

Construction Noise and Vibration Monthly Report – November 2023

Solihull Metropolitan 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 the Solihull Metropolitan Borough Council (SMBC) during the month of November 2023.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken at the Coleshill Heath Road worksite (ref.: CHR), where work activities included steel fixing, piling, rebar stability tower installation, temporary vehicle restraint system installation, pile cap excavation, excavation, ducting, rigid inclusion installation, backfilling and demobilisation.
- Noise monitoring was undertaken at the Bickenhill Cutting worksite (ref.: BIC), where work activities included reinforcement and formwork, excavation, substation construction and pond excavation.
- Noise monitoring was undertaken at the Birmingham Interchange Station worksite (ref.: BIS), where work activities included demobilisation, utilities, excavation, repairs and steel fixing.
- Noise monitoring was undertaken at Diddington Lane Embankment (ref.: DLE), where work activities included pre-augering, sheet piling, remobilisation, steel fixing, formwork, wall cutting, concrete works and piling.
- Noise monitoring was undertaken in the vicinity of the Blythe Bypass Embankment Worksite (ref.: BBE), where excavation works were underway.
- Noise monitoring was undertaken in the vicinity of the A452 compound (ref.: A452), where activities included embankment works and piling works.
- Noise monitoring was undertaken in the vicinity of the Park Lane Worksite (ref.: PL) where work activities included stockpiling, relocation of vegetation, earthworks, traffic diversion, footbridge construction works, topsoil stripping and embankment works.

- Noise and Vibration monitoring was undertaken in the vicinity of the Balsall Common Viaduct Worksite (ref.: BCV) where work activities included piling works and vehicle movements.
- Noise monitoring was undertaken in the vicinity of the Carol Green Rail Underbridge Worksite (ref.: CGRU), where work activities included piling works, backfilling and material haulage including freight movement by train.
- Noise and vibration monitoring were undertaken in the vicinity of the Waste Lane Overbridge and Satellite Worksite (ref.: WLOS), where work activities included utility works, piling works, concrete pouring and demolition works.

Further works, where monitoring did not take place, were undertaken at the Packington Embankment where work activities included bulk excavation, decommissioning works, parapet works, ducting, kerbing works including trimming and installation, removal works, lighting reinstatement, trial holes and excavation.

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

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

Two (2) complaints were received during the monitoring period. A description of the complaint, 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 Solihull Metropolitan District (SMBC) for the period 1st to 30th of November 2023.

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

- Coleshill Heath Road worksite, ref.: CHR (see Plan 1 in Appendix A), where works activities included:
 - Steel fixing.
 - Piling.
 - Rebar stability towers installation.
 - Temporary vehicle restraint system installation.
 - Pile cap excavation.
 - Excavation.
 - Ducting.
 - Rigid inclusion installation.
 - Backfilling.
 - Demobilisation.

- Bickenhill Cutting worksite, ref.: BIC (see Plan 3 in Appendix A), where works activities included:
 - Reinforcement and formwork.
 - Excavation.
 - Substation construction.
 - Pond excavation.
- Birmingham Interchange Station worksite, ref.: BIS (see Plan 3 in Appendix A), where works activities included:
 - Demobilisation.
 - Utility works.
 - Excavation.
 - Repair works.
 - Steel fixing.
- Diddington Lane Embankment worksite: ref.: DLE (see Plan 3 in Appendix A), where works activities included:
 - Pre-augering.
 - Sheet piling.
 - Remobilisation.
 - Steel fixing.
 - Formwork.
 - Wall cutting.
 - Concrete works including curing.
 - Piling.
- Blythe Bypass Embankment worksite, reference - BBE (see plan 4 in Appendix A), where works activities included:
 - Excavation works.
- A452 worksite, reference - A452 (see plan 5 in Appendix A), where work activities included:
 - Embankment works.
 - Piling works.
- Park Lane worksite, reference - PL (see plan 6 in Appendix A), where work activities included:
 - Stockpiling.

- Relocation of vegetation.
- Earthworks.
- Traffic diversion works.
- Footbridge construction including piling.
- Topsoil stripping.
- Embankment works.
- Balsall Common Viaduct worksite, reference - BCV (see plan 7 in Appendix A), where work activities included:
 - Piling works.
 - Vehicle movements including use of haul road.
- Carol Green Rail Underbridge worksite, reference - CGRU (see plan 7 in Appendix A), where work activities included:
 - Piling.
 - Backfilling.
 - Material haulage, including freight movement by train.
- Waste Lane Overbridge and Satellite worksite, reference WLOS (see plan 8 in Appendix A), where work activities included:
 - Utility works.
 - Piling works.
 - Concrete pouring.
 - Hydro demolition.

1.1.4 Further works, where monitoring did not take place, were undertaken at the Packington Embankment where work activities included bulk excavation, decommissioning works, parapet works, ducting, kerbing works including trimming and installation, removal works, lighting reinstatement, trial holes and excavation.

1.1.5 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 Seventeen (17) noise and Eight (8) vibration monitoring installations were active in November in the SMBC area. Table 2 summarises the position of noise and vibration monitoring installations within the SMBC area in November 2023.
- 1.2.2 Noise monitor DLE-1 was decommissioned and vibration monitor DLE-V1 was commissioned in the month of November.
- 1.2.3 Maps showing the position of noise monitoring installations are presented in Appendix B.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
CHR	CHR-1	Coleshill Heath Road, Coleshill Heath, Solihull
	CHRU-1	276 Yorkminster Drive, Birmingham
	CHRU-V1	276 Yorkminster Drive, Birmingham
BIC	BIC-1	Park Farm Barns, Chester Rd, Marston Green, Coventry
BIS	BIS-1	Hollywell Brook, Middle Bickenhill Lane, Solihull
DLE	DLE-1	Hampton Hill Hounds, Nursery Cottage, Coventry Road, Bickenhill
	DLE-2	Diddington Ln, Hampton in Arden
	DLE-V1	Hampton Hill Farmhouse, Coventry Road
BBE	BBE-1	Patrick Farm House, Meriden Road, Hampton in Arden
A452	A452-1	Marsh House Farm, Brandocks Marsh, Solihull
	A452-V1	Mercote Cottage, Marsh House, Farm Lane, Brandocks Marsh, Solihull
PL	PL-1	(east of) Final Home, Park Lane, Balsall Common
	PL-2	(north of) The Laurel, Lavender Hall Lane, Balsall Common, Solihull
	PL-3	(north-east of) Holly Acre Lodge, Kenilworth Road, Solihull
	PL-5	Lavender Hall Lane, Balsall Common, Solihull
	PL-V1	(east of) Final Home, Park Lane, Balsall Common, Coventry, West Midlands
	PL-V3	Lavender Hall Lane, Balsall Common, Solihull
	PL-V4	(north-east of) Holly Acre Lodge, Kenilworth Road, Berkswell, Solihull
BCV	BCV-1	(north-west of) Cherry Tree Cottage, Truggist Lane, Balsall Common, Solihull

Worksite Reference	Measurement Reference	Address
CGRU	CGRU-1	(west of) The Stables, Truggist Lane, Balsall Common, Solihull
	CGRU-3	Annora House, 314 Station Rd, Balsall Common
WLOS	WLOS-1	(south of) 19 Hodgetts Lane, Burton Green, Warwickshire
	WLOS-2	Little Beanitt Farm, Waste Lane, Balsall Common, Solihull
	WLOS-3	(north of) Dragonflies, Waste Lane, Balsall Common, Solihull
	WLOS-V1	19 Hodgetts Lane, Burton Green, Warwickshire
	WLOS-V2	Little Beanitt Farm, Waste Lane, Balsall Common, Solihull

2 Summary of Results

2.1 Summary of Measured Noise 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
CHR	CHRU-1	276 Yorkminster Drive, Birmingham	Free field	61.8 (66.2)	62.2 (66.2)	60.9 (64.7)	59.9 (64.6)	58.7 (65.9)	60.9 (61.1)	62.6 (67.6)	61.9 (66.2)	62.5 (66.4)	57.9 (63.9)	60.9 (65.6)	57.9 (66.4)
	CHR-1	Coleshill Heath Road, Coleshill Heath, Solihull	Free field	63.3 (65.7)	63.9 (65.7)	63.0 (67.7)	62.5 (65.3)	60.8 (66.8)	63.3 (64.2)	65.7 (67.9)	65.3 (66.9)	64.6 (66.4)	59.8 (63.3)	64.7 (67.7)	61.5 (67.3)
BIC	BIC-1	Park Farm Barns, Chester Rd, Marston Green	Free field	58.7 (61.9)	57.1 (59.1)	56.6 (59.0)	56.1 (58.7)	53.7 (60.7)	56.8 (58.3)	56.9 (58.1)	54.3 (57.6)	55.7 (58.4)	51.8 (57.3)	56.3 (59.8)	54.7 (60.0)
BIS	BIS-1	Hollywell Brook, Middle Bickenhill Lane, Solihull	Free field	58.0 (60.4)	57.1 (60.4)	56.2 (57.9)	56.2 (59.5)	53.4 (60.4)	56.3 (58.9)	55.4 (56.9)	56.6 (65.0)	55.6 (65.0)	51.2 (55.4)	55.1 (59.1)	53.3 (59.6)
DLE	DLE-2	Diddington Ln, Hampton in Arden, Solihull	Free field	56.9 (61.1)	57.2 (60.7)	55.5 (59.3)	54.2 (59.1)	51.6 (59.1)	54.0 (57.2)	55.6 (57.5)	53.4 (56.5)	54.0 (58.8)	50.1 (54.1)	52.6 (58.1)	50.0 (57.0)
BBE	BBE-1	Patrick Farm House	Free field	56.1 (57.5)	58.4 (60.0)	54.9 (57.8)	52.7 (56.5)	49.0 (55.8)	52.2 (53.0)	56.4 (58.8)	54.2 (55.8)	53.8 (60.4)	46.9 (50.3)	53.7 (56.6)	49.6 (55.9)
A452	A452-1	Marsh House Farm	Free field	56.3 (60.1)	59.4 (61.7)	53.9 (57.8)	51.0 (54.5)	48.3 (55.0)	53.8 (55.6)	53.1 (56.7)	50.7 (55.9)	53.5 (65.0)	45.5 (51.3)	52.1 (56.9)	48.8 (55.3)
PL	PL-1	Park Lane	Free field	52.7	60.6	54.0	47.7	45.3	50.5	55.1	49.5	49.4	43.1	52.7	60.6

OFFICIAL

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
				(57.2)	(62.8)	(63.8)	(54.4)	(54.7)	(51.7)	(57.4)	(53.5)	(54.5)	(48.3)	(57.2)	(62.8)
	PL-2	The Laurel	Free field	51.0 (55.3)	59.3 (62.0)	52.3 (59.2)	48.3 (57.2)	43.3 (53.9)	47.4 (47.9)	55.2 (60.3)	50.2 (55.7)	49.2 (56.1)	41.1 (45.4)	52.3 (68.7)	44.9 (51.6)
	PL-3	Holly Acre Lodge	Free field	58.7 (62.8)	58.5 (61.0)	56.0 (59.2)	52.8 (56.9)	50.2 (59.2)	55.1 (55.9)	56.0 (57.8)	54.3 (58.2)	56.7 (70.6)	47.2 (52.0)	55.6 (59.5)	51.3 (58.1)
	PL-5	Lavender Hall Lane	Free field	62.4 (67.2)	63.4 (65.7)	60.9 (62.7)	58.2 (62.3)	52.9 (69.8)	56.5 (57.3)	62.3 (63.9)	62.4 (65.0)	59.5 (62.9)	50.8 (55.8)	60.6 (68.4)	52.6 (57.5)
BCV	BCV-1	Cherry Tree Cottage	Free field	54.7 (60.6)	64.2 (68.6)	53.3 (66.3)	50.3 (53.6)	47.3 (53.6)	50.6 (51.4)	56.3 (62.6)	49.1 (51.2)	50.5 (56.7)	43.6 (50.0)	51.1 (55.3)	49.0 (58.8)
CGRU	CGRU-1	The Stables	Free field	51.2 (59.0)	56.2 (62.3)	48.7 (56.1)	47.9 (52.0)	46.0 (54.9)	48.6 (50.9)	48.4 (53.5)	45.7 (50.3)	47.8 (54.4)	43.7 (56.4)	48.8 (55.1)	46.9 (51.6)
	CGRU-3	Annora House, 314 Station Rd	Free field	55.3 (58.3)	65.2 (70.1)	52.8 (69.5)	50.6 (53.4)	47.5 (52.7)	50.2 (51.2)	51.6 (52.3)	51.0 (51.5)	51.0 (58.9)	45.1 (50.8)	50.9 (56.7)	52.3 (76.8)
WLOS	WLOS-1	19 Hodgetts Lane	Façade	50.7 (54.7)	63.9 (84.1)	44.0 (57.5)	41.7 (48.0)	38.9 (49.6)	47.2 (51.5)	54.8 (60.1)	42.6 (44.0)	43.6 (51.9)	38.7 (46.5)	43.7 (48.5)	38.8 (44.3)
	WLOS-2	Waste Lane (East)	Free field	49.9 (52.3)	52.5 (55.0)	47.1 (50.0)	44.3 (52.4)	40.6 (50.5)	46.5 (47.6)	51.6 (52.5)	48.2 (51.3)	46.0 (51.2)	38.8 (44.1)	46.3 (54.3)	40.7 (49.4)
	WLOS-3	Waste Lane (West)	Free field	59.5	59.3	56.7	53.6	48.7	54.4	58.2	57.1	55.0	46.8	55.9	49.7

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Worksite Reference	Measurement Reference	Site Address	Free-Field or Façade Measurement	Weekday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$)					Saturday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$)					Sunday / Public Holiday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$)	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
				(63.1)	(60.9)	(58.8)	(59.9)	(58.5)	(56.4)	(60.3)	(59.5)	(58.7)	(50.9)	(60.5)	(59.4)

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
CHR	CHRU-V1	276 Yorkminster Drive, Birmingham	1.57 (X-axis)
DLE	DLE-V1	Hampton Hill Farmhouse, Coventry Road	2.62 (X-axis)
A452	A452-V1	Mercote Cottage, Marsh House, Farm Lane, Brandocks Marsh, Solihull	1.09 (X-axis)
PL	PL-V2	(east of) Final Home, Park Lane, Balsall Common	1.27 (Y-axis)
	PL-V3	Lavender Hall Lane, Balsall Common, Solihull	0.51 (X-axis)
	PL-V4	(north-east of) Holly Acre Lodge, Kenilworth Road, Berkswell, Solihull	5.17 (Y-axis)*
WLOS	WLOS-V1	19 Hodgetts Lane, Burton Green, Warwickshire	1.02 (X-axis)
	WLOS-V2	Little Beanitt Farm, Waste Lane, Berkswell, Balsall Common, Solihull	0.54 (X-axis)

* High vibration level due to piling works for footbridge construction.

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
CHR	CHRU-1*	(east of) 276 Yorkminster Drive, Birmingham	All Days	All Periods	Not applicable**	No exceedance
	CHR-1*	Coleshill Heath Road	All Days	All Periods	Not applicable**	No exceedance
BIC	BIC-1	Park Farm Barns	All Days	All Periods	No exceedance	No exceedance
BIS	BIS-1*	Hollywell Brook, Middle Bickenhill Lane	All Days	All Periods	No exceedance	No exceedance
DLE	DLE-2*	Diddington Ln, Hampton in Arden	All Days	All Periods	Not applicable**	No exceedance

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
BBE	BBE-1*	Patrick Farm House	All Days	All Periods	No exceedance	No exceedance
A452 Compound	A452-1	Marsh House Farm	All Days	All Periods	No exceedance	No exceedance
PL	PL-1*	Park Lane	All Days	All Periods	No exceedance	No exceedance
	PL-2*	The Laurel	All Days	All Periods	No exceedance	No exceedance
	PL-3*	Holly Acre Lodge	All Days	All Periods	No exceedance	No exceedance
	PL-5	Lavender Hall Lane	Weekdays Saturday	0800-1800 0800-1800	15 2	No exceedance
BCV	BCV-1*	Cherry Tree Cottage	Weekdays	0800-1800	1	No exceedance
CGRU	CGRU-1*	The Stables	All Days	All Periods	No exceedance	No exceedance
	CGRU-3*	Annora House, 314 Station Rd	All Days	All Periods	No exceedance	No exceedance
WLOS	WLOS-1*	19 Hodgetts Lane	Weekdays	0800-1800	2	No exceedance
	WLOS-2	Waste Lane (East)	All Days	All Periods	No exceedance	No exceedance
	WLOS-3*	Waste Lane (West)	All Days	All Periods	No exceedance	No exceedance

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

** The LOAEL has not been assessed due to high baseline levels.

2.2.6 Exceedances of the LOAEL were recorded at three (3) noise monitoring locations during weekday and Saturday daytime periods.

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

2.3 Exceedances of Trigger Level

2.3.1 Table 6 provides a summary of exceedances of the S61 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
-	-	-	-	-	-

2.1 Complaints

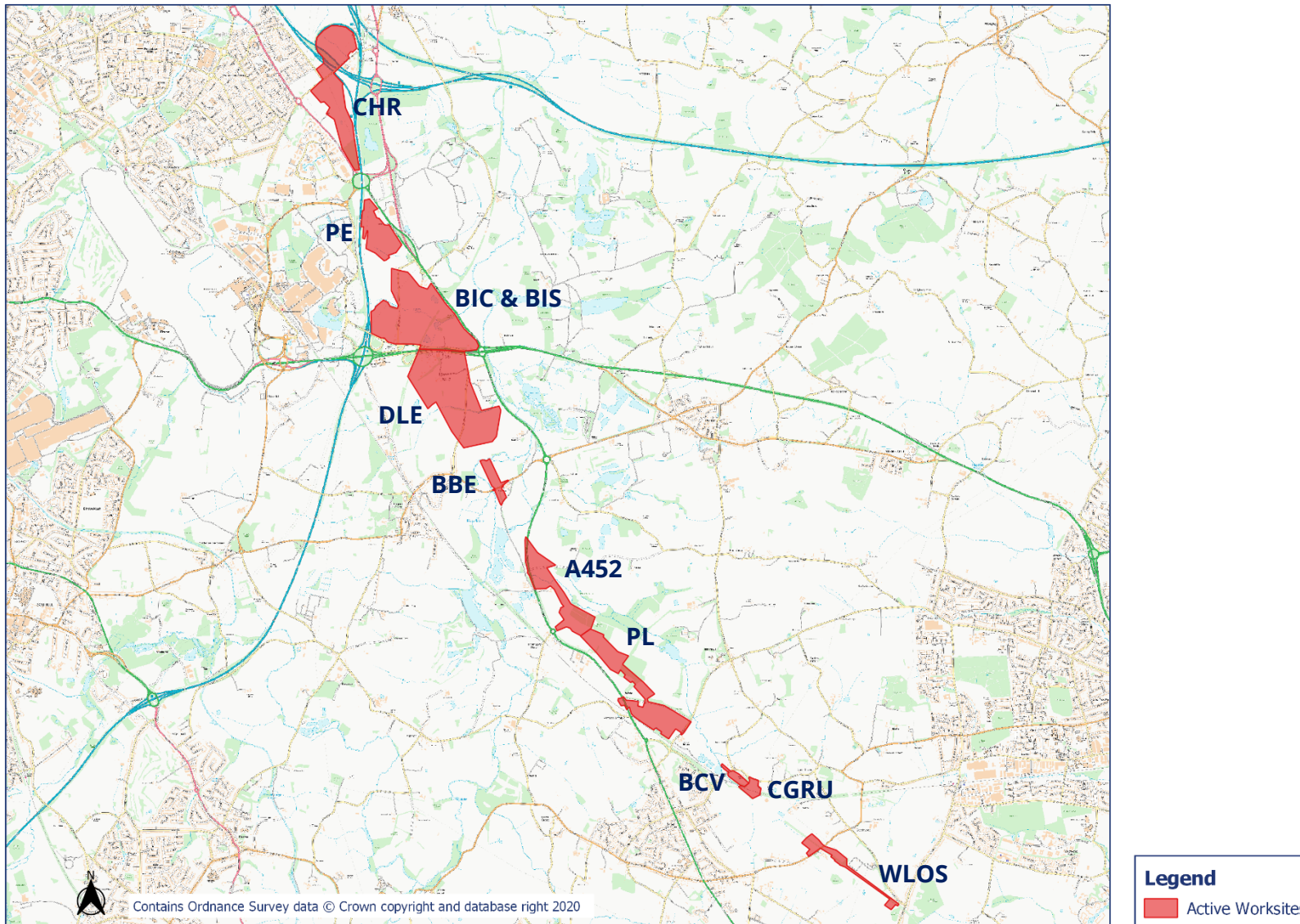
2.1.1 Table 7 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

Table 7: Summary of Complaints

Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-23-103389-E-C	CHR	Complaint due to drilling noise.	Investigation found that drilling originated in the next door property and was not from HS2 works.	Results of the investigation were provided to the complainant.
HS2-23-103519-E-C	WLOS	Complaint due to generator noise at night.	Noise due to a faulty generator which has since been repaired.	Results of the investigation were provided to the complainant.

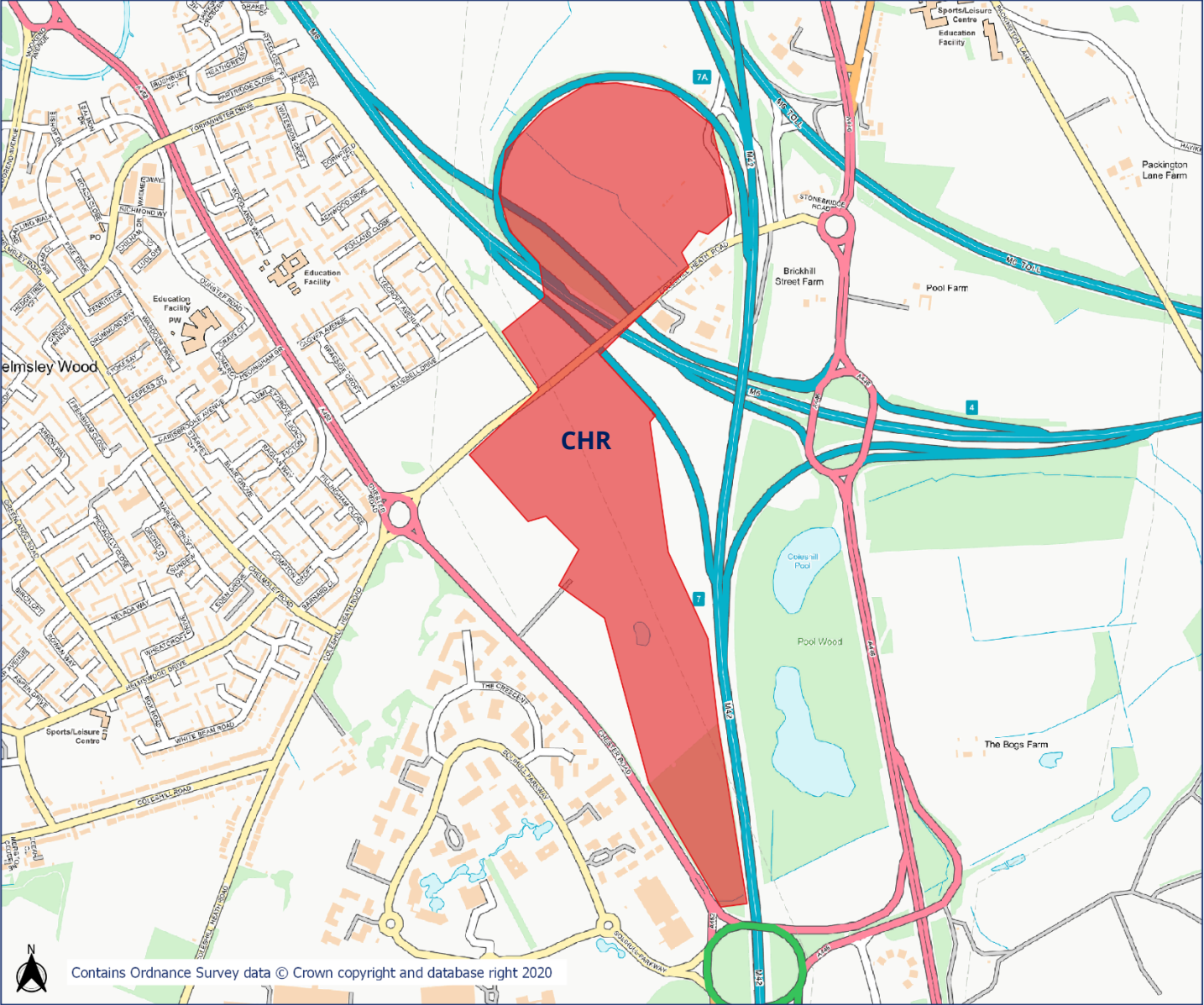
Appendix A Site Locations

Worksite Identification Plan - Overview



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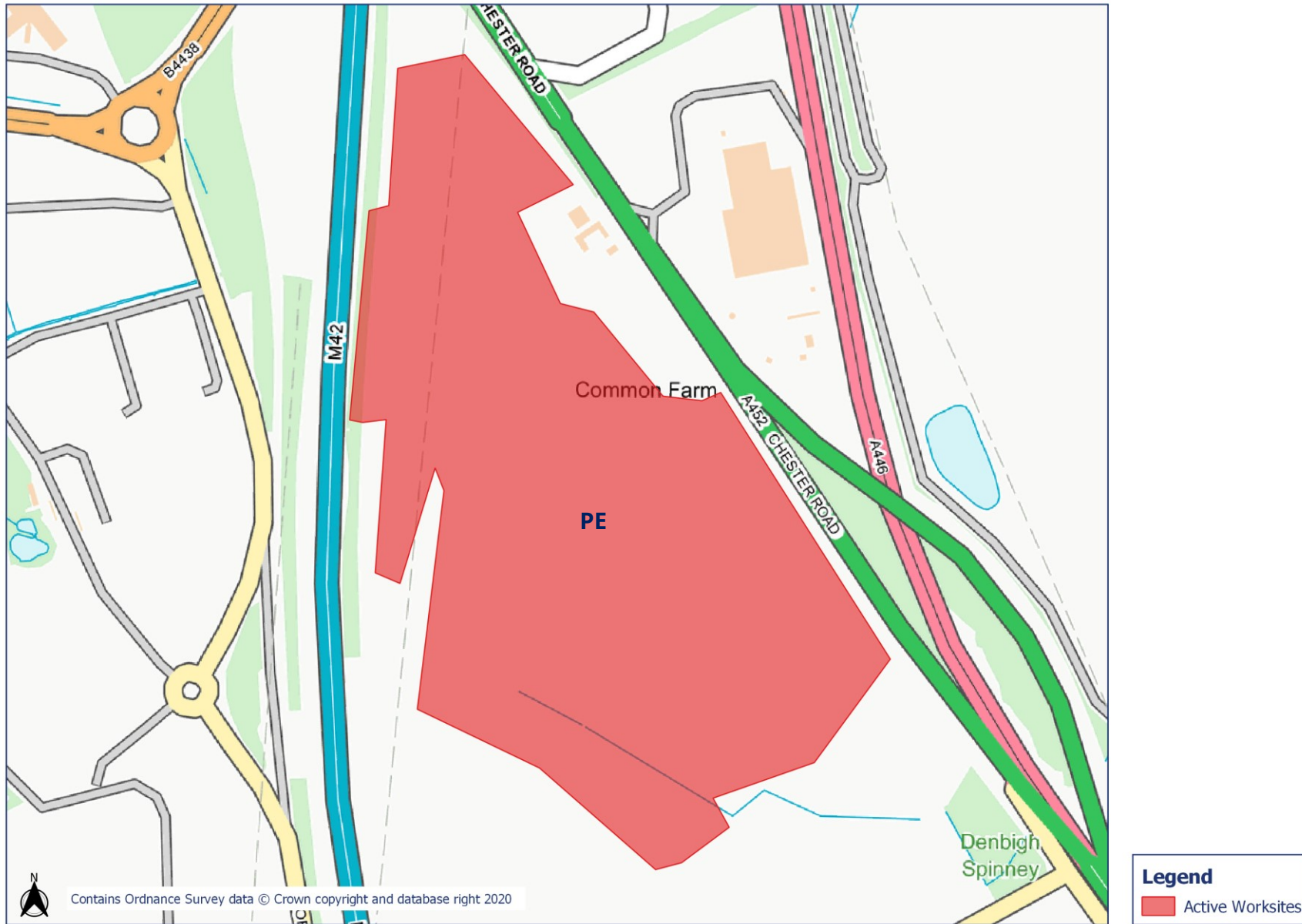
Worksite Identification Plan - 1



Legend

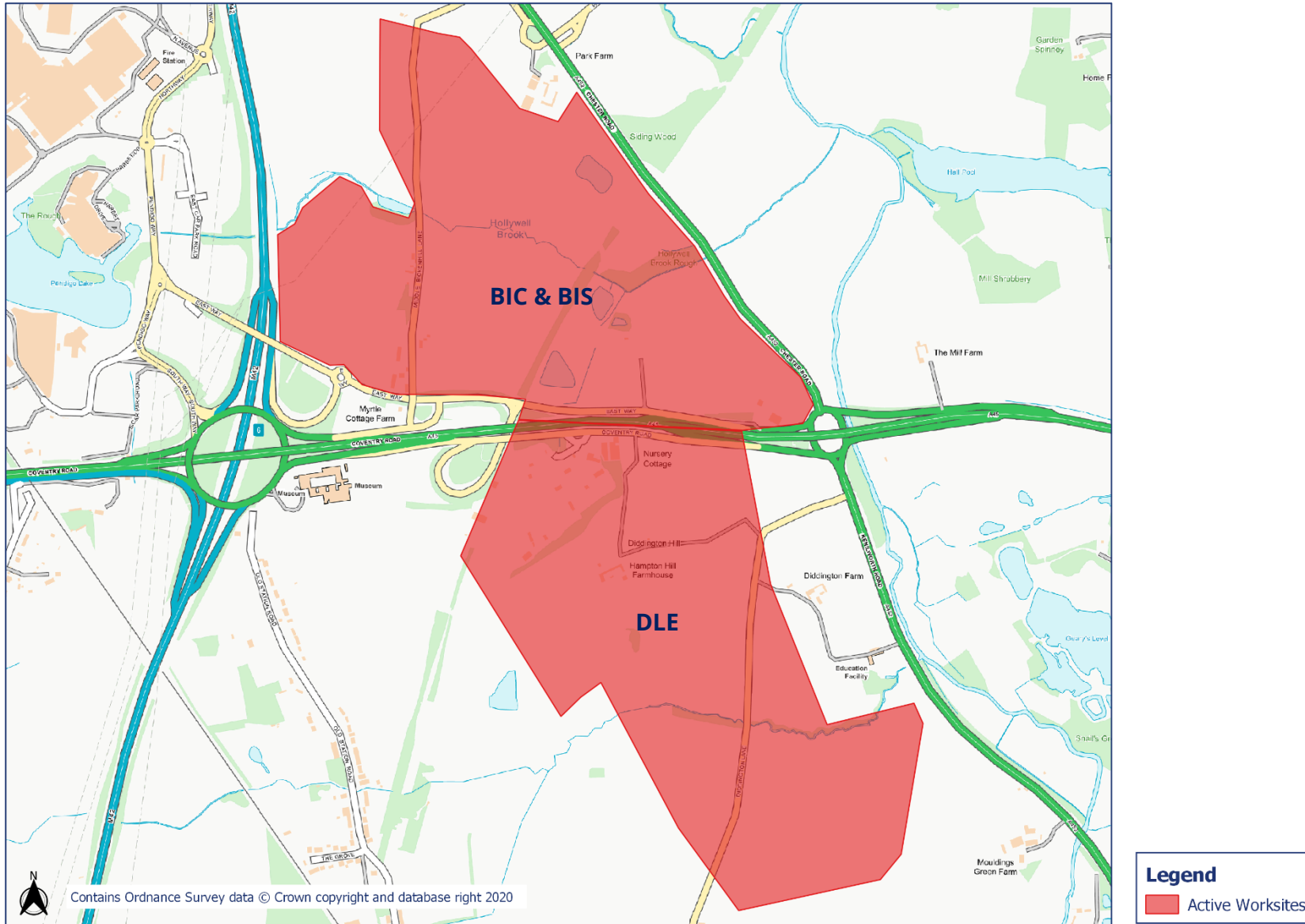
- Active Worksites

Worksite Identification Plan - 2



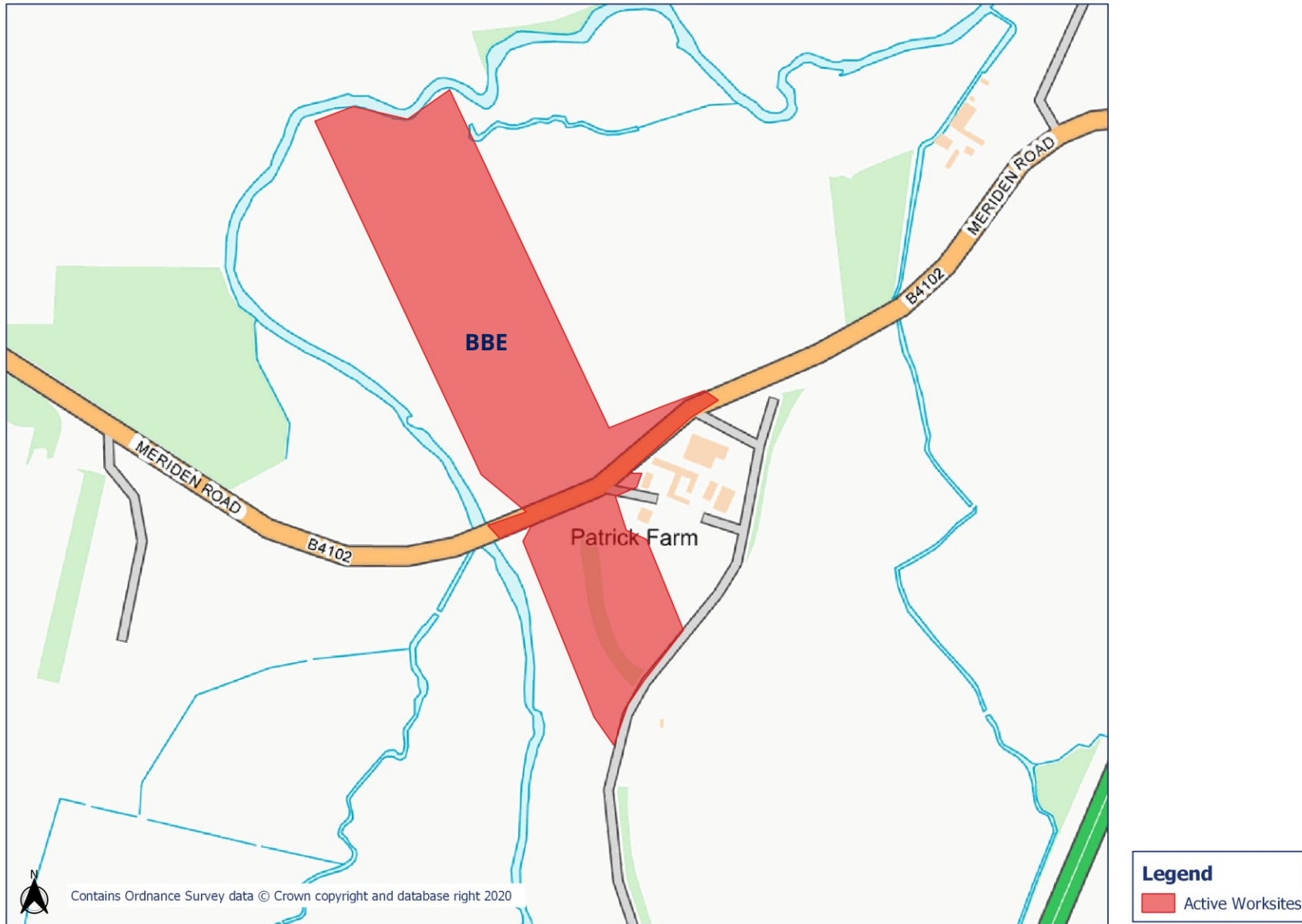
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Worksite Identification Plan - 3



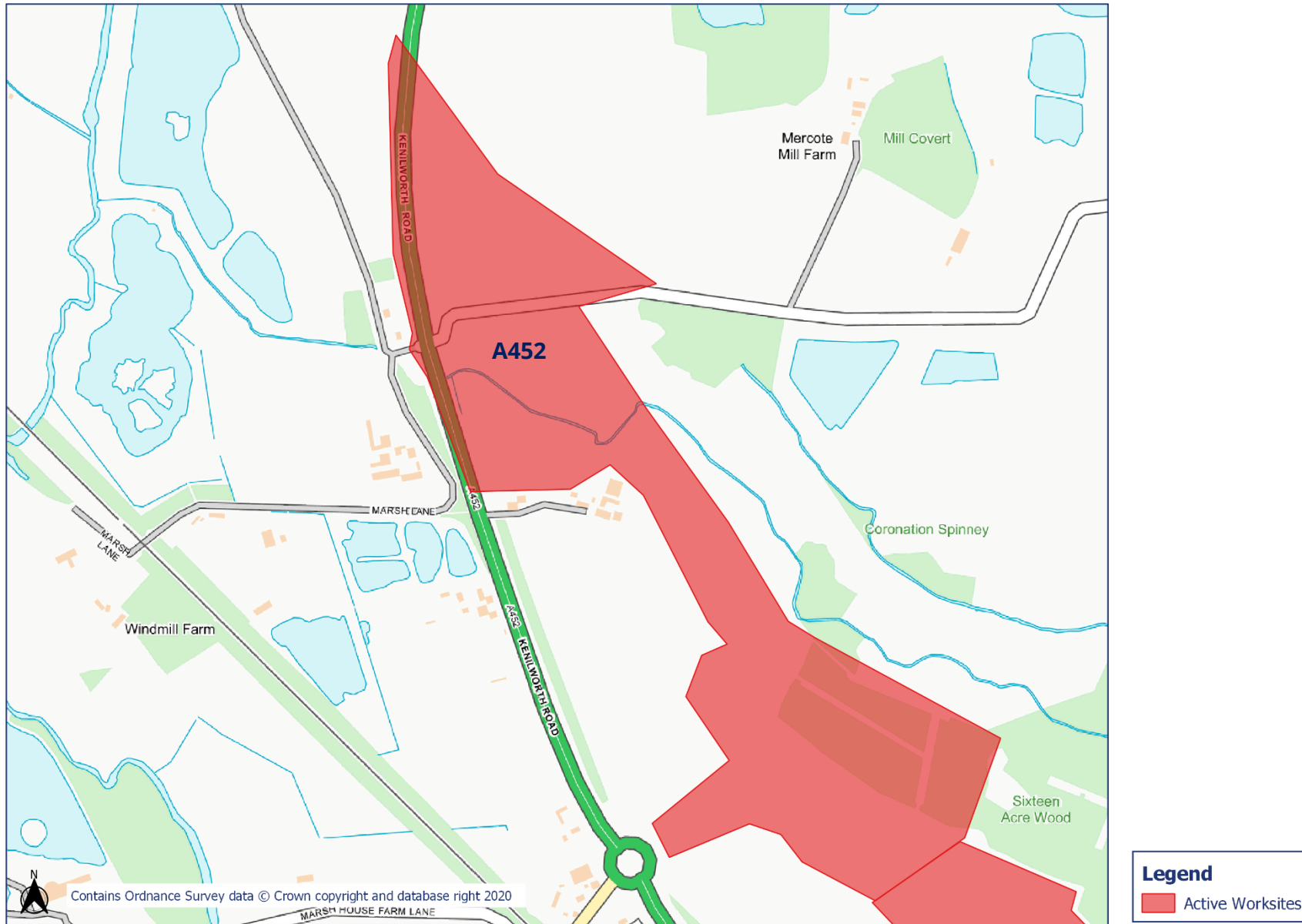
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Worksite Identification Plan - 4



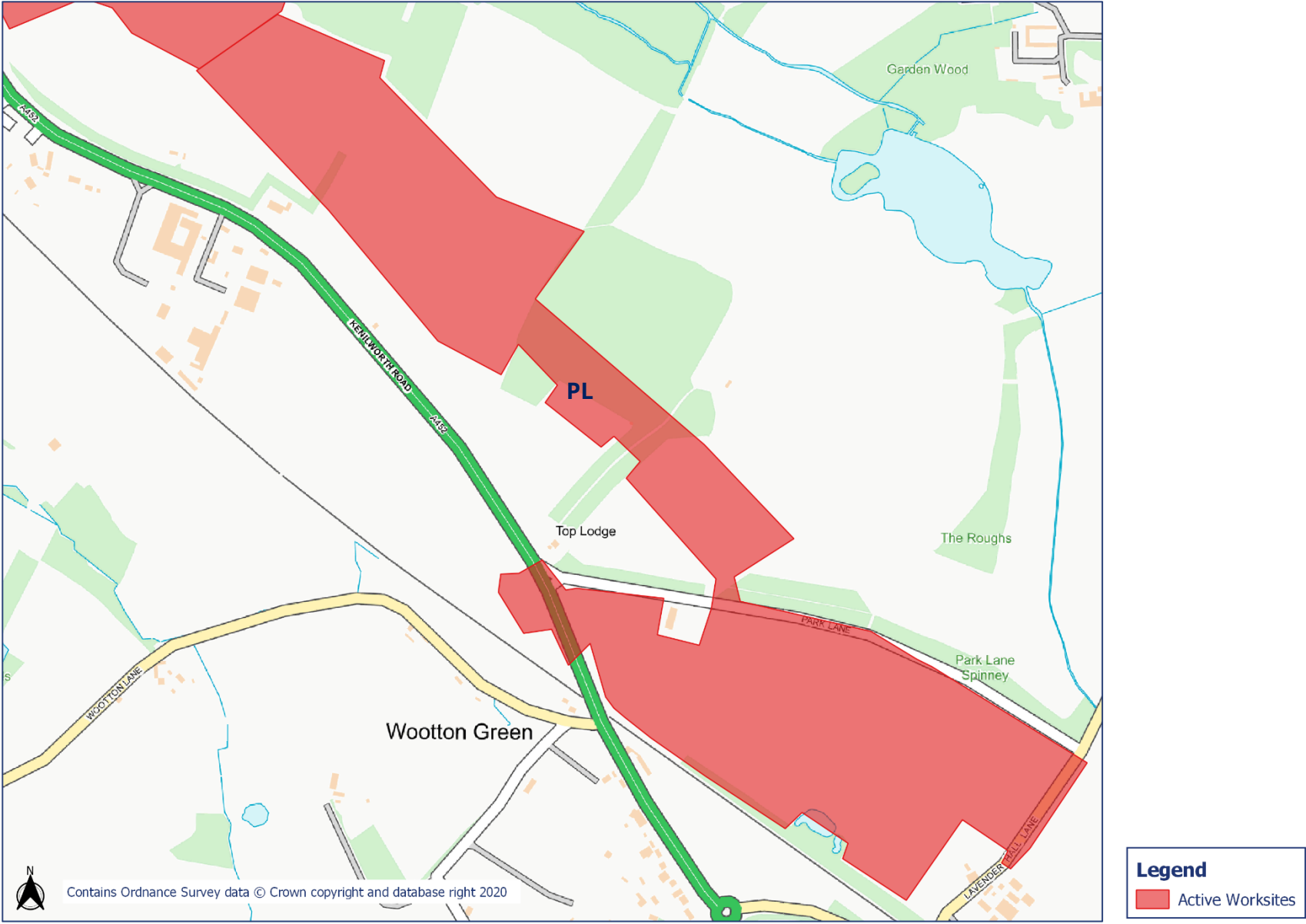
OFFICIAL

Worksite Identification Plan - 5



OFFICIAL

Worksite Identification Plan - 6

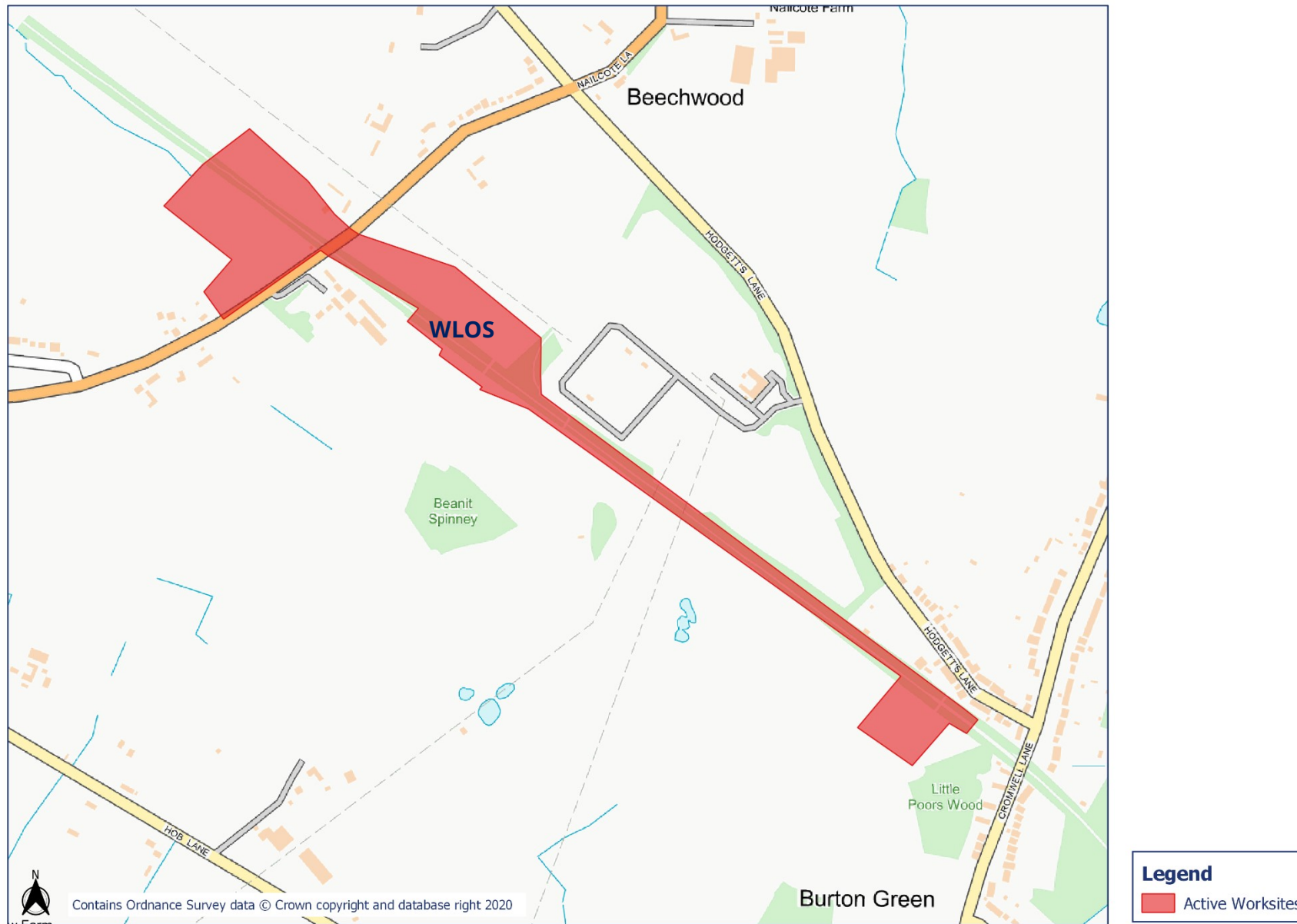


Worksite Identification Plan - 7



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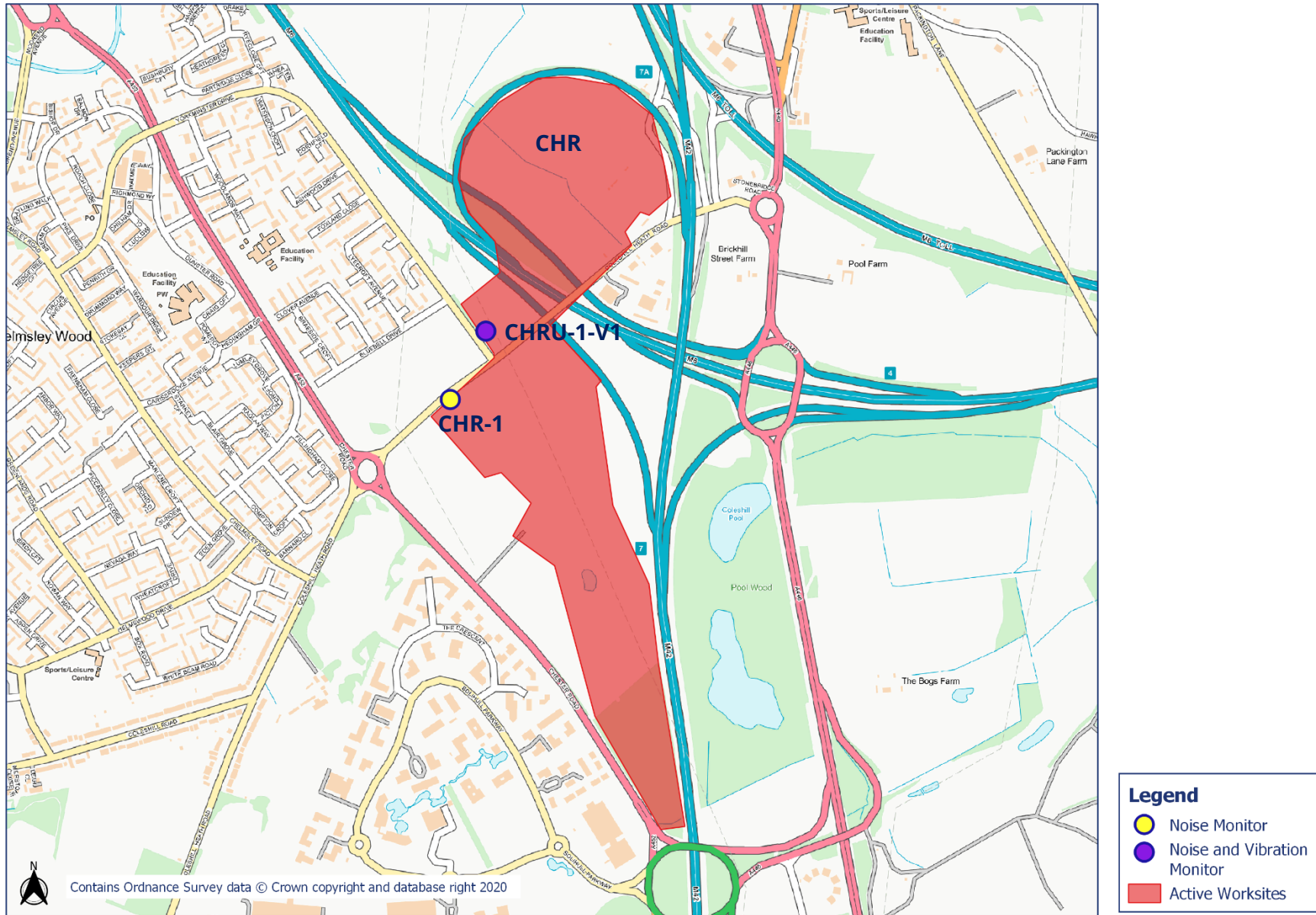
Worksite Identification Plan - 8



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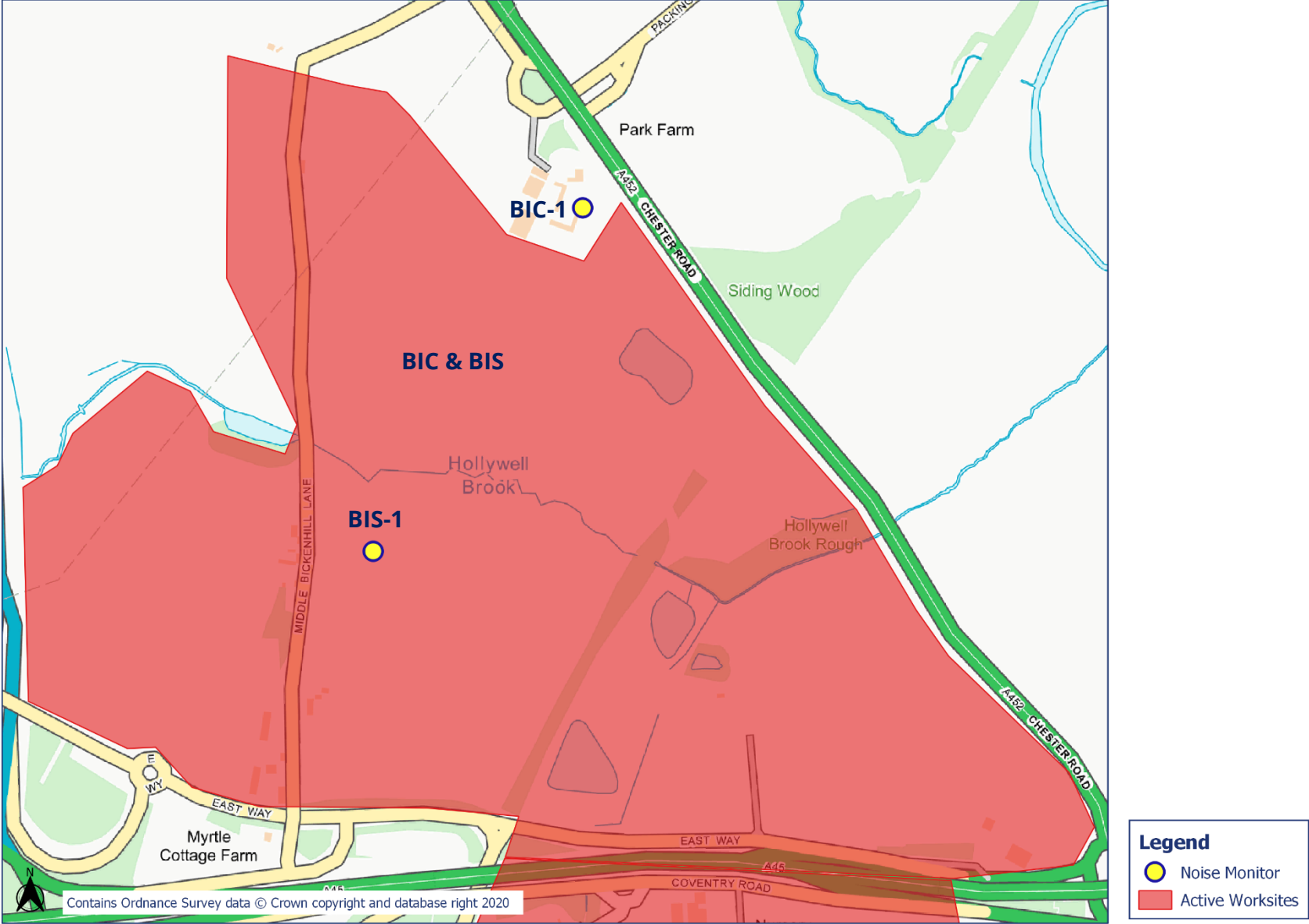
Appendix B Monitoring Locations

Noise and Vibration Monitoring Plan - 1



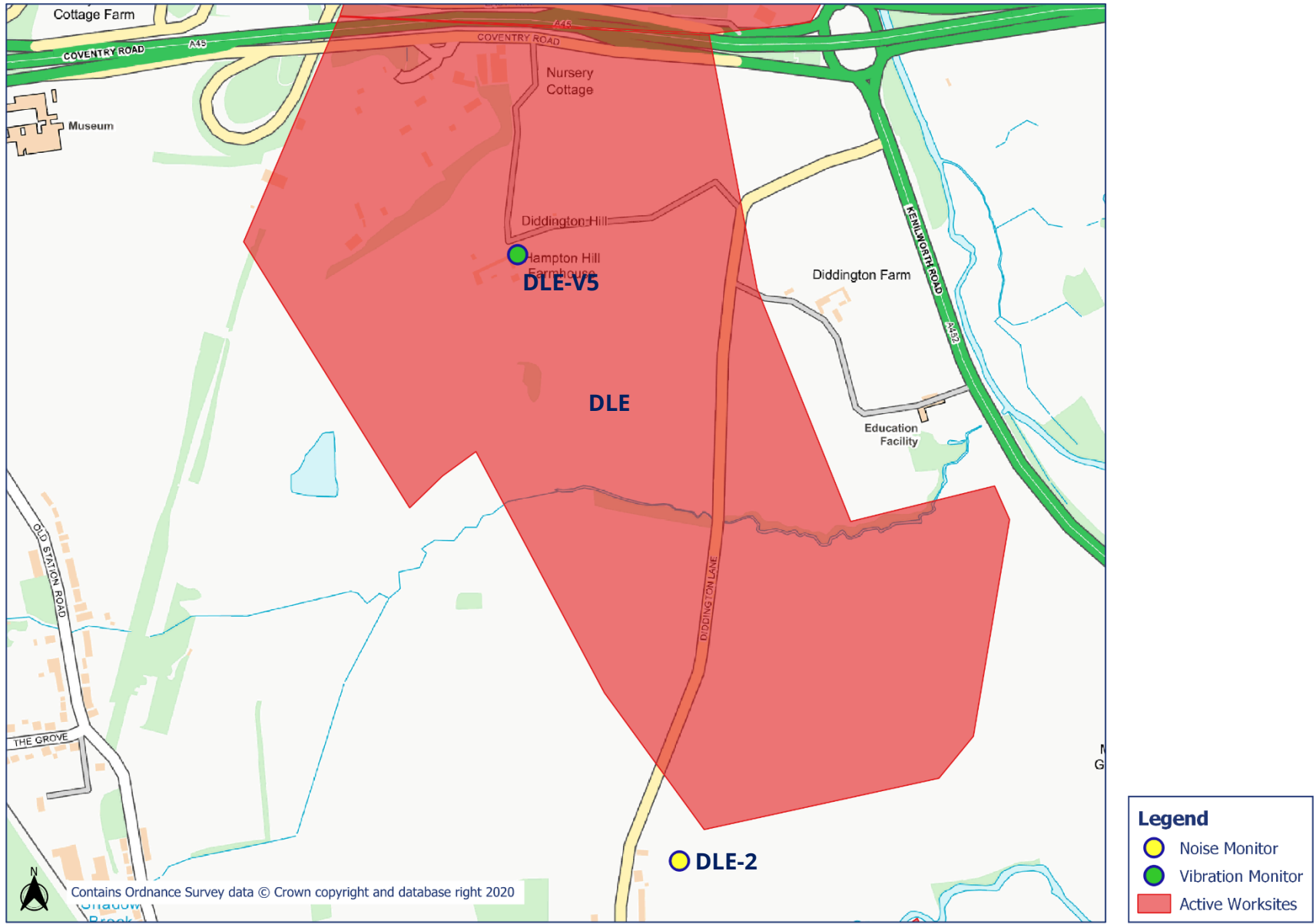
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Noise and Vibration Monitoring Plan - 2



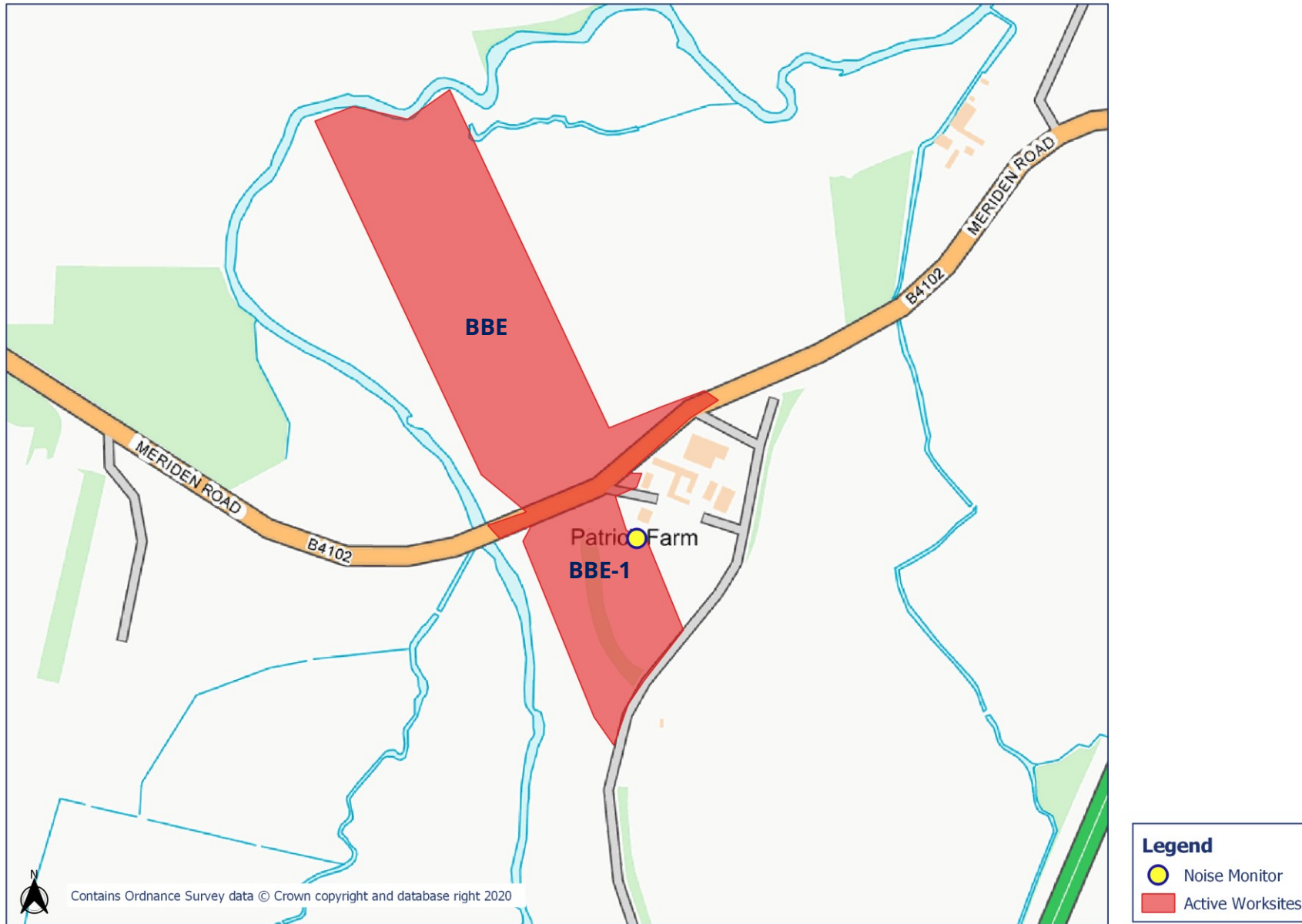
OFFICIAL

Noise and Vibration Monitoring Plan - 3



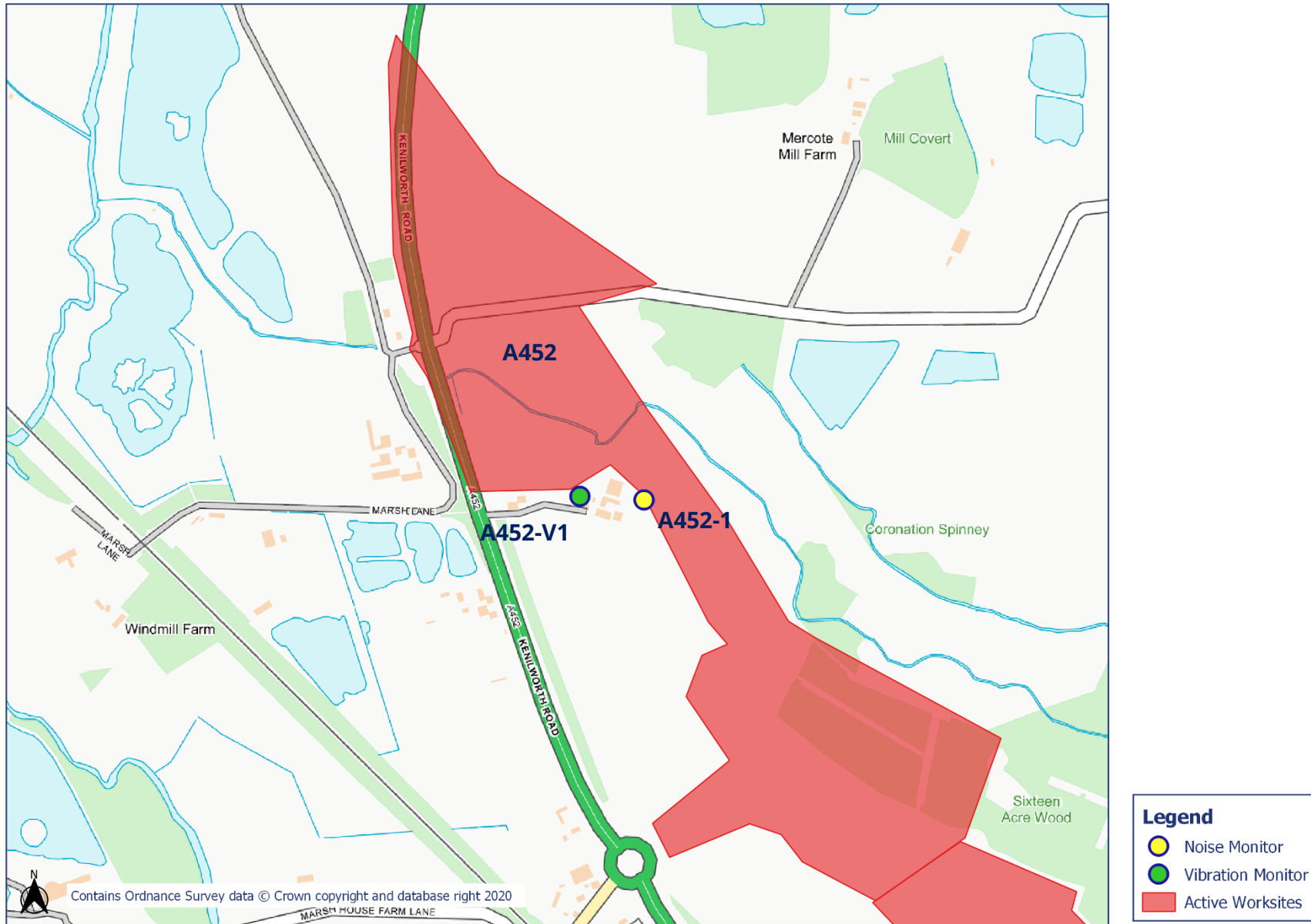
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Noise and Vibration Monitoring Plan - 4



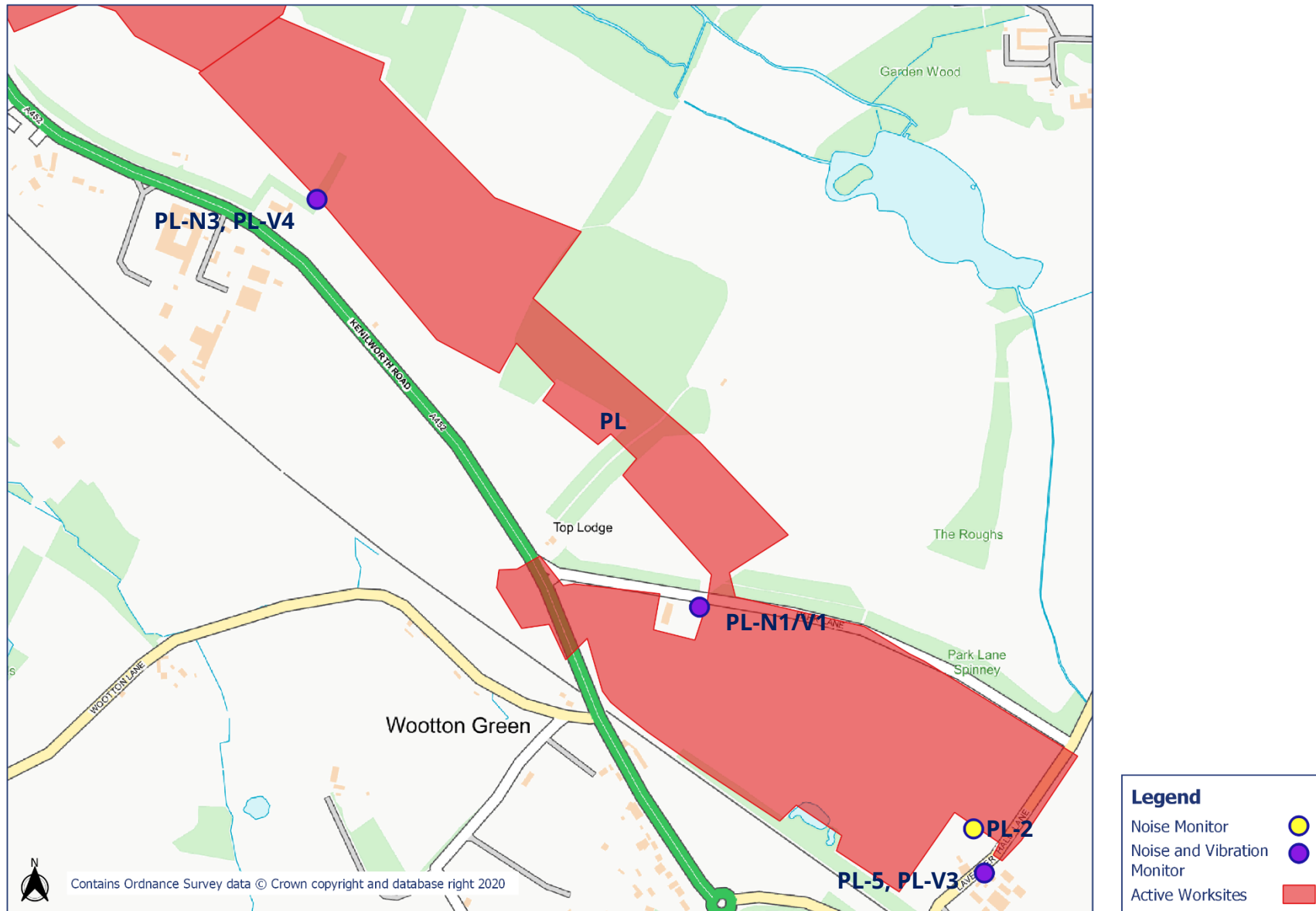
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Noise and Vibration Monitoring Plan - 5



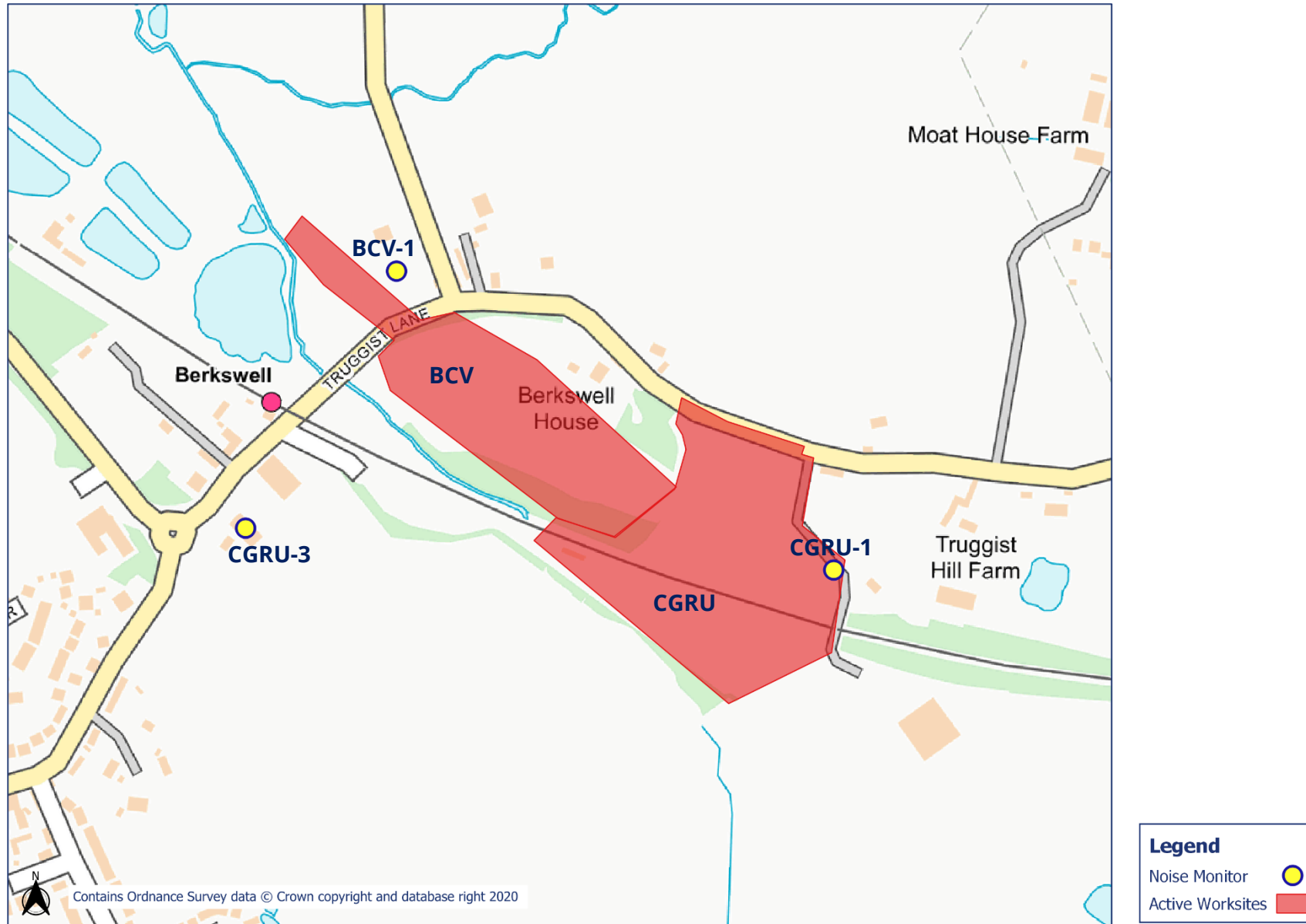
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Noise and Vibration Monitoring Plan - 6



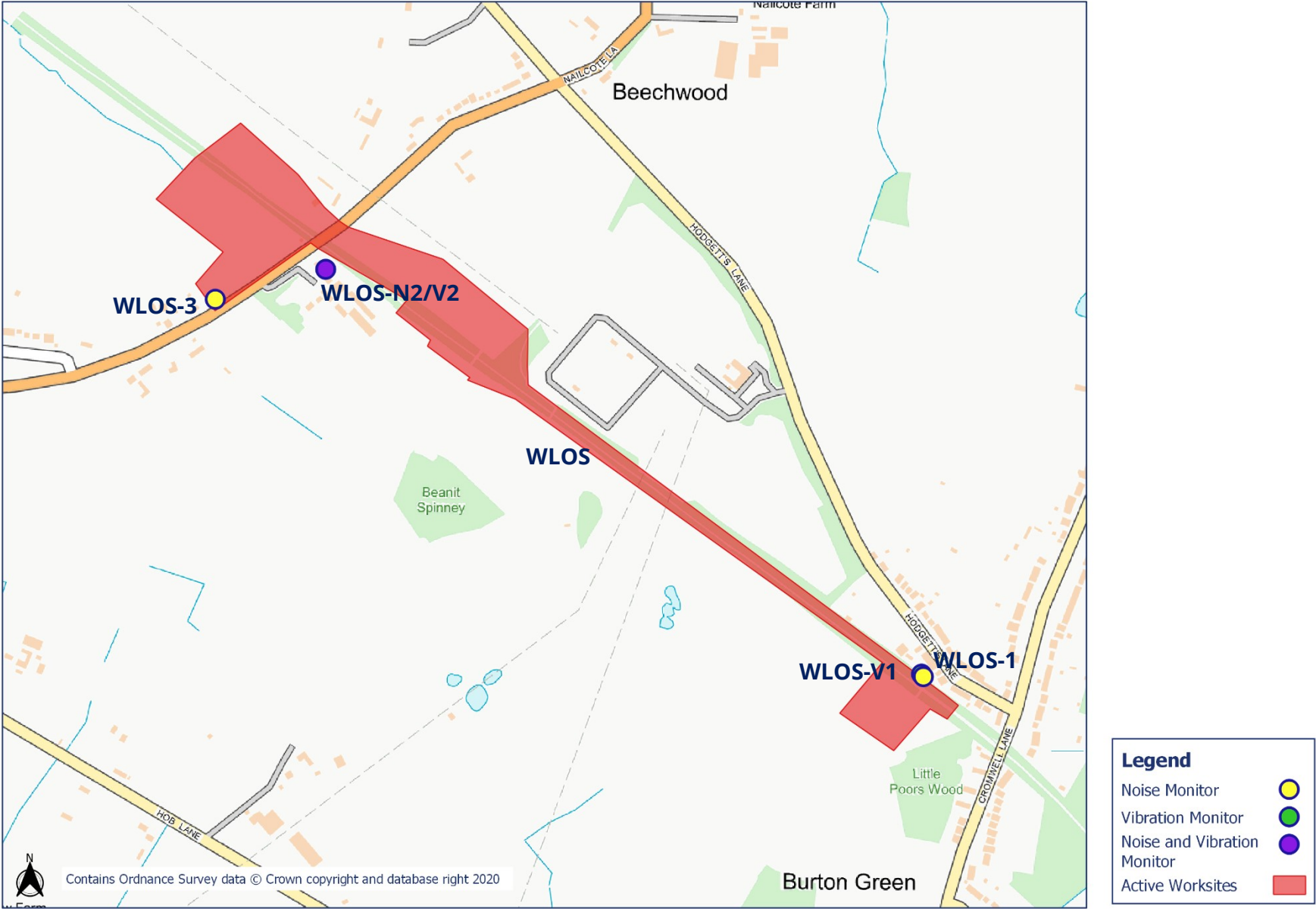
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Noise and Vibration Monitoring Plan - 7



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Noise and Vibration Monitoring Plan - 8



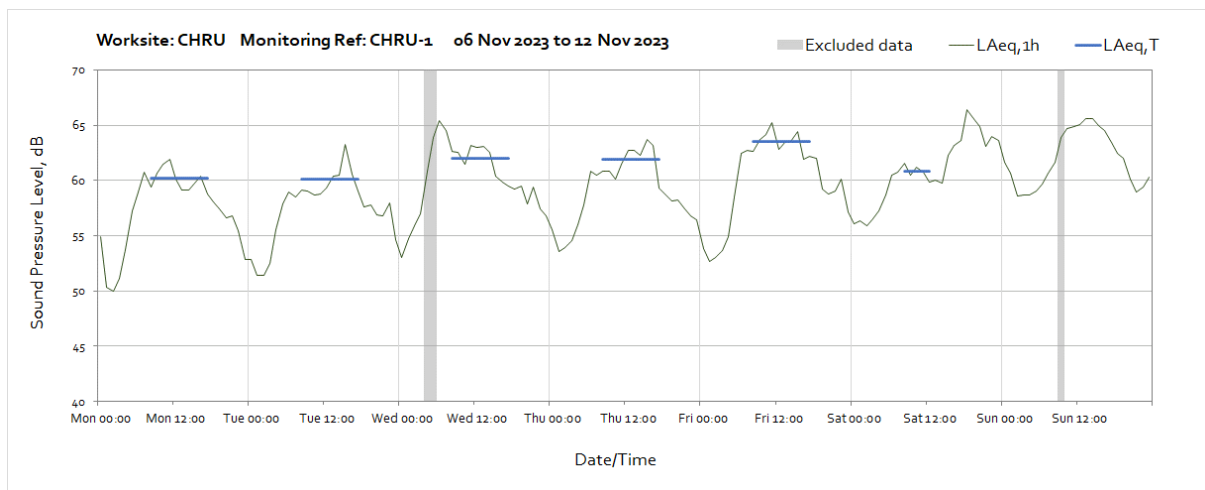
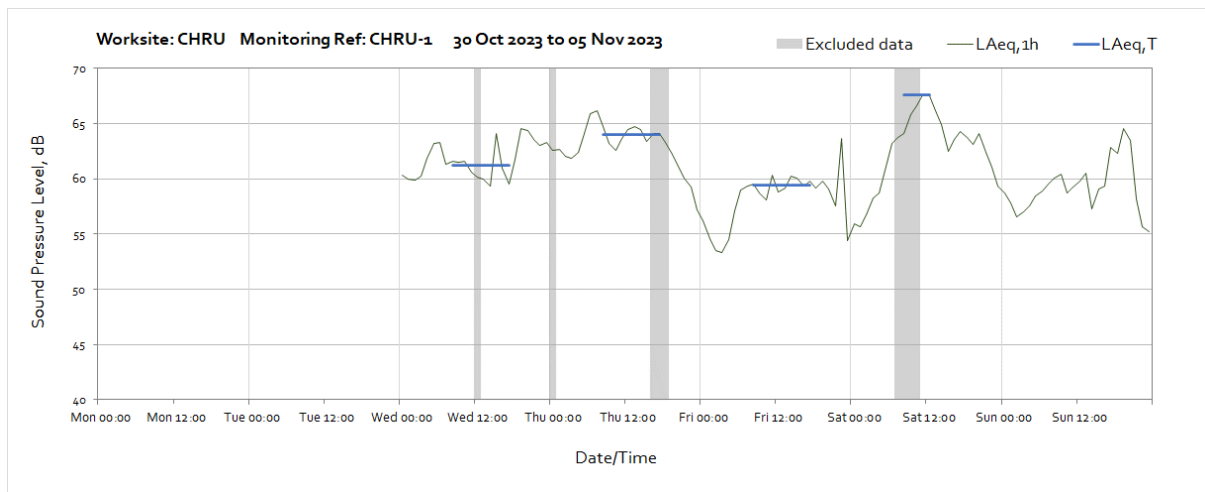
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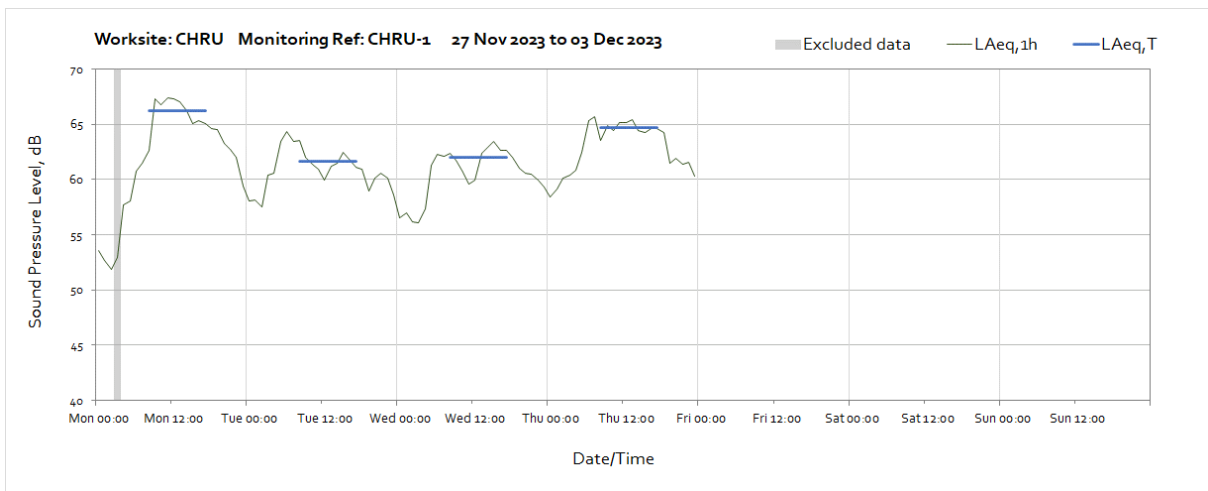
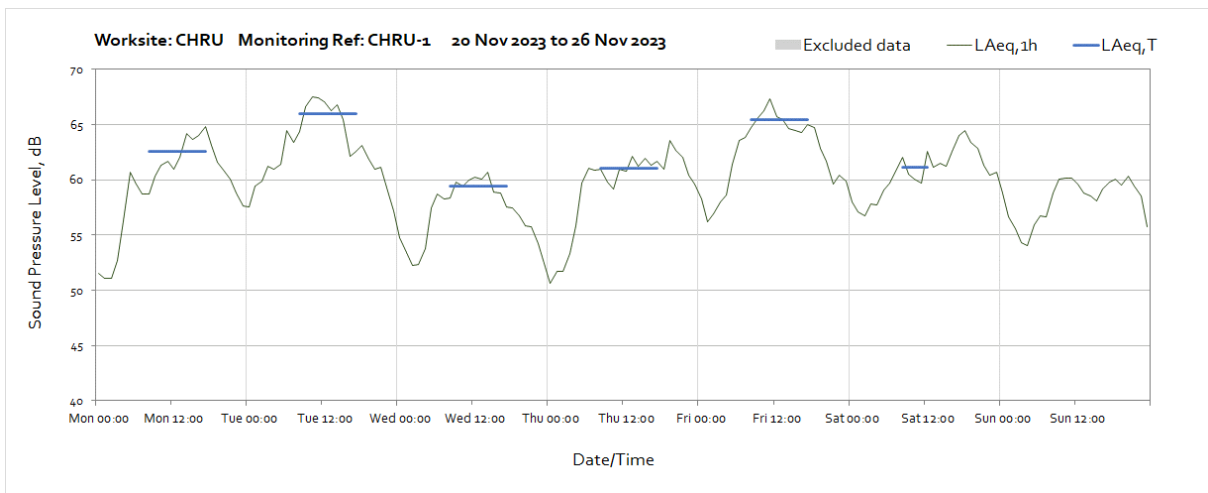
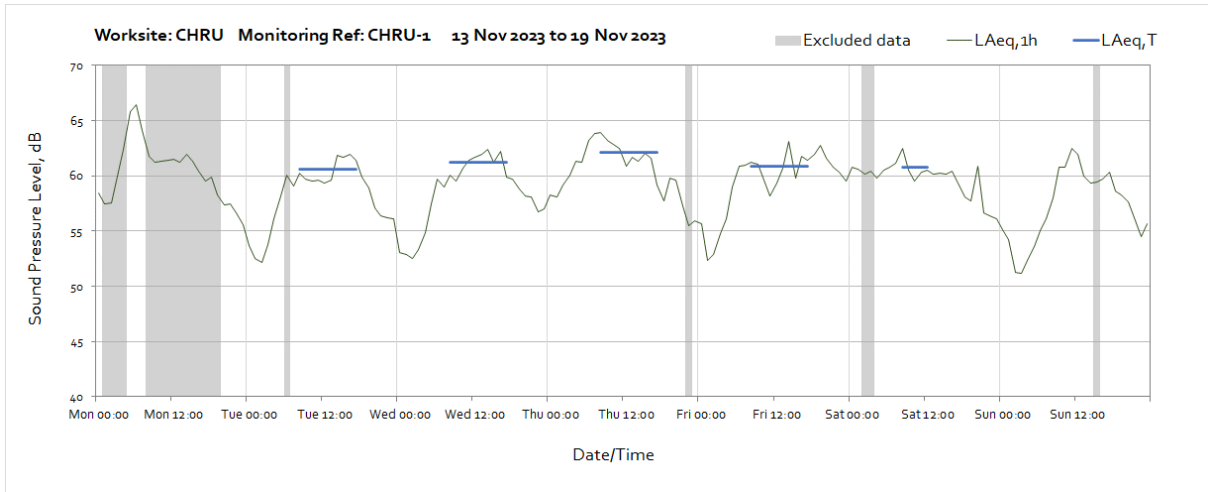
Appendix C Data

Noise

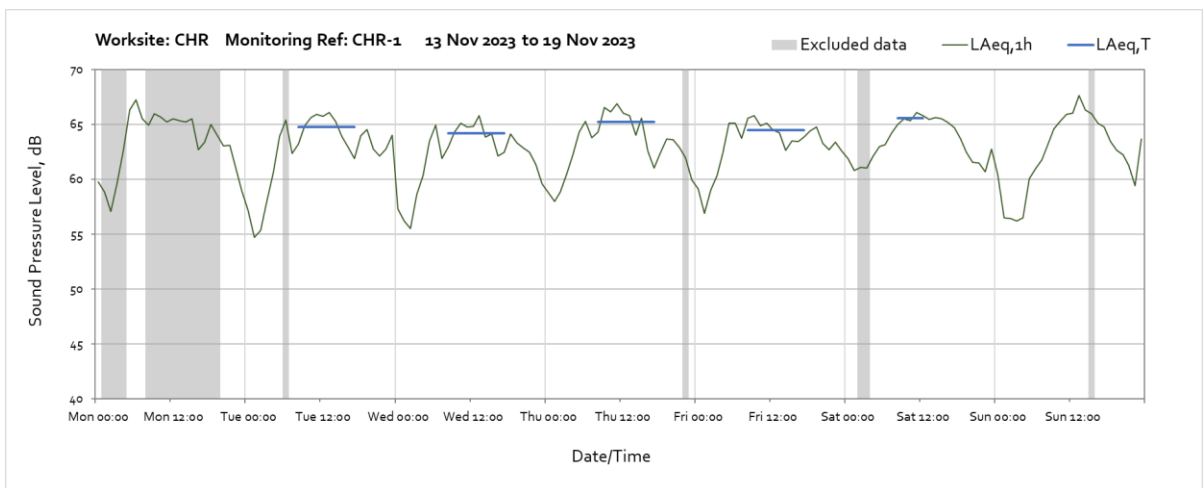
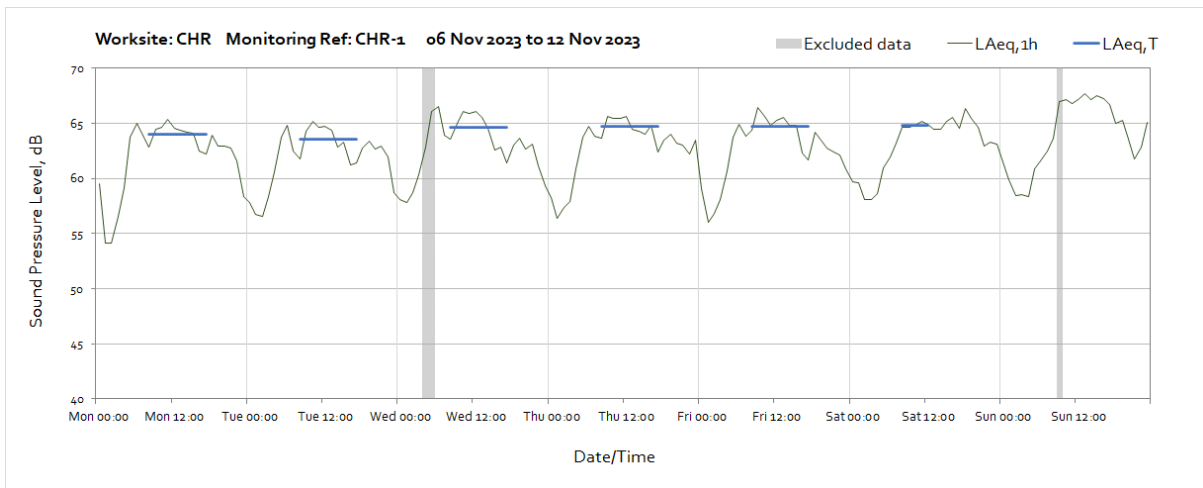
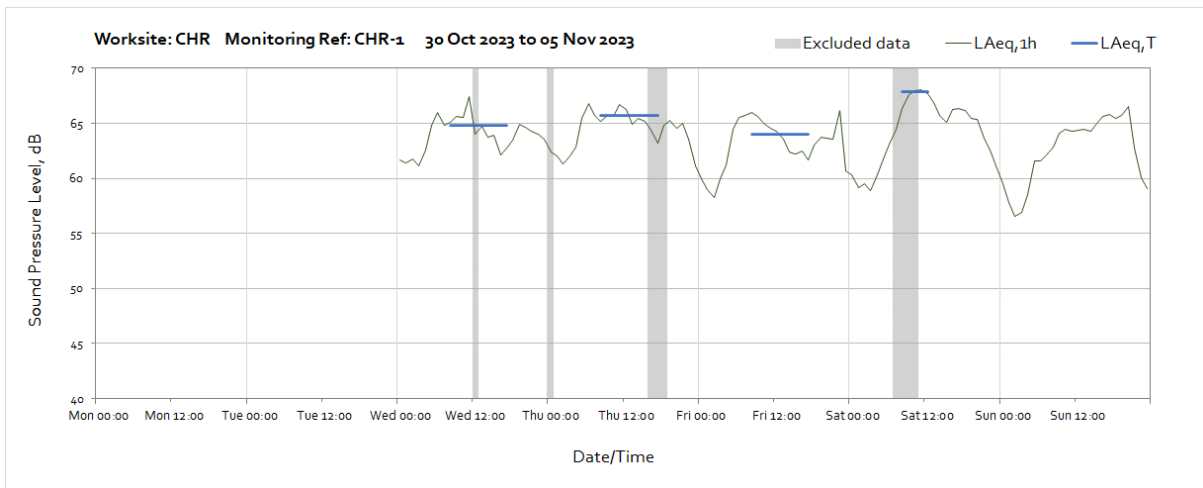
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods where noise levels are adversely affected by weather or only measured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

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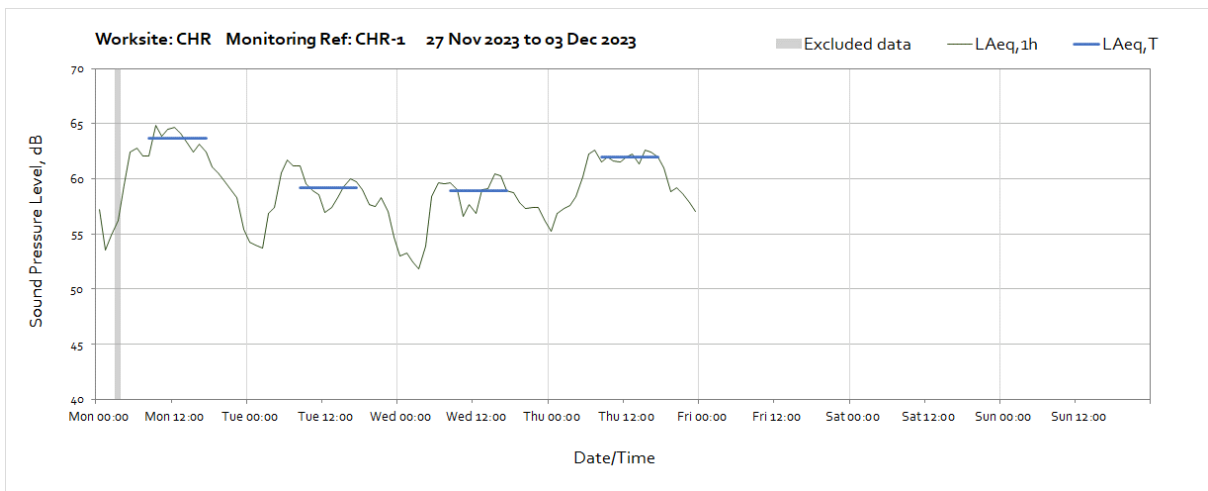
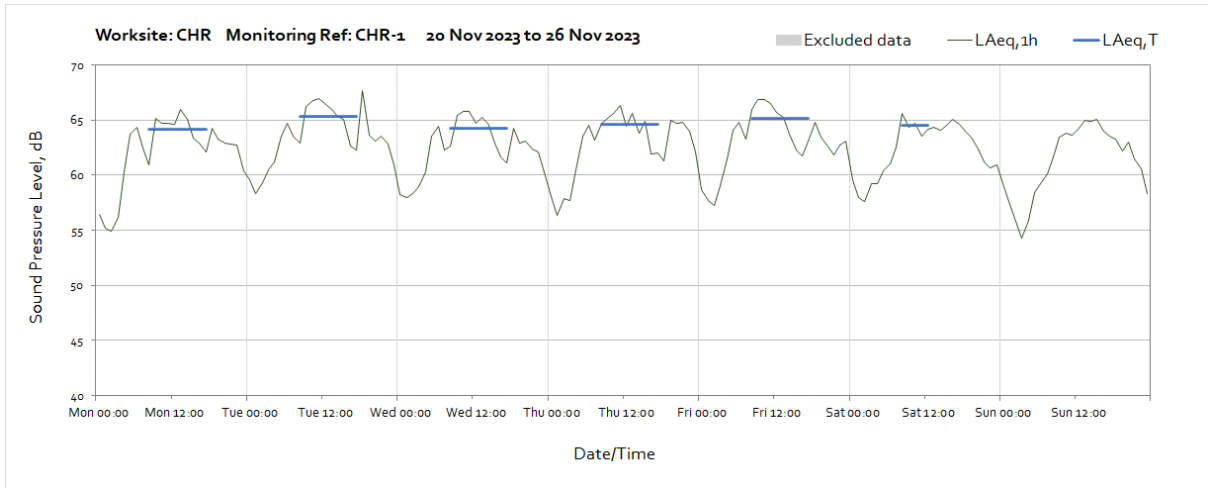




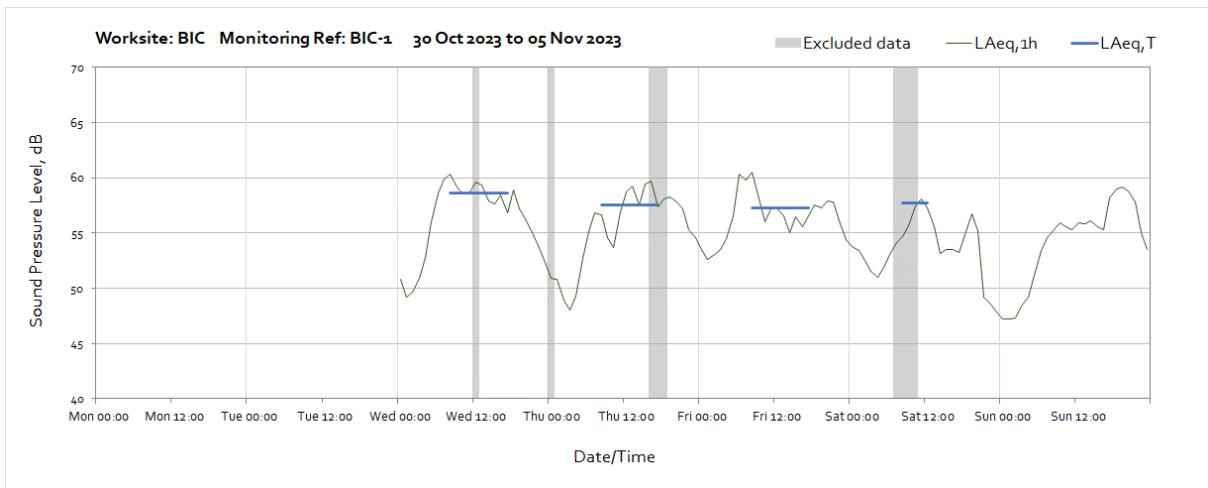
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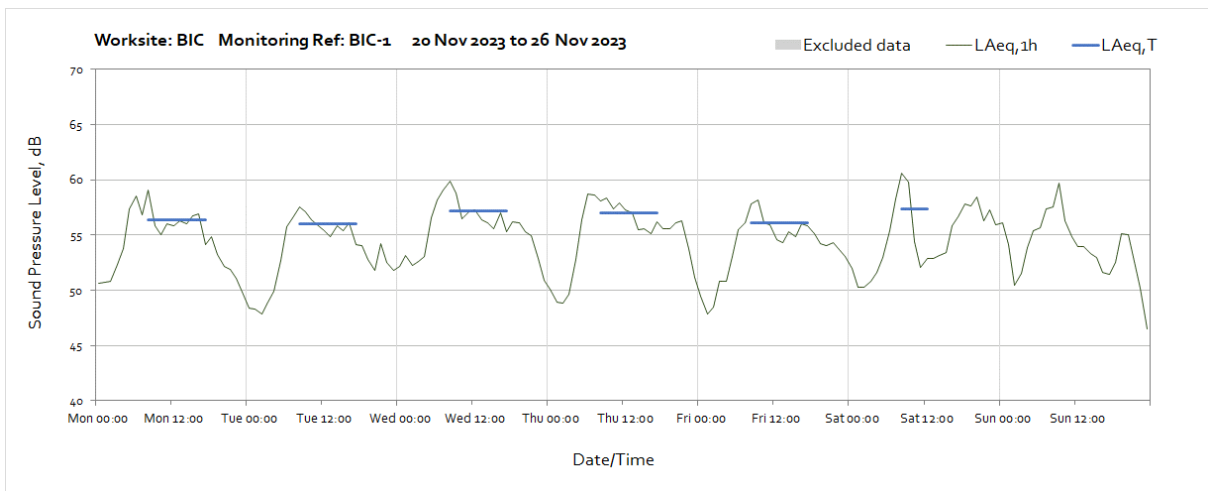
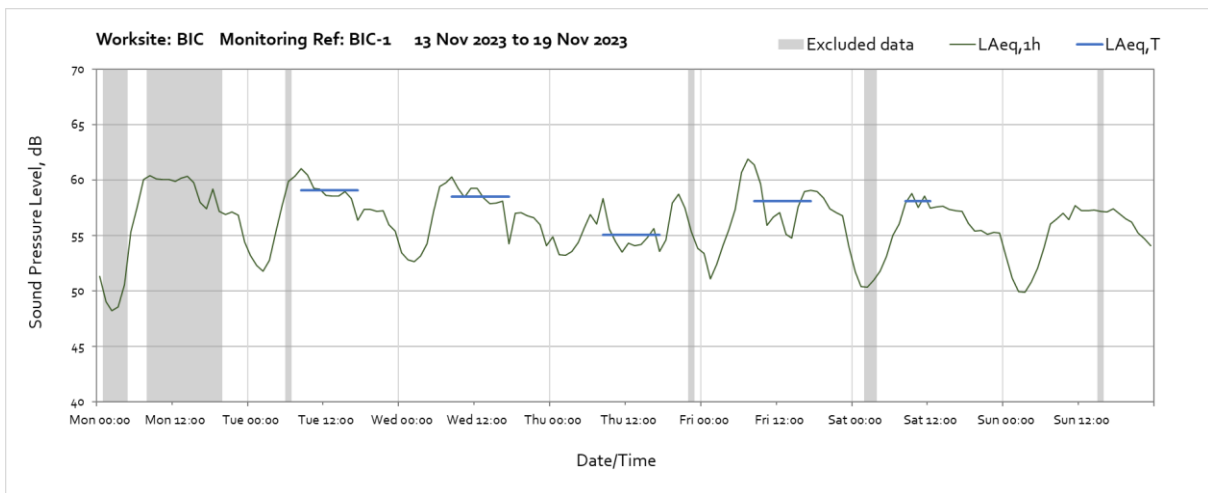
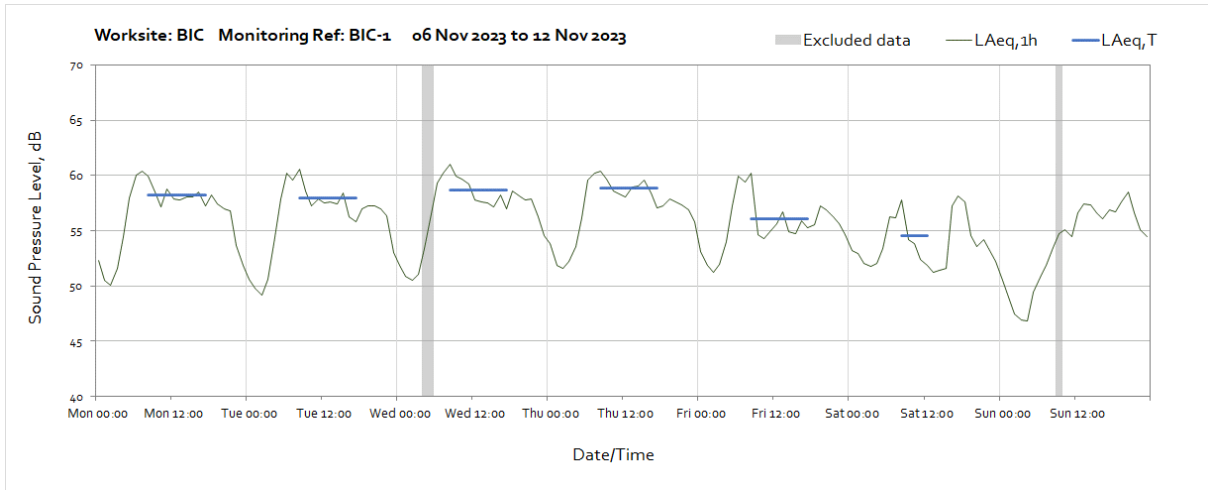


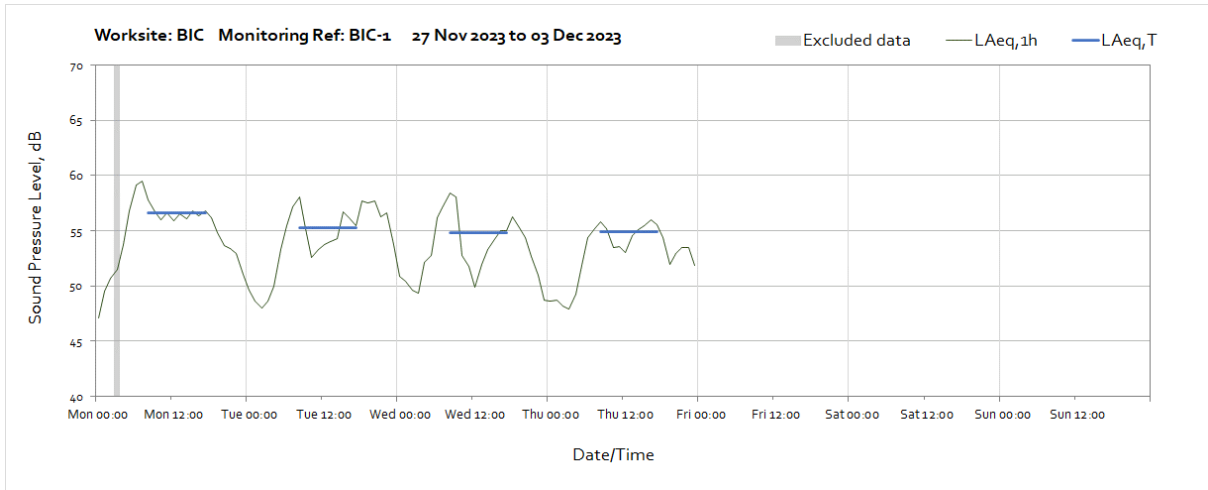
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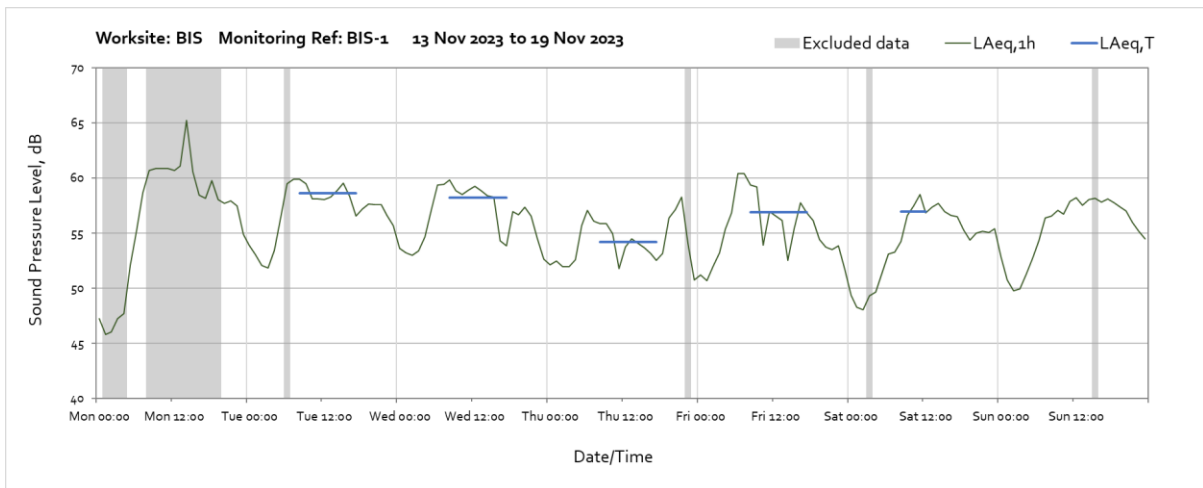
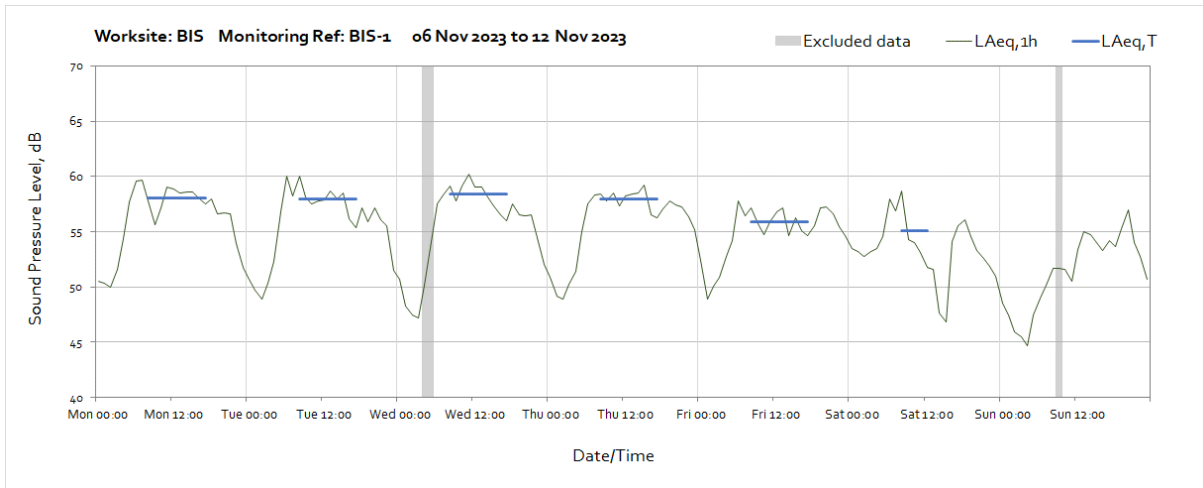
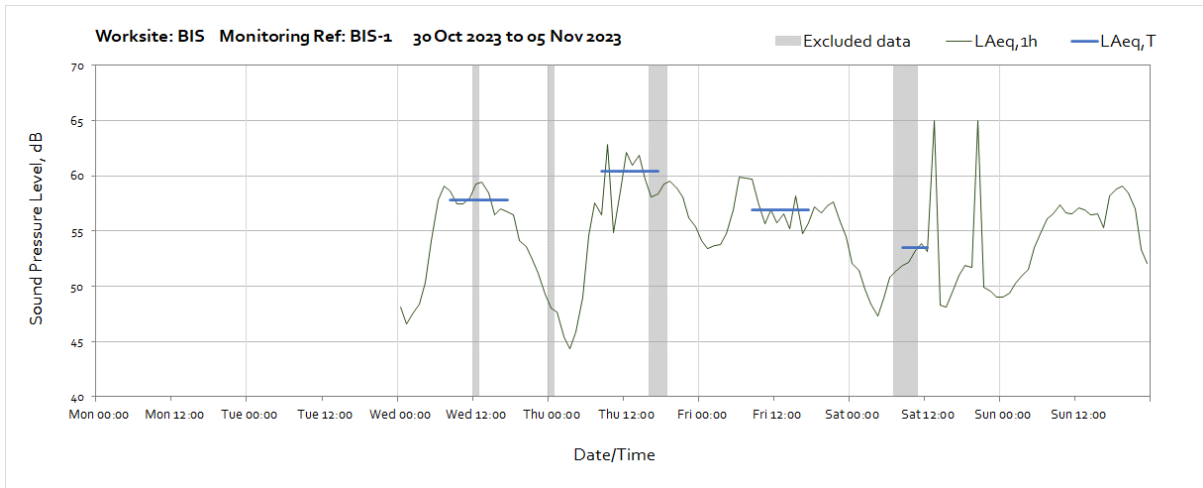
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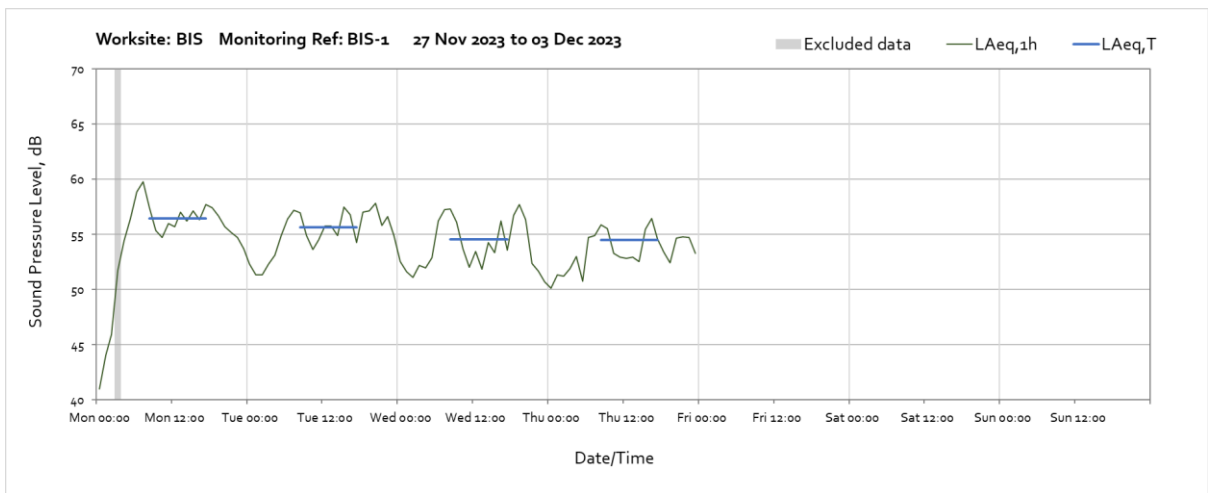
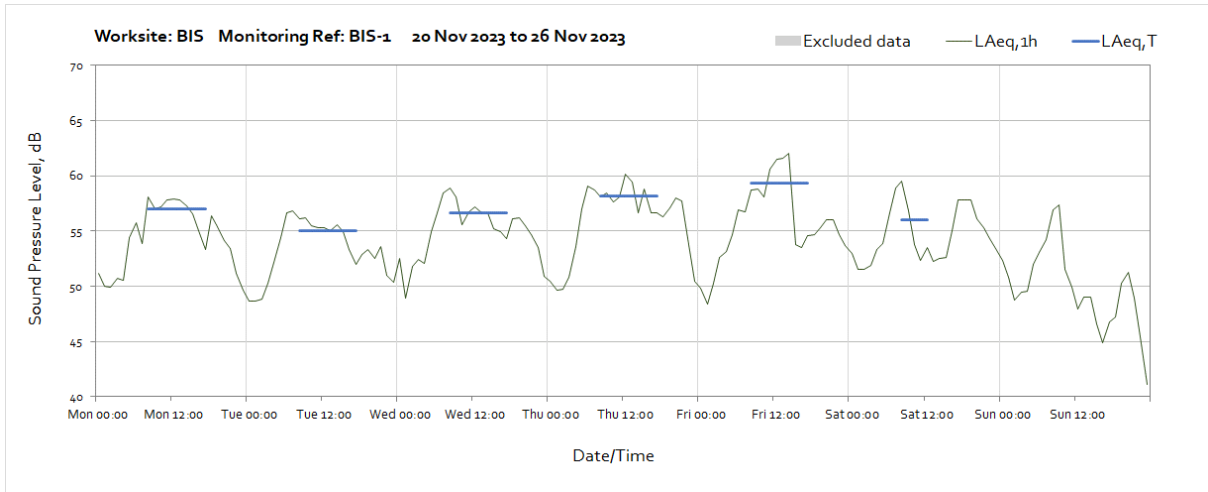




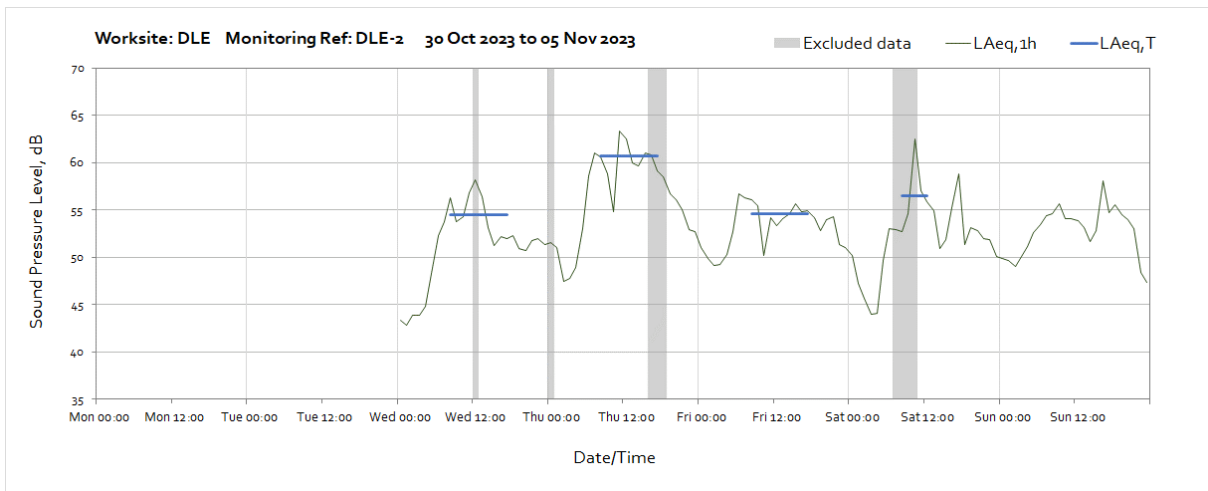
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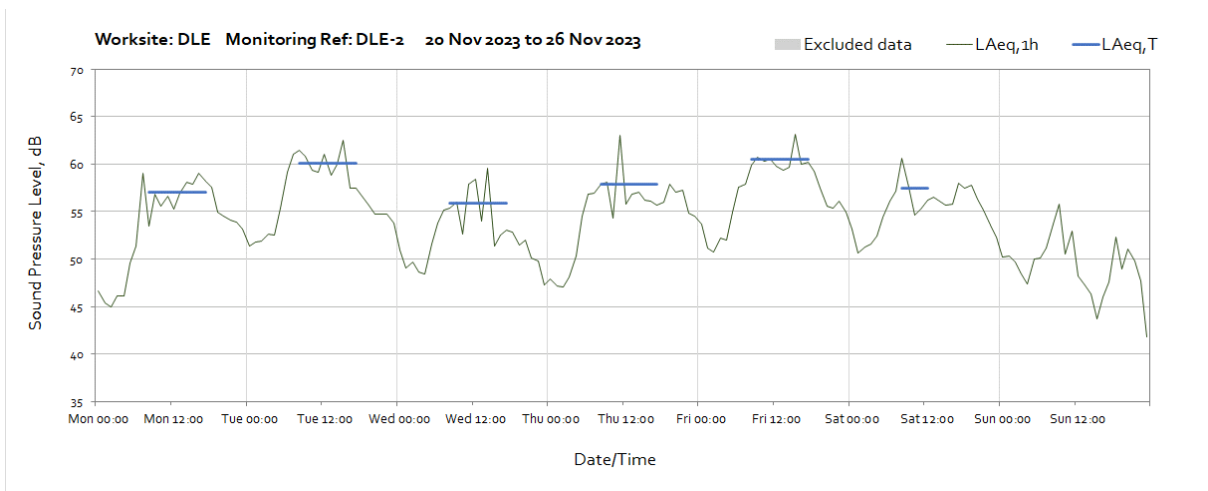
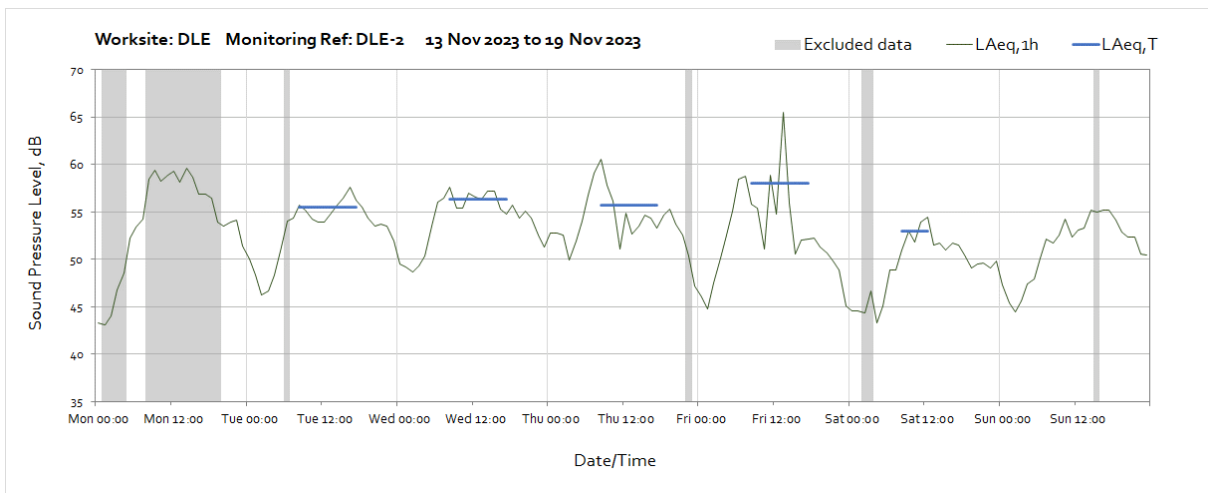
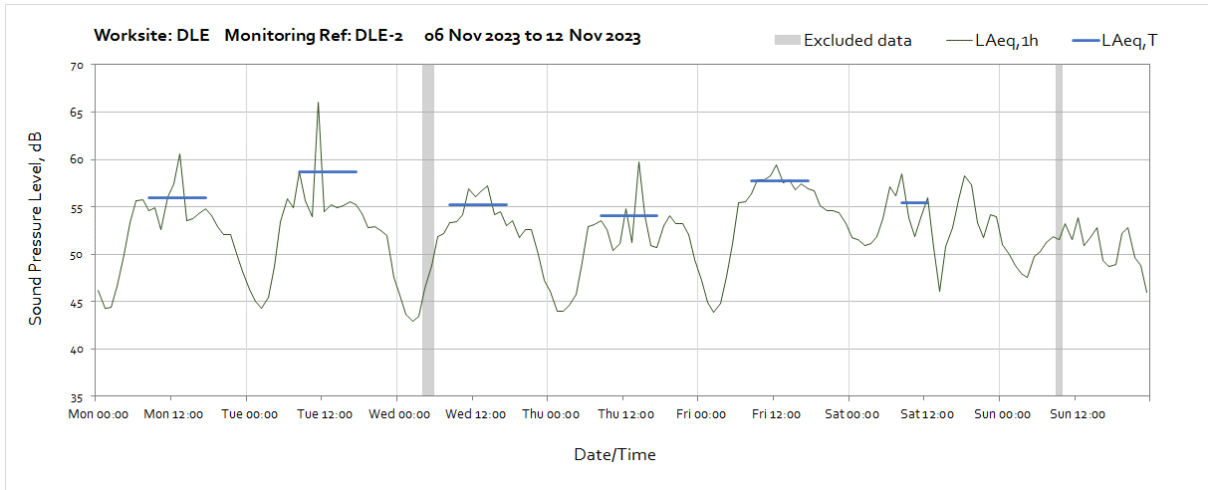


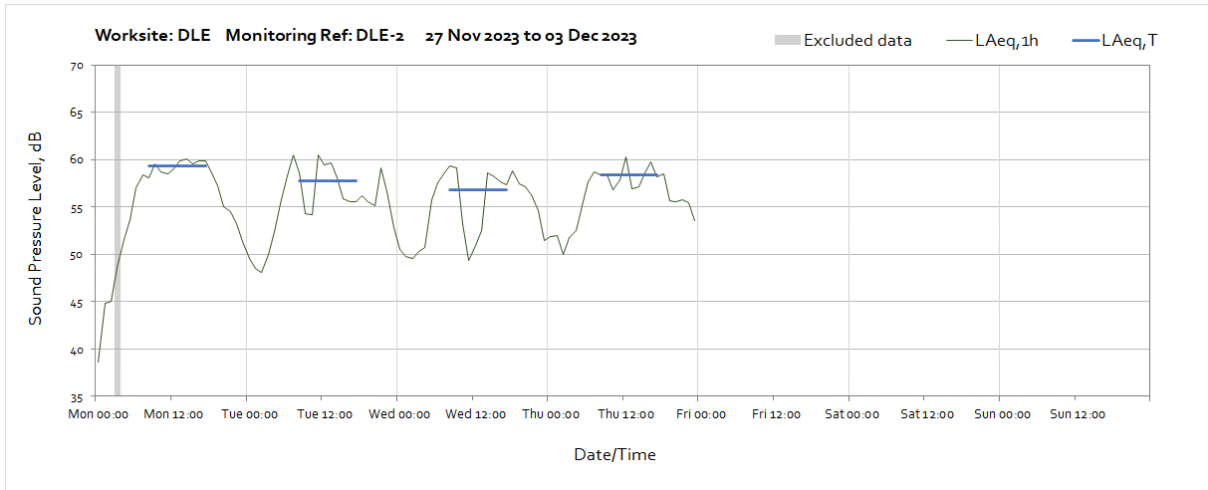
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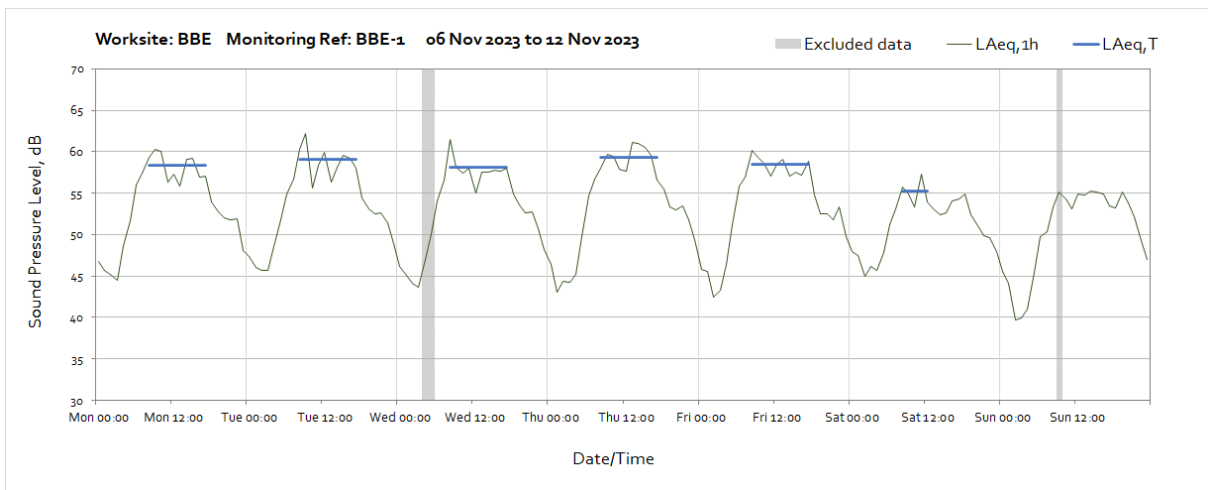
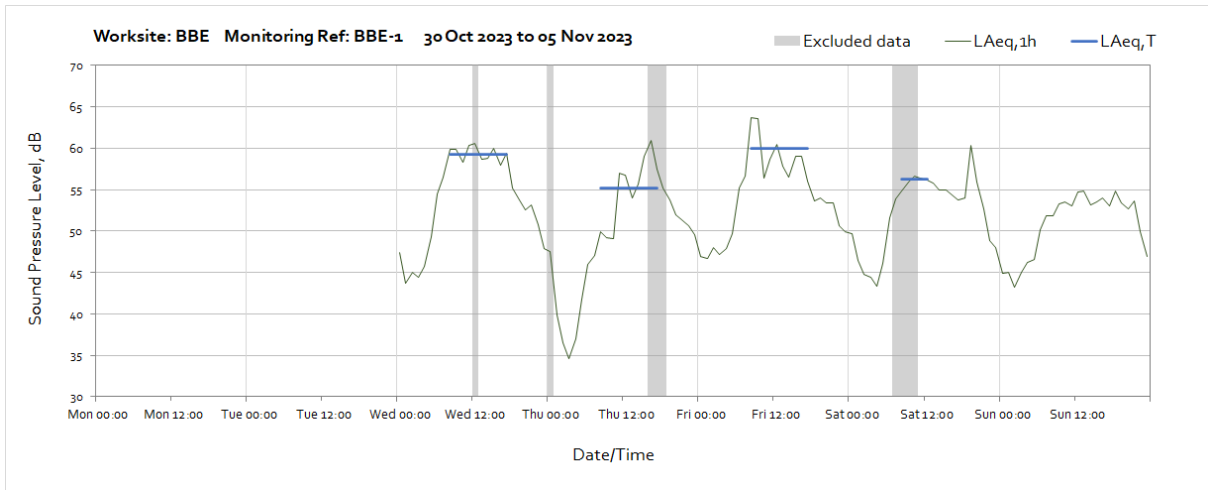
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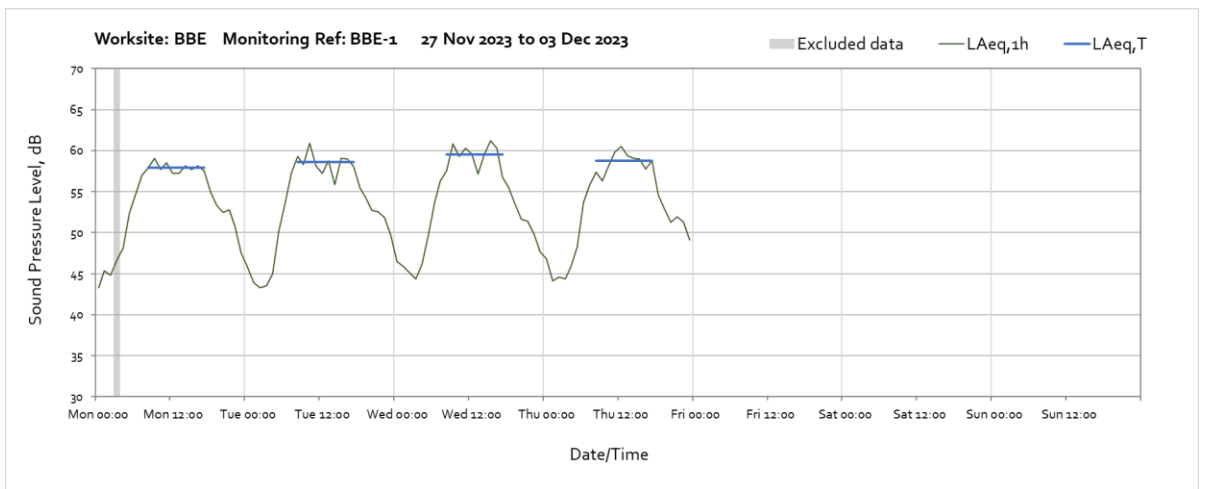
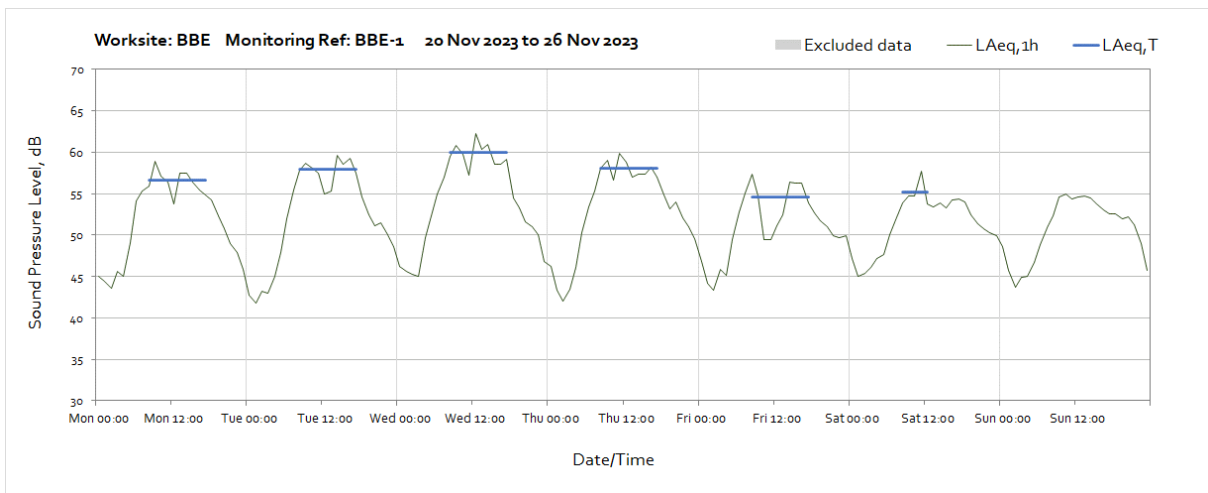
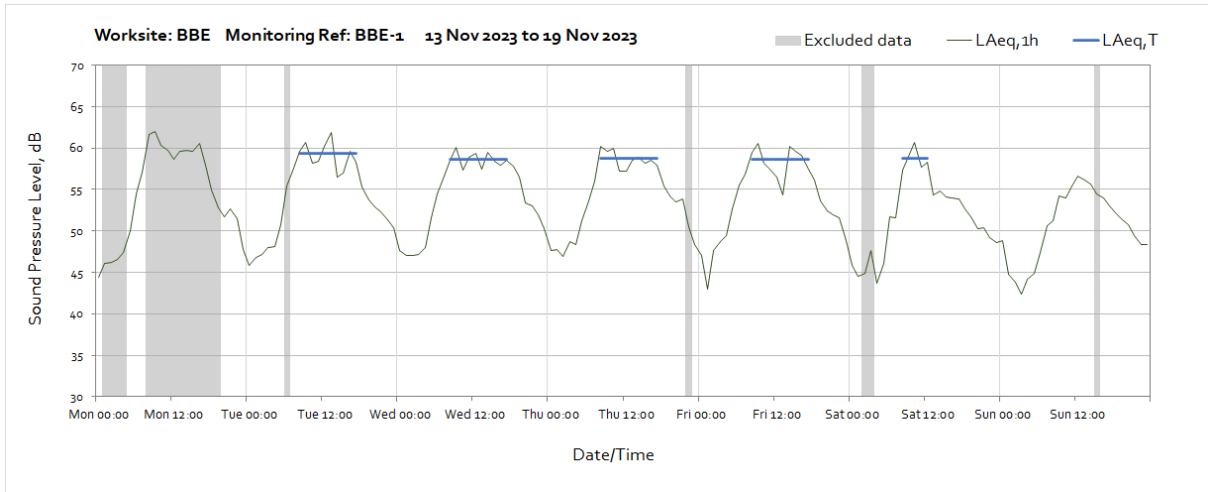




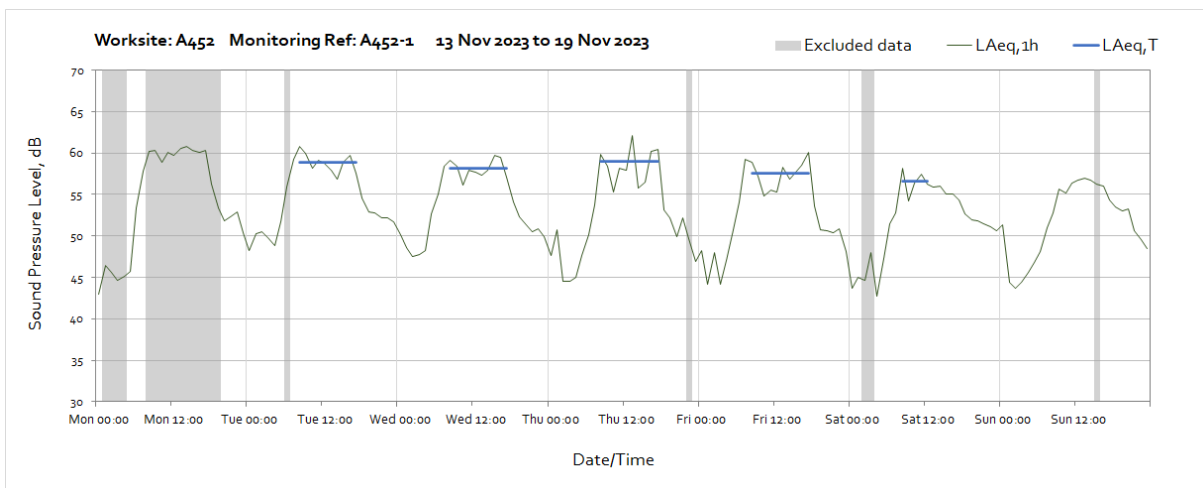
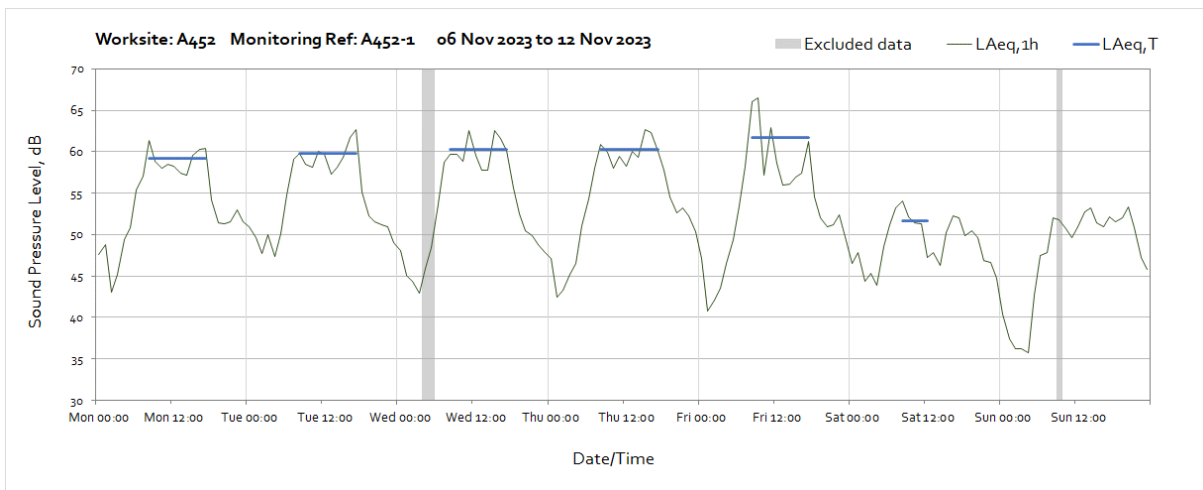
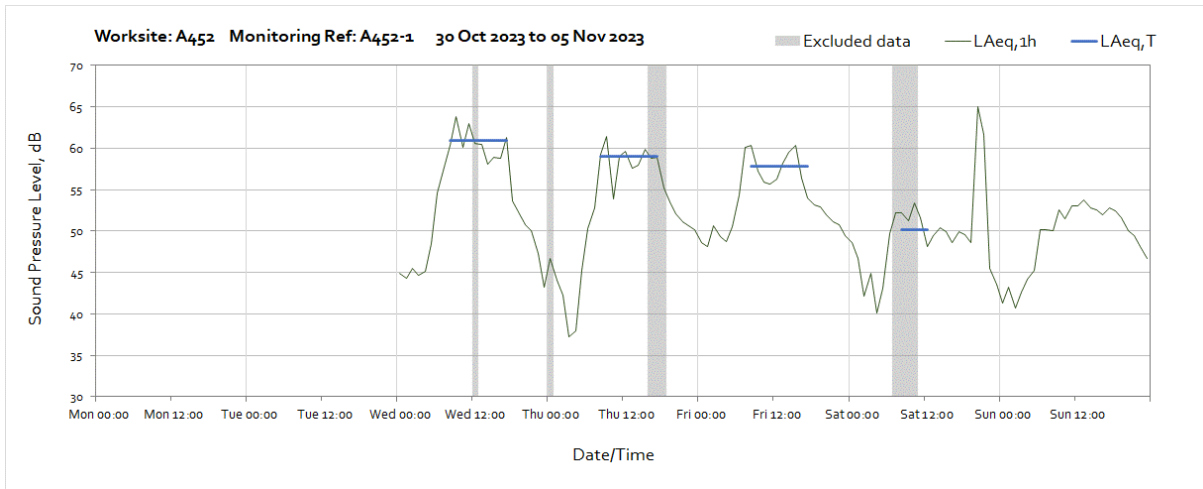


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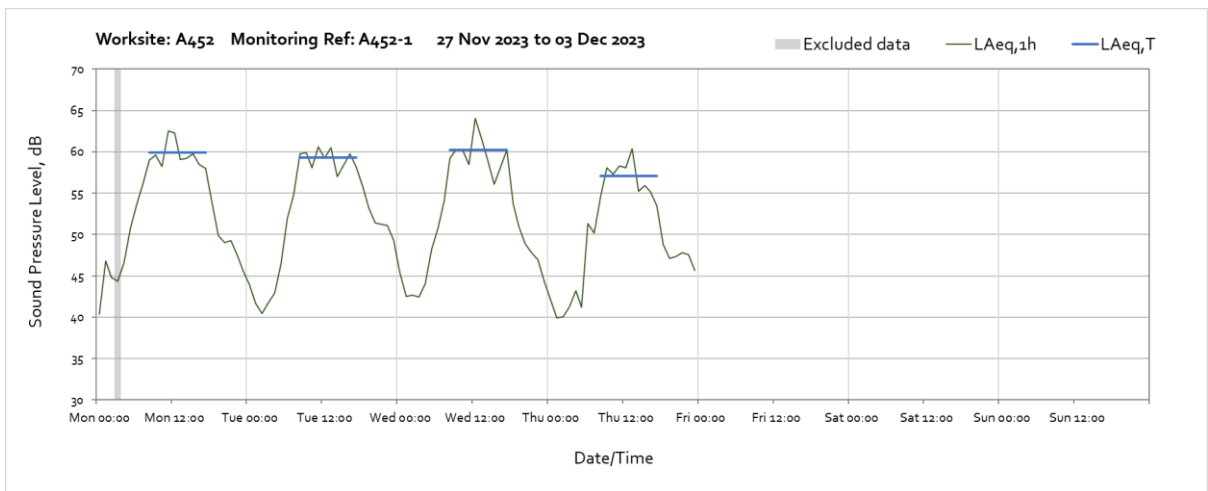
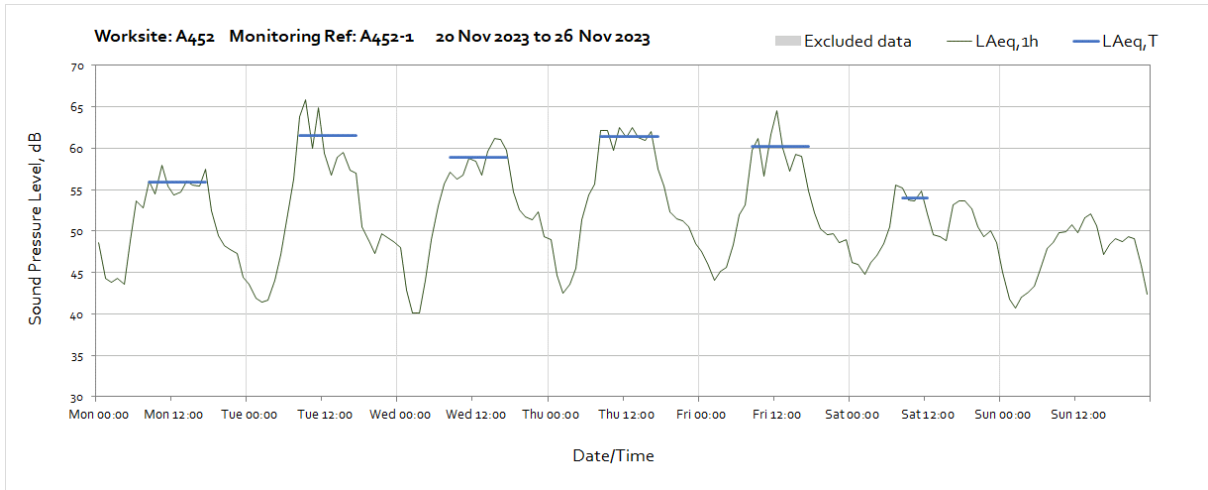




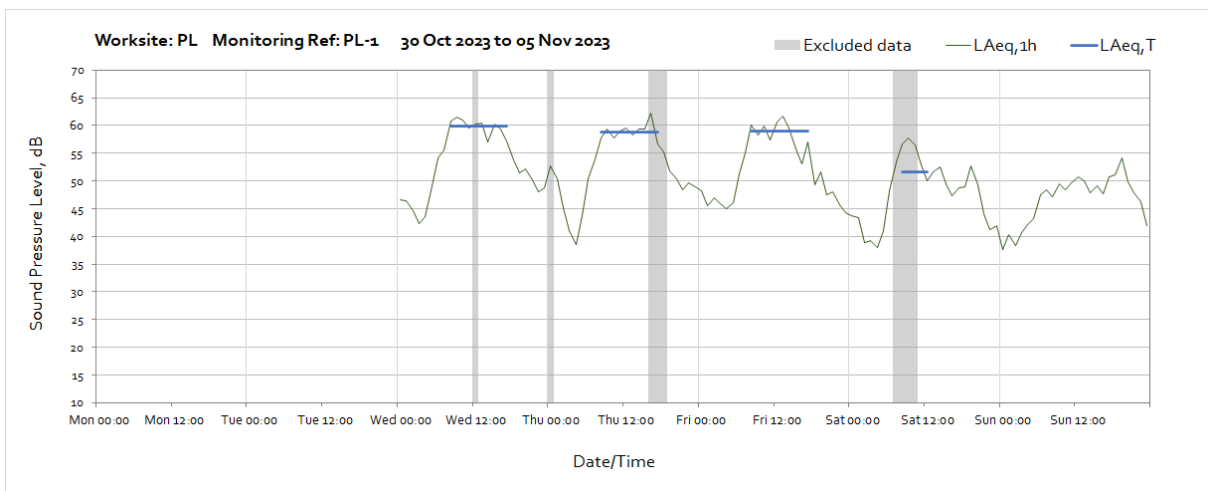
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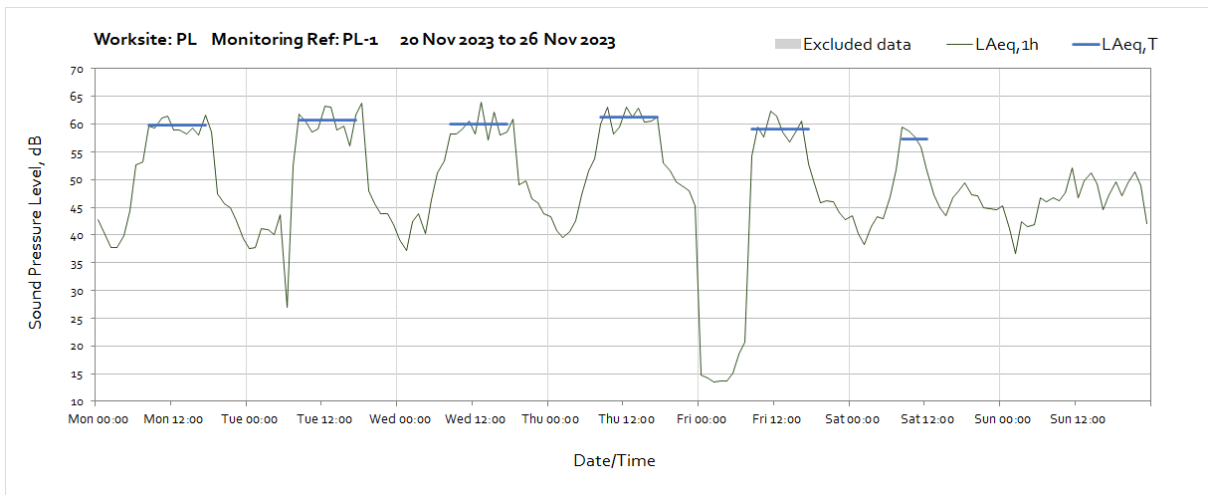
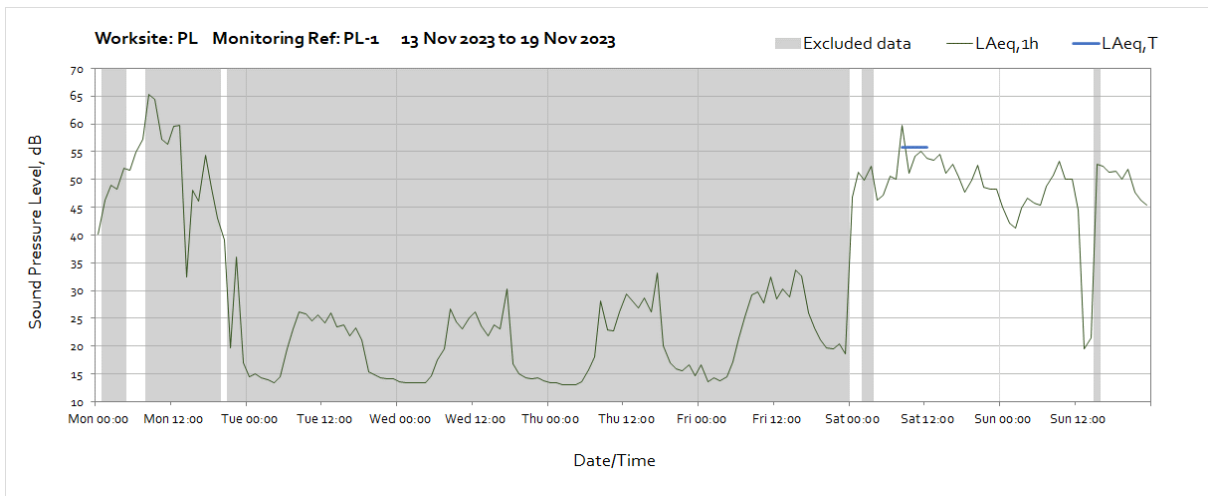
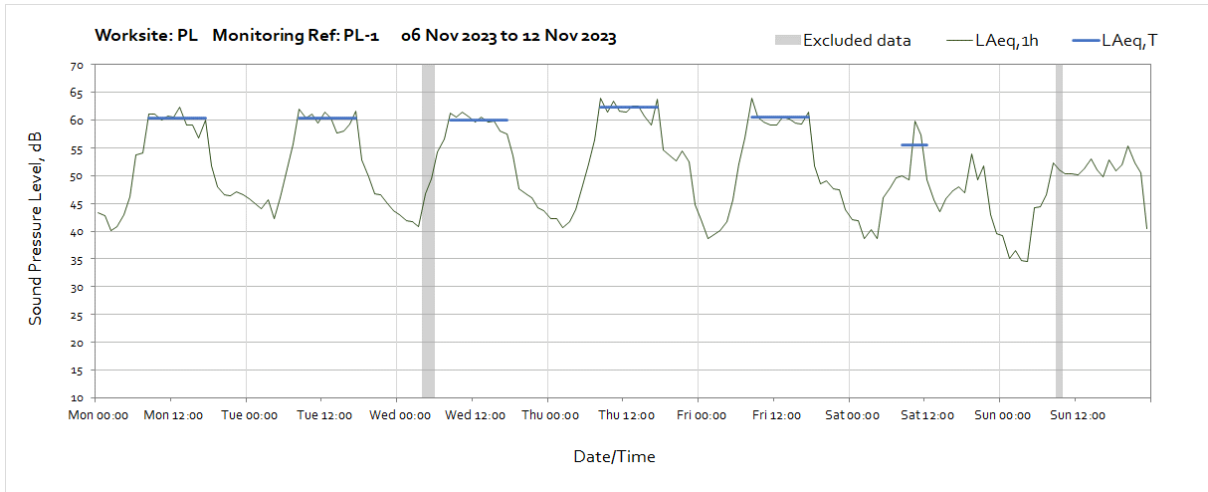


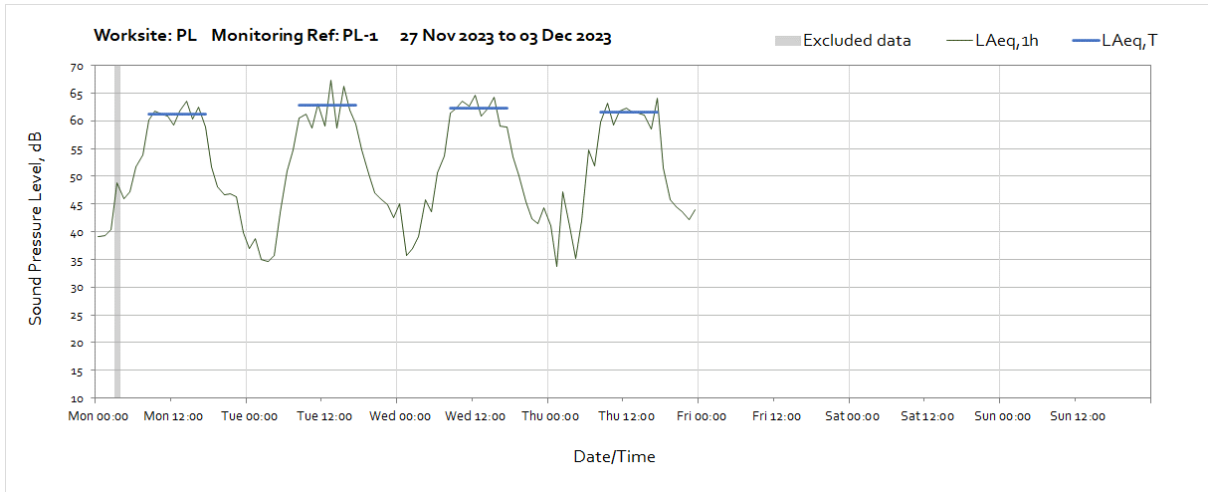
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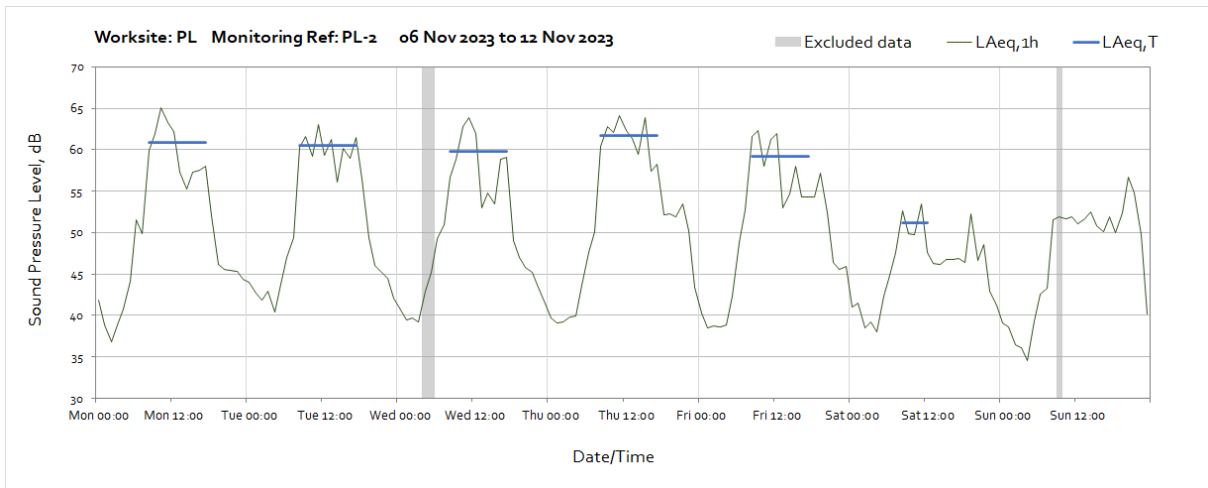
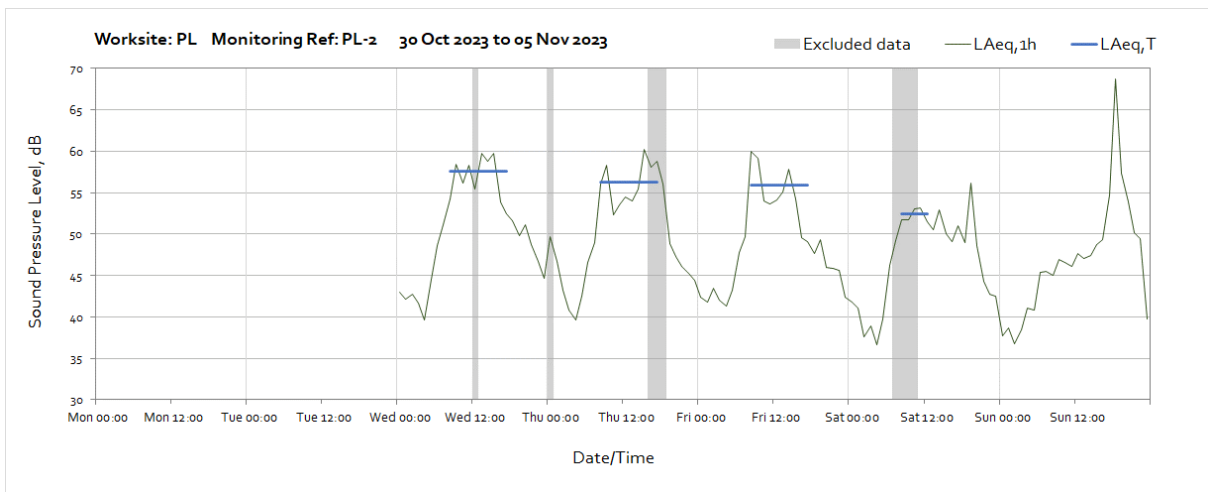
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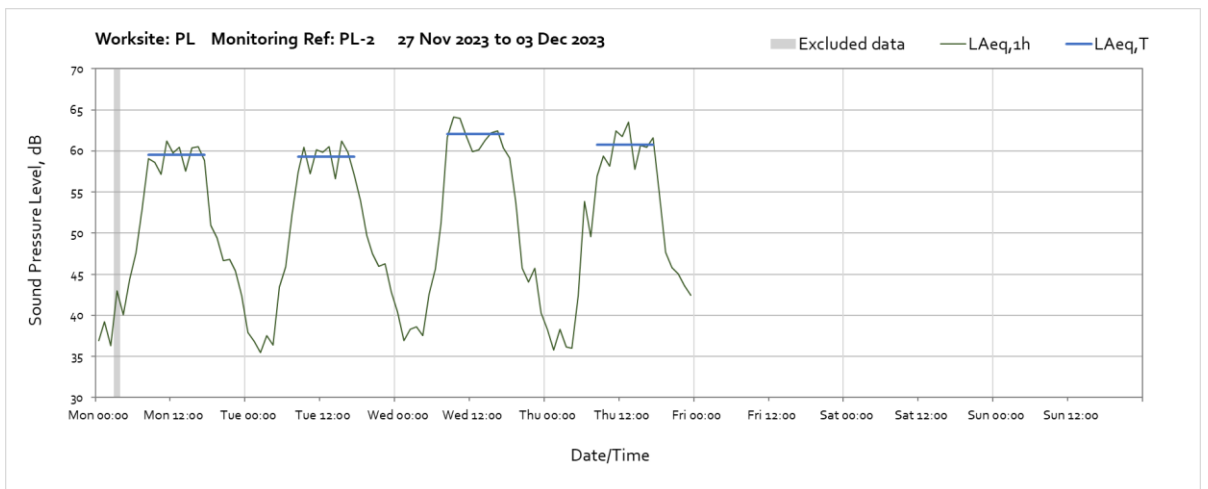
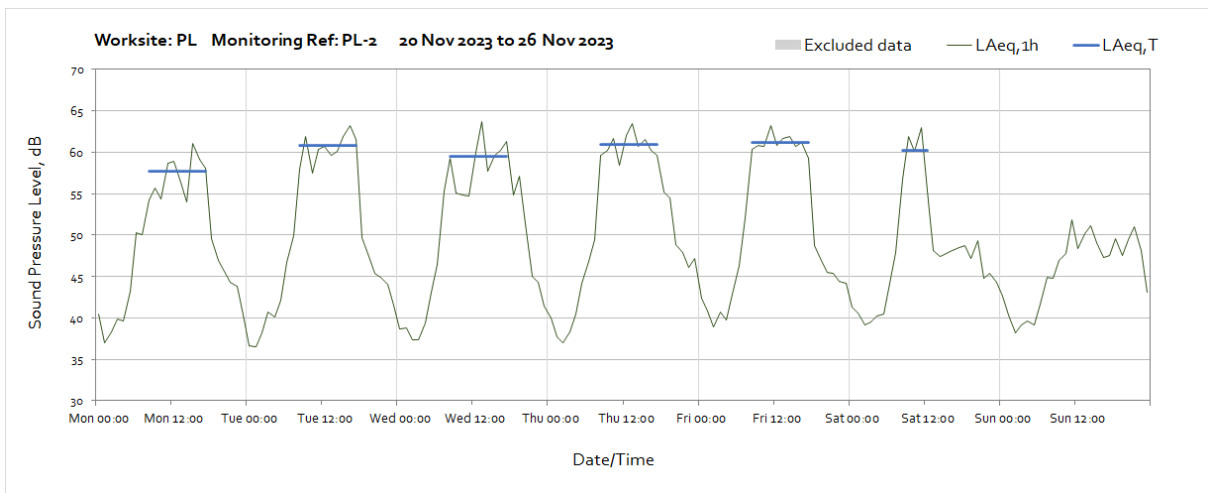
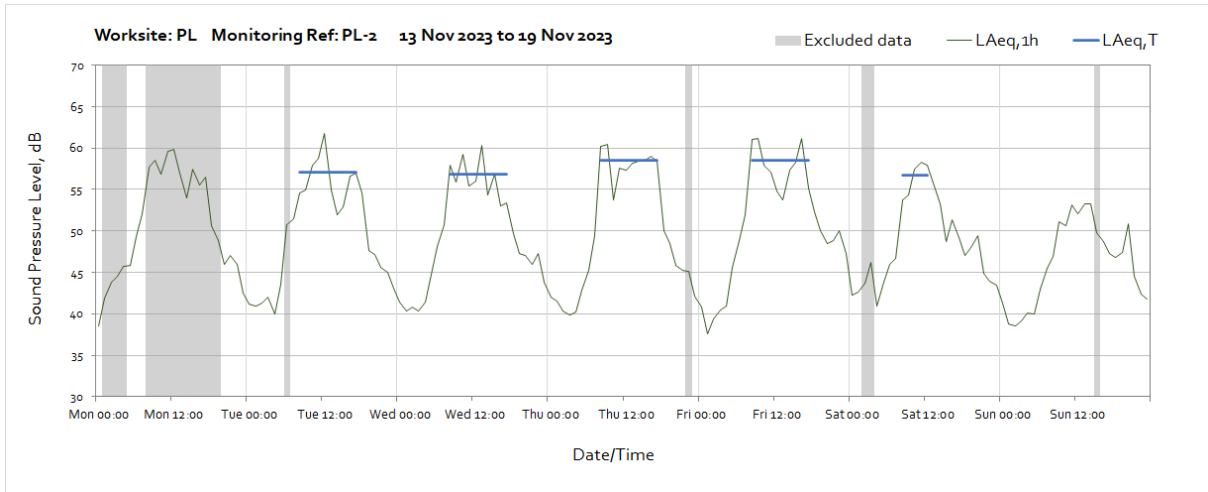




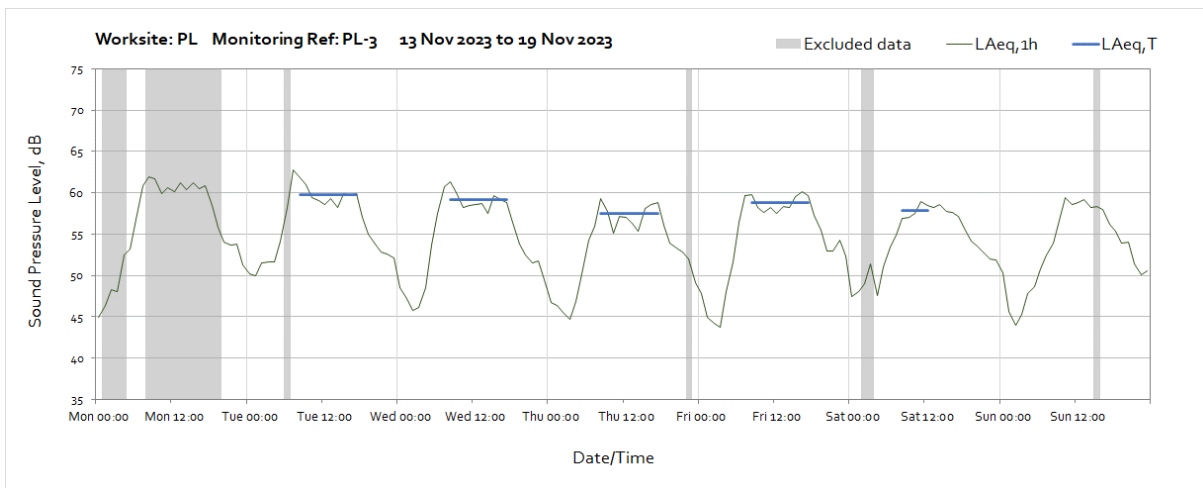
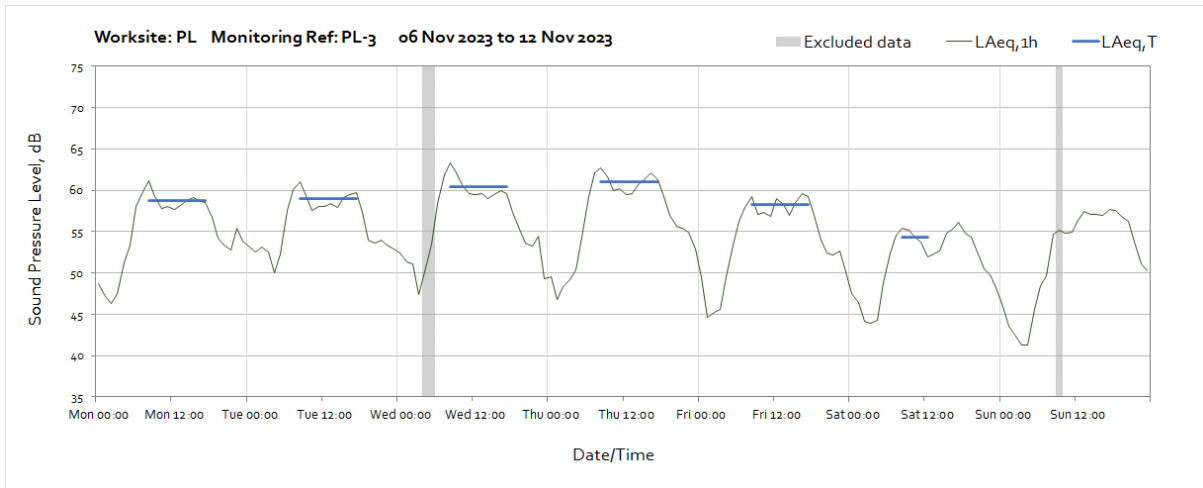
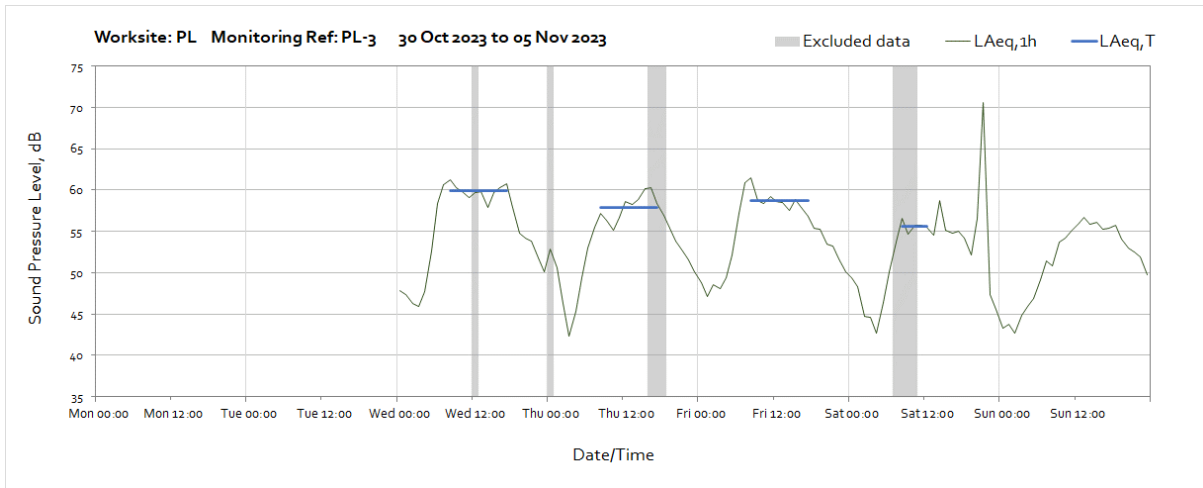


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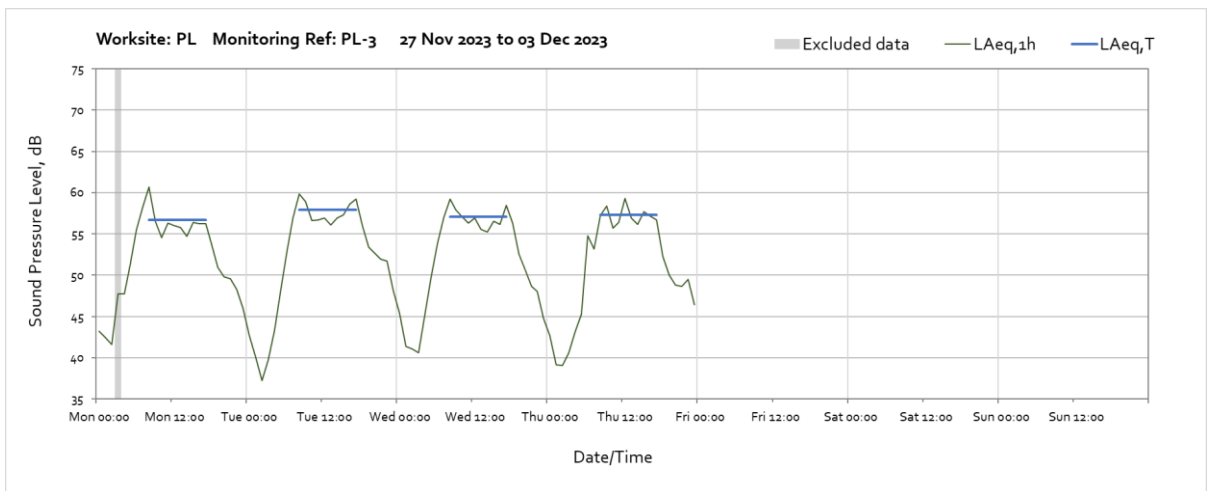
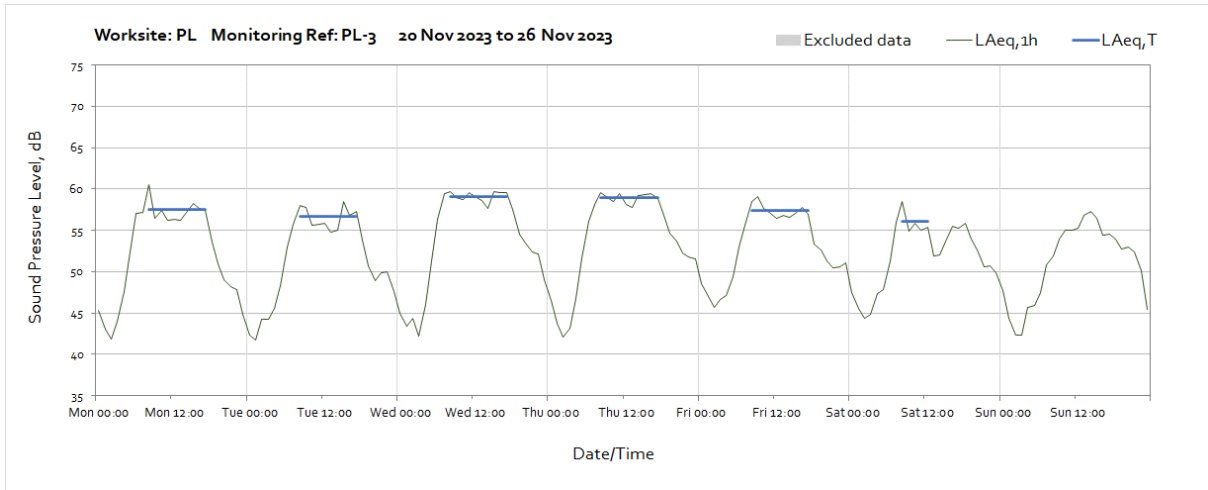




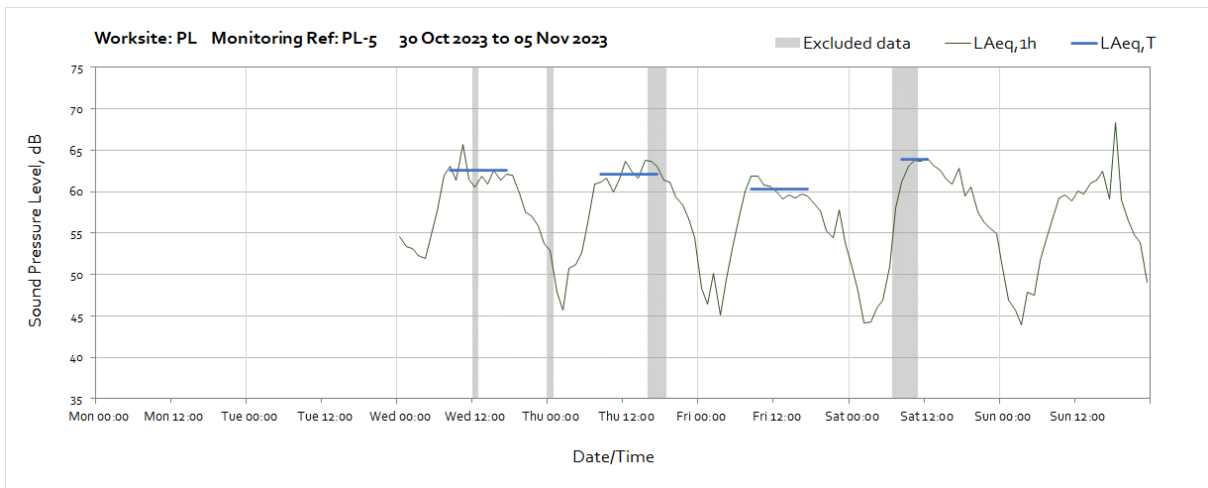
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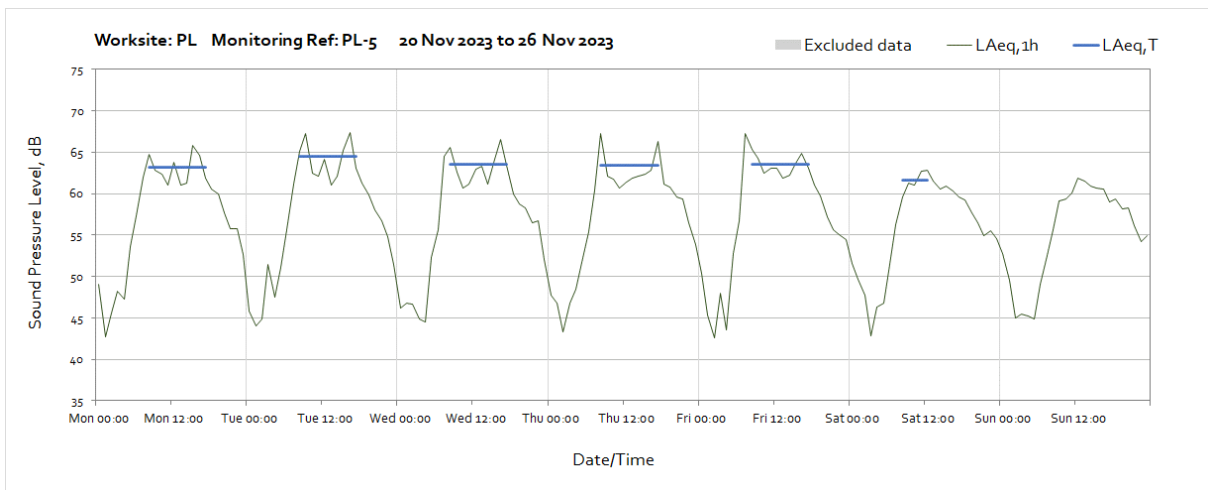
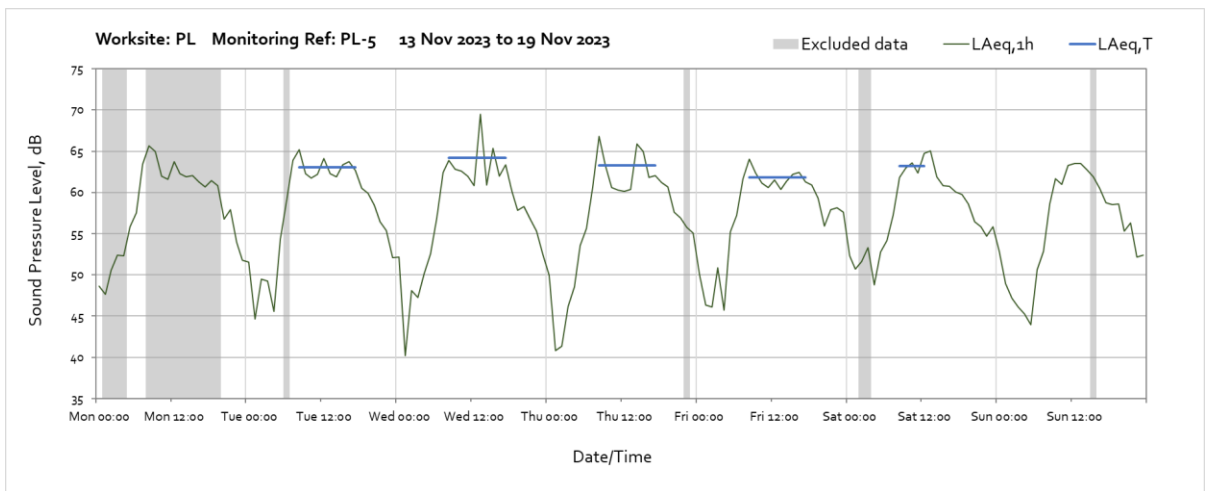
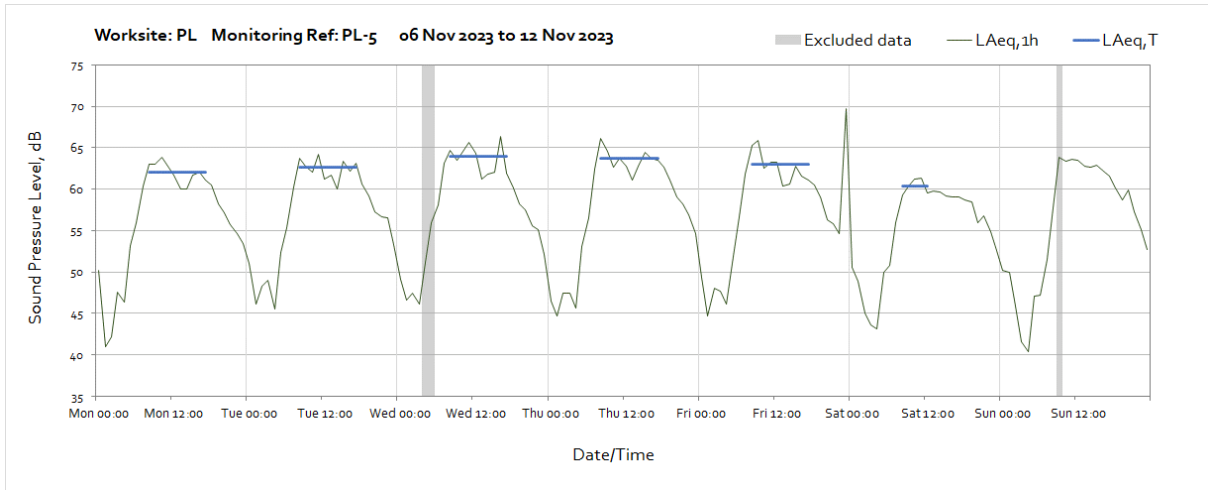


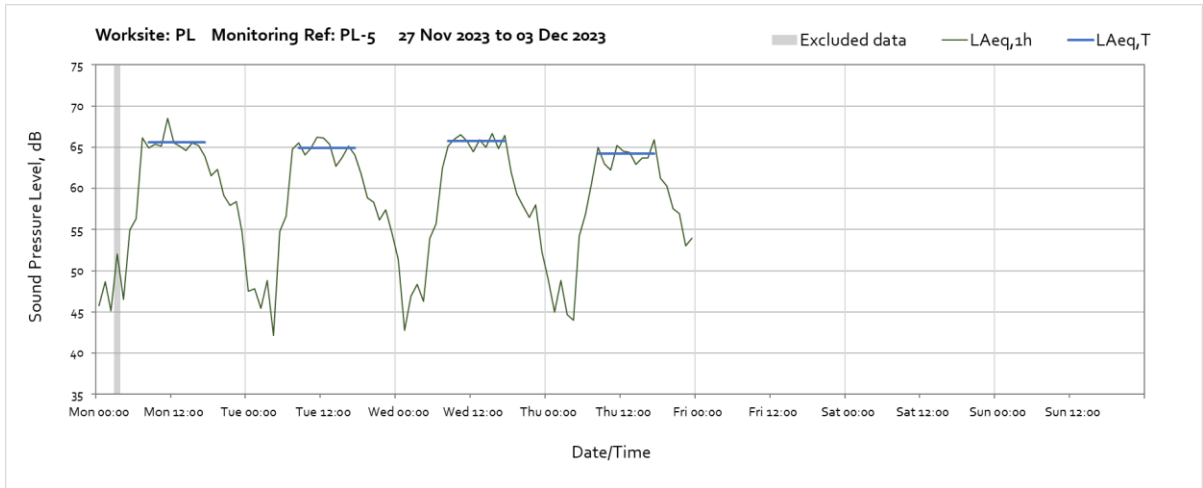
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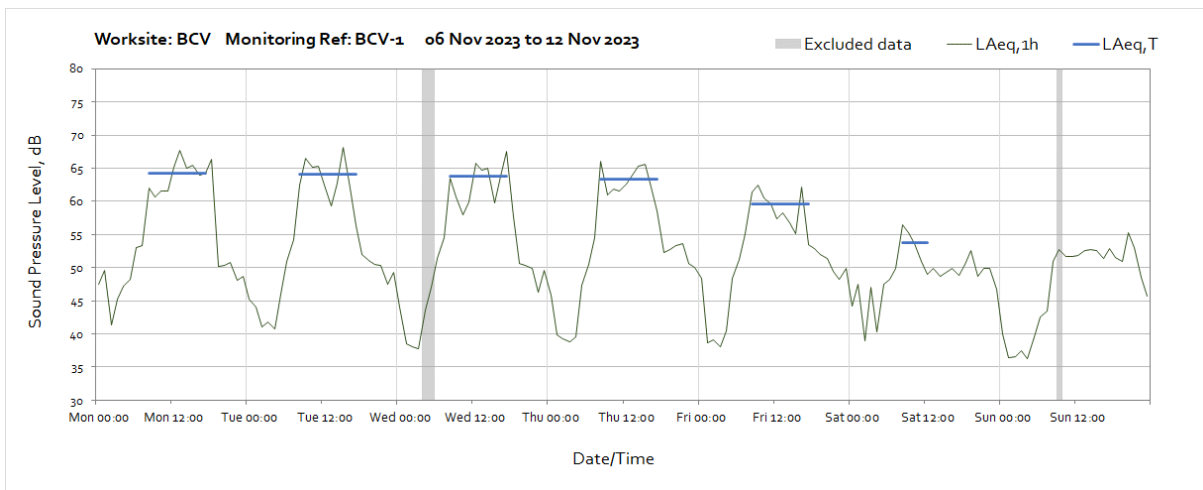
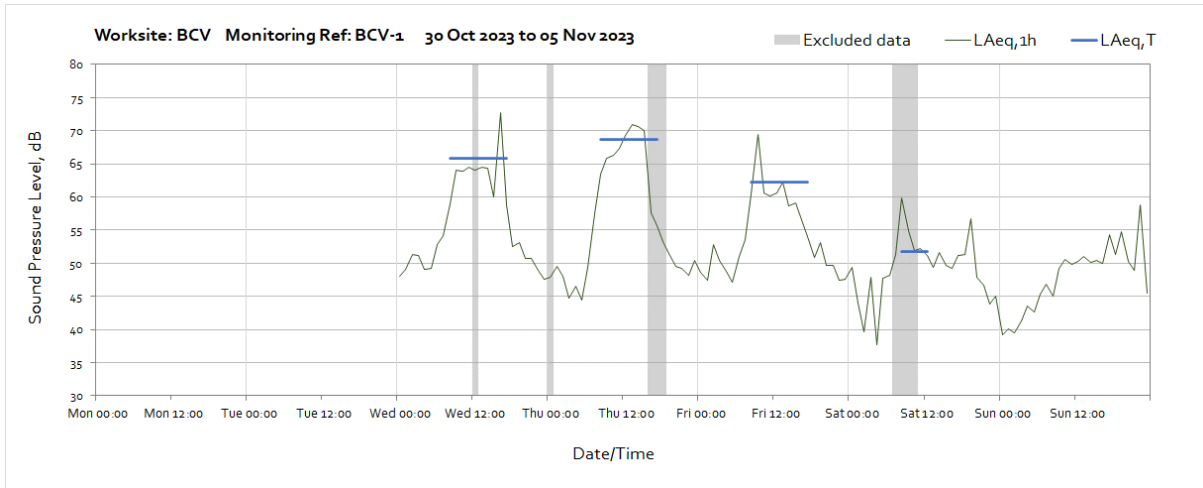
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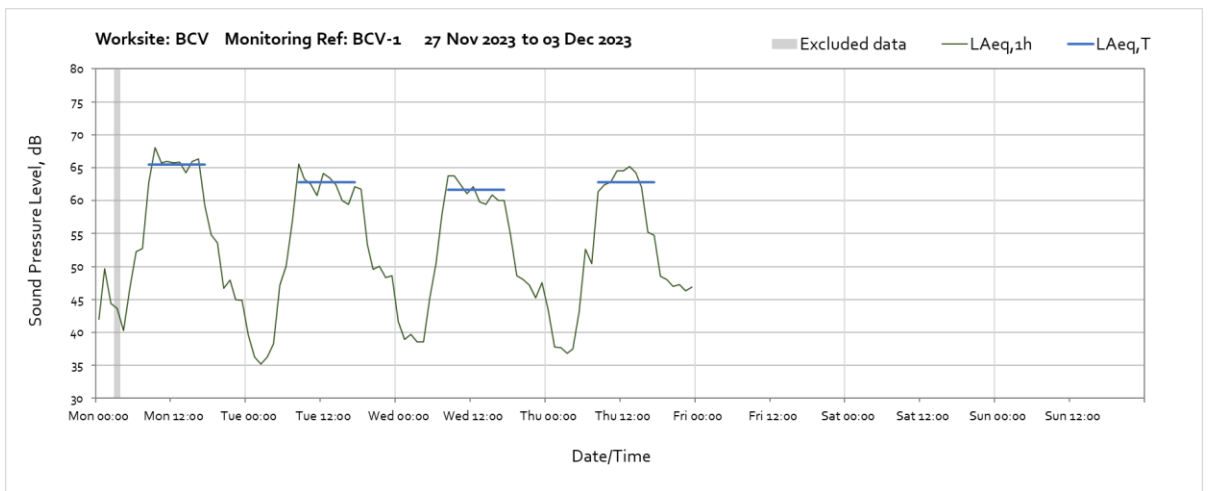
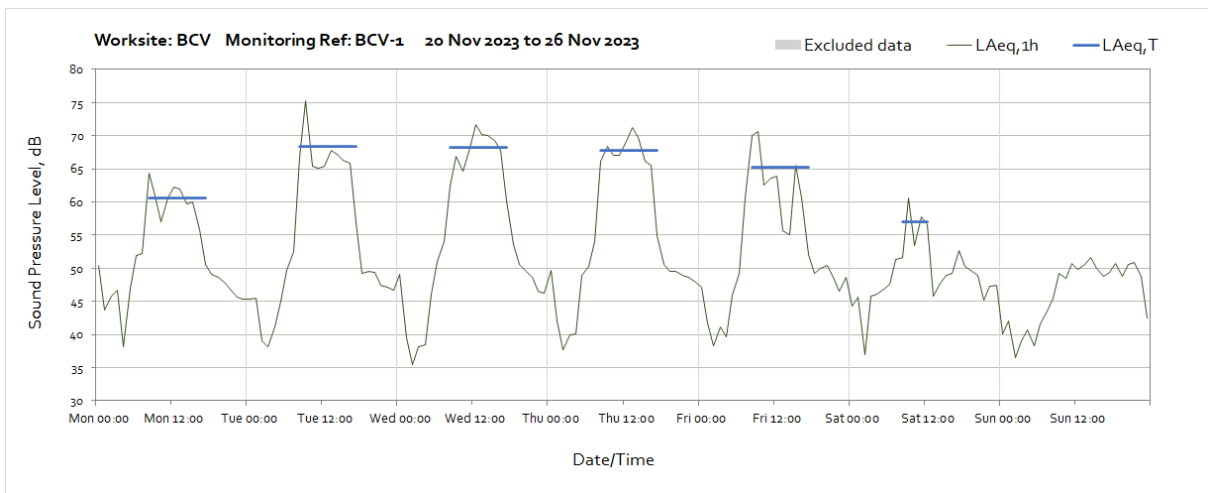
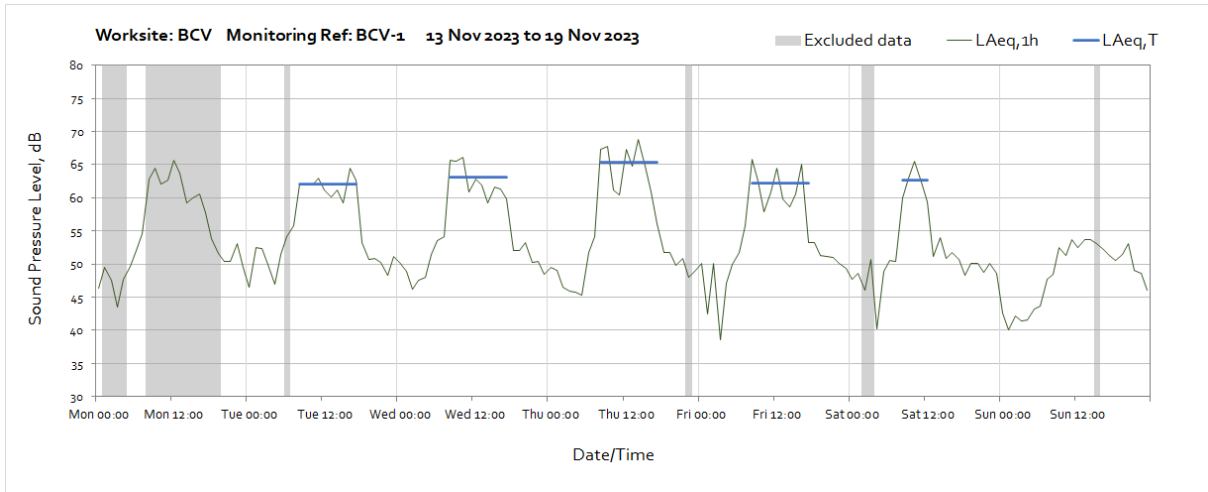




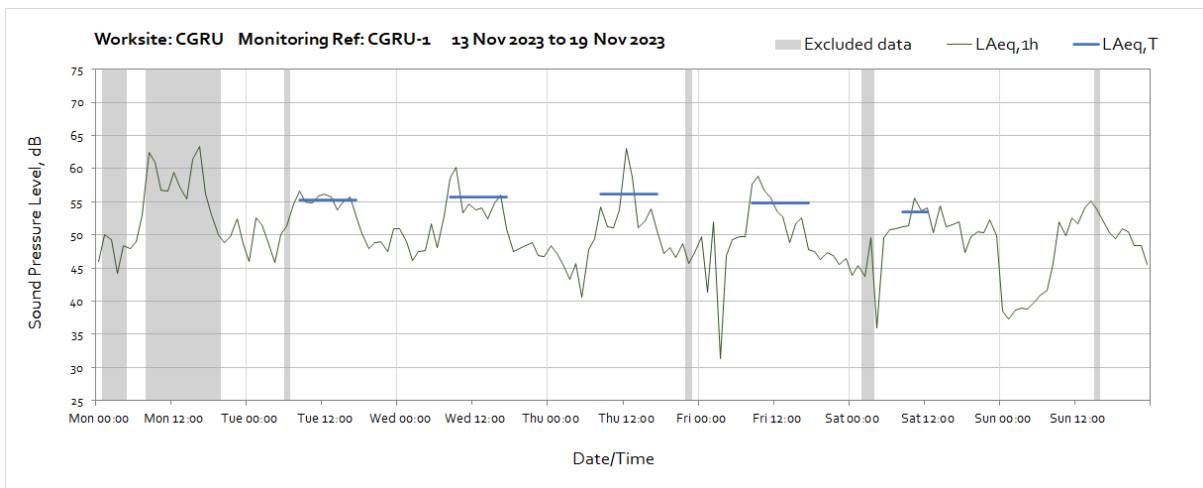
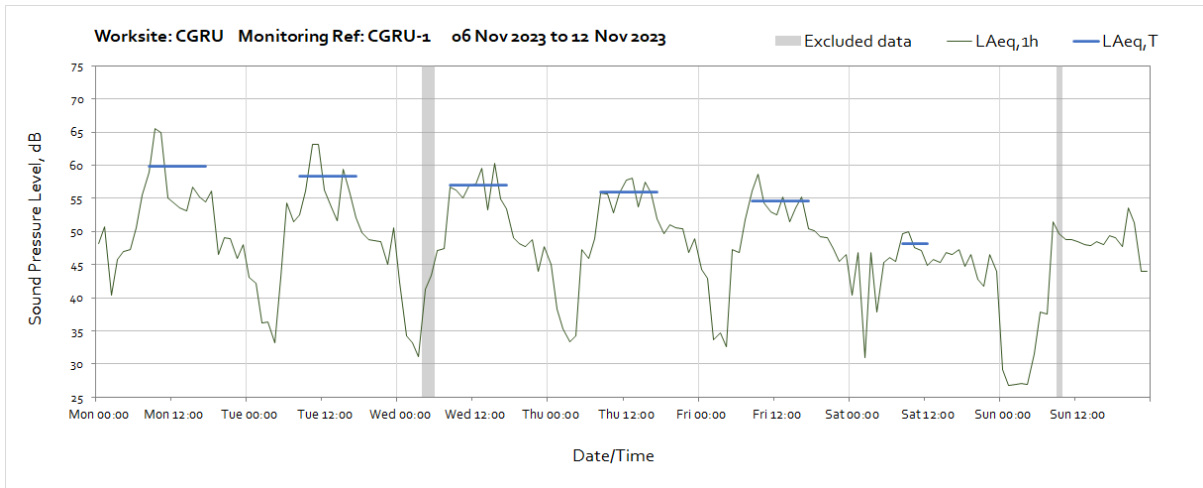
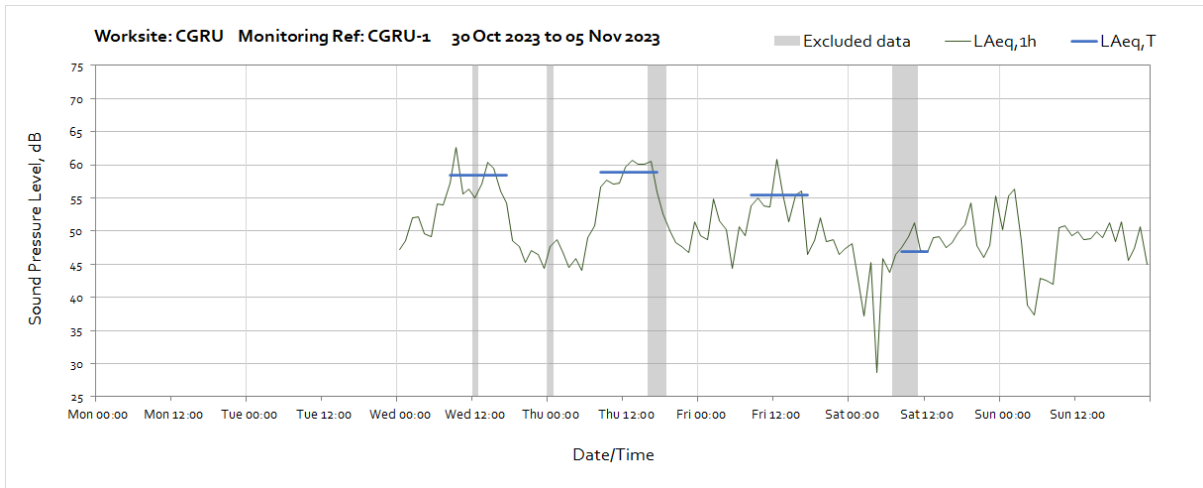


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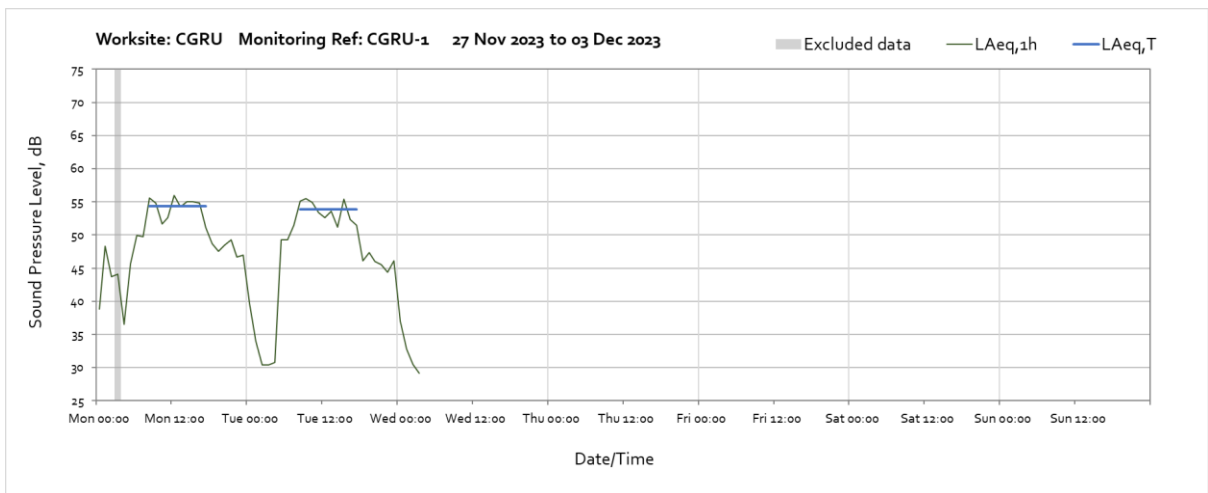
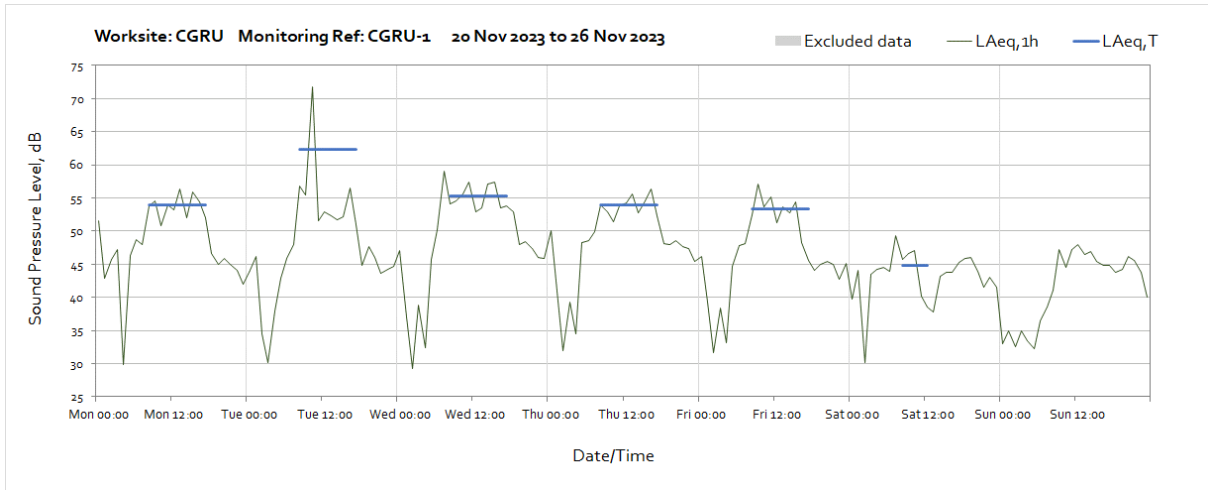




Worksite: CGRU- Monitoring Ref: CGRU-1

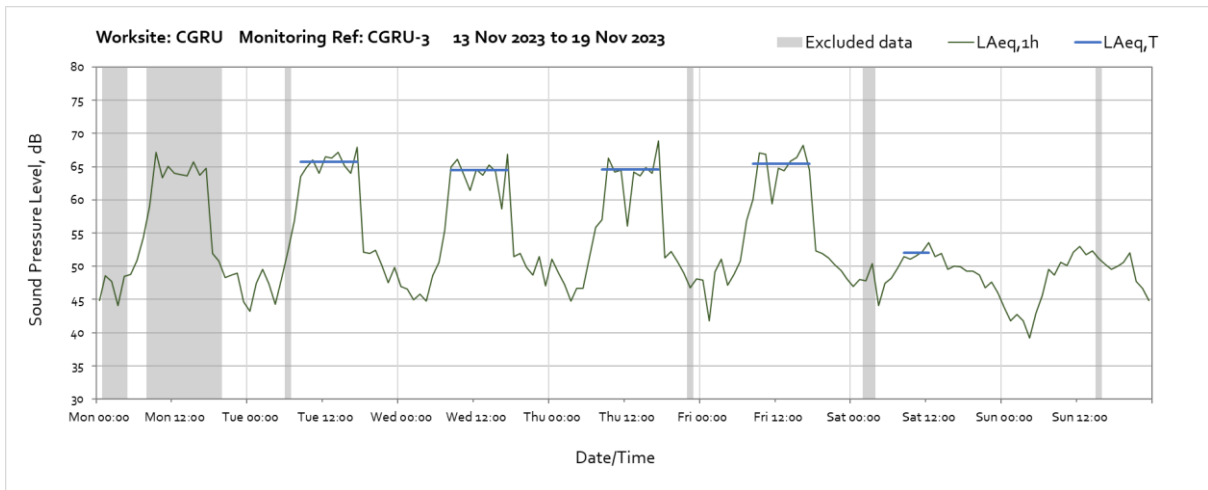
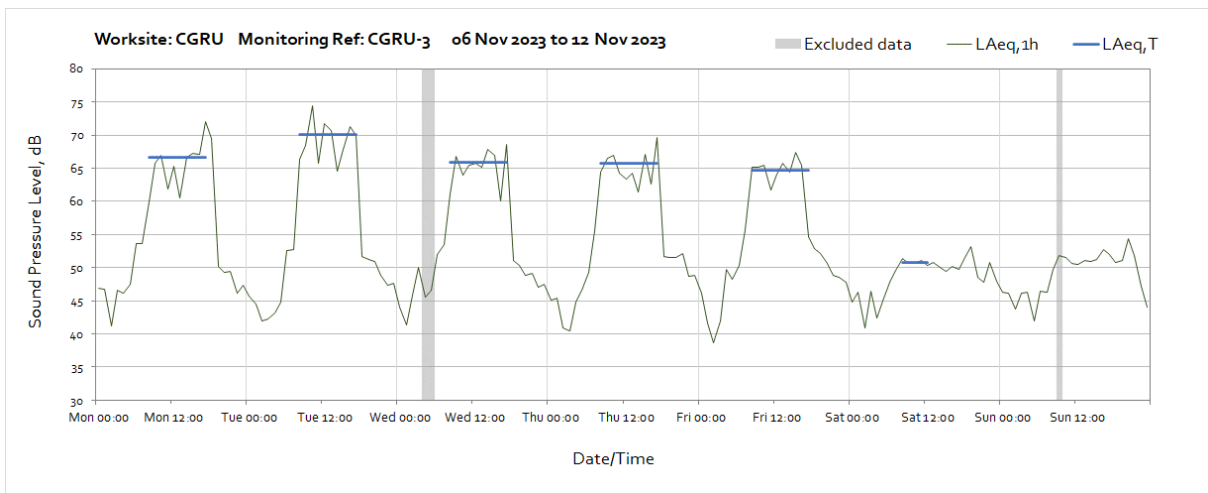
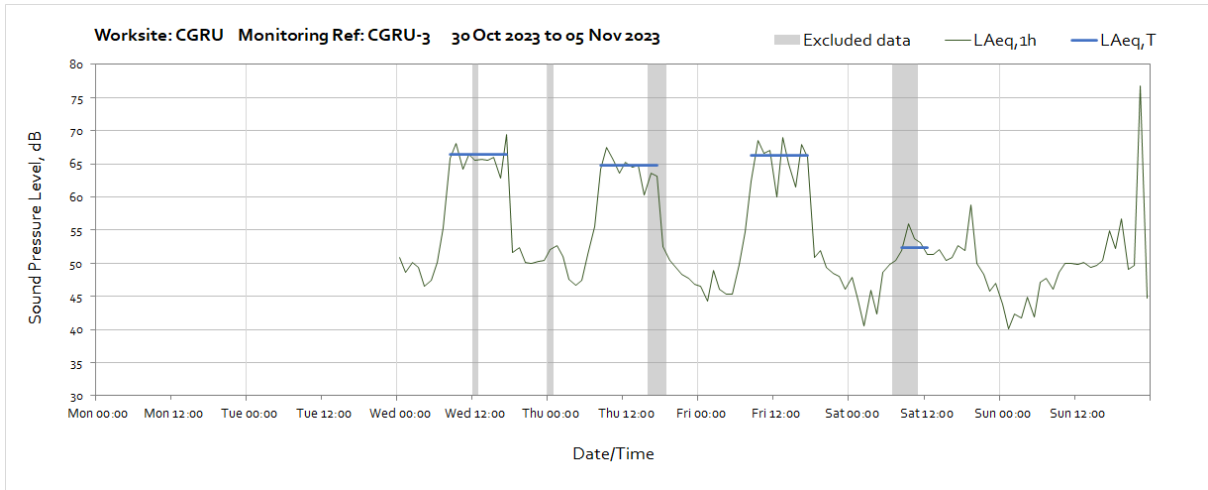


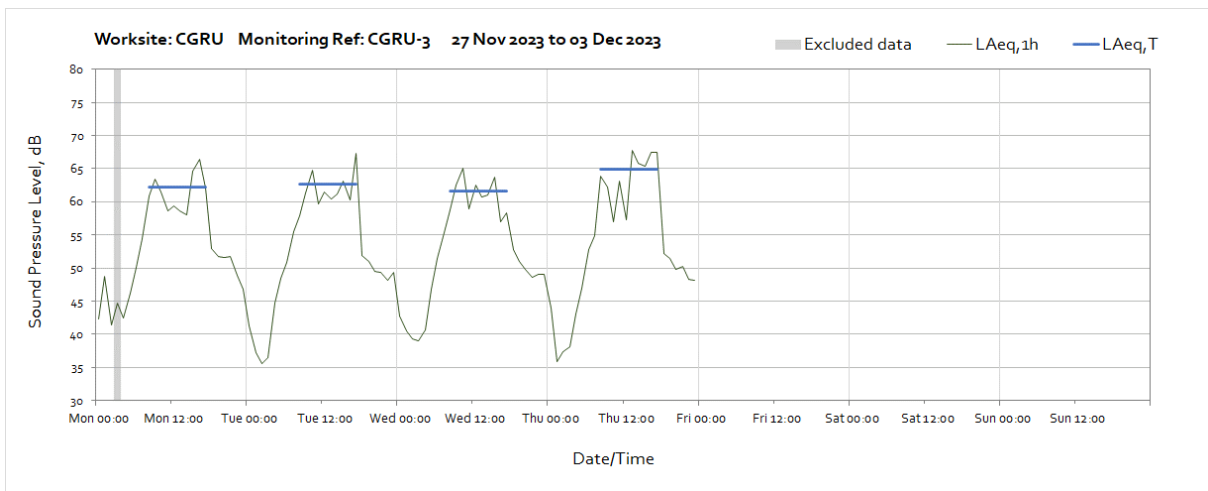
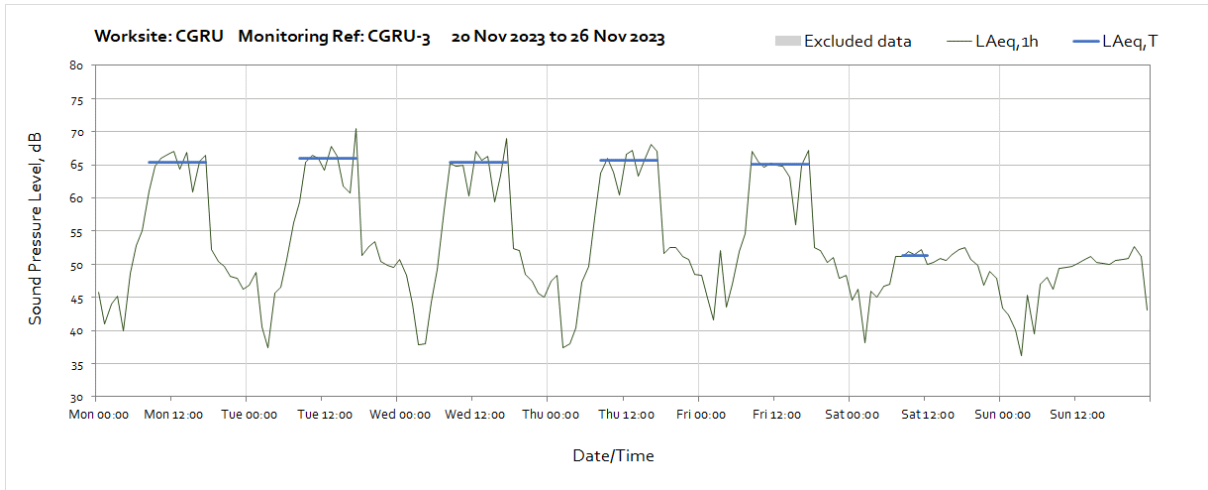
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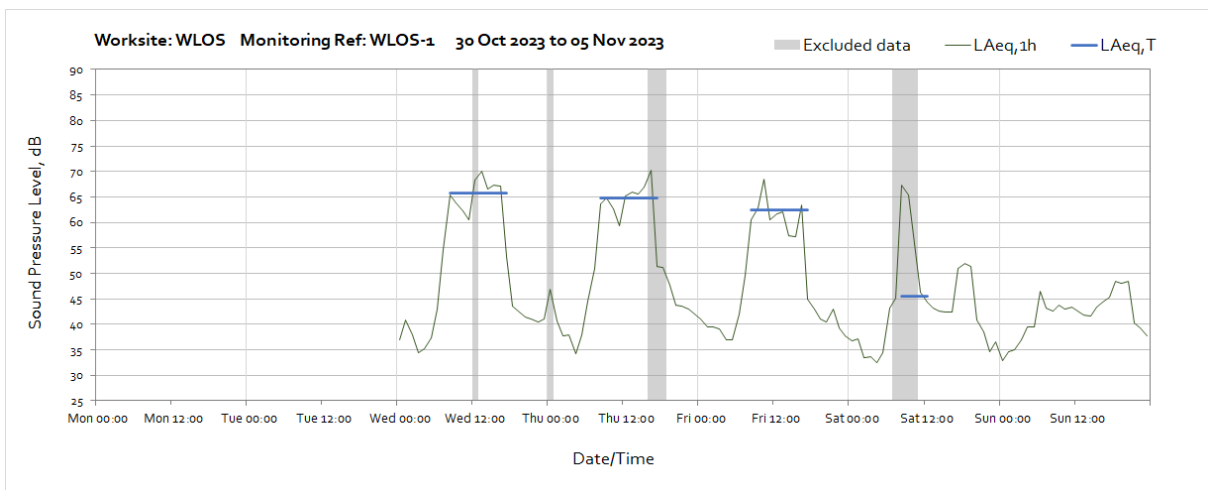
Note: Missing data from 04:00 on Wednesday 29th of November until the end of the month was due to a loss of power at the monitoring station.

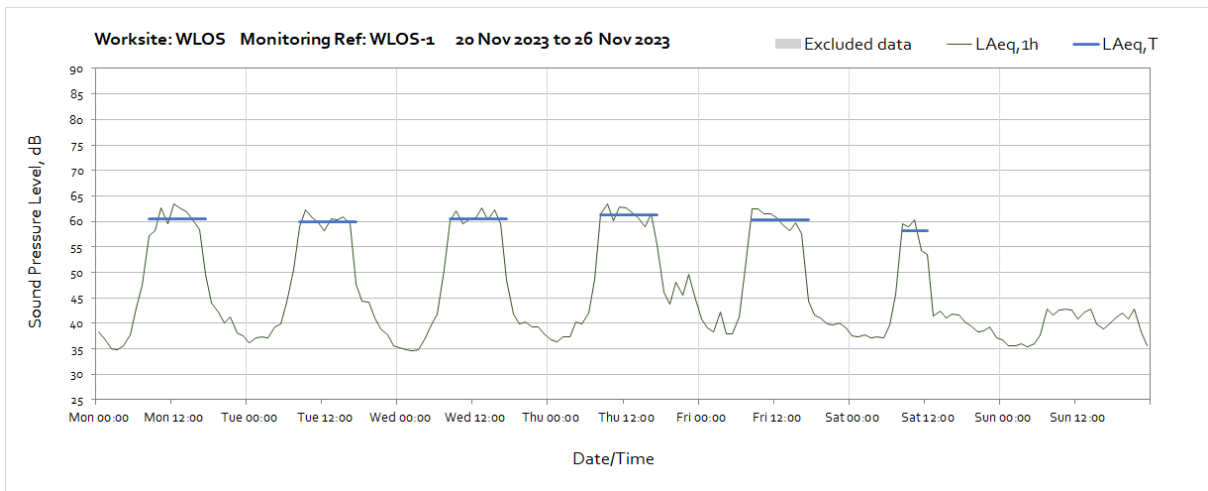
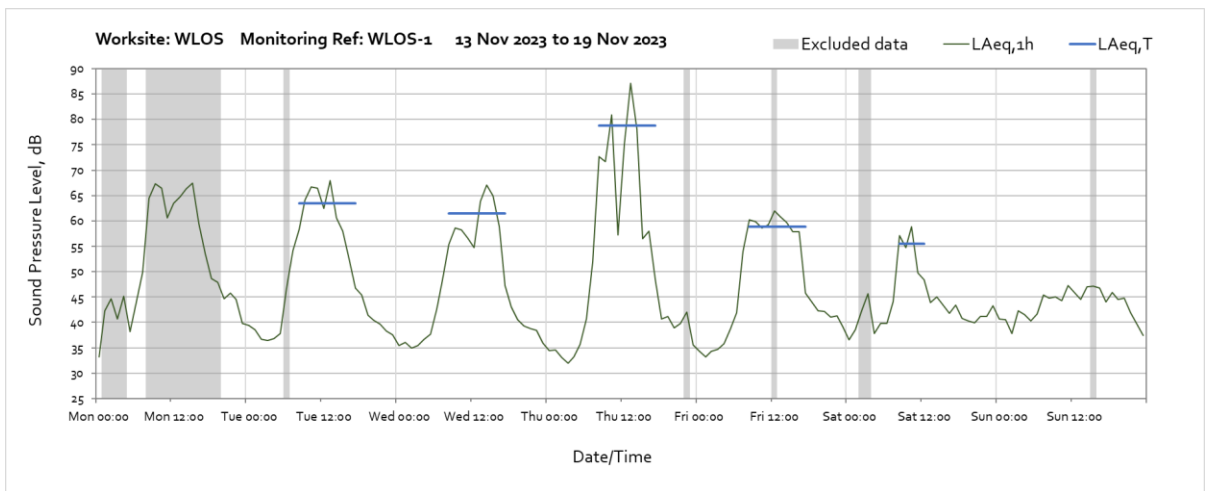
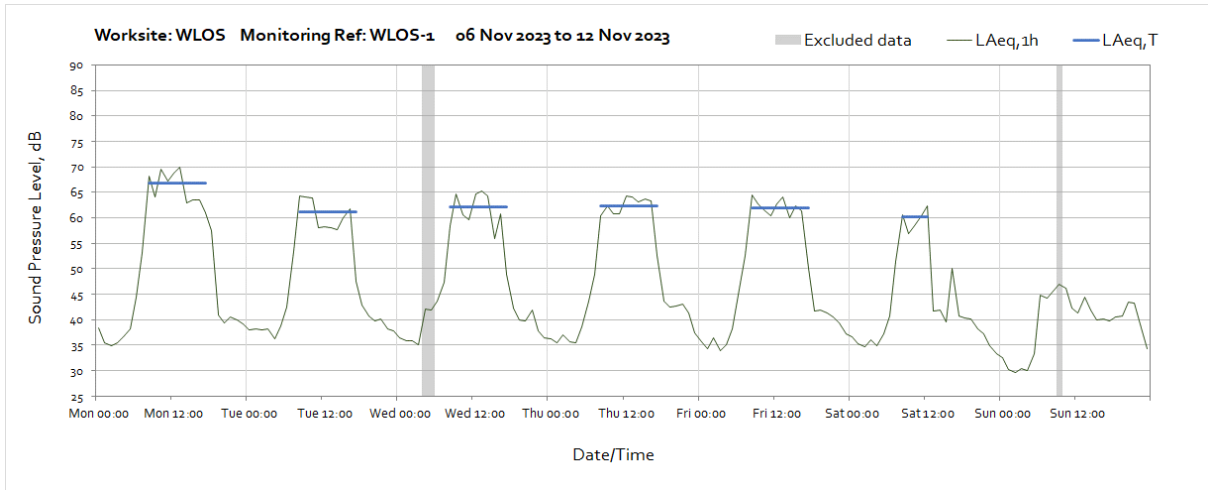
Worksite: CGRU- Monitoring Ref: CGRU-3





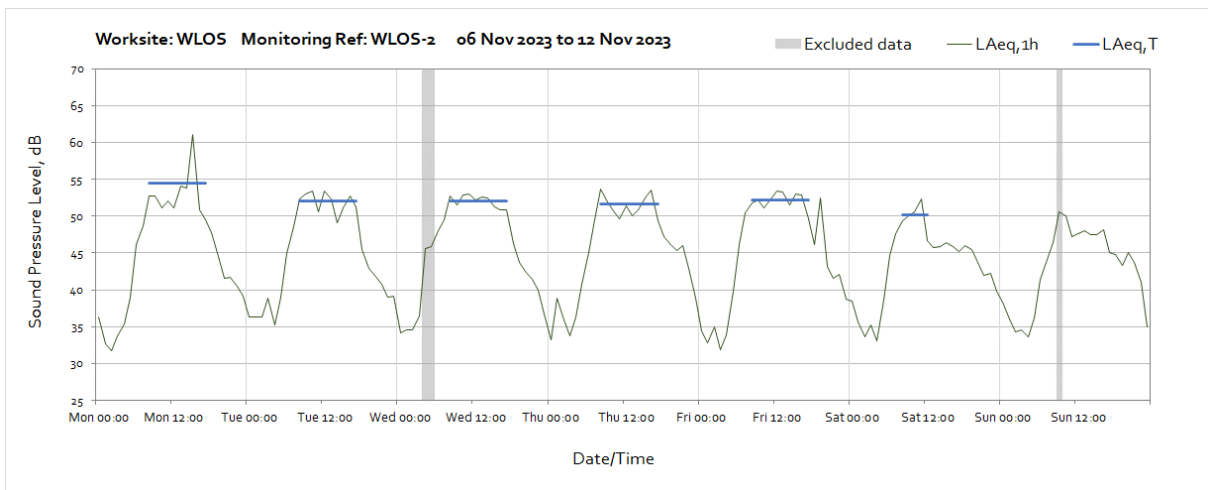
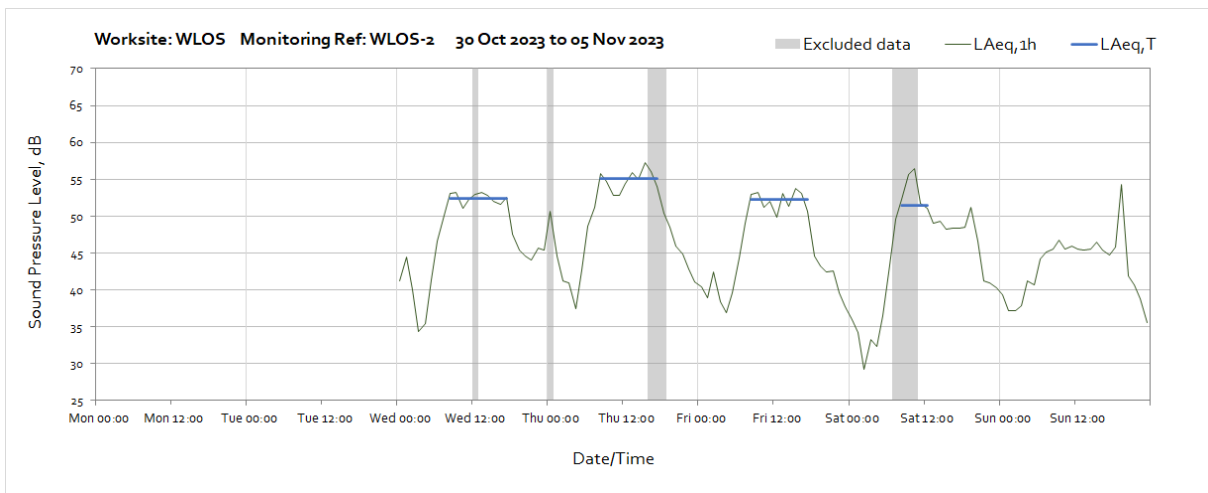
Worksite: WLOS - Monitoring Ref: WLOS-1

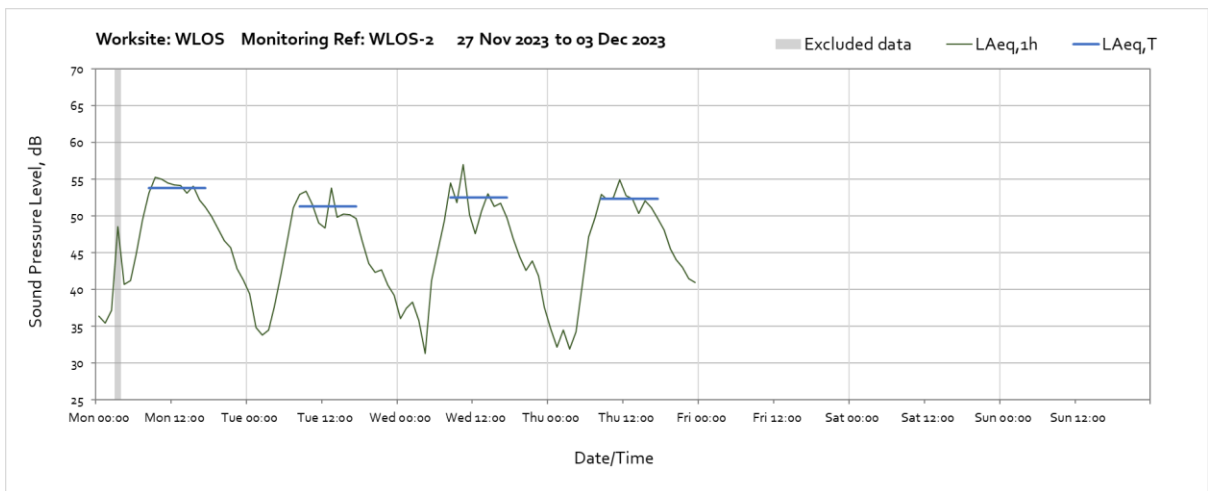
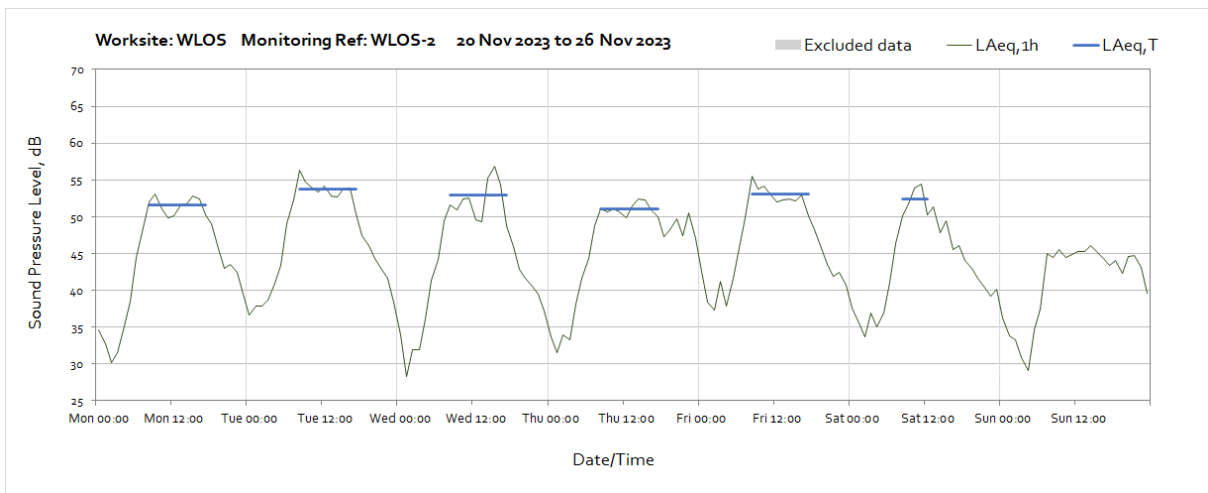
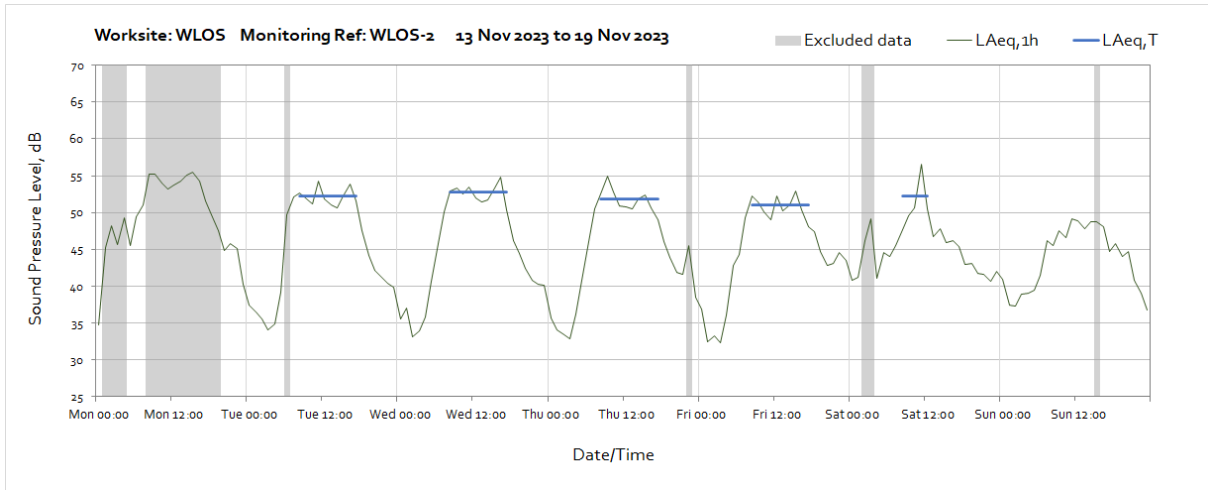




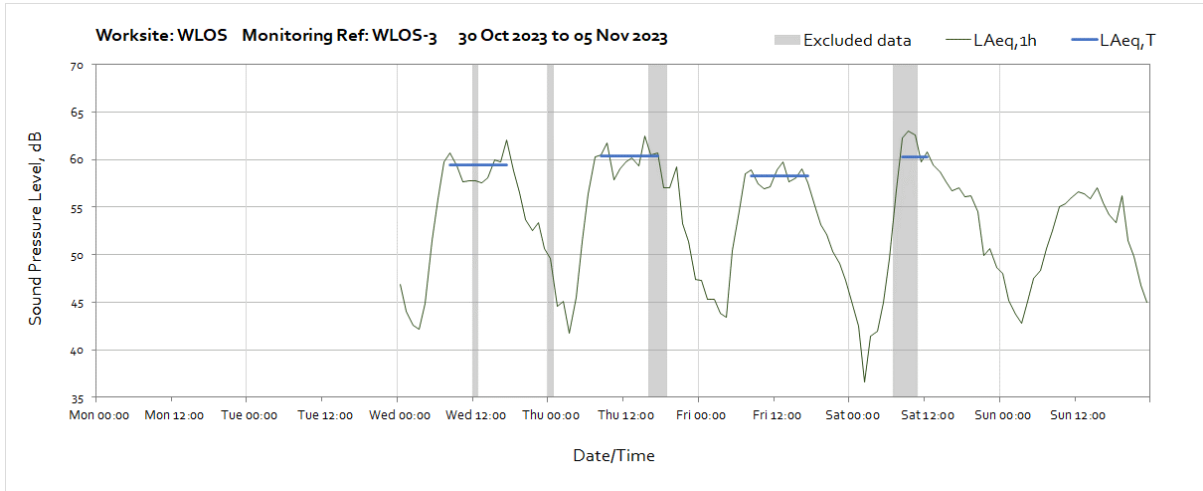


Worksite: WLOS – Monitoring Ref: WLOS-2

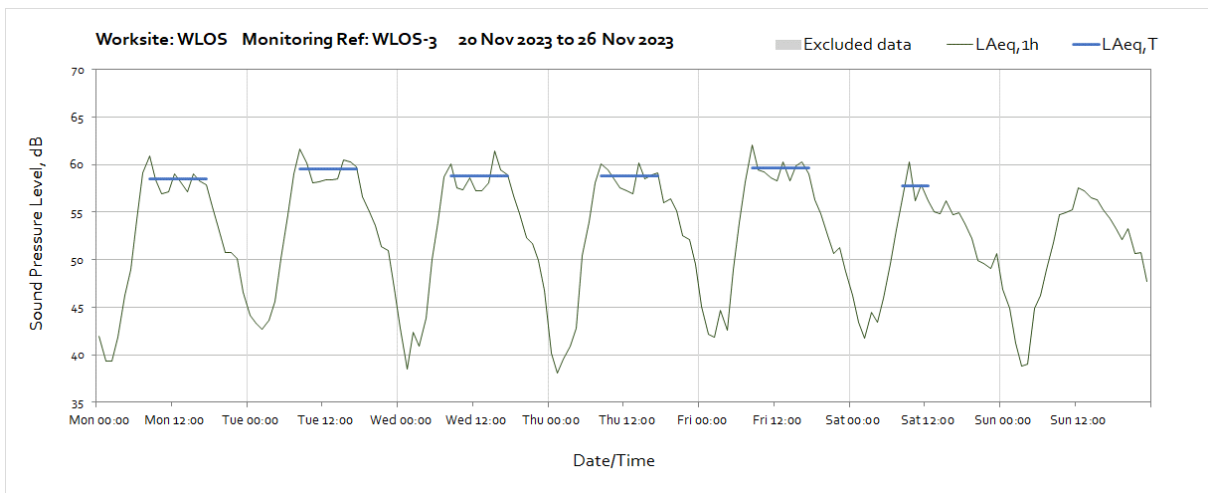
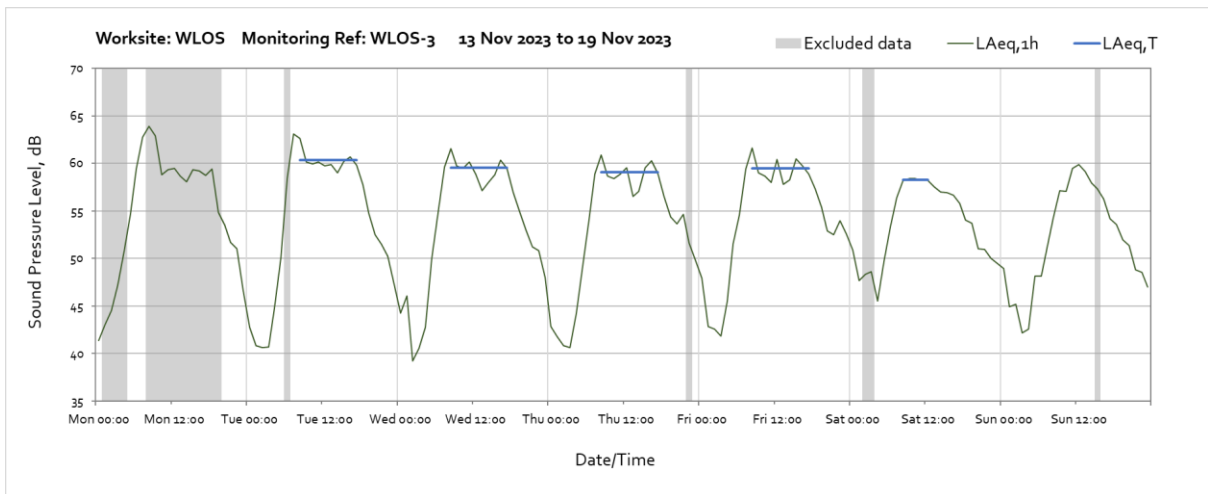
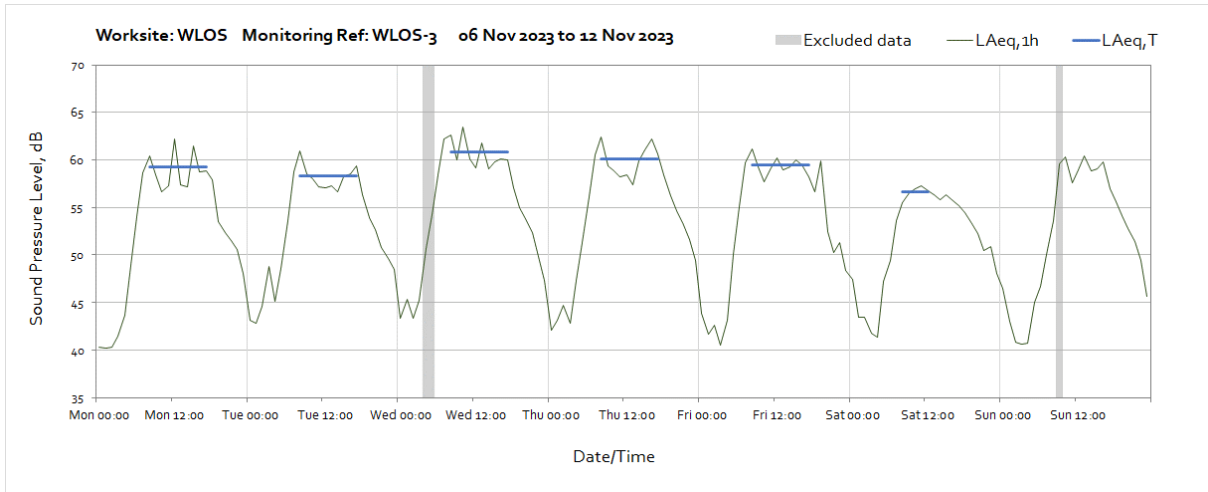




Worksite: WLOS - Monitoring Ref: WLOS-3



OFFICIAL

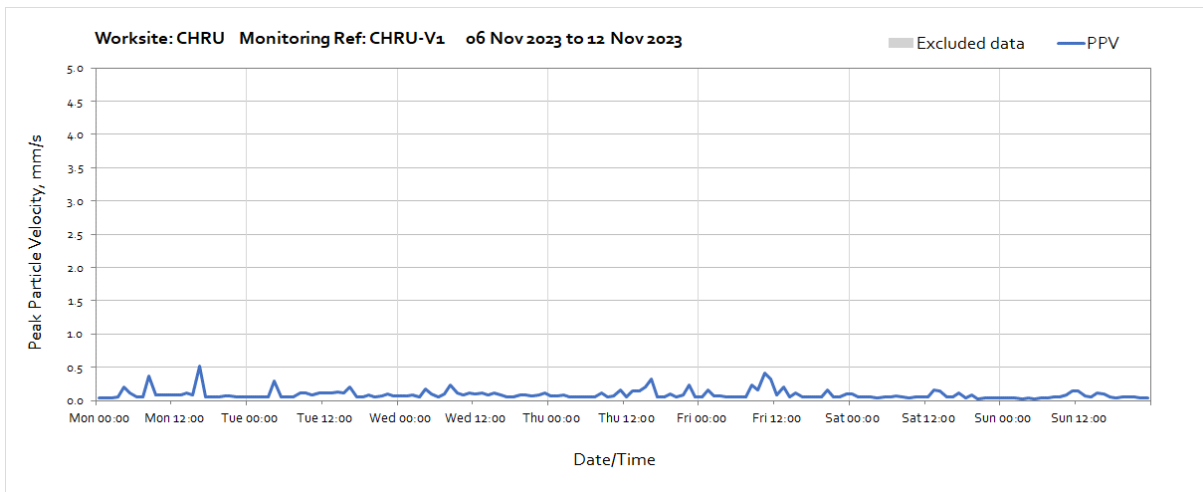
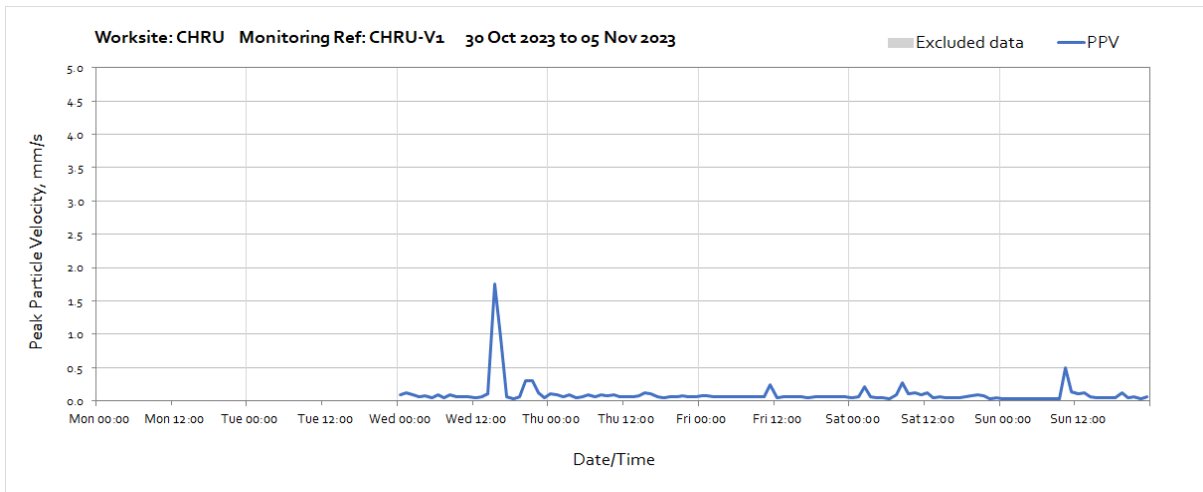


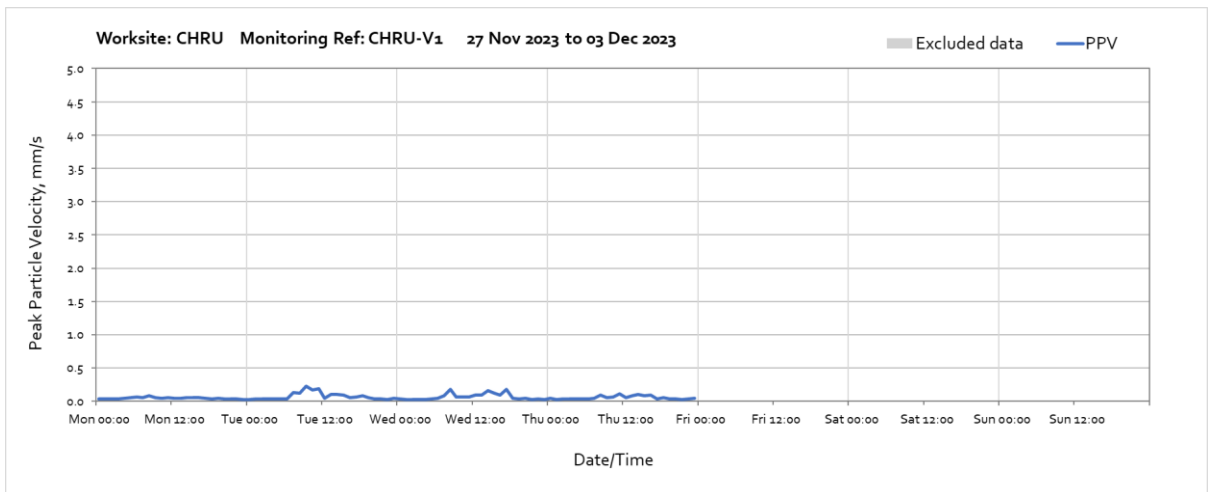
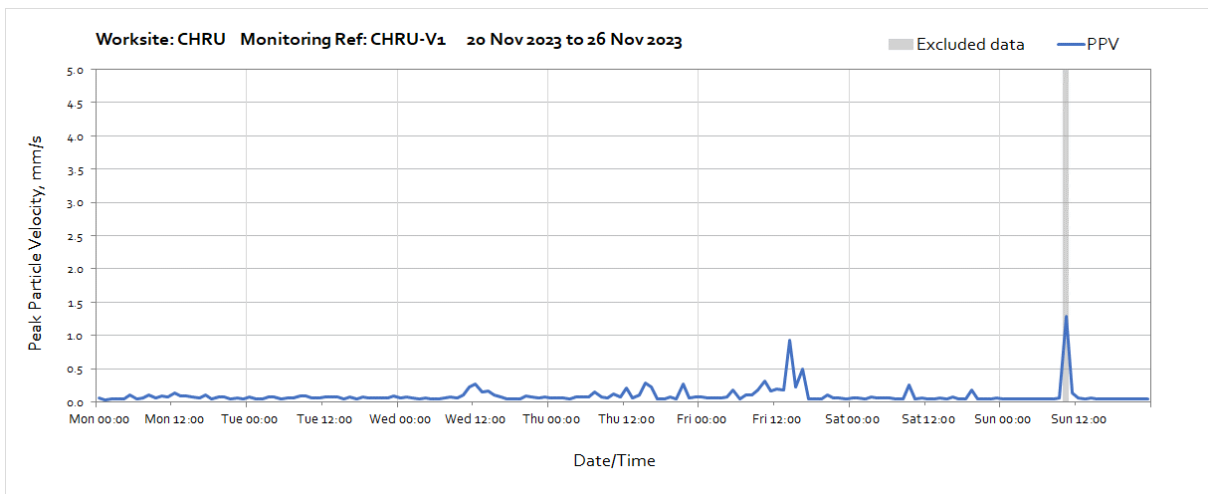
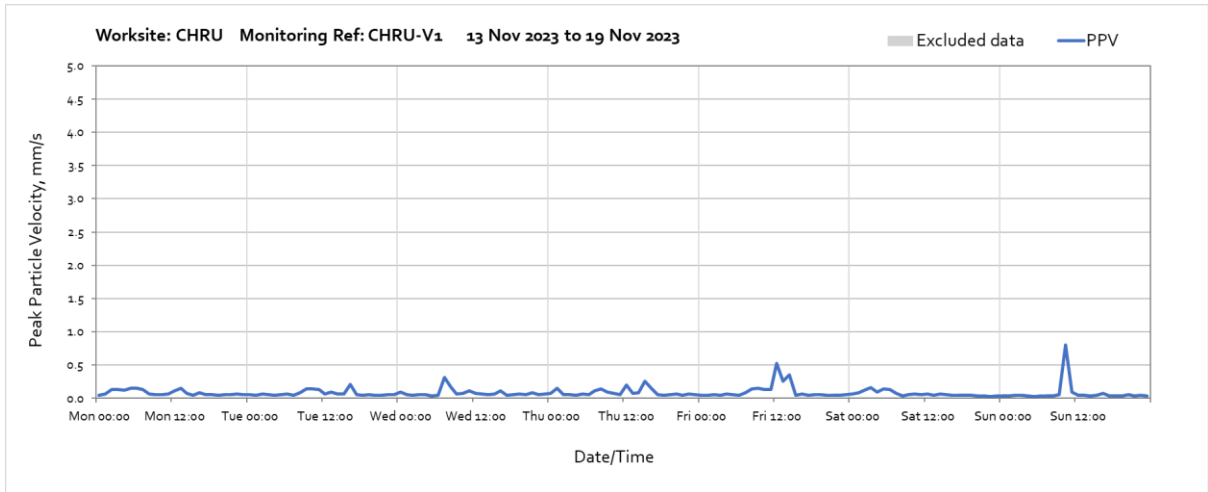


Vibration

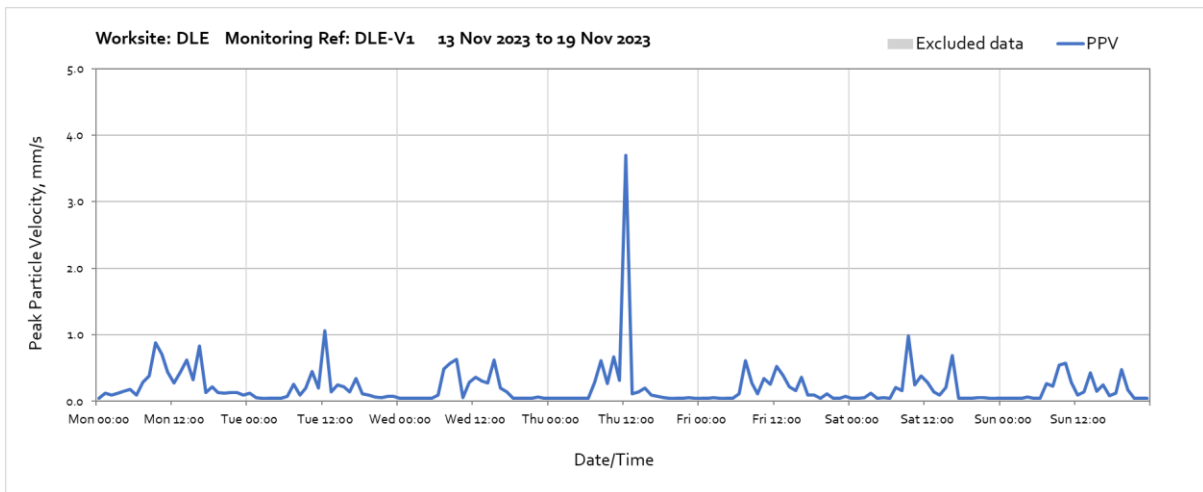
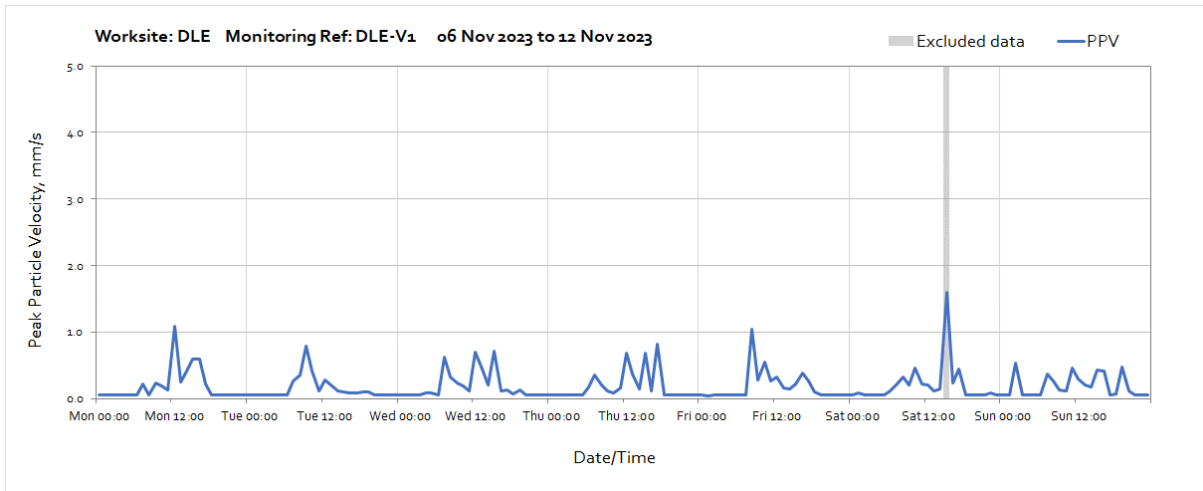
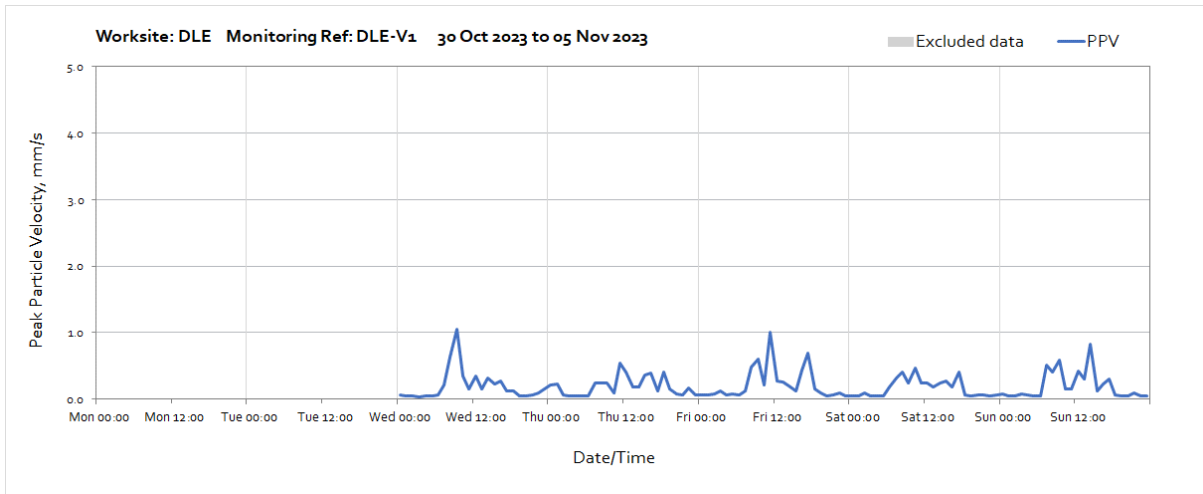
The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the highest PPV of the three orthogonal axes x, y and z. Periods where PPV values have been affected by local interference with the vibration monitor or only measured for part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

Worksite: CHR – Monitoring Ref: CHRU-V1

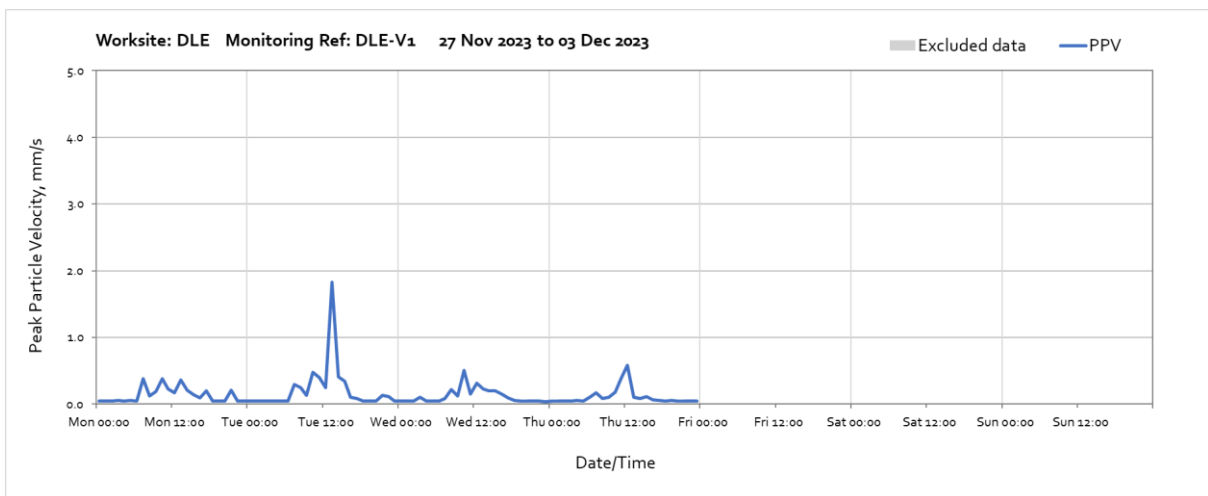
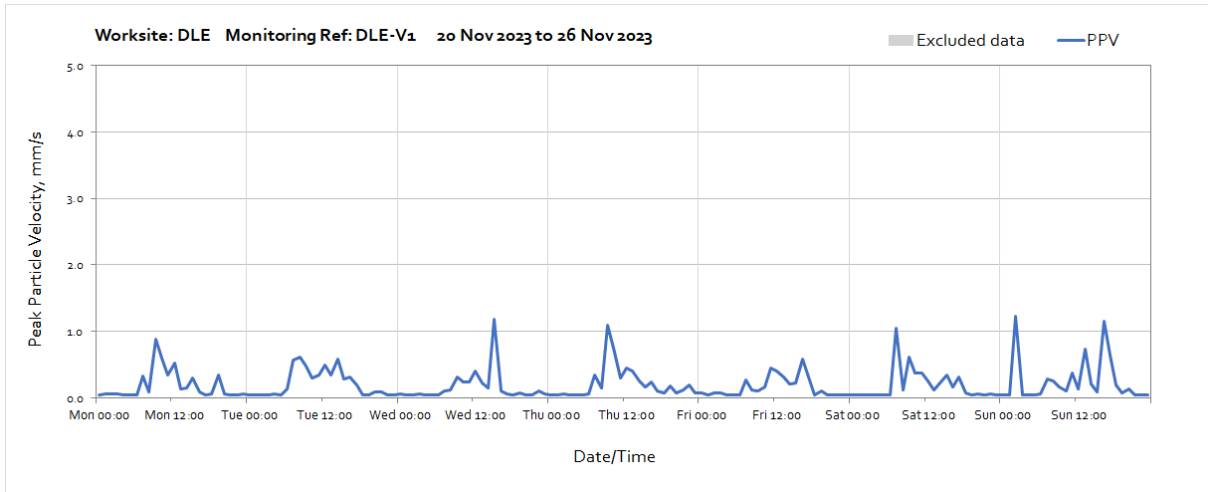




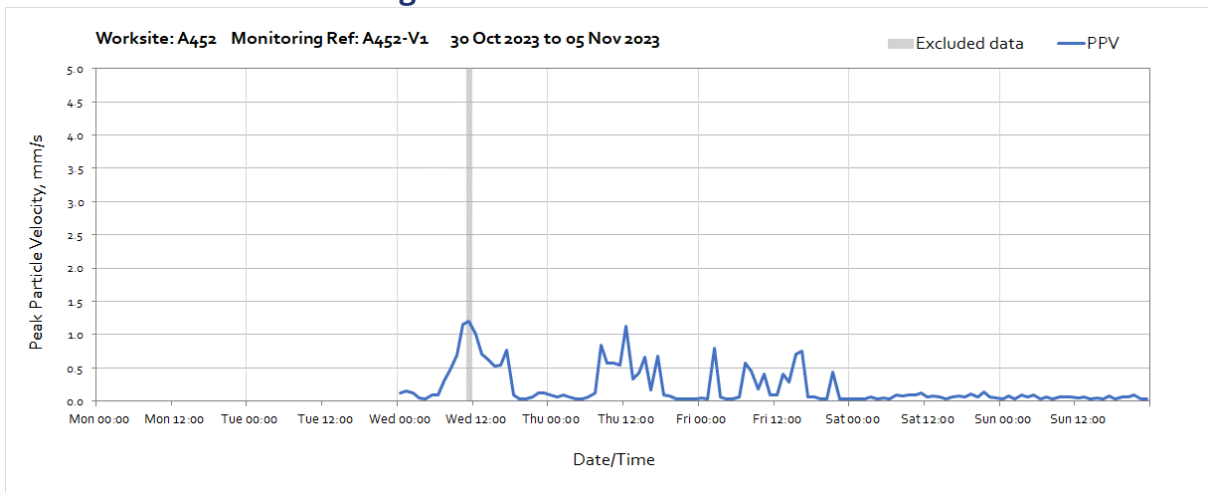
Worksite: DLE – Monitoring Ref: DLE-V1

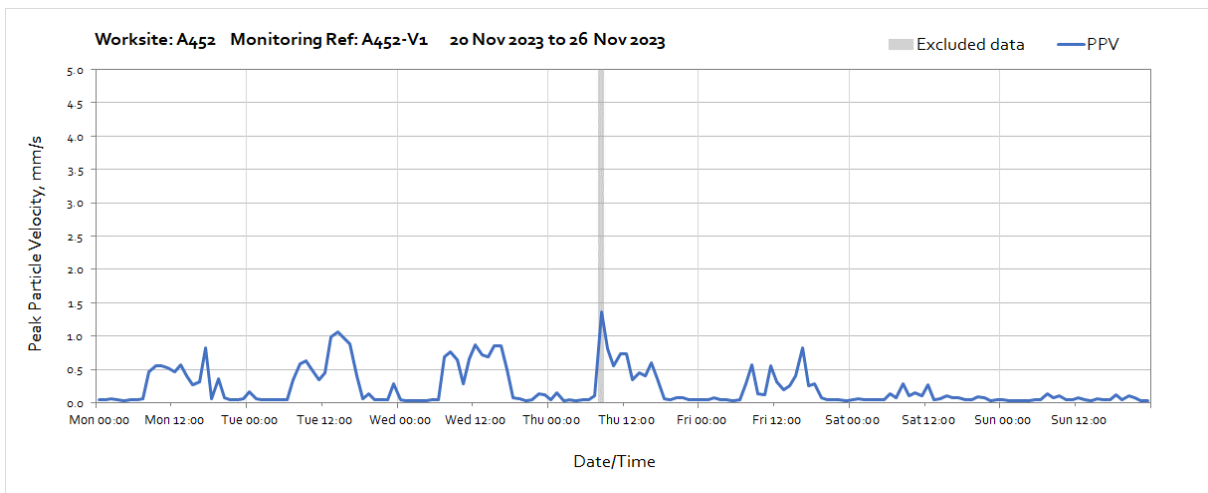
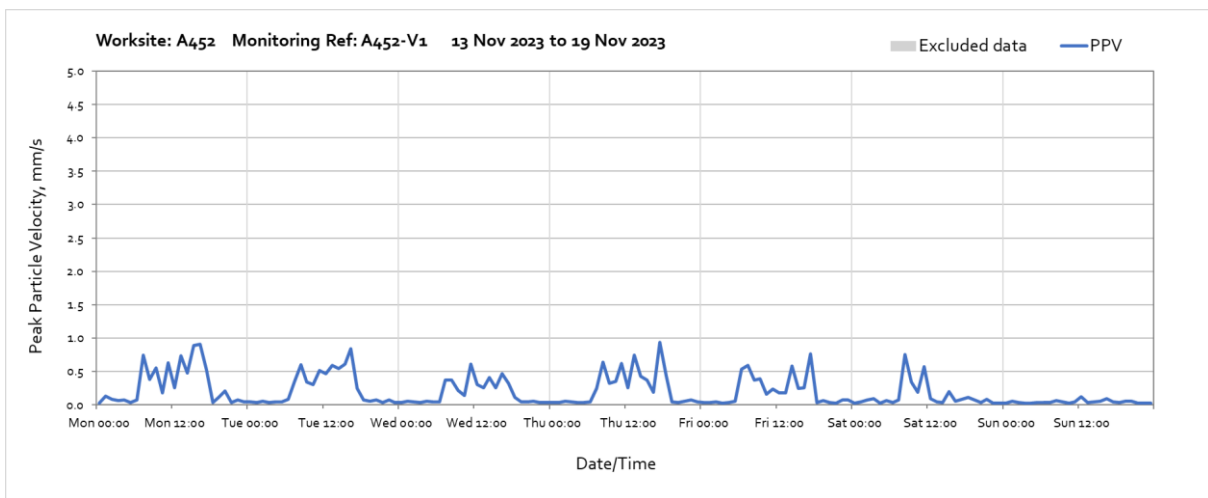
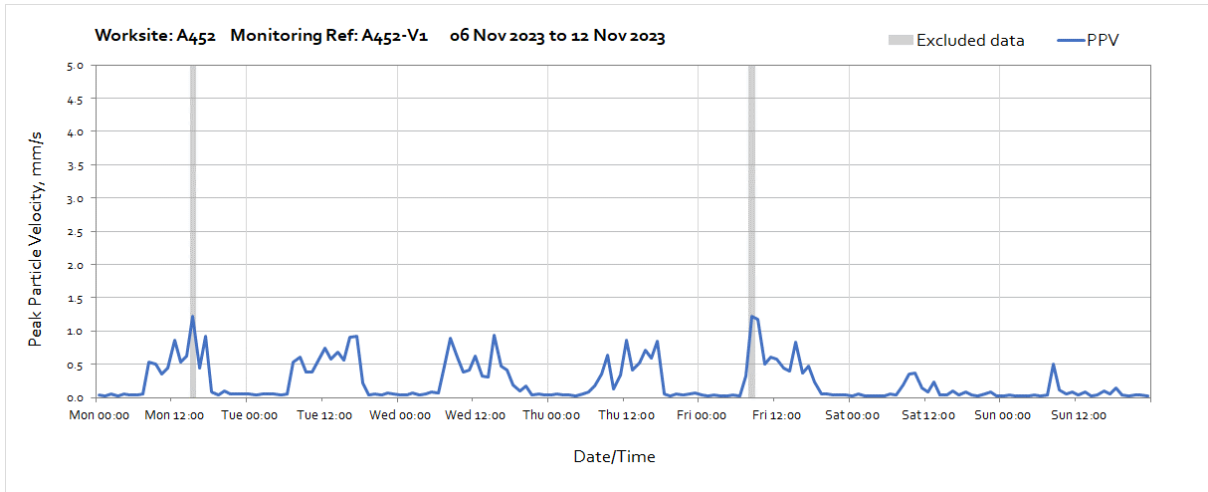


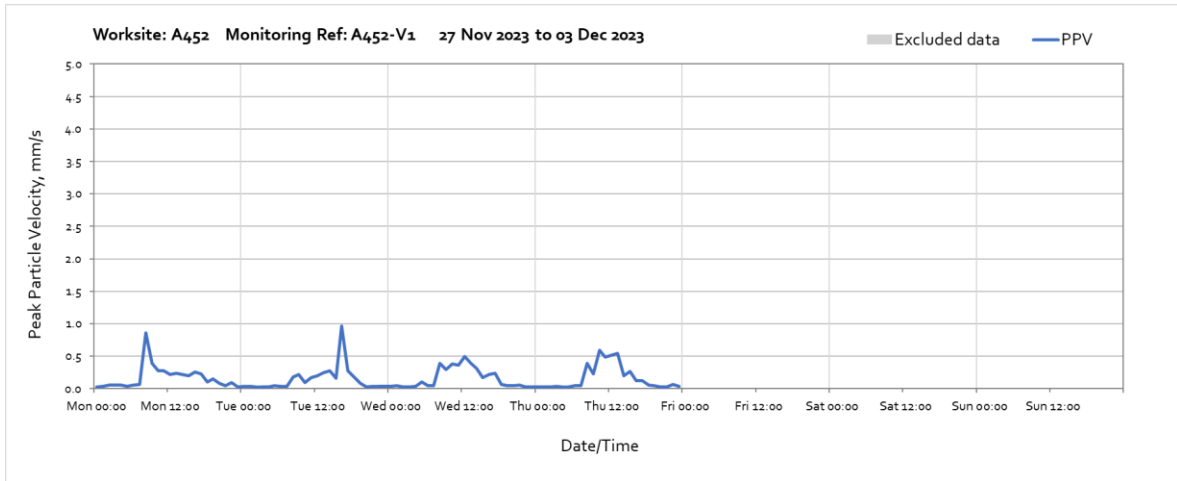
OFFICIAL



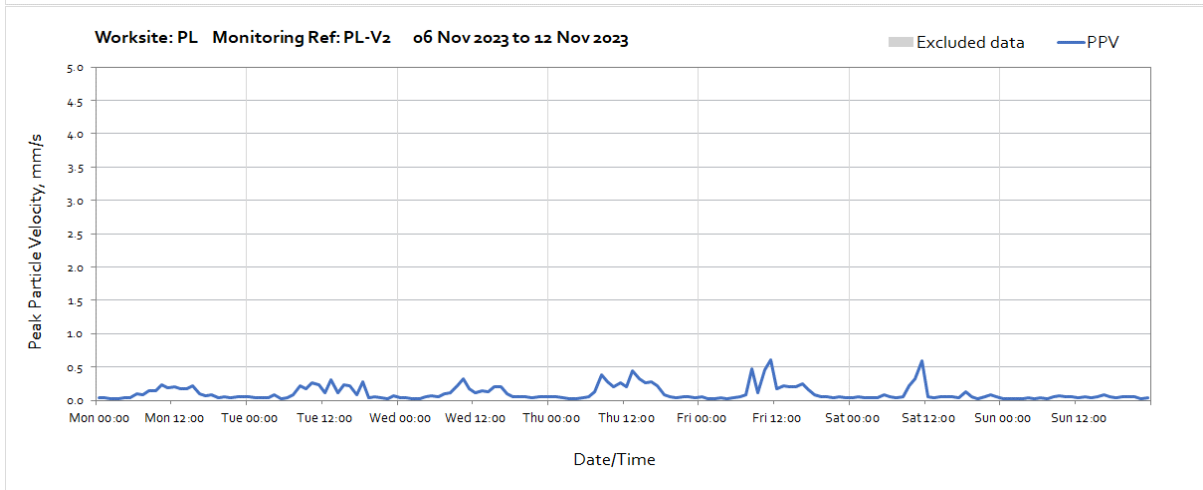
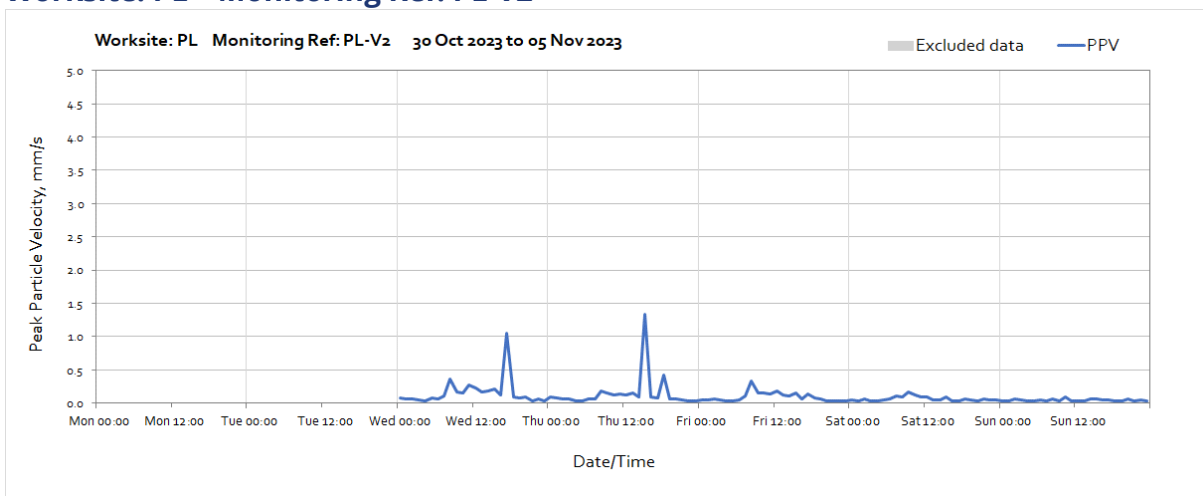
Worksite: A452 – Monitoring Ref: A452-V1

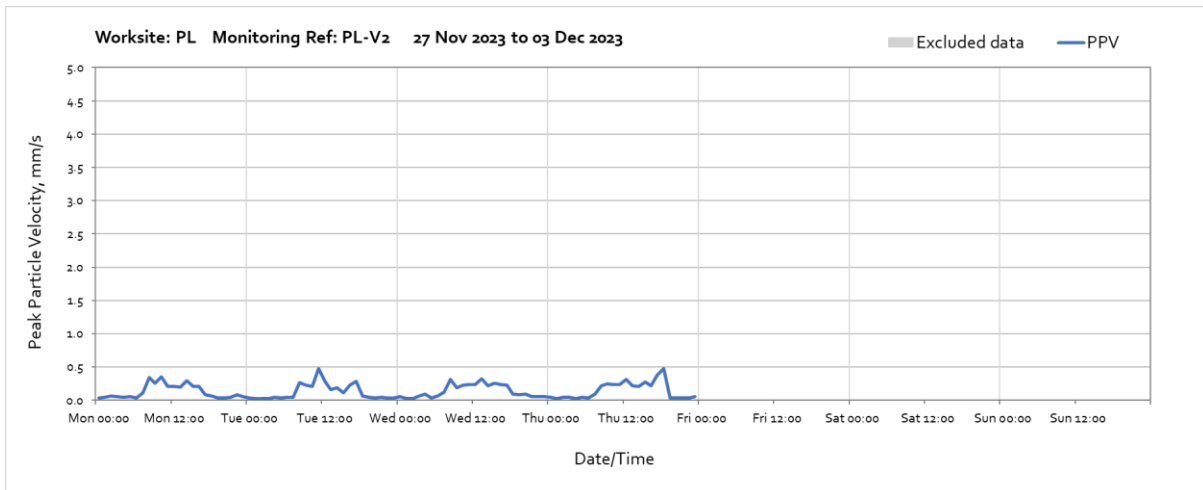
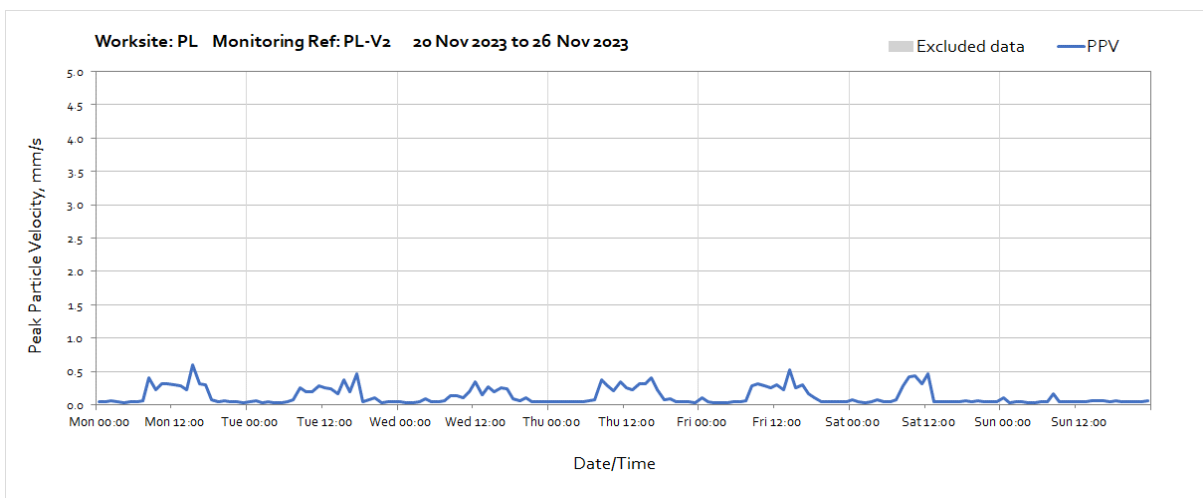
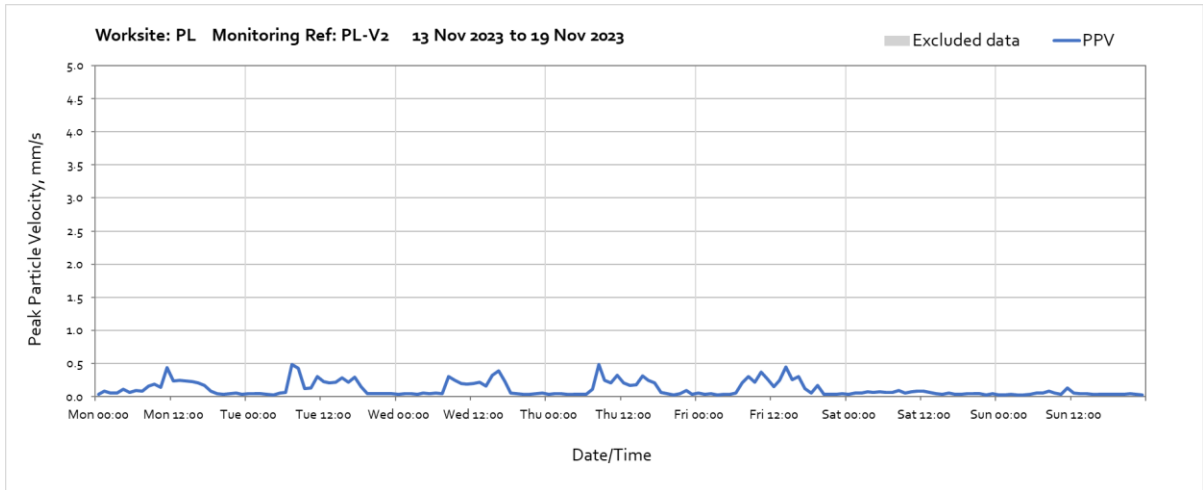




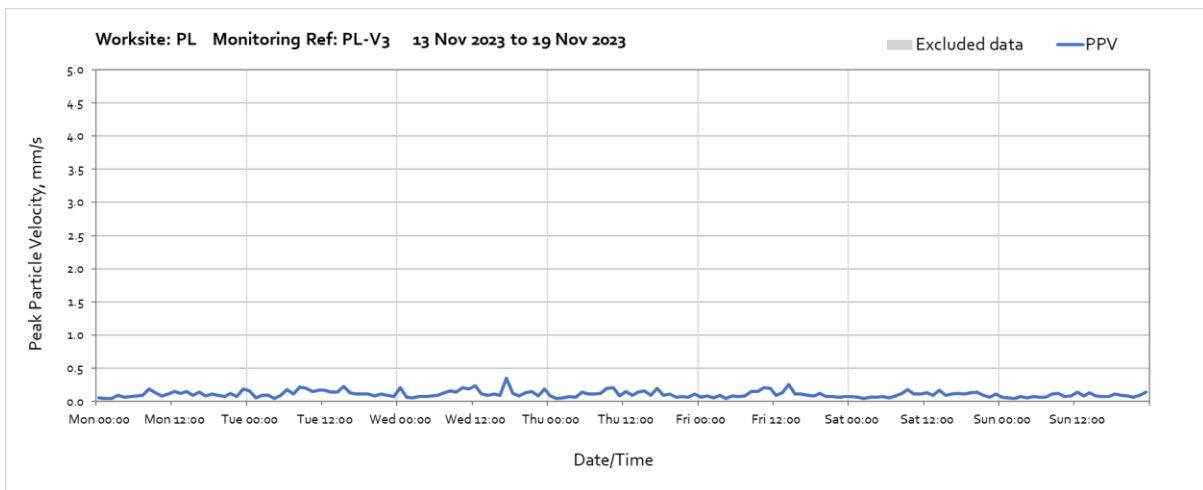
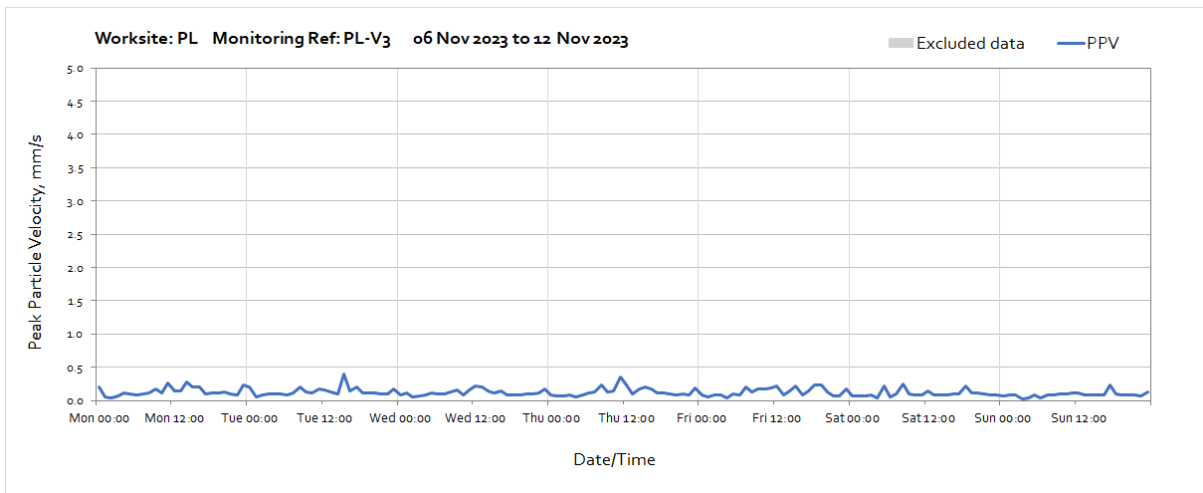
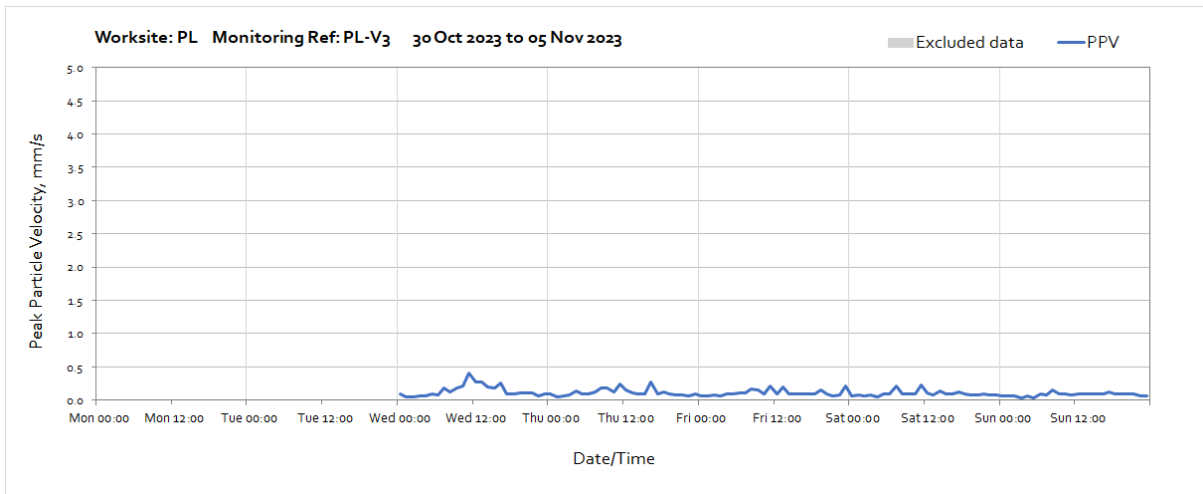


Worksite: PL – Monitoring Ref: PL-V2

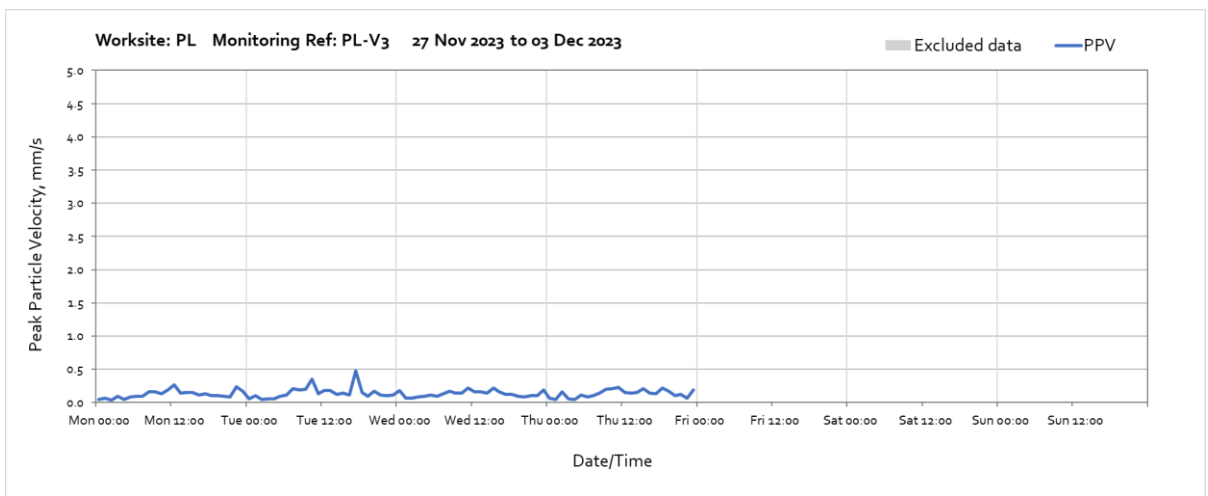
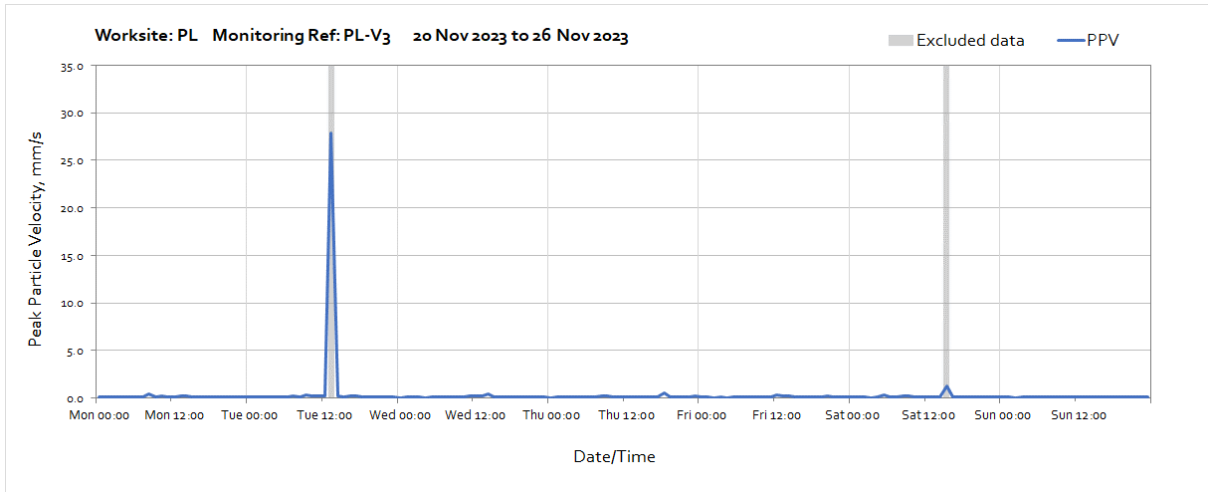




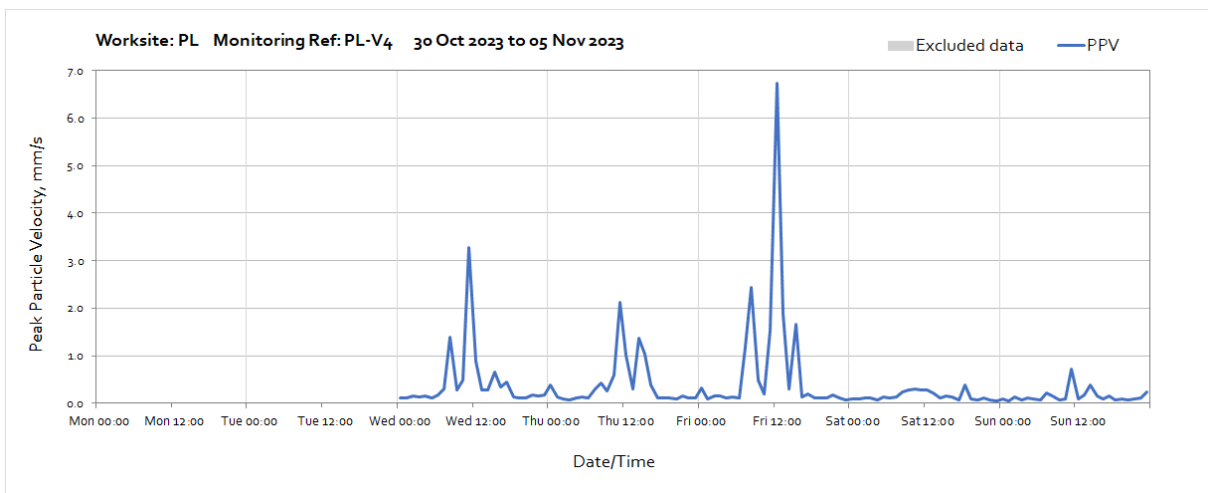
Worksite: PL – Monitoring Ref: PL-V3

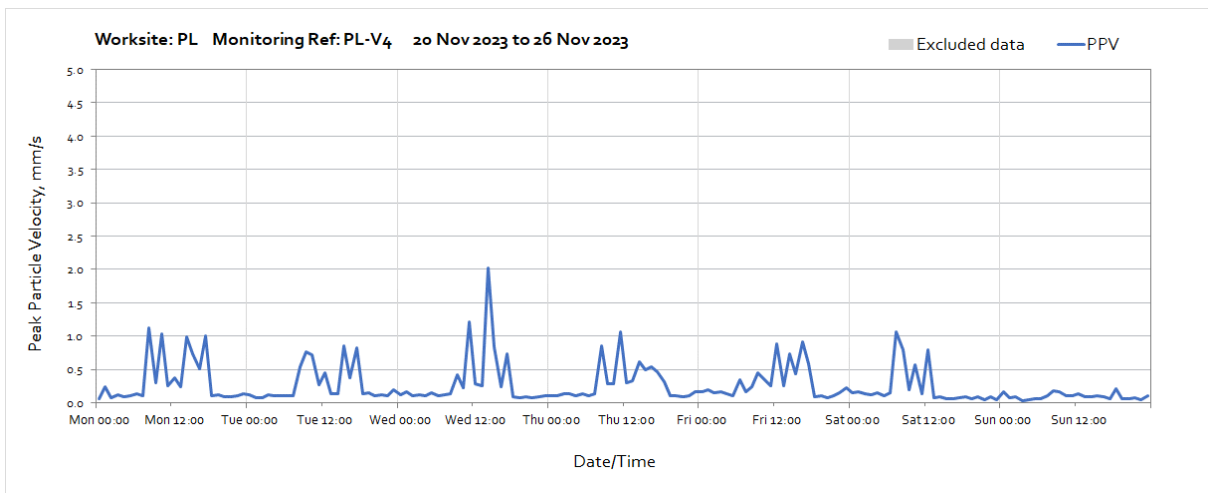
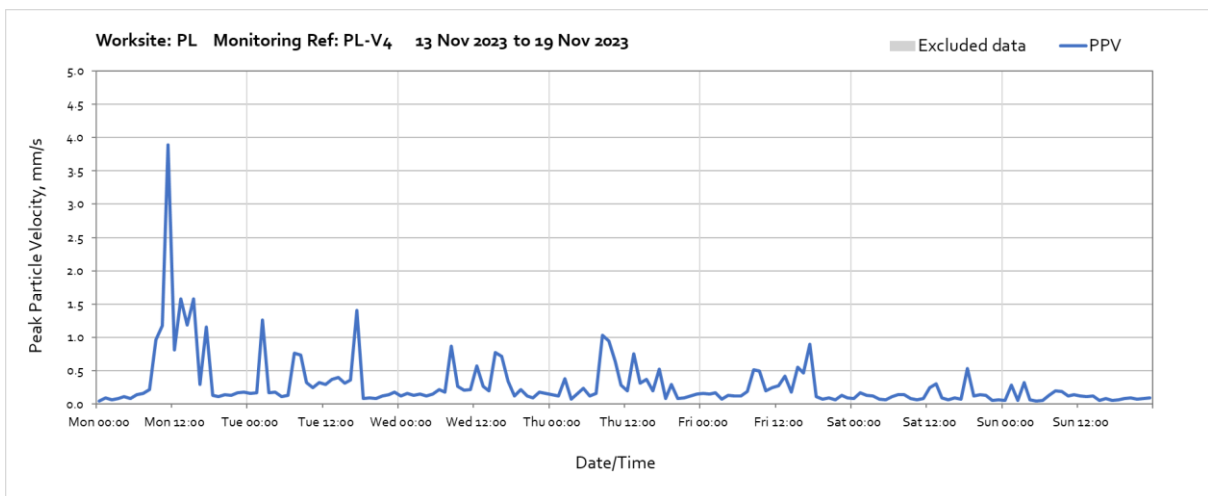
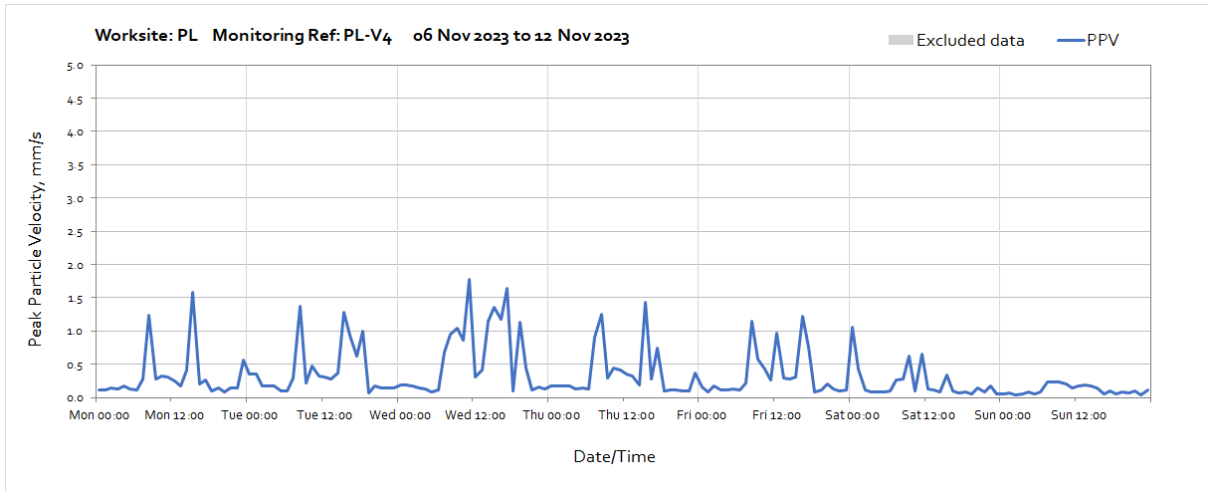


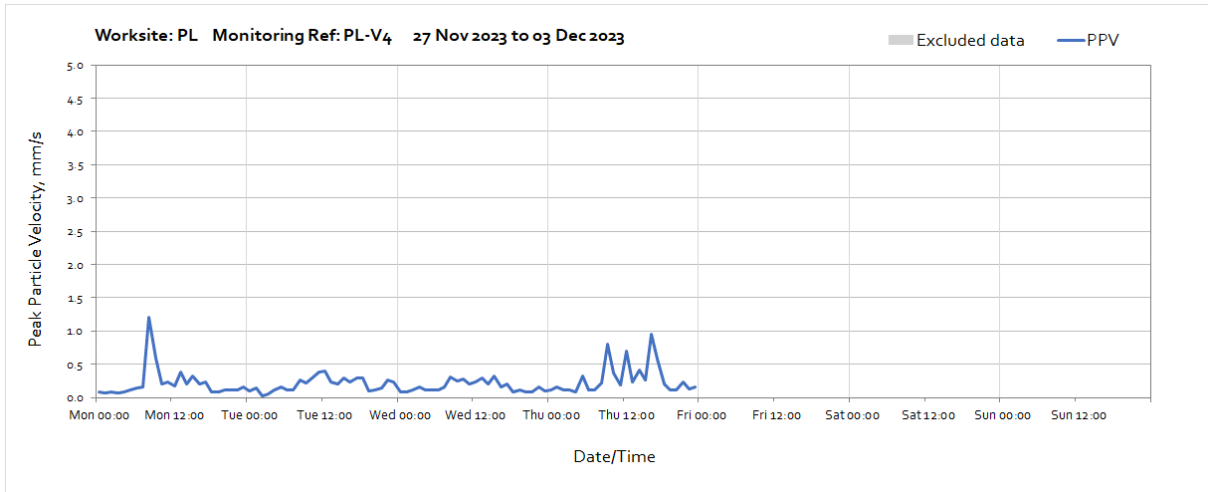
OFFICIAL



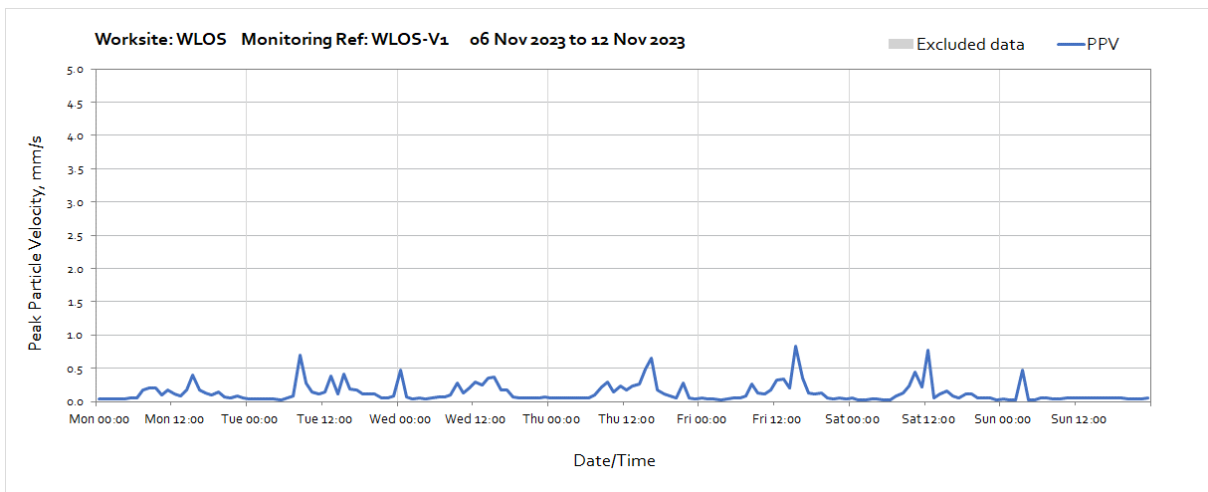
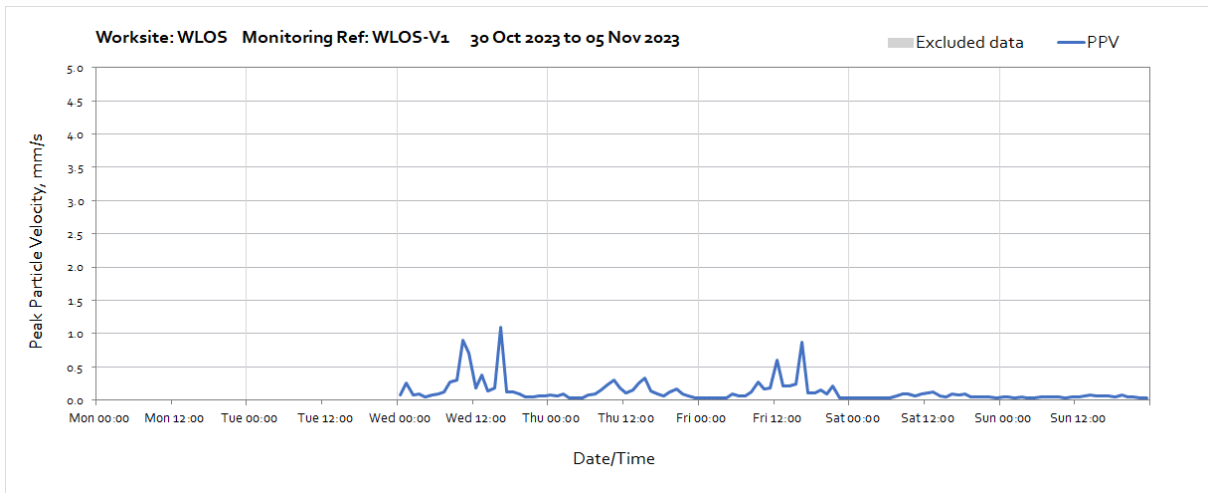
Worksite: PL - Monitoring Ref: PL-V4

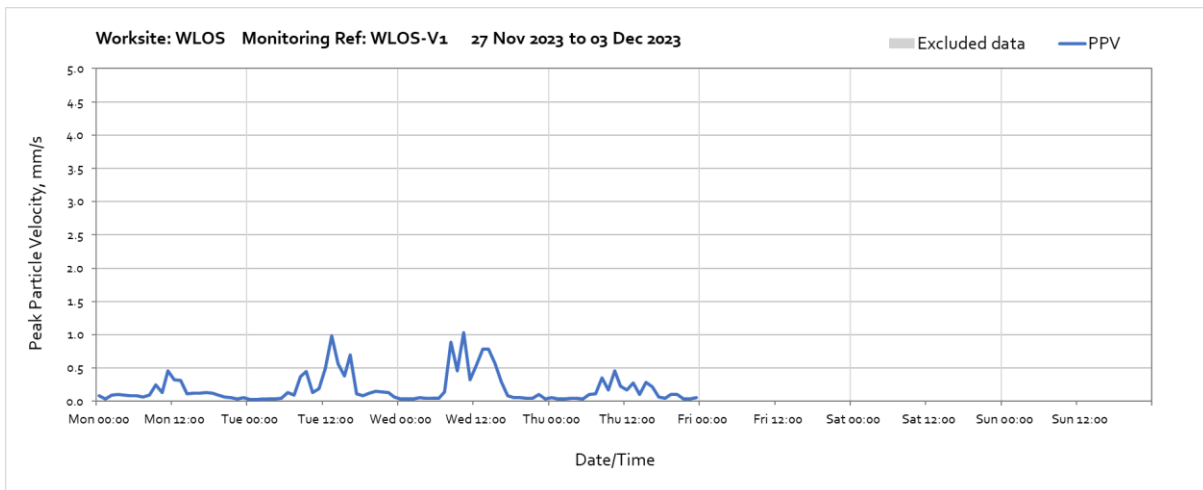
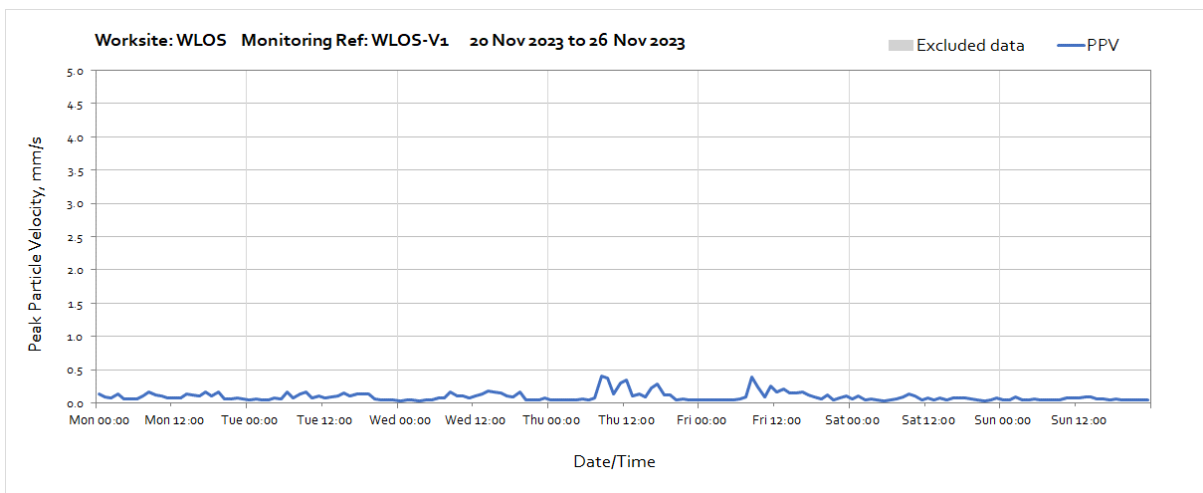
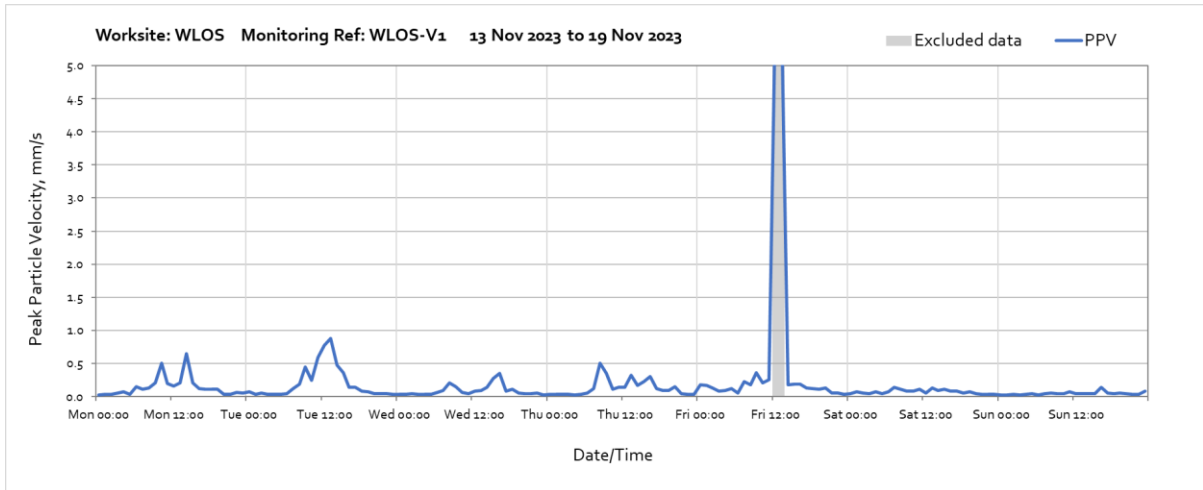




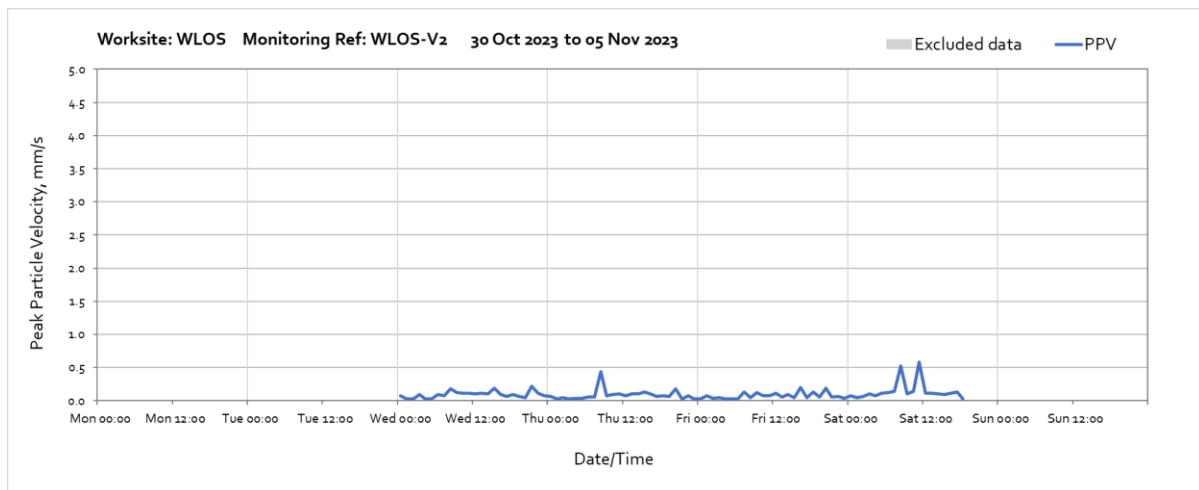


Worksite: WLOS – Monitoring Ref: WLOS-V1





Worksite: WLOS – Monitoring Ref: WLOS-V2



Note: Missing data from 19:00 on Sunday 4th of November until the end of the month was due to a loss of continuous power to the monitoring station.