

Construction noise and vibration Monthly Report – December 2020

London Borough of Camden

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Non-Technical Summary

This Noise and Vibration Monitoring Report fulfils HS2 Limited's commitment detailed in the Environmental Minimum Requirements (EMRs), Annex 1, Code of Construction Practice, to present the results of noise and vibration monitoring carried out within the London Borough of Camden during the month of December 2020.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken in the vicinity of The Adelaide Road Ventilation Shaft (ref.: ARVS), where loading of skips, hoarding lighting cable installation, construction of temporary moulds for pouring concrete, excavation of duct trenches, laying of cables and associated ground works, trial hole digging, chamber surveys, installation of road marking and removal of temporary traffic management systems and breaking out of asphalt were underway.
- Noise monitoring was undertaken in the vicinity of Euston Throat Retained Cut worksite (ref.: ETRC) where piling preparations, installation of temporary site office and hoardings works were underway.
- Noise and vibration monitoring was undertaken in the vicinity of the Hampstead Road Bridge worksite (ref.: HRB), where removal of street assets, installation of temporary services, installation of working platforms, surveying, hoarding works, construction of drilling fluid slabs, piling preparations, concrete breaking, extensions and widening of access ramp, piling, delivery of abnormal loads, parapet wall surveys and vegetation clearance were underway.
- Noise monitoring was undertaken in the vicinity of On-Network worksites (ref.: B, C, D, E, F, G and H), cable installation (worksite B only), points maintenance (worksites C, D, E, F and G), relocation of signalling assets (worksites C, D, E, F and G), LED signal head installation (worksite G only), cutting and removal of track panels (worksite D only) and cutline demolition works and cable management installation (worksite H only) were underway.
- Noise monitoring was undertaken in the vicinity of the 132 and 140 Hampstead Road and Petrol Station worksite (ref.: S001-WS02), where groundworks and pile cap removal were underway.
- Noise and vibration monitoring were undertaken in the vicinity of the Wolfson House, Walkden House, 67-75 & 77-79 Euston Road worksite (ref.: S003-WS03) where excavation of utility trenches and groundworks were underway.
- Noise monitoring was undertaken in the vicinity of the Former National Temperance Hospital, 110 Hampstead Road worksite (ref.: S003-WS06), where deliveries were underway.

- Noise monitoring was undertaken in the vicinity of the Former National Temperance Hospital - Euston North worksite (ref.: NTH-EN), piling, guide wall construction, site setup, groundworks and installation of monitoring instrumentation were underway.
- Noise monitoring was undertaken in the vicinity of the Vehicle Holding Area worksite (ref.: VHA), where surveying and monitoring of assets and surrounding structures, site clearance including vegetation clearance and hoarding works were underway.
- Vibration monitoring was undertaken in the vicinity of the Royal College of General Practitioners (RCGP) worksite (ref.: S003-WS08). Whilst works were not undertaken on worksite ref.: S003-WS08, vibration levels at the associated monitors may be influenced by work undertaken on nearby worksite ref.: S003-WS03.

Further works were also undertaken on Stephenson Way, Melton Street, North Gower Street, Ragnart Buildings and Harrington Street, where utilities works were underway.

There were nine (9) exceedances of the HS2 threshold levels for significant noise effects during the reporting period at six (6) monitoring positions.

There was one (1) exceedance of trigger levels as defined in section 61 consents during the reporting period at one monitoring position.

Twelve (12) complaints were received during the monitoring period. A description of complaints, the results of investigations and any actions taken are detailed in Table 8 of this report.

Monitor N046 was offline for most of December due to an electrical fault with the lamppost which supplies power to the monitor. Contact was made with the Local Authority and Power Supply Company to resolve this issue resulting with the power supply to the lamppost being reconnected on Tuesday 22nd December.

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 +2.5 to +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.

Monitoring data and interpretive reports are to be provided to each relevant local authority on a monthly basis and shall include a summary of the construction activities occurring, the data recorded over the monitoring period, any complaints received, any periods in exceedance of agreed trigger levels, the results of any investigations and any actions taken or mitigation measures implemented. This report provides noise data, and interpretation thereof, for monitoring carried out by HS2 within the London Borough of Camden (LBC) for the period 1st to 31st December 2020.

1.1.2 Active construction sites in the local authority area where monitoring was undertaken during this period include:

- The Adelaide Road ventilation shaft, (see plan 2 in Appendix A), where work activities included:
 - hoarding lighting cable installation into trenches;
 - construction of temporary moulds for pouring concrete on to the footpath area;
 - excavation of duct trenches;
 - laying of cables in completed trenches and association groundworks (backfilling);
 - trial hole digging;
 - chamber surveys;
 - installation of road markings and removal of temporary traffic management along Adelaide Road;
 - breaking out of asphalt.

- Euston Throat Retained Cut worksite ref.: ETRC (see plan 2 in Appendix A), where work activities included:
 - preparation for main piling works including piling mat installation, plate bearing tests, piling rig mobilisation, anchor pile installation and pile installation;
 - installation of temporary site offices;
 - installation and removal of hoarding.
- Hampstead Road Bridge worksite ref.: HRB (see plan 3 in Appendix A), where work activities included:
 - removal of street assets;
 - installation of temporary services;
 - installation of working platforms;
 - surveying and monitoring of assets and surrounding structures;
 - site clearance including vegetation clearance;
 - installation, adaption and removal of hoarding (height increase from 2.4 to 3.6m on Park Village East side from Granby Terrace Bridge to Morning Street Bridge);
 - construction of drilling fluid slabs;
 - preparation for main piling, including removal of DB Cargo shed foundations and slab construction;
 - extensions and widening of access ramp;
 - continuous flight auger piling;
 - delivery of a crane;
 - Park Village East parapet wall survey including vegetation removal and use of a scissor lift;
 - track level hoarding during weekend possessions.
- On-Network worksites ref.: B, C, D, E, F, G and H (see plan 3 in Appendix A), where work activities included:
 - cable installation at Gloucester Avenue (worksite B only);
 - points maintenance (worksites C, D, E, F and G);
 - relocation of signalling assets (worksites C, D, E, F and G);
 - LED signal head installation (worksite G only);
 - cutting and removal of track panels (worksite D only);
 - cutline demolition works and cable management installation (worksite H only).

- 132 and 140 Hampstead Road and Petrol Station worksite ref.: S001-WS02 (see plan 2 in Appendix A), where work activities included:
 - groundworks (ground remediation);
 - pile cap removal.
- Wolfson House, Walkden House, 67-75 & 77-79 Euston Road worksite ref.: S003-WS03 (see plan 3 in Appendix A), where work activities included:
 - excavation of utilities trenches;
 - groundworks (backfilling and propping).
- Former National Temperance Hospital, 110 Hampstead Road worksite ref.: S003-WS06 (see plan 3 in Appendix A), where work activities included:
 - deliveries.
- Former National Temperance Hospital - Euston North worksite ref.: NTH-EN (see plan 1 in Appendix A), where work activities included:
 - piling;
 - guide wall installation;
 - preparation works for new site office and welfare building including installation of fire protection system and furniture;
 - groundworks (props alteration);
 - installation of monitoring instrumentation.
- Vehicle Holding Area worksite ref.: VHA (see plan 1 in Appendix A), where work activities included:
 - surveying and monitoring of assets and surrounding structures;
 - site clearance including vegetation clearance;
 - installation, adaption and removal of hoarding.

1.1.3 Vibration monitoring was also undertaken in the vicinity of the Royal College of General Practitioners (RCGP) worksite (ref.: S003-WS08). Whilst works were not undertaken on worksite ref.: S003-WS08, vibration levels at the associated monitors may be influenced by work undertaken on nearby worksite ref.: S003-WS03.

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

- Stephenson Way, Melton Street, North Gower Street, Ragnart Buildings and Harrington Street, where utilities works were undertaken.

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 Thirty-two (32) noise and seven (7) vibration monitoring installations were active across twelve (12) worksites in December in the LBC area. Table 2 summarises the position of noise and vibration monitoring installations within the LBC area in December 2020.

1.2.2 Monitors N051 and N052 (worksite ref.: ARVS) were relocated from their temporary locations within the site boundary onto their planned permanent locations on lighting columns outside of the site boundary on the northern side of Adelaide Road on Friday 11th December.

1.2.3 Monitor V039 (worksite ref.: HRB) was relocated from the worksite boundary to a location more representative of the nearest receptor on Friday 18th December.

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
ARVS	N051 (old)	Opposite 68 Adelaide Road
	N051	Outside 70 Adelaide Road
	N052 (old)	Adelaide Road-Beaumont Walk
	N052	Adelaide Road-Beaumont Walk
B	JC	Juniper Crescent
ESC	N024	External to Park Village Studios, Park Village East
	N047	Park Village East/Mornington Street bridge, lamppost #13
ESC, C	N022	External to 34 Mornington Terrace
	N046	Lamppost opposite to 49 Mornington Terrace
ETRC	N001	Park Village East, lamppost #1 (external to Cubitt Court, 100 Park Village East)
	N002	Park Village East, lamppost #2 (external to Richmond Court)
	N003	Park Village East, lamppost #9 (external to Silsoe House)
	N005	5A Granby Terrace

Worksite Reference	Measurement Reference	Address
	N023	Lamppost #21 on Hampstead Road
ETRC, D	N004	Mornington Terrace, lamppost #7 (junction of Mornington Terrace, Mornington Place and Clarkson Row)
HRB	N020	Mackworth Street, lamppost #1
	N021	Stanhope Street, lamppost #2
	N044	Regents Park Estate west, near Langdale (temporarily removed from site on 31 st August)
	N045	Regents Park Estate south, external to Coniston
	V039 (old)	Coniston, Regents Park Estate
	V039	Coniston, Regents Park Estate
	V043	Cubitt Court, Park Village East
G	HH	Euston Station Parcel Deck, Barnby Street
	BS	Roof of Stockbeck House, Barnby Street
S001-WS02	N018	Outside replacement housing, Hampstead Road
	N019	Outside Cartmel, Hampstead Road
S003-WS03	N006	Royal College of General Practitioners roof level
	N008	Stephenson's Way lamppost (external to RCGP)
	N010	Wesley Hotel
	N011	Euston Street, lamppost #4 (external to 82 Euston Street)
	V002	Royal College of General Practitioners basement boiler room by Stephenson Way
	V037	Magic Circle, basement
	V038	Wesley Hotel, basement lightwell, Euston Street
S003-WS07	N012	Drummond Street, lamppost #14 (opposite to 92-94 Drummond Street)
S003-WS08	N007	Royal College of General Practitioners, Melton Street
	V003	Royal College of General Practitioners basement vaults under Melton St
Vehicle Holding Area (VHA)	N025	External to 3 Prince Albert Road
	N026	Thames Water Compound (temporarily removed from site on 21 st June)
NTH-EN	N014	Starcross Street lamppost (external to Exmouth Arms)
	N016	Margaret Centre roof
	N017	Hampstead Road, lamppost #48
	V021	42-44 Cobourg Street

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.

2.1.2 Monitor N046 was offline for most of December due to an electrical fault with the lamppost which supplies power to the monitor. Contact was made with the Local Authority and Power Supply Company to resolve this issue resulting with the power supply to the lamppost being reconnected on Tuesday 22nd December.

Table 3: Summary of Measured dB L_{Aeq} Data over the Monitoring Period

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly 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
ARVS	N051 (old)	Opposite 68 Adelaide Road	Free-field	59.5 (61.0)	61.0 (63.6)	61.4 (64.1)	60.0 (63.1)	56.4 (61.0)	58.4 (58.4)	60.4 (60.4)	59.3 (59.3)	61.4 (64.5)	53.6 (56.7)	57.3 (58.9)	55.8 (59.3)
	N051	Outside 70 Adelaide Road	Free-field	65.6 (68.1)	68.3 (70.4)	67.7 (72.0)	69.1 (90.9)	65.4 (90.4)	62.9 (63.3)	66.4 (67.4)	70.6 (71.2)	67.5 (72.2)	64.1 (67.4)	68.2 (78.6)	64.5 (69.8)
	N052 (old)	Adelaide Road-Beaumont Walk	Free-field	59.6 (59.8)	64.6 (67.1)	58.1 (58.2)	61.1 (63.0)	56.4 (59.0)	-* (-)*	-* (-)*	-* (-)*	-* (-)*	-* (-)*	-* (-)*	-* (-)*
	N052	Adelaide Road-Beaumont Walk	Free-field	63.9 (66.0)	67.5 (70.5)	66.0 (72.6)	65.4 (70.2)	62.7 (69.4)	61.5 (63.2)	67.0 (71.5)	66.3 (66.6)	66.1 (68.8)	62.4 (65.9)	66.3 (74.0)	62.1 (67.9)
B	JC	Juniper Crescent	Free-field	57.1 (60.2)	58.8 (60.3)	57.7 (59.9)	58.0 (64.5)	55.4 (59.4)	55.9 (57.3)	57.0 (58.4)	56.1 (57.7)	56.9 (59.4)	54.1 (57.2)	56.6 (58.7)	54.1 (56.9)
ESC52	N024	External to Park Village Studios, Park Village East	Free-field	58.5 (67.2)	61.3 (67.2)	60.3 (69.8)	58.1 (61.1)	54.6 (63.1)	55.4 (57.6)	57.5 (59.1)	58.2 (59.6)	58.7 (62.3)	54.6 (57.9)	57.7 (60.6)	53.9 (58.4)
	N047	Park Village East/Mornington Street bridge, lamppost #13	Free-field	58.1 (60.8)	61.4 (64.8)	60.9 (72.3)	58.8 (71.5)	54.1 (62.7)	55.2 (57.4)	57.7 (59.6)	58.8 (60.9)	59.4 (62.5)	54.2 (57.4)	58.3 (60.8)	53.5 (56.9)

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly 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
ESC, C	N022	External to 34 Mornington Terrace	Free-field	59.5 (61.2)	61.2 (74.9)	60.4 (63.7)	59.3 (61.8)	54.9 (60.5)	56.0 (59.3)	58.0 (60.0)	58.3 (60.9)	58.3 (61.1)	55.1 (62.4)	58.5 (60.2)	55.1 (59.1)
	N046	Mornington Terrace near The Edinboro Castle pub, lamppost #18	Free-field	60.8 (63.7)	61.4 (62.9)	61.8 (65.4)	61.0 (63.1)	56.0 (61.5)	49.6 (49.6)	52.4 (52.4)	53.9 (53.9)	55.1 (55.8)	56.6 (56.6)	60.9 (62.2)	56.5 (60.2)
ETRC	N001	External to Cubitt Court, 100 Park Village East	Free-field	58.0 (64.9)	64.9 (70.1)	59.7 (64.9)	57.8 (61.0)	54.5 (64.6)	55.8 (60.0)	65.6 (69.0)	63.1 (70.5)	59.0 (61.6)	54.2 (57.7)	57.7 (60.7)	53.0 (58.8)
	N002	Richmond Court, Park Village East	Free-field	57.2 (59.4)	62.0 (65.7)	60.4 (64.2)	58.2 (61.8)	53.1 (60.6)	55.0 (56.6)	63.6 (77.7)	61.2 (67.4)	59.8 (62.7)	54.0 (57.4)	58.6 (62.4)	53.0 (57.8)
	N003	Silsoe House, Park Village East	Façade	57.8 (60.5)	61.8 (64.3)	60.9 (62.6)	58.8 (63.0)	53.6 (61.2)	55.2 (56.5)	58.2 (60.3)	59.2 (61.4)	60.1 (63.5)	54.8 (58.1)	58.7 (62.4)	53.4 (57.2)
	N005	5A Granby Terrace	Free-field	64.9 (66.0)	67.4 (70.1)	65.1 (67.1)	64.5 (67.9)	62.8 (66.6)	63.9 (64.8)	67.0 (69.4)	64.9 (67.9)	64.7 (69.1)	63.6 (65.9)	64.3 (65.6)	62.8 (64.4)
	N023	Ampthill Estate, Hampstead Road	Free-field	69.0 (71.4)	71.2 (73.8)	69.6 (72.4)	68.9 (74.5)	66.2 (75.0)	66.2 (67.5)	69.4 (72.4)	69.1 (72.6)	69.6 (75.2)	66.9 (70.6)	68.5 (71.8)	65.8 (70.2)
ETRC, D	N004	Mornington Terrace, lamppost #7	Free-field	63.0 (65.6)	64.7 (68.0)	63.3 (65.2)	63.3 (75.7)	58.7 (67.7)	61.8 (63.2)	62.5 (64.0)	62.0 (63.3)	61.7 (65.4)	57.4 (62.7)	61.8 (65.1)	59.8 (66.2)

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly 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
HRB	N020	Mackworth Street	Free-field	54.3 (57.9)	61.4 (71.8)	54.0 (58.0)	53.7 (63.6)	52.2 (60.1)	50.7 (53.6)	59.5 (63.3)	56.3 (58.9)	54.5 (58.8)	53.7 (57.8)	54.6 (60.1)	52.6 (55.0)
	N021	Stanhope Street, lamppost #2	Free-field	57.4 (62.2)	62.9 (67.4)	59.0 (61.6)	57.0 (61.5)	52.9 (63.1)	54.9 (57.5)	61.5 (65.3)	63.0 (73.4)	58.2 (60.8)	55.5 (63.4)	57.3 (62.6)	52.8 (63.2)
	N044	Regents Park Estate west	Free-field	54.3 (57.6)	63.3 (70.9)	54.7 (71.1)	53.8 (65.4)	51.9 (60.2)	52.0 (53.4)	64.6 (72.0)	56.9 (61.5)	53.2 (60.0)	51.2 (53.4)	52.7 (58.4)	49.9 (51.9)
	N045	Regents Park Estate south, external to Coniston	Free-field	57.9 (63.7)	64.2 (77.4)	57.2 (59.8)	57.3 (67.3)	56.3 (63.4)	50.0 (50.0)	60.2 (62.2)	58.6 (58.6)	57.7 (58.4)	56.7 (57.3)	56.8 (60.1)	55.7 (56.9)
G	HH	Euston Station Parcel Deck, Barnby Street	Free-field	62.0 (66.2)	63.1 (65.4)	62.9 (67.9)	62.0 (69.3)	60.7 (70.8)	62.7 (72.3)	63.5 (65.8)	63.4 (71.2)	63.2 (68.6)	60.3 (66.0)	63.7 (68.7)	58.6 (62.7)
	BS	Roof of Stockbeck House, Barnby Street	Free-field	55.7 (58.3)	57.5 (60.3)	55.8 (59.9)	56.2 (59.7)	54.1 (60.0)	52.1 (55.9)	54.8 (58.4)	52.5 (57.7)	54.4 (59.4)	52.7 (57.2)	54.3 (58.7)	53.7 (56.9)
S001-WS02	N018	Outside replacement housing, Hampstead Road	Free-field	69.6 (75.1)	71.1 (72.8)	70.8 (74.3)	70.6 (77.3)	67.5 (74.1)	67.3 (70.0)	68.7 (70.0)	69.0 (69.8)	71.0 (78.4)	67.8 (70.6)	70.1 (74.7)	67.4 (71.4)
	N019	Outside Cartmel, Hampstead Road	Free-field	59.3 (61.3)	63.4 (67.9)	59.8 (64.7)	59.8 (68.1)	57.4 (63.5)	57.9 (59.0)	61.7 (64.8)	59.7 (60.8)	60.1 (67.6)	57.4 (59.6)	59.3 (64.2)	57.3 (59.9)

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly 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
S003-WS03	N006	RCGP Roof level	Free-field	54.8 (57.3)	58.8 (66.0)	53.9 (57.7)	53.7 (57.0)	54.1 (61.7)	53.1 (54.7)	56.1 (60.2)	55.4 (58.0)	54.0 (56.6)	54.0 (56.1)	53.7 (58.2)	53.4 (54.7)
	N008	RCGP Stephenson Way	Façade	55.2 (60.7)	61.7 (72.4)	53.8 (56.2)	53.6 (56.8)	53.2 (60.2)	54.3 (55.7)	58.0 (62.9)	55.3 (58.2)	54.4 (56.2)	53.4 (57.1)	56.4 (74.2)	52.5 (54.9)
	N010	Wesley Hotel	Façade	58.3 (65.9)	62.3 (71.6)	58.7 (65.6)	57.9 (66.0)	52.1 (65.1)	58.4 (65.9)	59.0 (66.1)	65.0 (65.6)	61.7 (65.5)	52.3 (59.5)	59.3 (66.0)	52.5 (64.3)
	N011	Outside 82 Euston Street	Free-field	53.6 (59.1)	57.0 (69.2)	53.0 (55.9)	52.2 (56.9)	51.5 (61.3)	51.3 (52.2)	54.5 (59.2)	54.3 (56.9)	53.9 (58.1)	51.8 (57.4)	55.2 (68.8)	51.0 (58.4)
S003-WS07	N012	Opposite 92-94 Drummond Street	Free-field	57.9 (60.7)	61.0 (67.0)	58.3 (60.9)	58.1 (61.3)	56.5 (61.8)	57.0 (58.1)	58.6 (60.3)	59.5 (62.1)	58.9 (61.9)	56.7 (58.5)	58.6 (64.6)	56.2 (60.4)
S003-WS08	N007	RCGP, Melton Street	Free-field	63.0 (65.6)	65.6 (71.7)	63.3 (65.0)	63.2 (67.2)	61.7 (67.4)	62.1 (63.8)	63.4 (66.6)	63.3 (65.0)	63.5 (67.2)	62.8 (67.9)	63.1 (68.1)	61.6 (66.8)
VHA	N025	External to 3 Prince Albert Road	Free-field	66.9 (69.3)	69.6 (73.2)	67.5 (71.4)	66.7 (71.1)	63.6 (69.1)	64.4 (66.1)	69.0 (72.9)	67.6 (72.3)	67.0 (69.9)	64.7 (66.6)	67.3 (75.1)	63.9 (71.1)
	N026	Thames Water Compound	Free-field	59.5 (61.8)	61.7 (65.5)	59.7 (61.5)	58.6 (62.3)	57.1 (62.0)	59.5 (59.8)	60.2 (63.1)	57.7 (59.7)	59.1 (62.5)	57.9 (60.4)	58.9 (61.6)	57.5 (59.5)
NTH-EN	N014	Starcross Street lamppost (external to Exmouth Arms)	Free-field	54.7 (59.6)	58.4 (65.9)	55.9 (62.0)	55.7 (66.0)	51.8 (64.7)	52.5 (53.5)	54.5 (56.9)	55.6 (58.1)	56.0 (61.4)	51.7 (58.0)	55.1 (61.4)	50.8 (56.3)
	N016	Margaret Centre roof	Free-field	54.5 (57.2)	57.7 (65.8)	54.3 (57.1)	54.0 (60.5)	52.3 (59.2)	53.0 (53.6)	55.0 (57.2)	55.6 (57.6)	55.0 (59.5)	53.3 (59.5)	54.0 (59.1)	51.4 (55.4)

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly 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
	N017	42-44 Cobourg Street	Free-field	69.8 (74.0)	71.6 (73.4)	70.4 (73.4)	71.0 (77.2)	67.7 (75.0)	67.5 (69.6)	68.6 (70.2)	69.9 (71.0)	71.5 (79.5)	67.7 (71.0)	70.1 (75.2)	67.8 (71.3)

* Insufficient data were collected within noted periods at the noise monitor.

2.1.3 Table 4 presents a summary of the measured vibration levels at each monitoring location over the reporting period. The highest PPV measured during the monitoring along any axis is presented in the table.

Table 4: Summary of Measured PPV Data over the Monitoring Period

Worksite Reference	Measurement Reference	Monitor Address	Highest PPV measured in any axis, mm/s
HRB	V039 (old)	Coniston, Regents Park Estate	4.95 (X-Axis)
	V039	Coniston, Regents Park Estate	4.54 (X-Axis)
	V043	Cubitt Court, Park Village East	2.51 (Y-Axis)
S003-WS03	V002	RCGP. basement boiler room. 305 Euston Road	5.52 (X-axis)
	V037	Magic Circle, basement	1.96 (Z-axis)
	V038	Wesley Hotel, basement lightwell, Euston Street	1.48 (Z-axis)
S003-WS09	V003	RCGP. basement vaults, 305 Euston Road	0.84 (Z-axis)
NTH-EN	V021	42-44 Cobourg Street (floor)	0.49 (Z-axis)

2.1.4 Monitor V039 was sited on a concrete block which is attached to the site hoarding from the start of the month until 19:00 on Wednesday 16th December, resulting in interference due to extraneous vibration events, such as the closing of the site gate. The monitor was relocated to a location more representative of the nearest receptor on Friday 18th December.

2.1.5 Appendix C presents graphs of the noise and vibration monitoring data over the month for each of the measurement locations. Noise data presented consists of the hourly L_{Aeq} values and, where relevant, the $L_{Aeq,T}$ values (where the time period T has been taken to be the averaging period as specified in Table 1 of HS2 Information Paper E23). Vibration data presented consist of hourly PPV values. The full data set for the monitoring equipment can be found at the following location: <https://data.gov.uk/dataset/24542ae7-dd44-444f-b259-871c4cc43b5e/environmental-monitoring-data>.

2.2 Exceedances of the SOAEL

2.2.1 The significant observed adverse effect level (SOAEL) is defined in the 'Planning Practice Guidance – Noise' as the level above which "noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area."

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

2.2.3 Where construction noise levels exceed the SOAEL, relevant periods will be identified, and summary statistics provided in order to evaluate ongoing qualification for noise insulation and temporary rehousing.

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

Table 5: Summary of Exceedances of SOAEL

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
ARVS	N051 (old)	Opposite 68 Adelaide Road	All days	All periods	No exceedance
	N051	Outside 70 Adelaide Road	All days	All periods	No exceedance
	N052 (old)	Adelaide Road-Beaumont Walk	All days	All periods	No exceedance
	N052	Adelaide Road-Beaumont Walk	All days	All periods	No exceedance
B	JC	Juniper Crescent	All days	All periods	No exceedance
ESC	N024	External to Park Village Studios, Park Village East	All days	All periods	No exceedance
	N047	Park Village East/Mornington Street bridge, lamppost #13	All days	All periods	No exceedance
ESC - C	N022	External to 34 Mornington Terrace	Weekday	08:00-18:00	1
	N046	Lamppost opposite to 49 Mornington Terrace	All days	All periods	No exceedance
ETRC	N001	Park Village East Lamppost #1	Night	All periods	No exceedance
	N002	Park Village East Lamppost #2	All days	All periods	No exceedance
	N003	Park Village East Lamppost #9	All days	All periods	No exceedance
	N005	5A Granby Terrace	All days	All periods	No exceedance
	N023	Amphill Estate, lamppost #21, Hampstead Road	All days	All periods	No exceedance
ETRC - D	N004	Mornington Terrace, lamppost #7	Night	22:00-08:00	4

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
HRB	N020	Mackworth Street, lamppost #1	All days	All periods	No exceedance
	N021	Stanhope Street, lamppost #2	All days	All periods	No exceedance
	N044	Regents Park Estate West, near Langdale	Weekday	18:00-19:00 19:00-22:00	1 1
	N045	Regents Park Estate south, external to Coniston	Weekday	08:00-18:00	2
G	HH	Euston Station Parcel Deck, Barnby Street	All days	All periods	No exceedance
	BS	Barnby Street	All days	All periods	No exceedance
S001-WS02	N018	132 and 140 Hampstead Road and Petrol Station	All days	All periods	No exceedance
	N019	132 and 140 Hampstead Road and Petrol Station	All days	All periods	No exceedance
S003-WS03	N006	Royal College of General Practitioners Roof level	All days	All periods	Not applicable*
	N008	Walkden House, 67-75 & 77-79 Euston Rd	All days	All periods	No exceedance
	N010	Wesley Hotel	All days	All periods	No exceedance
	N011	Walkden House, 67-75 & 77-79 Euston Rd	All days	All periods	No exceedance
S003-WS07	N012	93-103 Drummond Street, 11-15 Melton Street, 54-64 Euston Street, 69 Cobourg Street	All days	All periods	No exceedance
S003-WS08	N007	Euston Square Gardens (west)	All days	All periods	No exceedance

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
VHA	N025	External to 3 Prince Albert Road	All days	All periods	No exceedance
	N026	Thames Water Compound	All days	All periods	No exceedance
NTH-EN	N014	Ibis Hotel, 3 Cardington Street & 1-3 Cobourg Street	All days	All periods	No exceedance
	N016	Margarete Centre roof	All days	All periods	No exceedance
	N017	Hampstead Road, lamppost #48	All days	All periods	No exceedance

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

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

Table 6: Summary of Total Exceedances of SOAEL

Worksite Reference	Measurement Reference	Monitor Address	Total of SOAEL exceedances in the month
ESC - C	N022	External to 34 Mornington Terrace	1
ETRC - D	N004	Mornington Terrace, lamppost #7	1
HRB	N044	Regents Park Estate West, near Langdale	1
	N045	Regents Park Estate south, external to Coniston	2

2.2.6 5 exceedances of the SOAEL were recorded due to HS2 construction works during December 2020. The exceedances occurred at:

- Monitoring location N022 during the daytime due to parapet wall deconstruction;
- Monitoring location N004 during the night-time due to sheet piling as part of possession works;
- Monitoring location N044 during the daytime due to use of a vacuum excavator;

- Monitoring location N045 during the daytime due to backfilling, rolling and compaction, removal of hoarding, excavation of polymer silo slab and installation, rolling and compaction of pile mat.

2.3 Exceedances of Trigger Level

2.3.1 Table 7 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 7: Summary of Exceedances of Trigger Levels

Complaint Reference Number (if applicable)	Worksite Reference	Date and Time Period	Identified Source	Results of Investigation (including noise monitoring results)	Actions Taken
HS2-20-51488-E HS2-20-51479-E HS2-20-51496-E	ARVS	15 th - 16 th December, evening and night-time	Application of line markings to Adelaide Road.	There was a misunderstanding by the site team as to what they had consent to do, which meant they worked beyond the permitted hours. 83 dB L _{Aeq,T} (21:00-07:00)	The site team has conducted a full investigation and the relevant parties have been informed and lessons learnt for the future to try and prevent similar incidents happening in the future.

2.4 Complaints

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

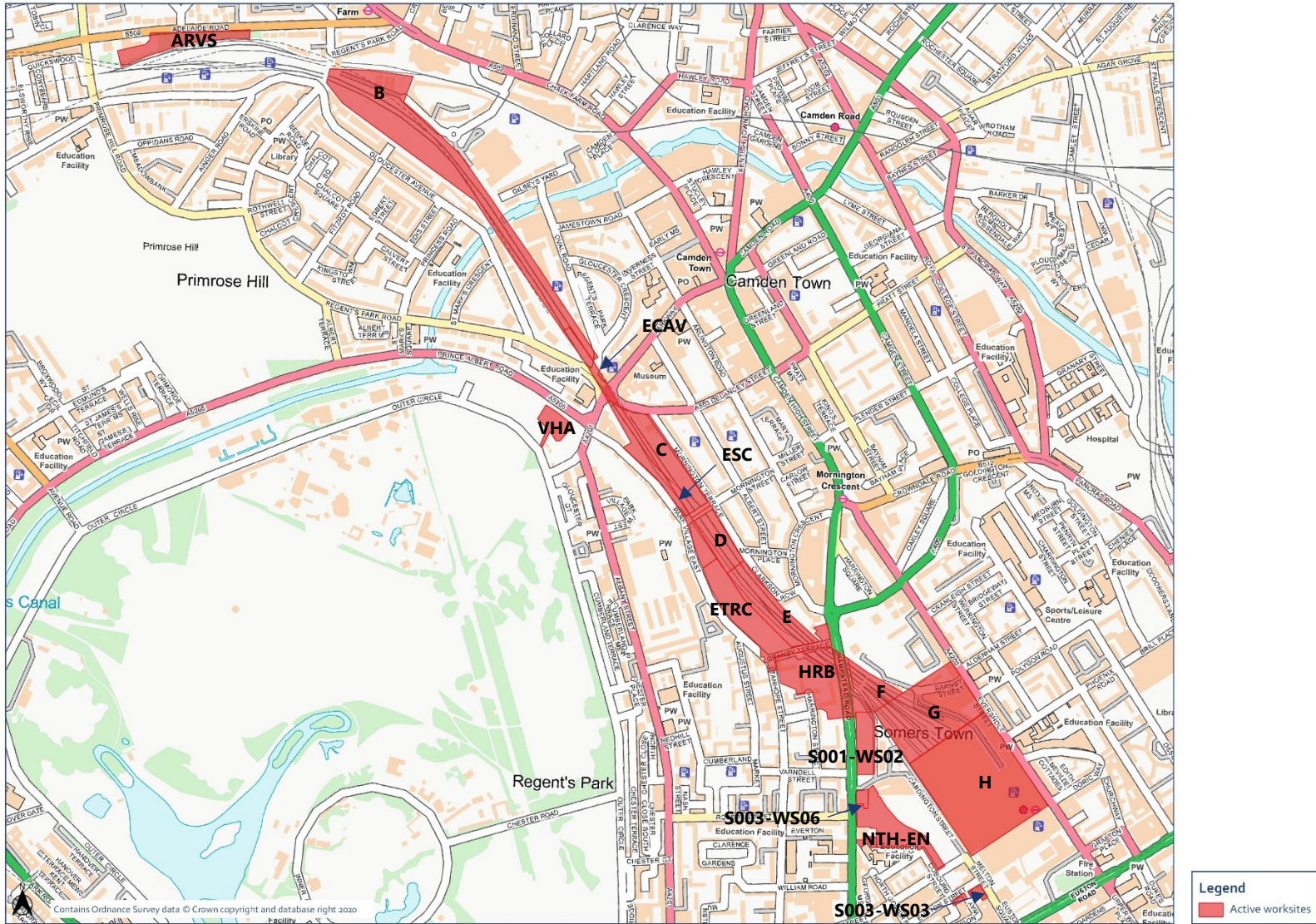
Table 8: Summary of Complaints

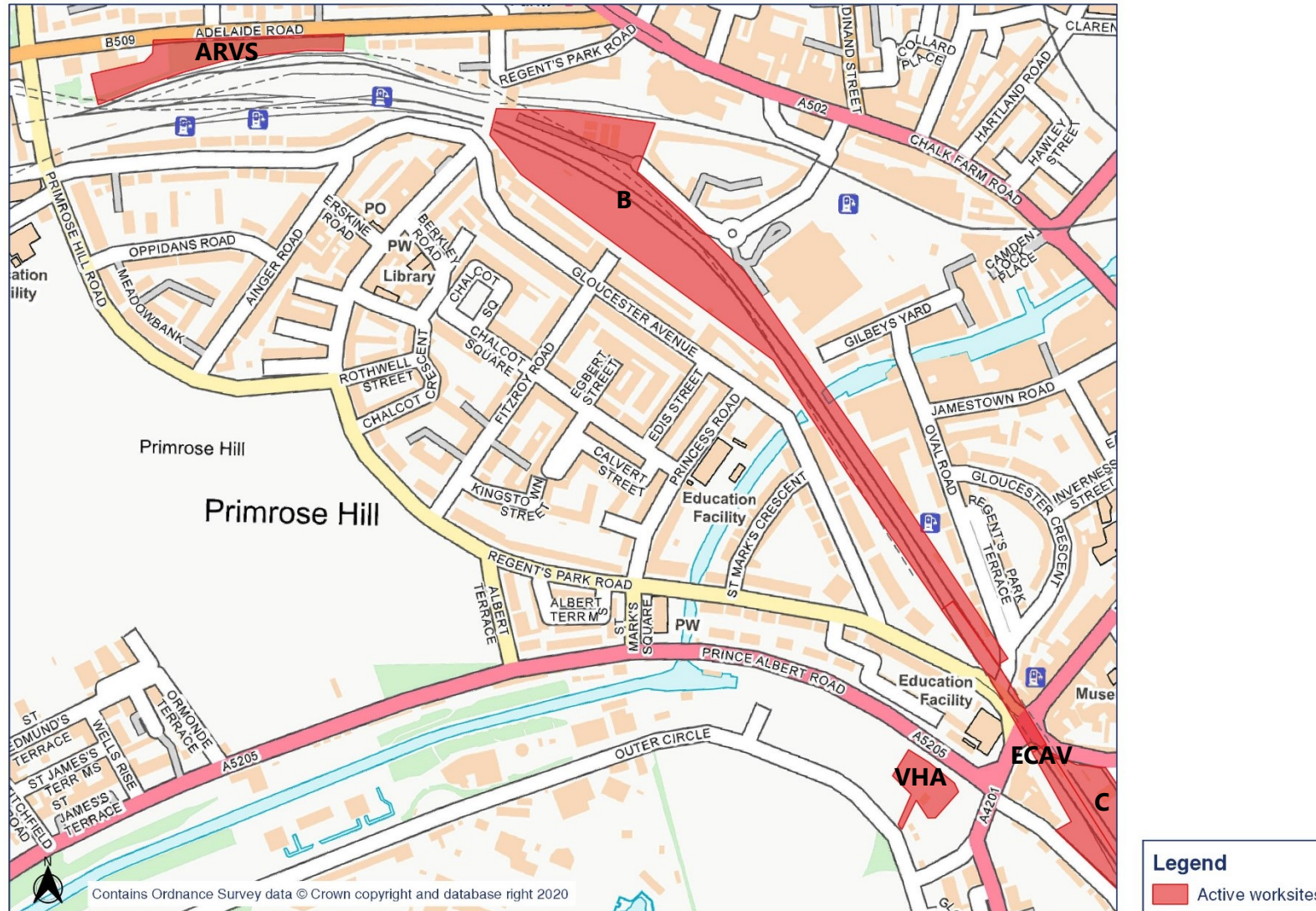
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-20-41027-C	HRB	Complaint regarding generator noise during the night-time within the vicinity of Granby Bridge.	The generator was initially installed for a temporary welfare unit.	The generator was exchanged for a smaller unit
HS2-20-41059-C	HRB, S001-WS02	Complaint regarding construction noise during the daytime.	On-going.	On-going.

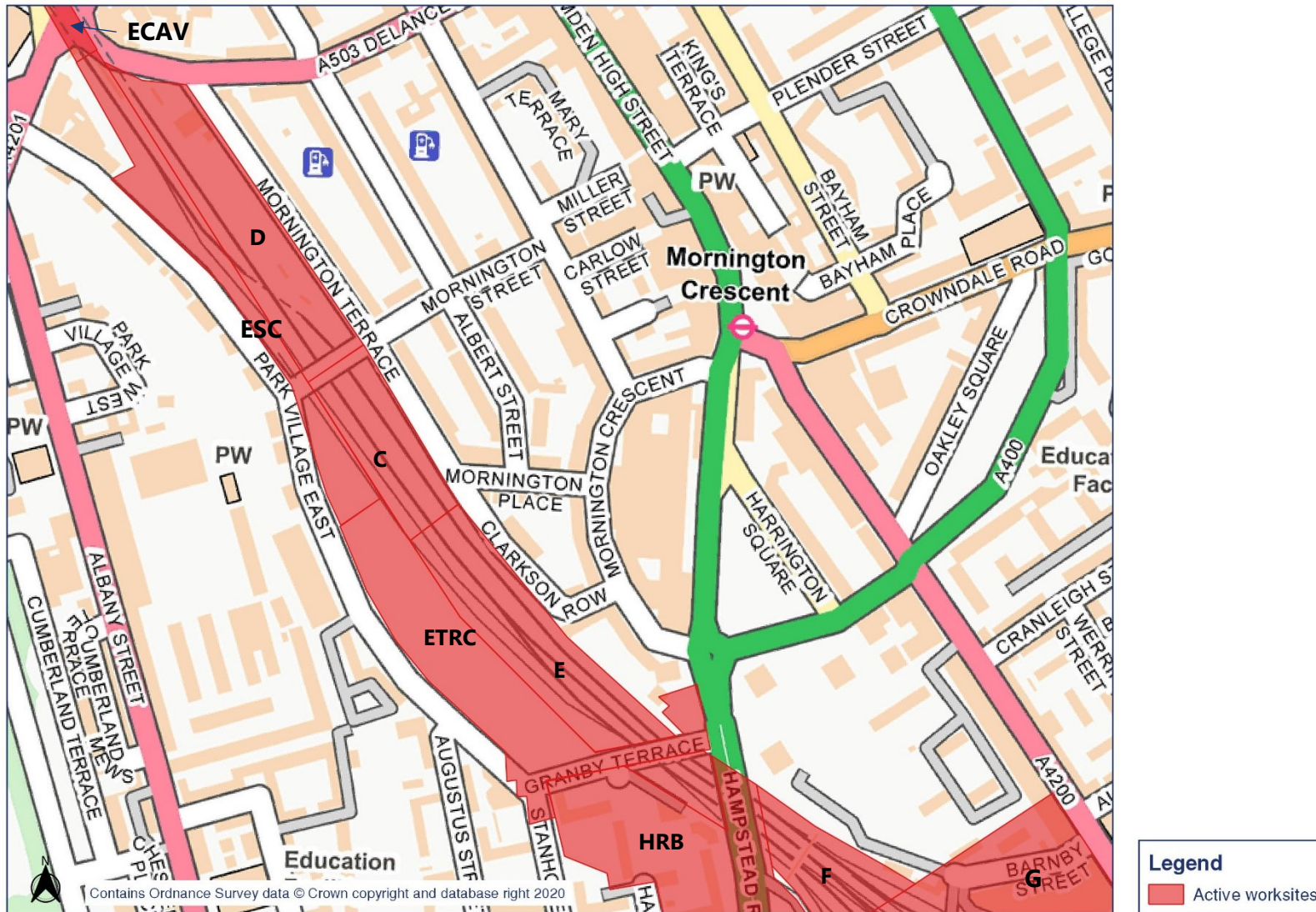
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-20-41065-C	HRB, F	Complaint regarding reversing siren alarms.	The reversing sirens were associated with HS2 works.	The associated contractor has liaised with the site teams to ensure that white noise reversing sirens are used wherever possible. The complainant requested that a response is not sent to them, therefore the complaint was then closed.
HS2-21-41133-C	ESC	Complaint regarding noise from site personnel and the closing of vehicle doors.	The noise was not due to HS2 construction works.	A response was provided to the stakeholder by the associated contractor.
HS2-20-41095-C	HRB	Complaint regarding construction noise during the daytime.	On-going.	On-going.
HS2-21-41132-C	ESC	Complaint regarding a single noise and vibration event which occurred at 06:00	On-going.	On-going.
HS2-20-51488-E HS2-20-51479-E HS2-20-51496-E	ARVS	Complaint regarding construction noise during the night-time.	Works related to removal of Heras fencing and application of line markings ready to re-open Adelaide Road to 2-way traffic. Residents had been notified of the works but the works continued later than the residents had been notified due to a misunderstanding by the site team as to what working hours they had consent to.	The site team has conducted a full investigation and lessons learnt for the future to try and prevent similar incidents happening in the future.

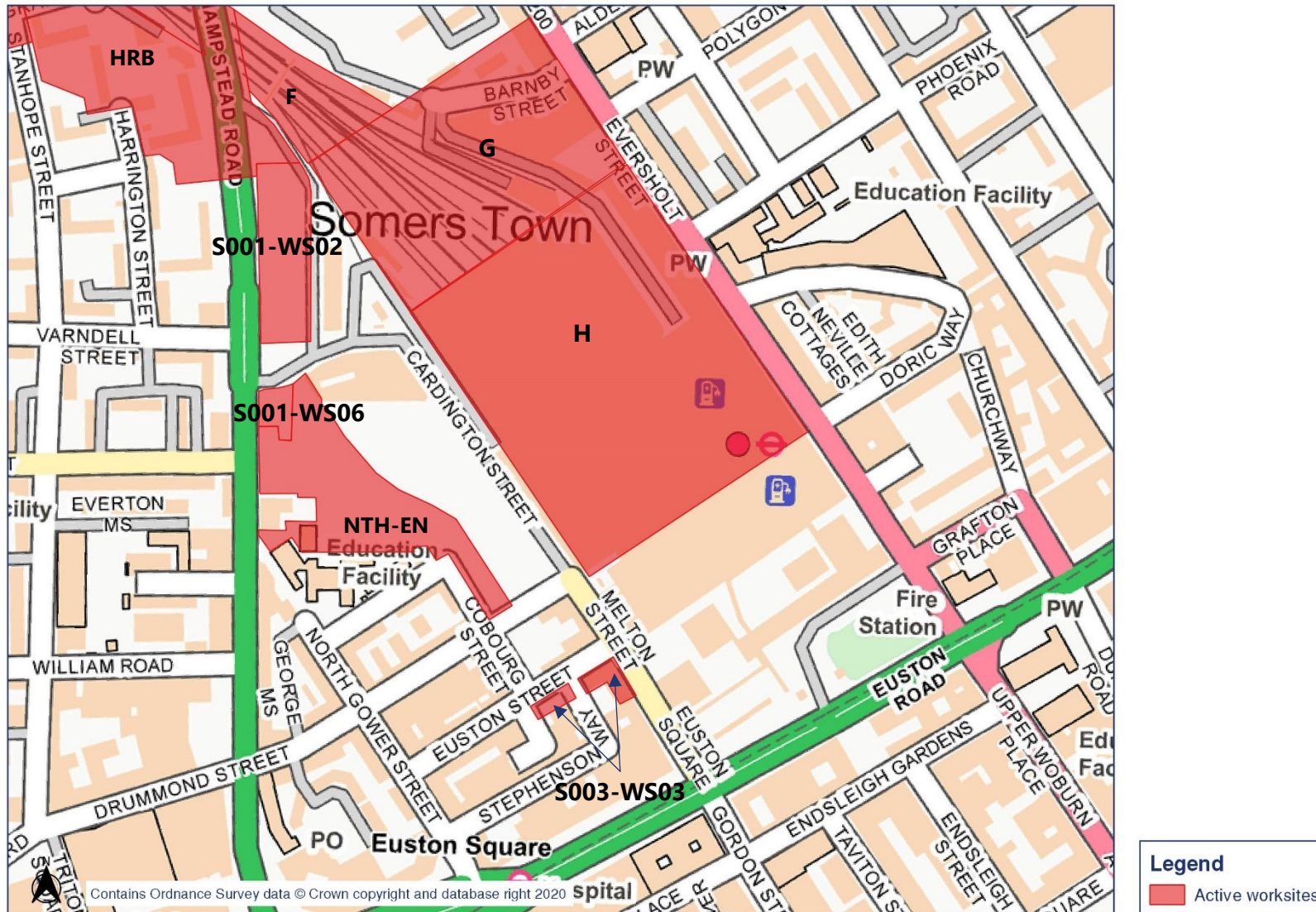
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-20-41099-C	ARVS	Complaint regarding noise from generators and general disruption from the works.	The generators in use on the site have noise attenuation measures in place. Hybrid units are being used to prevent or minimise operation out of hours (particularly at night). Site hoardings are now in place along Adelaide Road which will improve noise mitigation over the previous temporary fencing (mesh with acoustic blankets).	Communities team has contacted the complainant and provided information.
HS2-20-41050-C	HRB	Complaint regarding construction noise and vibration throughout the day.	HS2 construction works were on-going.	Confirmed to the stakeholder that works are on-going and an overall schedule of works will be provided to the stakeholder.
HS2-20-41068-C	HRB, S001-WS02	Complaint regarding construction noise during the night-time.	On-going.	On-going.

Appendix A Site Locations

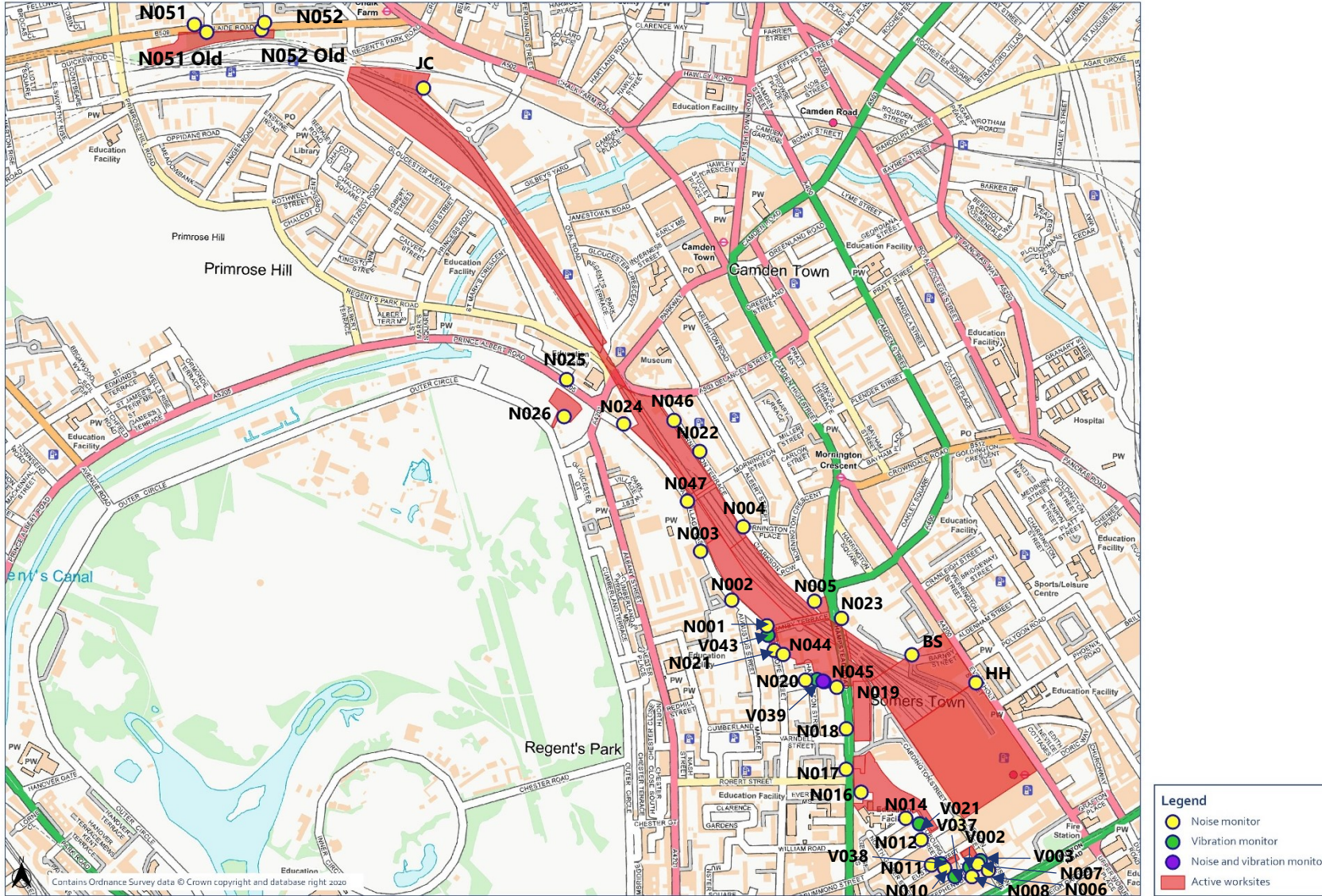


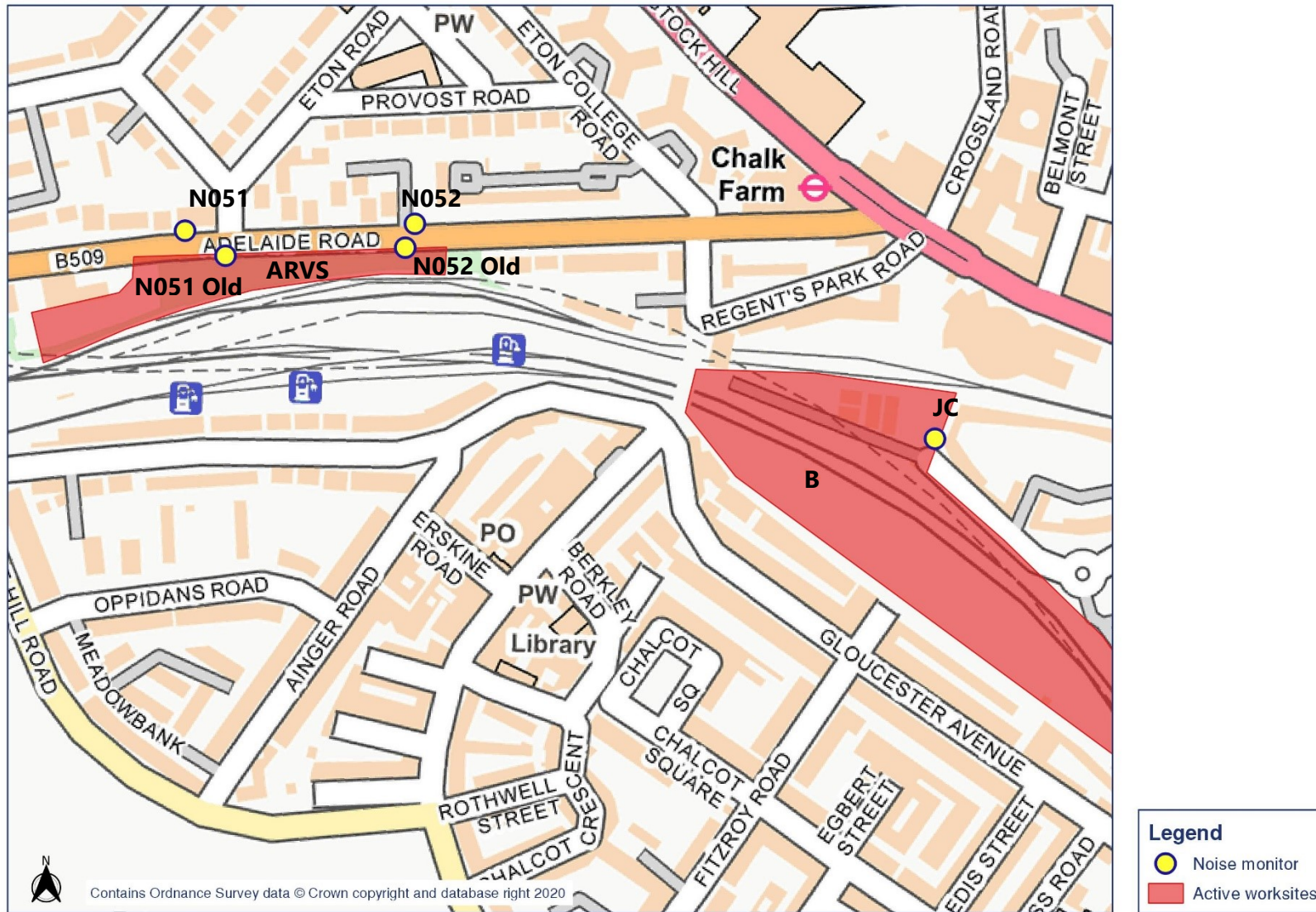


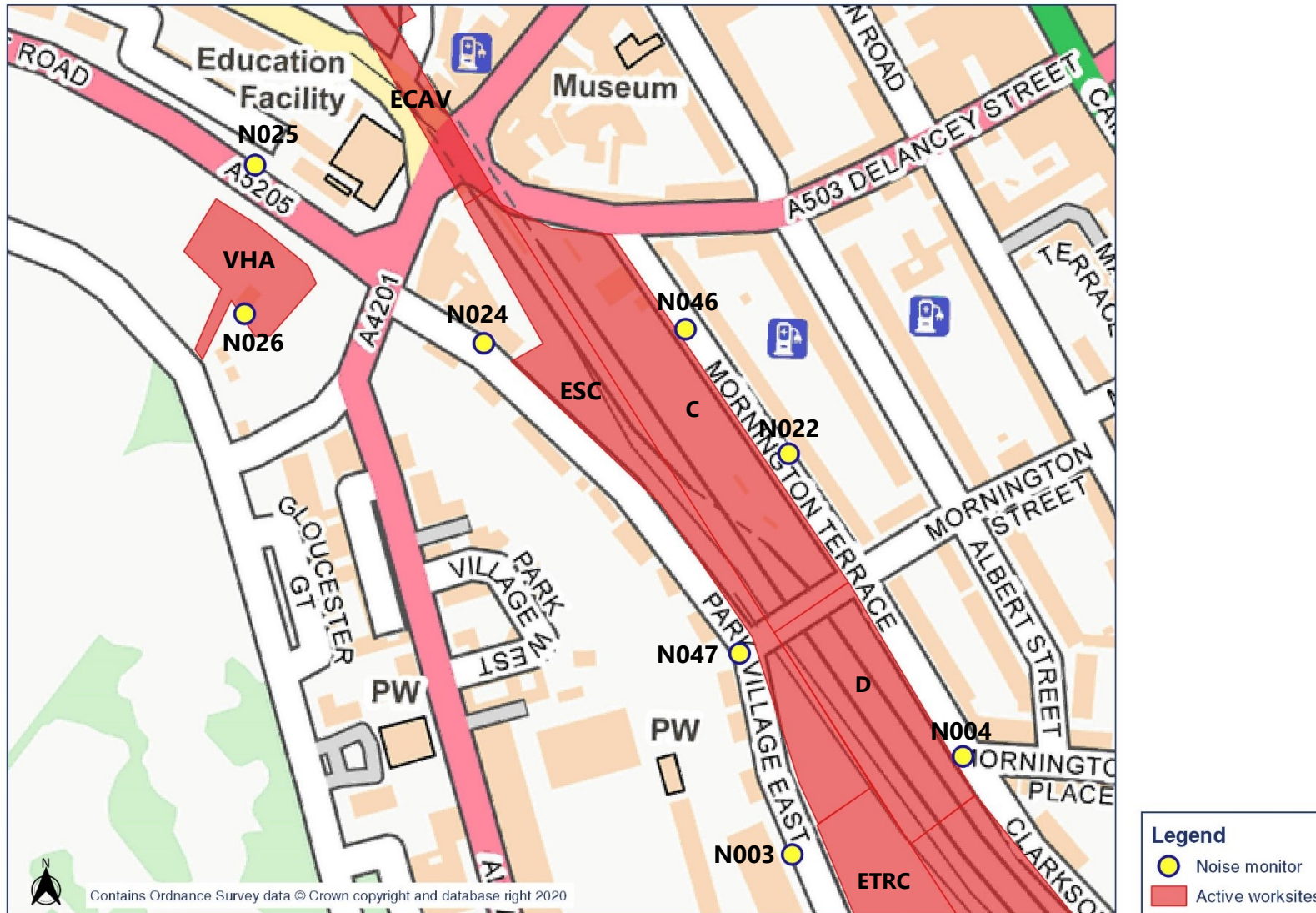


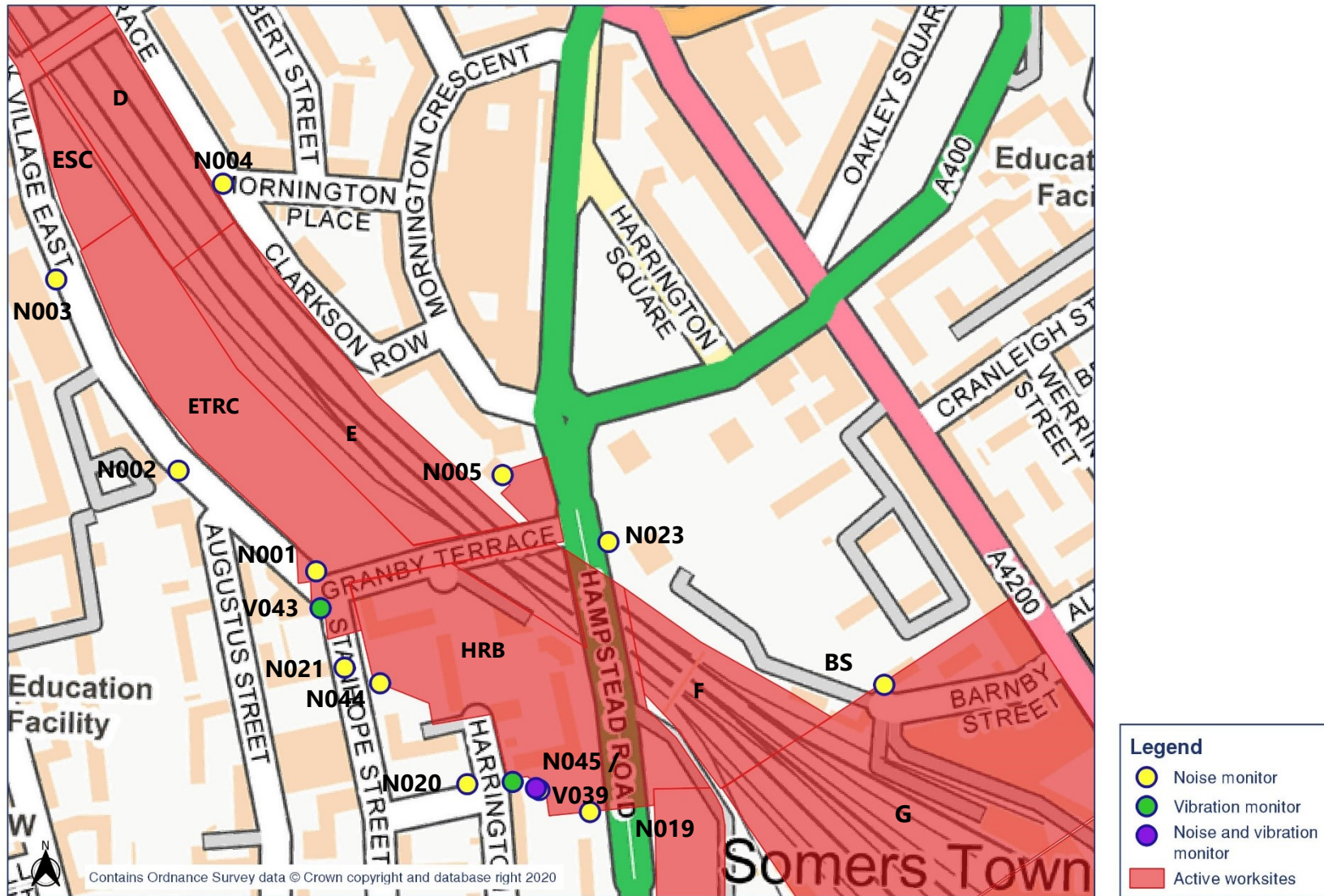


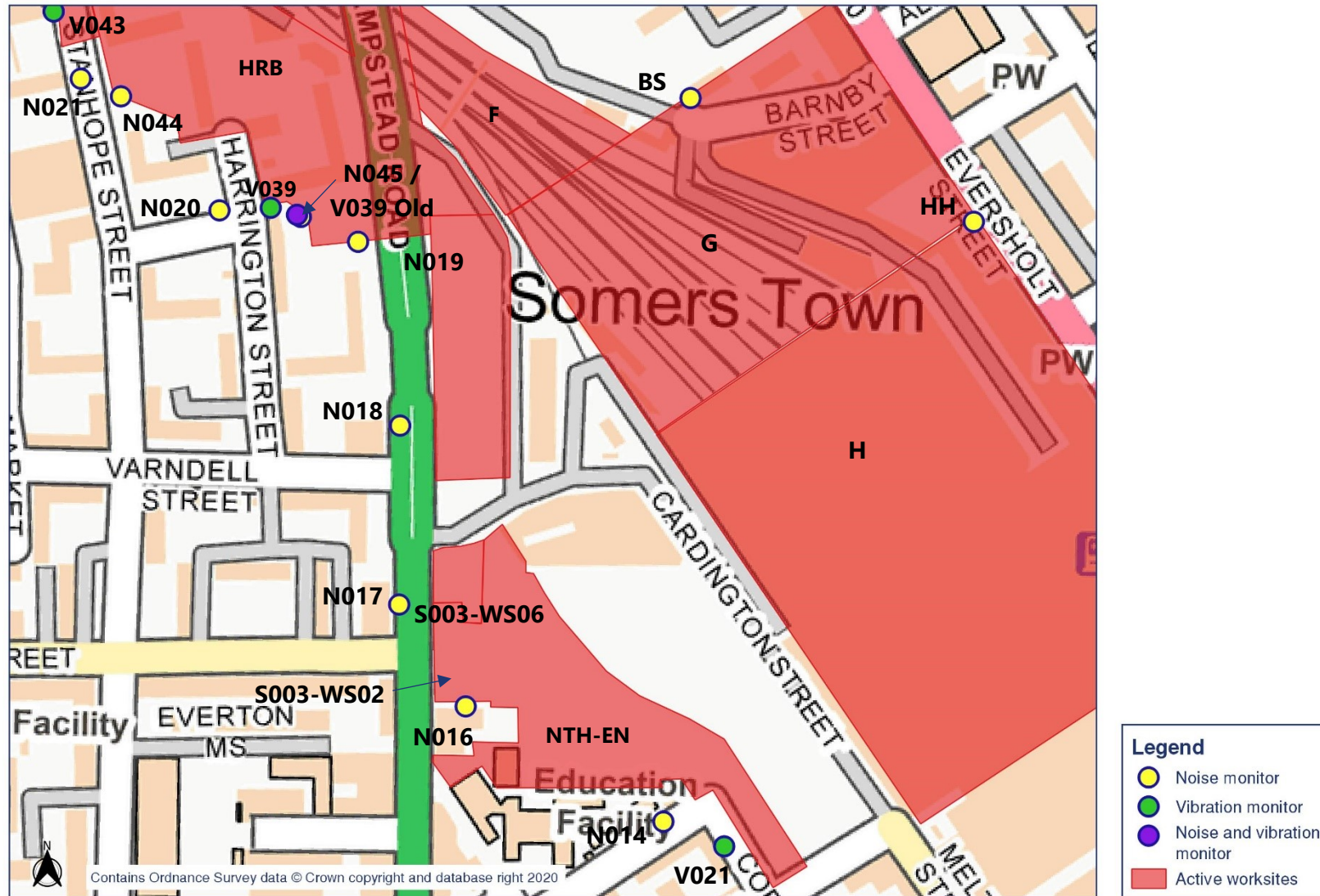
Appendix B Monitoring Locations

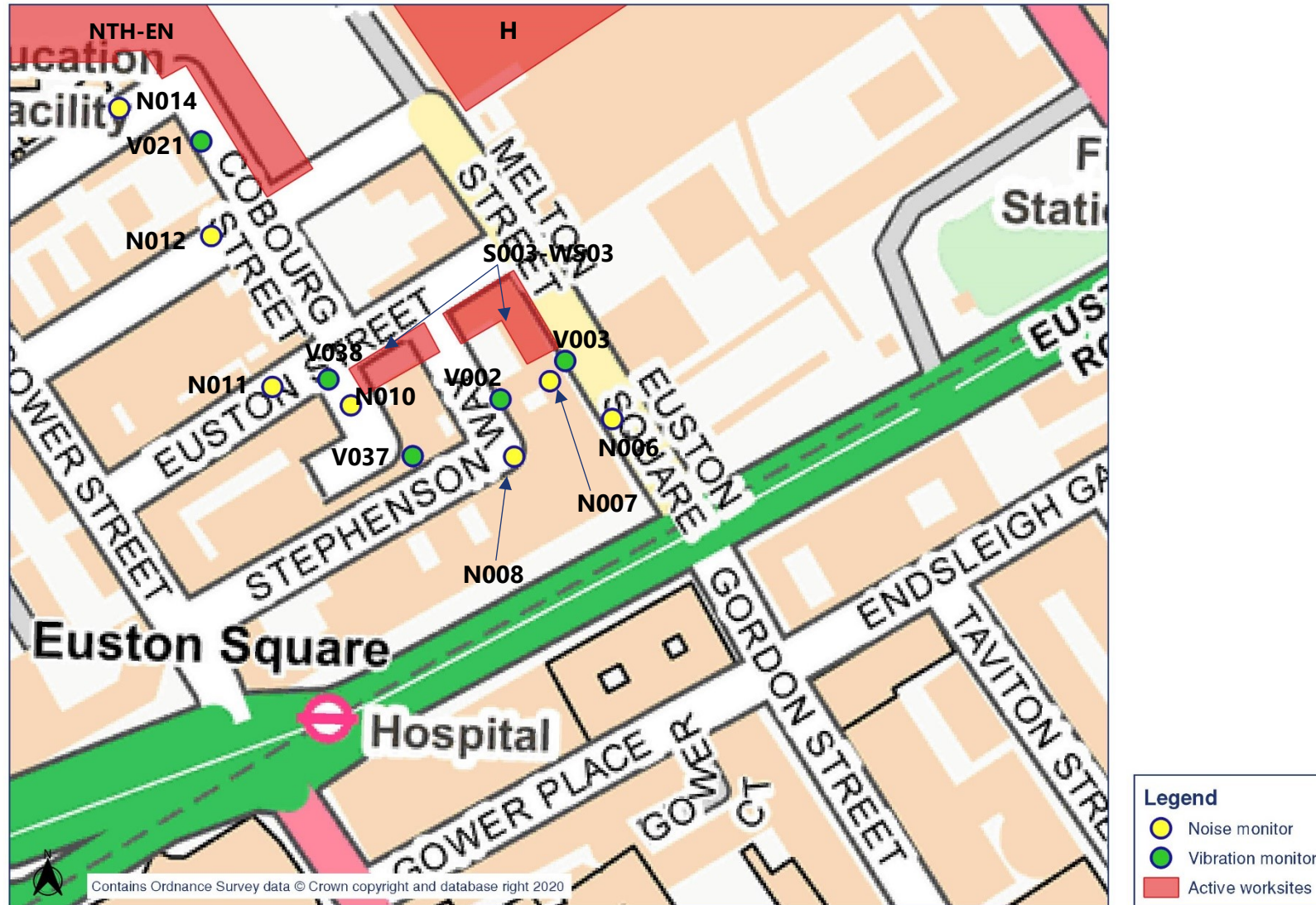










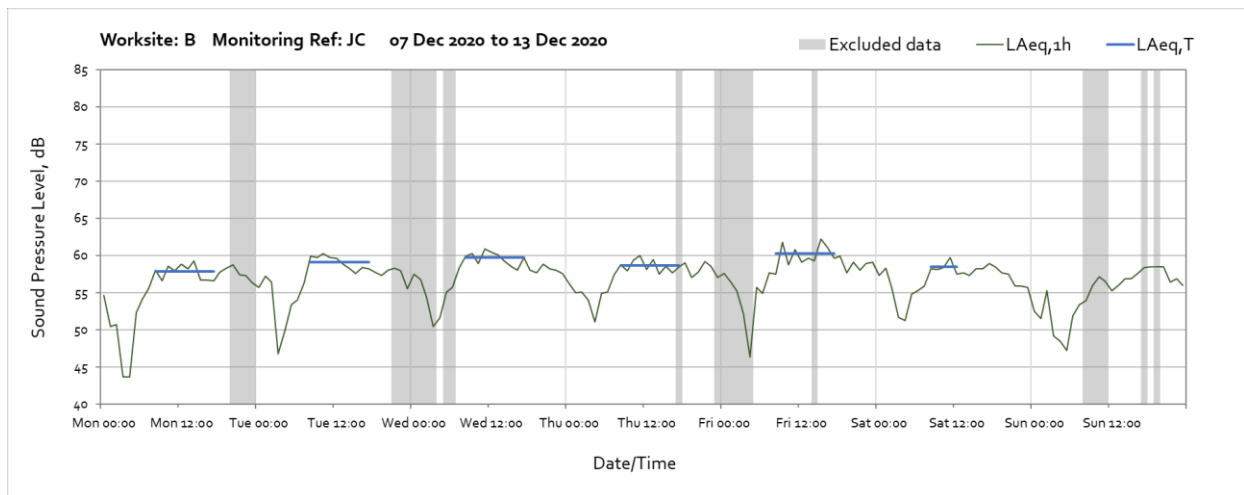
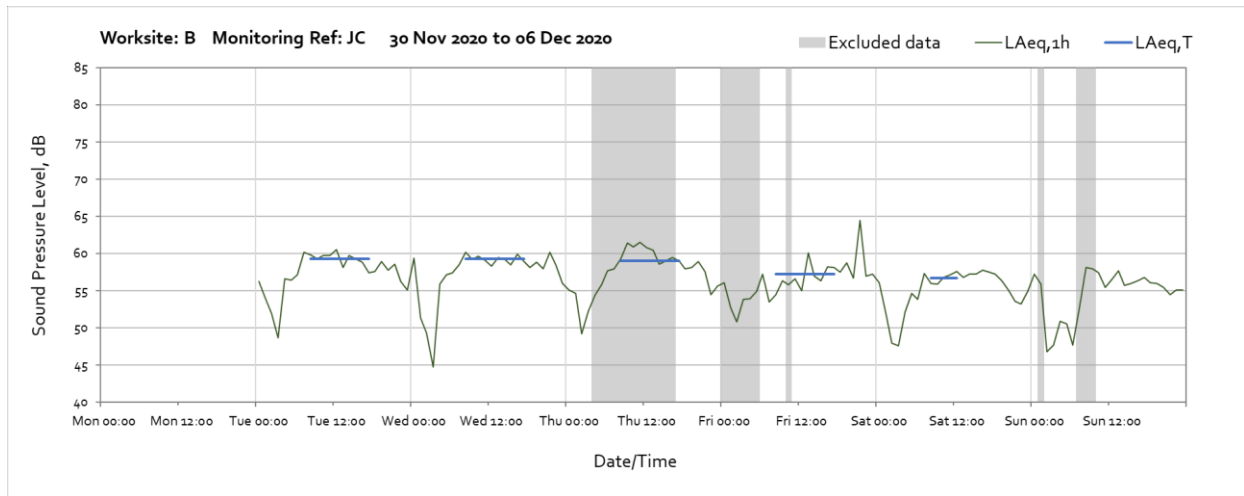


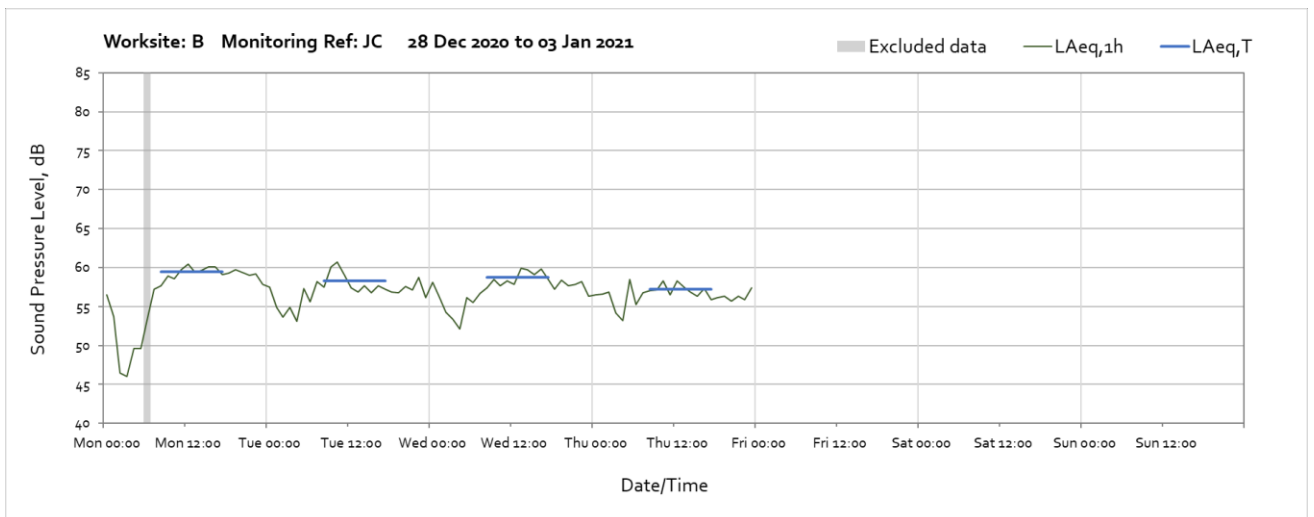
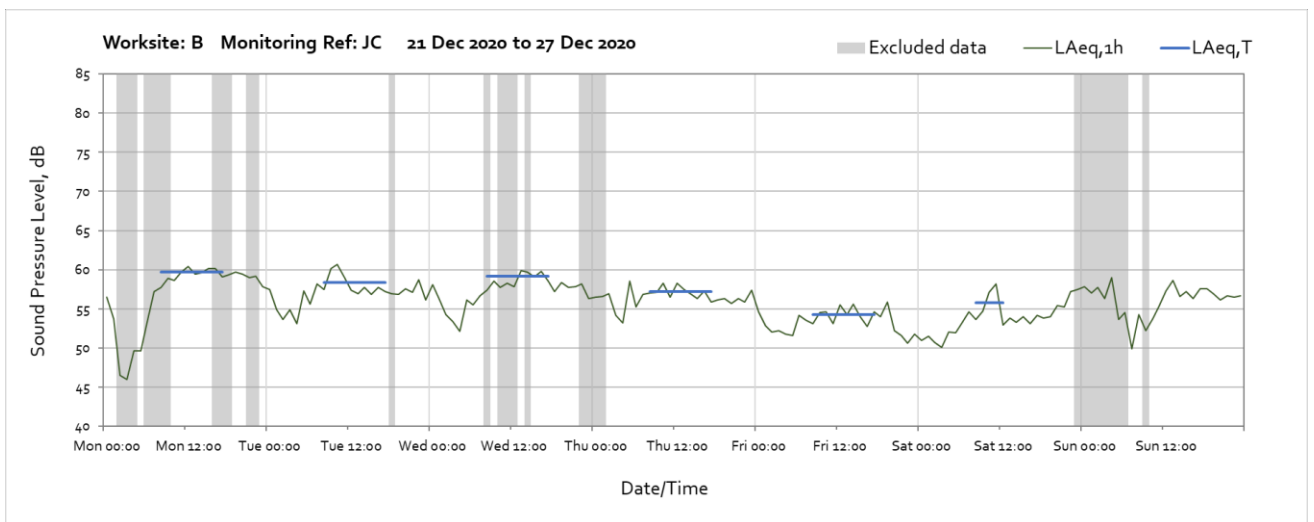
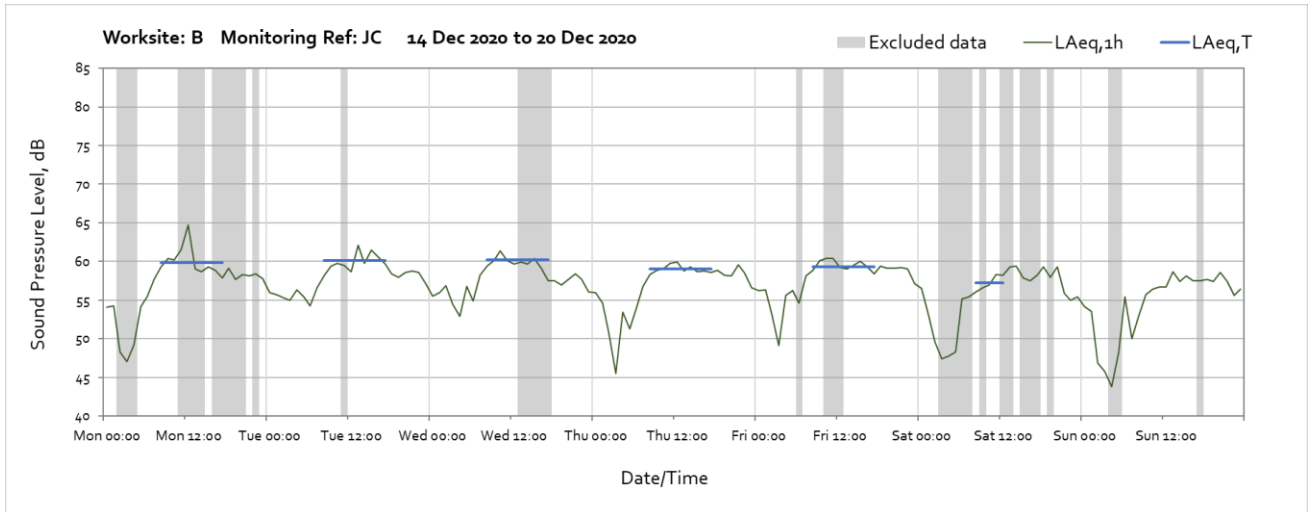
Appendix C Data

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.

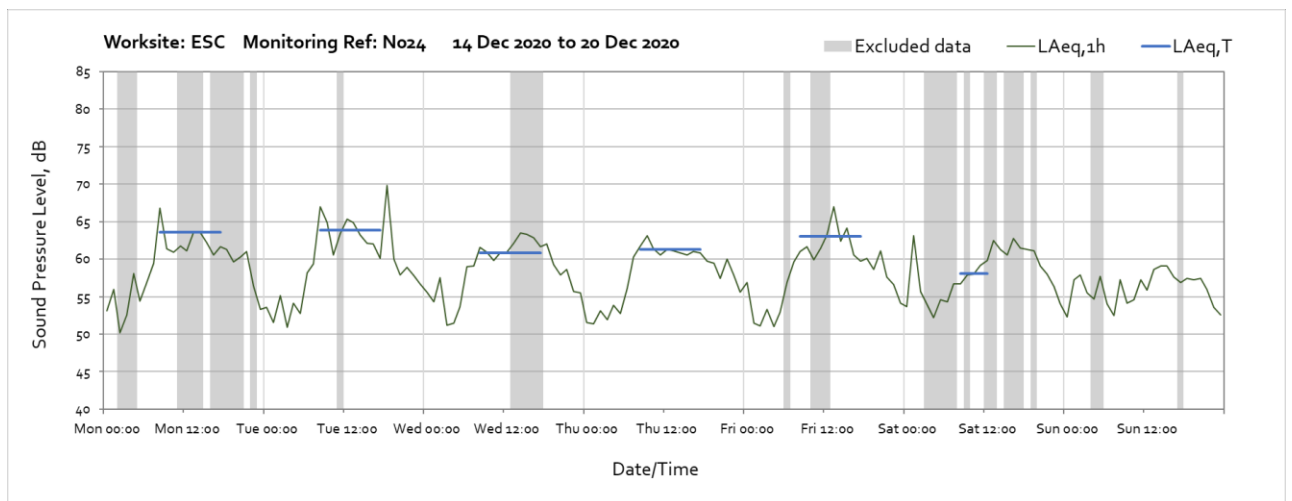
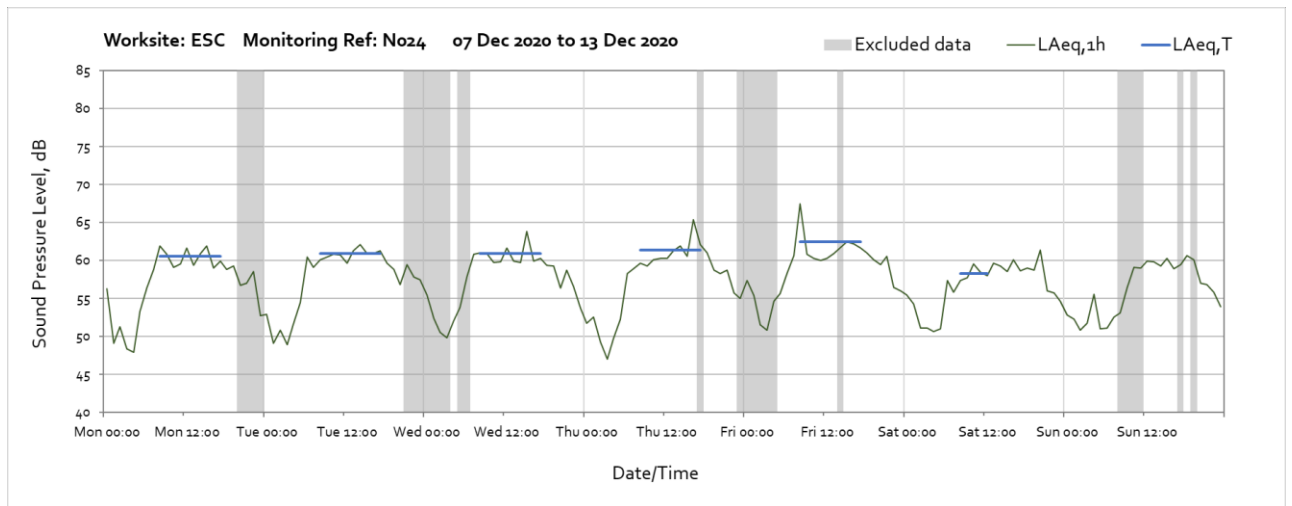
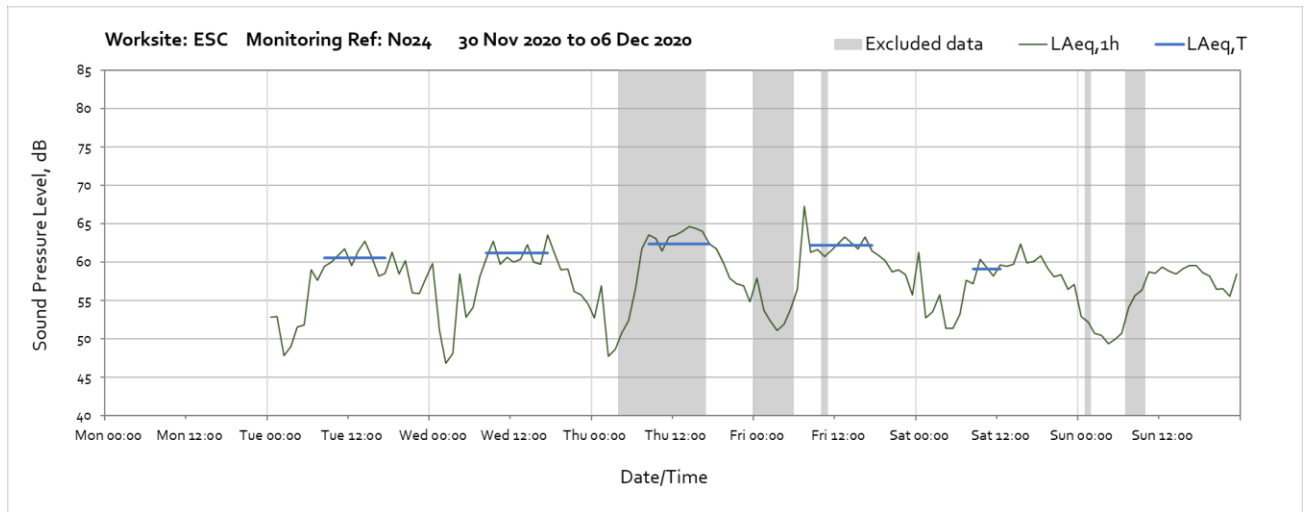
Noise

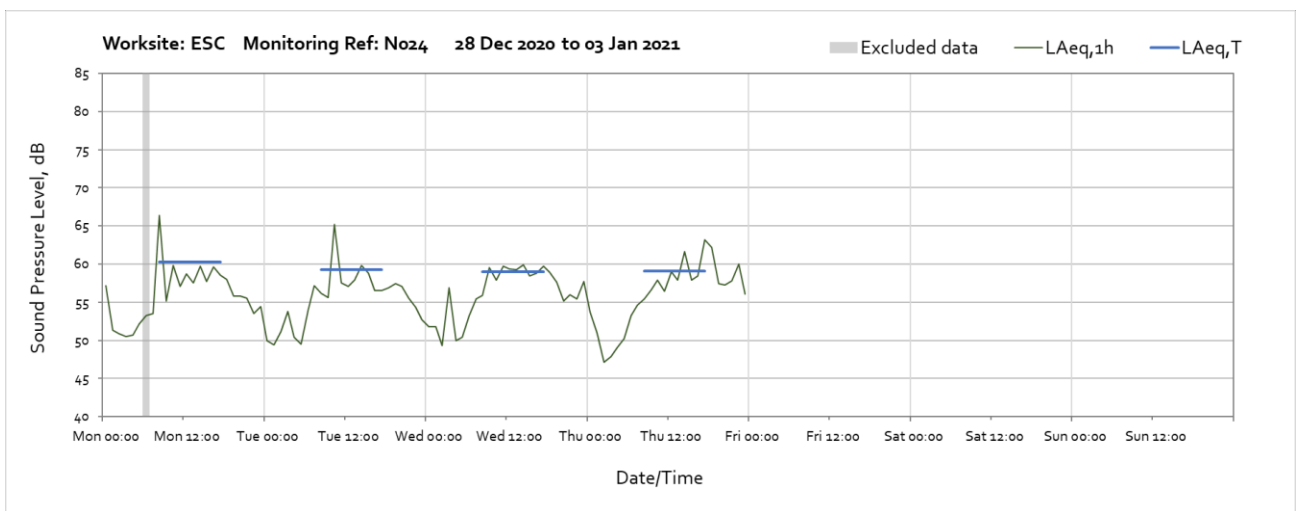
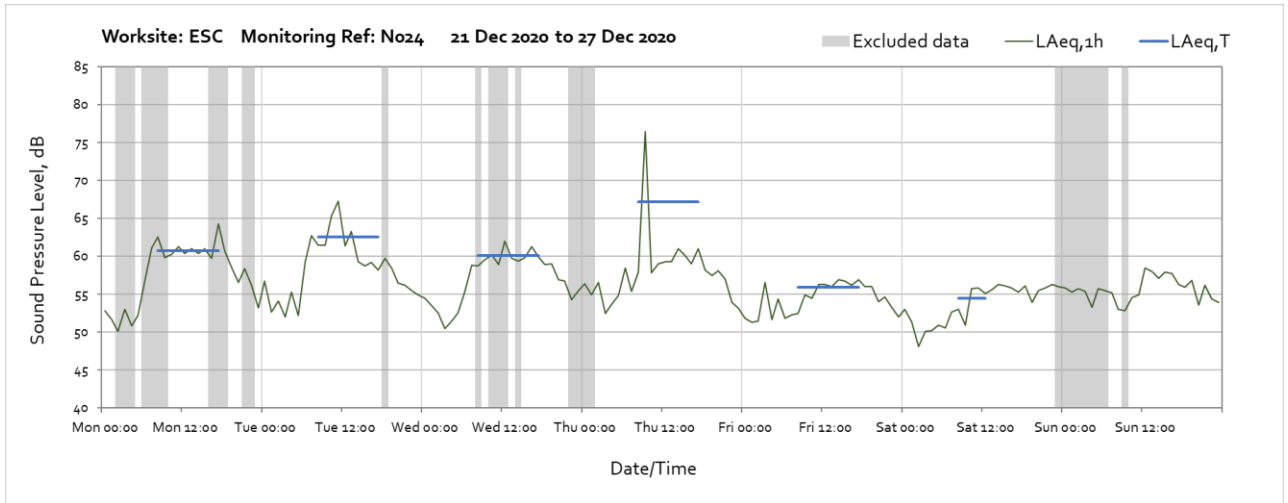
Worksite: B – Monitoring Ref: JC



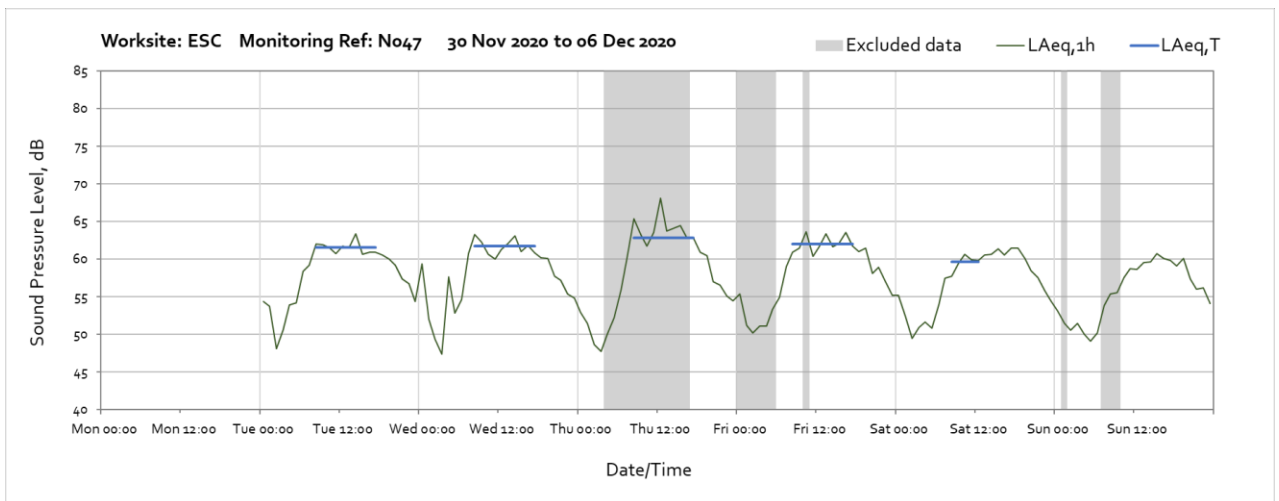


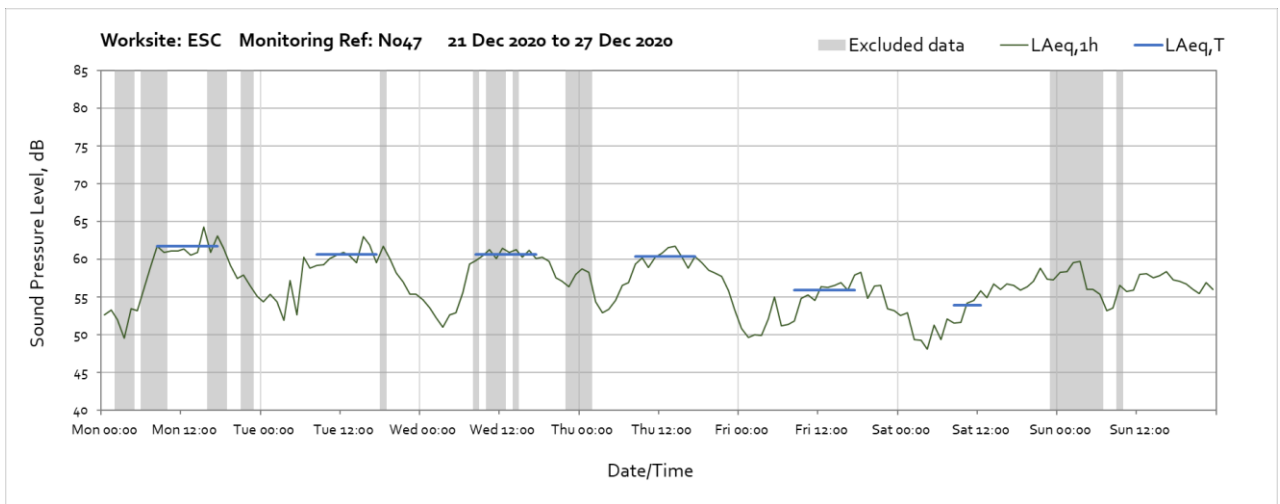
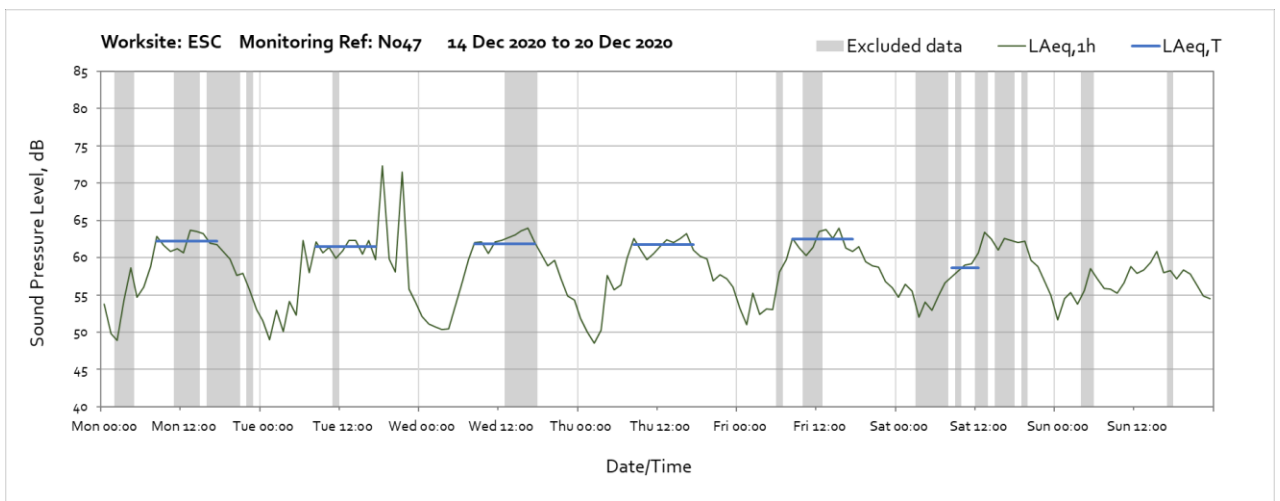
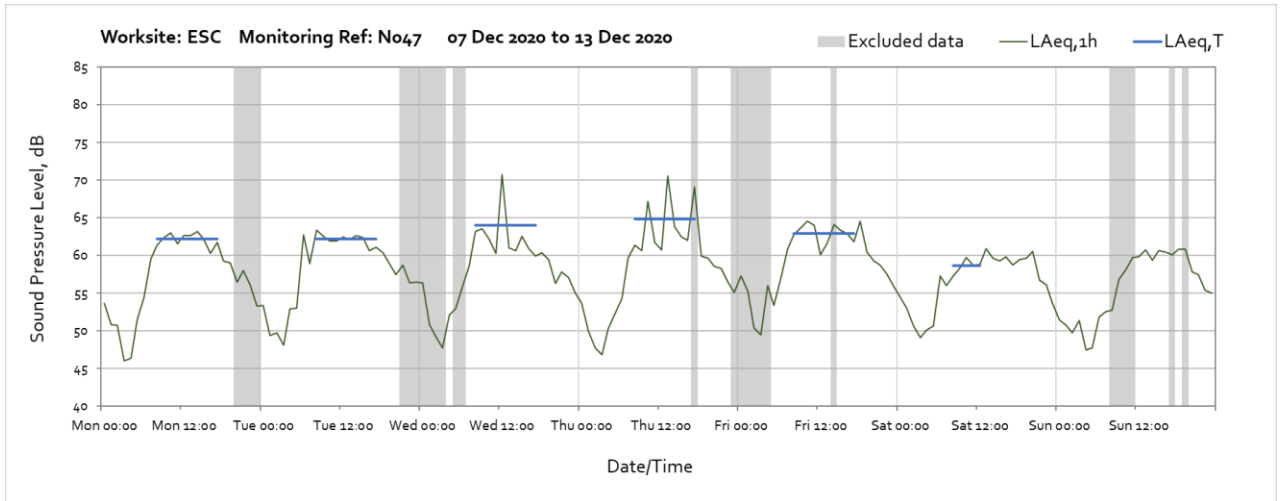
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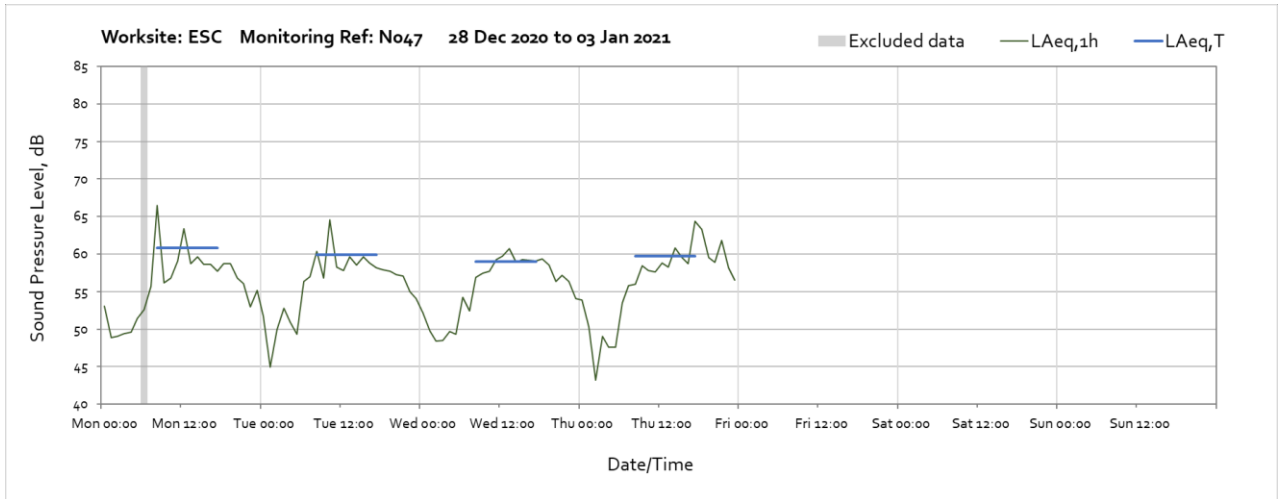




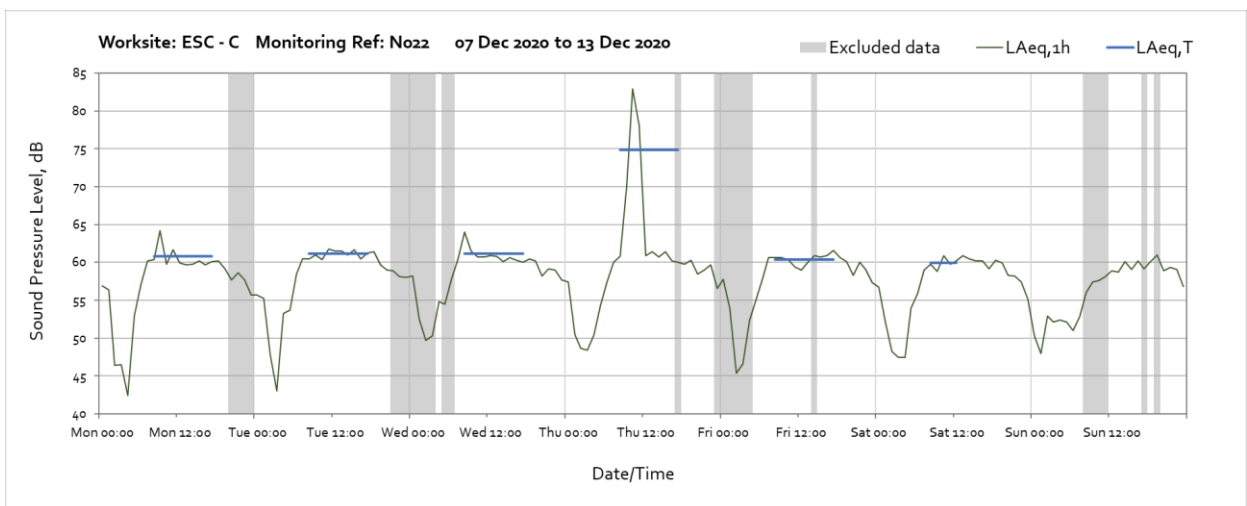
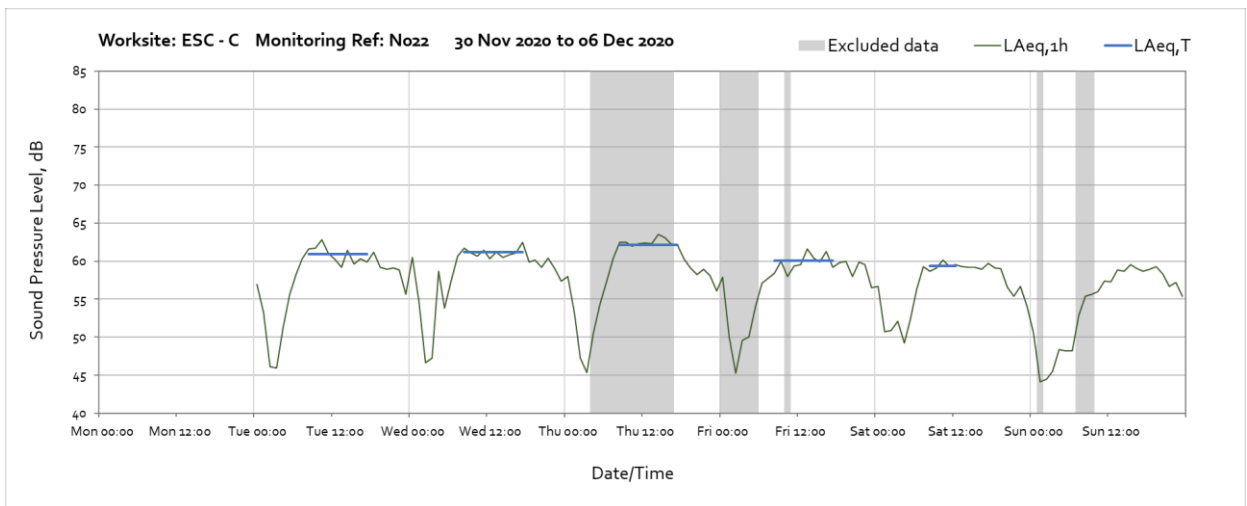
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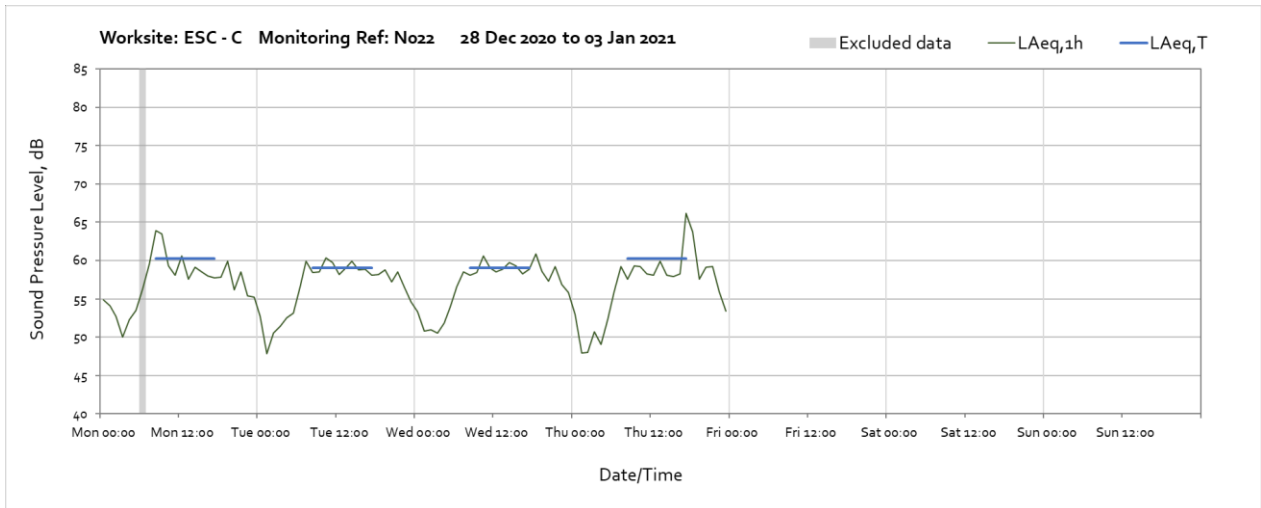
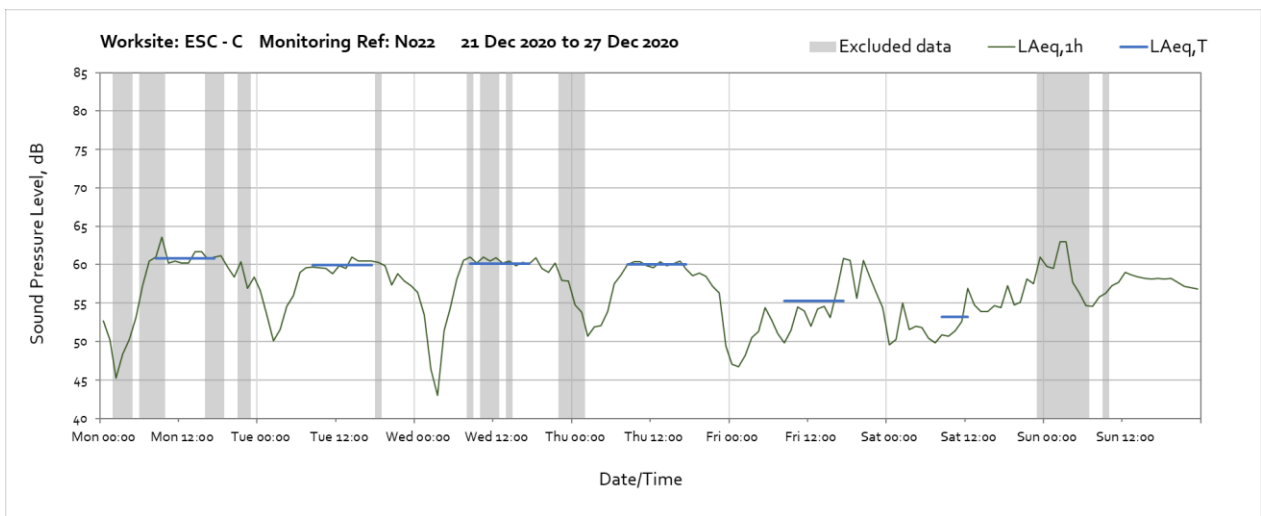
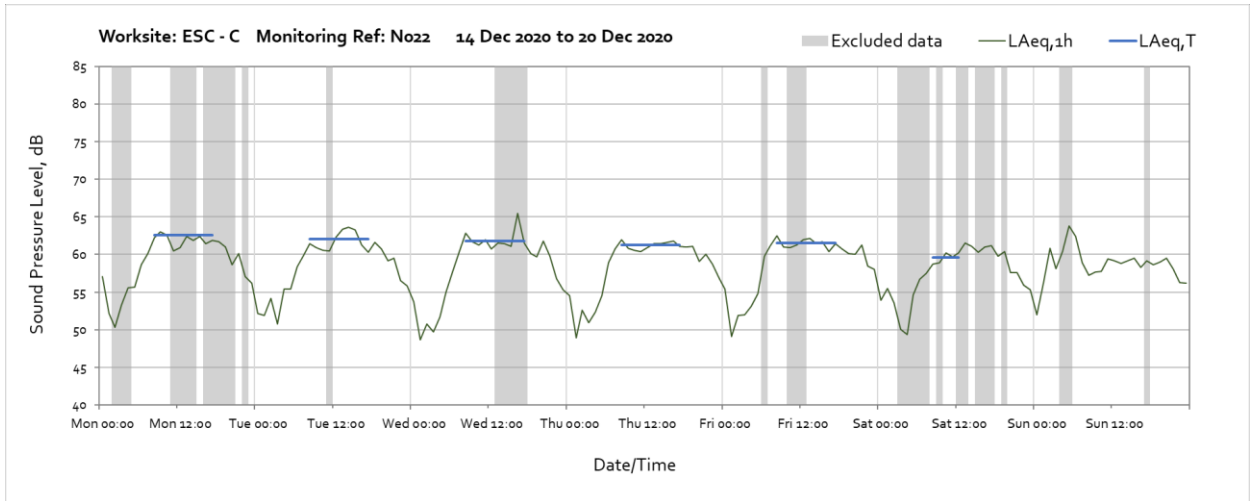




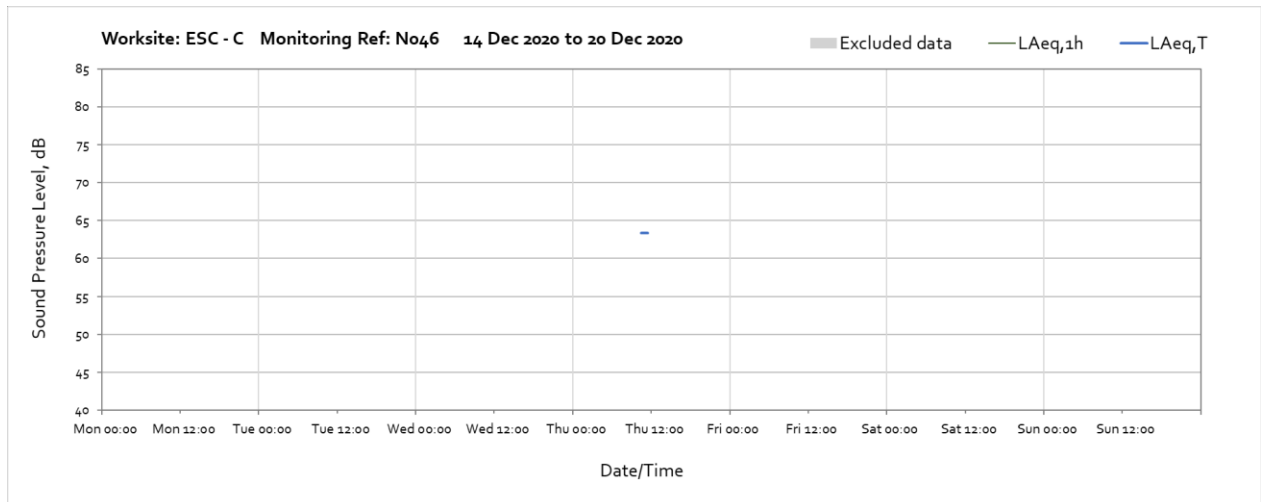


Worksite: ESC-C – Monitoring Ref: N022

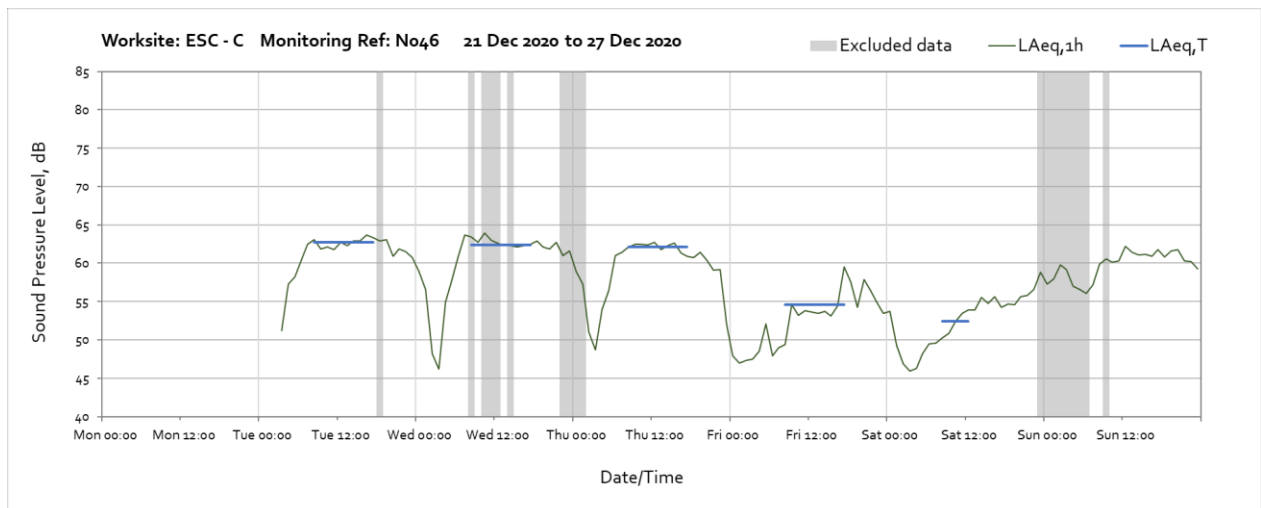




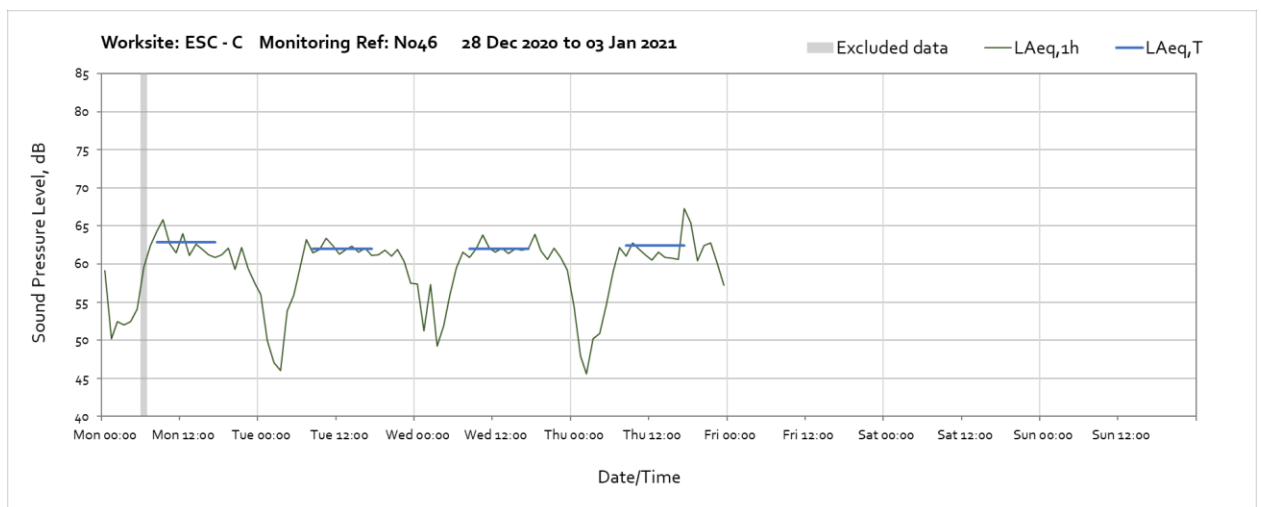
Worksite: ESC-C – Monitoring Ref: N046



Note: Missing data from the start of the month until 10:00 on Thursday 17th December and from 12:00 on Thursday 17th December until until 03:00 on Tuesday 22nd December was due to an electrical fault with the lamppost which resulted in a loss of power at the noise monitor.

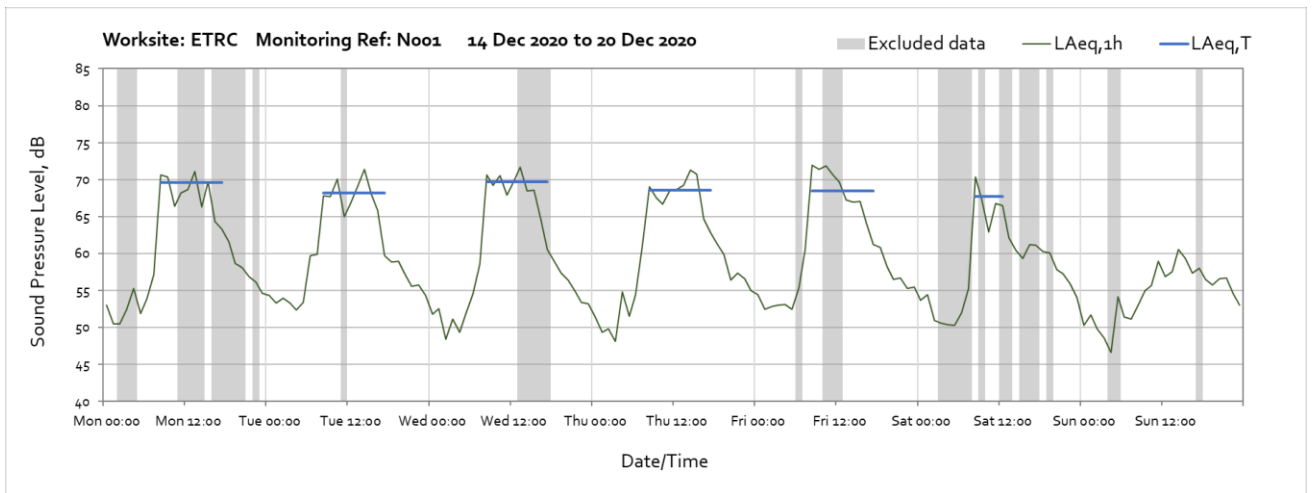
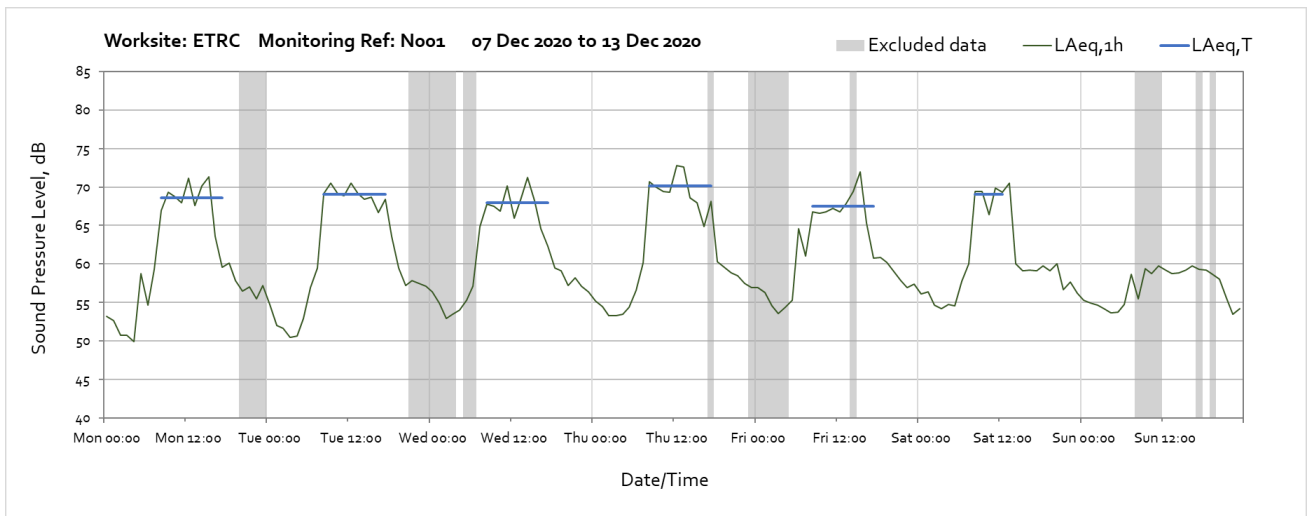
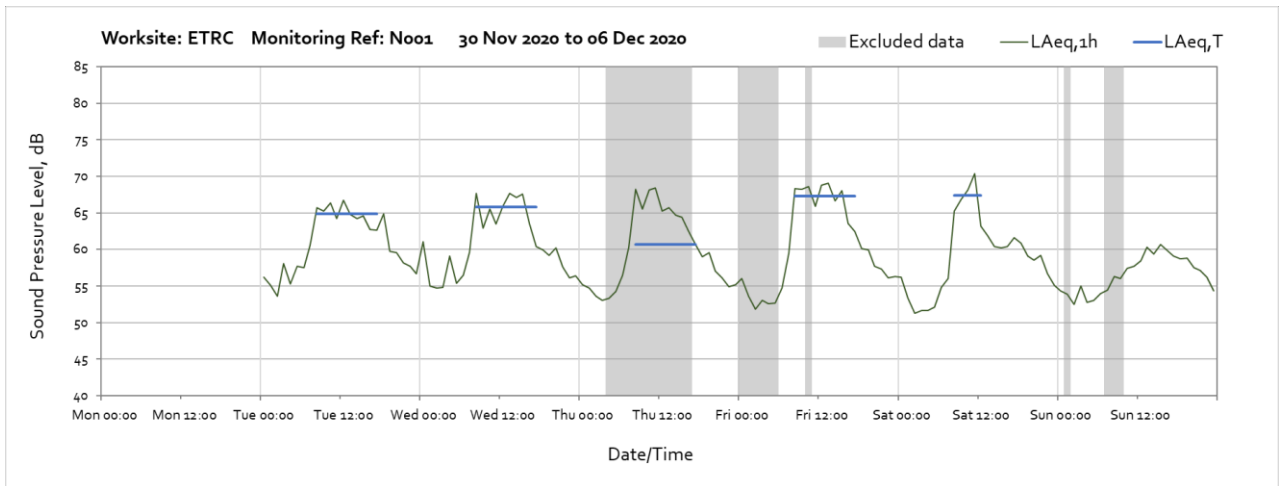


Note: Missing data from 12:00 on Thursday 17th December until until 03:00 on Tuesday 22nd December was due to an electrical fault with the lamppost which resulted in a loss of power at the noise monitor.

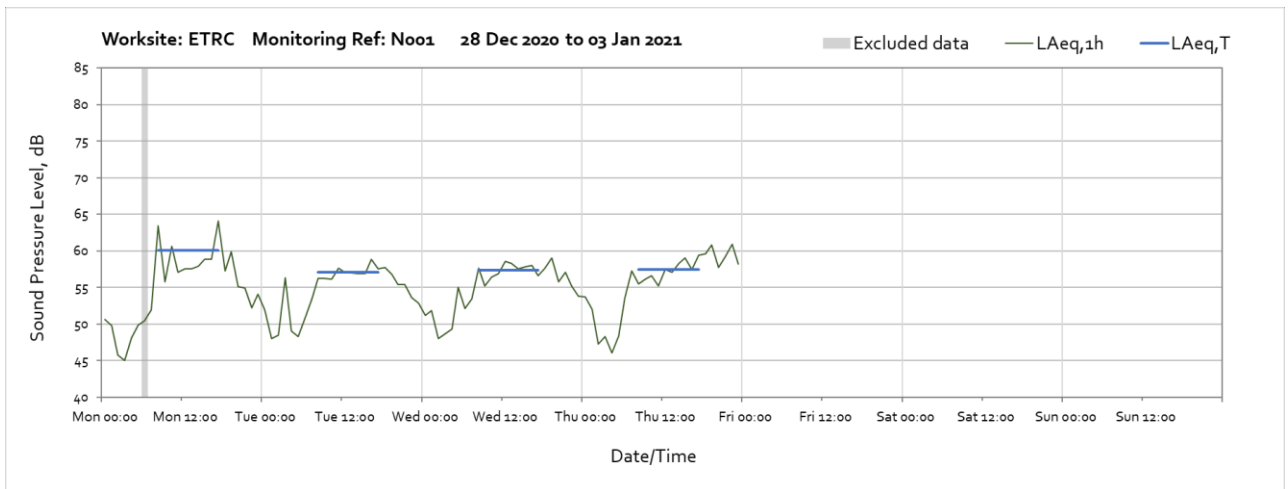
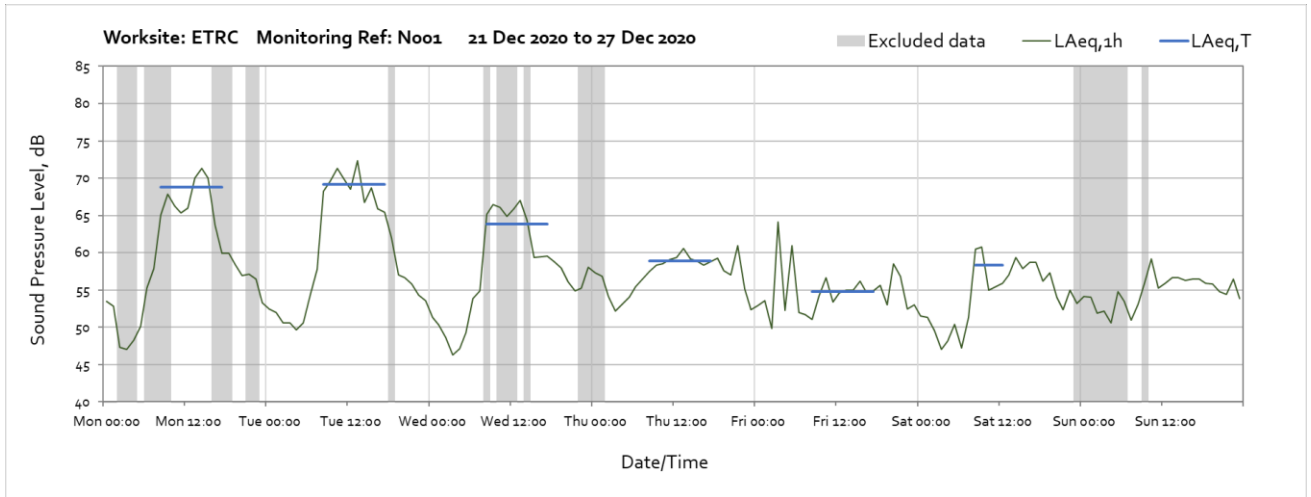


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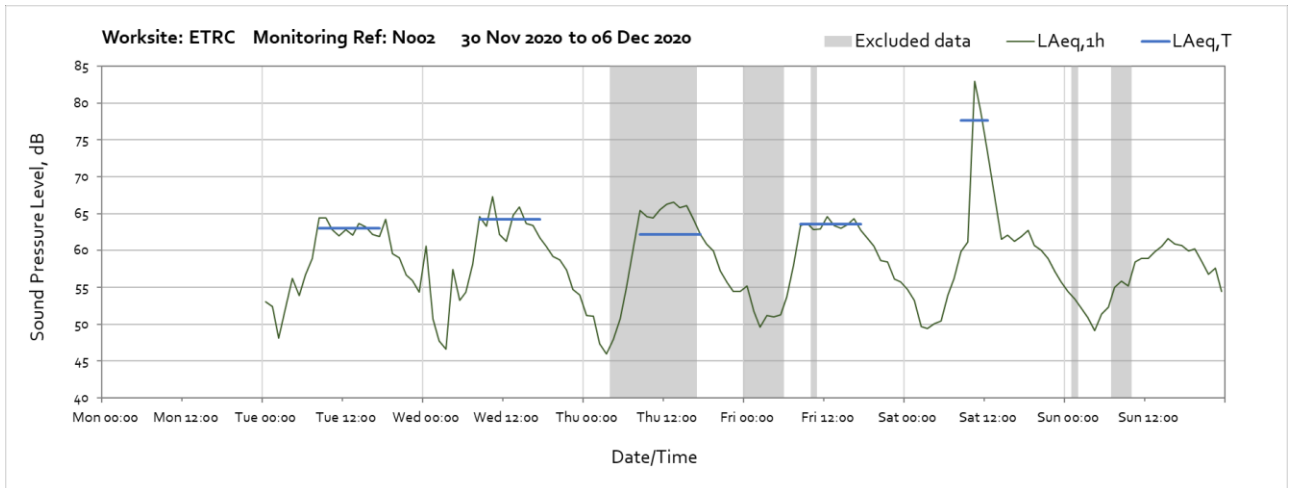
Worksite: ETRC – Monitoring Ref: N001

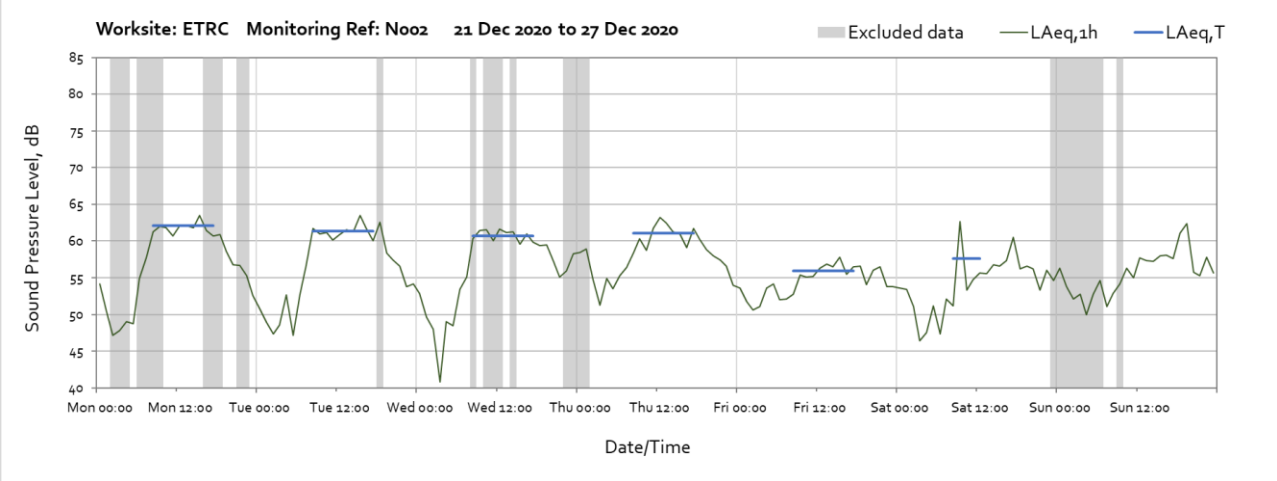
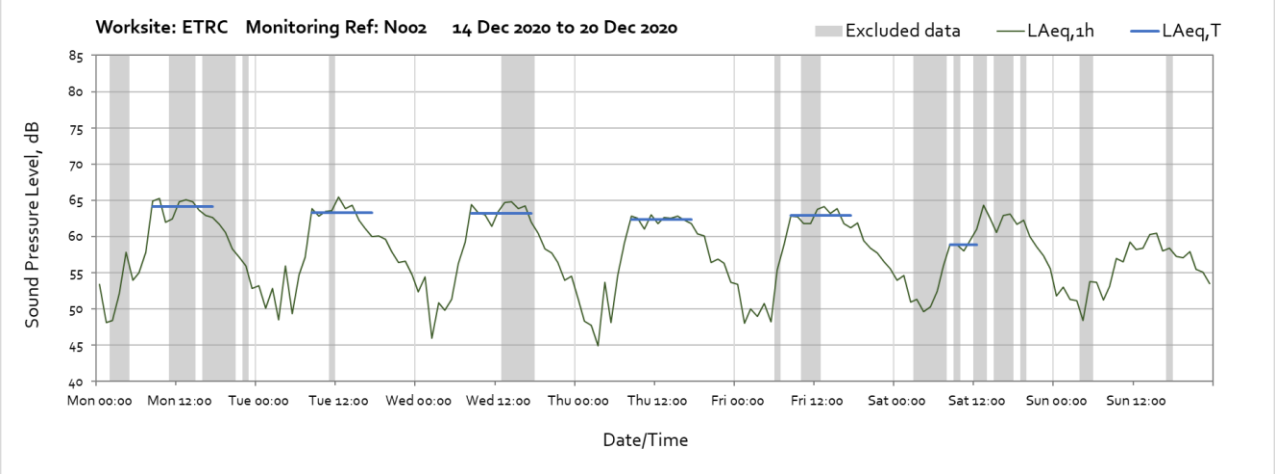
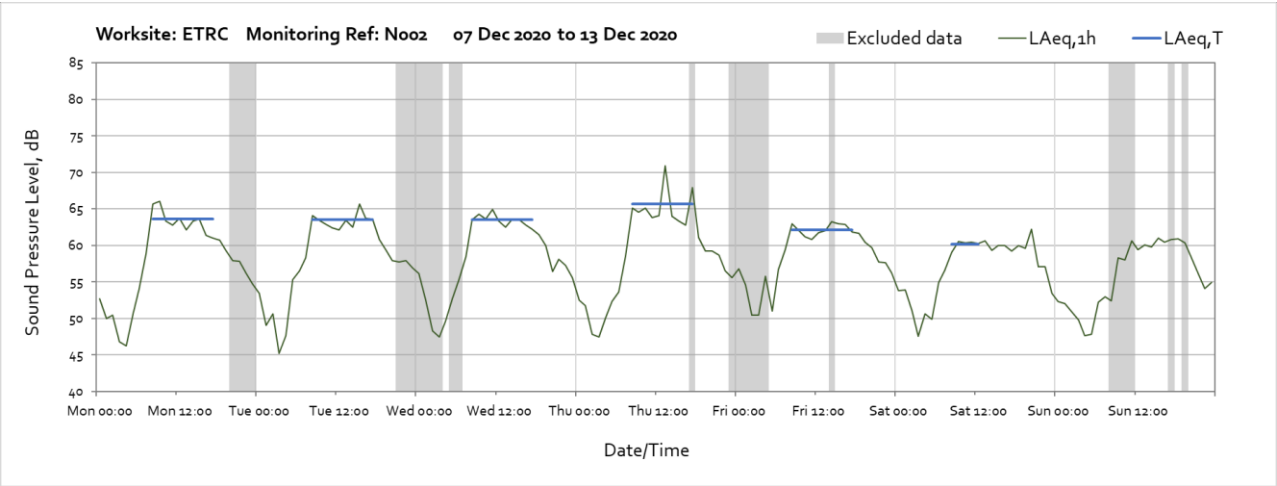


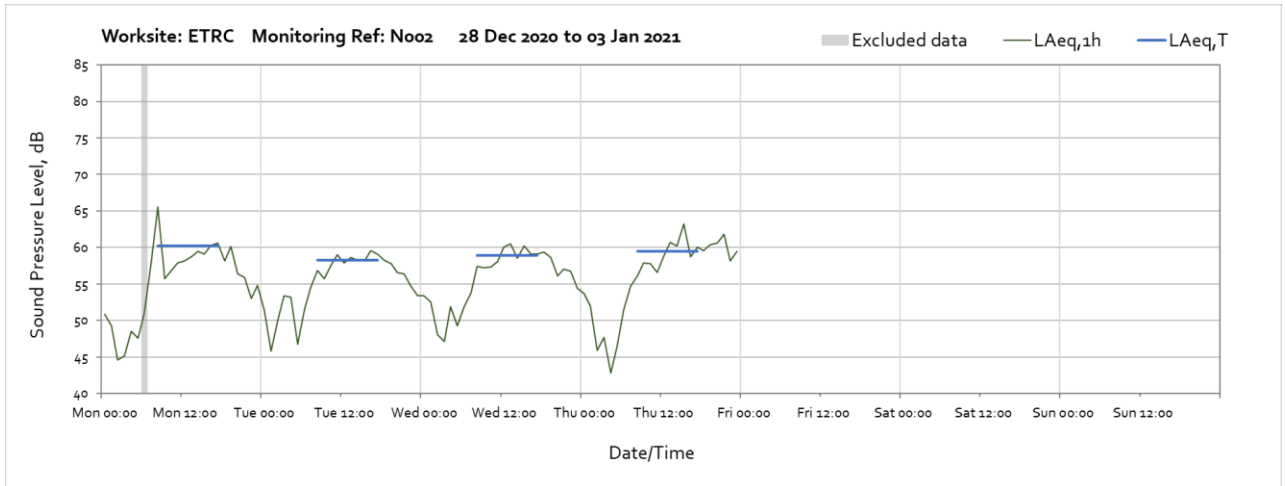
OFFICIAL



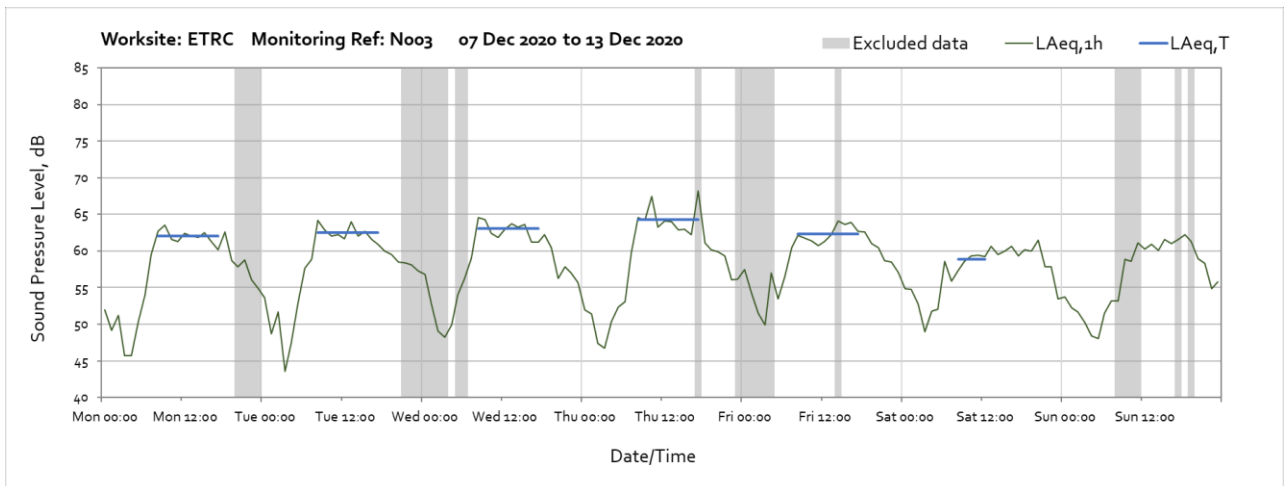
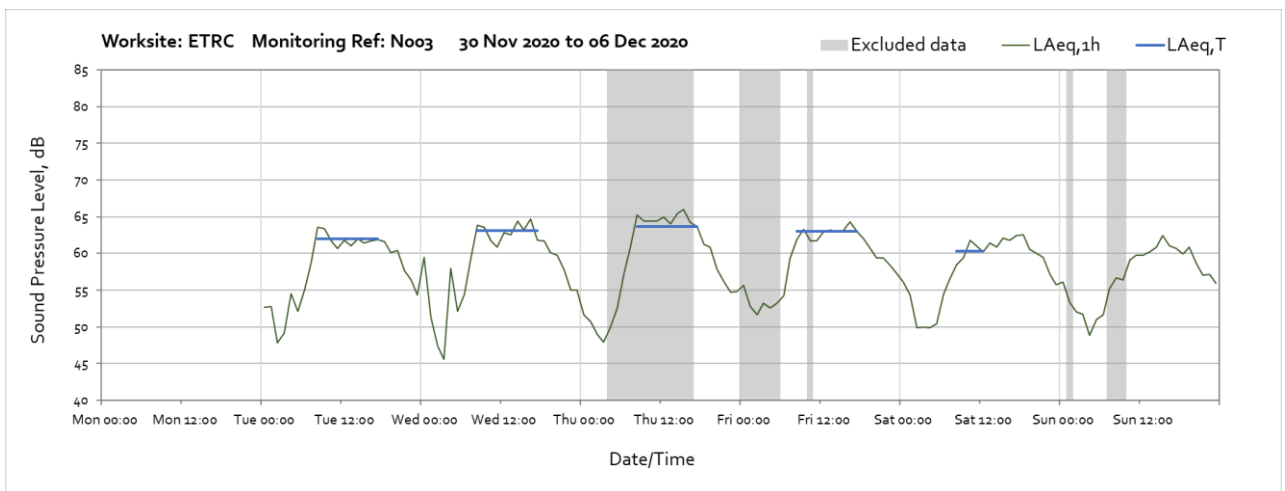
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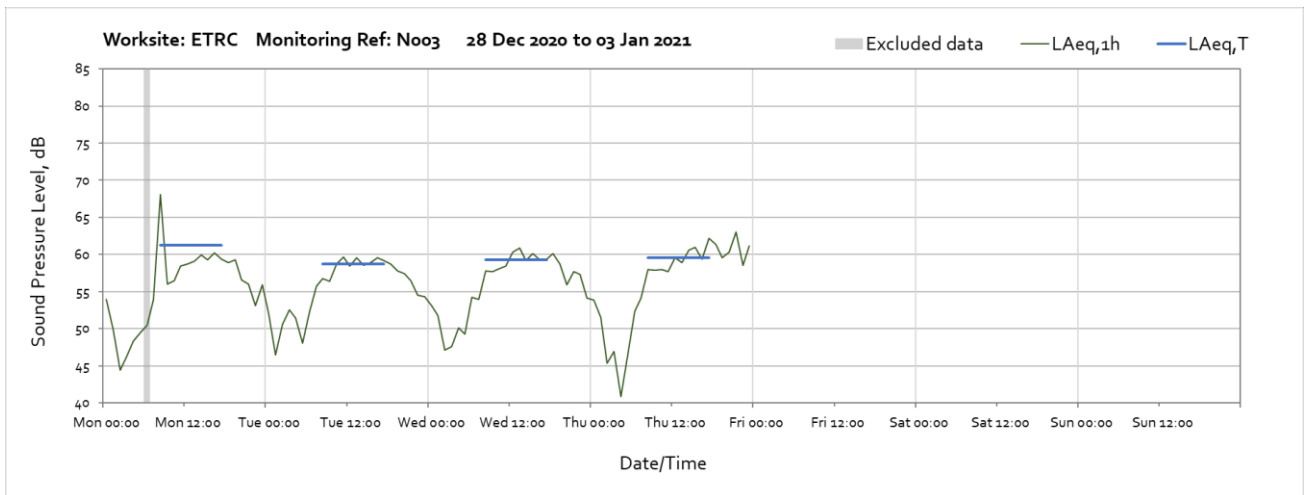
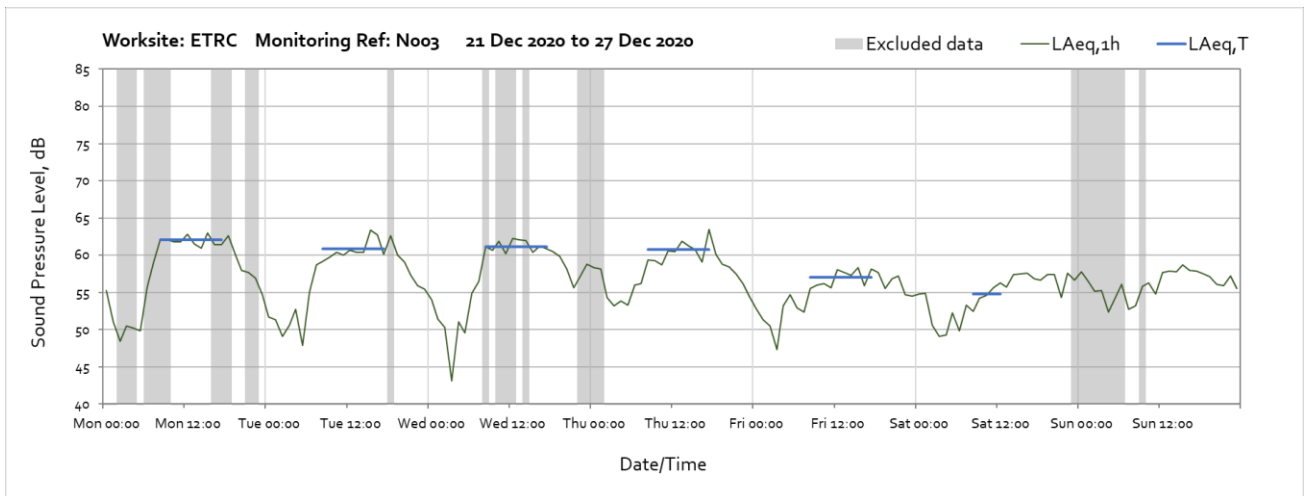




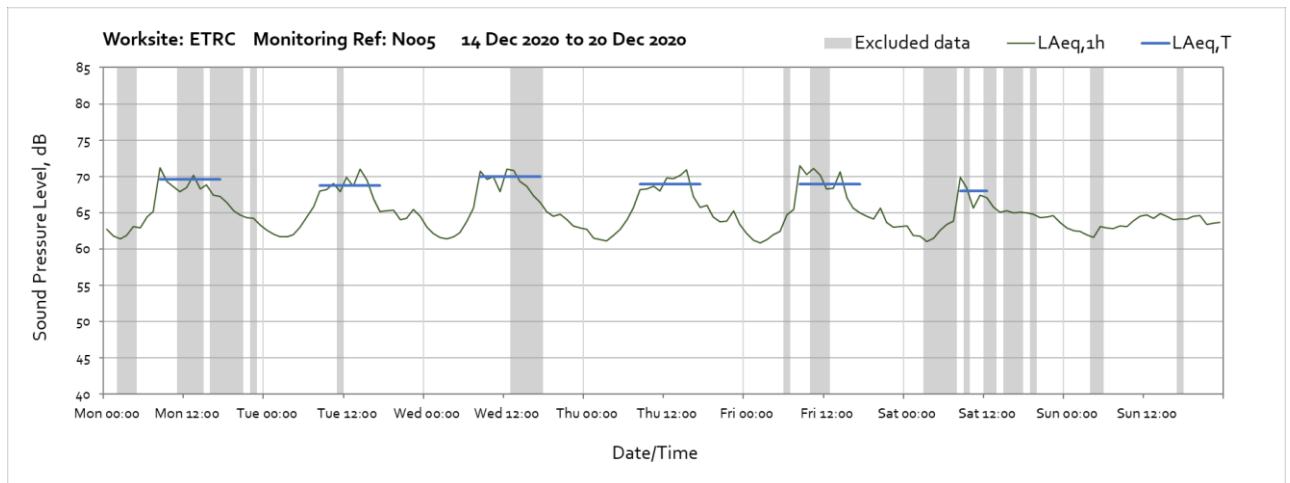
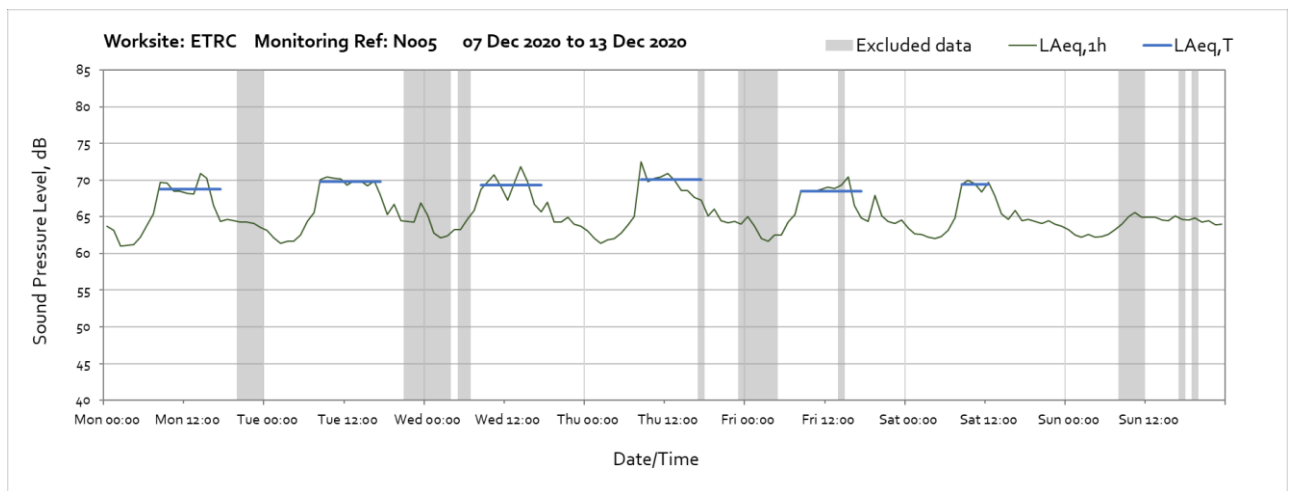
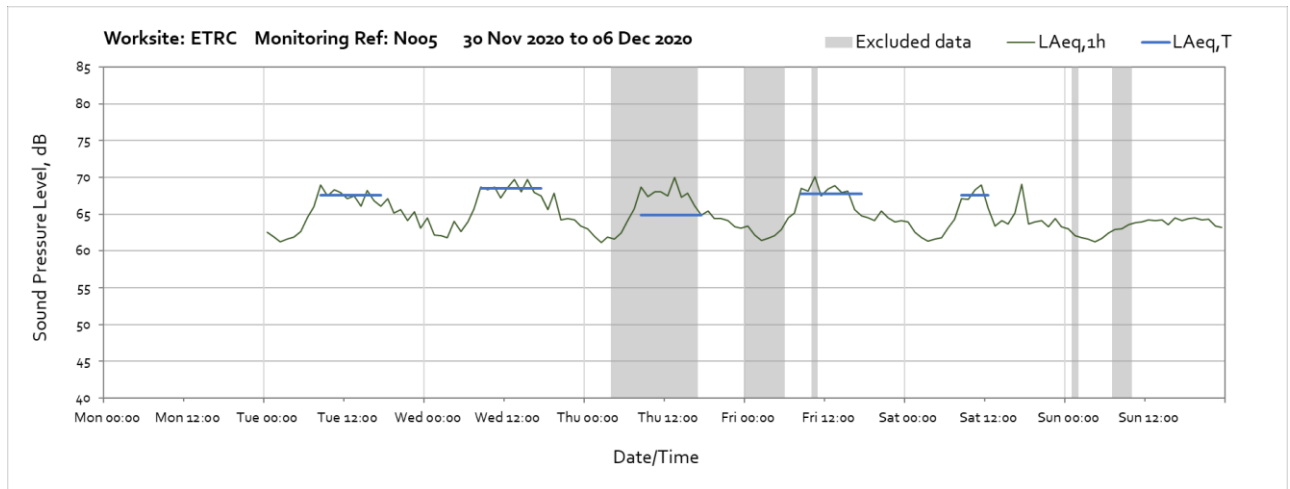


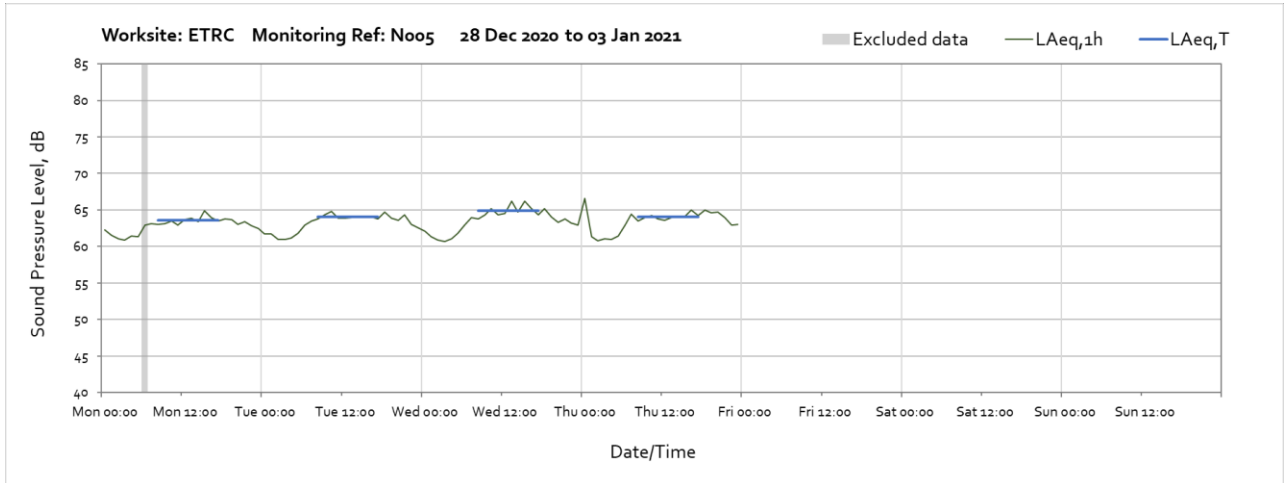
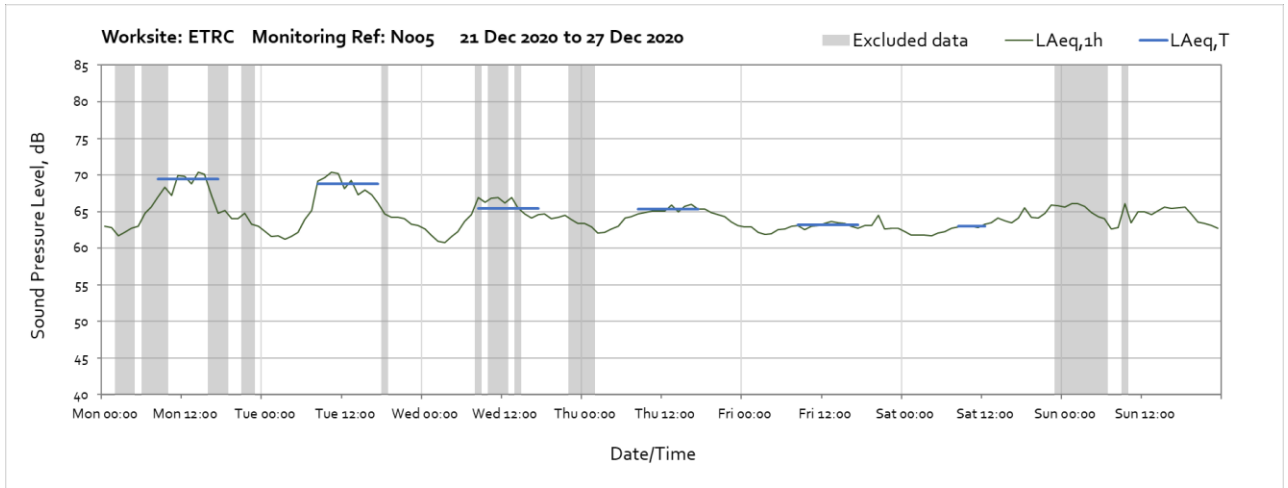
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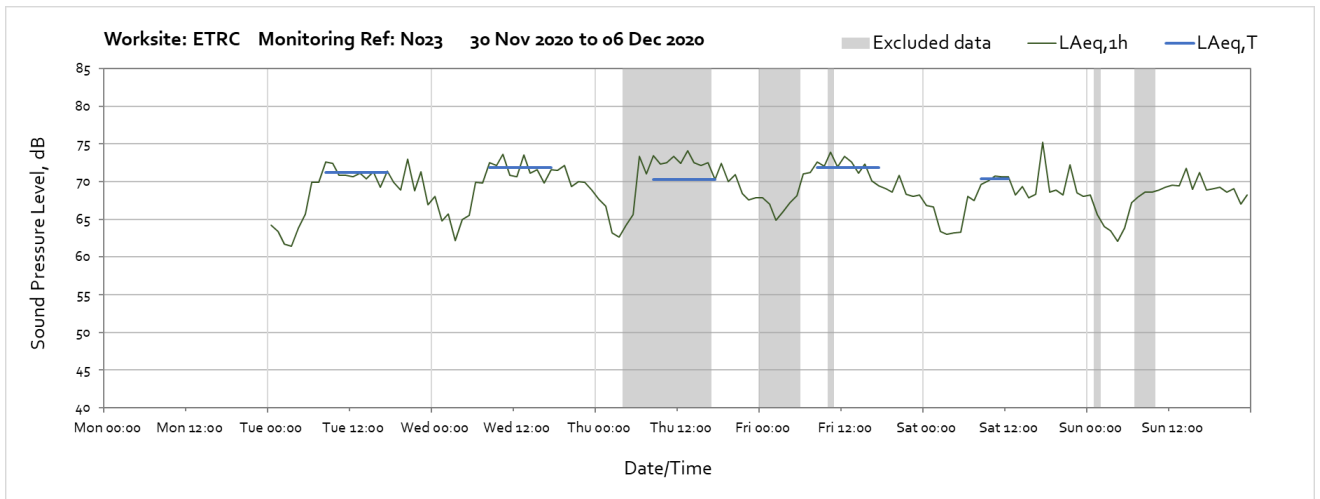


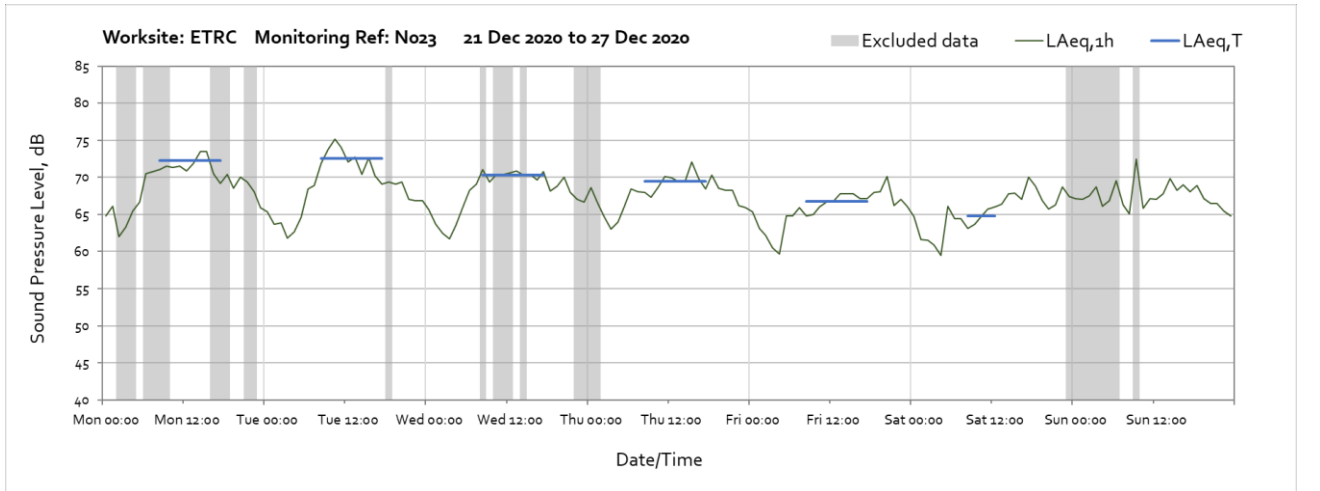
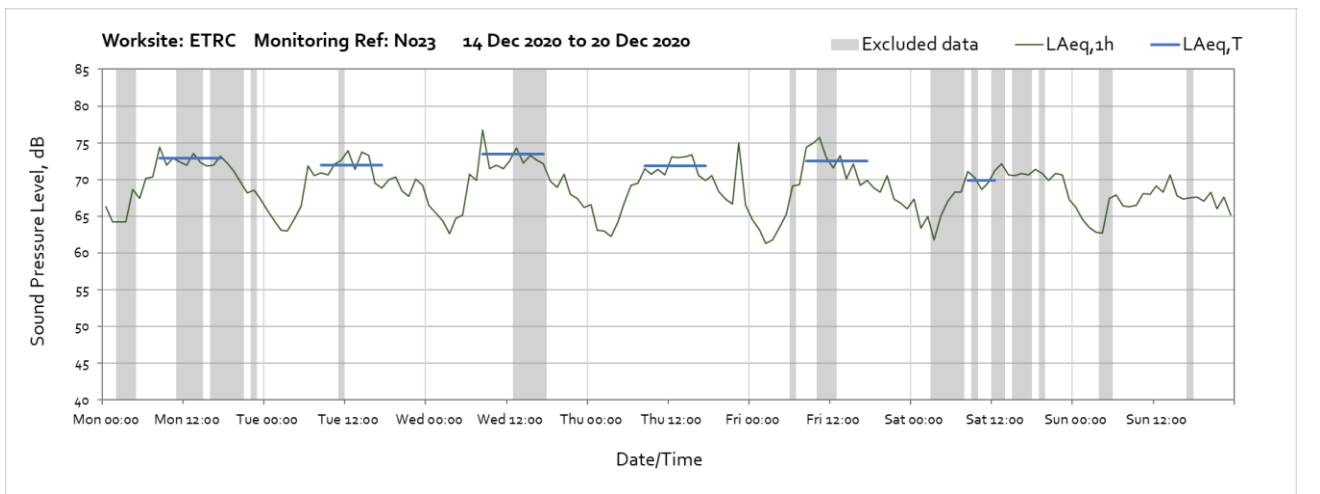
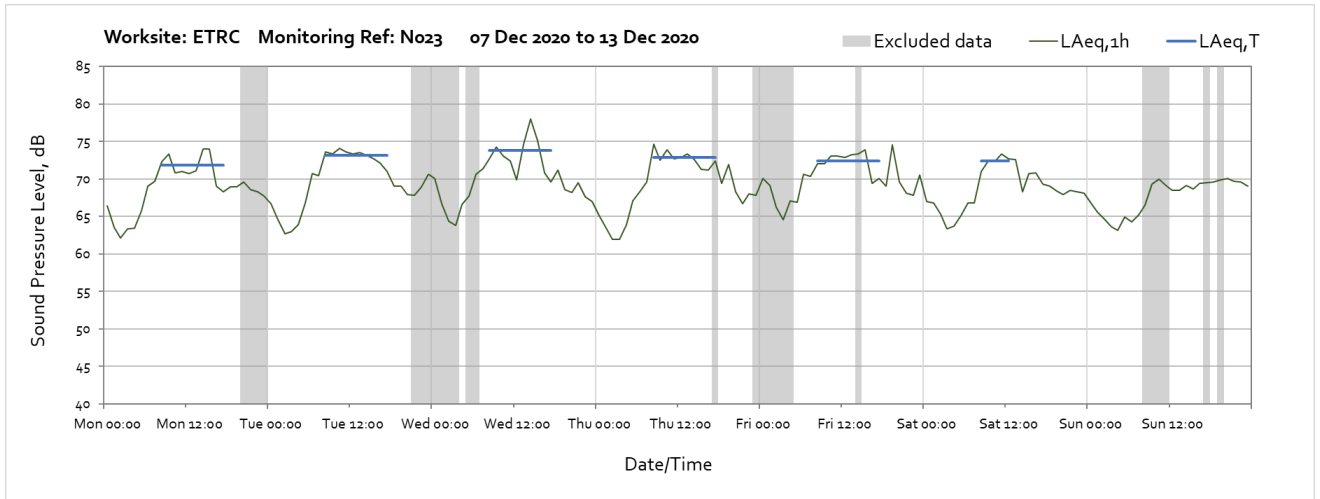
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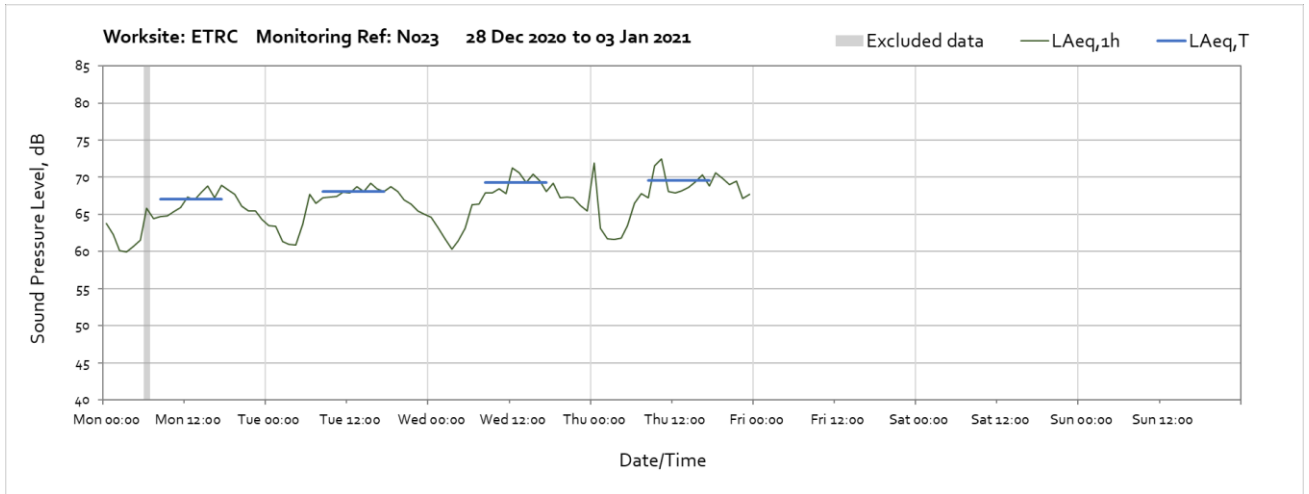




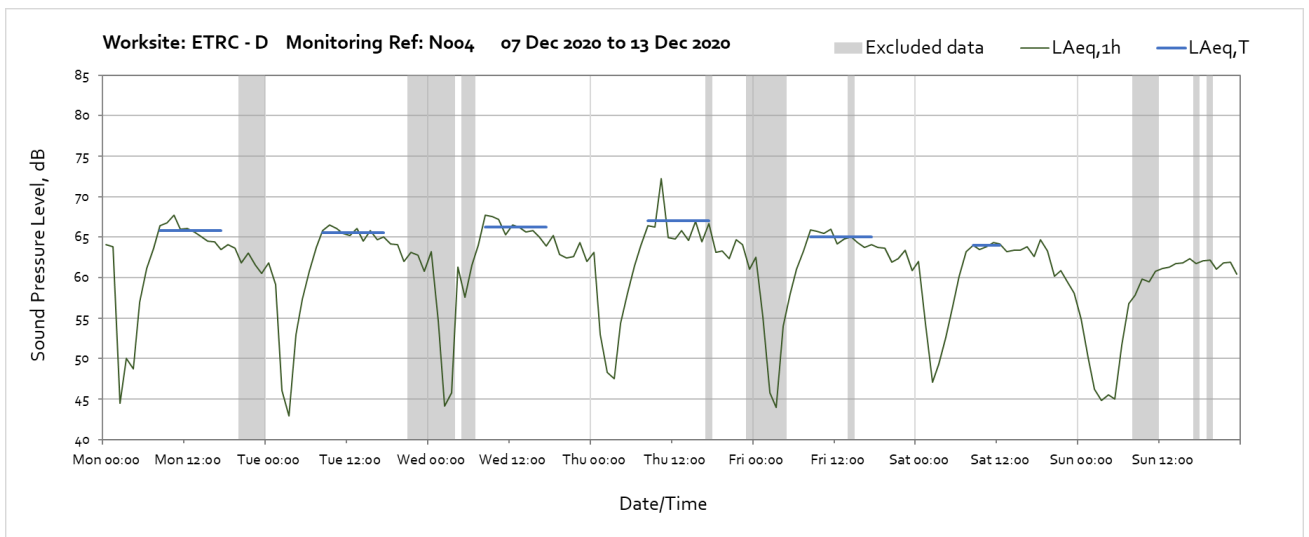
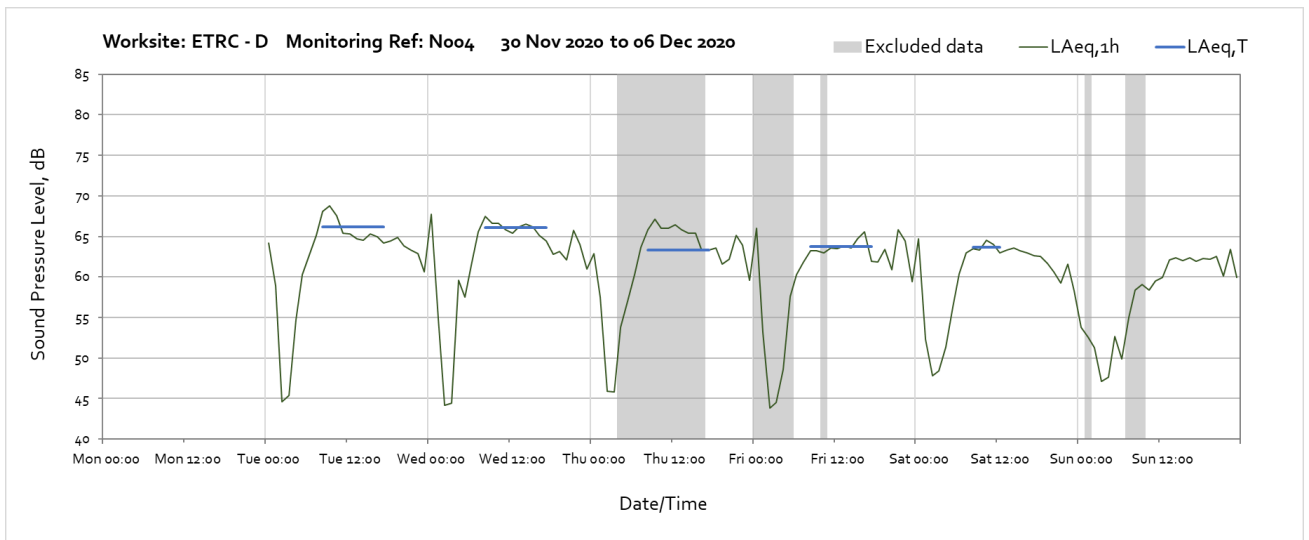
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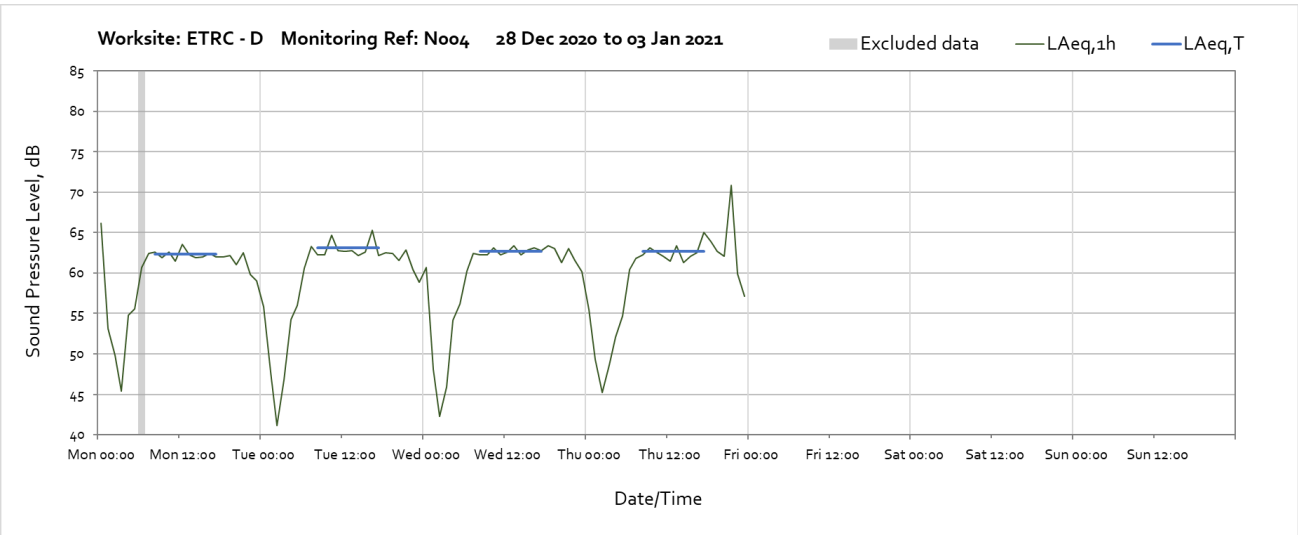
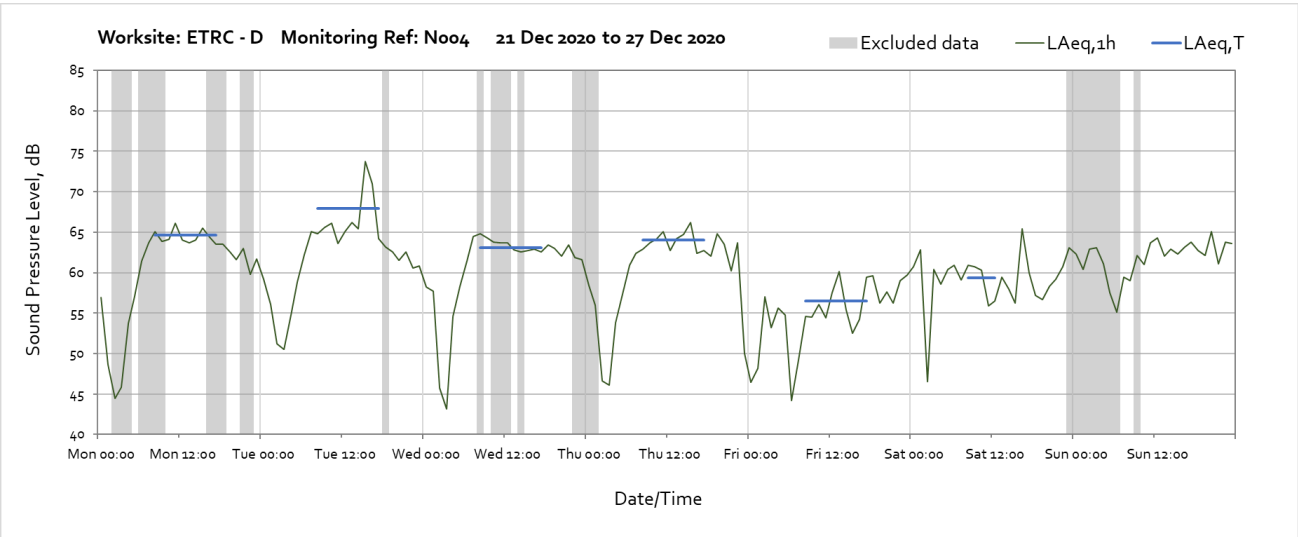
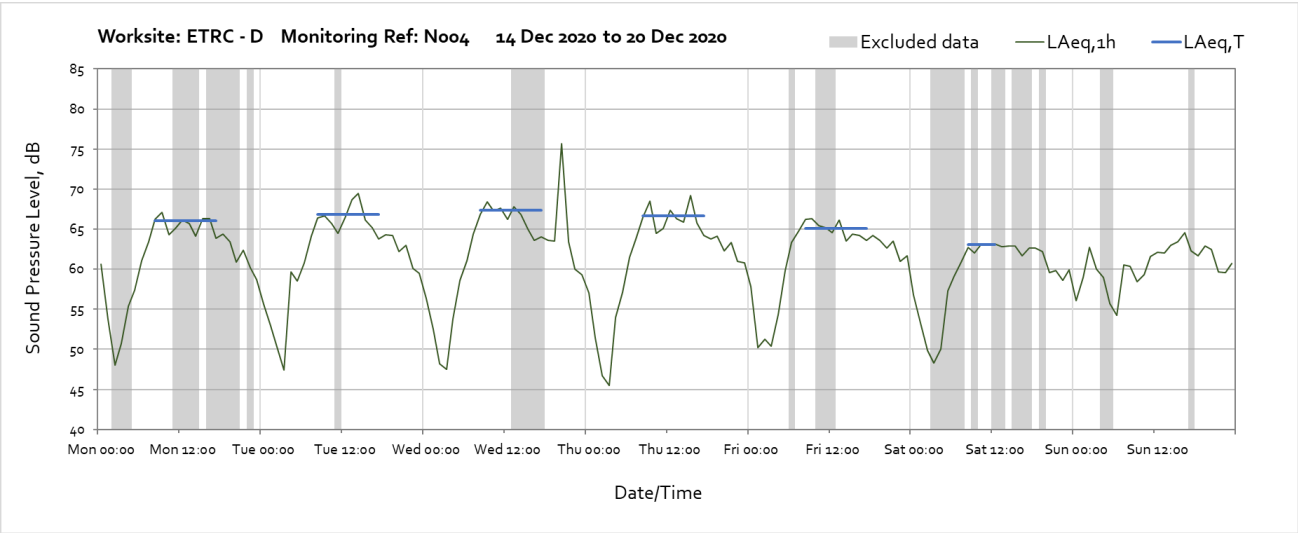




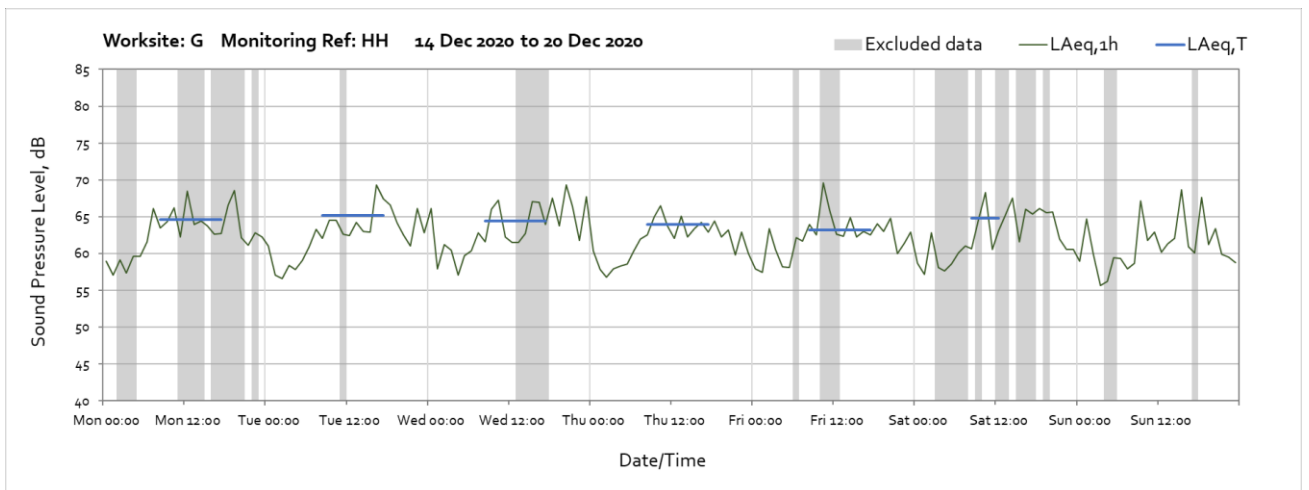
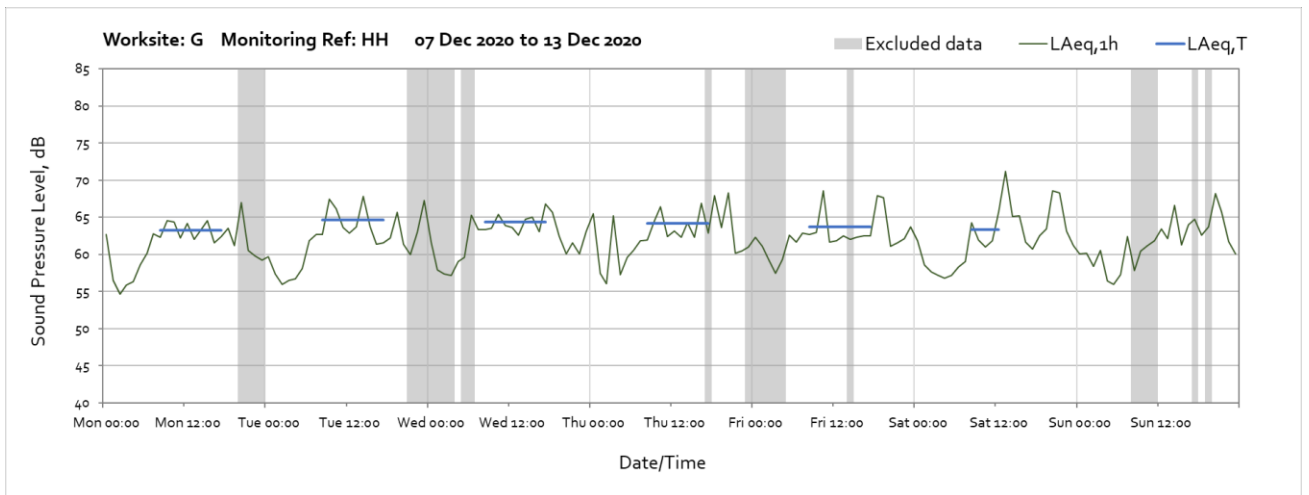
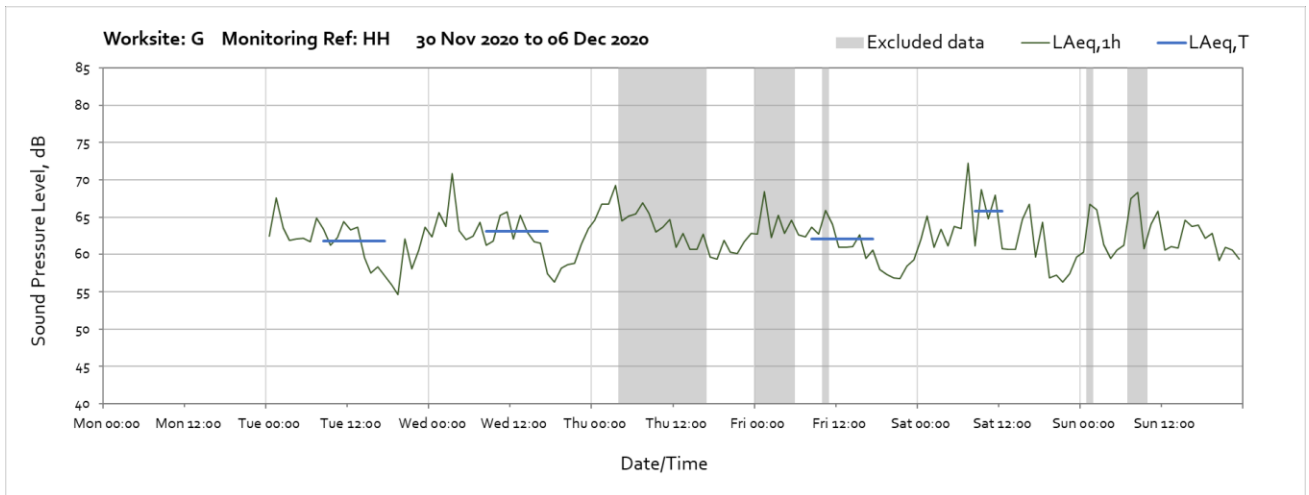


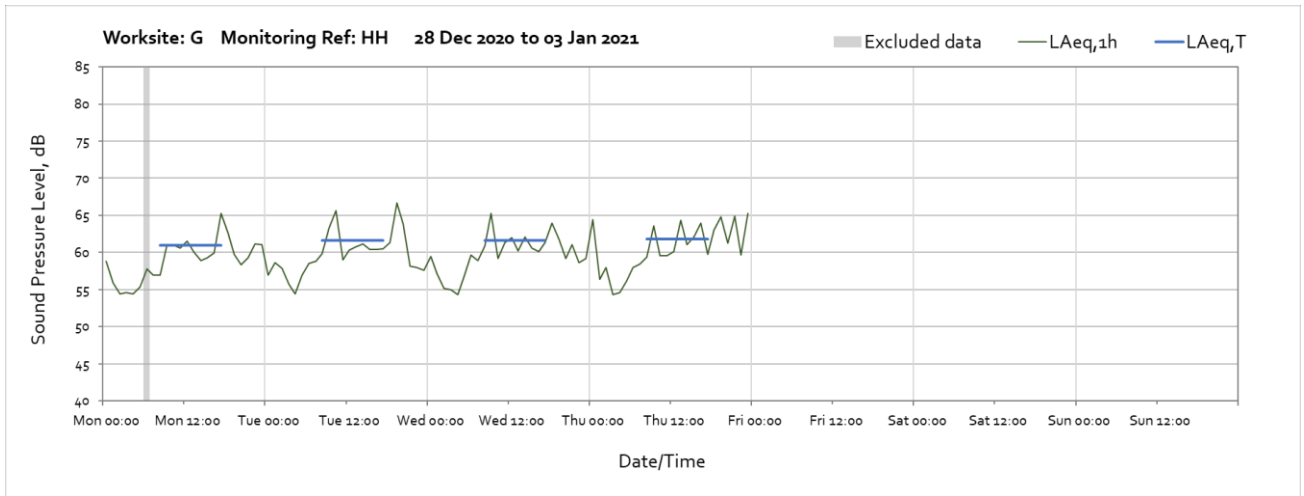
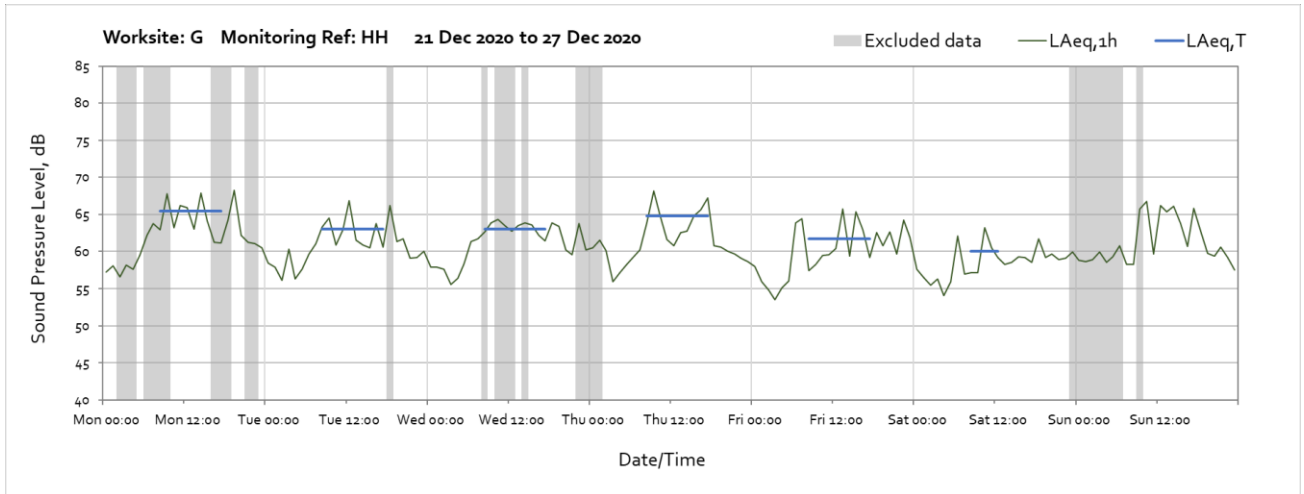
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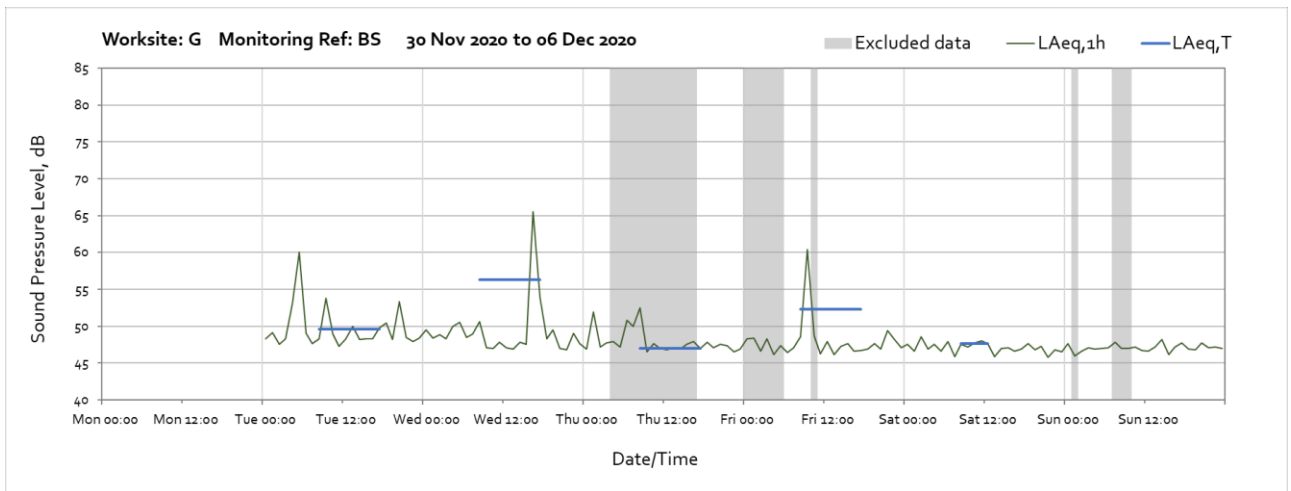


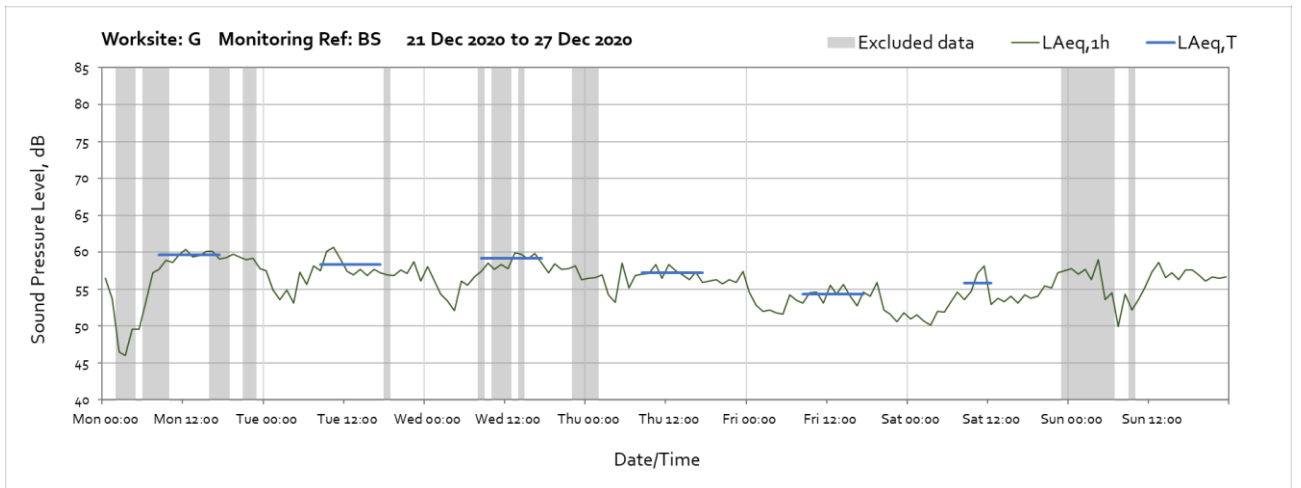
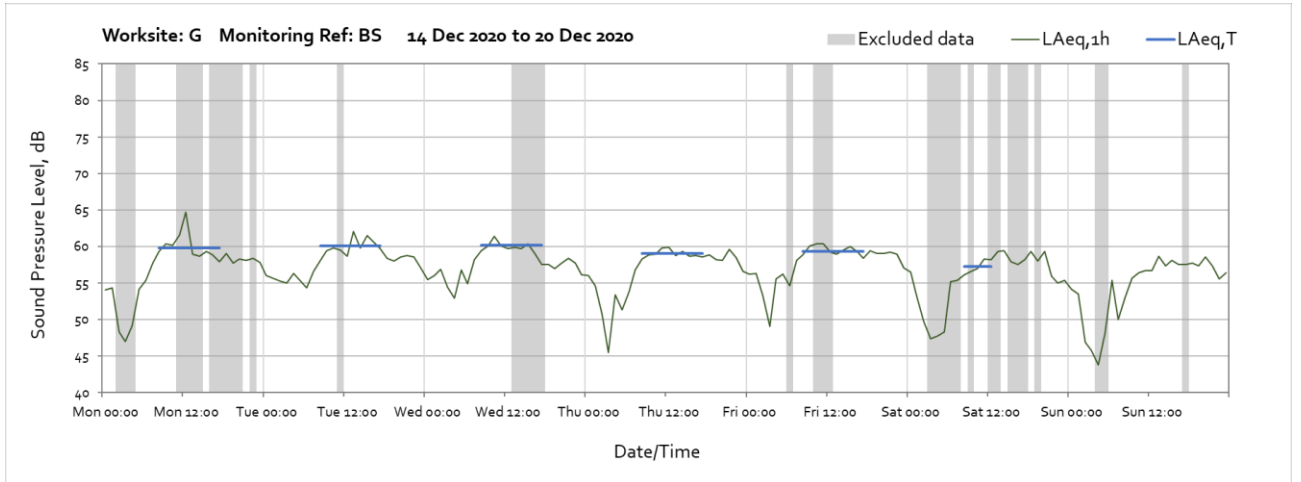
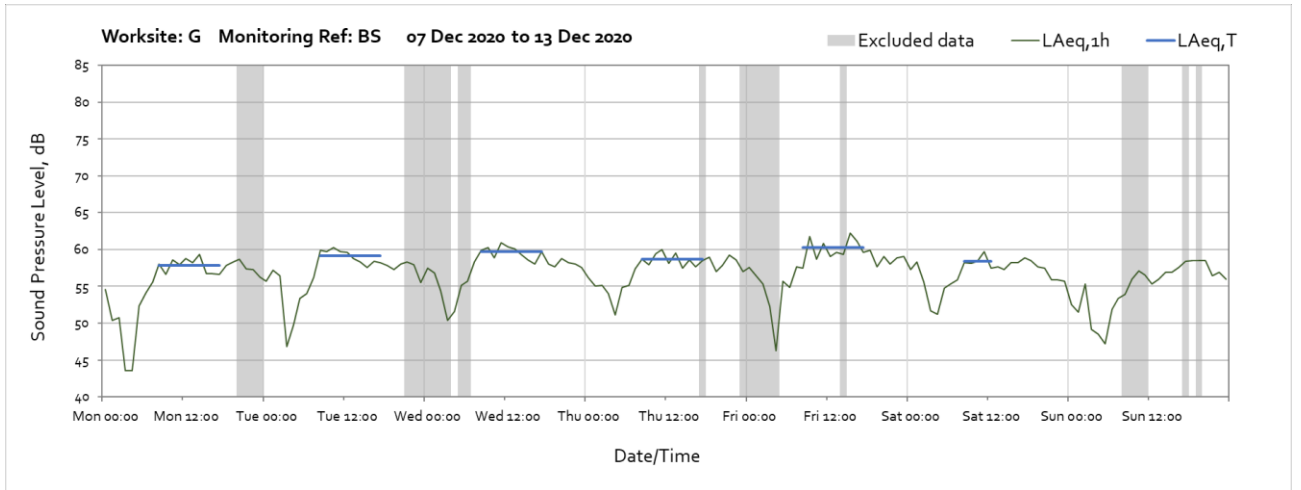
Worksite: G – Monitoring Ref: HH

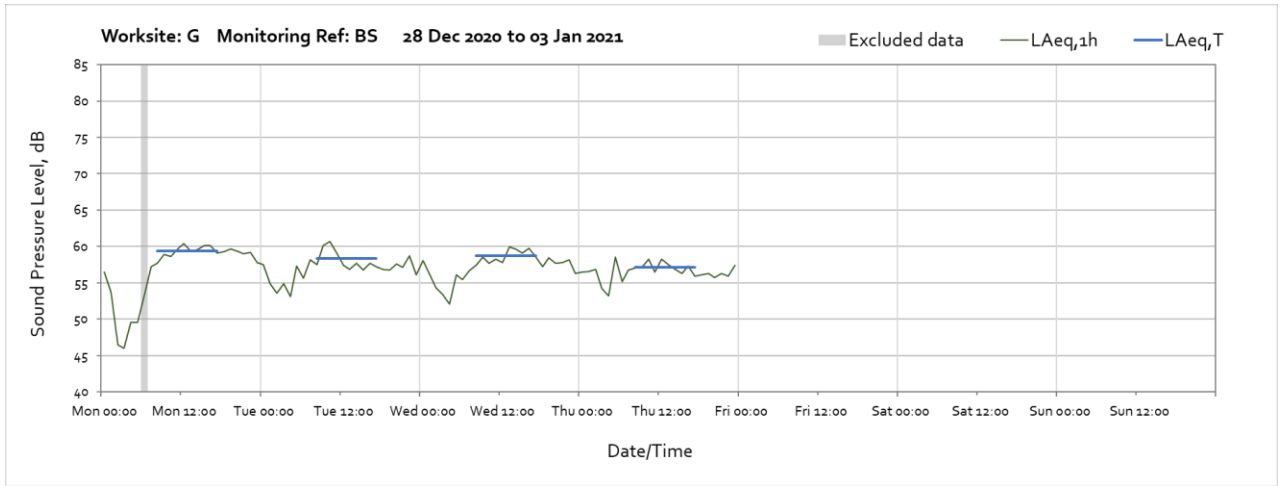




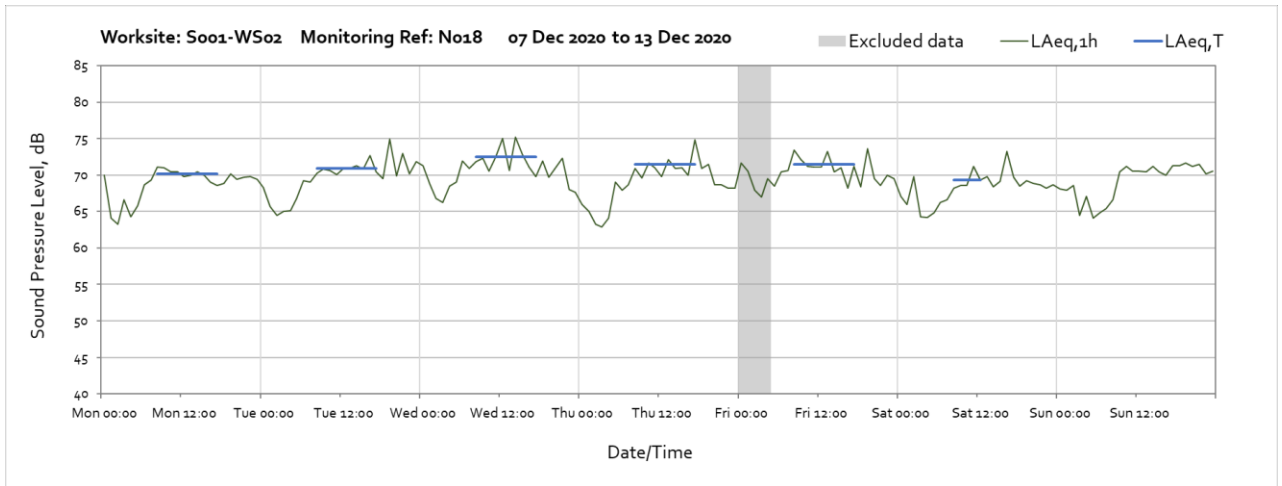
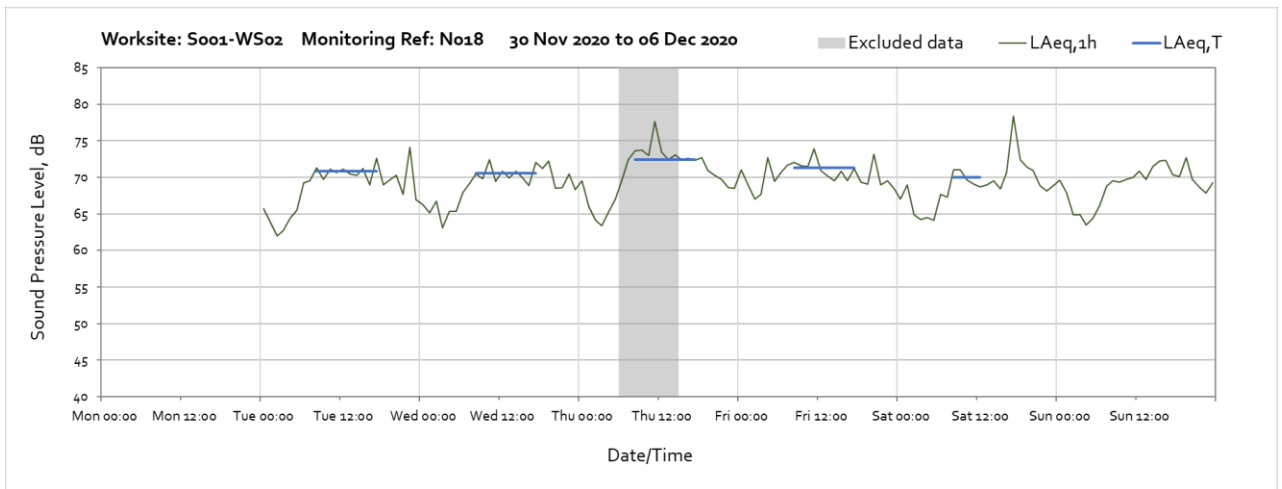
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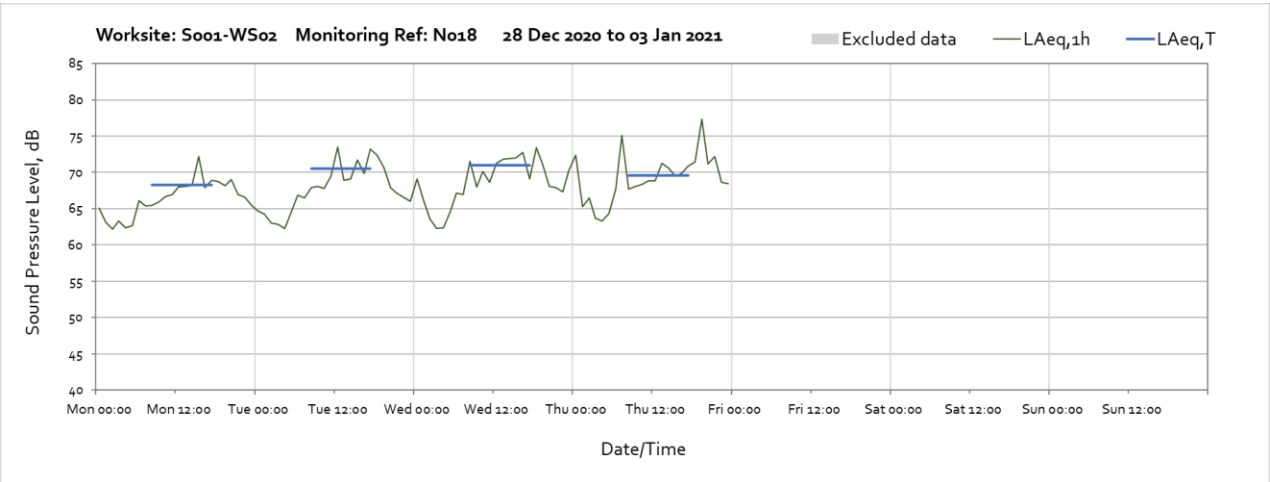
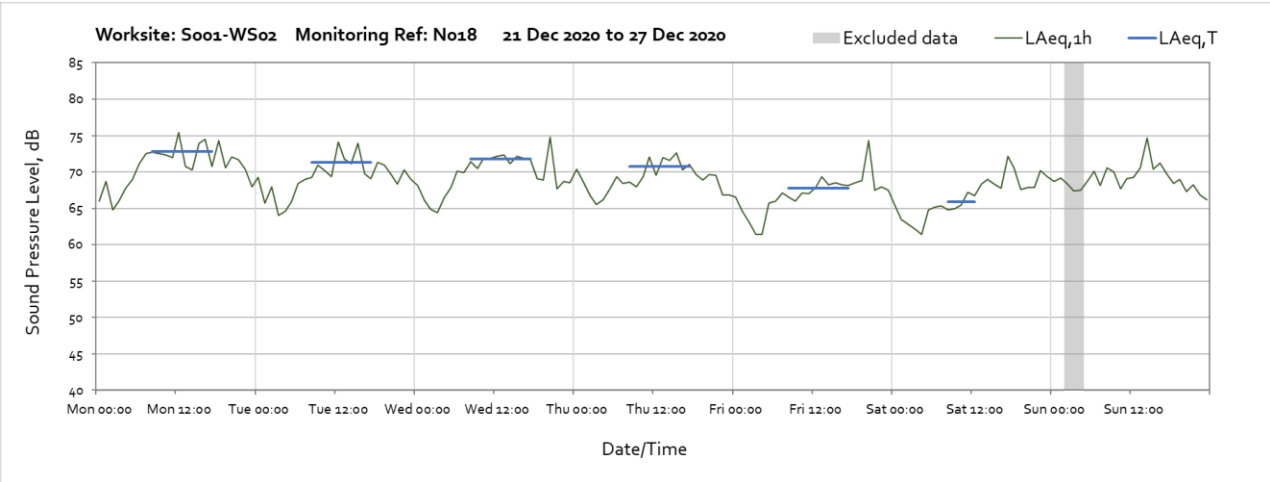
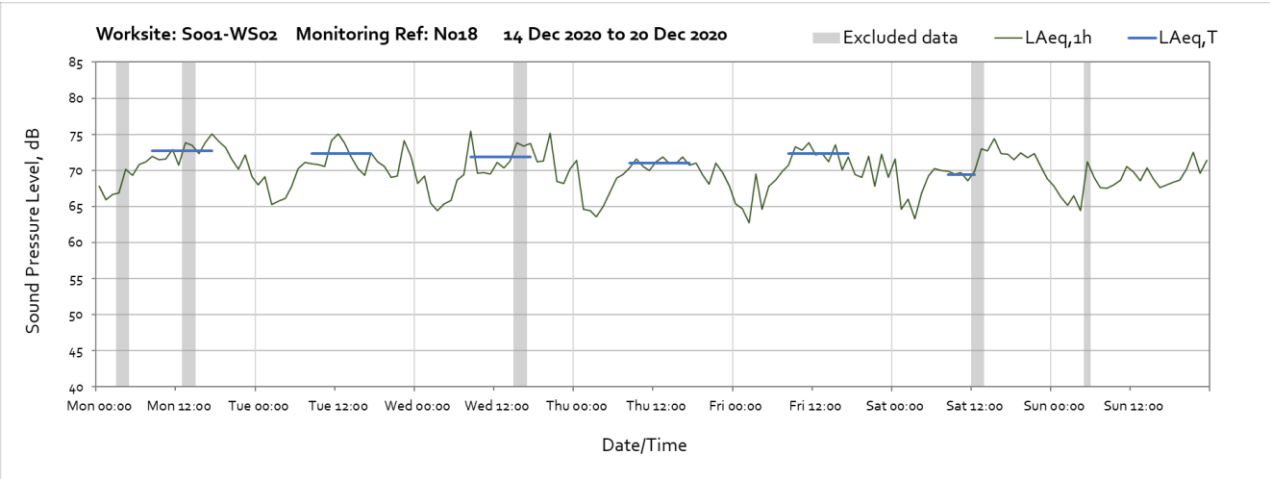




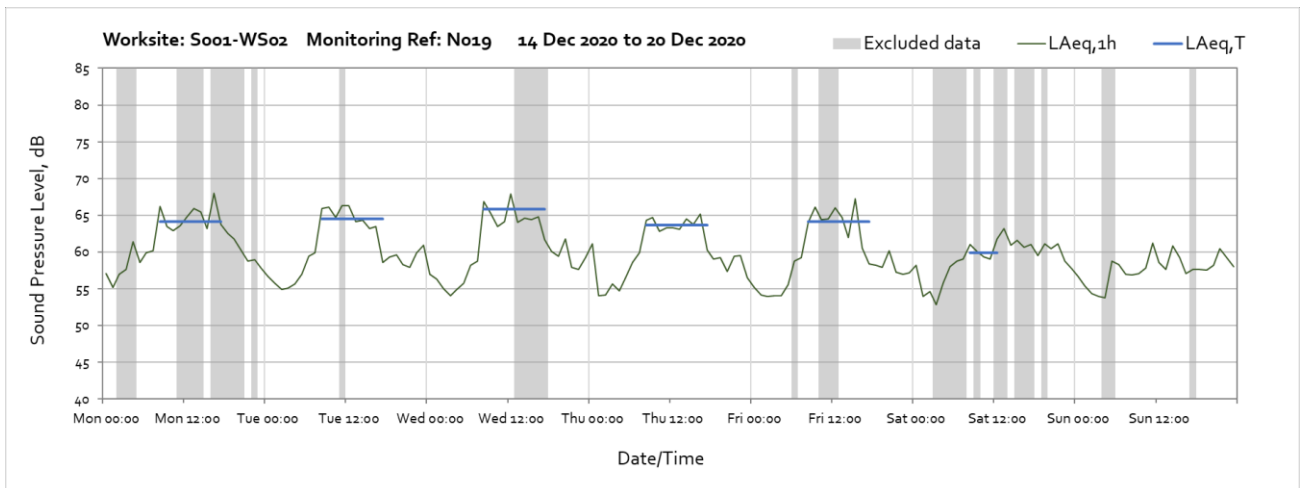
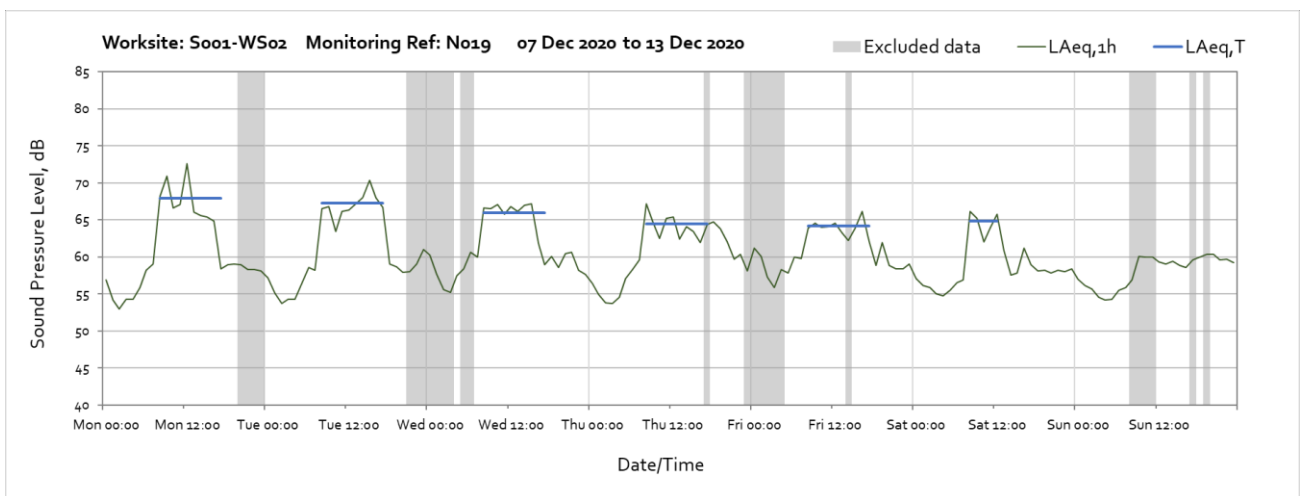
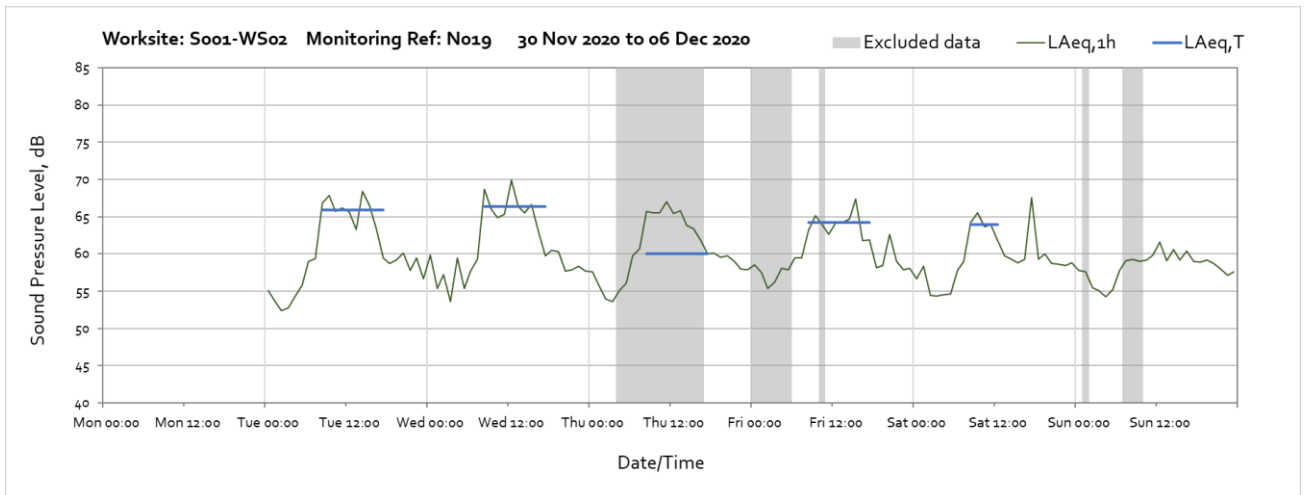


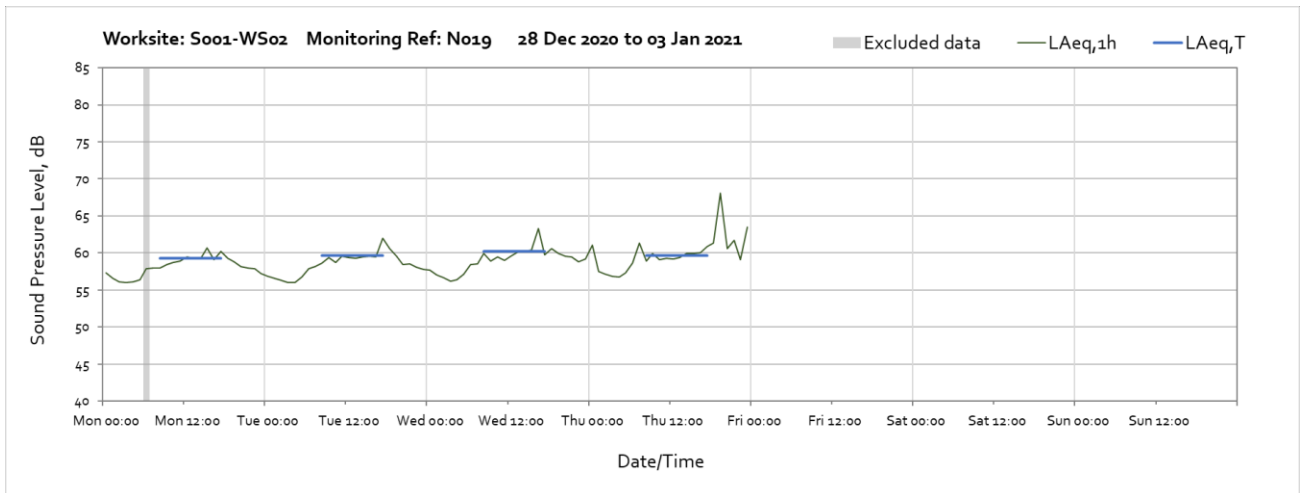
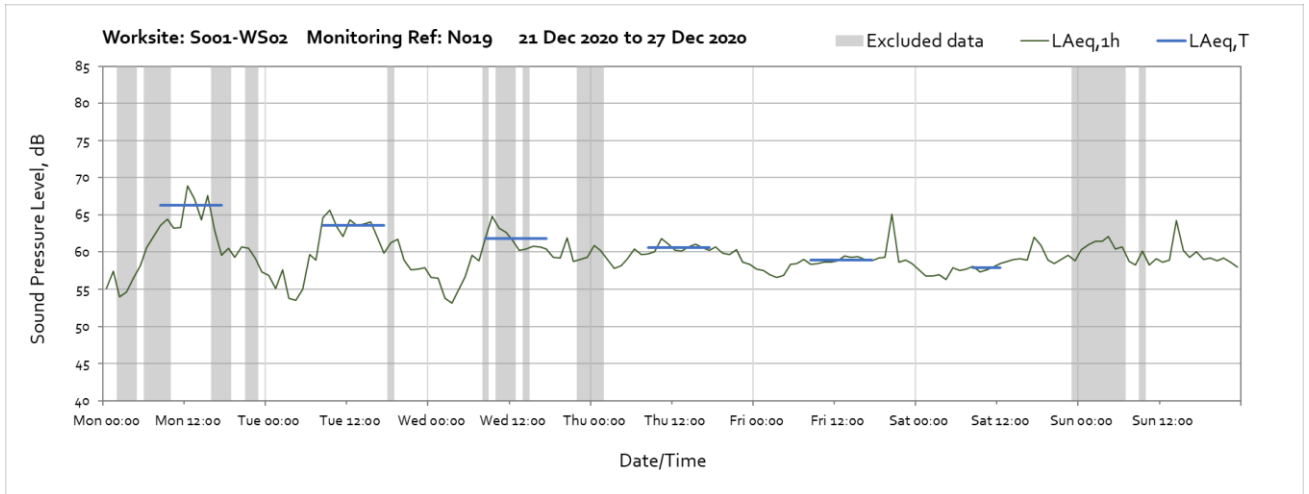
Worksite: S001-WS02 – Monitoring Ref: N018



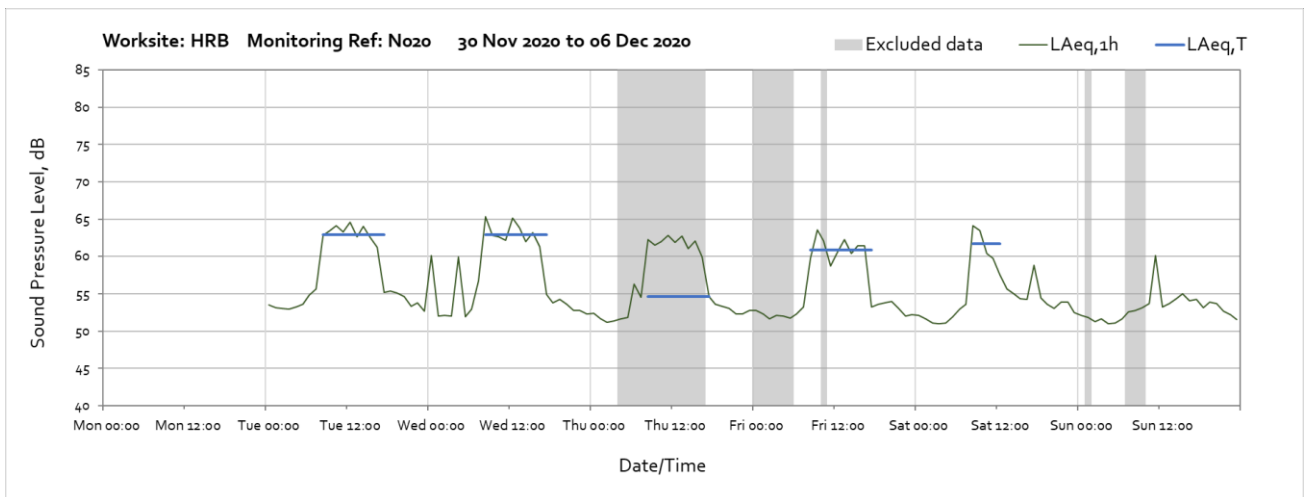


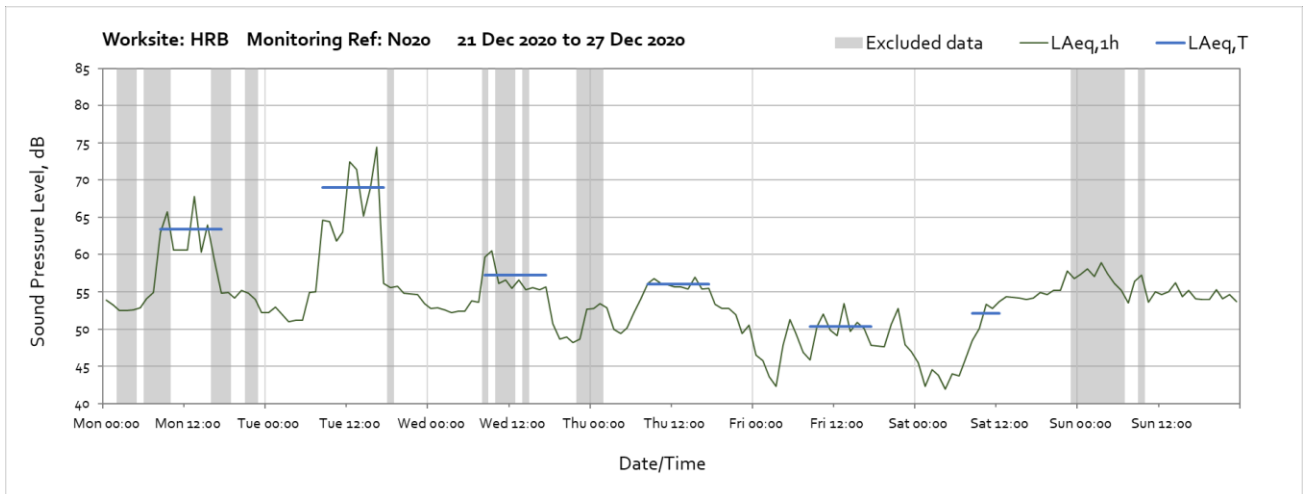
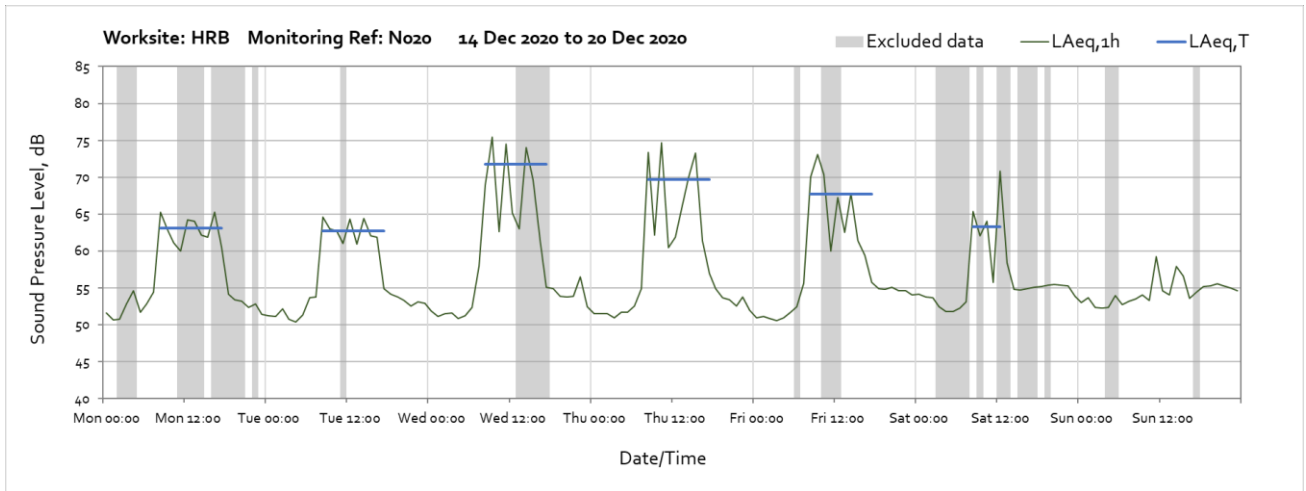
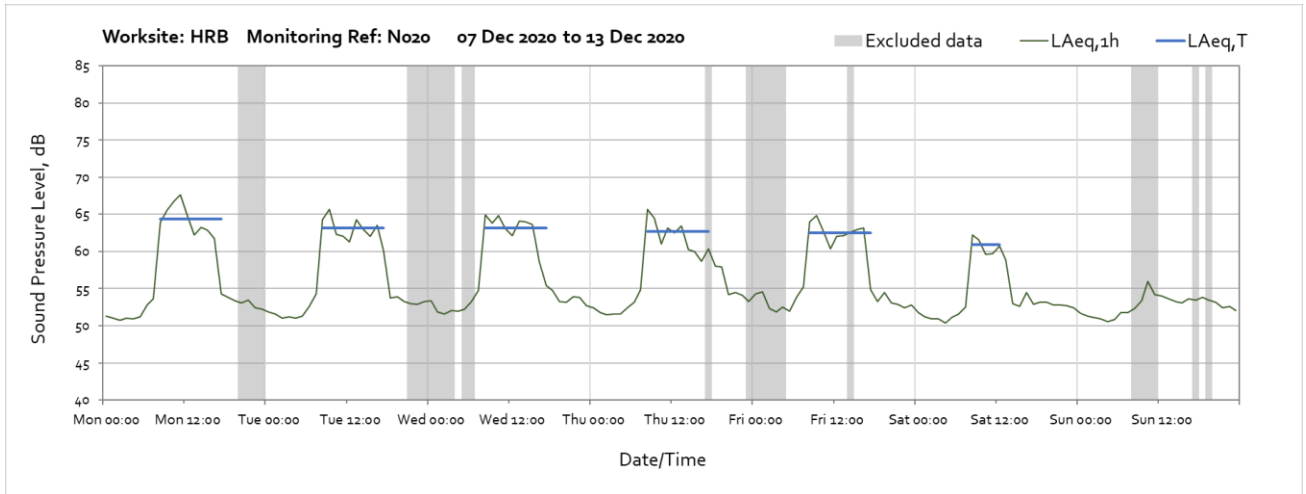
Worksite: S001-WS02 – Monitoring Ref: N019

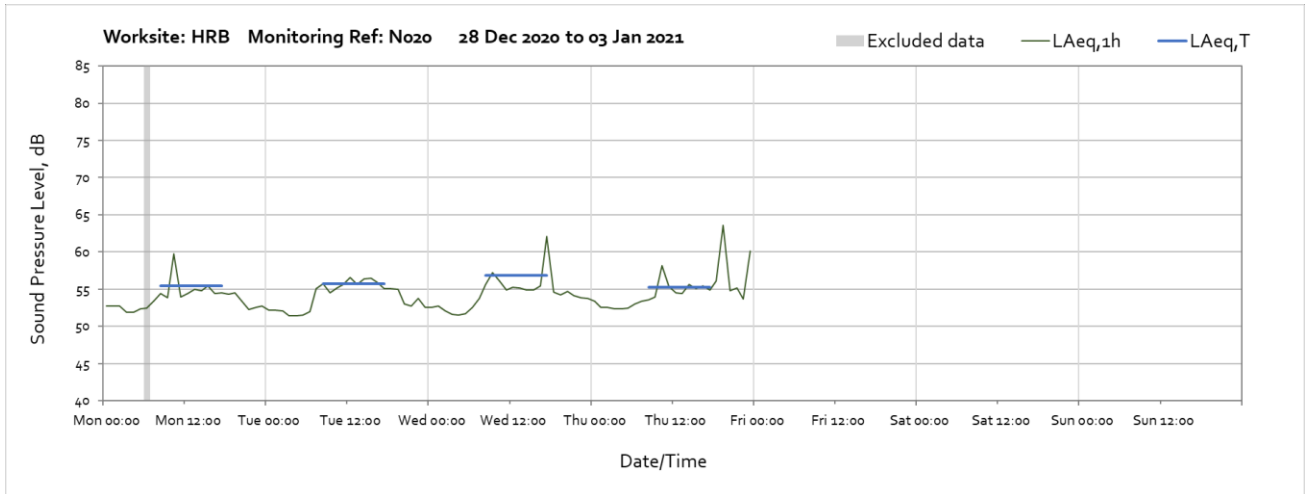




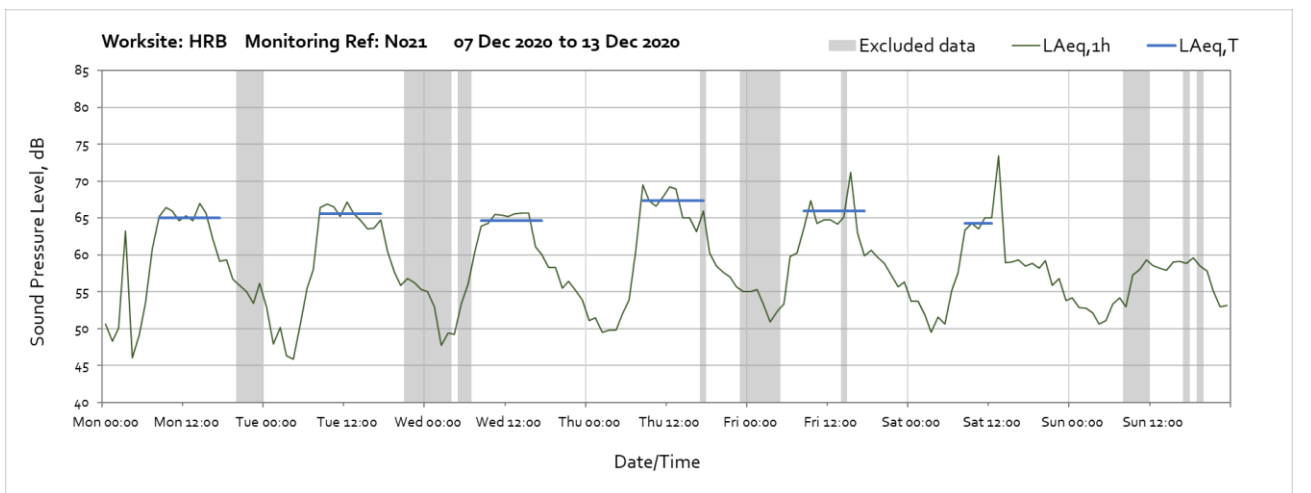
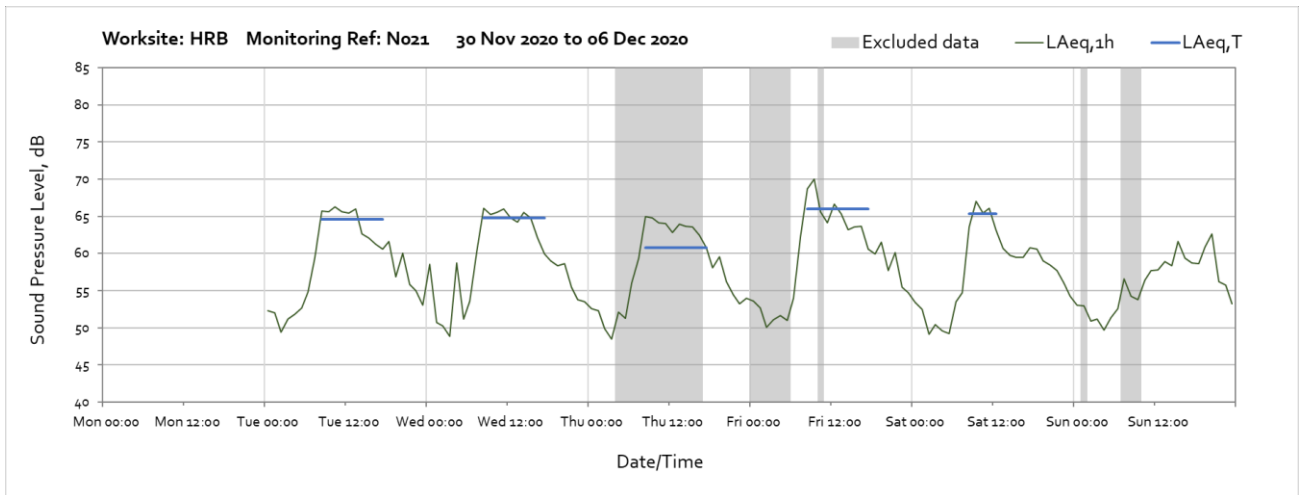
Worksite: HRB – Monitoring Ref: N020

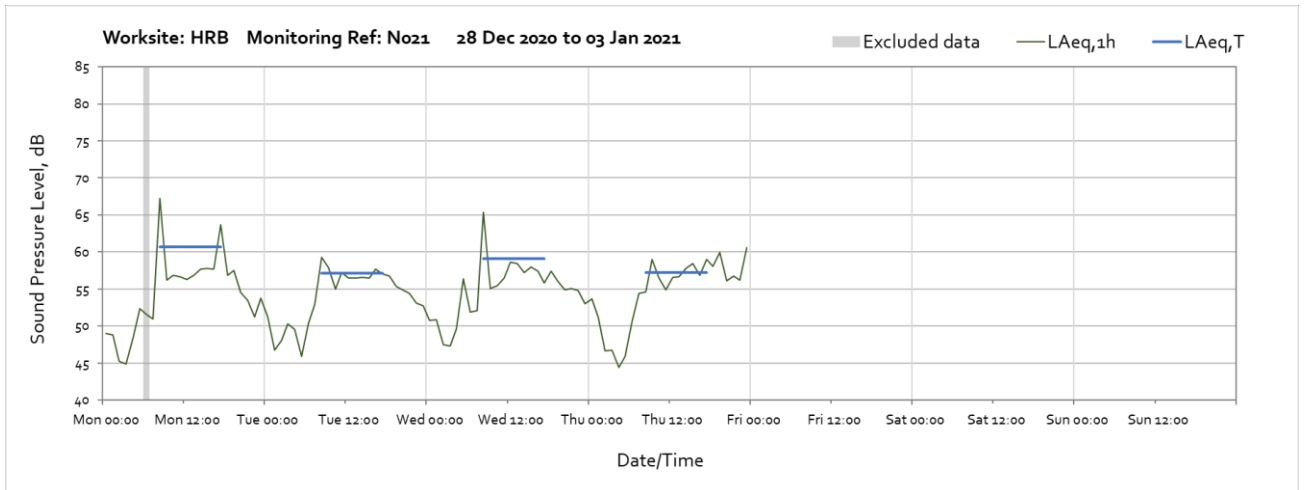
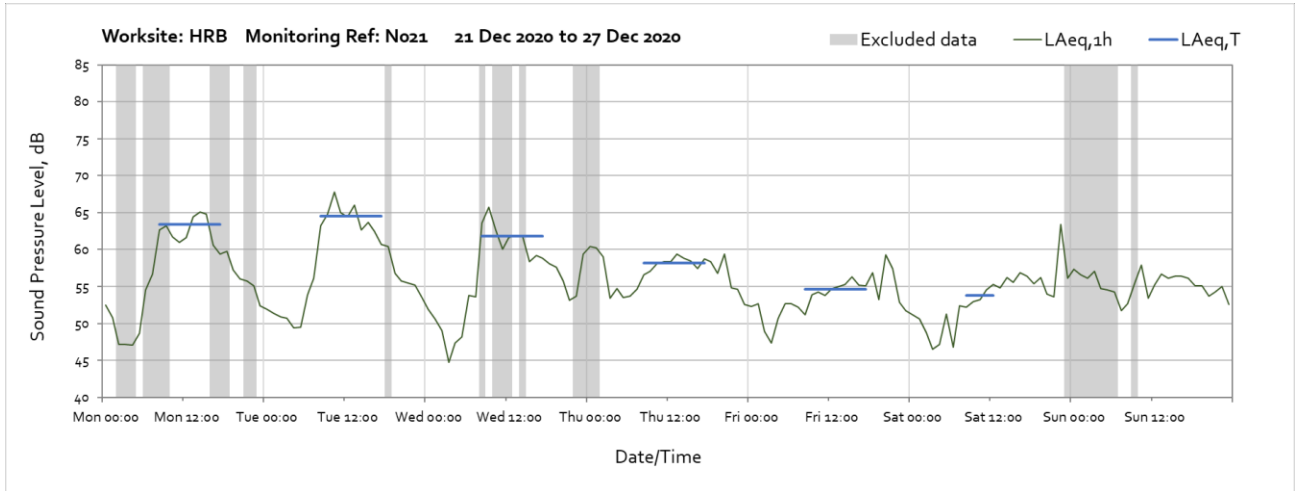
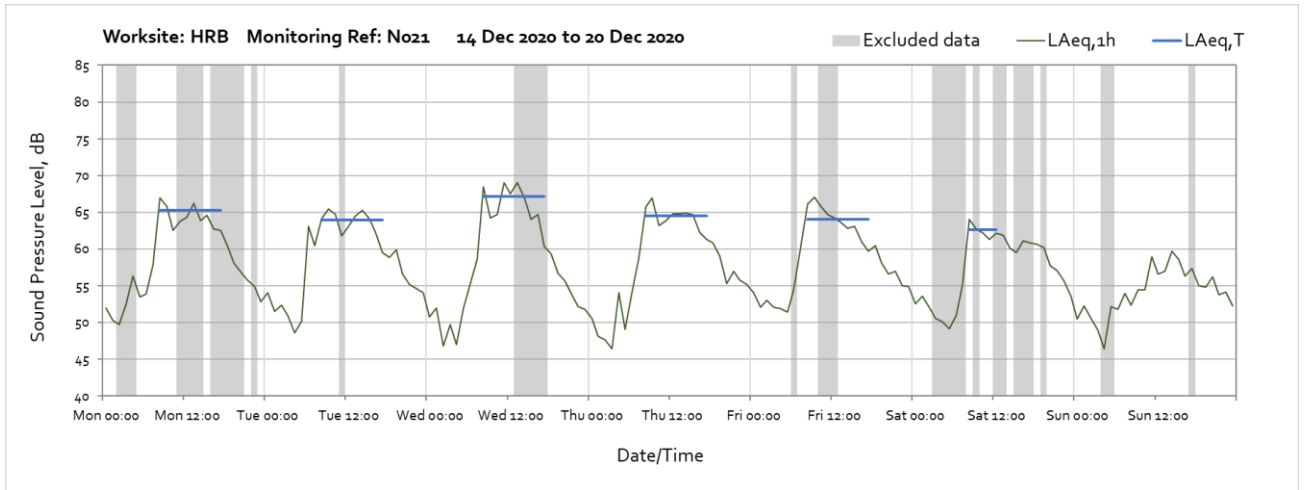




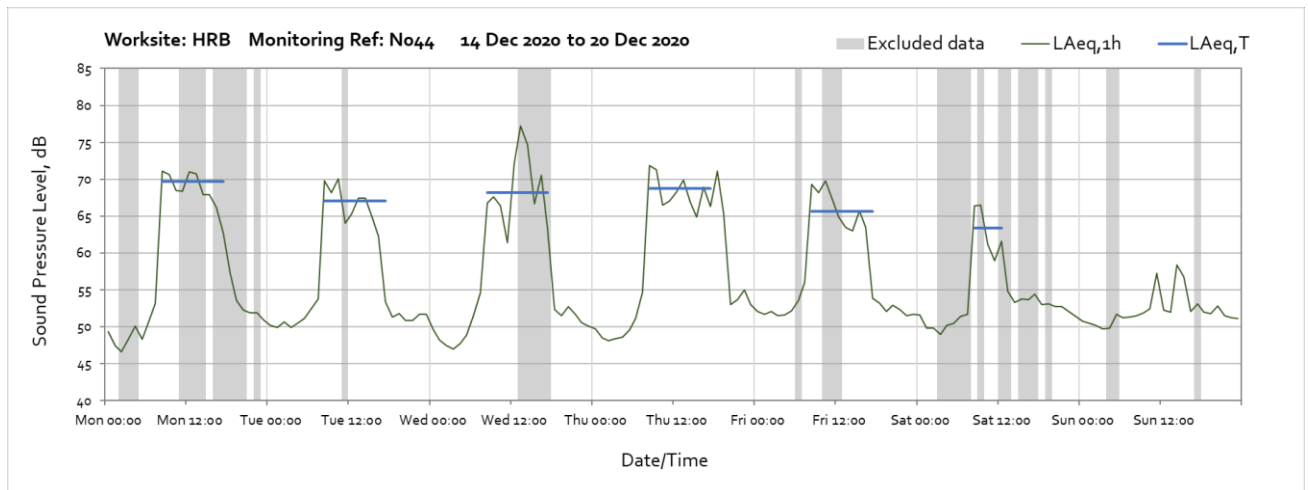
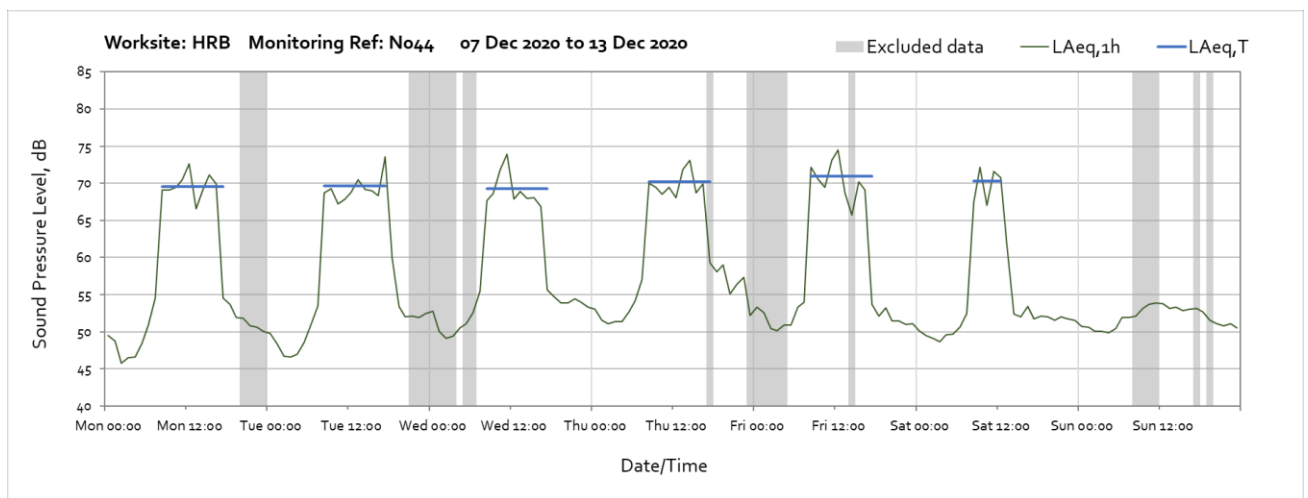
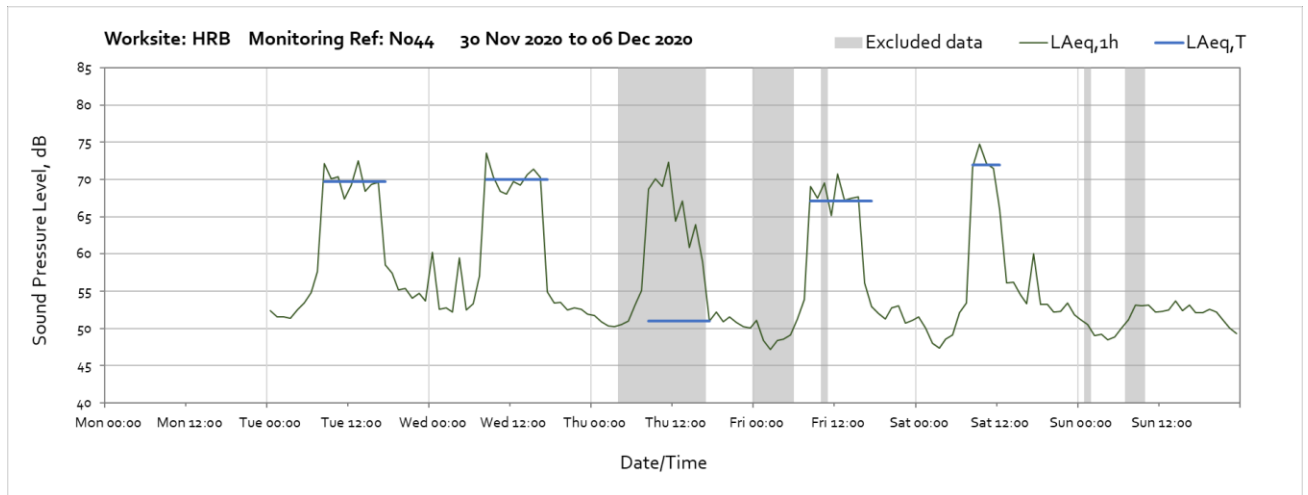


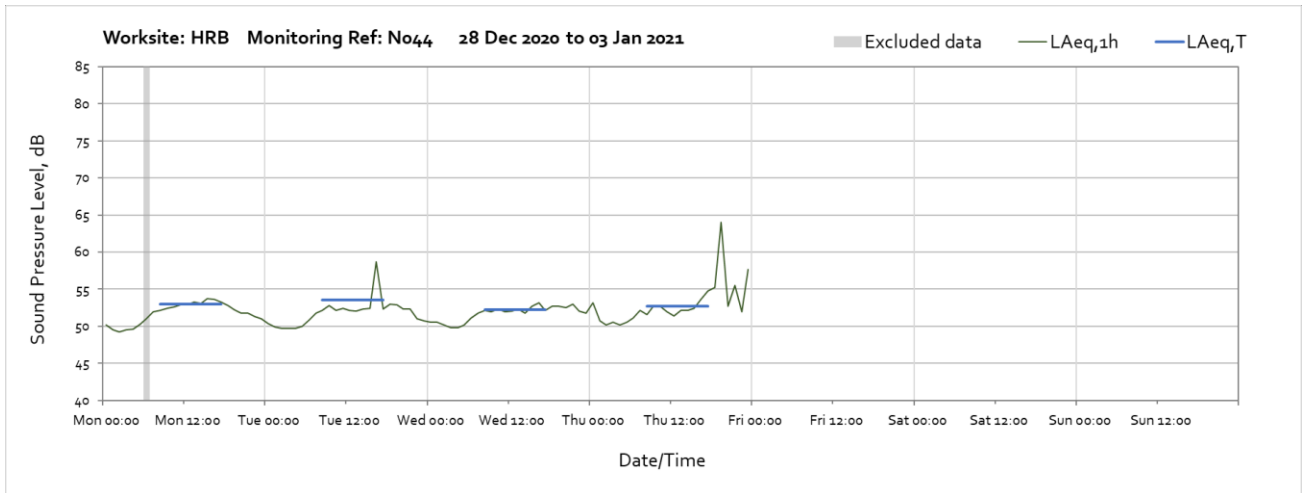
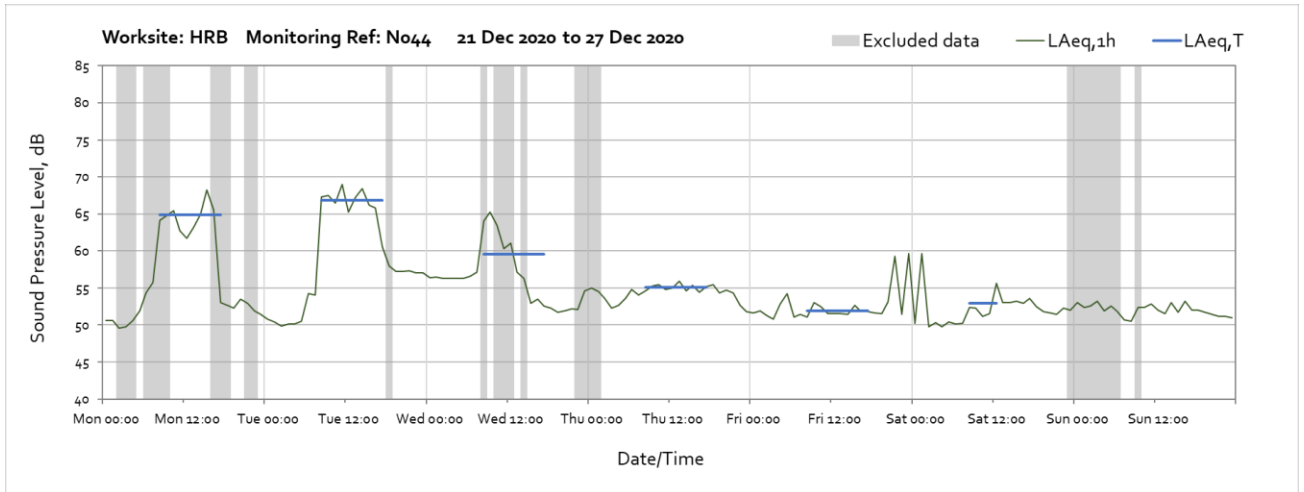
Worksite: HRB – Monitoring Ref: N021



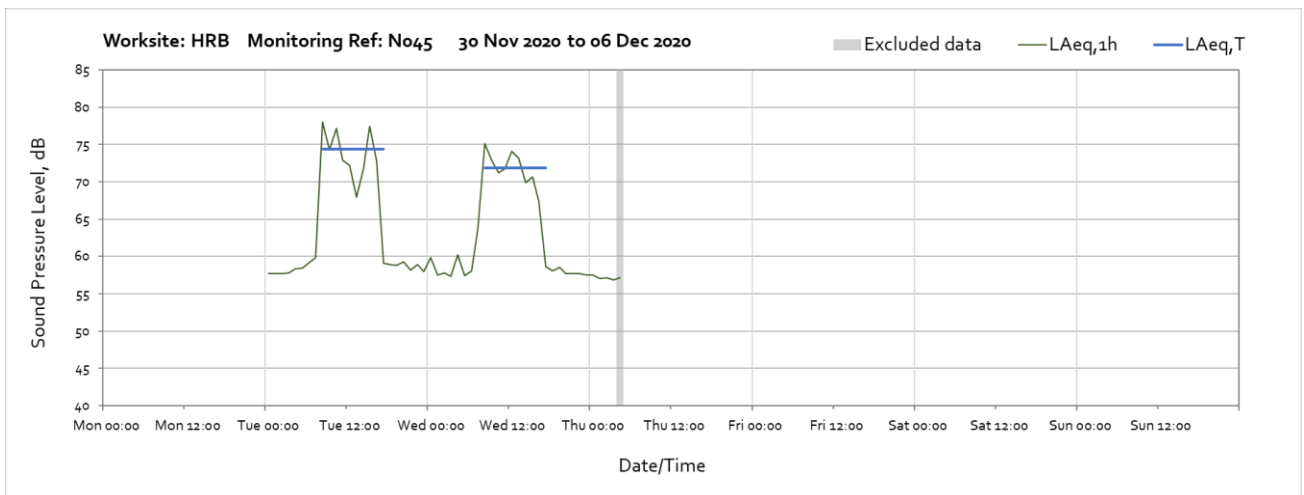


Worksite: HRB – Monitoring Ref: N044



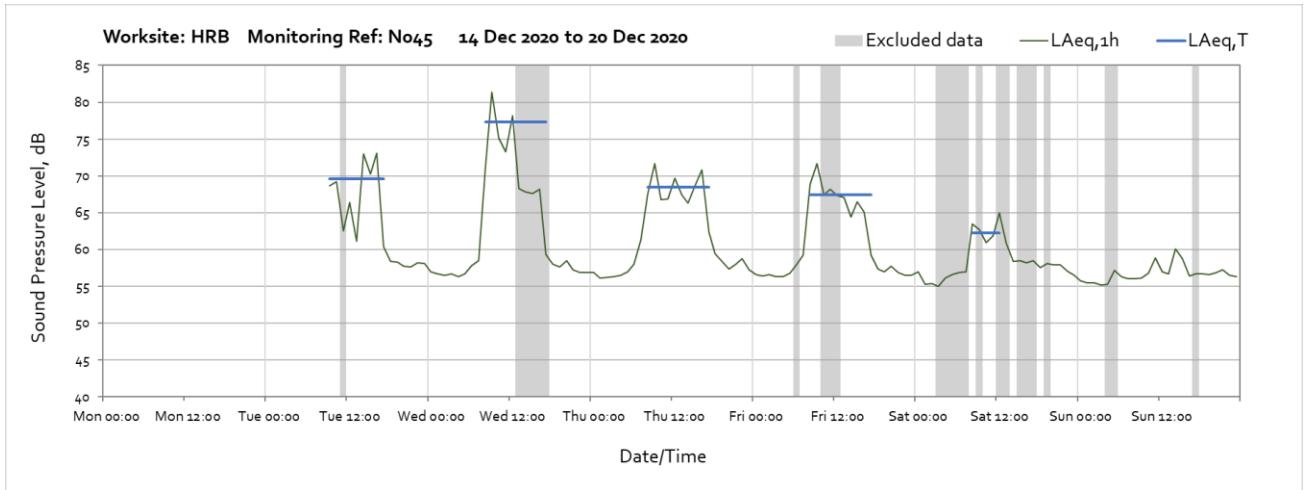


Worksite: HRB – Monitoring Ref: N045

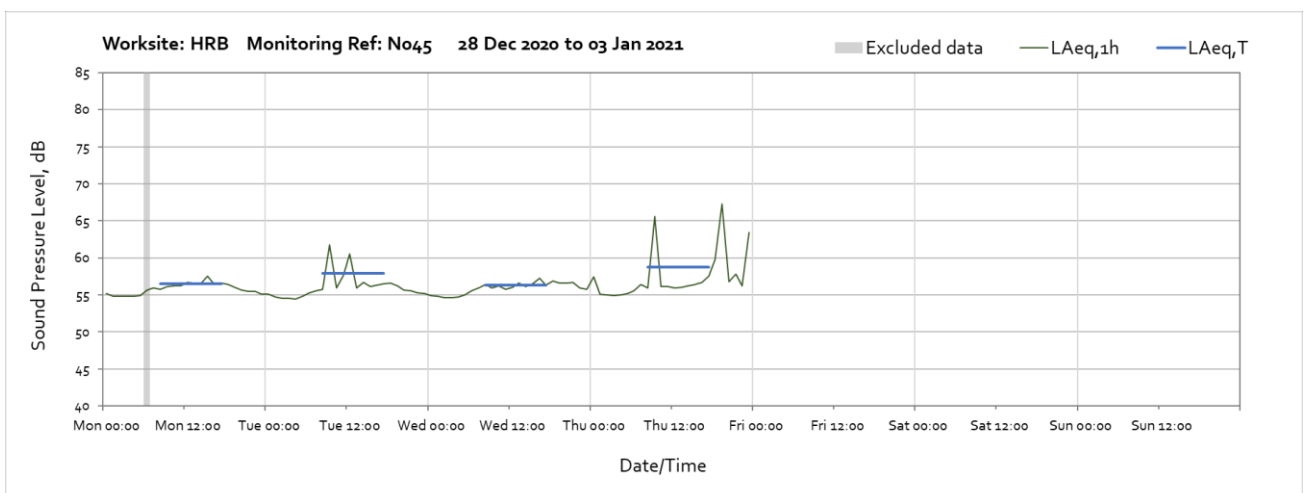
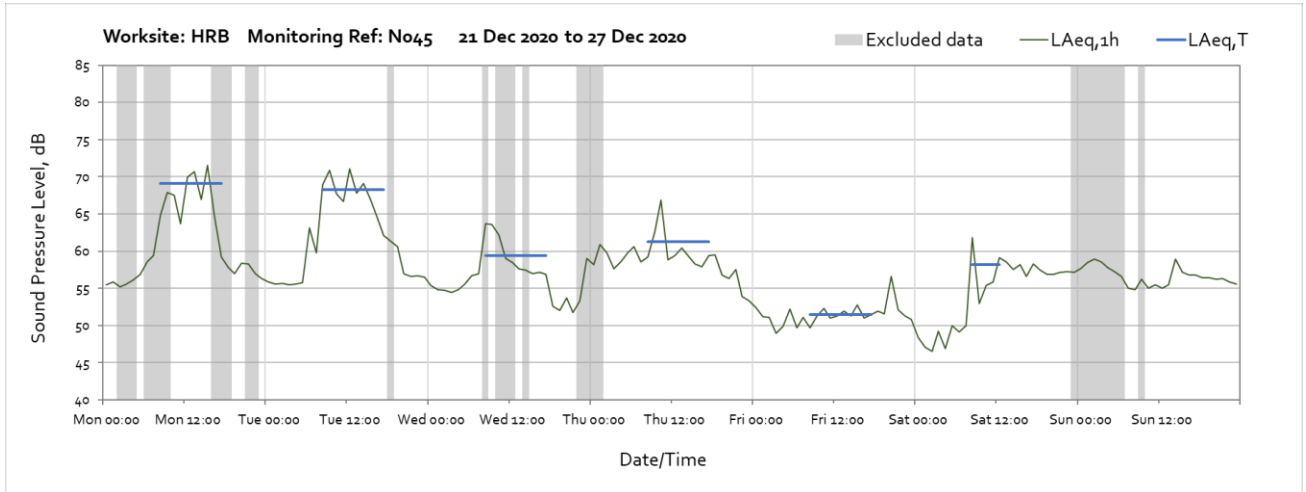


Note: Missing data from 05:00 on Thursday 3rd December until 09:00 on Tuesday 15th December was due to loss of power to the monitor caused by the monitor being unplugged from the power supply. Environmental advisors have informed site teams to keep power connected. Alerts have been set up informing of power disconnect, which are sent to the Environmental Advisors who will take action and notify site teams to investigate loss of power.

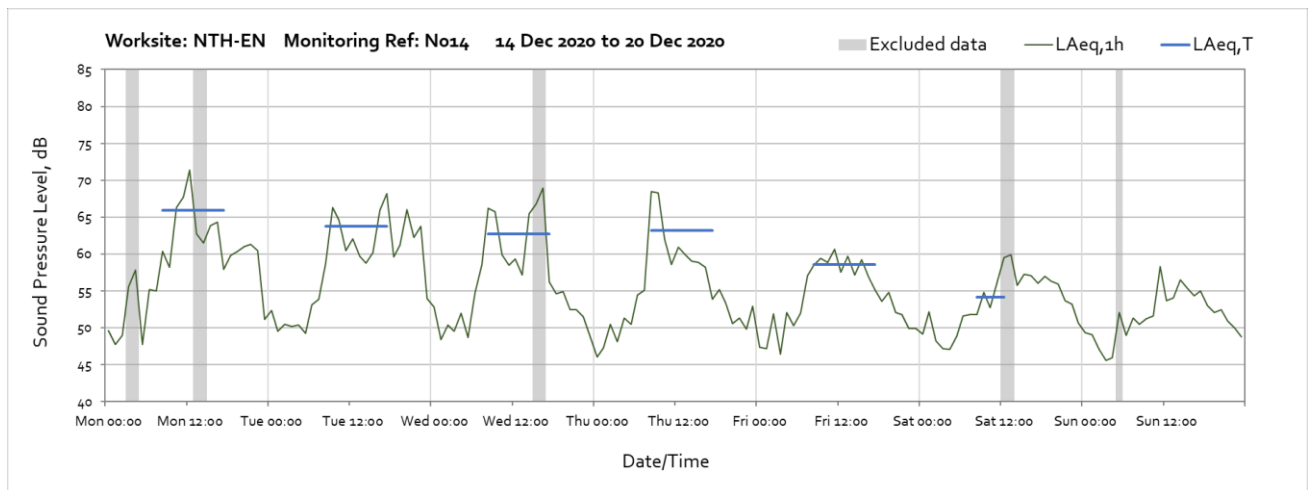
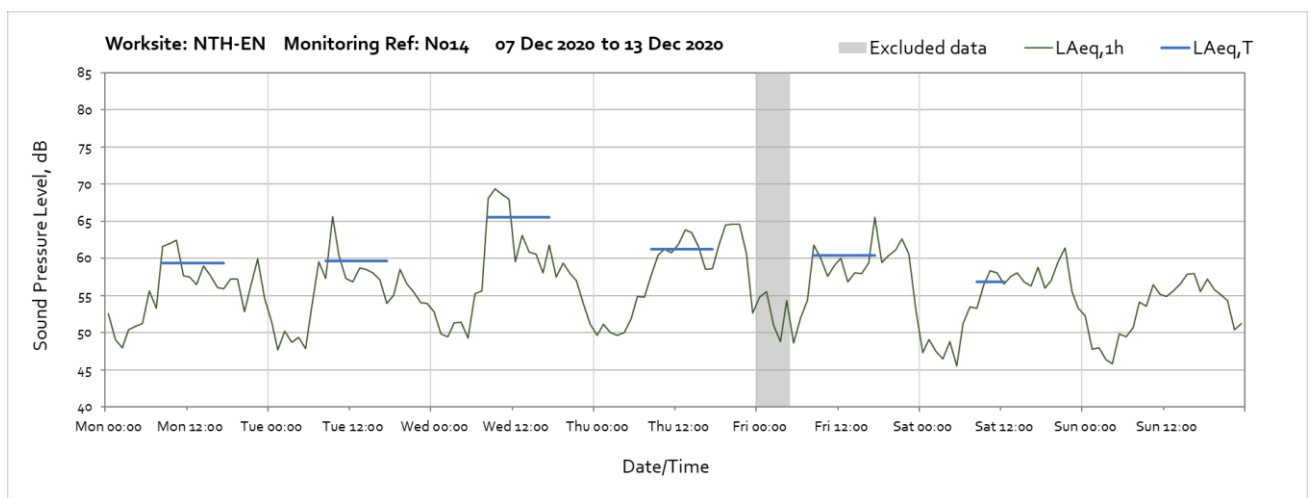
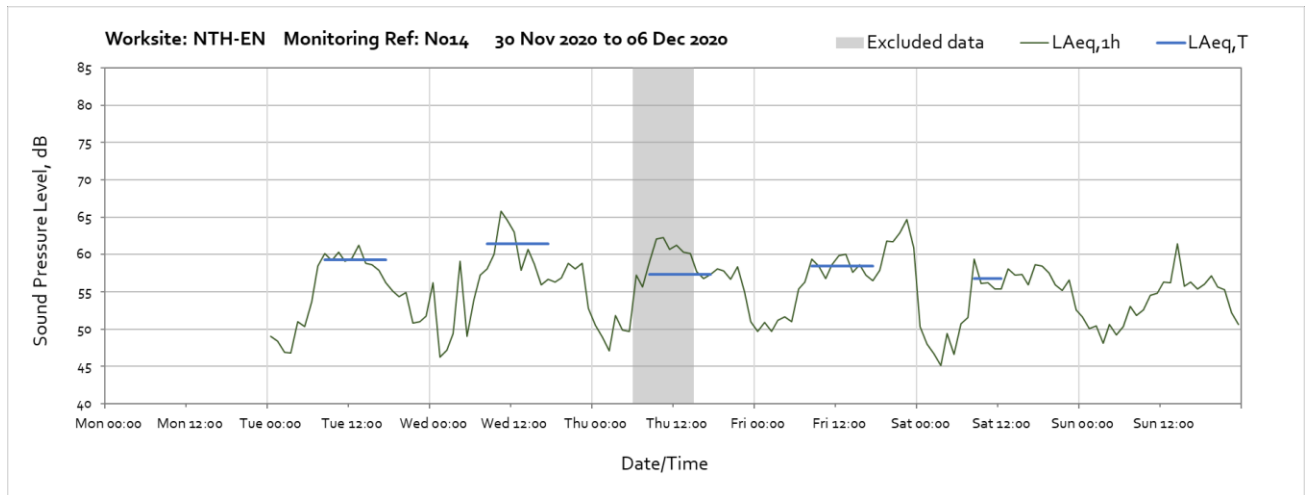
OFFICIAL

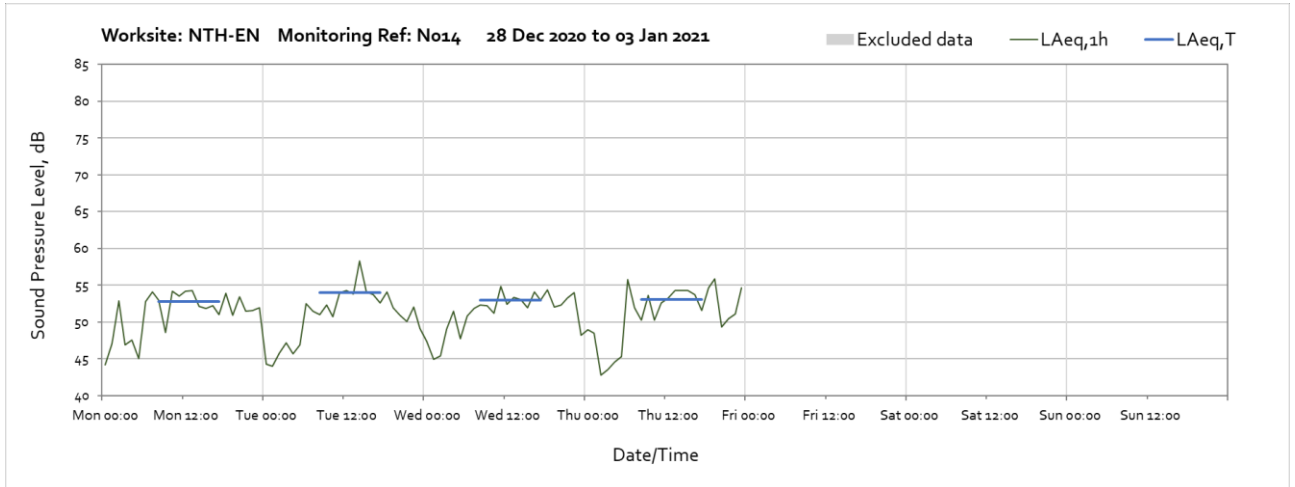
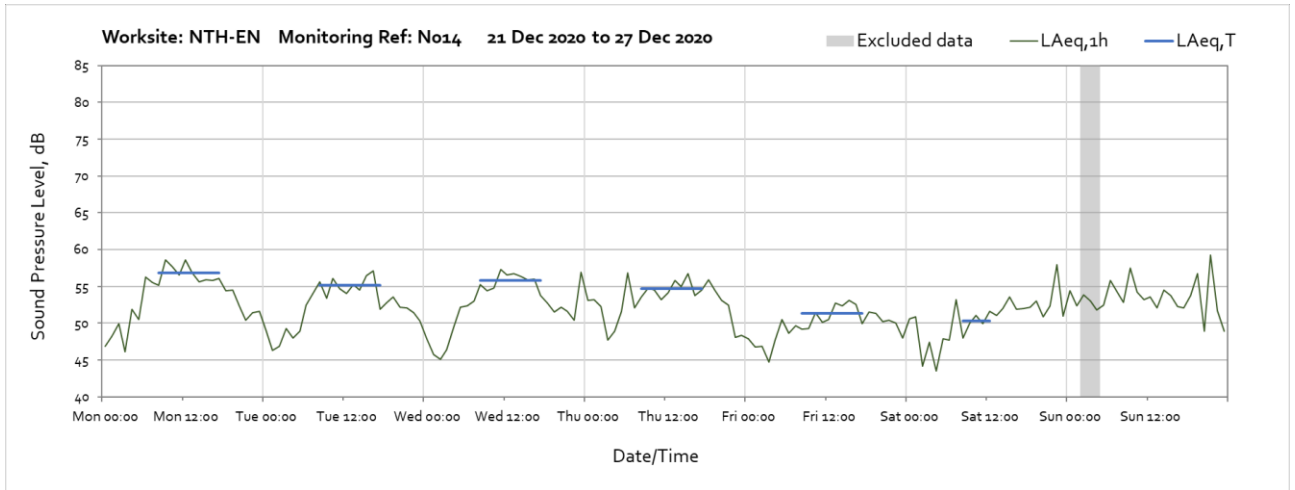


Note: Missing data from 05:00 on Thursday 3rd December until 09:00 on Tuesday 15th December was due to loss of power to the monitor caused by the monitor being unplugged from the power supply. Environmental advisors have informed site teams to keep power connected. Alerts have been set up informing of power disconnect, which are sent to the Environmental Advisors who will take action and notify site teams to investigate loss of power.

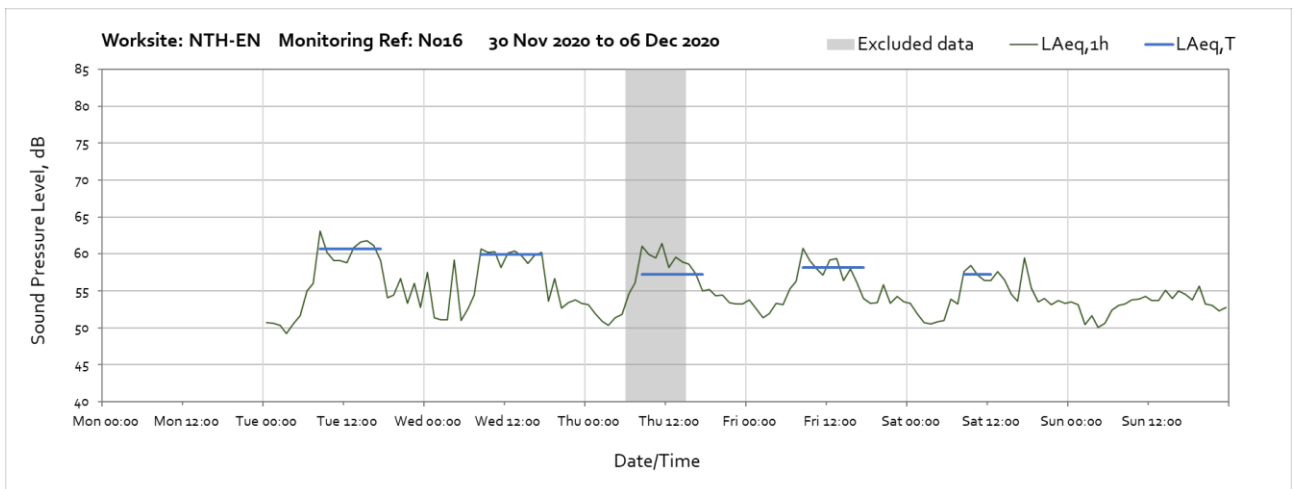


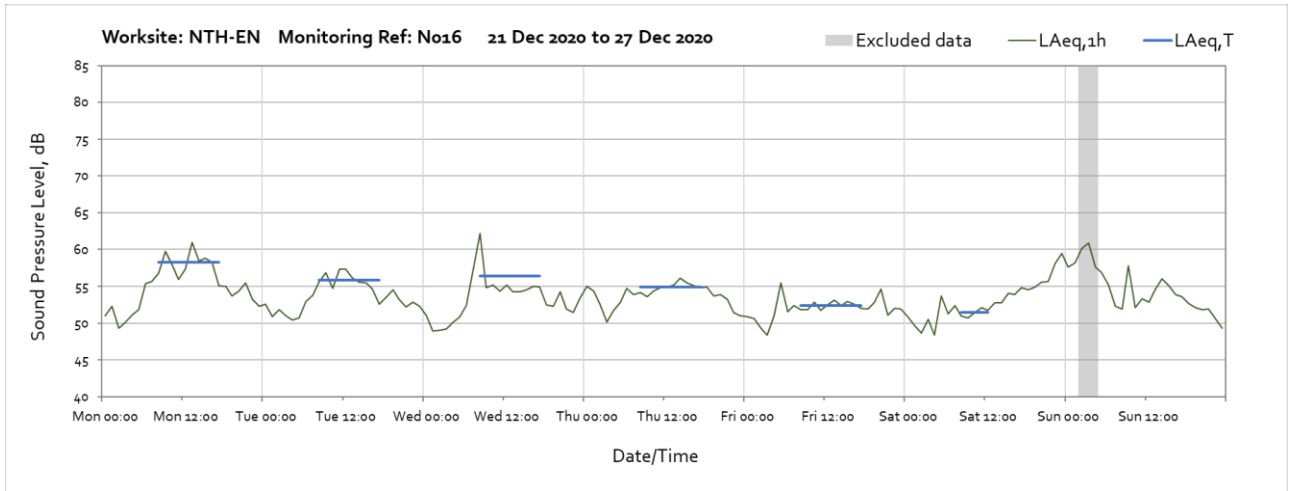
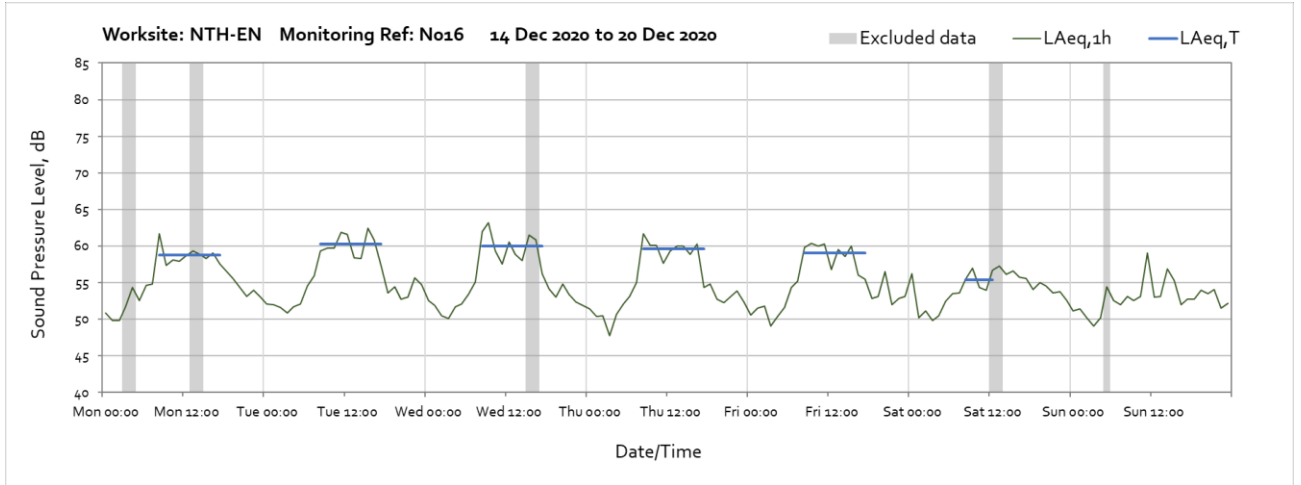
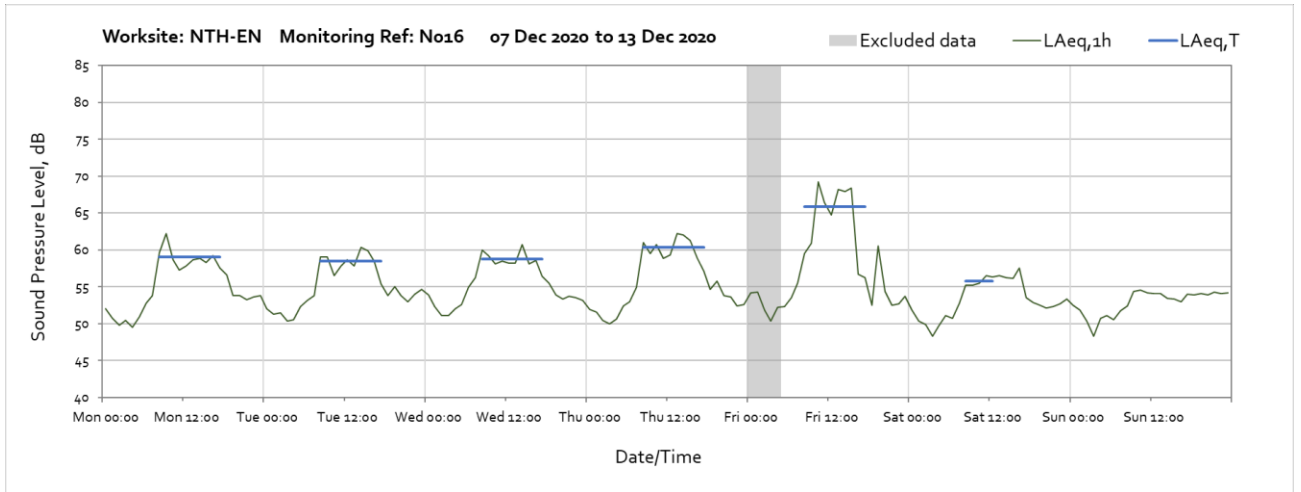
Worksite: NTH-EN – Monitoring Ref: N014

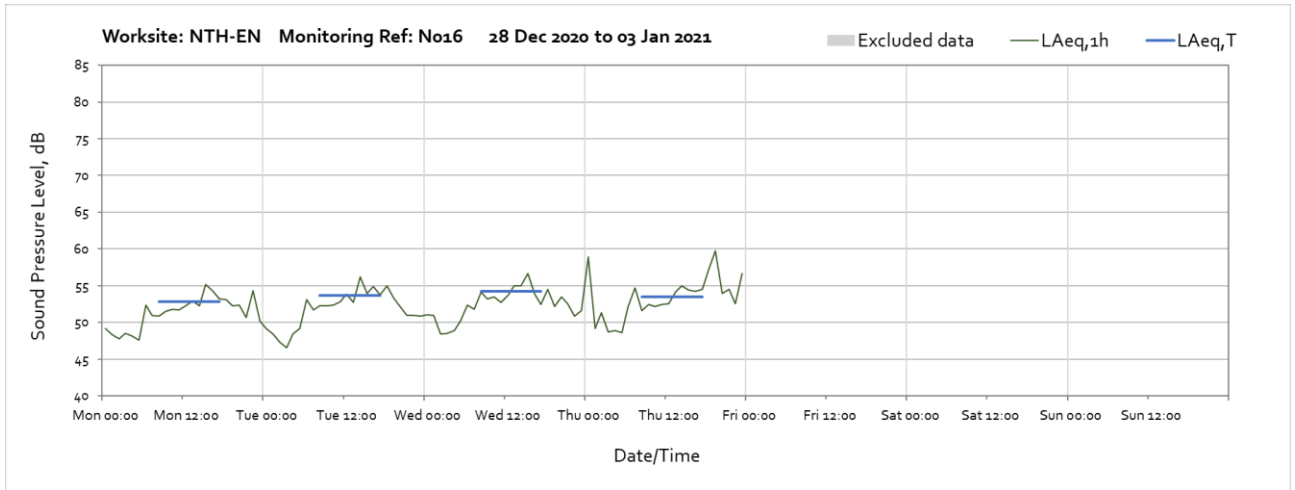




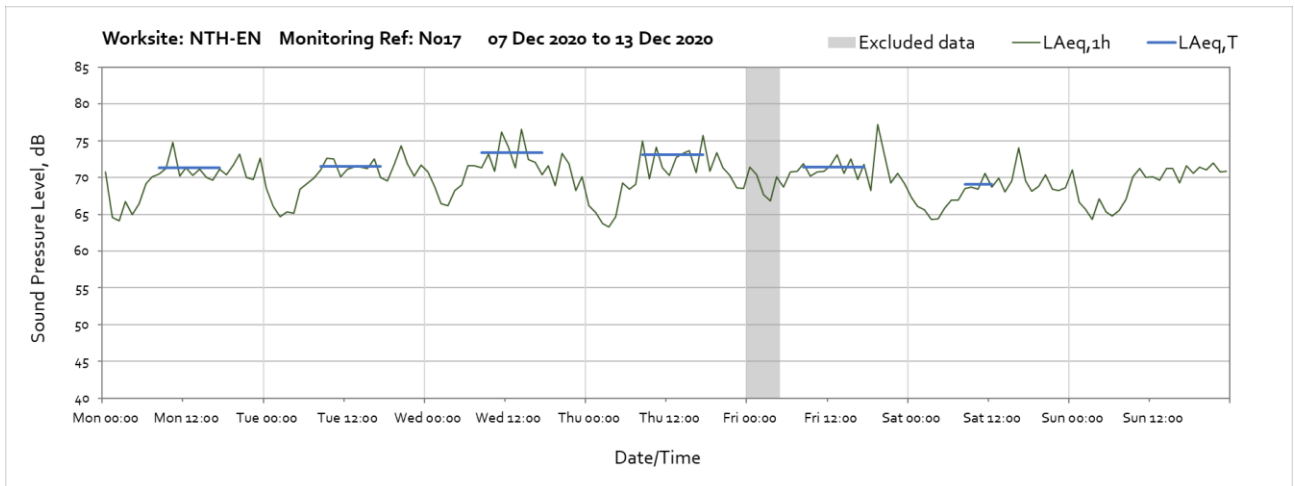
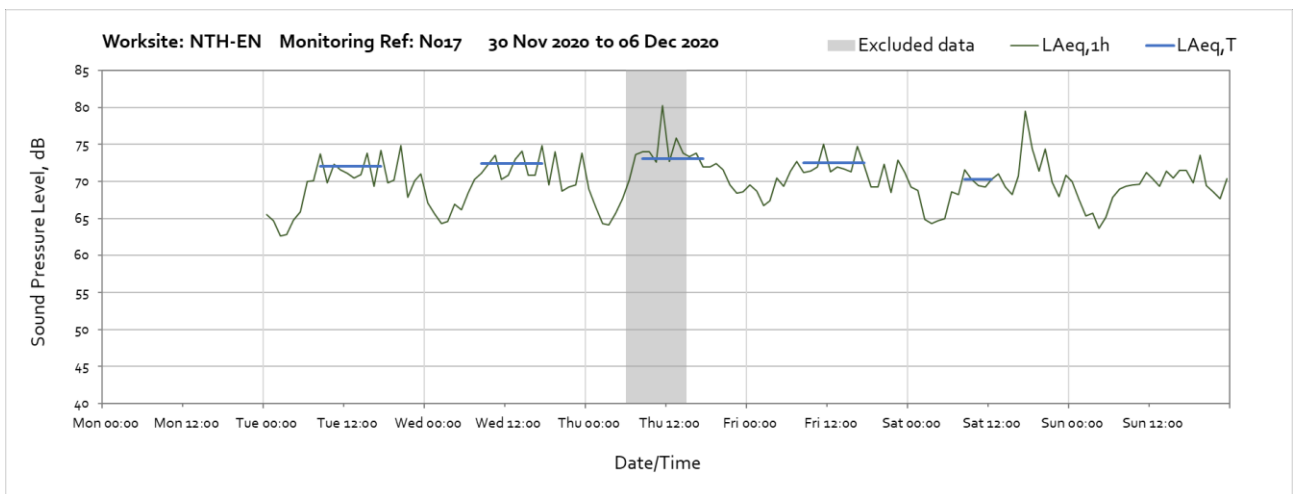
Worksite: NTH-EN – Monitoring Ref: N016

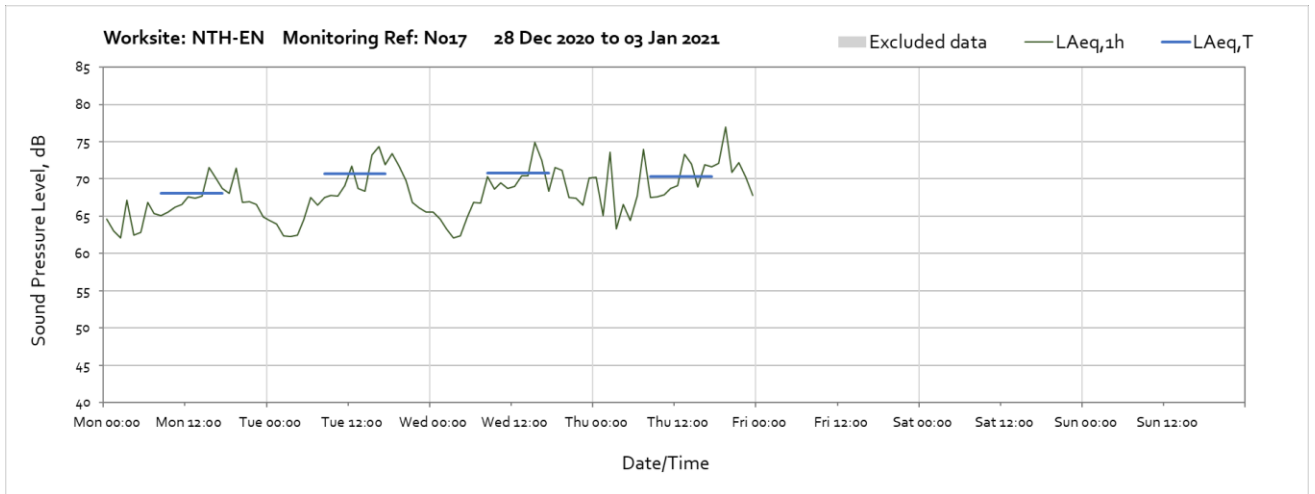
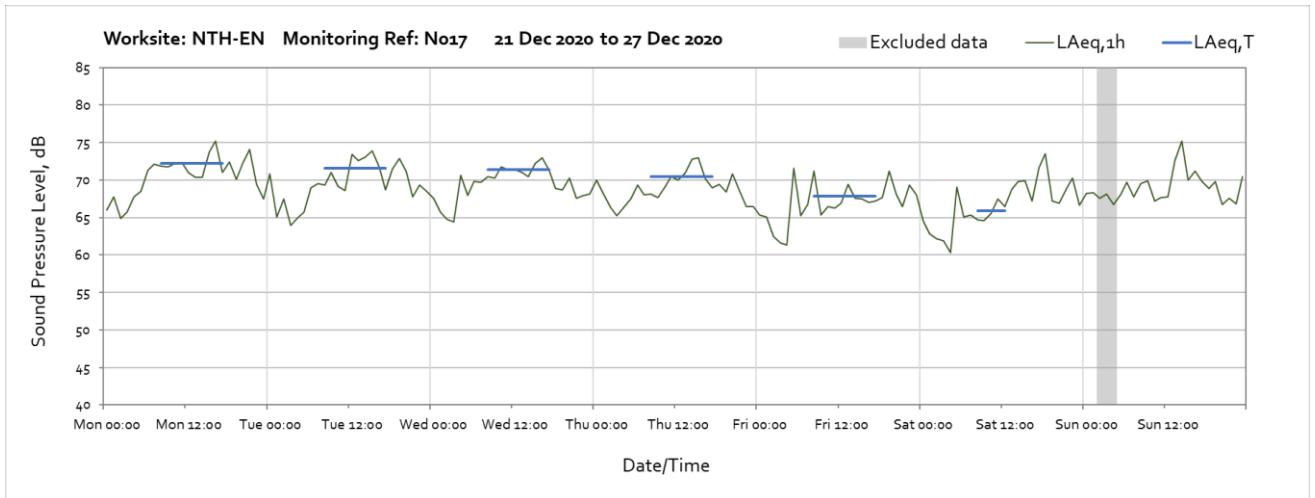
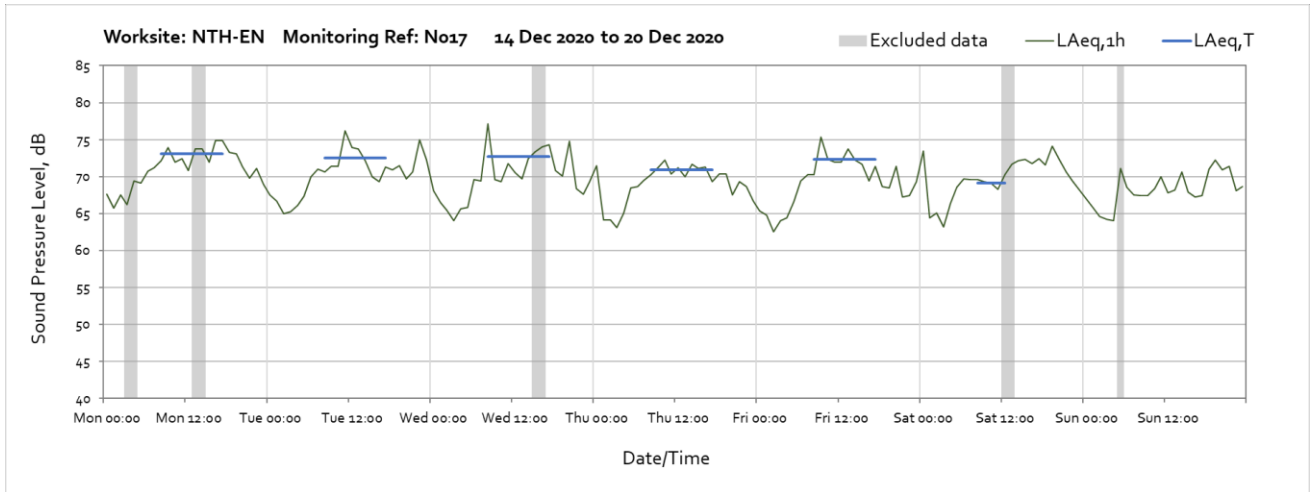




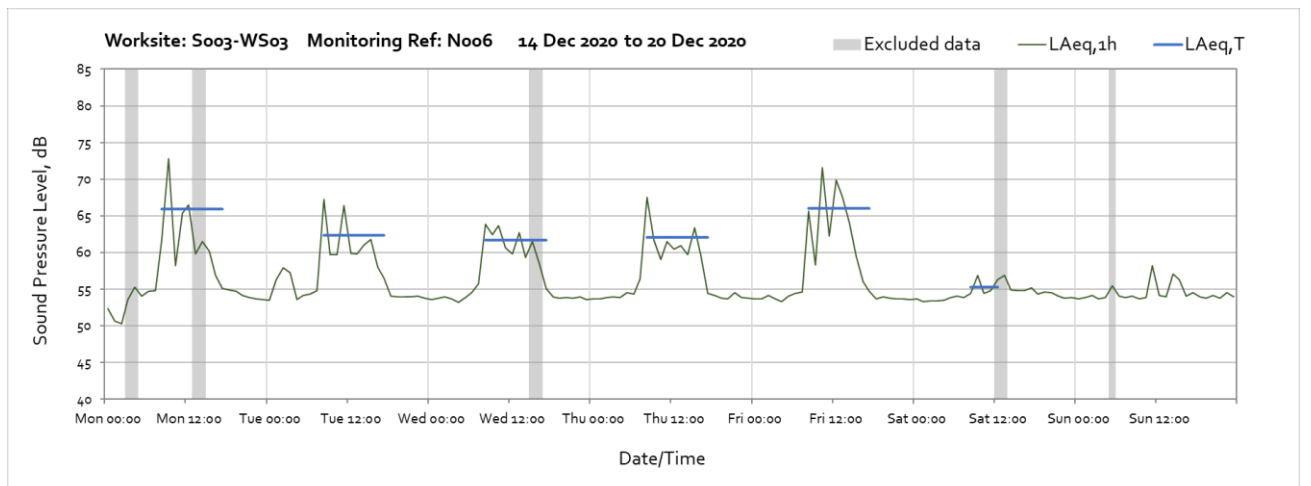
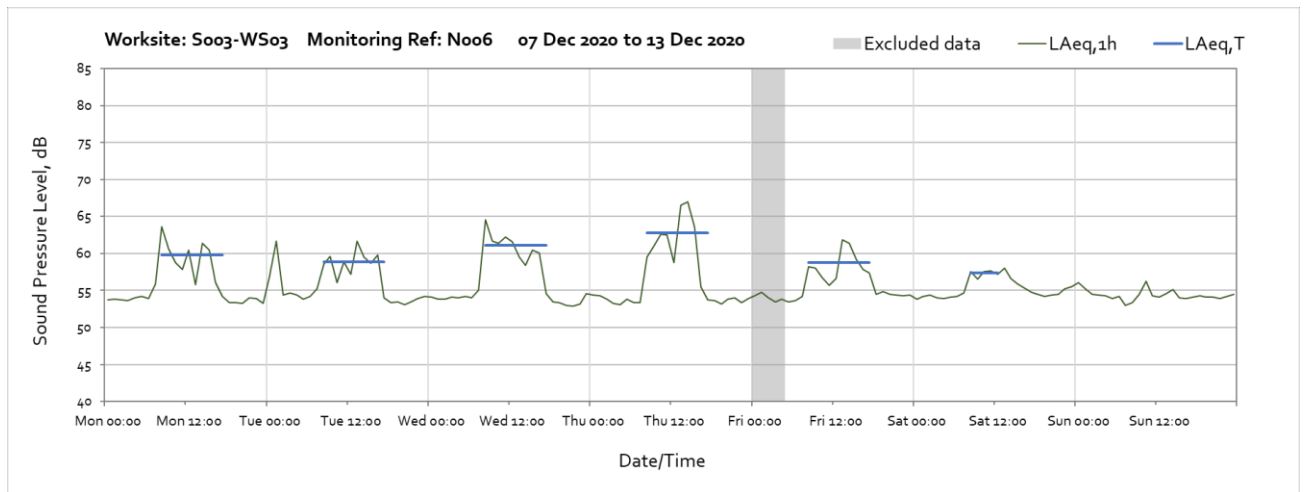
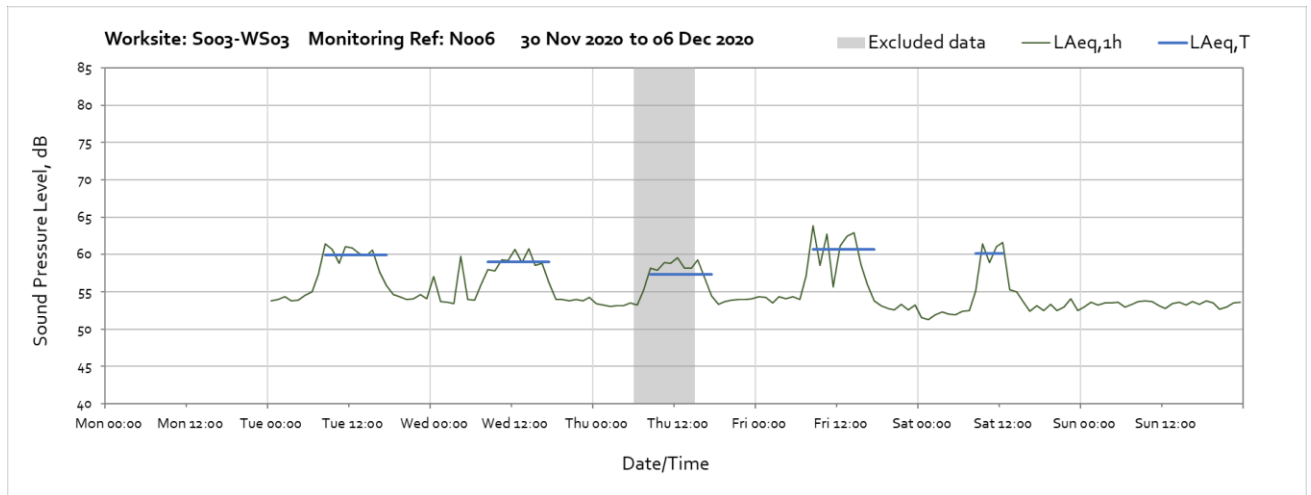


Worksite: NTH-EN – Monitoring Ref: N017

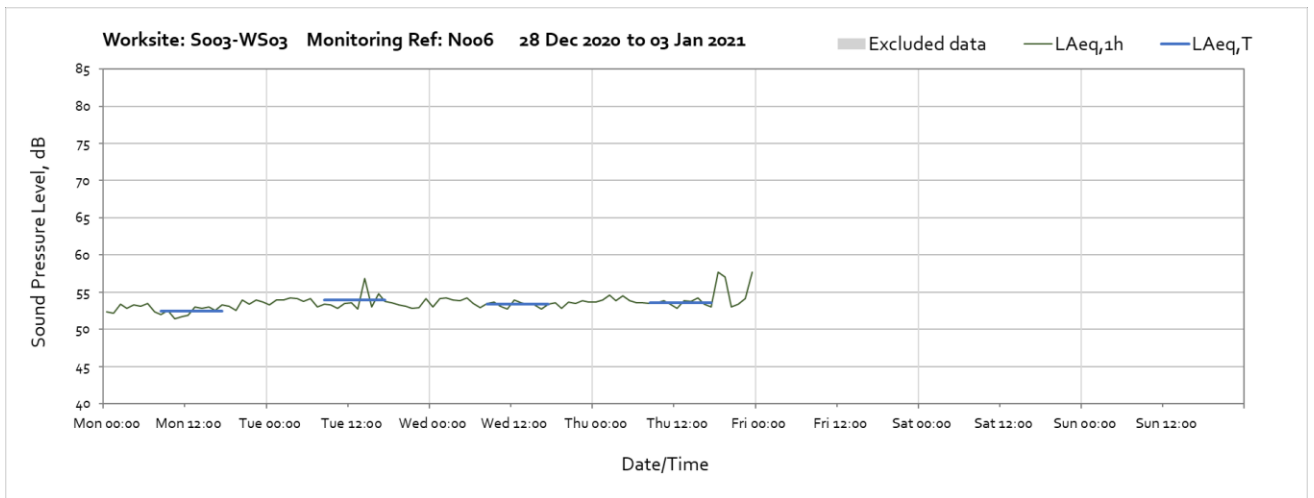
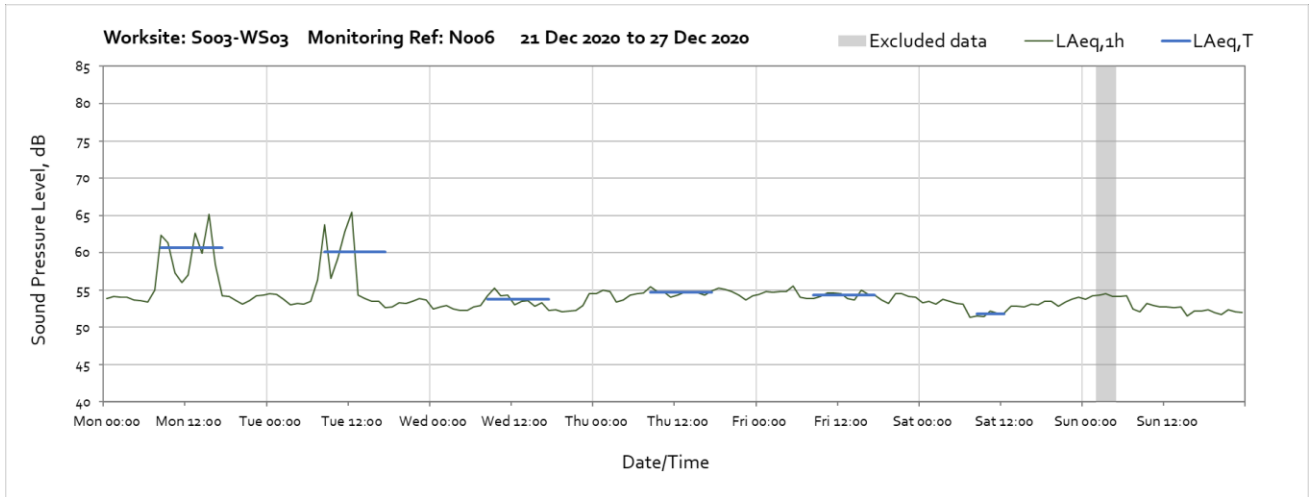




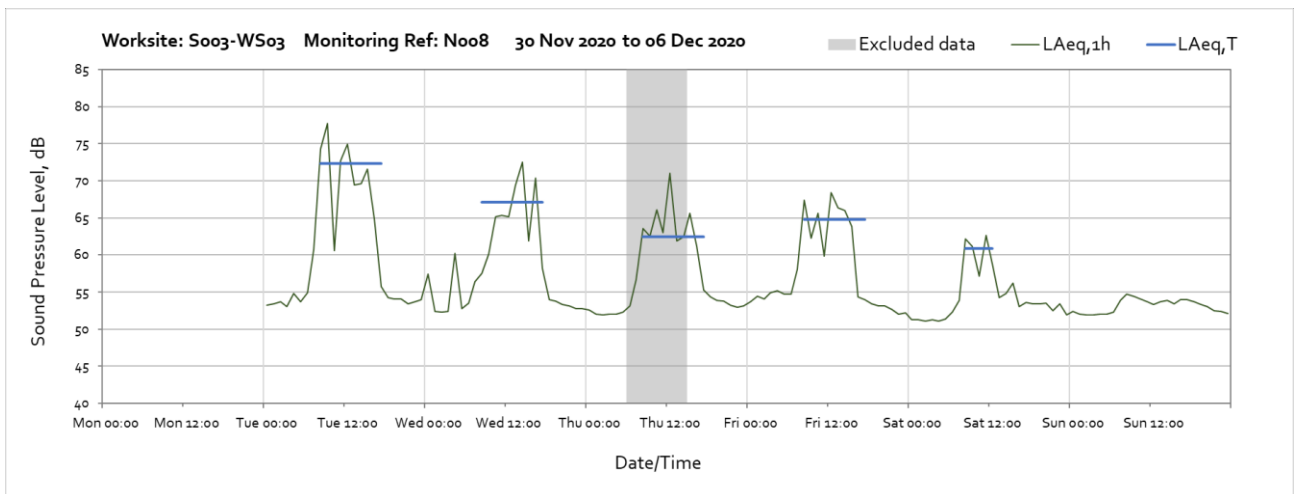
Worksite: S003-WS03 – Monitoring Ref: N006

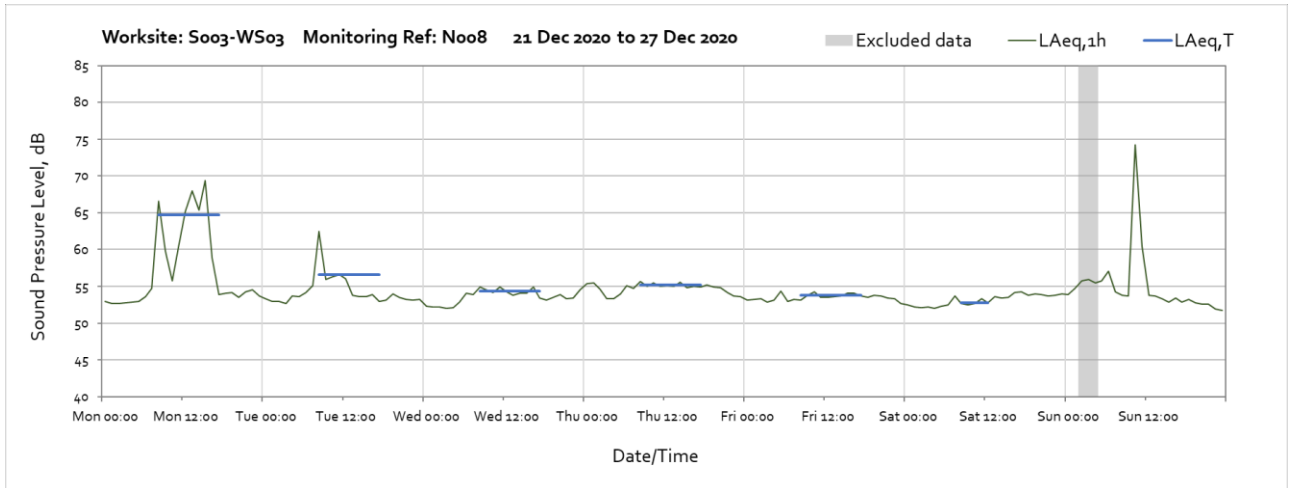
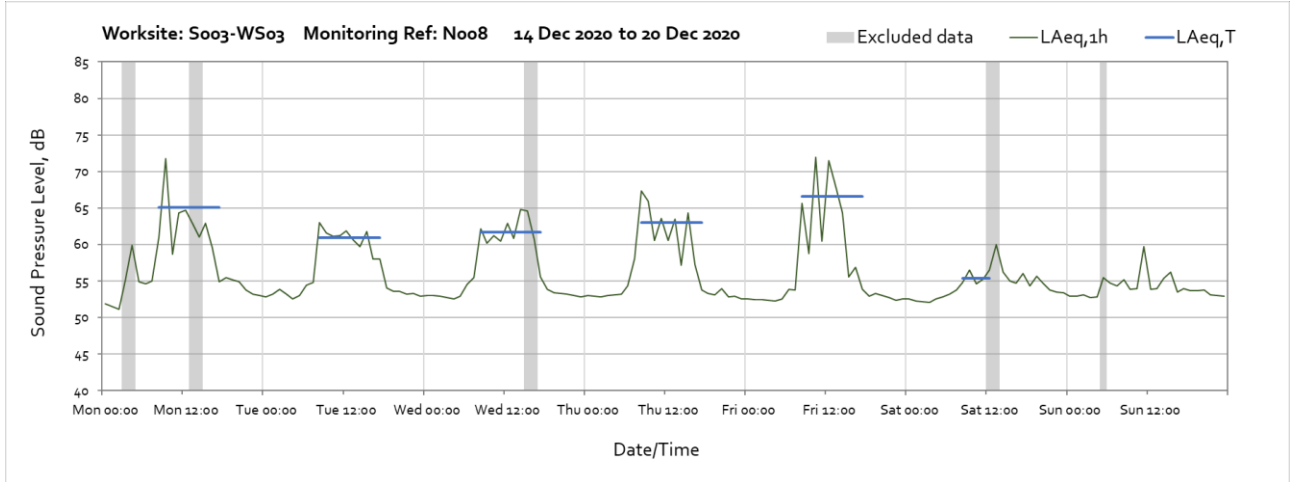
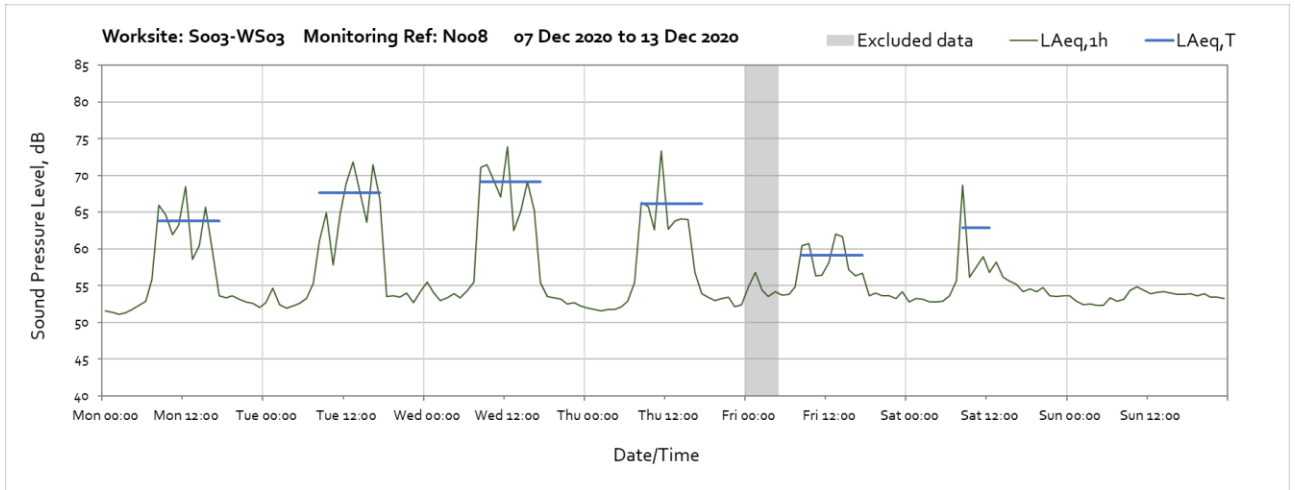


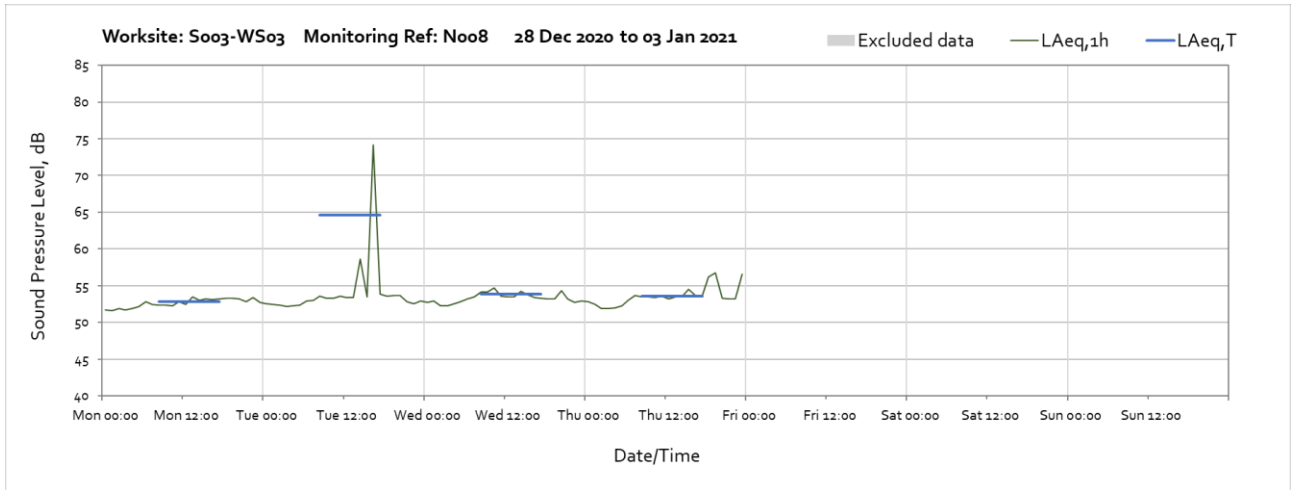
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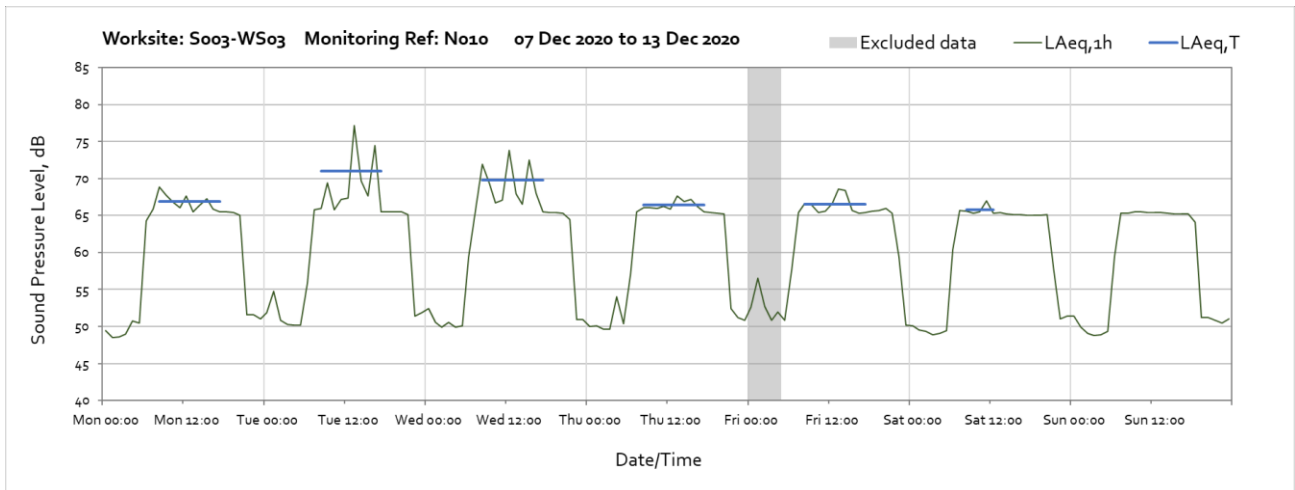
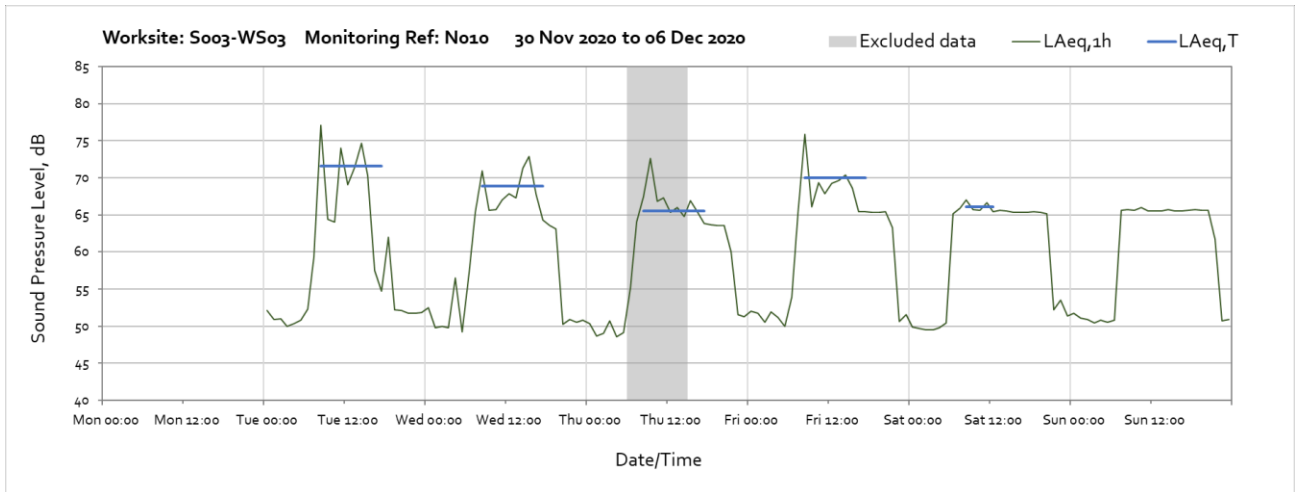
Worksite: S003-WS03 – Monitoring Ref: N008

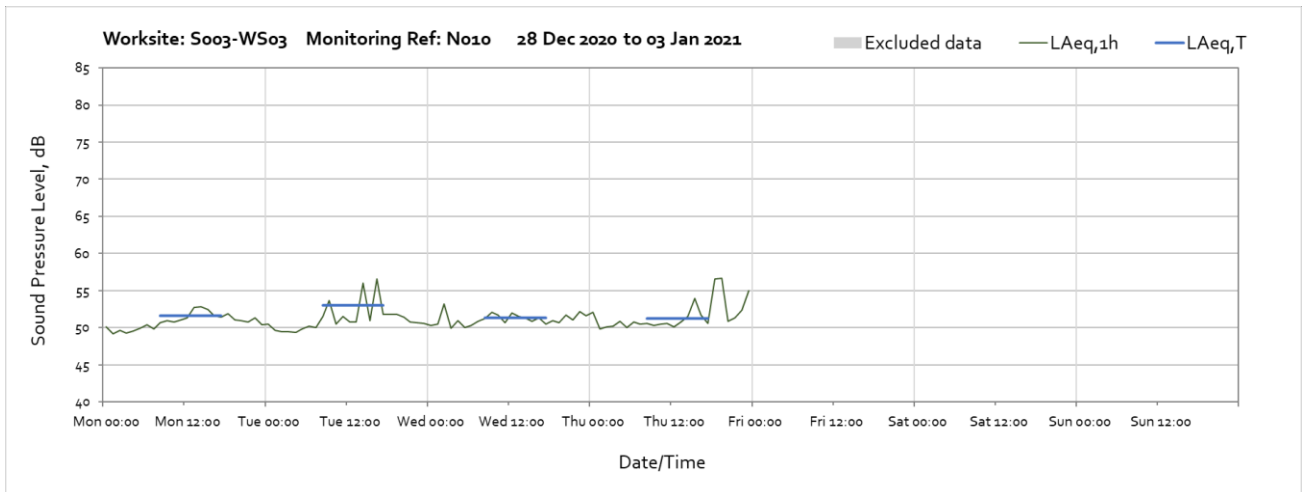
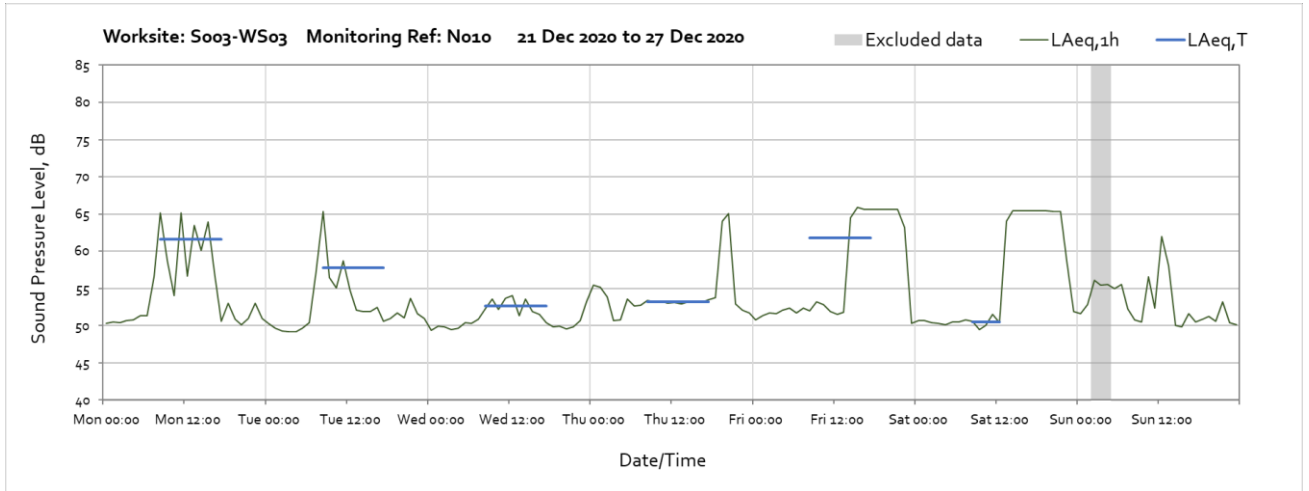
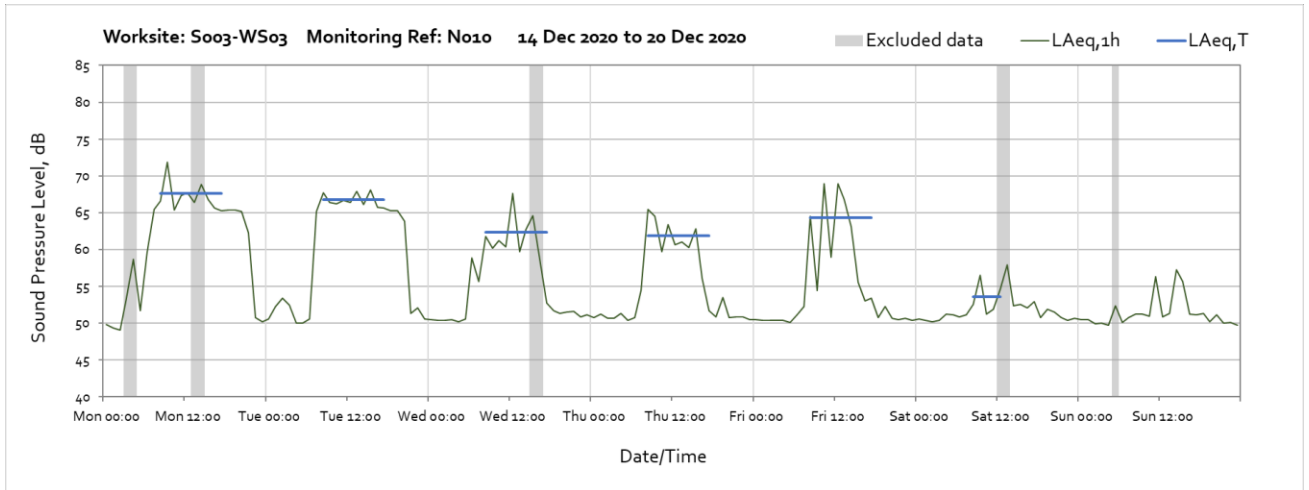




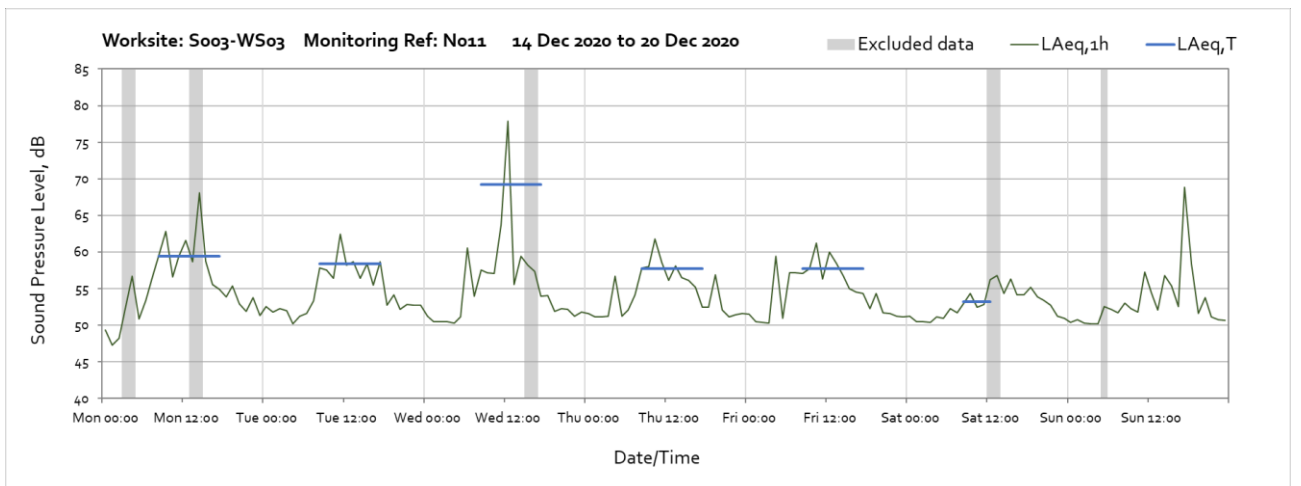
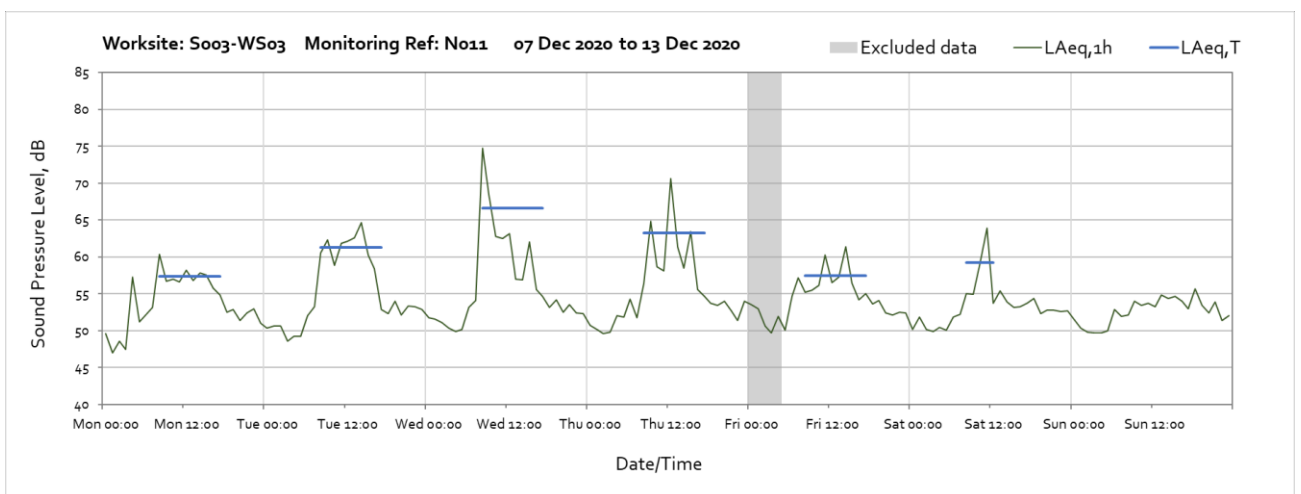
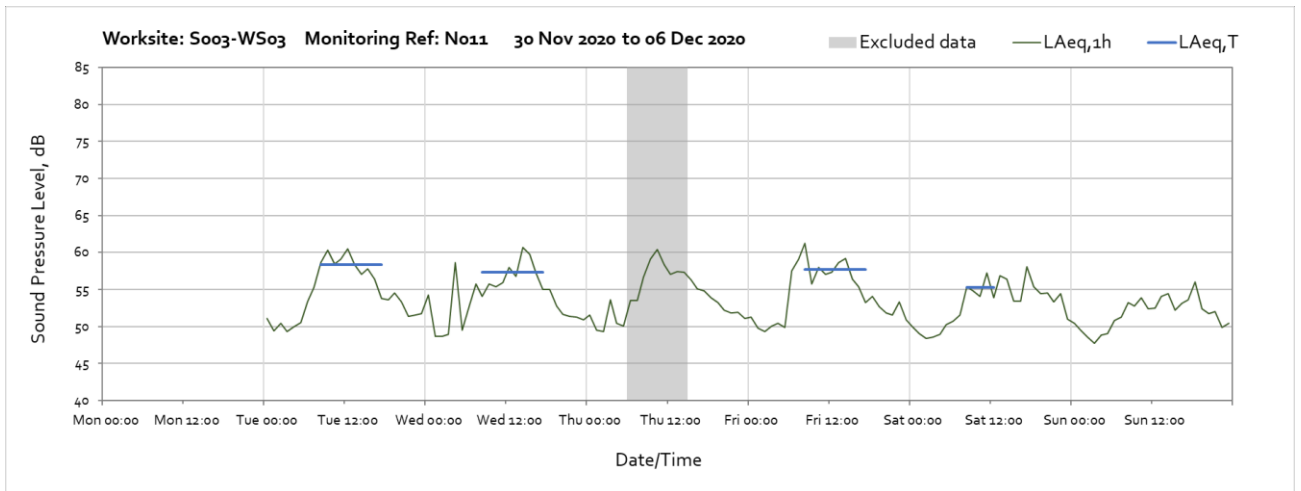


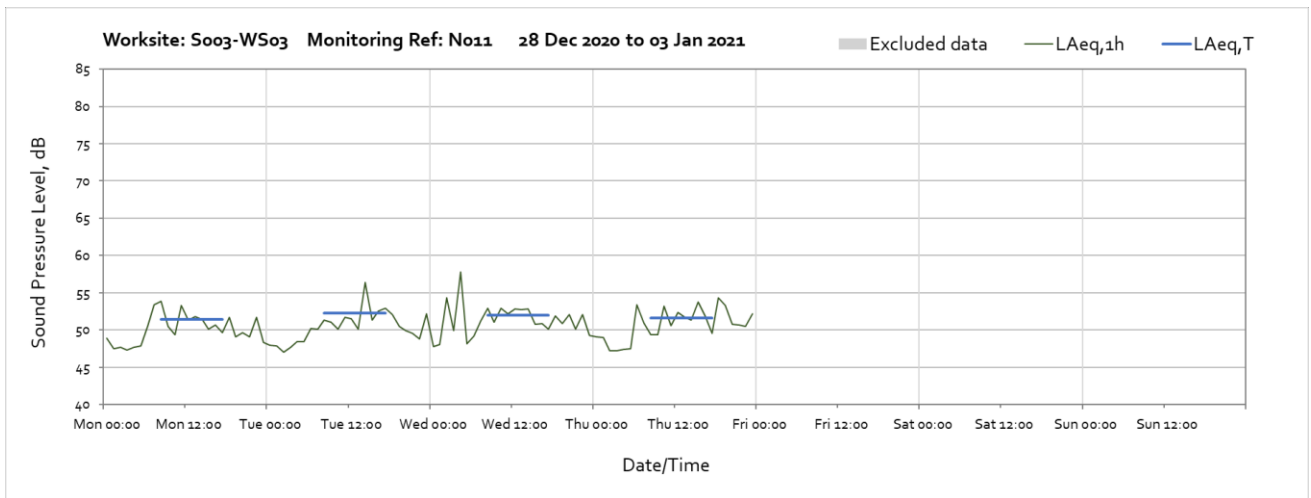
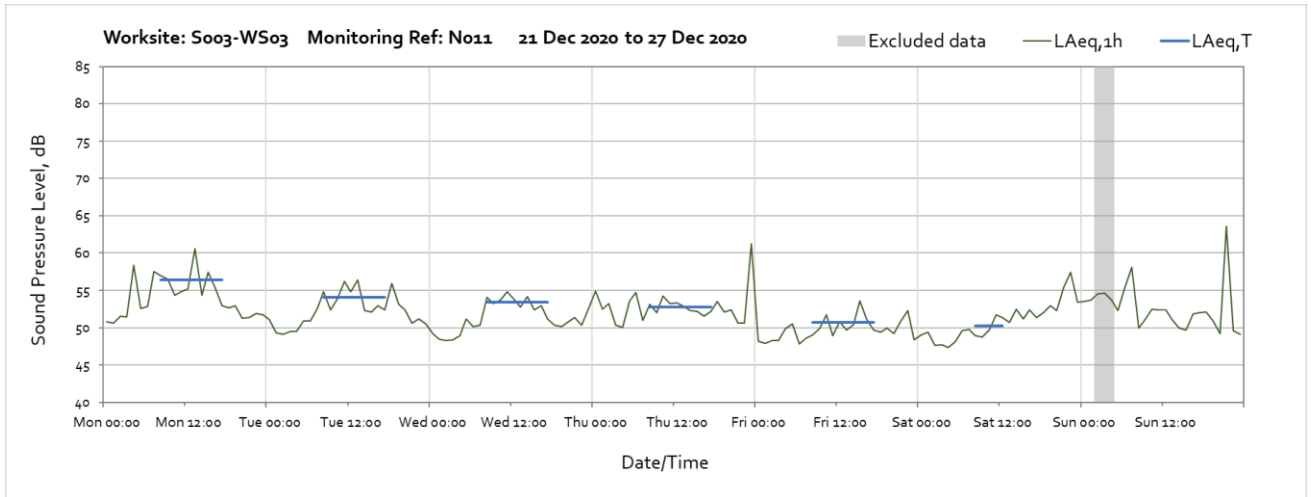
Worksite: S003-WS03 – Monitoring Ref: N010



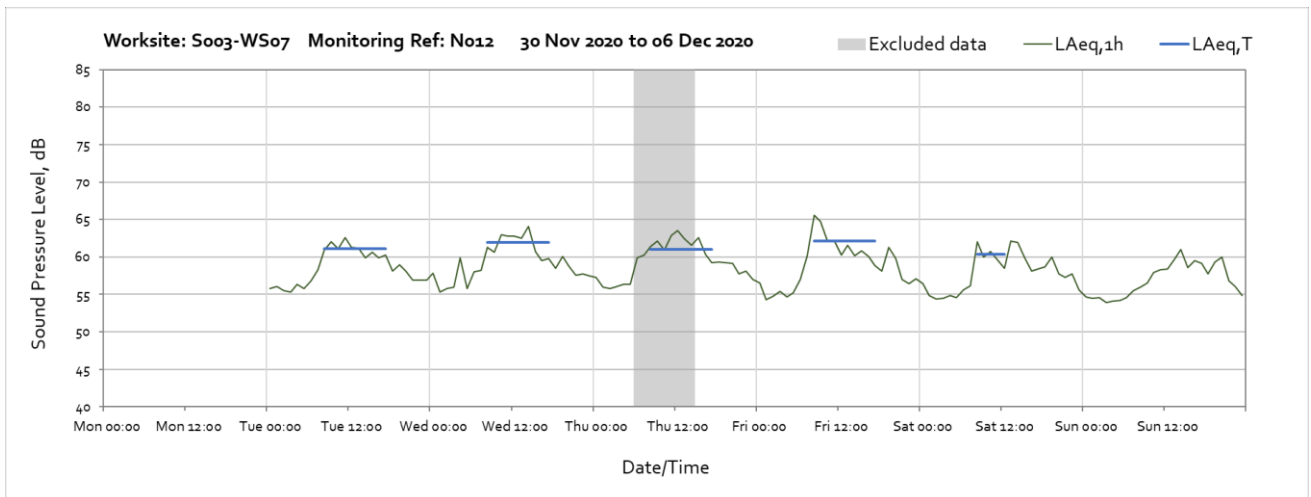


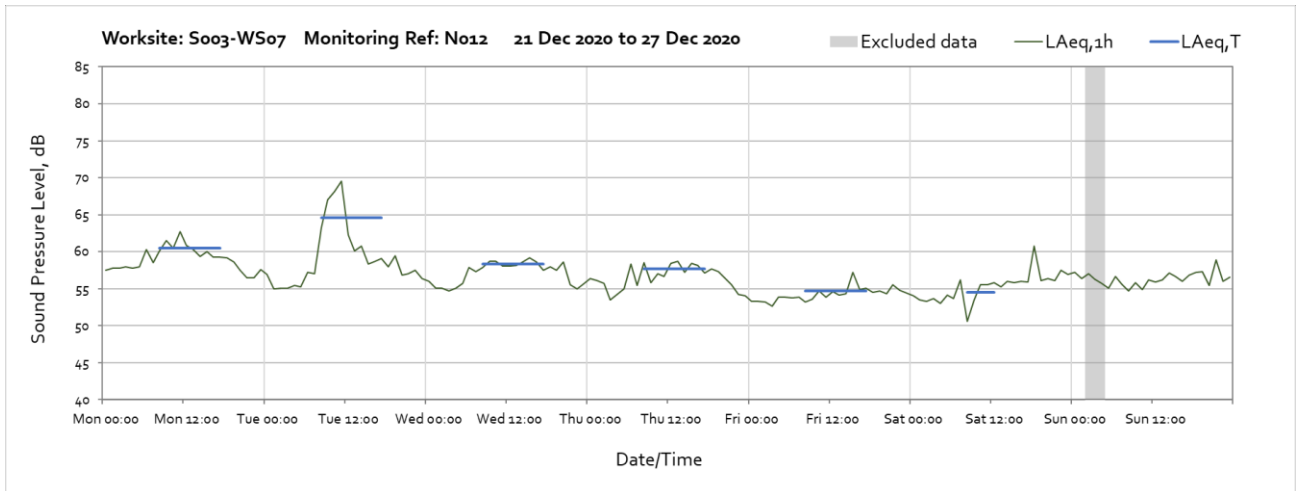
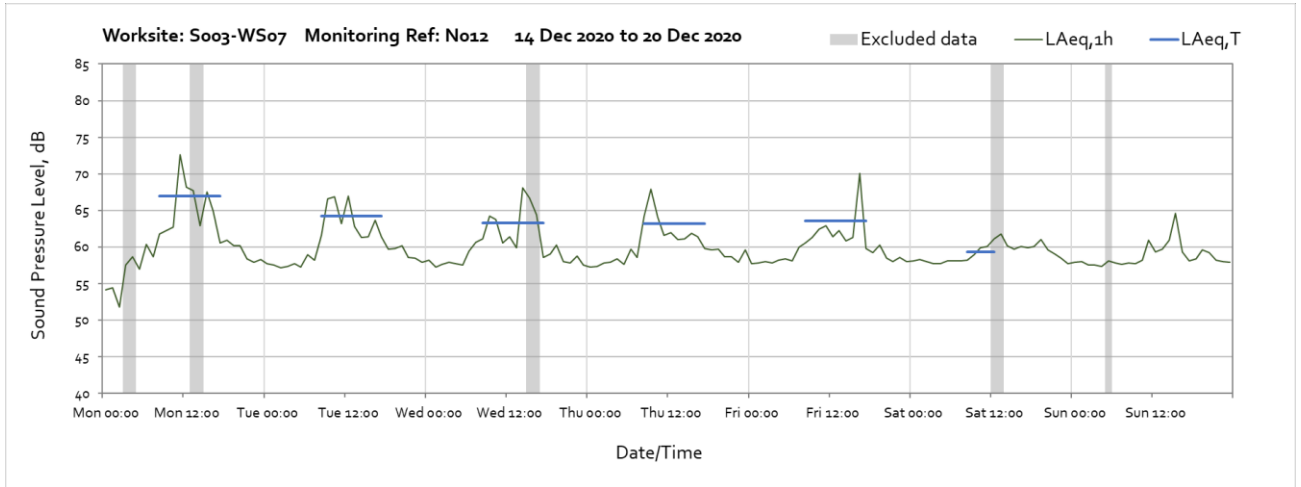
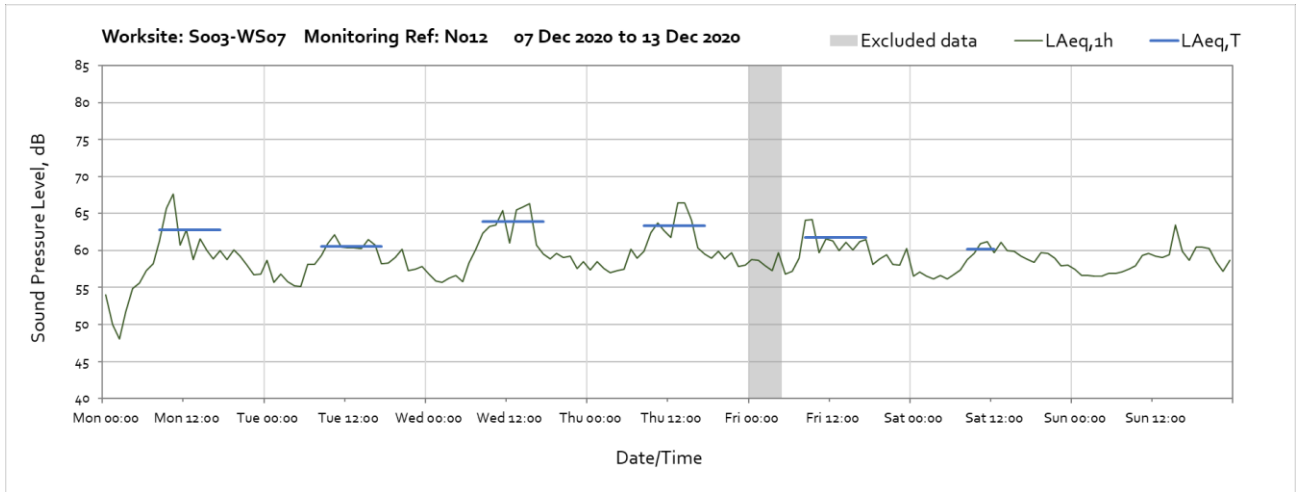
Worksite: S003-WS03 – Monitoring Ref: N011

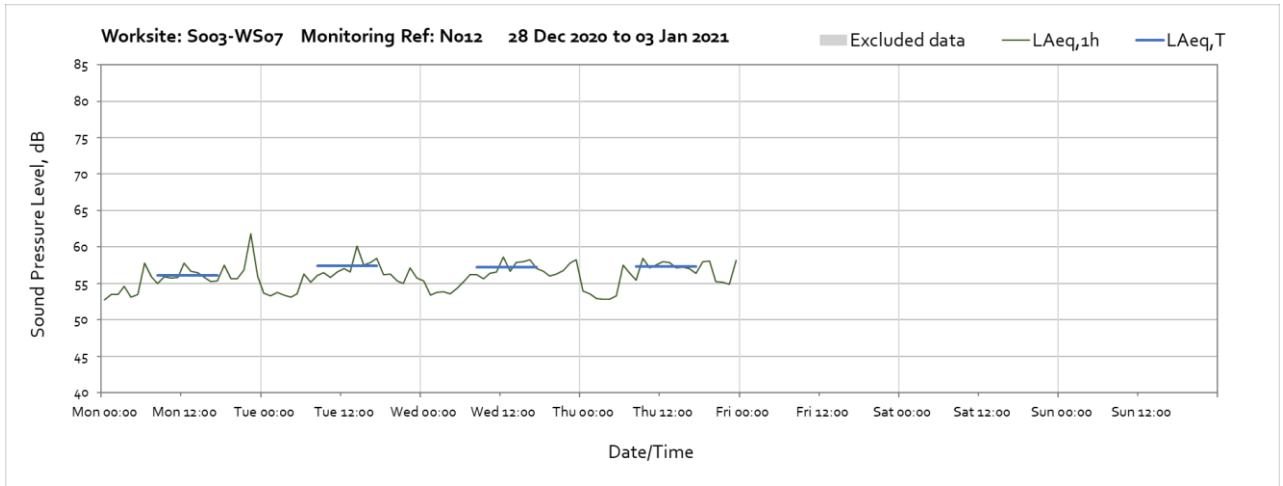




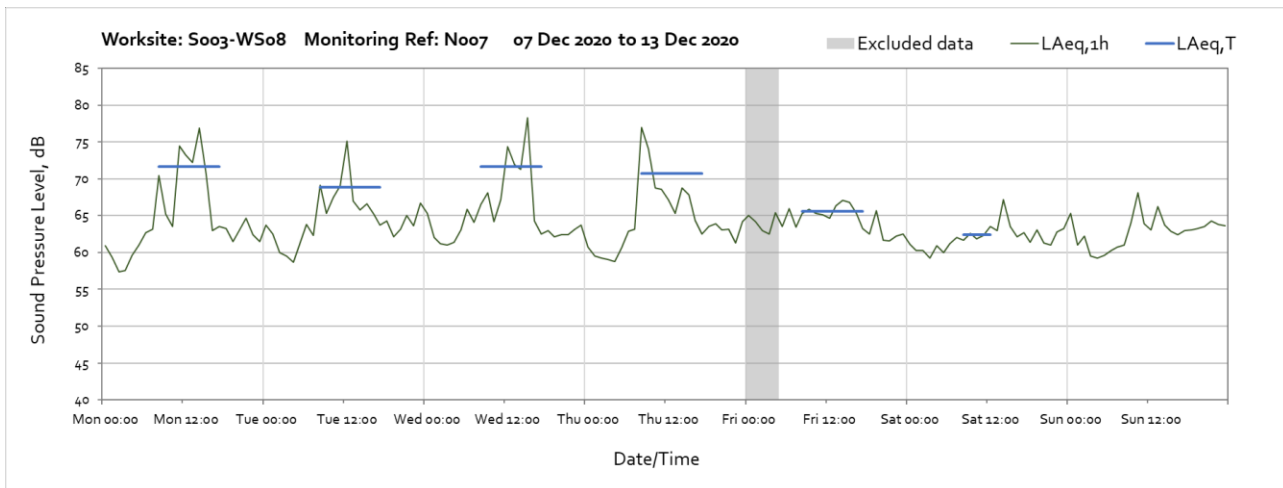
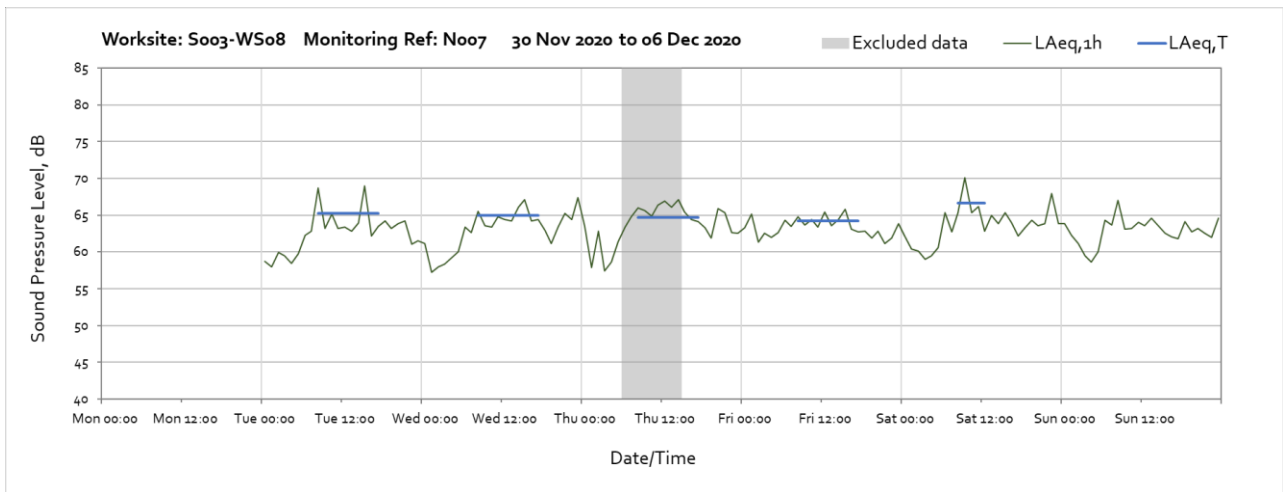
Worksite: S003-WS07 – Monitoring Ref: N012

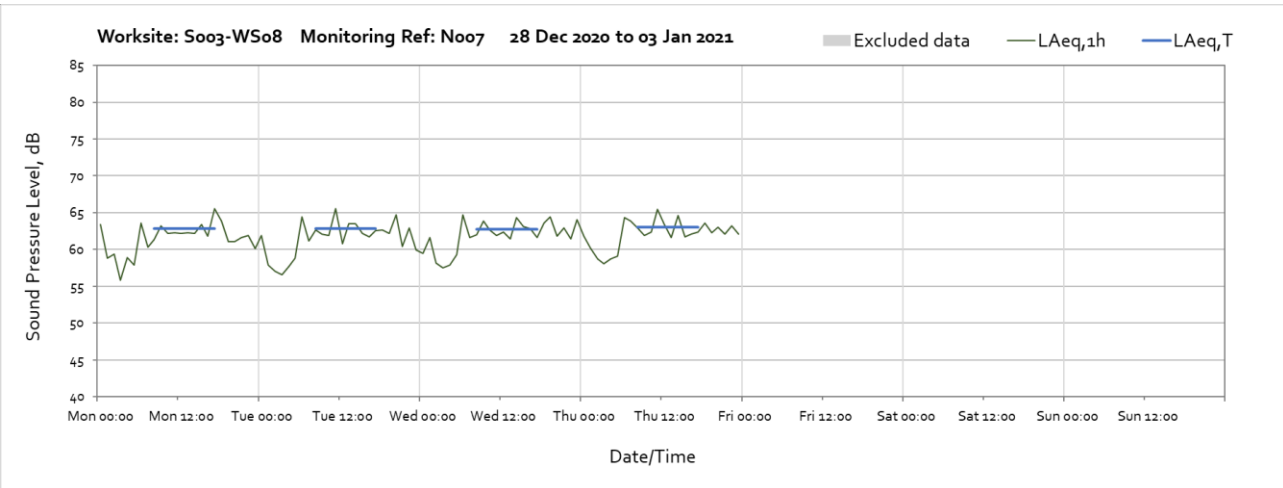
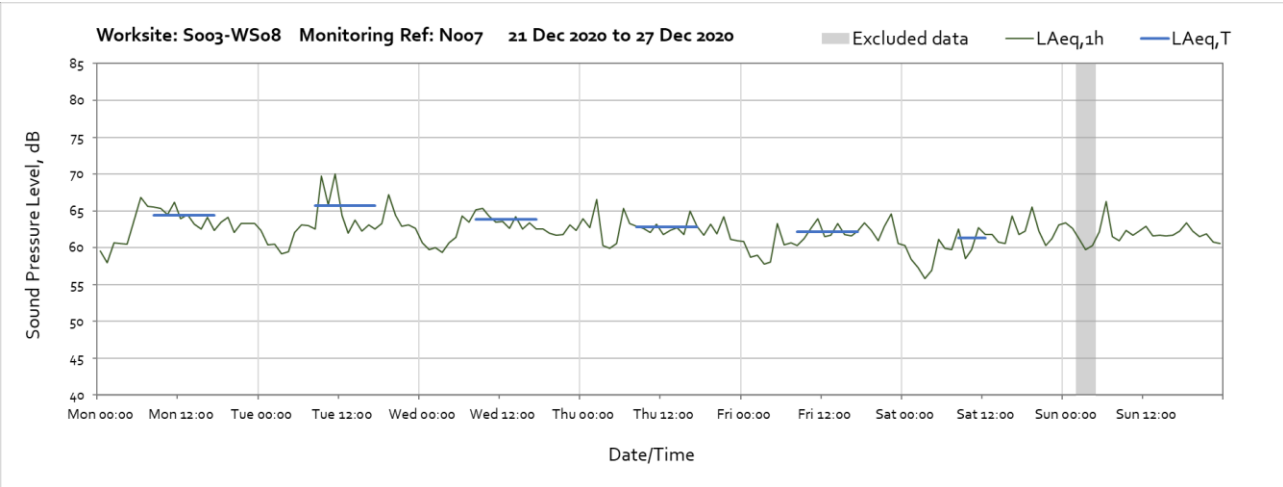
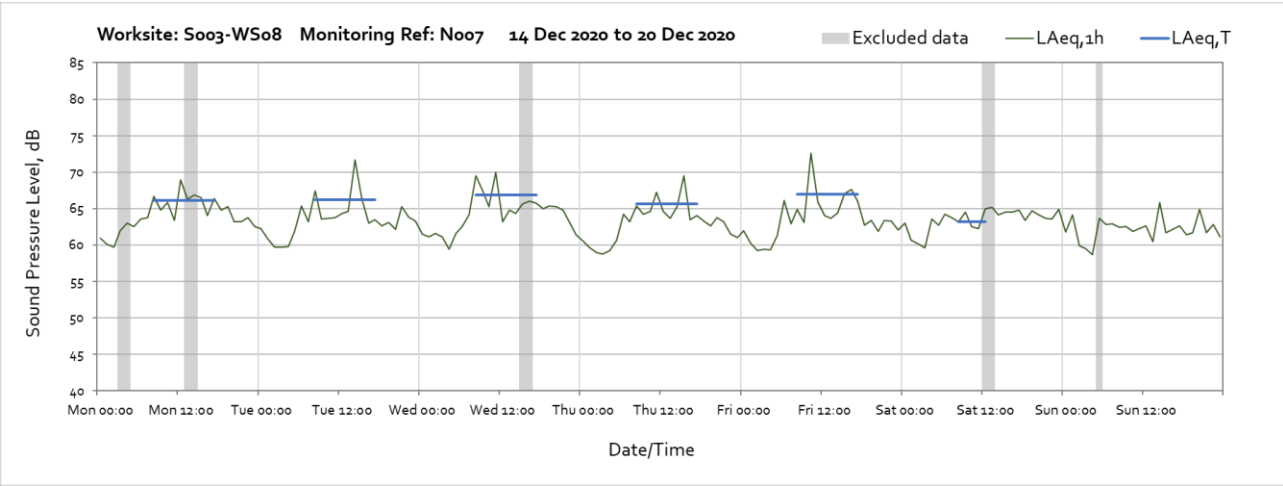




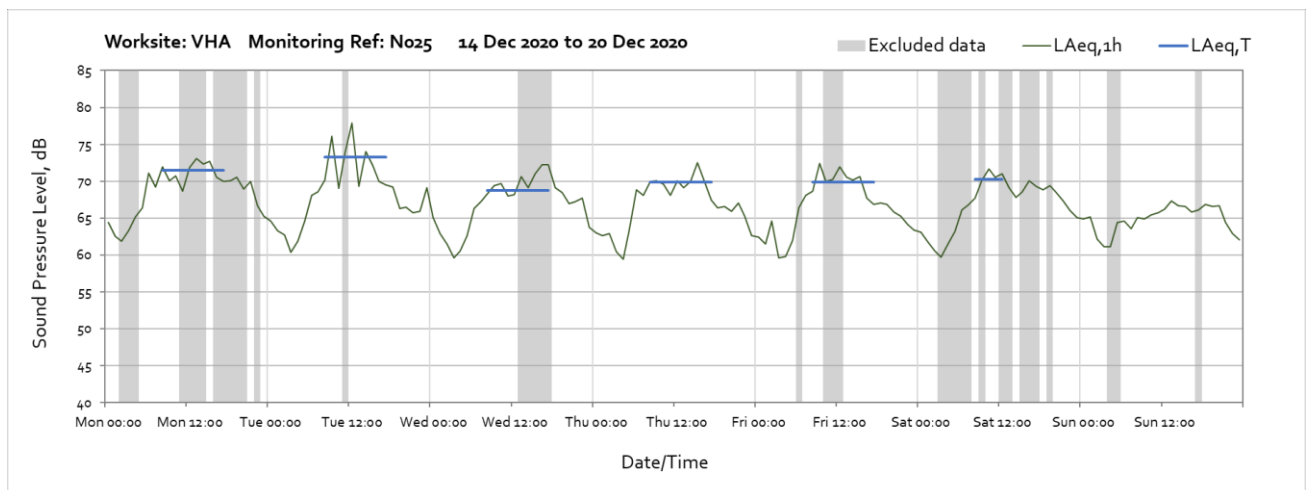
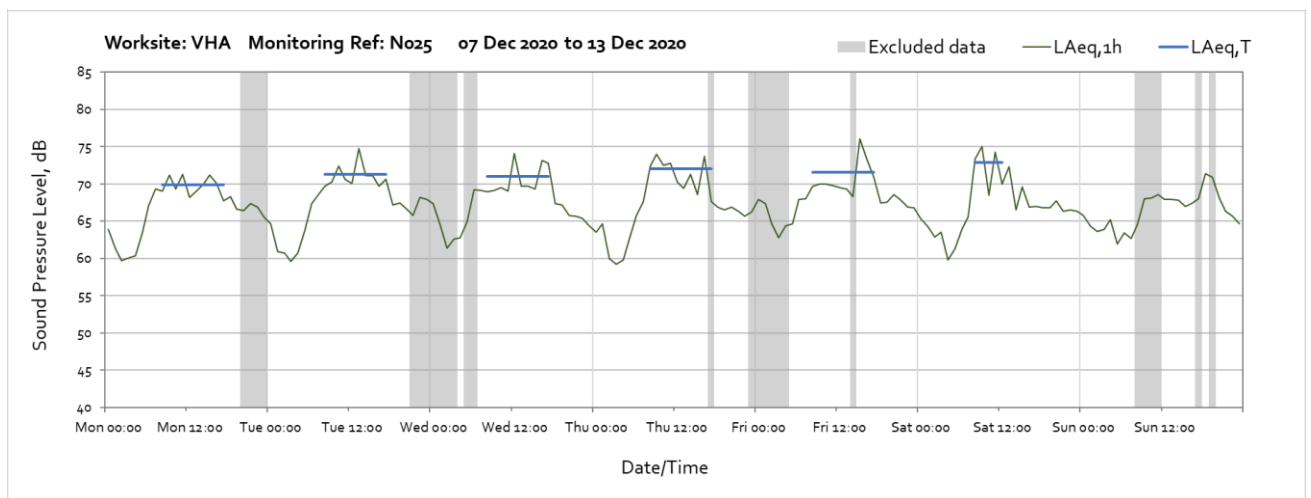
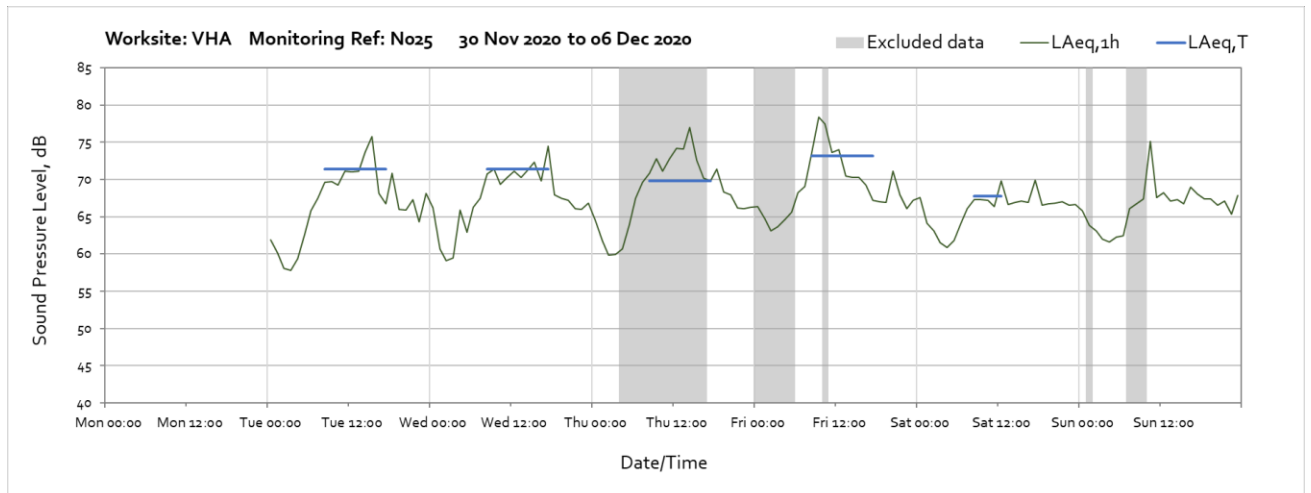


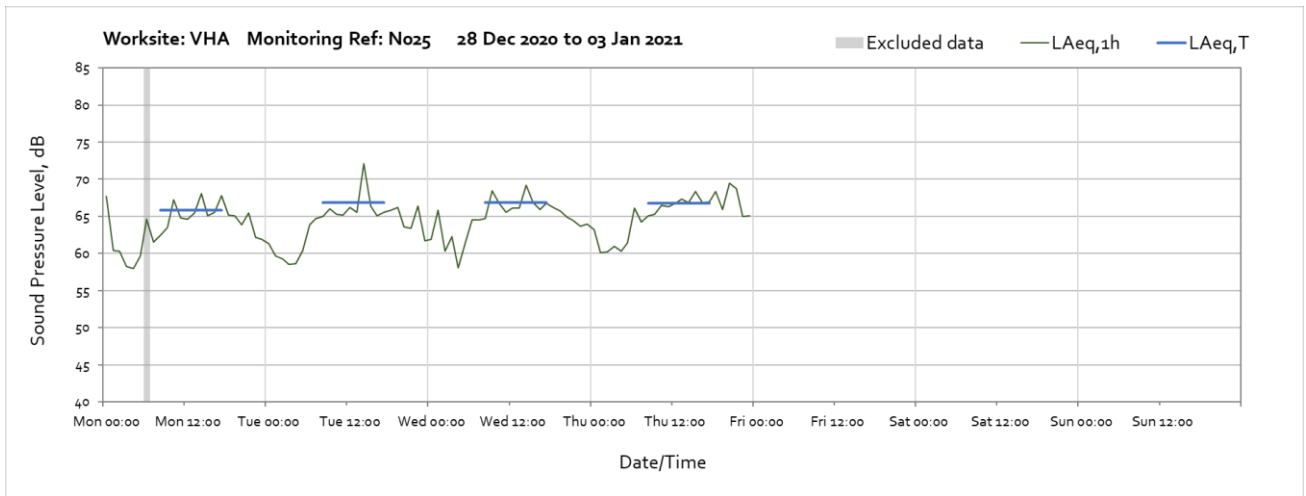
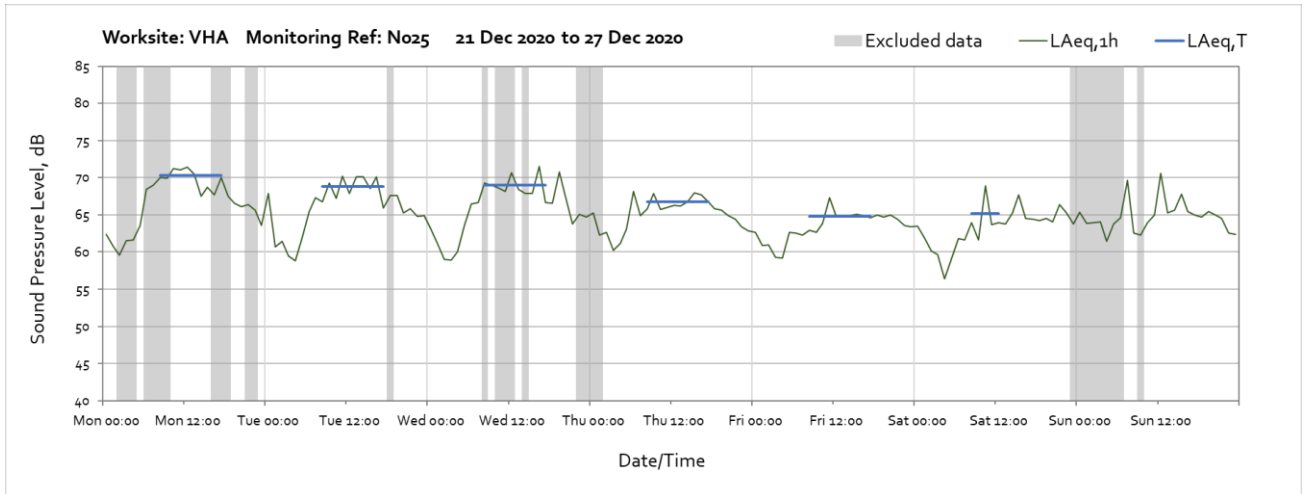
Worksite: S003-WS08 – Monitoring Ref: N007



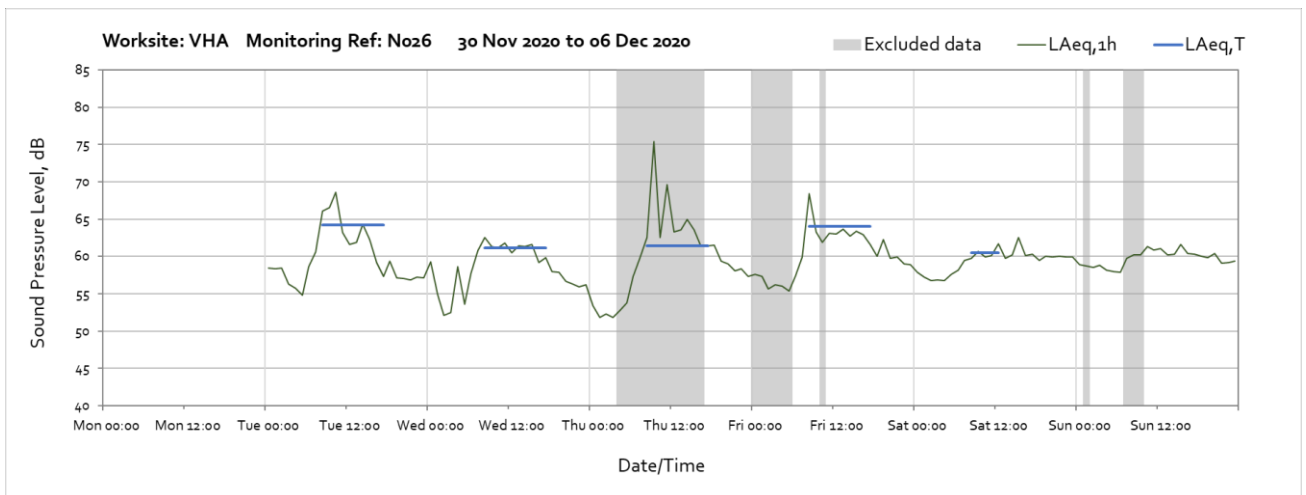


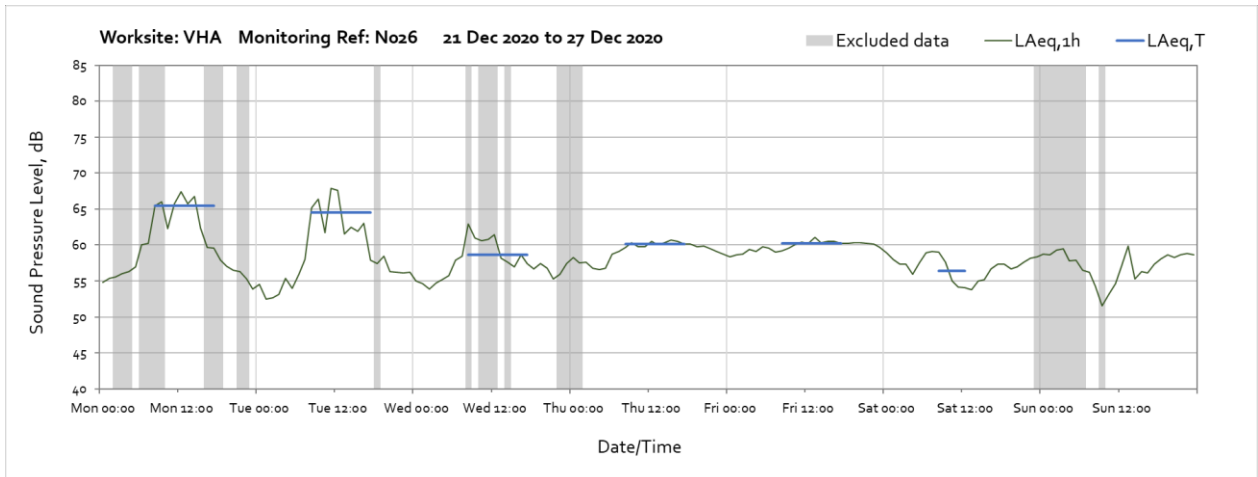
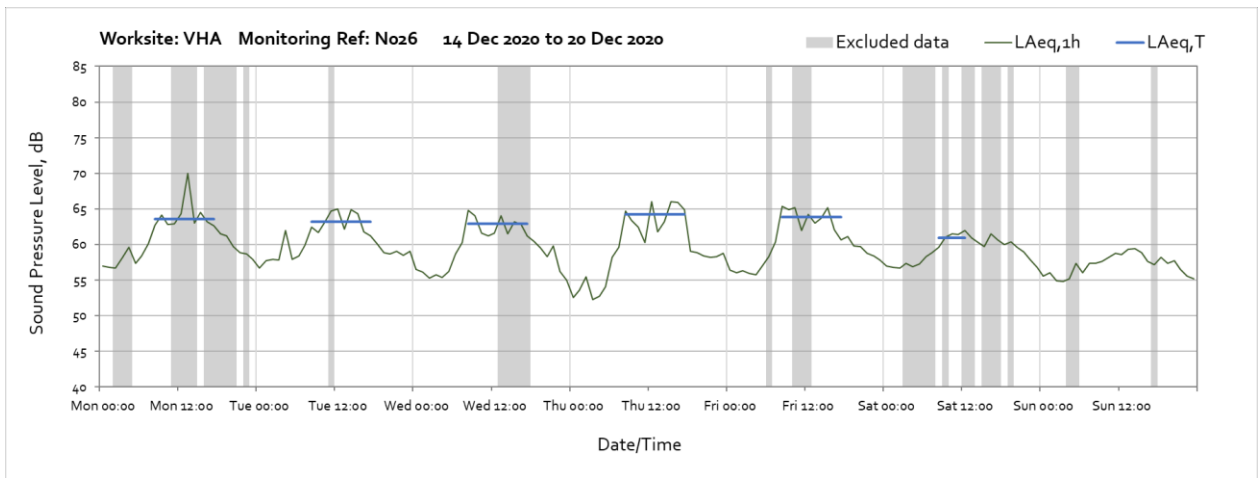
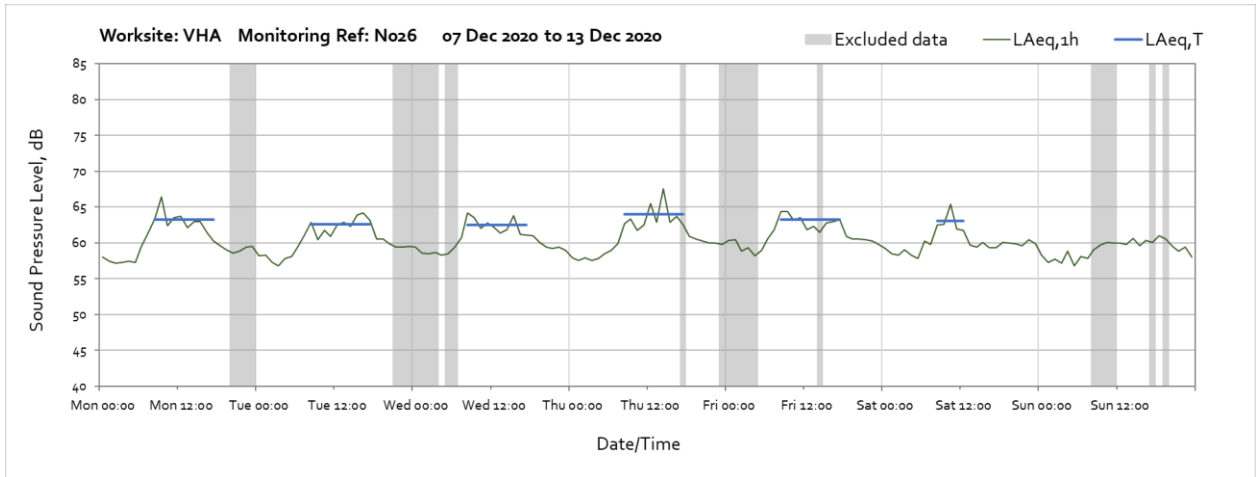
Vehicle Holding Area (VHA) – Monitoring Ref: N025

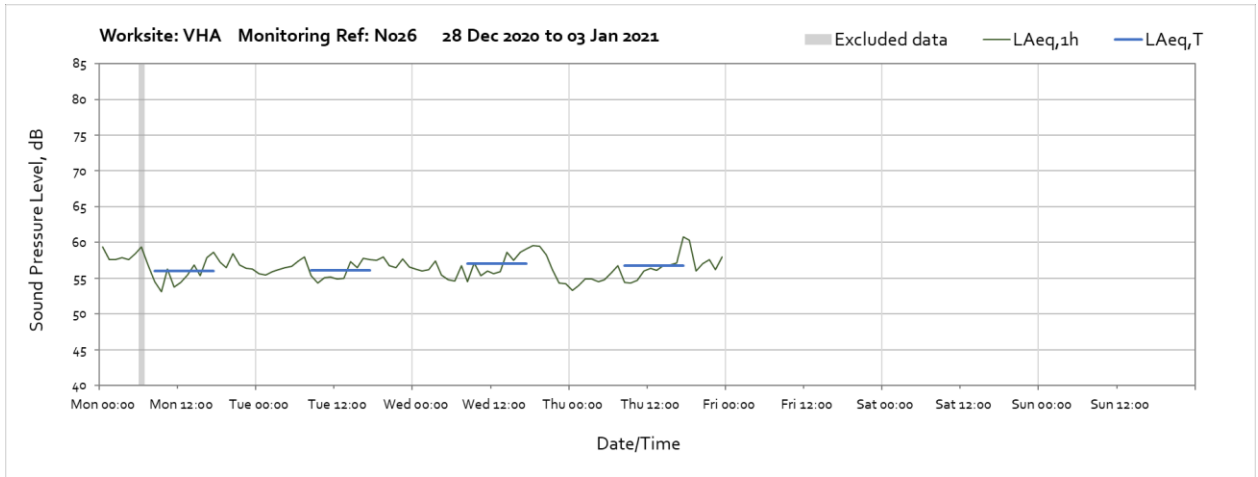




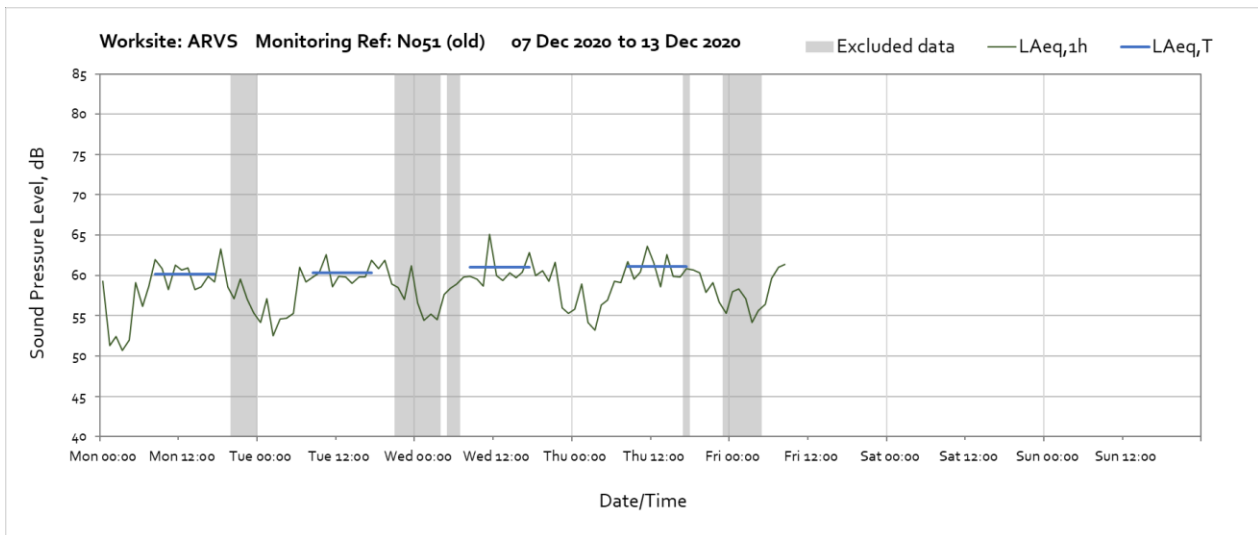
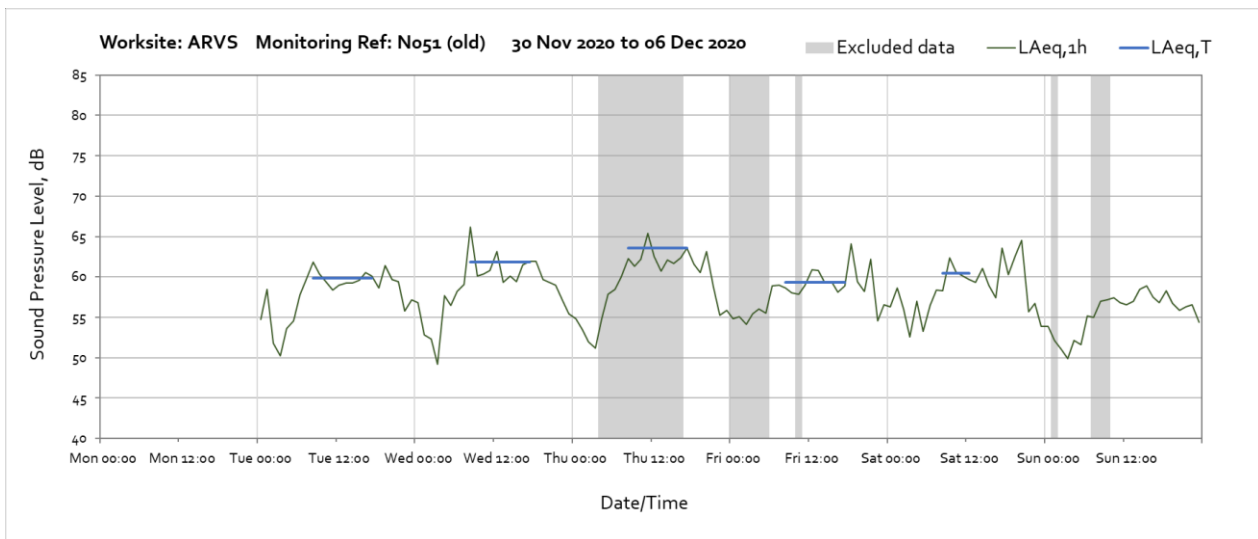
Vehicle Holding Area (VHA) – Monitoring Ref: N026







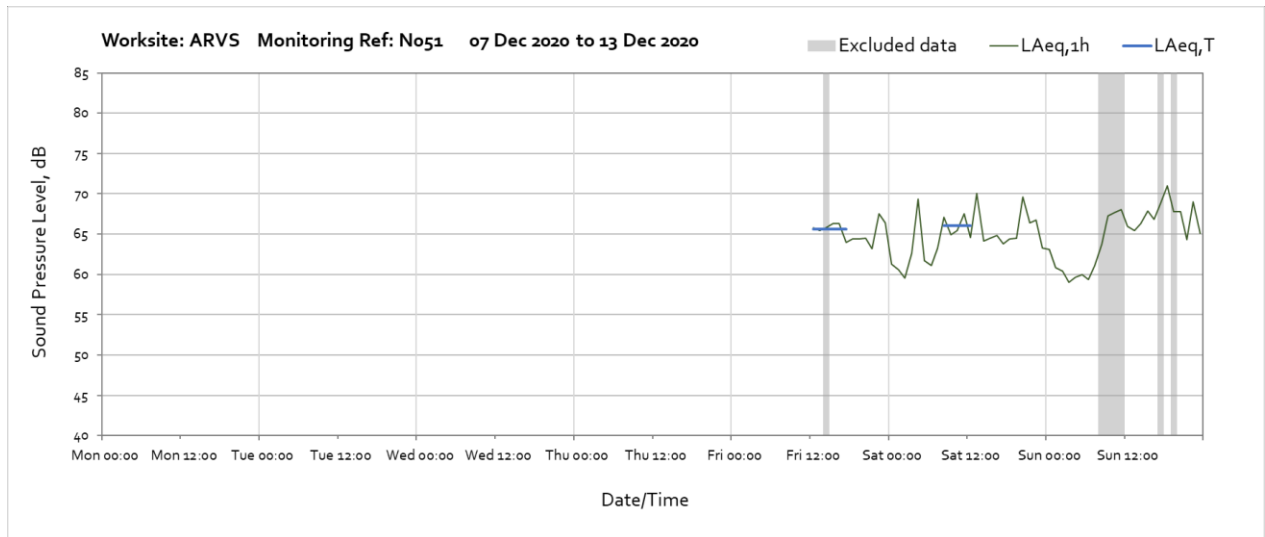
Adelaide Road Ventilation Shaft (ARVS) – Monitoring Ref: N051 (old)



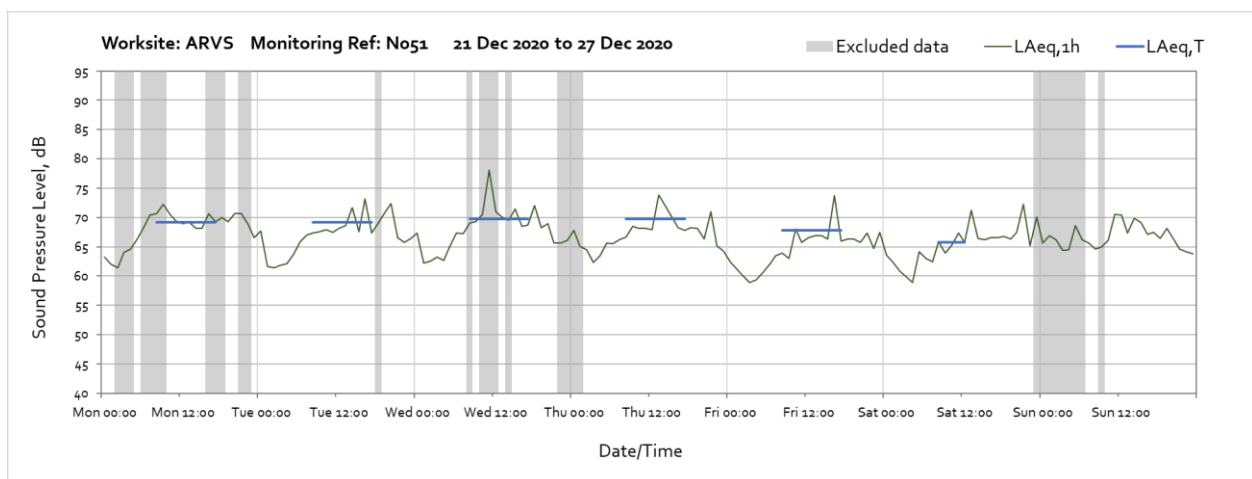
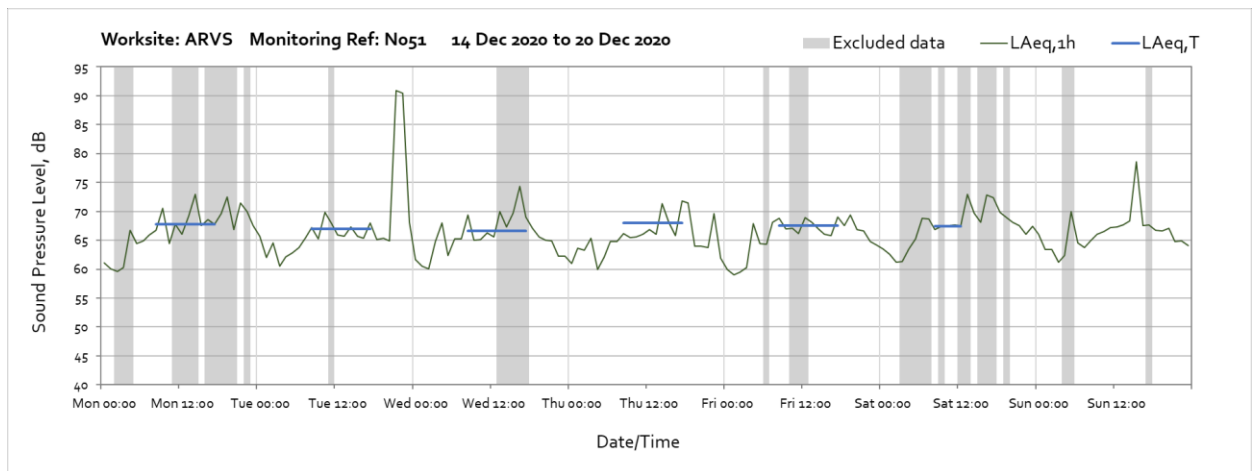
Note: The monitor was relocated at 08:00 on Friday 11th December to a new position on a lamppost across the road.

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Adelaide Road Ventilation Shaft (ARVS) – Monitoring Ref: N051

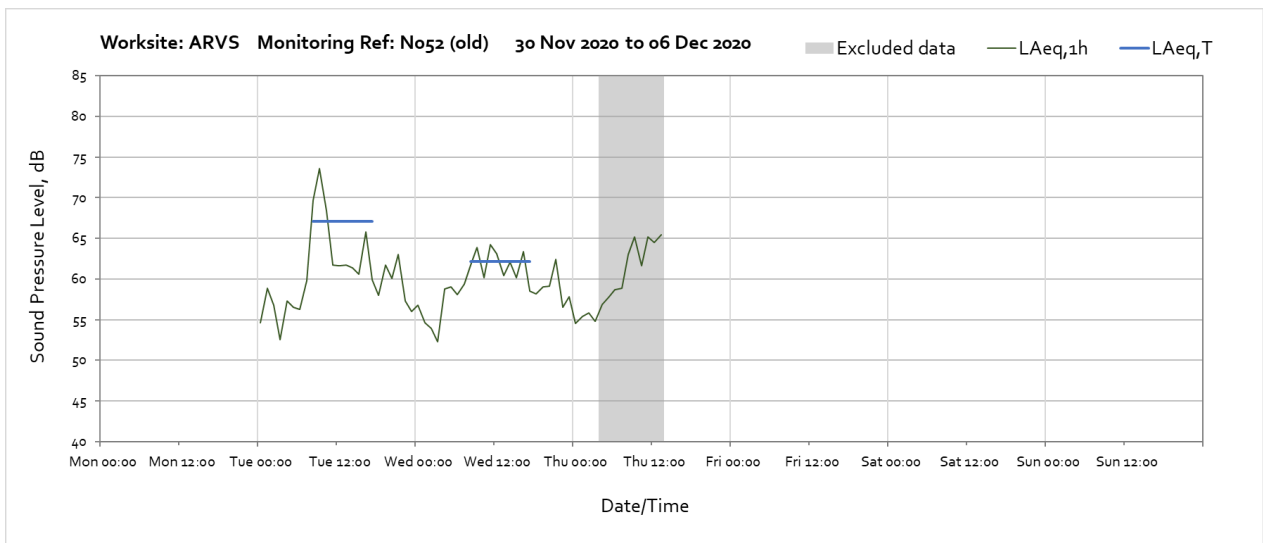


Note: Monitoring at this position was started at 12:00 on Friday 11th December.



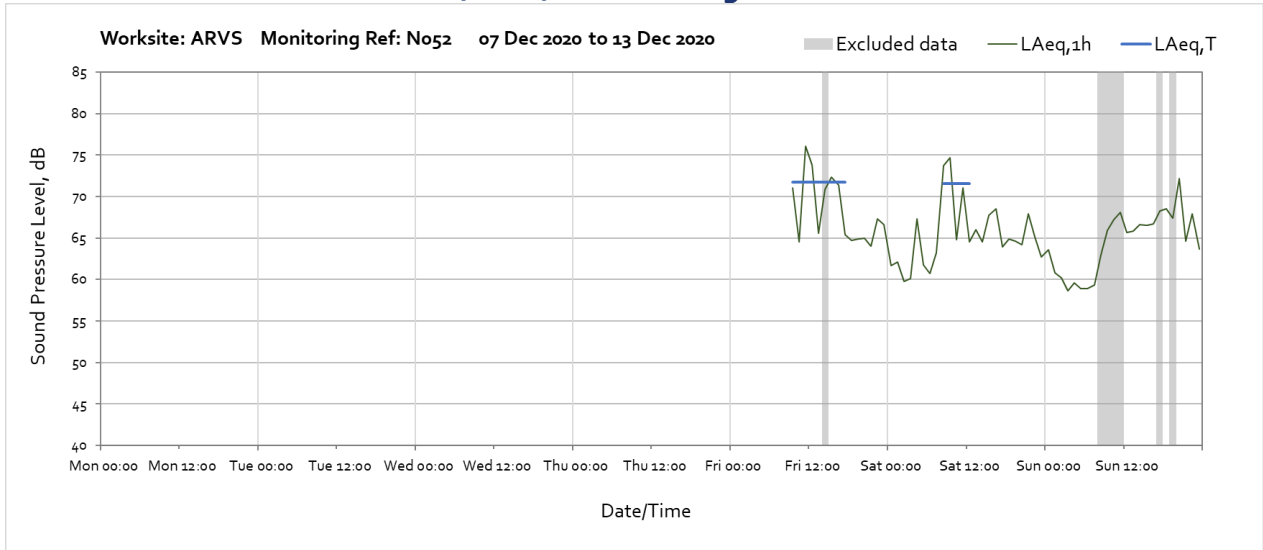


Adelaide Road Ventilation Shaft (ARVS) – Monitoring Ref: N052 (old)

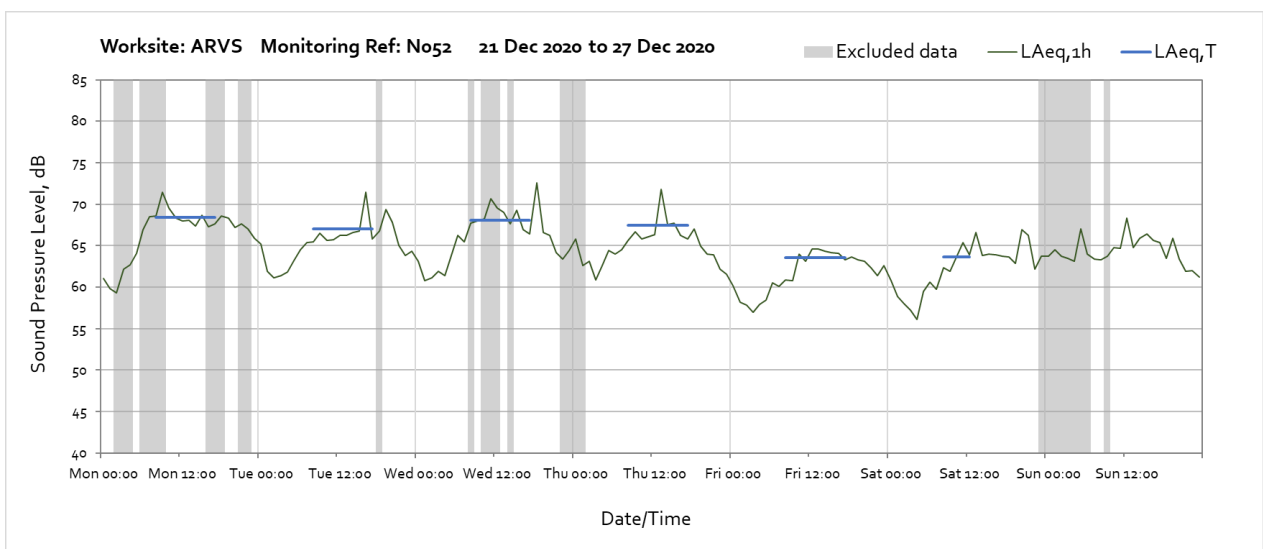
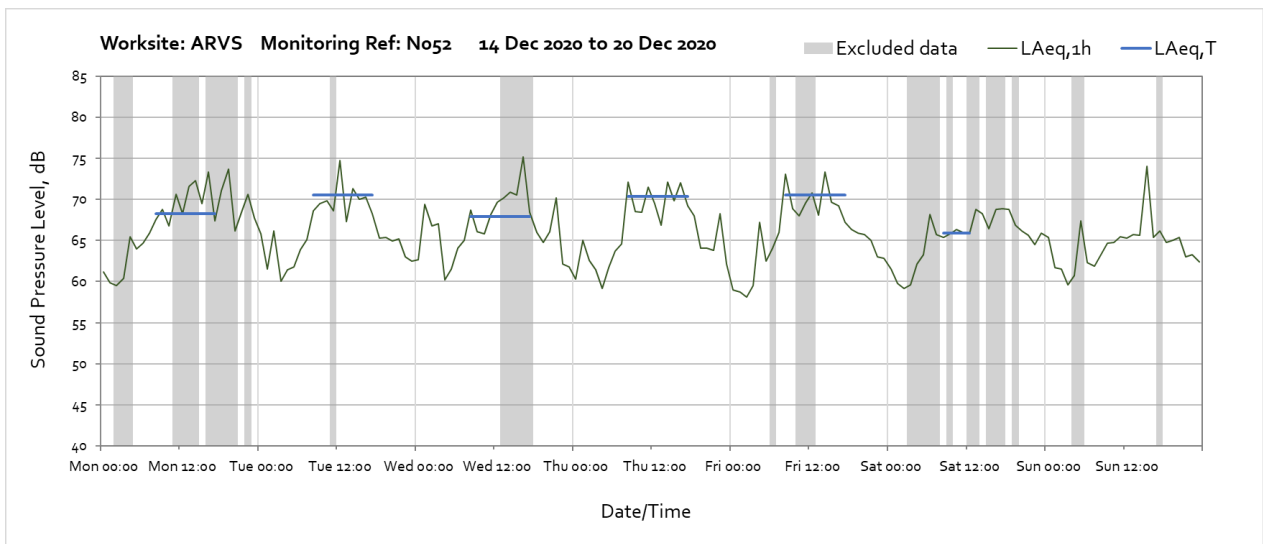


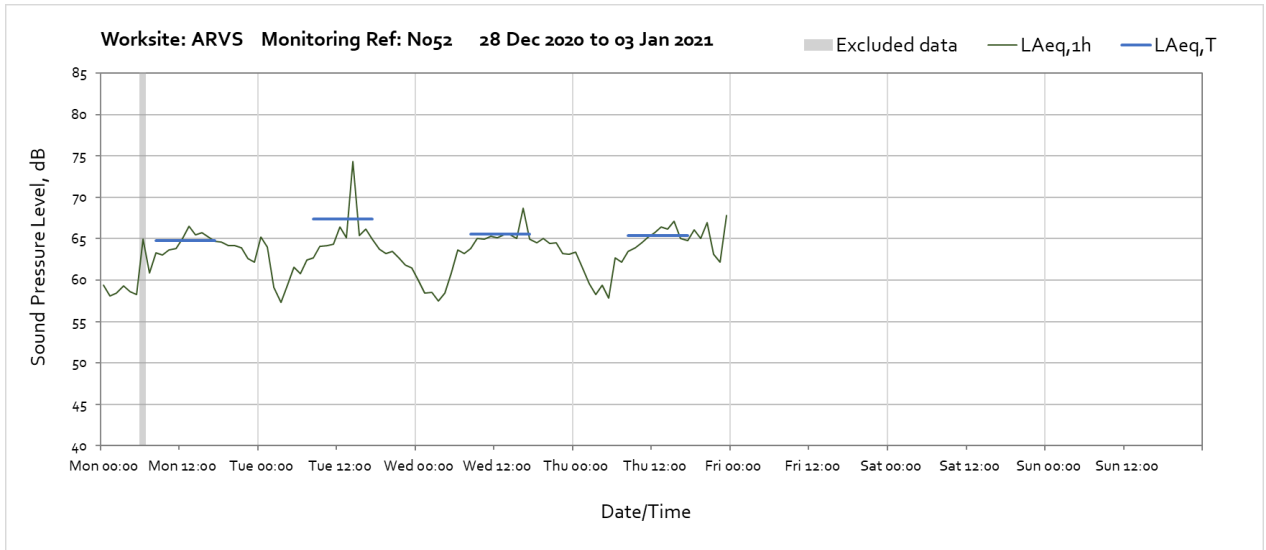
Note: Missing data from 14:00 on Thursday 3rd December was due to a fault with the monitoring station. Additional functionality checks will be undertaken to help avoid future data losses caused by similar issues. The monitor was relocated on Friday 11th December to a new position on a lamppost across the road.

Adelaide Road Ventilation Shaft (ARVS) – Monitoring Ref: N052



Note: Monitoring at this position was started at 09:00 on Friday 11th December.

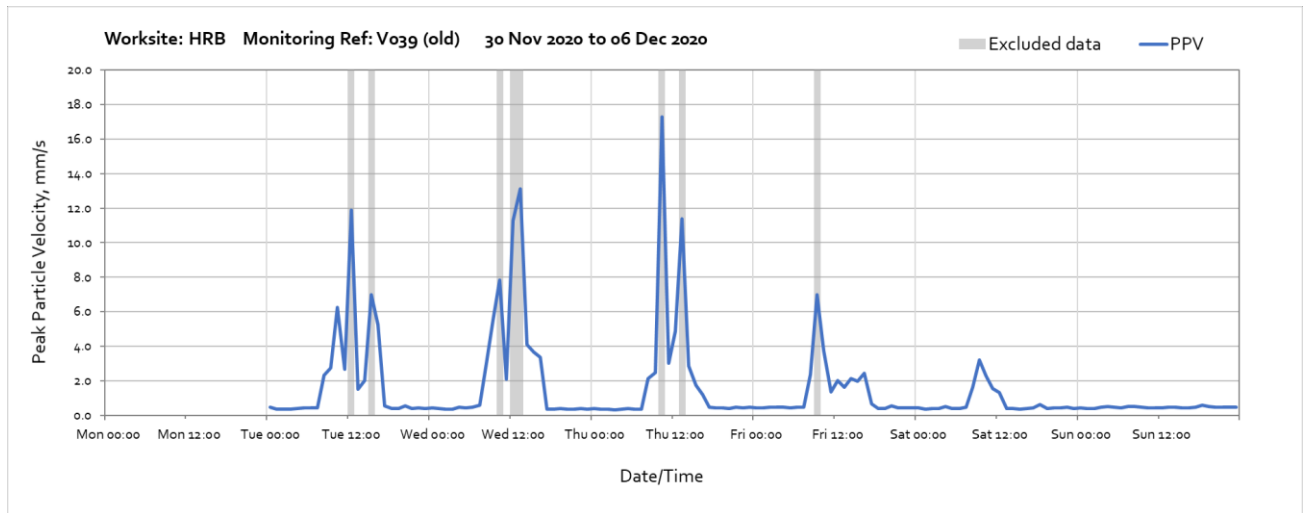




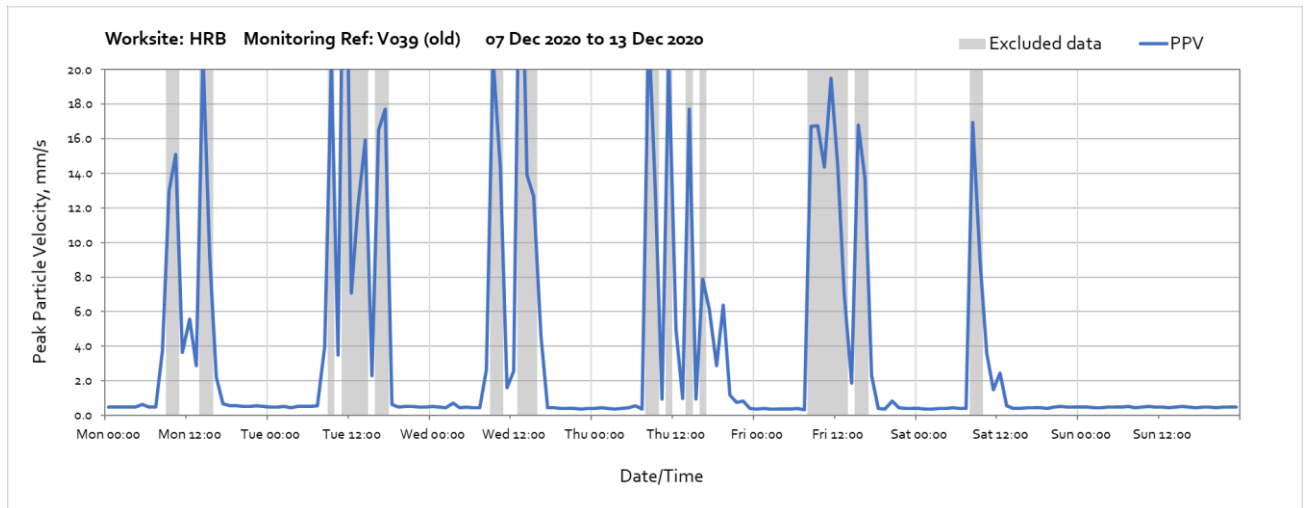
Vibration

The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the resultant PPV due to vibration components on three orthogonal axis x, y and z. Where high values of PPV were caused by local interference with the vibration monitor, which are not representative of HS2 construction works, these values have been greyed out in the following charts and have been excluded to calculate values in Table 4 of the main report.

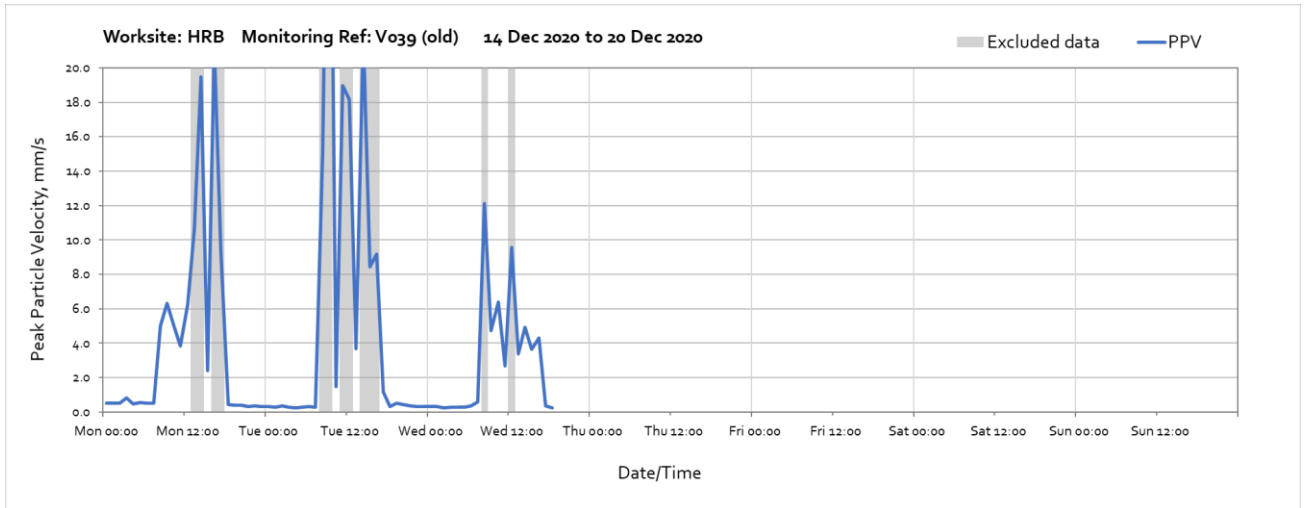
Worksite: HRB – Monitoring Ref: V039 (old)



Note: High vibration levels measured throughout the week were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels.

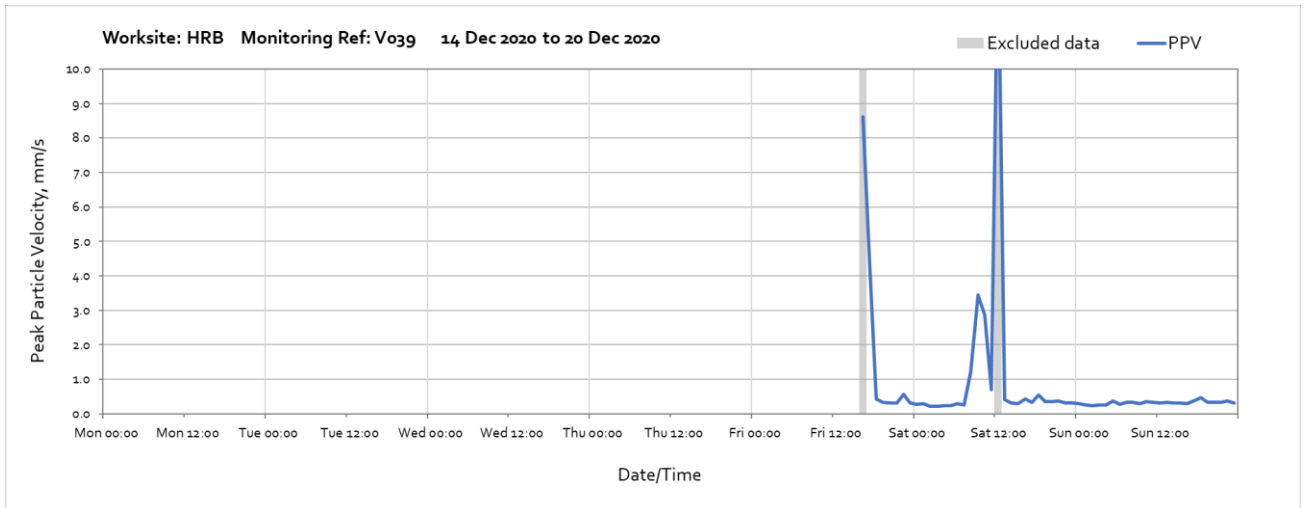


Note: High vibration levels measured throughout the week were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels.

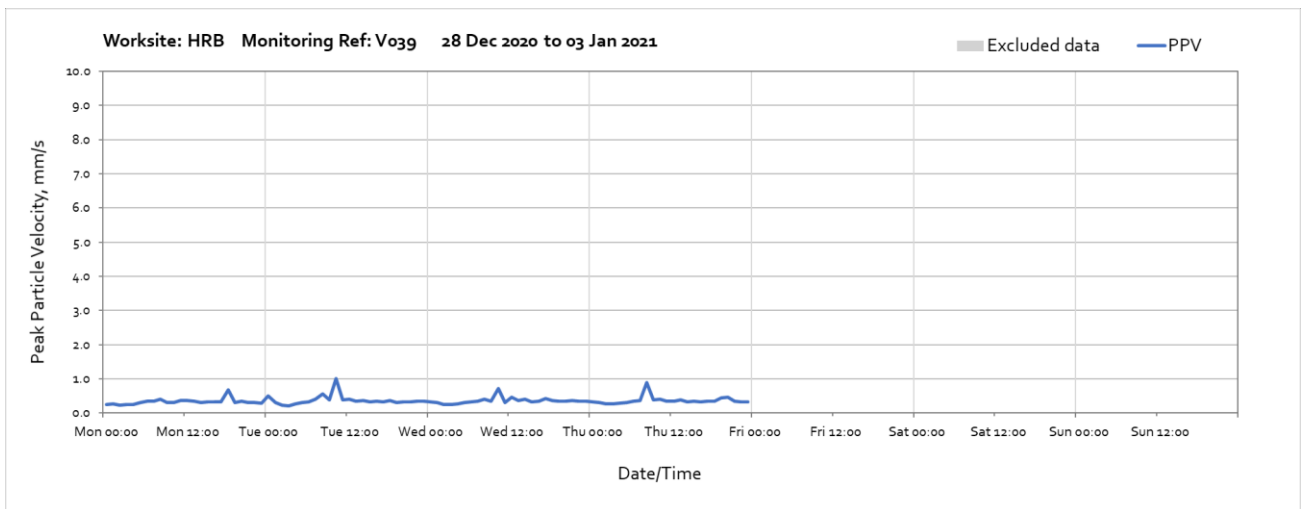
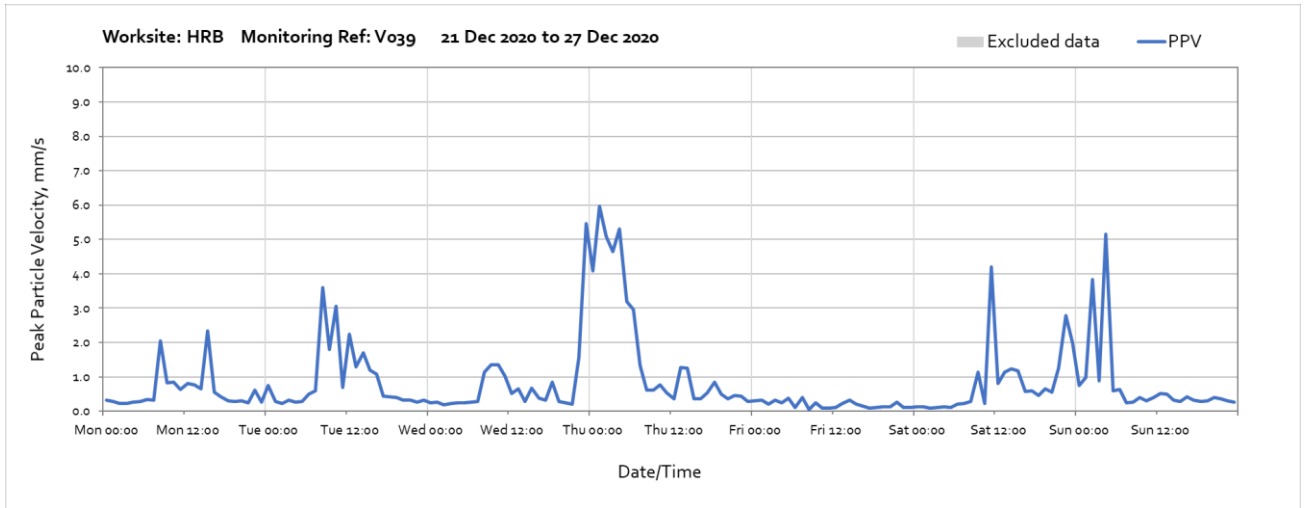


Note: High vibration levels measured throughout the week were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels. Missing data from 19:00 on Wednesday 16th until 16:00 on Friday 18th December was due to the handover of the monitoring station between contractors. The monitor was relocated on Friday 18th December to a new position more representative of residential receptors near the construction site.

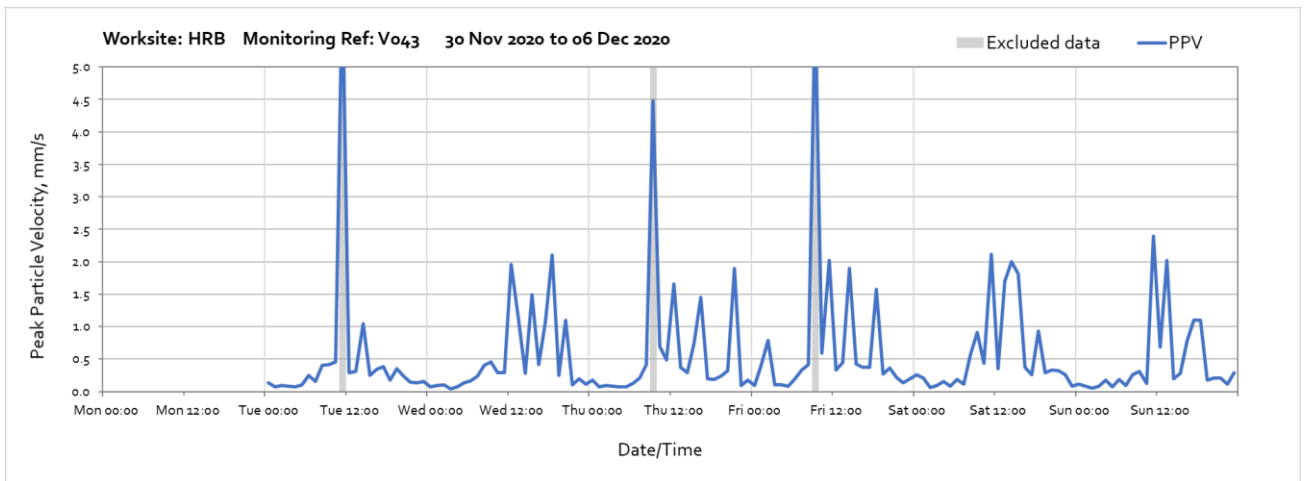
Worksite: HRB – Monitoring Ref: V039



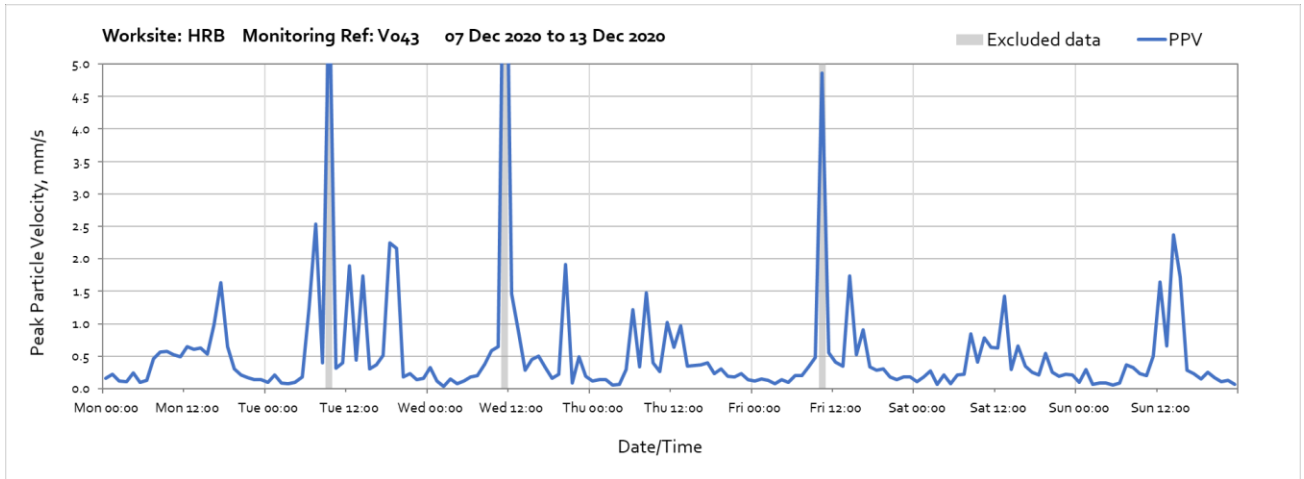
Note: High vibration levels measured throughout the week were due to local disturbance of the vibration monitor and are not representative of HS2 vibration levels.



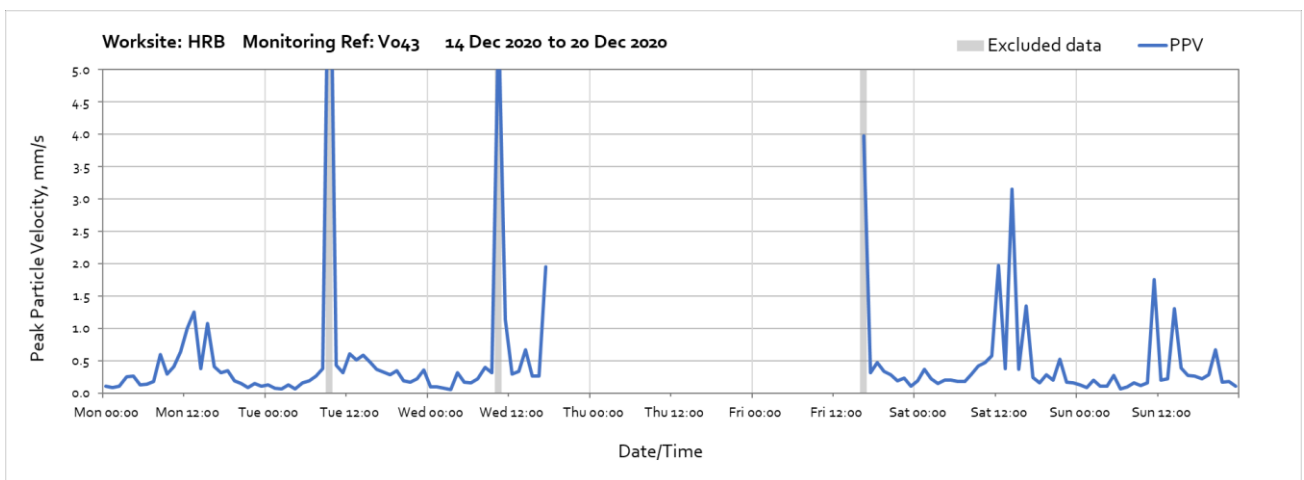
Worksite: HRB – Monitoring Ref: V043



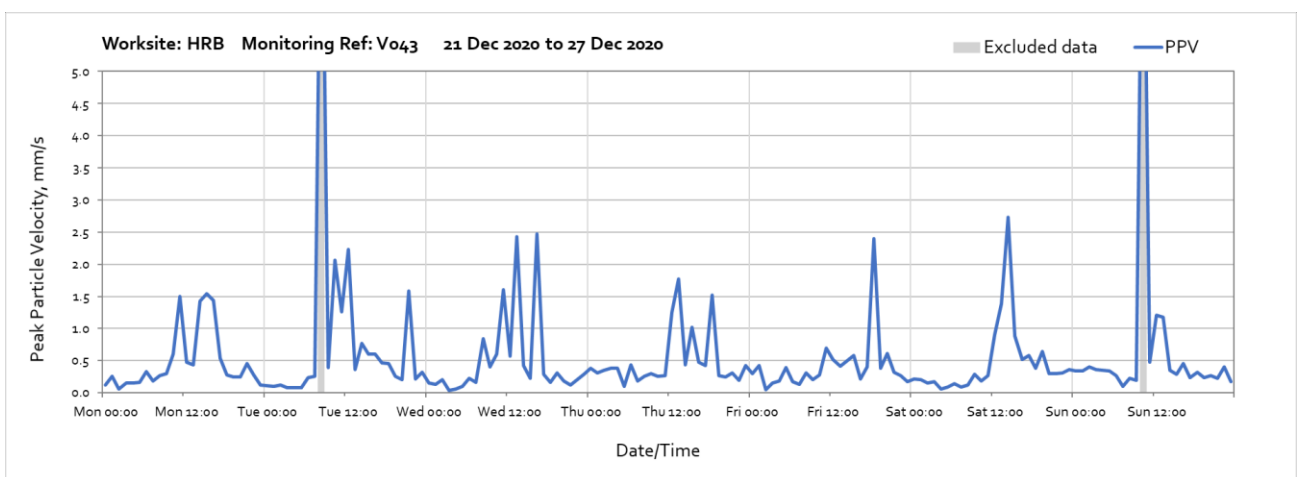
Note: High vibration levels measured throughout the week were due to the use of the nearby residential bin store and are not representative of HS2 vibration levels.



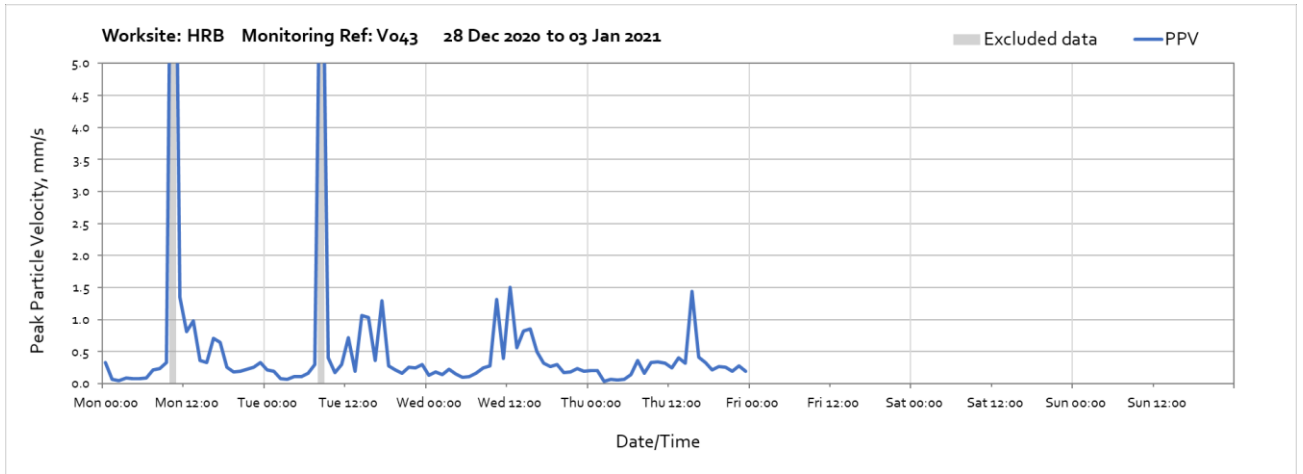
Note: High vibration levels measured throughout the week were due to the use of the neraby residential bin store and are not representative of HS2 vibration levels.



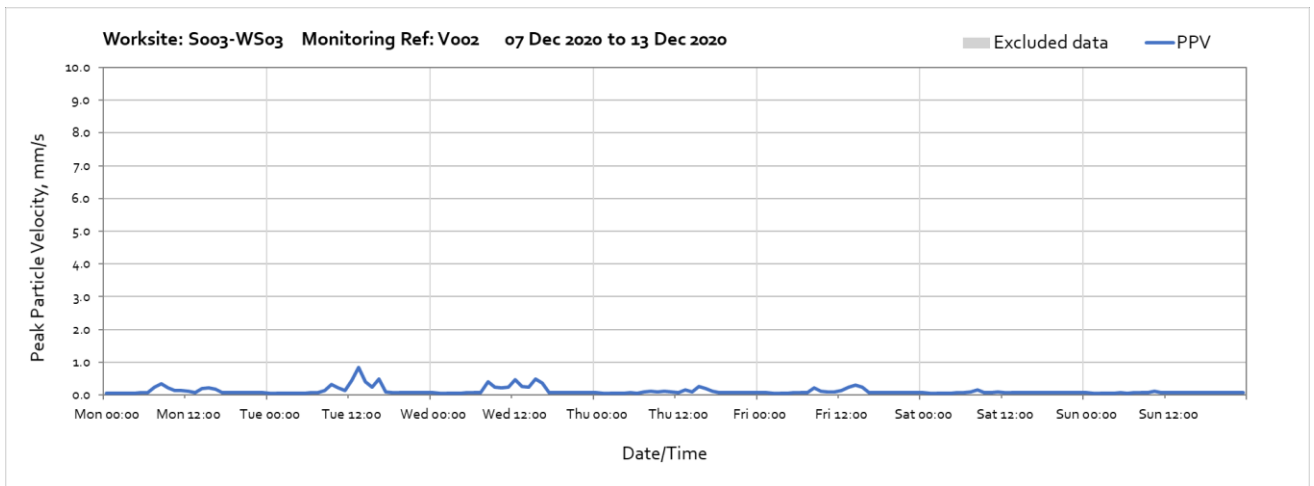
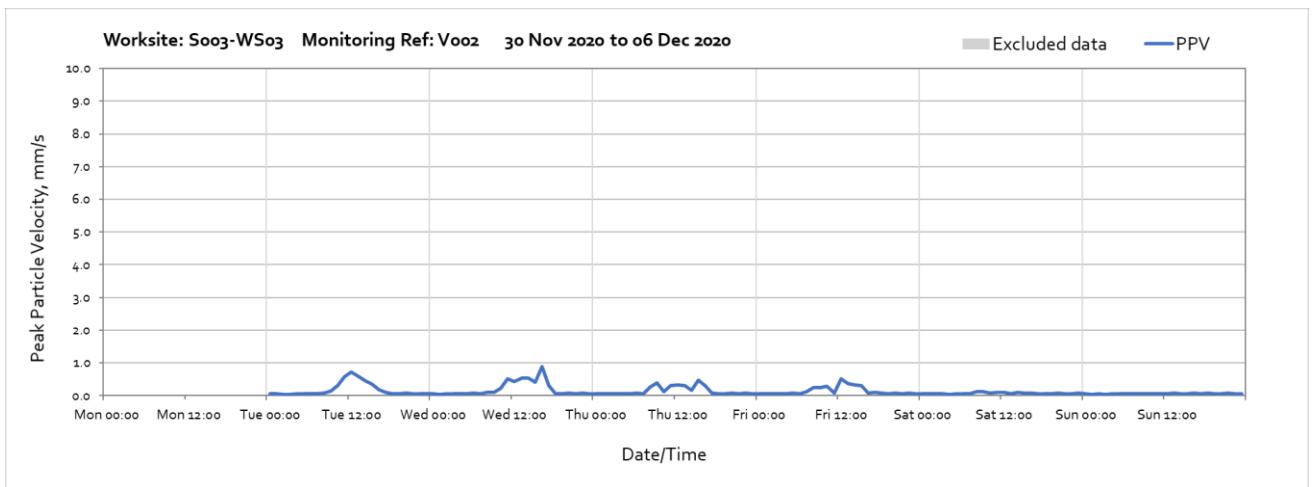
Note: High vibration levels measured throughout the week were due to the use of the neraby residential bin store and local interference of the monitor and are not representative of HS2 vibration levels. Missing data from 19:00 on Wednesday 16th until 15:00 on Friday 18th December was due to the handover of the monitoring station between contractors.

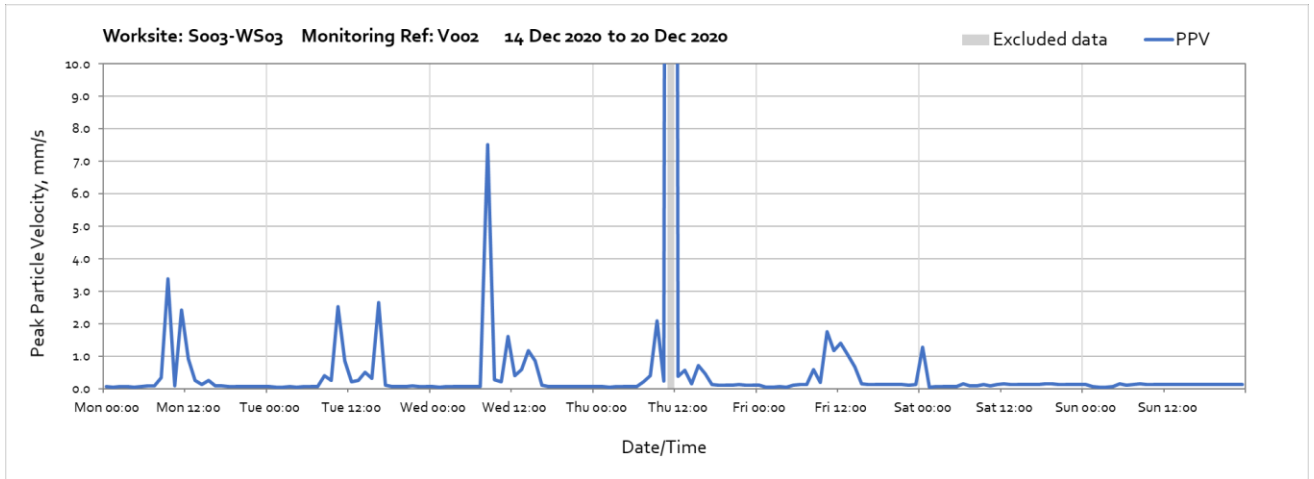


Note: High vibration levels measured throughout the week were due to the use of the neraby residential bin store and local interference of the monitor and are not representative of HS2 vibration levels.

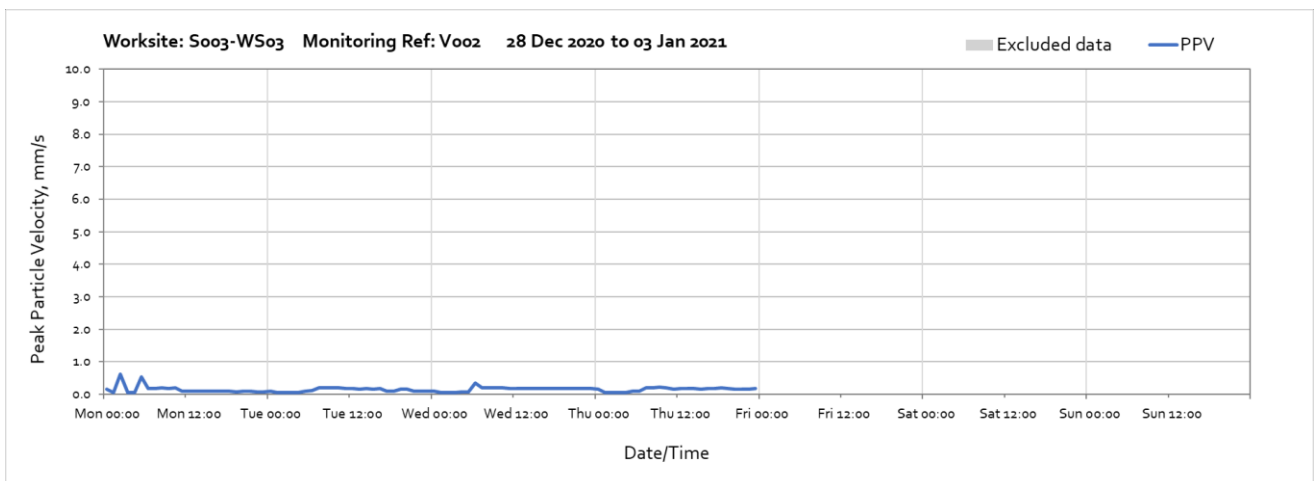
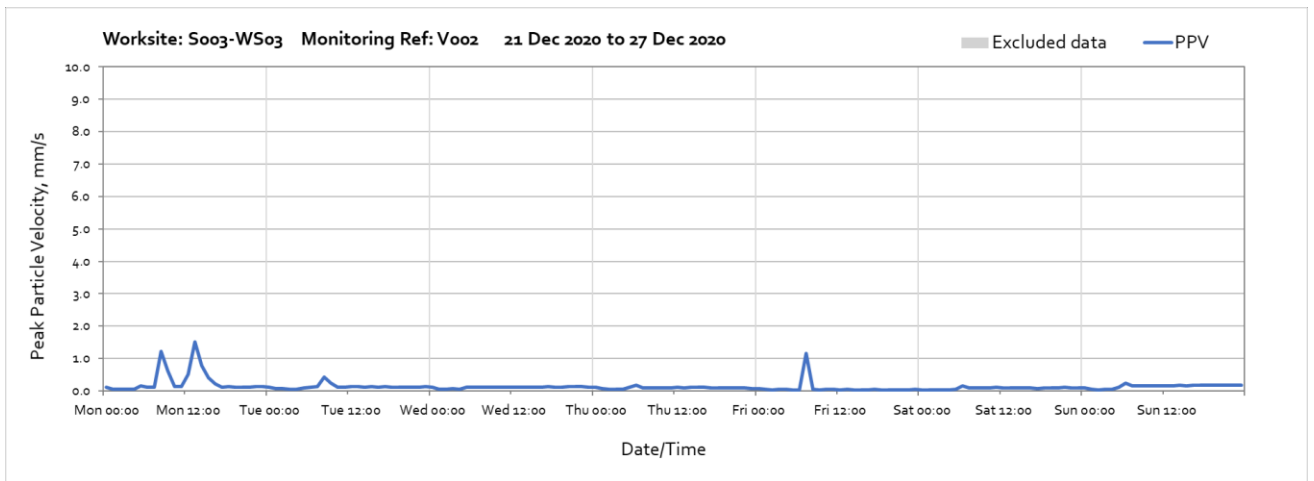


Worksite: S003-WS03 – Monitoring Ref: V002

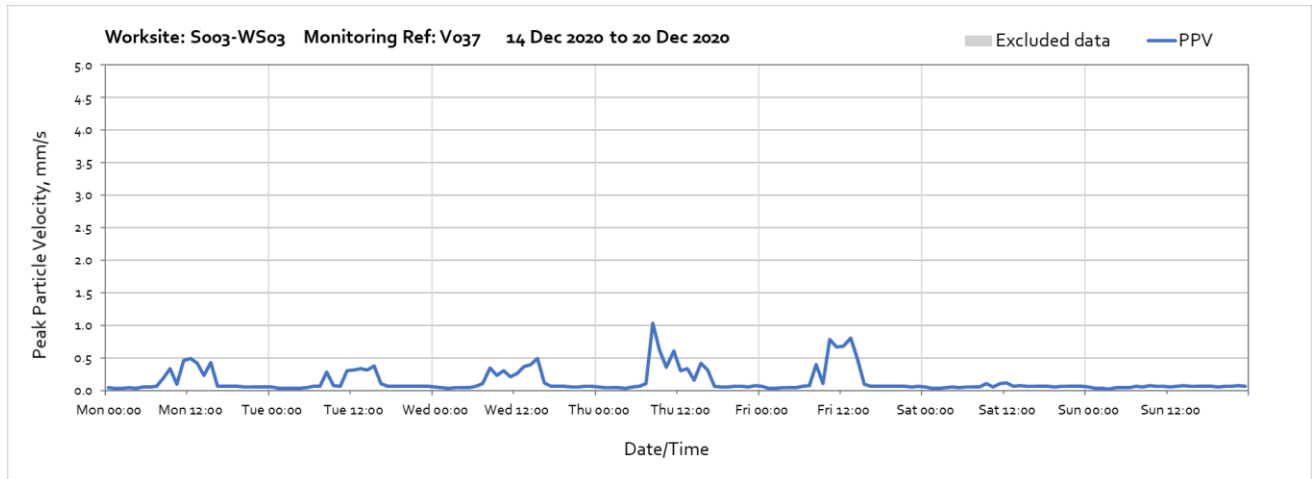
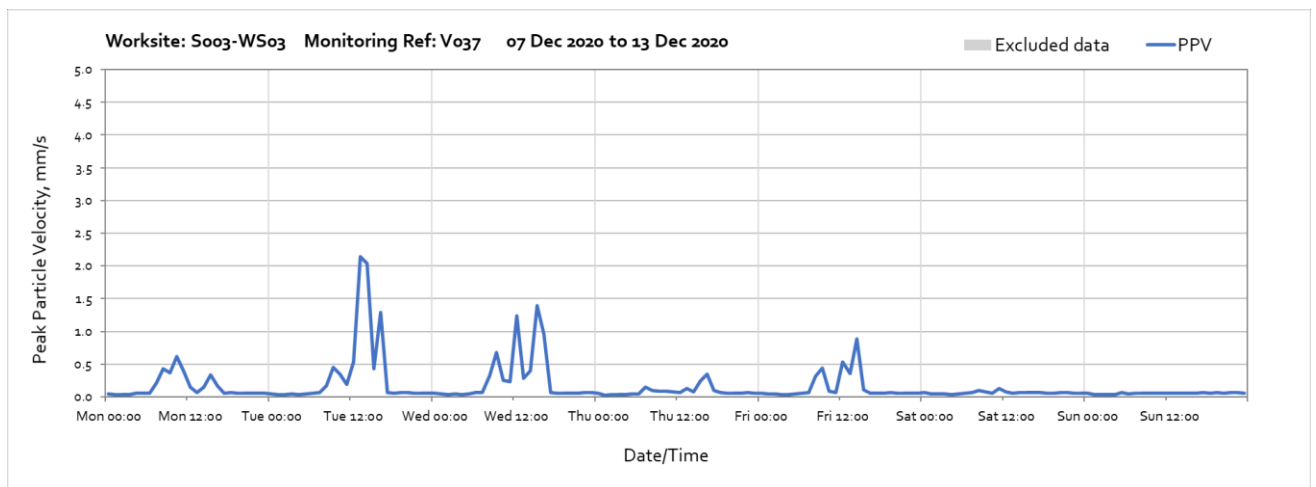
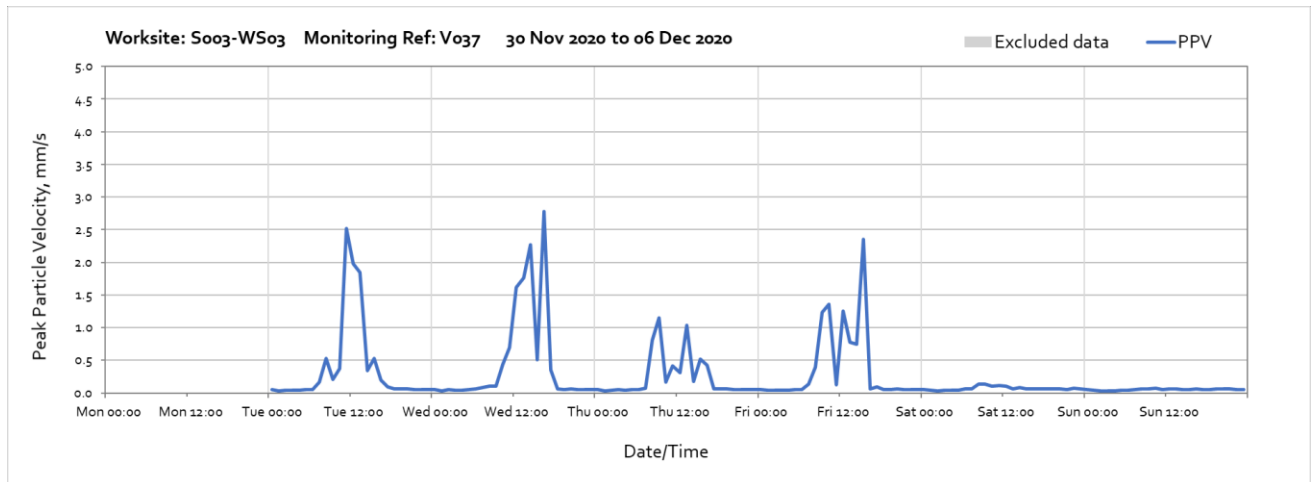




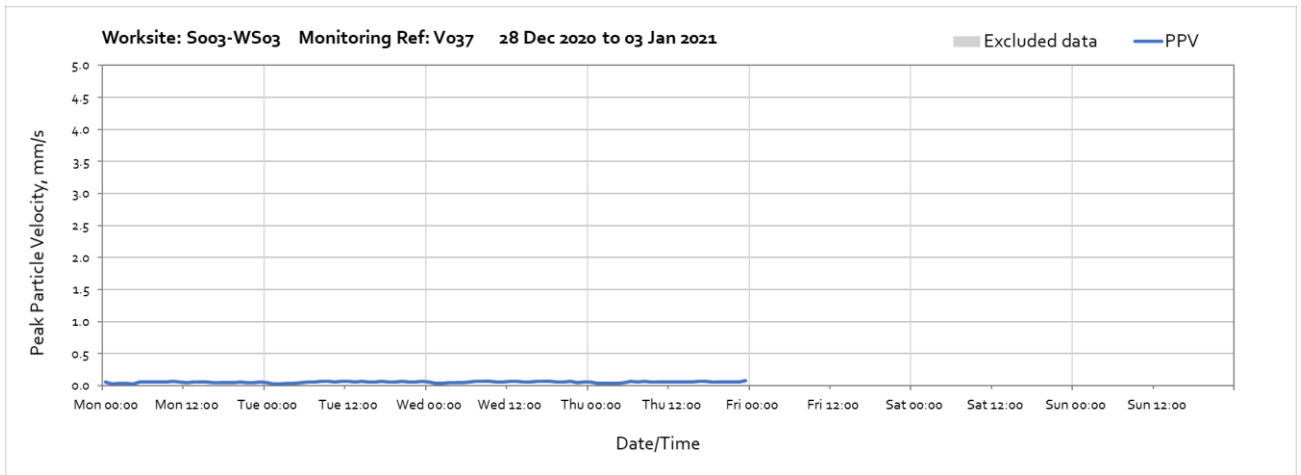
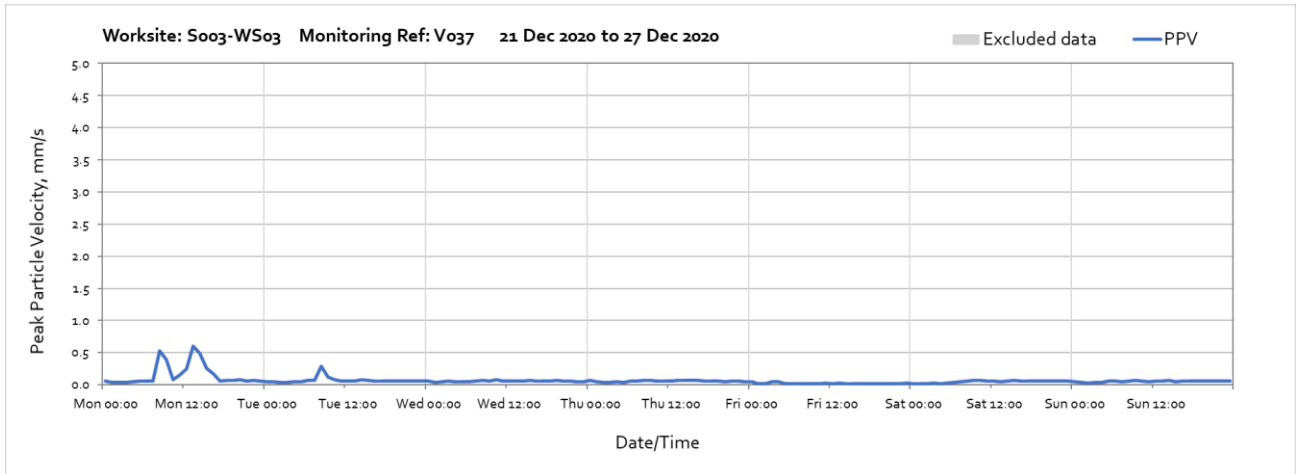
Note: High vibration levels measured at 11:00 on Thursday 17th December were caused by local disturbance of the monitor due to the installation of a new boiler adjacent to the monitoring station and are not representative of HS2 construction works.



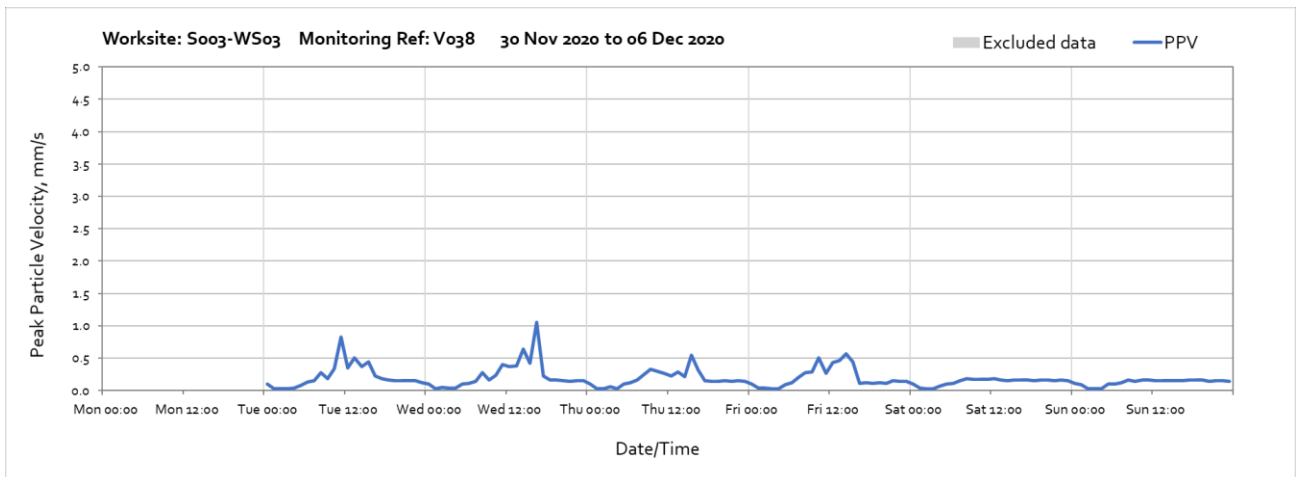
Worksite: S003-WS03 – Monitoring Ref: V037

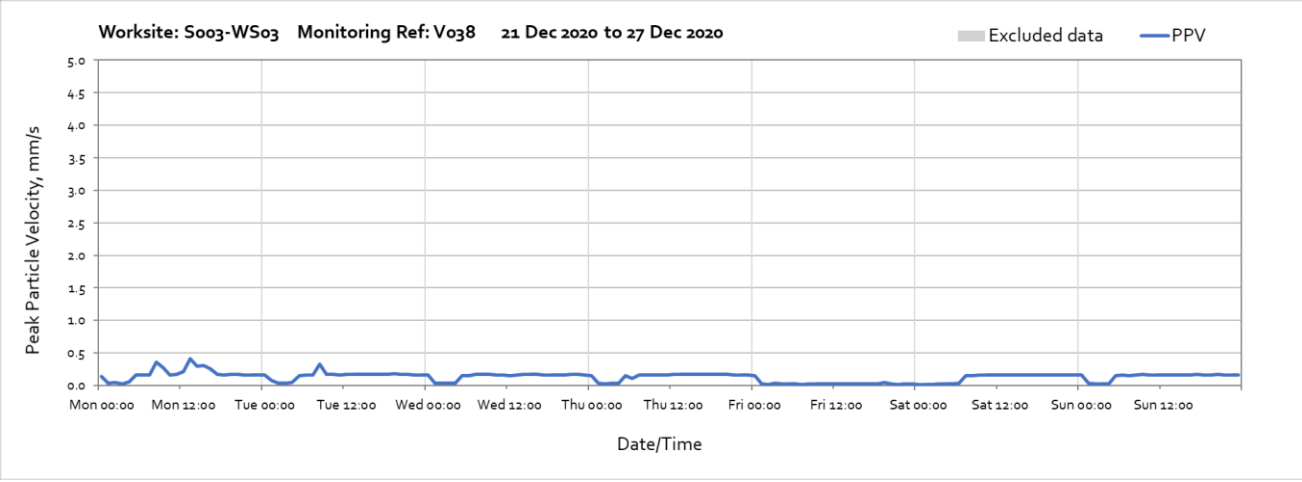
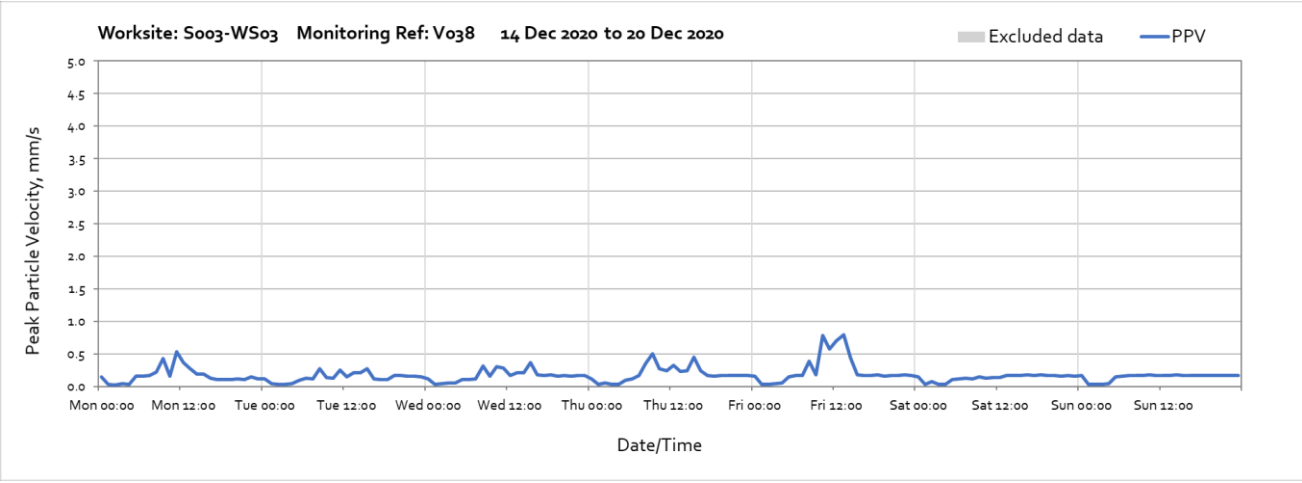
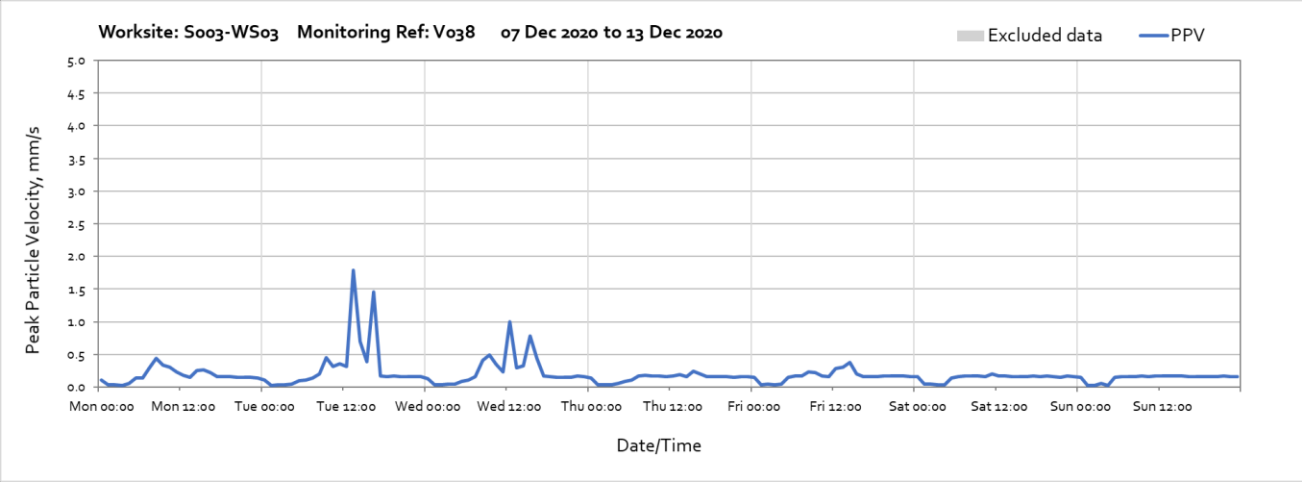


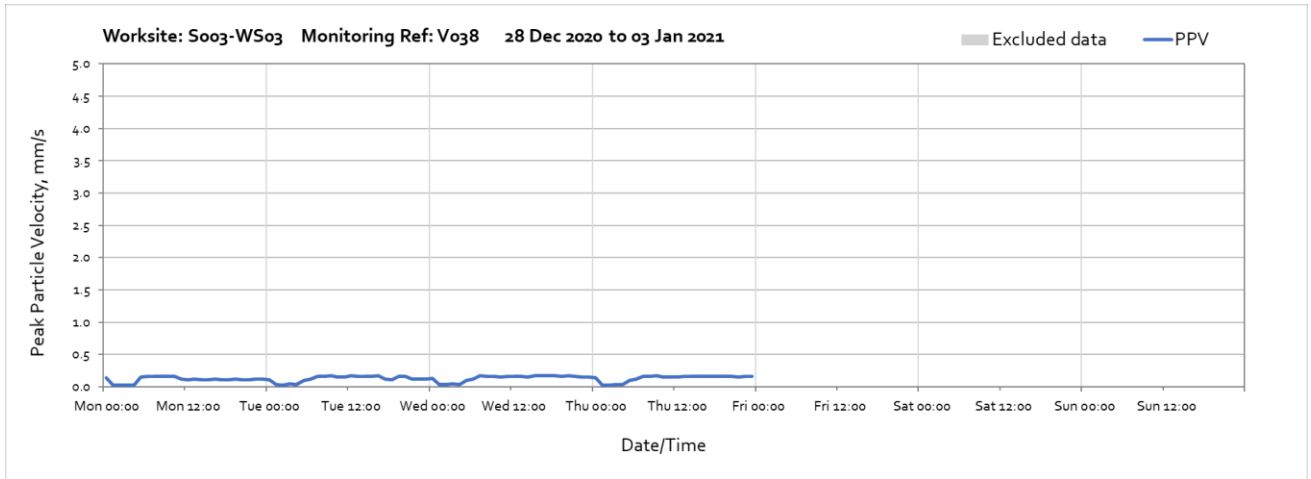
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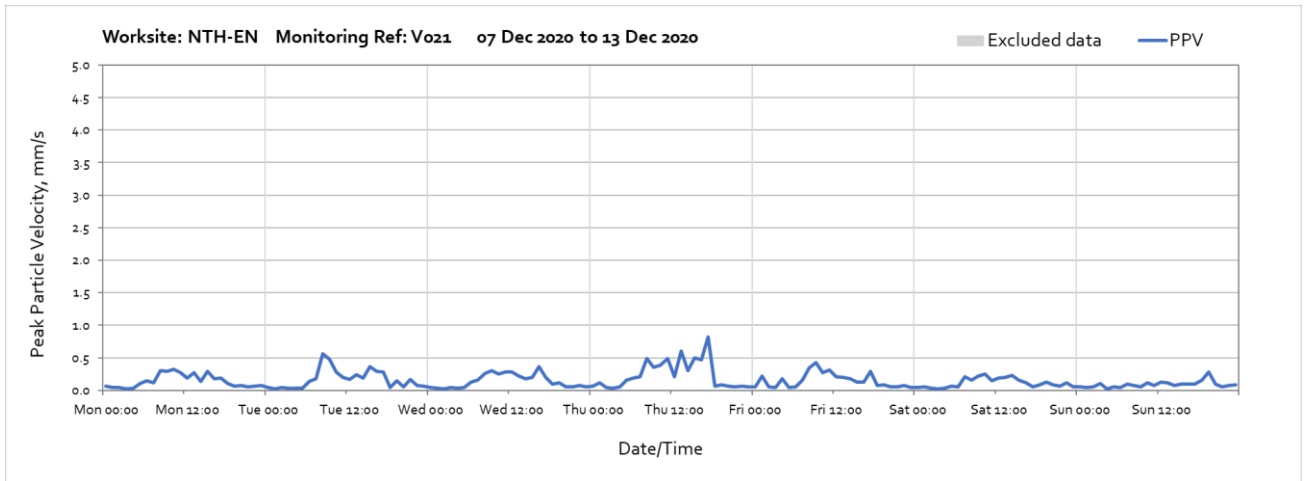
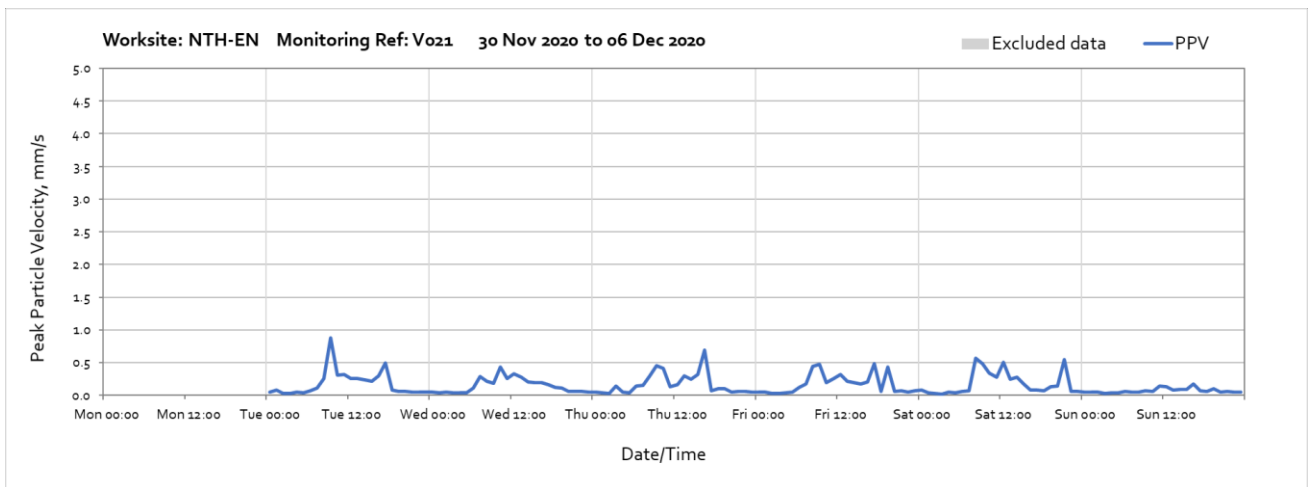
Worksite: S003-WS03 – Monitoring Ref: V038

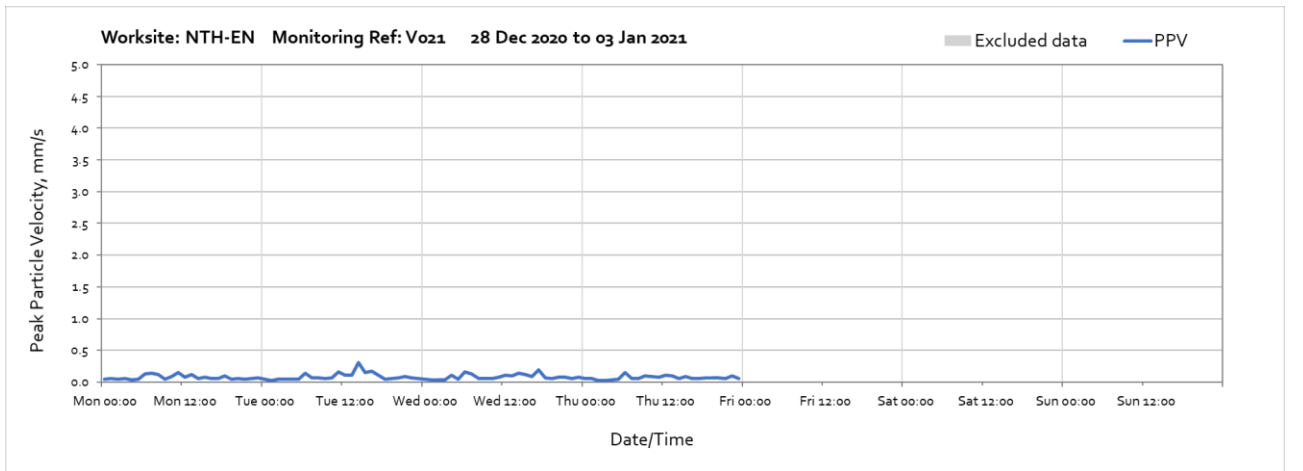
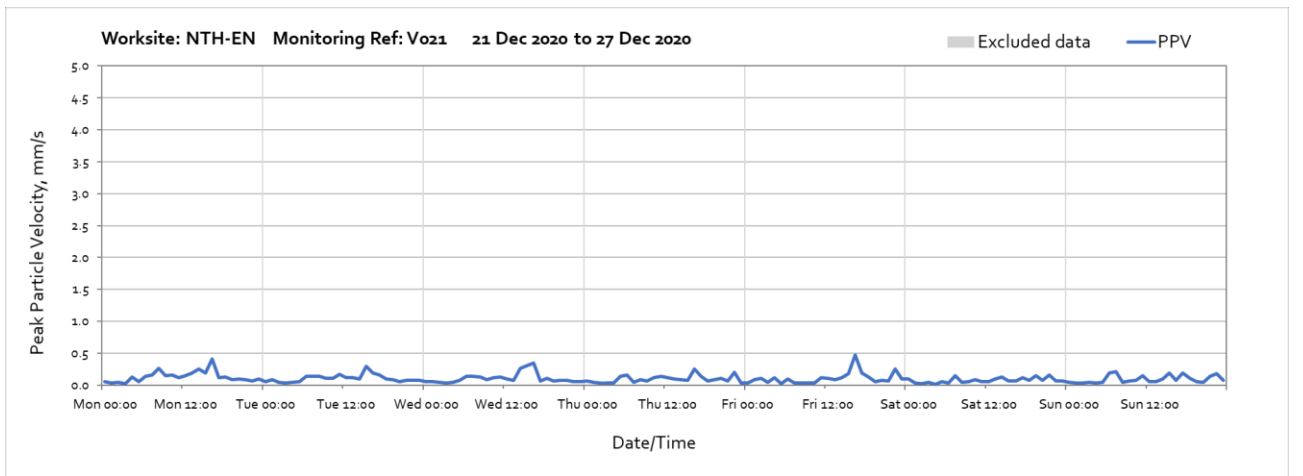
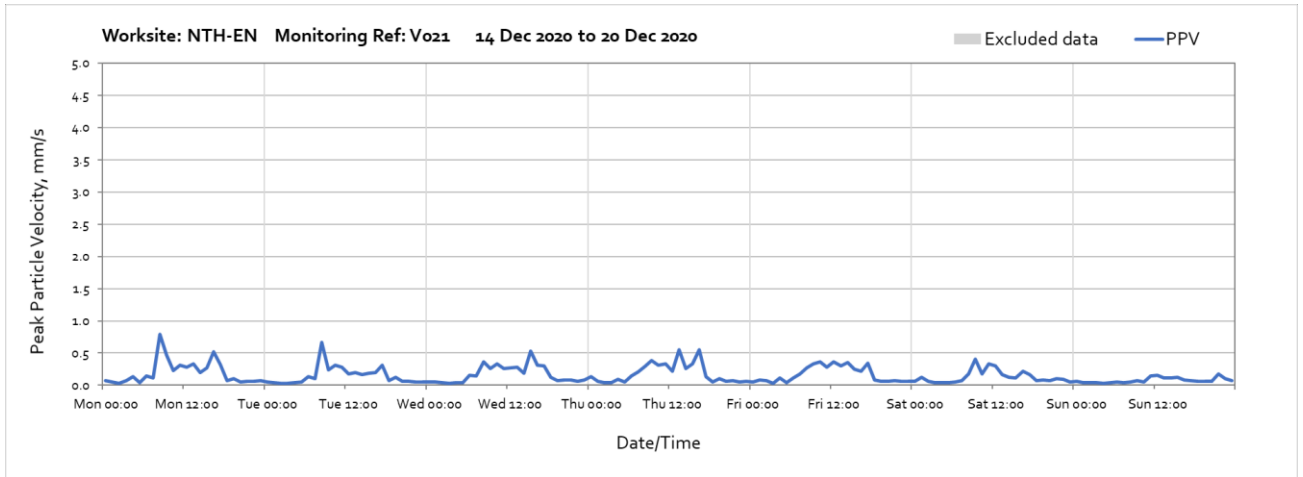




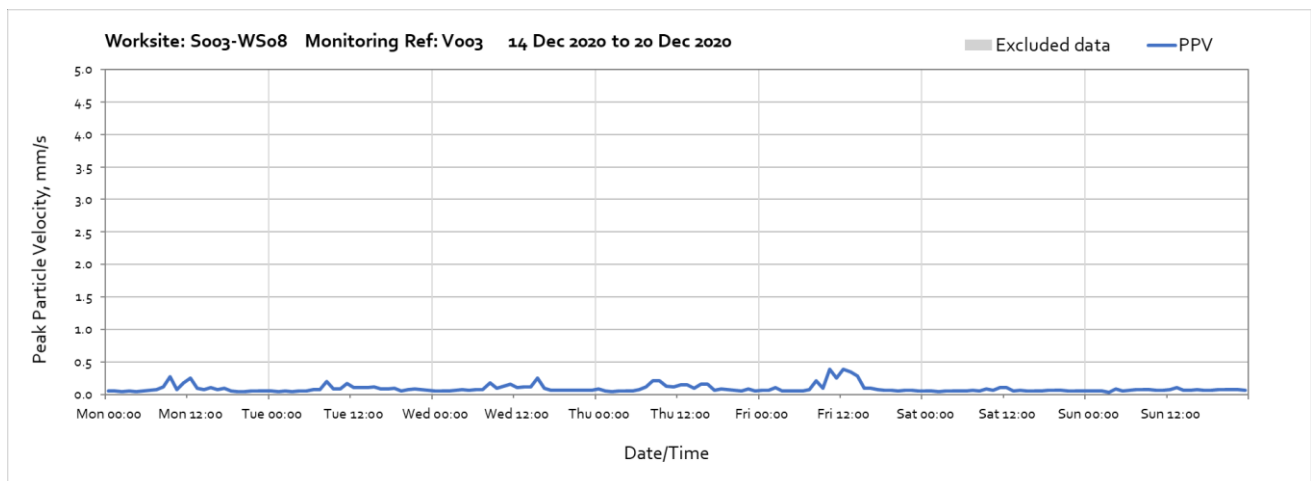
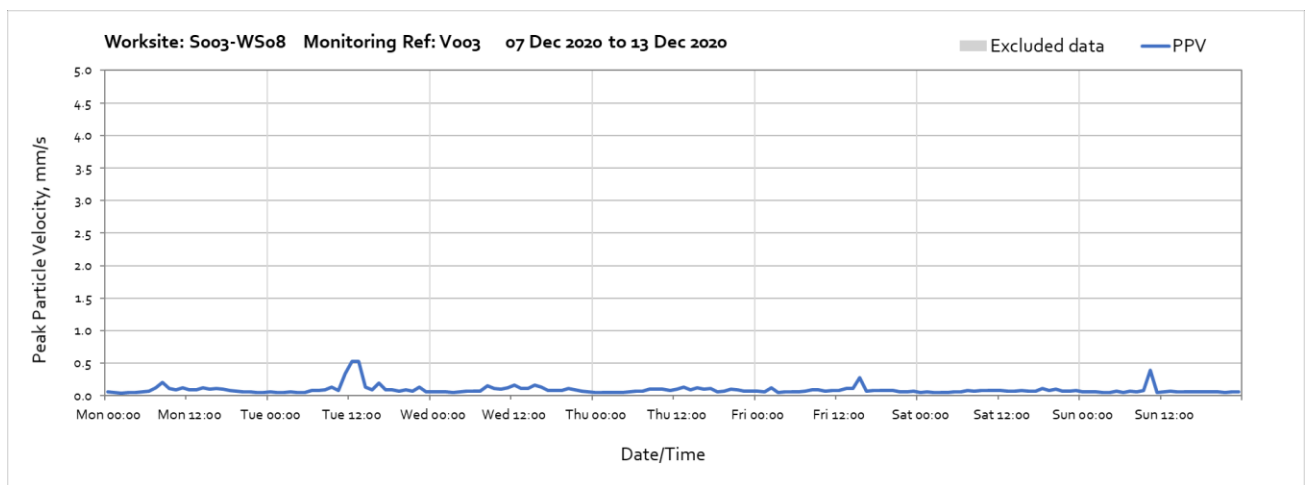
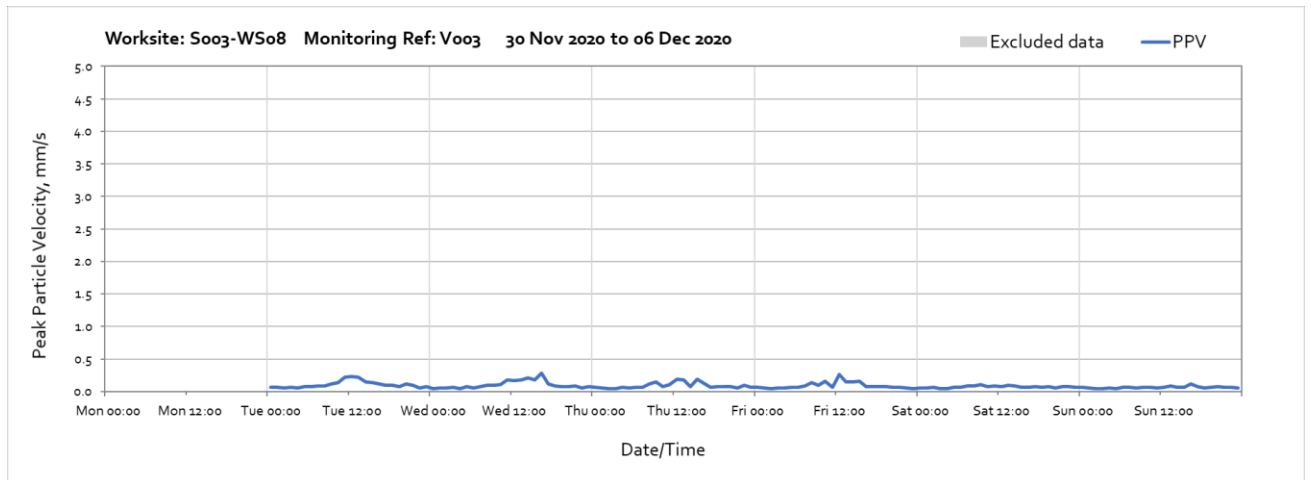


Worksite: NTH-EN – Monitoring Ref: V021





Worksite: S003-WS09 – Monitoring Ref: V003



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