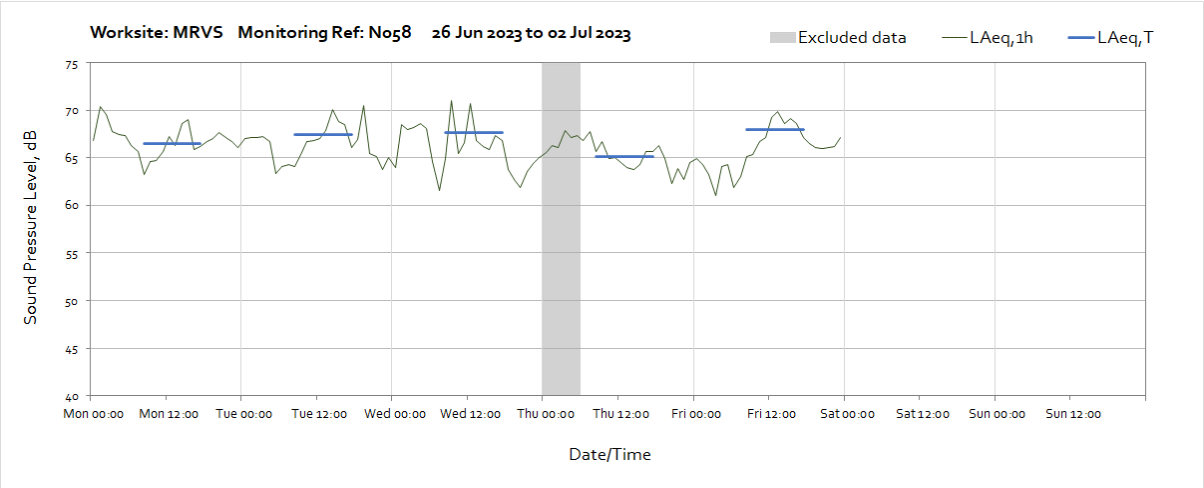

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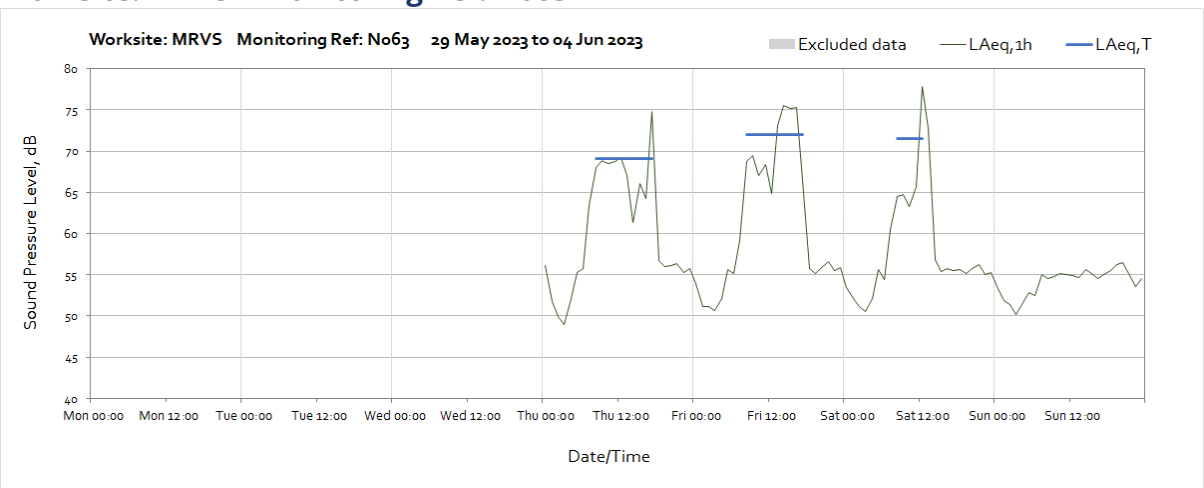

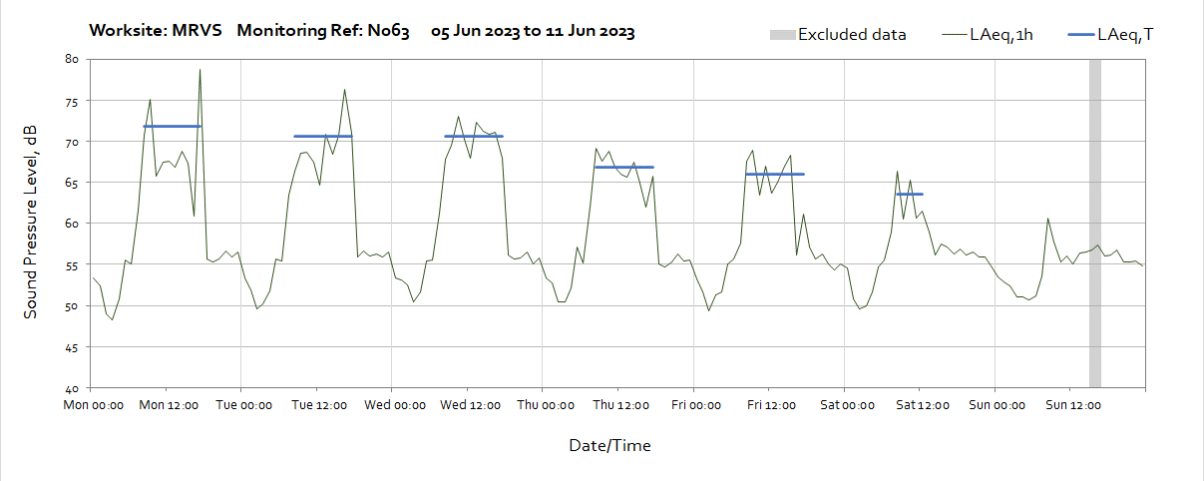
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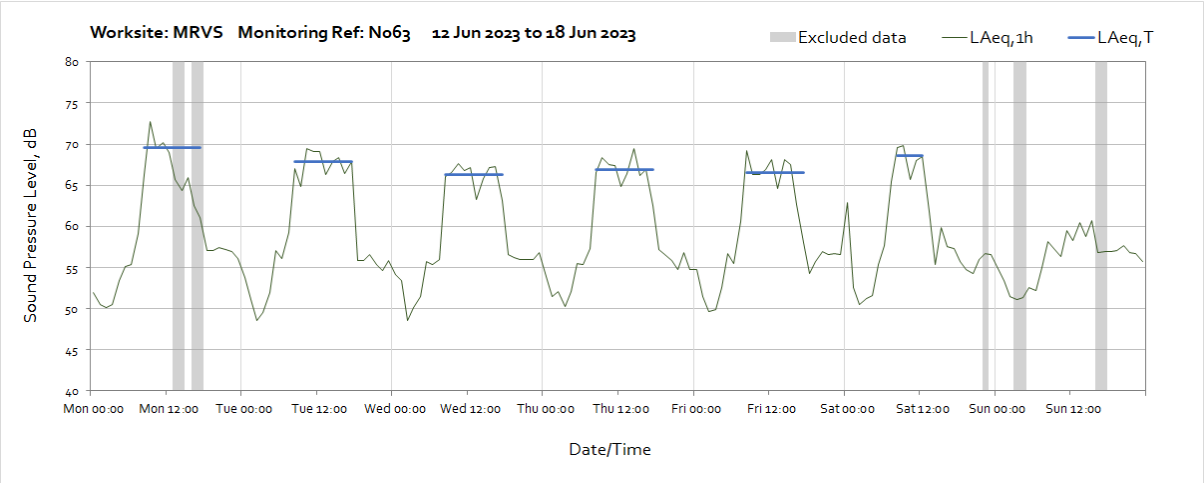
Date/Time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Sound Pressure Level, dB
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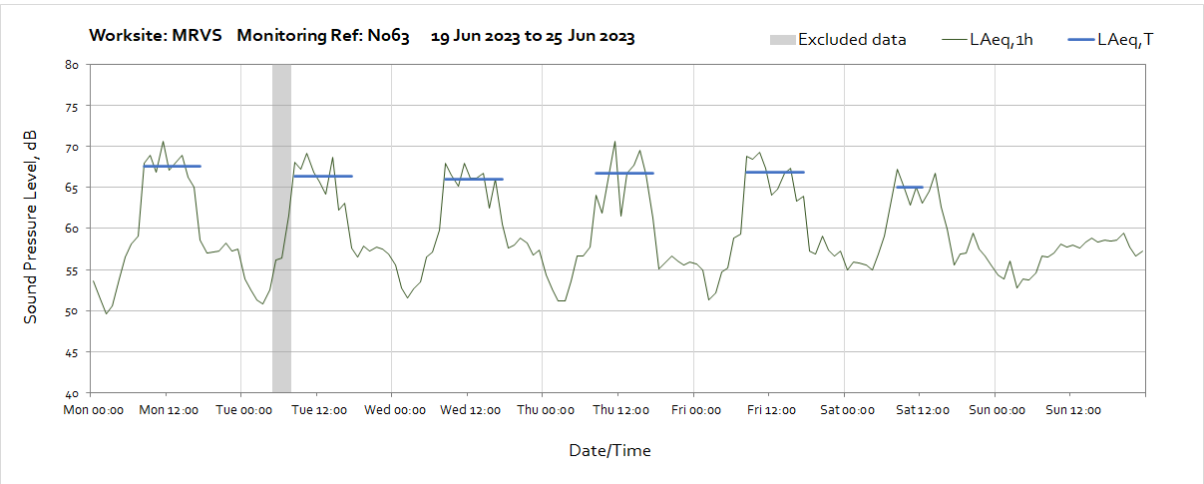
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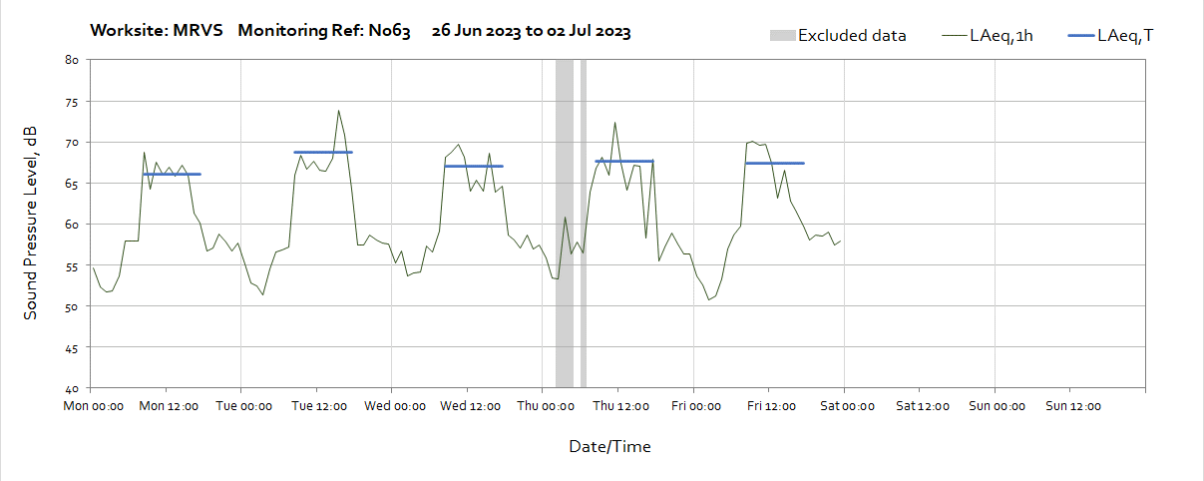

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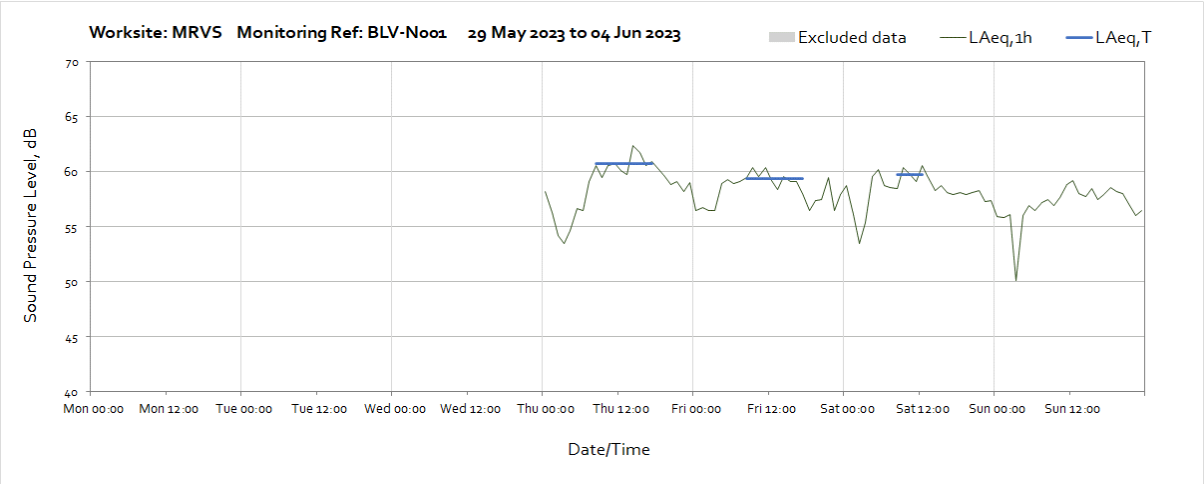

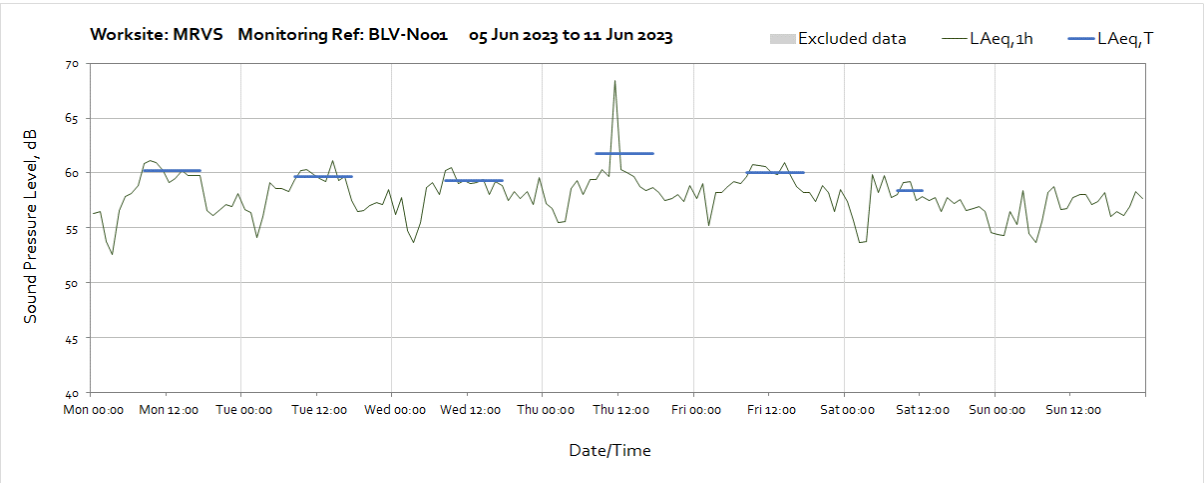

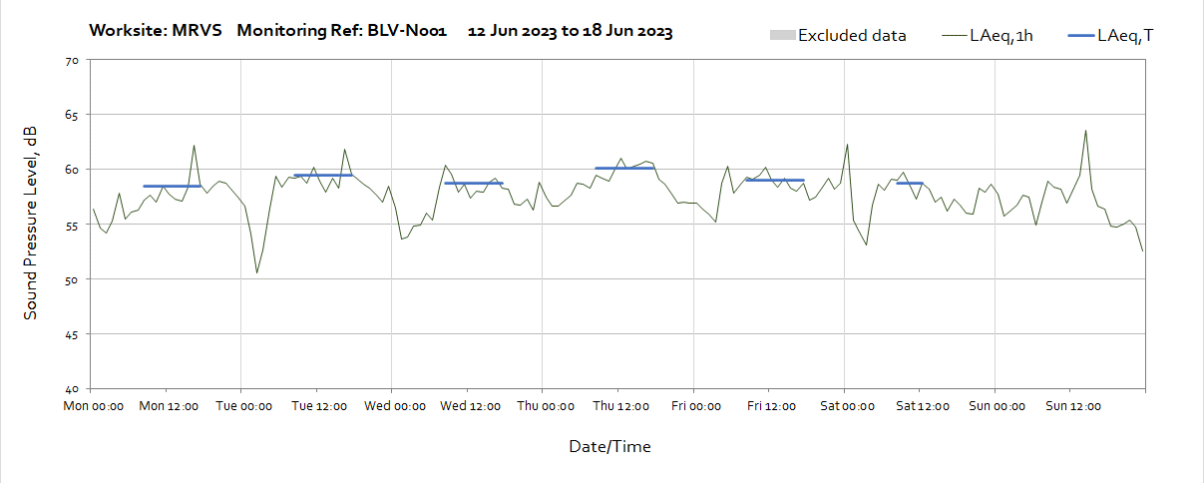
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Wed 00:00
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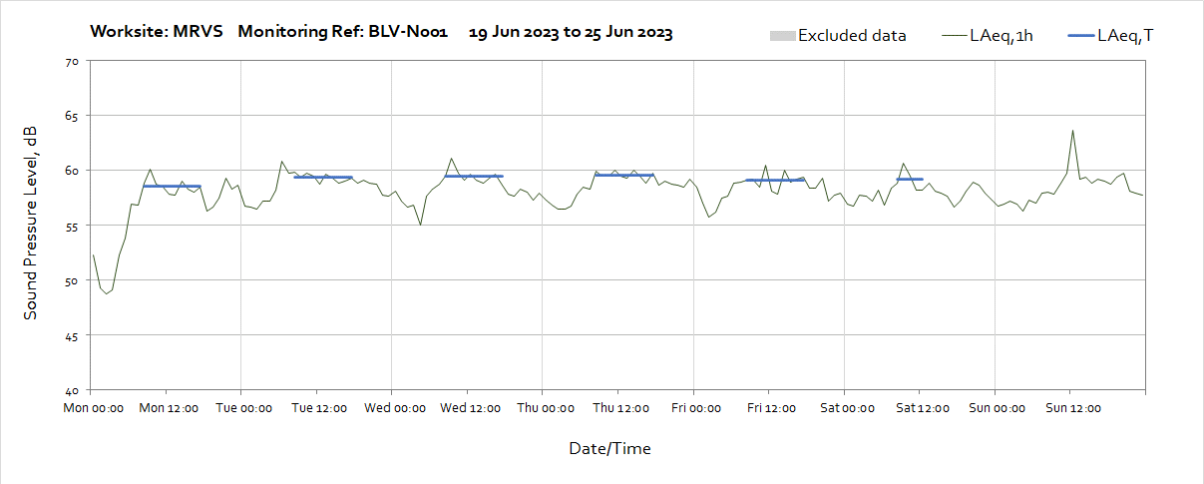
Date/Time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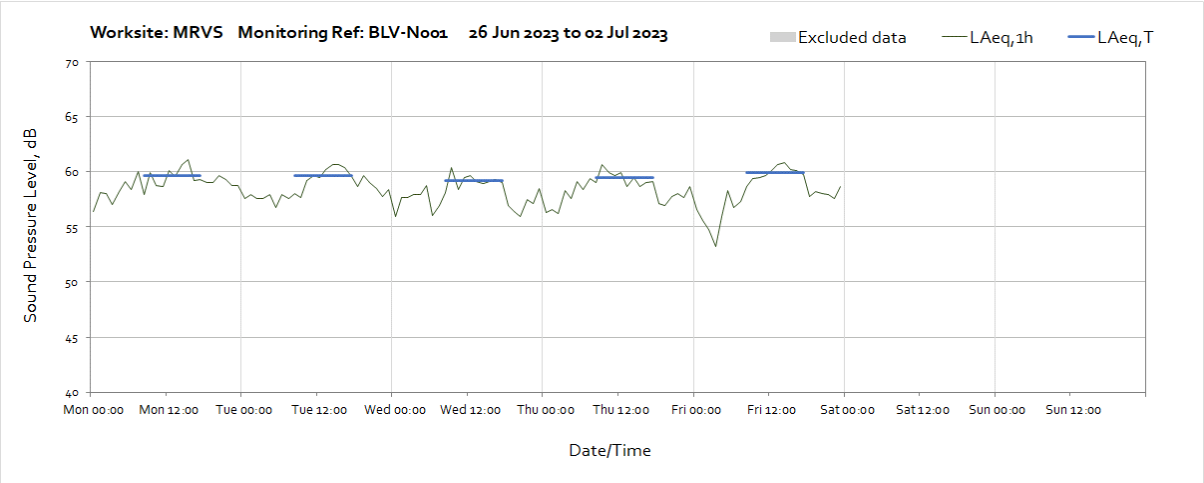
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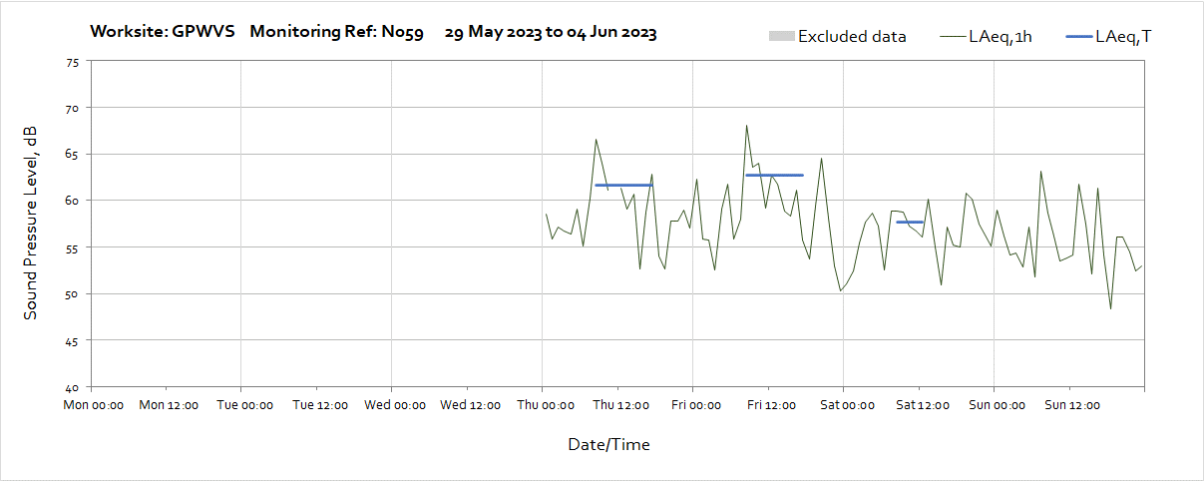
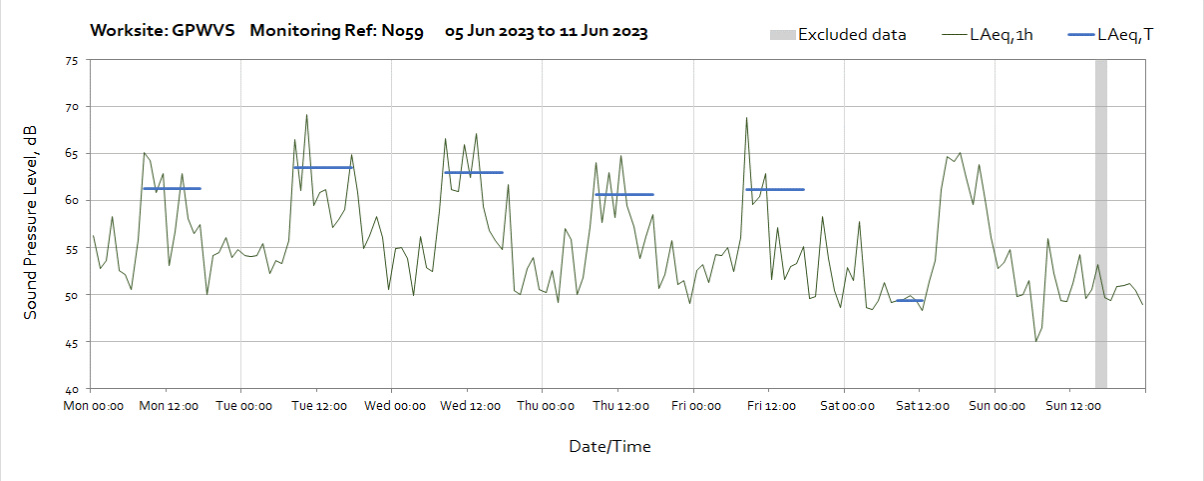
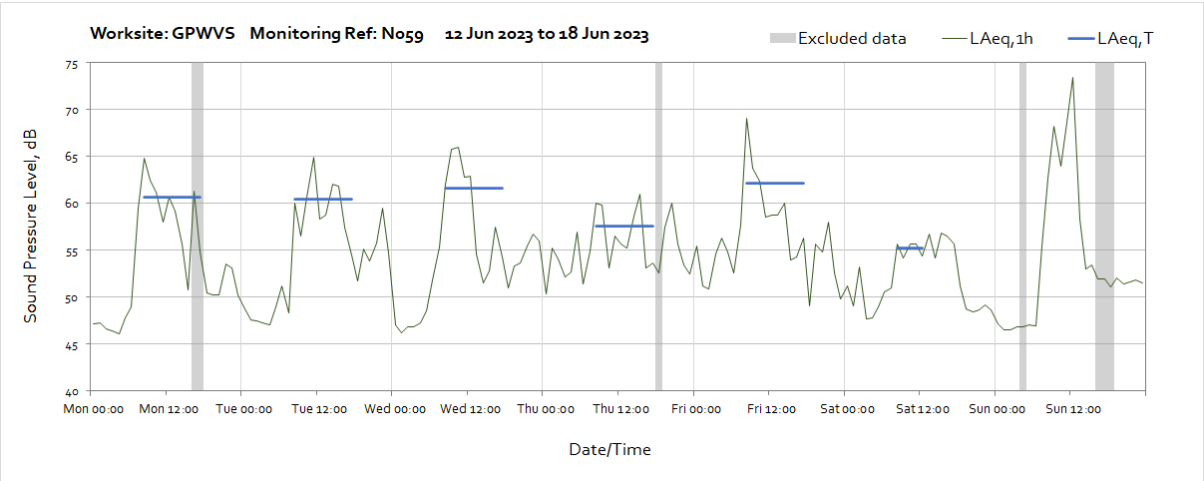
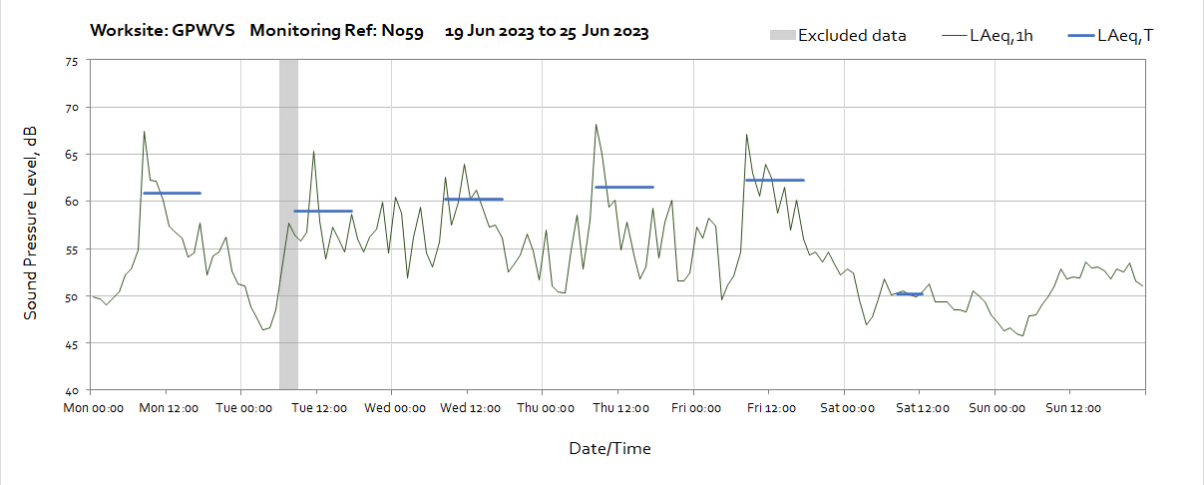
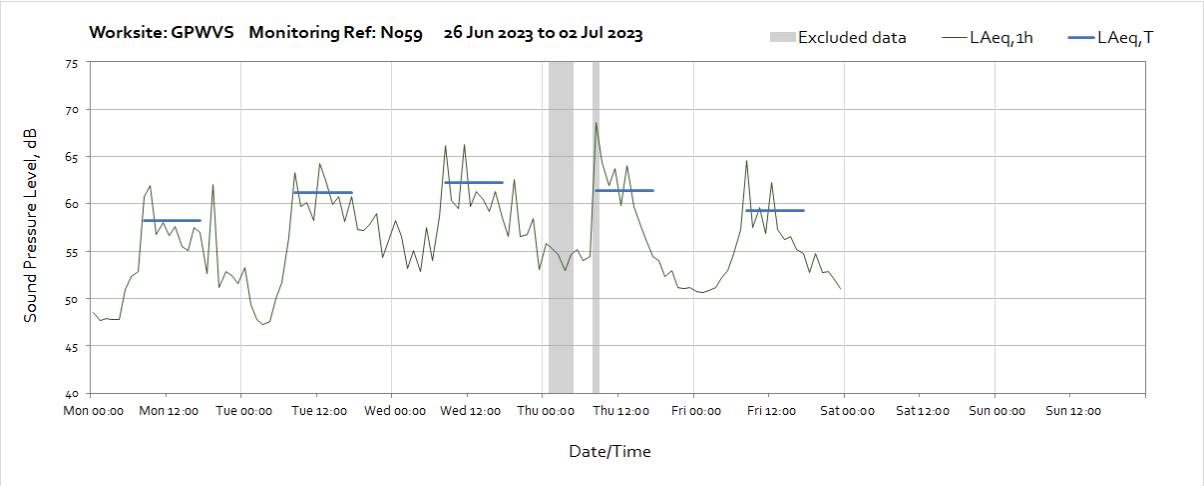


Note: Missing data between 11:00 and 12:00 on Thursday 1st June was due to monitoring station replacement.









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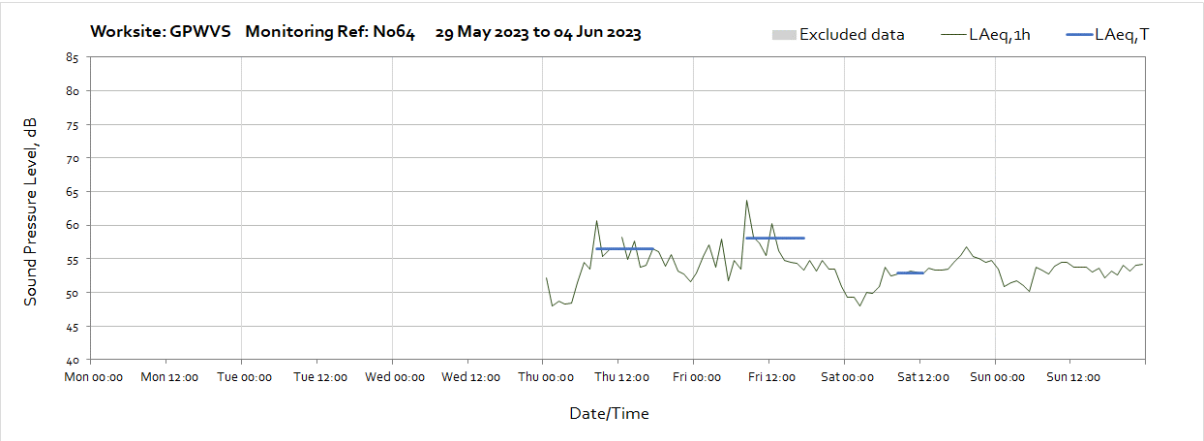
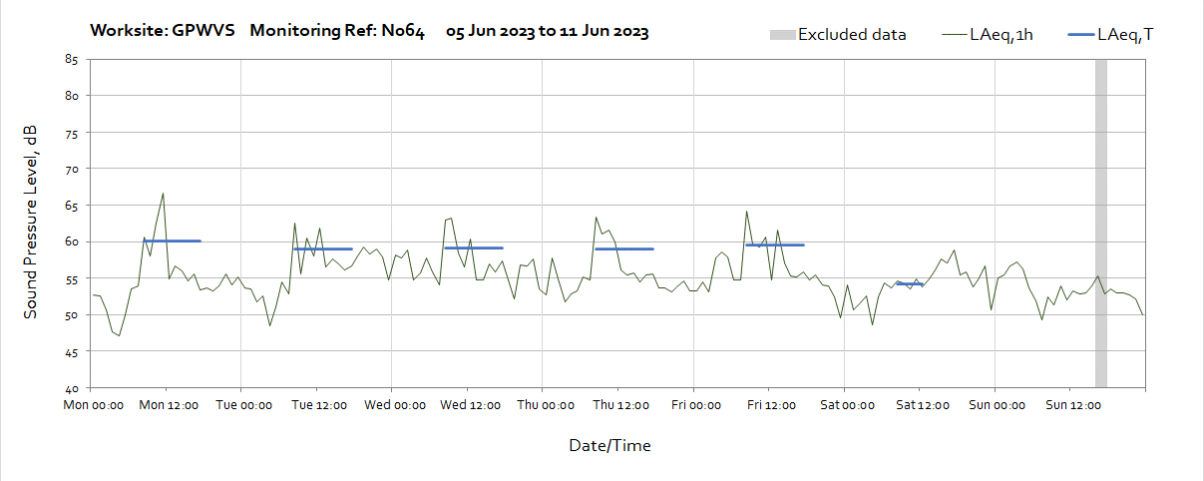


Note: Missing data between 11:00 and 12:00 on Thursday 1st June was due to monitoring station replacement.


Worksite: GPWVS Monitoring Ref: No64 05 Jun 2023 to 11 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
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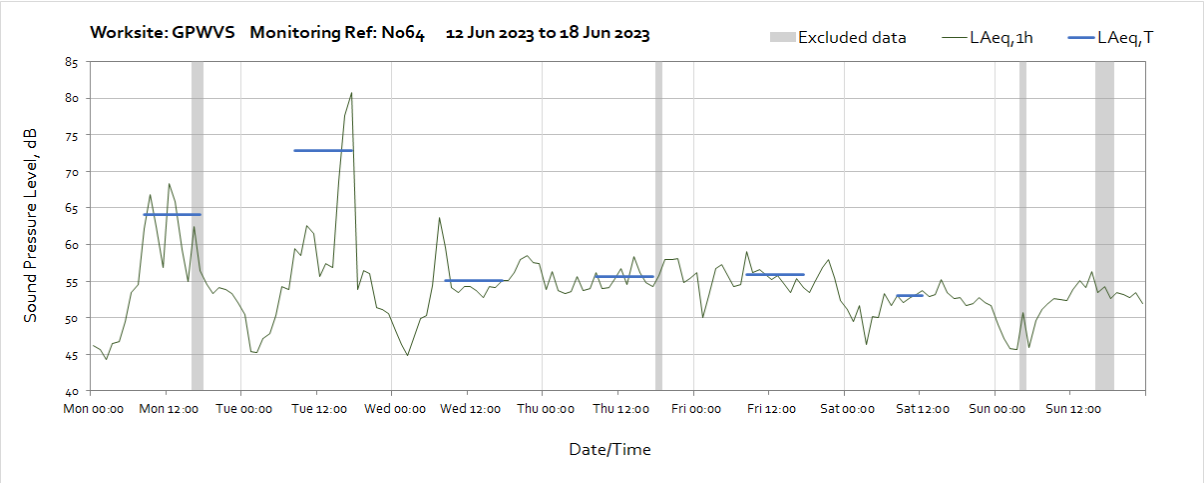
Sun 12:00
Date/Time


Worksite: GPWVS Monitoring Ref: No64 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
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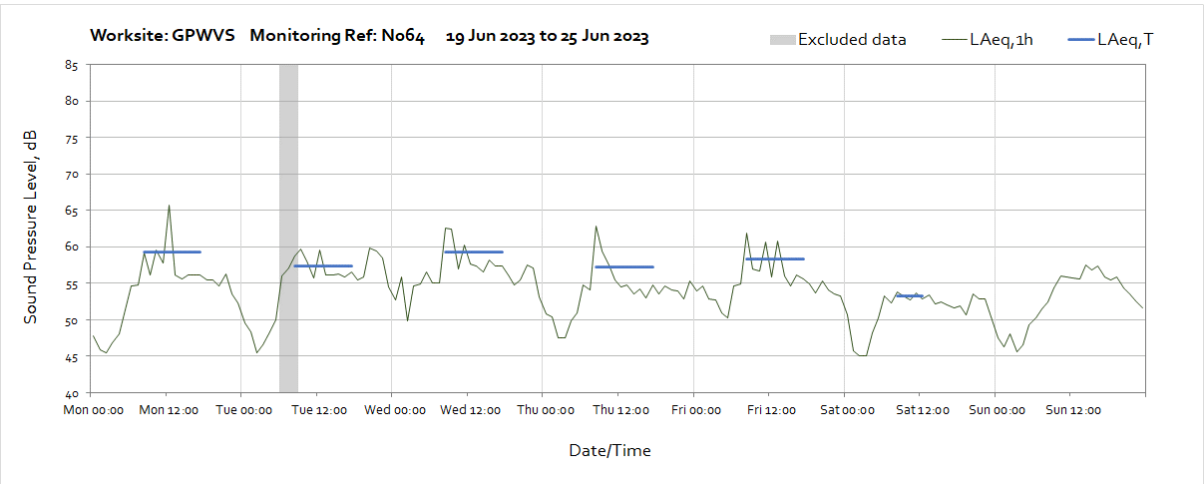
Sun 12:00
Date/Time


Worksite: GPWVS Monitoring Ref: No64 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
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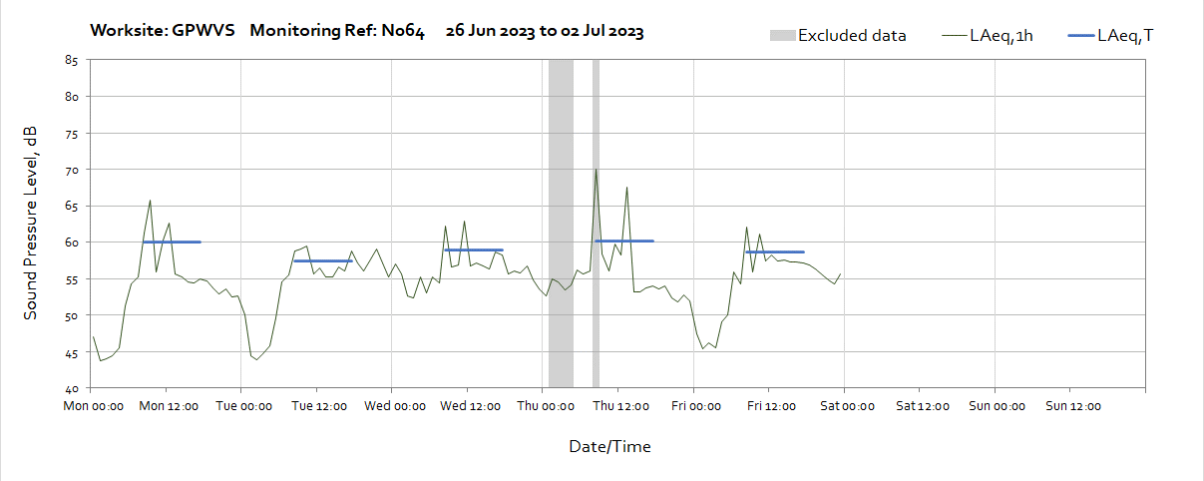
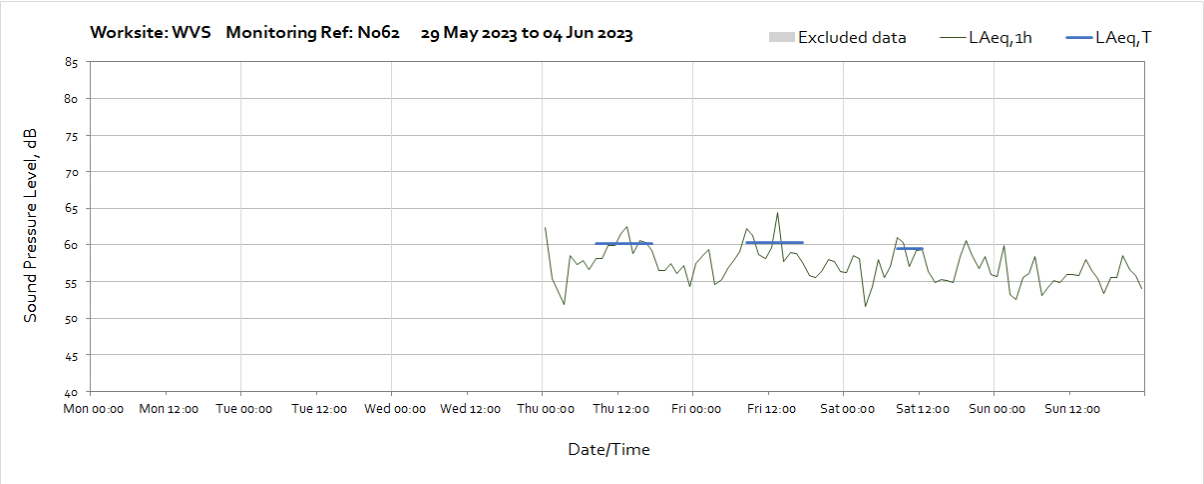
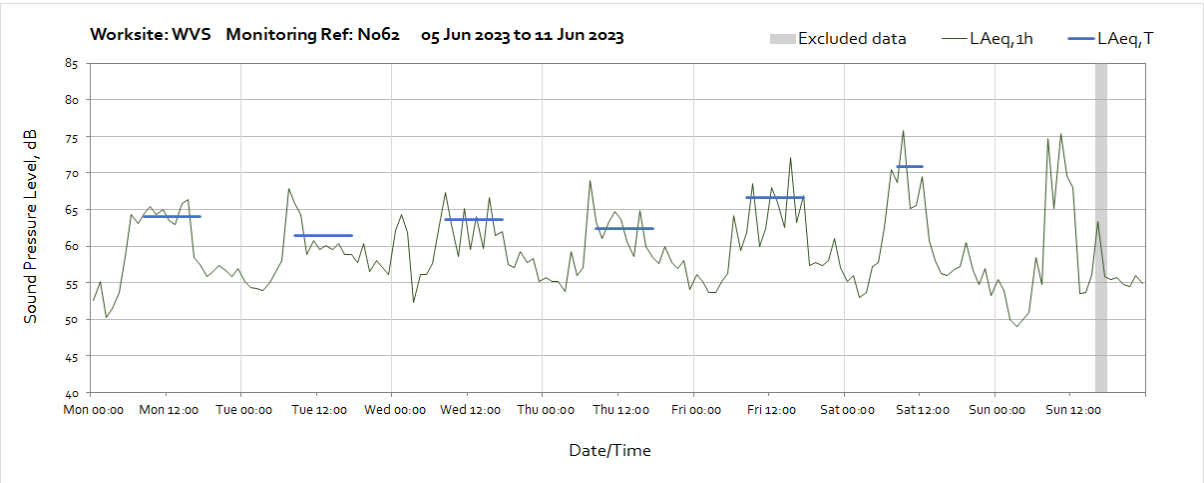
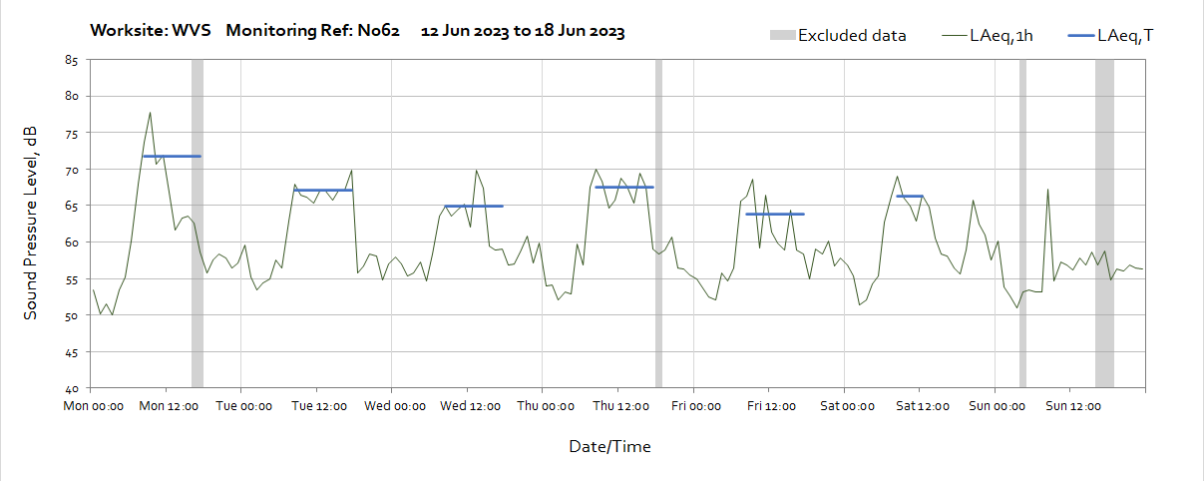
Date/Time



Worksite: WVS – Monitoring Ref: N062






Worksite: WVS Monitoring Ref: No62 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
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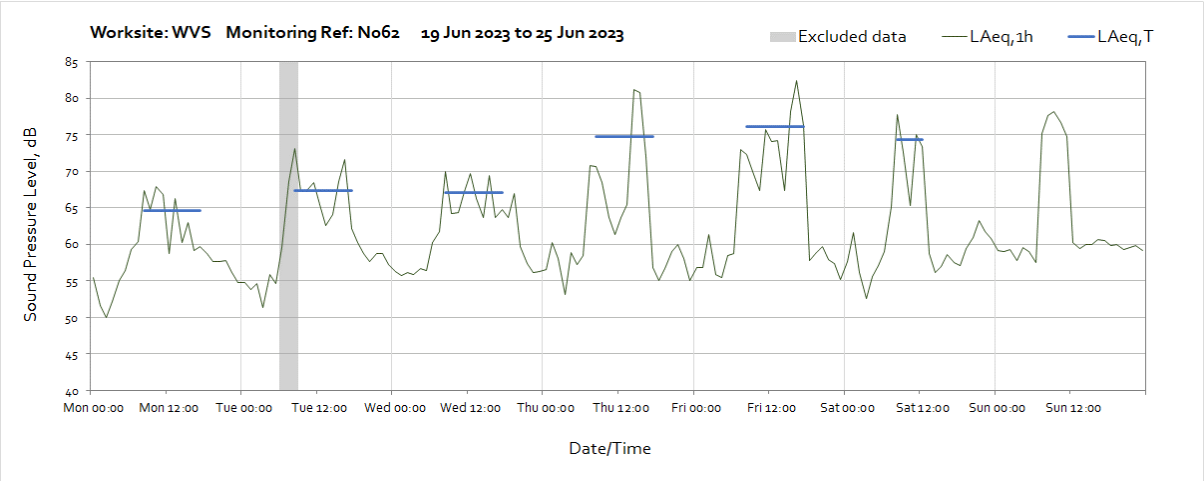
Sun 12:00
Date/Time


Worksite: WVS Monitoring Ref: No62 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
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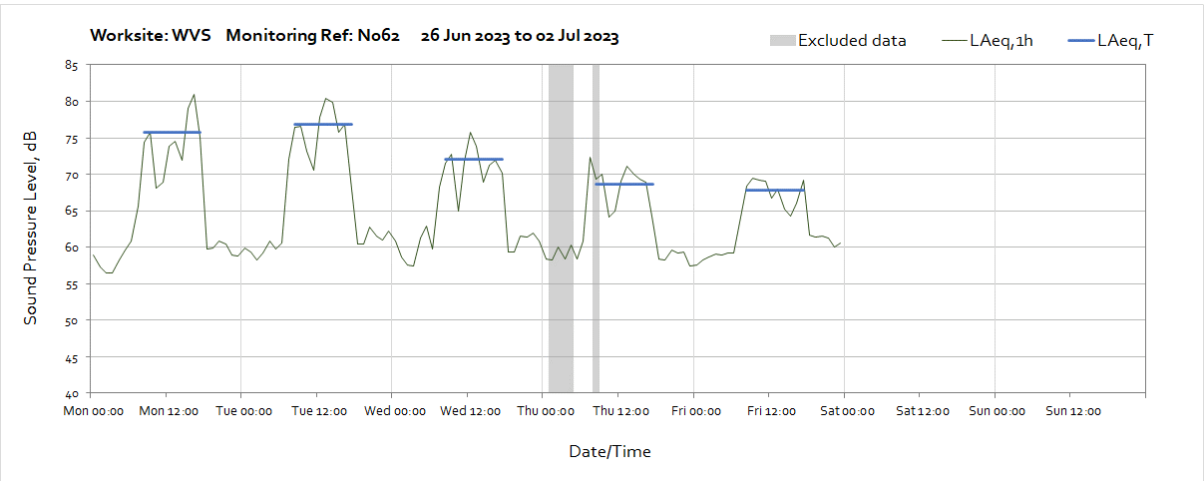
Sun 12:00
Date/Time


Worksite: WVS Monitoring Ref: No62 26 Jun 2023 to 02 Jul 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
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75
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65
60
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Mon 00:00
Mon 12:00
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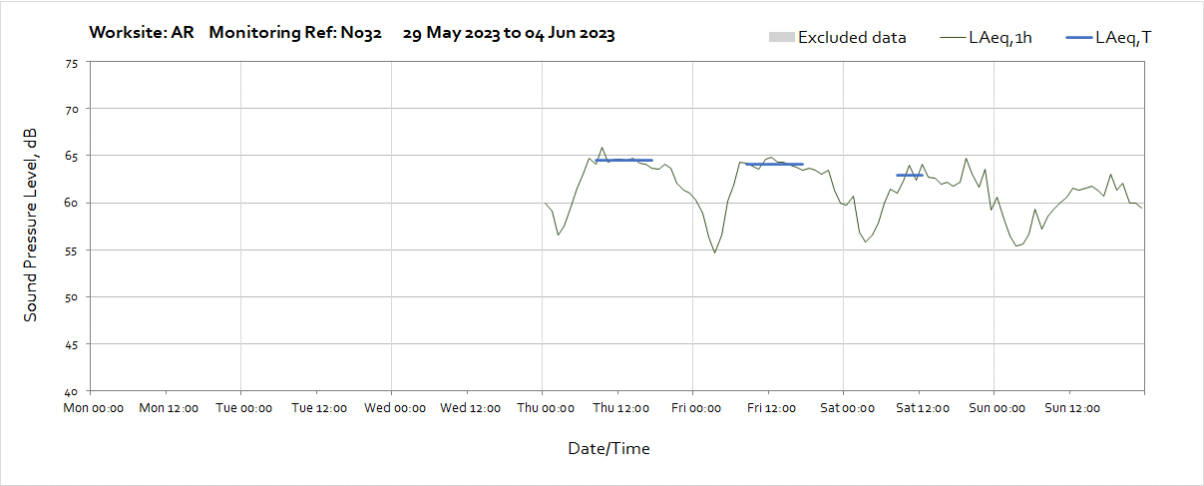
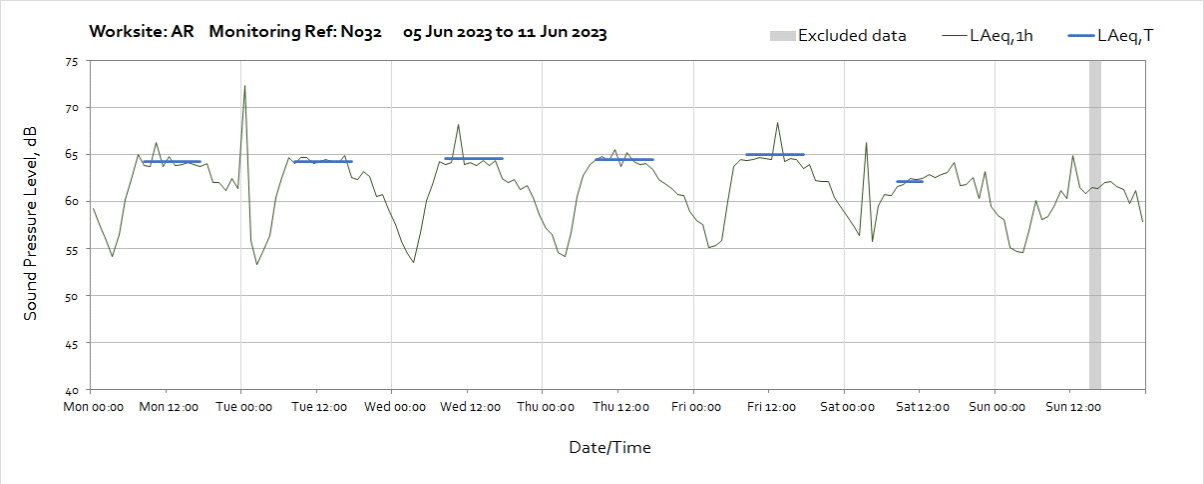
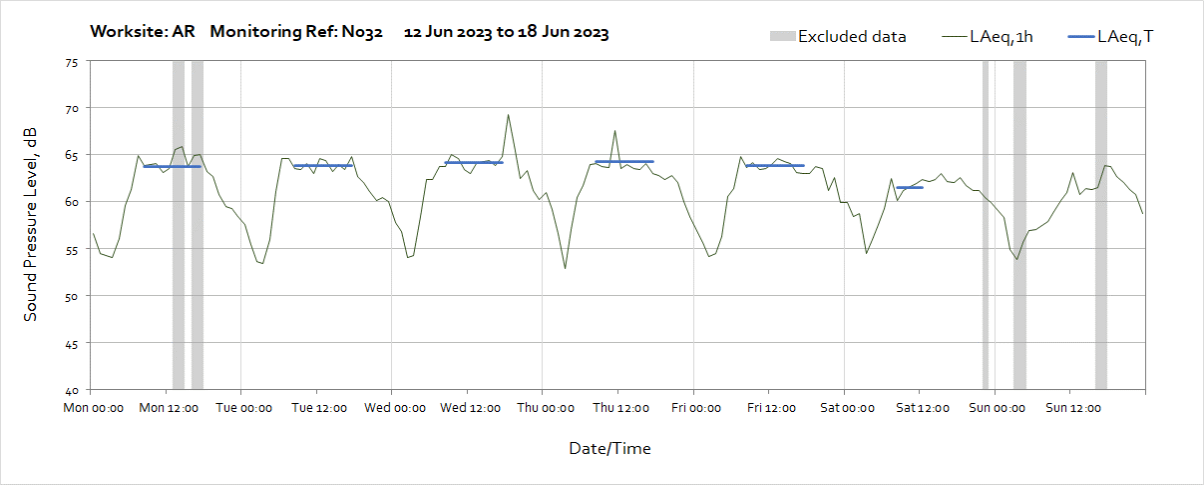
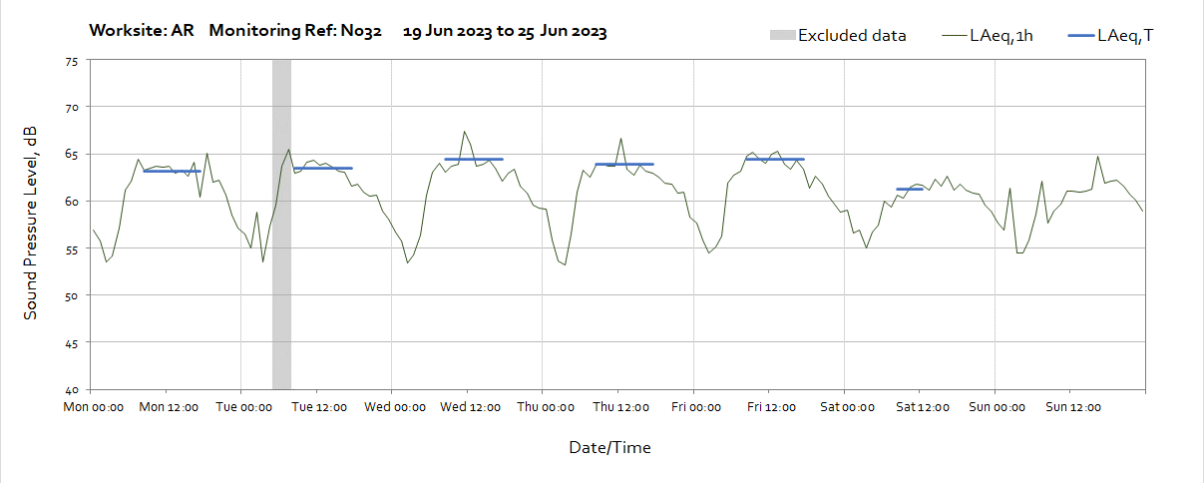
Date/Time

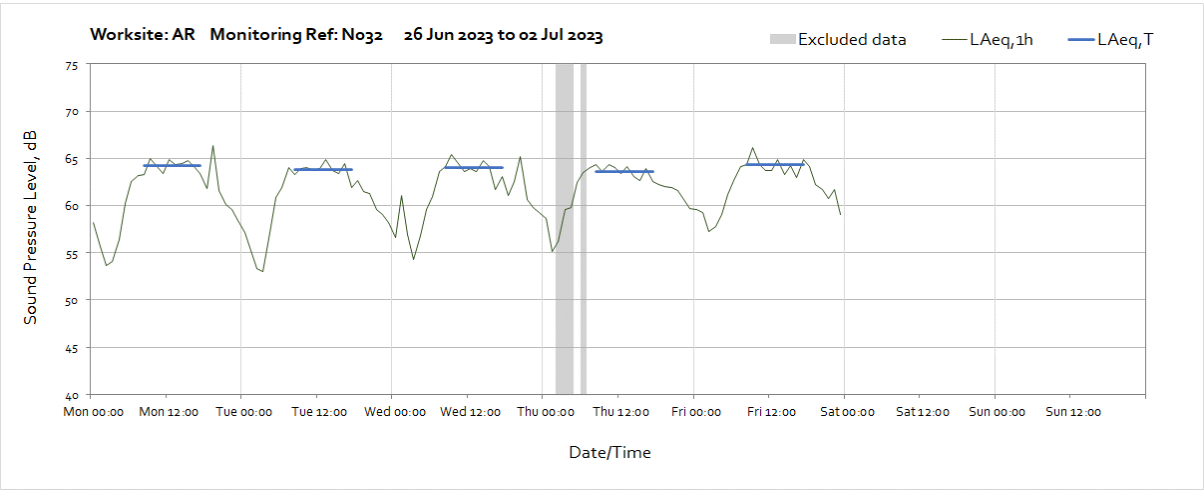
Worksite: AR – Monitoring Ref: N032



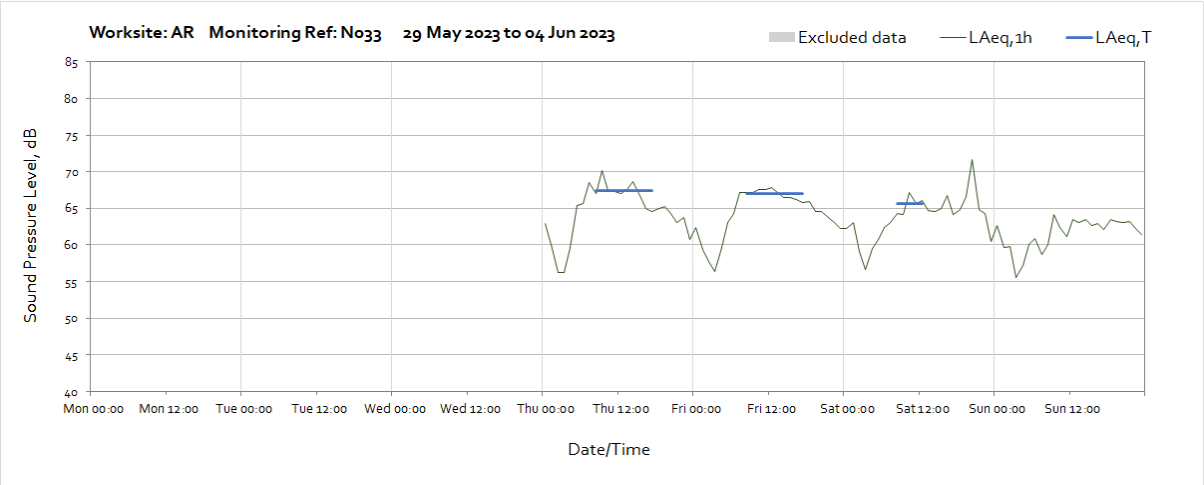


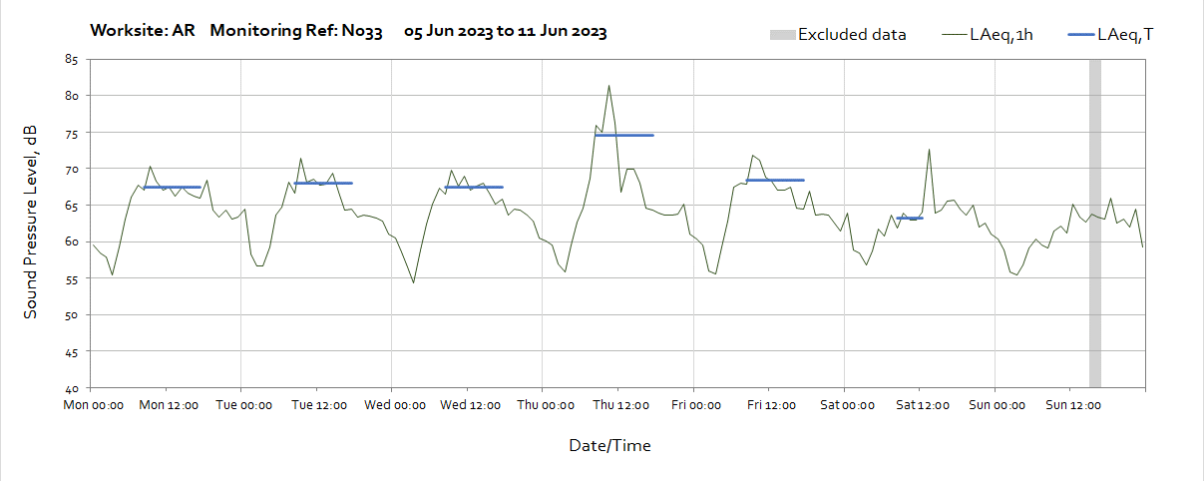






Worksite: AR – Monitoring Ref: N033




Worksite: AR Monitoring Ref: No33 05 Jun 2023 to 11 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
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70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
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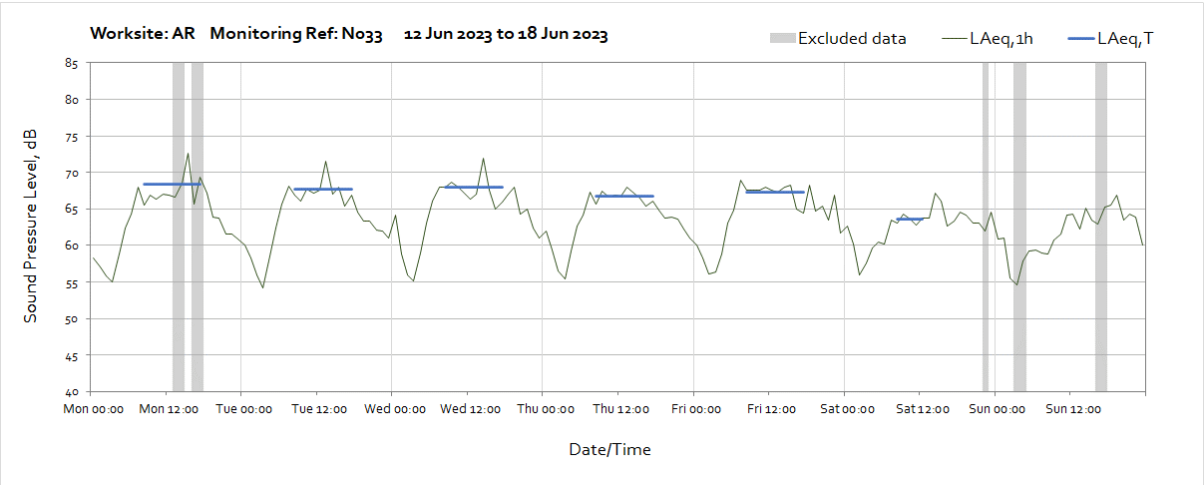
Date/Time


Worksite: AR Monitoring Ref: No33 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
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75
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65
60
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Mon 00:00
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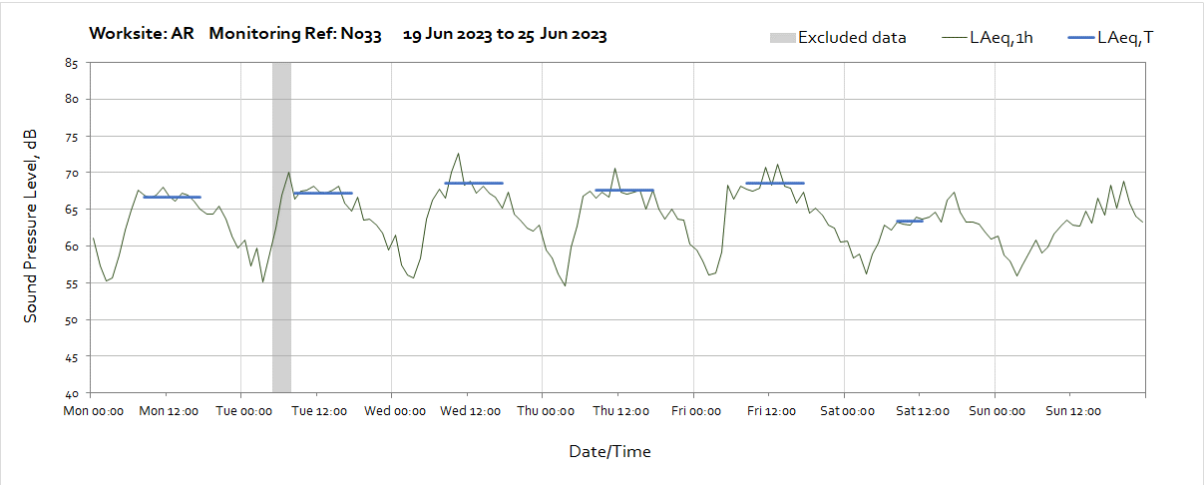
Date/Time


Worksite: AR Monitoring Ref: No33 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
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Mon 00:00
Mon 12:00
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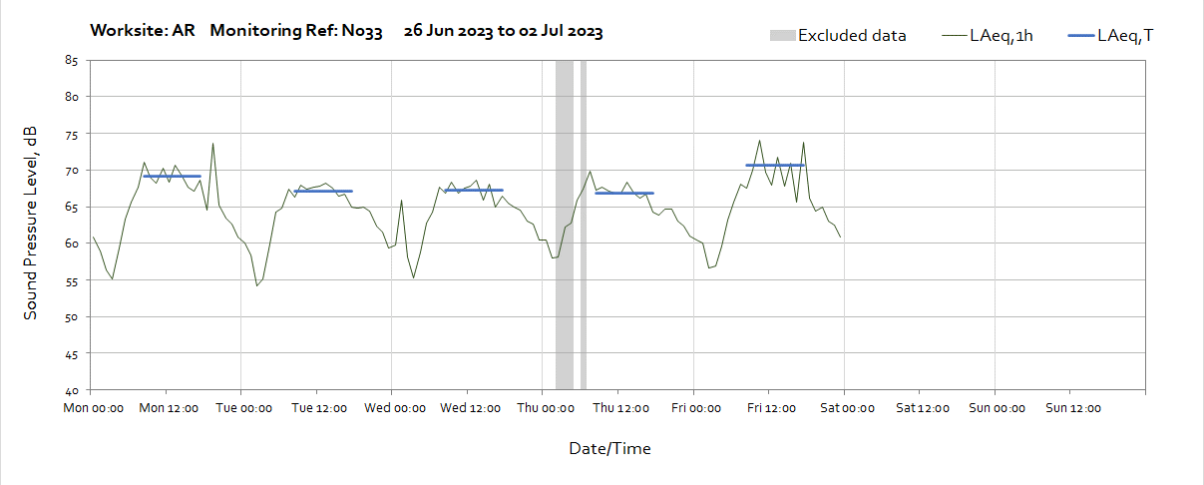
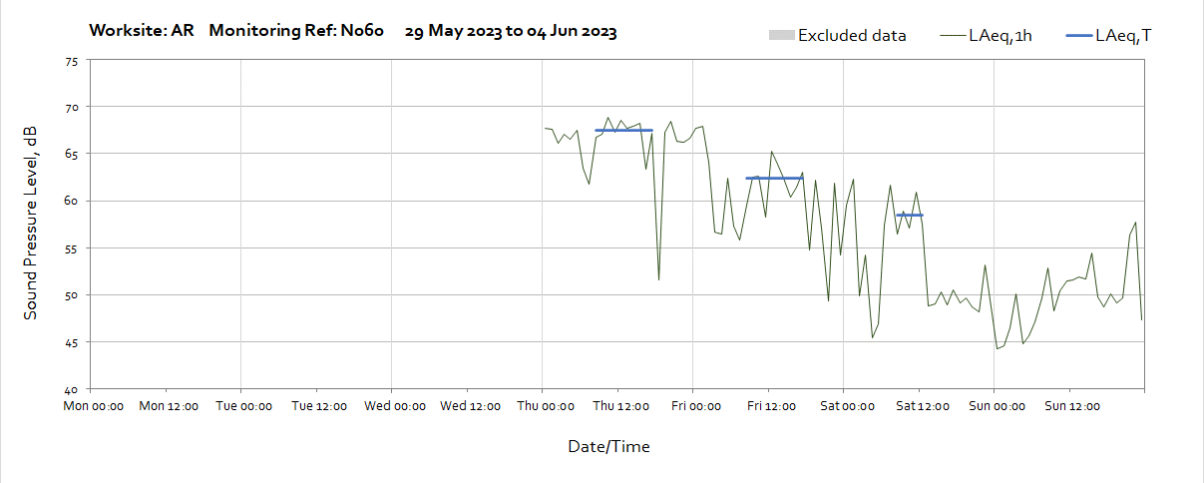
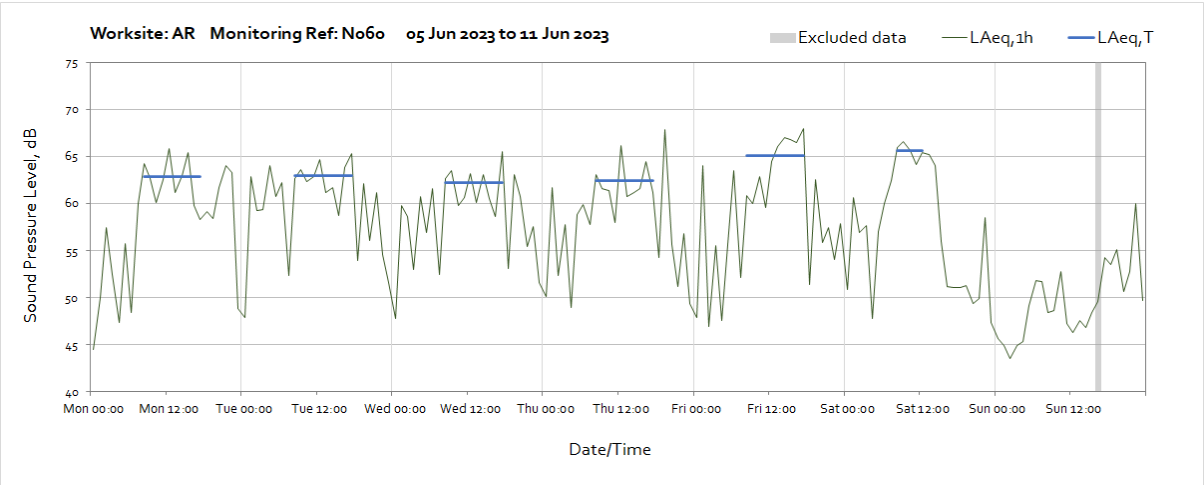
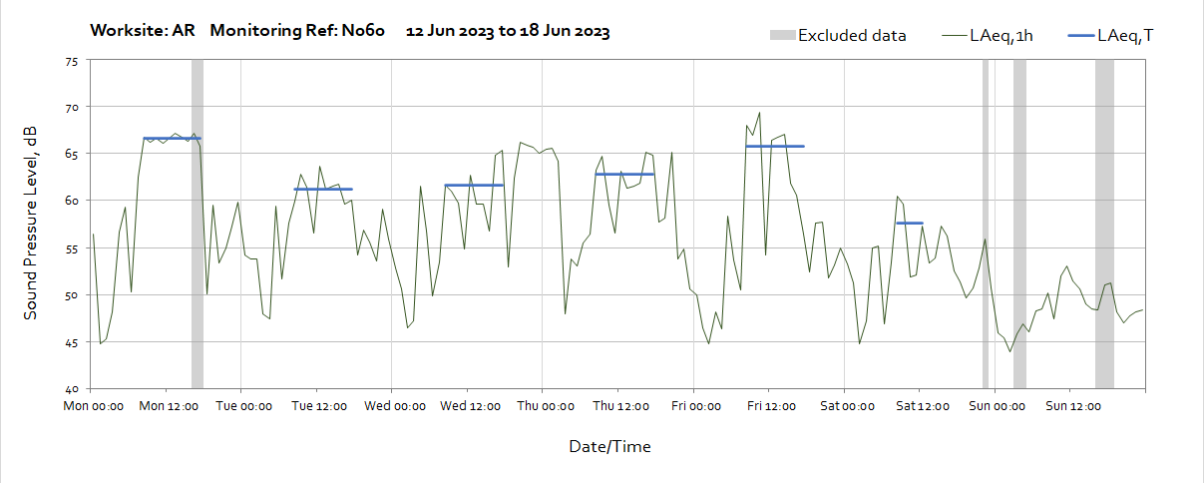
Date/Time



Worksite: AR – Monitoring Ref: N060






Worksite: AR Monitoring Ref: No60 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
70
65
60
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45
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Mon 00:00
Mon 12:00
Tue 00:00
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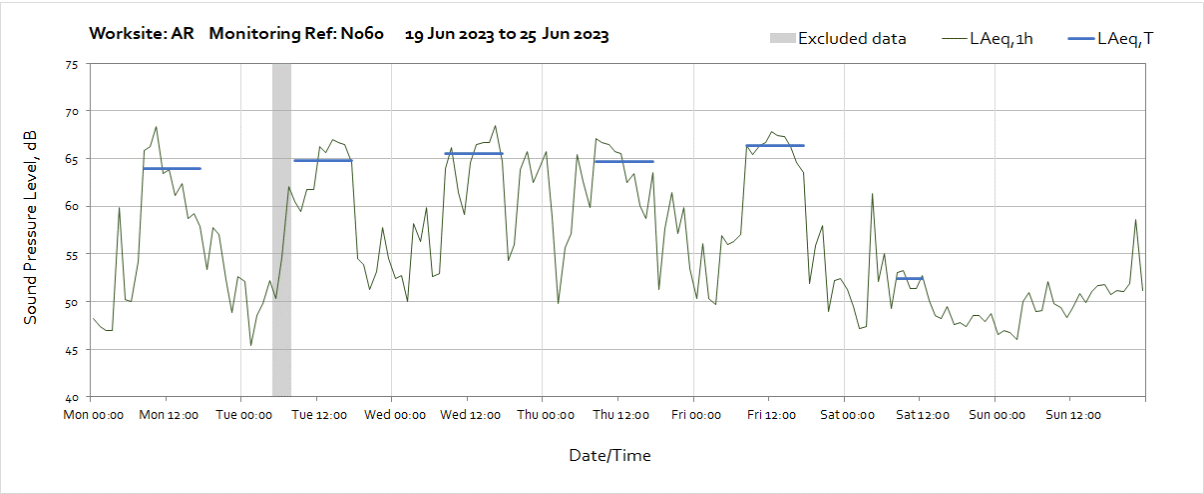
Sun 00:00
Sun 12:00
Date/Time


Worksite: AR Monitoring Ref: No60 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
70
65
60
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Mon 00:00
Mon 12:00
Tue 00:00
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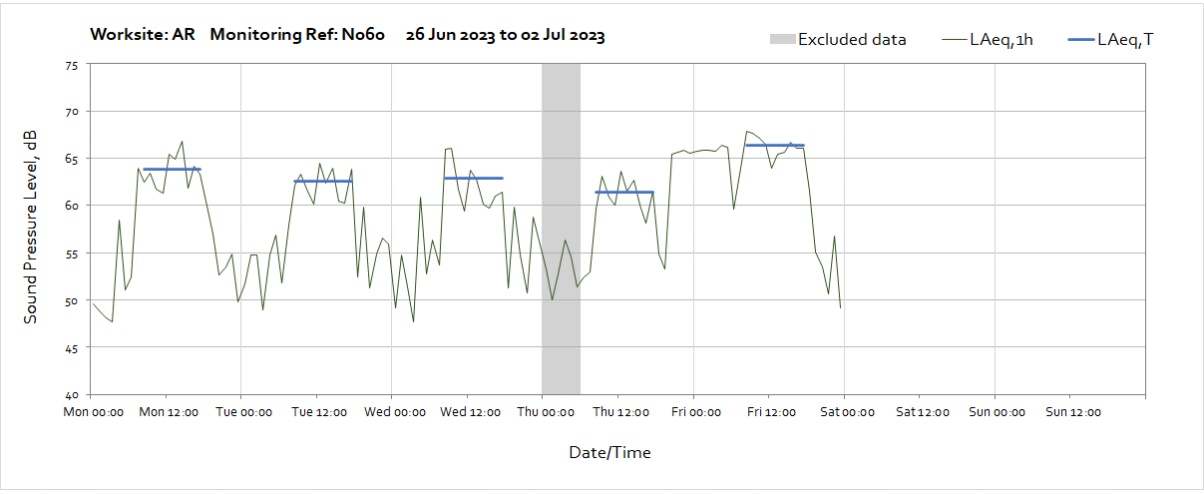
Sun 12:00
Date/Time


Worksite: AR Monitoring Ref: No60 26 Jun 2023 to 02 Jul 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
70
65
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50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
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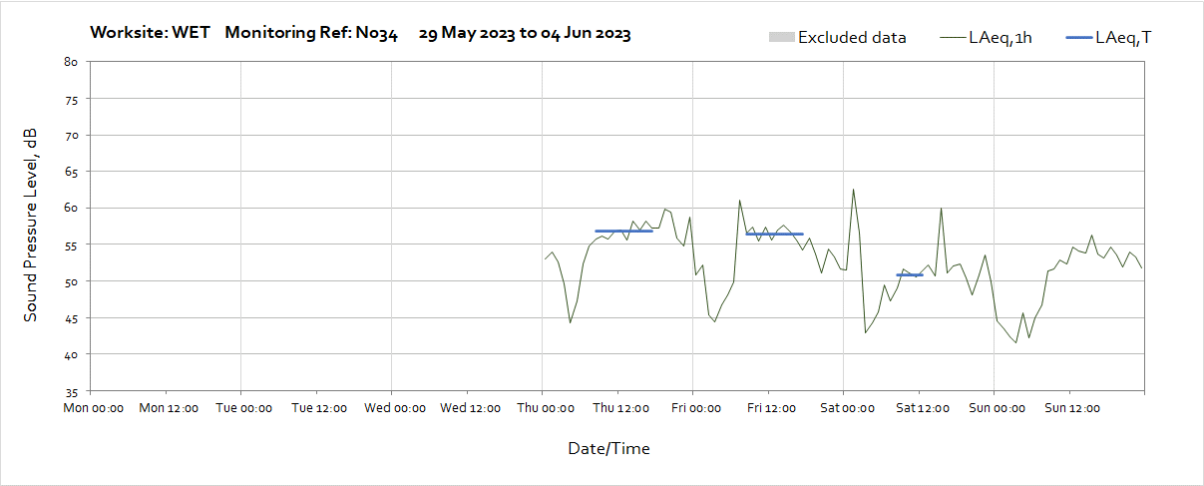
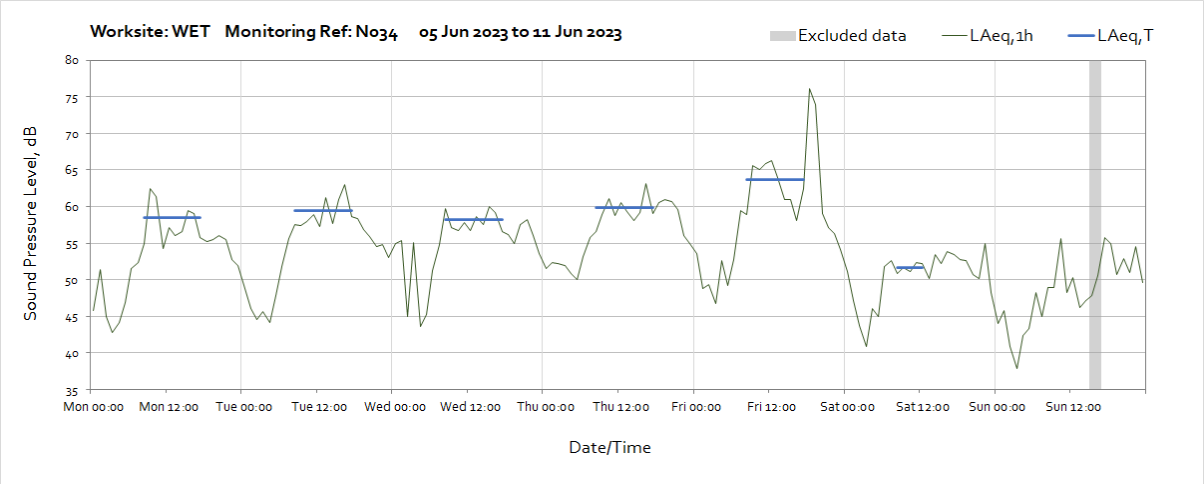
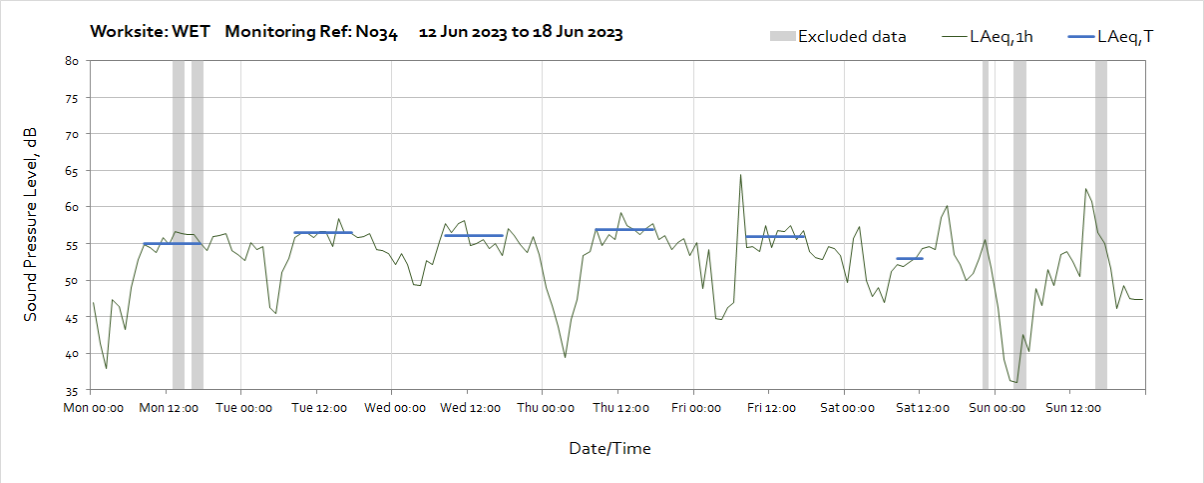
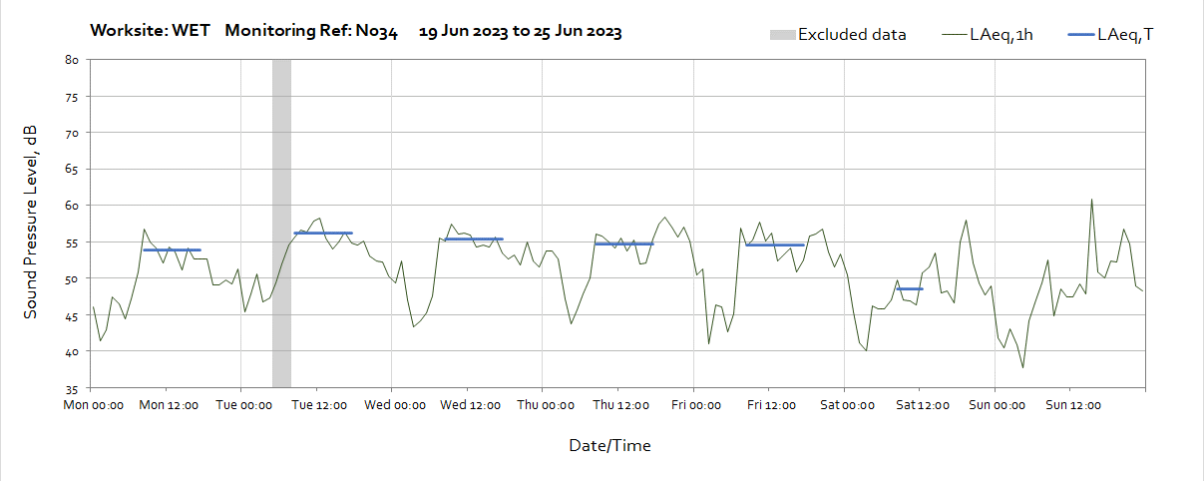
Date/Time

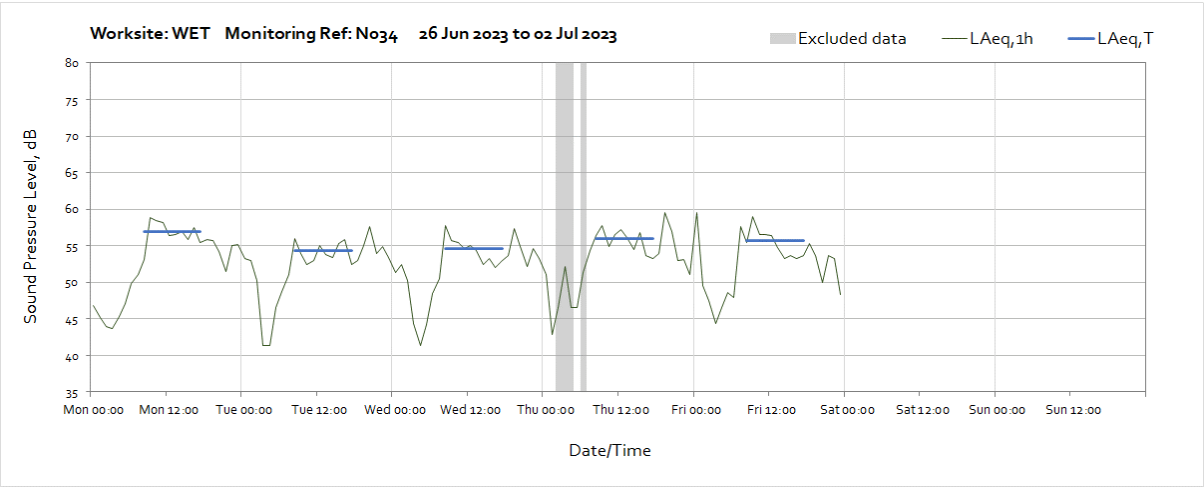
Worksite: WET – Monitoring Ref: N034



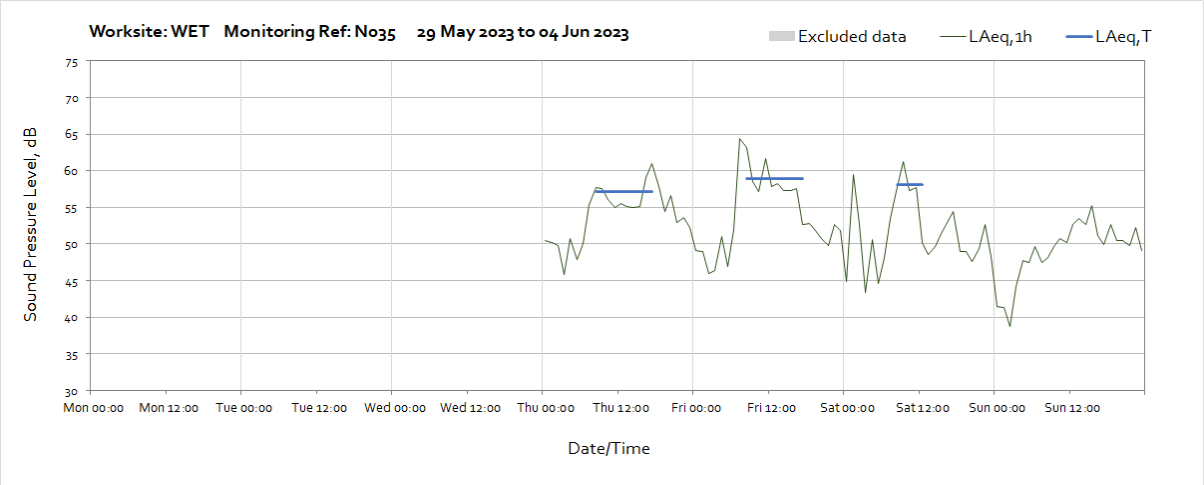


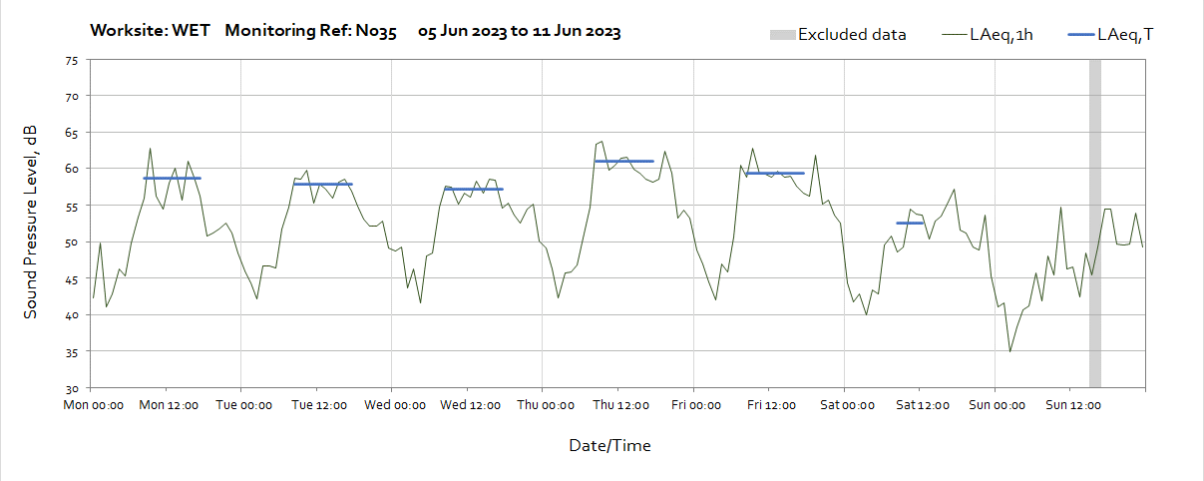






Worksite: WET – Monitoring Ref: N035




Worksite: WET Monitoring Ref: No35 05 Jun 2023 to 11 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
70
65
60
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50
45
40
35
30
Mon 00:00
Mon 12:00
Tue 00:00
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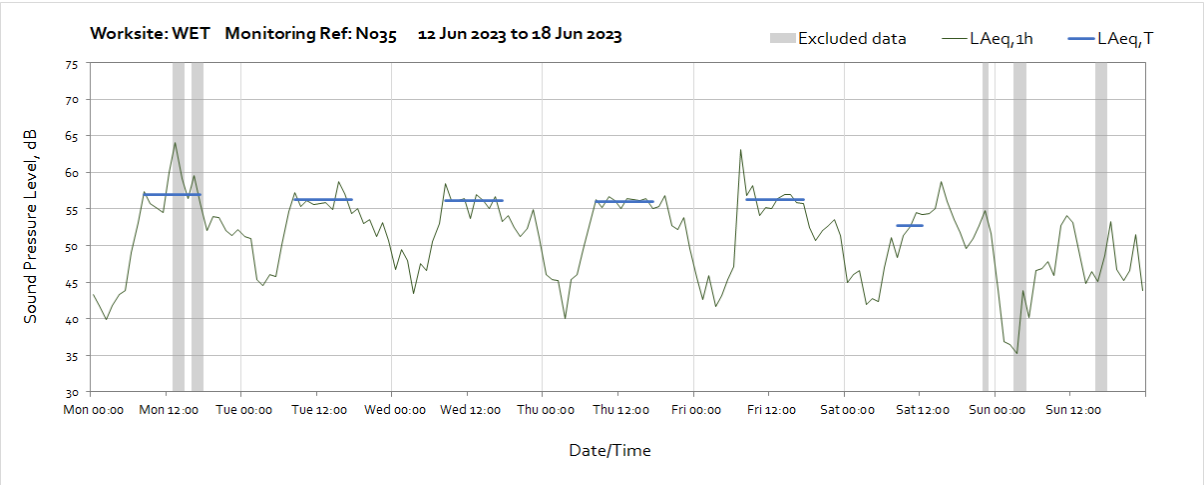
Sun 00:00
Sun 12:00
Date/Time


Worksite: WET Monitoring Ref: No35 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
70
65
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50
45
40
35
30
Mon 00:00
Mon 12:00
Tue 00:00
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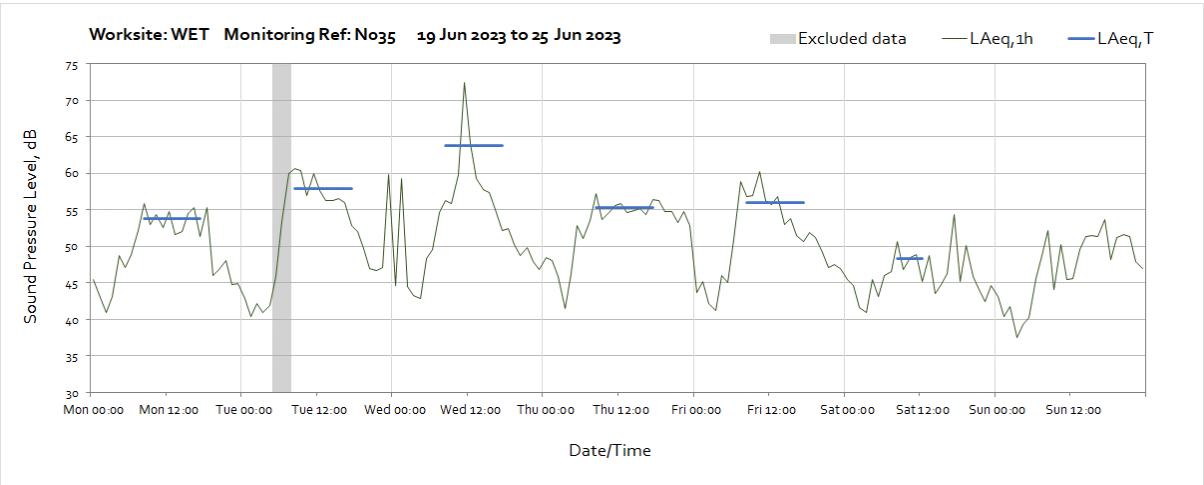
Date/Time


Worksite: WET Monitoring Ref: No35 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
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Mon 00:00
Mon 12:00
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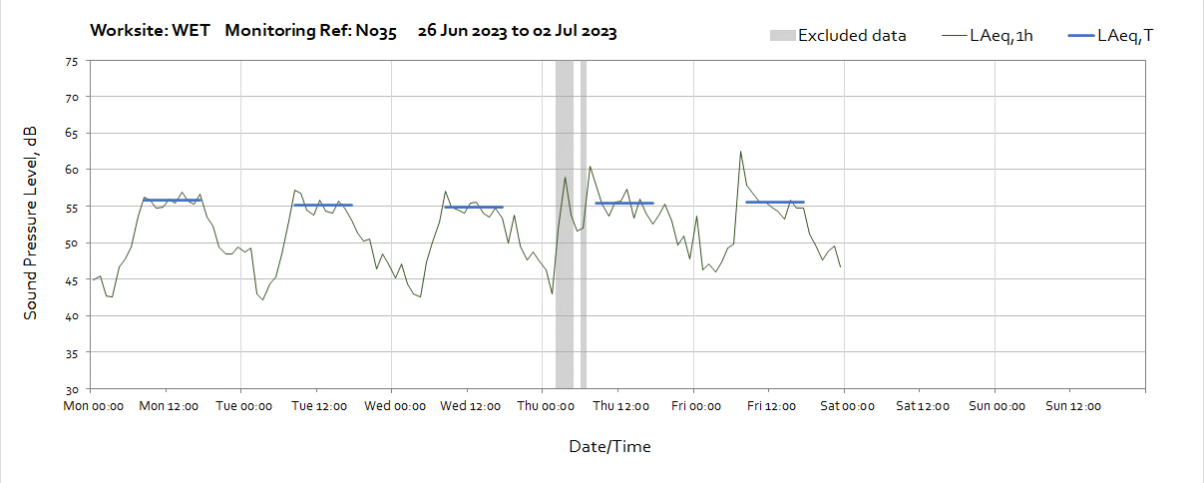
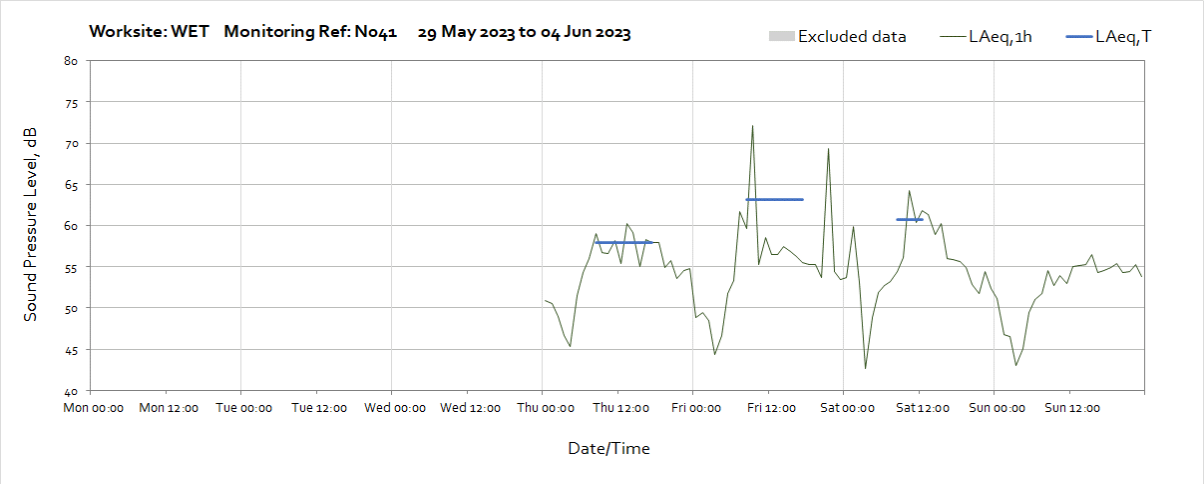
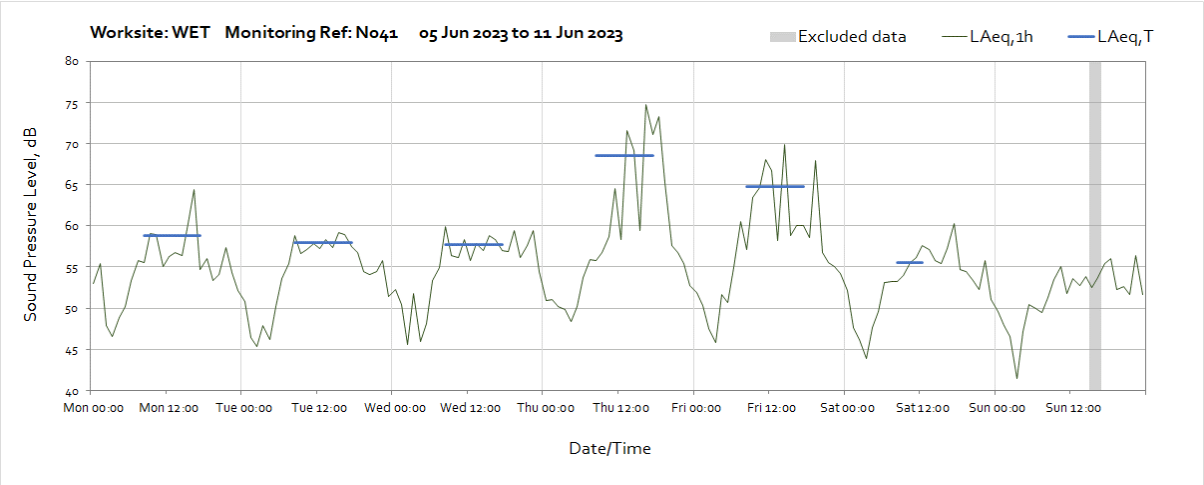
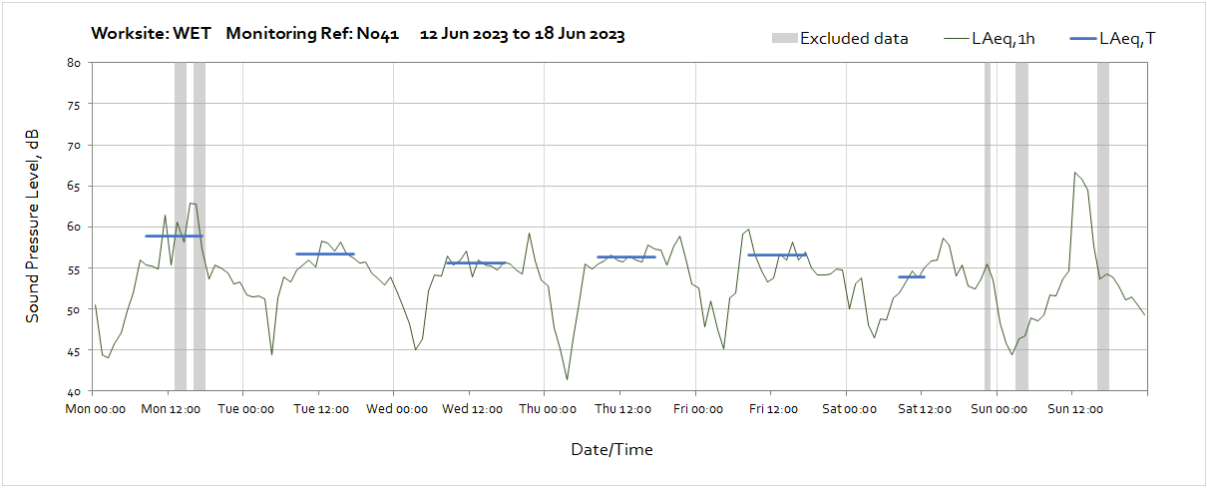
Date/Time



Worksite: WET – Monitoring Ref: N041






Worksite: WET Monitoring Ref: No41 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
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55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
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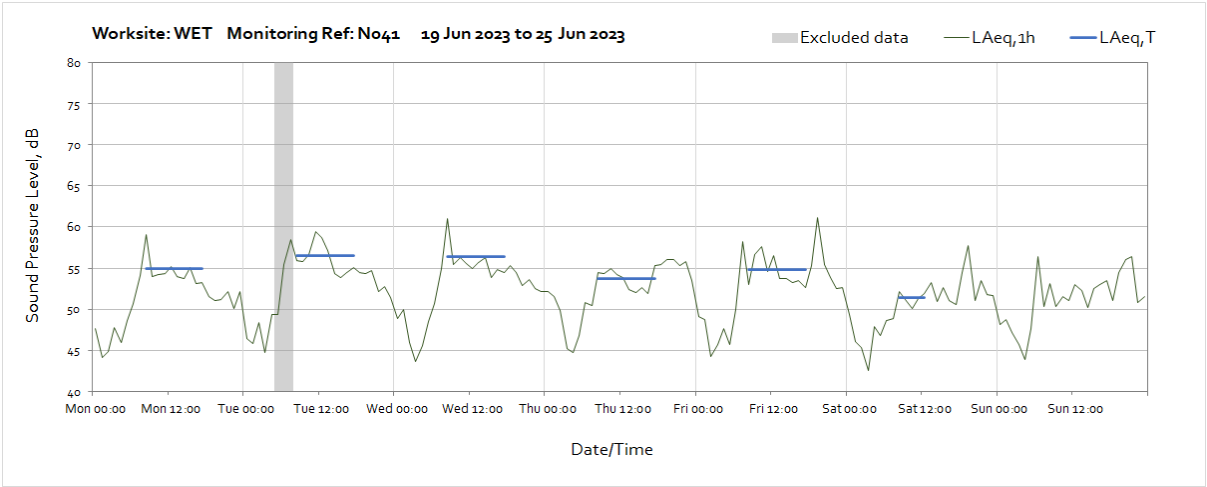
Sun 12:00
Date/Time


Worksite: WET Monitoring Ref: No41 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
65
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55
50
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40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
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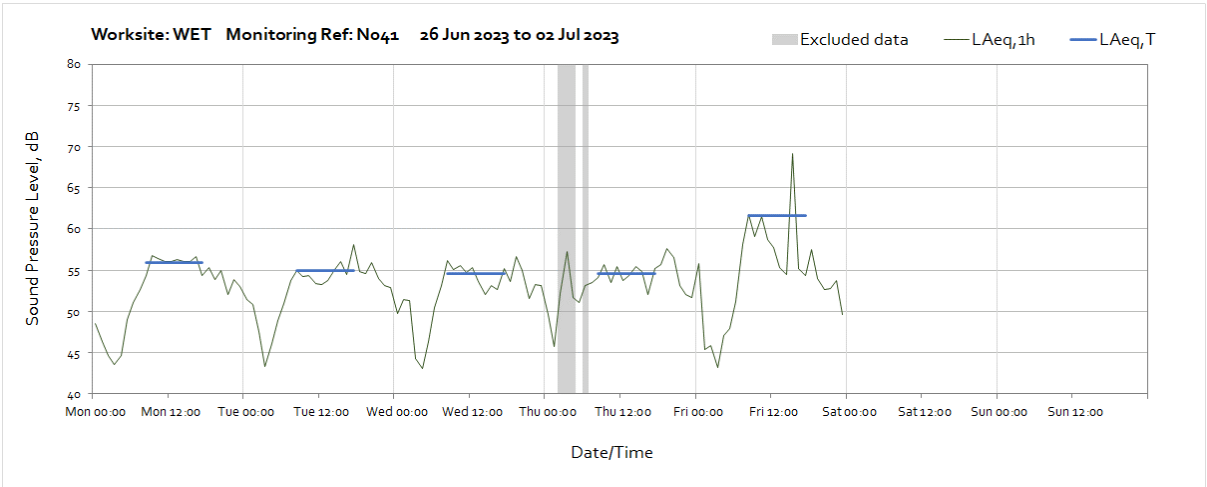
Sun 12:00
Date/Time


Worksite: WET Monitoring Ref: No41 26 Jun 2023 to 02 Jul 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
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70
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55
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Mon 00:00
Mon 12:00
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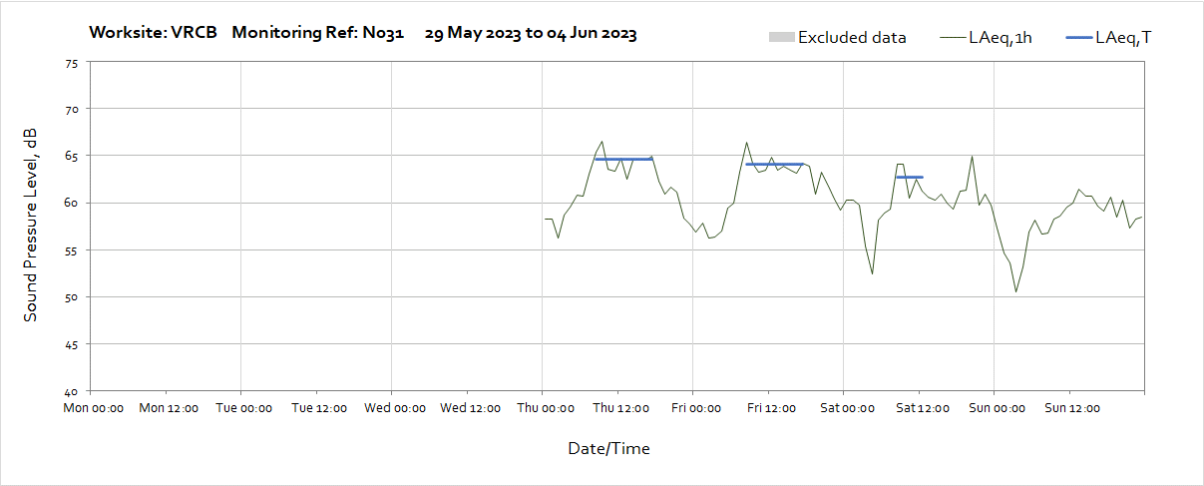
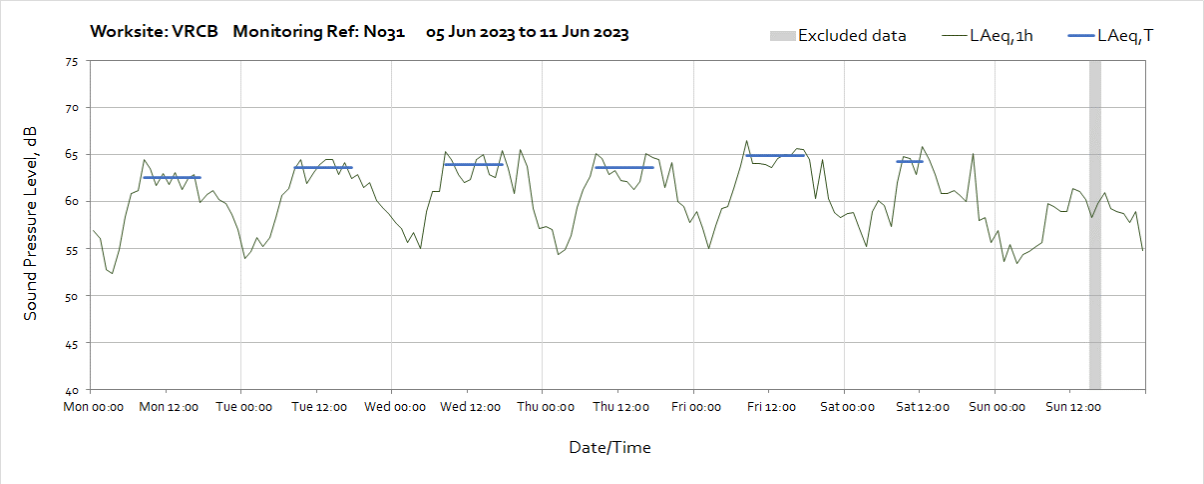
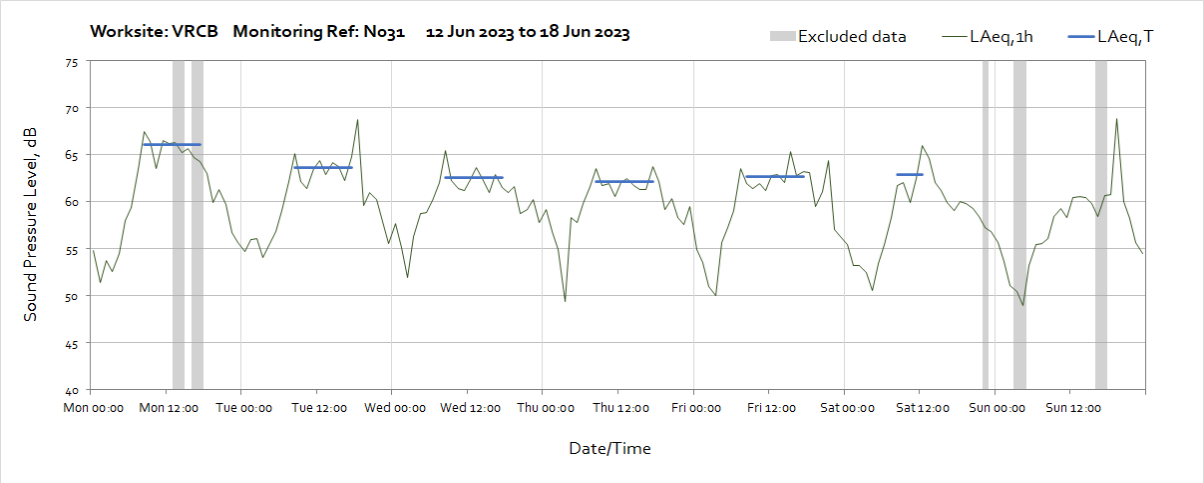
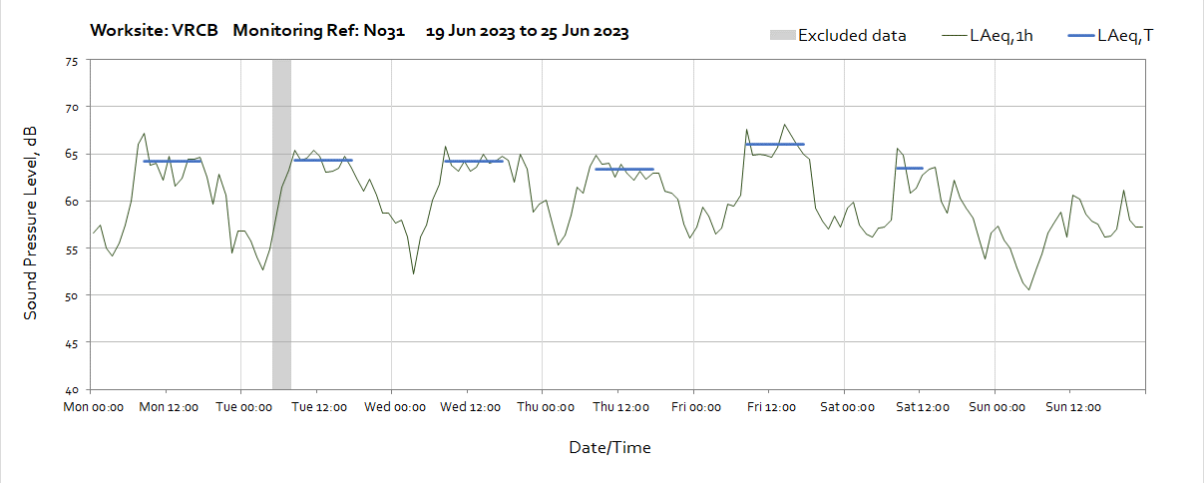
Date/Time

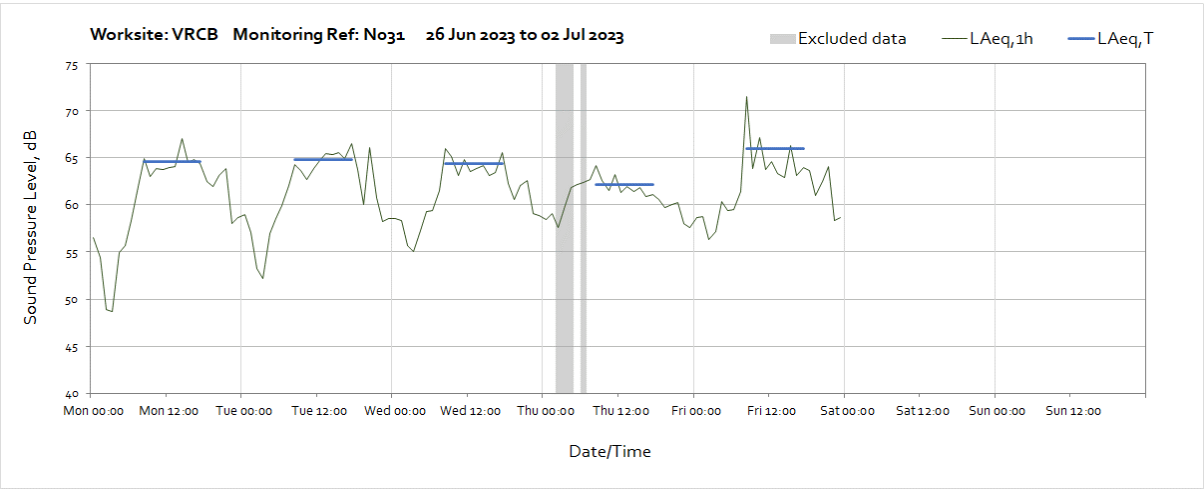
Worksite: VRCB – Monitoring Ref: N031



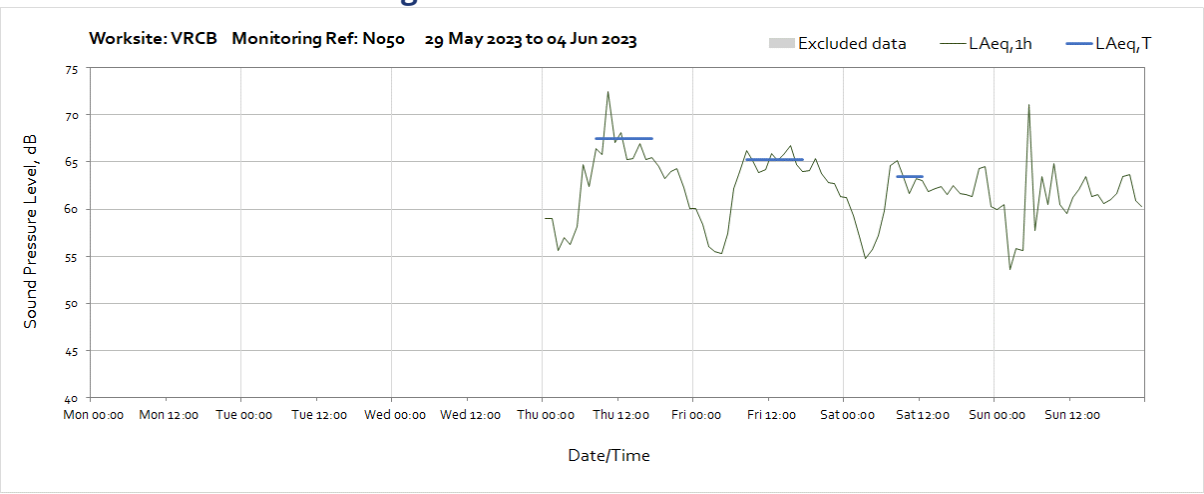


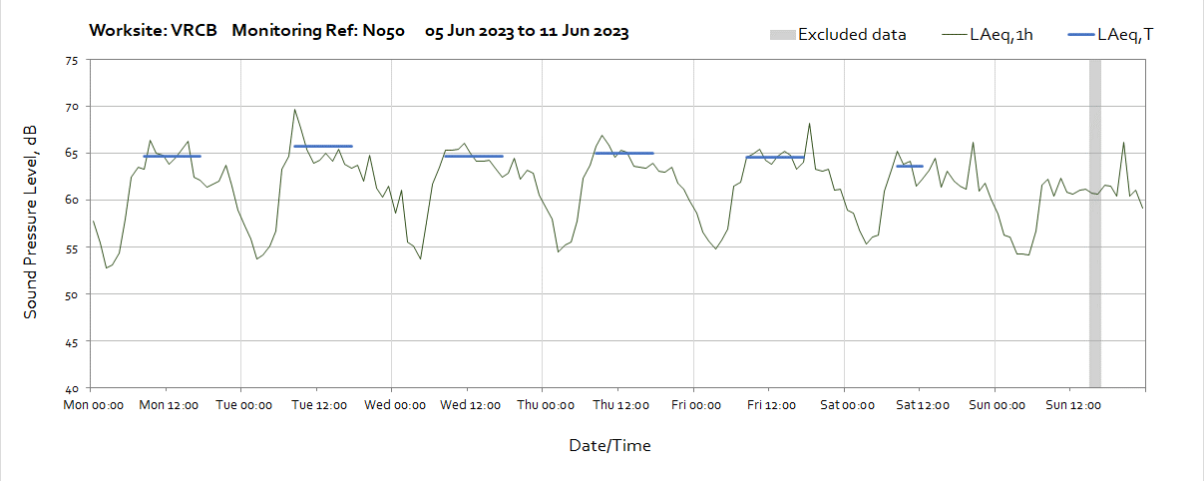


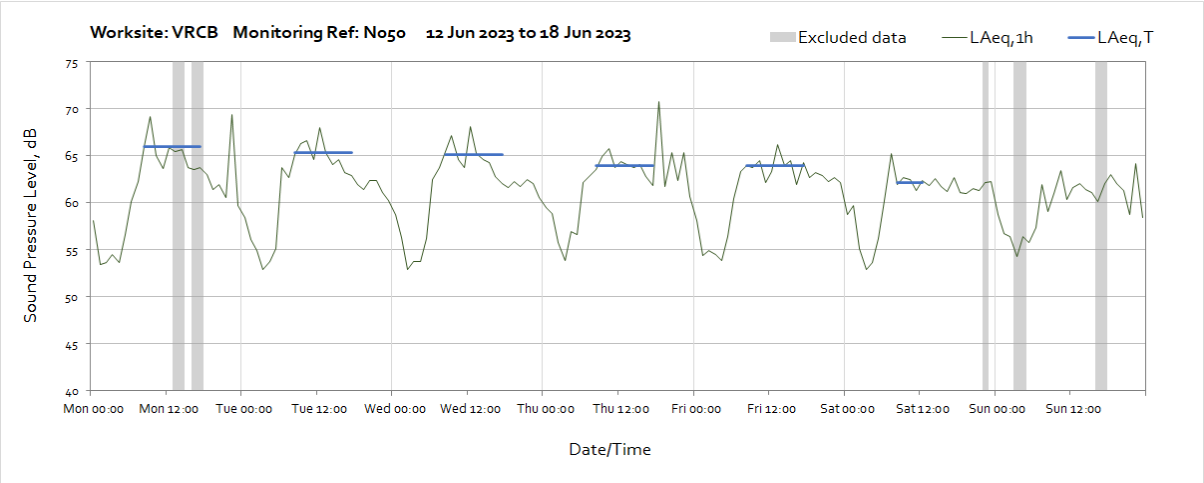


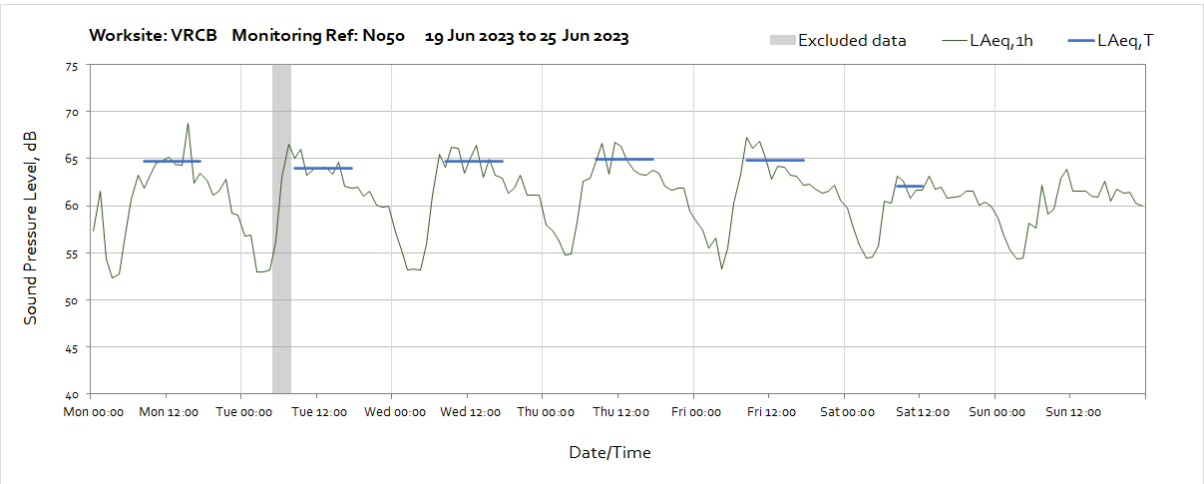


Worksite: VRCB – Monitoring Ref: N050

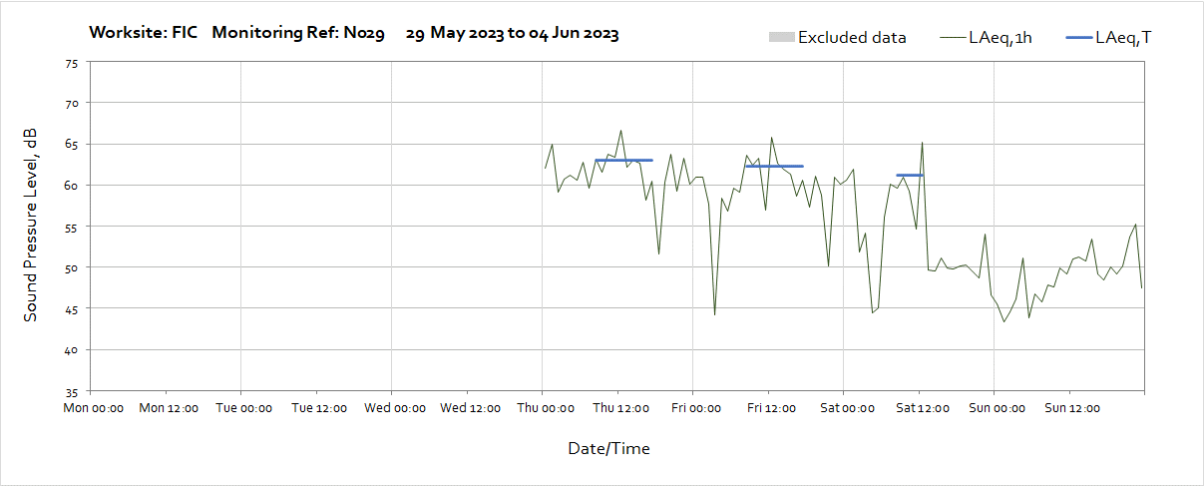


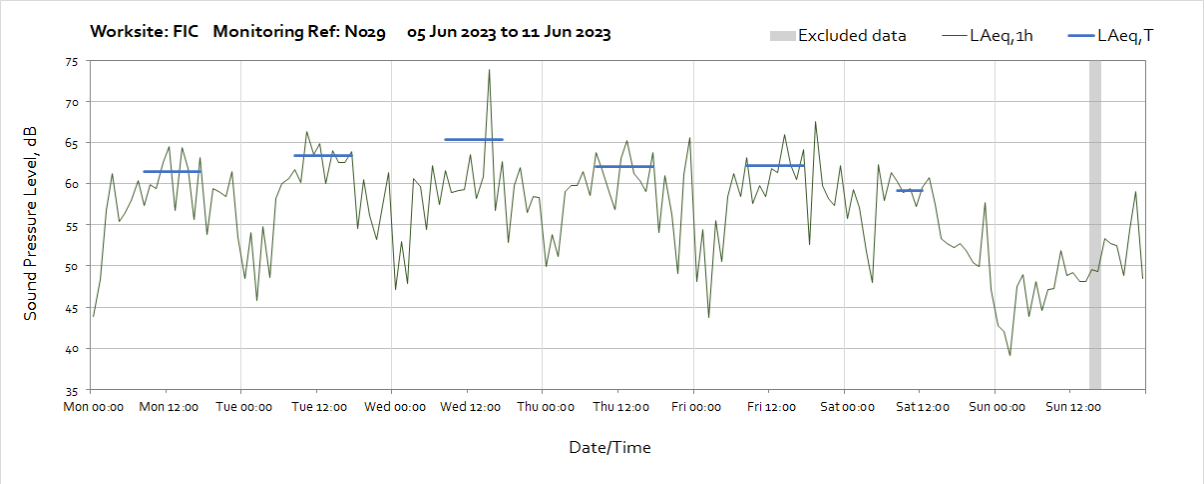

Worksite: VRCB Monitoring Ref: No50 05 Jun 2023 to 11 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

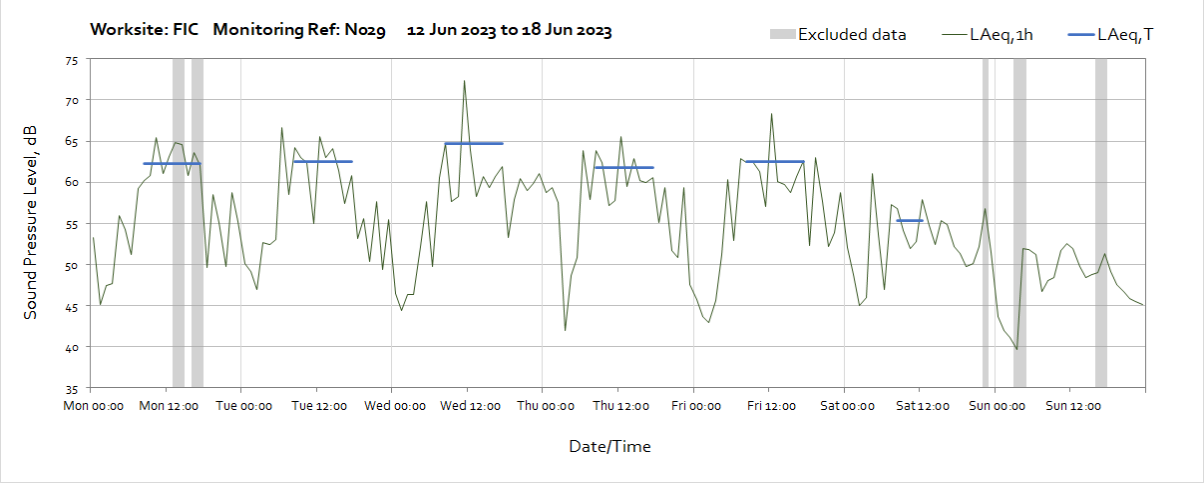

Worksite: VRCB Monitoring Ref: No50 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

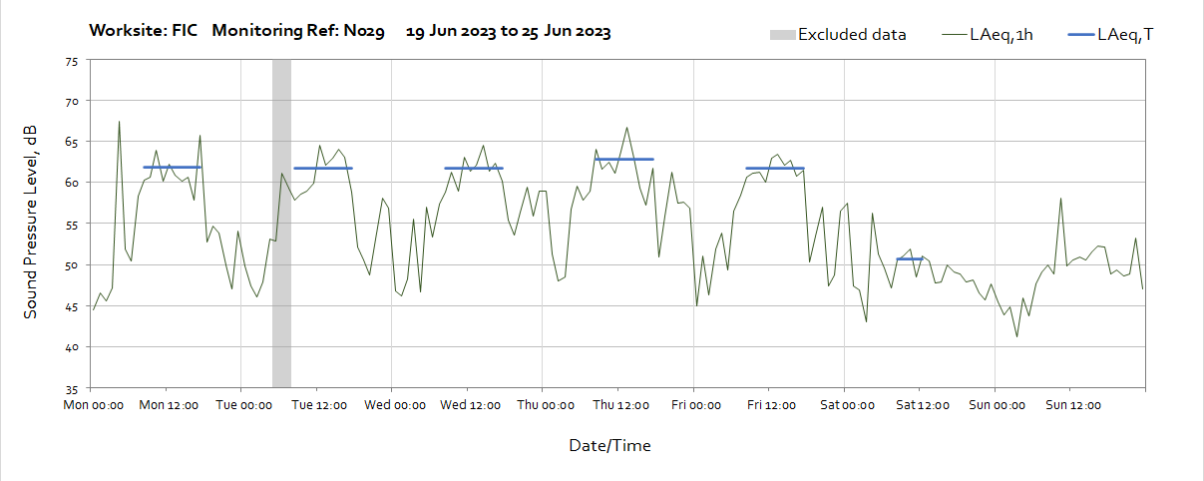

Worksite: VRCB Monitoring Ref: No50 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

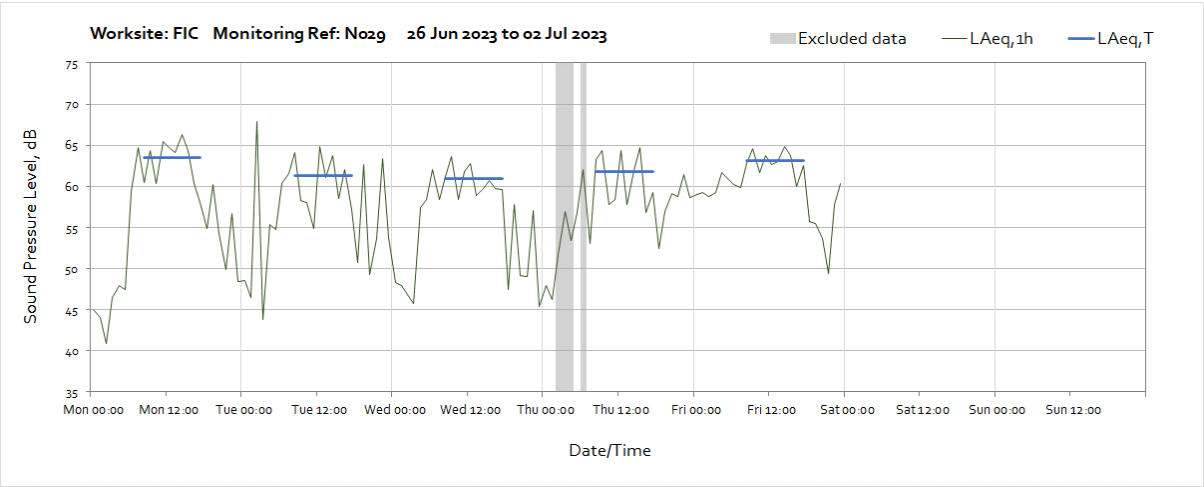
Worksite: FIC – Monitoring Ref: N029



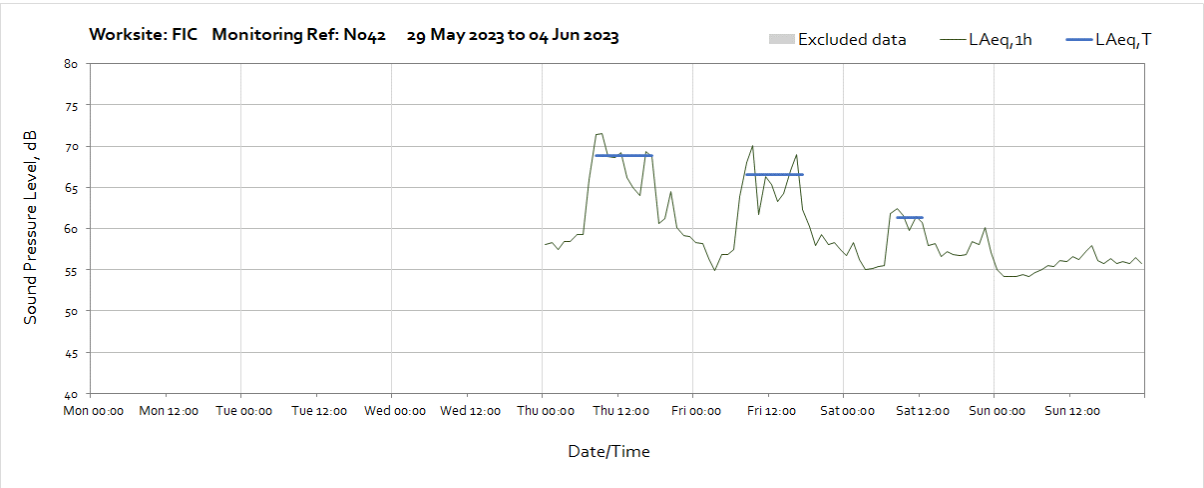


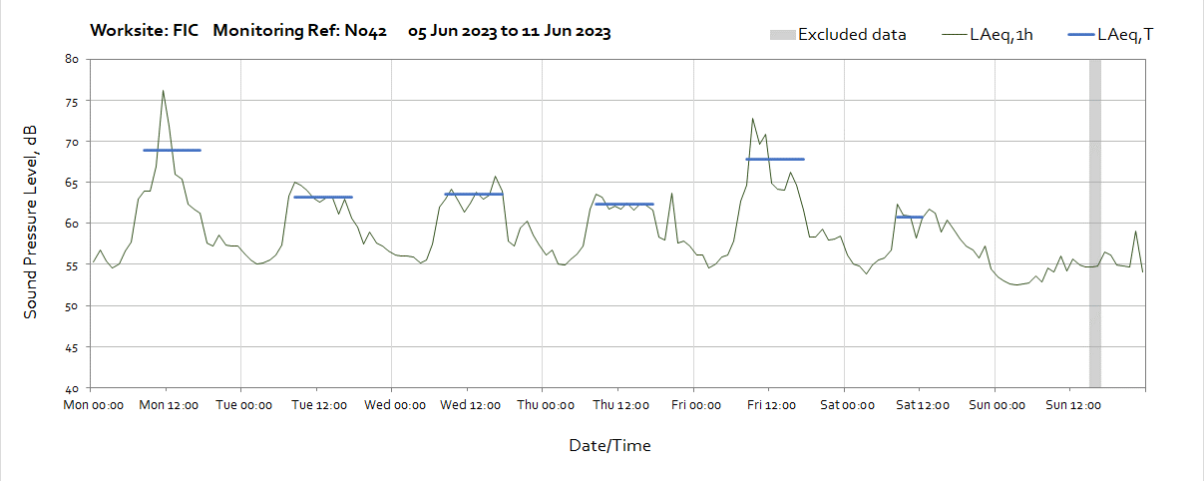


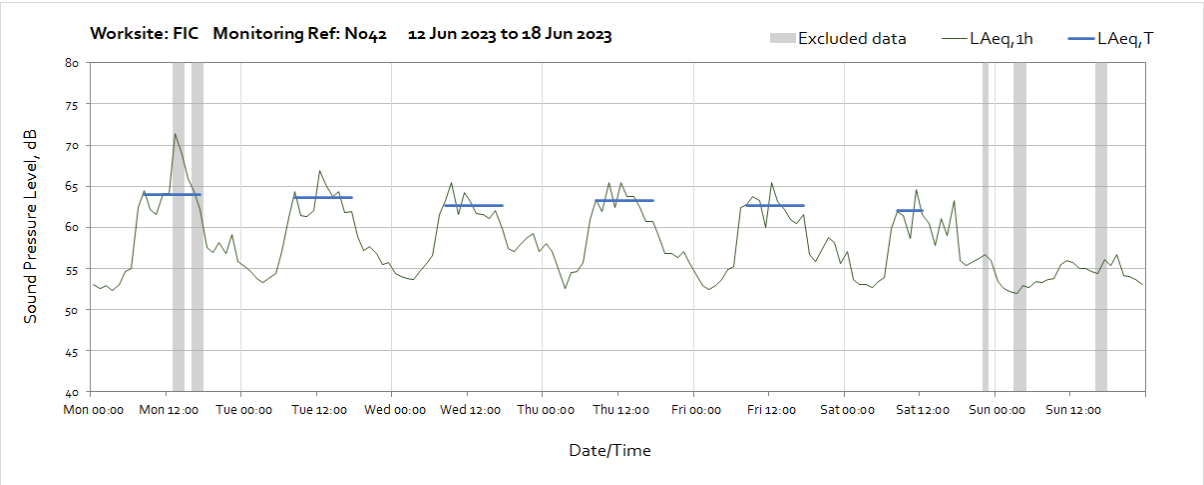


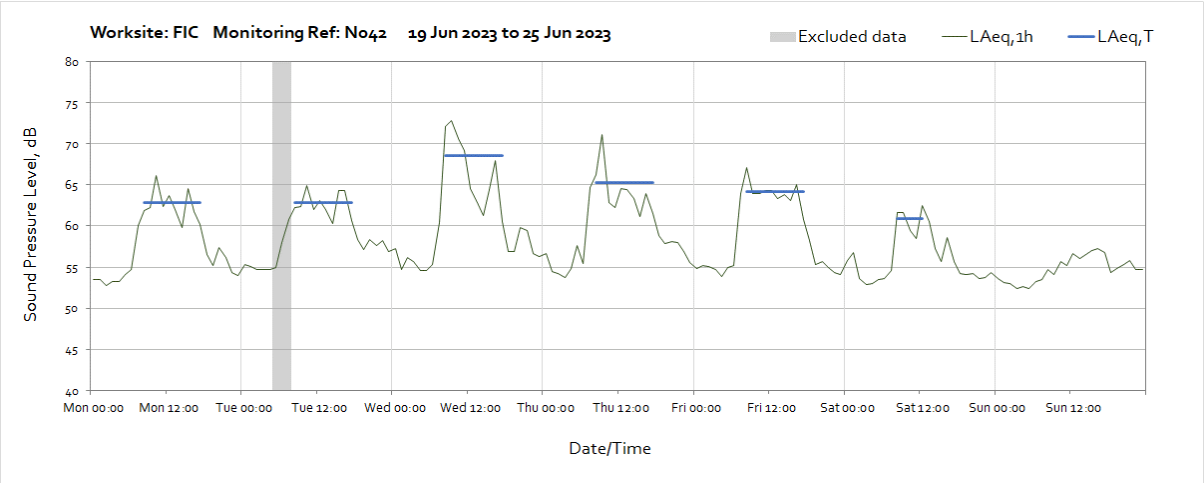


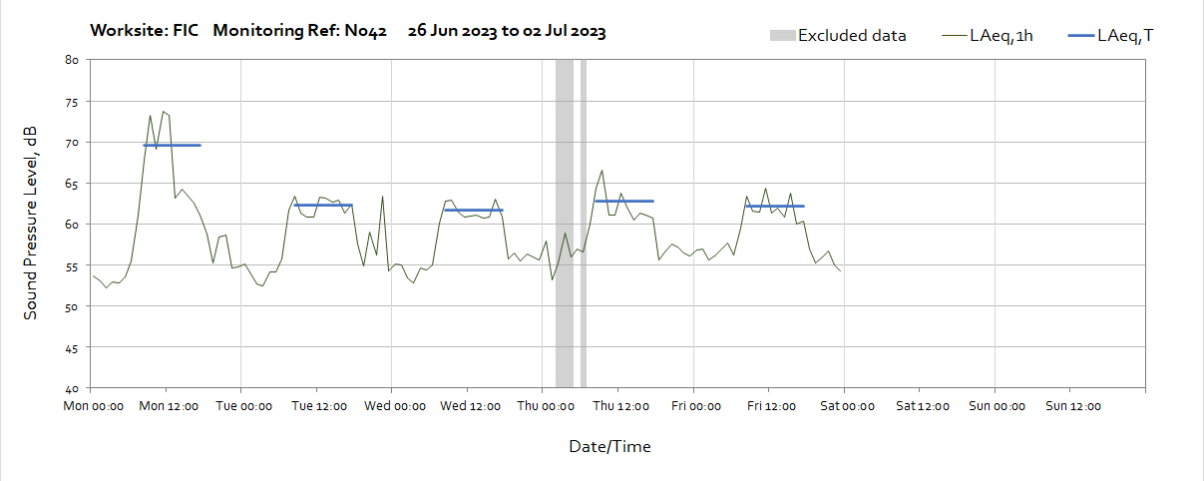
Worksite: FIC – Monitoring Ref: N042



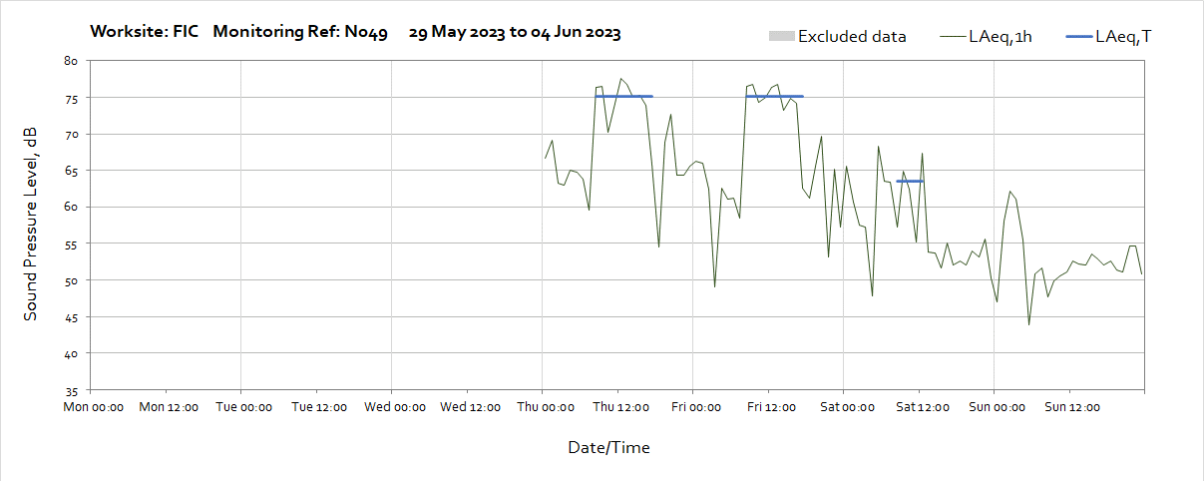

Worksite: FIC Monitoring Ref: No42 05 Jun 2023 to 11 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

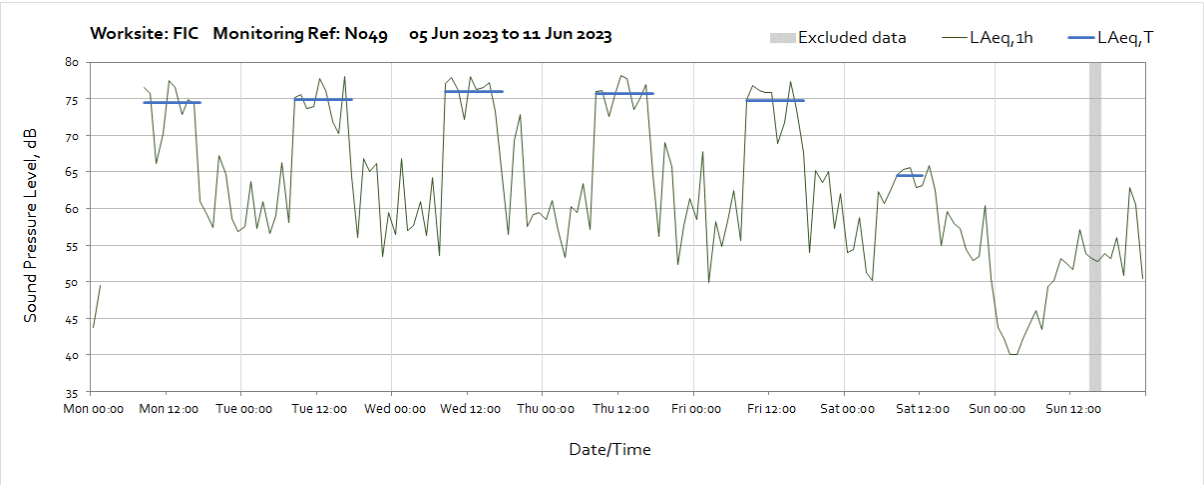

Worksite: FIC Monitoring Ref: No42 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: FIC Monitoring Ref: No42 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

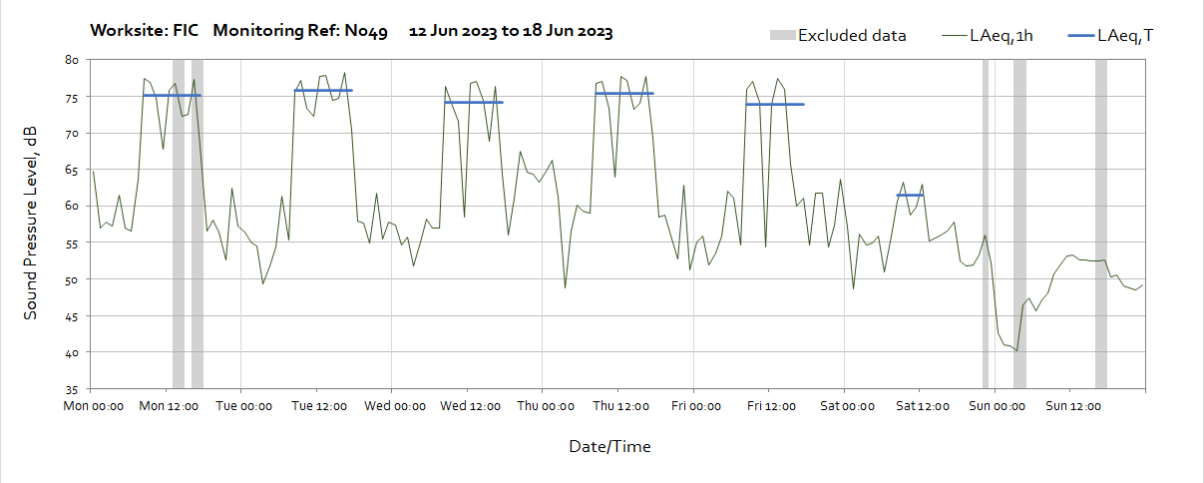


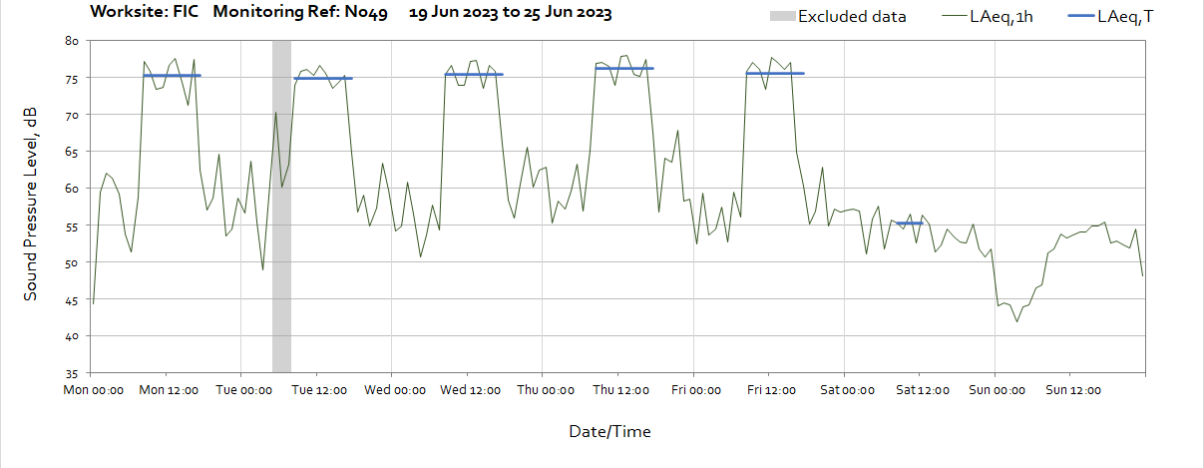
Worksite: FIC – Monitoring Ref: N049

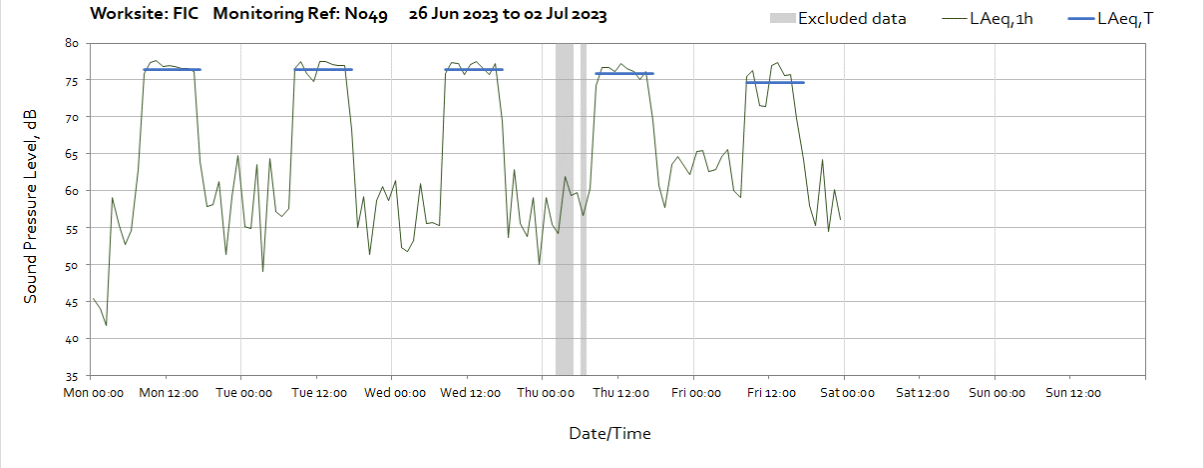




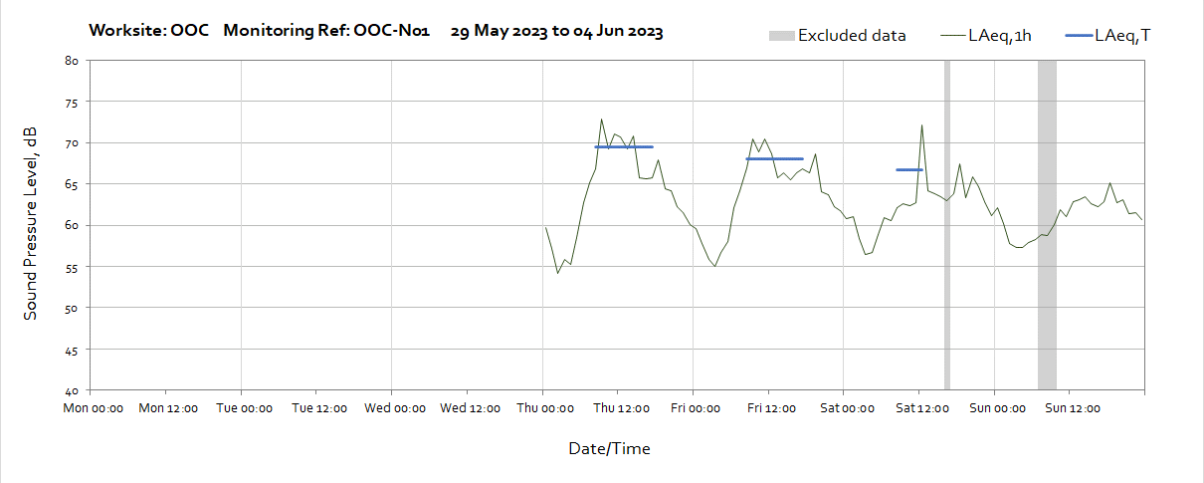
Note: Missing data between 02:00 and 08:00 on Monday 5th June was due to depleted monitor battery.

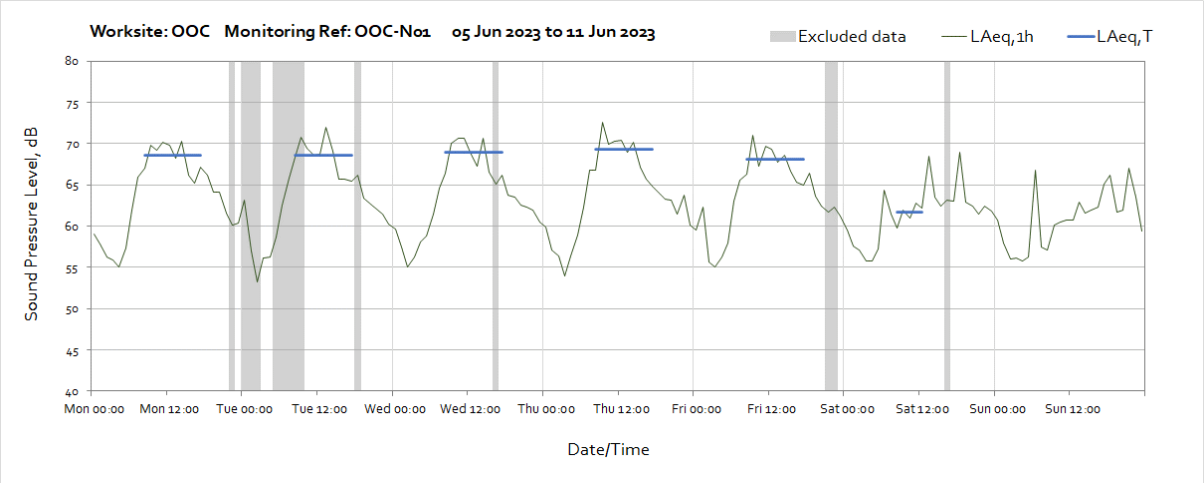

Worksite: FIC Monitoring Ref: No49 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
65
60
55
50
45
40
35
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

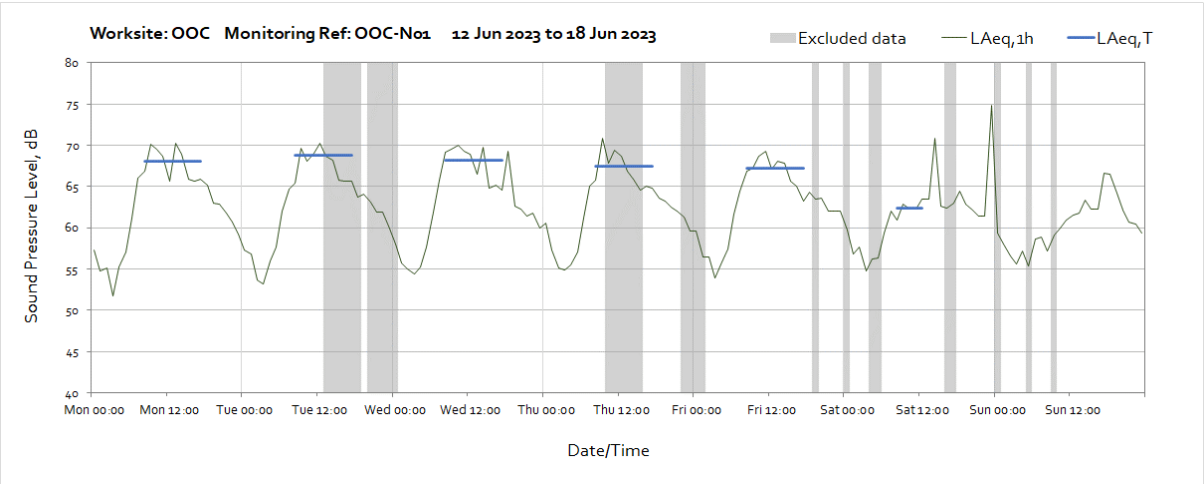

Worksite: FIC Monitoring Ref: No49 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
65
60
55
50
45
40
35
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

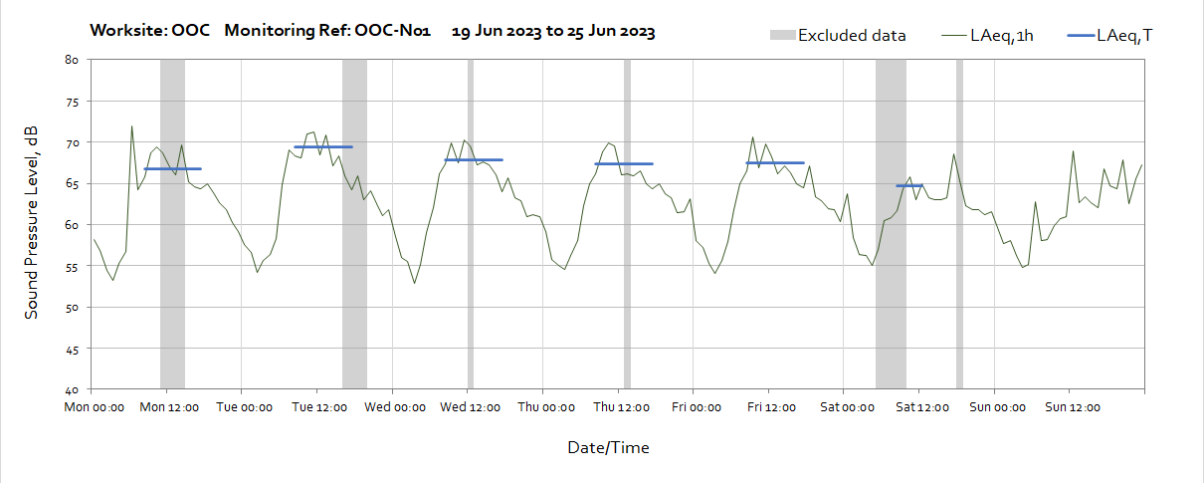

Worksite: FIC Monitoring Ref: No49 26 Jun 2023 to 02 Jul 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
65
60
55
50
45
40
35
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

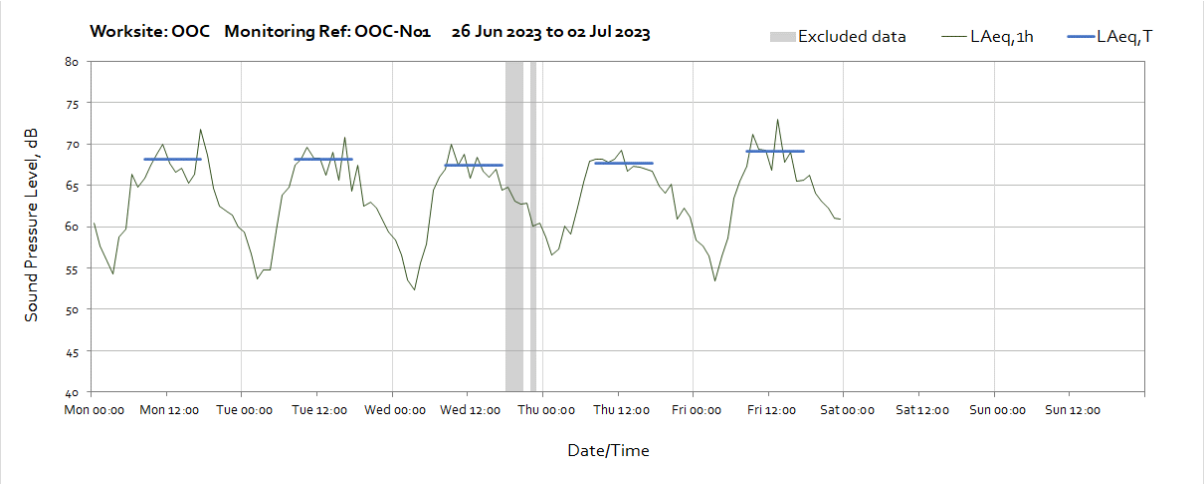
Worksite: OOC – Monitoring Ref: OOC-N01



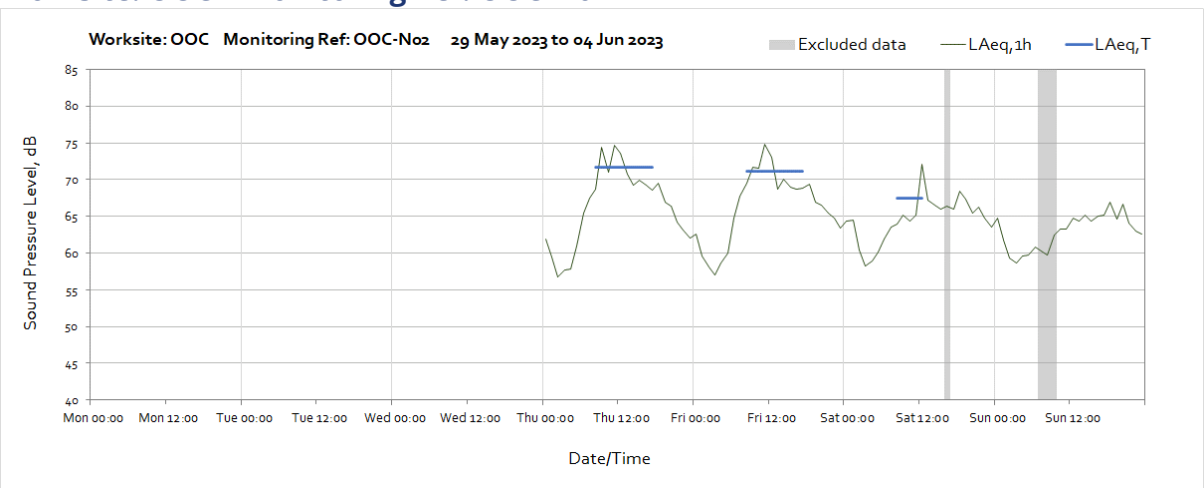


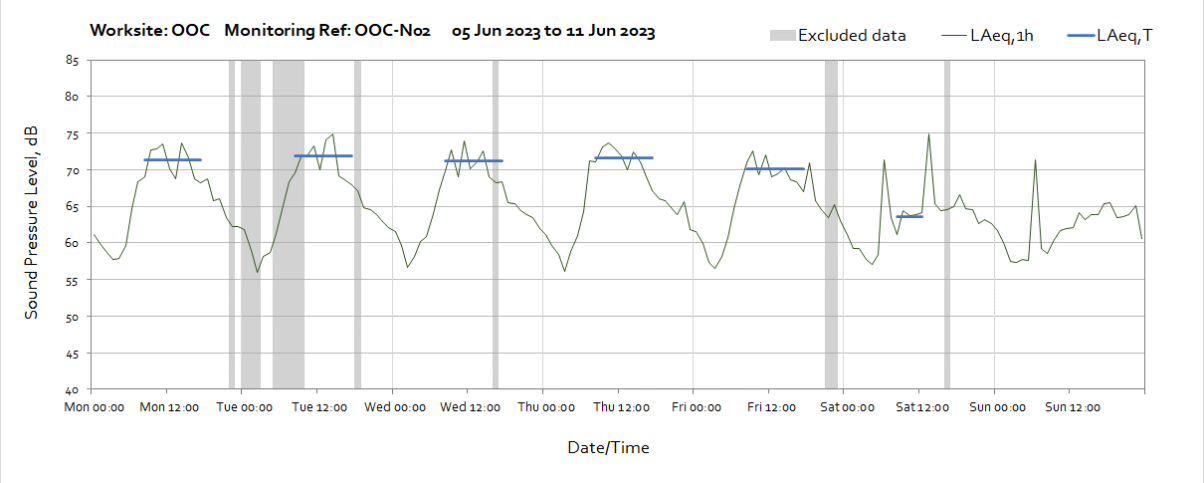


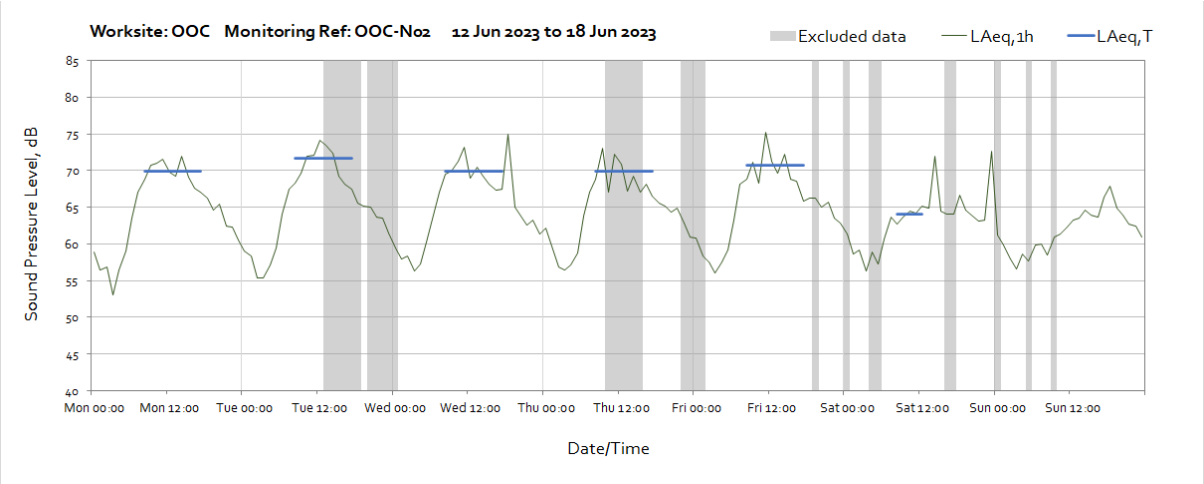


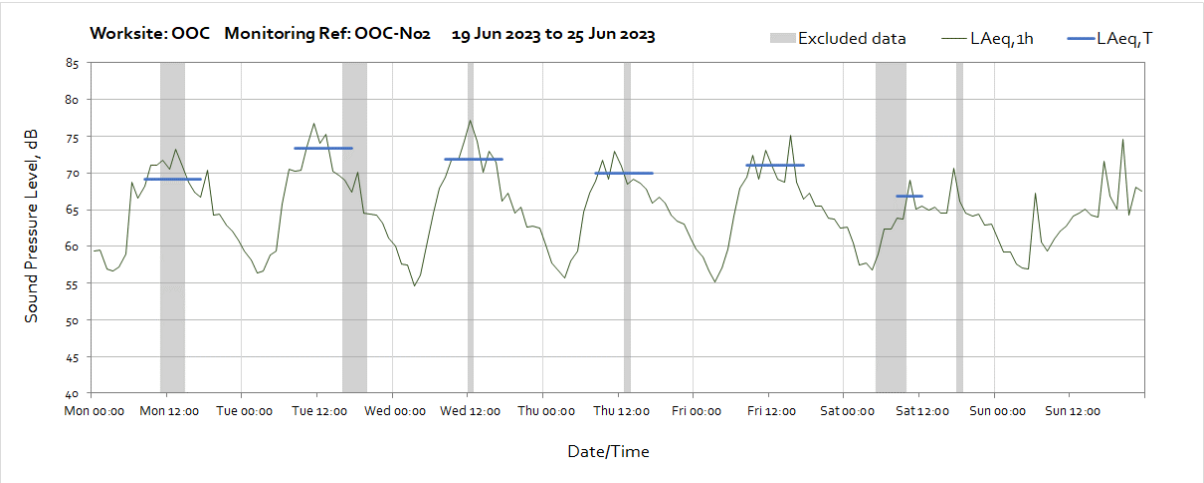


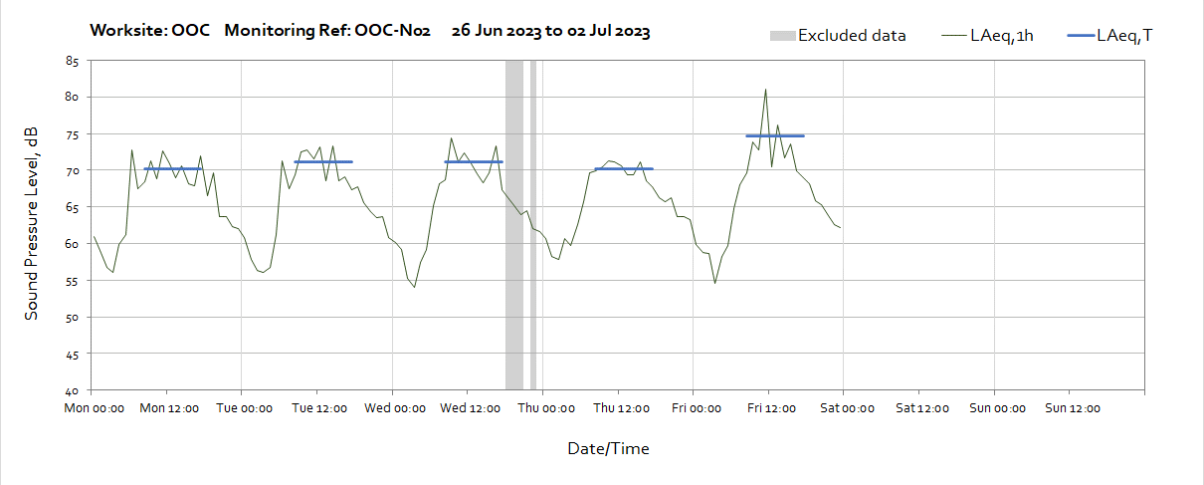
Worksite: OOC – Monitoring Ref: OOC-N02



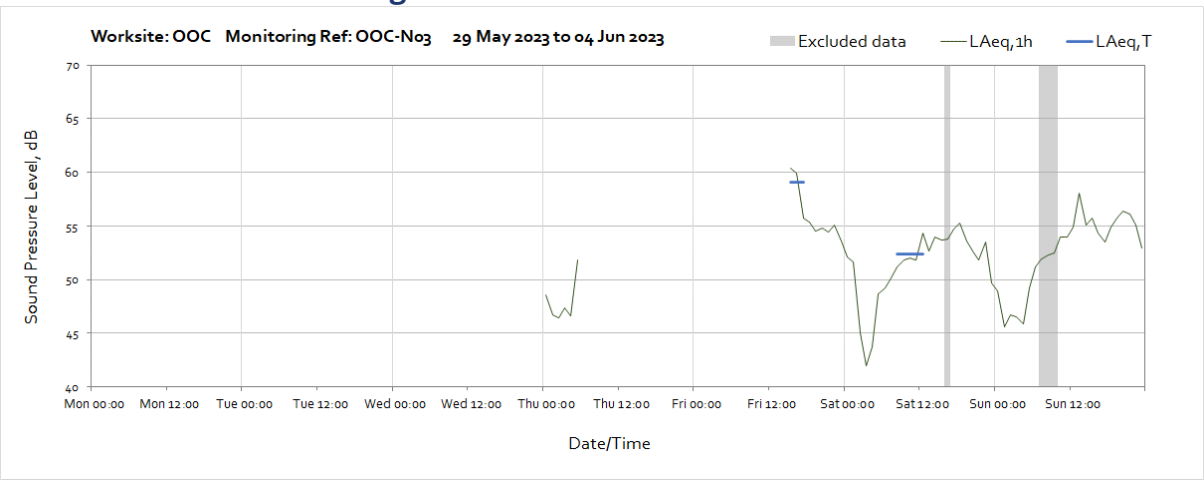

Worksite: OOC Monitoring Ref: OOC-No2 05 Jun 2023 to 11 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: OOC Monitoring Ref: OOC-No2 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

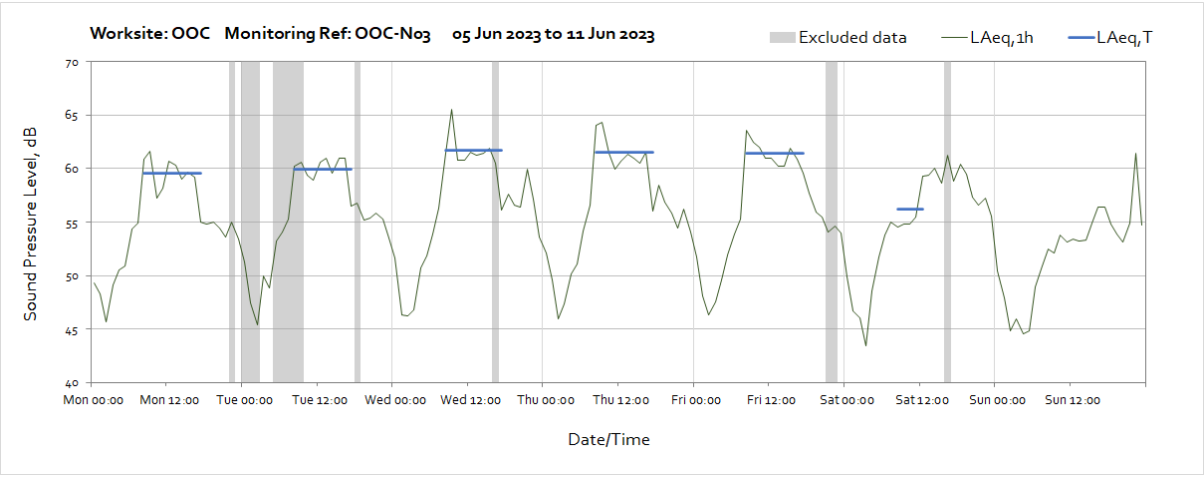

Worksite: OOC Monitoring Ref: OOC-No2 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

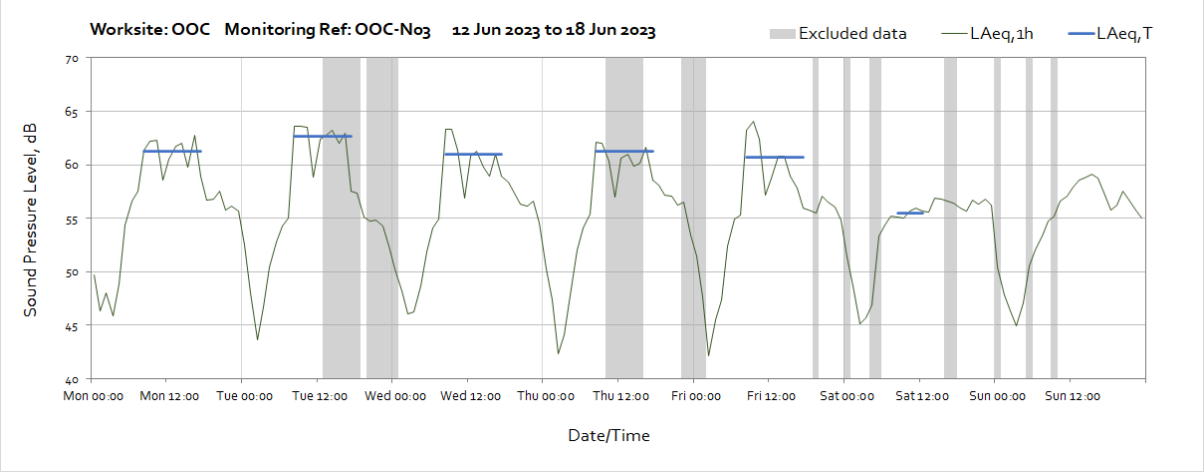


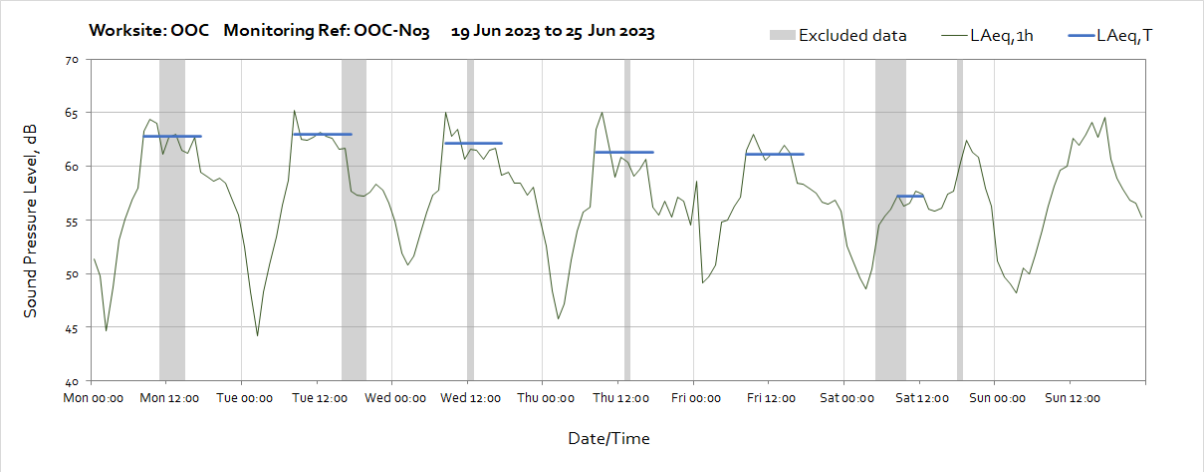
Worksite: OOC – Monitoring Ref: OOC-N03

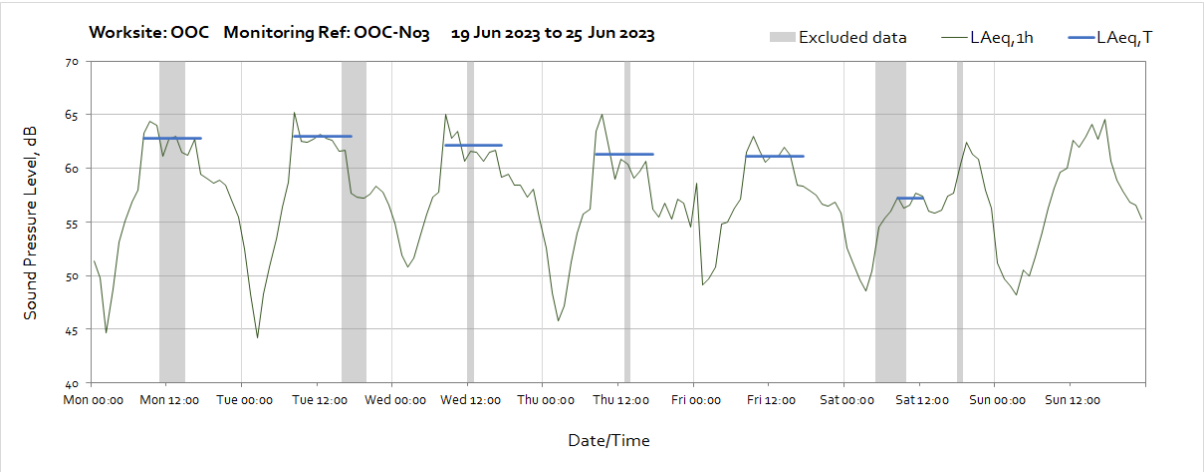


Note: Missing data between 06:00 Thursday 1st and 15:00 Friday 2nd June was due to loss of power to the monitor.




Worksite: OOC Monitoring Ref: OOC-No3 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: OOC Monitoring Ref: OOC-No3 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: OOC Monitoring Ref: OOC-No3 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
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Fri 12:00
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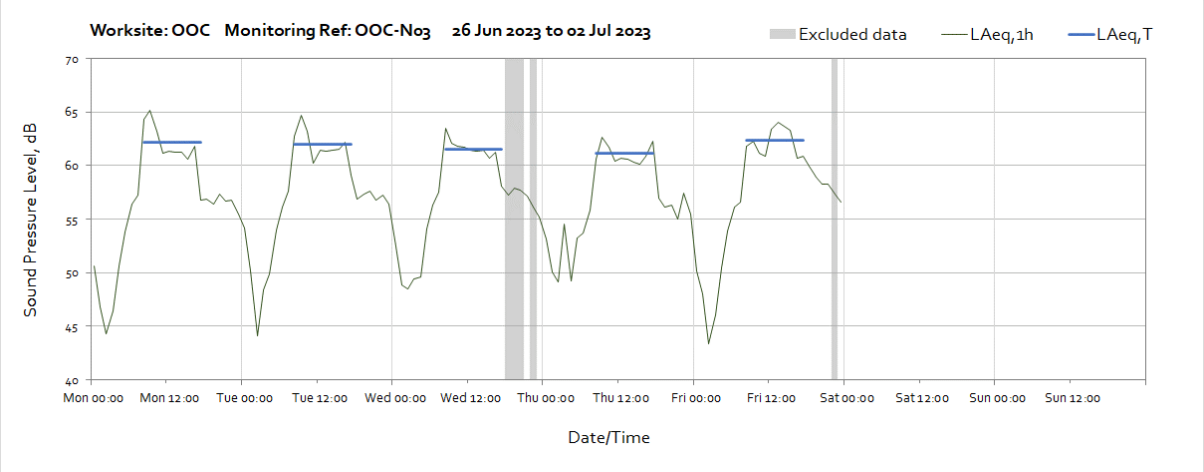
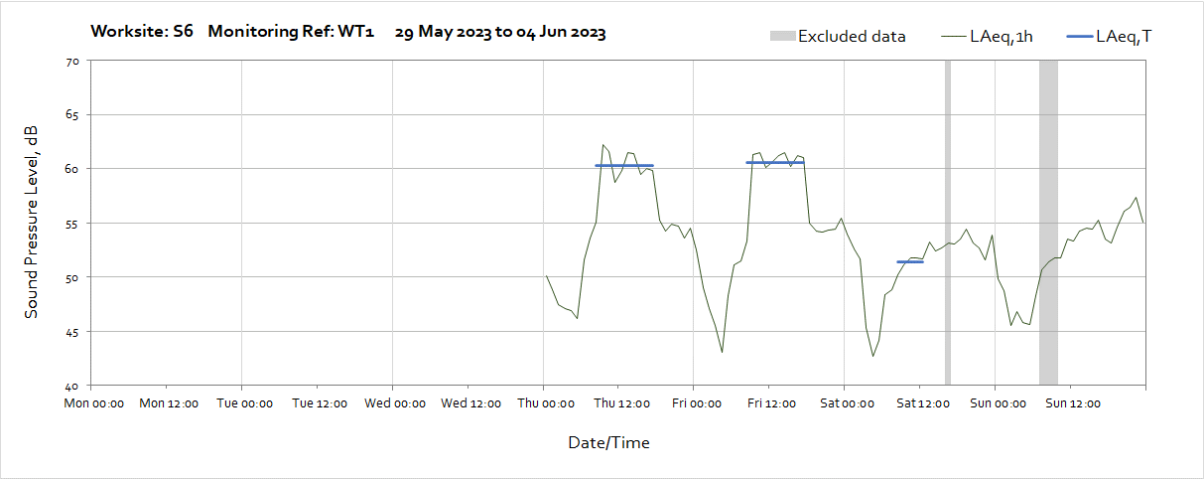
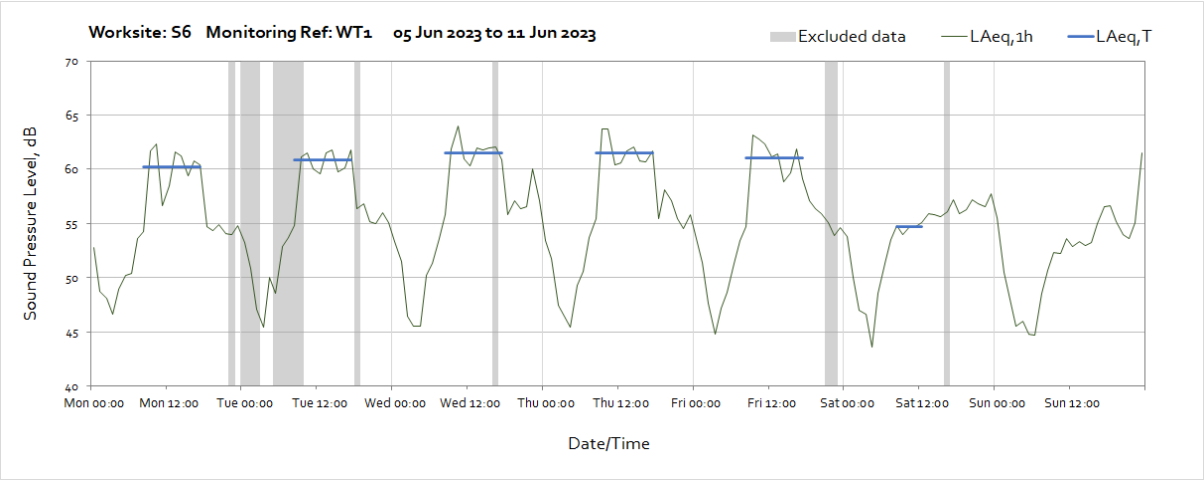
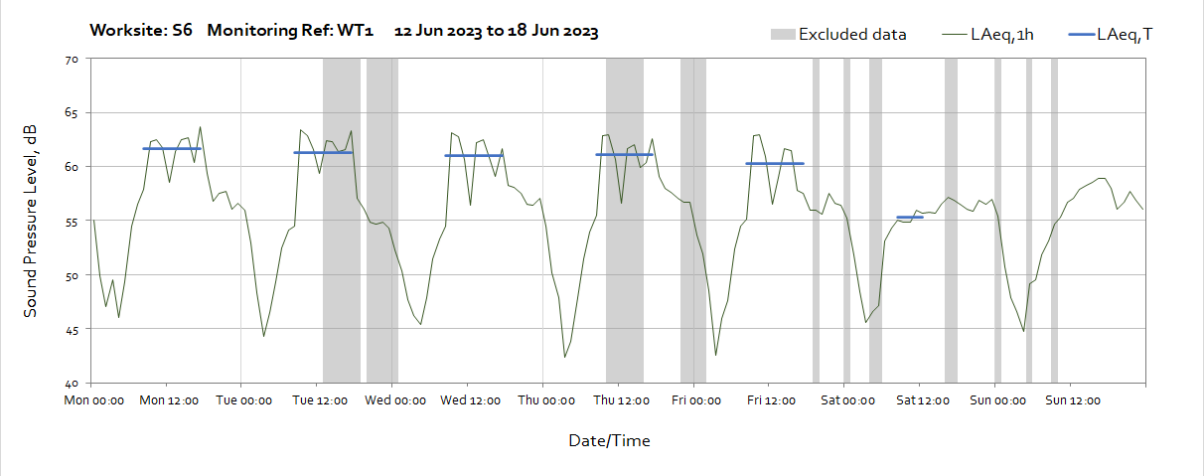
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

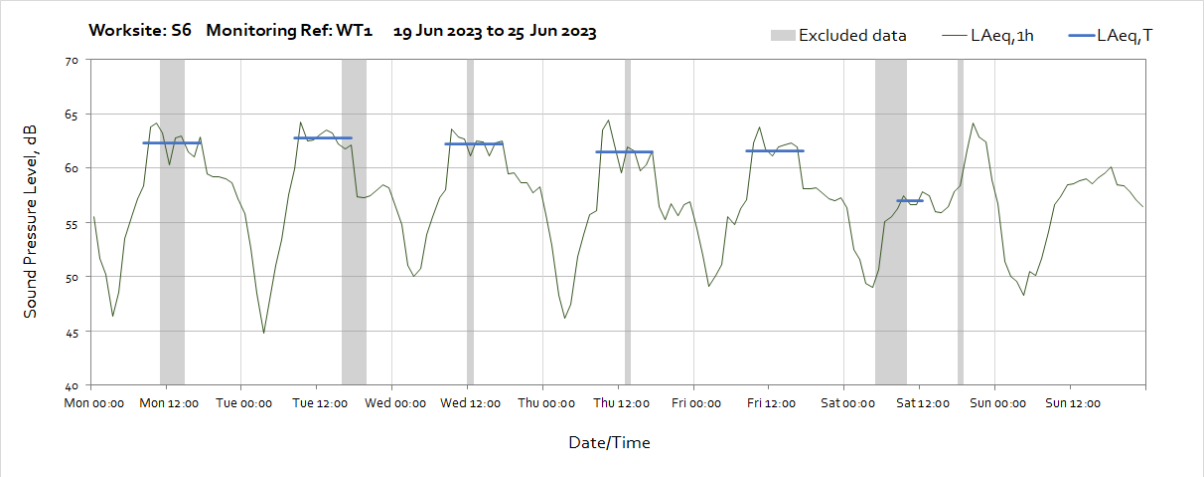


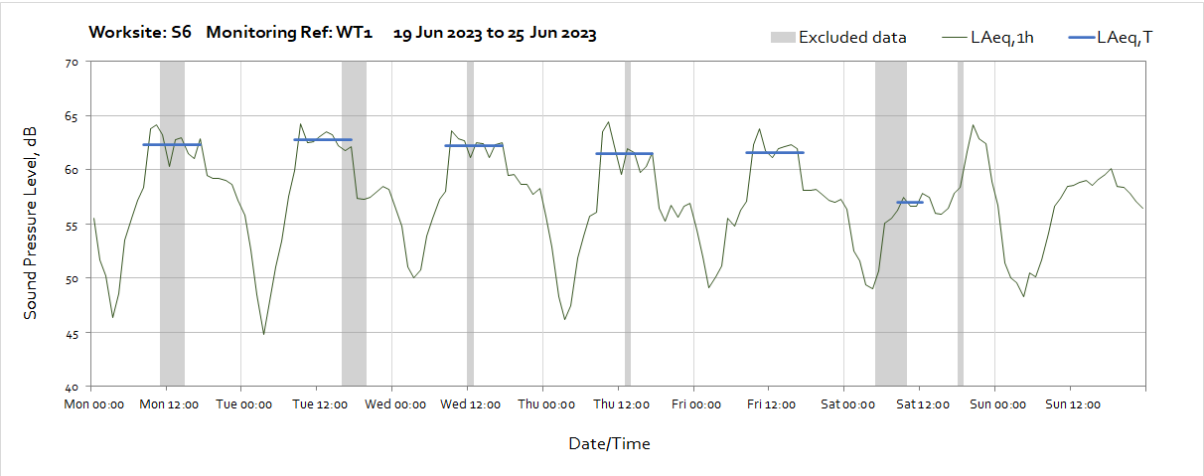
Worksite: S6 – Monitoring Ref: WT-N01






Worksite: S6 Monitoring Ref: WT1 12 Jun 2023 to 18 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

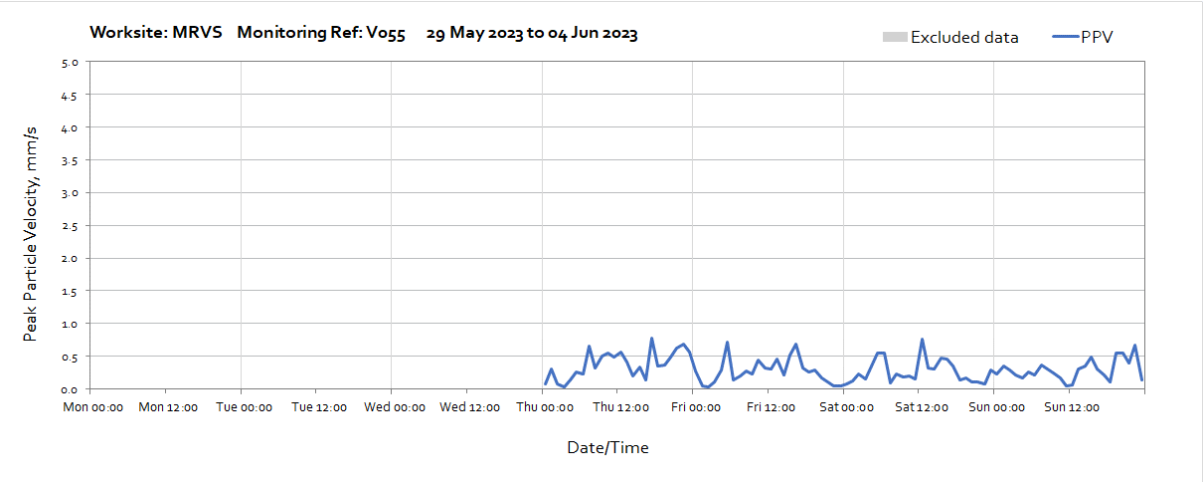

Worksite: S6 Monitoring Ref: WT1 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

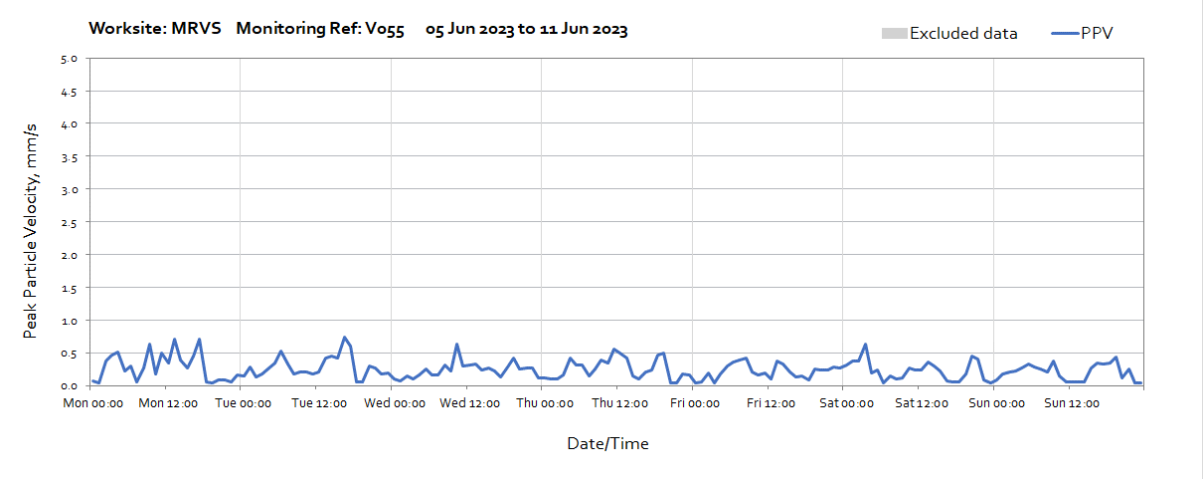

Worksite: S6 Monitoring Ref: WT1 19 Jun 2023 to 25 Jun 2023
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

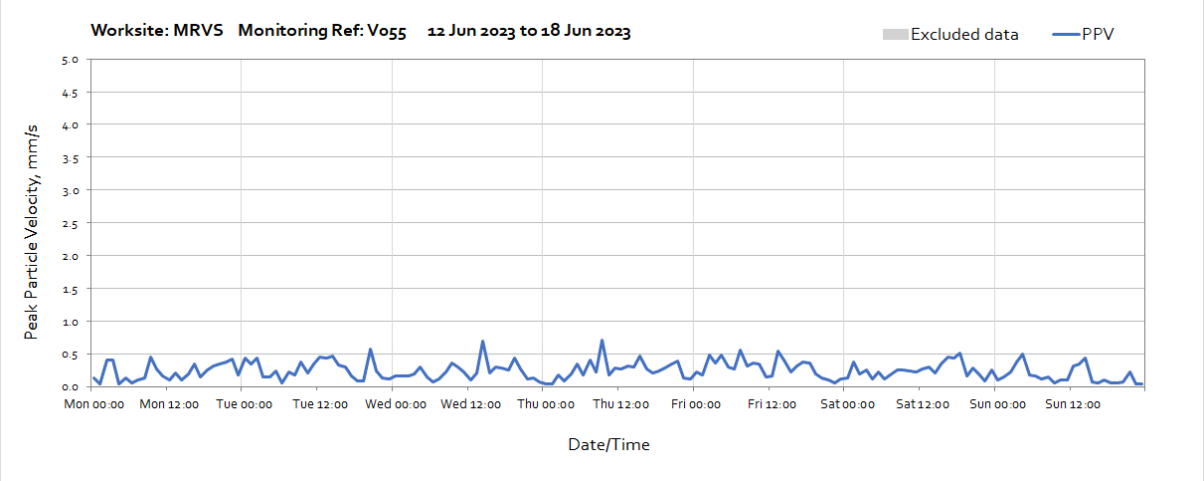
Vibration

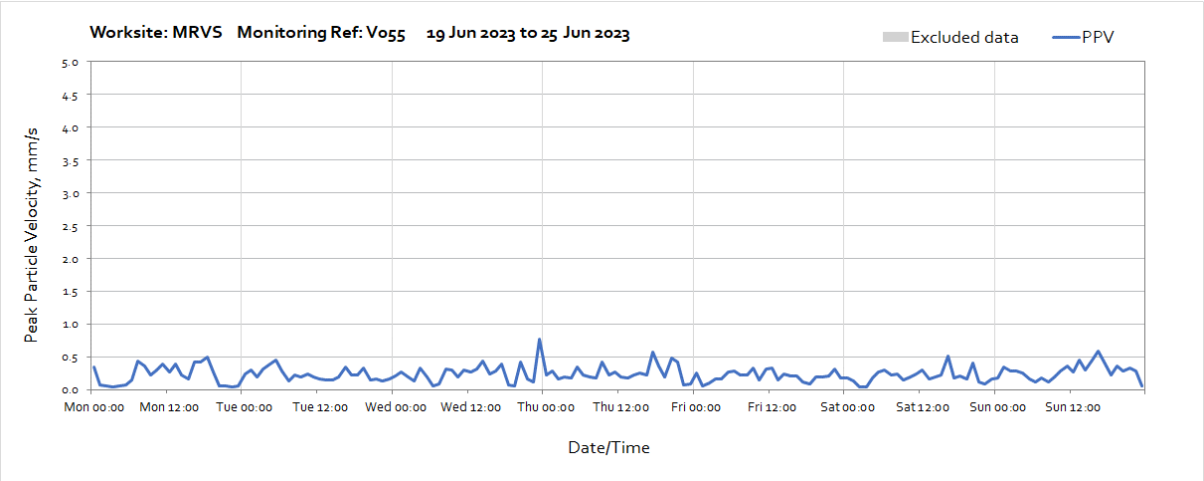
The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the highest PPV of the three orthogonal axis x, y and z. Where high values of PPV were caused by local interference with the vibration monitor, which are not representative 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.

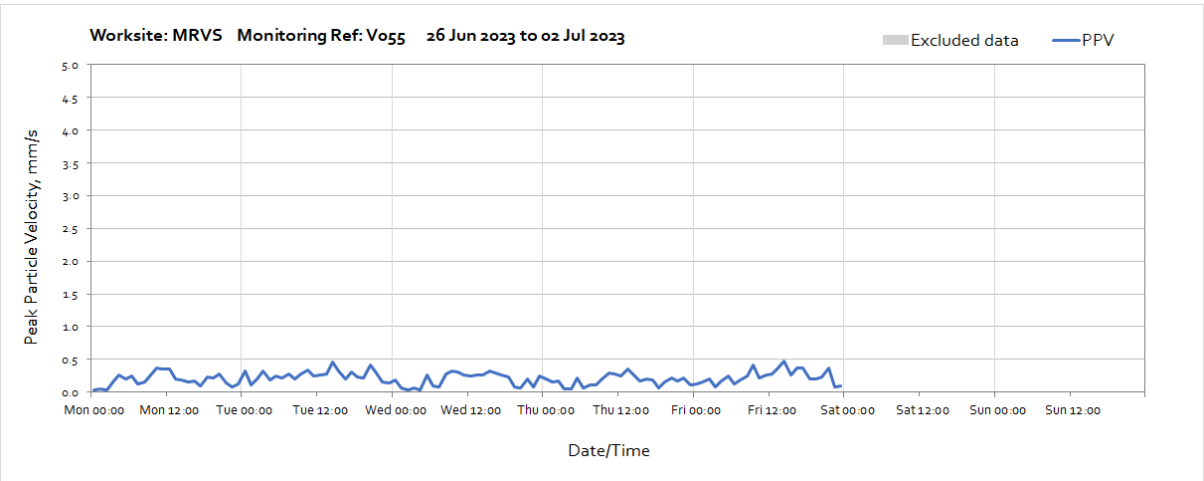
Worksite: MRVS – Monitoring Ref: V055



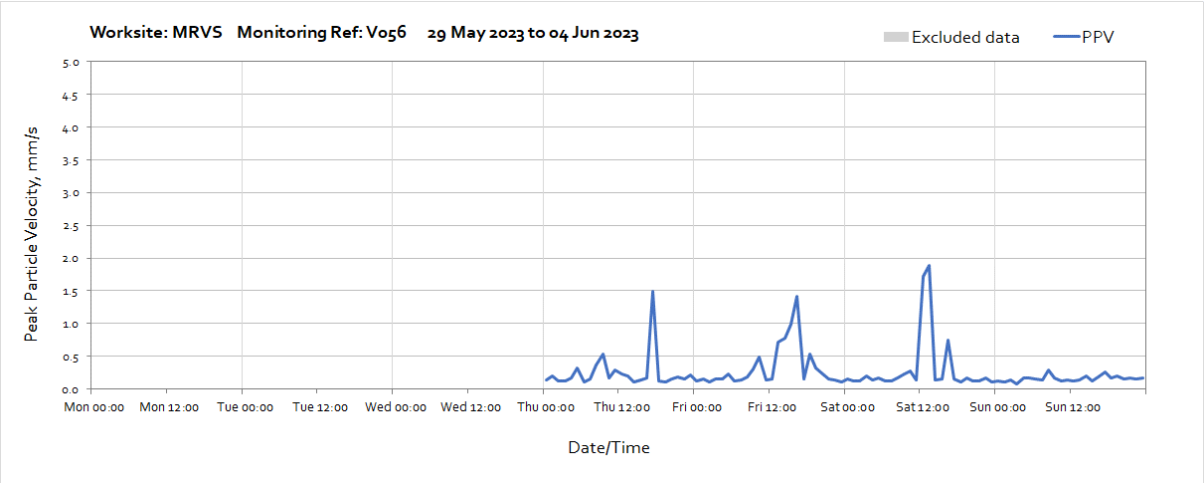


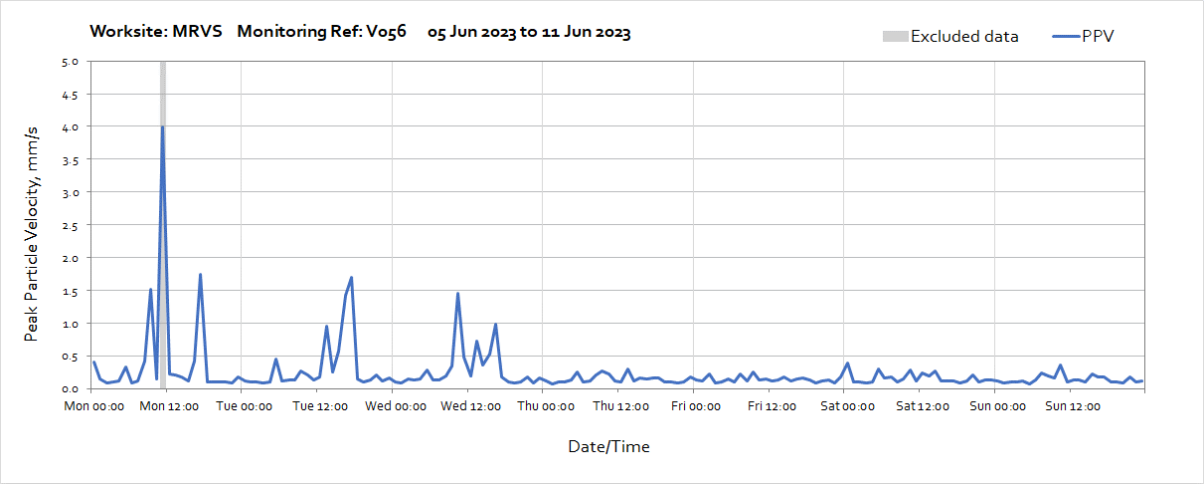

Worksite: MRVS Monitoring Ref: V055 12 Jun 2023 to 18 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

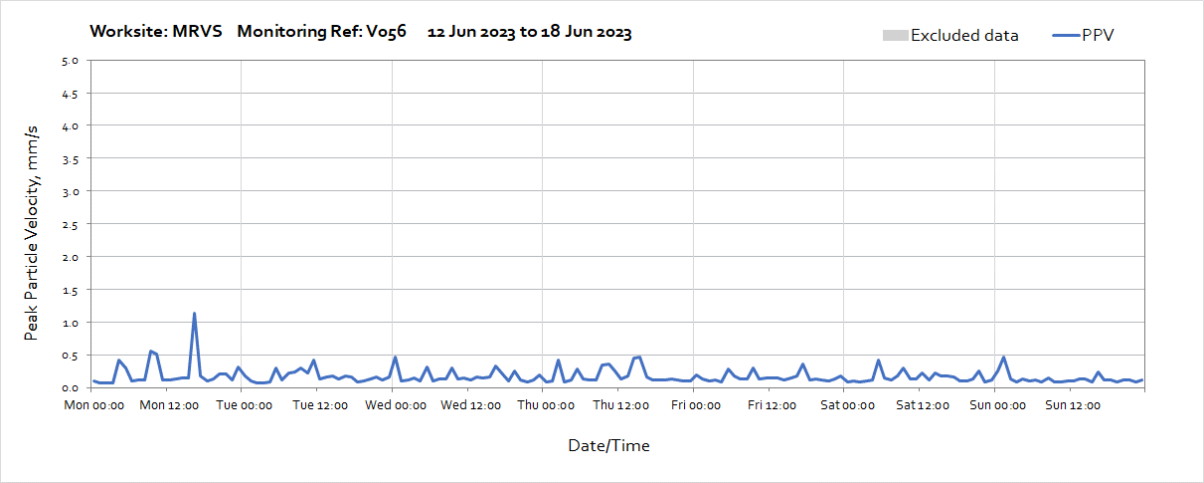

Worksite: MRVS Monitoring Ref: V055 19 Jun 2023 to 25 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

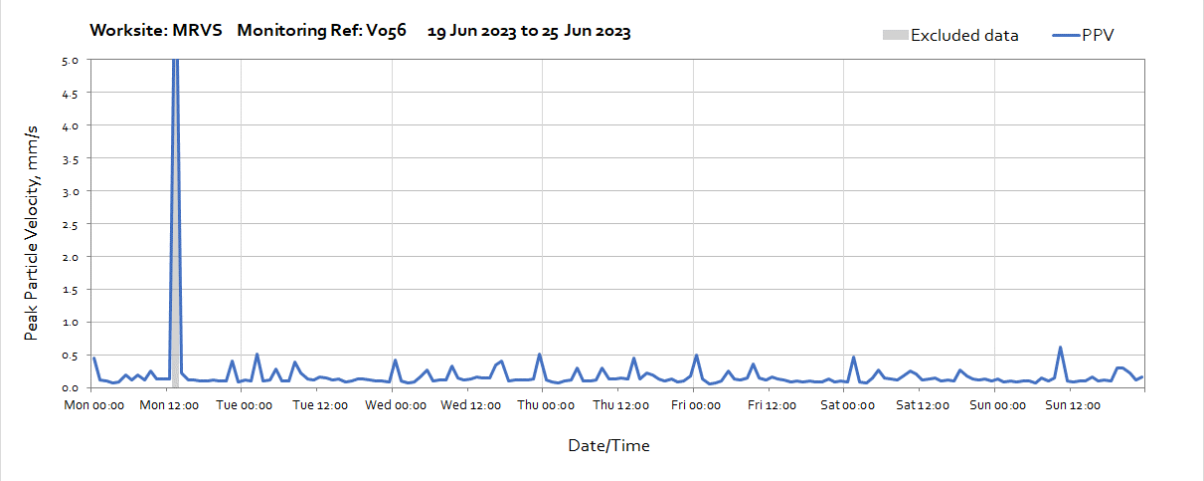

Worksite: MRVS Monitoring Ref: V055 26 Jun 2023 to 02 Jul 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

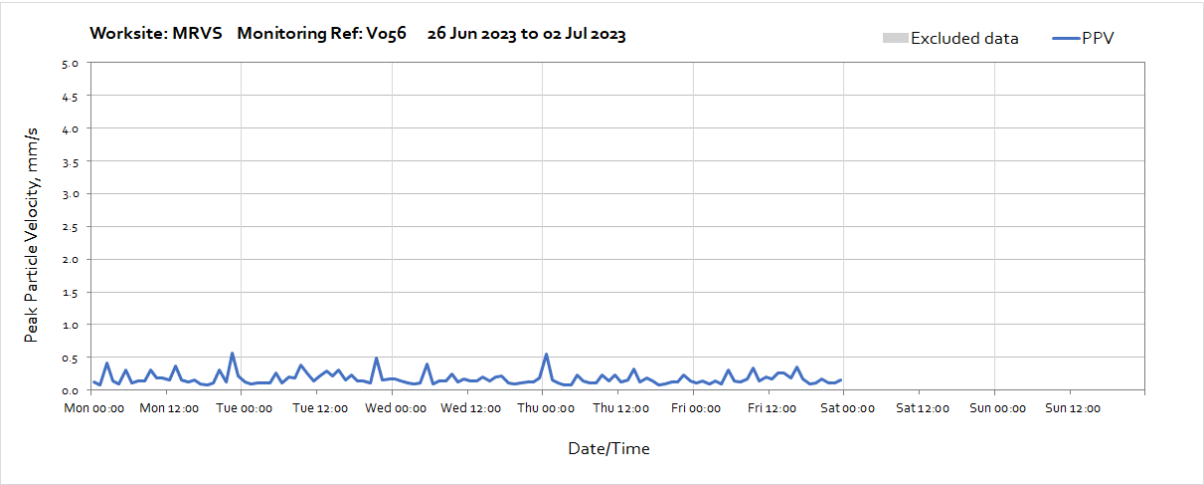
Worksite: MRVS – Monitoring Ref: V056



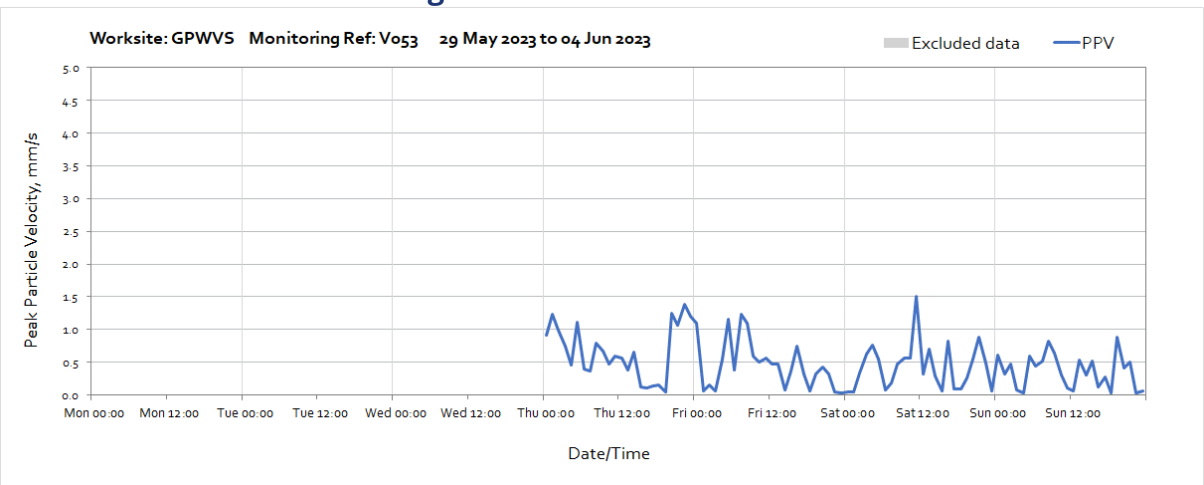


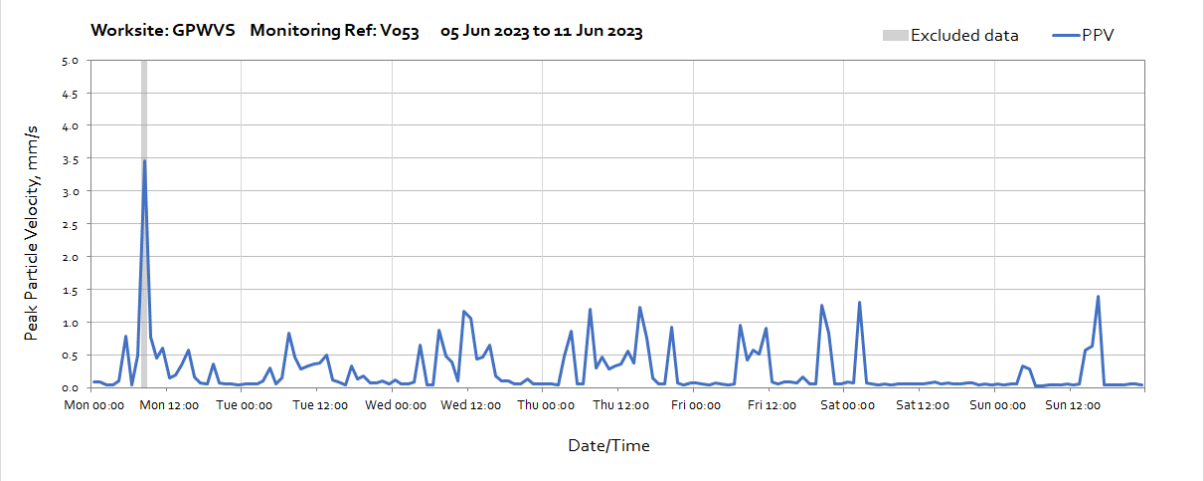


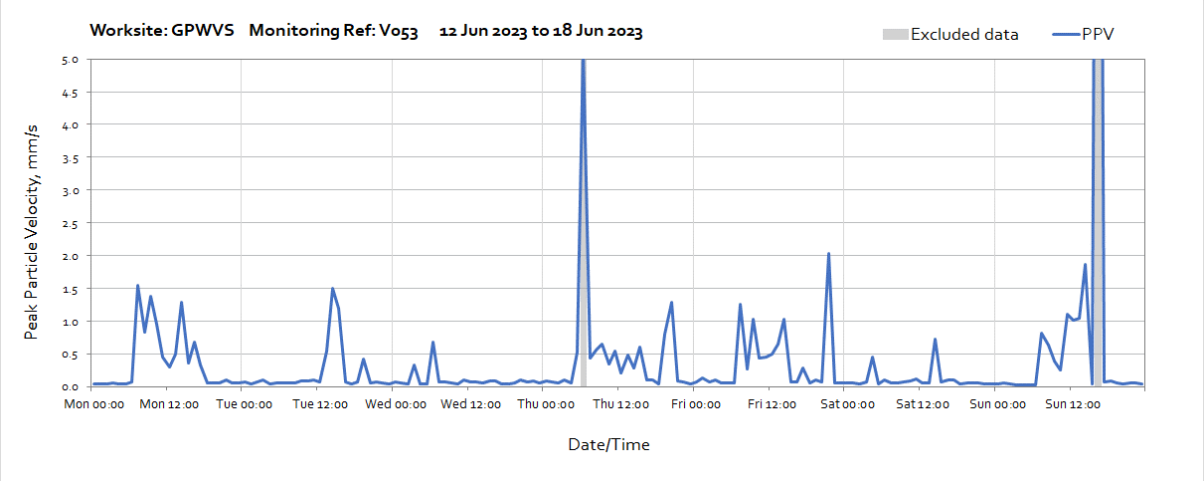


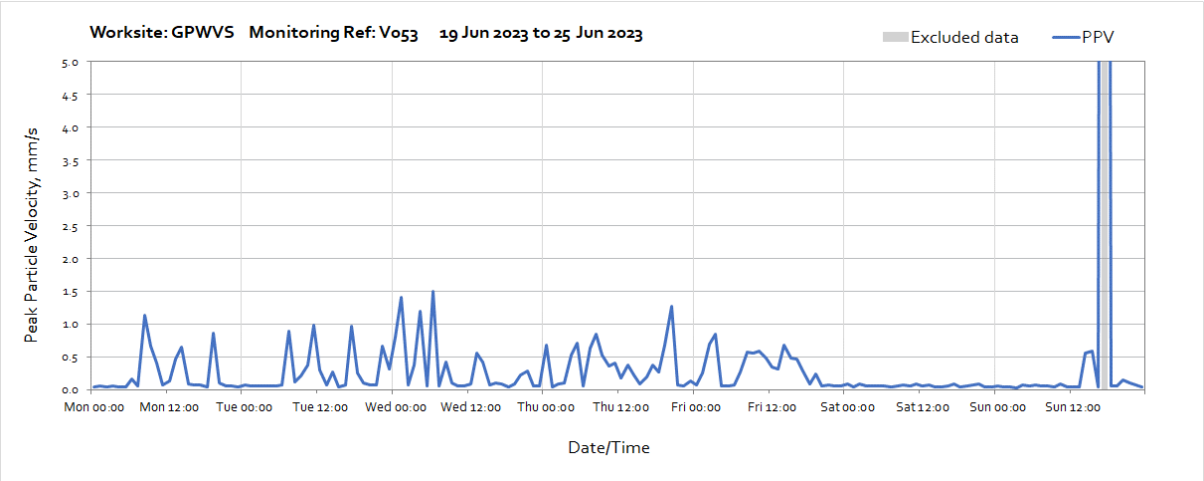


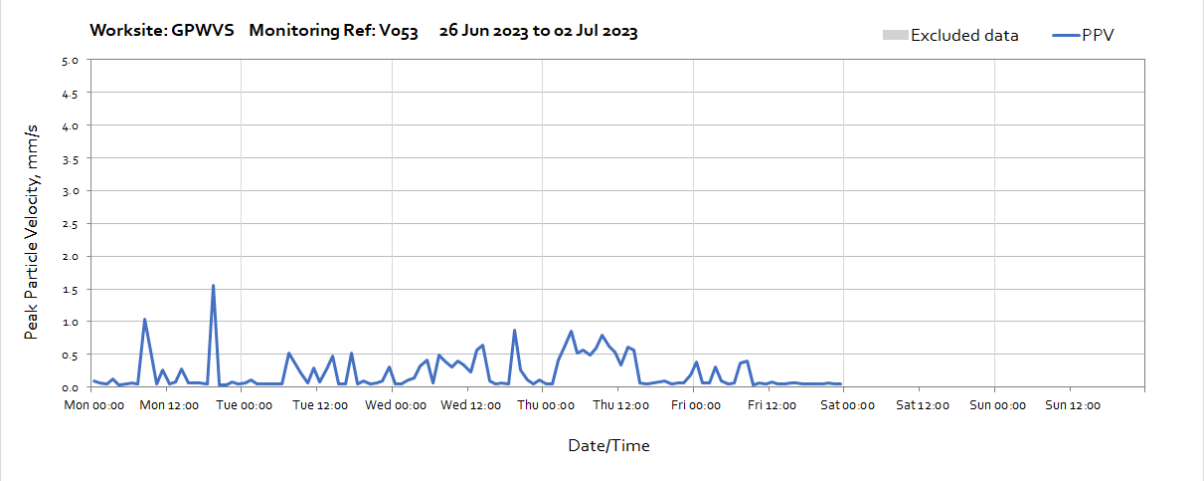
Worksite: GPWVS – Monitoring Ref: V053



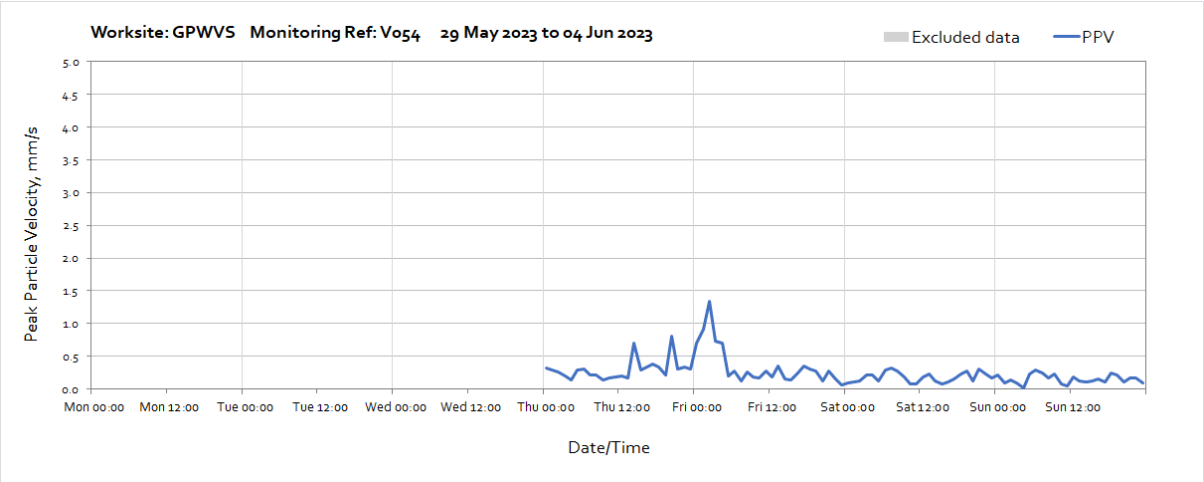

Worksite: GPWVS Monitoring Ref: Vo53 05 Jun 2023 to 11 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

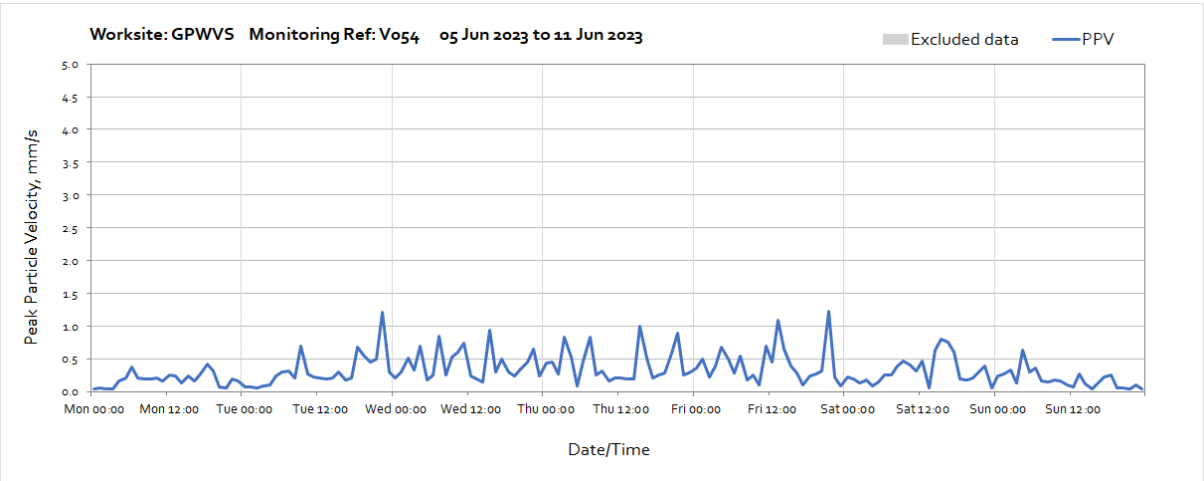

Worksite: GPWVS Monitoring Ref: Vo53 12 Jun 2023 to 18 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

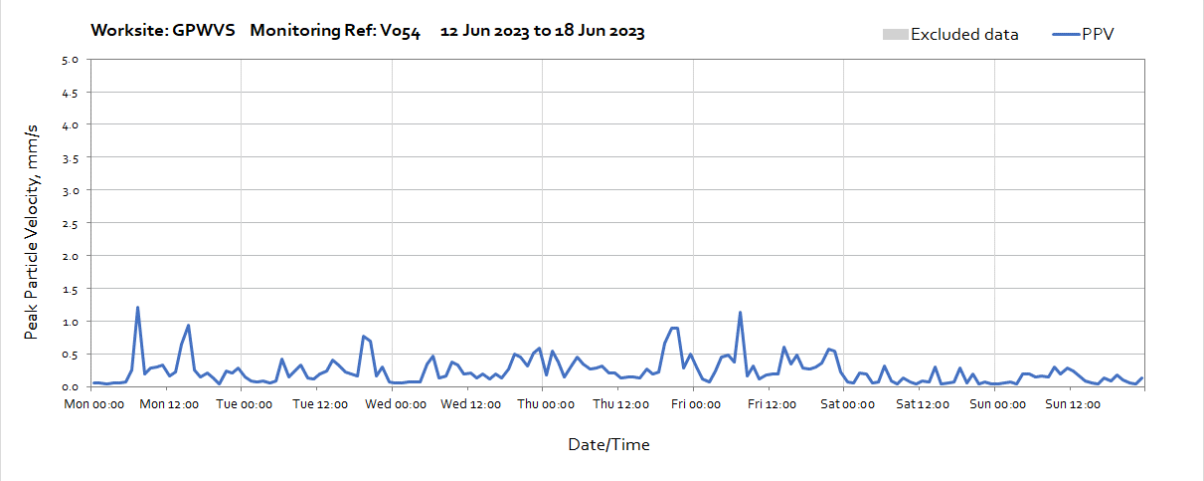

Worksite: GPWVS Monitoring Ref: Vo53 19 Jun 2023 to 25 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

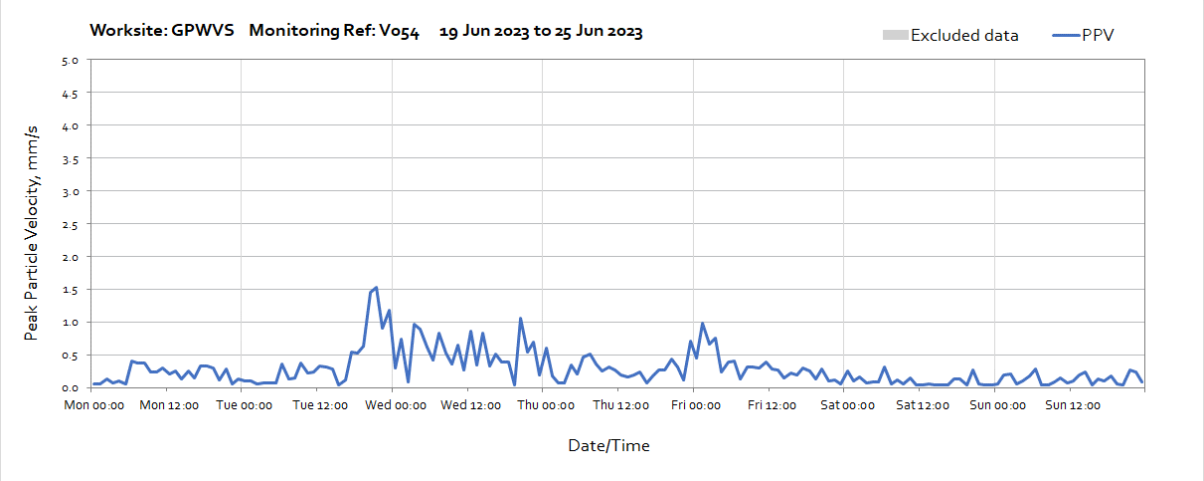


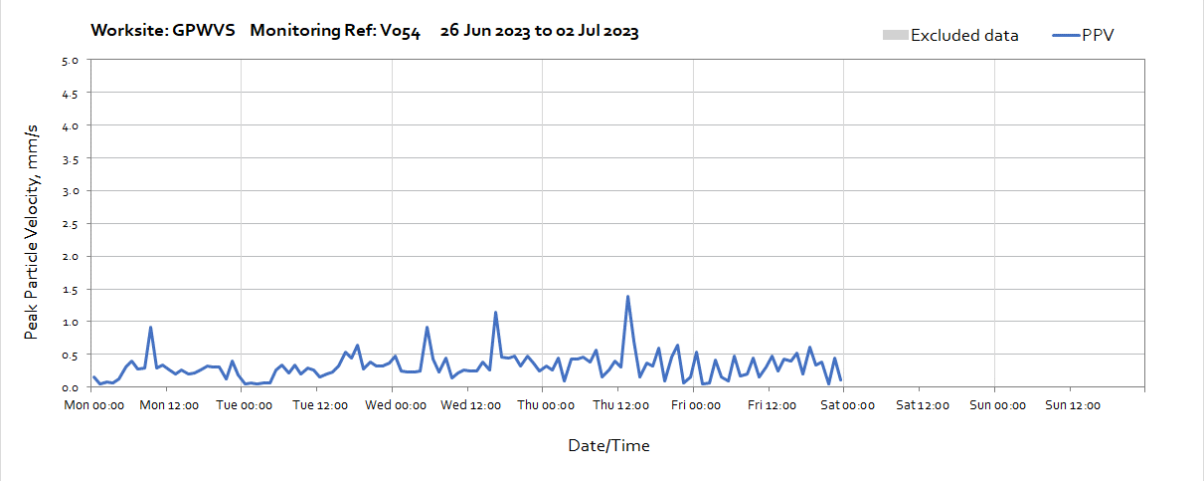
Worksite: GPWVS – Monitoring Ref: V054



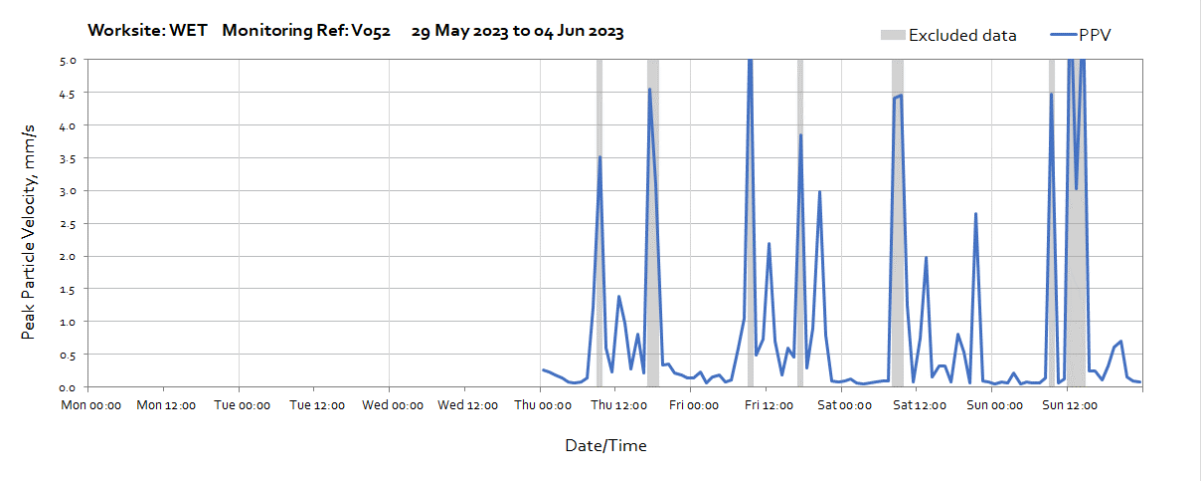


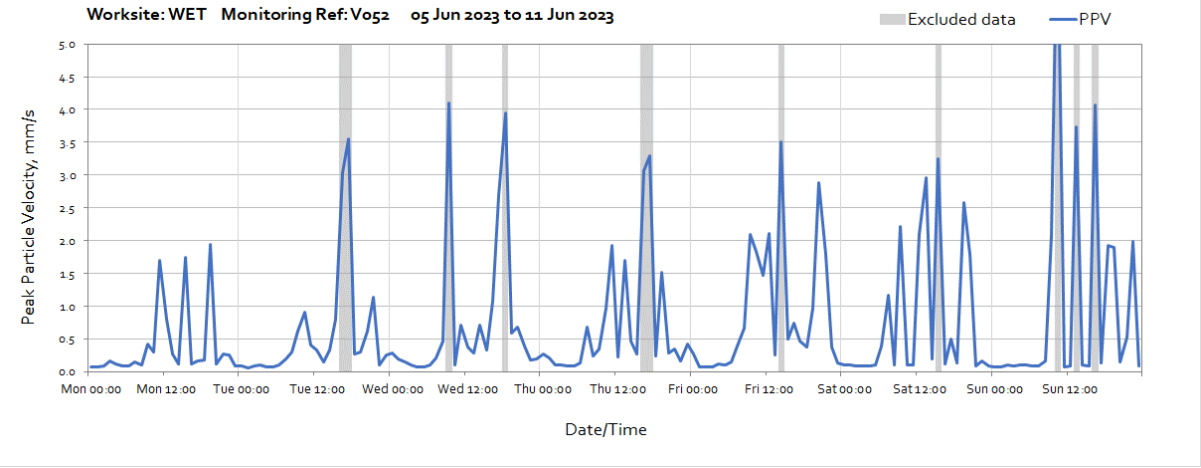

Worksite: GPWVS Monitoring Ref: V054 12 Jun 2023 to 18 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

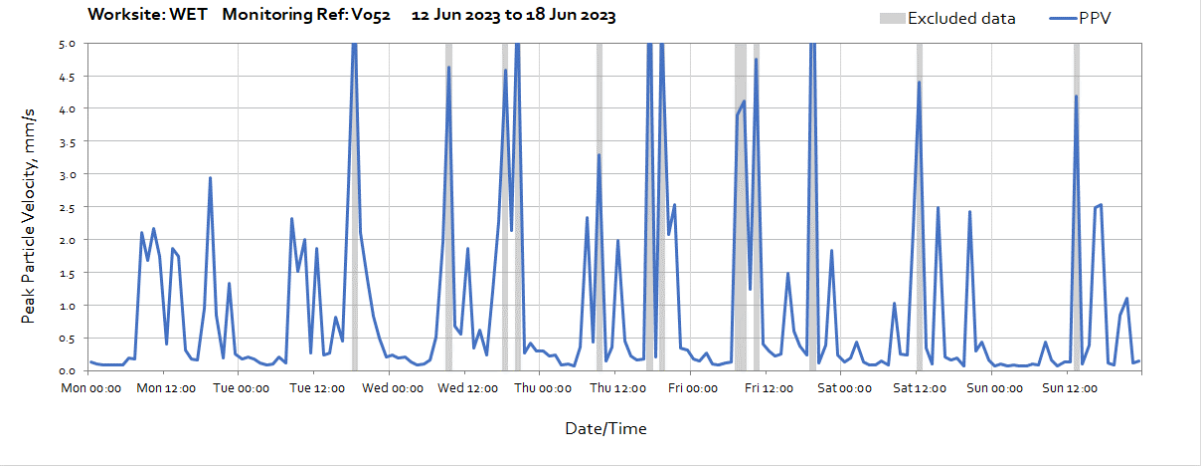

Worksite: GPWVS Monitoring Ref: V054 19 Jun 2023 to 25 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

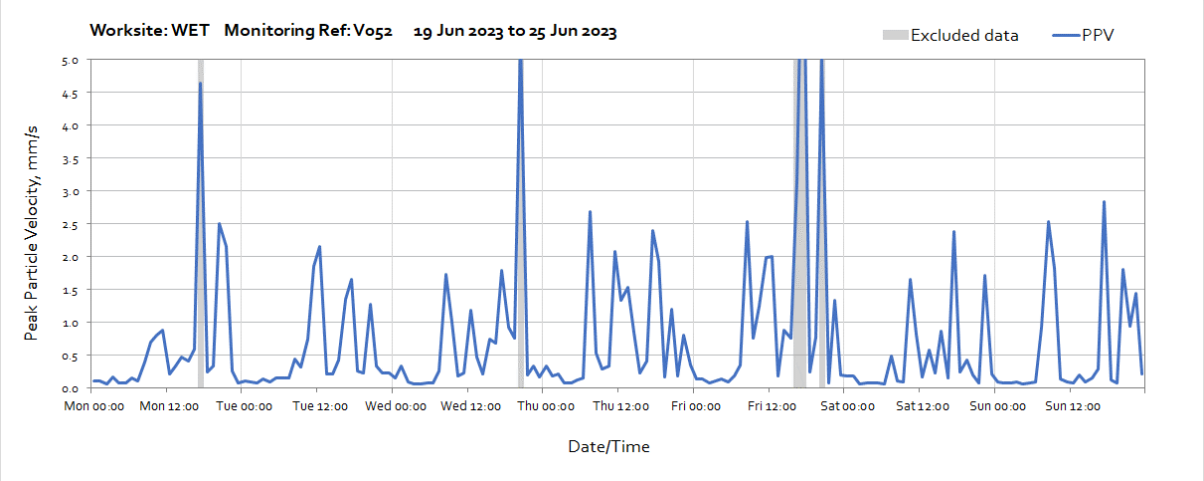

Worksite: GPWVS Monitoring Ref: V054 26 Jun 2023 to 02 Jul 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

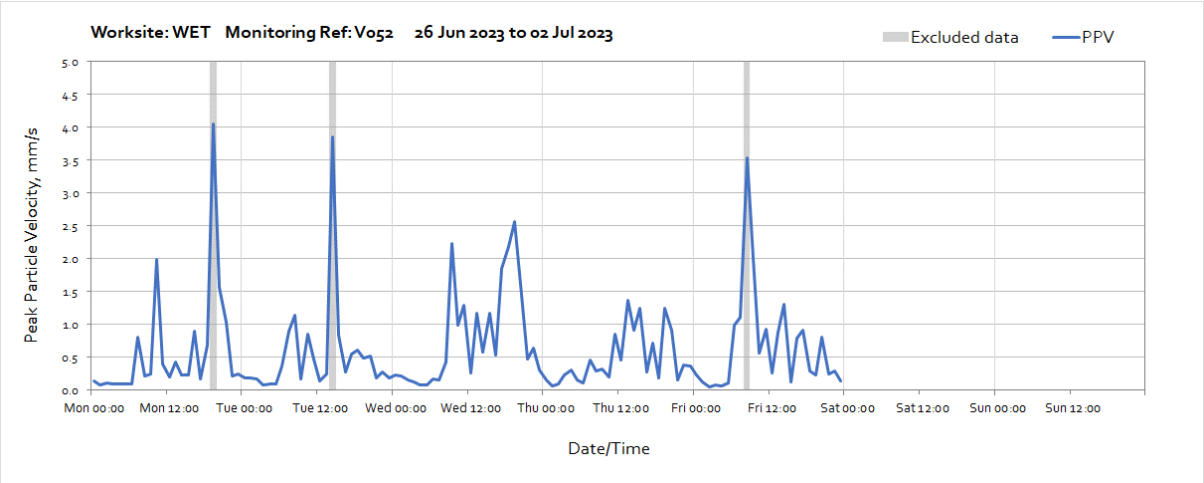
Worksite: WET – Monitoring Ref: V052



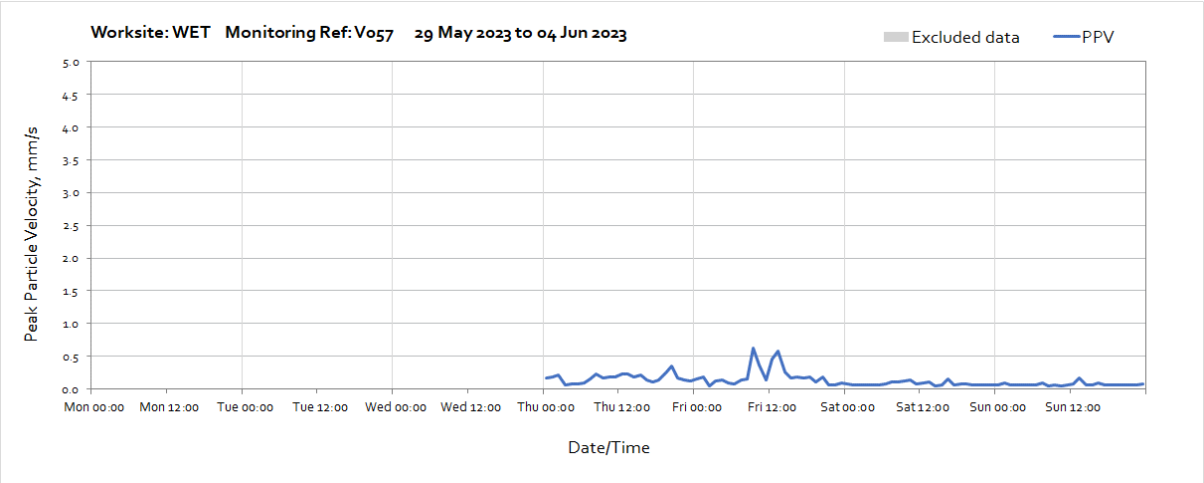


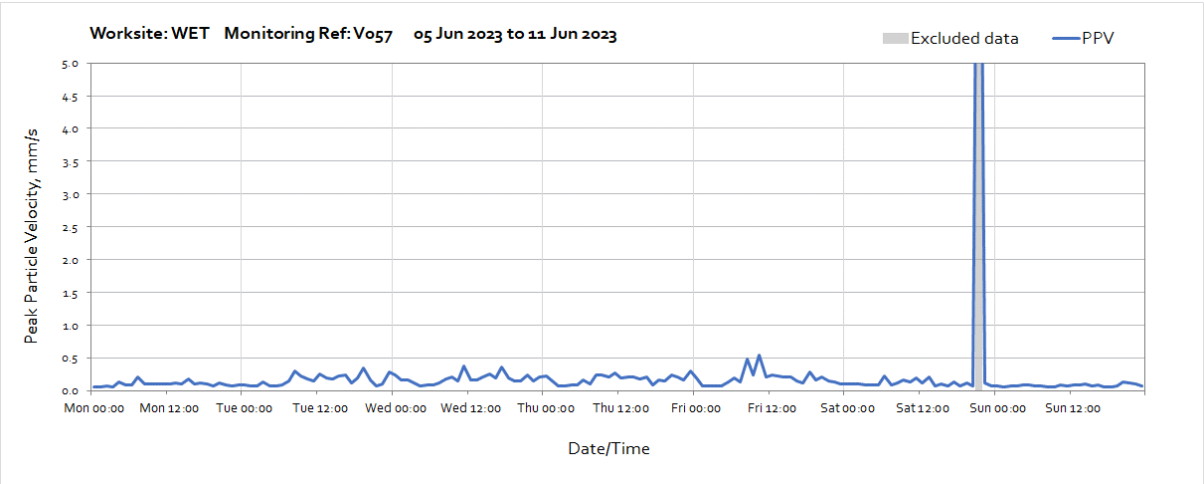


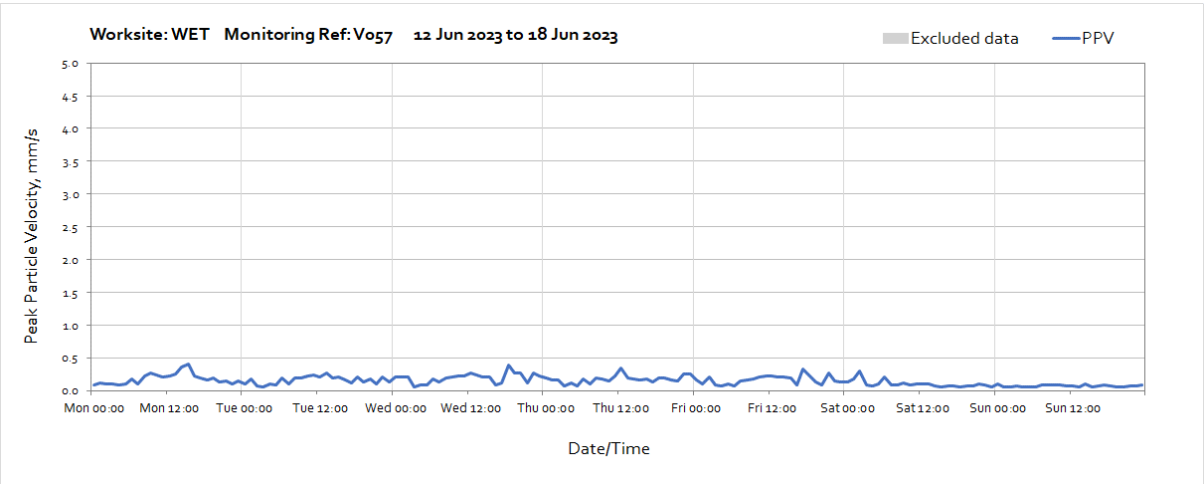

Worksite: WET Monitoring Ref: V052 19 Jun 2023 to 25 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

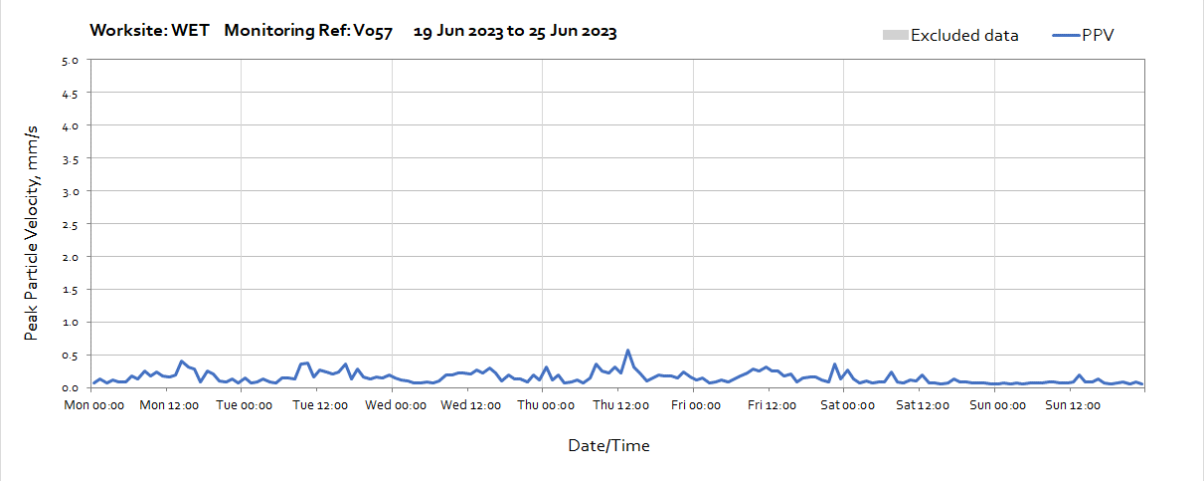

Worksite: WET Monitoring Ref: V052 26 Jun 2023 to 02 Jul 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

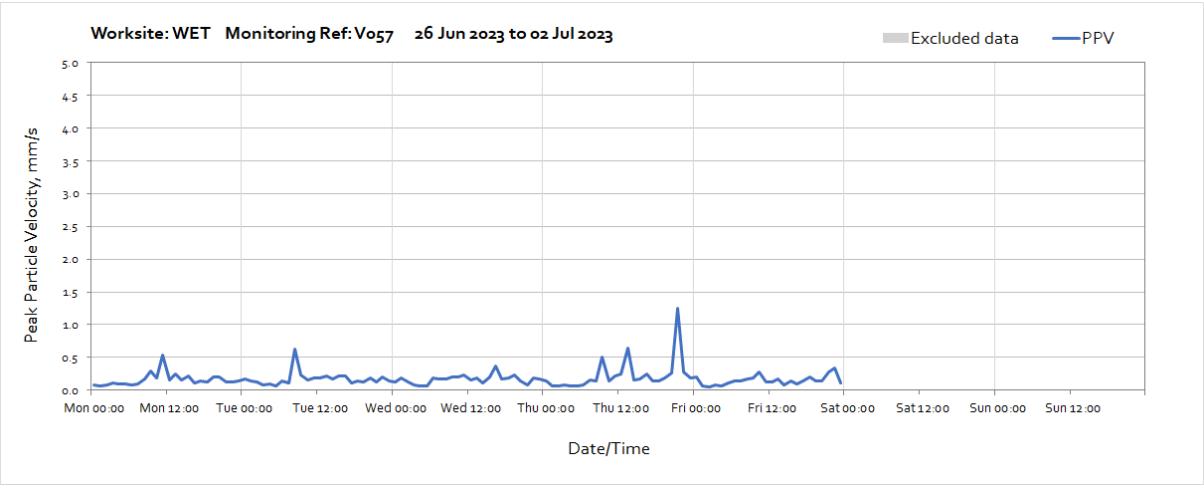
Worksite: WET – Monitoring Ref: V057



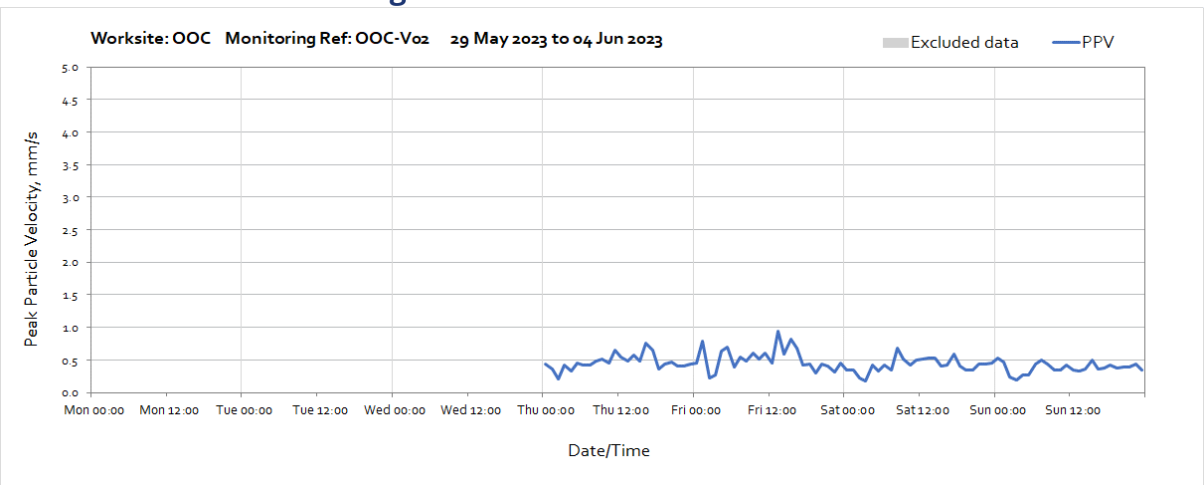


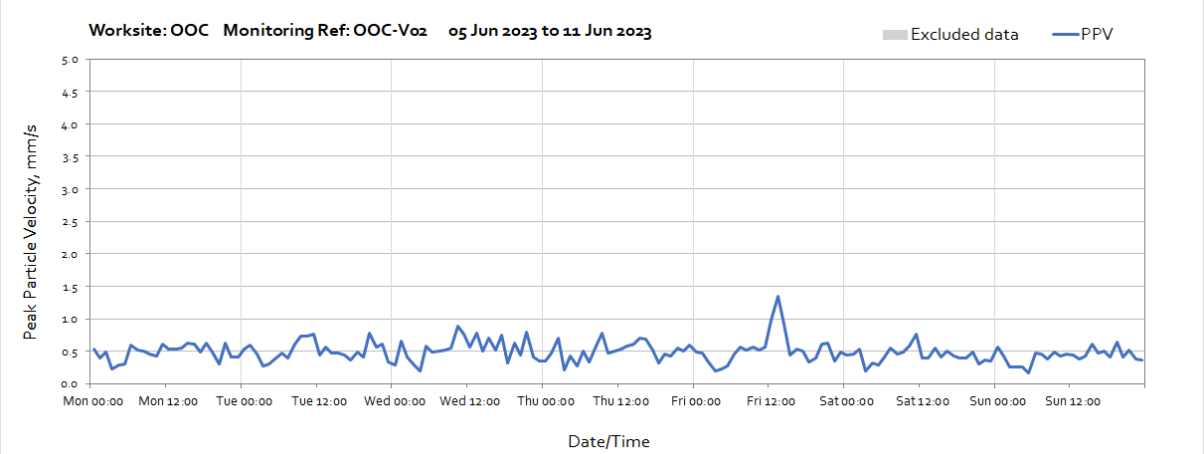


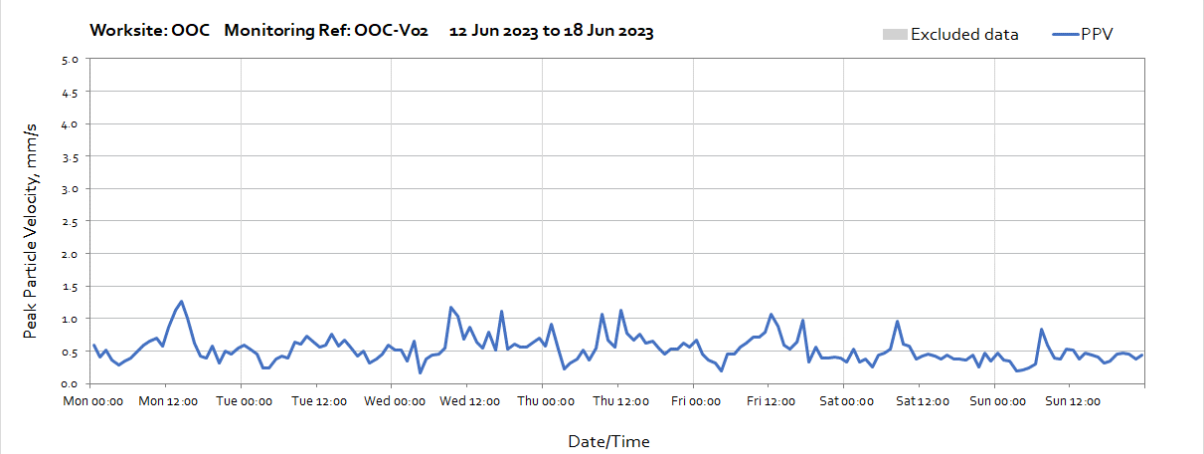


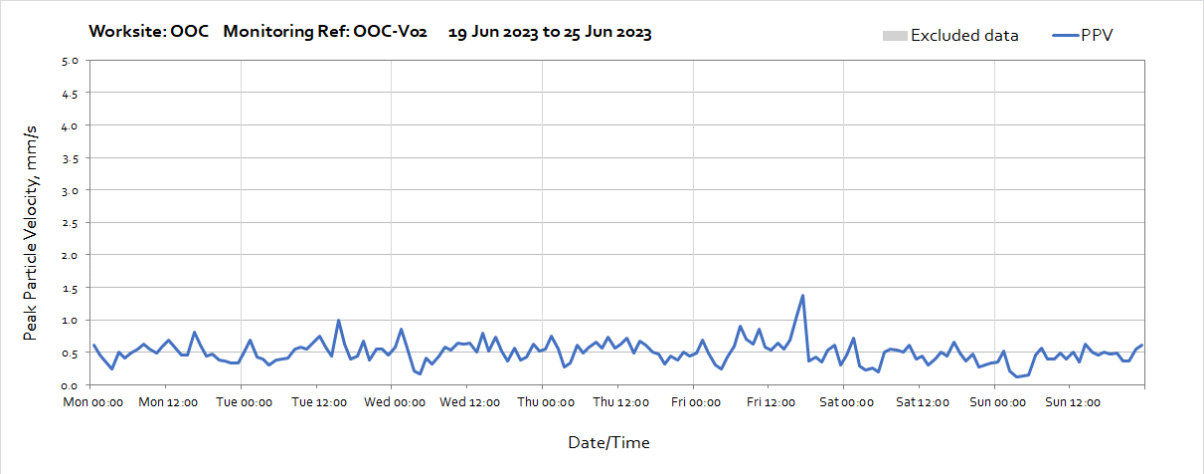


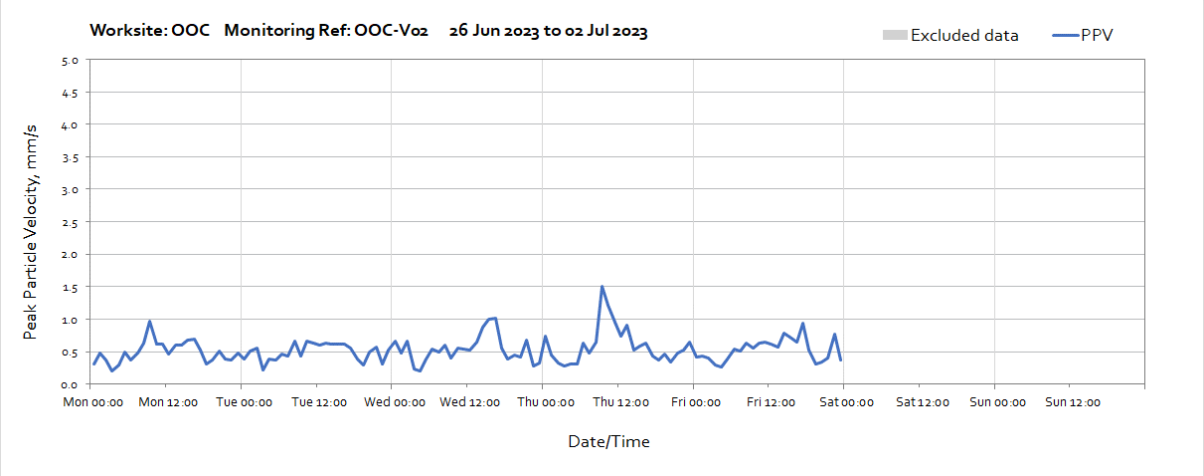
Worksite: OOC – Monitoring Ref: OOC-V02



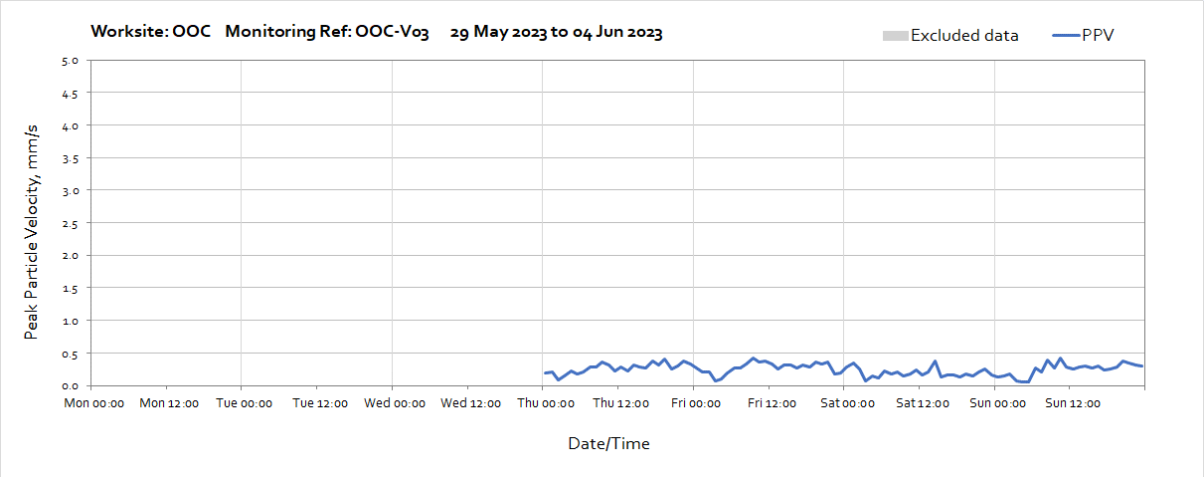

Worksite: OOC Monitoring Ref: OOC-V02 05 Jun 2023 to 11 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

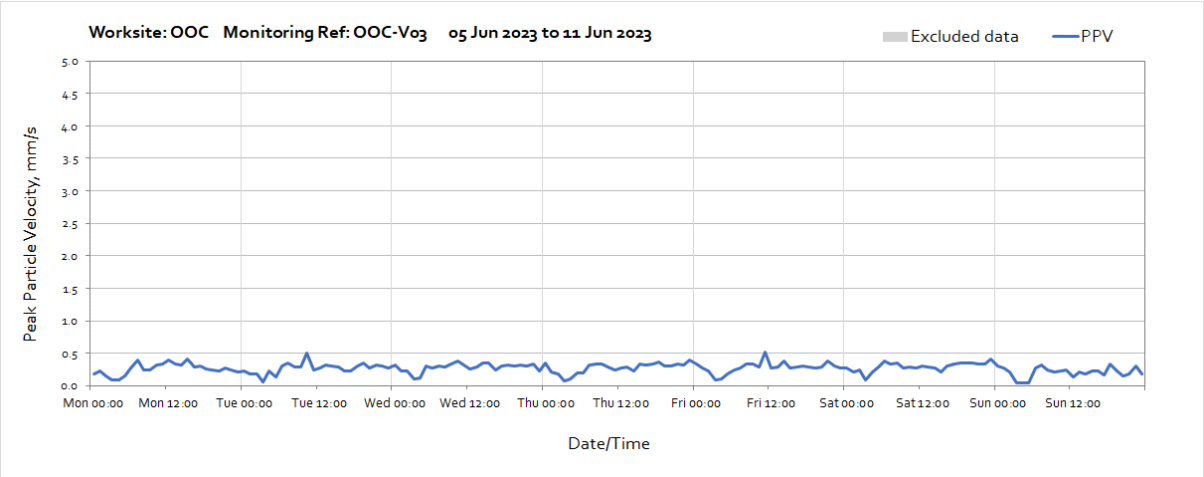

Worksite: OOC Monitoring Ref: OOC-V02 12 Jun 2023 to 18 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

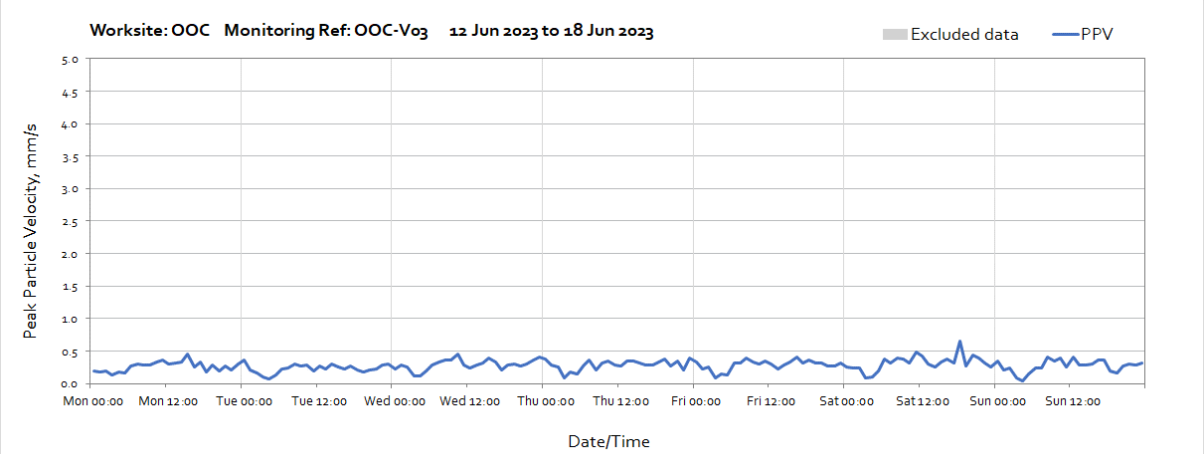

Worksite: OOC Monitoring Ref: OOC-V02 19 Jun 2023 to 25 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

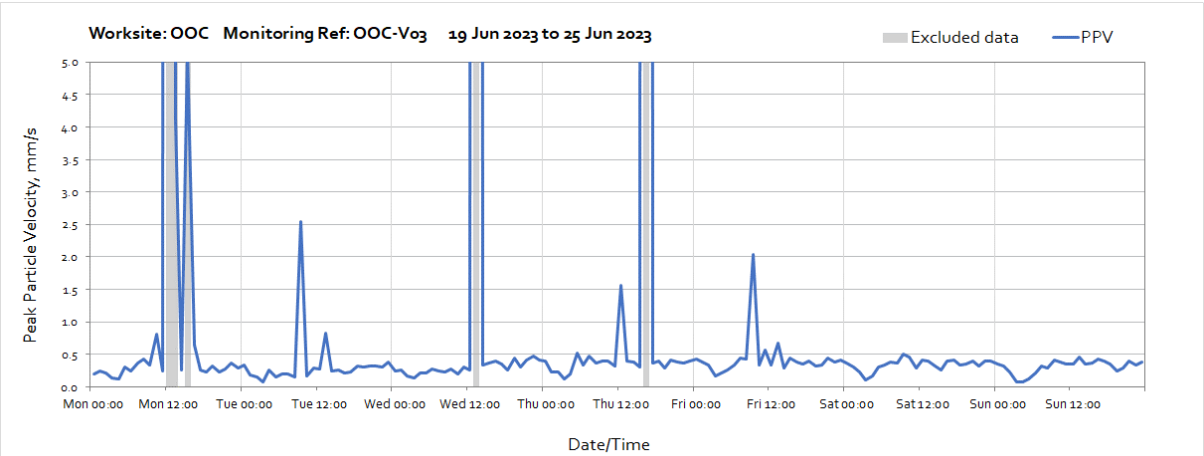


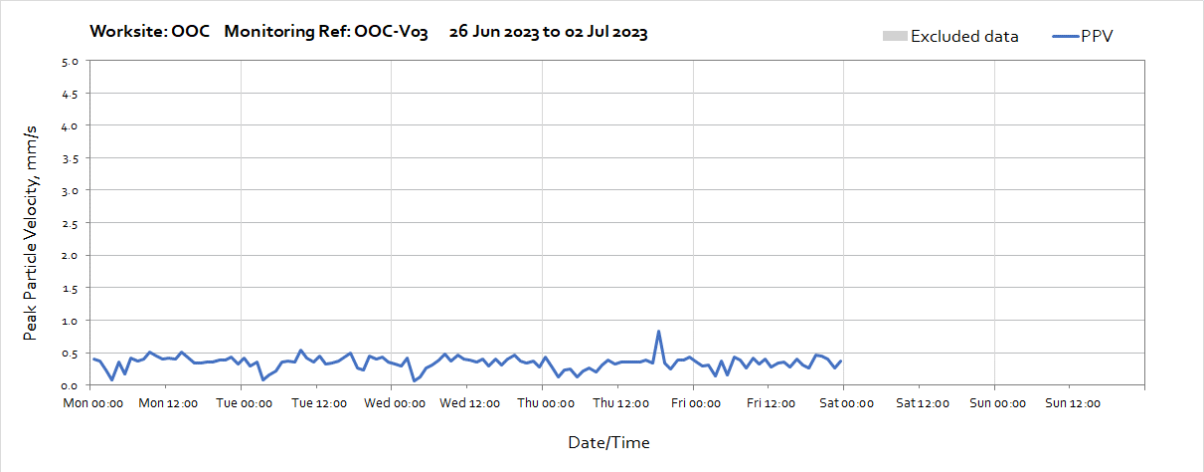
Worksite: OOC – Monitoring Ref: OOC-V03






Worksite: OOC Monitoring Ref: OOC-V03 12 Jun 2023 to 18 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: OOC Monitoring Ref: OOC-V03 19 Jun 2023 to 25 Jun 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: OOC Monitoring Ref: OOC-V03 26 Jun 2023 to 02 Jul 2023
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time