

HS2

February 2023

Construction Noise and Vibration Monthly Report – December 2022

North Warwickshire Borough Council

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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 North Warwickshire Borough Council (NWBC) area during the month of December 2022.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken at the Church Lane Embankment worksite (ref.: CLE) where no works were undertaken in December 2022.
- Noise monitoring was undertaken at the Kingsbury Main Compound worksite (ref.: KMC), where work activities included services installation, trimming works, road sweeping, kerb installation and asphalt placement.
- Noise monitoring was undertaken at the Birmingham & Fazeley Canal Viaduct worksite (ref.: BFCV), where work activities included rolling works, plate bearing testing and de-vegetation works.
- Noise and vibration monitoring were undertaken at the Marston Box/Marston Lane worksite (ref.: MB), where work activities included concrete works, fabrication and construction of deck, steel fixing, formwork, spraying, installation of strands, mobilisation works, road surface works, installation of drainage, installation of vehicle restraint system (VRS), waterproofing works, construction of carriageway placement of the box and backfilling works.
- Noise monitoring was undertaken at the Faraday Avenue Embankment and Underbridge worksite (ref.: FAEU), where work activities included rigid inclusions, piling works, material movement.
- Noise monitoring was undertaken at the Water Orton South Compound worksite (ref.: WOSC), where work activities included building mock-up pier, earthworks, material mixing and material deliveries.
- Noise monitoring was undertaken at the Chattle Hill Box Structure worksite (ref.: CHBS), where work activities included mobilisation works, construction of haul road and pile testing.
- Noise monitoring was undertaken at the Attleboro Lane Overbridge worksite (ref.: ALO), where work activities included site maintenance activities, diaphragm wall operations and piling works.
- Noise monitoring was undertaken at the Gilson Embankment worksite (ref.: GE), where work activities included construction of piling platform, topsoil stripping, installation and compaction works.

- Noise monitoring was undertaken at the Gilson Drive worksite (ref.: GLD), where work activities included topsoil stripping, haul road surfacing and maintenance work, installation of drainage ditches and pond, water management, installation and compaction work.
- Noise monitoring was undertaken at the Birmingham Road worksite (ref.: BRD), where work activities included topsoil stripping, excavation works, installation of drainage pipes and manholes, installation and compaction of general fill and aggregates.

Further works, where noise and vibration monitoring did not take place, were also undertaken at Gilson as part of sewer and embankment works.

The HS2 threshold levels for significant noise impacts, which are defined in Information Paper E23 (<https://www.gov.uk/government/publications/hs2-information-papers-environment>) were not exceeded during December 2022.

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

Two complaints were received within the North Warwickshire area during the monitoring period. A description of complaints, the results of investigations and any actions taken are detailed in Table 7 of this report.

Abbreviations and Descriptions

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

Table 1: Table of Abbreviations

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

1 Introduction

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

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

1.1.2 Monitoring data and interpretive reports are to be provided to each relevant local authority on a monthly basis and shall include a summary of the construction activities occurring, the data recorded over the monitoring period, any complaints received, any periods in exceedance of agreed trigger levels, the results of any investigations and any actions taken or mitigation measures implemented. This report provides noise data, and interpretation thereof, for monitoring carried out by HS2 within the North Warwickshire Borough Council (NWBC) area for the period 1st to 31st December 2022.

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

- Church Lane Embankment worksite, ref.: CLE (see Plan 1 in Appendix A), where no works were undertaken in December 2022 as the site had shut down for Christmas.
- Kingsbury Main Compound worksite, ref.: KMC (see Plan 2 in Appendix A), where work activities included:
 - Services installation.
 - Trimming works.
 - Road sweeping.
 - Kerb placement.
 - Asphalt placement.

- Birmingham & Fazeley Canal Viaduct worksite, ref.: BFCV (see Plan 2 in Appendix A), where works included:
 - Rolling works.
 - Plate bearing testing.
 - De-vegetation works.
- Marston Box/Marston Lane worksite, ref.: MB (see Plan 2 in Appendix A), where work activities included:
 - Concrete works.
 - Fabrication and construction of deck.
 - Steel fixing.
 - Formwork.
 - Spraying.
 - Installation of strands.
 - Mobilisation works.
 - Road surface works.
 - Installation of drainage and Vehicle Restraint System (VRS).
 - Waterproofing works.
 - Backfilling works.
 - Construction of carriageway.
 - Placement of the box.
- Faraday Avenue Embankment and Underbridge worksite, ref.: FAEU (see Plan 3 in Appendix A), work activities included:
 - Rigid inclusions.
 - Material movement.

- Piling works.
- Water Orton South Compound worksite, ref.: WOSC (see Plan 4 in Appendix A), work activities included:
 - Building mock-up pier.
 - Material mixing.
 - Earthworks.
 - Material deliveries.
- Chattle Hill Box Structure worksite, ref.: CHBS (see Plan 4 in Appendix A), where work activities included:
 - Mobilisation works.
 - Construction of haul road.
 - Pile testing.
- Attleboro Lane Overbridge worksite, ref.: ALO (see Plan 4 in Appendix A), where work activities included:
 - Site maintenance activities.
 - Diaphragm wall operations, including excavations.
 - Piling works.
- Gilson Embankment worksite, ref.: GE (see Plan 4 in Appendix A), where work activities included:
 - Construction of piling platform.
 - Topsoil stripping.
 - Installation and compaction work of general fill and aggregates.
- Gilson Drive worksite, ref.: GLD (see Plan 4 in Appendix A), works activities included:
 - Topsoil stripping.

- Haul road surfacing and maintenance work.
 - Installation of drainage ditches and pond.
 - Water management.
 - Installation and compaction work of general fill and aggregates.
- Birmingham Road worksite, ref.: BRD (see Plan 4 in Appendix A), work activities included:
 - Topsoil stripping.
 - Excavation works.
 - Installation of drainage pipes and manholes.
 - Installation and compaction of general fill and aggregates.

1.1.4 Further works, where noise and vibration monitoring did not take place, were also undertaken at Gilson as part of sewer and embankment works.

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

1.2 Measurement Locations

- 1.2.1 Thirteen (13) noise monitoring installations and eight (8) vibration monitoring installations were active in December in the NWBC area. Table 2 summarises the position of noise and vibration monitoring installations within the NWBC area in December 2022.
- 1.2.2 A noise monitor was installed at ref: CHBS-N1, worksite ref: CHBS on Wednesday 30th November 2022.
- 1.2.3 Noise and Vibration monitor was installed at ref: GE-N1-V1, worksite ref: GE on Thursday 15th December 2022.
- 1.2.4 Maps showing the position of noise and vibration monitoring installations are presented in Appendix B.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
Church Lane Embankment (CLE)	CLE-N1	Highfields Cottage, Middleton, North Warwickshire
Kingsbury Main Compound (KMC)	KMC-N1	Kingsbury Road, Curdworth CP, Marston, Warwick, West Midlands
	KMC-N2	Kingsbury Road, Curdworth CP, Marston, Warwick, West Midlands
Birmingham Fazeley Canal Viaduct (BFCV)	BFCV-N2	Lock Cottage, Marston Lane, Curdworth CP, North Warwickshire
	BFCV-V4	Lock Cottage, Marston Lane, Curdworth CP, North Warwickshire
Marston Box (MB)	MB-N1	Kingsbury Road, Curdworth, Sutton Coldfield, West Midlands
	MB-V1	Kingsbury Road, Curdworth, Sutton Coldfield, West Midlands
Faraday Avenue Embankment and Underbridge (FAEU)	FAEU-N1	Orchard Cottage, Newlands Lane, Curdworth, Warwickshire
	FAEU-V1	Orchard Cottage, Newlands Lane, Curdworth, Warwickshire
Water Orton South Compound (WOSC)	WOSC-N1	53 Watton Lane, Water Orton CP, Warwickshire
	WOSC-V1	53 Watton Lane, Water Orton CP, Warwickshire
Chattle Hill Box Structure (CHBS)	CHBS-N1	6 Gorseway, Coleshill, Warwickshire, Birmingham
Attleboro Lane Overbridge (ALO)	ALO-N1	47 Attleboro Lane, Water Orton, Birmingham
	ALO-V1	47 Attleboro Lane, Water Orton, Birmingham
Gilson Embankment (GE)	GE-N1	The Cottage, Gilson Road, Coleshill, Warwickshire
	GE-V1	The Cottage, Gilson Road, Coleshill, Warwickshire
Gilson Drive (GLD)	GLD-N1	Gilson Dr, Coleshill, Birmingham
	GLD-V1	Gilson Dr, Coleshill, Birmingham

Worksite Reference	Measurement Reference	Address
Birmingham Road (BRD)	BRD-N2	New Cottages, Birmingham Road, Coleshill, Birmingham
	BRD-N3	1 New Cottages, Birmingham Road, Coleshill, Birmingham
	BRD-V1	New Cottages, Birmingham Road, Coleshill, Birmingham

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
CLE	CLE-N1	Highfields Cottage, Middleton	Free-field	45.5 (48.4)	46.6 (50.9)	44.8 (51.8)	43.4 (51.7)	40.8 (47.7)	45.4 (49.0)	46.9 (48.3)	45.6 (47.3)	45.3 (51.3)	39.7 (43.3)	45.0 (52.6)	42.2 (57.7)
KMC	KMC-N1	Kingsbury Road, Curdworth CP, Marston	Free-field	59.9 (62.4)	60.4 (65.8)	59.3 (61.0)	58.7 (60.8)	57.9 (62.8)	59.7 (60.9)	60.3 (61.7)	59.2 (60.3)	58.1 (60.8)	56.8 (58.0)	57.6 (60.4)	56.6 (60.1)
	KMC-N2	Kingsbury Road, Curdworth CP, Marston	Free-field	56.2 (59.3)	57.8 (62.4)	56.4 (58.4)	55.8 (58.3)	54.3 (58.2)	56.1 (57.5)	57.4 (57.9)	57.0 (58.0)	55.8 (58.1)	54.7 (59.1)	55.5 (61.0)	54.1 (56.3)
BFCV	BFCV-N2	(north of) Lock Cottage, Marston Lane, Curdworth CP, North Warwickshire	Free-field	66.1 (70.3)	66.3 (70.9)	65.5 (69.0)	65.2 (68.3)	63.5 (69.1)	63.2 (66.4)	64.4 (67.9)	65.9 (67.2)	64.4 (68.9)	63.1 (70.1)	65.7 (70.3)	63.7 (70.4)
MB	MB-N1	Kingsbury Road, Curdworth, Sutton Coldfield	Free-field	56.8 (61.3)	57.9 (61.7)	57.0 (59.6)	56.0 (59.0)	53.6 (60.3)	56.7 (58.2)	57.5 (59.3)	56.6 (58.3)	55.6 (58.5)	51.3 (54.6)	54.4 (57.0)	52.5 (57.4)
FAEU	FAEU-N1	Orchard Cottage, Newlands Lane, Curdworth	Free-field	58.2 (64.2)	59.9 (63.3)	57.9 (62.6)	57.0 (61.0)	55.3 (63.5)	58.0 (61.3)	58.9 (61.6)	58.0 (60.8)	56.2 (60.9)	50.6 (54.9)	53.1 (58.1)	52.1 (60.2)

WOSC	WOSC-N1	53 Watton Lane, Water Orton CP	Free-field	64.2 (68.4)	67.0 (69.4)	65.7 (66.8)	64.2 (68.5)	59.9 (67.1)	61.8 (63.5)	66.2 (66.8)	67.2 (67.8)	65.6 (67.4)	57.6 (59.5)	63.6 (66.7)	56.2 (60.3)
CHBS	CHBS-N1	6 Gorsey Way, Coleshill, Warwickshire, Birmingham	Free-field	64.6 (67.1)	65.4 (66.7)	64.1 (65.8)	62.5 (64.9)	60.4 (66.9)	61.6 (62.8)	64.2 (65.2)	64.3 (65.2)	62.4 (65.2)	57.0 (60.6)	62.1 (65.3)	59.2 (65.3)
ALO	ALO-N1	47 Attleboro Lane, Water Orton	Free-field	56.9 (61.5)	58.9 (62.6)	57.2 (61.8)	56.1 (62.4)	54.0 (61.7)	56.7 (59.0)	58.1 (59.5)	56.2 (58.6)	56.2 (59.3)	52.6 (59.2)	54.7 (60.7)	51.4 (61.8)
GE	GE-N1	The Cottage, Gilson Road, Coleshill, Warwickshire	Free-field	61.6 (65.3)	63.0 (64.4)	62.1 (63.9)	61.0 (62.8)	57.9 (64.4)	59.9 (61.5)	62.3 (63.5)	62.1 (62.3)	60.5 (63.0)	54.3 (57.7)	59.4 (62.0)	56.4 (63.0)
GLD	GLD-N1	10 Gilson Dr, Coleshill, Birmingham	Free-field	59.2 (64.3)	59.7 (63.9)	58.3 (61.7)	57.7 (61.9)	56.0 (62.5)	58.5 (61.3)	60.9 (62.3)	59.7 (62.7)	59.5 (63.3)	53.7 (59.2)	58.9 (65.6)	54.5 (63.8)
BRD	BRD-N2	1, New Cottages, Birmingham Road, Coleshill	Free-field	63.8 (66.2)	64.5 (66.5)	63.4 (64.8)	62.4 (64.6)	59.6 (64.9)	61.7 (63.2)	64.6 (66.1)	64.0 (64.7)	63.0 (64.8)	57.5 (61.3)	62.6 (65.9)	58.6 (64.6)
	BRD-N3	1 New Cottages, Birmingham Road, Coleshill, Birmingham	Free-field	68.9 (70.9)	70.9 (73.6)	69.0 (70.2)	67.6 (69.3)	64.3 (69.8)	65.5 (66.6)	69.9 (71.2)	70.0 (70.6)	68.5 (70.4)	62.6 (66.3)	68.1 (72.0)	63.5 (69.5)

2.1.2 Table 4 presents a summary of the measured vibration levels at the 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
BFCV - Birmingham & Fazeley Canal Viaduct	BFCV-V4	(north of) Lock Cottage, Marston Lane, Curdworth CP, North Warwickshire	2.76 (Y-axis)
MB - Marston Box	MB-V1	Kingsbury Road, Curdworth, Sutton Coldfield, West Midland	0.37 (X-axis)
FAEU - Orchard Cottage	FAEU-V1	Orchard Cottage, Newlands Lane, Curdworth, Warwickshire	0.60 (Y-axis)
WOSC - Water Orton South Compound	WOSC-V1	53 Watton Lane, Water Orton CP, Warwickshire	1.64 (X-axis)
ALO - Attleboro Lane Overbridge	ALO-V1	47 Attleboro Lane, Water Orton, Birmingham	1.60 (Z-axis)
GE - Gilson Embankment	GE-V1	The Cottage, Gilson Road, Coleshill, Warwickshire	0.47 (X-axis)
GLD - Gilson Drive	GLD-V1	10 Gilson Dr, Coleshill, Birmingham	1.20 (Z-axis)
BRD - Birmingham Road	BRD-V1	1, New Cottages, Birmingham Road, Coleshill, Birmingham	3.73 (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 LOAEL and SOAEL

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

- 2.2.2 The significant observed adverse effect level (SOAEL) is defined in the 'Planning Practice Guidance – Noise' as the level above which "noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area."
- 2.2.3 HS2 Phase One Information Paper E23: Control of Construction Noise and Vibration sets out the LOAELs and SOAELs for construction noise.
- 2.2.4 Where reported construction noise levels exceed the LOAEL and SOAEL, relevant periods will be identified. Summary statistics to evaluate ongoing qualification for noise insulation and temporary rehousing are also presented where relevant.
- 2.2.5 Table 5 presents a summary of recorded exceedances of the LOAEL and SOAEL at each measurement location over the reporting period, including the number of exceedances during each time period.

Table 5: Summary of Exceedances of LOAEL and SOAEL

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
CLE	CLE-N1*	Highfields Cottage, Middleton	All days	All periods	No exceedances	No exceedances
KMC	KMC-N1*	Wheatley House, Kingsbury Road, Sutton Coldfield	All days	All periods	No exceedances	No exceedances
	KMC-N2	Wheatley House, Kingsbury Road, Sutton Coldfield	All days	All periods	No exceedances	No exceedances
BFCV	BFCV-N2	(north of) Lock Cottage, Marston Lane, Curdworth CP	All days	All periods	No exceedances	No exceedances

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
MB	MB-N1*	Kingsbury Road, Curdworth	Weekday	2200-0700	1	No exceedances
FAEU	FAEU-N1	Orchard Cottage, Newlands Lane, Curdworth	Weekday	0800-1800	2	No exceedances
WOSC	WOSC-N1	53 Watton Lane, Water Orton CP, Warwickshire	All days	All periods	No exceedances	No exceedances
CHBS	CHBS-N1*	6 Gorsey Way, Coleshill, Warwickshire, Birmingham	Weekday	0800-1800	4	No exceedances
ALO	ALO-N1	47 Attleboro Lane, Water Orton, Birmingham	Weekday	0800-1800	2	No exceedances
GE	GE-N1	(west of) 47 Attleboro Lane, Water Orton, Birmingham	All days	All periods	No exceedances	No exceedances
GLD	GLD-N1	Gilson Dr, Coleshill, Birmingham	Weekday	0800-1800	1	No exceedances
BRD	BRD-N2	New Cottages, Birmingham Road, Coleshill, Birmingham	All days	All periods	Not applicable [#]	Not applicable [#]
	BRD-N3	1 New Cottages, Birmingham Road, Coleshill, Birmingham	All days	All periods	Not applicable [#]	Not applicable [#]

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

The baseline levels are above the LOAEL preventing accurate construction noise assessment.

2.2.6 Ten (10) exceedances of the LOAEL were recorded during weekday core working hours at the monitoring locations ref.: FAEU-N1, ALO-N1, CHBS-N1 and GLD-N1.

No exceedances of SOAEL were recorded due to HS2 construction works during December 2022.

2.3 Exceedances of Trigger Level

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

Table 6: Summary of Exceedances of Trigger Levels

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

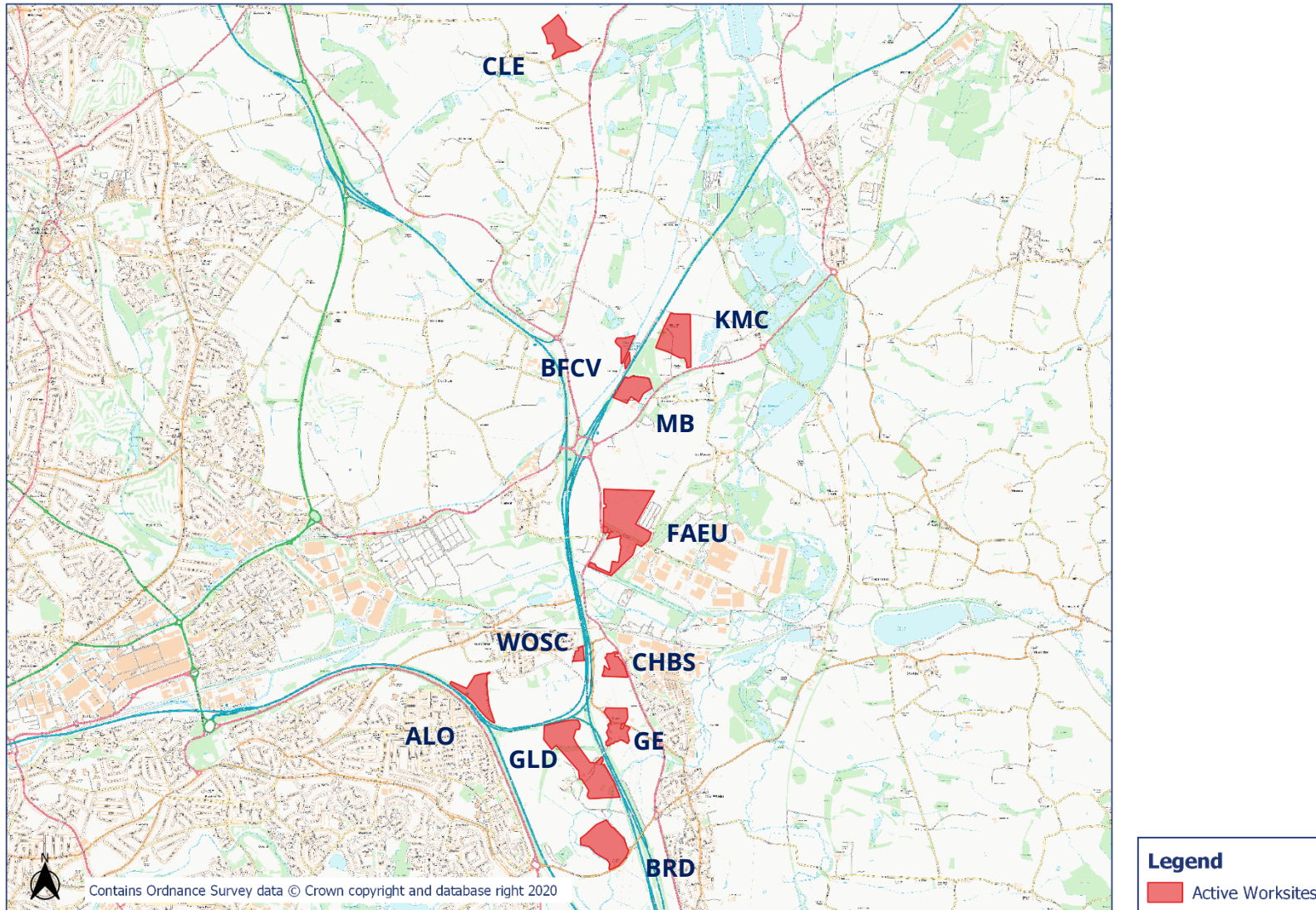
2.4 Complaints

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

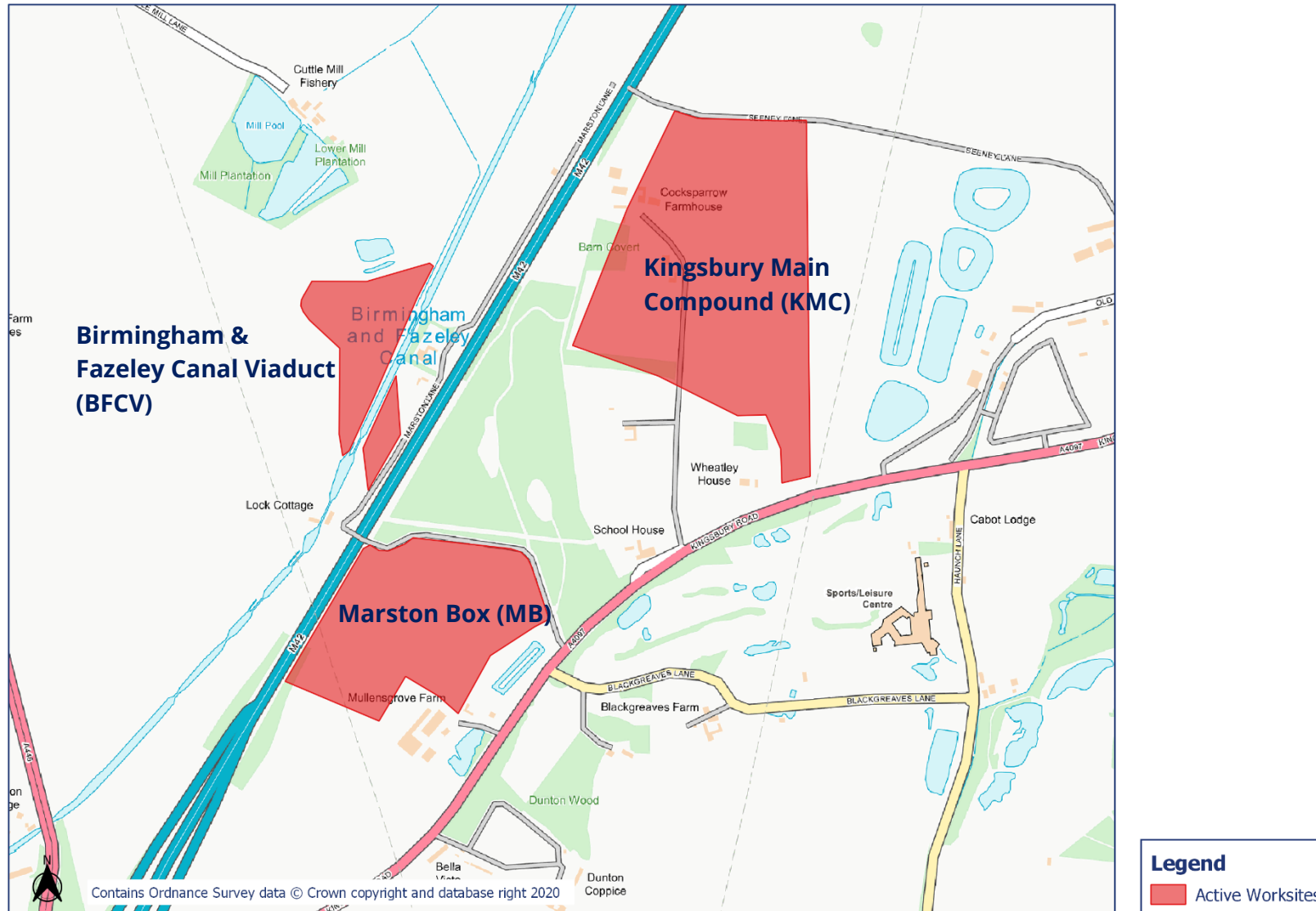
Table 7: Summary of Complaints

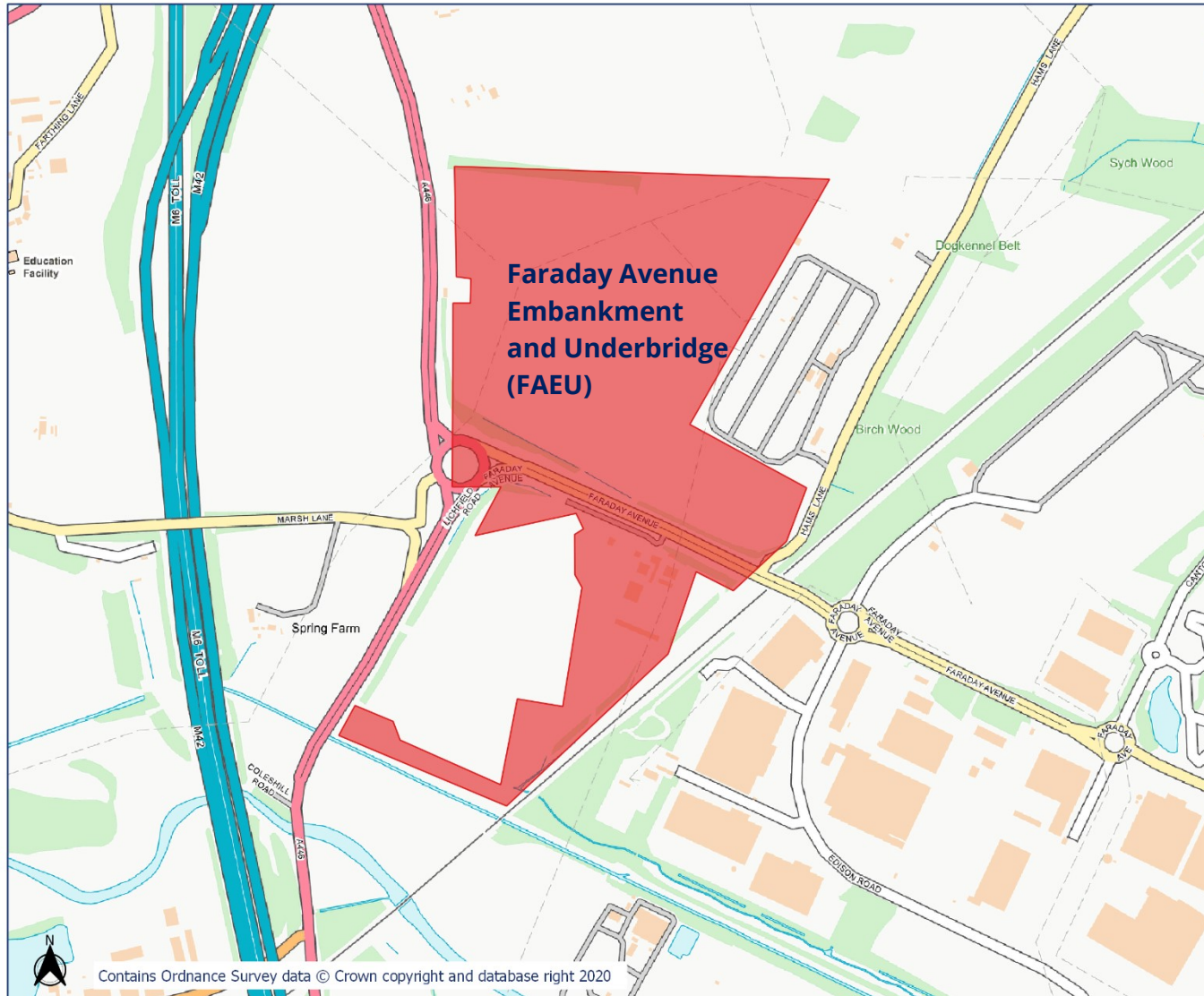
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-22-44203-C	MB	Complaint due to noise disturbance during early hours.	Investigation showed that noise disturbance was caused around 5.30am. The source of noise was on-site loudspeaker.	The investigation results have been shared with the stakeholder. The site team has been informed to be mindful of the use of loudspeaker outside the core working hours.
HS2-22-87609-E-C	GLD	Complaint due to noise disturbance from various machine operating near the property.	Investigation showed that noise disturbance was caused due to generator operating on-site.	The generator operation times have been amended to be later in the morning. The current position of the generator does not permit an acoustic barrier and hence the contractor shall investigate if the generator can be moved.

Appendix A Site Locations



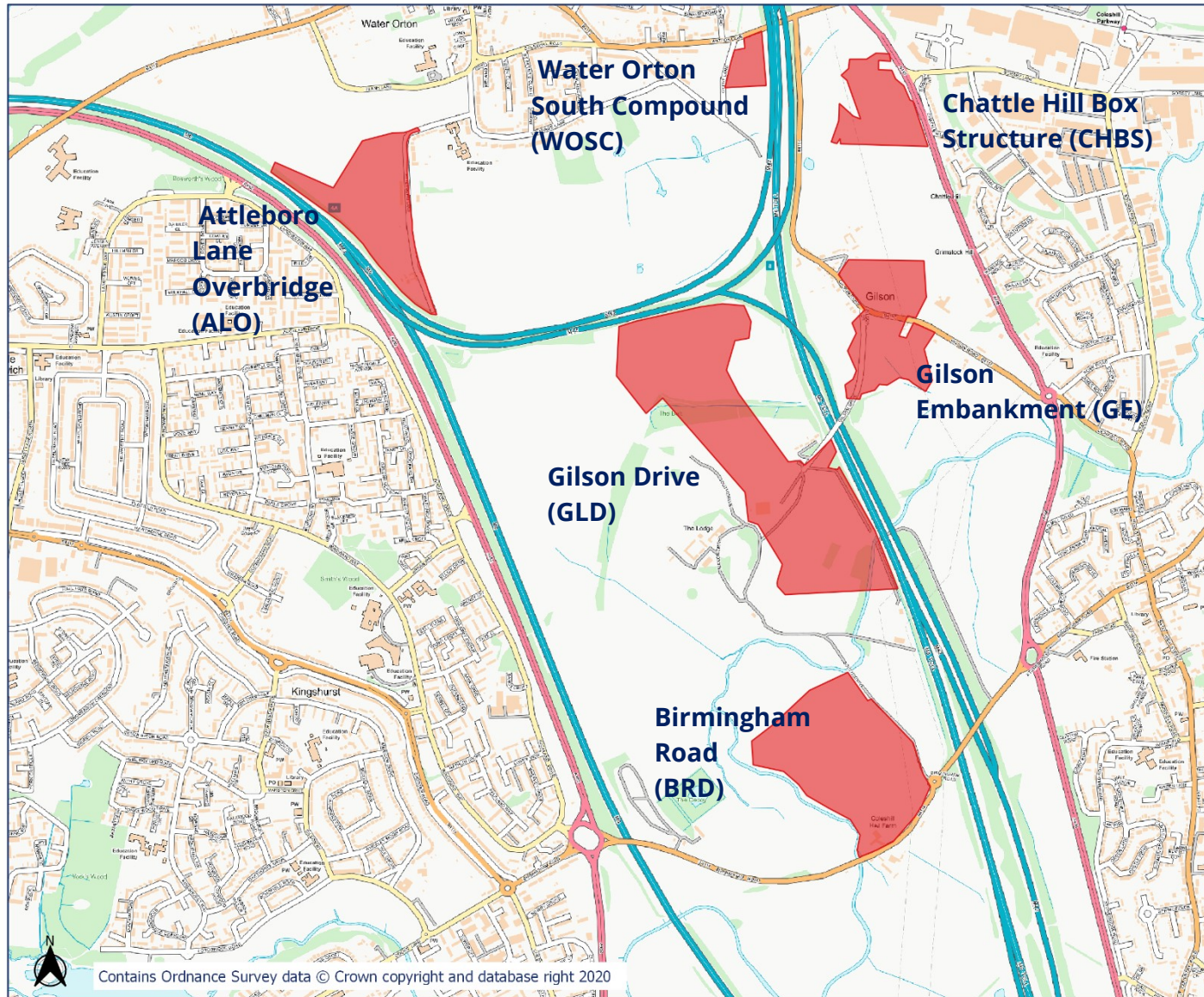




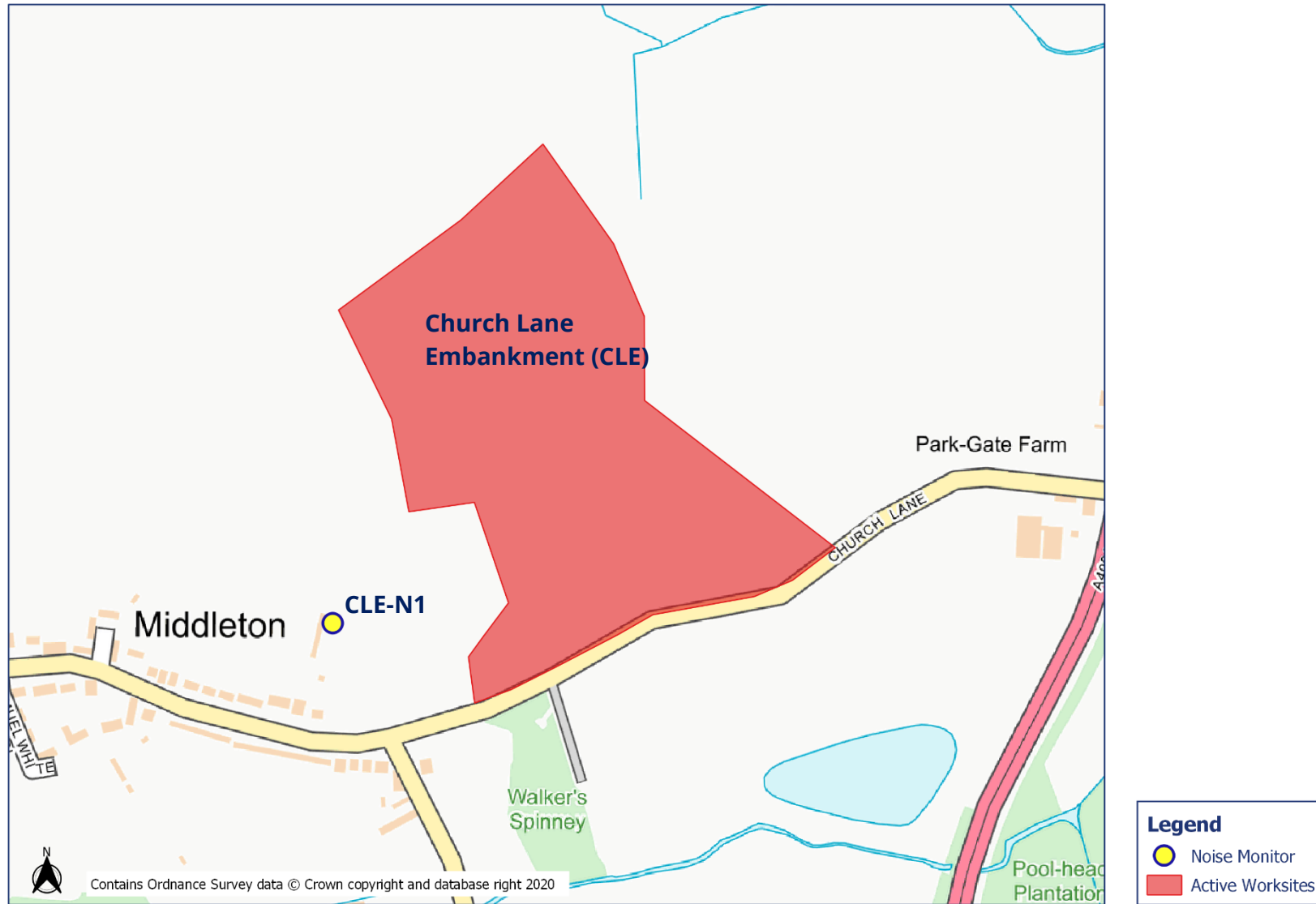


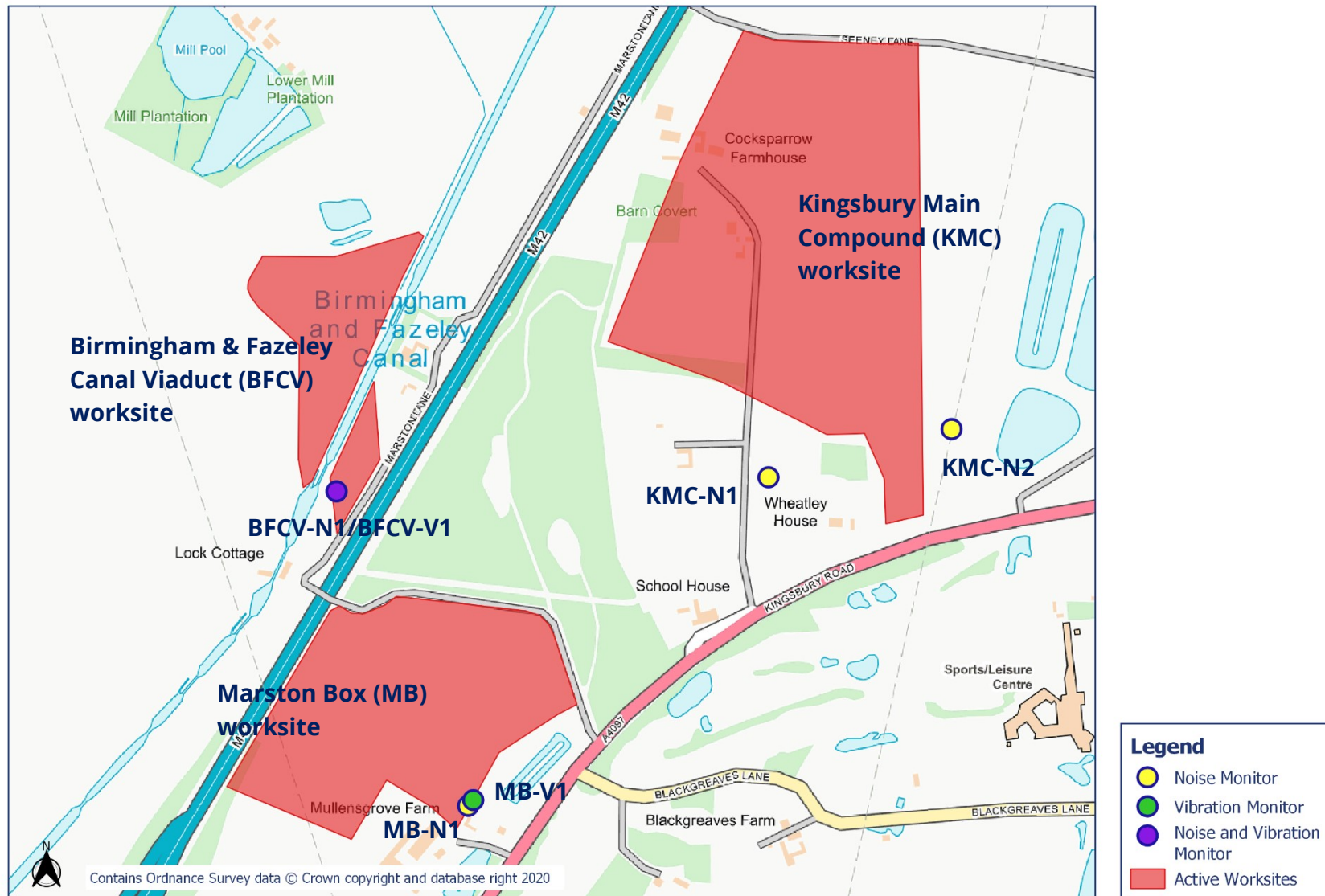
HS2

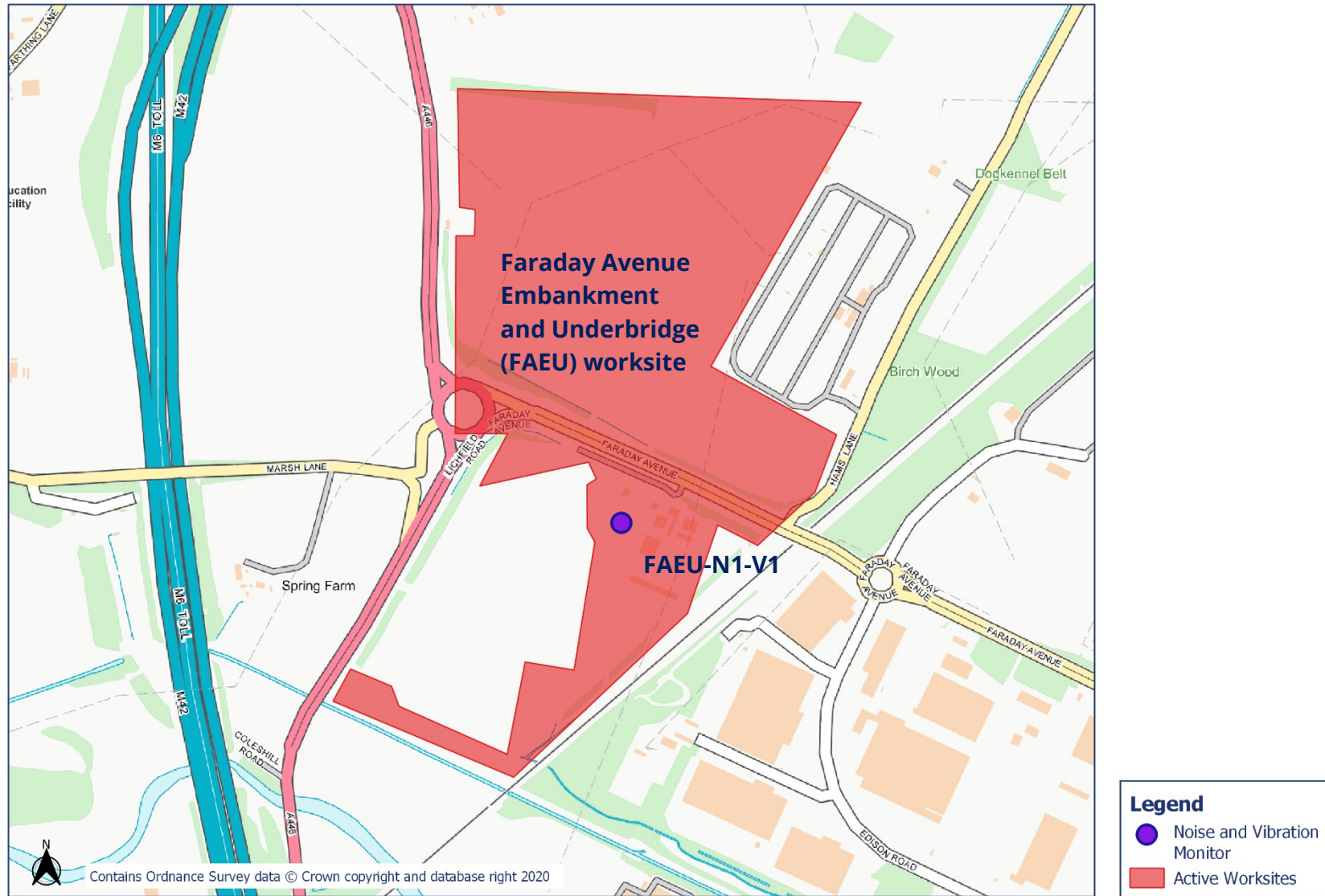
Worksite Identification Plan - 4

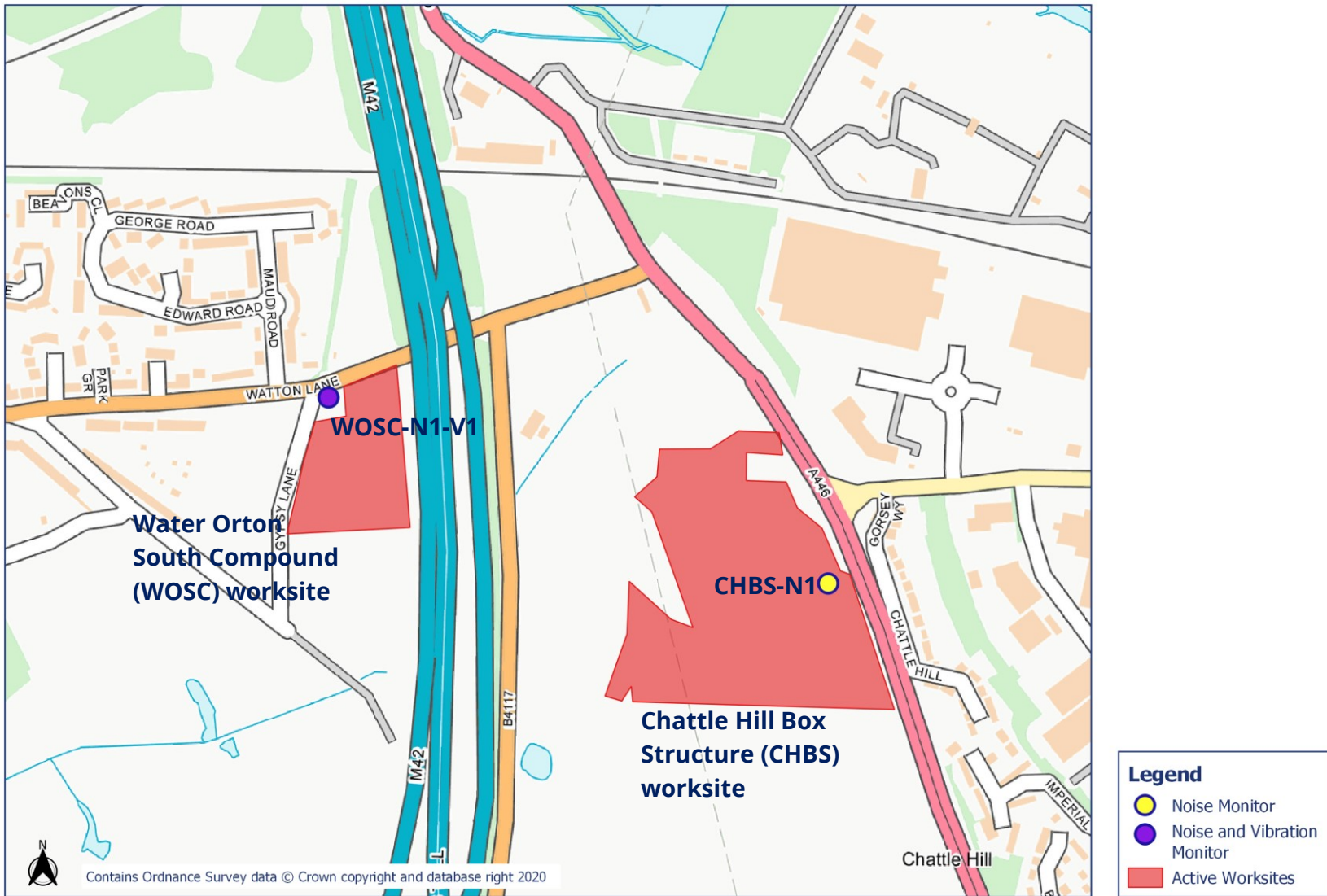


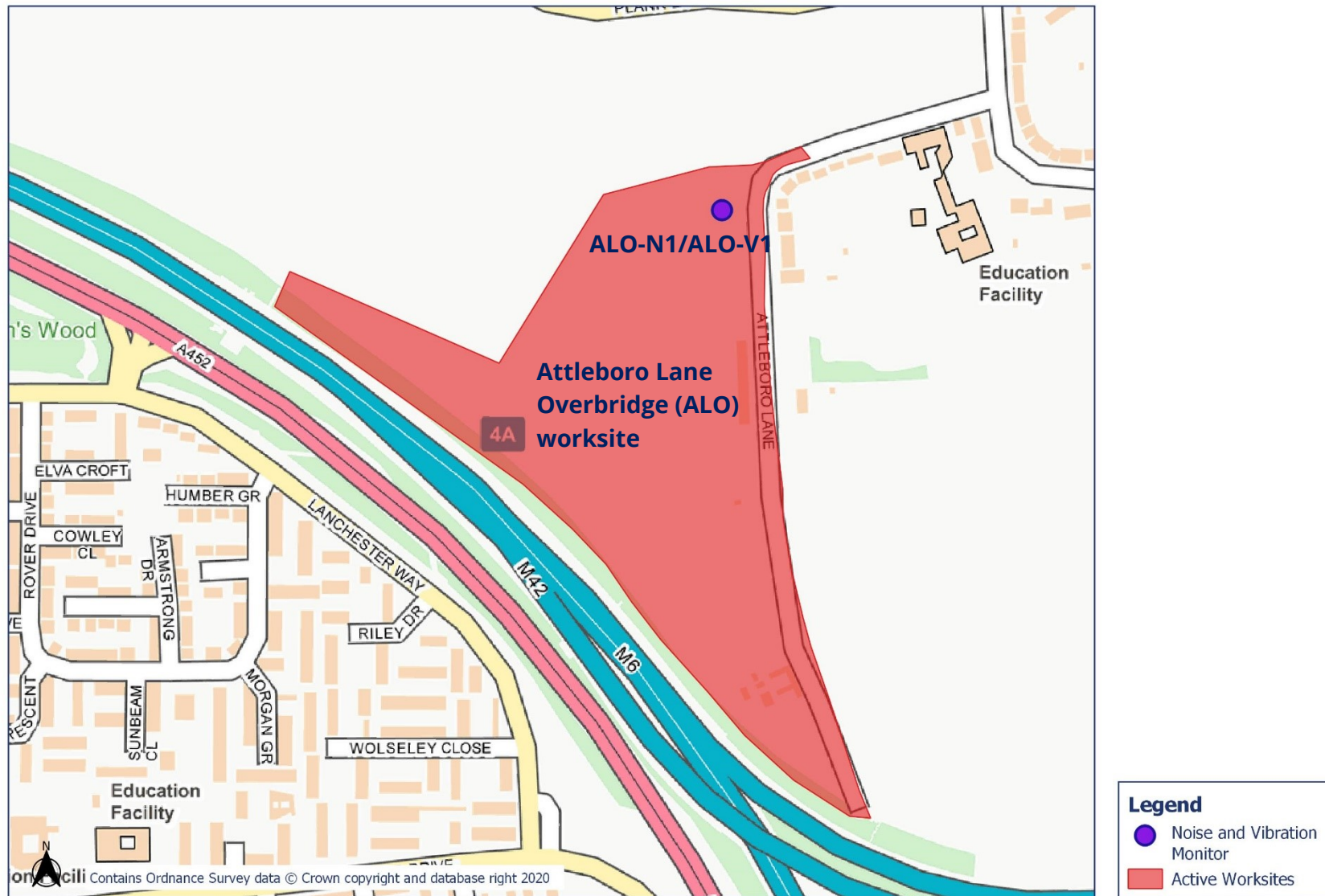
Appendix B Monitoring Locations

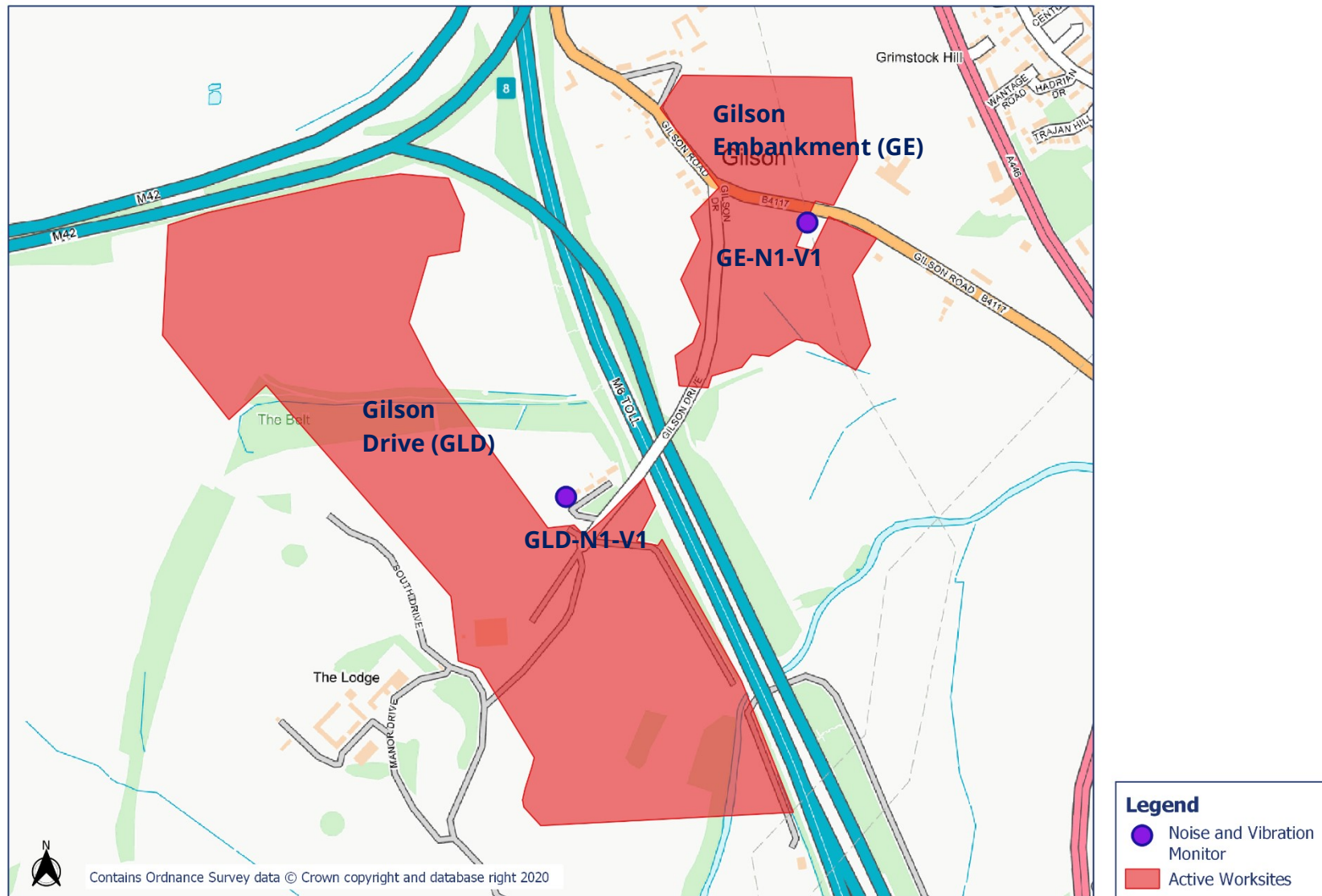


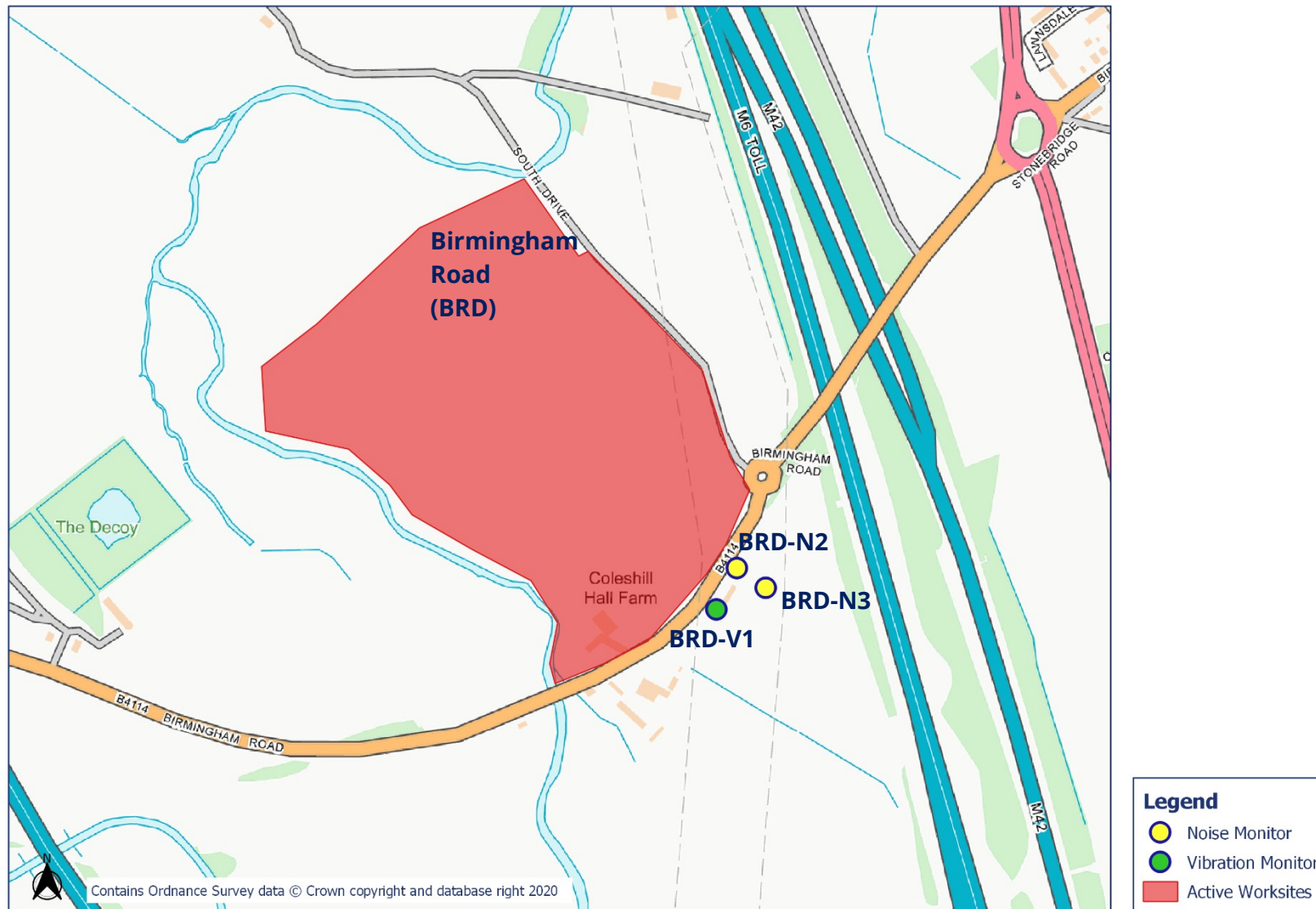










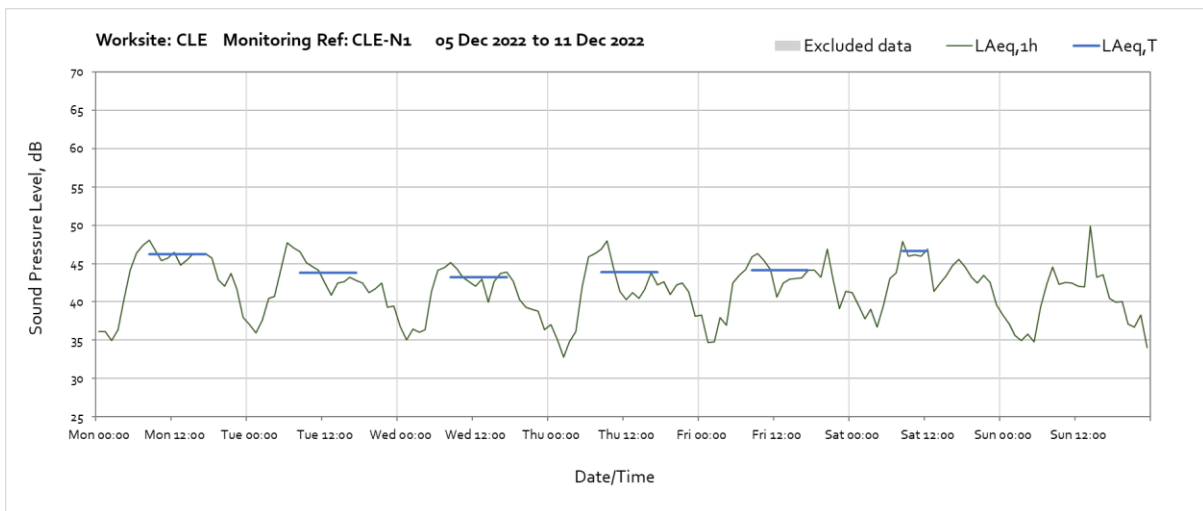
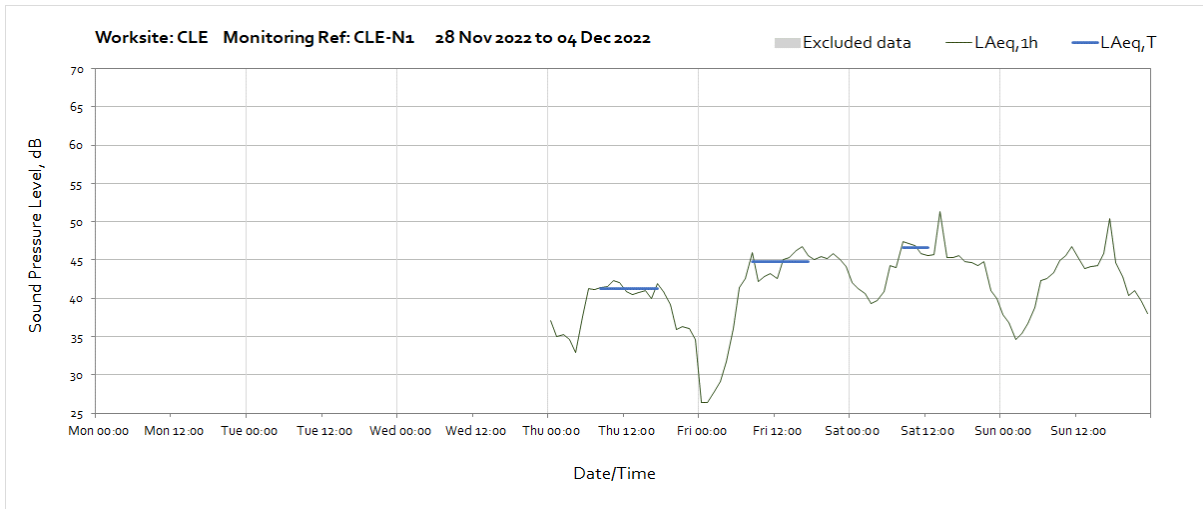


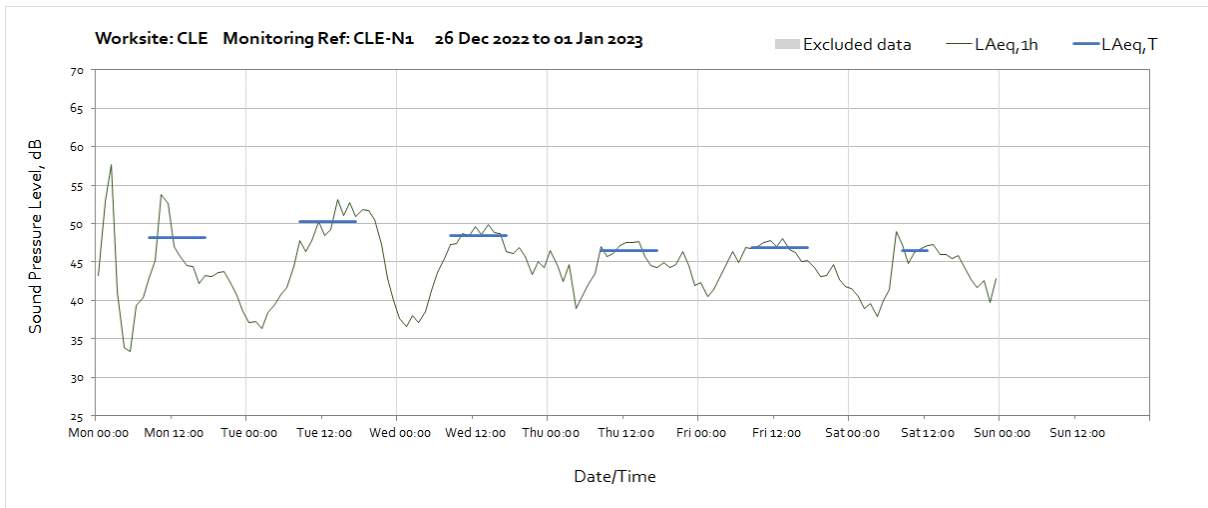
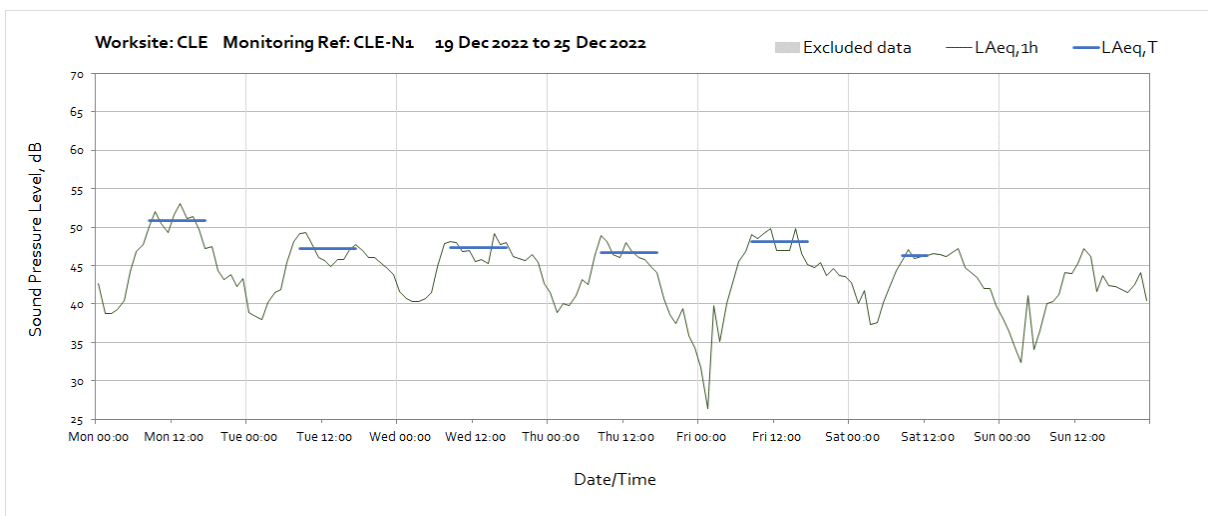
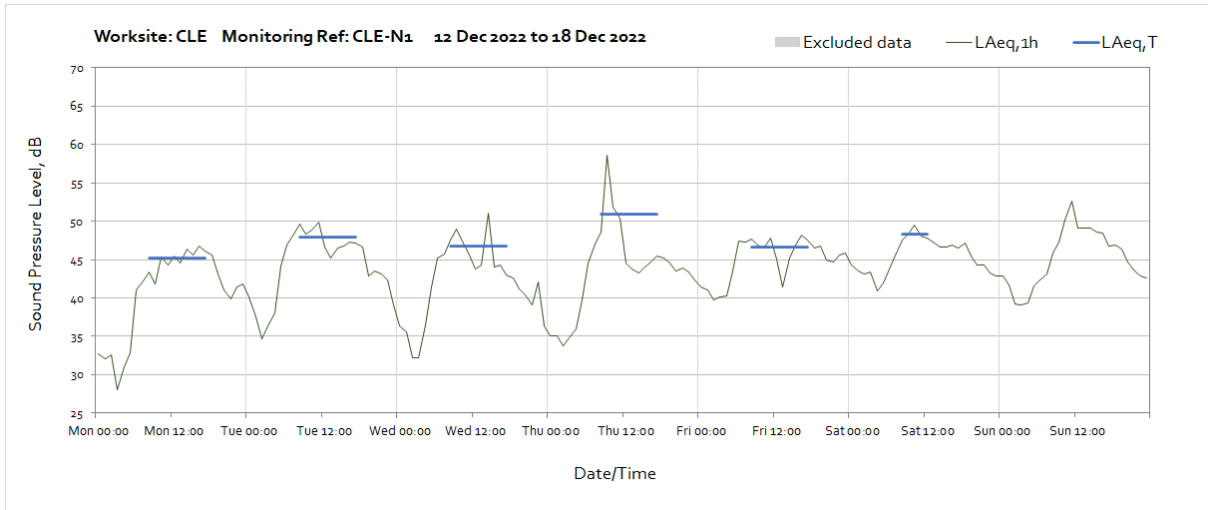
Appendix C Data

Noise

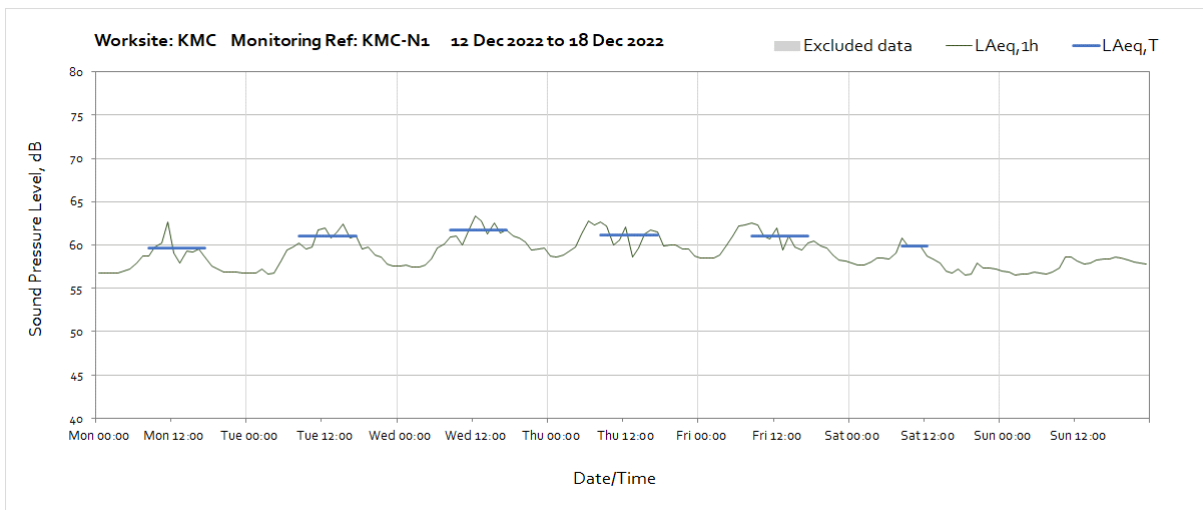
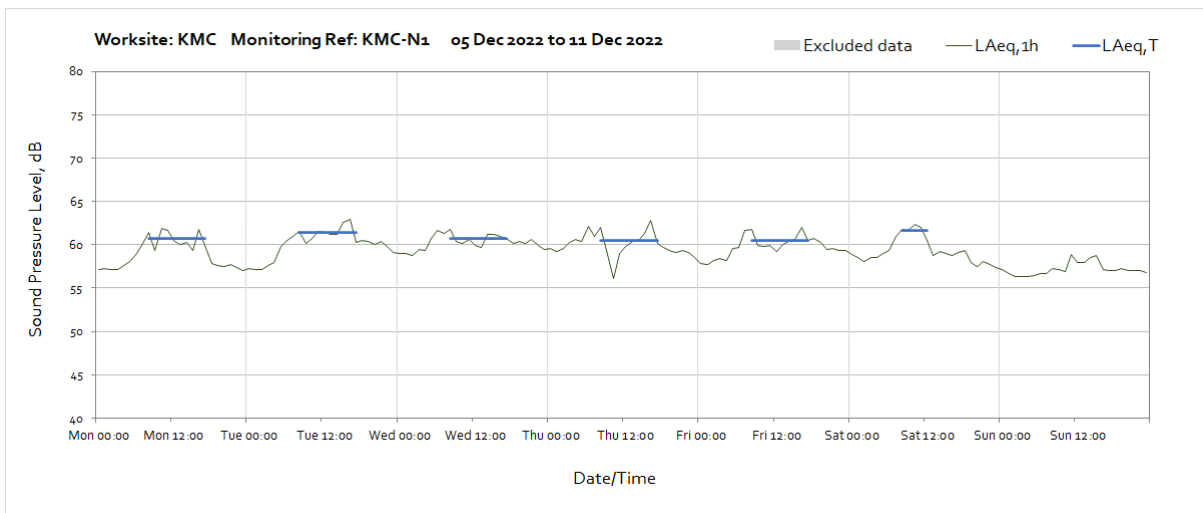
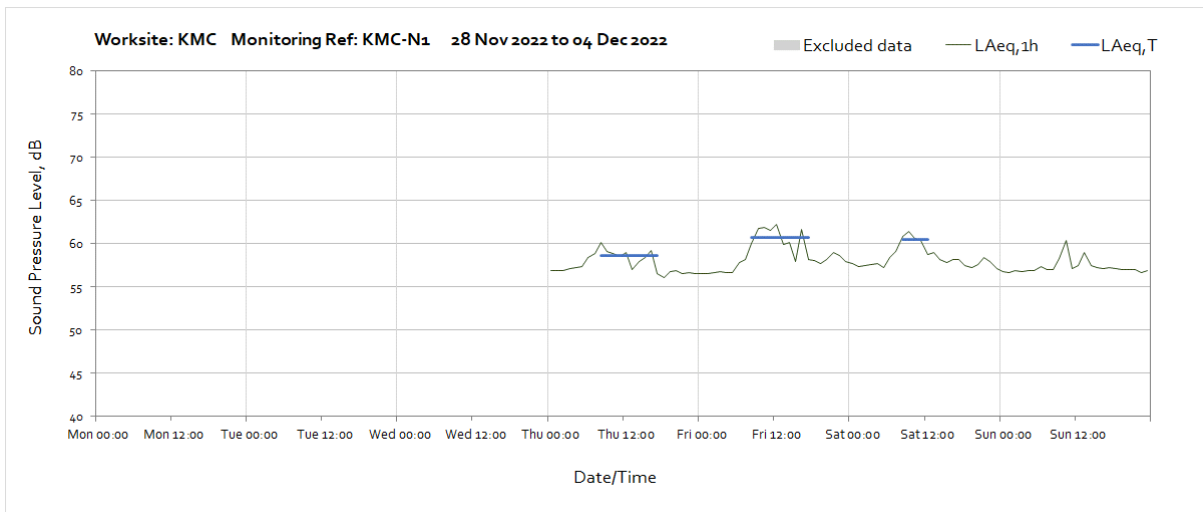
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have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

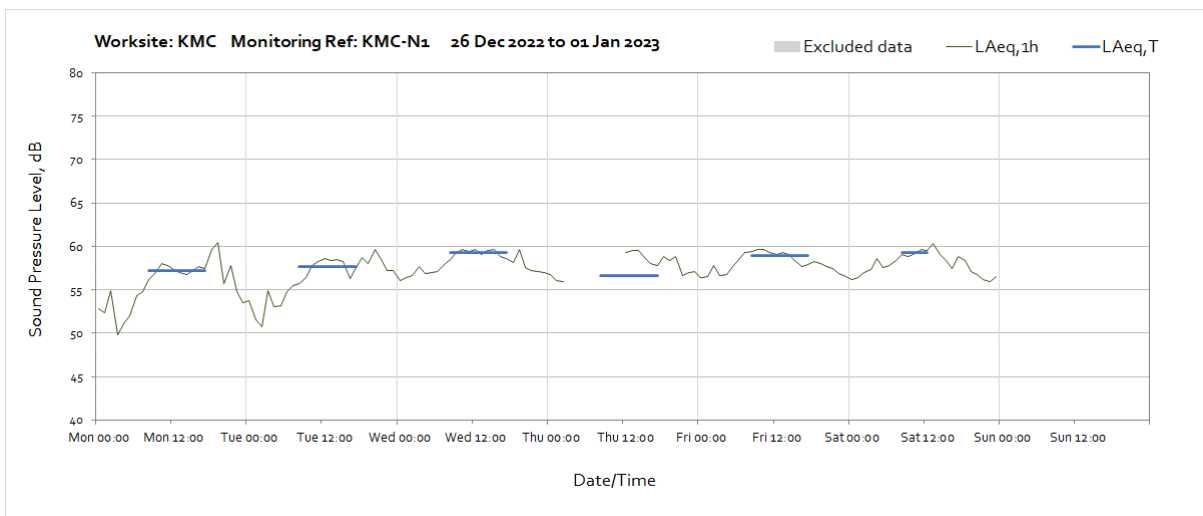
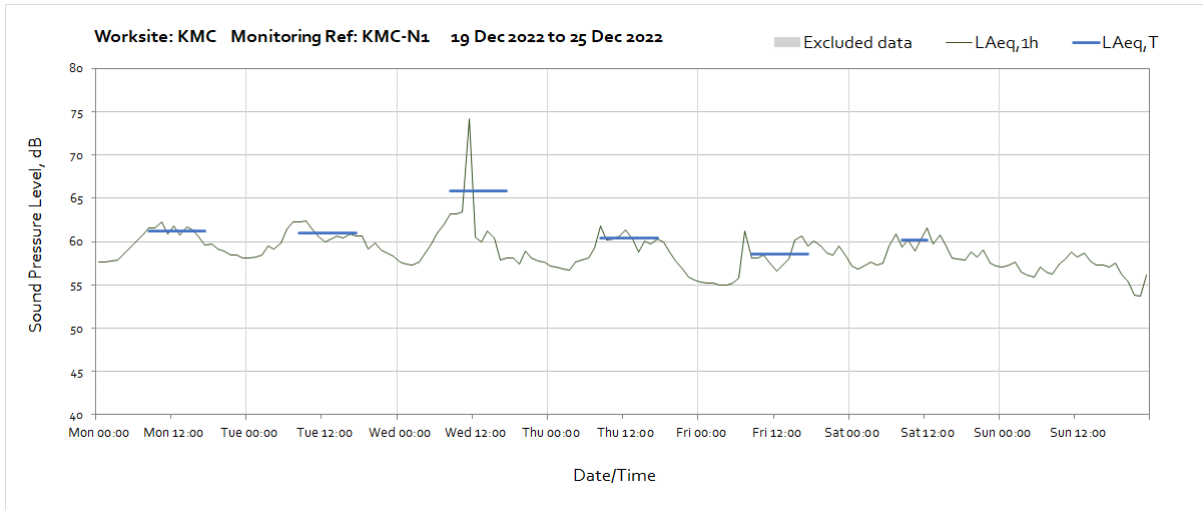
Worksite: CLE – Monitoring Ref: CLE-N1





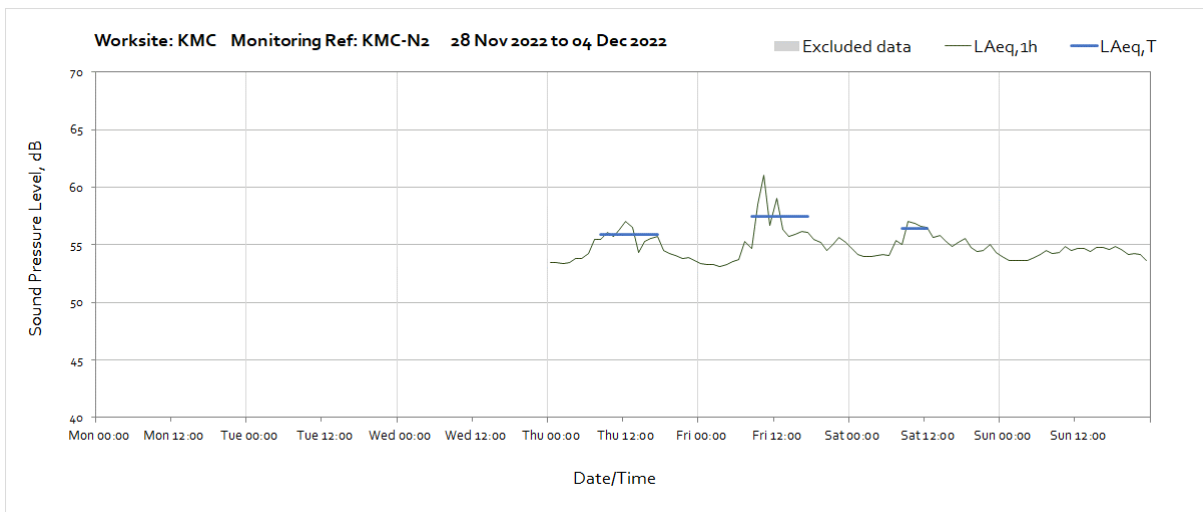
Worksite: KMC – Monitoring Ref: KMC-N1

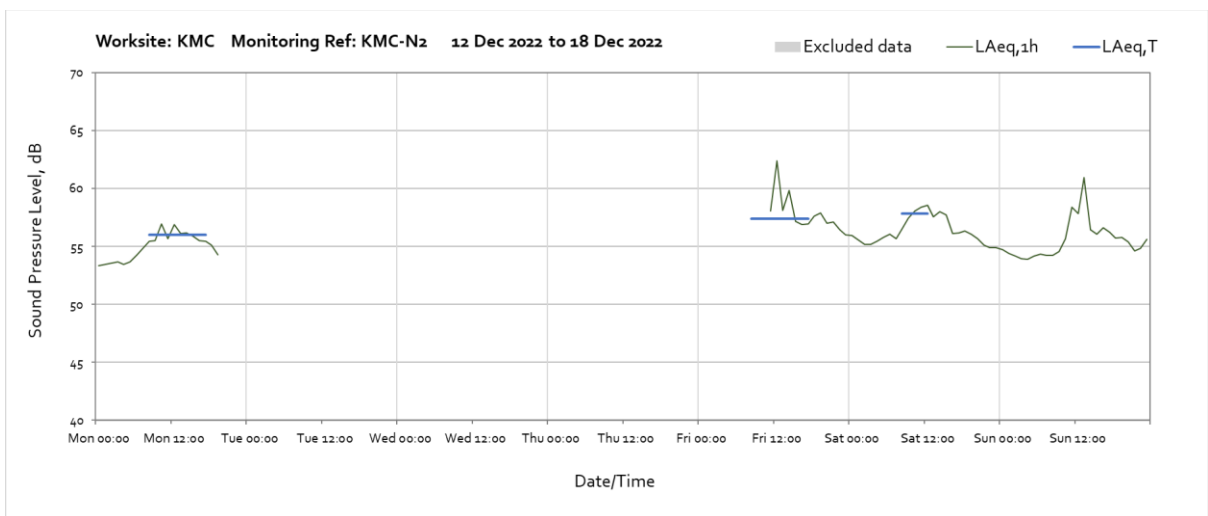
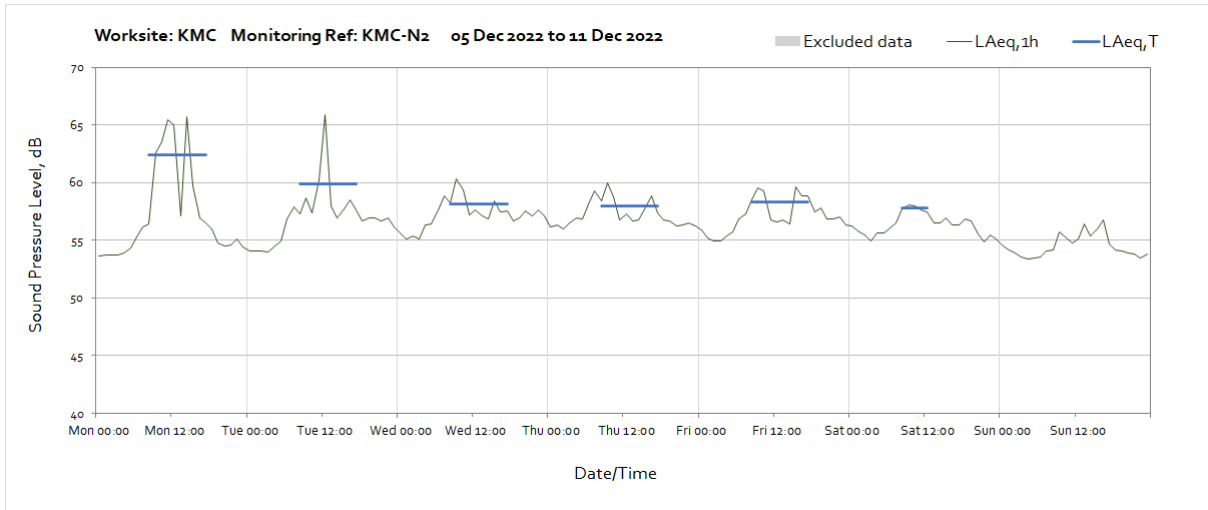




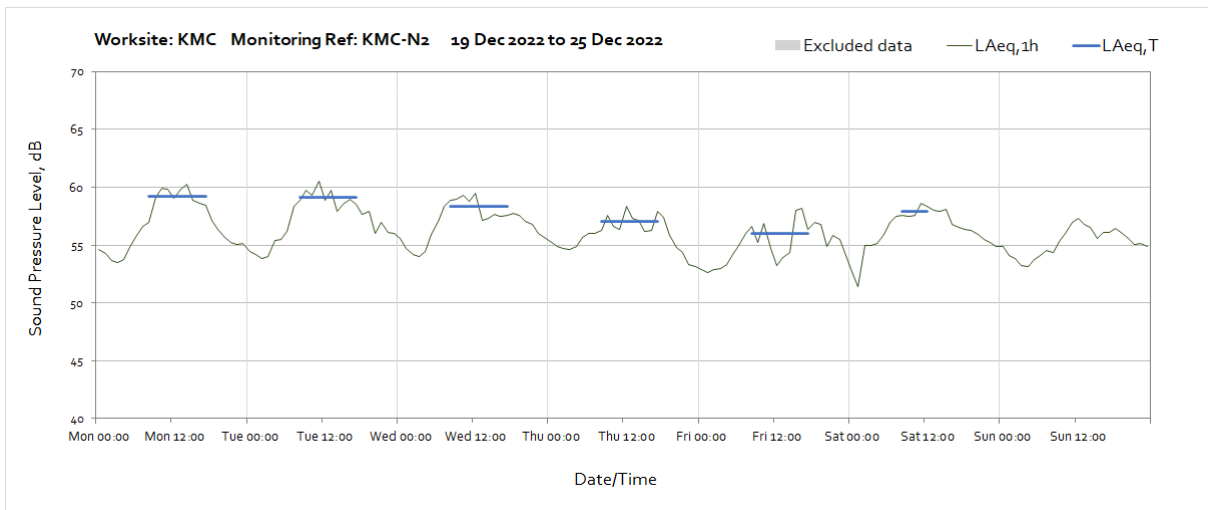
Note: Missing data between 03:00 and 12:00 on Thursday 29th December was due to software issue which is under investigation.

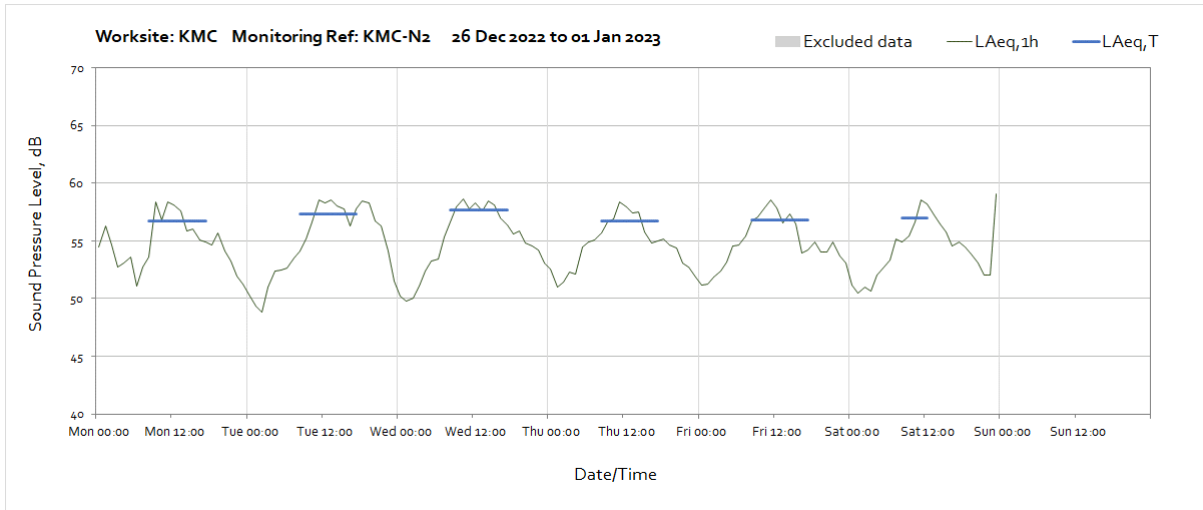
Worksite: KMC - Monitoring Ref: KMC-N2



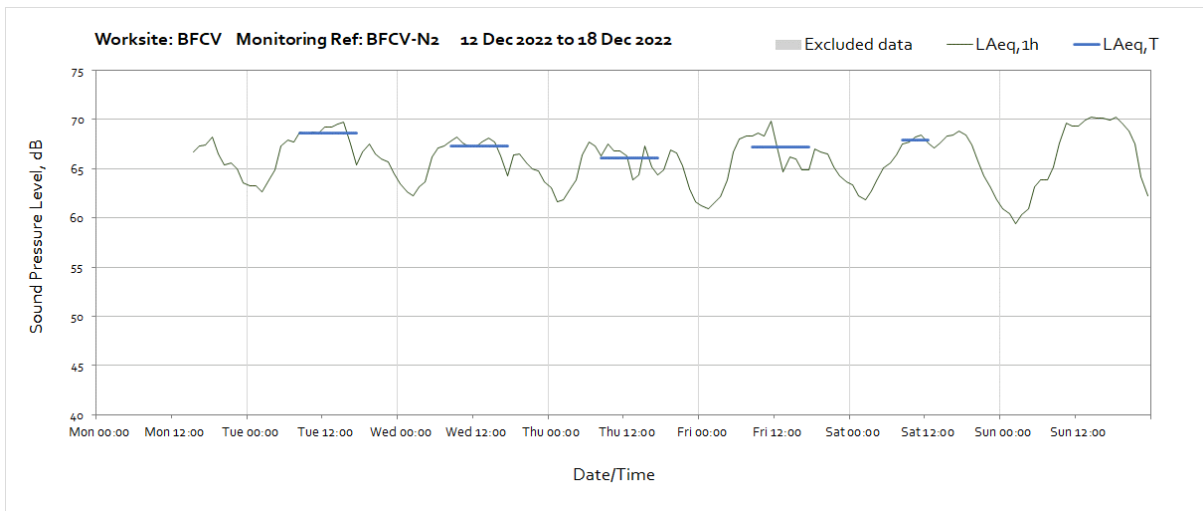


Note: Missing data between 20:00 on Monday 12th December and 11:00 on Friday 16th December due to data storage problem.

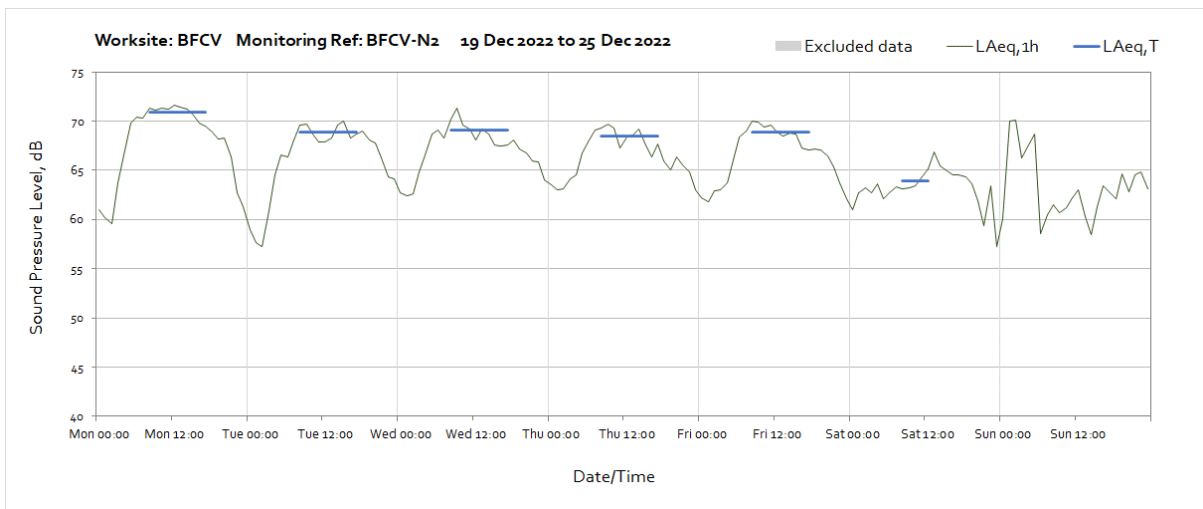




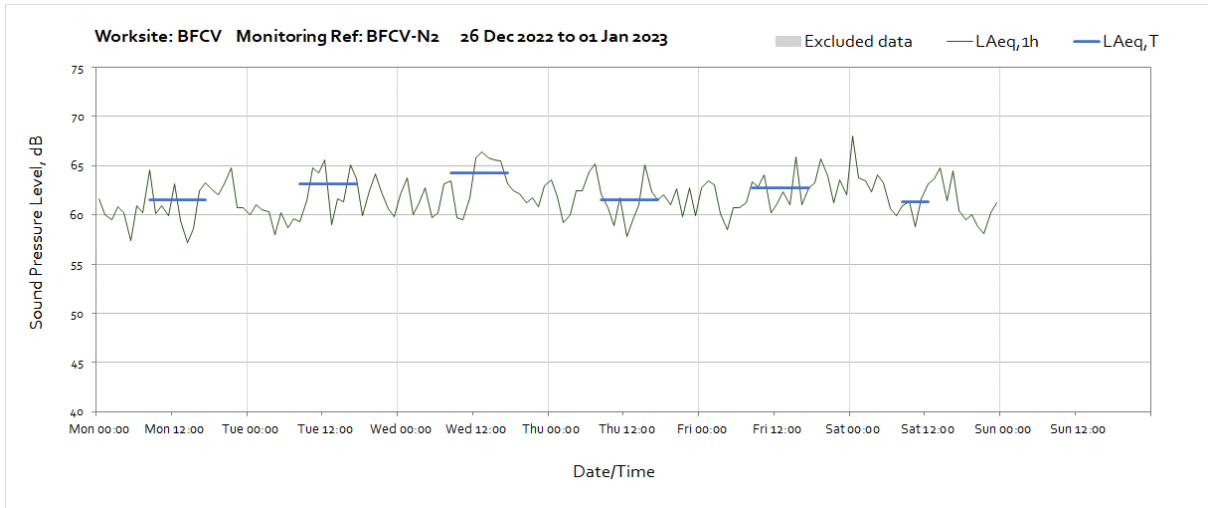
Worksite: BFCV – Monitoring Ref: BFCV-N2



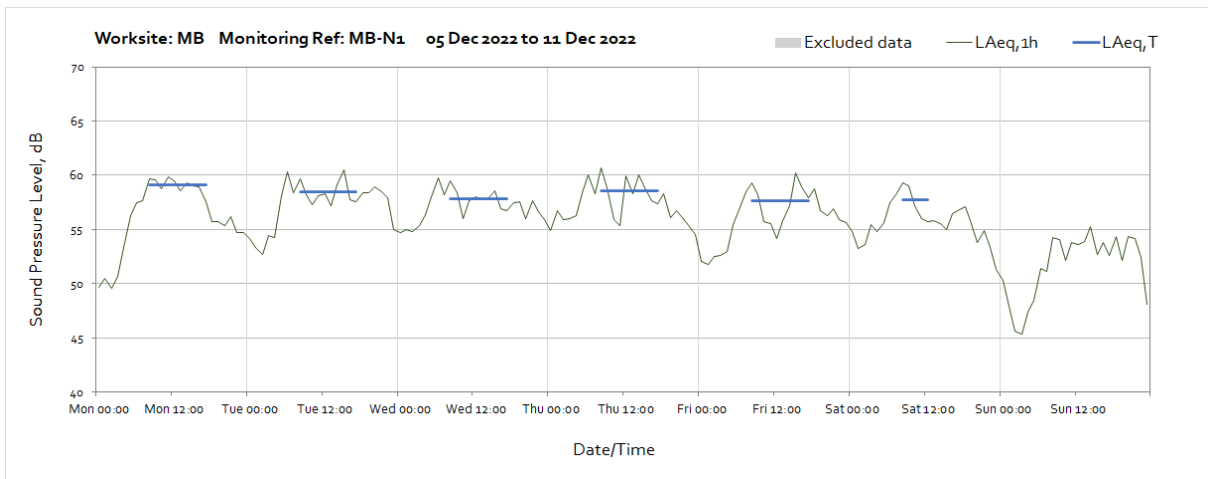
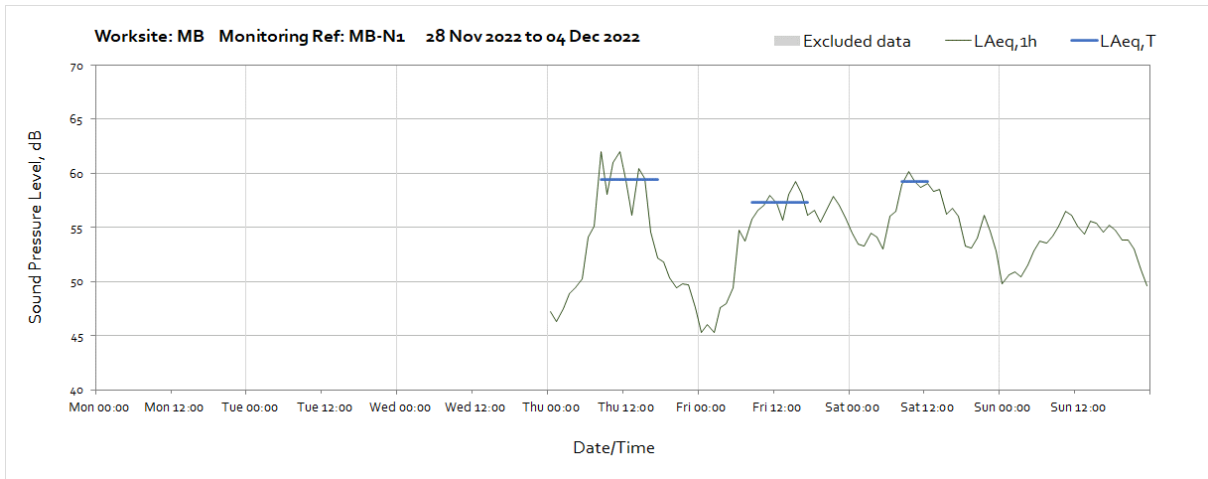
Note: Missing data between 00:00 on Thursday 1st December and 15:00 on Monday 12th December was due relocation of monitor.

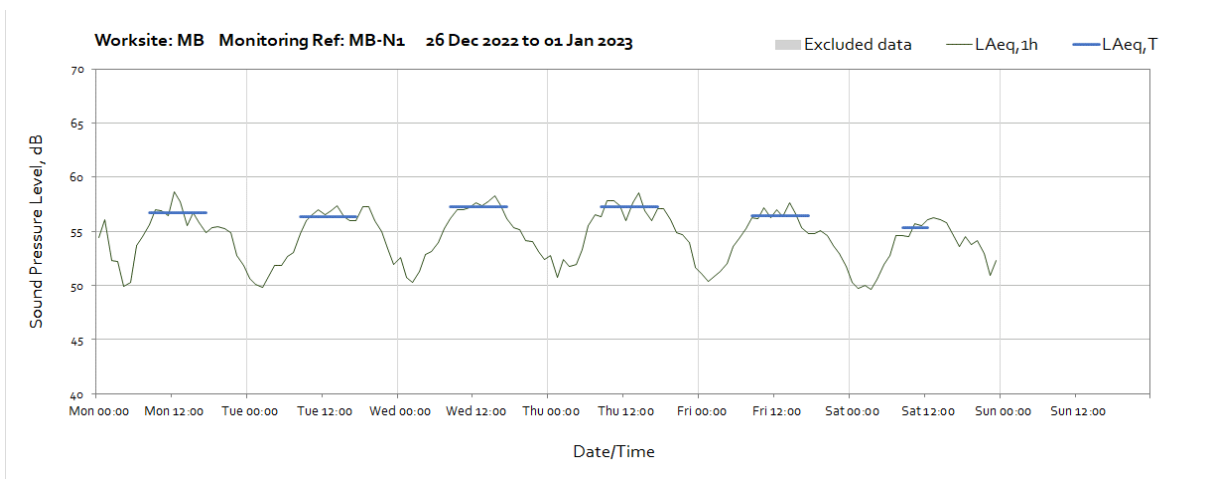
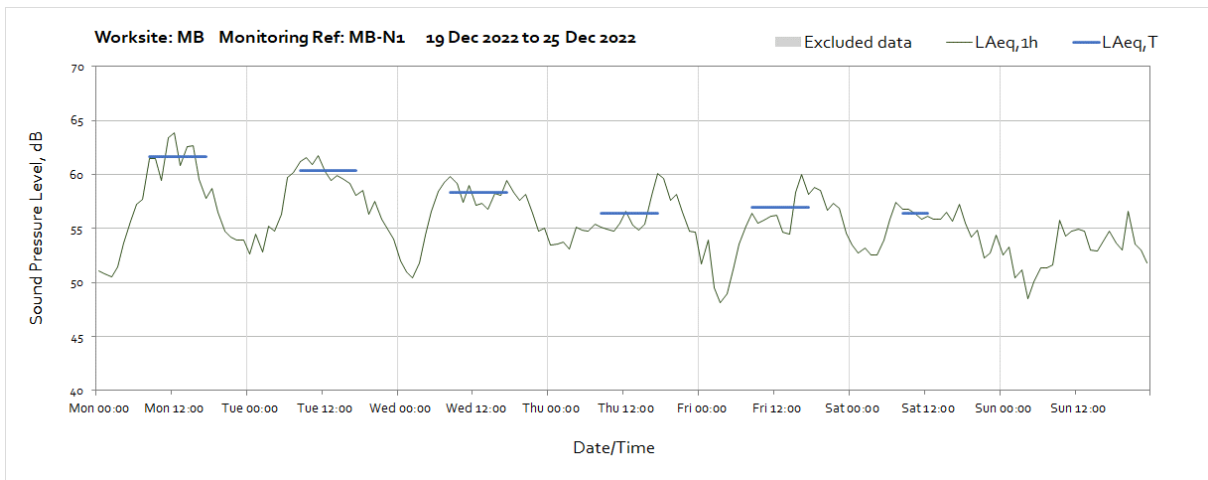
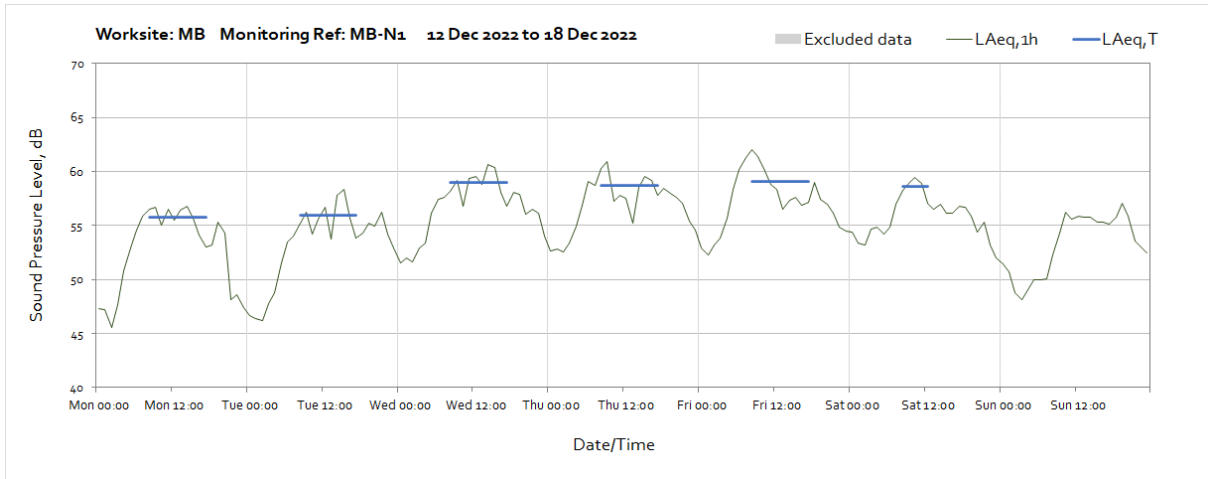


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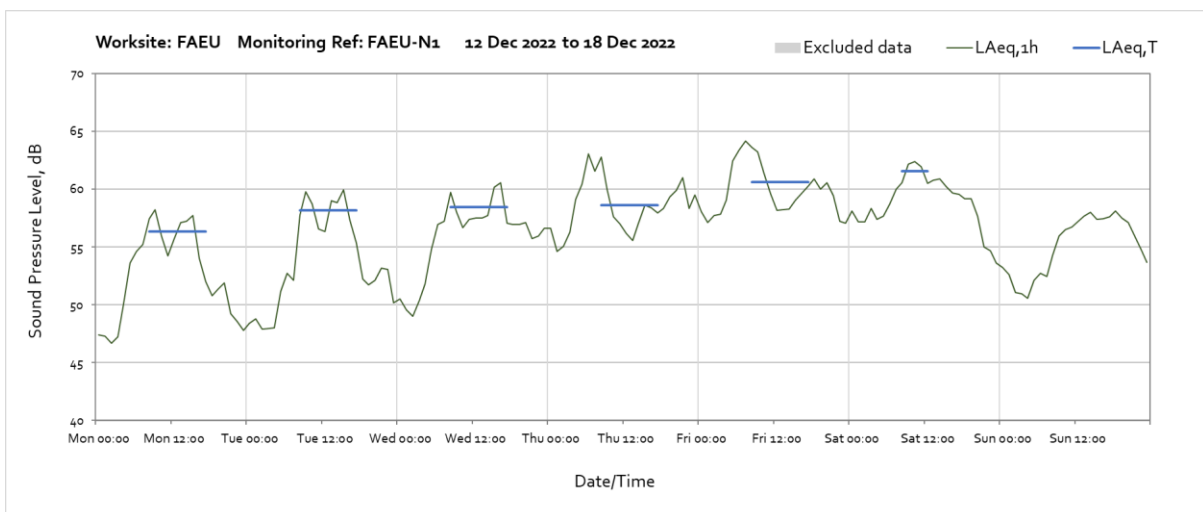
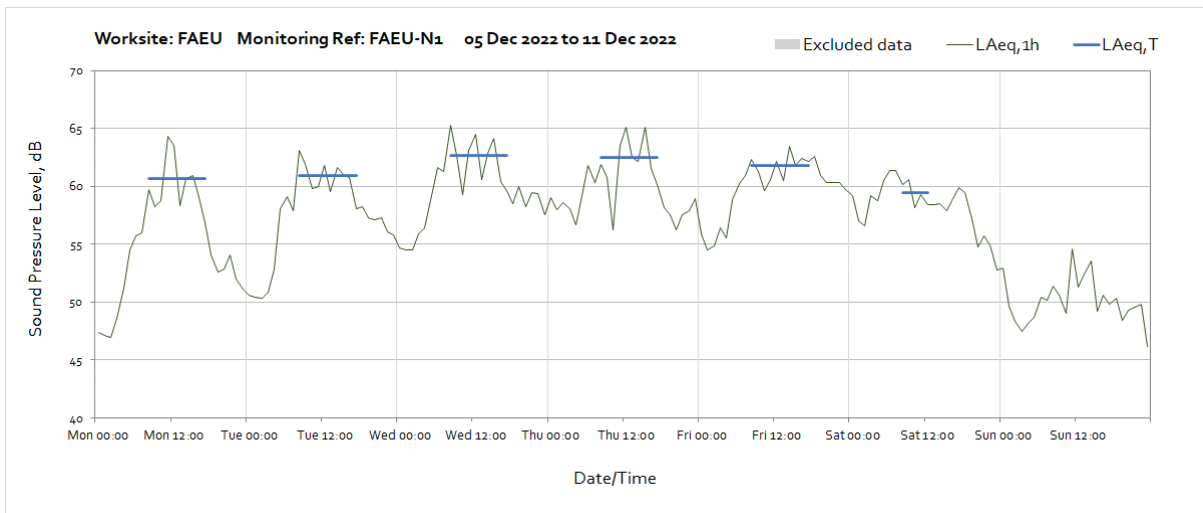
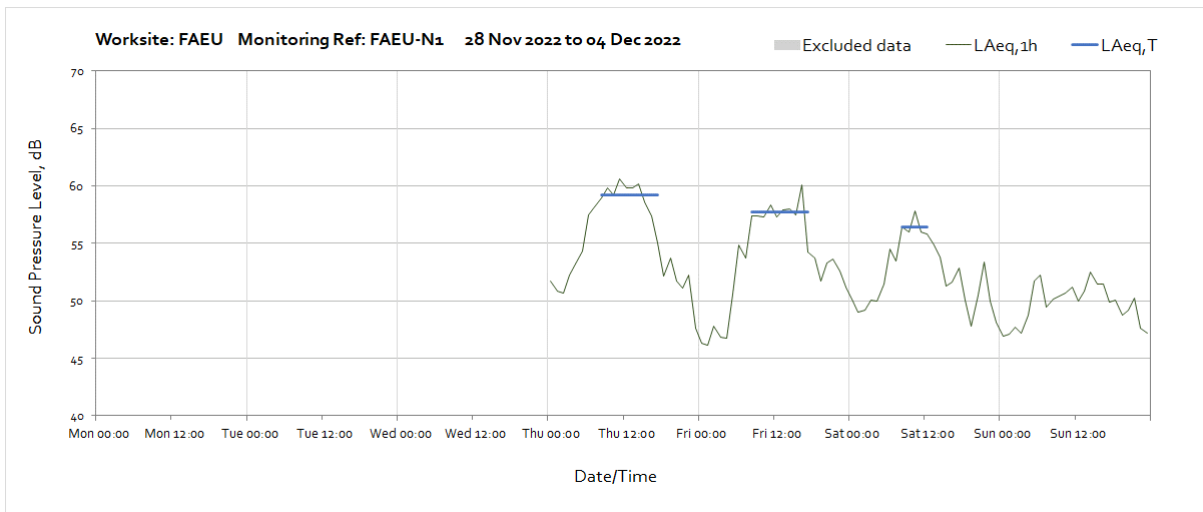


Worksite: MB – Monitoring Ref: MB-N1

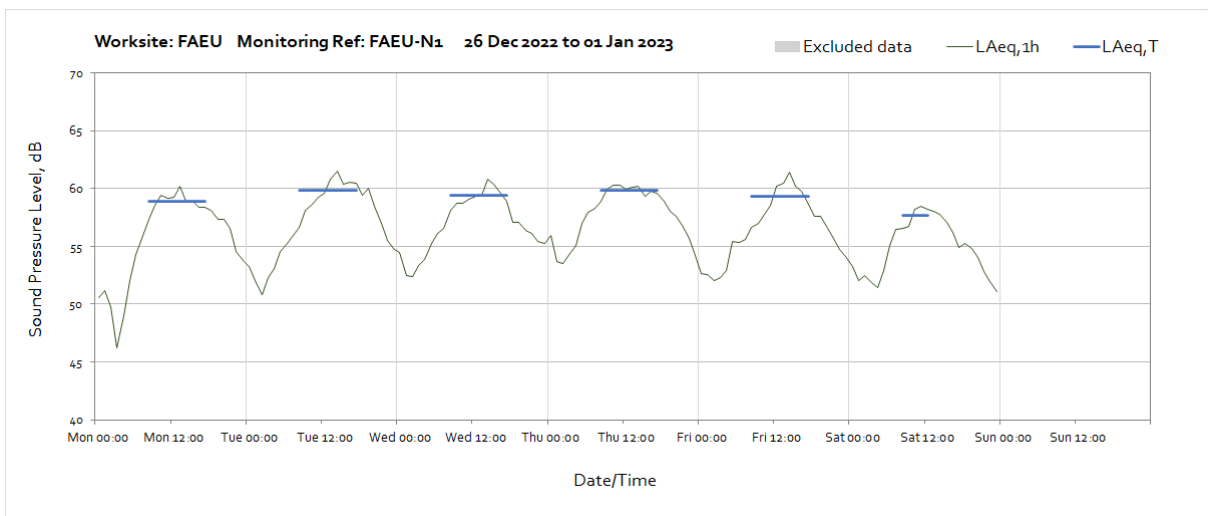
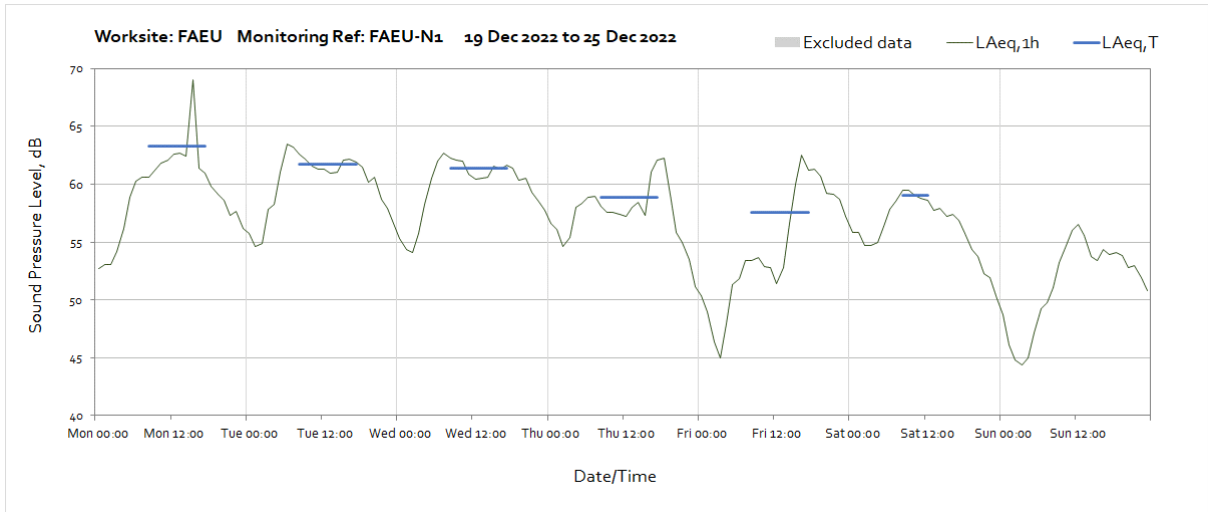




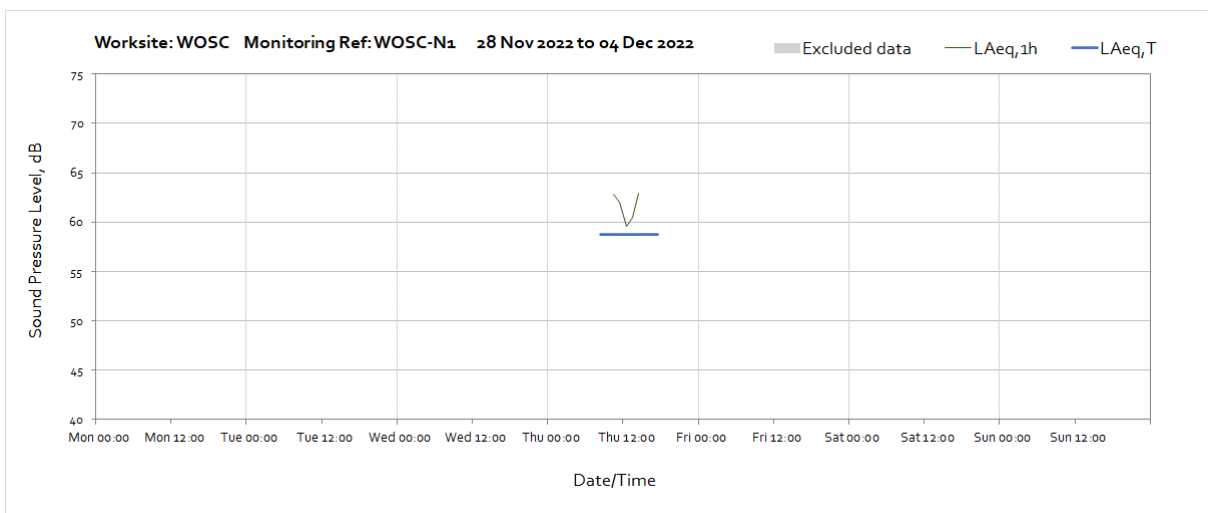
Worksite: FAEU – Monitoring Ref: FAEU-N1



OFFICIAL

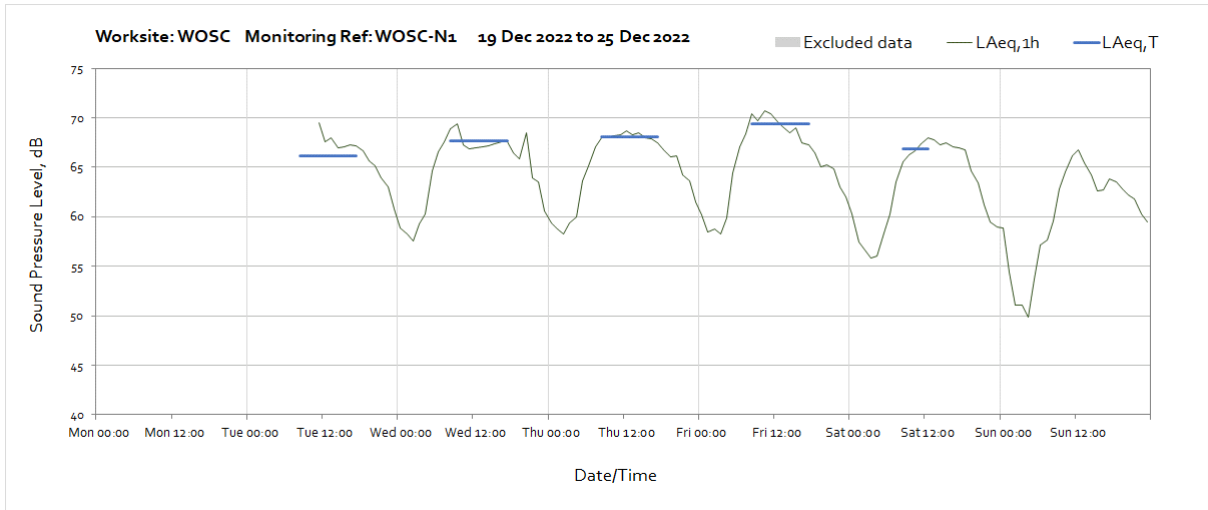


Worksite: WOSC – Monitoring Ref: WOSC-N1

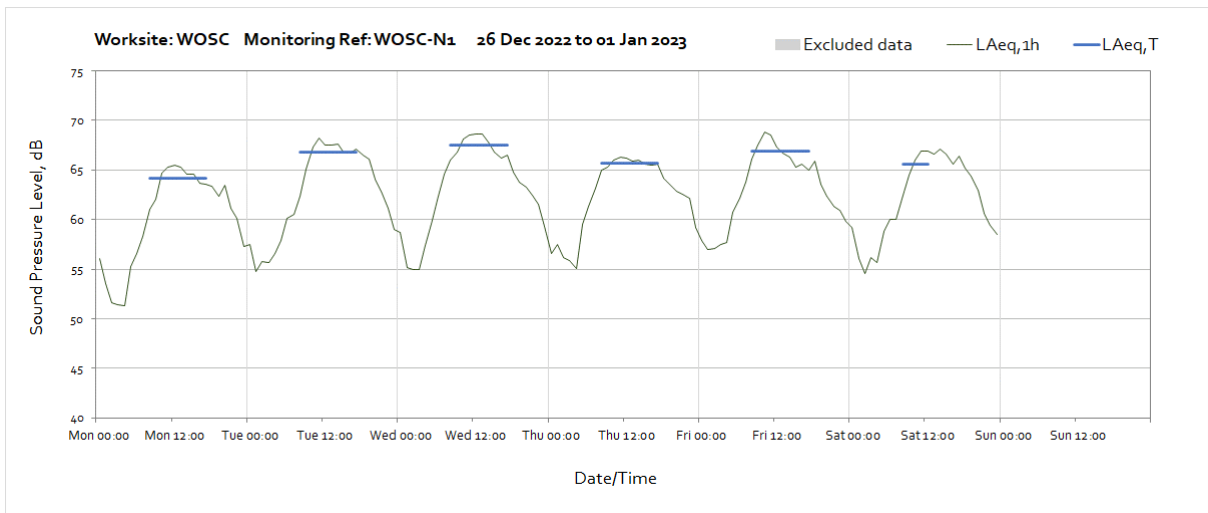


Note: Missing data throughout the week was due to site equipment movement leading to loss of power to the monitor.

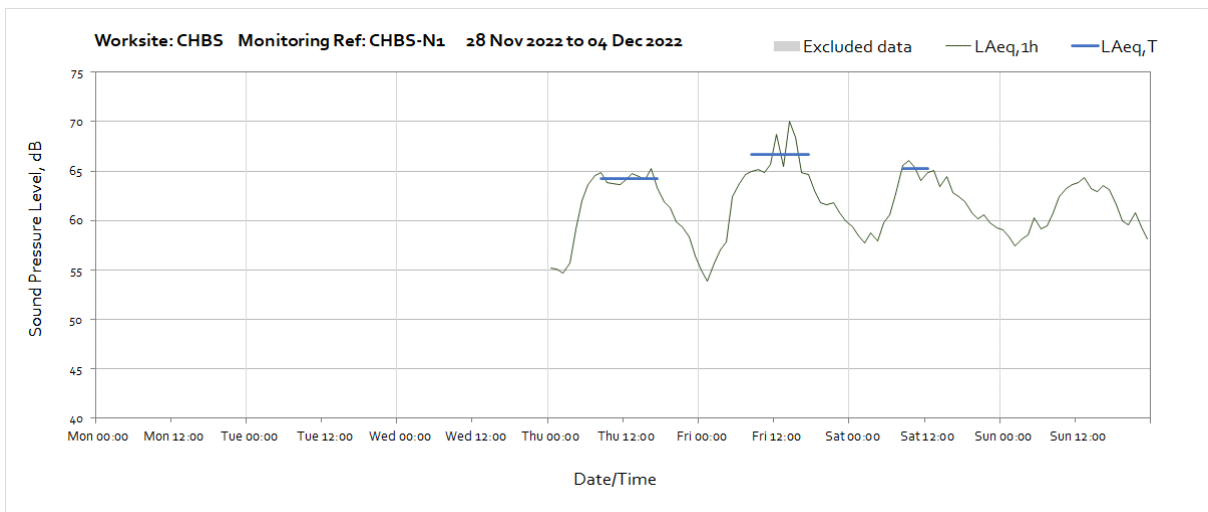
OFFICIAL

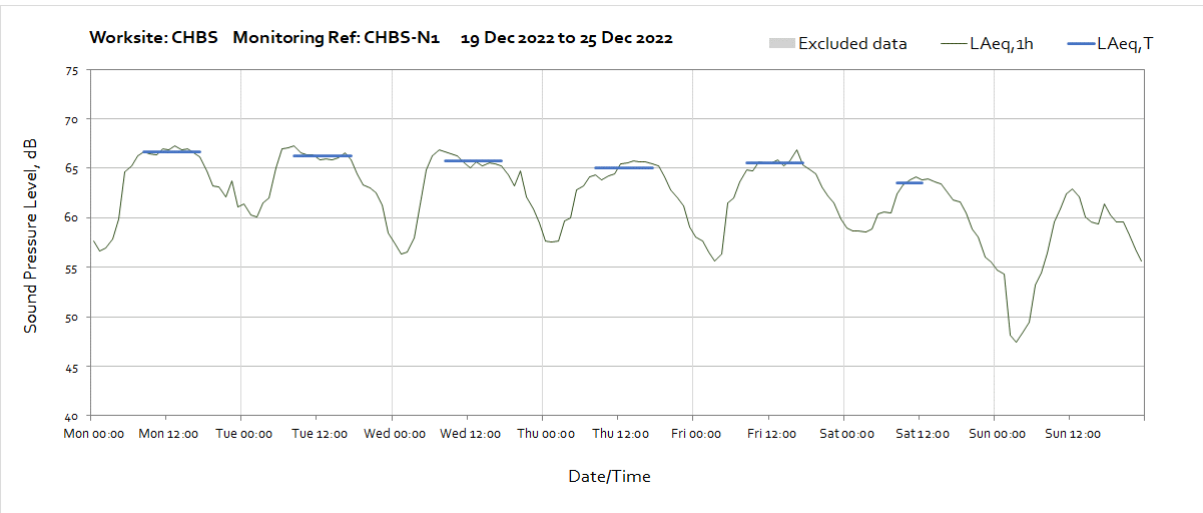
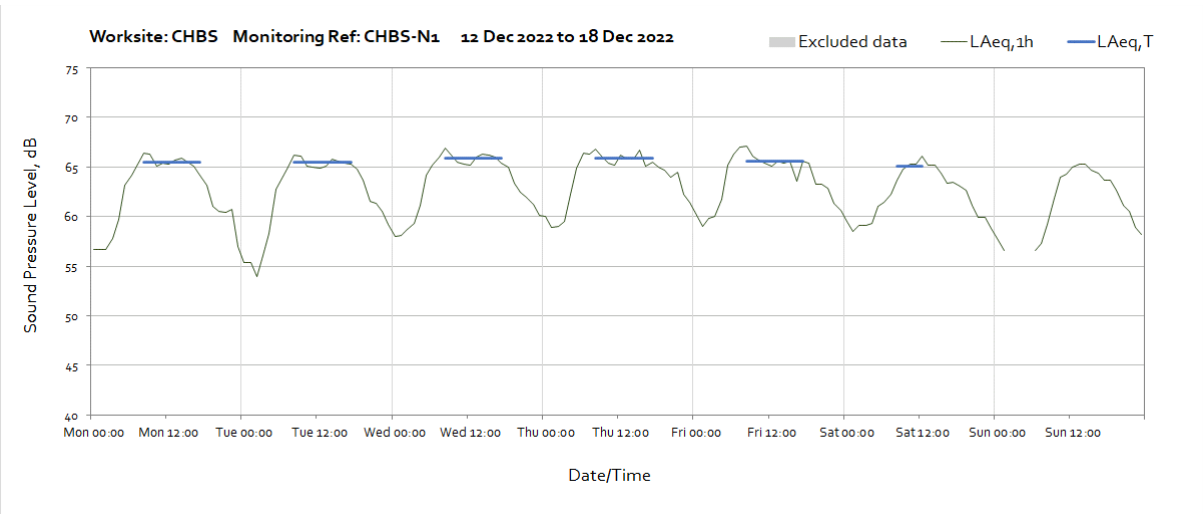
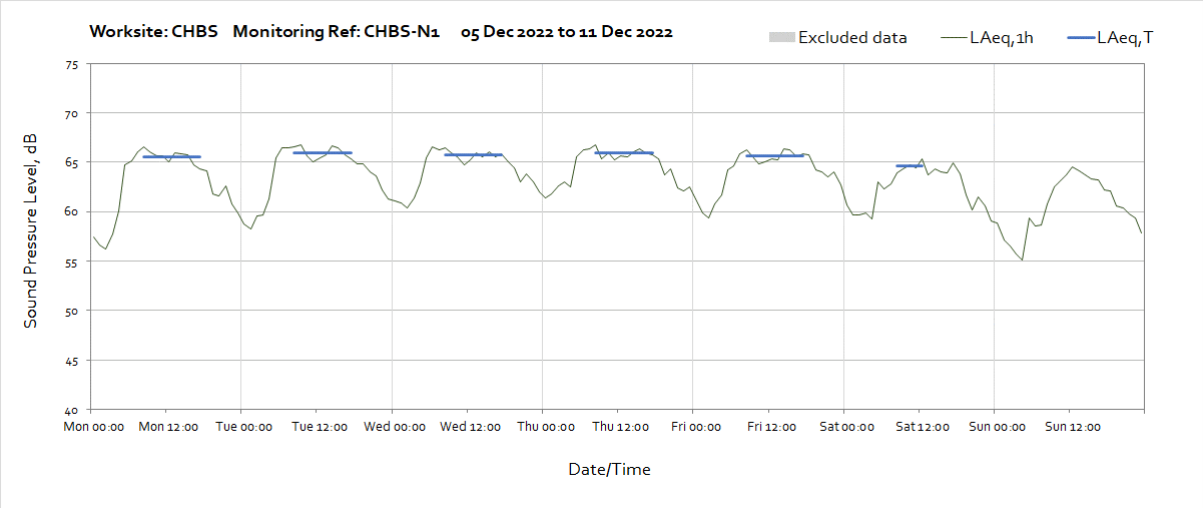


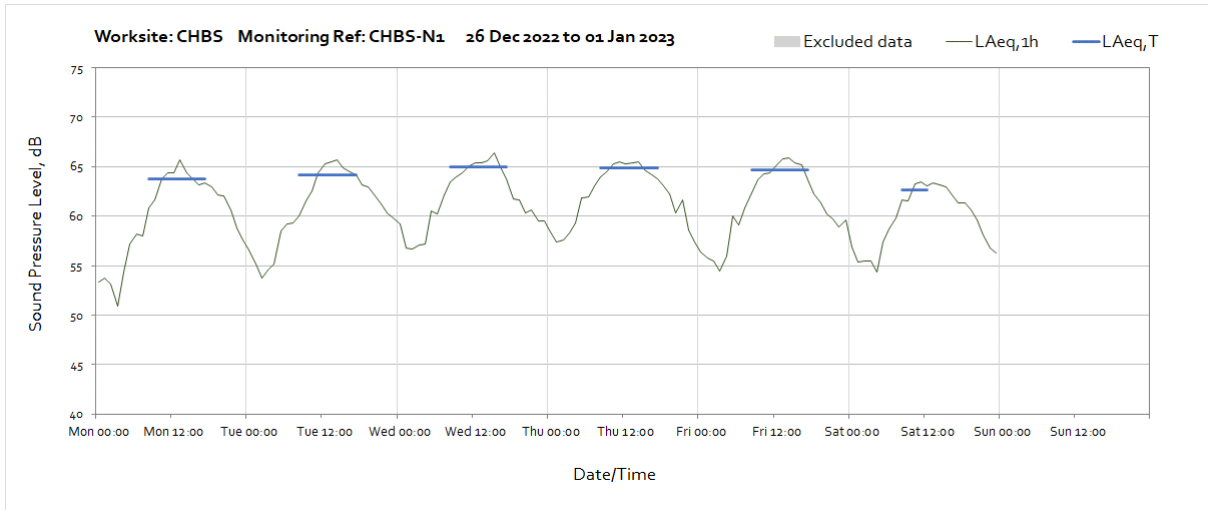
Note: Missing data from beginning of the week till 11:00 on Tuesday 20th December was due to site equipment movement leading to loss of power to the monitor.



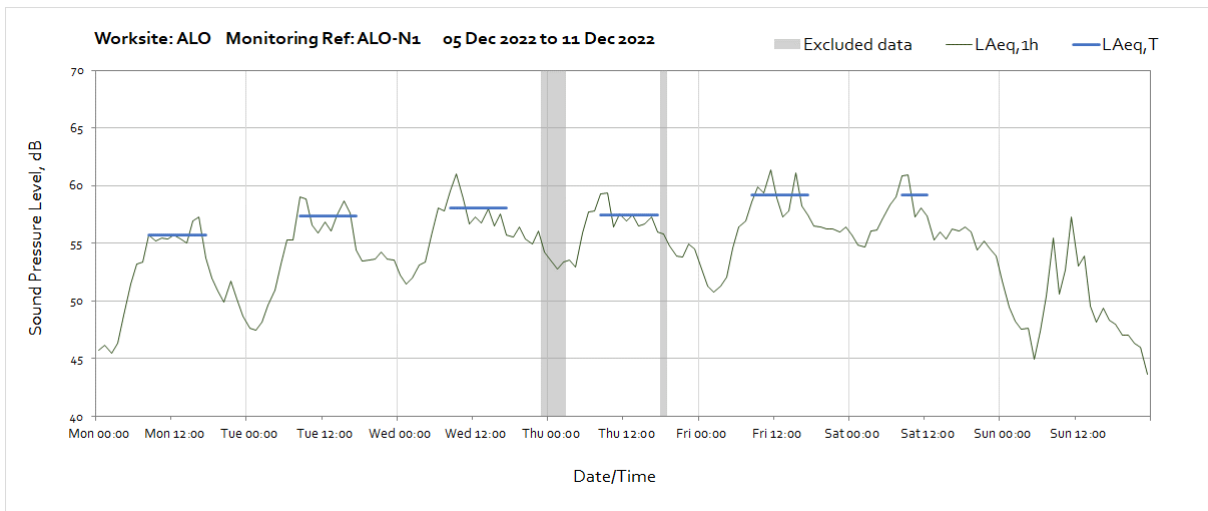
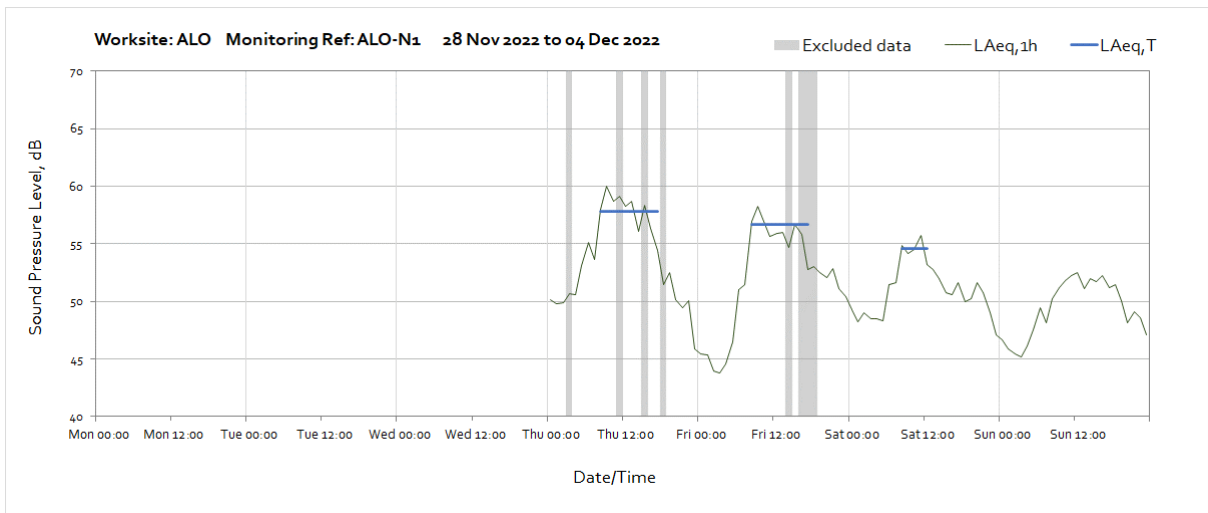
Worksite: CHBS – Monitoring Ref: CHBS-N1

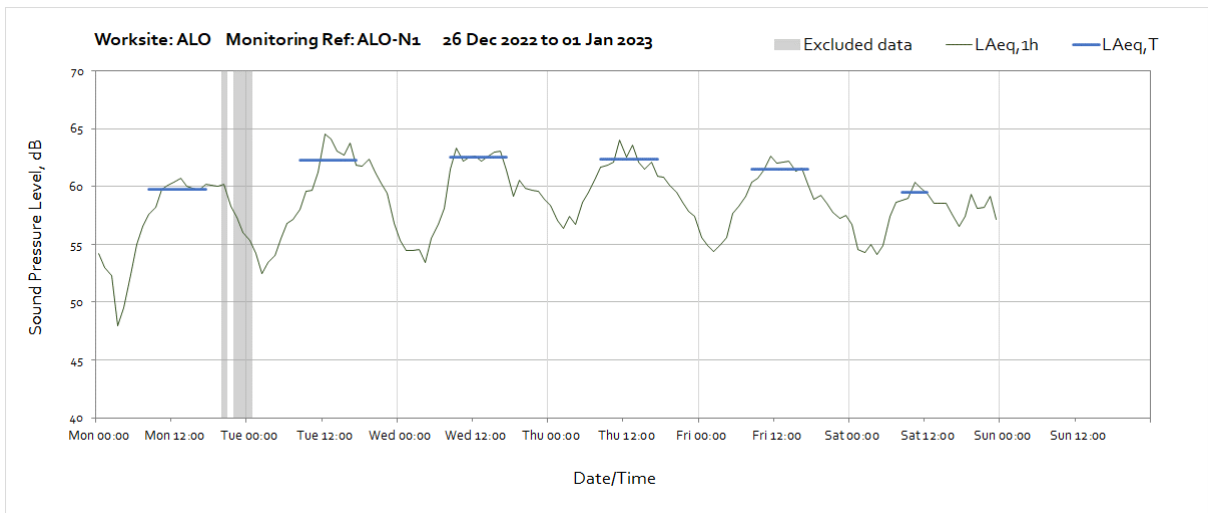
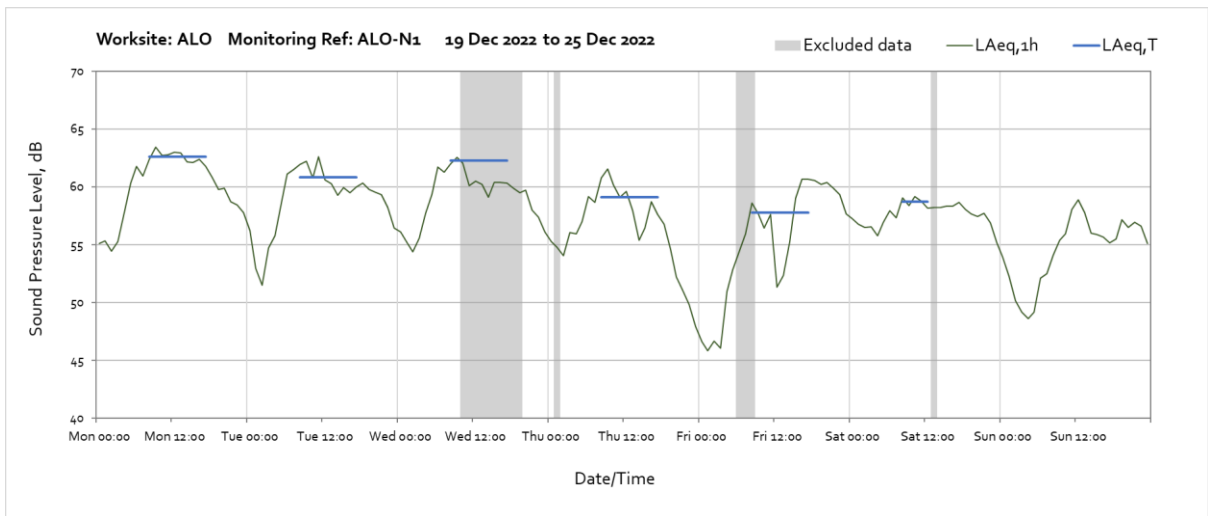
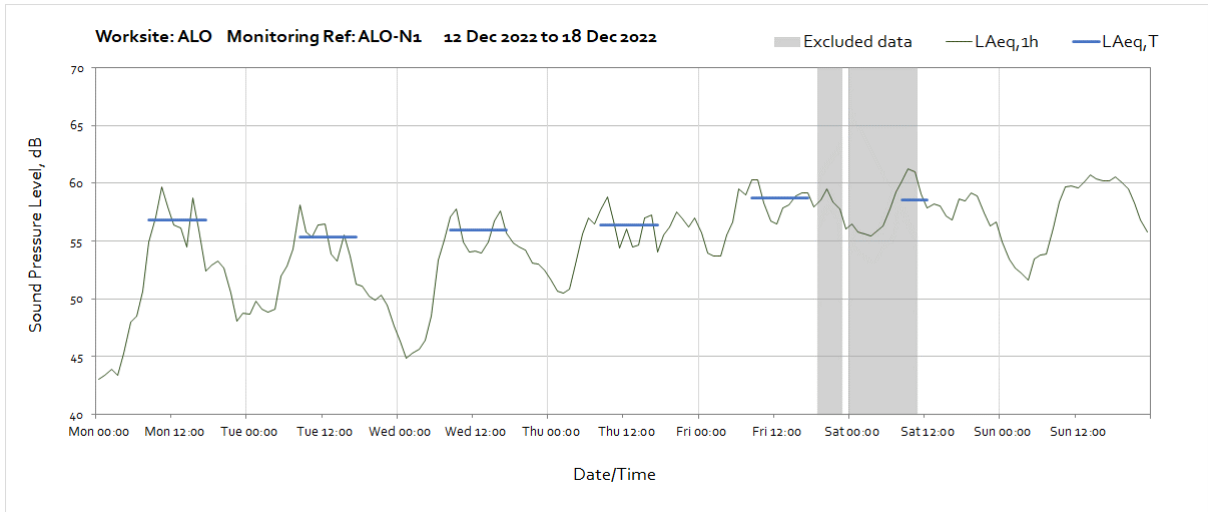




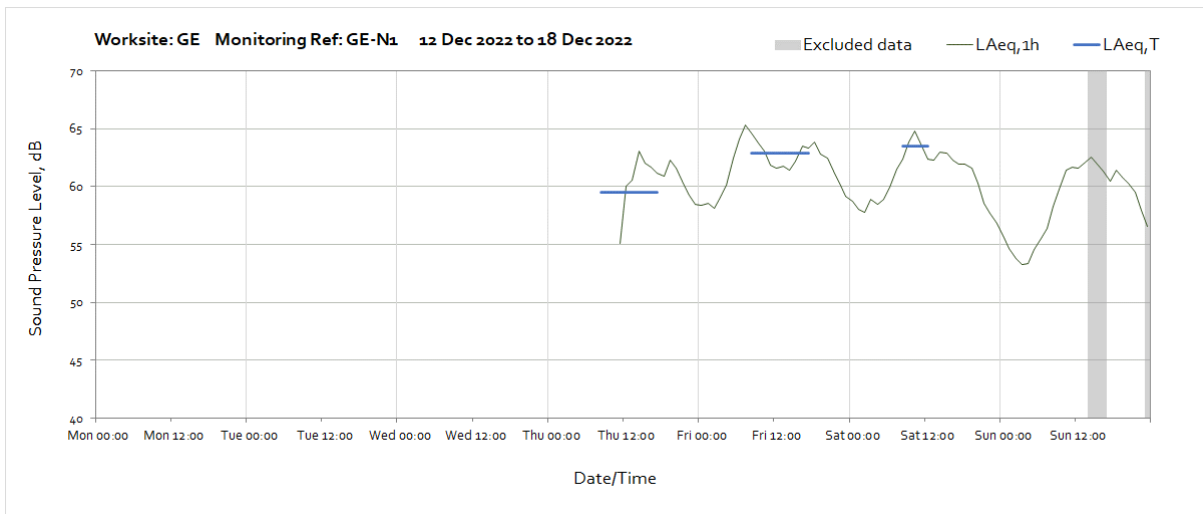


Worksite: ALO – Monitoring Ref: ALO-N1

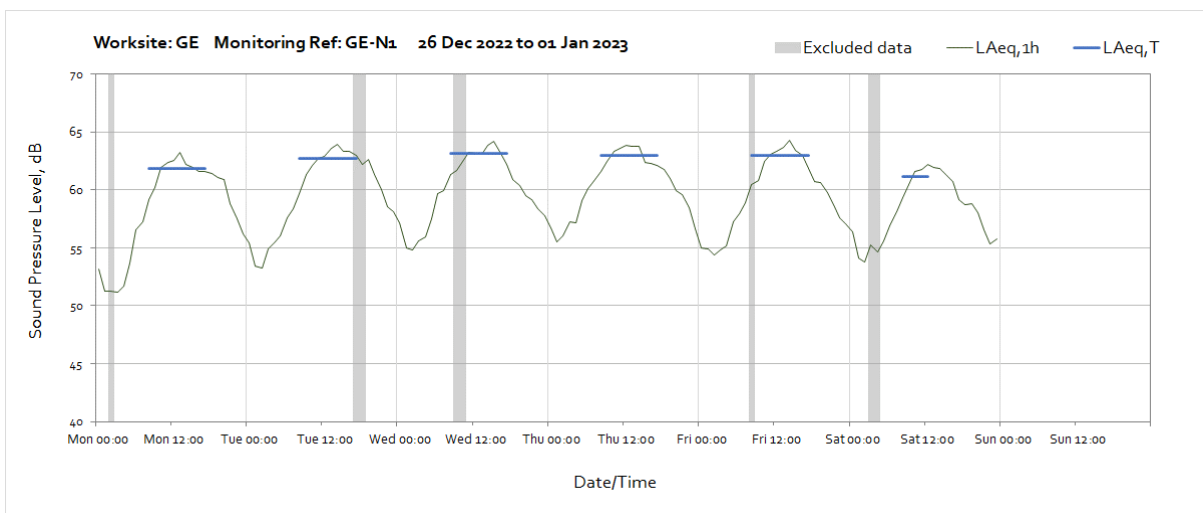
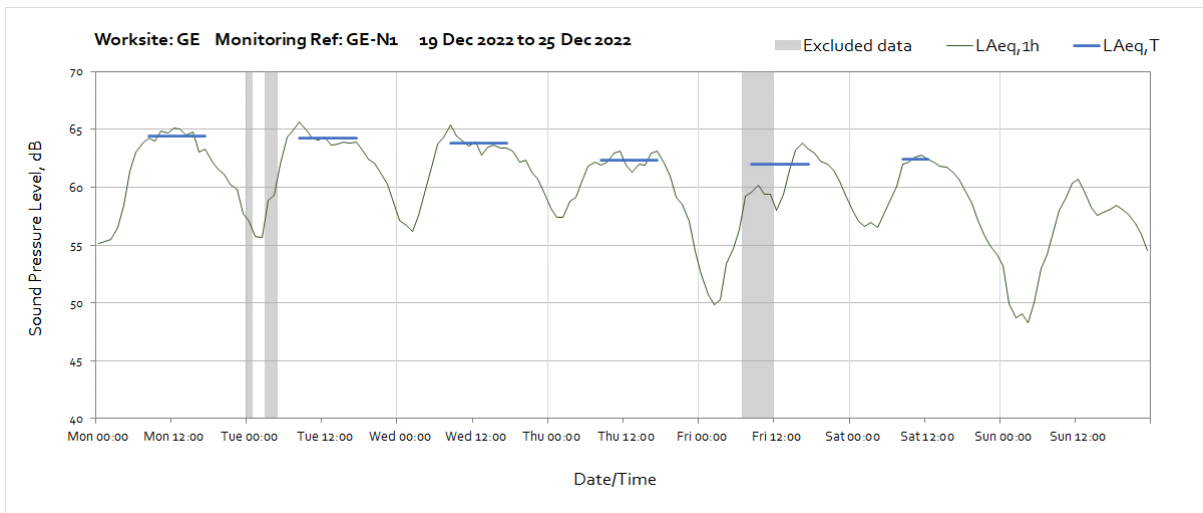




Worksite: GE – Monitoring Ref: GE-N1

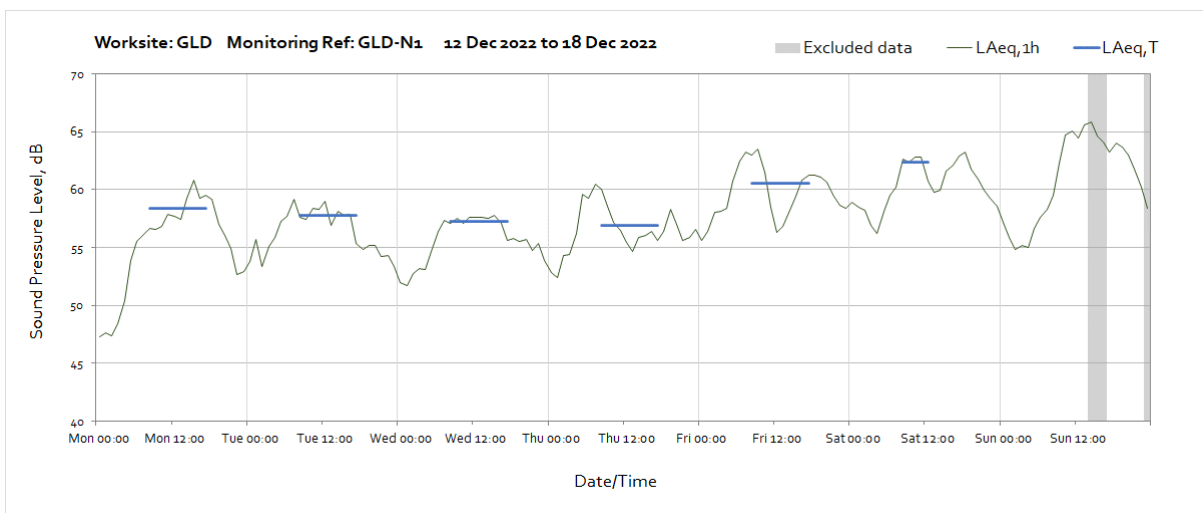
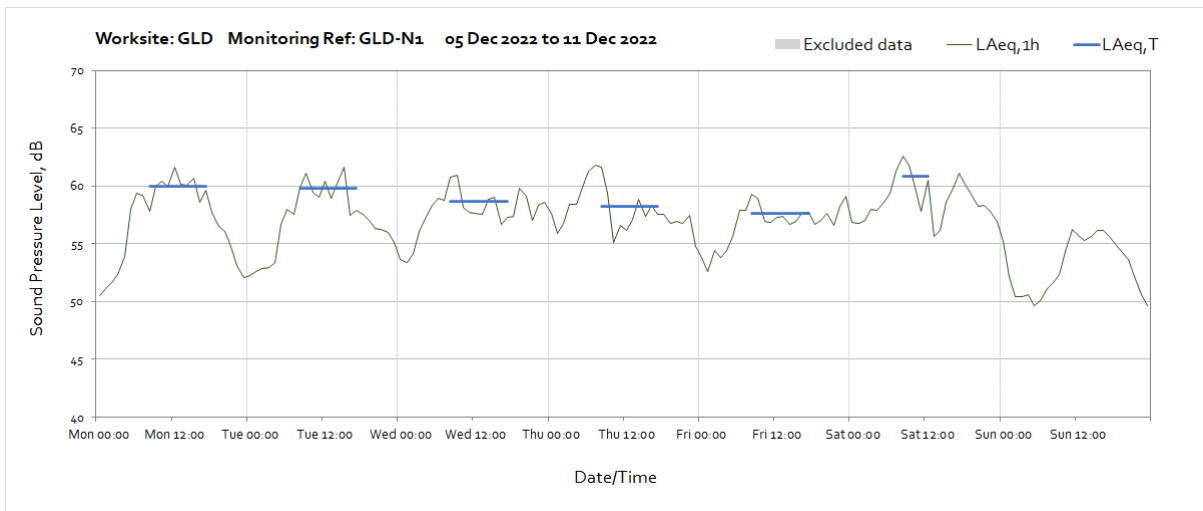
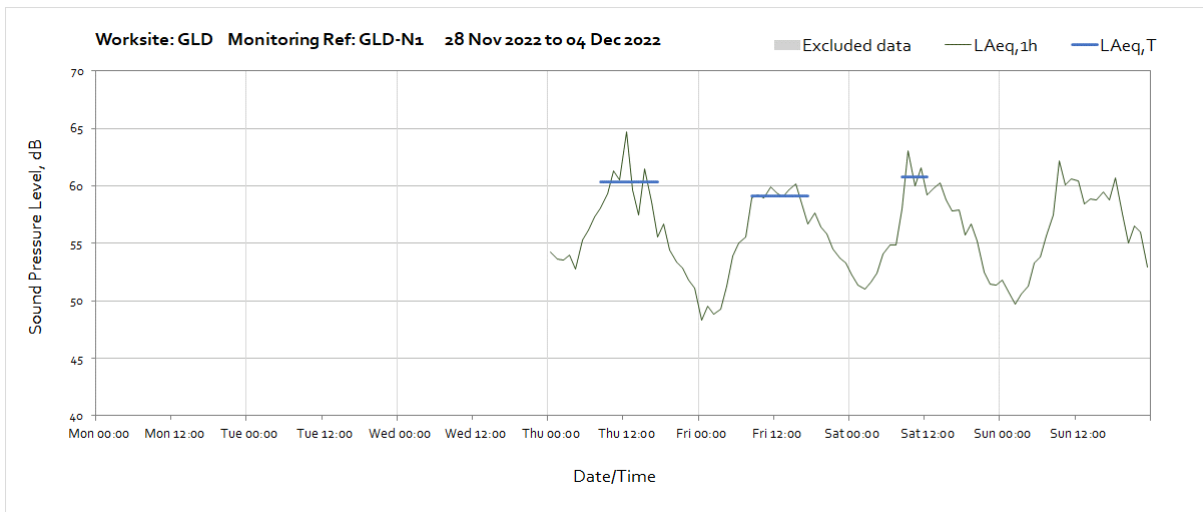


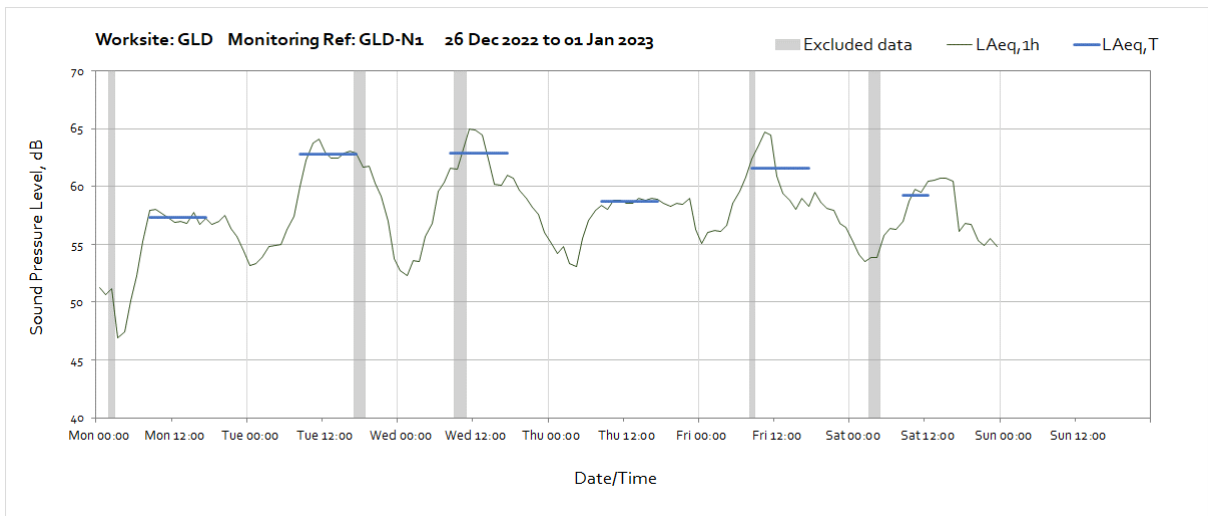
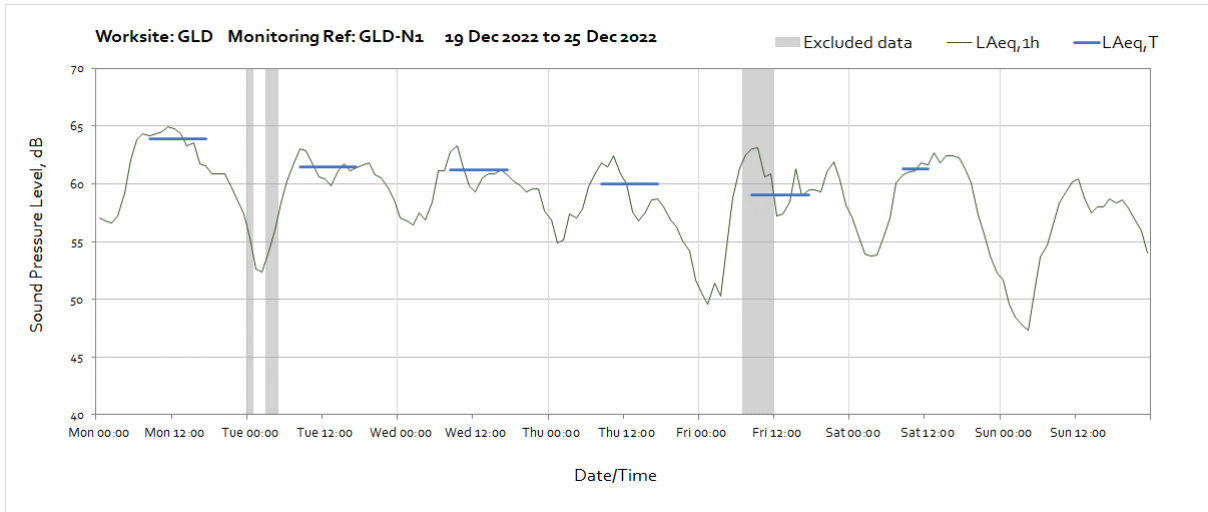
Note: Monitor installed at 11:00 on Thursday 15th December 2022.



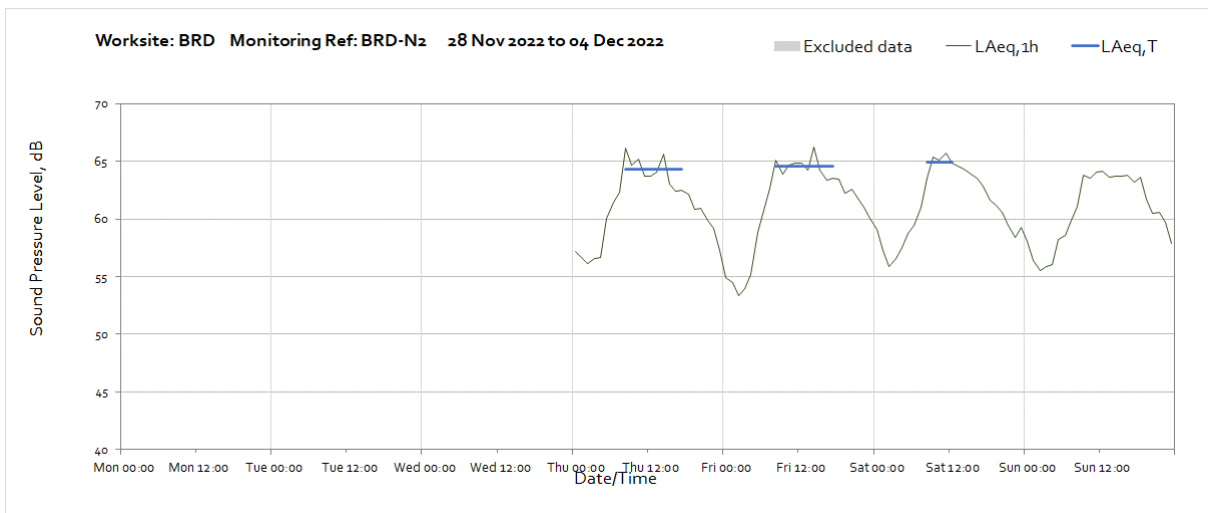
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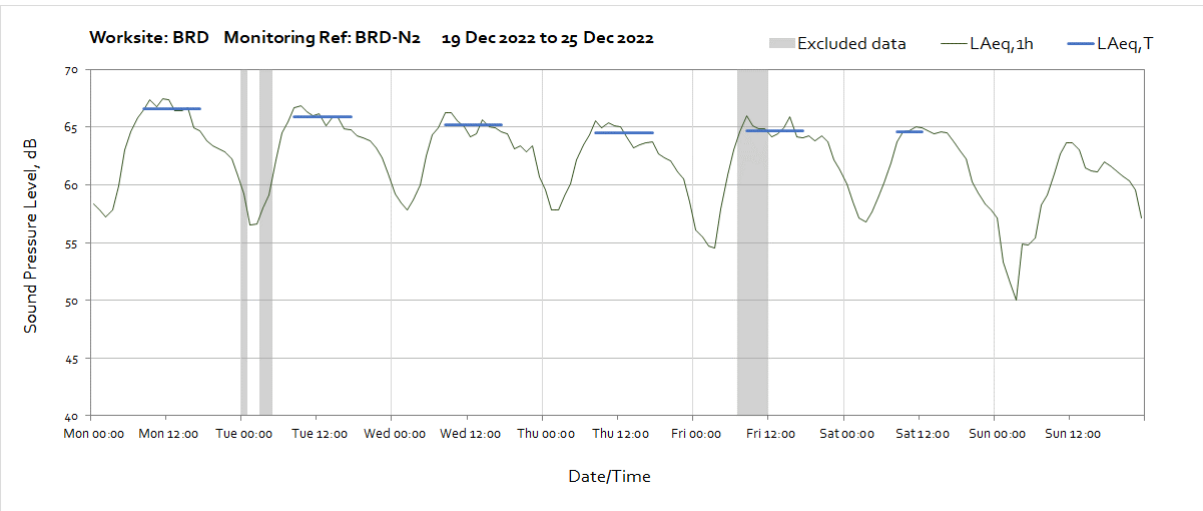
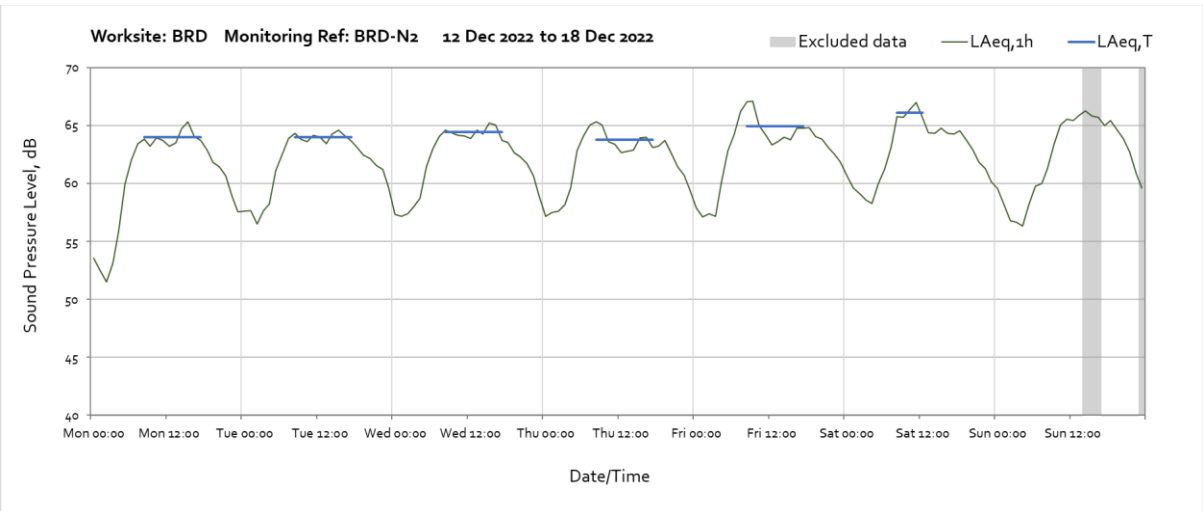
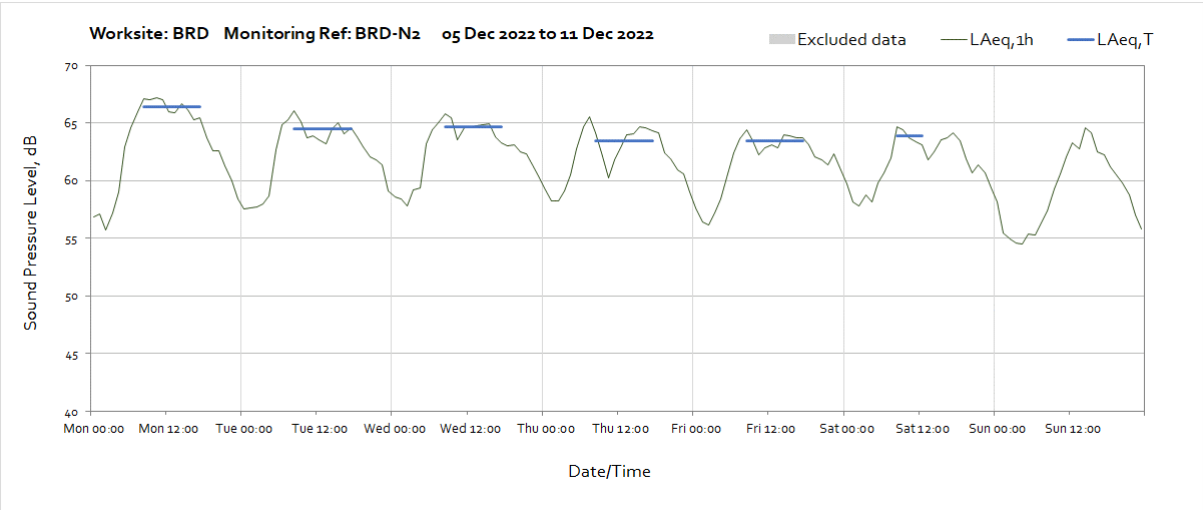
Worksite: GLD - Monitoring Ref: GLD-N1

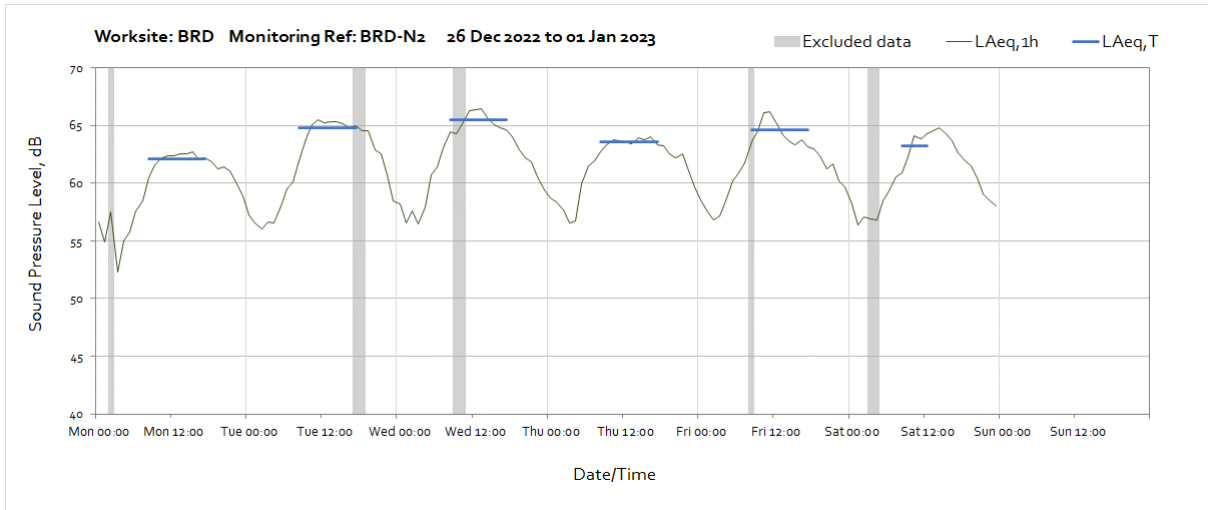




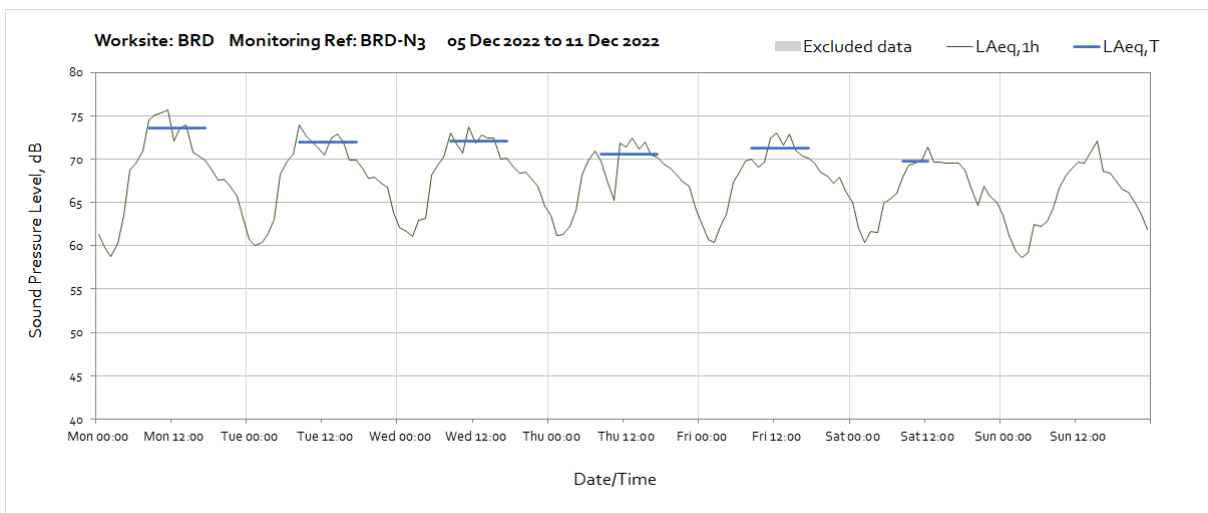
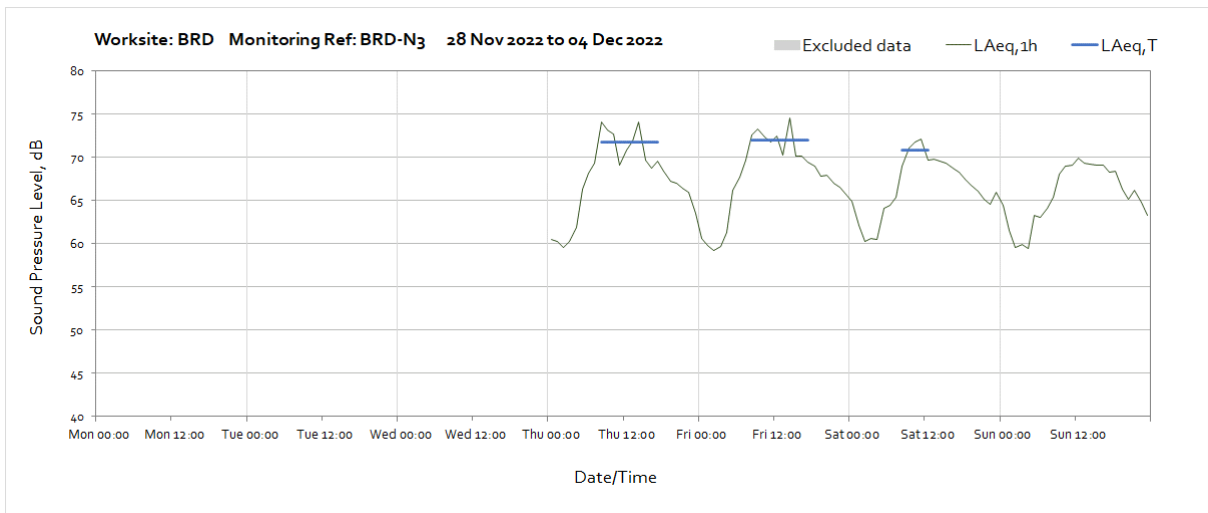
Worksite: BRD - Monitoring Ref: BRD-N2

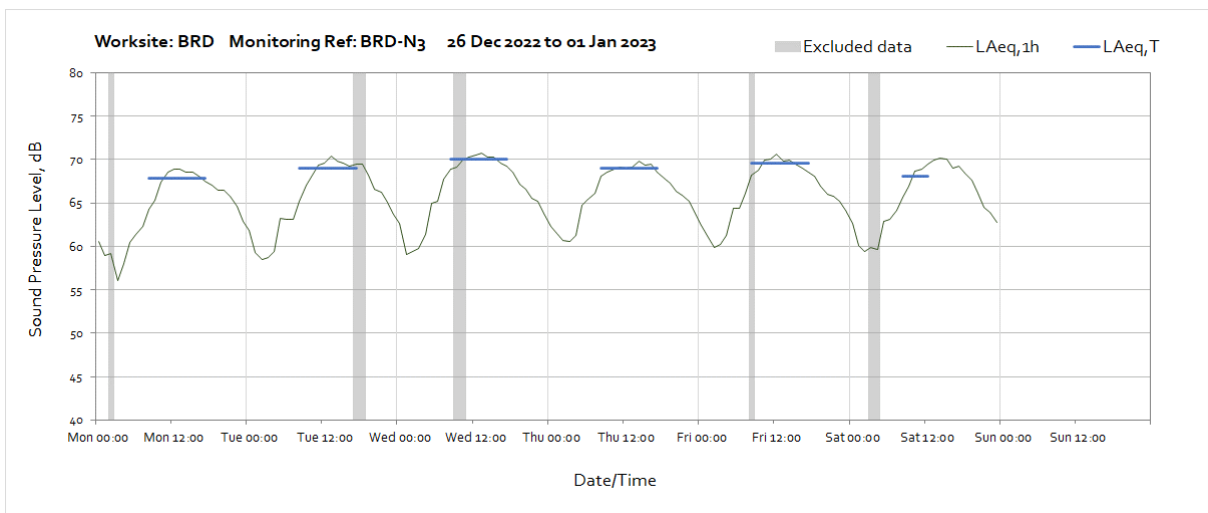
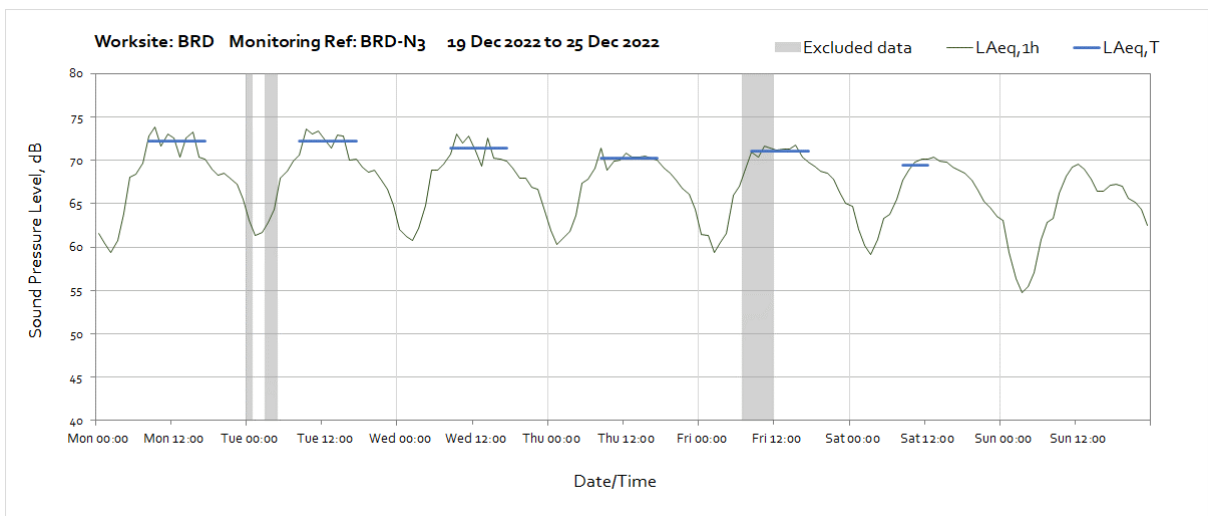
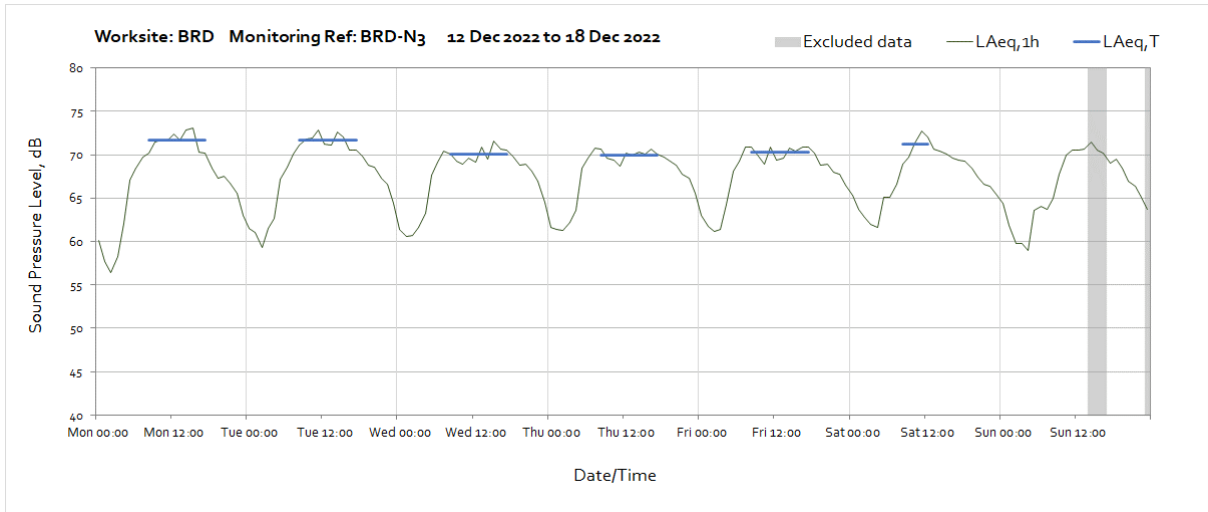






Worksite: BRD - Monitoring Ref: BRD-N3

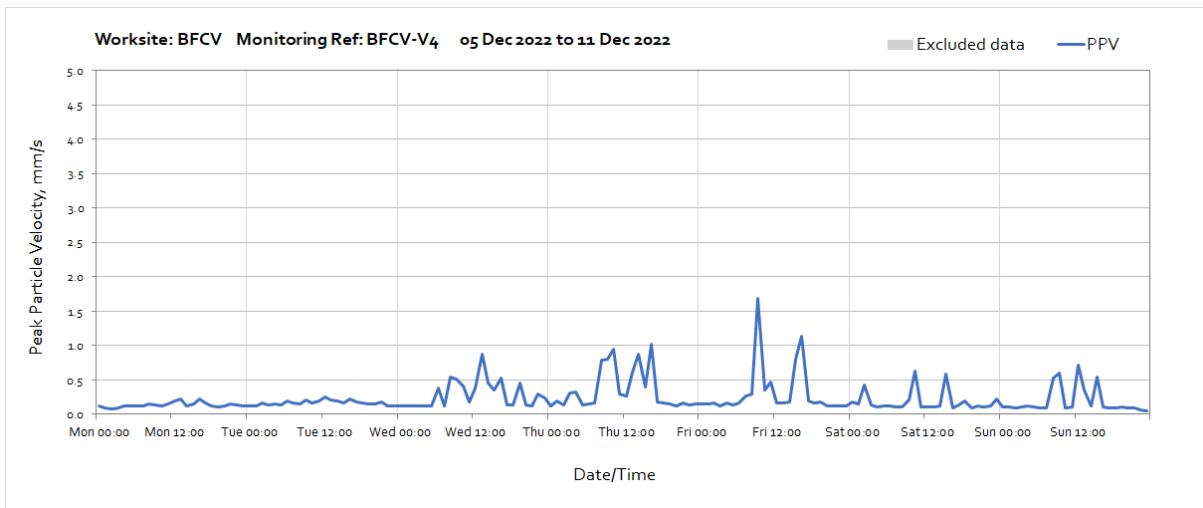
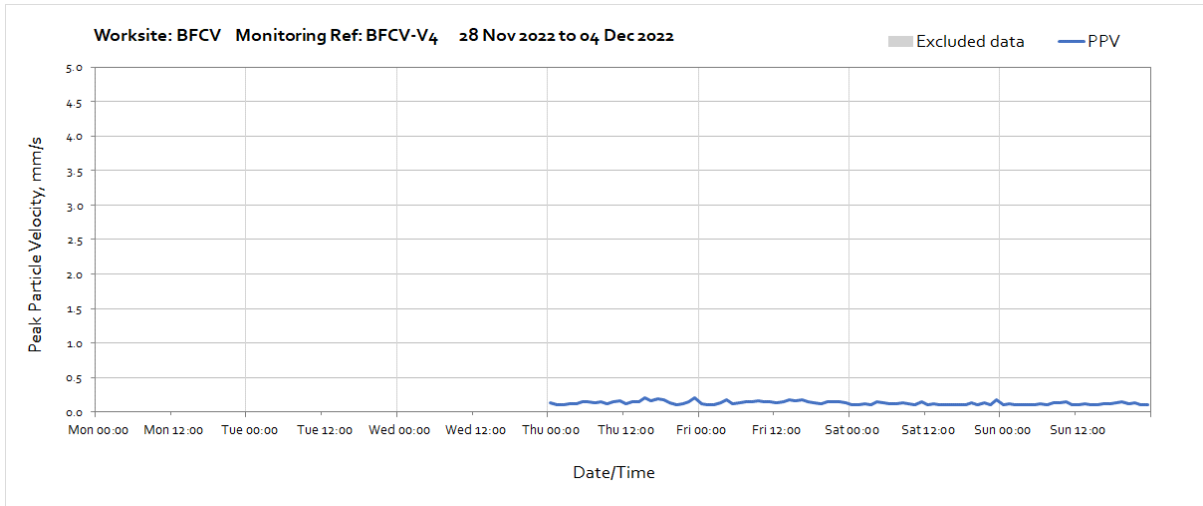


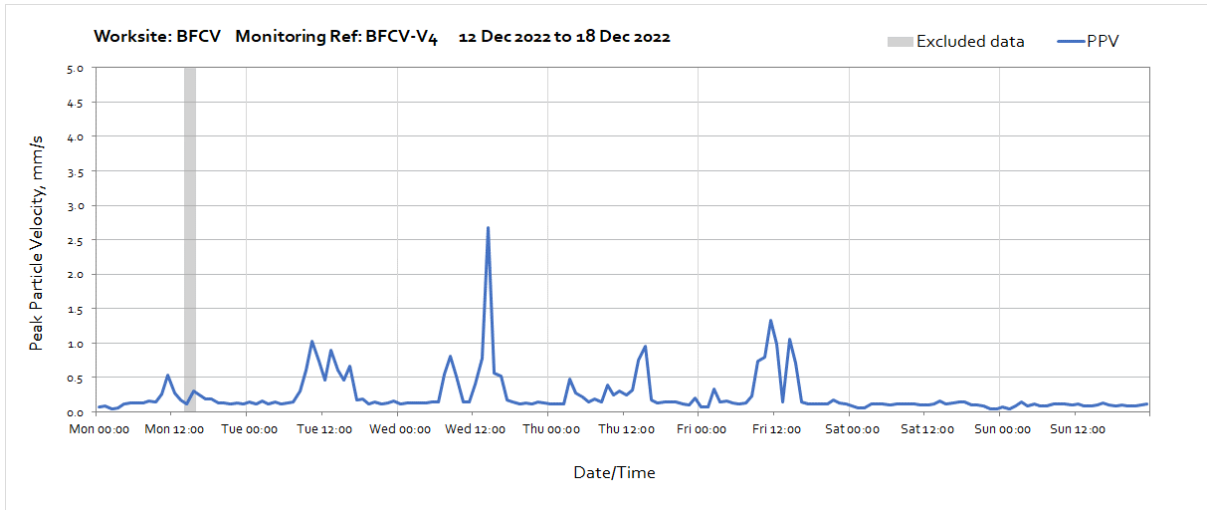


Vibration

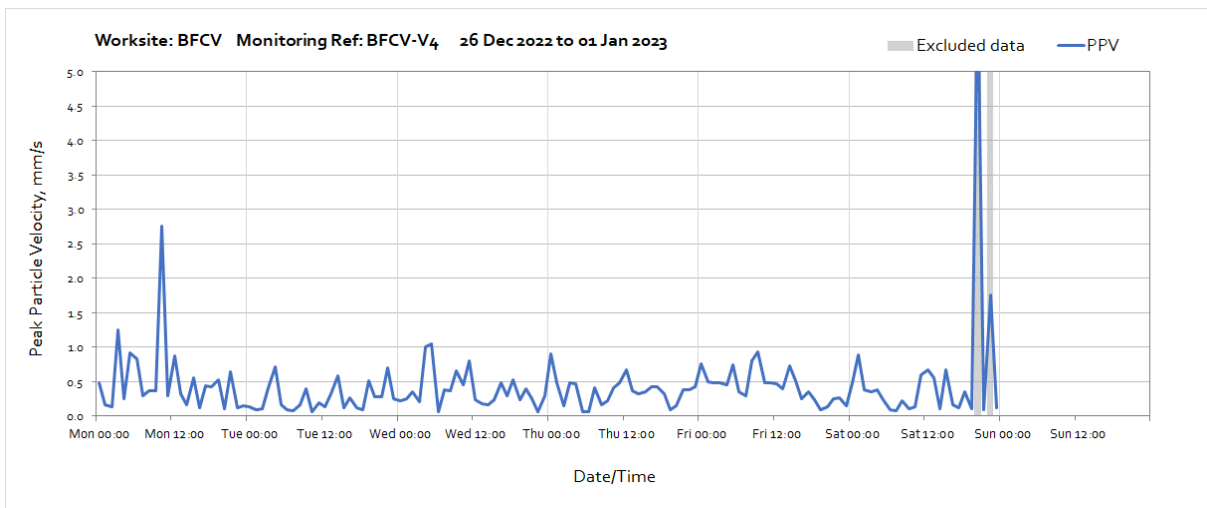
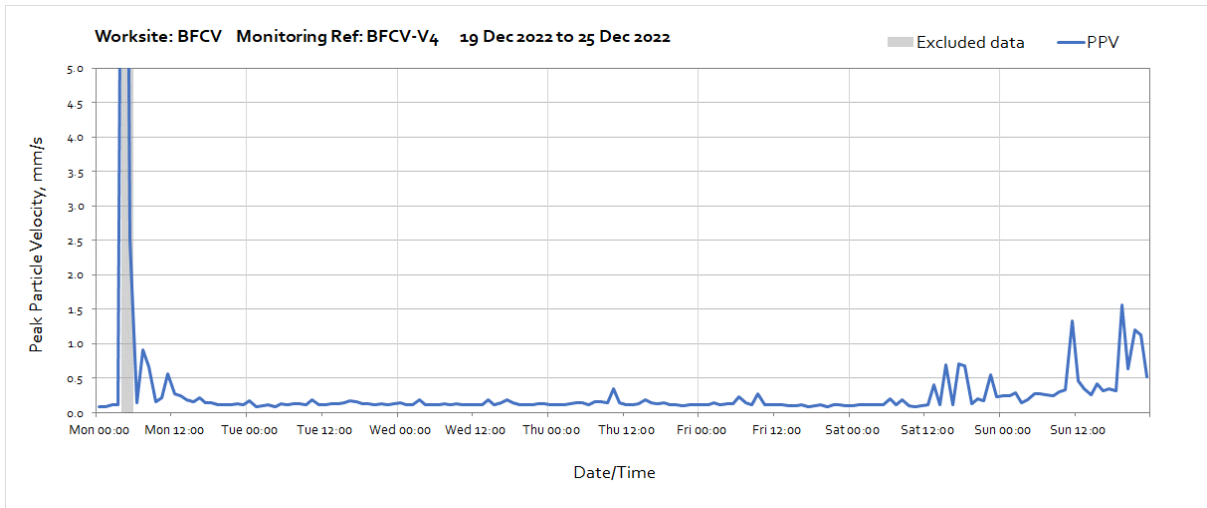
The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the highest PPV of the three orthogonal axes x, y and z. Where high values of PPV were caused by local interference with the vibration monitor, which are not representative 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: BFCV - Monitoring Ref: BFCV-V4





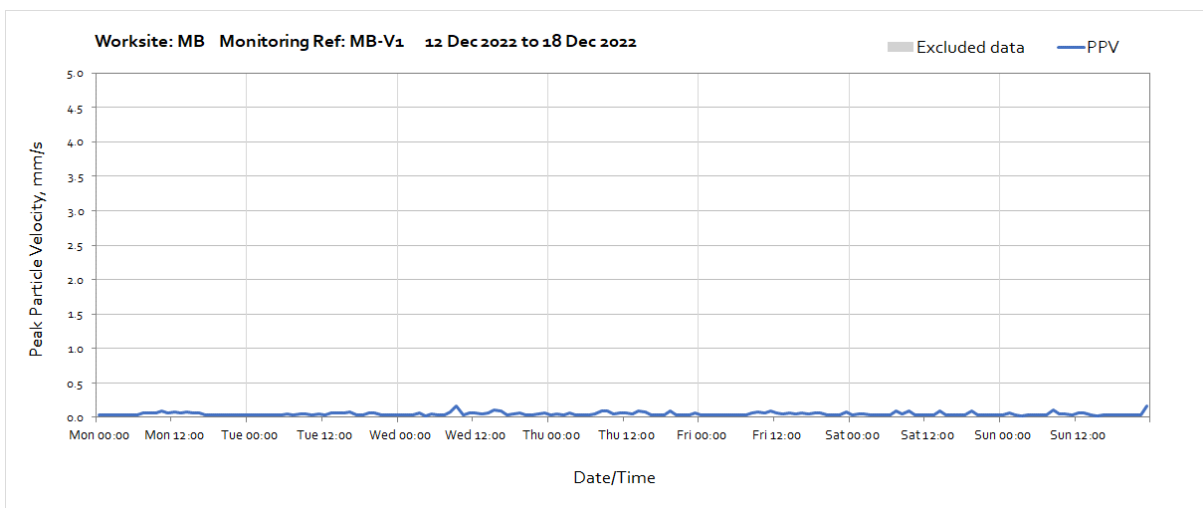
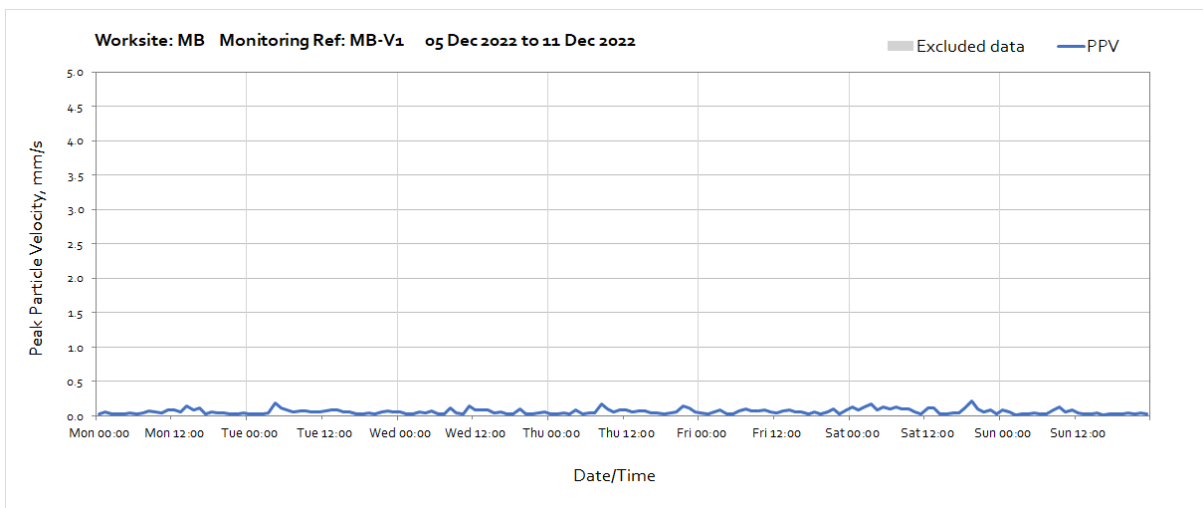
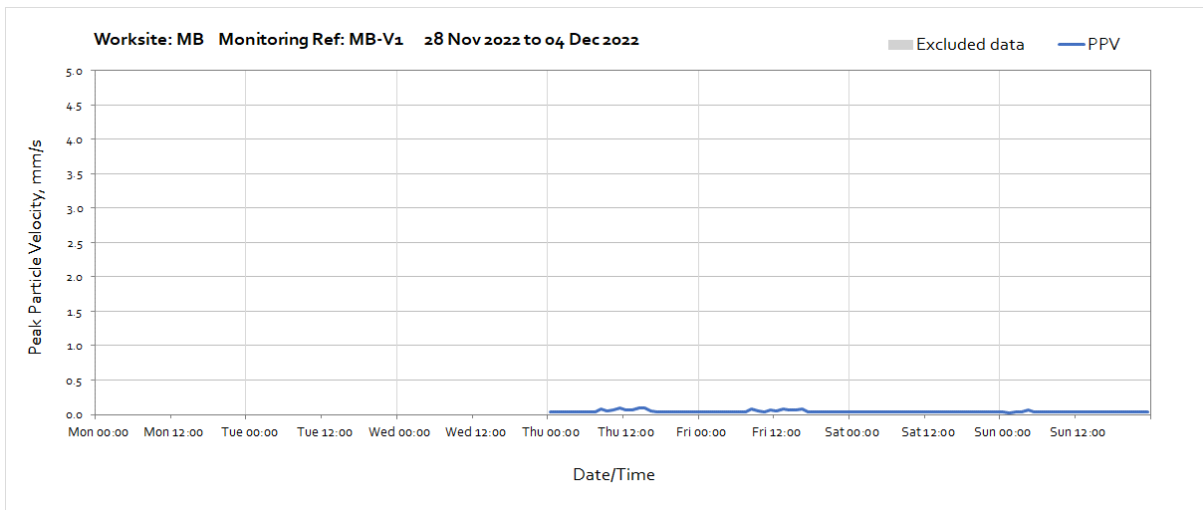
Note: High vibration levels at 14:00 on Wednesday 14th December was due to plant movement on the haul road undertaken approximately 5m away from the monitor.



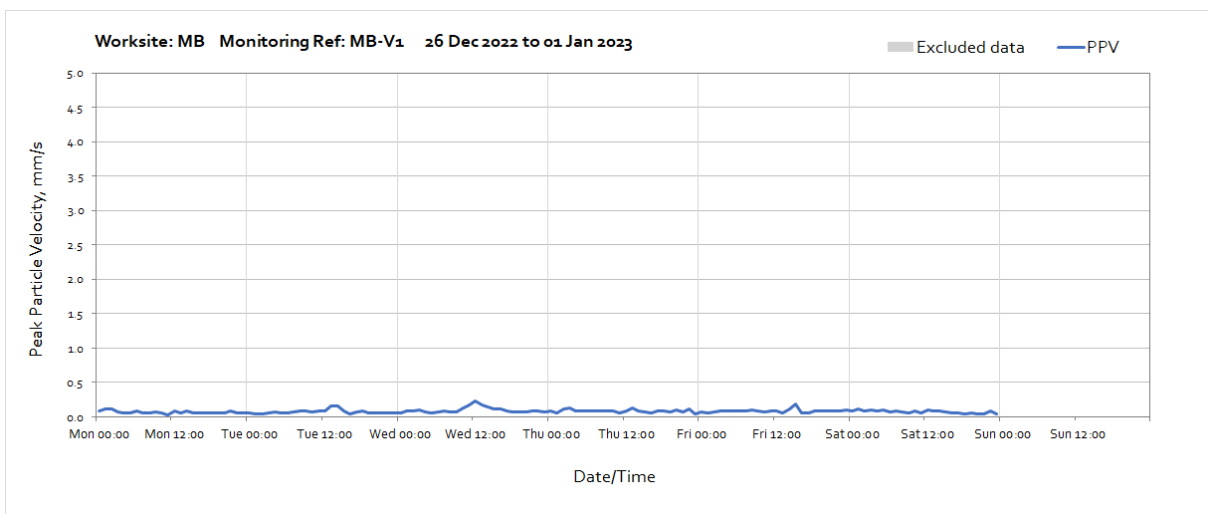
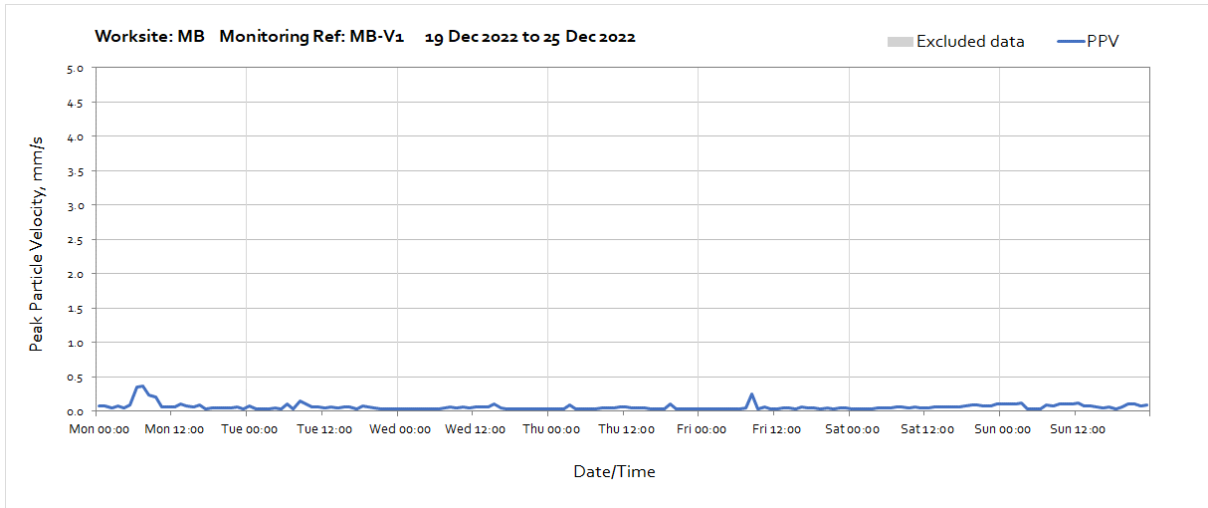
Note: High vibration levels at 10:00 on Monday 26th December was due to plant movement on the haul road undertaken approximately 5m away from the monitor.

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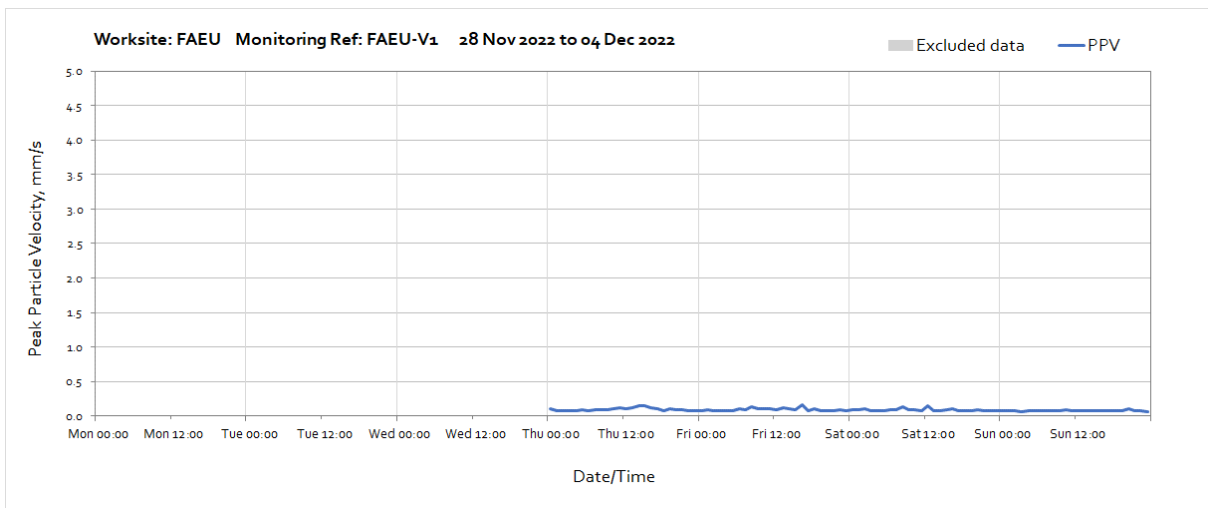
Worksite: MB – Monitoring Ref: MB-V1

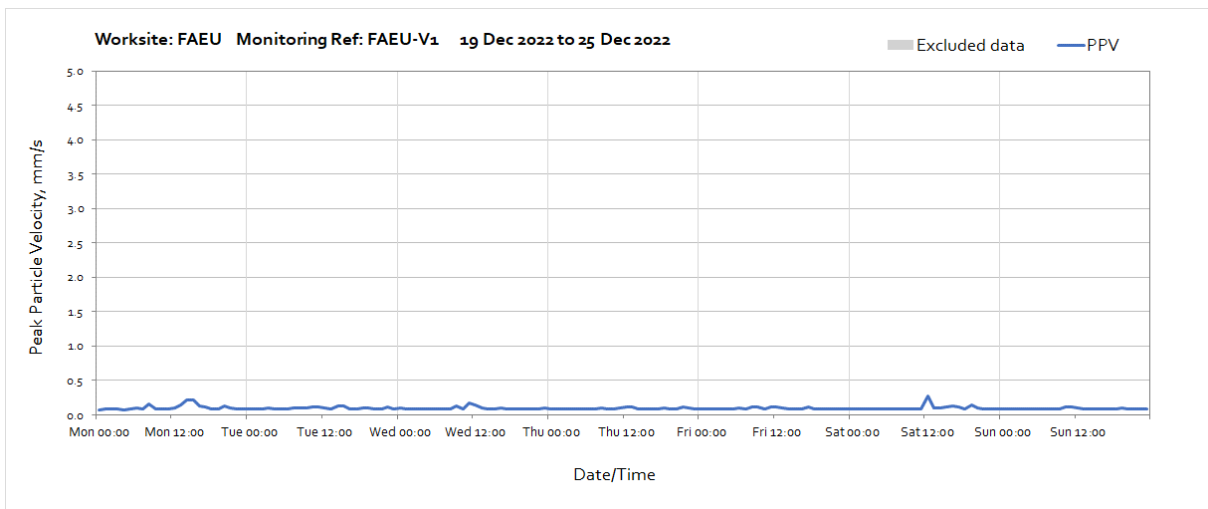
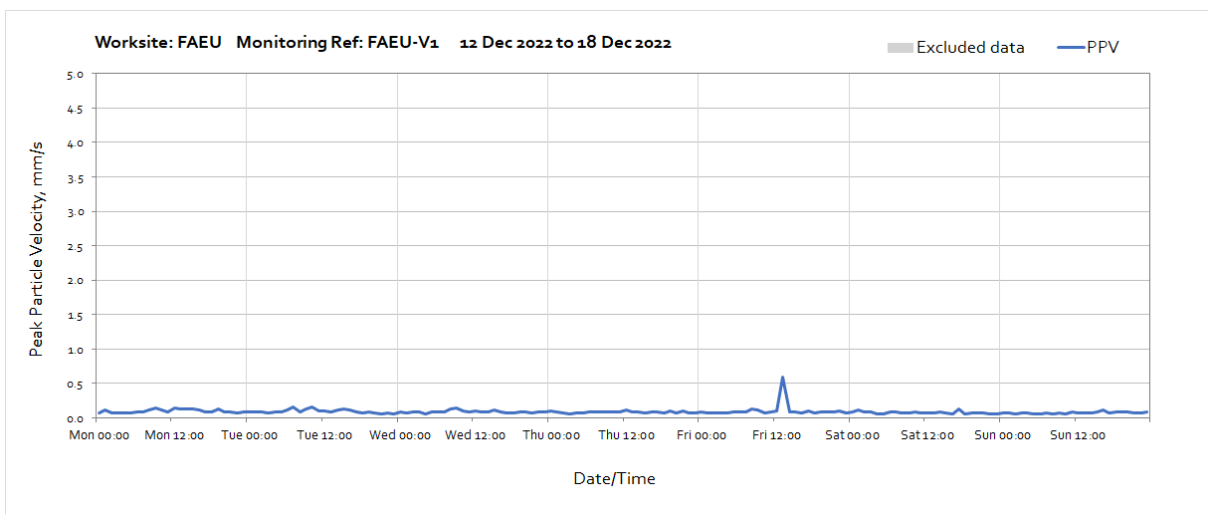
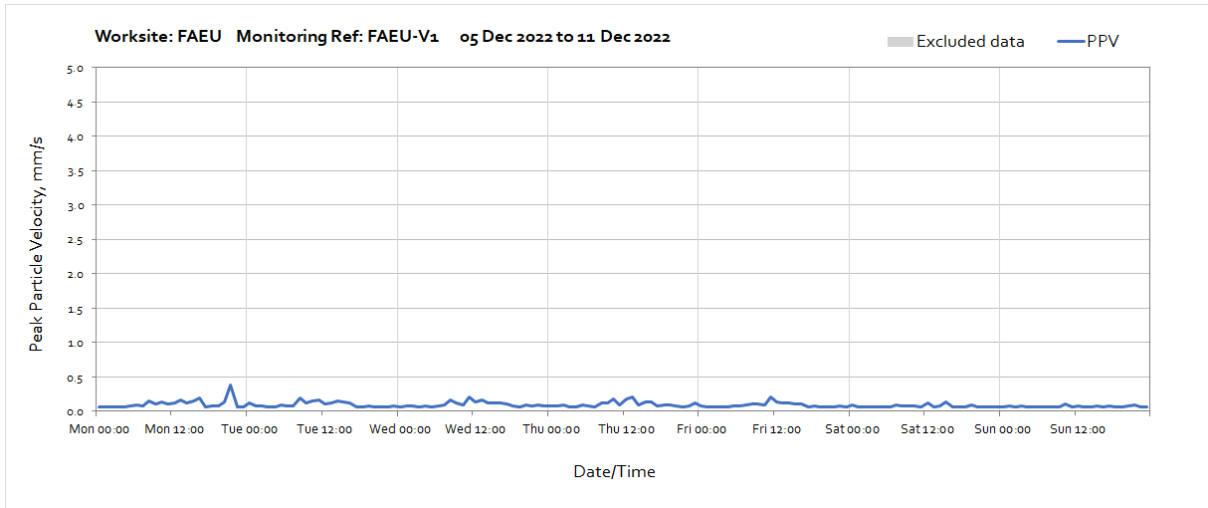


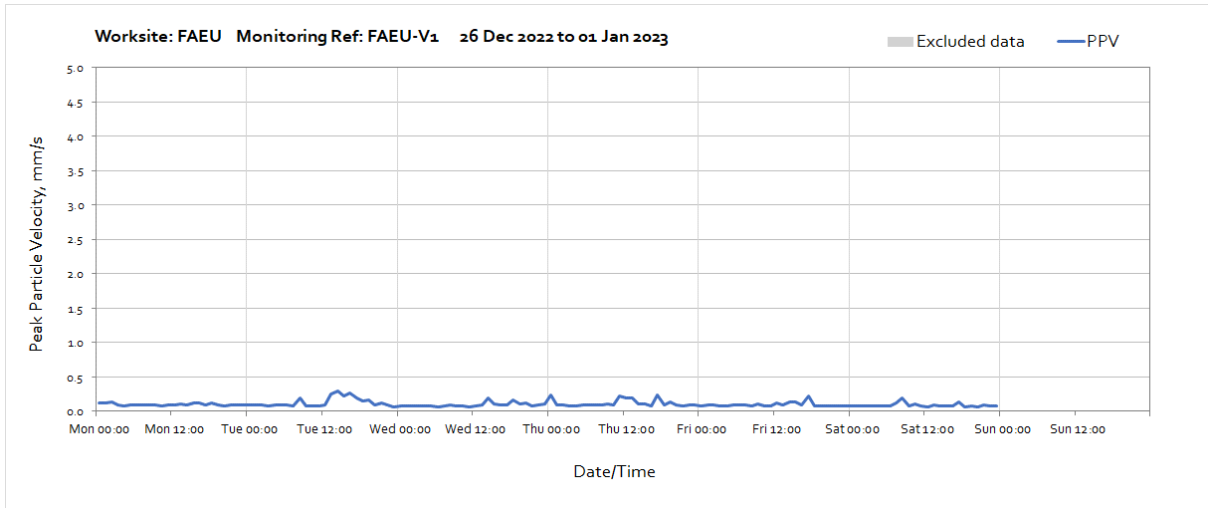
OFFICIAL



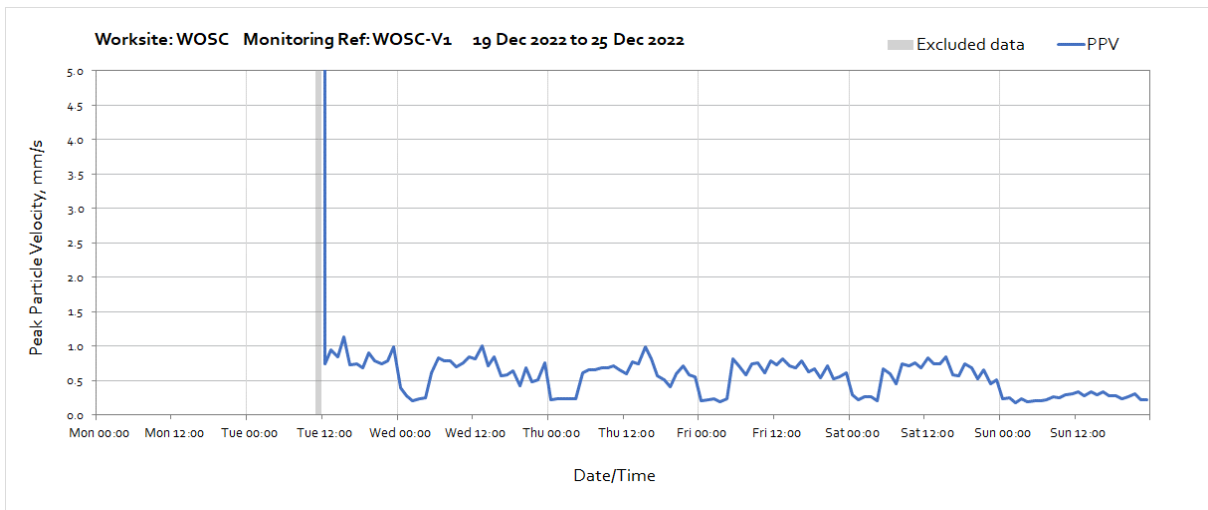
Worksite: FAEU – Monitoring Ref: FAEU-V1



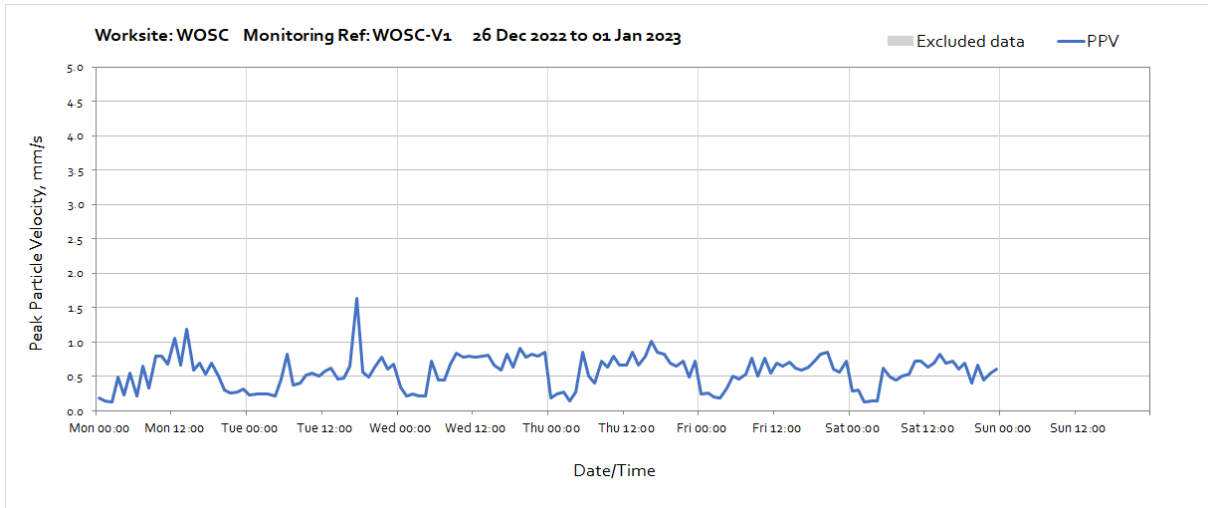




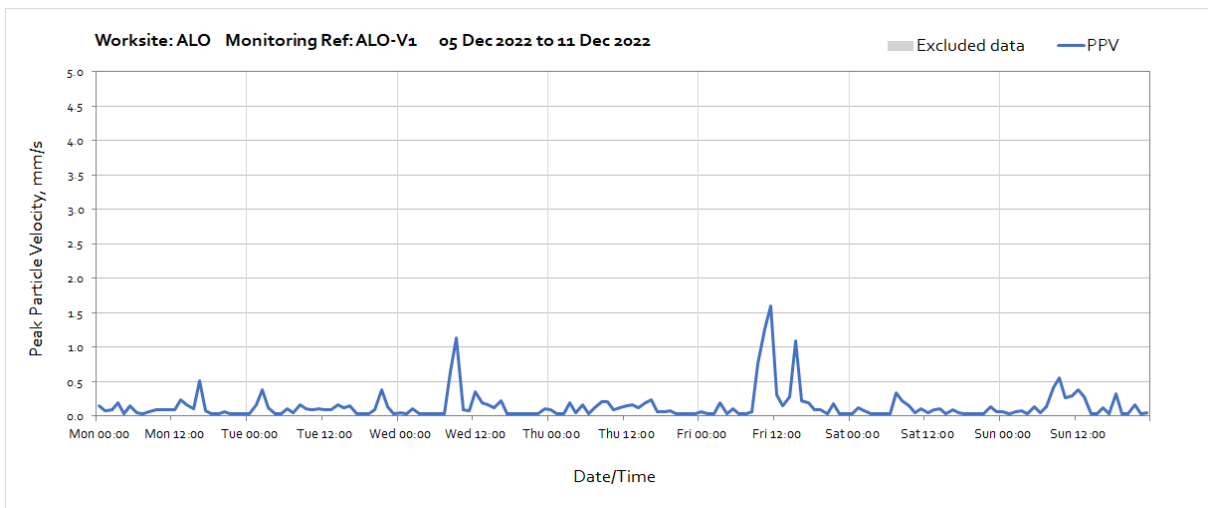
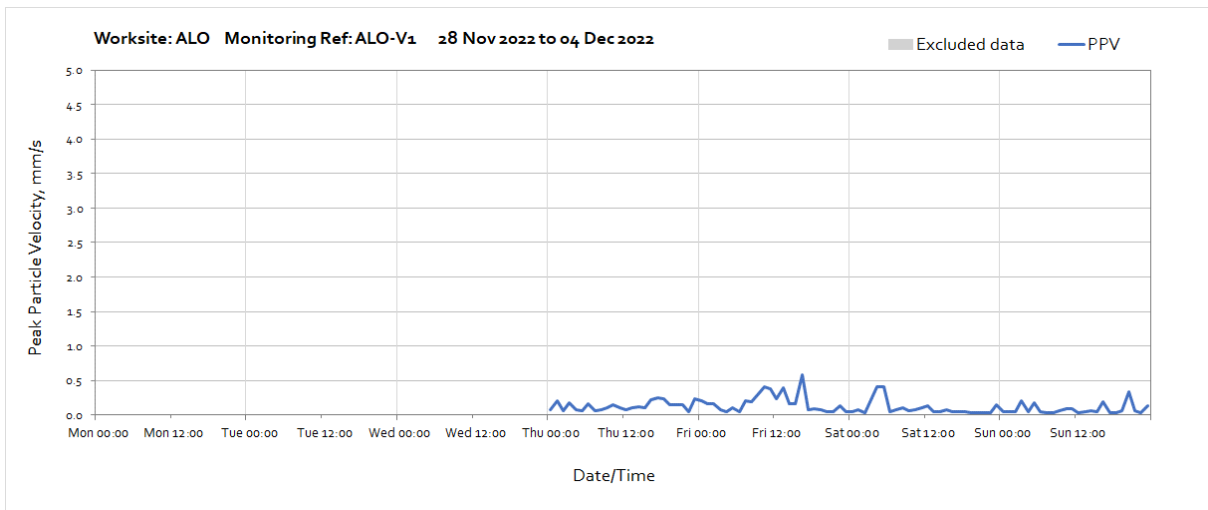
Worksite: WOSC – Monitoring Ref: WOSC-V1



Note: Missing data from beginning of the month till 11:00 on Tuesday 20th December was due to site equipment movement leading to loss of power to the monitor.

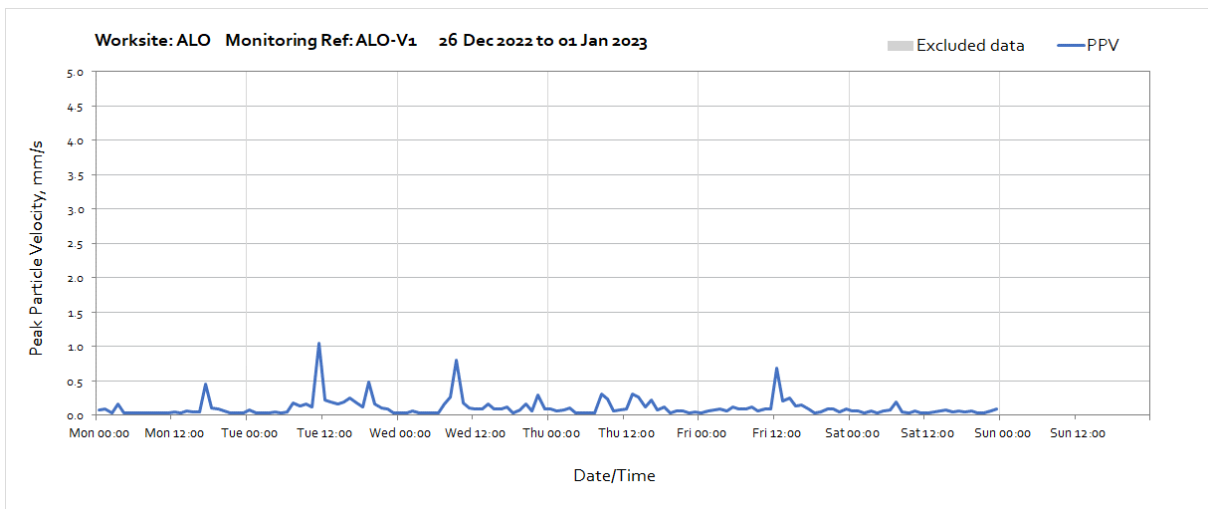
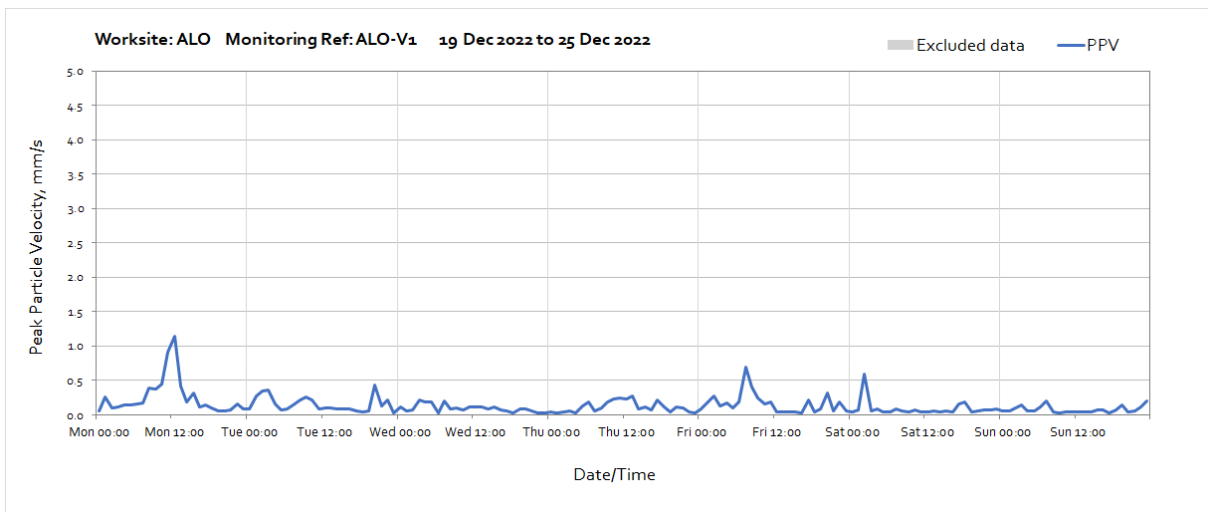
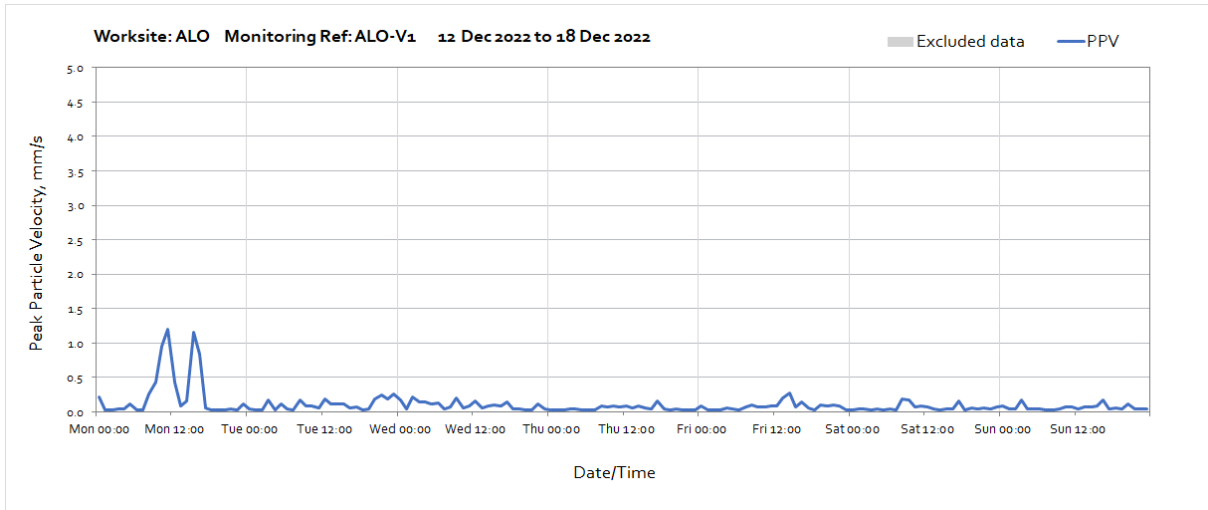


Worksite: ALO - Monitoring Ref: ALO-V1

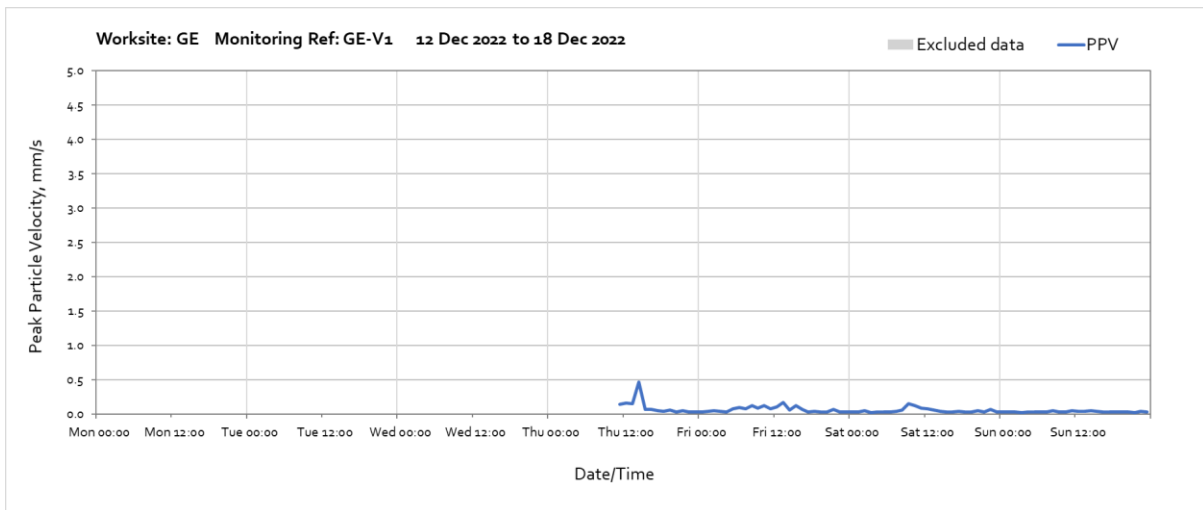


Note: High vibration levels at 11:00 on Friday 9th December was due to plant movement in close proximity to the monitor.

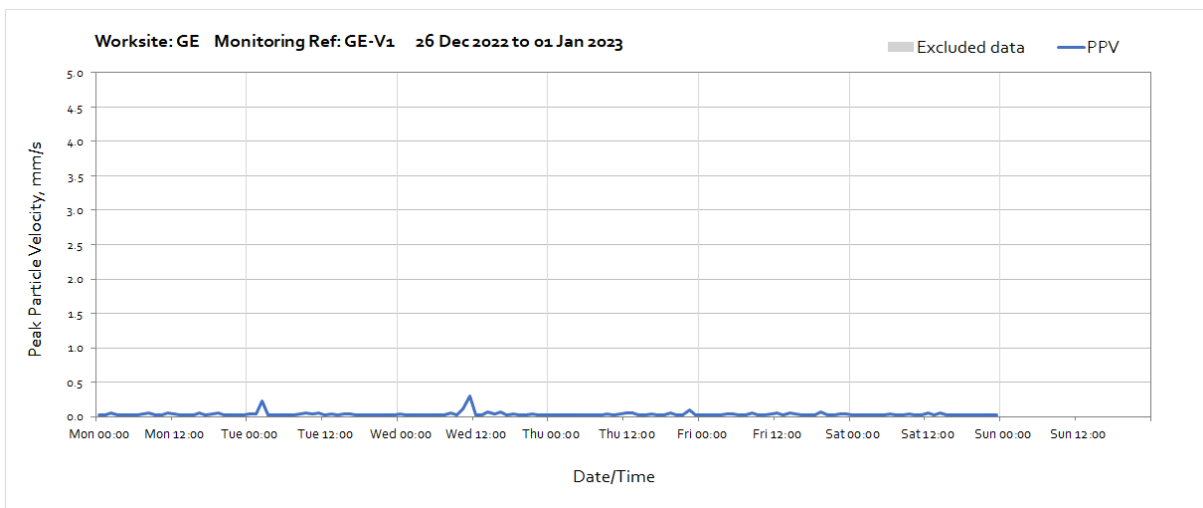
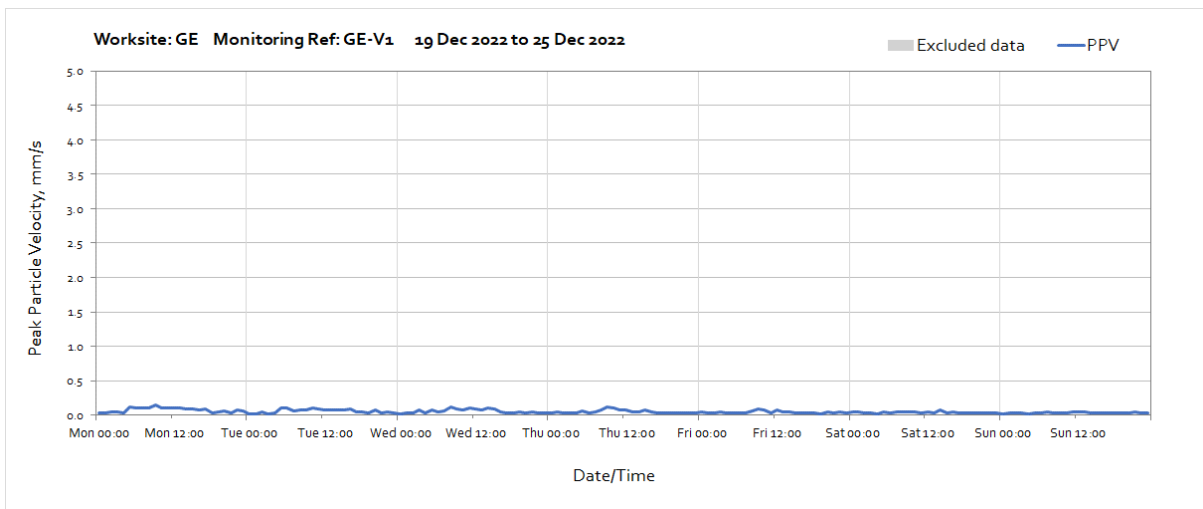
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Worksite: GE – Monitoring Ref: GE-V1

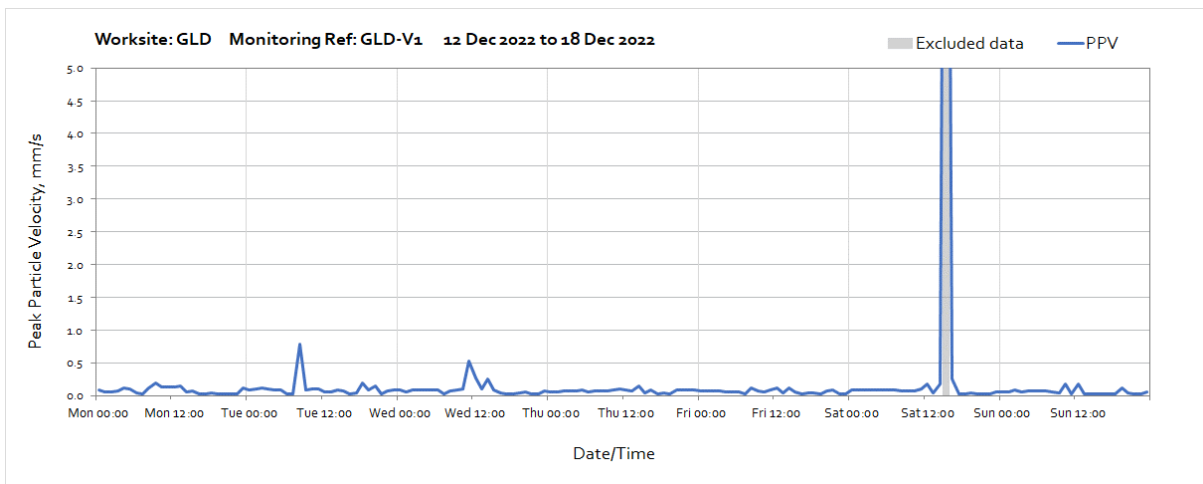
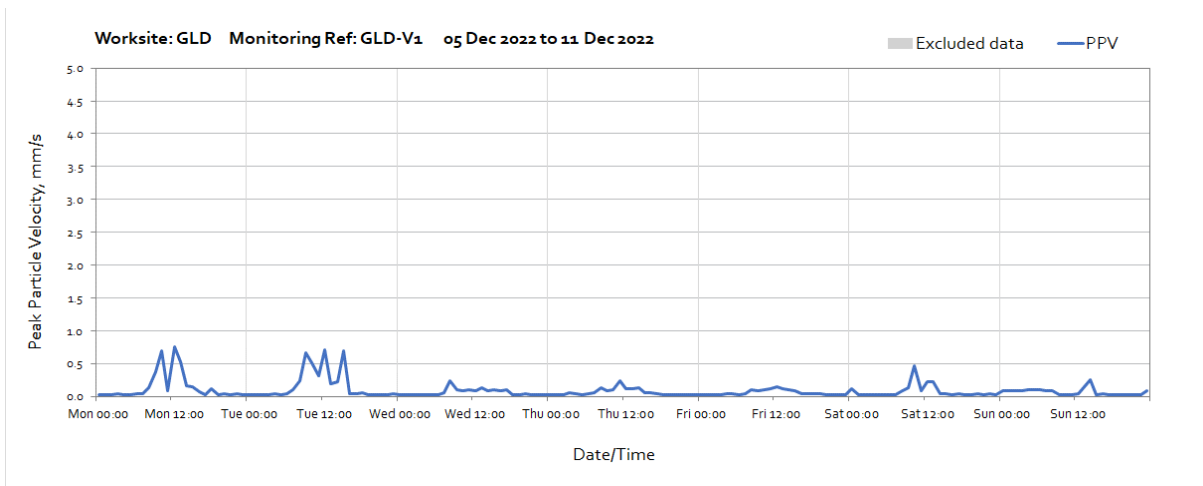
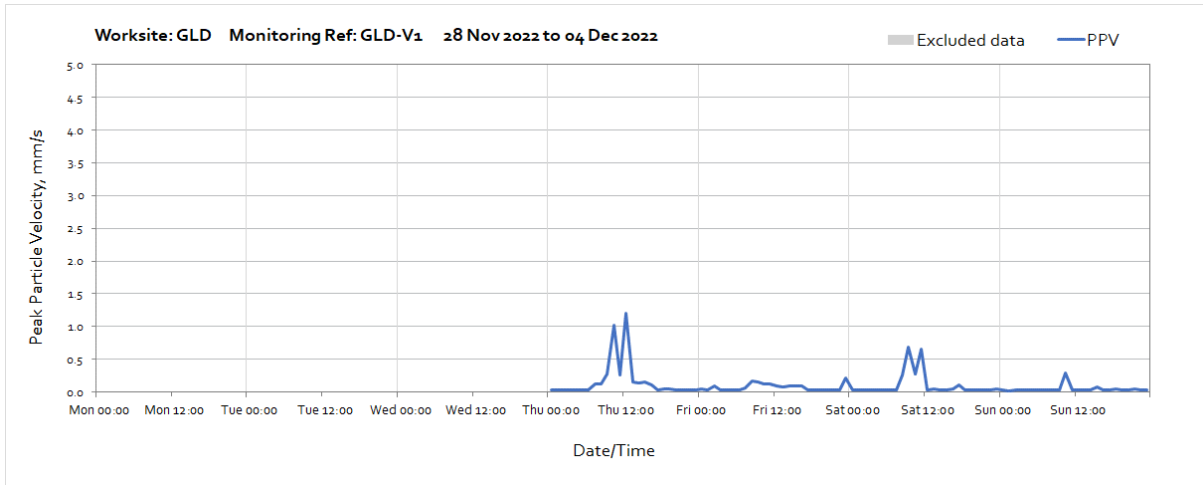


Note: Monitor installed at 11:00 on Thursday 15th December 2022.

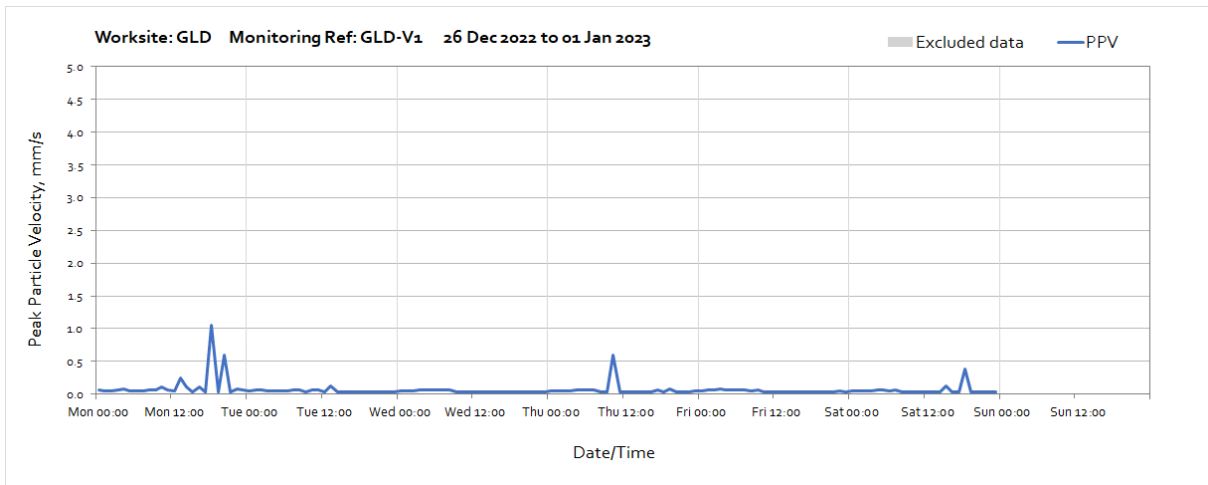
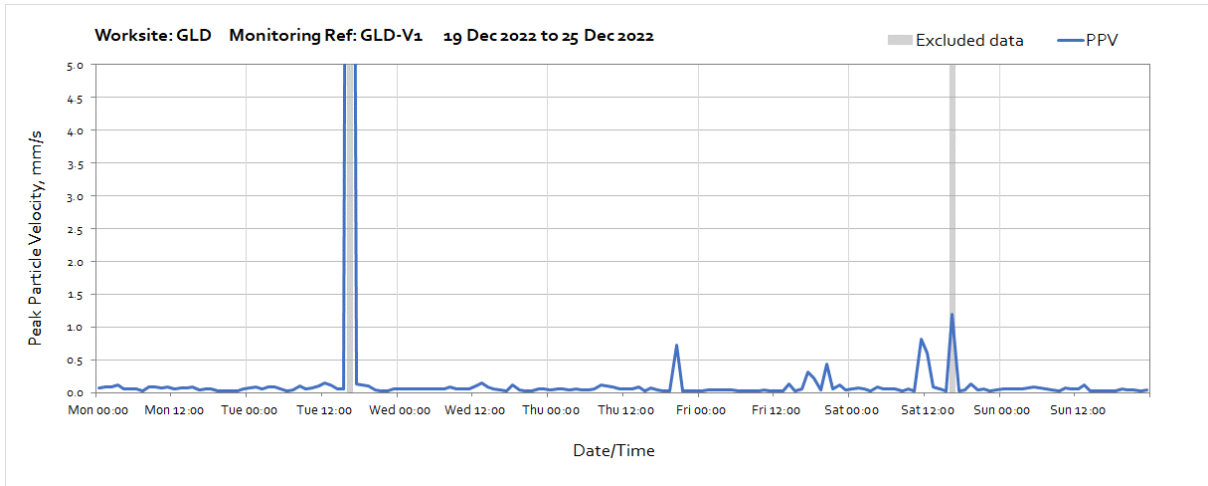


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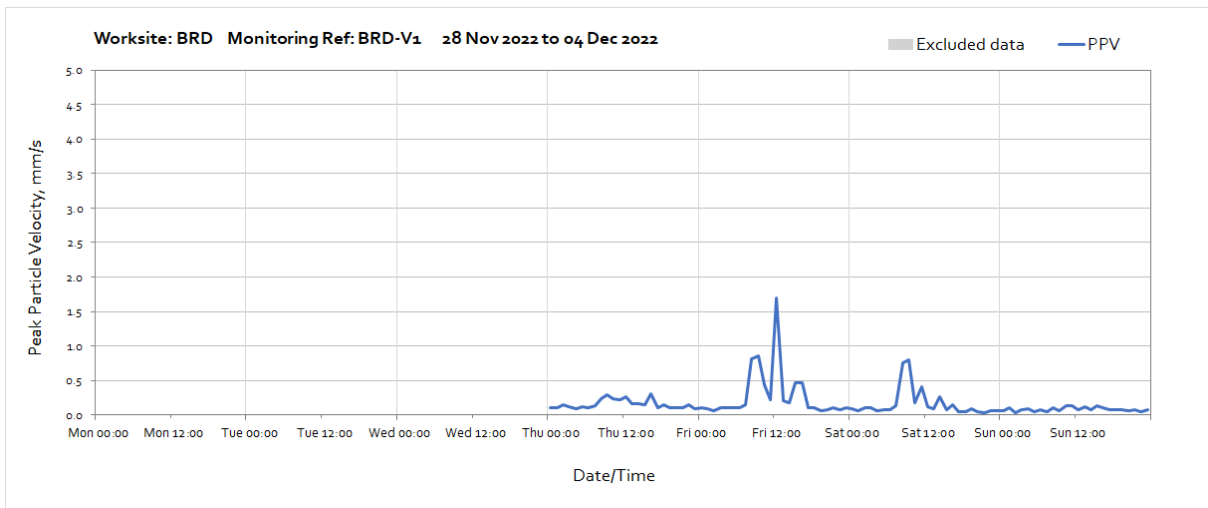
Worksite: GLD - Monitoring Ref: GLD-V1



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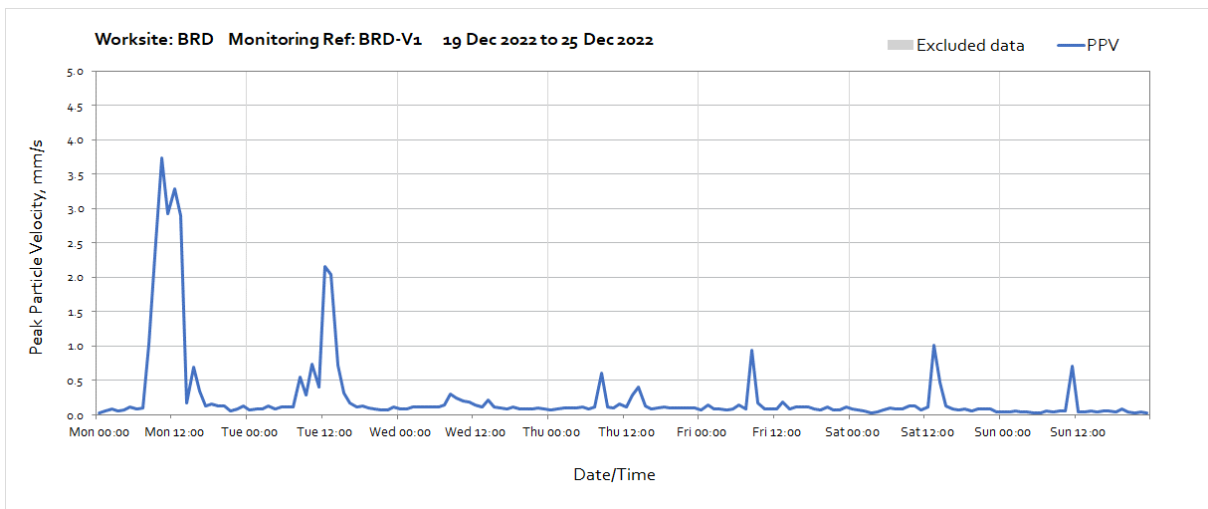
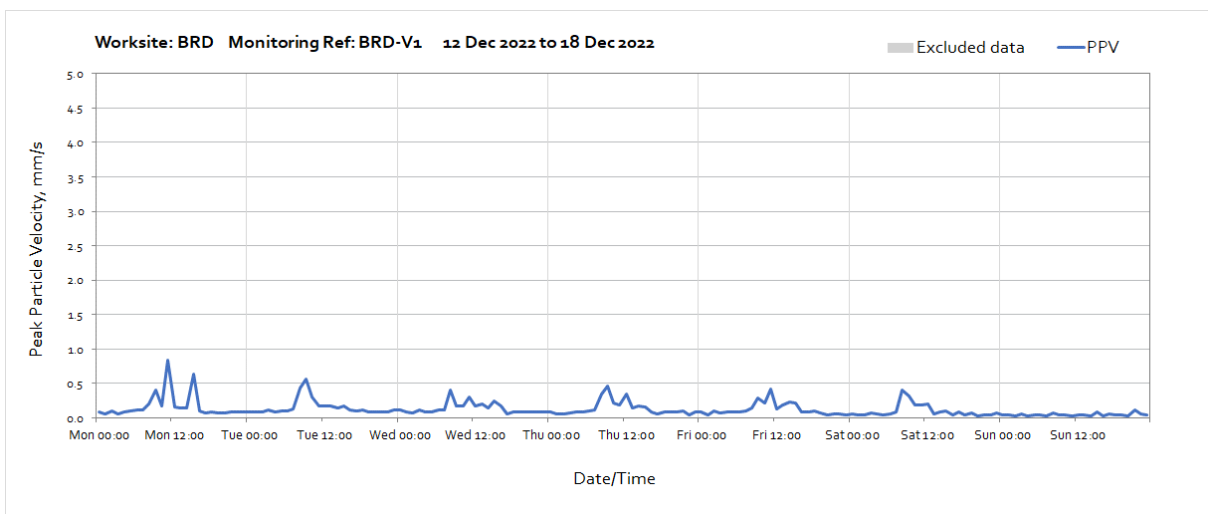
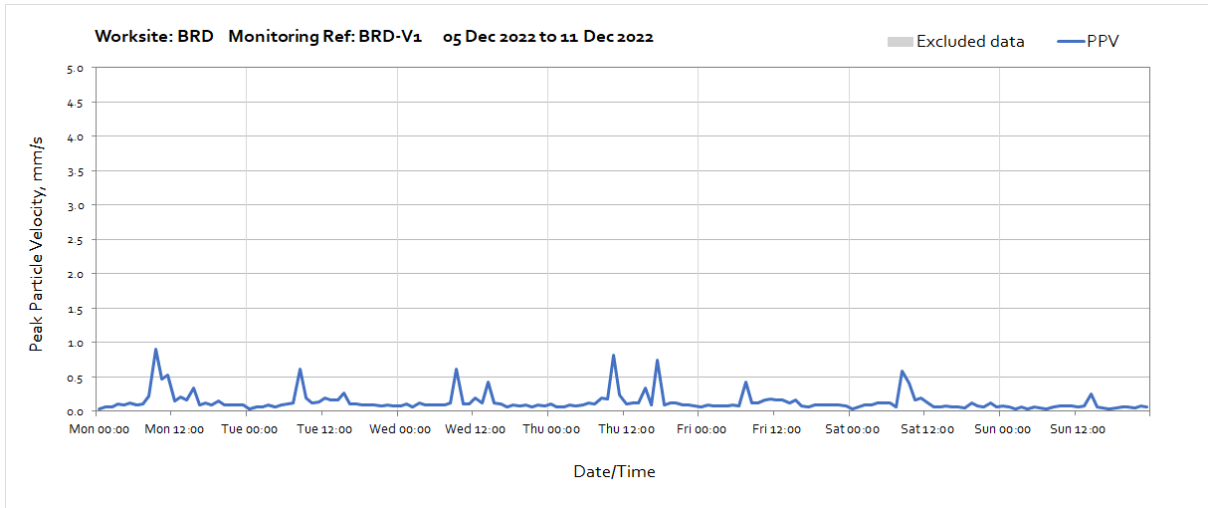


Worksite: BRD – Monitoring Ref: BRD-V1



Note: High PPV value recorded at 12:00 on Friday 2nd December was due road sweeping at the site entrance.

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Note: High PPV value recorded from 09:00 to 13:00 on Monday 19th December and from 12:00 to 13:00 on Tuesday 20th December was due to topsoil stripping in the vicinity to the monitor.

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