

Construction noise and vibration Monthly Report – February 2021

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 February 2021.

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 vegetation clearance, trench excavations, installation of hardstanding for laydown areas and temporary haul road, utility diversion works, relocation of dry room, central gate ramp construction, working platform construction and lighting works were underway.
- Noise monitoring was undertaken in the vicinity of Euston Throat Retained Cut worksite (ref.: ETRC) where guide wall construction, silo installation and grouting, excavations, ground compaction and piling were underway.
- Noise monitoring was undertaken in the vicinity of Euston Scissor Cut worksite (ref.: ESC) where pile installation, groundworks, installation of pile mat and guide walls, access ramp installation, surveys and haul road maintenance were underway.
- Noise and vibration monitoring was undertaken in the vicinity of the Hampstead Road Bridge worksite (ref.: HRB), where hoarding and haul road access works and installation of traffic management systems were underway.
- Noise and vibration monitoring was undertaken in the vicinity of the Euston Cavern worksite (ref.: ECAV), where testing of ground anchors, bridge investigations, hoarding works and trial of sheet piling were underway.
- Noise monitoring was undertaken in the vicinity of On-Network worksites (ref.: B, C, D, E, F, G and H), where
 - fencing installation (worksite B);
 - overhead line equipment inspections and adjustments, signalling and cabling works (worksites C, D, E, F and G);
 - cable and signal recoveries and drainage works (worksites C, D and E);
 - resurfacing, cutline installation and demolition works (worksites G and H); and
 - erection of an access scaffold (worksite F) were underway.
- Noise monitoring was undertaken in the vicinity of the 140 Hampstead Road and Power Signal Box worksite (ref.: S001-WS02), where groundworks, pile cap removal and minor demolitions 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), where clearance of plant and materials, working platform installation and completion of footpaths and walkways were underway.
- Noise monitoring was undertaken in the vicinity of the Euston Towers Demolition worksite (ref.: EDT), where site setup and core drilling were underway.
- Noise monitoring was undertaken in the vicinity of the Vehicle Holding Area worksite (ref.: VHA), where concrete slab construction and site setup were underway.

Further works were also undertaken at:

- Hampstead Road, Stephenson Way, Melton Street, North Gower Street, Regnart Buildings and Harrington Street, where utilities works were underway.
- The Interim Taxi Rank worksite where ground load bearing testing, construction of concrete crossovers, tree removal and waste clearance, establishment of welfare compound and site setup were underway.

There was one exceedance of the HS2 threshold levels for significant noise effects during the reporting period.

There were no exceedances 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.

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 28th February 2021.

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:
 - vegetation clearance;
 - trench excavations;
 - installation of hardstanding for laydown areas and temporary haul road;
 - utility diversion works;
 - relocation of dry room;
 - central gate ramp construction;
 - working platform construction; and
 - disconnection of lamp post and installation of three spot lights on hoarding.
- Euston Throat Retained Cut worksite ref.: ETRC (see plan 2 in Appendix A), where work activities included:
 - guide wall construction;
 - polymer silo installation and grouting;

- excavations;
- ground compaction; and
- continuous flight auger (CFA) piling and sheet piling.
- Euston Scissor Cut worksite ref.: ESC (see plan 2 in Appendix A), where work activities included:
 - sheet piling;
 - pile installation;
 - groundworks;
 - installation of pile mat and guide walls;
 - completion of ramp access into the site;
 - surveys along Park Village East at track and street level; and
 - haul road maintenance.
- Hampstead Road Bridge worksite ref.: HRB (see plan 3 in Appendix A), where work activities included:
 - installation of hoarding and haul road access; and
 - installation of traffic management systems;
 - preparation for removal of bridge and parapet at Granby Terrace Bridge.
- Euston Cavern worksite ref.: ECAV (see plan 3 in Appendix A), where work activities included:
 - testing of ground anchors;
 - bridge investigations; and
 - hoarding works; and
 - trial of vibratory sheet piling.
- On-Network worksites ref.: B, C, D, E, F, G and H (see plan 3 in Appendix A), where work activities included:
 - fencing installation (worksite B);
 - overhead line equipment inspections and adjustments, signalling and cabling works (worksites C, D, E, F and G);
 - cable and signal recoveries and drainage works (worksites C, D and E);
 - LED signalhead works (worksite G only);
 - resurfacing works, cutline installation and demolition works (worksites G and H); and
 - erection of an access scaffold under Granby Terrace Bridge (worksite F).
- 140 Hampstead Road and Power Signal Box worksite ref.: S001-WS02 (see plan 2 in Appendix A), where work activities included:

- groundworks (ground remediation); and
- pile cap removal enabling works including preparation of pile mats and minor demolition works.
- 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; and
 - 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 3 in Appendix A), where work activities included:
 - clearance of plant and materials;
 - preparation and laying of aggregate material as working platforms for ground investigation equipment and compound; and
 - completion of footpaths and walkways.
- Euston Towers Demolition worksite ref.: ETD (see plan 3 in Appendix A), where work activities included:
 - site setup; and
 - core drilling to establish depth, position and integrity of existing piles.
- Vehicle Holding Area worksite ref.: VHA (see plan 1 in Appendix A), where work activities included:
 - steel fixing of concrete slabs;
 - concrete pouring; and
 - site setup.

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

- Hampstead Road, Stephenson Way, Melton Street, North Gower Street, Ragnart Buildings and Harrington Street, where utilities works were undertaken.
- Interim Taxi Rank worksite where work activities included ground load bearing testing, construction of concrete crossovers, tree removal and waste clearance, establishment of welfare compound and site setup.

1.1.4 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 February in the LBC area. Table 2 summarises the position of noise and vibration monitoring installations within the LBC area in February 2021.

1.2.2 Due to a coupling issue at the interface between vibration monitor V039 and the ground no valid data was collected at this location in February 2021.

1.2.3 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	Outside 70 Adelaide Road
	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
	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
	N045	Regents Park Estate south, external to Coniston
	V039	Coniston, Regents Park Estate

Worksite Reference	Measurement Reference	Address
	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
	V003	Royal College of General Practitioners basement vaults under Melton St
	V037	Magic Circle, basement
	V038	Wesley Hotel, basement lightwell, Euston Street
ETD	N007	Royal College of General Practitioners, Melton Street
Vehicle Holding Area (VHA)	N025	External to 3 Prince Albert Road
	N026	Vehicle Holding Area
NTH-EN	N012	Drummond Street, lamppost #14 (opposite to 92-94 Drummond Street)
	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.

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	Outside 70 Adelaide Road	Free-field	68.2 (70.2)	69.3 (71.1)	69.2 (75.1)	67.6 (71.0)	64.7 (73.6)	66.0 (66.5)	67.2 (68.1)	68.6 (69.8)	68.5 (71.4)	64.3 (71.3)	67.4 (71.7)	65.5 (71.1)
	N052	Adelaide Road-Beaumont Walk	Free-field	66.5 (69.3)	67.2 (68.7)	66.6 (75.3)	65.5 (68.2)	62.6 (74.7)	63.9 (64.3)	65.1 (66.3)	68.0 (73.5)	66.9 (71.7)	62.1 (73.0)	65.2 (69.2)	63.9 (70.8)
B	JC	Juniper Crescent	Free-field	57.0 (63.9)	58.2 (62.2)	55.6 (57.5)	57.0 (60.8)	54.7 (60.7)	56.1 (57.4)	54.8 (56.4)	54.3 (55.8)	54.5 (55.7)	52.0 (59.9)	54.4 (57.3)	53.3 (58.6)
ESC	N024	External to Park Village Studios, Park Village East	Free-field	59.7 (62.9)	60.2 (62.3)	59.7 (64.3)	57.7 (65.4)	53.2 (61.2)	55.6 (56.6)	57.5 (58.4)	58.7 (60.0)	58.4 (65.0)	51.8 (55.7)	56.8 (60.0)	54.5 (57.2)
	N047	Park Village East/Mornington Street bridge, lamppost #13	Free-field	59.0 (64.1)	60.8 (61.8)	59.7 (61.8)	58.0 (61.9)	53.3 (62.2)	56.5 (57.4)	59.7 (61.7)	59.5 (60.0)	59.4 (66.2)	53.2 (57.6)	58.1 (65.0)	53.5 (57.1)
ESC, C	N022	External to 34 Mornington Terrace	Free-field	59.7 (61.8)	60.4 (64.5)	58.7 (61.4)	57.7 (59.8)	53.8 (59.2)	58.4 (58.8)	58.7 (59.9)	58.2 (60.0)	57.6 (59.4)	51.3 (59.7)	56.9 (62.0)	53.4 (56.6)
	N046	Mornington Terrace near The Edinboro Castle pub, lamppost #18	Free-field	62.2 (63.5)	62.2 (63.3)	60.8 (63.8)	60.6 (62.6)	57.0 (61.5)	61.8 (62.5)	61.7 (62.1)	61.3 (62.5)	60.8 (61.6)	56.6 (62.4)	60.1 (65.1)	56.4 (60.7)
ETRC	N001	External to Cubitt Court, 100 Park Village East	Free-field	58.8 (61.7)	69.7 (74.4)	59.1 (61.5)	57.2 (65.0)	52.8 (67.2)	56.4 (58.8)	65.9 (70.1)	62.2 (66.7)	59.4 (66.2)	52.8 (57.4)	57.6 (65.4)	53.1 (56.2)
	N002	Richmond Court, Park Village East	Free-field	59.3 (62.7)	68.2 (75.3)	60.4 (62.7)	57.8 (62.3)	52.7 (60.1)	55.0 (56.2)	63.2 (66.6)	60.4 (62.1)	59.8 (65.9)	53.2 (57.8)	58.4 (66.3)	53.6 (58.9)

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
	N003	Silsoe House, Park Village East	Façade	58.4 (60.6)	62.1 (66.0)	60.2 (62.3)	58.1 (62.1)	53.0 (60.3)	55.4 (56.5)	60.1 (61.1)	60.2 (60.7)	60.3 (68.6)	53.6 (58.0)	58.5 (65.7)	54.0 (58.7)
	N005	5A Granby Terrace	Free-field	65.3 (68.3)	68.8 (71.9)	64.8 (68.2)	63.3 (65.5)	62.0 (65.5)	64.6 (65.1)	71.6 (75.0)	65.6 (68.5)	64.6 (73.3)	62.2 (64.6)	63.4 (66.6)	62.1 (64.1)
	N023	Ampthill Estate, Hampstead Road	Free-field	69.1 (70.8)	71.1 (72.4)	69.6 (73.6)	67.9 (72.7)	65.3 (75.2)	66.6 (66.9)	69.5 (71.8)	68.6 (69.0)	68.1 (71.6)	65.3 (70.2)	68.0 (75.7)	65.7 (69.3)
ETRC, D	N004	Mornington Terrace, lamppost #7	Free-field	63.7 (67.1)	66.4 (68.9)	63.7 (74.8)	62.3 (64.5)	59.2 (67.6)	64.4 (66.0)	66.6 (67.5)	63.4 (65.0)	63.4 (68.1)	55.5 (65.4)	62.1 (67.6)	59.5 (65.2)
HRB	N020	Mackworth Street	Free-field	54.6 (57.8)	63.1 (67.2)	52.9 (55.6)	50.9 (53.7)	48.5 (53.6)	52.5 (54.3)	57.9 (59.3)	54.8 (59.2)	53.1 (63.8)	48.5 (53.7)	52.8 (62.6)	48.3 (53.1)
	N021	Stanhope Street, lamppost #2	Free-field	58.6 (61.2)	66.5 (72.7)	58.7 (61.2)	56.9 (62.7)	52.5 (60.8)	54.9 (57.7)	63.4 (68.0)	59.8 (63.0)	59.1 (65.5)	52.9 (57.0)	57.5 (64.8)	53.2 (58.0)
	N044	Regents Park Estate west	Free-field	53.6 (56.7)	70.0 (73.3)	53.4 (64.2)	51.6 (61.4)	48.6 (54.6)	52.5 (53.2)	64.4 (65.6)	56.5 (63.4)	53.4 (64.0)	50.0 (61.2)	53.1 (63.3)	49.3 (52.6)
	N045	Regents Park Estate south, external to Coniston	Free-field	56.5 (58.8)	66.7 (70.8)	56.5 (58.9)	54.4 (60.1)	51.8 (58.7)	55.2 (57.3)	65.3 (74.9)	58.7 (63.0)	54.8 (59.5)	51.9 (56.6)	56.2 (62.6)	51.7 (57.5)
G	HH	Euston Station Parcel Deck, Barnby Street	Free-field	60.9 (66.2)	62.6 (65.1)	63.2 (70.3)	62.0 (67.9)	58.2 (67.8)	60.1 (63.1)	59.9 (61.0)	60.2 (62.6)	60.8 (62.9)	57.8 (68.2)	60.9 (66.8)	59.1 (64.7)
	BS	Roof of Stockbeck House, Barnby Street	Free-field	59.7 (61.1)	62.2 (64.8)	59.8 (63.9)	59.1 (62.6)	55.6 (61.2)	60.1 (60.4)	60.7 (62.1)	61.0 (64.2)	60.2 (62.5)	55.7 (60.9)	59.6 (65.7)	55.6 (60.2)

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
S001-WS02	N018	Outside replacement housing, Hampstead Road	Free-field	69.2 (71.6)	71.4 (73.9)	70.0 (76.7)	68.8 (72.5)	65.7 (76.8)	67.1 (67.7)	68.1 (69.4)	68.0 (68.7)	68.9 (73.0)	66.7 (71.8)	68.5 (73.4)	67.5 (73.6)
	N019	Outside Cartmel, Hampstead Road	Free-field	56.8 (60.1)	63.0 (66.6)	56.8 (60.3)	55.8 (62.8)	53.6 (60.5)	55.9 (57.7)	59.3 (60.1)	57.3 (58.9)	55.9 (59.2)	53.8 (57.0)	56.2 (63.0)	53.7 (56.6)
S003-WS03	N006	RCGP Roof level	Free-field	55.6 (60.0)	65.7 (68.0)	52.9 (57.6)	52.1 (53.8)	51.6 (53.7)	52.7 (52.9)	56.0 (59.8)	56.4 (64.3)	53.6 (63.6)	51.6 (53.2)	53.3 (60.3)	51.9 (54.1)
	N008	RCGP Stephenson Way	Façade	56.9 (67.4)	71.7 (89.2)	54.7 (70.9)	53.7 (65.4)	52.7 (63.7)	61.7 (73.7)	72.8 (90.0)	61.9 (78.1)	59.3 (72.1)	53.1 (55.8)	56.5 (70.5)	52.7 (56.4)
	N010	Wesley Hotel	Façade	59.8 (70.2)	69.6 (82.8)	55.8 (65.5)	54.8 (65.6)	53.1 (65.7)	58.0 (64.2)	66.6 (70.8)	60.4 (63.1)	60.1 (64.9)	54.0 (63.2)	55.6 (64.7)	54.3 (63.4)
	N011	Outside 82 Euston Street	Free-field	55.3 (60.9)	60.0 (65.8)	53.9 (58.9)	53.5 (59.9)	51.4 (62.5)	52.3 (54.7)	55.8 (59.6)	54.6 (57.4)	54.1 (58.1)	50.8 (58.5)	54.8 (62.0)	52.1 (61.4)
ETD	N007	RCGP, Melton Street	Free-field	63.8 (70.0)	68.2 (75.5)	63.1 (65.4)	63.2 (67.1)	61.4 (67.7)	63.4 (65.8)	67.7 (71.4)	63.1 (65.4)	62.3 (65.7)	60.9 (65.2)	62.8 (66.0)	61.5 (65.6)
VHA	N025	External to 3 Prince Albert Road	Free-field	66.3 (68.1)	67.5 (71.5)	65.1 (69.3)	64.1 (68.9)	61.3 (68.2)	63.1 (65.2)	65.6 (68.1)	64.3 (66.8)	64.3 (70.8)	61.2 (67.4)	64.2 (68.6)	62.2 (67.5)
	N026	Thames Water Compound	Free-field	59.0 (63.6)	62.2 (68.9)	57.0 (59.2)	55.4 (61.2)	51.5 (58.1)	55.5 (57.0)	57.4 (65.3)	55.3 (56.1)	55.9 (58.1)	50.6 (53.8)	55.4 (60.2)	53.1 (58.4)

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
NTH-EN	N012	Opposite 92-94 Drummond Street	Free-field	56.2 (59.3)	61.4 (63.6)	57.4 (62.9)	56.4 (61.8)	54.5 (63.7)	56.3 (58.8)	58.5 (59.6)	59.3 (60.0)	57.5 (61.1)	54.0 (55.8)	58.5 (72.1)	55.5 (63.0)
	N014	Starcross Street lamppost (external to Exmouth Arms)	Free-field	55.1 (58.1)	59.6 (62.1)	54.8 (58.7)	53.4 (59.4)	51.5 (58.4)	52.8 (54.5)	56.3 (58.3)	56.7 (59.5)	55.3 (60.0)	50.8 (59.7)	55.7 (65.6)	51.6 (56.2)
	N016	Margaret Centre roof	Free-field	54.8 (57.1)	60.7 (64.3)	54.2 (60.3)	52.9 (56.0)	51.4 (57.8)	53.7 (54.4)	56.7 (57.5)	55.5 (58.2)	53.7 (57.2)	51.3 (54.9)	54.6 (62.6)	52.1 (55.7)
	N017	42-44 Cobourg Street	Free-field	70.1 (73.0)	71.5 (73.0)	70.6 (76.0)	69.1 (73.7)	66.7 (76.7)	68.5 (70.7)	68.7 (69.7)	68.5 (69.1)	69.2 (74.2)	67.1 (71.4)	69.0 (74.9)	67.9 (74.6)

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

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

Worksite Reference	Measurement Reference	Monitor Address	Highest PPV measured in any axis, mm/s
HRB	V039	Coniston, Regents Park Estate	N/A*
	V043	Cubitt Court, Park Village East	2.12 (Y-Axis)
S003-WS03	V002	RCGP basement boiler room, 305 Euston Road	2.51 (Z-axis)
	V003	RCGP basement vaults, 305 Euston Road	0.74 (Z-axis)
	V037	Magic Circle, basement	2.11 (Y-axis)
	V038	Wesley Hotel, basement lightwell, Euston Street	1.05 (Z-axis)
NTH-EN	V021	42-44 Cobourg Street (floor)	0.60 (Z-axis)

* Due to a coupling issue at the interface between the vibration monitor and the ground no valid data was collected at this location in February 2021.

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

2.2 Exceedances of the SOAEL

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

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

2.2.3 Where 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	Outside 70 Adelaide Road	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	All days	All periods	No exceedance
	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	Weekday	08:00-18:00	1
	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	All days	All periods	No exceedance
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	08:00-18:00	2*
	N045	Regents Park Estate south, external to Coniston	All days	All periods	No exceedance

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
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
ETD	N007	RCGP, Melton Street	All days	All periods	No exceedance
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	N012	93-103 Drummond Street, 11-15 Melton Street, 54-64 Euston Street, 69 Cobourg Street	All days	All periods	No exceedance
	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

* Exceedance of the SOAEL was due to piling activities happening in close proximity to the monitor, noise levels at the nearest receptor are predicted to be below the SOAEL.

** 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
ETRC	N002	Park Village East Lamppost #2	1

2.2.6 One exceedance of the SOAEL was recorded due to HS2 construction works during February 2021 at monitoring location N002 during a weekday period (result of contribution from use of roller and boring activities).

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
-	-	-	-	-	-

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.

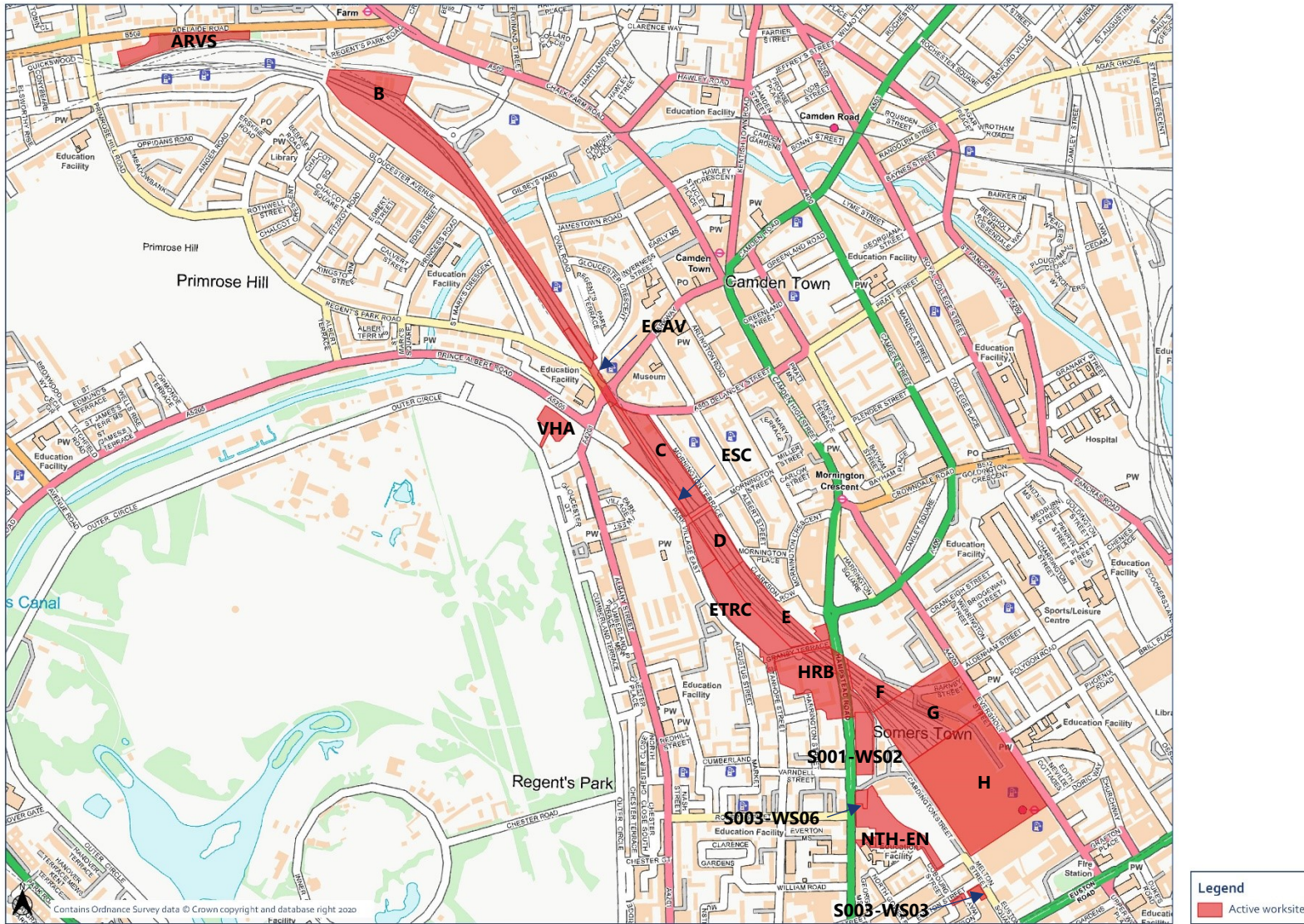
Table 8: Summary of Complaints

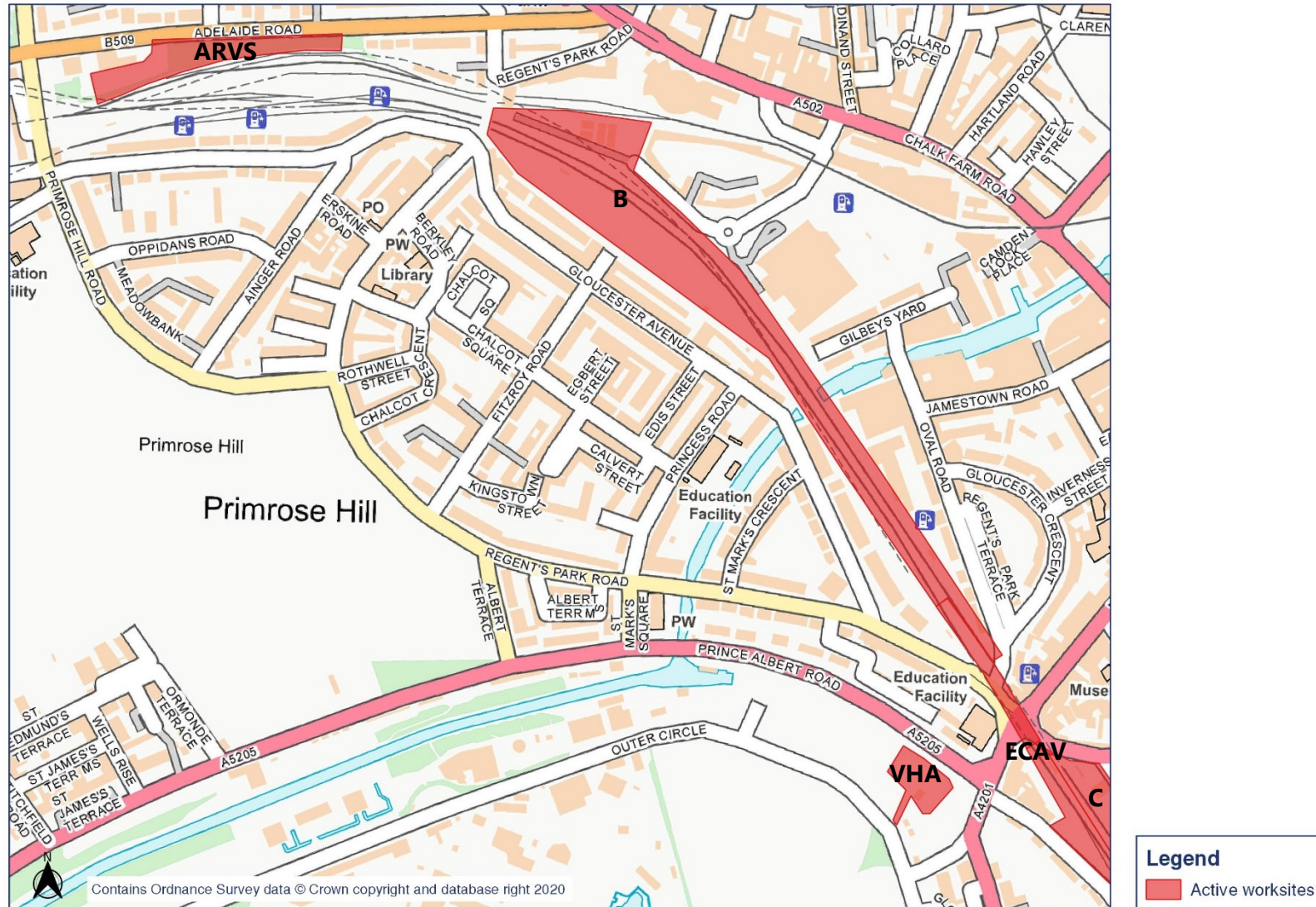
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-55916-E	ARVS	Complaint regarding construction noise during the daytime.	Noise levels were within consented levels. Works being carried out in line with Section 61 and viable BPM measures were in place.	Investigation carried out on site to confirm works in line with Section 61 Consent and that viable BPM measures were in place. Communities team made contact with the complainant to update them on the outcome of the investigation.

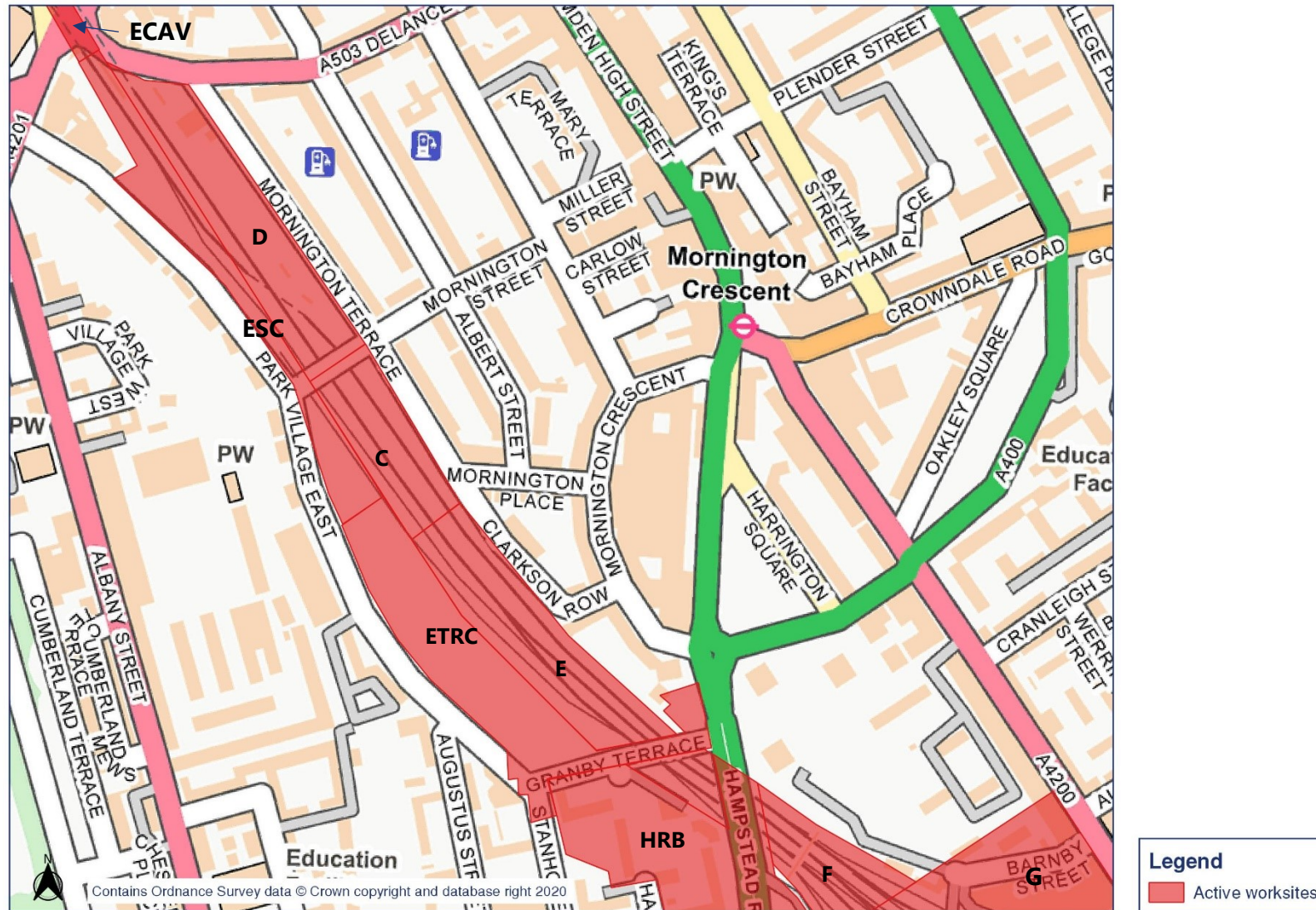
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-41273-C	S003-WS03	Noise barriers removed from fencing before work began.	Investigation confirmed that noise barriers were mistakenly removed while the work was ongoing.	Noise barrier were re-installed and site staff were re-briefed.
HS2-21-41272-C	HRB	General complaint on construction noise.	On-going.	On-going.
HS2-21-41359-C	ECAV	General complaint on construction noise.	Sound barriers installed around the works. Noise and vibration levels in line with Section 61 consent. These specific works (trial holes) were to be completed by 09/03/21.	Confirmed the results of the investigation to the stakeholder.
HS2-21-41384-C	HRB	Complaint on construction noise at night.	Remains under investigation.	On-going.
HS2-21-41403-C	ESC	Complaint regarding persistent vibration felt in property.	Piling was undertaken which would have generate perceptible vibration. However, works being carried out in line with Section 61 and viable BPM measures were in place.	Information was provided to the stakeholder detailing days and times of works.
HS2-21-41409-C	HRB	Complaint on construction noise during the daytime.	Noise caused by construction of haul road within the site. Haul road has now been constructed.	Confirmed information to stakeholder and advised that the construction of the haul road was in part to minimise vehicle numbers on the surrounding highways.
HS2-21-41448-C	ESC	Complaint regarding vibration felt throughout the morning.	Piling was undertaken which would have generated perceptible vibration. However, works being carried out in line with Section 61 and viable BPM measures were in place.	Information was provided to the stakeholder detailing days and times of works.

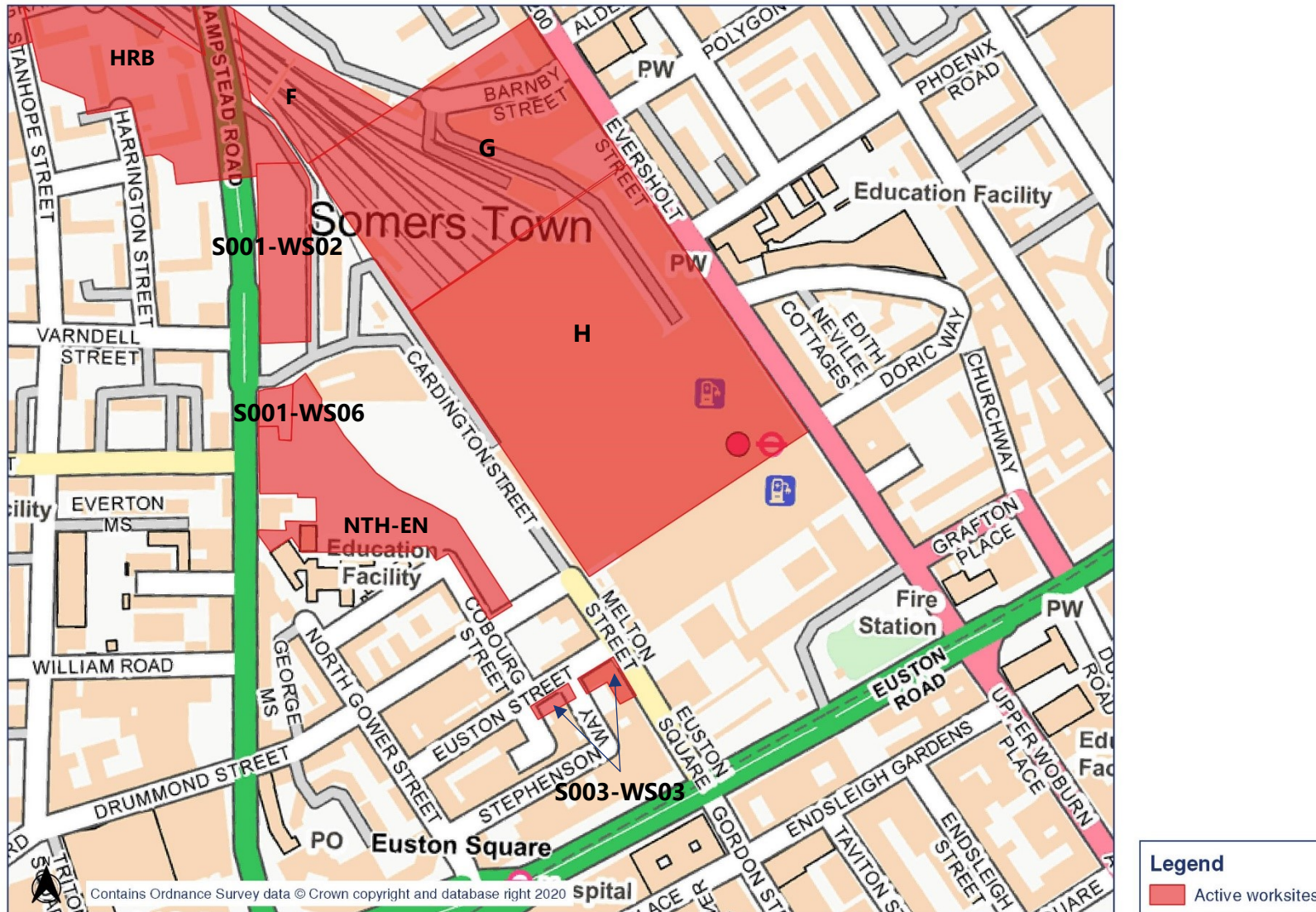
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-41446-C	S001-WS02	Complaint regarding construction noise during the daytime.	Noise caused by sewer construction works. Noise monitoring has been in place and no triggers detected. Work close to the resident due to end by end of March and will then be moving further away from stakeholder's home so should not cause further disturbance to them.	Confirmed the results of the investigation to the stakeholder.
HS2-21-41491-C	ESC	Complaint regarding persistent vibration felt in property.	Piling was undertaken which would have generated perceptible vibration. Works being carried out in line with Section 61 and viable BPM measures were in place.	Information was provided to the stakeholder detailing days and times of works.
HS2-21-41493-C	ECAV, C	Complaint regarding construction noise at night.	Substantial investigations have not found any works at night that may be the cause of the disturbances. Stakeholder has also advised there is non-HS2 construction work nearby.	Contractor has advised they are happy to review any evidence to assist in trying to pinpoint the cause and has advised the stakeholder to send any videos showing the disturbances to them.
HS2-21-41469-C	HRB	Complaint regarding loud noise from piling activities	Piling was undertaken which would have generated perceptible vibration. Noise monitor shows that construction noise was within permitted levels. Works being carried out in line with Section 61 and viable BPM measures were in place.	Information was provided to the stakeholder detailing days and times of works.

Appendix A Site Locations

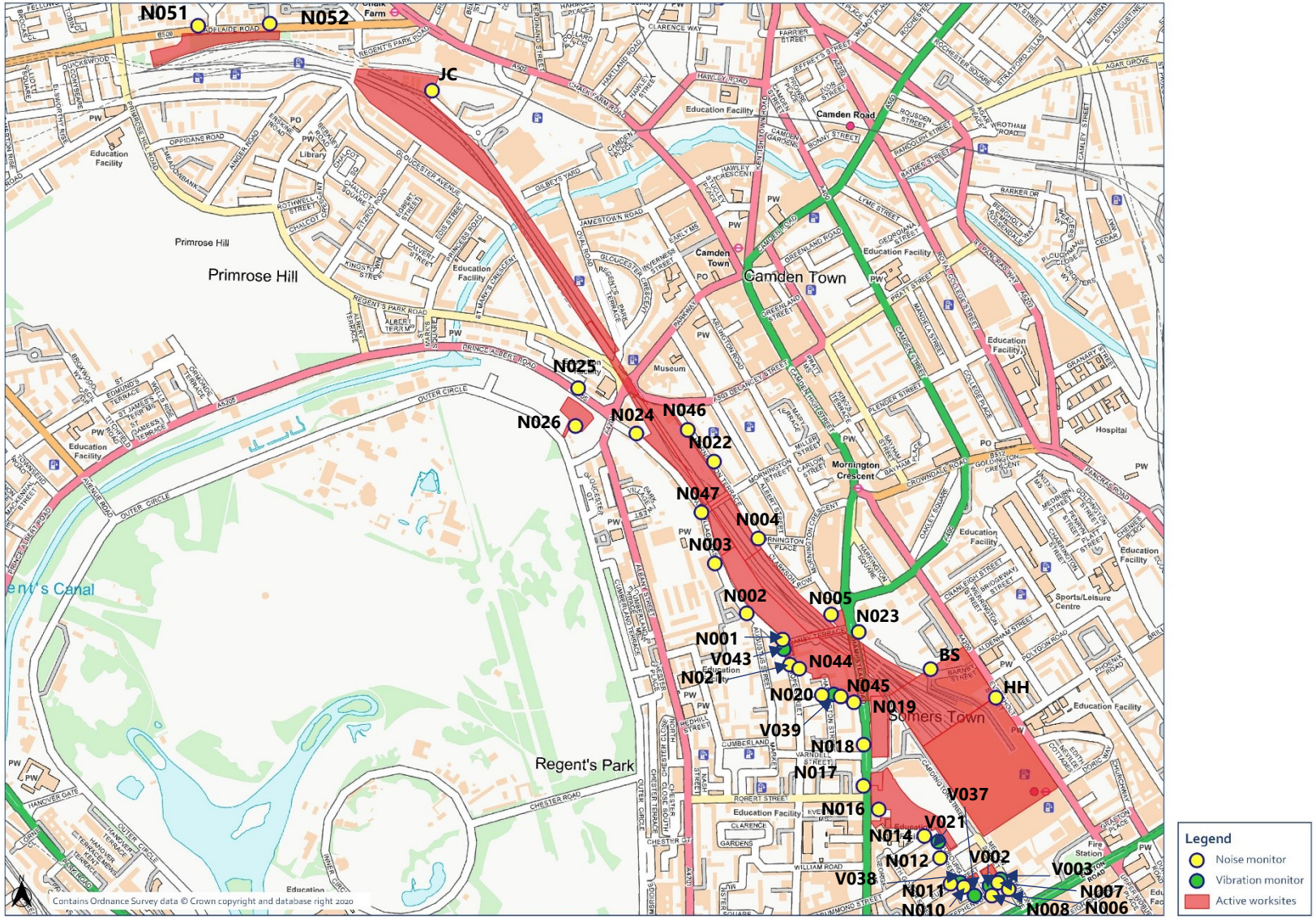


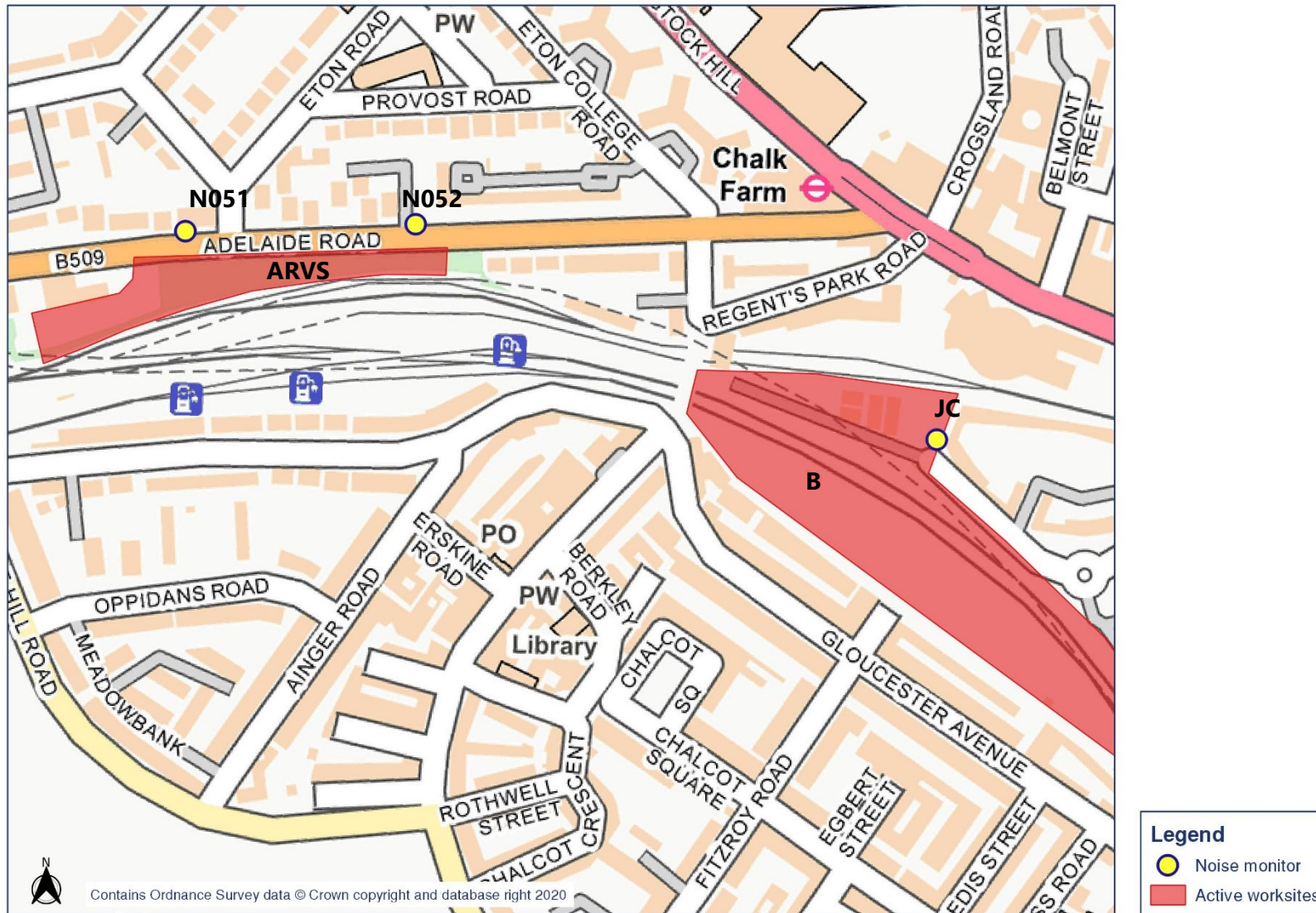


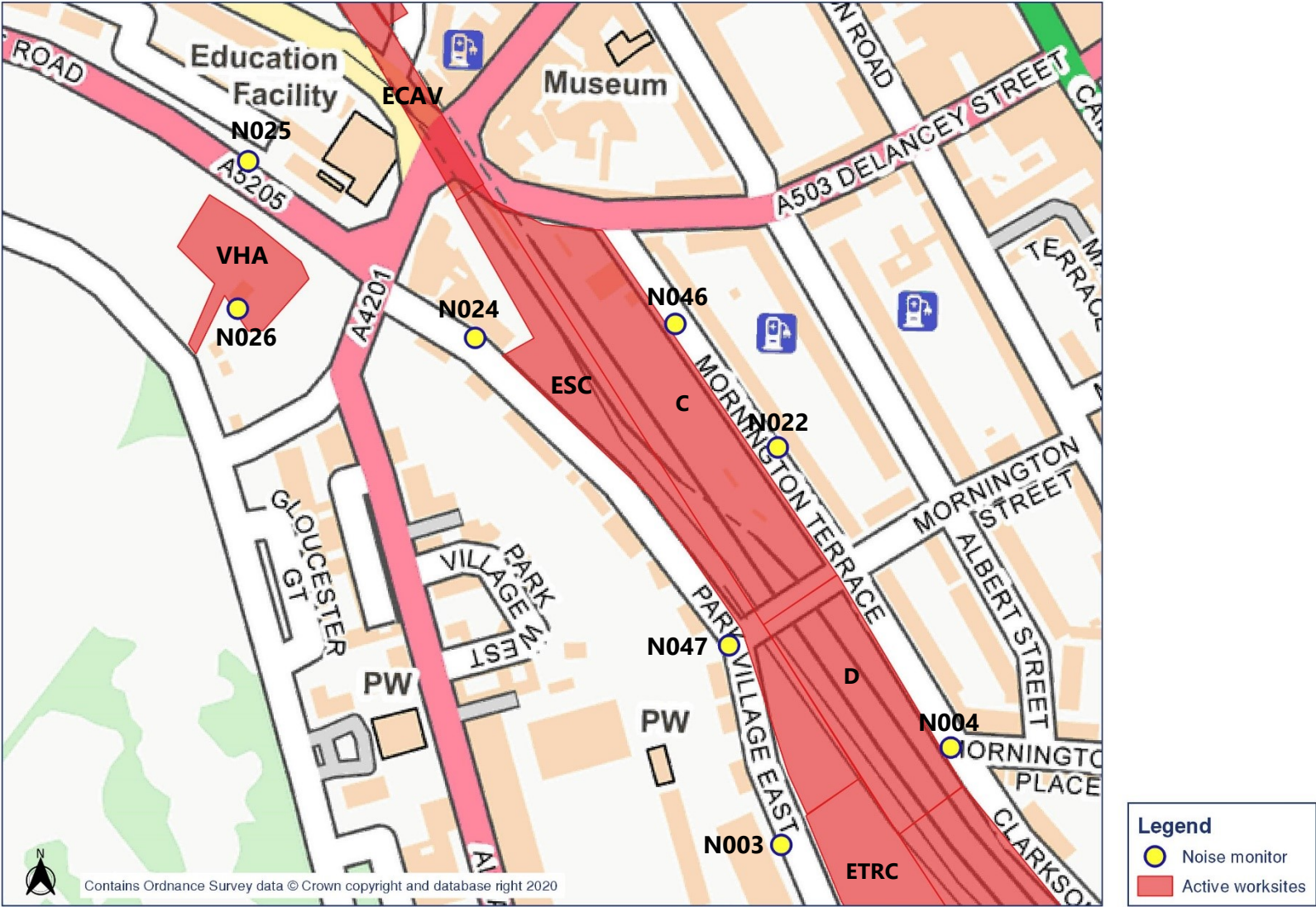


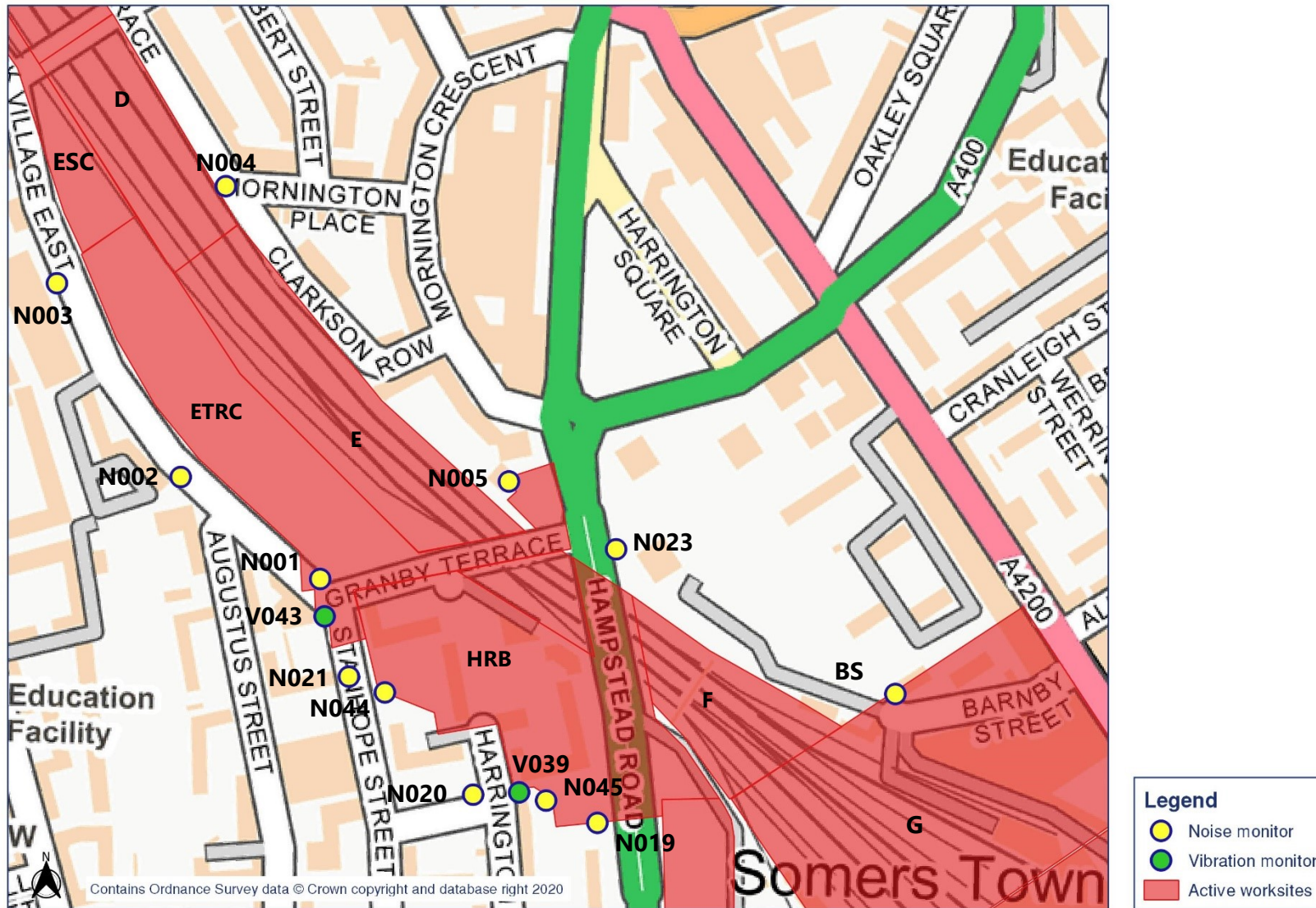


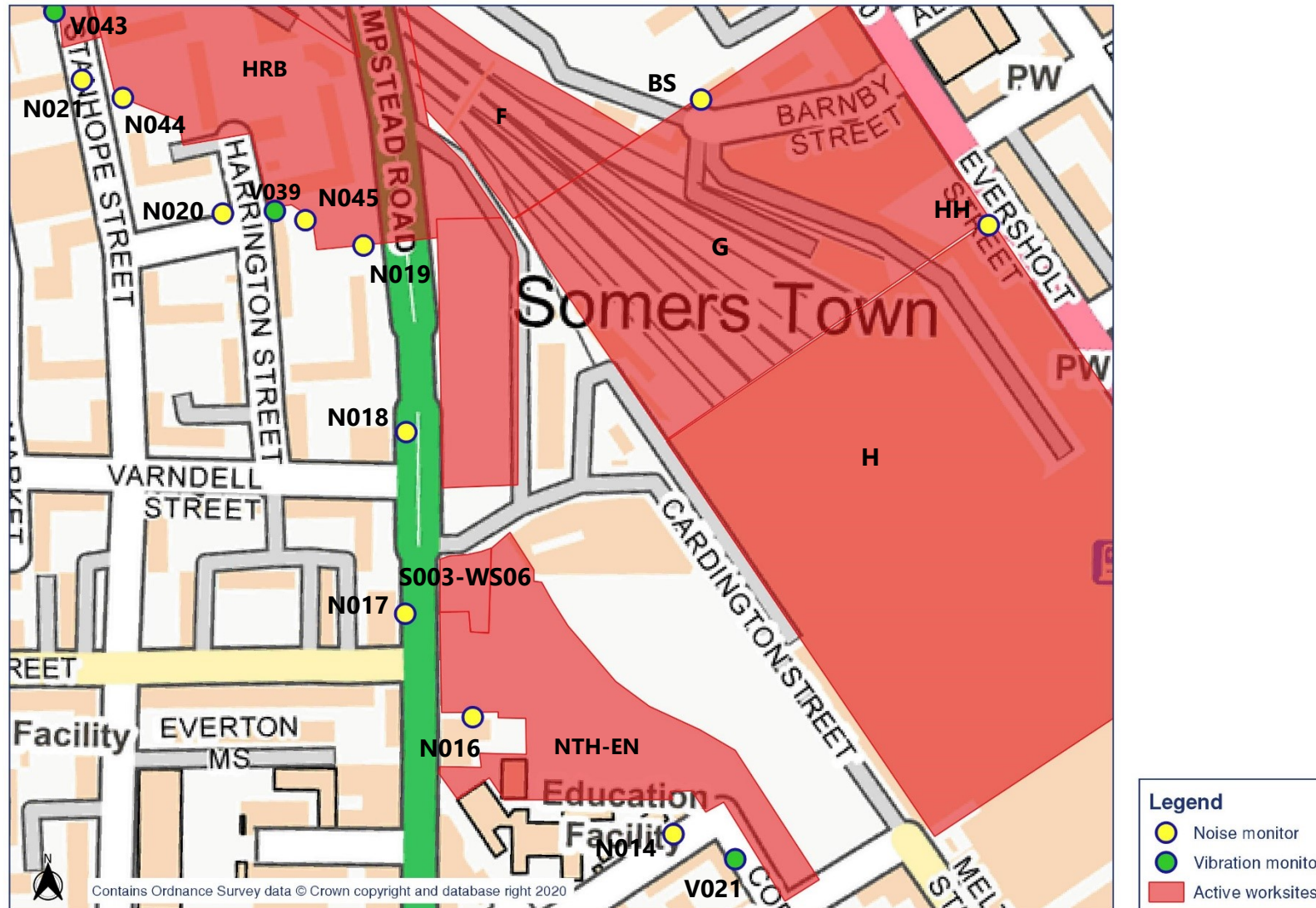
Appendix B Monitoring Locations

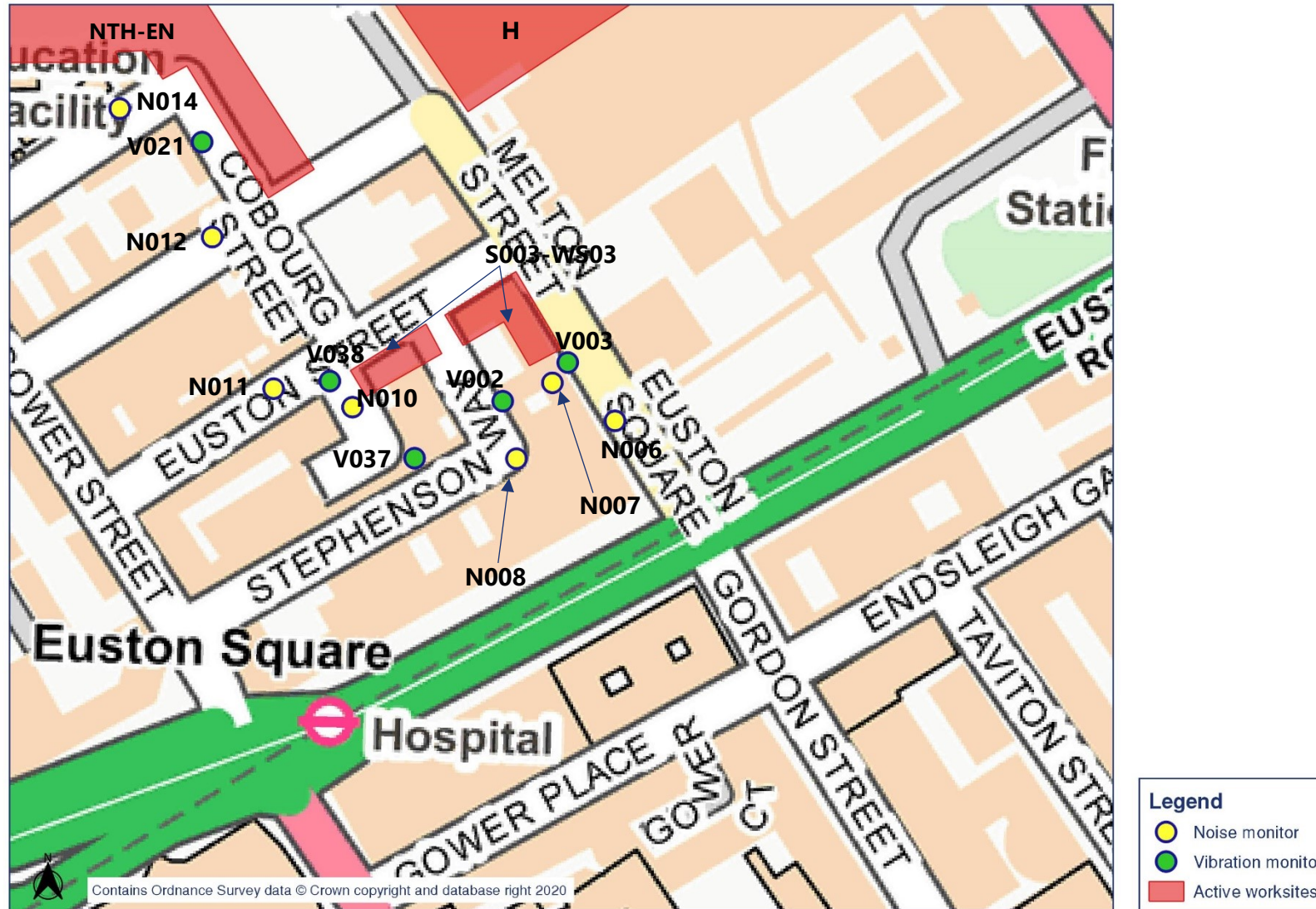










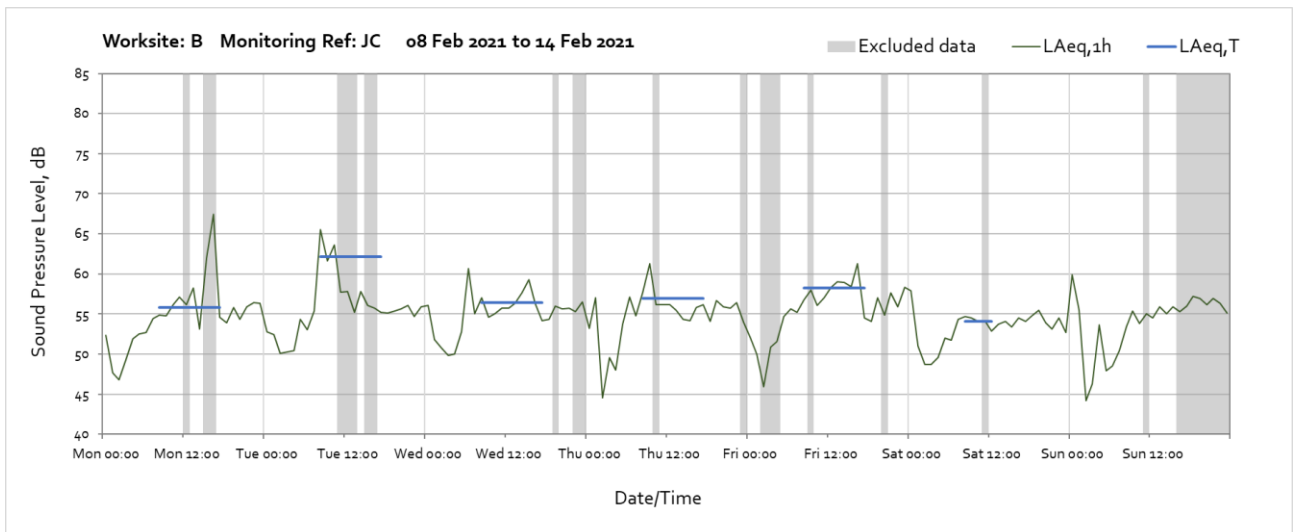
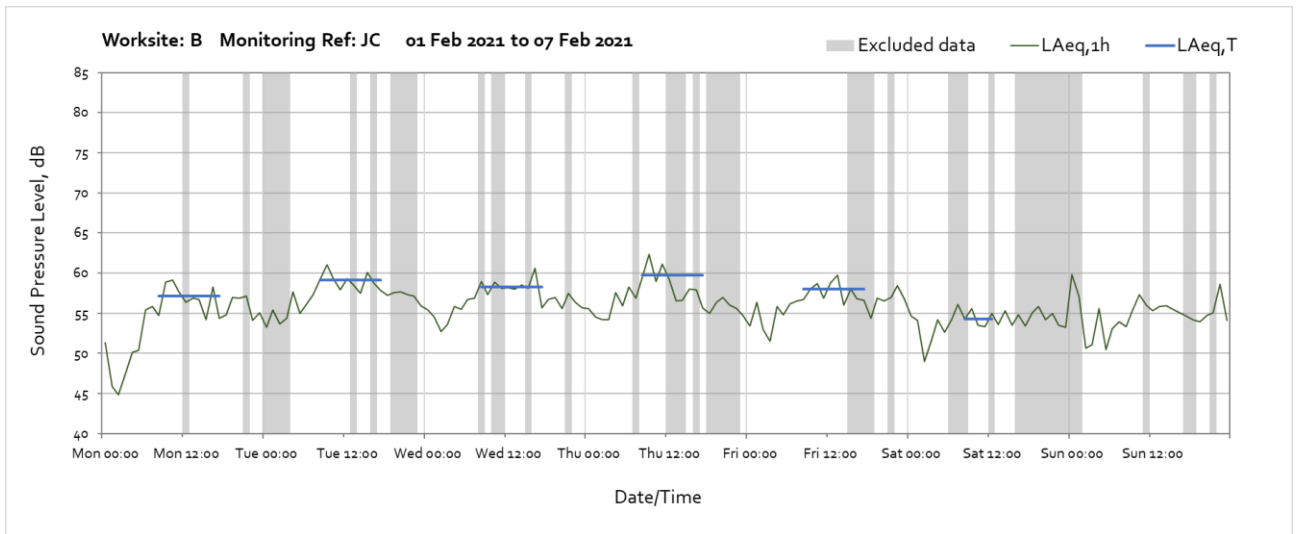


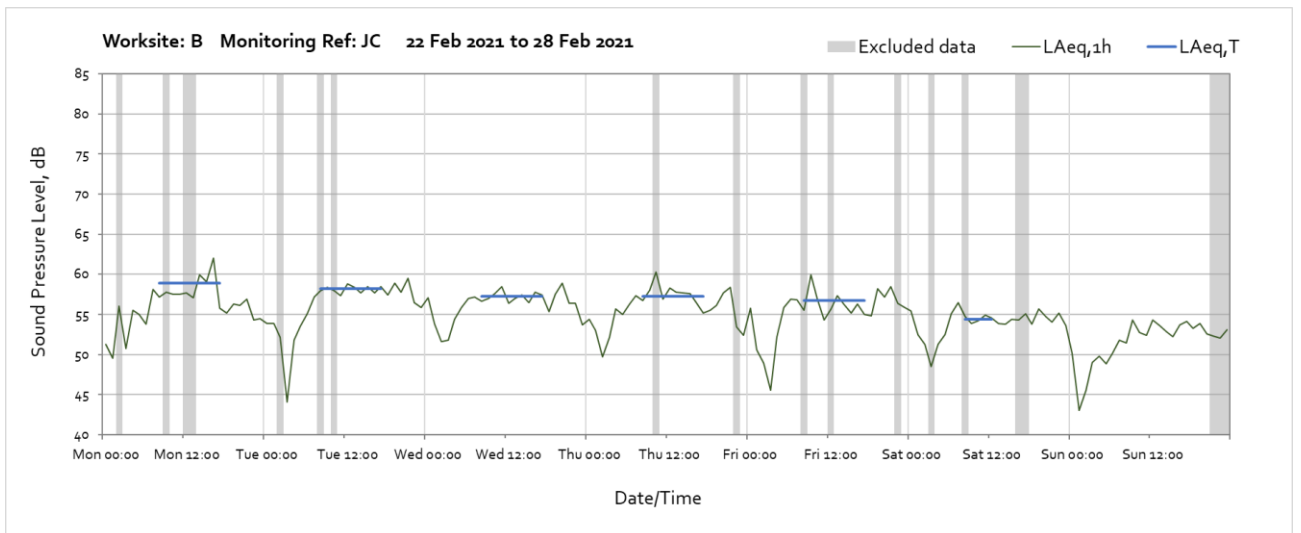
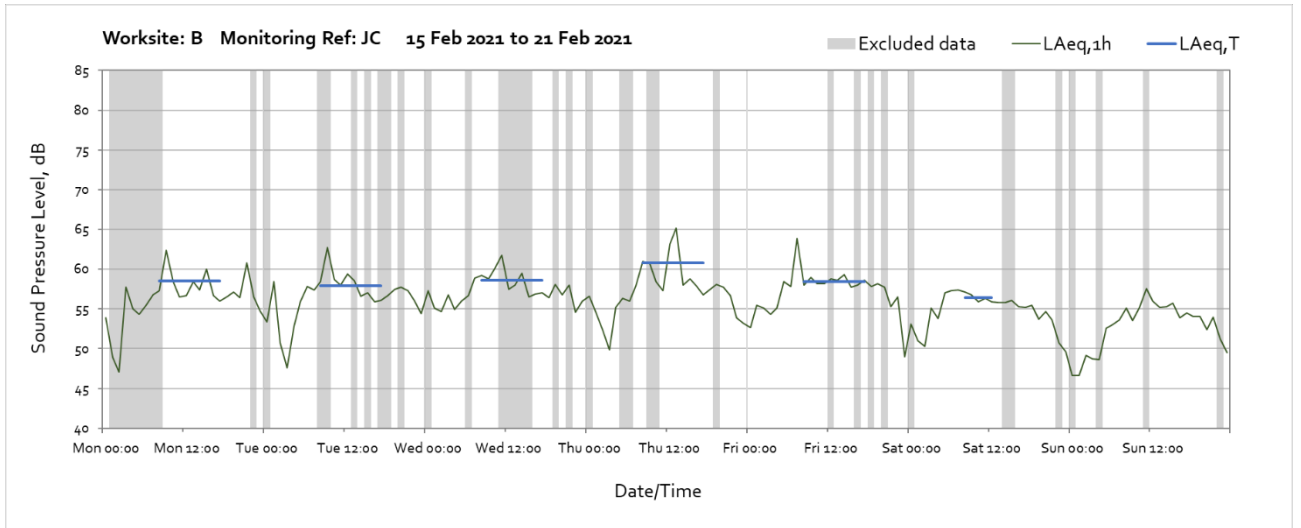
Appendix C Data

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.

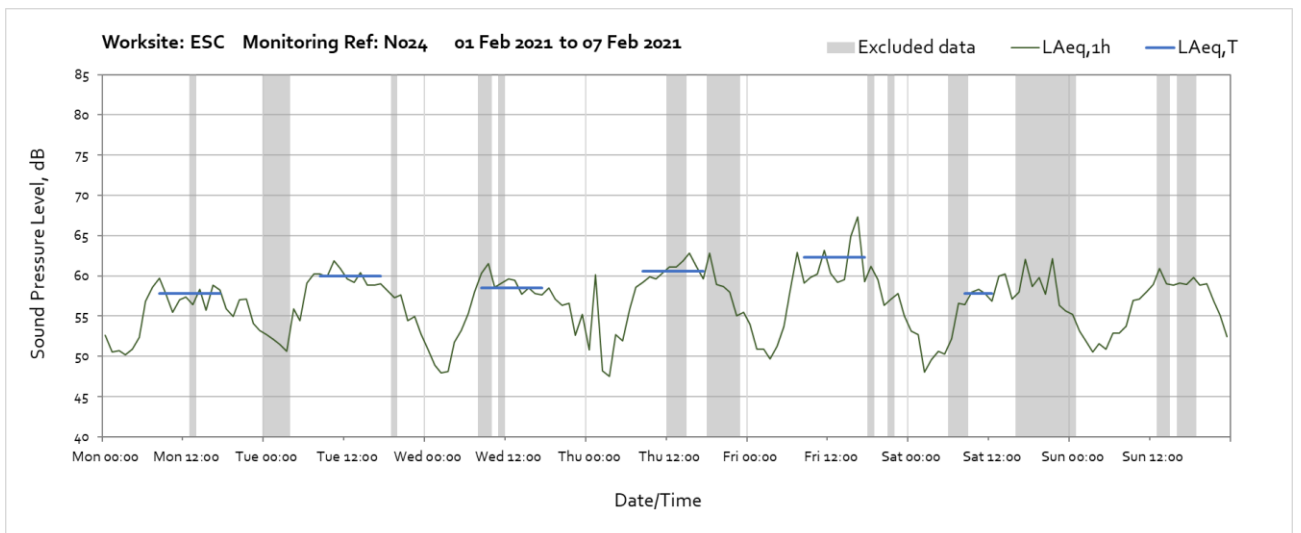
Noise

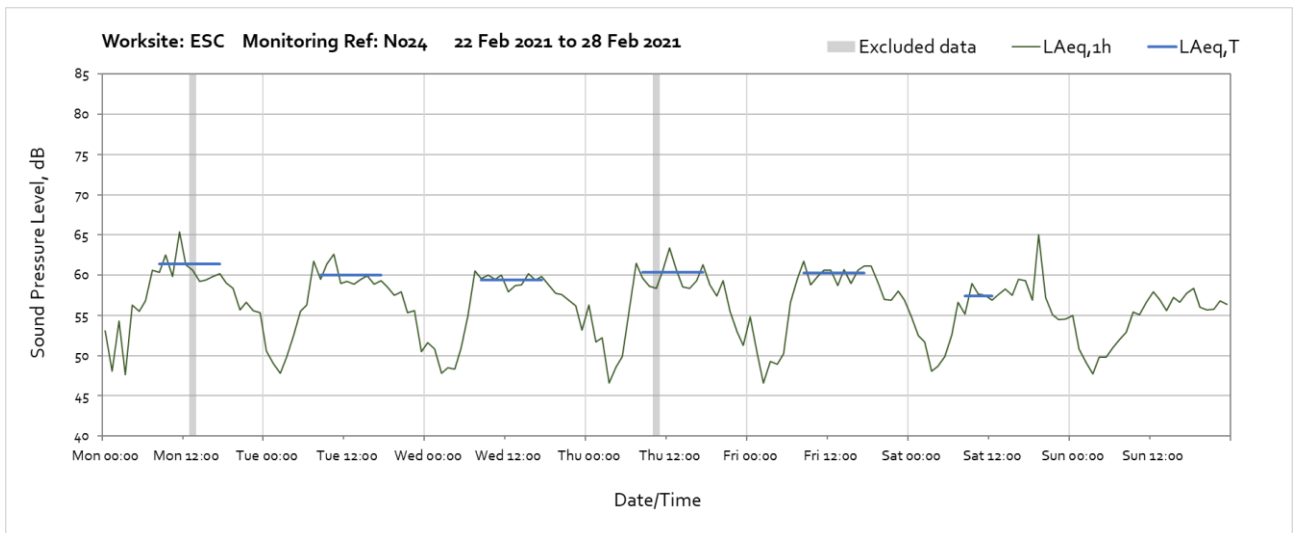
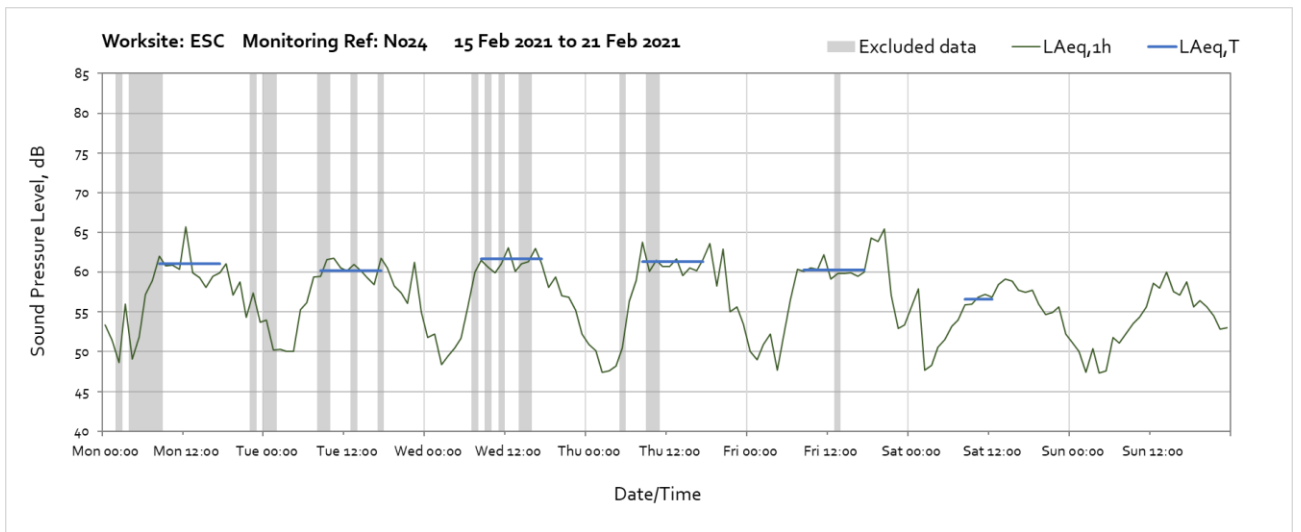
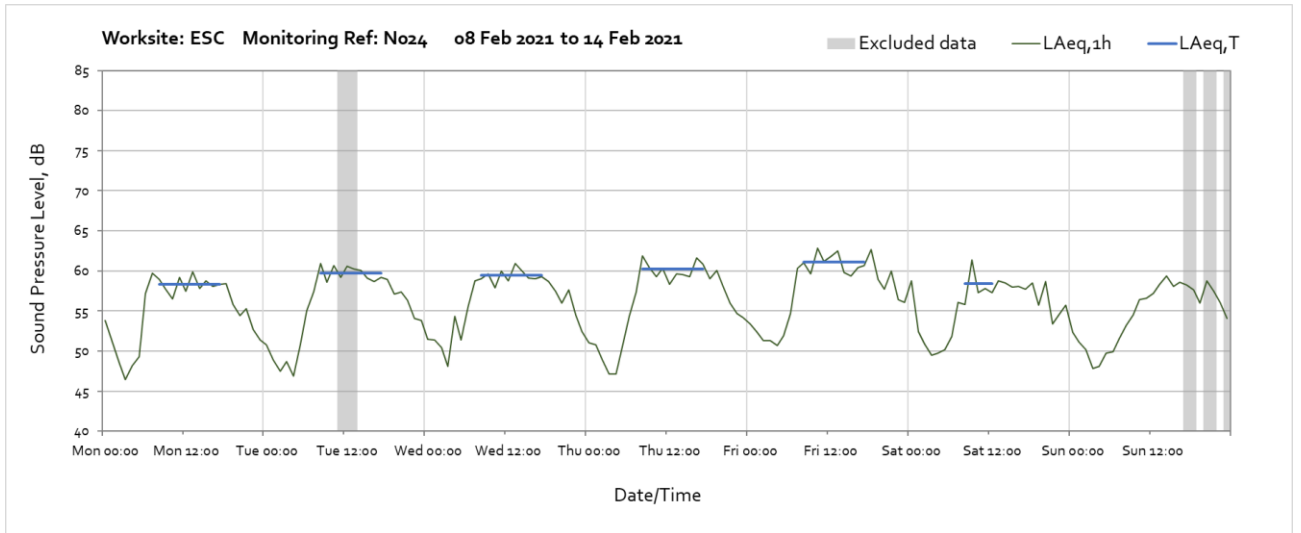
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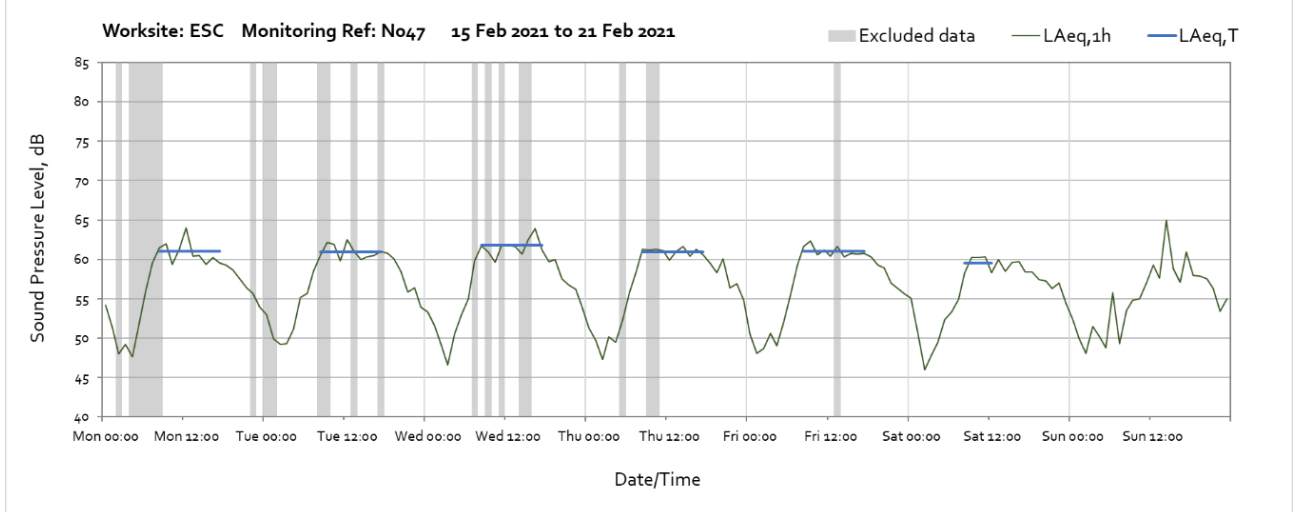
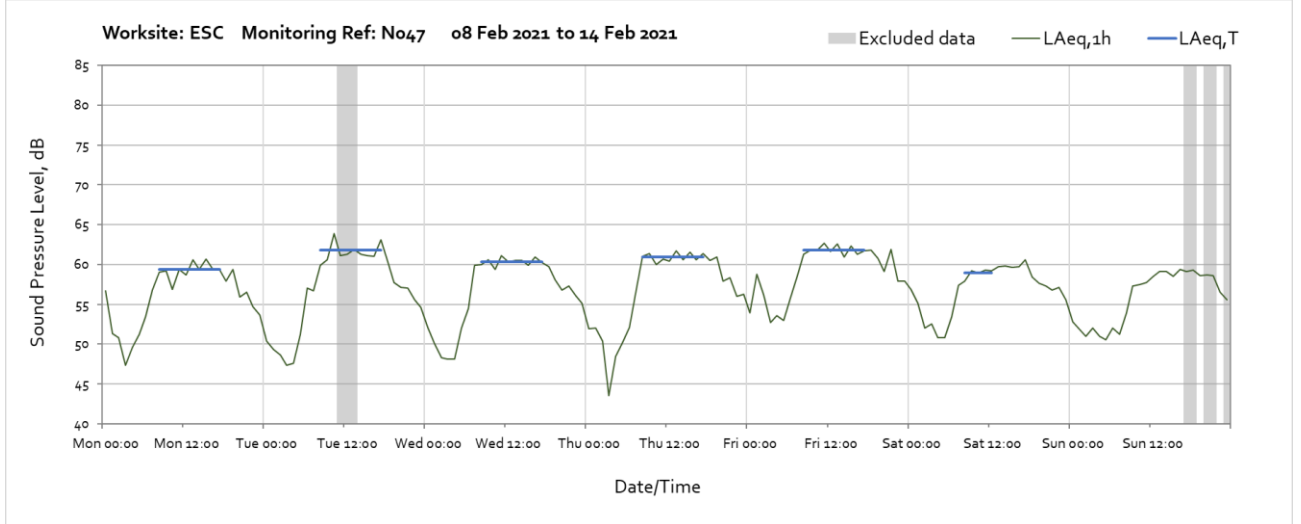
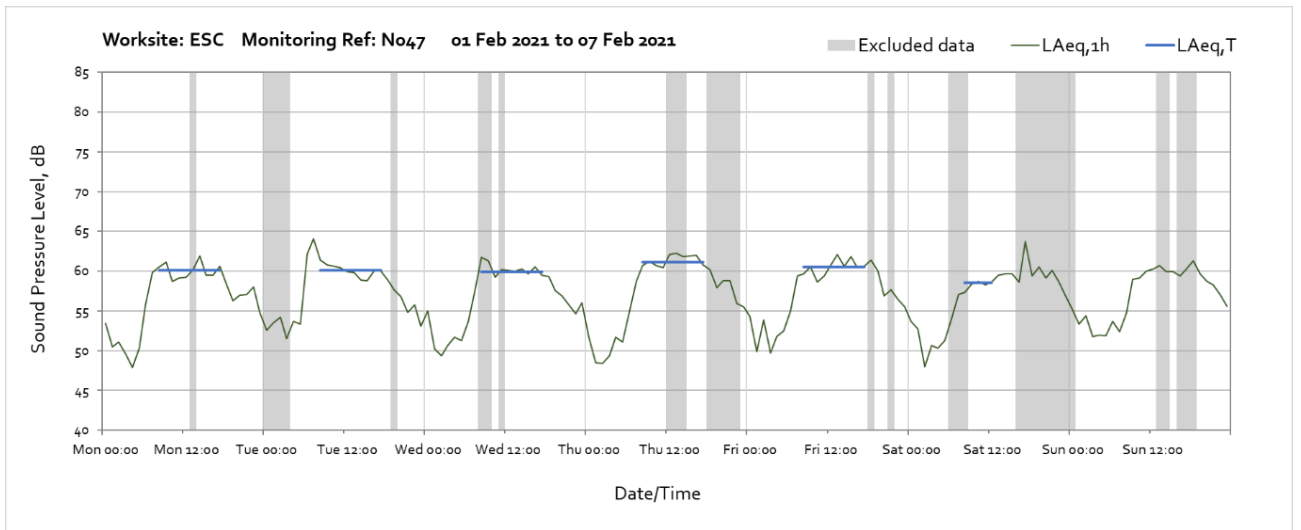


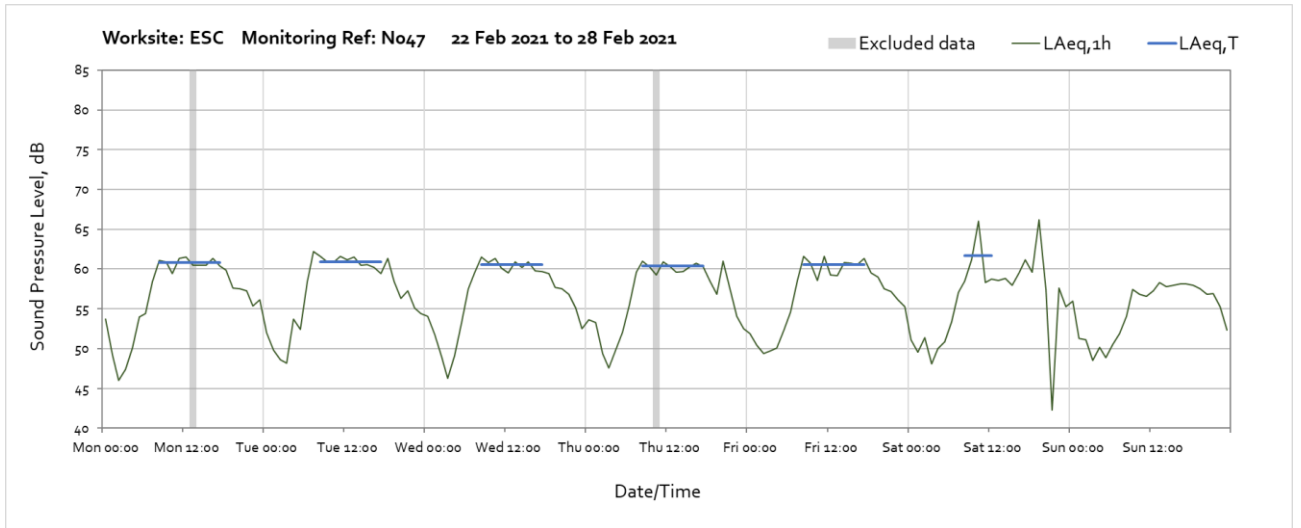
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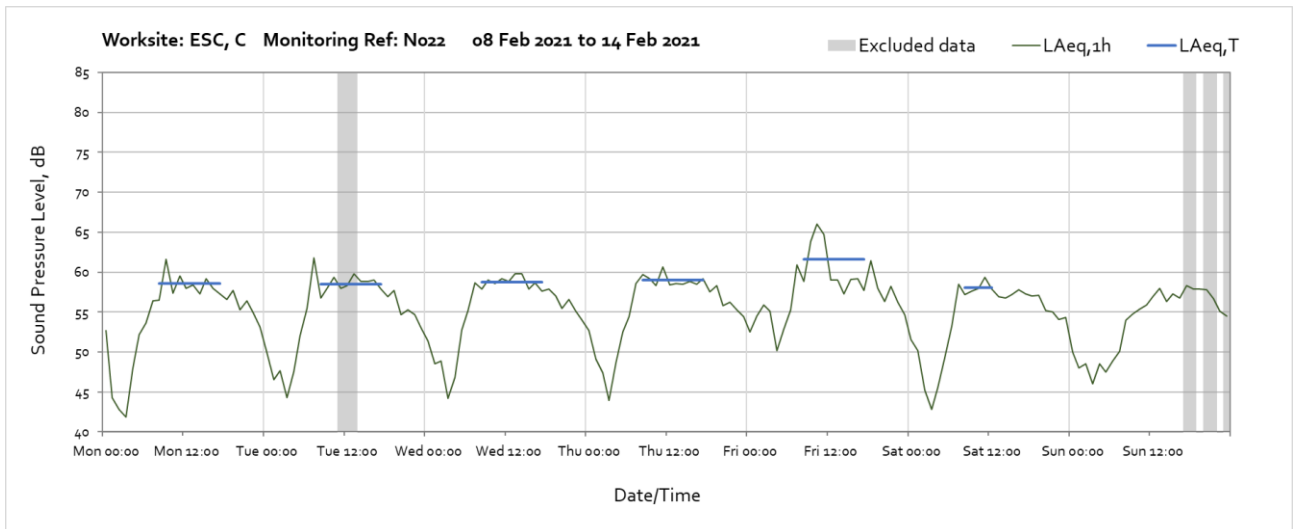
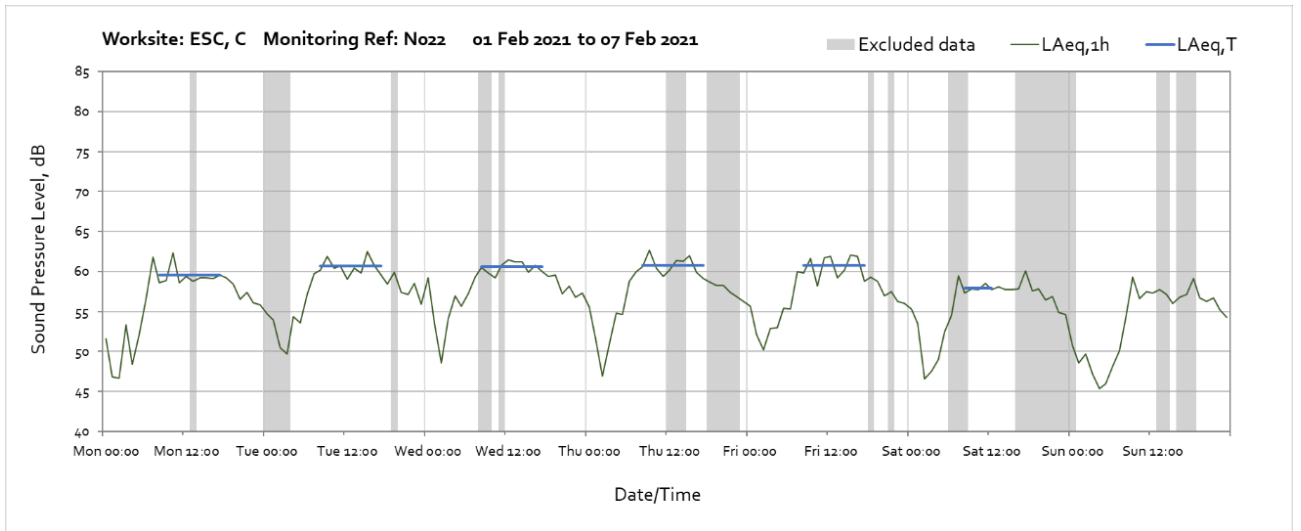


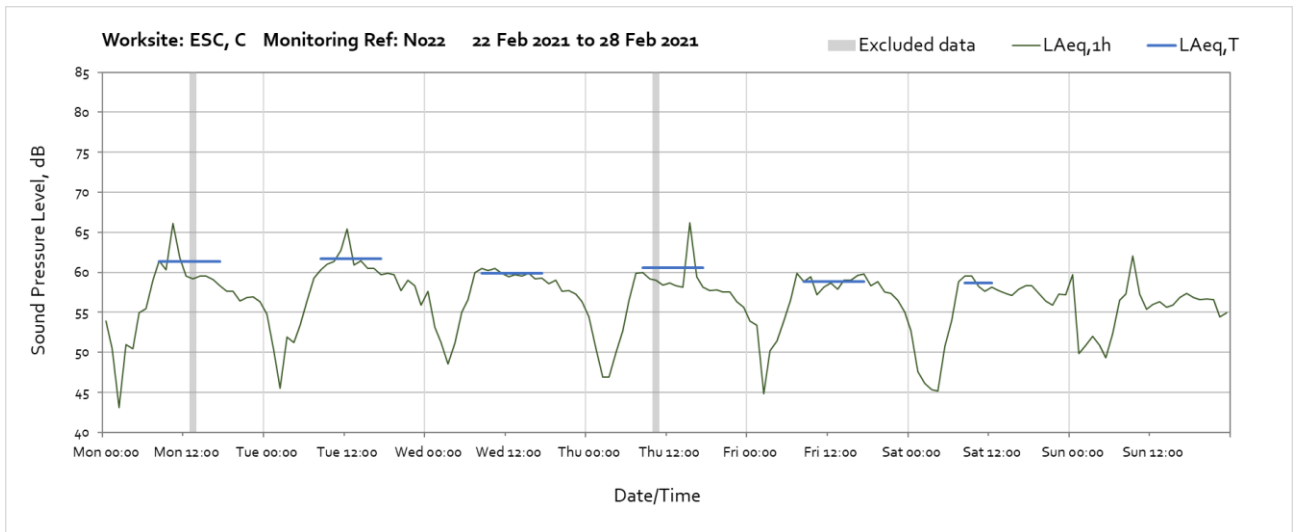
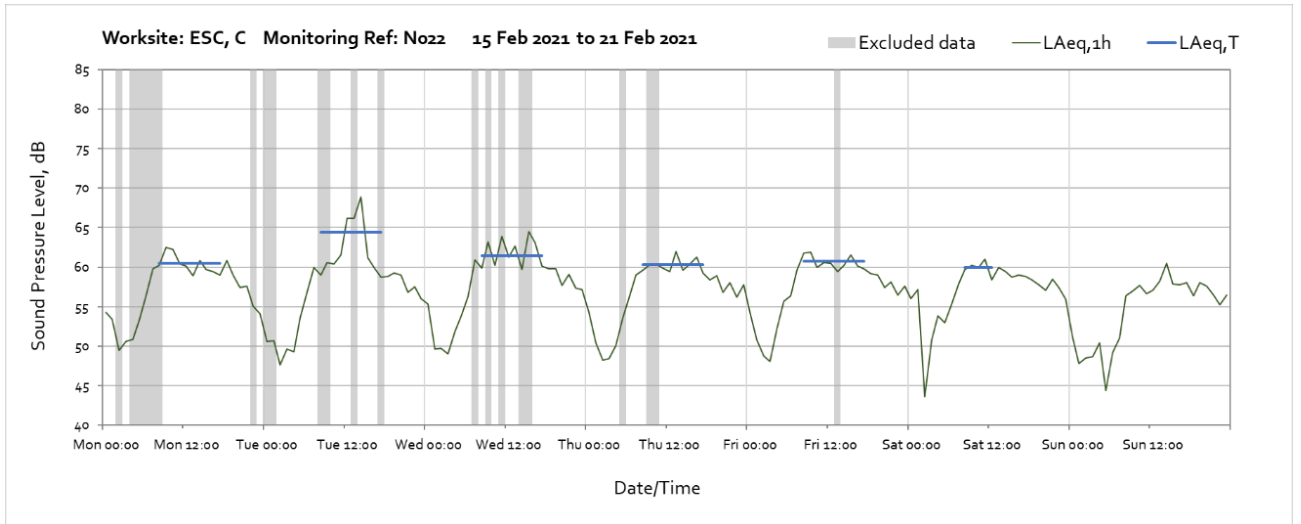
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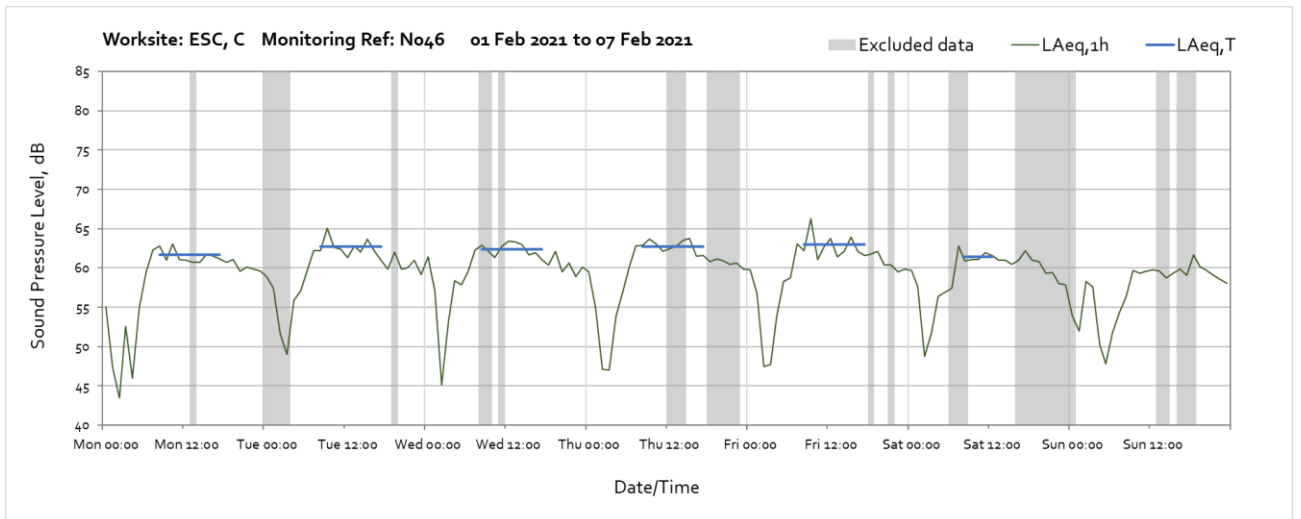


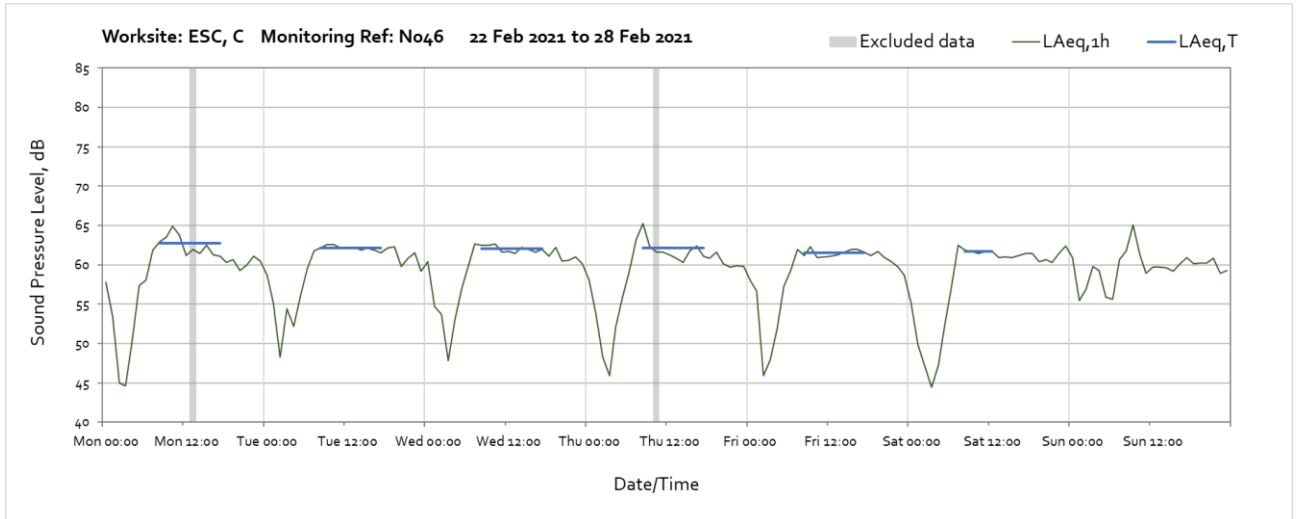
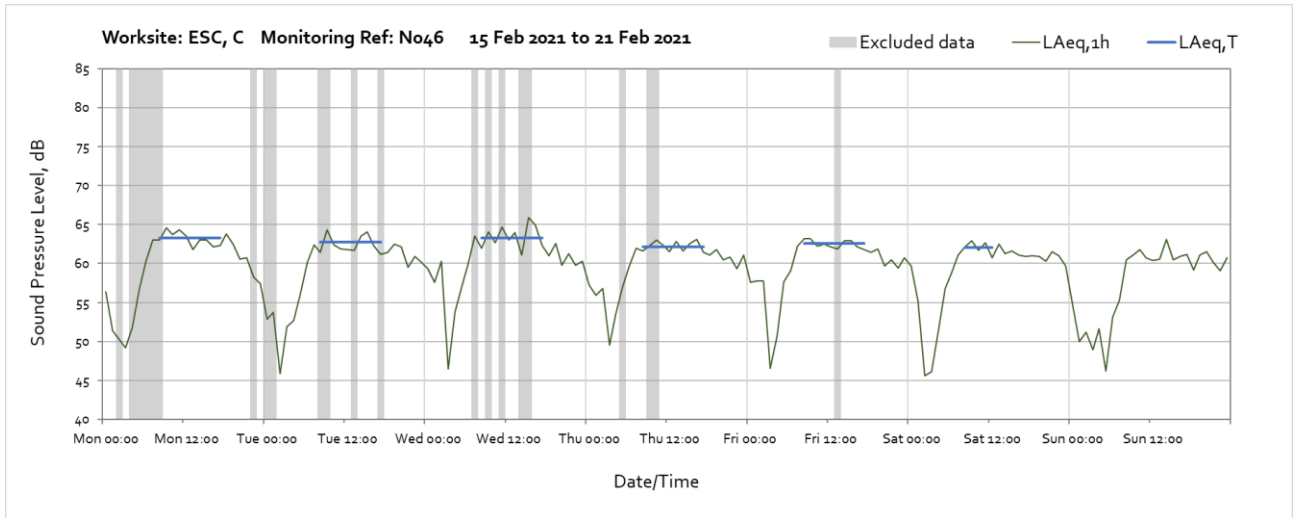
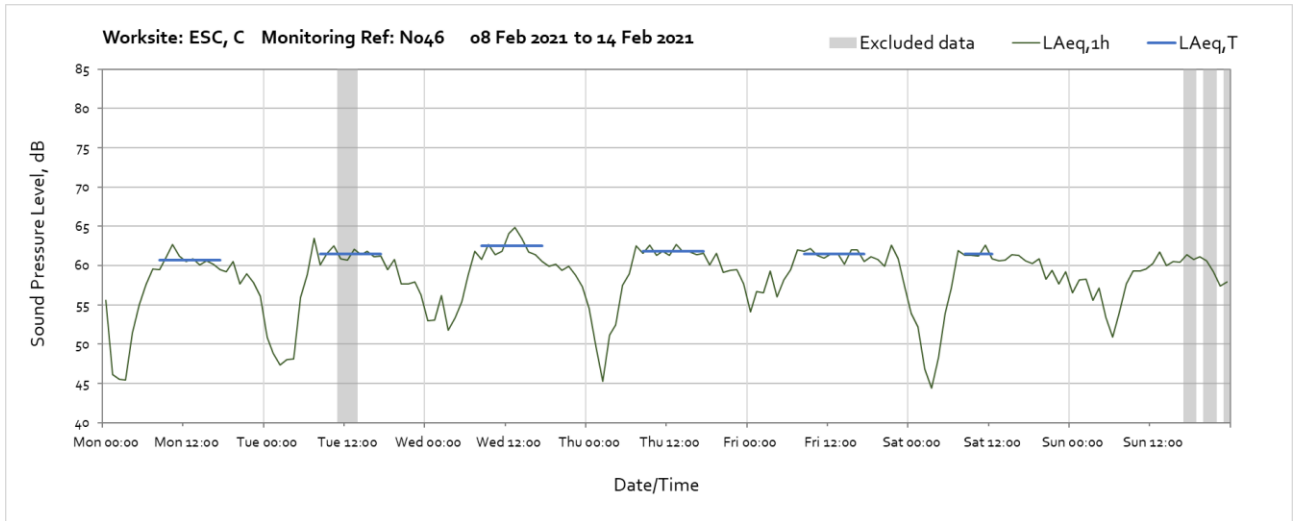
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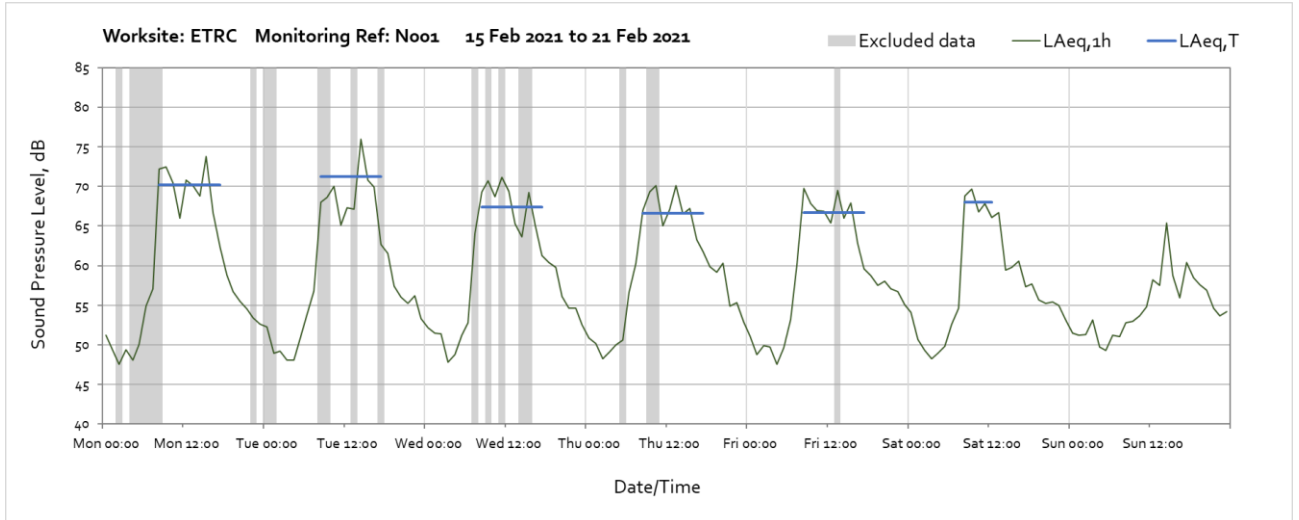
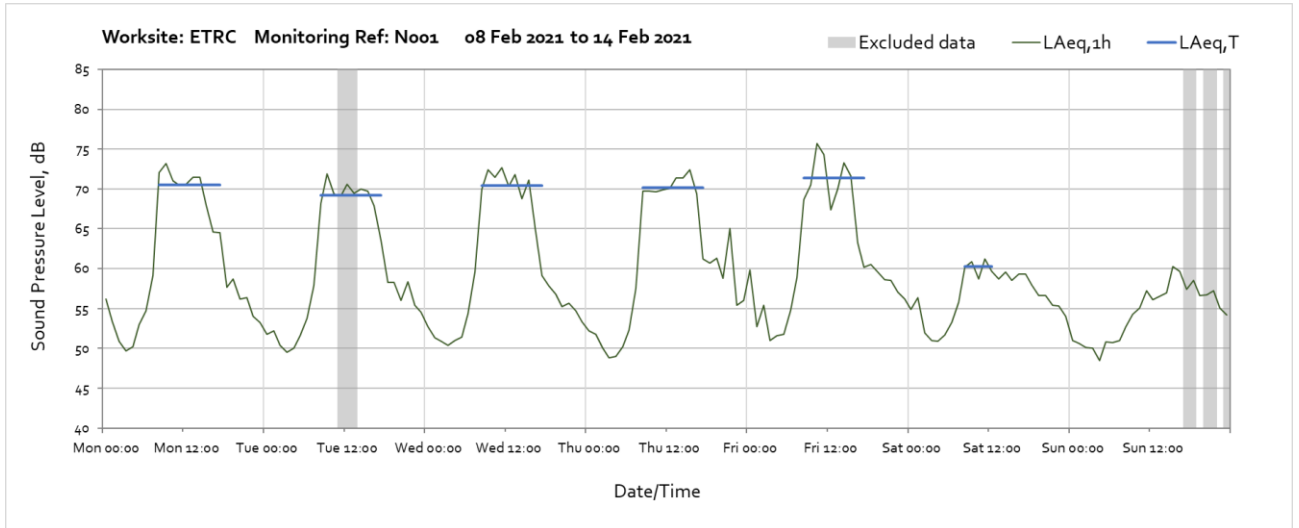
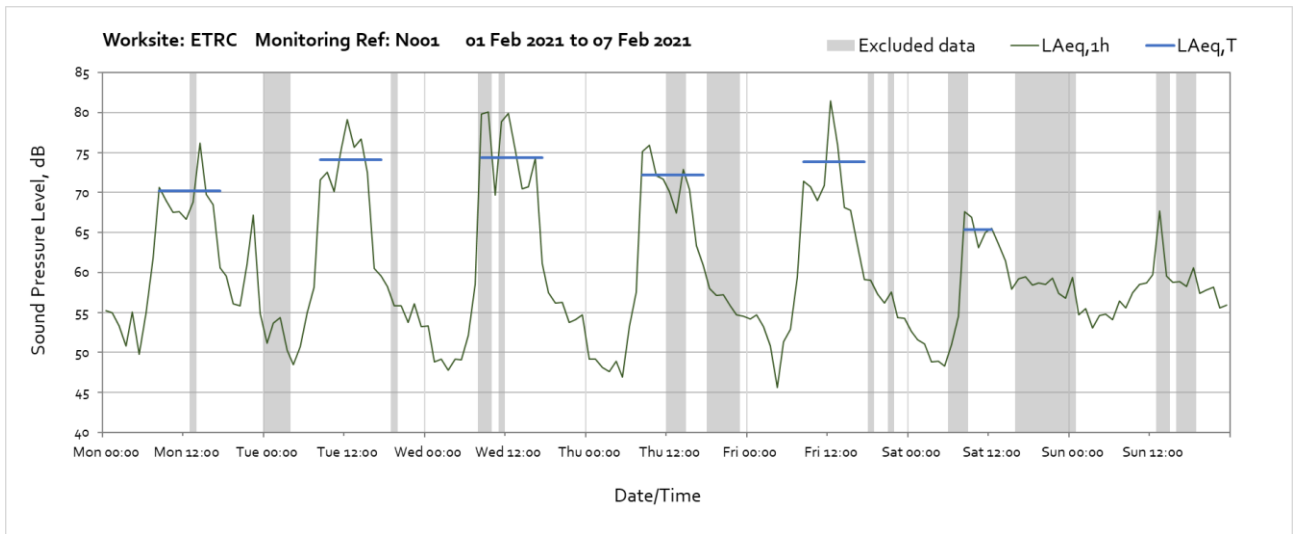


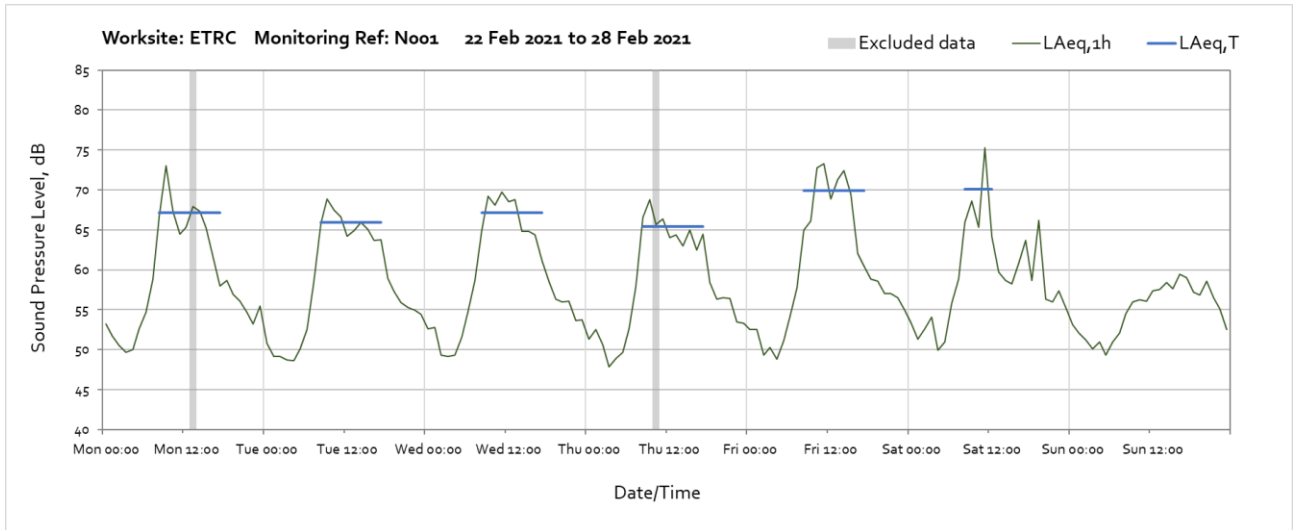
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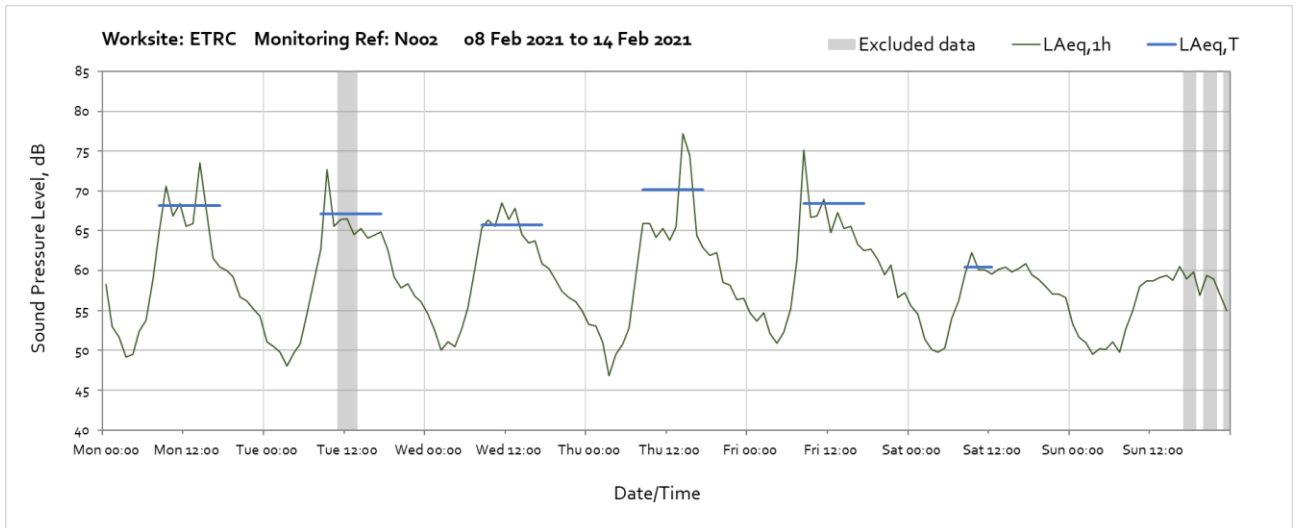
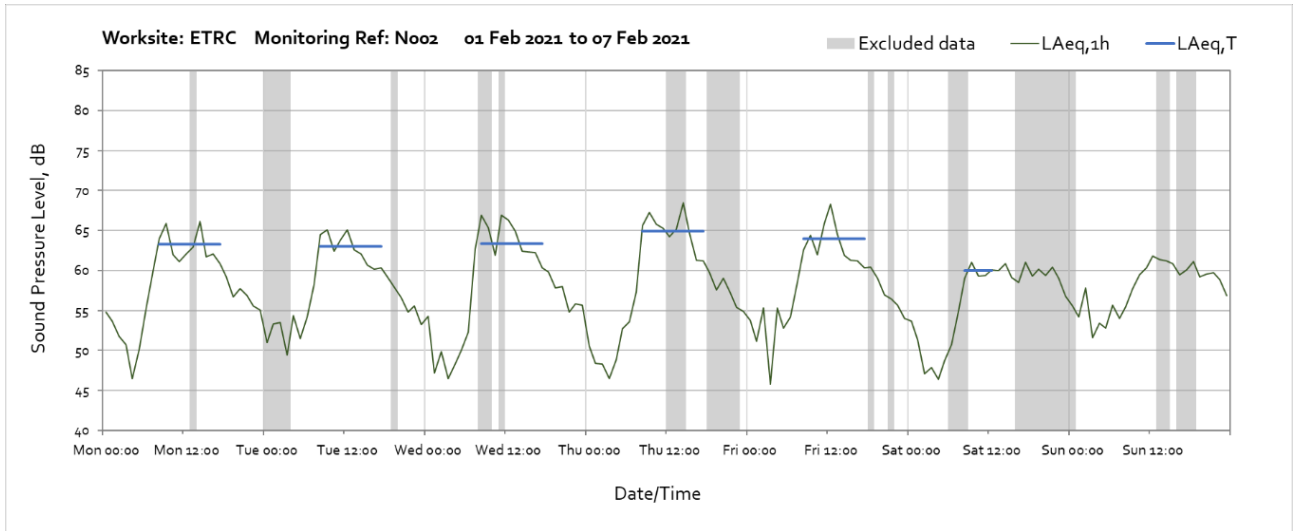


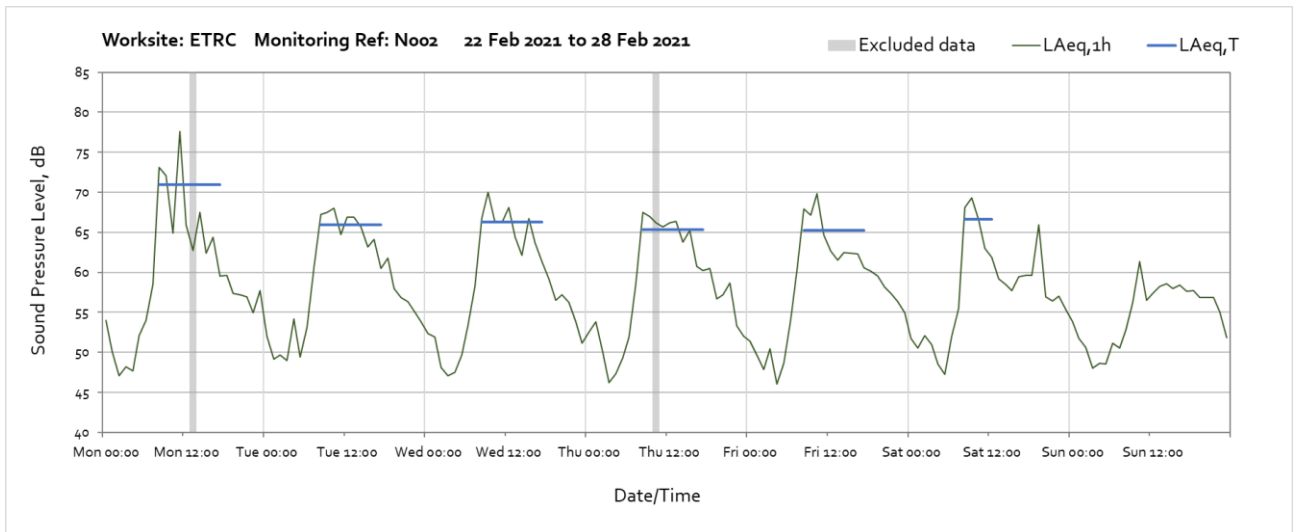
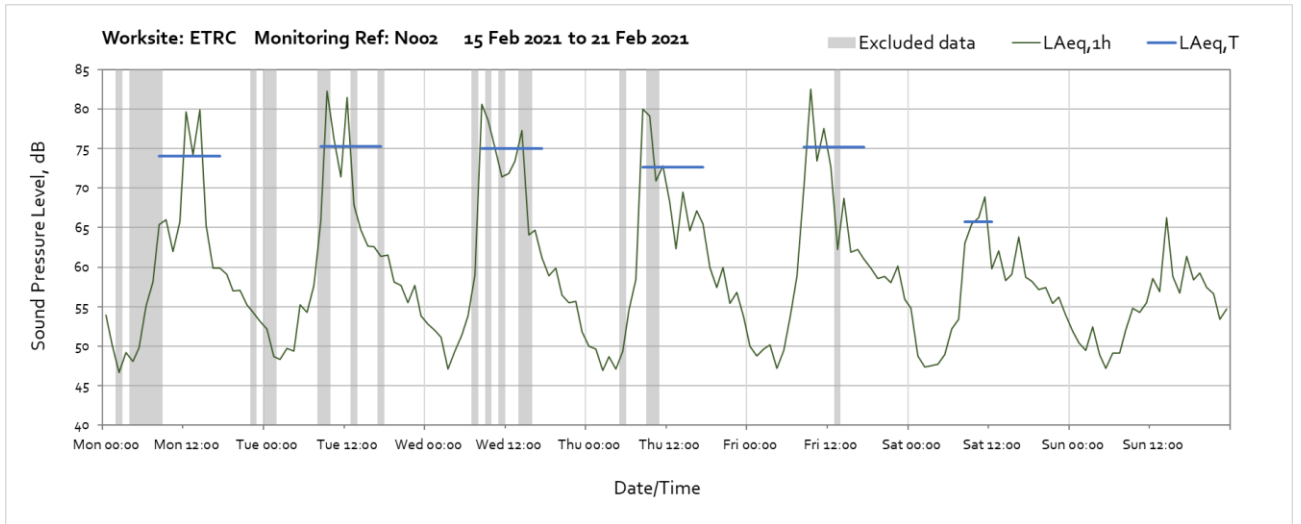
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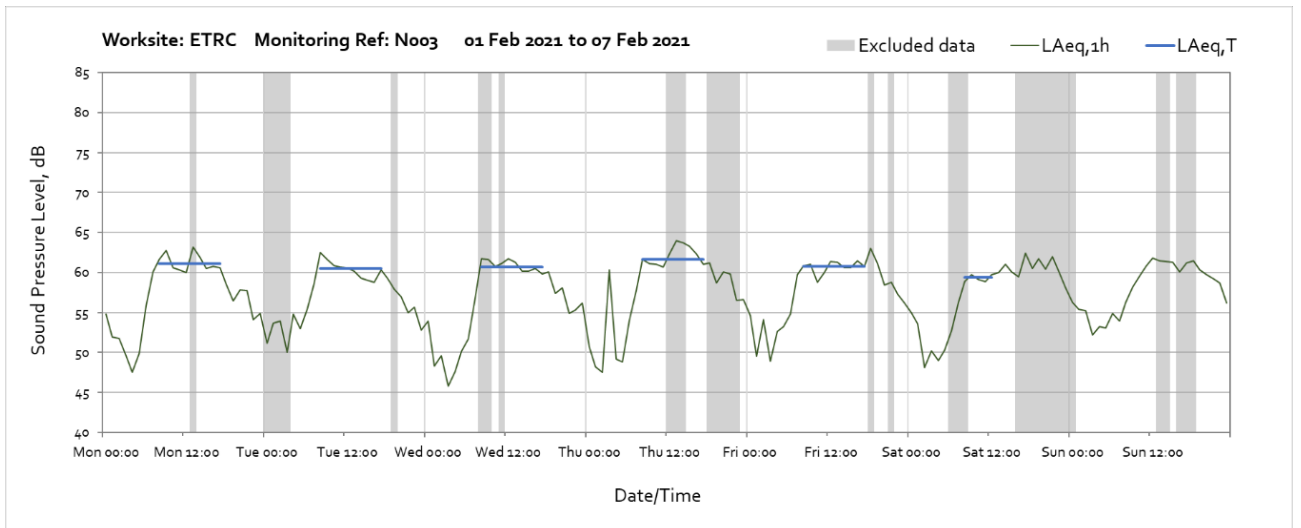


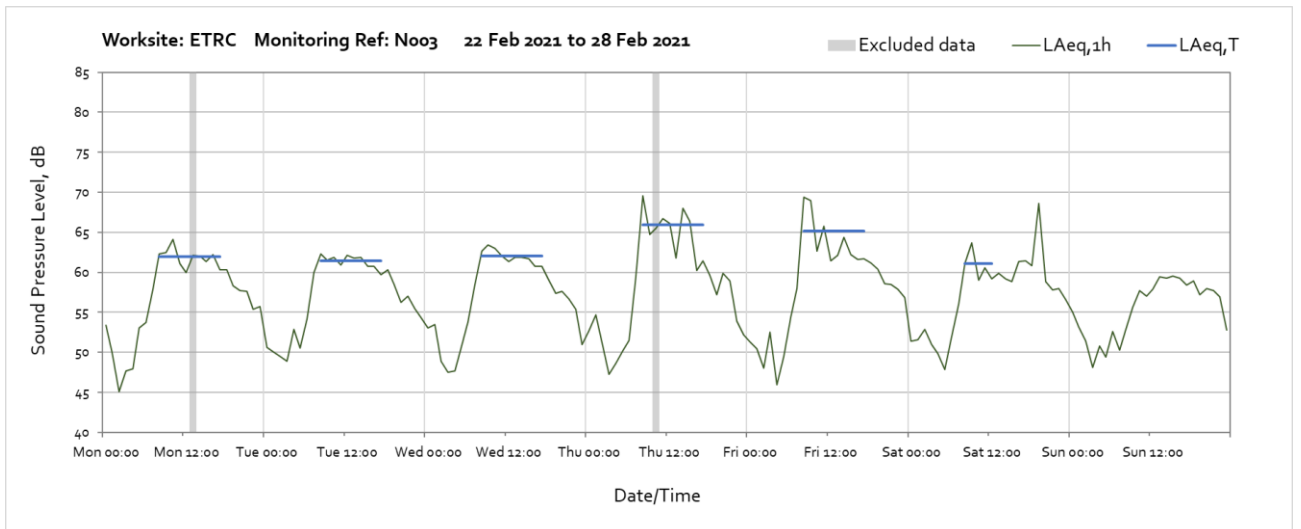
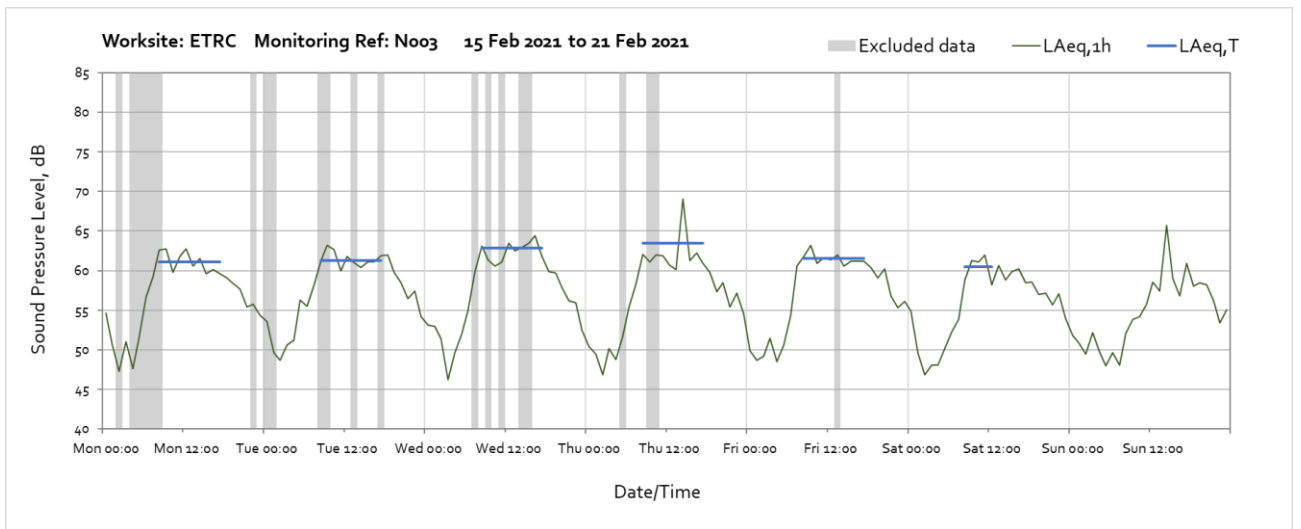
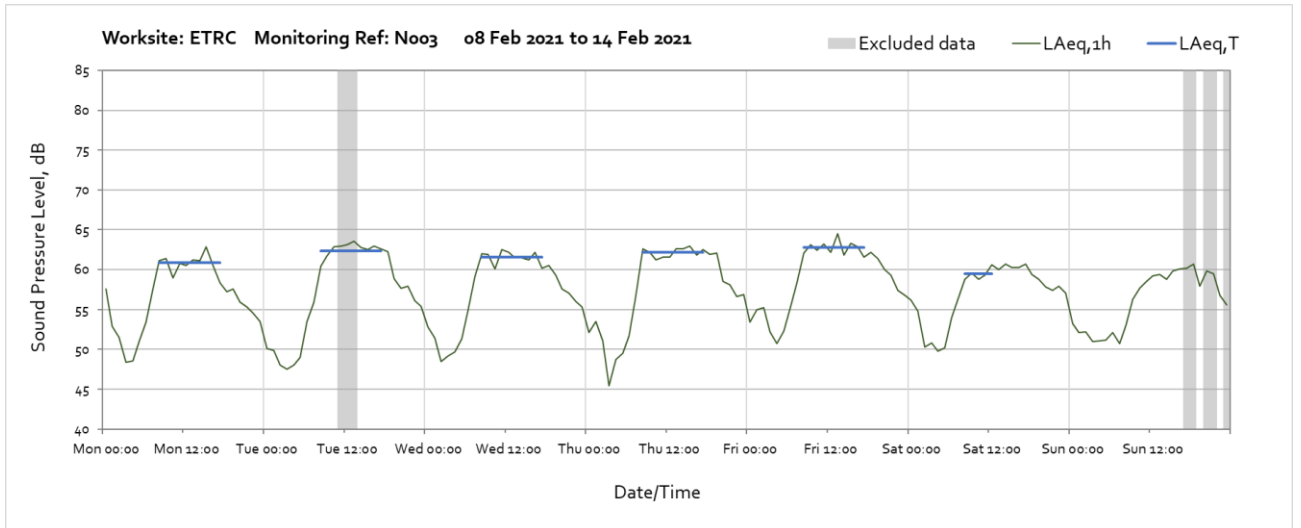
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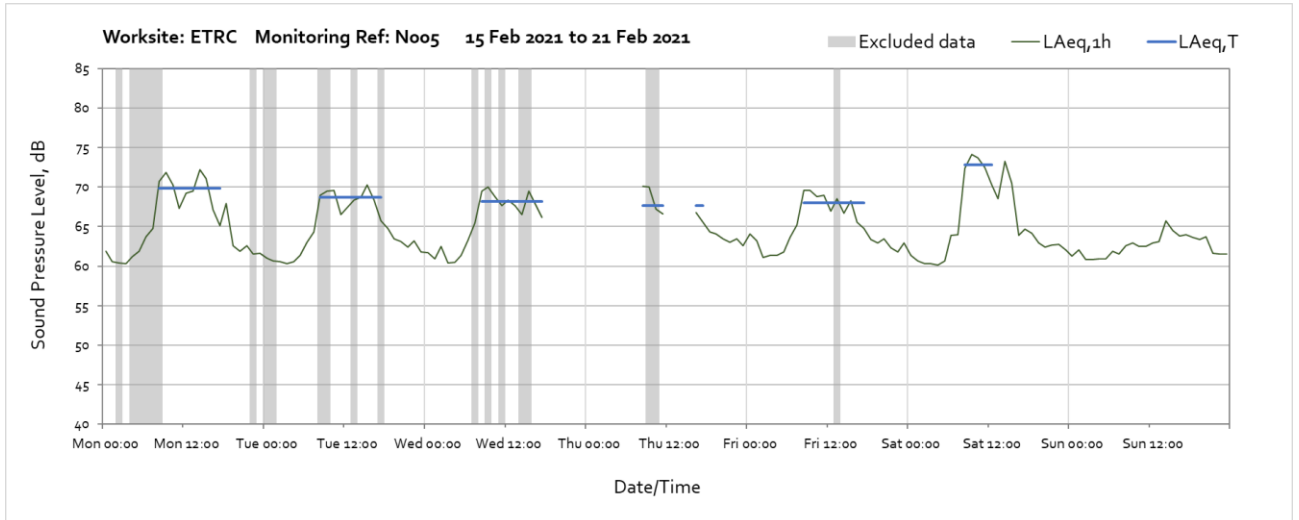
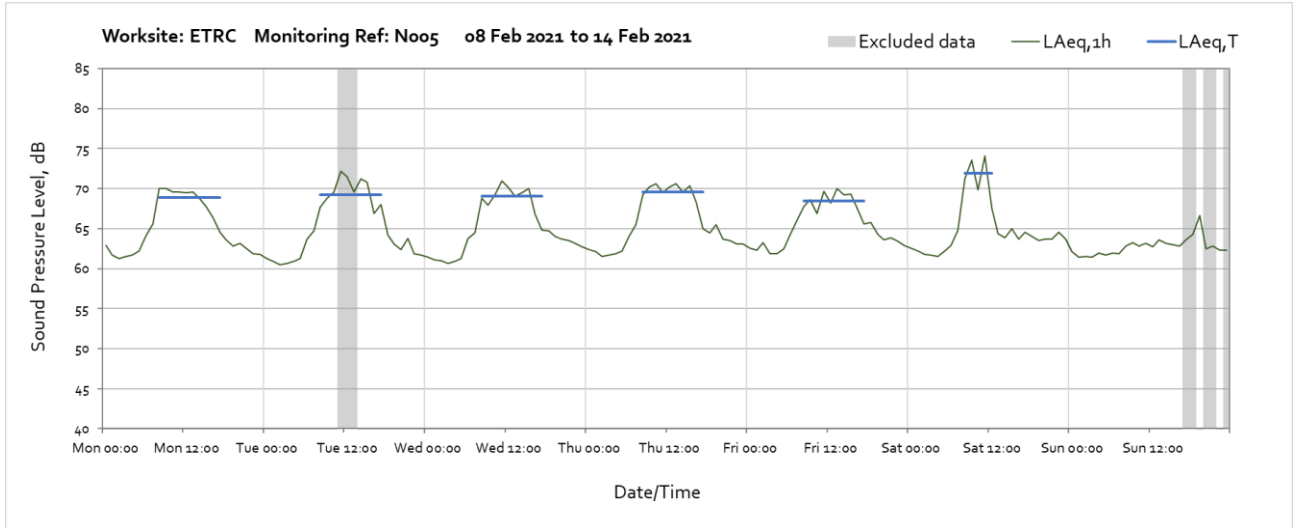
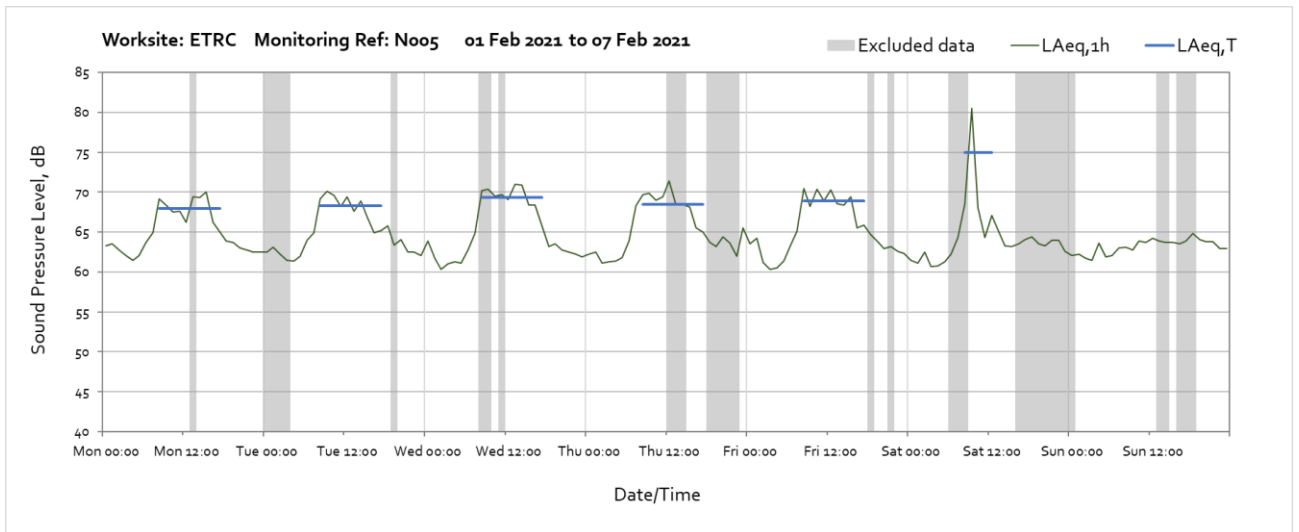


Worksite: ETRC – Monitoring Ref: N003



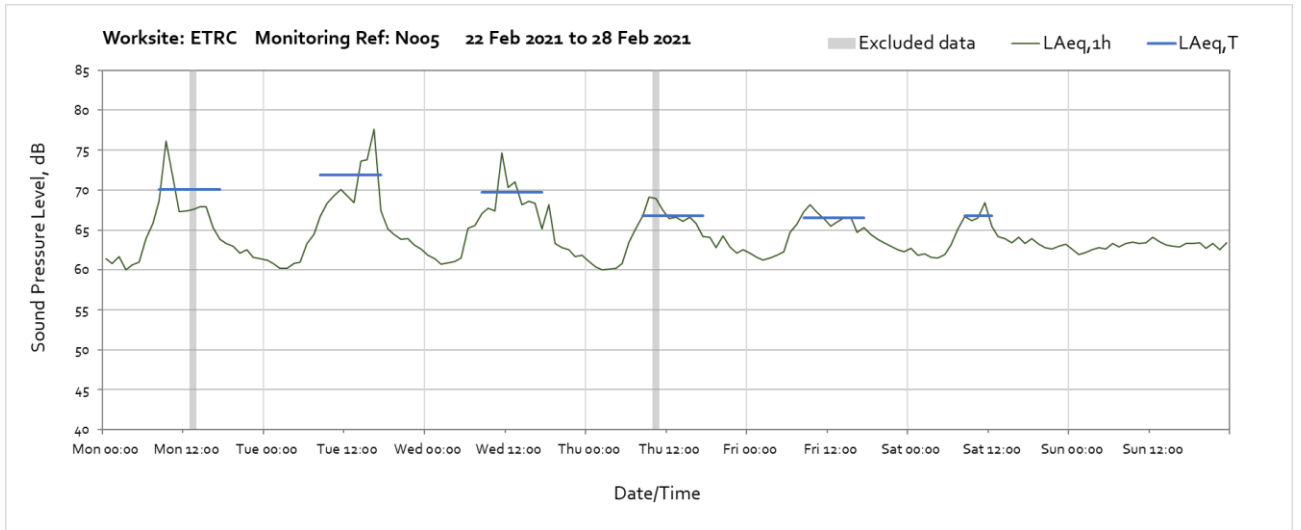


Worksite: ETRC – Monitoring Ref: N005

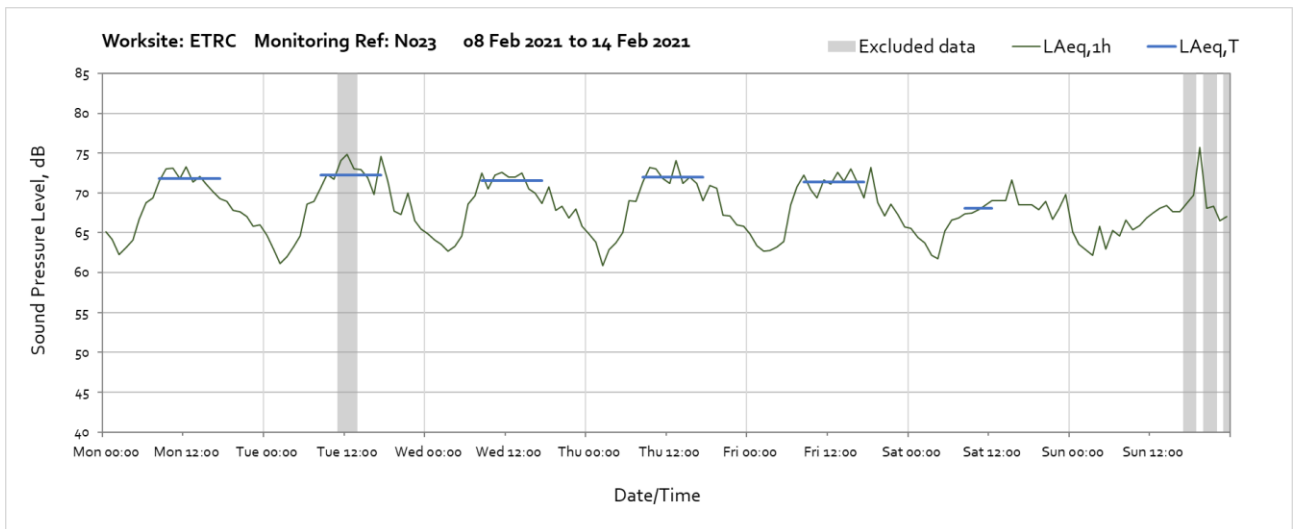
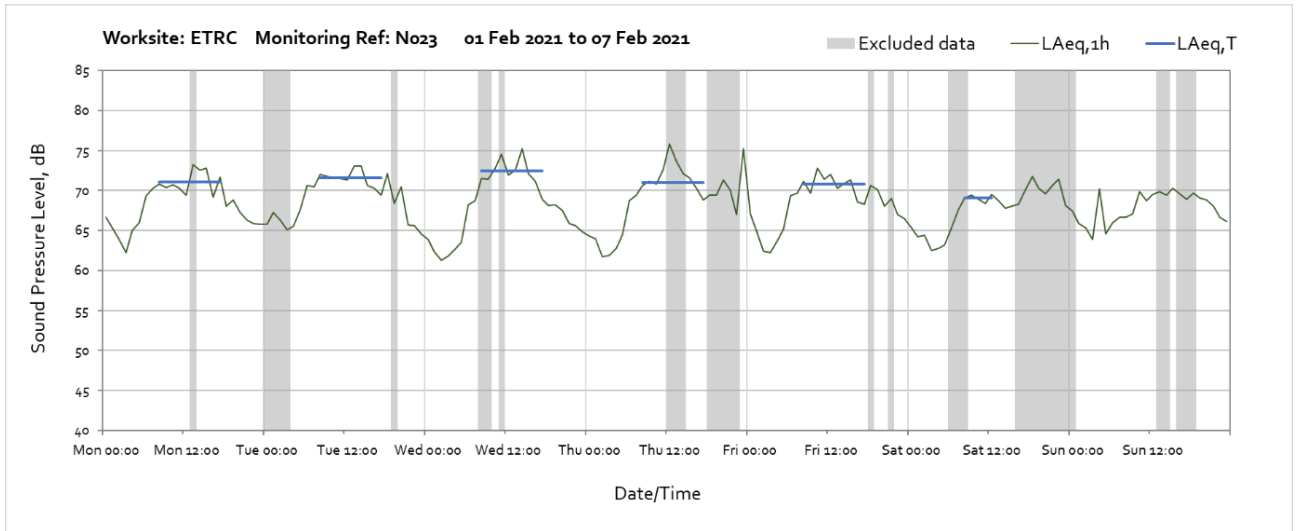


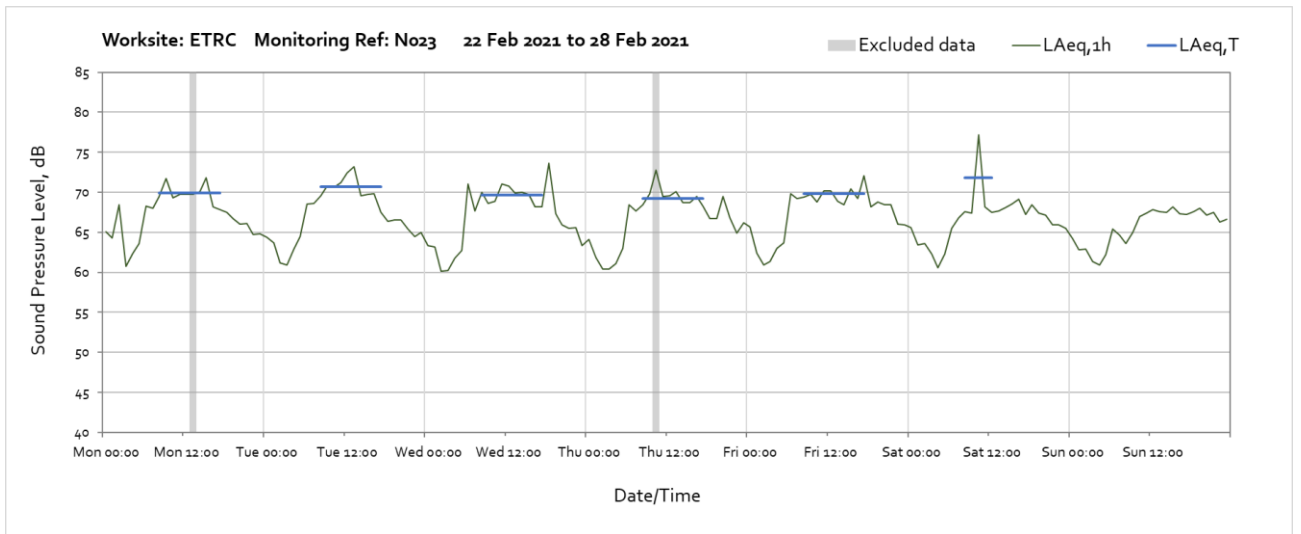
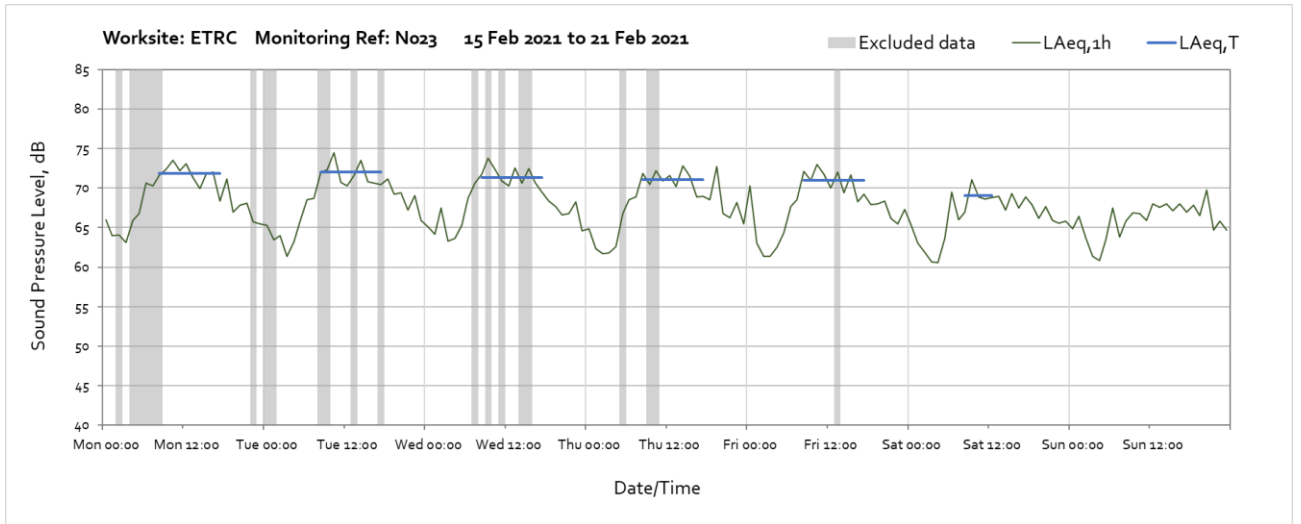
Note: Missing data from 18:00 on Wednesday 17th February until 16:00 on Thursday 18th February was due to a fault with the monitor settings.

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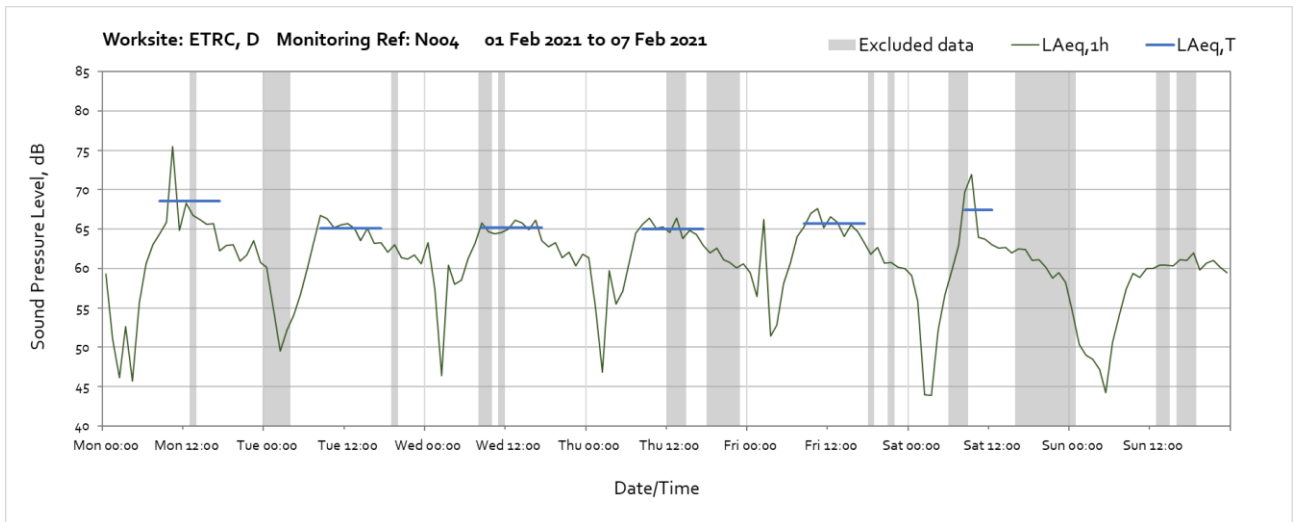


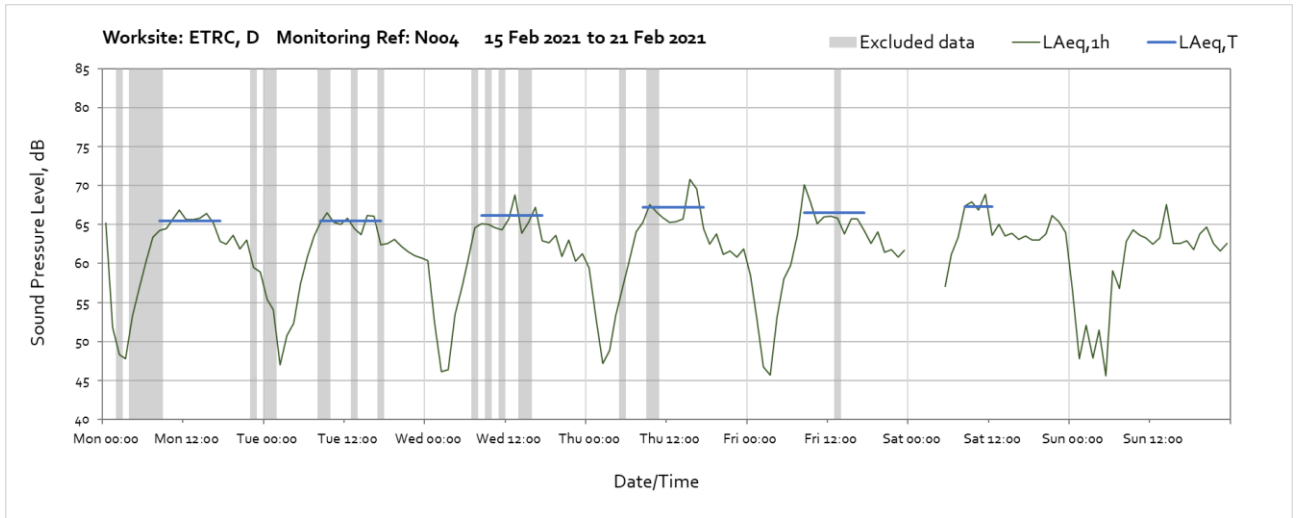
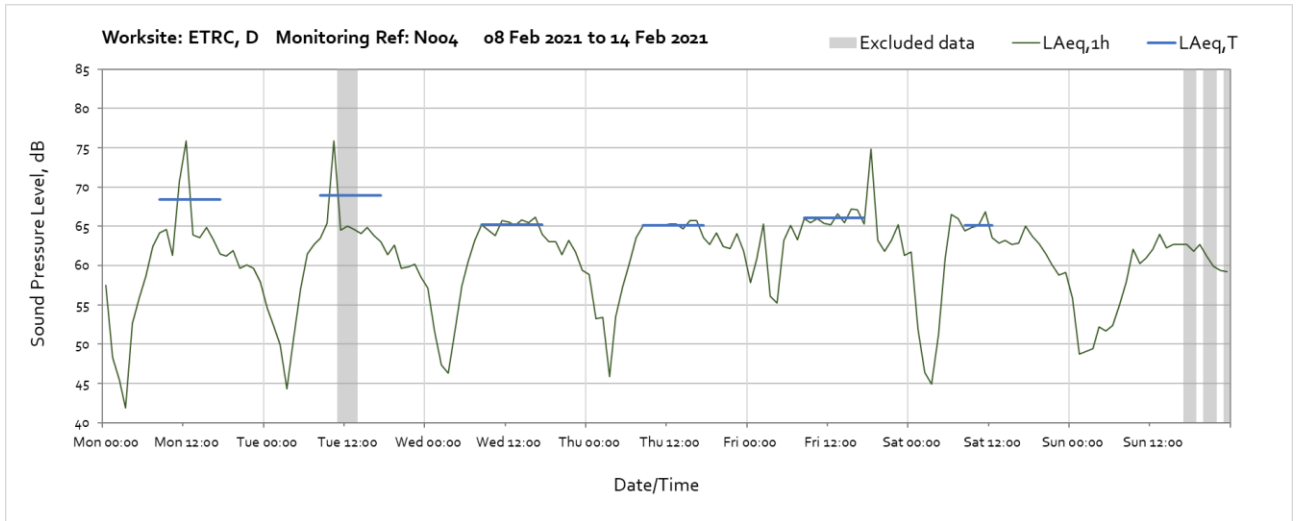
Worksite: ETRC – Monitoring Ref: N023



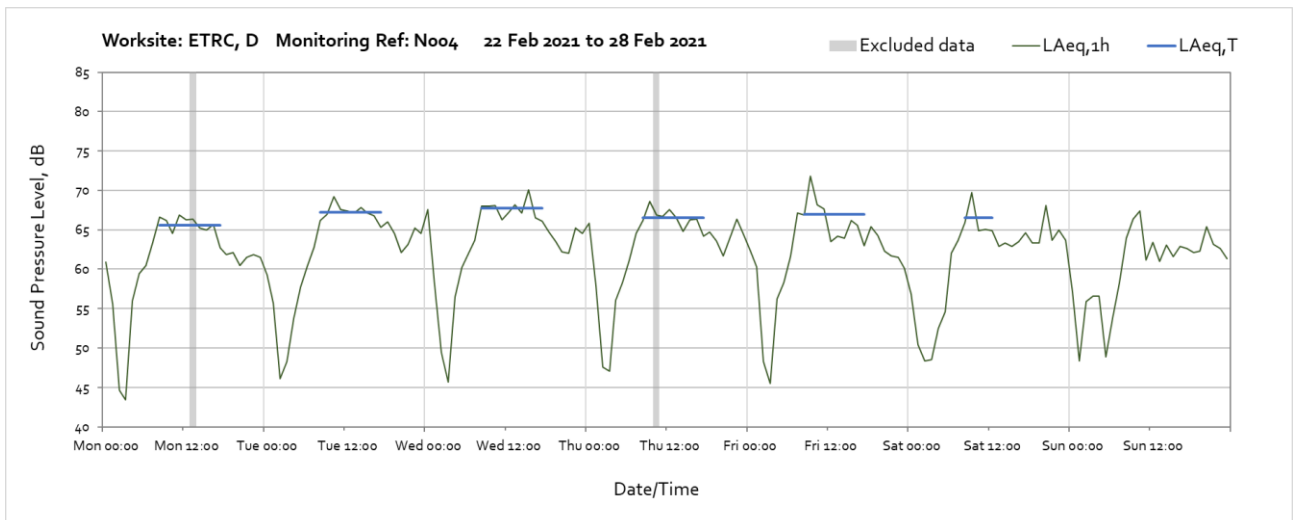


Worksite: ETRC-D – Monitoring Ref: N004

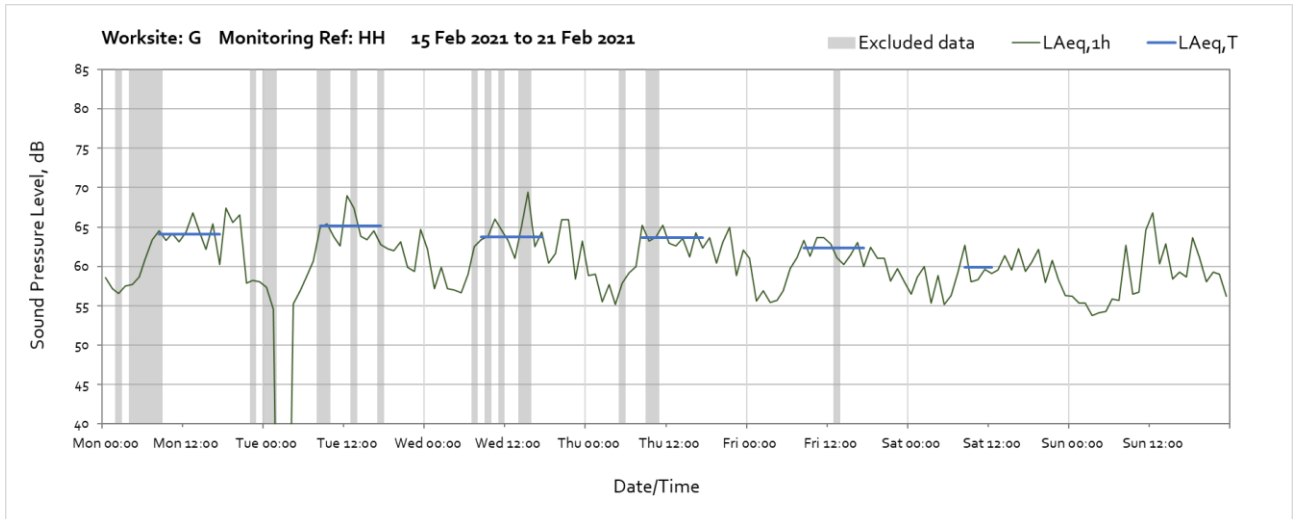
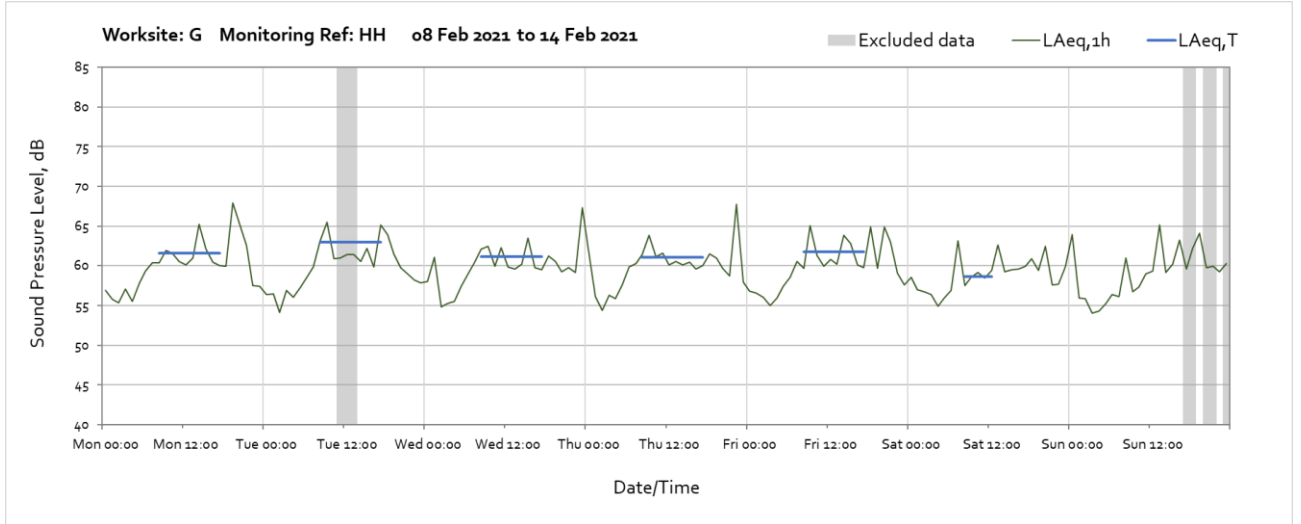
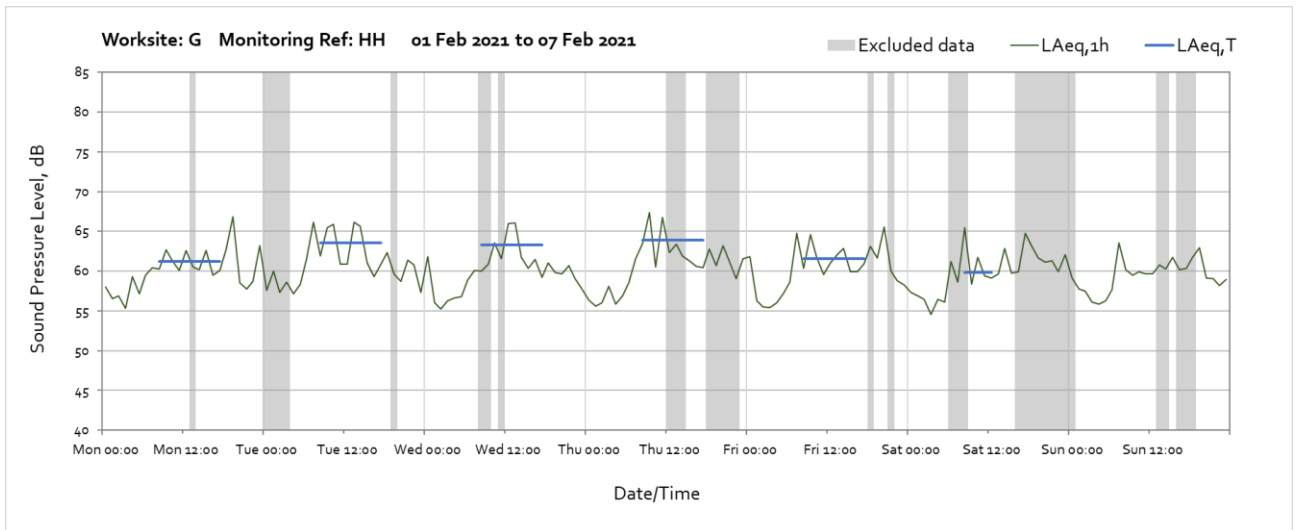


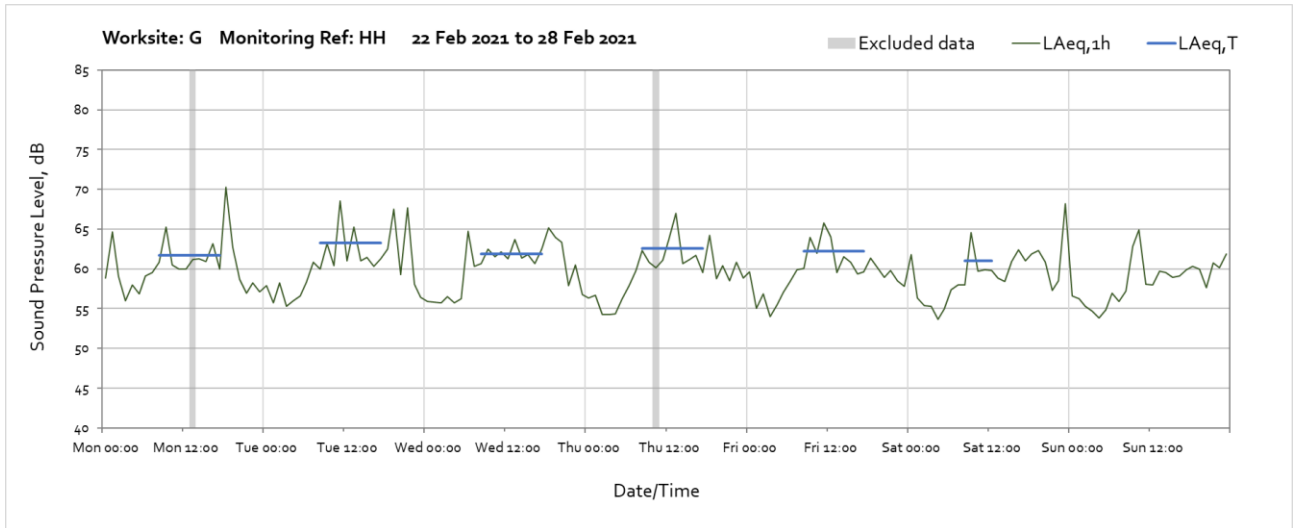


Note: Missing data from 00:00 until 05:00 on Wednesday 20th February was due to a software issue causing an automatic reset of the monitor.

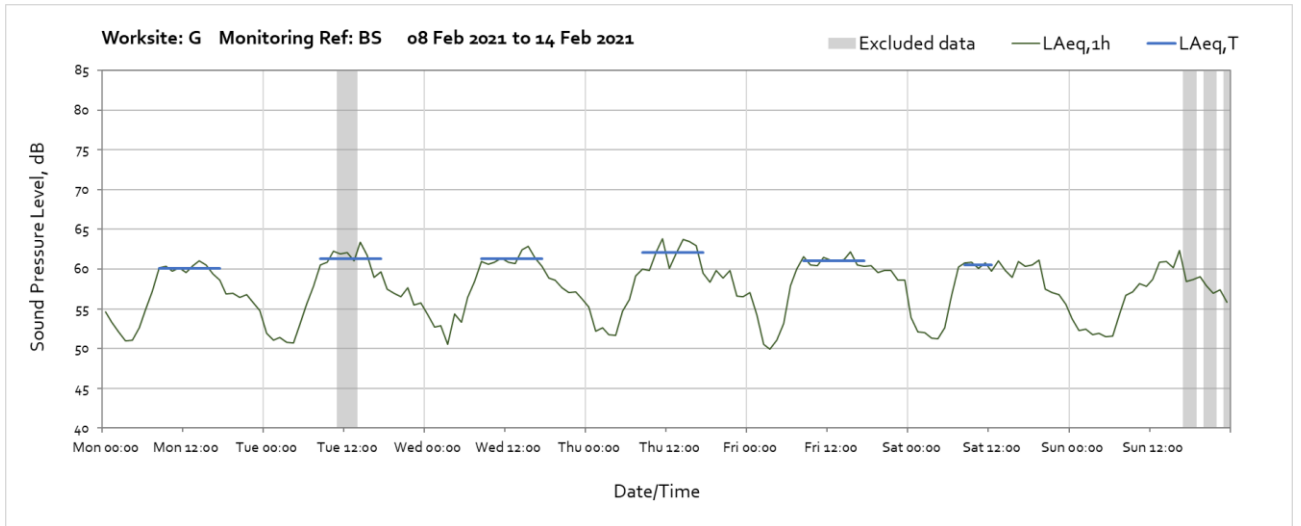
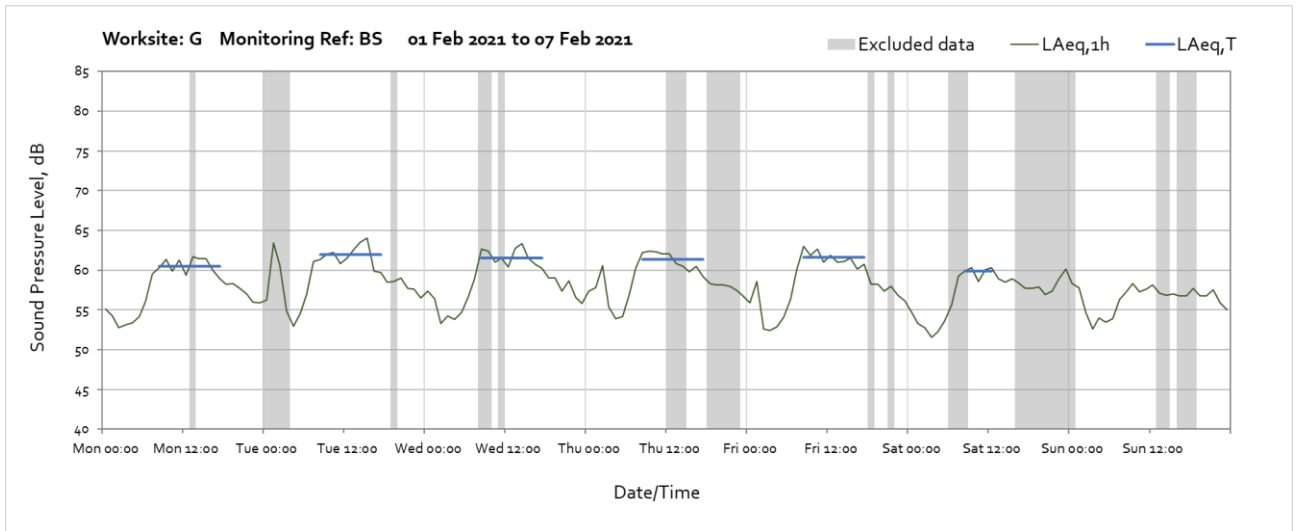


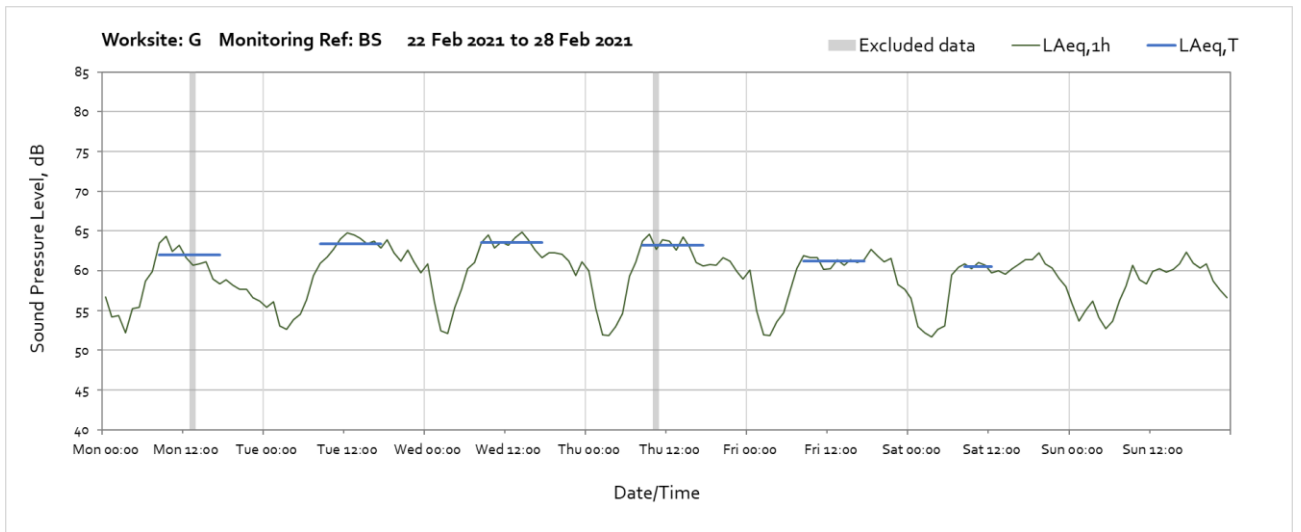
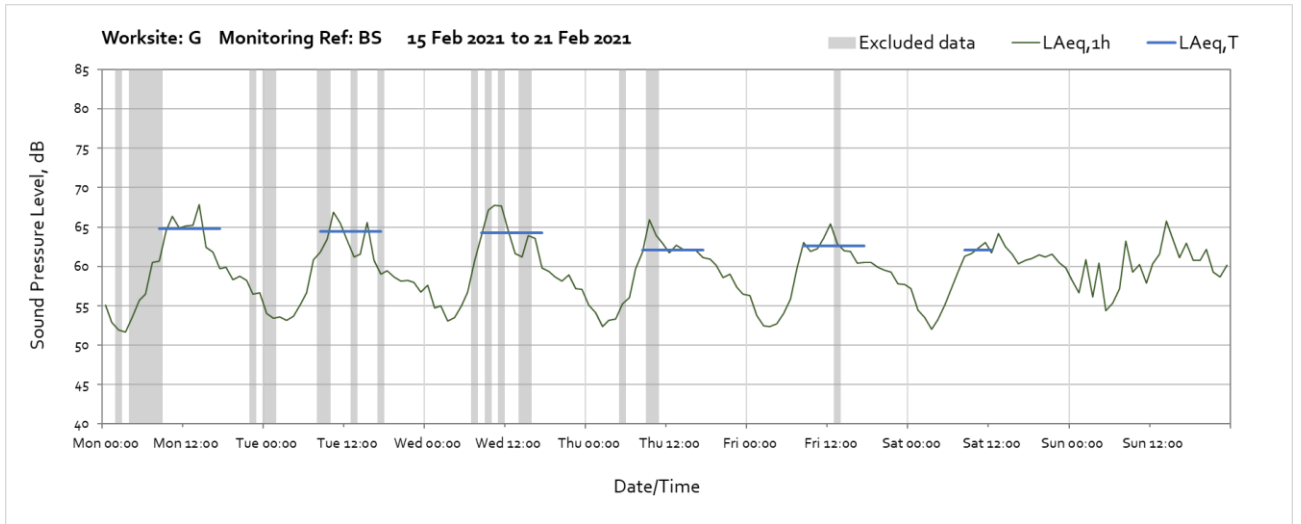
Worksite: G – Monitoring Ref: HH



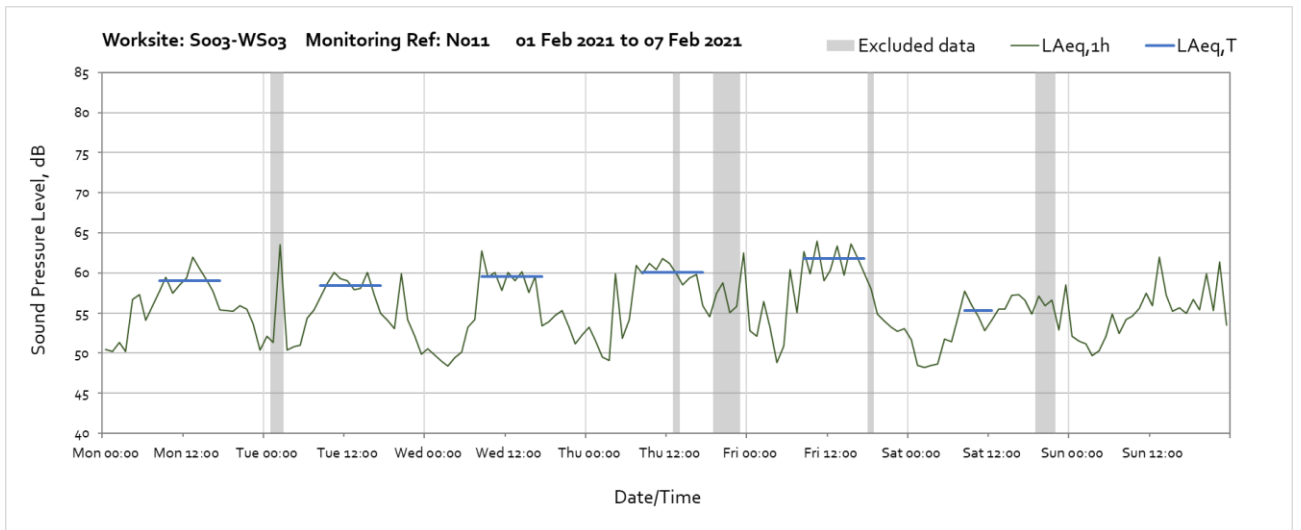


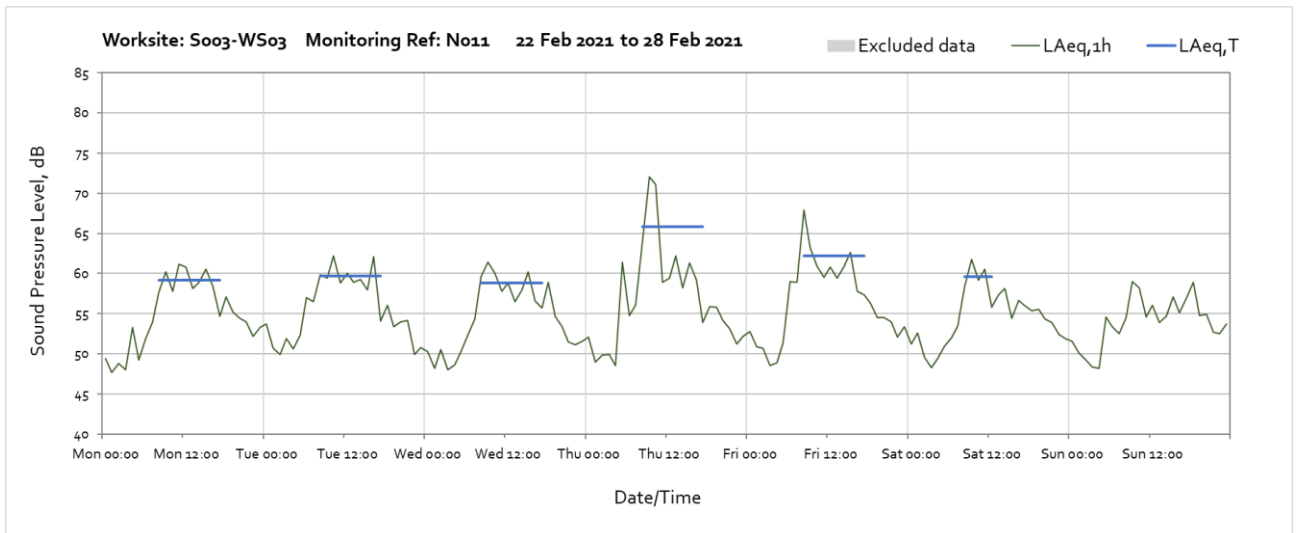
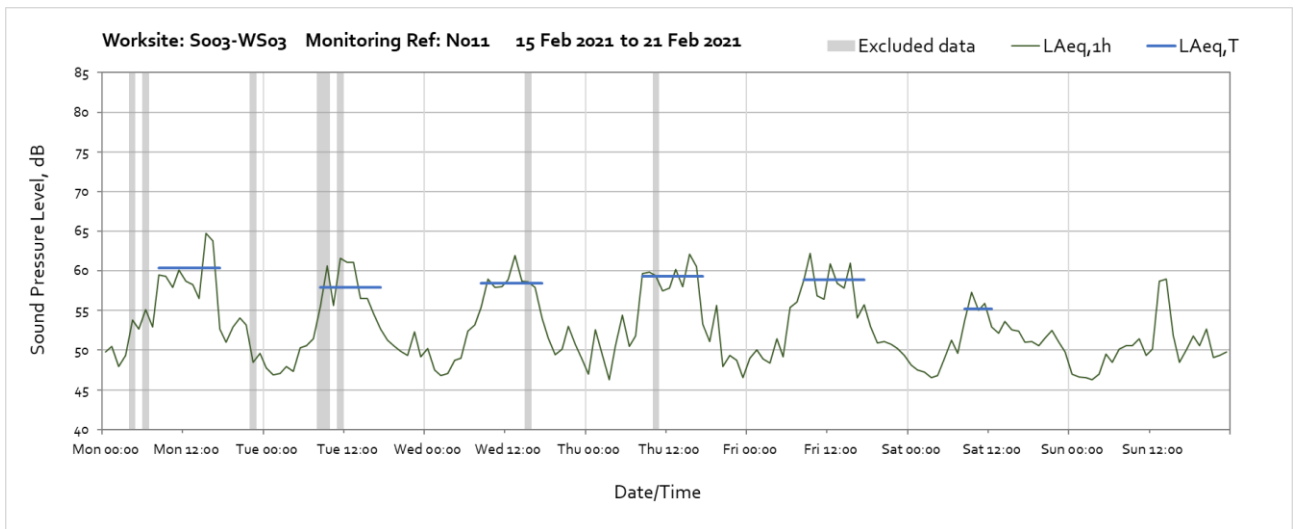
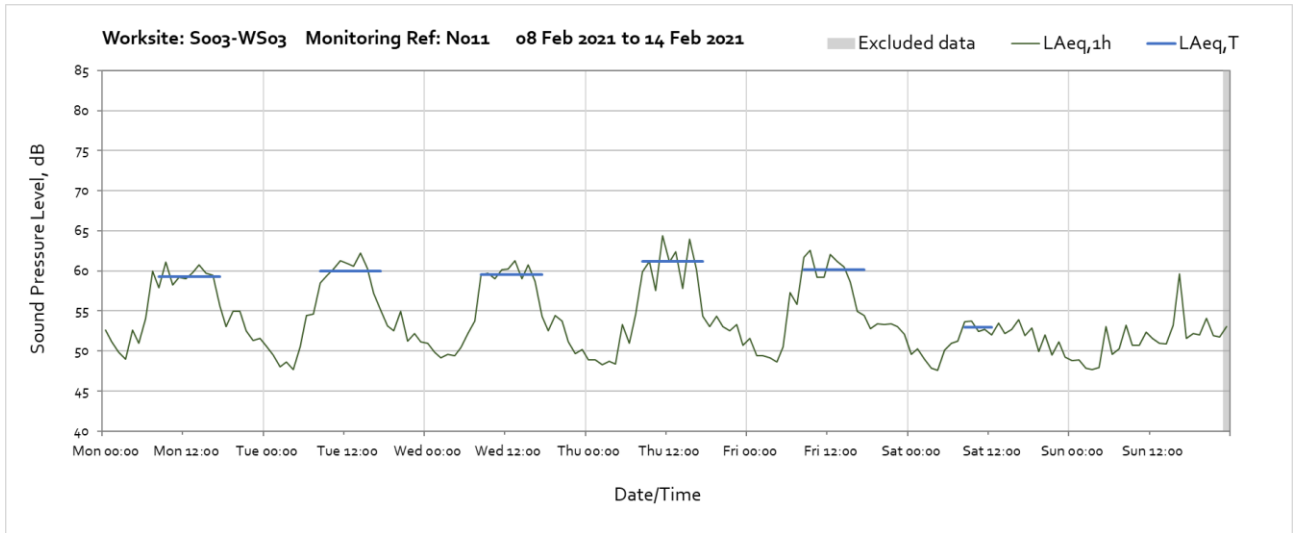
Worksite: G – Monitoring Ref: BS



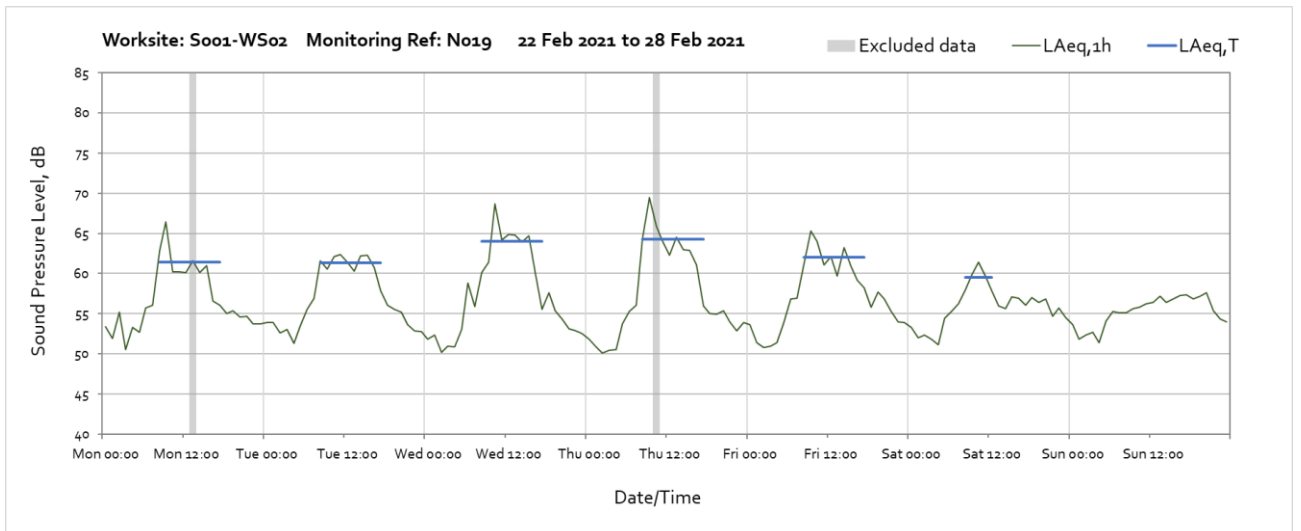
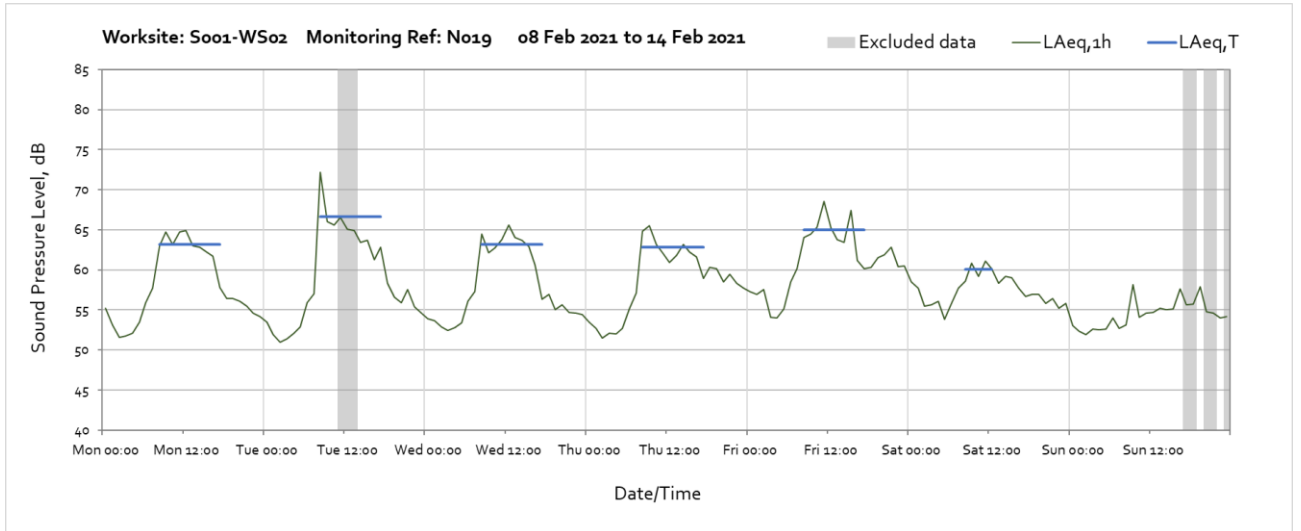
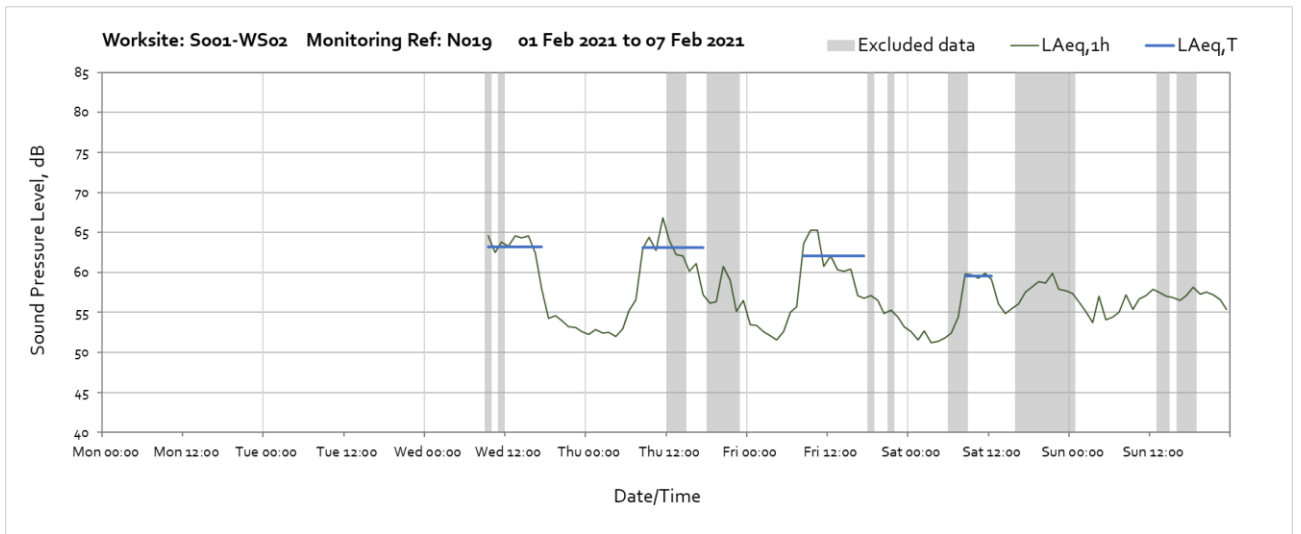


Worksite: S001-WS02 – Monitoring Ref: N018



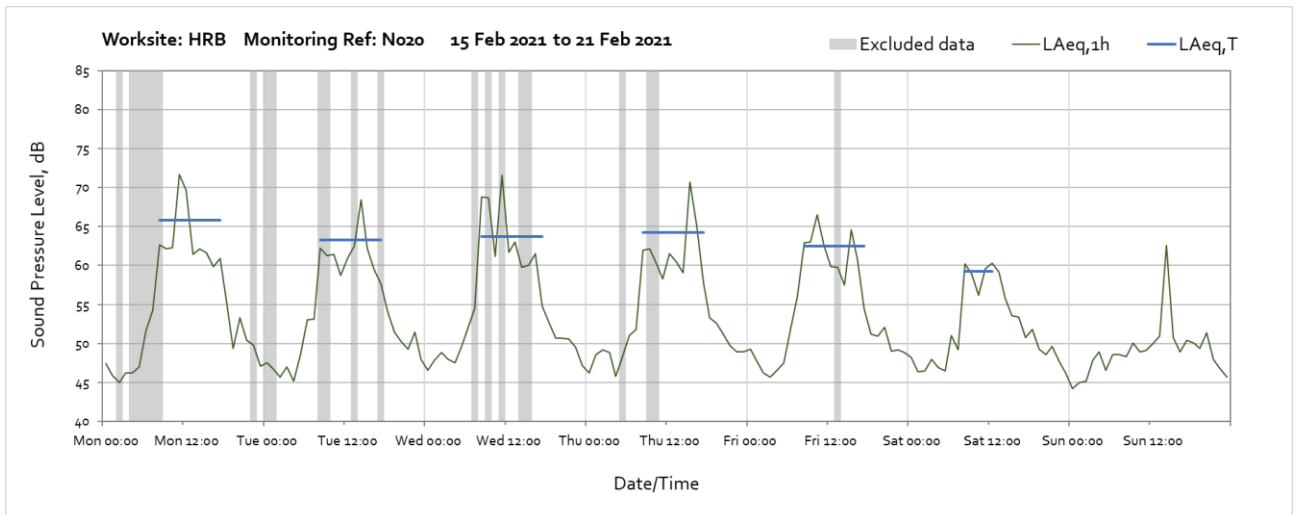
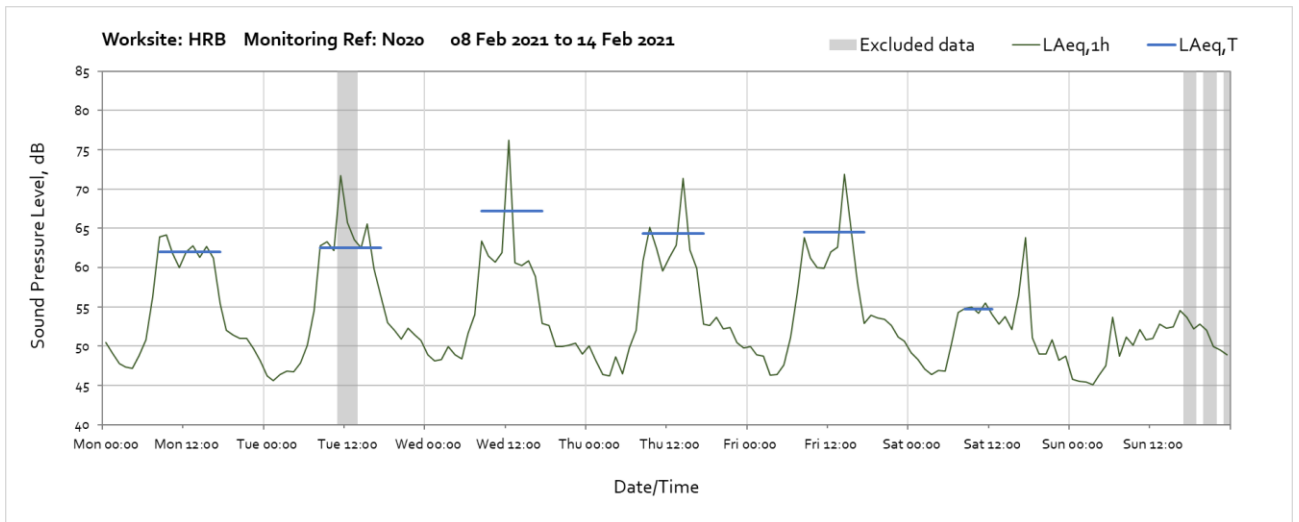
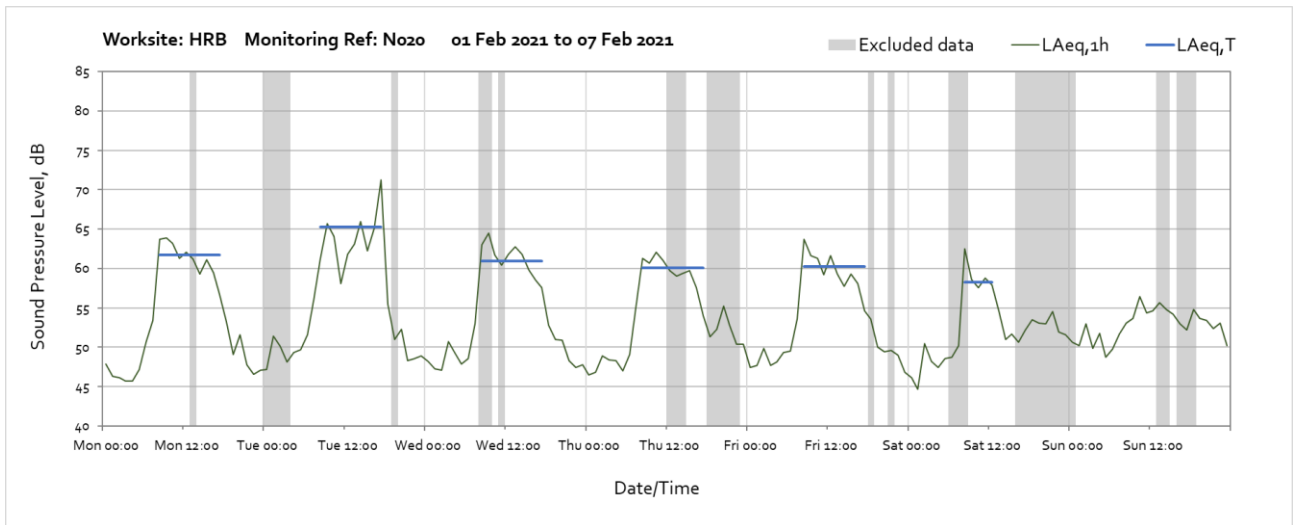


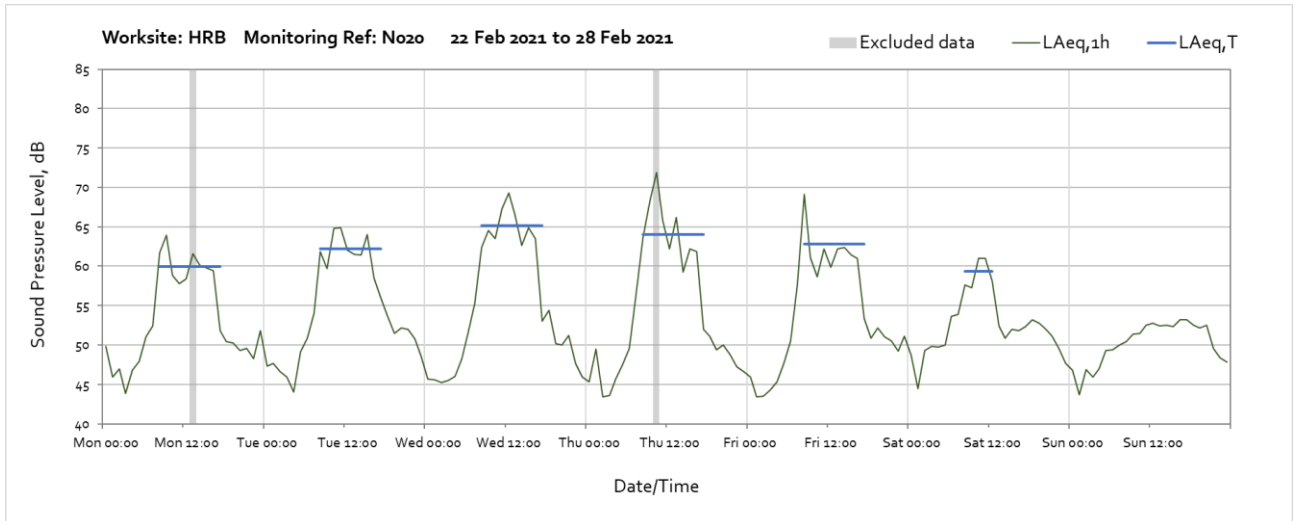
Worksite: S001-WS02 – Monitoring Ref: N019



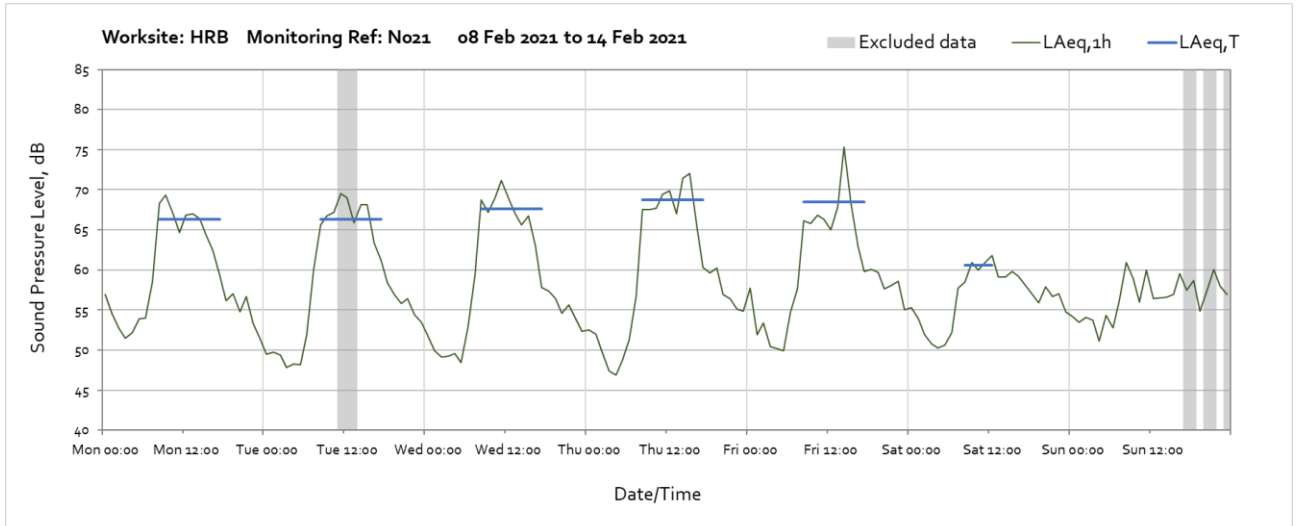
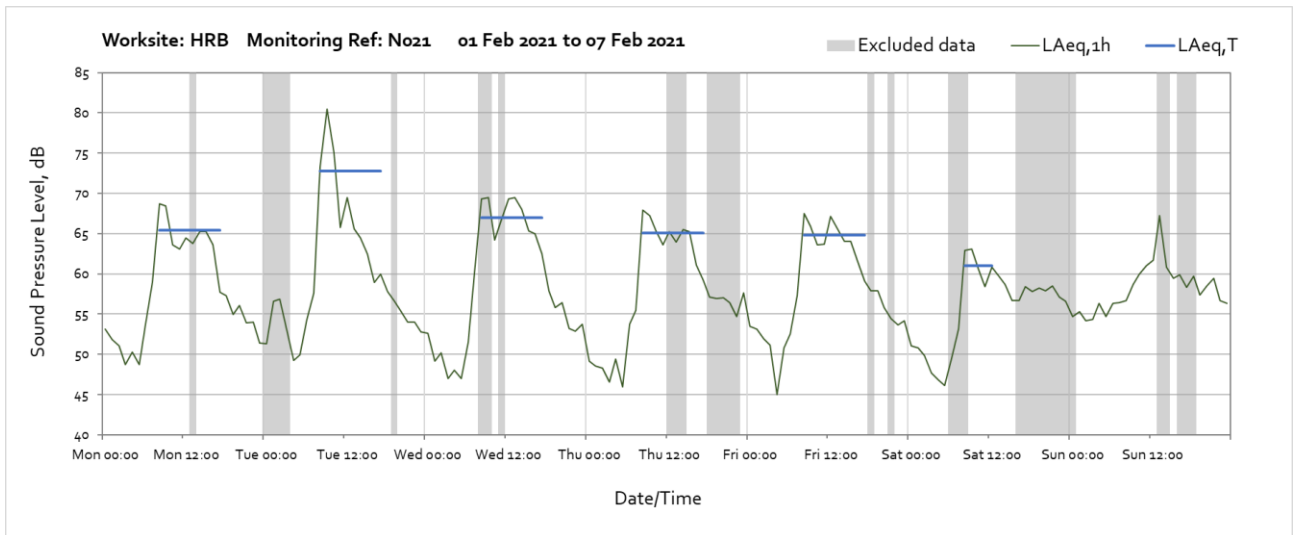
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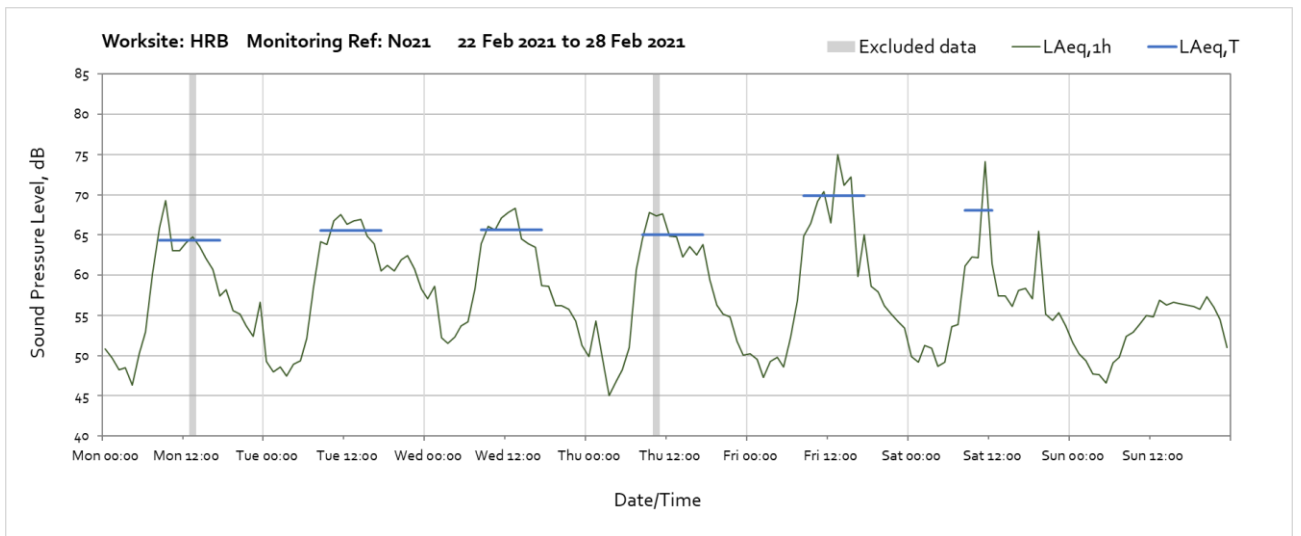
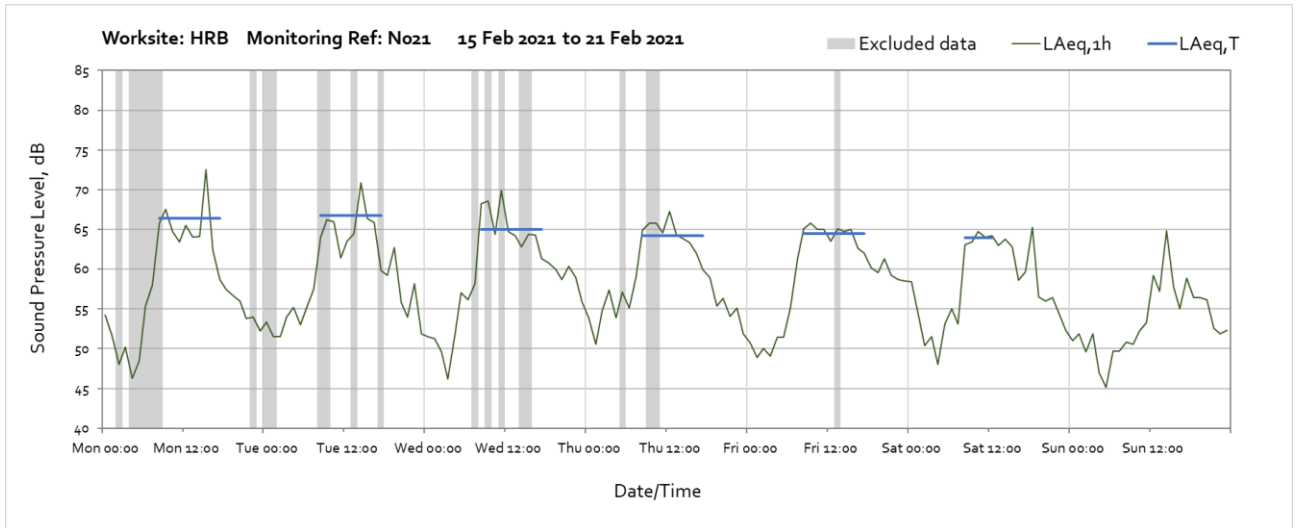
Worksite: HRB – Monitoring Ref: N020



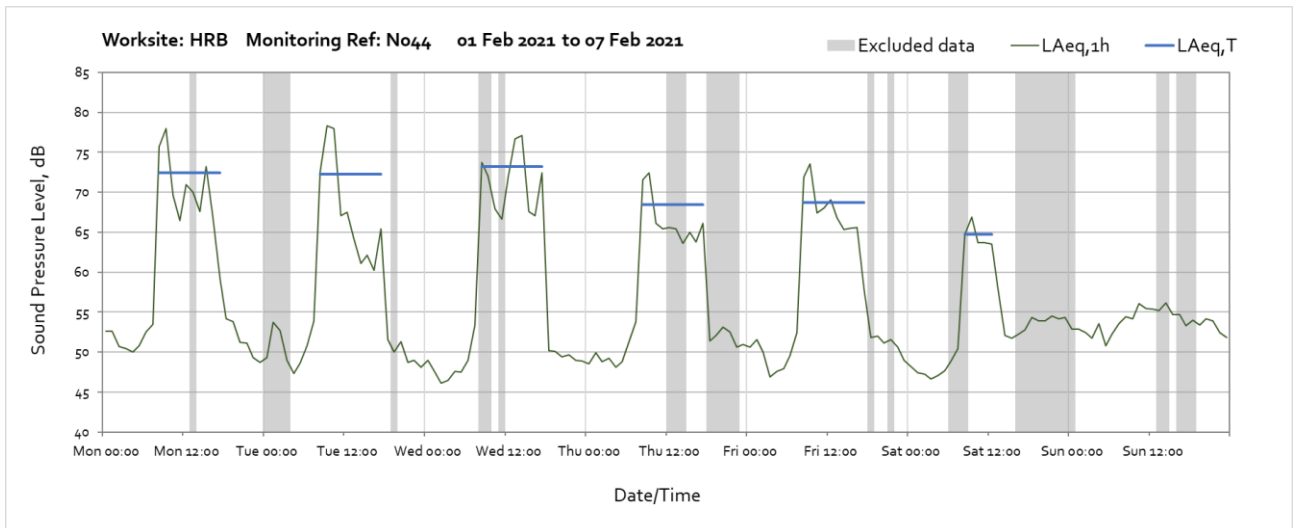


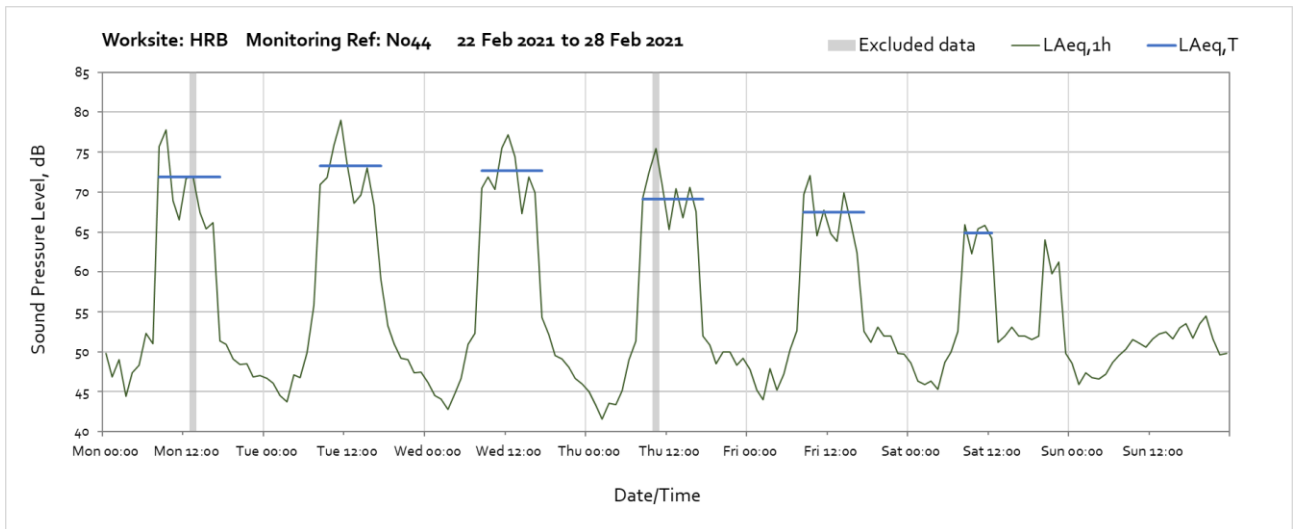
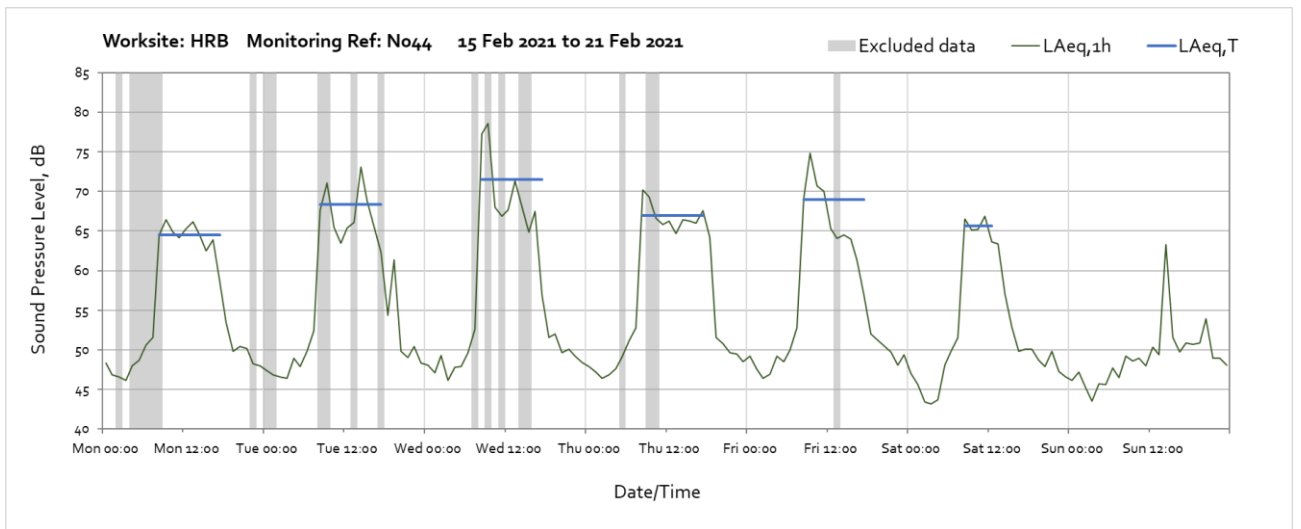
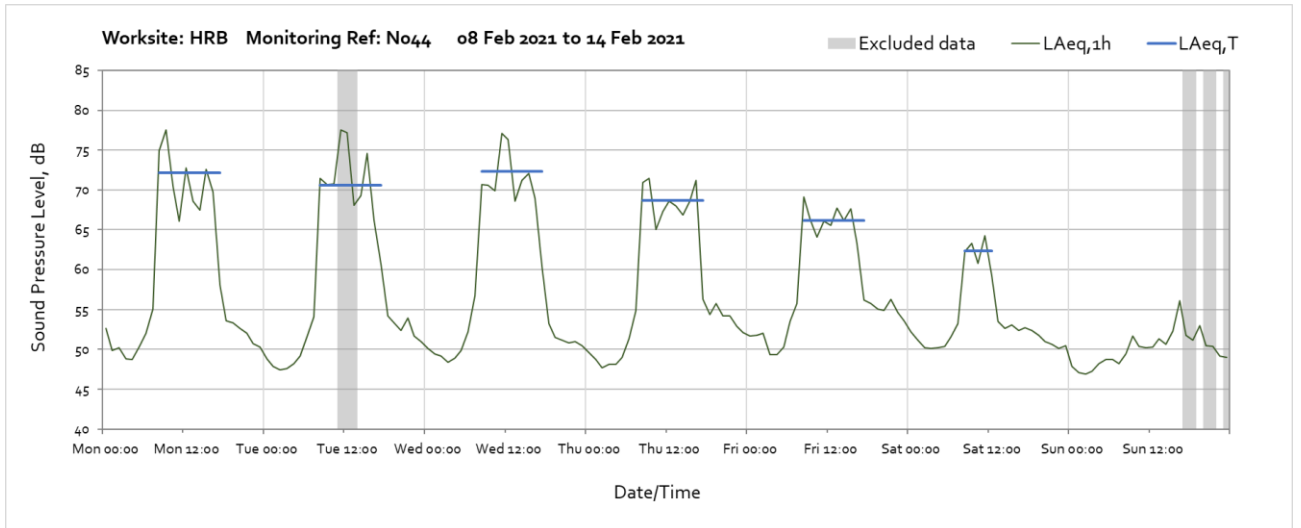
Worksite: HRB – Monitoring Ref: N021



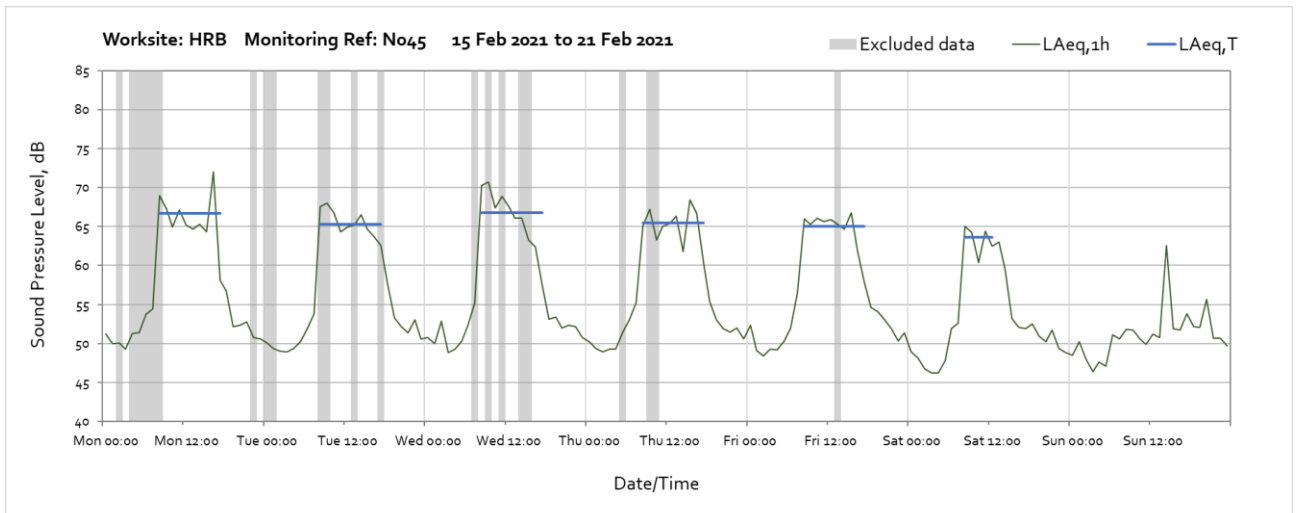
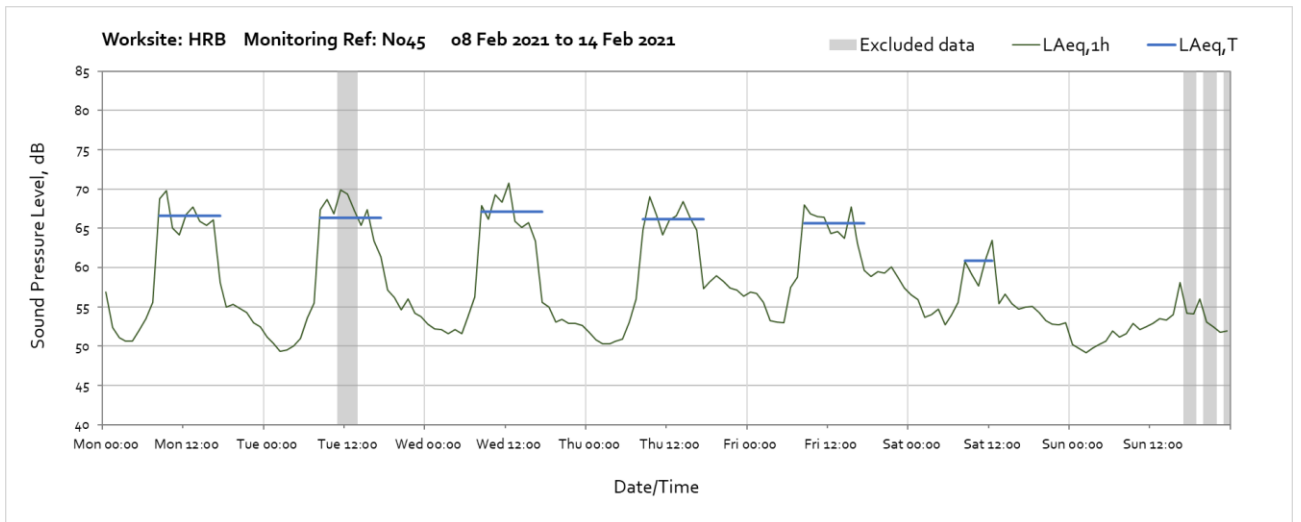
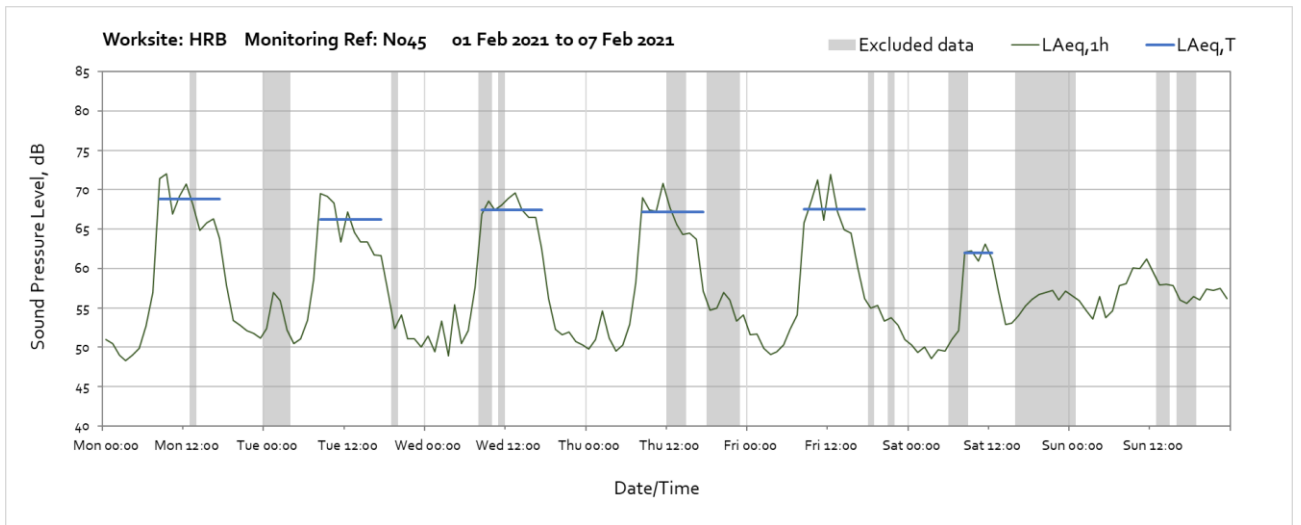


Worksite: HRB – Monitoring Ref: N044

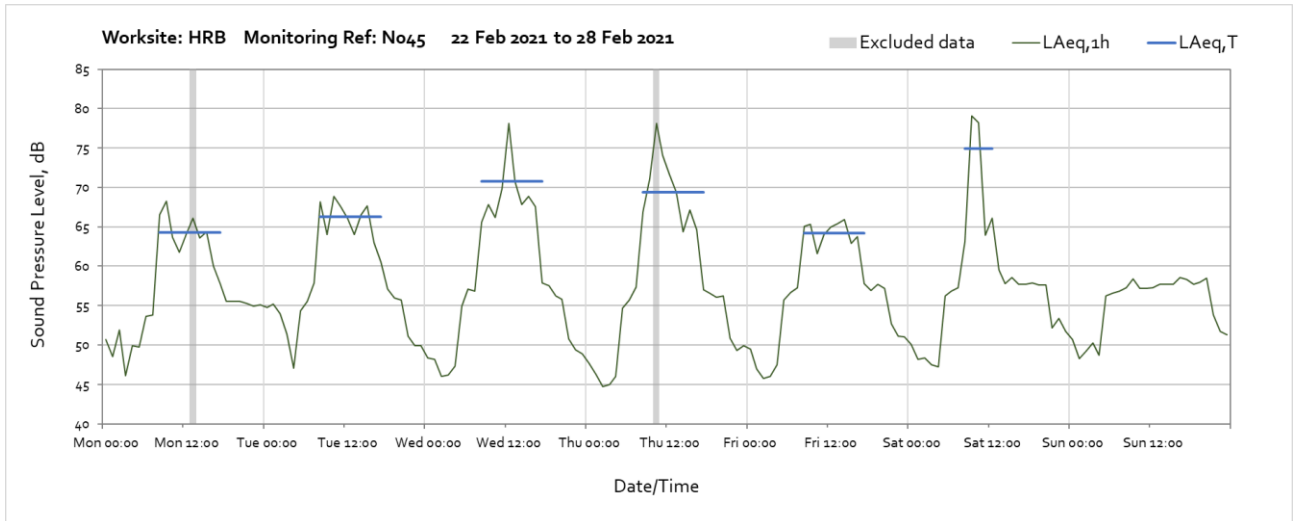




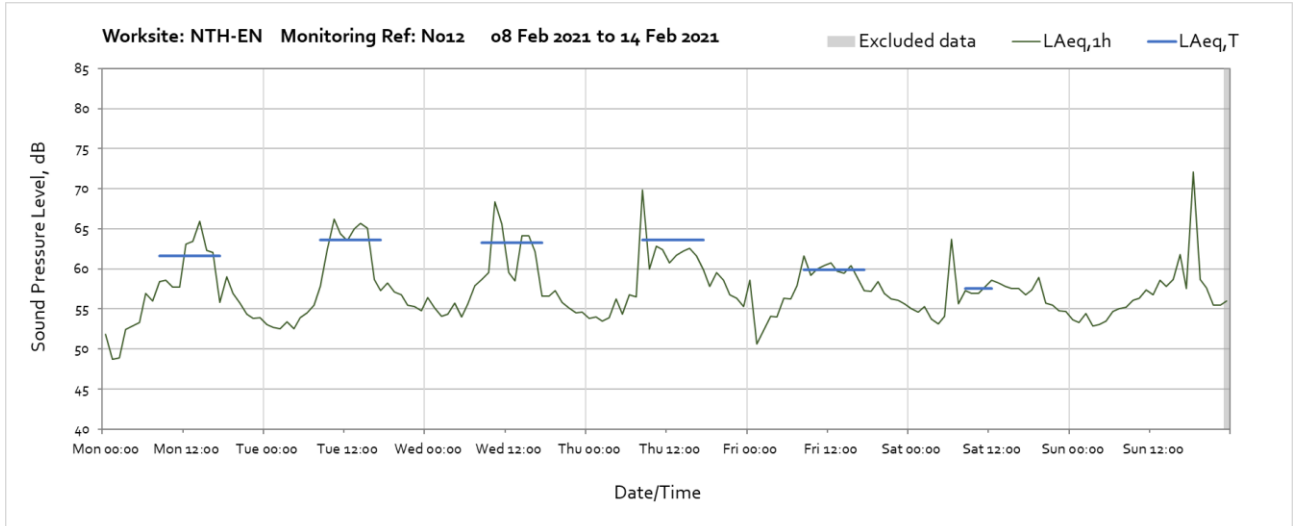
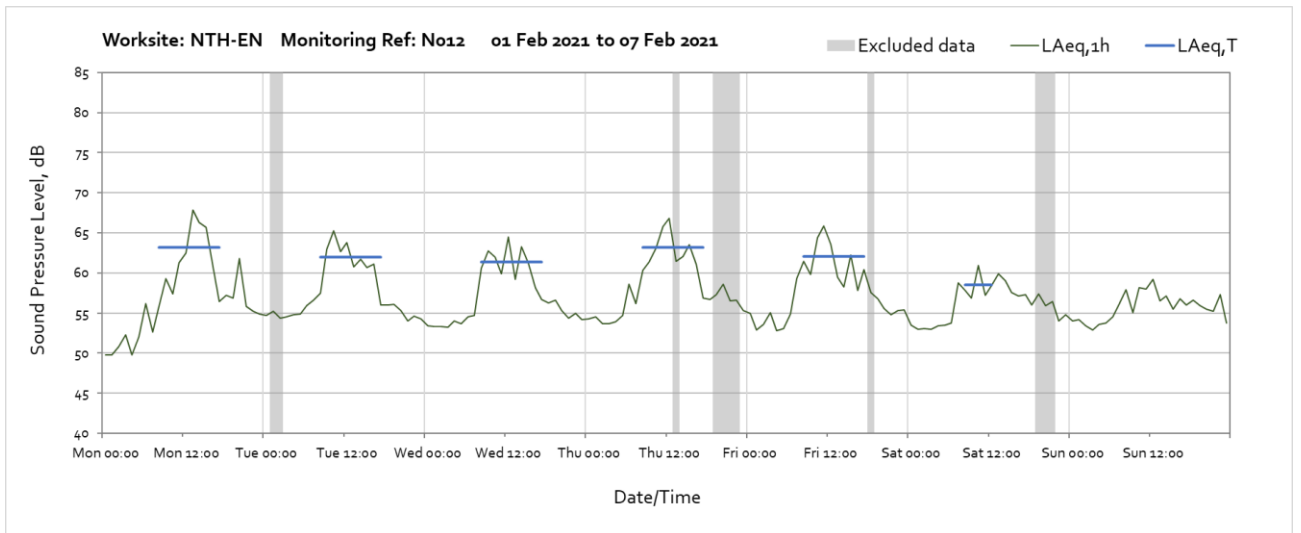
Worksite: HRB – Monitoring Ref: N045

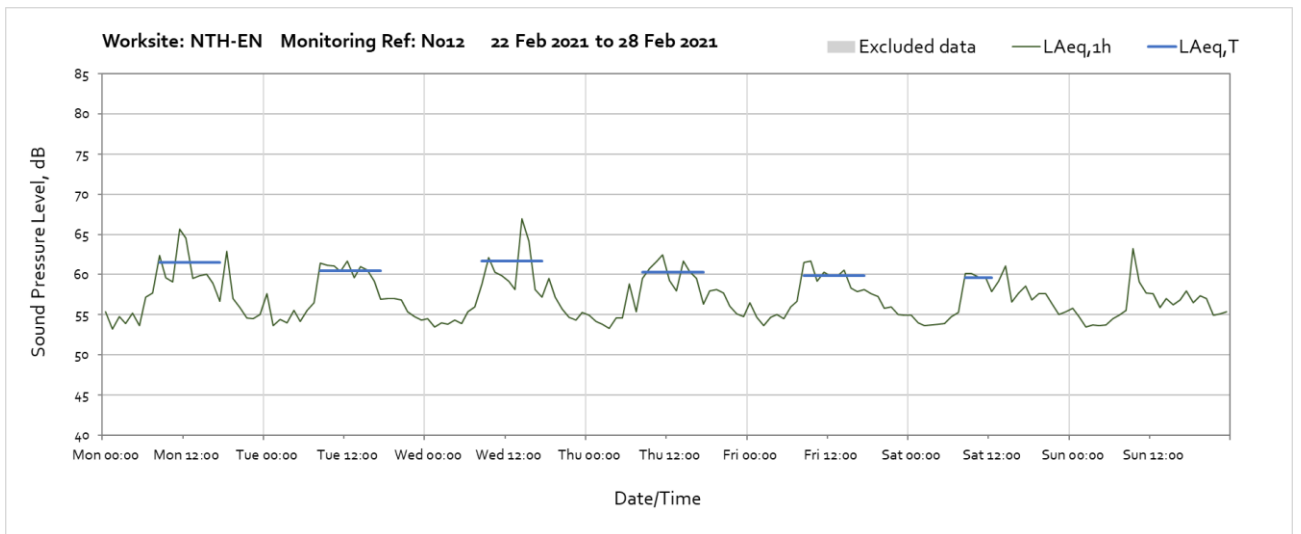
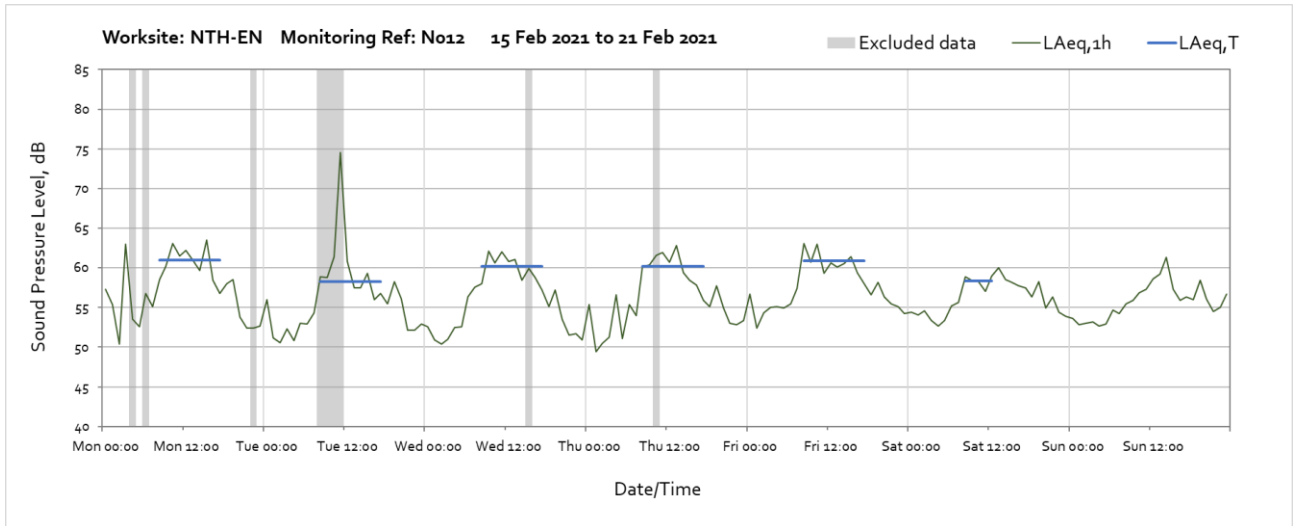


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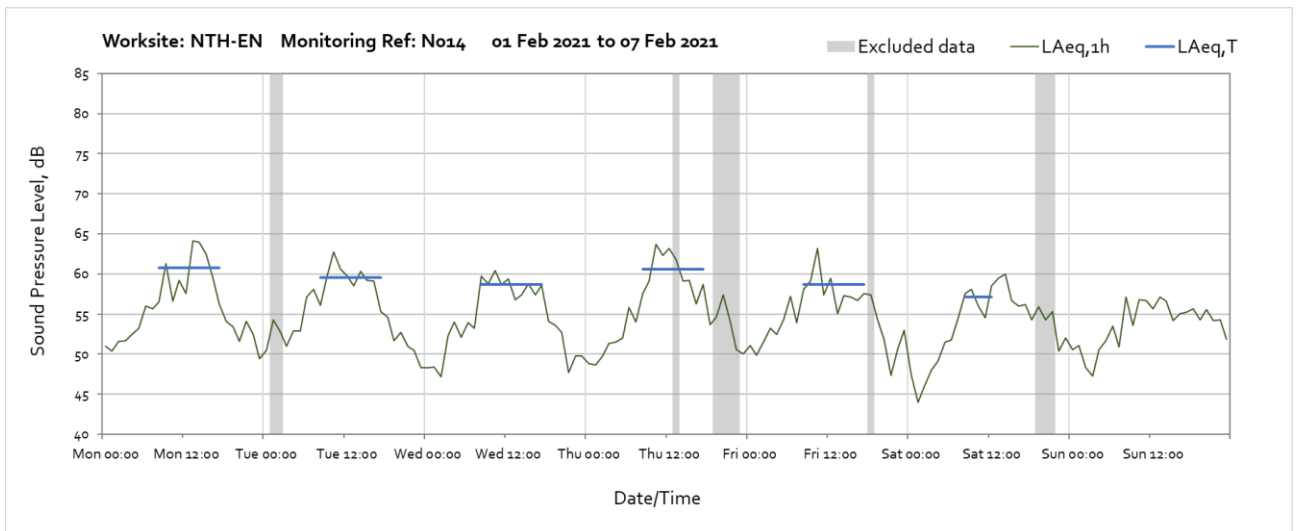


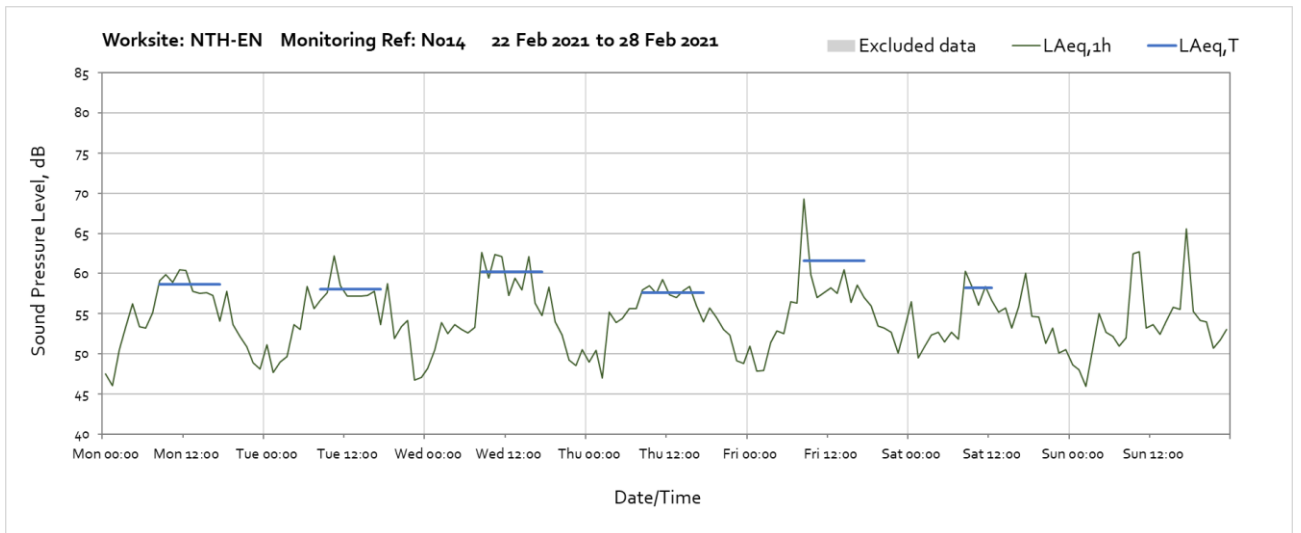
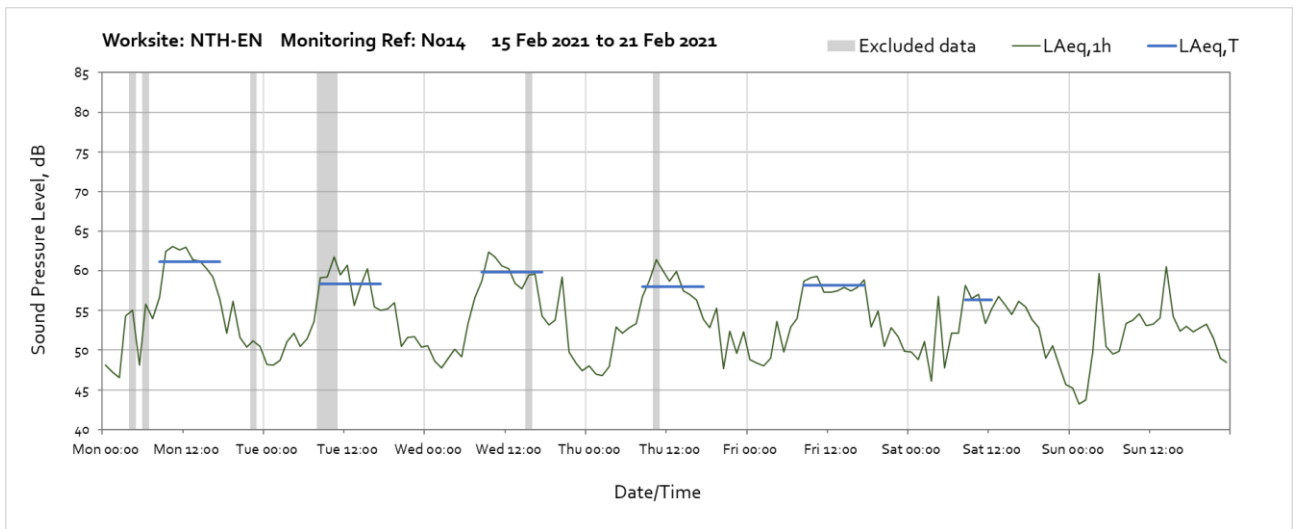
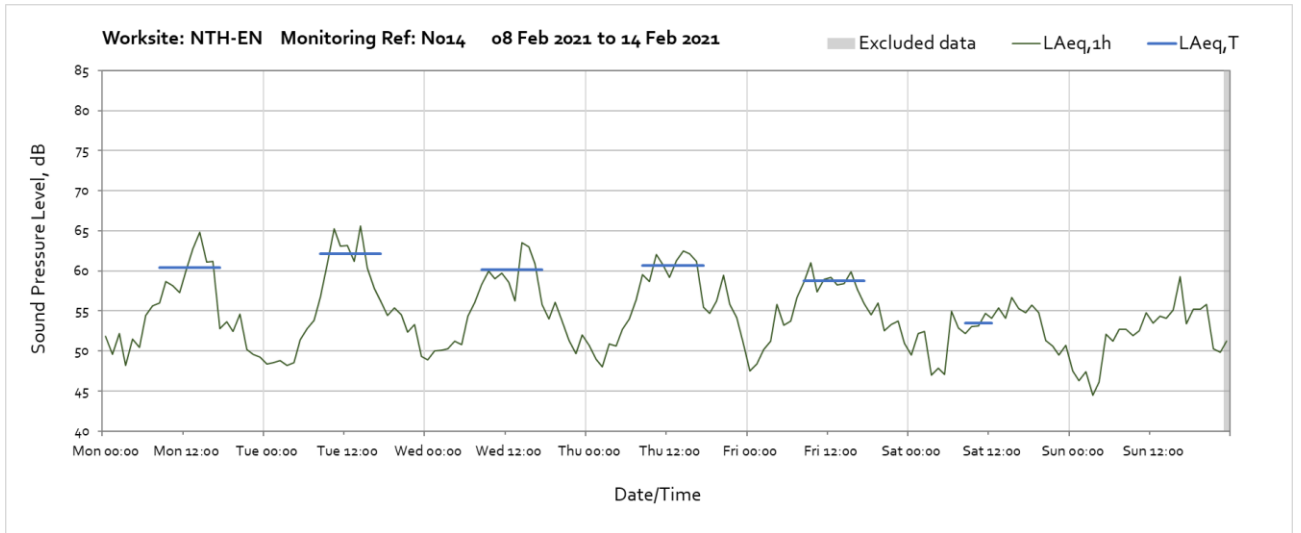
Worksite: NTH-EN – Monitoring Ref: N012



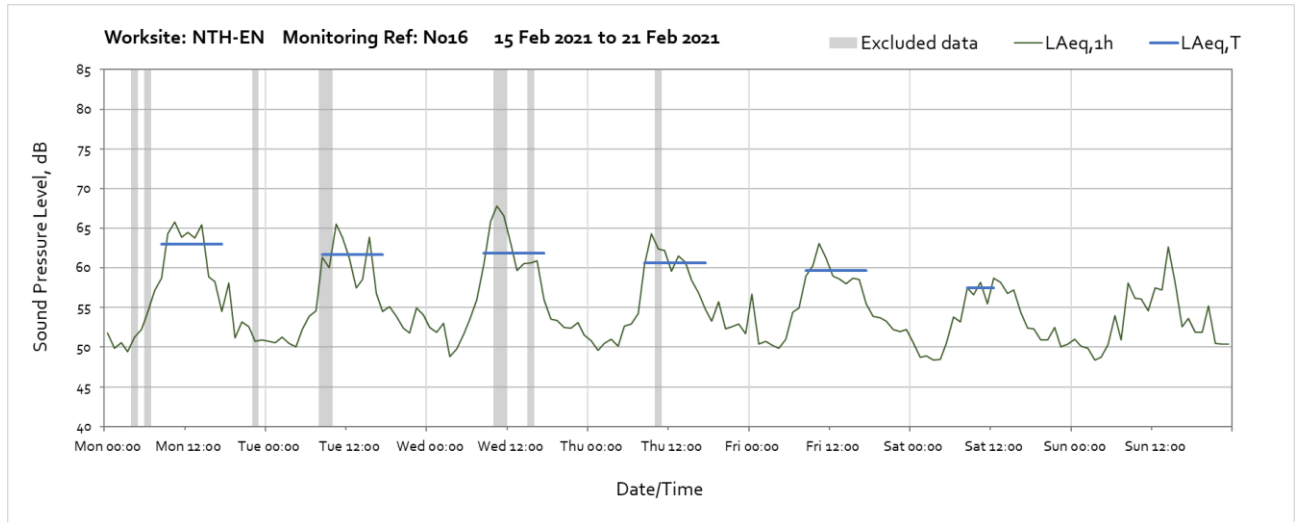
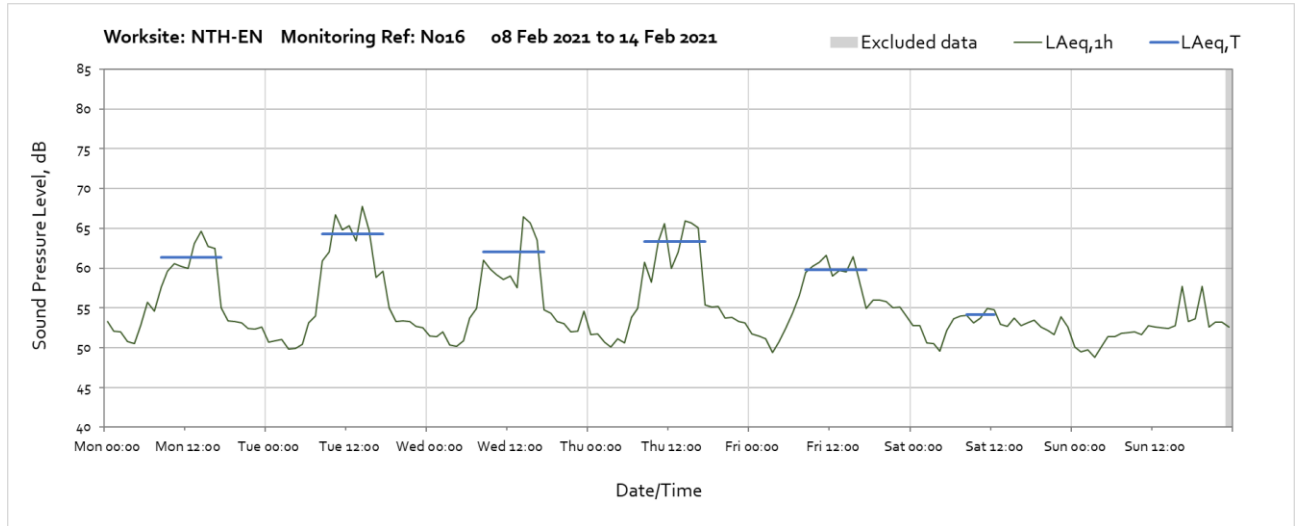
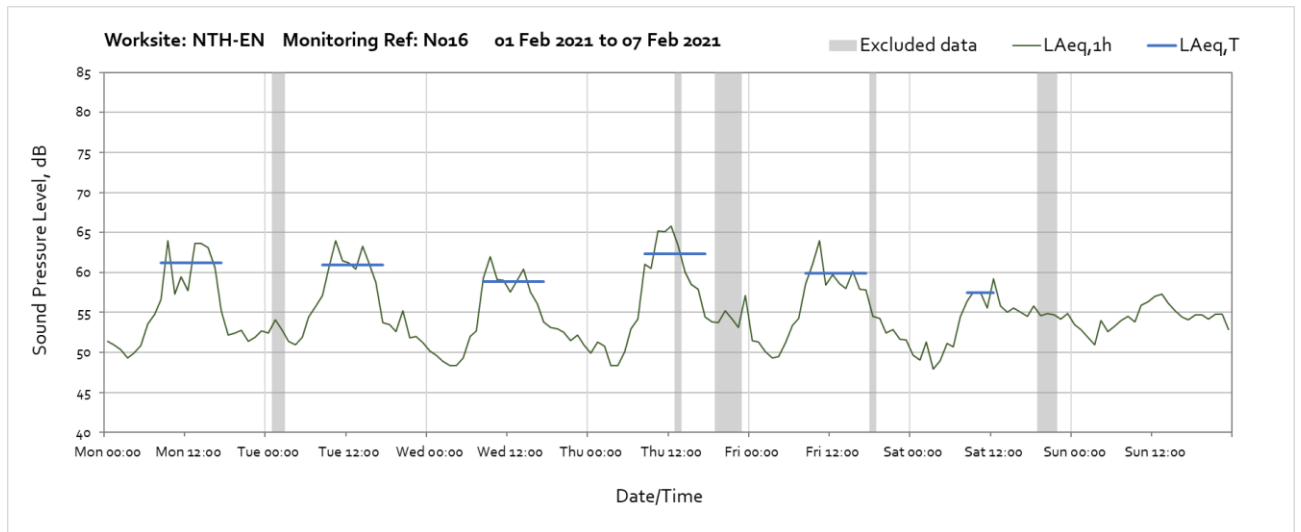


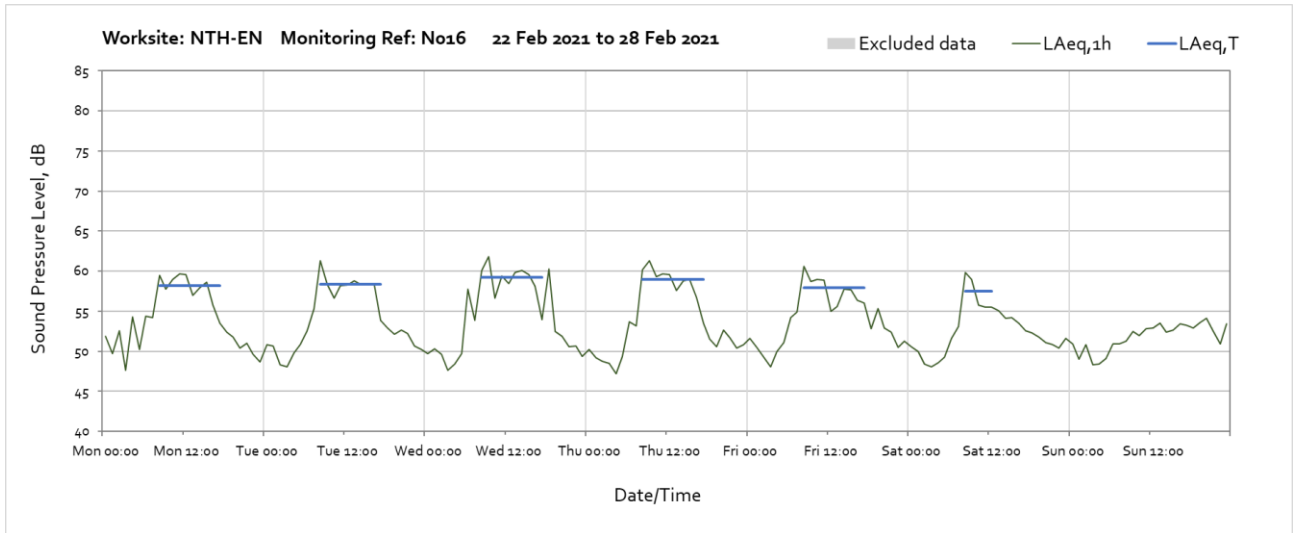
Worksite: NTH-EN – Monitoring Ref: N014



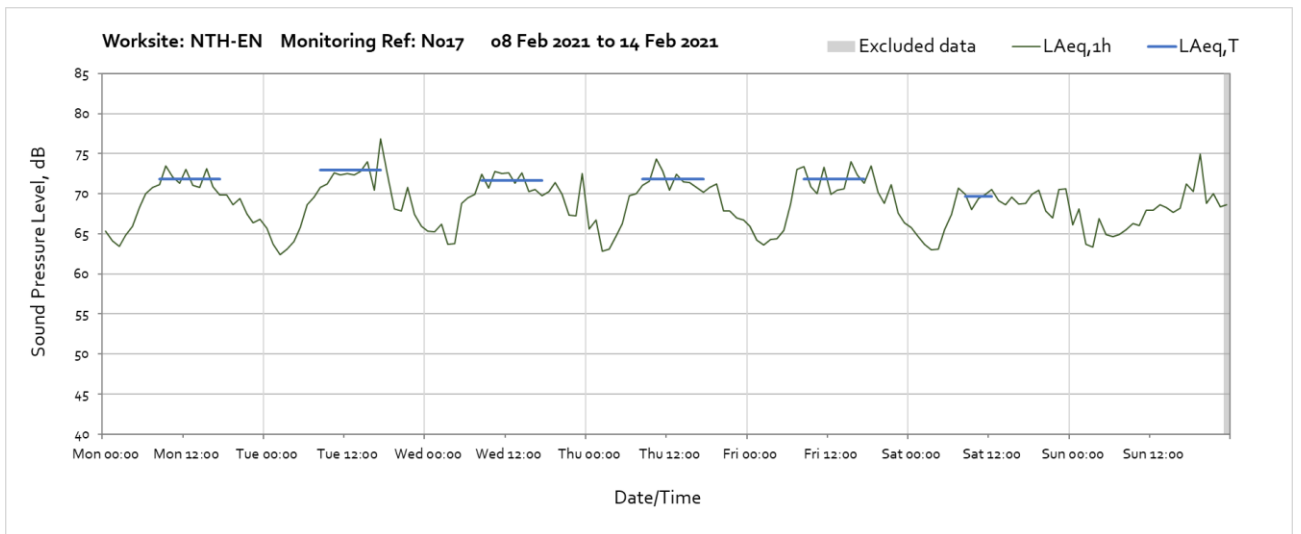
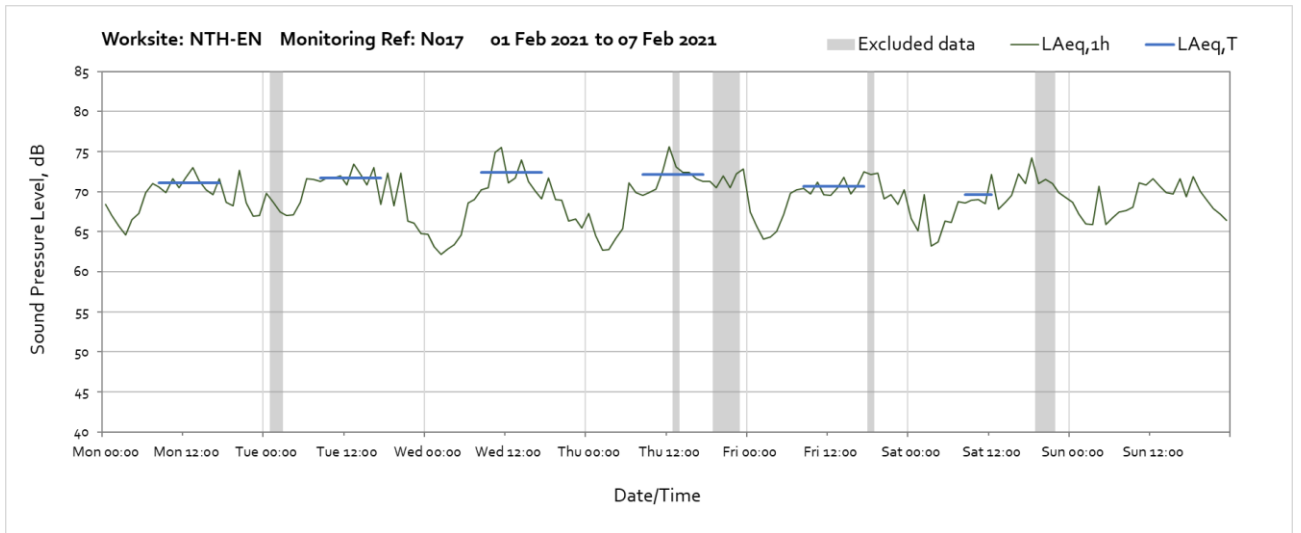


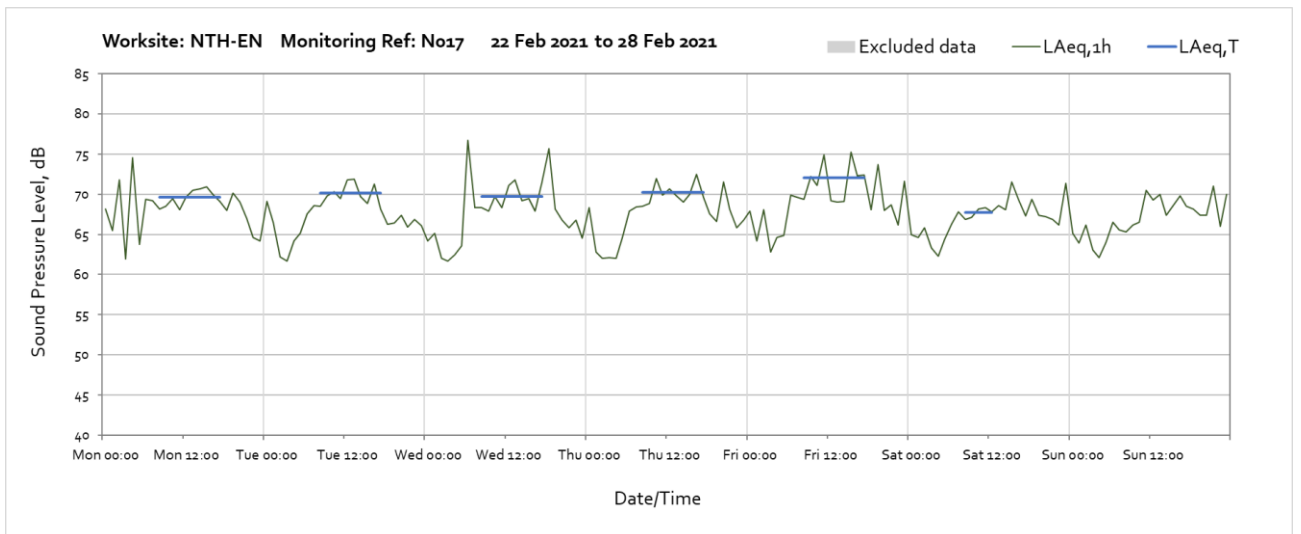
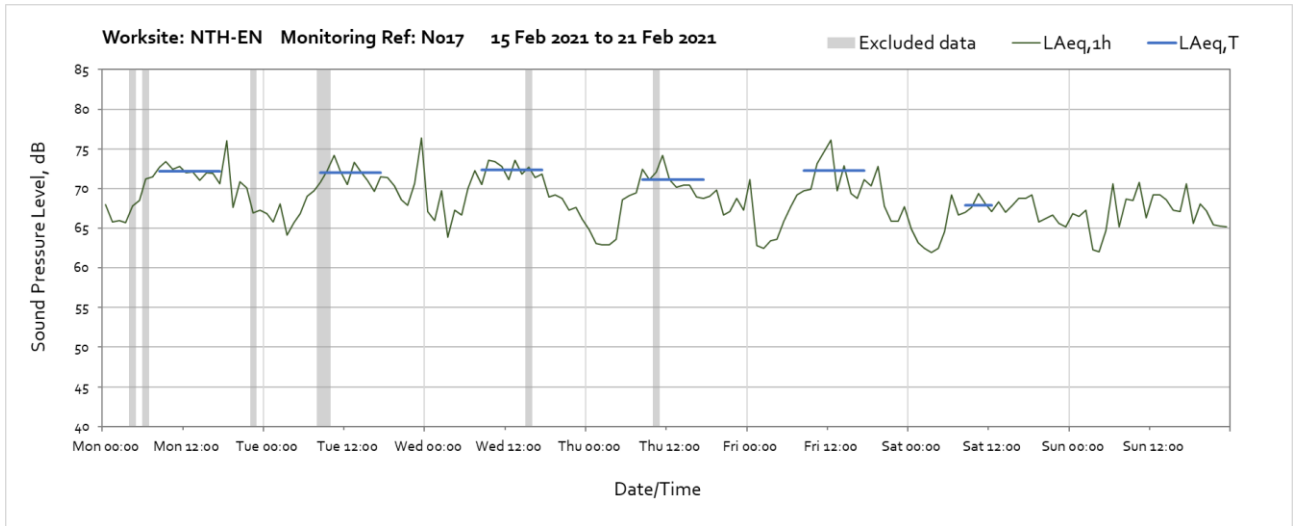
Worksite: NTH-EN – Monitoring Ref: N016



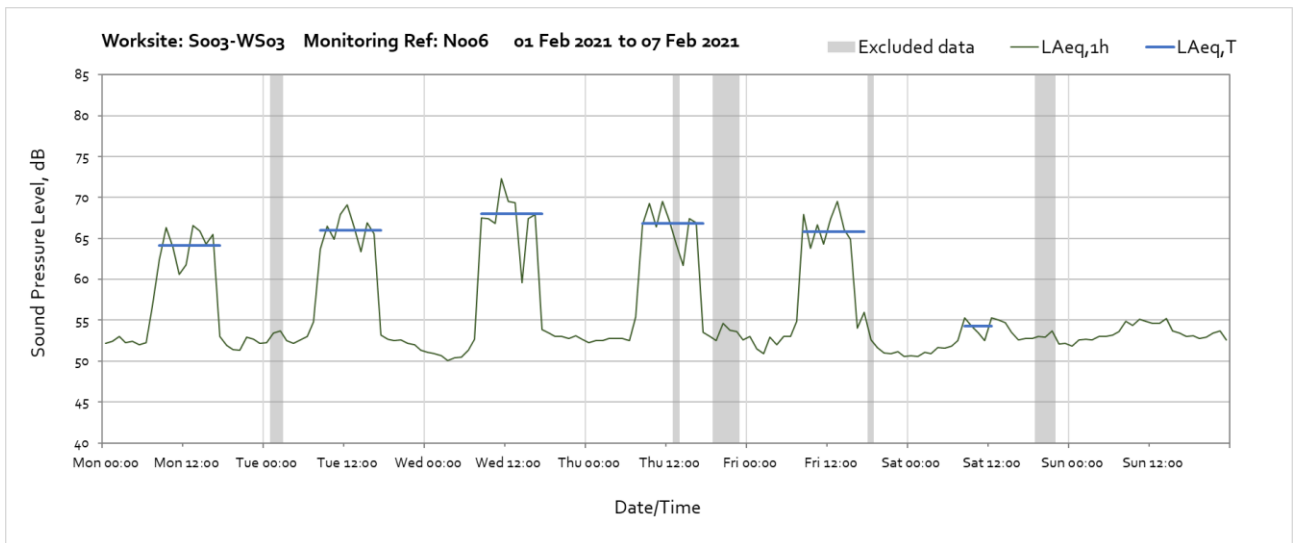


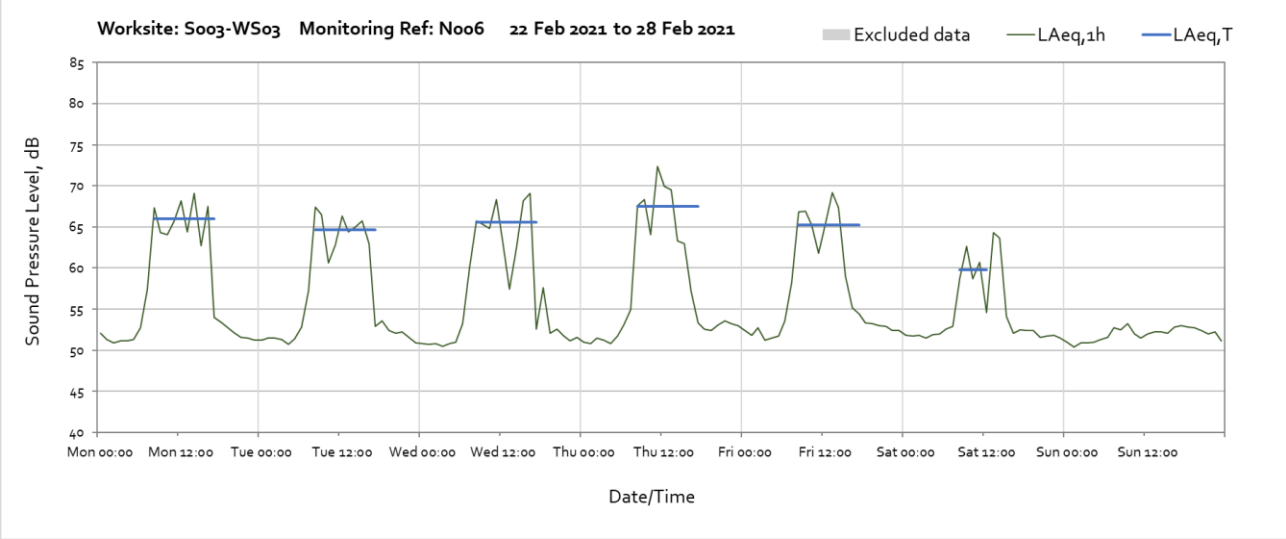
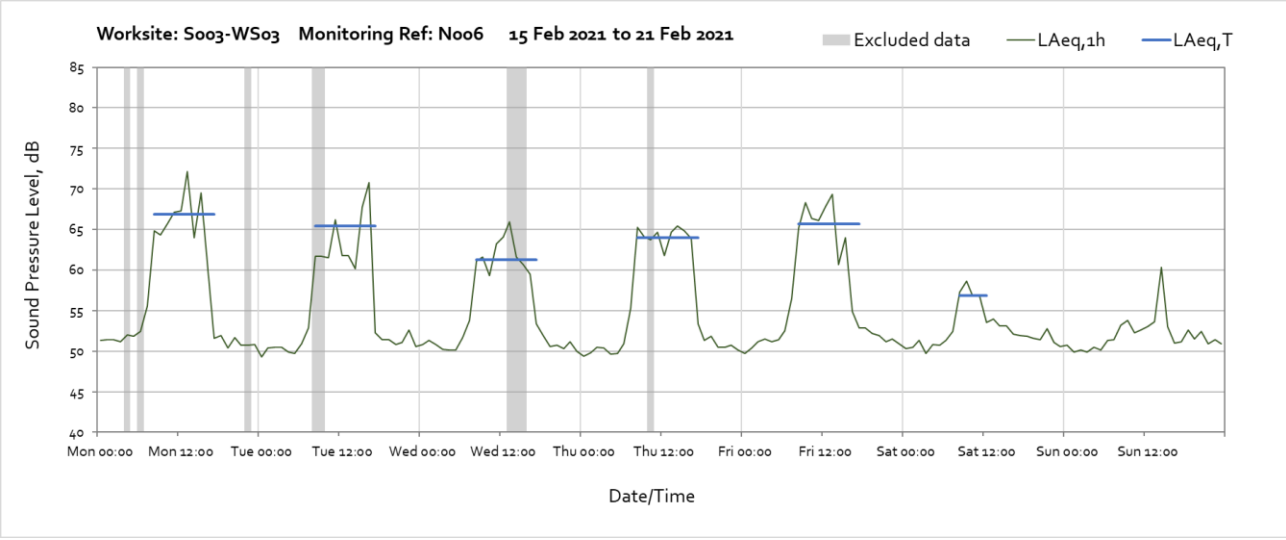
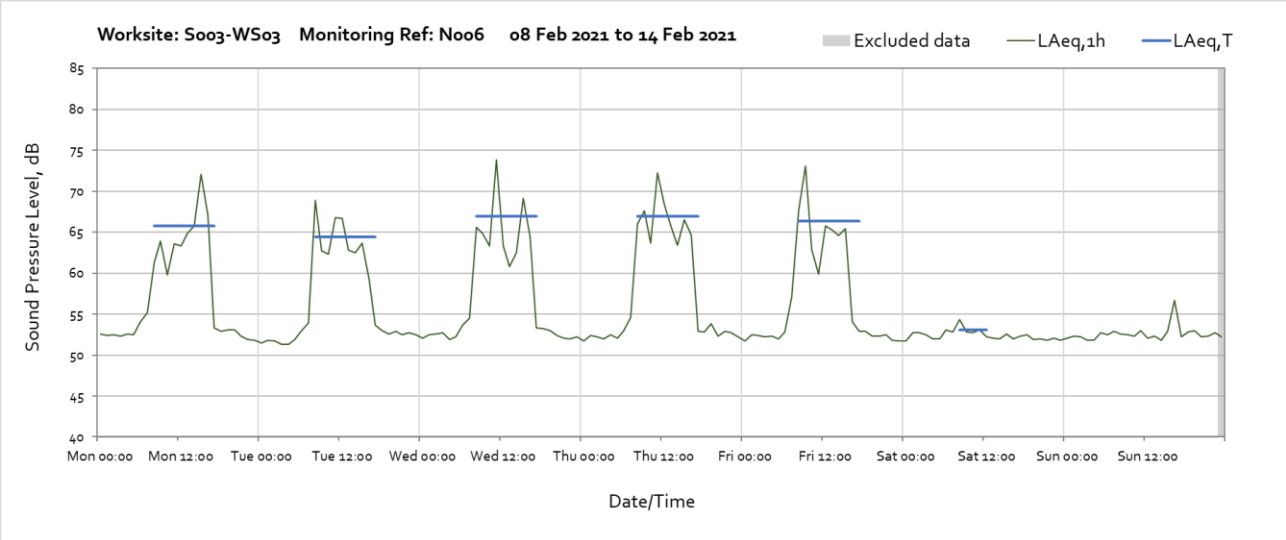
Worksite: NTH-EN – Monitoring Ref: N017



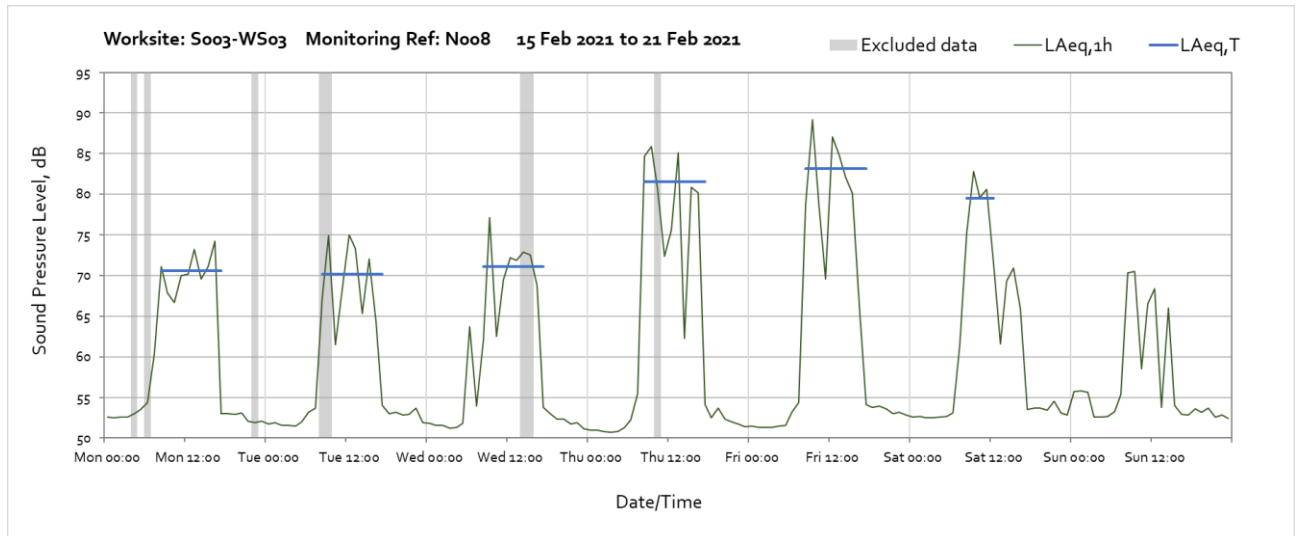
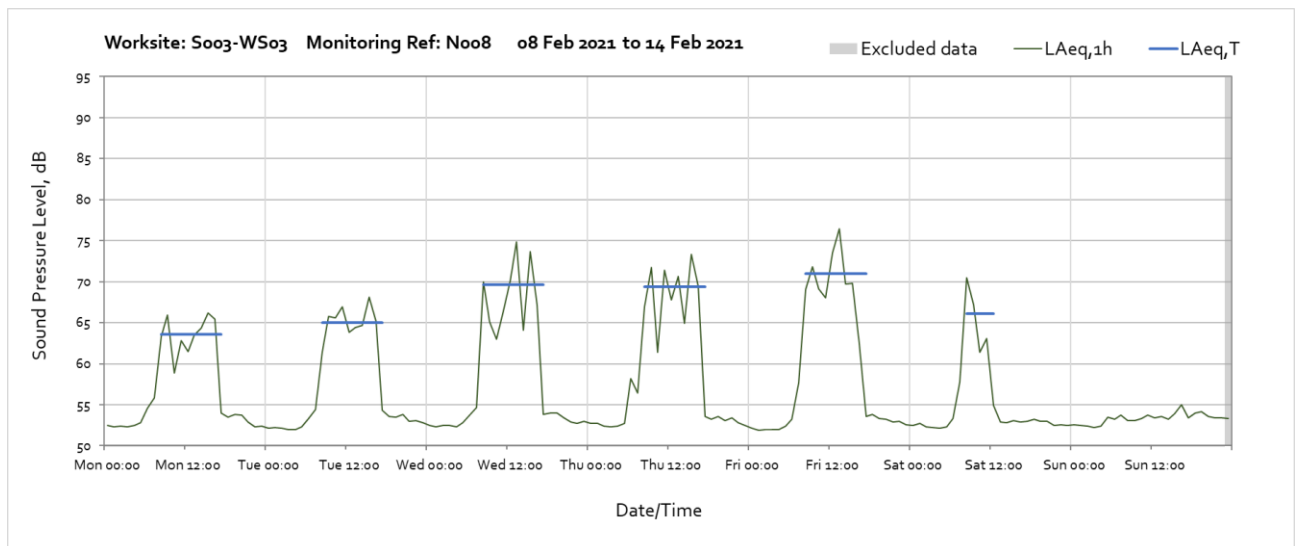
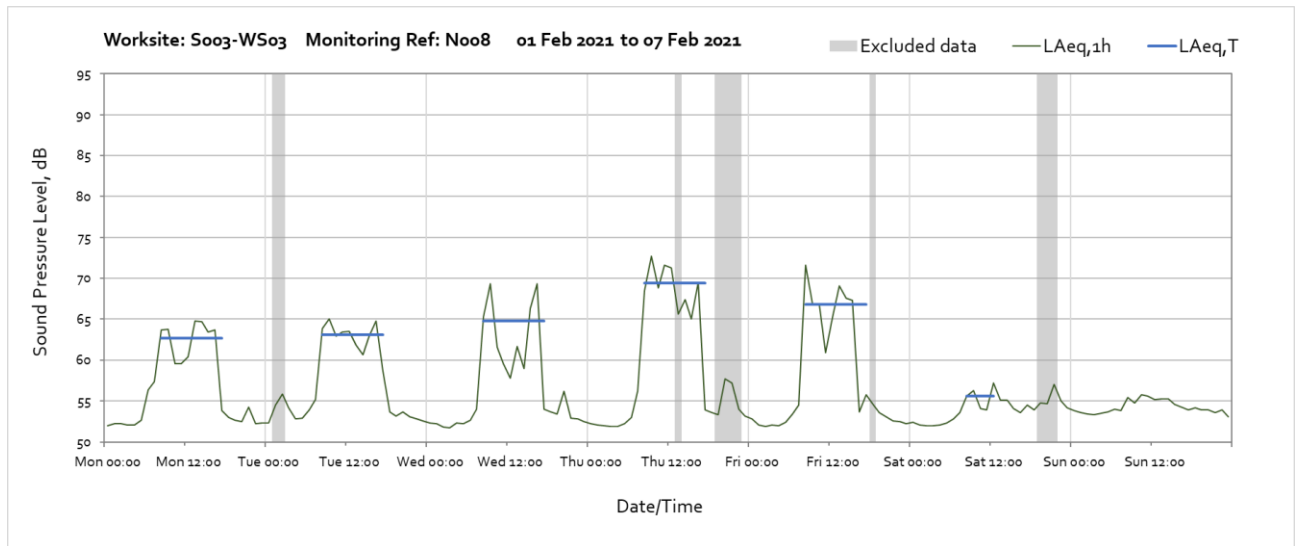


Worksite: S003-WS03 – Monitoring Ref: N006

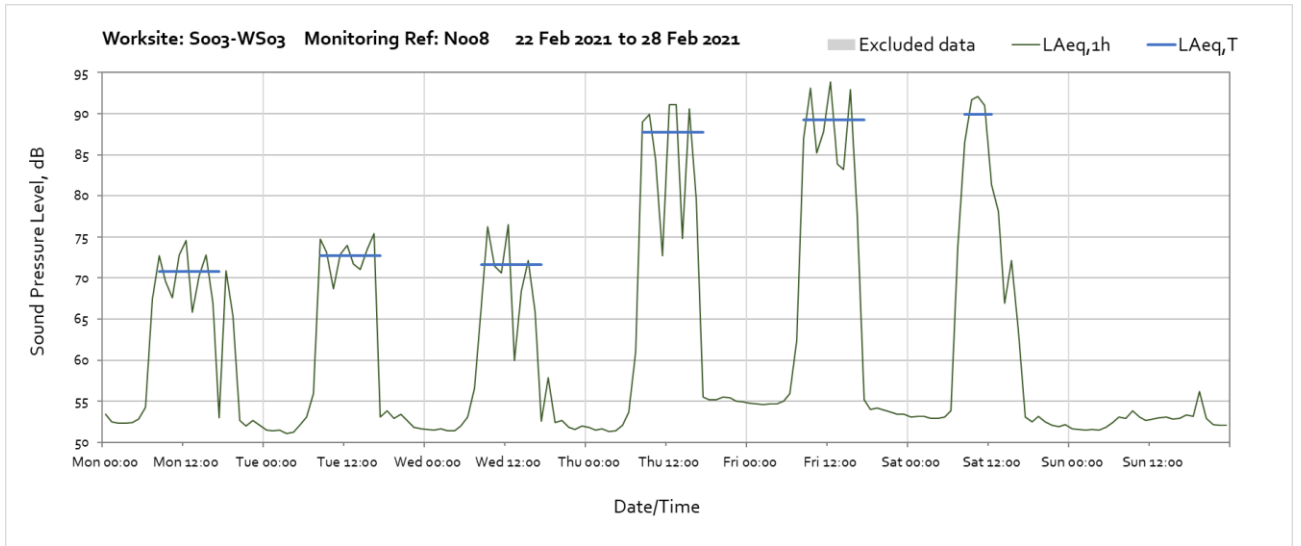




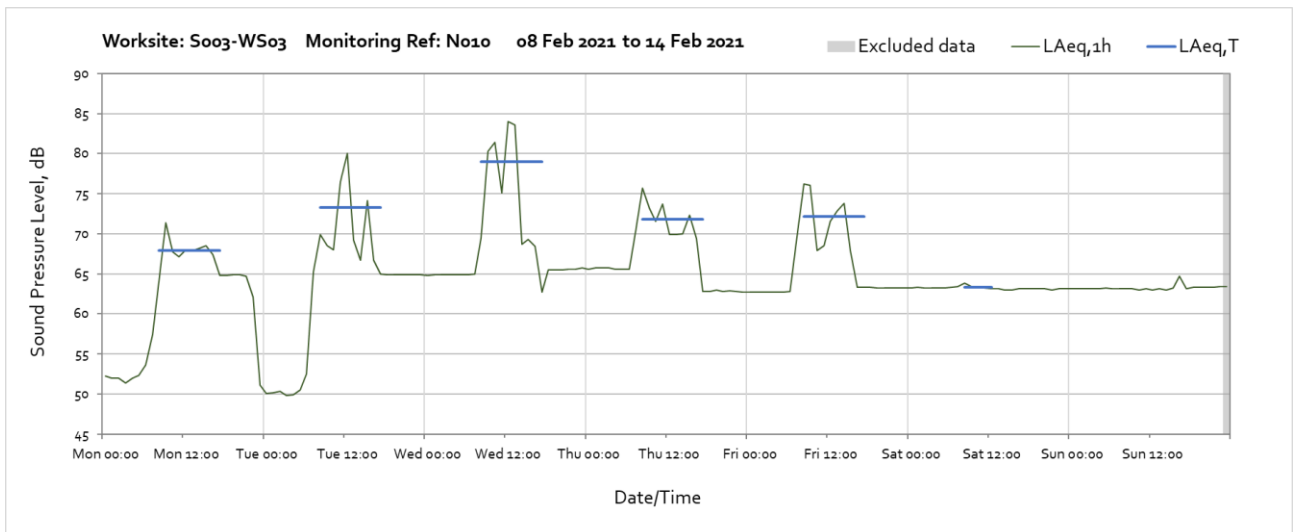
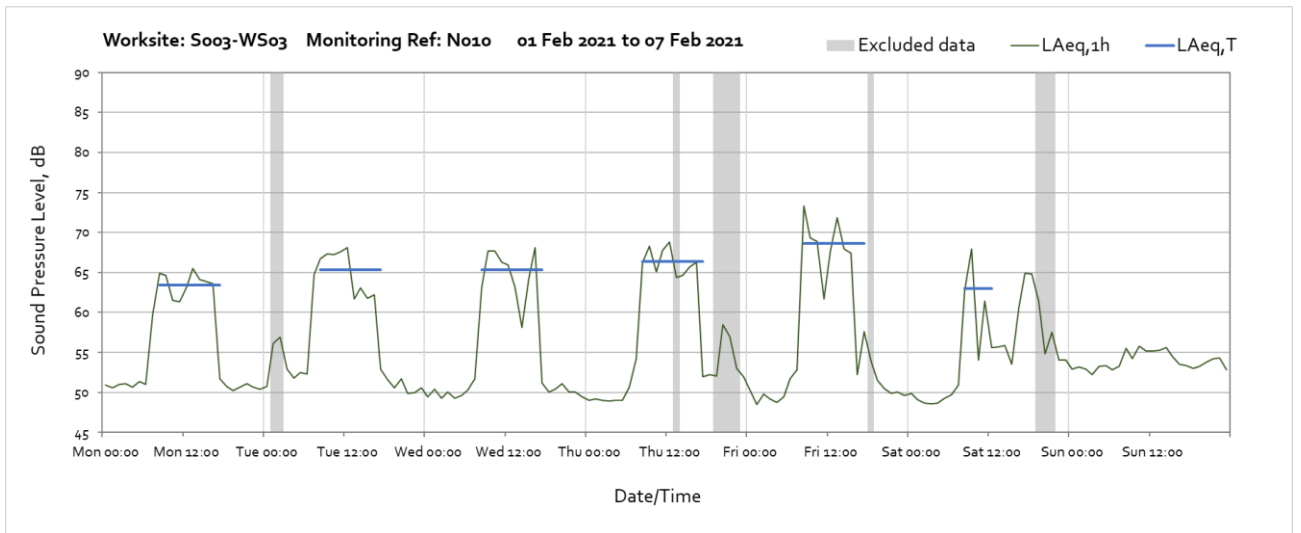
Worksite: S003-WS03 – Monitoring Ref: N008



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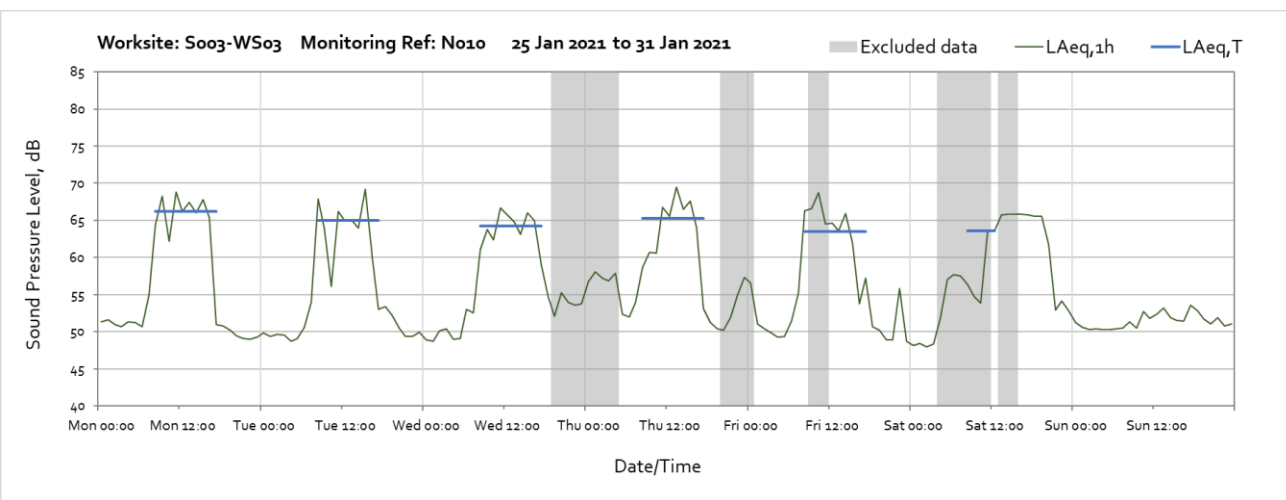
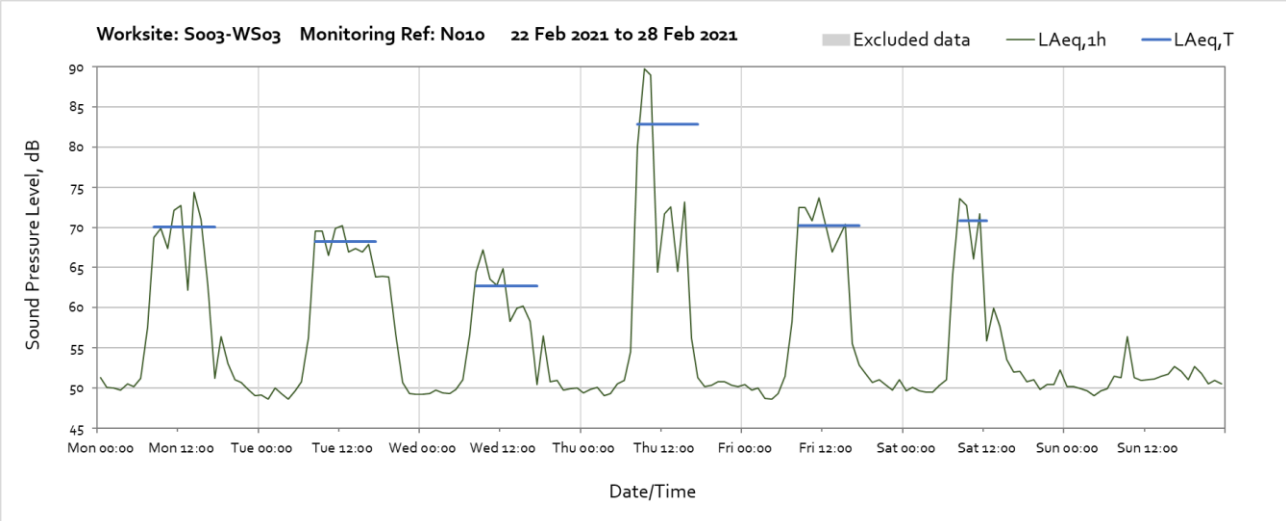
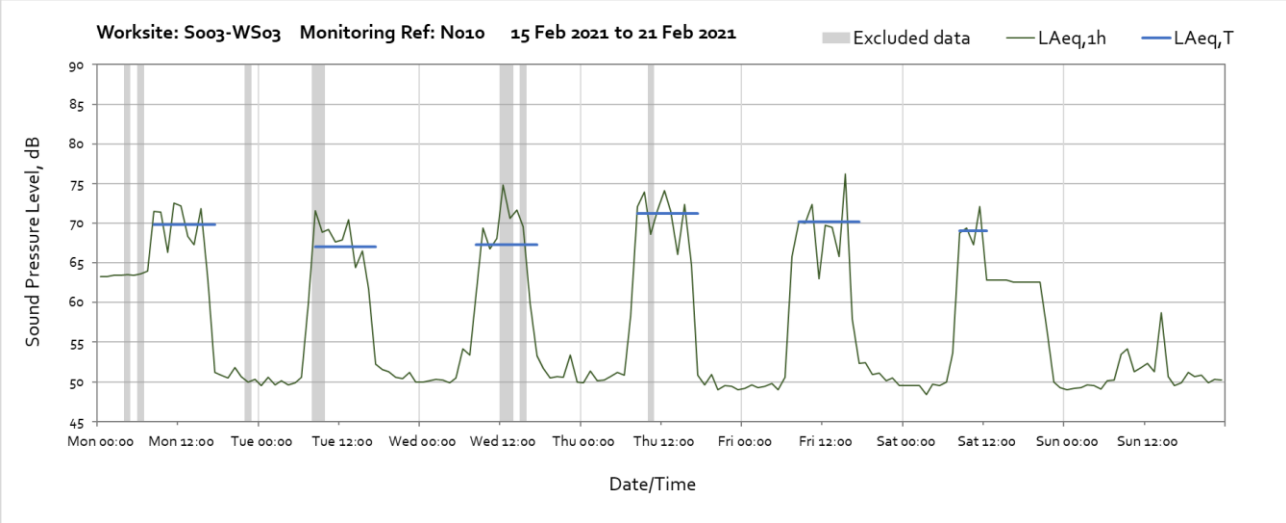


Worksite: S003-WS03 – Monitoring Ref: N010

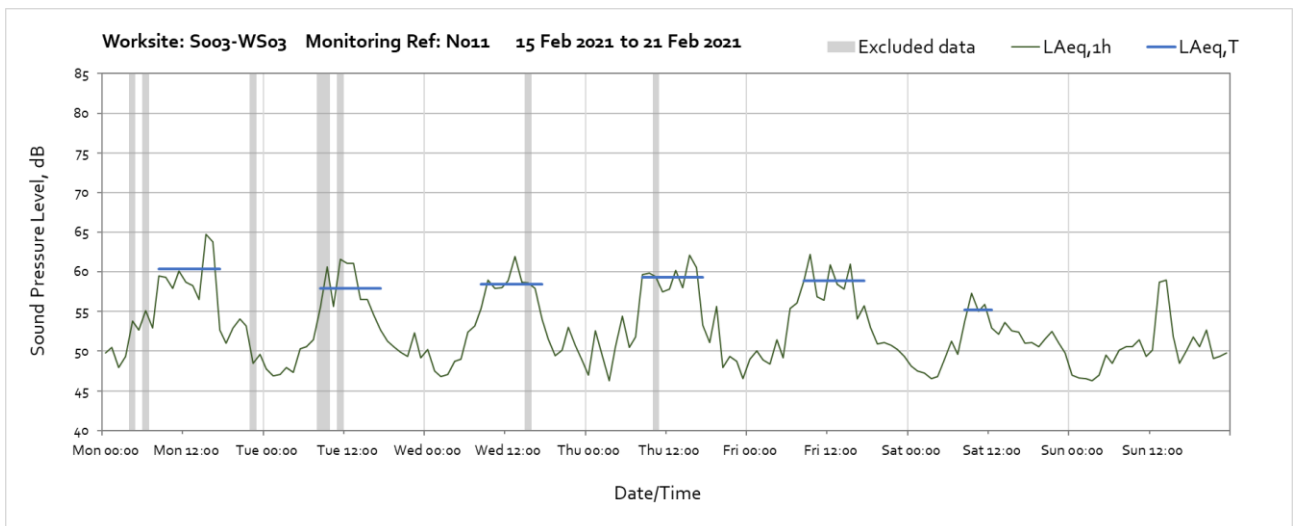
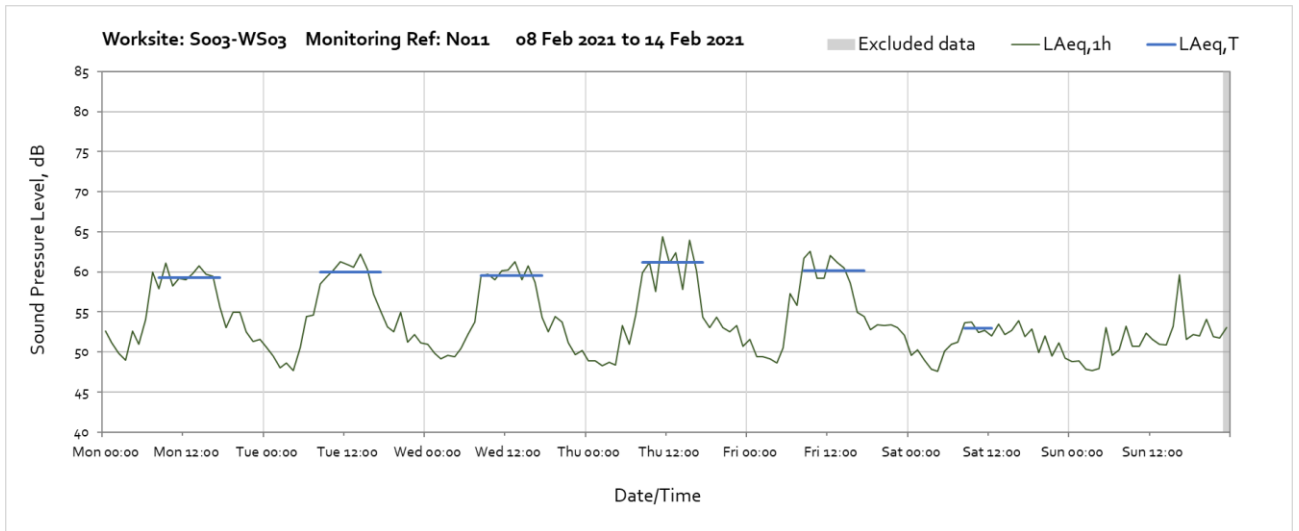
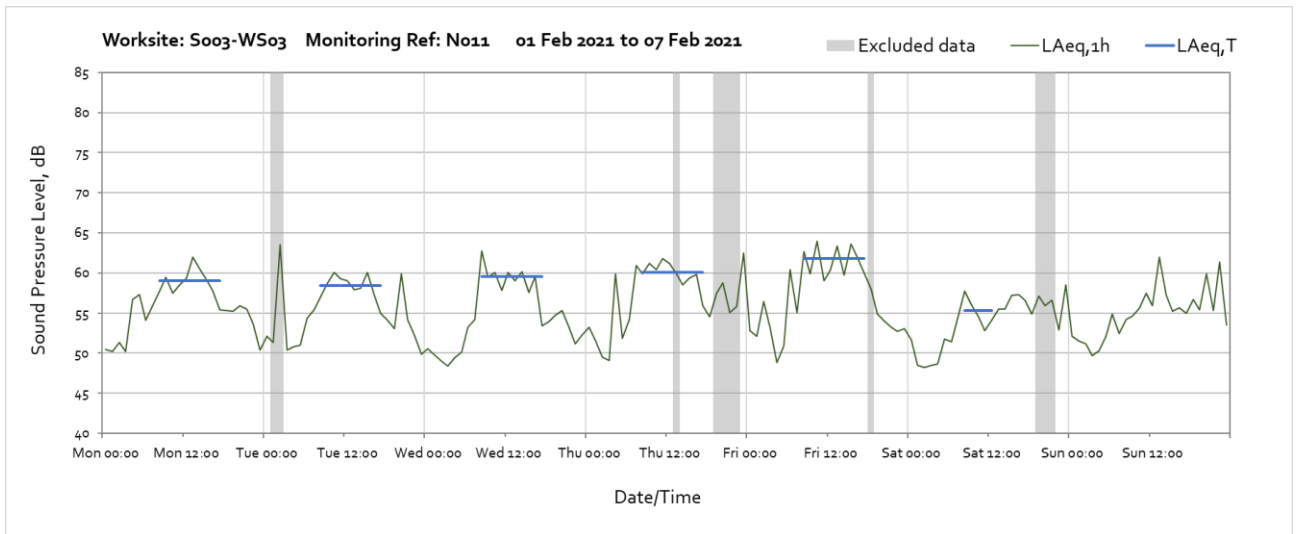


Note: High noise levels measured during evening and night-time periods between Tuesday 8th and Monday 15th February were due to noise from a tower light temporary installed in close proximity to the monitor.

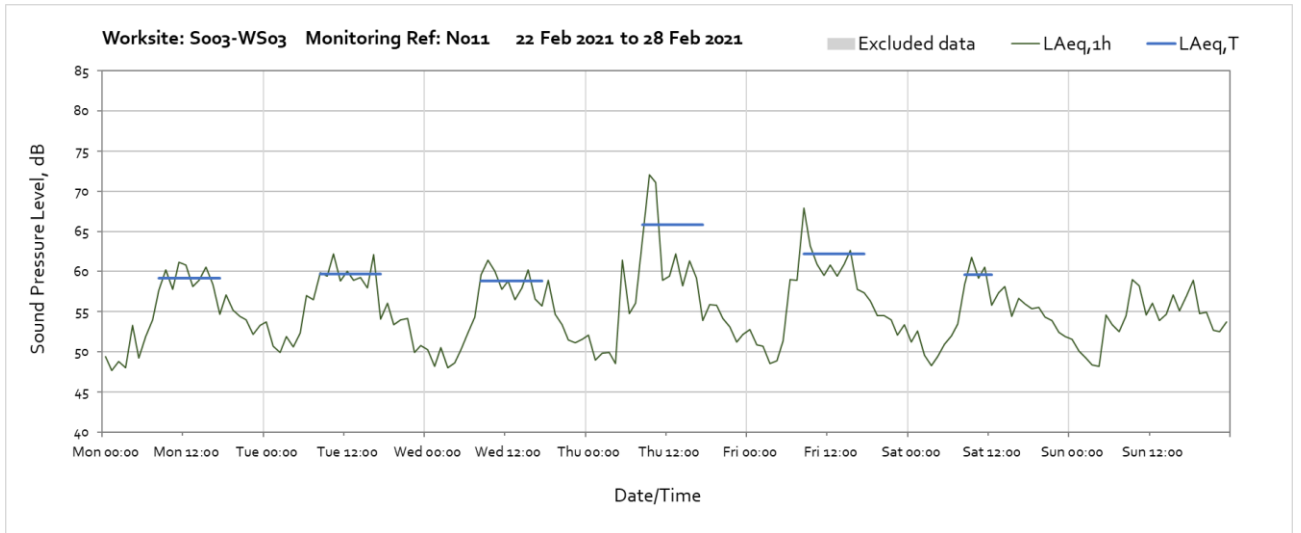
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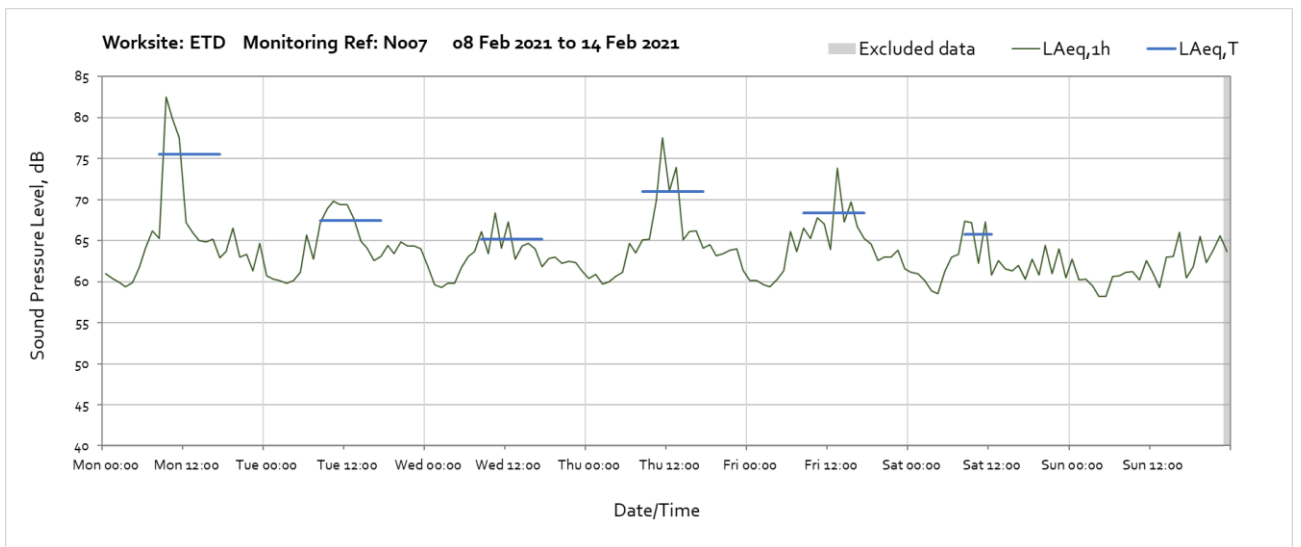
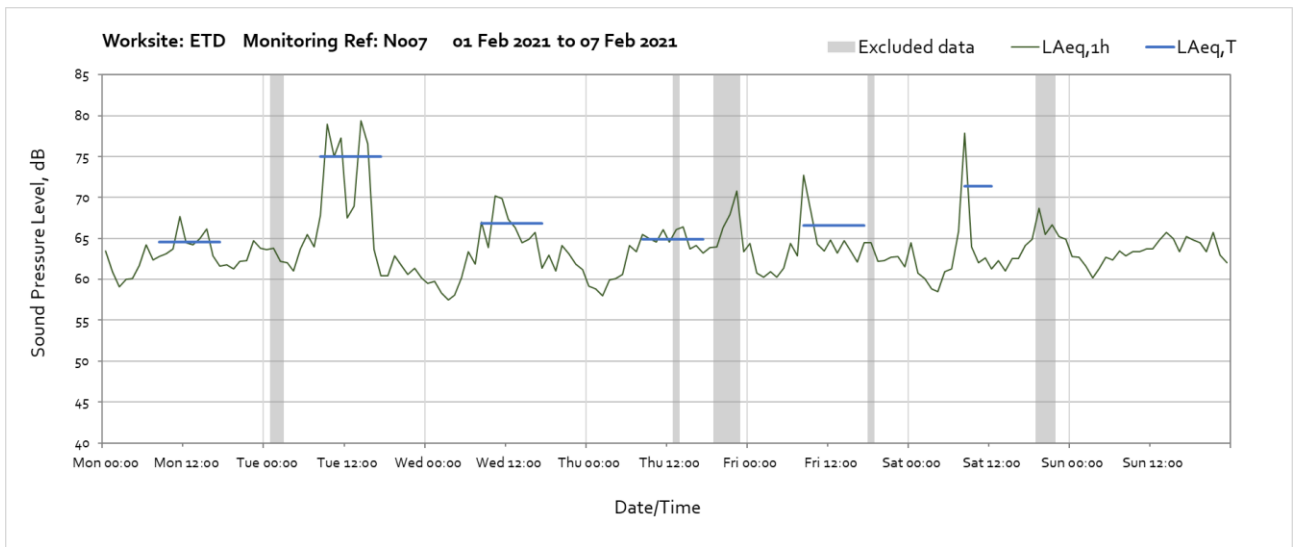
Worksite: S003-WS03 – Monitoring Ref: N011

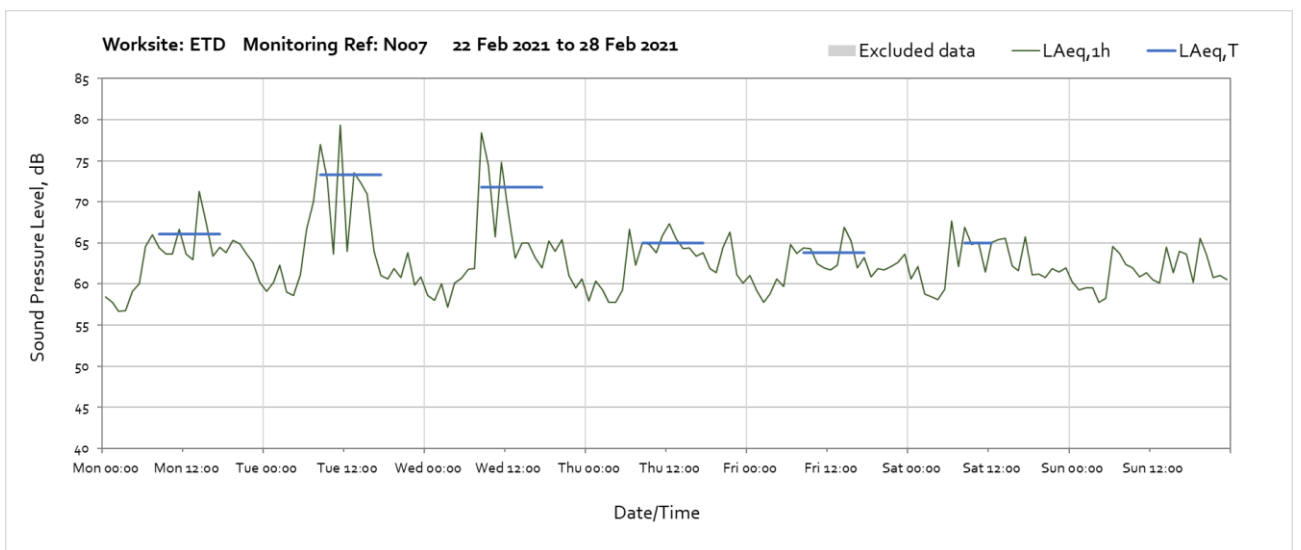
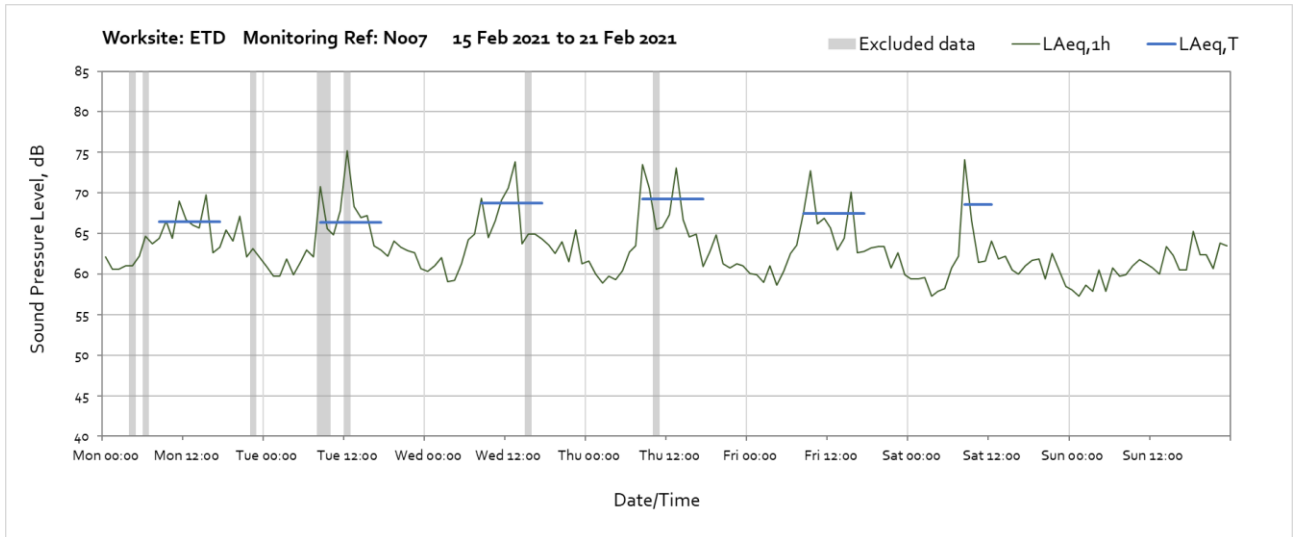


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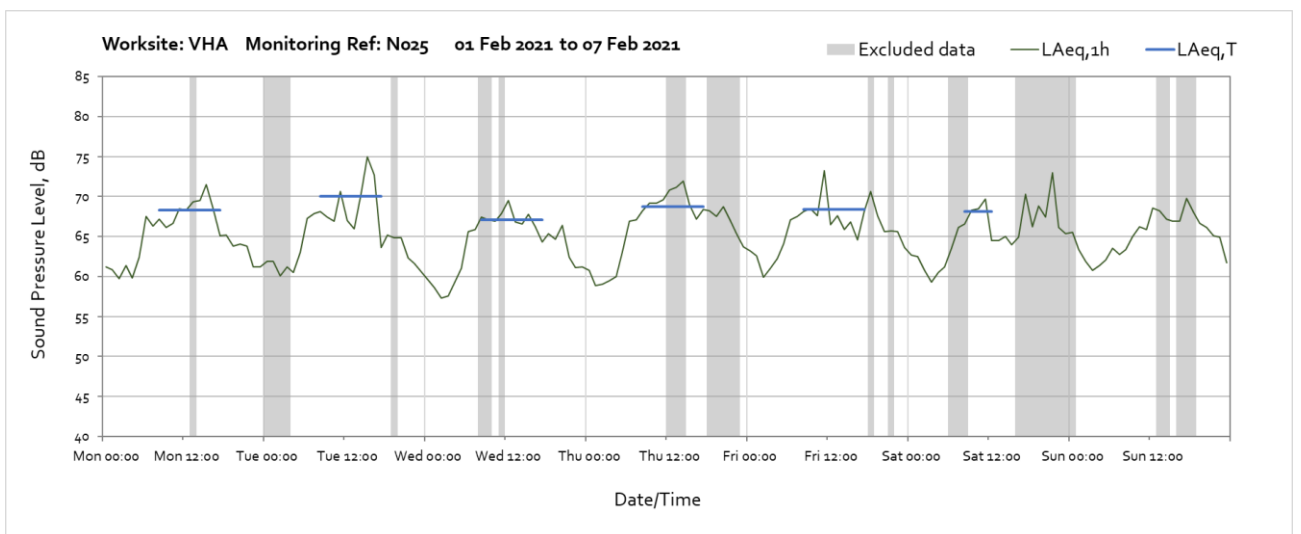


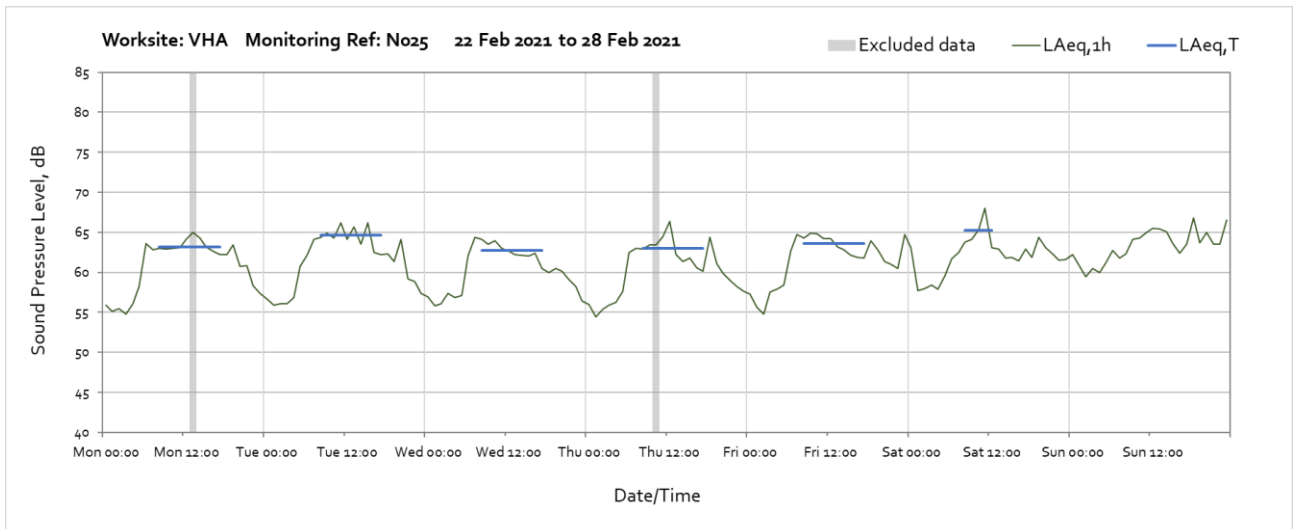
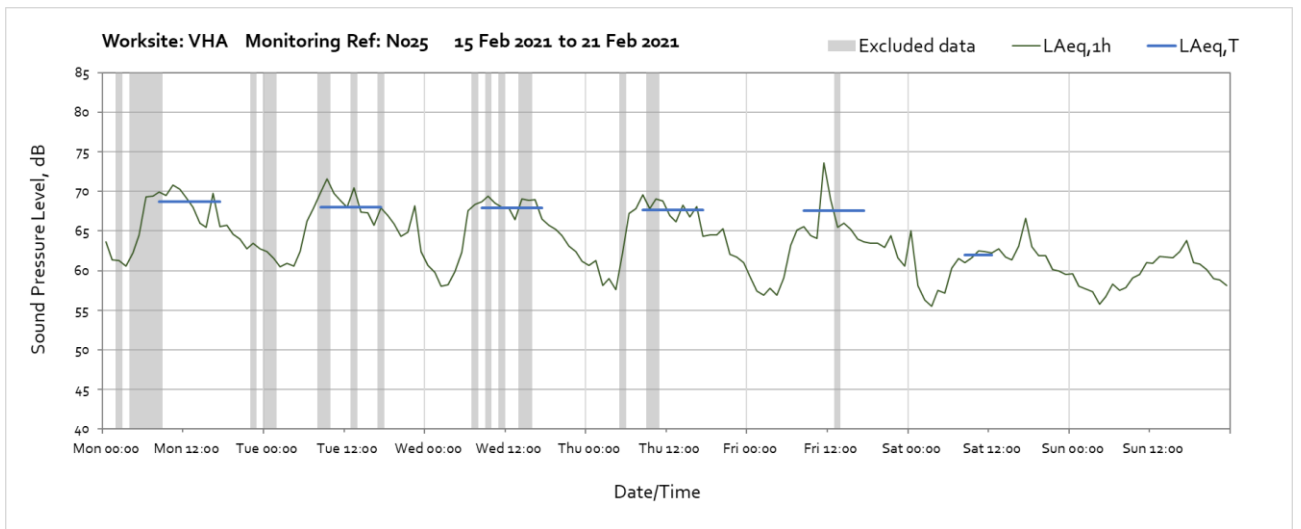
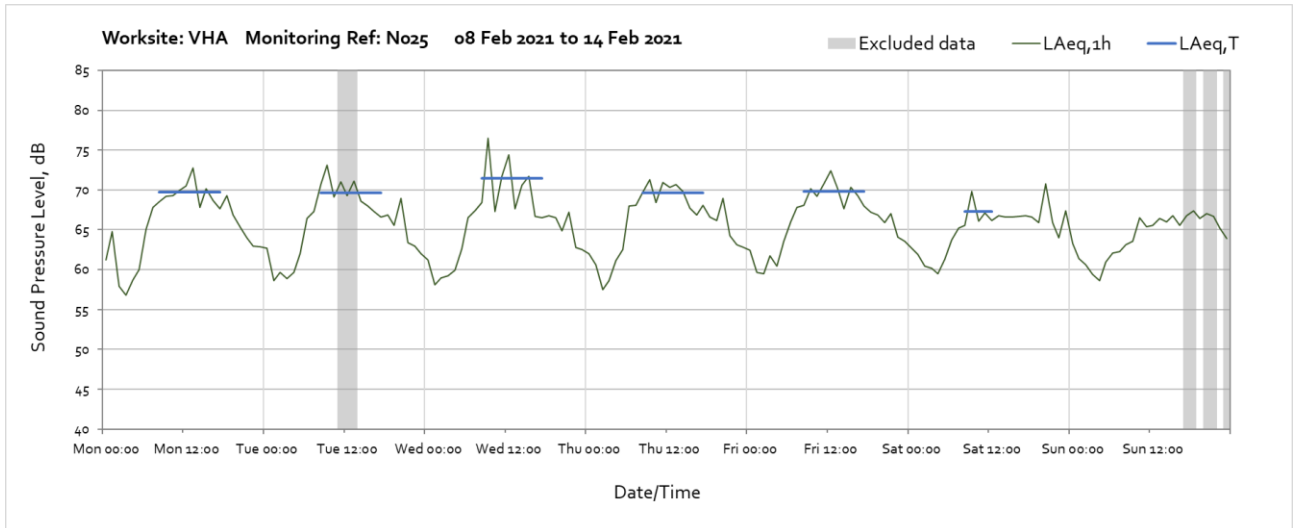
Worksite: ETD – Monitoring Ref: N007



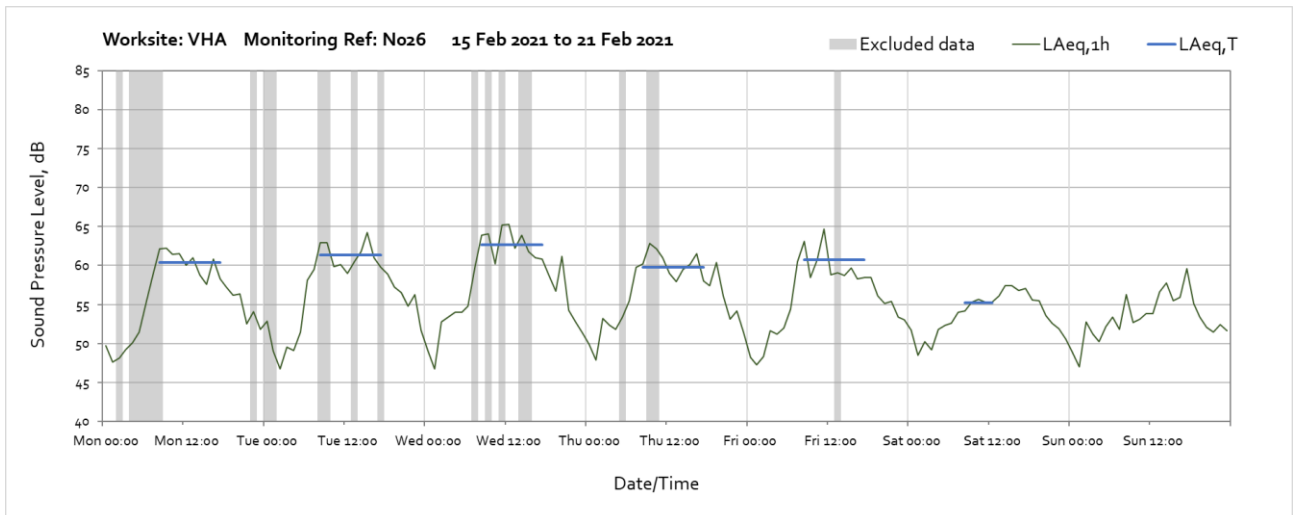
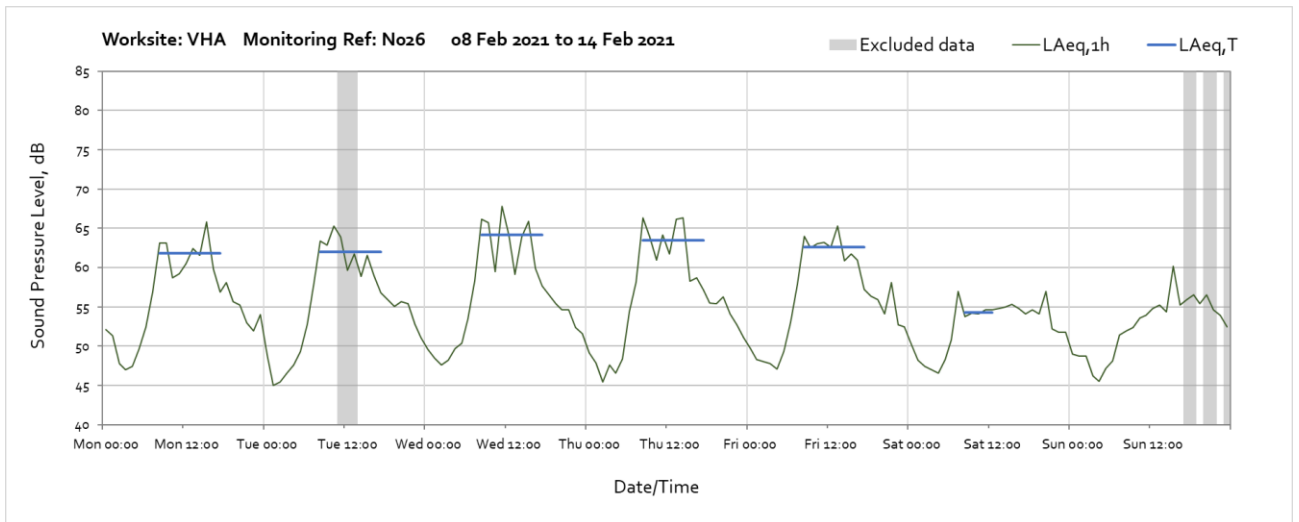
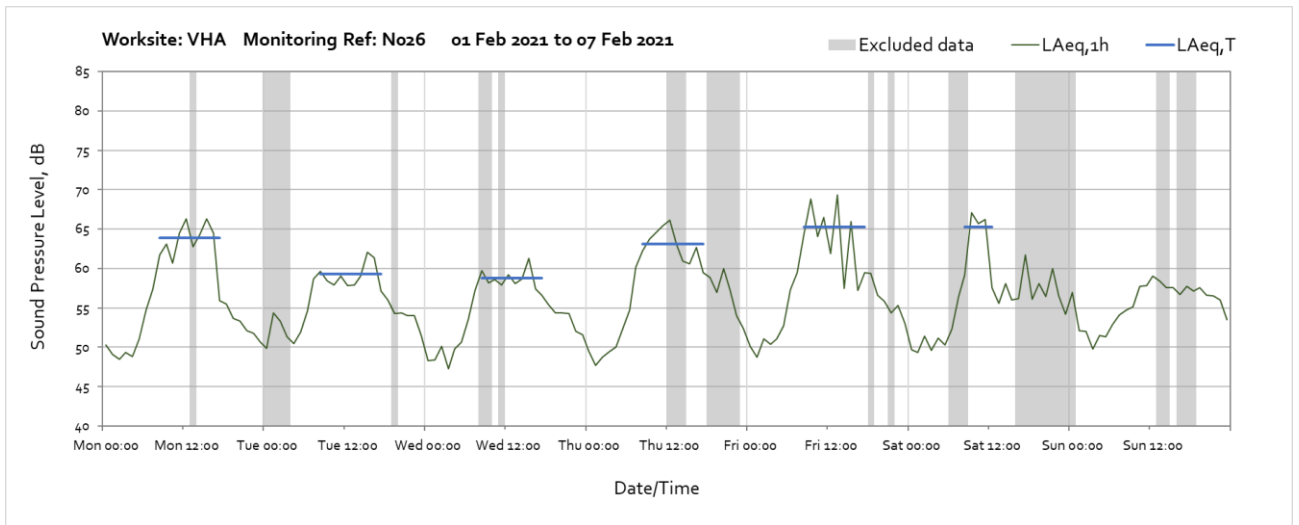


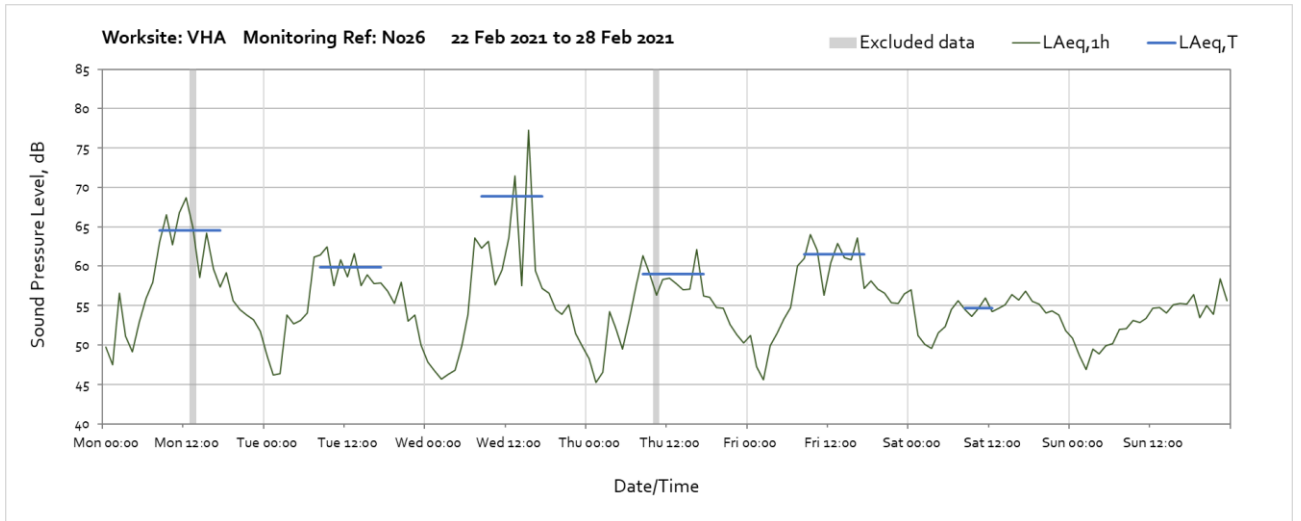
Vehicle Holding Area (VHA) – Monitoring Ref: N025



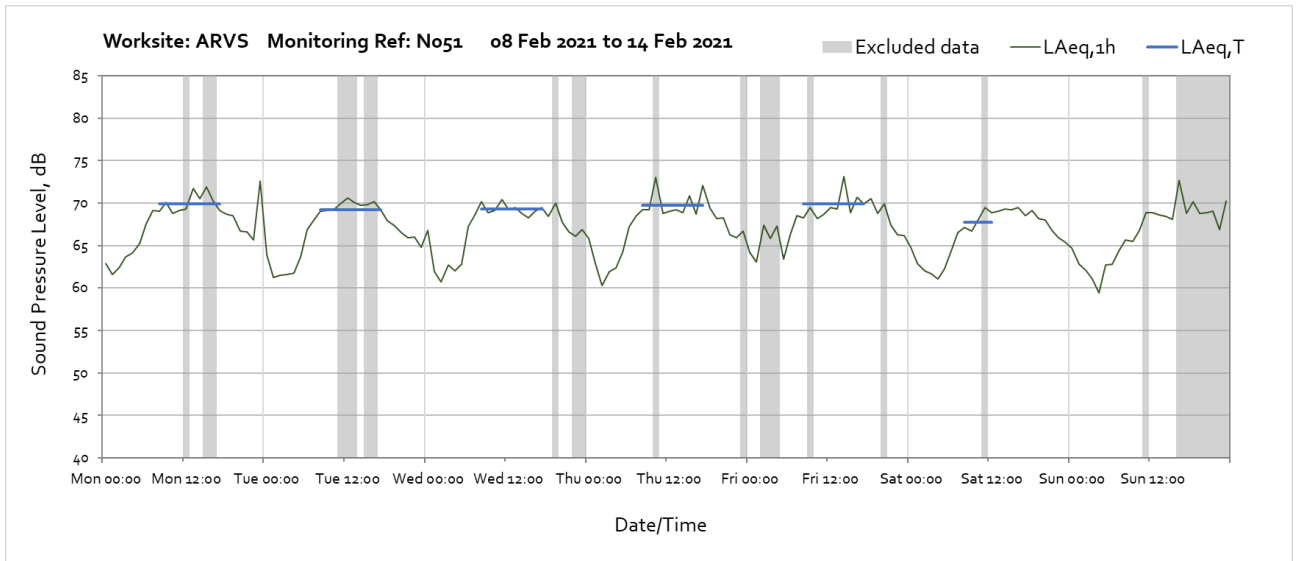
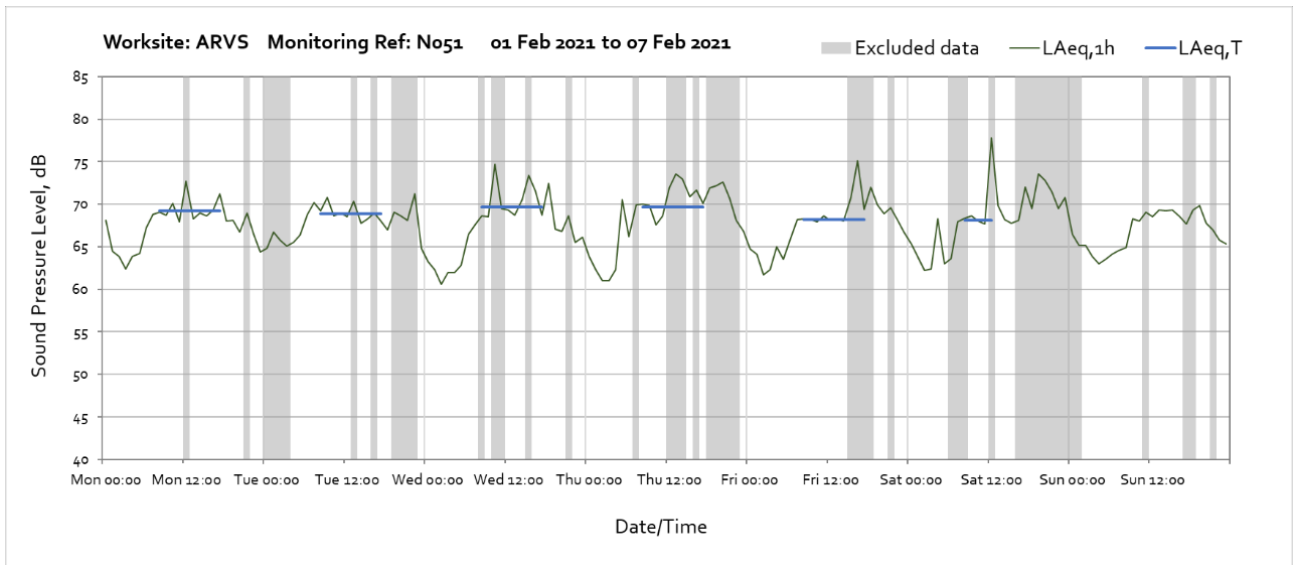


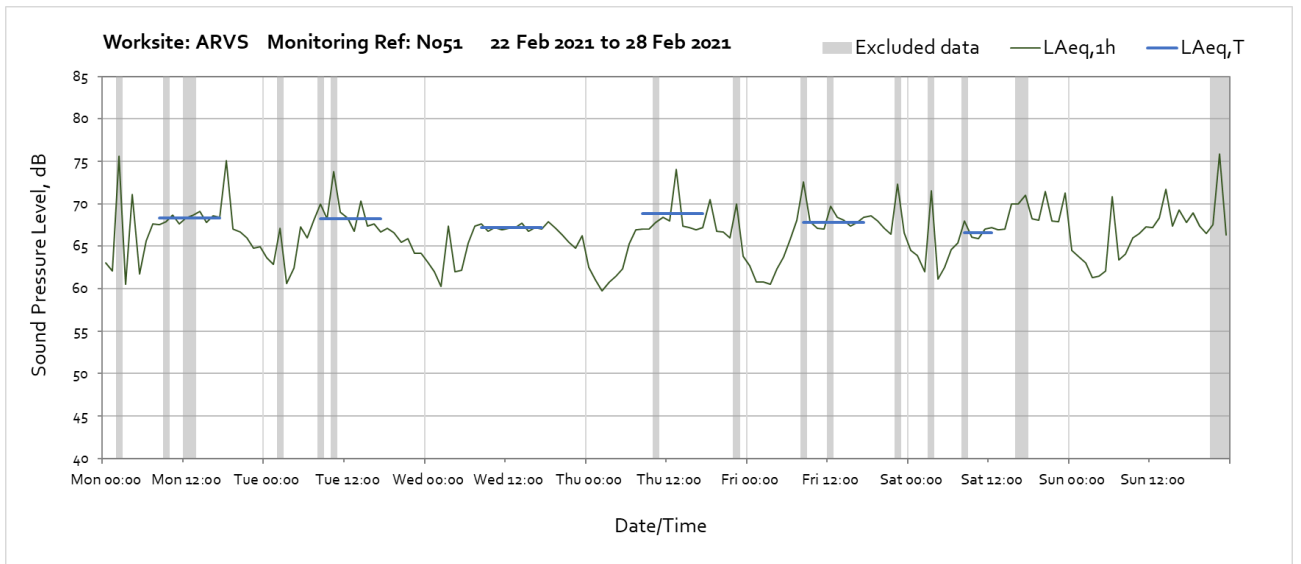
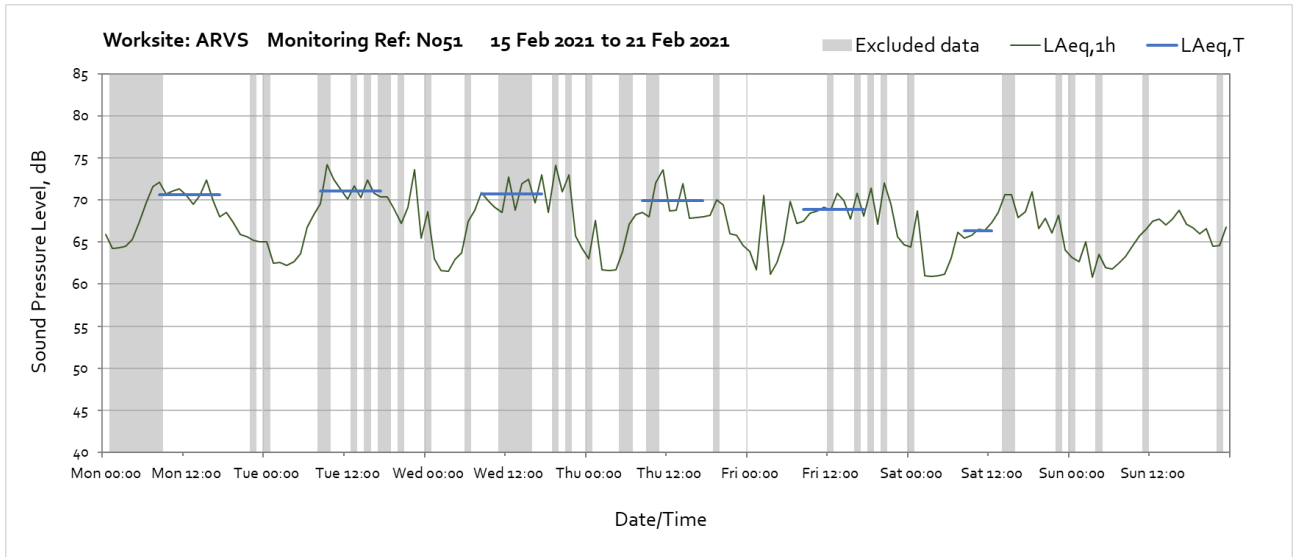
Vehicle Holding Area (VHA) – Monitoring Ref: N026



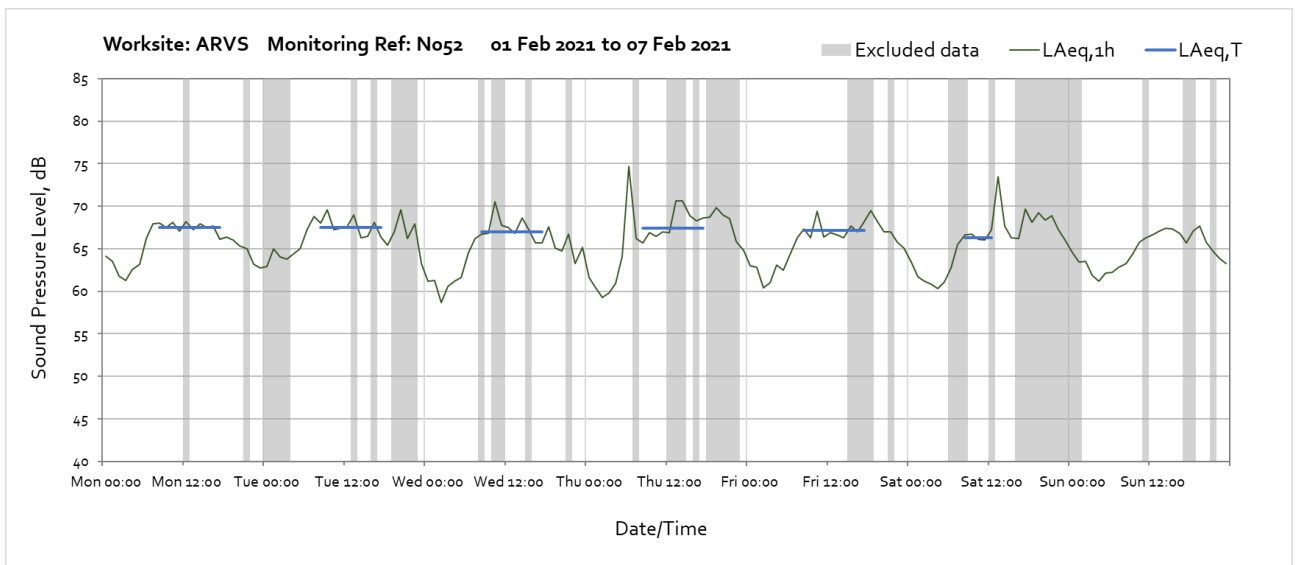


Adelaide Road Ventilation Shaft (ARVS) – Monitoring Ref: N051

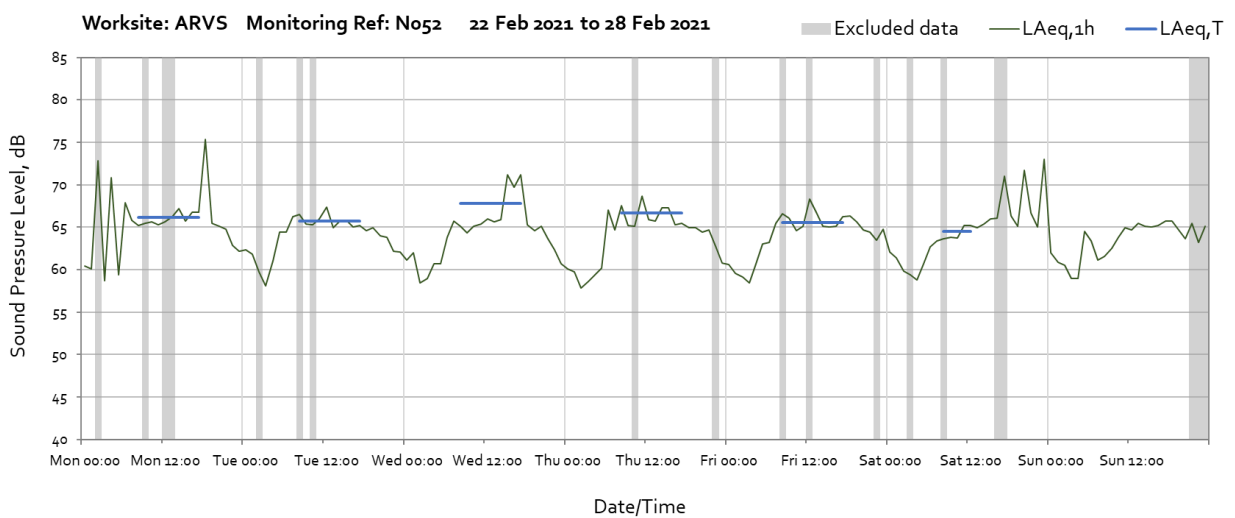
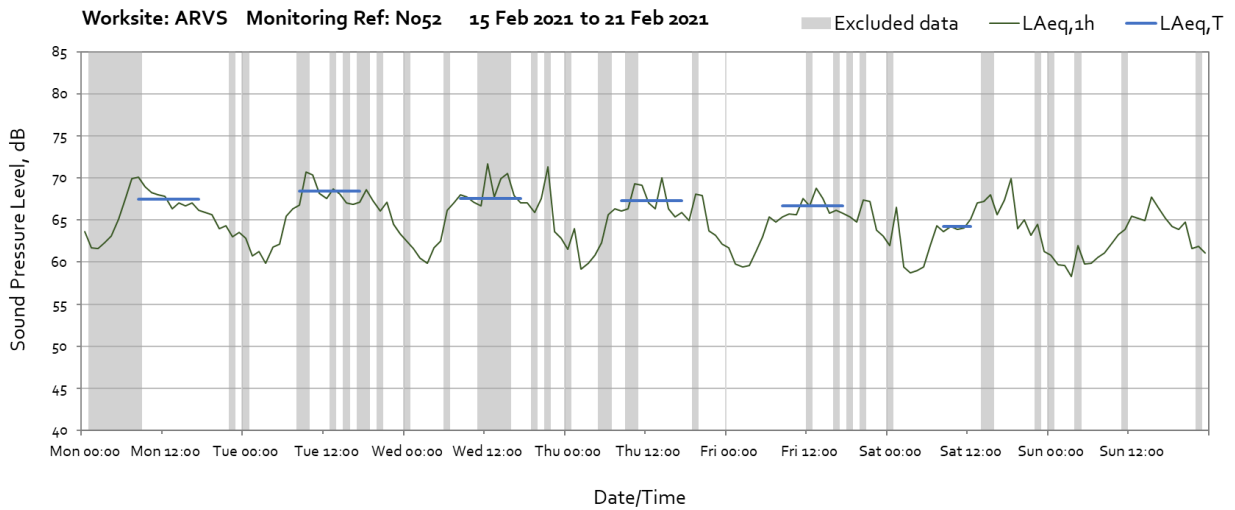
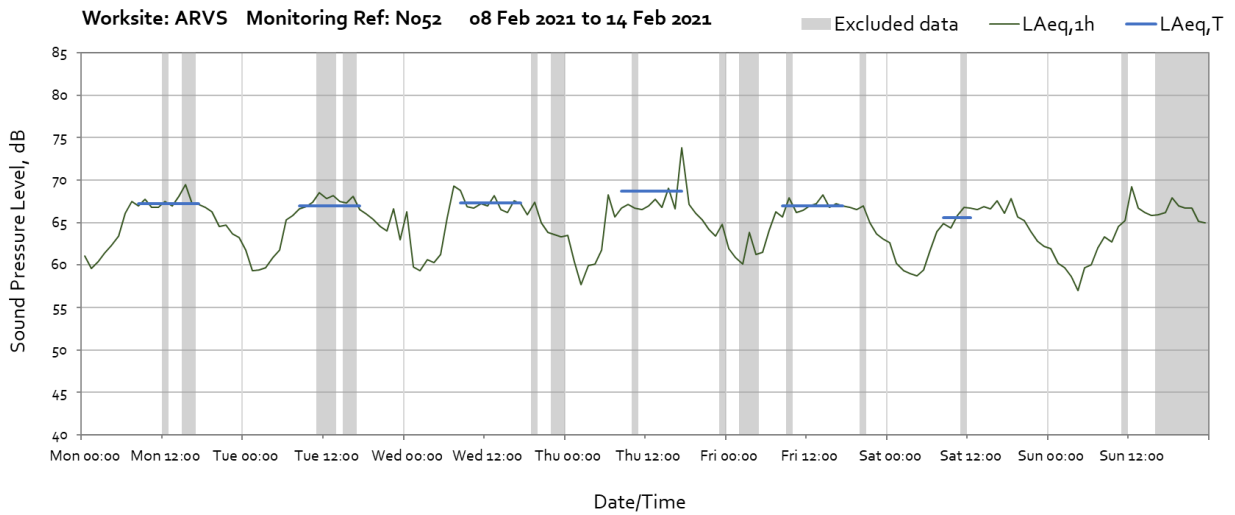




Adelaide Road Ventilation Shaft (ARVS) – Monitoring Ref: N052



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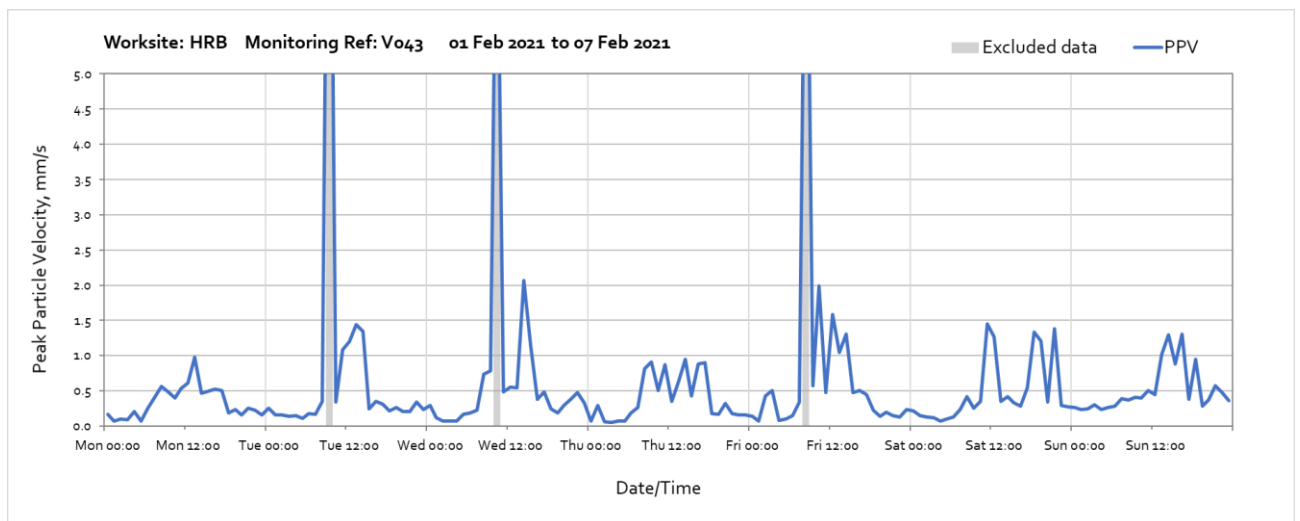
Vibration

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.

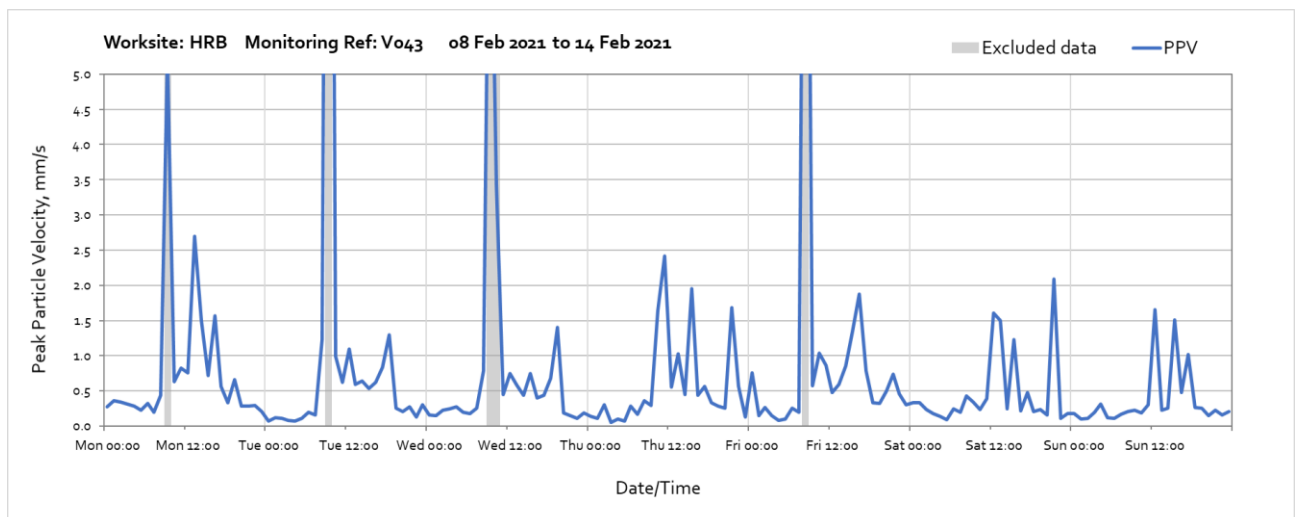
Worksite: HRB – Monitoring Ref: V039

Note: due to a coupling issue at the interface between the monitor and the ground no valid data were collected in February 2021.

Worksite: HRB – Monitoring Ref: V043

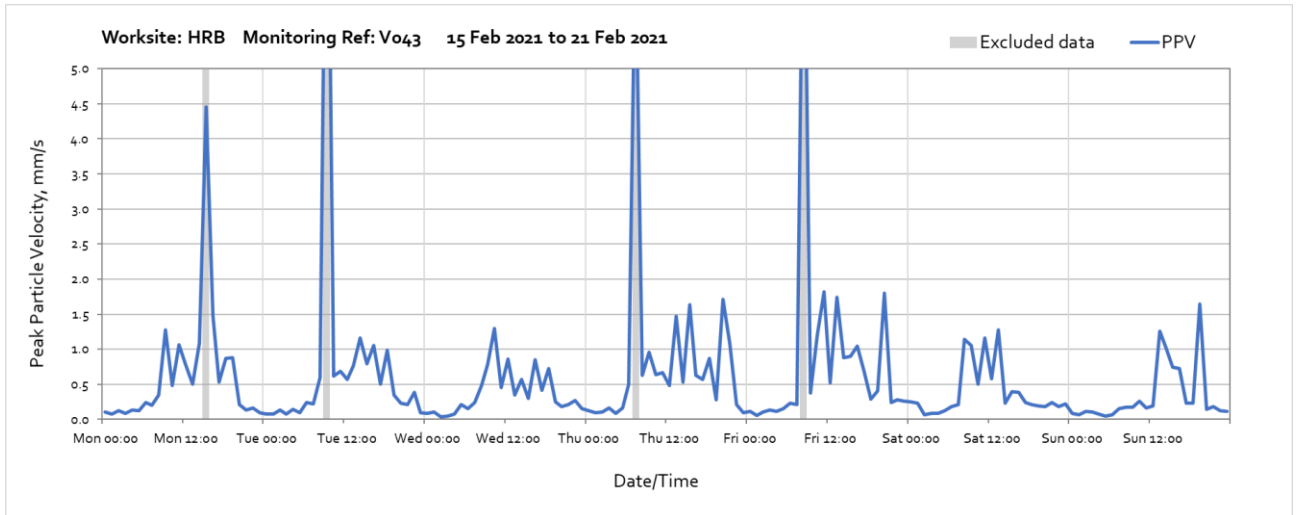


Note: High vibration levels measured at 08:00 on Saturday 2nd January were due to use of the nearby residential bin store and are not representative of HS2 vibration levels.

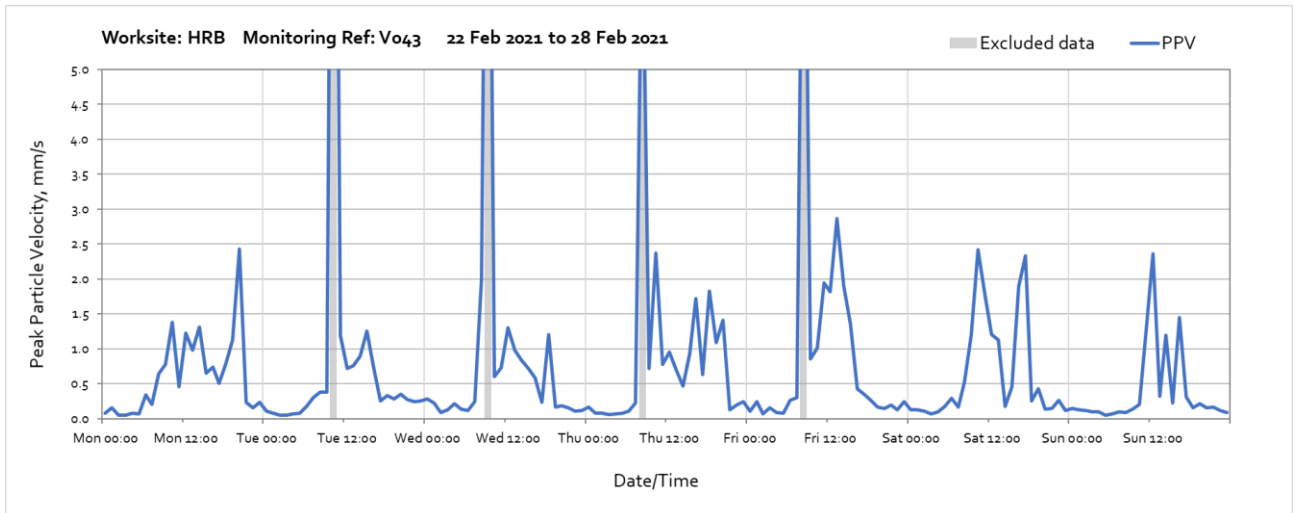


Note: High vibration levels measured throughout the week were due to the use of the nearby residential bin store and are not representative of HS2 vibration levels.

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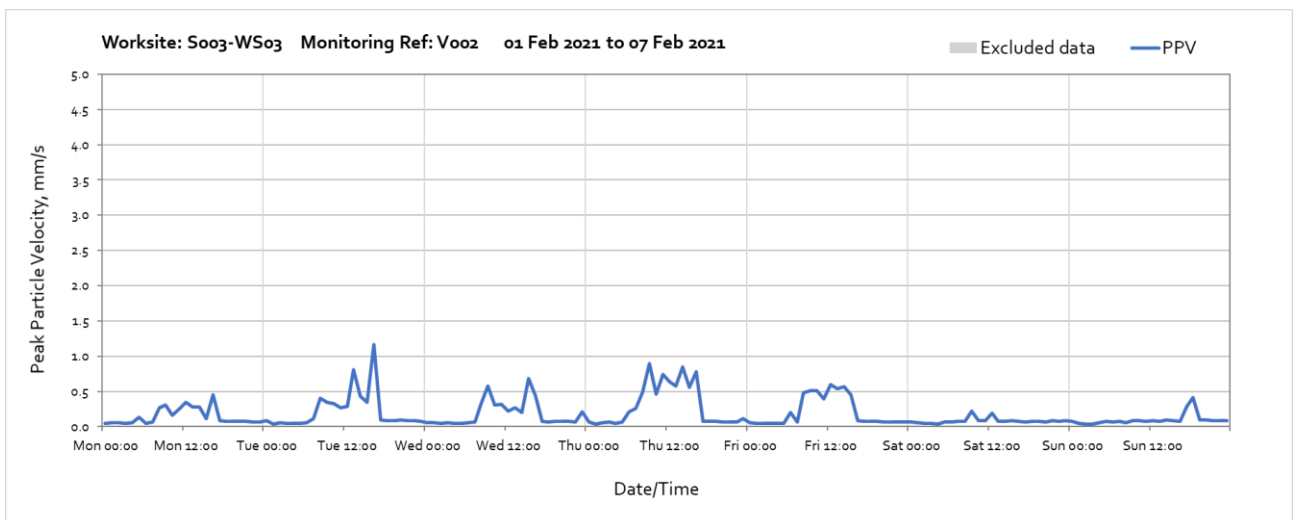


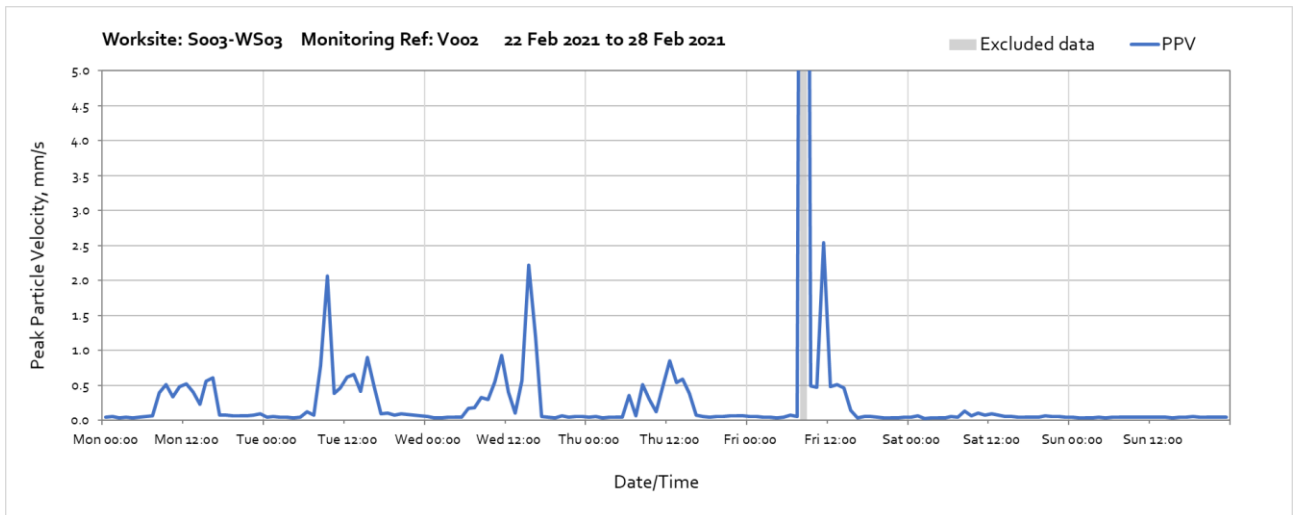
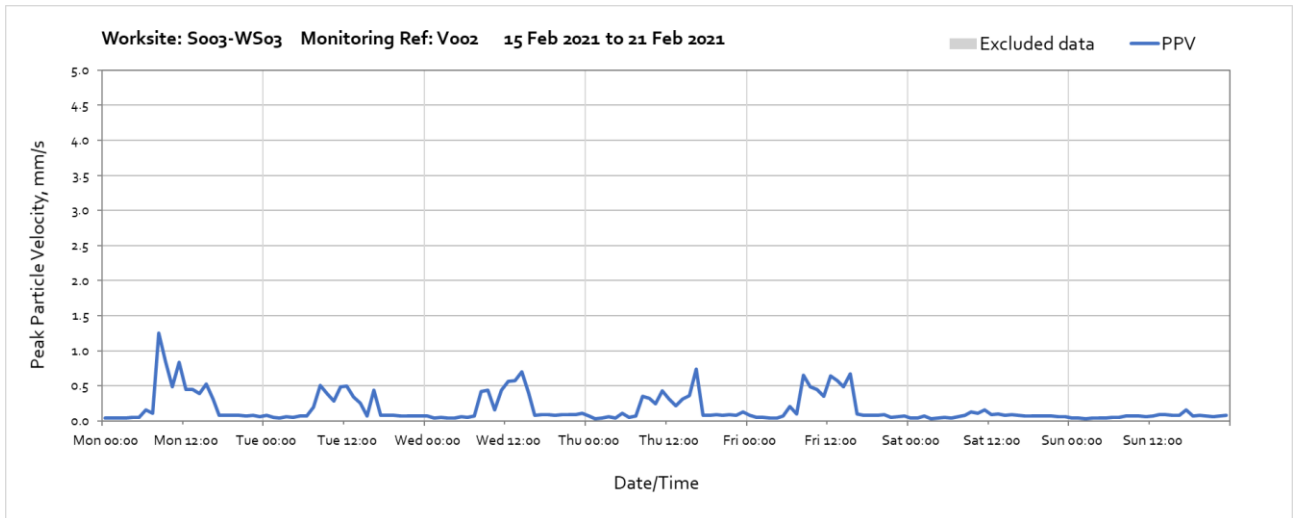
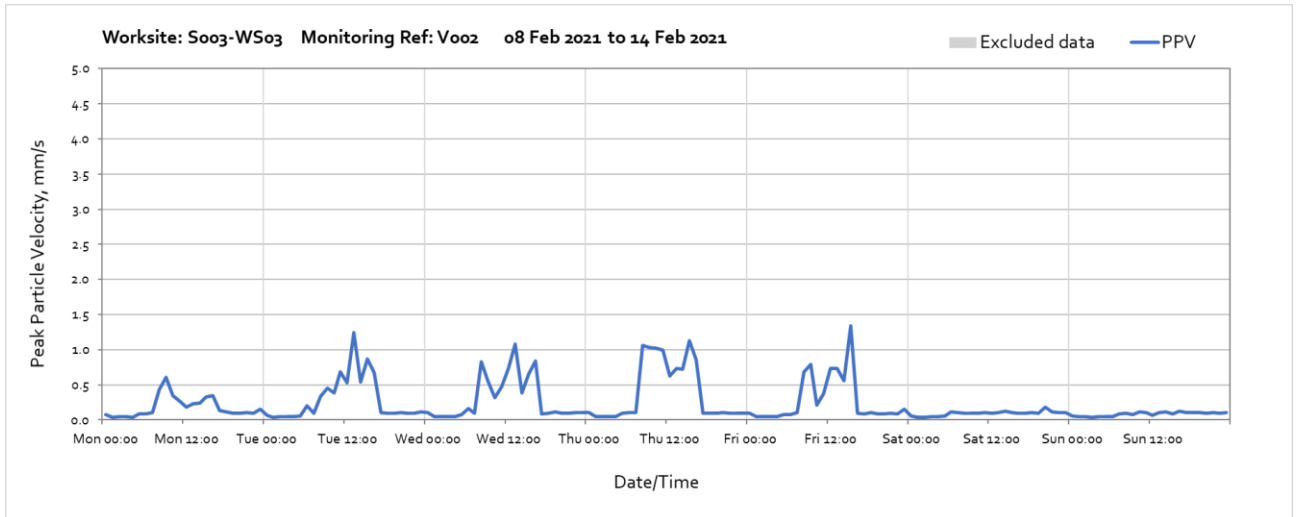
Note: High vibration levels measured throughout the week were due to the use of the nearby residential bin store and local interference of the monitor and are not representative of HS2 vibration levels.



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

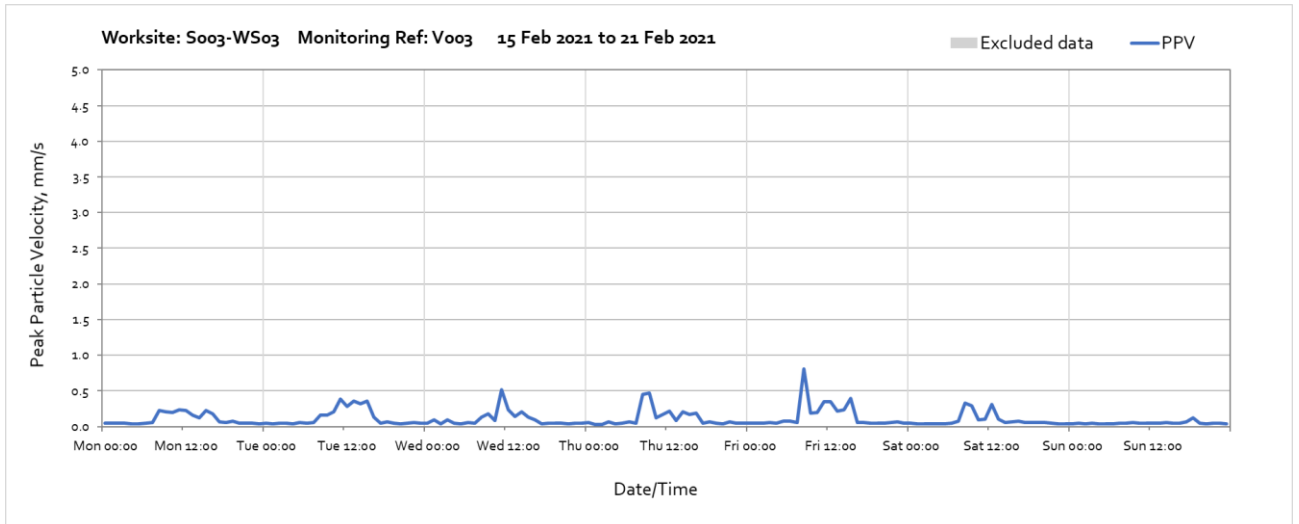
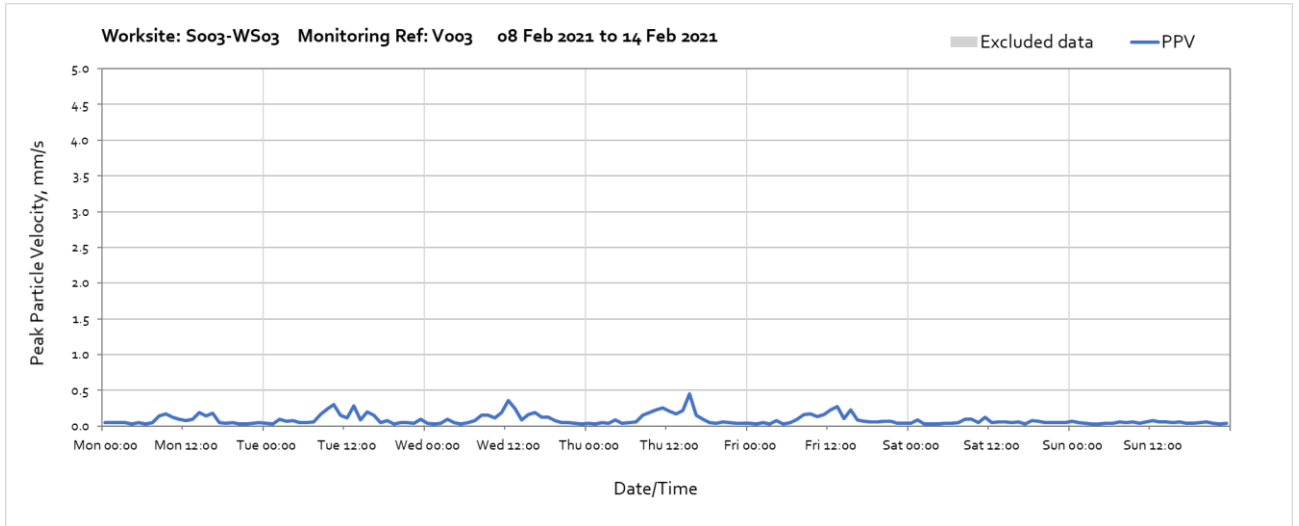
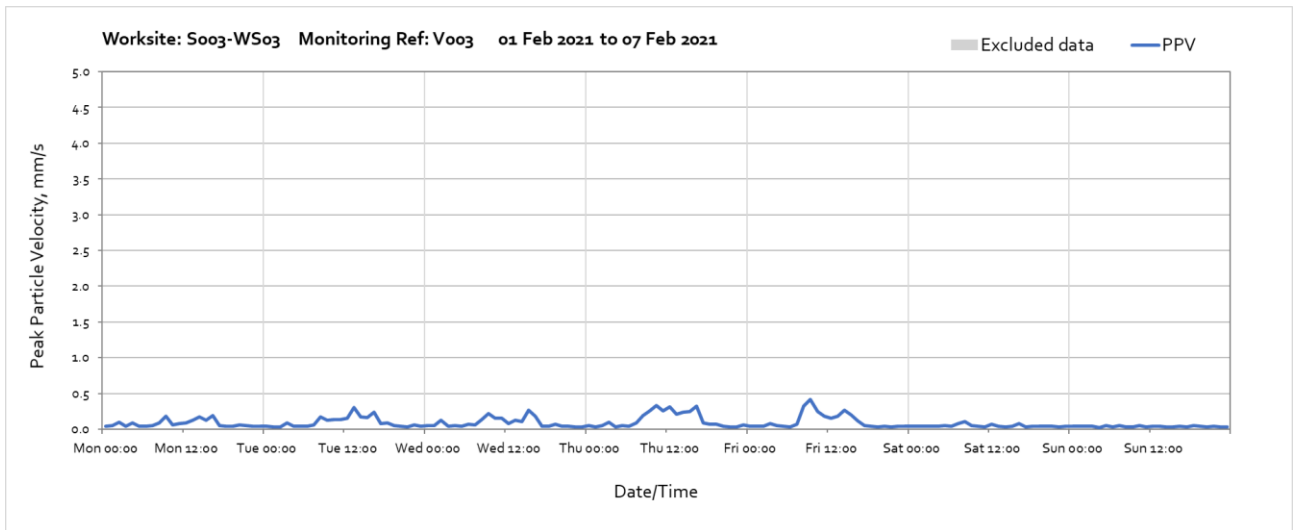
Worksite: S003-WS03 – Monitoring Ref: V002

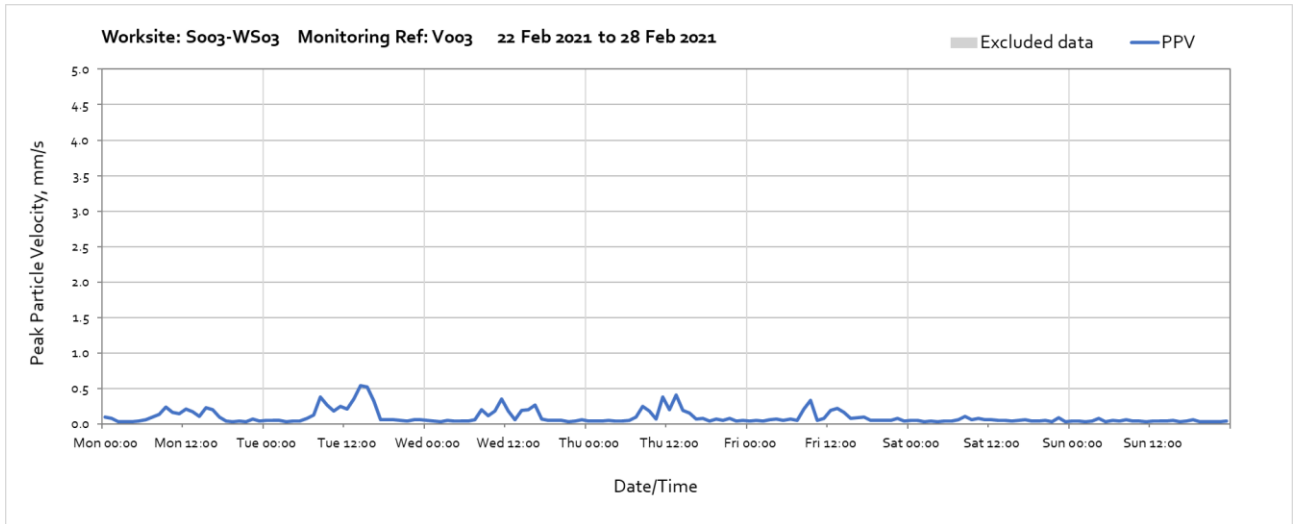




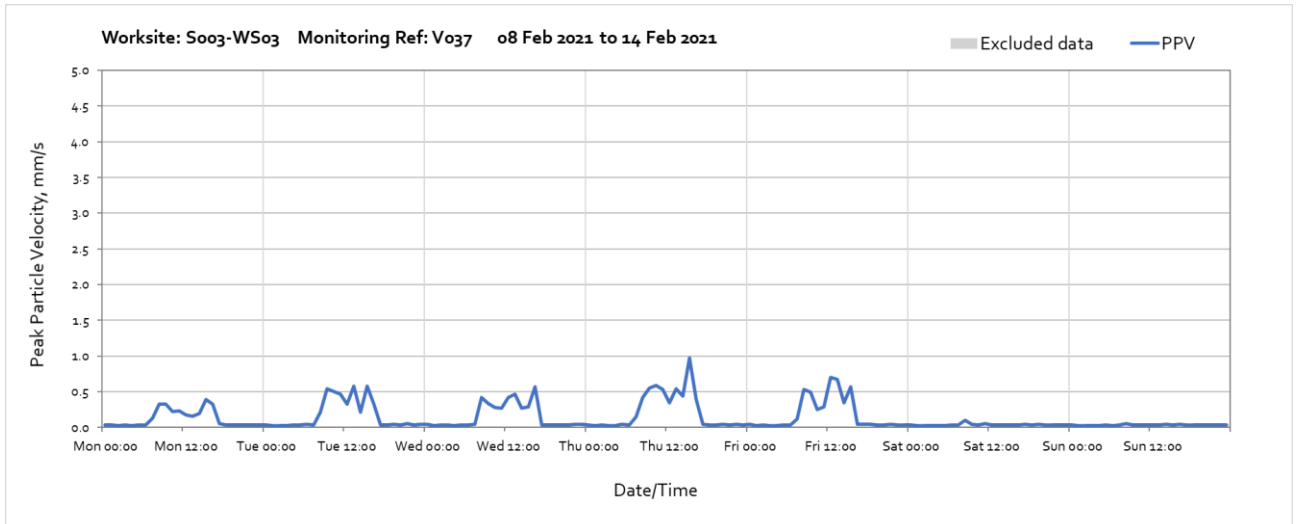
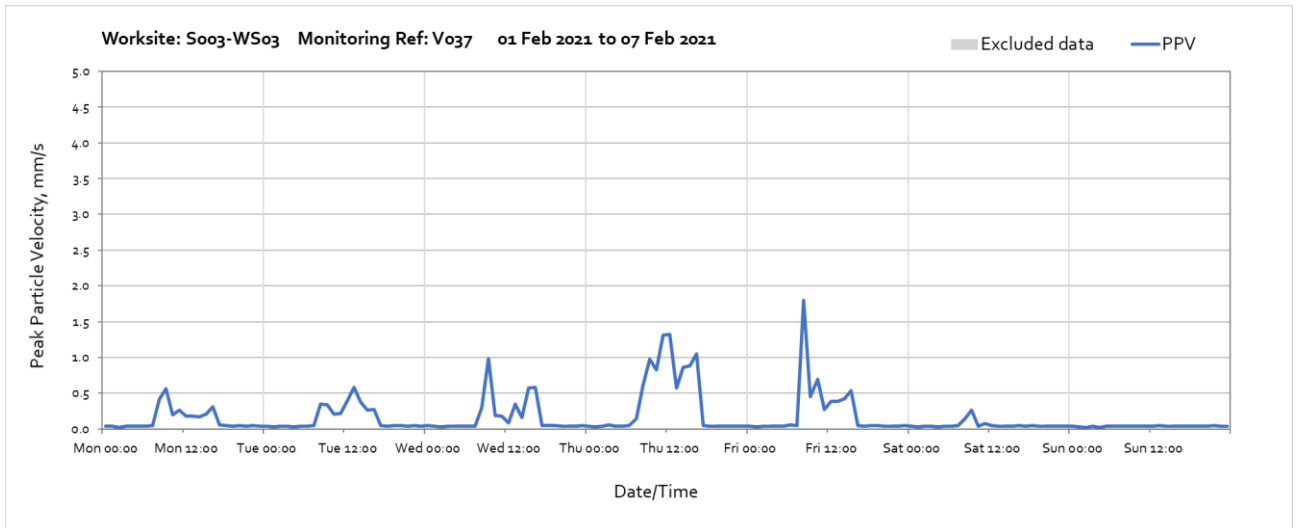
Note: High vibration levels measured at 08:00 on Friday 26th February were due to local interference of the monitor and are not representative of HS2 vibration levels.

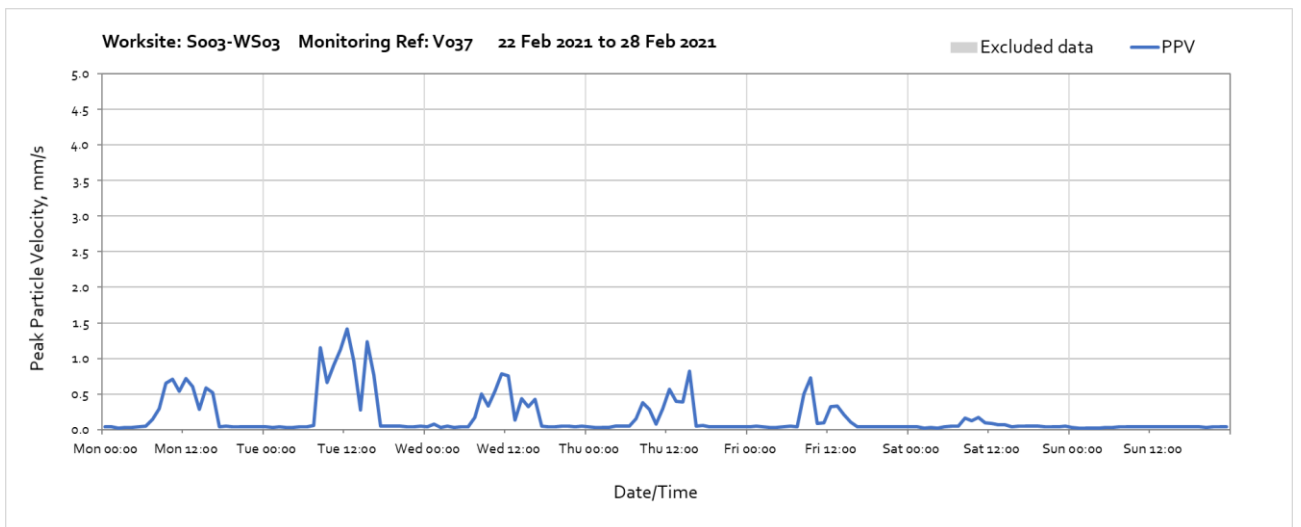
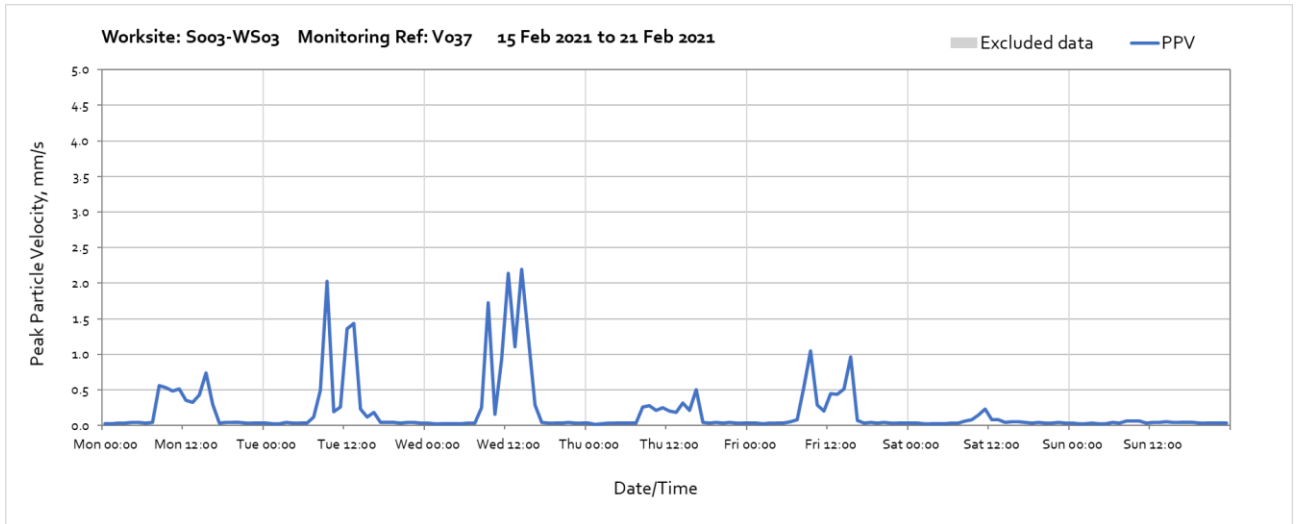
Worksite: S003-WS03 – Monitoring Ref: V003



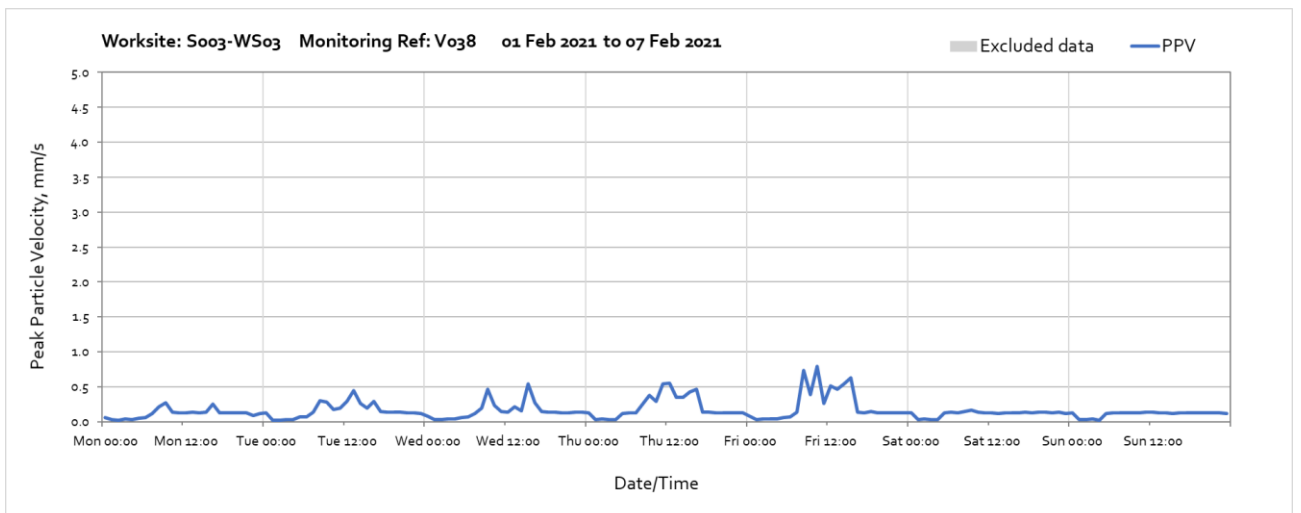


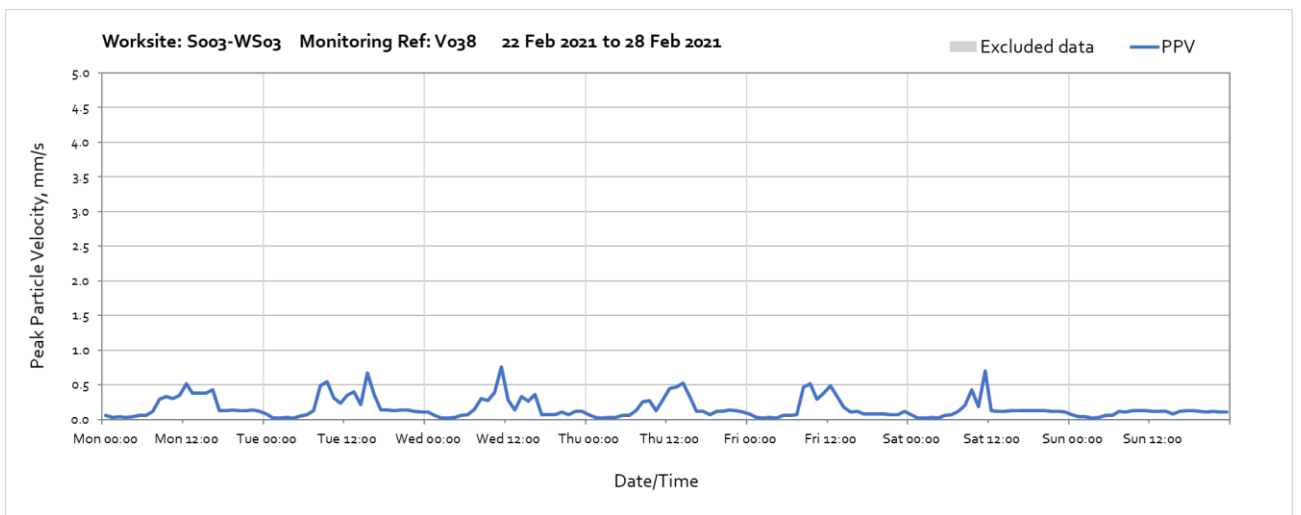
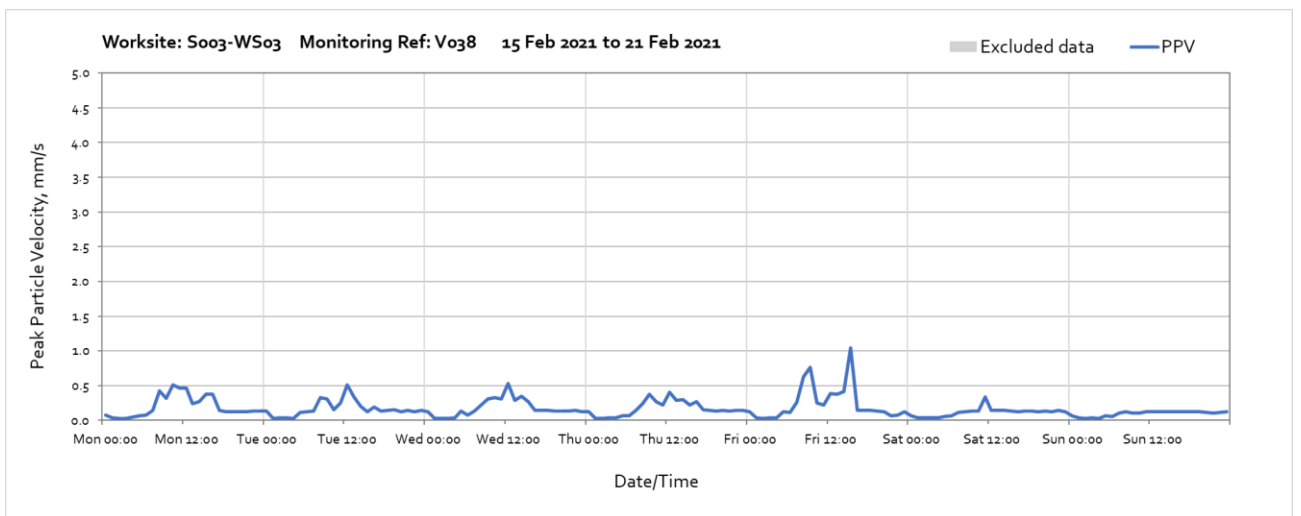
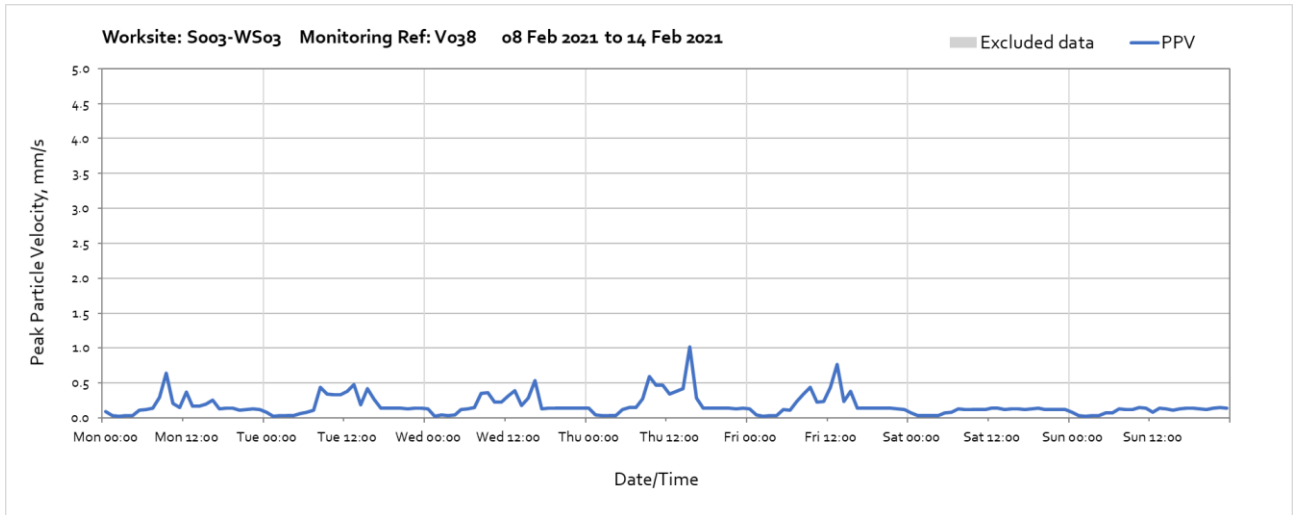
Worksite: S003-WS03 – Monitoring Ref: V037





Worksite: S003-WS03 – Monitoring Ref: V038





Worksite: NTH-EN – Monitoring Ref: V021

