

Construction noise and vibration Monthly Report – January 2019

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 (LBC) during the month of January 2019.

A number of worksites were active during the reporting month in the LBC area. Deliveries and modifications to tracks were underway at Network Rail worksite B. Deliveries, works on retaining walls and foundations were underway at C, D and E. Construction of electrical substation was underway at Network Rail worksite F. Demolition of foundations was underway at Network Rail worksite G. Ancillary activities were undertaken at the DB Cargo and former Addison Lee worksite (ref. S001-WS01). Demolitions were underway at 132 and 140 Hampstead Road and Petrol Station, worksite (ref. S001-WS02), at the former National Temperance Hospital, 110 Insull Wing worksite (ref. S003-WS02) and at the Ibis Hotel, 3 Cardington Street & 1-3 Cobourg Street worksite (ref. S003-WS05). Archaeological excavations and construction of screening structures were underway at St James's Gardens worksite (ref. S003-WS01). Removal of fixtures and fittings and scaffolding of buildings were carried out at Walkden House, 67-75 & 77-79 Euston Rd worksite (ref. S003-WS03). Removal of fixtures and fittings and asbestos removal were carried out at the Thistle Hotel worksite (ref. S003-WS04). Site deliveries were underway at the former National Temperance Hospital, 110-122 Hampstead Road, worksite (ref. S003-WS06). Removal of fixtures and fittings and utility disconnections were carried out at Drummond Street / Euston Street worksite (ref.: S003-WS07). Removal of fixtures and fittings, scaffolding and loading bay enabling works were carried out at One Euston Square, 40 Melton Street, Grant Thornton House, 22 Melton Street worksite (ref. S003-WS09). Utilities diversions were also undertaken around Granby Terrace Bridge, along Stanhope Street, Varndell Street, Harrington Street, Mackworth Street and at the north end of Park Village East. Details of works undertaken at each worksite are presented in the report.

Noise monitoring was undertaken in the vicinity of Network Rail worksites B, C, D, E and F, the DB Cargo worksite (ref.: S001-WS01), 132 and 140 Hampstead Road and Petrol Station worksite (ref.: S001-WS02), St James's Gardens worksite (ref.: S003-WS01), Walkden House, 67-75 & 77-79 Euston Rd worksite (ref.: S003-WS03), the Ibis Hotel, 3 Cardington Street & 1-3 Cobourg Street worksite (ref. S003-WS05), former National Temperance Hospital, 110-122 Hampstead Road worksite (ref. S003-WS06), Drummond Street / Euston Street worksites (ref.: S003-WS07), Ibis Hotel, Euston Square Gardens (west) worksite (ref. S003-WS08) and the Thistle Hotel (ref. S003-WS04). Further noise monitoring was also undertaken at Regents Park Estate, in the vicinity of Regents Park Lorry Holding Area and on Eversholt Street. Vibration monitoring was undertaken in the vicinity of the Walkden House, 67-75 & 77-79 Euston Rd worksite (ref. S003-WS03) and the Ibis Hotel, Euston Square Gardens (west) worksite (ref. S003-WS08).

Exceedances of the SOAELs were measured at some monitoring positions surrounding worksites B and near Granby Terrace Bridge. One exceedance of S61 trigger levels was measured at a monitoring location in proximity to Granby Terrace Bridge, this was due to utility diversion works. Nine complaints were received during the monitoring period. Description exceedance of trigger levels and of complaints, results of investigations and any actions taken are detailed in the report.

Abbreviations and descriptions

The abbreviations, descriptions and project terminology used within this report can be found in the Project Dictionary (HS2-HS2-PM-GDE-000-000002).

Table 1: Table of abbreviations

Acronym	Meaning
$L_{Aeq,T}$	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.
Equivalent continuous sound pressure level, or $L_{pAeq,T}$	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.
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.
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 The nominated undertaker 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 January 2019.

1.1.2 Active construction sites in the local authority area during this period include:

- Network Rail on-networks HS2 preparatory works: worksite ref. B (see plan 1 in Appendix A)
 - Works activities include materials deliveries, extension of siding 6, reconnection of siding 9, and reconnection of the pump to control emission toilet (CET), water and CCTV.
- Network Rail on-networks HS2 preparatory works: worksite ref. C, D and E (see plan 2 in Appendix A)
 - Works activities include materials deliveries, core drilling of retaining walls, transfers of track function module (TFM), preparing and installing concrete foundation, installing transfer plates, masts and booms.
- Network Rail on-networks HS2 preparatory works: worksite ref. F (see plan 2 in Appendix A)
 - Works activities include installation of roof membrane system, inspection of brickworks for defects, fit out of Cable Management System (CMS) in Network Rail building, assembly of high voltage switchgear, delivery and assembly of low voltage switchgear, reinforcement of retaining wall and preparation for screeding of southern and western sides of Network Rail building.

- Network Rail on-networks HS2 preparatory works: worksite ref. G (see plan 2 in Appendix A)
 - Works activities include demolition of foundations.
- DB Cargo shed and adjacent land on Granby Terrace, worksite ref. S001-WS01 (see plan 2 in Appendix A)
 - Works activities include ancillary activities at the former Addison Lee site.
- 132 and 140 Hampstead Road and Petrol Station, worksite ref. S001-WS02 (see plan 3 in Appendix A)
 - Works activities include demolition.
- St James's Gardens, worksite ref. S003-WS01 (see plan 3 in Appendix A)
 - Works activities include archaeological excavations and construction of screening structures.
- Former National Temperance Hospital, Insull Wing, worksite ref. S003-WS02 (see 3 in Appendix A)
 - Works activities include demolition.
- Walkden House, 67-75 & 77-79 Euston Rd, worksite ref. S003-WS03 (see plan 3 in Appendix A)
 - Works activities include removal of fixtures and fittings and scaffolding.
- Thistle Hotel, Cardington Street, worksite ref. S003-WS04 (see plan 3 in Appendix A)
 - Works activities include removal of fixtures and fittings and asbestos removal.
- Ibis Hotel, 3 Cardington Street & 1-3 Cobourg Street, worksite ref. S003-WS05 (see plan 3 in Appendix A)
 - Works activities include demolition.
- Former National Temperance Hospital, 110-122 Hampstead Road, worksite ref. S003-WS06 (see plan 3 in Appendix A)
 - Site activities include deliveries.
- 93-103 Drummond Street, 11-15 Melton Street, 54-64 Euston Street, 69 Cobourg Street, worksite ref. S003-WS07 (see plan 3 in Appendix A)
 - Works activities include removal of fixtures and fittings, scaffolding and utilities disconnections.

- One Euston Square, 40 Melton Street, Grant Thornton House, 22 Melton Street, worksite ref. S003-WS09 (see plan 3 in Appendix A)
 - Works activities include removal of fixtures and fittings, scaffolding and loading bay enabling works.
- Further works were also undertaken as part of the Granby Terrace utilities diversion Bridge (GBT Utilities) on Stanhope Street, Varndell Street, Harrington Street and Mackworth Street. Works were also carried out at the north end of Park Village East to divert utilities, including site set-up and works to divert an existing BT cable.

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. Noise and vibration reports prior to 2018 can be found at the following location www.gov.uk/government/publications/monitoring-noise-and-vibration-on-the-hs2-phase-one-route.

1.2 Measurement locations

1.2.1 The following table summarises the position of noise and vibration monitoring installations within the LBC area in January 2019.

1.2.2 Maps showing the position of noise monitoring installations are presented in Appendix B.

Table 2: Monitoring locations.

Worksite Reference	Measurement Reference	Address
B	CC	Whittlebury Mews West, Camden Town, London, NW1 8JB
	JC	Juniper Crescent, London, NW1 8HA
C	EC	The Edinboro Castle, 57 Mornington Terrace, London, NW1 7RU
	N022	External to #34 Mornington Terrace
	N024	External to Park Village Studios, Park Village East
D	MT	13 Mornington Terrace, Kings Cross, London, NW1 7RR
	N004	Mornington Terrace lamppost #7 (junction of Mornington Terrace, Mornington Place and Clarkson Row)
E	N005	5A Granby Terrace, Kings Cross, London, NW1 3SA
F	BS	Roof of Stockbeck House, Barnby Street, Kings Cross, London, NW1 2RS
	N023	Lighting column #21 on Hampstead Road
G	HH	Euston Station Parcel Deck, Barnby Street, Euston, London, NW1 2RS
S001-WS01	N001	Park Village East lamppost #1 (external to Cubitt Court, 100 Park Village East)

Worksite Reference	Measurement Reference	Address
	N002	Park Village East lamppost #2 (external to Richmond Court)
	N003	Park Village East lamppost #9 (external to Silsoe House)
	N021	Stanhope Street, Lamppost #2
S001-WS02	N018	Outside replacement housing, Hampstead Road
	N019	Outside Cartmel, Hampstead Road
S003-WS02	N016	Margarete Centre roof
	V09	Margaret Centre
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)
	V01	Royal College of General Practitioners basement boiler room by Stephenson Way
S003-WS05	N014	Starcross Street lamppost (external to Exmouth Arms)
S003-WS06	N015	Maria Fidelis School
	N017	Hampstead Road, Lamppost #48
S003-WS07	N012	Drummond Street lamppost #14 (opposite to 92-94 Drummond Street)
S003-WS08	N007	Royal College of General Practitioners, Melton Street
	V02	Royal College of General Practitioners basement vaults under Melton St
Not near worksite	N020	Mackworth Street lamppost #1
Not near worksite	N025	External to #3 Prince Albert Road
Not near worksite	N026	Thames Water Compound

2 Summary of results

2.1 Exceedances of SOAEL

2.1.1 The significant observed adverse effect levels (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."

2.1.2 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.

2.1.3 Table 3 presents a summary of recorded exceedances of the SOAEL due to HS2 related construction noise at each measurement location over the reporting period, including the number of exceedances during each time period.

Table 3: Summary of exceedances of LOAEL and SOAEL.

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL ⁽¹⁾
B	CC	Whittlebury Mews West, Camden Town, London, NW1 8JB	Sunday	0700-2200	1
			Night	2200-0700	3
	JC ⁽¹⁾	Juniper Crescent	Saturday	1400-2200	1
			Night	2200-0700	9
C	EC	The Edinboro Castle, 57 Mornington Terrace, London, NW1 7RU	All days	All periods	No exceedance
	N022	External to #34 Mornington Terrace	All days	All periods	No exceedance
	N024	External to Park Village Studios, Park Village East	All days	All periods	No exceedance
D	MT	Mornington Terrace	All days	All periods	No exceedance
	N004	Mornington Terrace lamppost #7	All days	All periods	No exceedance
E	N005	5A Granby Terrace, Kings Cross, London, NW1 3SA	All days	All periods	No exceedance
F	BS	Barnby Street	All days	All periods	No exceedance
	N023	Amphill Estate lighting column #21, Hampstead Road	All days	All periods	No exceedance
G	HH	Euston Station Parcel Deck, Barnby Street, Euston, London, NW1 2RS	All days	All periods	No exceedance
S001-WS01	N001	DB Cargo shed and adjacent land on Granby Terrace	All days	All periods	No exceedance
	N002	DB Cargo shed and adjacent land on Granby Terrace	All days	All periods	No exceedance
	N003	DB Cargo shed and adjacent land on Granby Terrace	All days	All periods	No exceedance
	N005	5A Granby Terrace, Kings Cross, London, NW1 3SA	All days	All periods	No exceedance
	N021	Stanhope Street, Lamppost #2	All days	All periods	No exceedance

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL ⁽¹⁾
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-WS02	N016	Margarete Centre roof	All days	All periods	No exceedance
S003-WS03	N006	Royal College of General Practitioners Roof level	All days	All periods	No exceedance
	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-WS05	N014	Ibis Hotel, 3 Cardington Street & 1-3 Cobourg Street	All days	All periods	No exceedance
S003-WS06	N015	Maria Fidelis School	All days	All periods	No exceedance
	N017	Hampstead Road, Lamppost #48	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
Not near worksite	N020	Mackworth Street lamppost #1	All days	All periods	No exceedance
Not near worksite	N025	External to #3 Prince Albert Road	All days	All periods	No exceedance
Not near worksite	N026	Thames Water Compound	All days	All periods	No exceedance
GBT Utilities	N001	DB Cargo shed and adjacent land on Granby Terrace	Weekday Saturday	0800-1800 0800-1300	3 1
	N021	Stanhope Street, Lamppost #2	Weekday	0800-1800	1

⁽¹⁾ This monitor is located within the worksite and the measured noise levels and exceedances of the SOAEL are not representative of noise at the surrounding residential properties. Alternative locations for repositioning of this monitor are being considered in discussion with the Local Council.

2.1.4 Over the reporting period the SOAEL was exceeded at a number of measurement locations in the vicinity of worksite B and near Granby Terrace Bridge. These were caused by activities at Network Rail worksite B during night-time periods and during weekend days, and to utility diversion works at Granby Terrace Bridge during core working hours. Except at these two locations any exceedances of the SOAEL were caused by the underlying ambient noise levels or other construction activities not related to HS2, rather than being attributable to HS2 construction noise.

2.1.5 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 4 and may be lower than the total sum of individual exceedances reported in Table 3 for each location.

Table 4: Summary of total exceedances of SOAEL.

Worksite Reference	Measurement Reference	Site Address	Total of SOAEL exceedances in the month
B	CC	Whittlebury Mews West, Camden Town, London, NW1 8JB	3
	JC ⁽¹⁾	Juniper Crescent	9
S001-WS01	N001	DB Cargo shed and adjacent land on Granby Terrace	4
	N021	Stanhope Street, Lampost #2	1

⁽¹⁾ This monitor is located within the worksite and the measured noise levels and exceedances of the SOAEL are not representative of noise at the surrounding residential properties. Alternative locations for repositioning of this monitor are being considered in discussion with the Local Council.

2.1.6 Monitoring of vibration peak particle velocity (PPV) was undertaken with the purpose of ensuring that construction generated vibration are not of such a magnitude to damage adjacent buildings, in accordance with Annex 1: Code of Construction Practice of the High Speed Rail (London-West Midlands) Environmental Minimum Requirements. There are no LOAEL and SOAEL criteria based on PPV applicable to HS2 construction vibration.

2.2 Summary of measured noise and vibration levels

2.2.1 Table 5 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.

2.2.2 Noise monitoring in the vicinity of worksites B, C, D, F, G, S001-WS02, S003-WS02 and S003-WS05 is considered representative of HS2 Area South works during periods of construction works. Other worksites were not considered to be giving rise to substantial levels of HS2 related construction noise, with the measured noise levels largely dominated by the underlying ambient noise, acknowledging that intermittent HS2 works may on occasion be taking place within the area.

Table 5: 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
B	CC	Whittlebury Mews West, Camden Tow	Free-field	59.5 (61.5)	61.1 (64.0)	60.7 (63.3)	61.6 (63.7)	56.8 (67.6)	58.2 (58.9)	61.9 (62.4)	57.3 (57.8)	58.8 (63.5)	60.7 (68.9)	63.6 (75.3)	57.6 (69.5)
	JC ⁽¹⁾	Juniper Crescent, London, NW1 8HA	Free-field	67.5 (70.8)	68.1 (68.7)	68.3 (71.4)	66.7 (68.6)	62.6 (72.1)	66.4 (66.8)	67.9 (68.4)	67.5 (68.3)	66.7 (67.9)	64.9 (73.0)	66.3 (68.7)	63.4 (68.8)
C	EC	The Edinboro Castle, 57 Mornington Terrace	Free field	66.1 (67.5)	65.9 (66.7)	66.8 (67.9)	65.0 (67.0)	61.6 (66.9)	65.3 (65.7)	65.7 (66.5)	65.1 (66.1)	66.1 (70.4)	60.0 (66.3)	65.1 (67.7)	61.8 (66.6)
	N022	External to #34 Mornington Terrace	Free-field	60.0 (62.1)	61.6 (66.2)	61.3 (62.7)	59.5 (62.2)	55.5 (63.5)	58.5 (59.4)	60.3 (60.8)	60.1 (61.0)	59.9 (60.7)	56.0 (61.0)	59.3 (61.1)	55.4 (60.8)
	N024	External to Park Village Studios, Park Village East	Free-field	58.1 (66.8)	60.3 (65.2)	59.7 (66.5)	58.6 (65.1)	53.5 (63.7)	53.6 (56.2)	56.6 (58.7)	56.2 (58.9)	56.3 (60.8)	52.9 (58.1)	56.0 (65.5)	52.4 (57.7)
D	MT	13 Mornington Terrace, Kings Cross, London, NW1 7RR	Free-field	53.2 (62.5)	58.2 (59.5)	58.2 (60.0)	56.3 (60.2)	49.4 (56.7)	54.9 (55.5)	57.5 (58.4)	56.7 (57.7)	57.1 (60.5)	53.8 (58.0)	55.9 (57.8)	50.9 (55.5)
	N004	Mornington Terrace lamppost #7	Free-field	63.7 (69.0)	64.9 (66.1)	64.8 (66.2)	64.0 (67.9)	59.7 (70.1)	62.8 (63.5)	64.4 (65.4)	63.4 (63.8)	64.4 (70.9)	60.2 (67.2)	65.5 (76.4)	61.0 (67.9)
E	N005	5A Granby Terrace, Kings Cross, London, NW1 3SA	Free-field	66.4 (67.5)	67.2 (67.6)	67.0 (68.8)	66.1 (67.7)	64.2 (70.4)	65.4 (65.9)	66.9 (67.4)	66.7 (68.7)	66.3 (68.1)	64.3 (66.3)	65.8 (67.6)	64.2 (67.8)

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
F	BS	Roof of Stockbeck House, Barnby Street	Free-field	60.6 (63.0)	63.1 (64.3)	61.5 (62.9)	59.9 (62.2)	56.8 (78.6)	59.6 (59.7)	61.7 (62.6)	61.6 (63.7)	60.2 (64.1)	56.0 (60.9)	59.9 (62.3)	56.4 (60.5)
	N023	Amphill Estate, Hampstead Road	Free-field	71.6 (73.6)	71.1 (72.6)	70.9 (73.2)	70.5 (73.5)	68.8 (73.3)	68.9 (69.8)	70.4 (71.6)	71.0 (73.2)	70.8 (72.5)	69.0 (71.6)	70.5 (75.1)	68.0 (72.1)
G	HH	Euston Station Parcel Deck, Barnby Street	Free-field	65.9 (69.4)	67.2 (71.7)	64.9 (68.2)	64.2 (69.1)	61.6 (71.5)	63.3 (64.6)	65.9 (67.8)	65.0 (71.1)	64.2 (68.9)	62.7 (67.3)	63.0 (66.6)	60.7 (64.5)
S001-WS01	N001	External to Cubitt Court, 100 Park Village East	Façade	57.3 (66.7)	66.0 (79.5)	57.9 (60.6)	56.9 (68.0)	53.0 (68.2)	54.2 (56.6)	64.4 (77.1)	57.2 (59.5)	56.7 (61.1)	52.7 (57.9)	56.4 (59.6)	53.1 (59.2)
	N002	Richmond Court, Park Village East	Free-field	59.7 (61.9)	62.2 (66.3)	62.1 (64.6)	60.6 (68.6)	55.7 (63.6)	56.8 (58.5)	60.4 (62.0)	60.8 (62.0)	60.3 (63.6)	55.8 (59.9)	59.5 (63.4)	55.3 (60.0)
	N003	Silsoe House, Park Village East	Free-field	59.8 (69.4)	62.2 (64.8)	62.1 (64.1)	60.8 (68.7)	55.3 (61.5)	56.5 (57.6)	59.9 (60.2)	60.3 (61.1)	60.4 (62.4)	55.6 (60.2)	59.3 (62.7)	54.4 (58.8)
	N021	Stanhope Street, Lampost #2	Free-field	52.7 (61.0)	63.7 (77.2)	53.0 (60.5)	52.2 (67.9)	49.7 (69.9)	50.1 (54.6)	57.5 (60.1)	53.8 (58.1)	53.2 (58.8)	49.3 (55.5)	53.6 (59.1)	48.9 (56.2)
S001-WS02	N018	Outside replacement housing, Hampstead Road	Free-field	72.8 (76.1)	74.1 (75.8)	74.2 (76.3)	73.7 (76.8)	72.2 (76.7)	71.3 (72.2)	72.4 (73.7)	73.2 (75.5)	73.6 (75.3)	72.8 (76.3)	73.3 (76.5)	70.9 (73.6)
	N019	Outside Cartmel, Hampstead Road	Free-field	71.4 (74.7)	72.4 (74.2)	72.7 (74.2)	72.2 (75.7)	71.1 (76.1)	69.5 (70.0)	71.2 (72.3)	71.8 (73.8)	72.2 (74.1)	71.7 (76.3)	71.7 (74.9)	69.5 (72.6)

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	53.1 (57.4)	63.9 (67.3)	51.7 (53.2)	52.2 (62.6)	51.1 (59.9)	52.4 (55.6)	56.9 (60.0)	53.6 (58.0)	53.0 (60.6)	51.0 (52.7)	53.1 (55.2)	51.3 (53.9)
	N008	RCGP Stephenson Way	Façade	62.8 (66.3)	64.6 (69.9)	55.6 (59.3)	55.5 (59.6)	57.8 (72.3)	57.0 (58.9)	61.8 (66.1)	58.4 (59.9)	56.1 (59.0)	55.1 (62.8)	55.8 (59.1)	58.4 (68.2)
	N010	Wesley Hotel	Façade	64.6 (67.0)	66.5 (69.3)	63.8 (65.2)	63.6 (65.4)	60.4 (65.5)	64.4 (66.3)	67.1 (76.6)	64.5 (65.9)	64.0 (64.6)	61.8 (64.8)	64.3 (71.0)	58.7 (64.3)
	N011	Outside #82 Euston Street	Free-field	58.3 (65.0)	61.4 (70.4)	57.5 (61.5)	56.1 (60.4)	54.4 (63.5)	56.3 (59.6)	58.3 (59.7)	56.9 (59.8)	57.4 (65.9)	51.7 (55.2)	56.7 (62.5)	53.7 (58.4)
S003-WS05	N014	Starcross Street	Free-field	57.0 (61.2)	59.2 (60.9)	57.0 (68.7)	55.9 (66.3)	53.5 (66.5)	56.7 (60.1)	59.6 (60.9)	57.5 (58.7)	56.3 (63.1)	53.4 (56.9)	56.8 (68.1)	52.8 (58.0)
S003-WS06	N015	Maria Fidelis School	Free-field	58.3 (60.4)	66.7 (70.5)	57.5 (59.8)	57.5 (60.6)	56.3 (66.1)	57.7 (58.4)	64.4 (66.1)	63.4 (65.8)	59.5 (64.3)	56.5 (59.5)	59.4 (67.6)	55.5 (58.0)
	N016	Margarete Centre roof	Free-field	57.0 (58.8)	62.4 (65.1)	56.5 (58.0)	56.2 (59.6)	57.4 (72.9)	55.7 (56.1)	63.4 (65.4)	60.6 (61.5)	57.6 (62.2)	57.2 (70.5)	57.8 (65.6)	54.6 (60.1)
	N017	Hampstead Road, Lampost #48	Free-field	71.8 (74.0)	72.7 (74.5)	72.0 (74.6)	71.9 (75.6)	70.5 (74.8)	70.3 (71.5)	71.2 (72.7)	71.8 (74.1)	72.0 (73.6)	70.7 (74.3)	71.8 (81.9)	69.1 (72.0)
S003-WS07	N012	Opposite #92-94 Drummond Street	Free-field	58.4 (59.9)	61.9 (69.9)	59.4 (69.3)	59.1 (62.3)	56.6 (62.7)	56.4 (57.0)	59.2 (61.0)	59.0 (59.8)	59.1 (60.8)	55.7 (58.7)	58.4 (63.7)	55.7 (58.9)
S003-WS08	N007	RCGP, Melton Street	Free-field	65.7 (67.7)	68.7 (71.8)	65.5 (67.3)	65.5 (68.0)	63.9 (68.9)	66.1 (69.7)	68.0 (70.4)	66.6 (69.2)	65.9 (68.1)	64.1 (68.6)	64.7 (67.5)	64.0 (74.2)

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
Not near worksite	N020	Mackworth Street	Free-field	53.1 (56.8)	54.6 (57.2)	52.9 (57.2)	51.9 (60.1)	51.1 (68.7)	49.8 (51.6)	53.1 (54.6)	54.4 (57.0)	52.5 (55.9)	51.0 (55.4)	52.3 (57.6)	51.2 (63.7)
Not near worksite	N025	External to #3 Prince Albert Road	Free-field	68.4 (71.5)	69.3 (70.8)	68.0 (71.4)	68.4 (72.8)	66.0 (72.3)	67.7 (69.3)	67.6 (68.0)	68.1 (70.6)	68.7 (73.1)	66.8 (70.7)	67.7 (73.6)	64.7 (69.4)
Not near worksite	N026	Thames Water Compound	Free-field	57.2 (58.6)	58.9 (62.3)	57.0 (58.8)	56.7 (60.3)	53.2 (62.9)	54.7 (55.3)	56.1 (57.3)	56.1 (57.9)	56.5 (57.9)	53.3 (57.0)	56.0 (59.3)	52.1 (55.6)

⁽¹⁾ This monitor is located within the worksite and the measured noise levels and exceedances of the SOAEL are not representative of noise at the surrounding residential properties. Alternative locations for repositioning of this monitor are being considered in discussion with the Local Council.

2.2.3 Table 6 presents a summary of the measured vibration levels at monitoring locations V01, V02 and V09 over the reporting period. The highest PPV measured during the monitoring along any axis is presented in the table.

Table 6: Summary of measured PPV data over the monitoring period.

Worksite Reference	Measurement Reference	Site Address	Highest PPV measured in any axis, mm/s
S003-WS03	V01	Royal College of General Practitioners basement boiler room by Stephenson Way	0.83 (Z axis)
S003-WS08	V02	Royal College of General Practitioners basement vaults under Melton St	0.50 (Y axis)
S003-WS06	V09	Margarete Centre	1.81 (Z axis)

2.2.4 Appendix C presents graphs of noise and vibration monitoring data over the month for each of the measurement locations. Noise data presented consist 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>.

2.3 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 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
N/A	GTB Utilities	12/01/2019, 0800-1200; 15/01/2019, 0800-1800; 16/01/2019, 0800-1800; 17/01/2019, 0800-1800.	Saw cutting and breaking out of utilities trench immediately beneath monitor / adjacent to receptor.	Measured noise level above 76 dB L _{Aeq,T} . Works methodology, including use of acoustic barriers, was in accordance with best practicable means and S61 consent. Trench relocated slightly closer to receptor due to space constraints within ground.	No additional mitigation practicable due to proximity to monitor / receptor.

2.3.2 There were four days with exceedances of trigger levels as defined in section 61 consents during the reporting period at any monitoring position, due to works to divert utilities at Granby Terrace Bridge.

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.

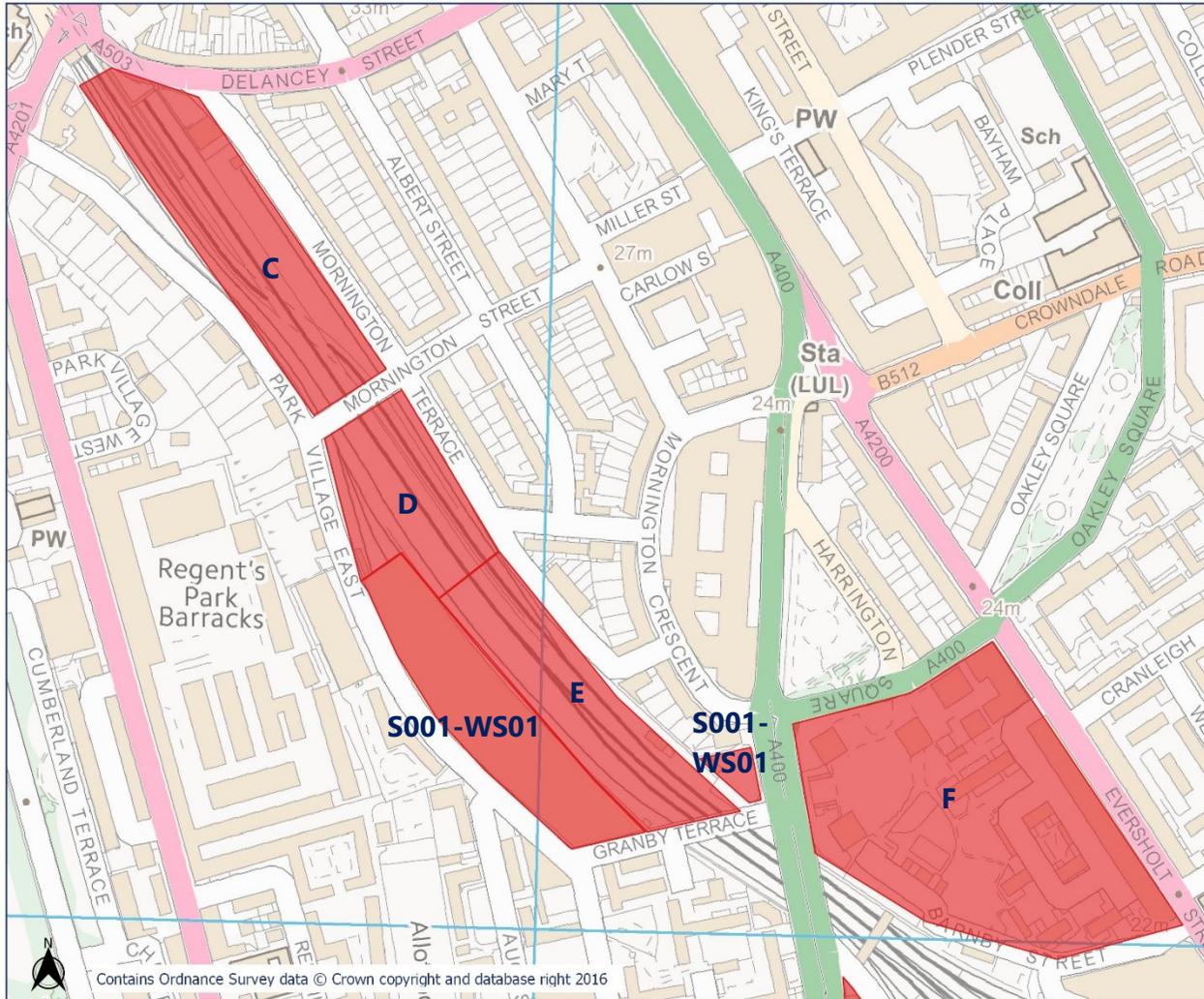
Complaint reference number	Worksite reference	Description of complaint	Results of investigation	Actions taken
N/A	S001-WS02	Complaint regarding perceptible vibration within residential premise of Cartmel, Regent's Park Estate.	No demolition or other vibration generating activities were being undertaken at the S001-WS02 worksite on the day in question.	No action taken.
N/A	C	Complaint from a resident of Mornington Terrace about being continuously exposed to construction noise during daytime periods.	Works methodology was in accordance with best practicable means and S61 consent.	No additional mitigation practicable.

Complaint reference number	Worksite reference	Description of complaint	Results of investigation	Actions taken
CPA-000635	S003-WS01 / S003-WS02 / S003-WS06	Complaint from a resident of Robert Street about mechanical noise during a night-time period.	Records show no activity of HS2 contractors in the area at the time of the complaint.	No action taken.
CPA-000641	B	Complaints from residents of Sunny Mews about noise from on tracks machinery movements and screeching noise at night.	Works methodology was in accordance with best practicable means and S61 consent.	No additional mitigation practicable.
CPA-000645	GBT Utilities	Complaint from a resident of Park Village East regarding construction noise during daytime and night-time periods.	Saw cutting and breaking out of utilities trench immediately adjacent to receptor during daytime core working hours. Works methodology, including use of acoustic barriers, was in accordance with best practicable means and S61 consent. Trench relocated slightly closer to receptor due to space constraints within ground. No noisy HS2 night-time works were being undertaken in the area at the time of the complaint.	No additional mitigation practicable.
CPA-000651	GBT Utilities	Complaint about vibration within the premises causing objects to fall off the walls.	Complaint relating to sewer diversion works. HS2 contractor has contacted the resident to clarify the issue.	Resident contacted and issue closed.
CPA-000661	B	Complaint about noise disturbance at night.	Complaint relating to on network construction activities. HS2 contractor has contacted the resident to clarify the issue.	Resident contacted and issue closed.
CPA-000665	No worksite nearby	Complaint from a resident of Albany Street about vibration within the premises causing objects to fall off the walls.	The location of the complaint is not near any HS2 worksites that could cause perceptible vibration at the premises.	No action taken.

Complaint reference number	Worksite reference	Description of complaint	Results of investigation	Actions taken
CPA-000668	Various	General complaint concerning increase in construction activity, including construction noise.	The resident has been contacted to discuss the issue.	Resident contacted and issue closed.

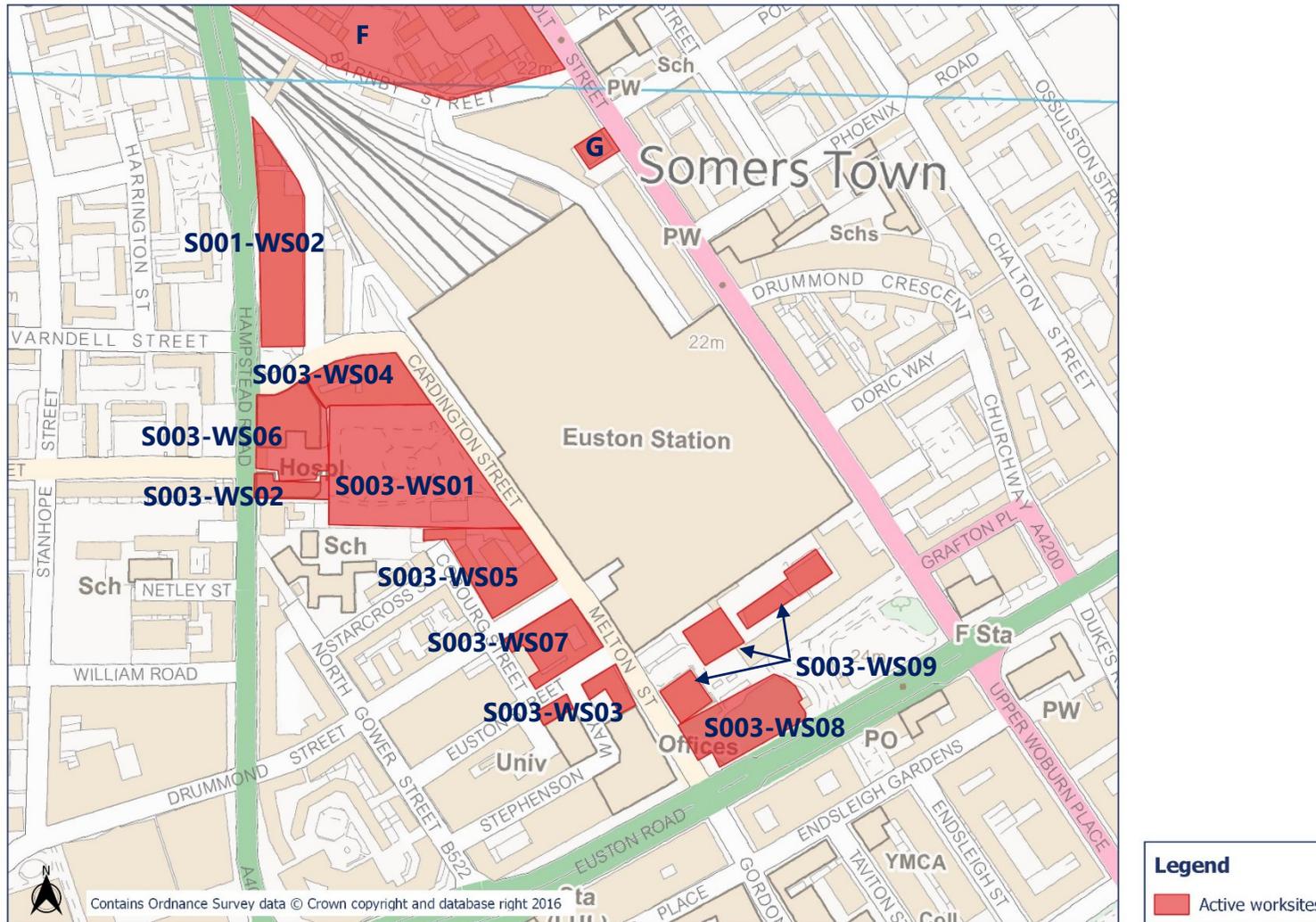
Appendix A Site Locations



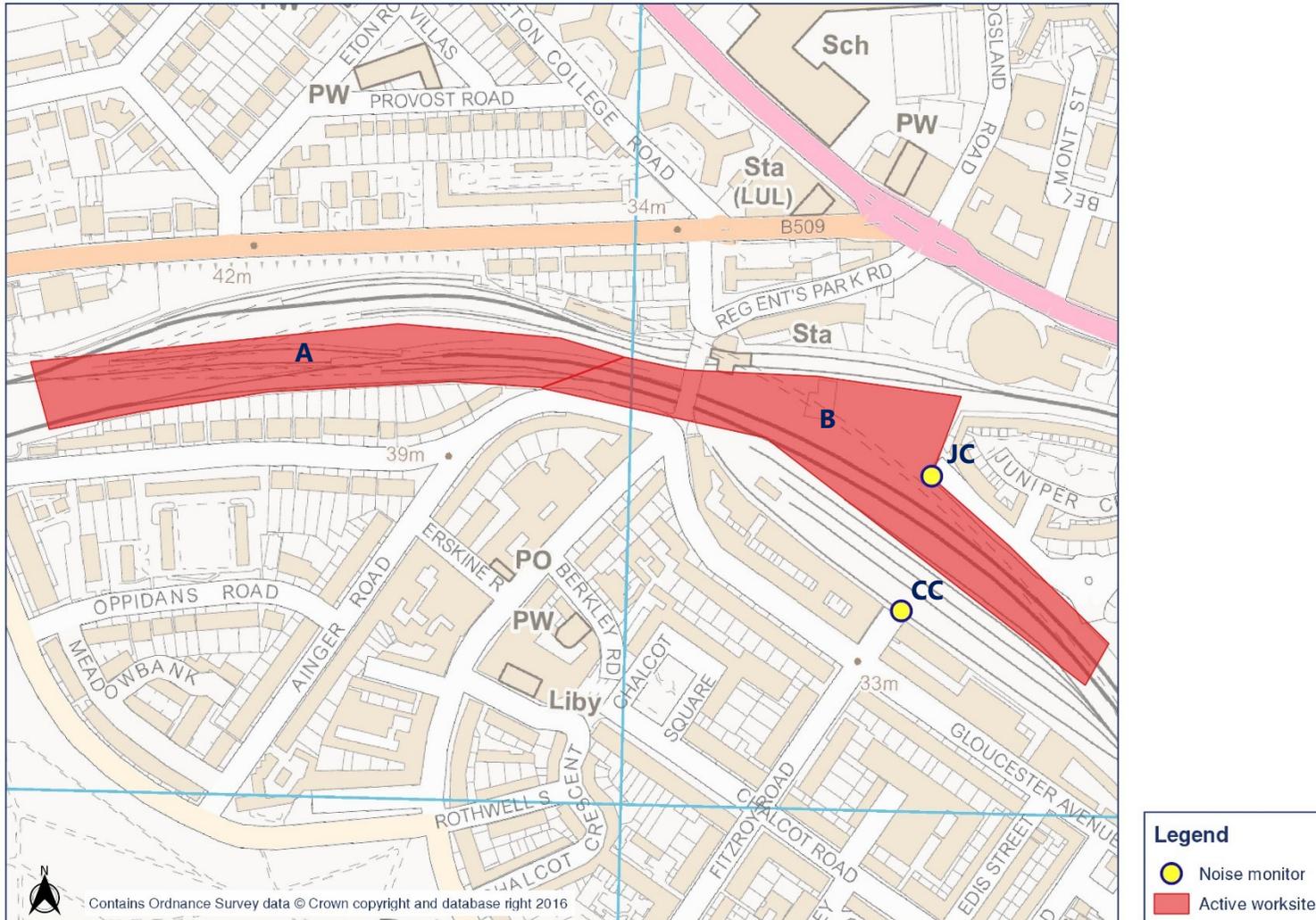


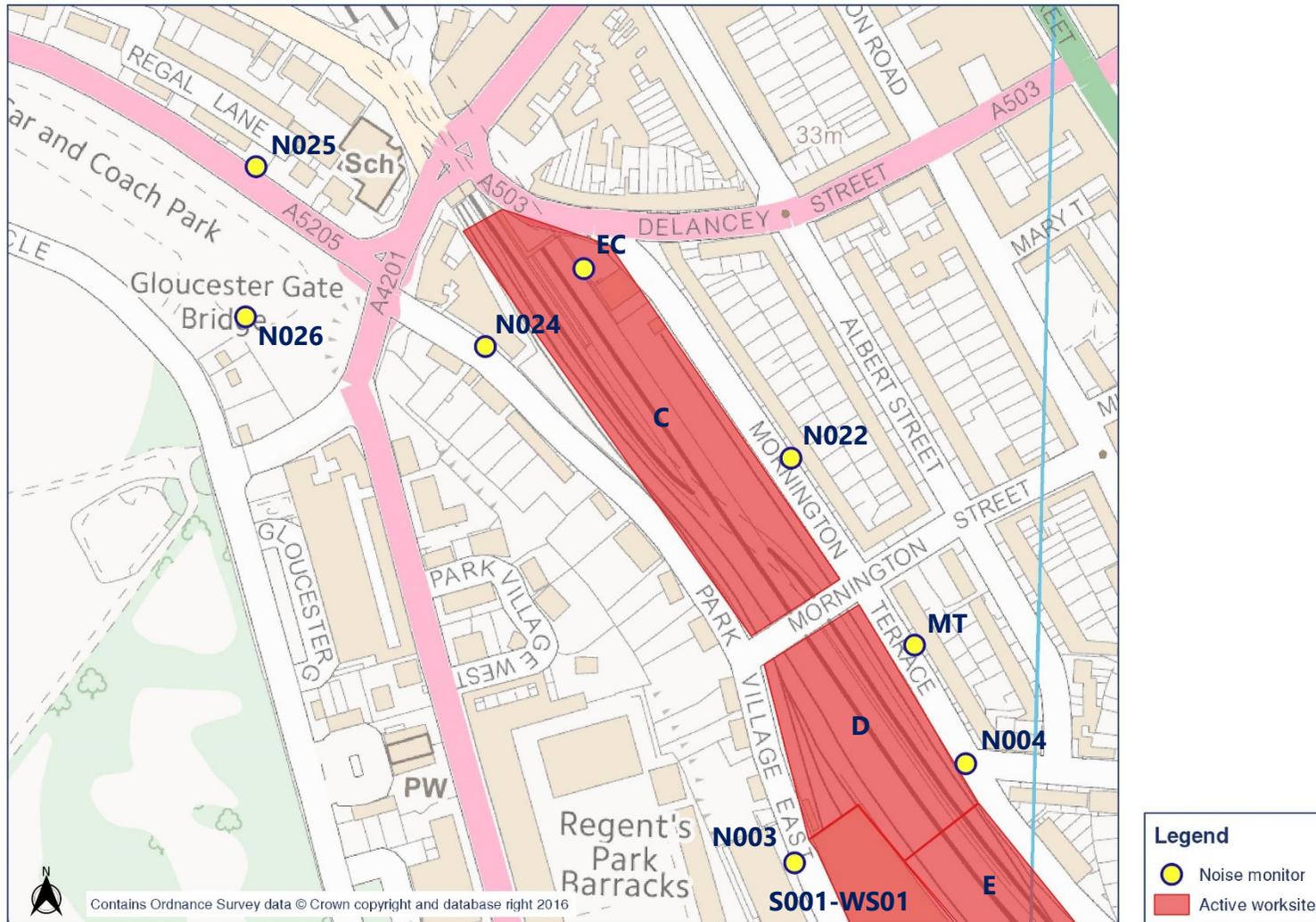
Legend

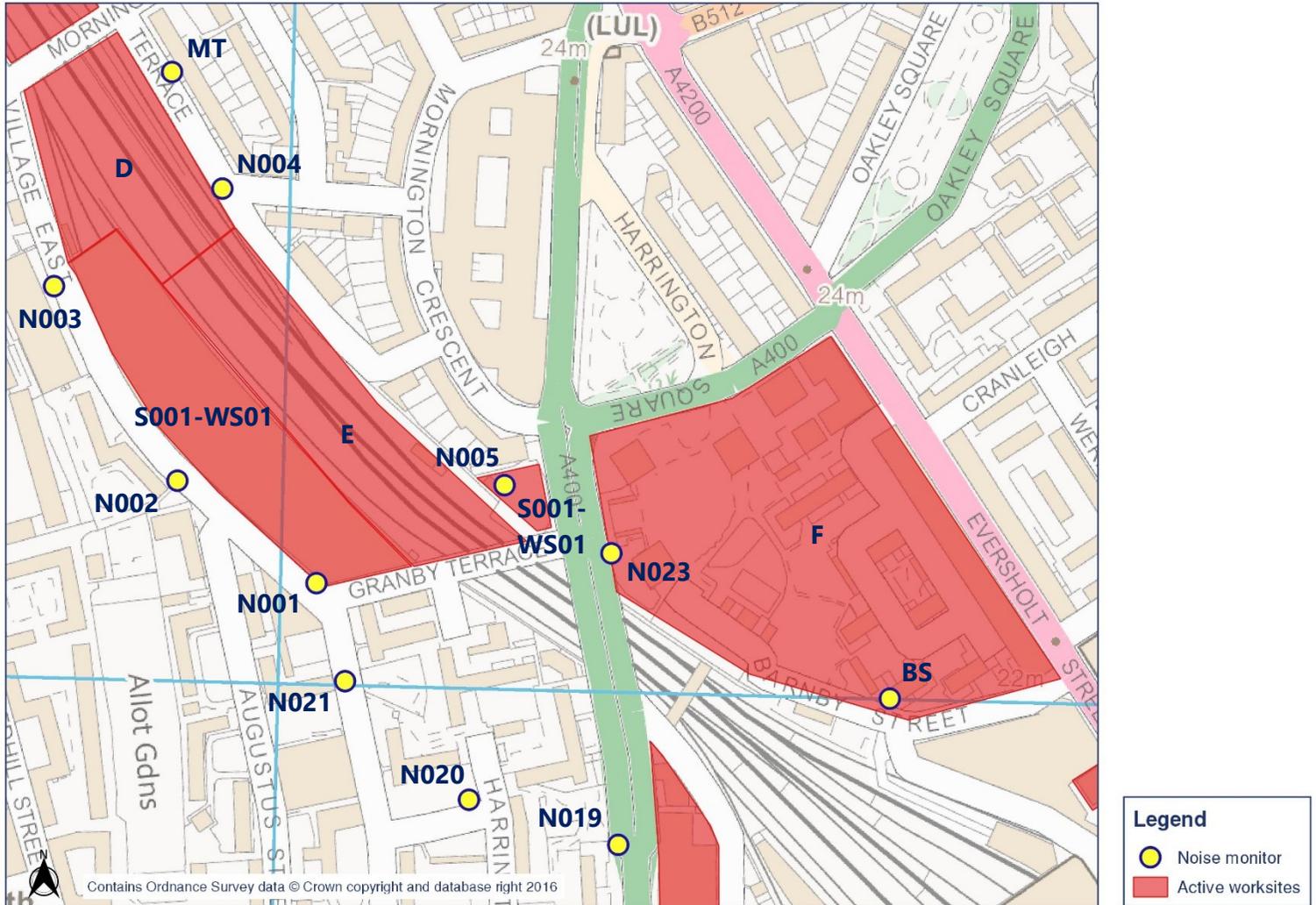
- Active worksites

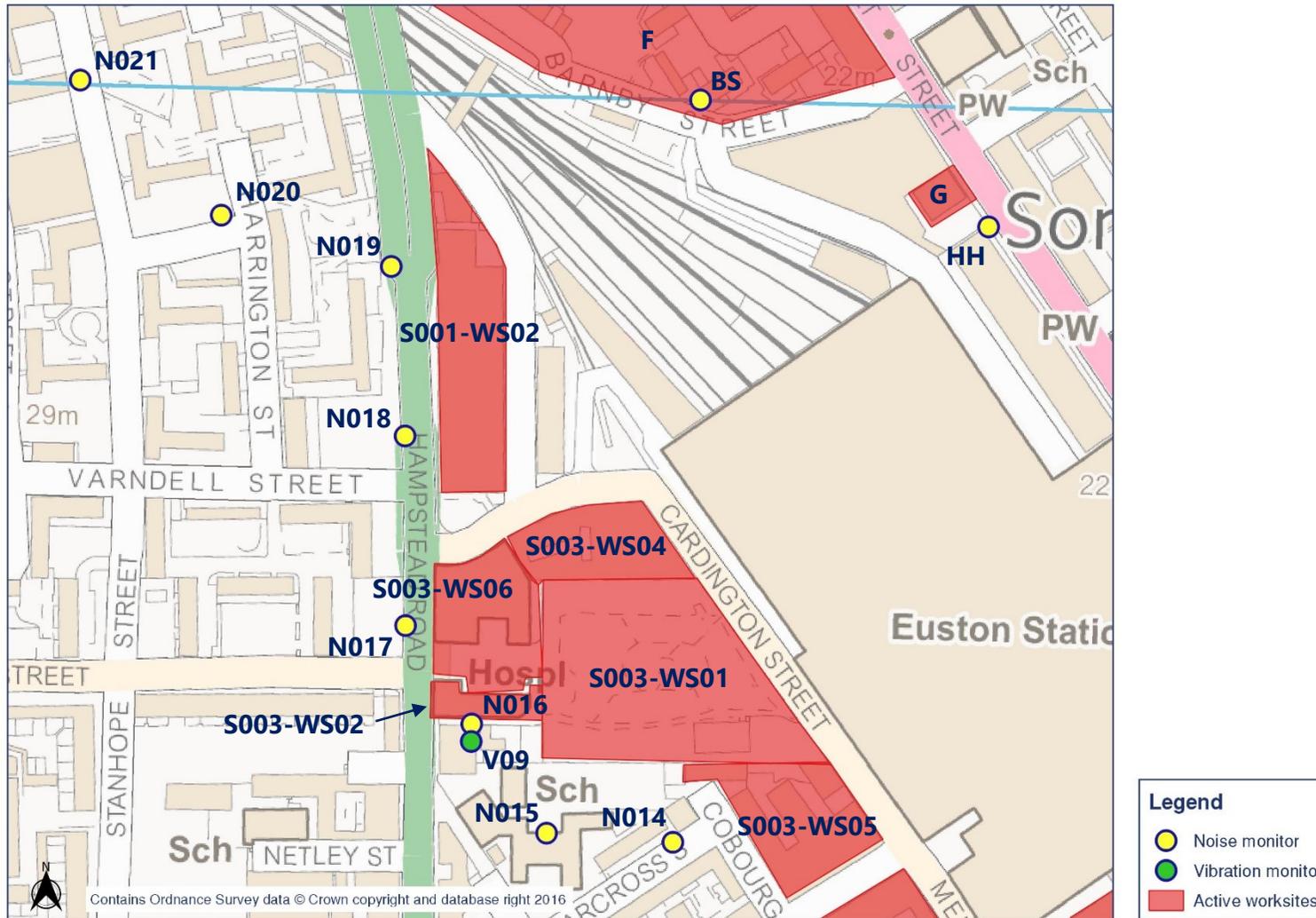


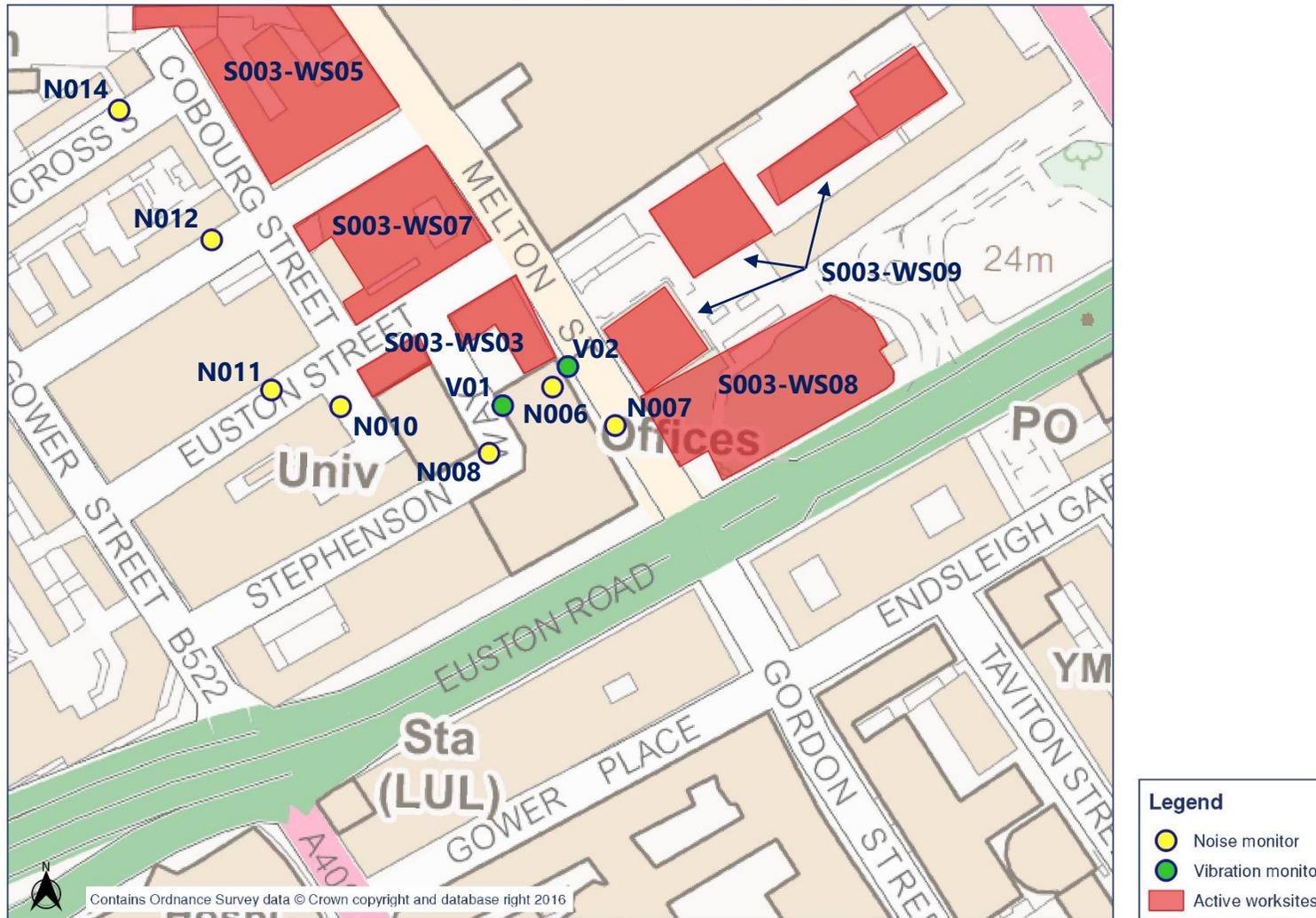
Appendix B Monitoring Locations









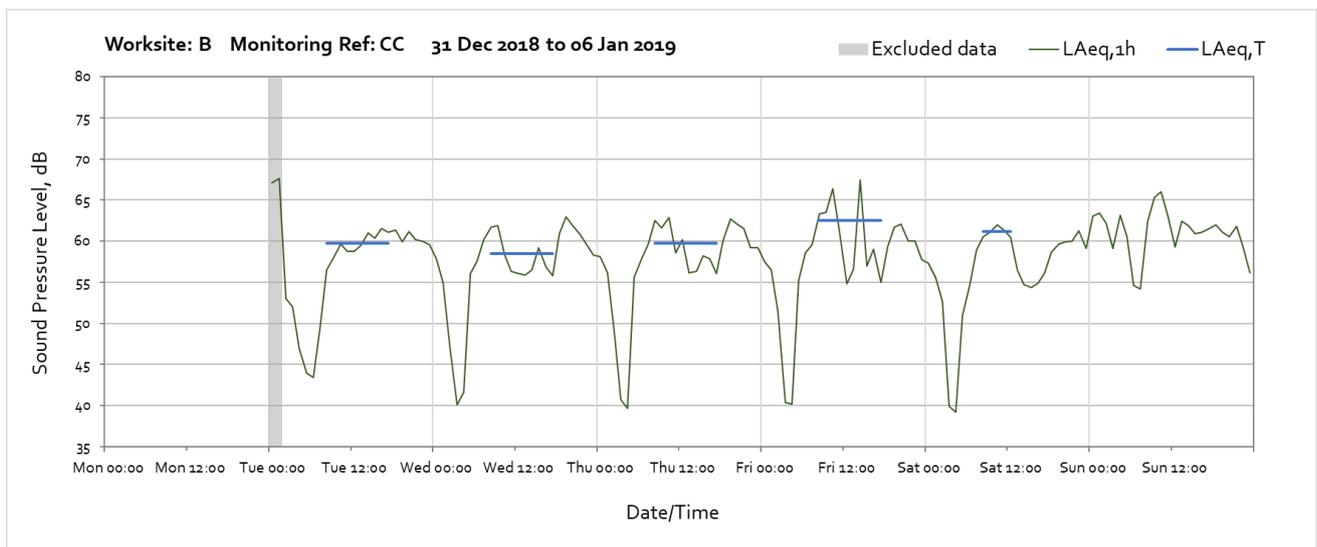


Appendix C Data

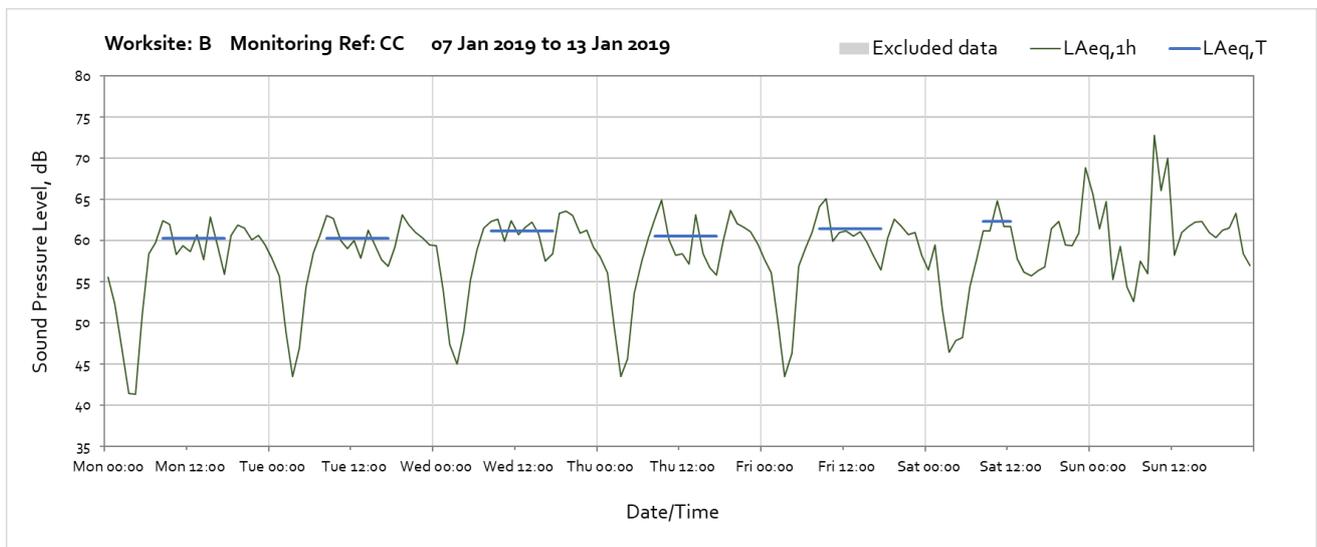
Noise

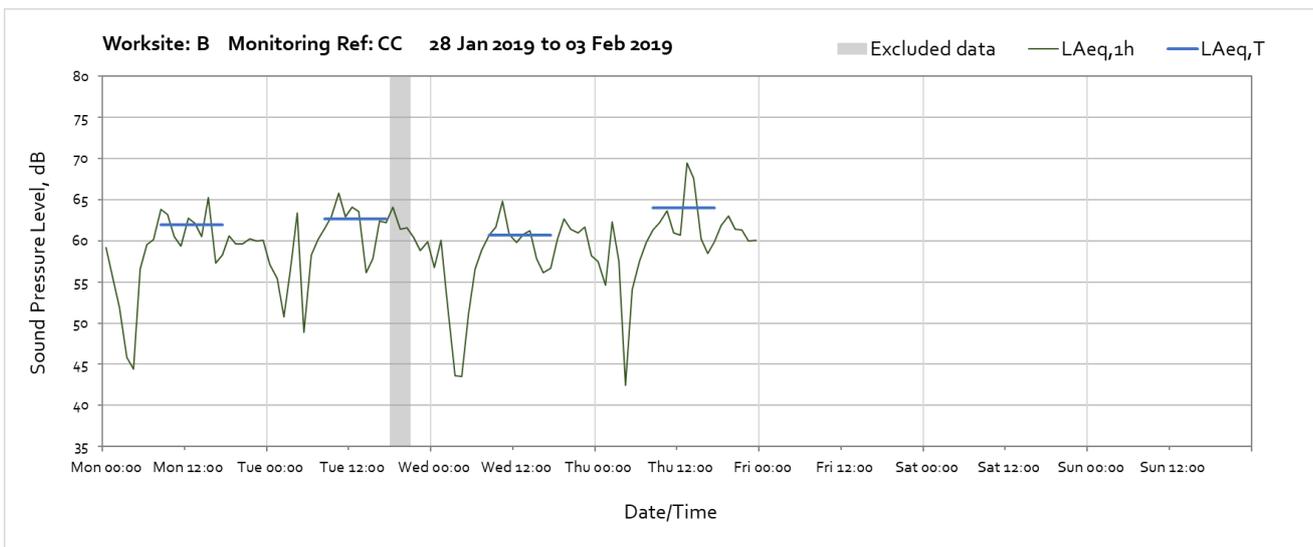
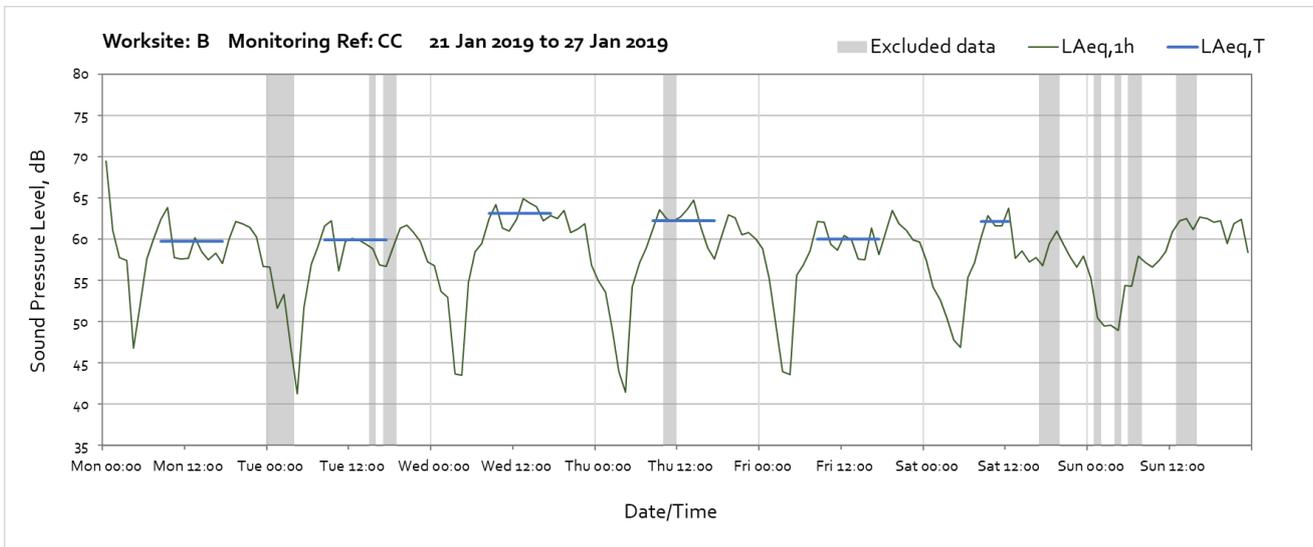
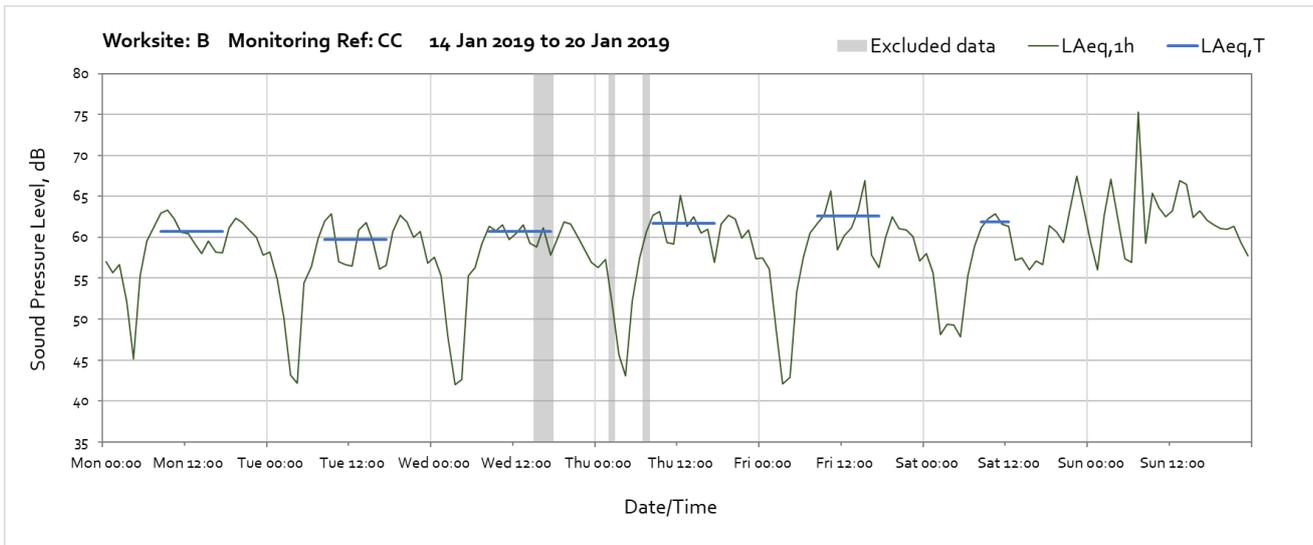
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have been excluded from the calculation of the $L_{Aeq,T}$ values. High noise levels measured at some locations on the early hours of January 1st were due to New Year's Eve celebrations and have been excluded to calculate values in Table 5.

Worksite: B – Monitoring Ref: CC

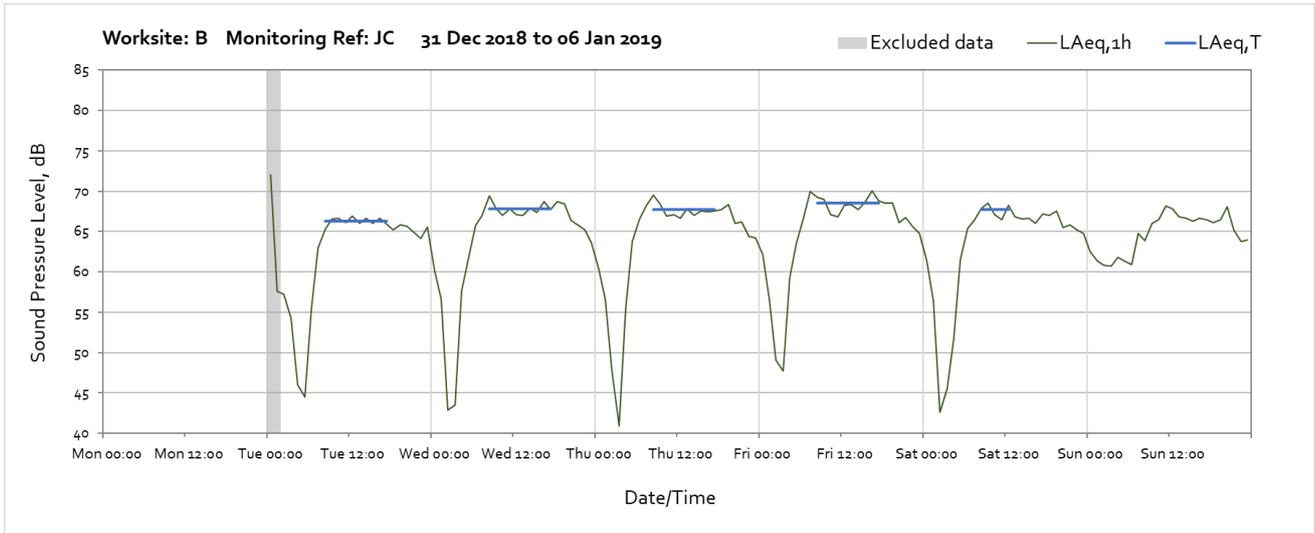


Note – High noise levels on the early hours of the 1st January were due to New Year's Eve celebrations and have been excluded to calculate values in Table 5.

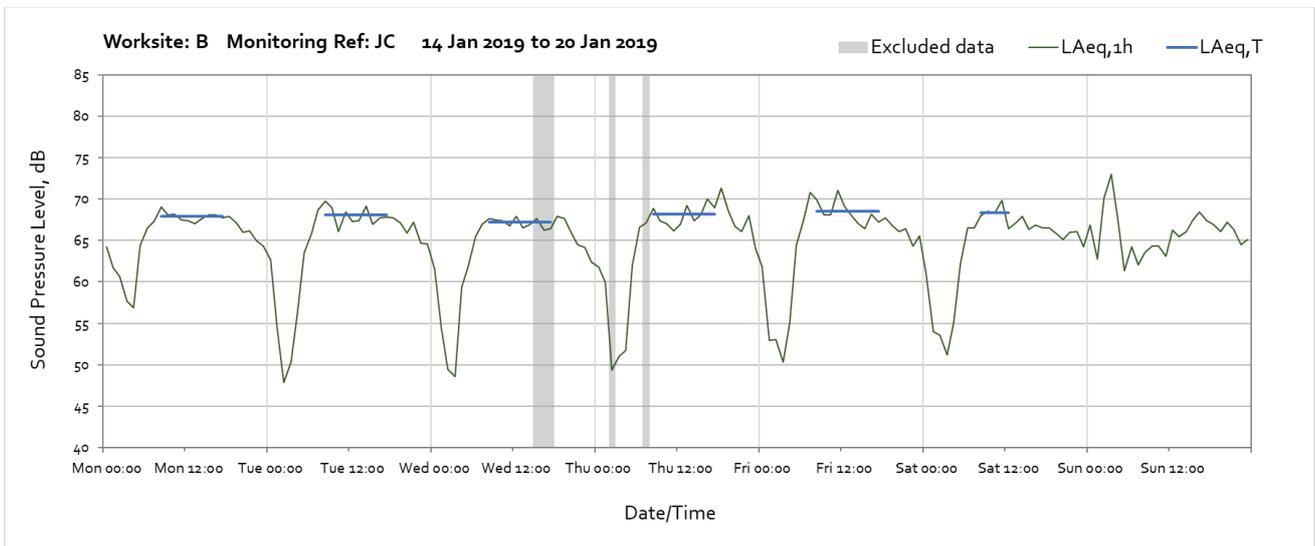
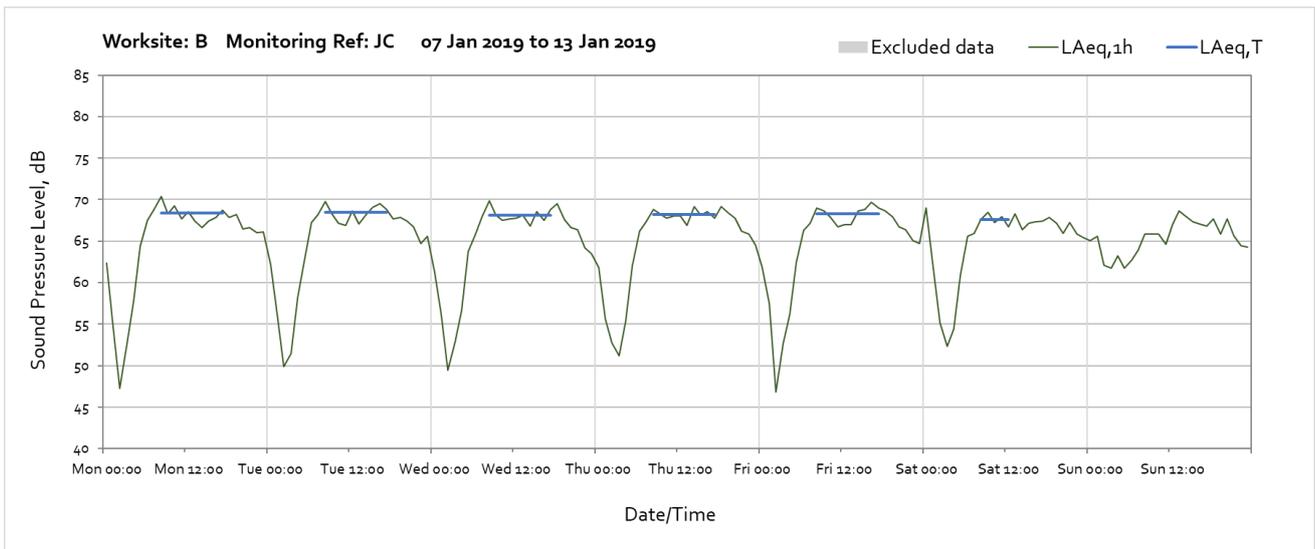


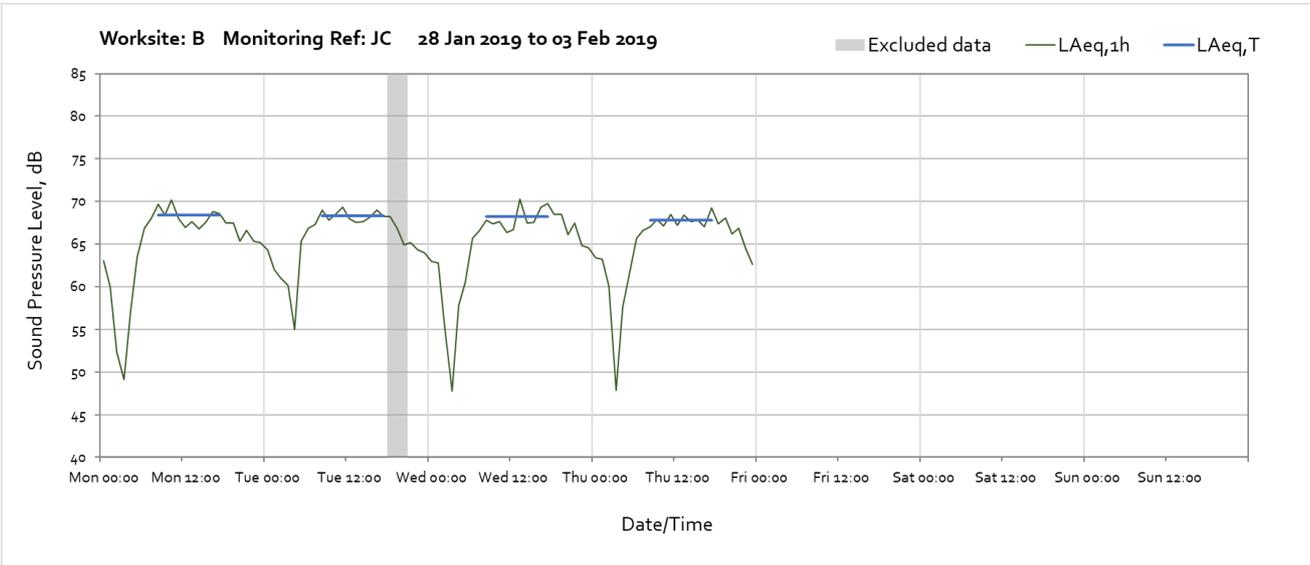
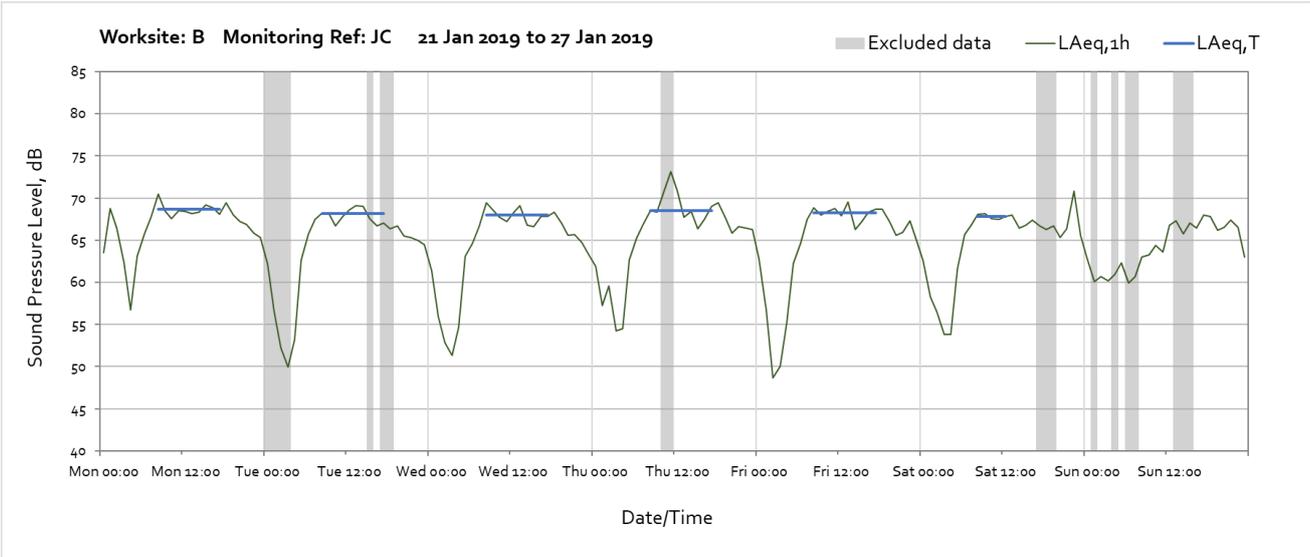


Worksite: B – Monitoring Ref: JC

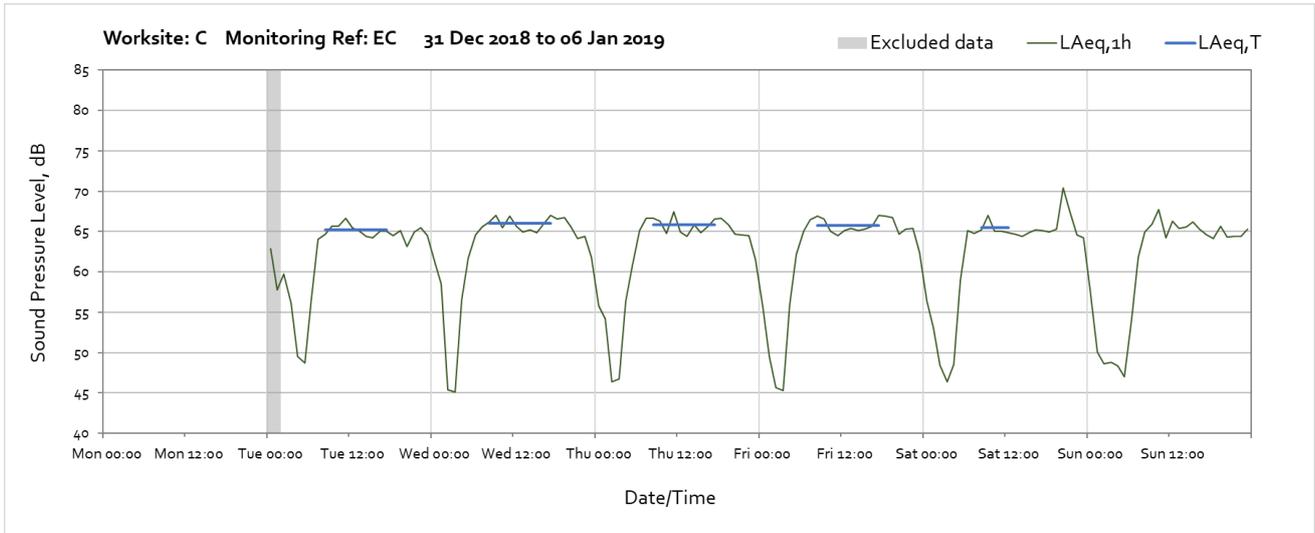


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

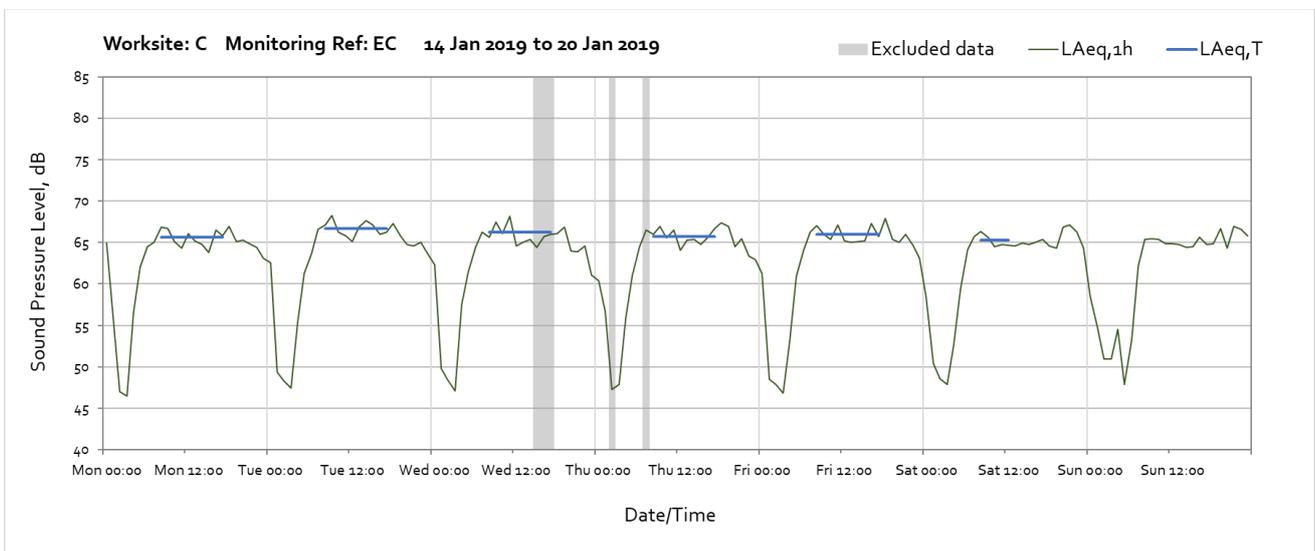
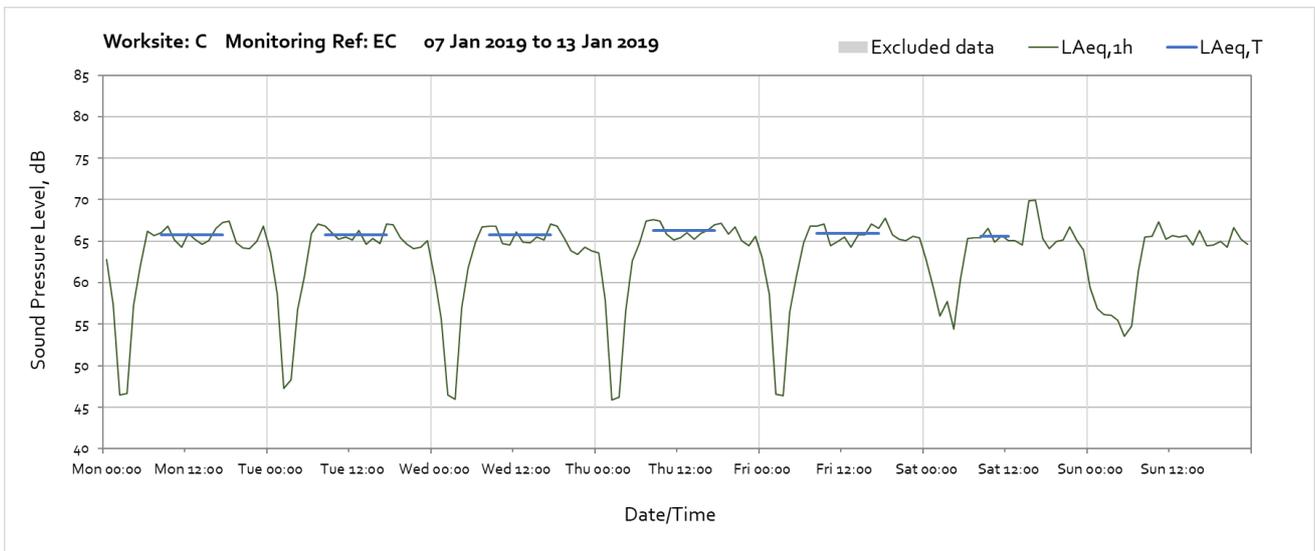


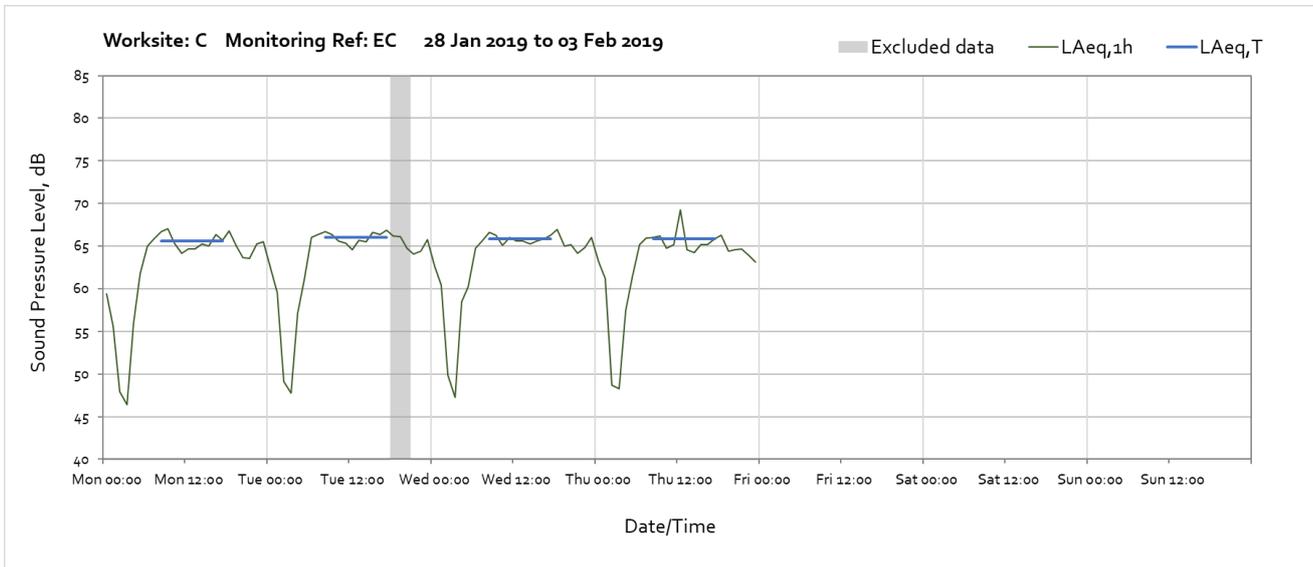
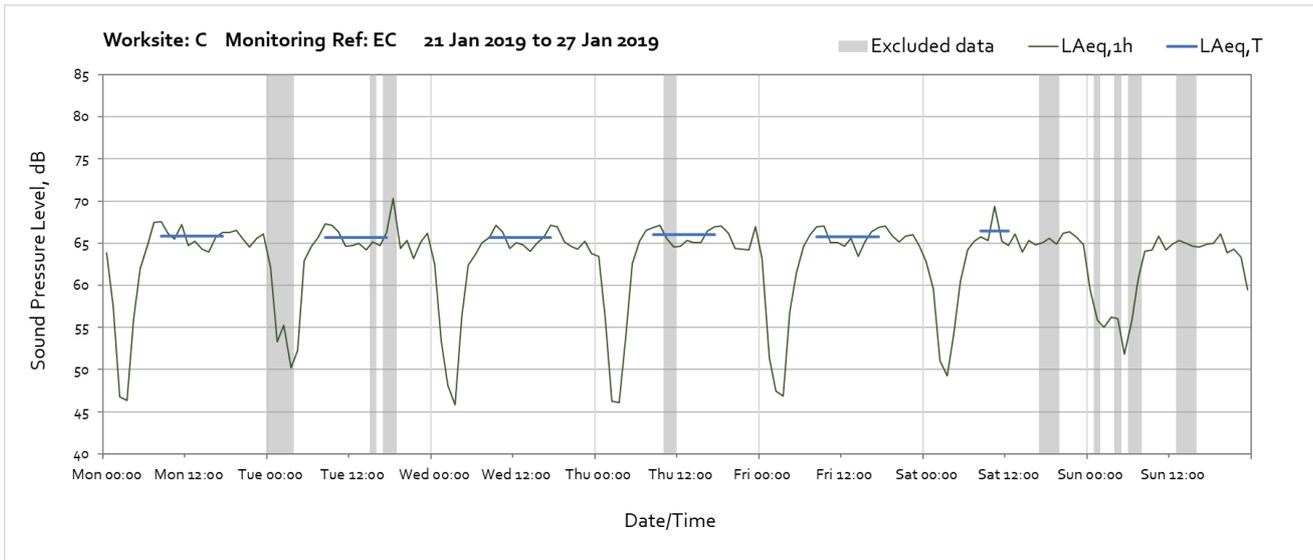


Worksite: C – Monitoring Ref: EC

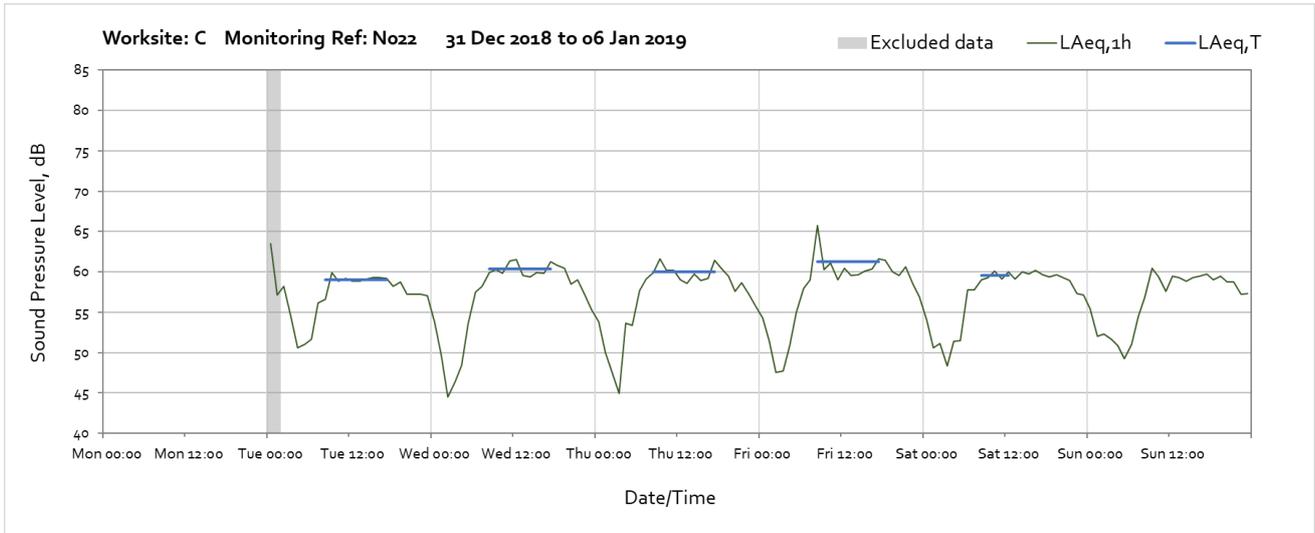


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

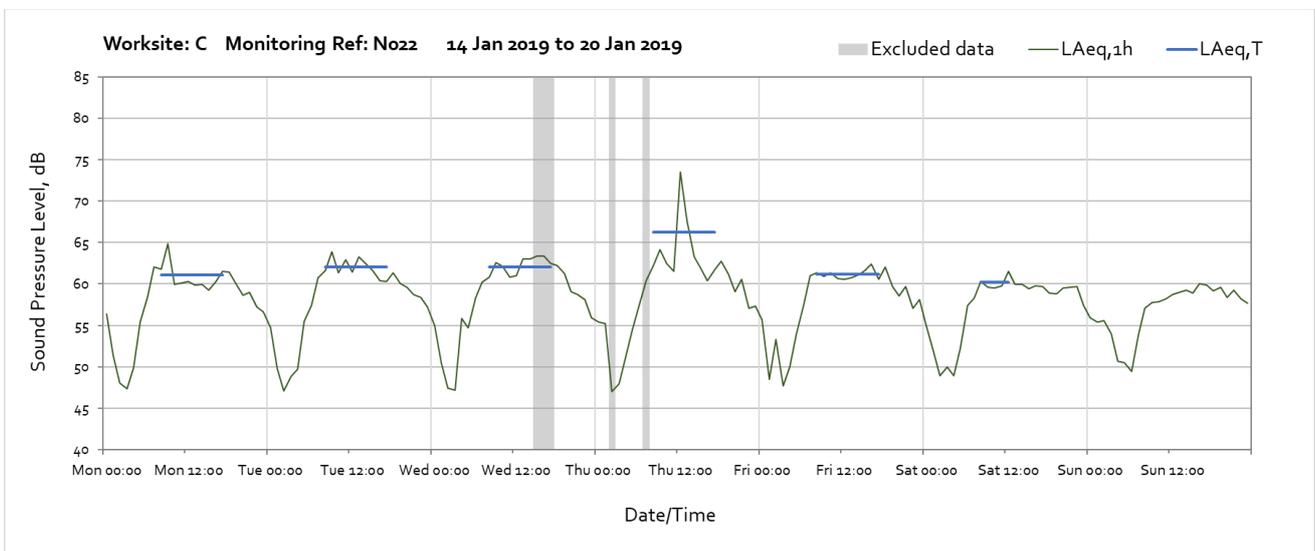
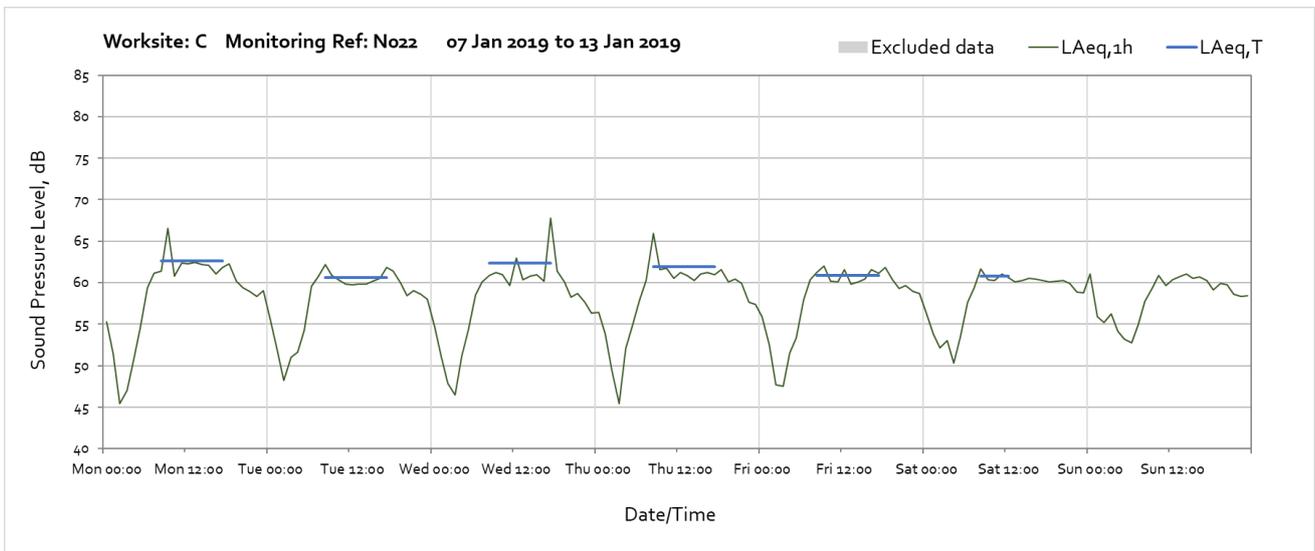


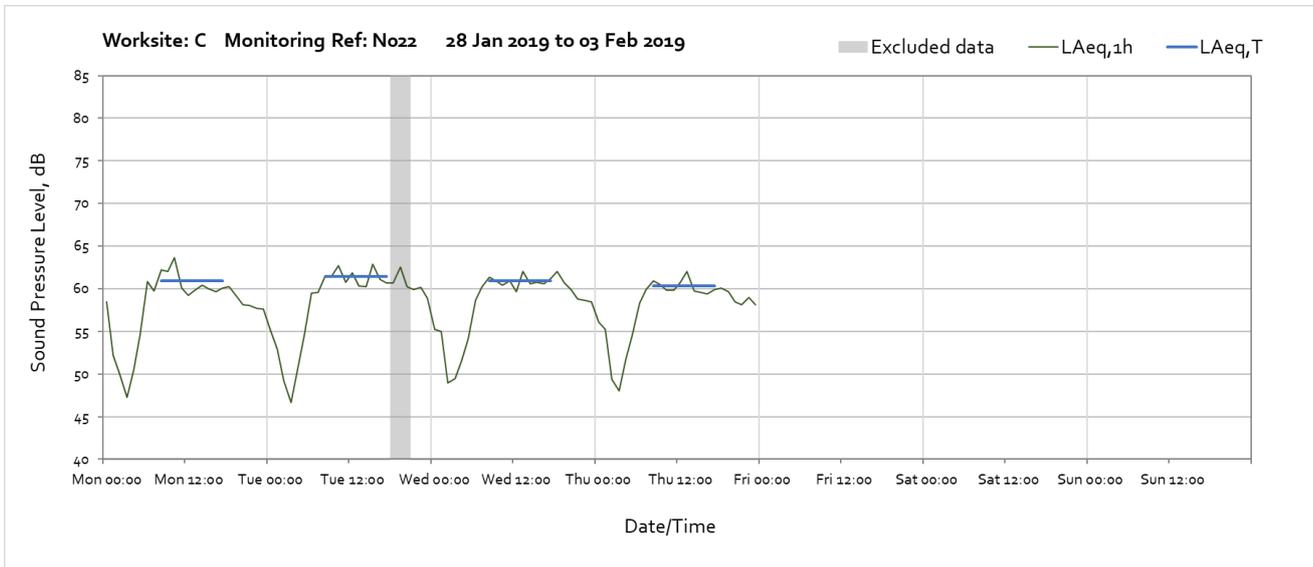
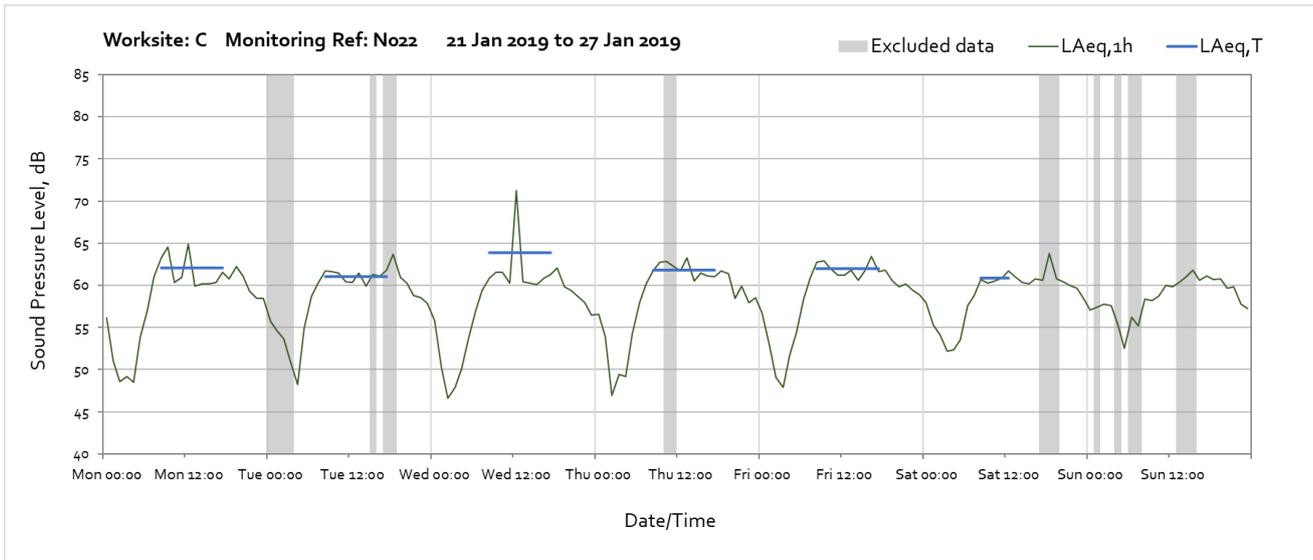


Worksite: C – Monitoring Ref: N022

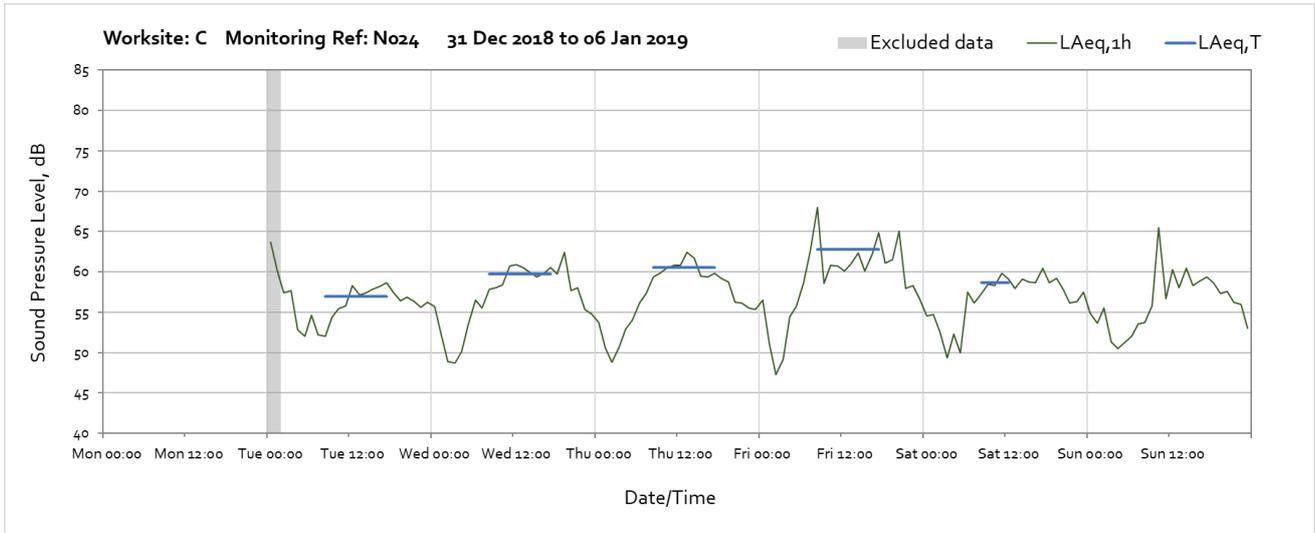


Note – High noise levels on the early hours of the 1st January were due to New Year's Eve celebrations and have been excluded to calculate values in Table 5.

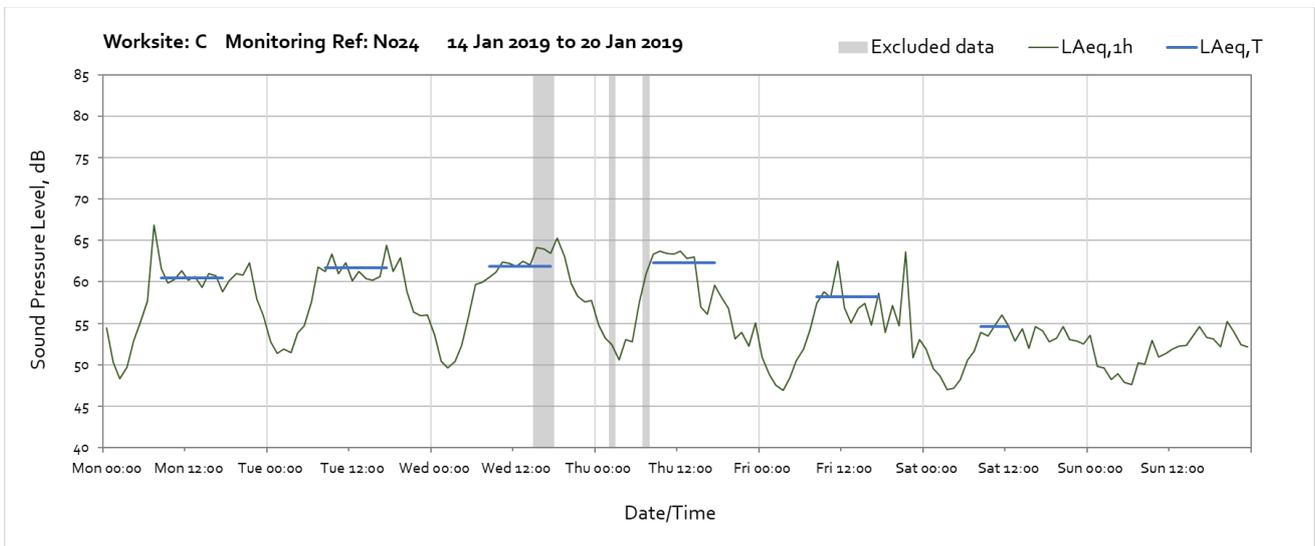
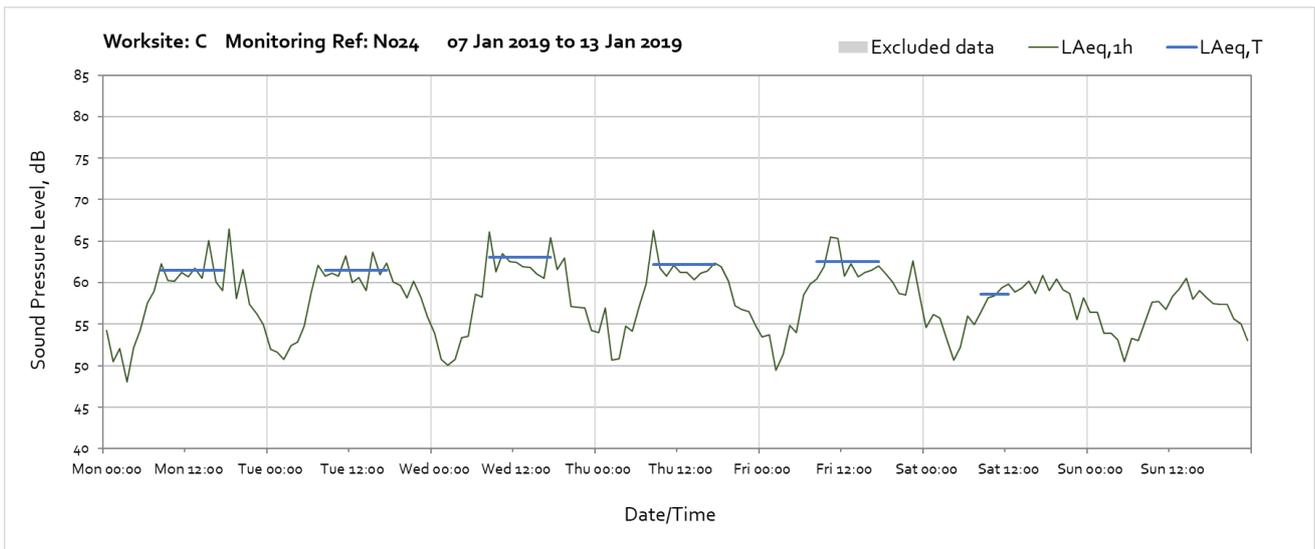


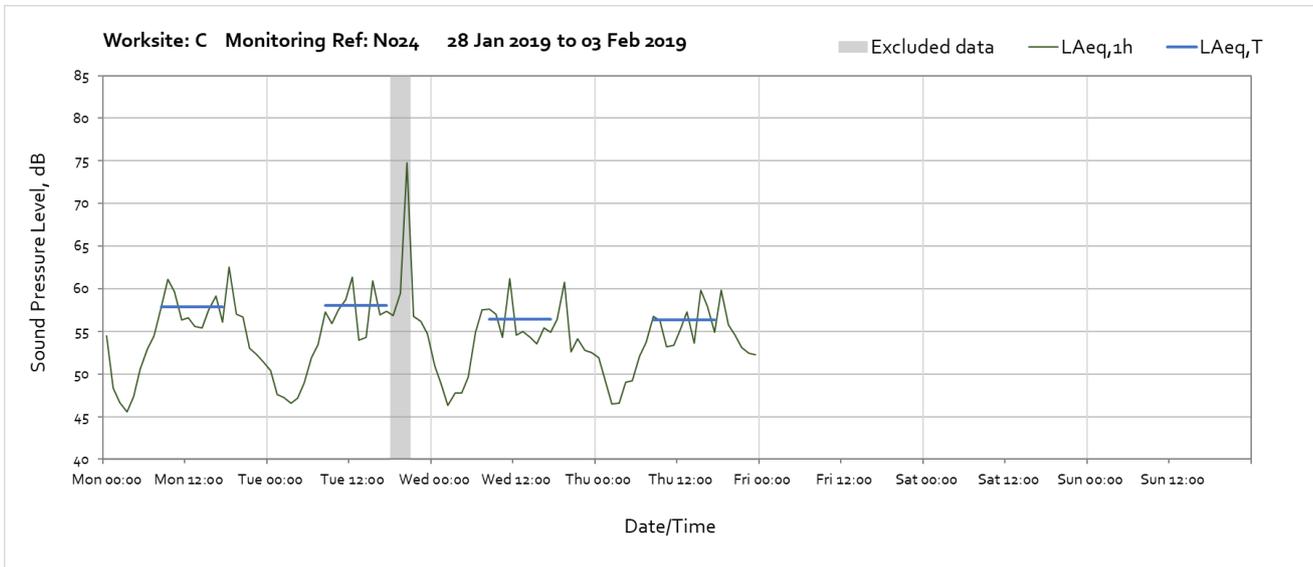
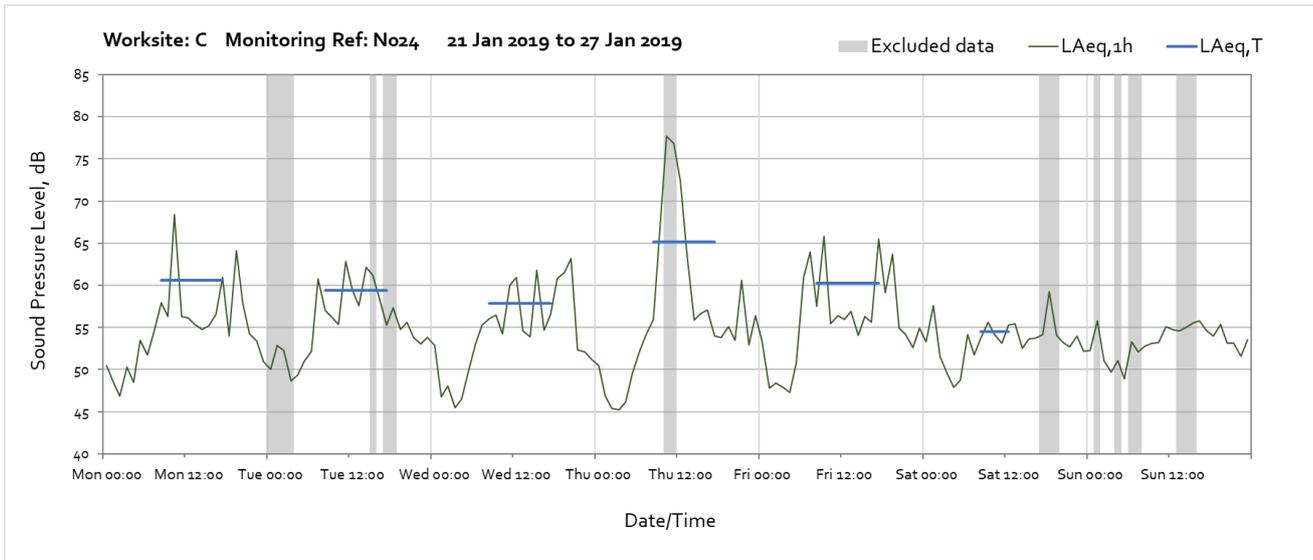


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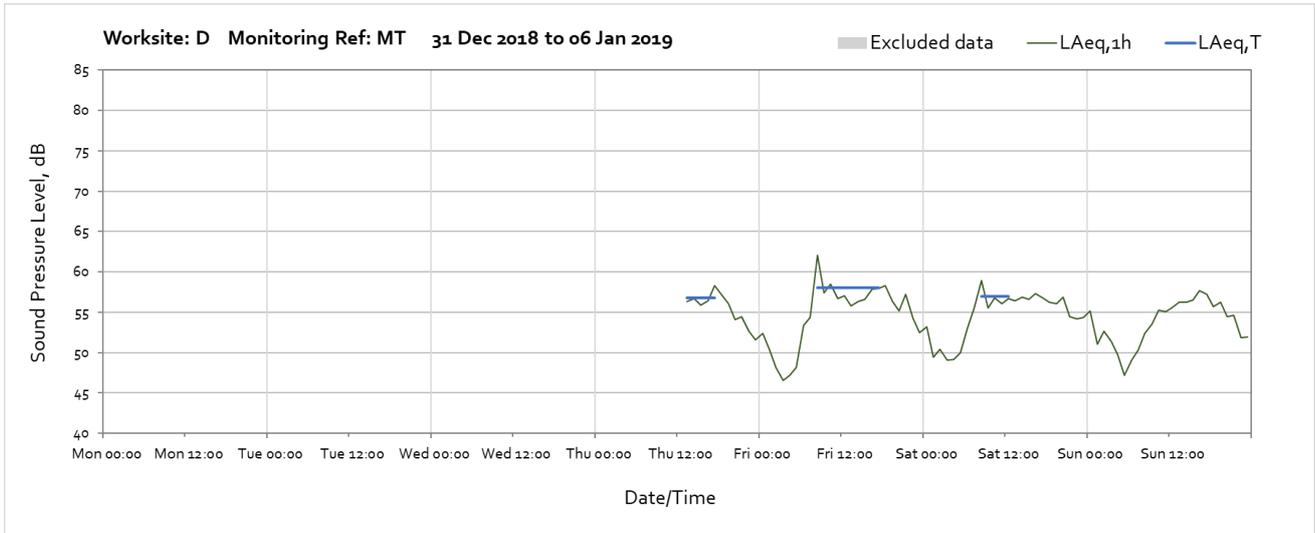


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

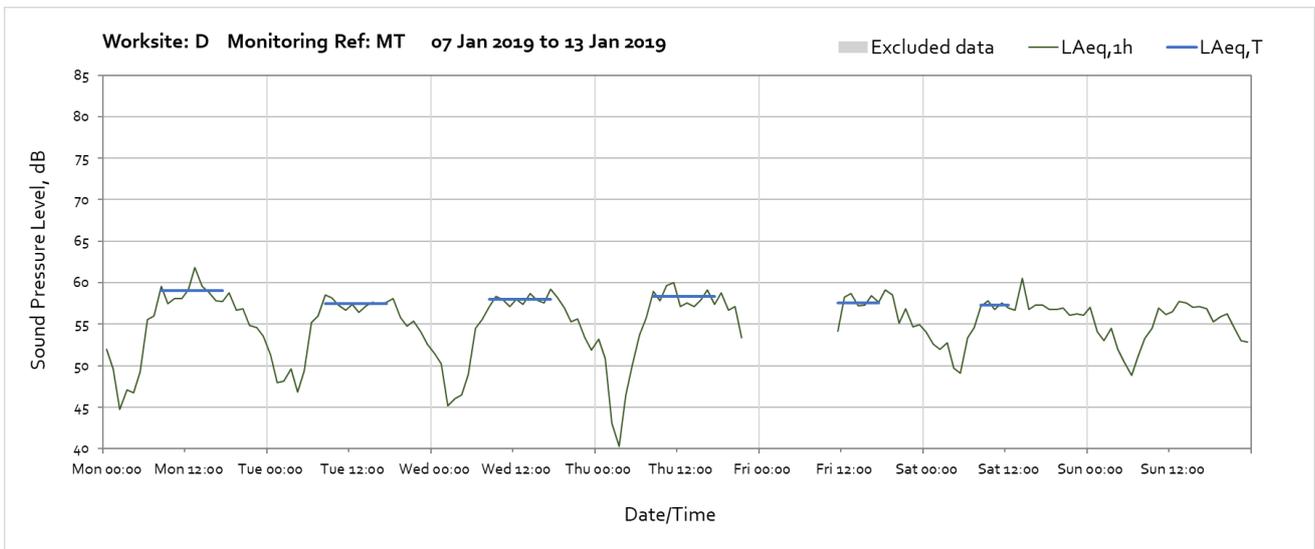




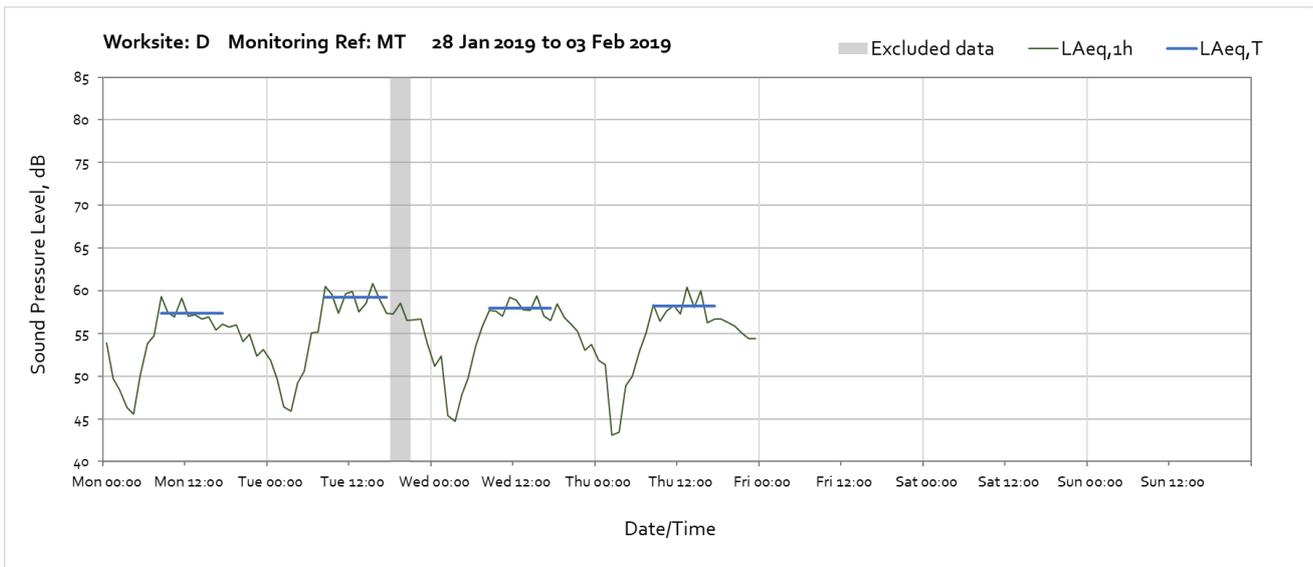
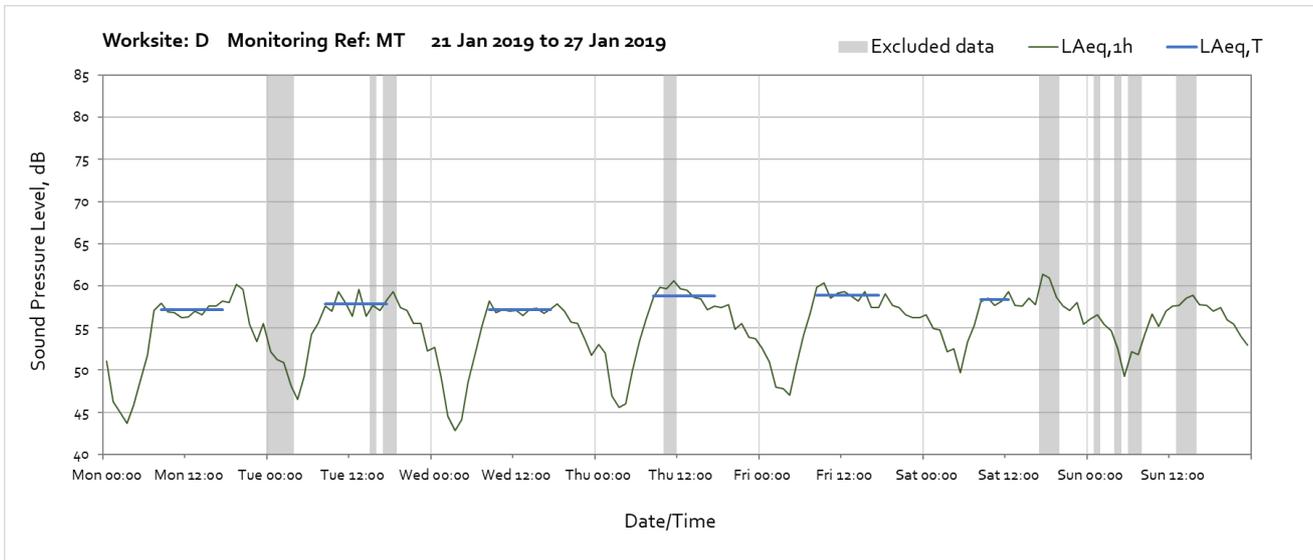
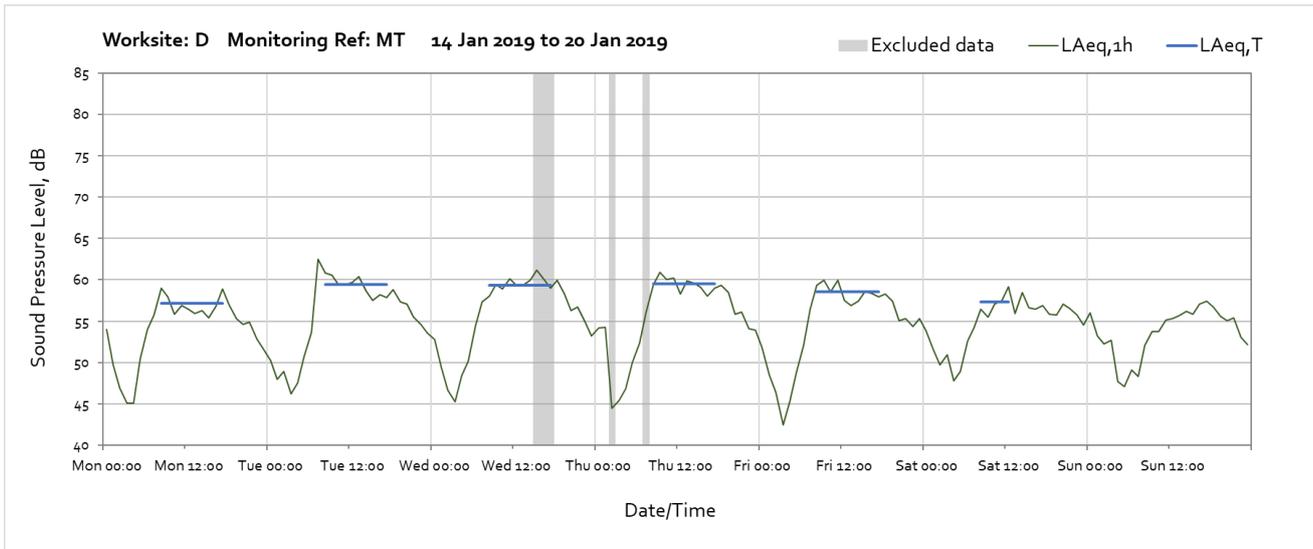
Worksite: D – Monitoring Ref: MT



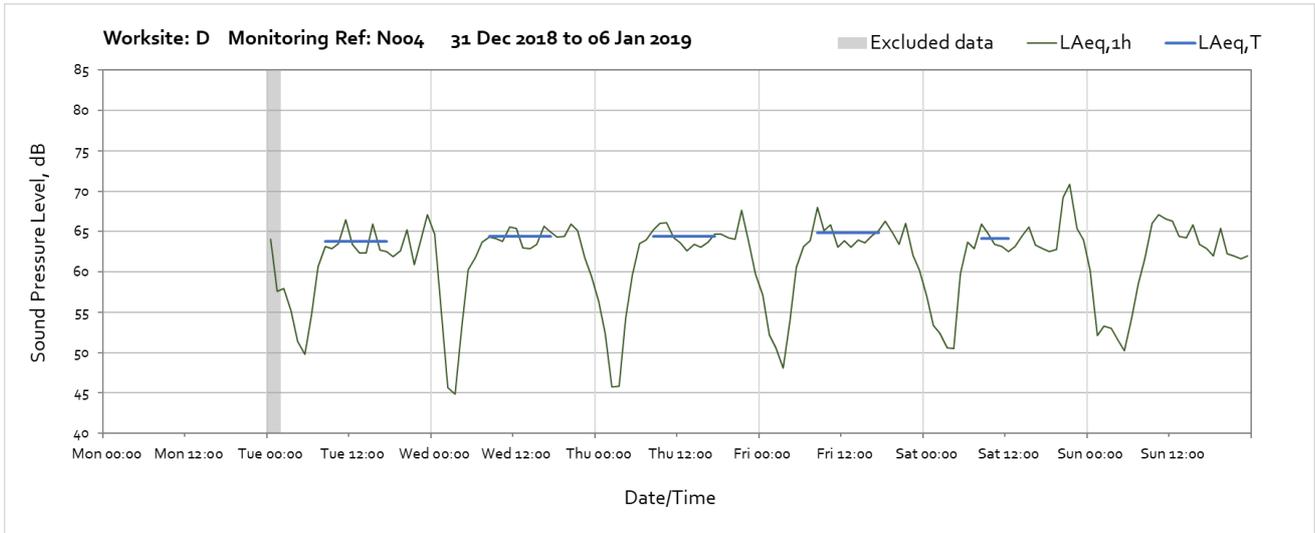
Note – Missing data between 00:00 on Tuesday 1st and 13:00 on Thursday 3rd due to a loss of power at the noise monitor.



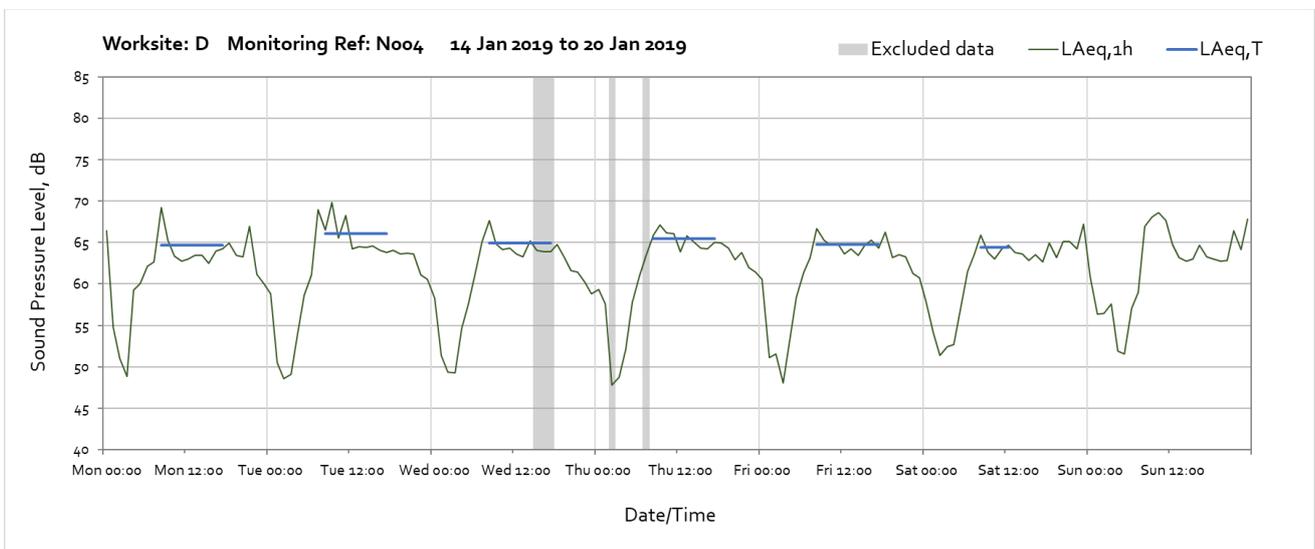
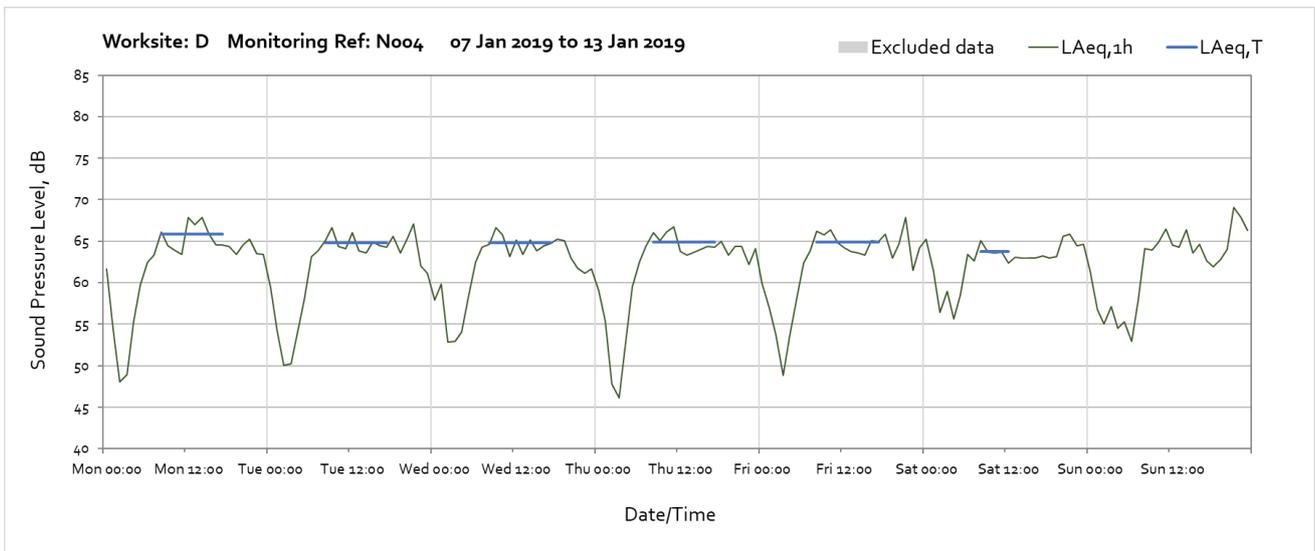
Note – Missing data between 22:00 on Thursday 10th and 11:00 on Friday 11th January due to a loss of power at the noise monitor.

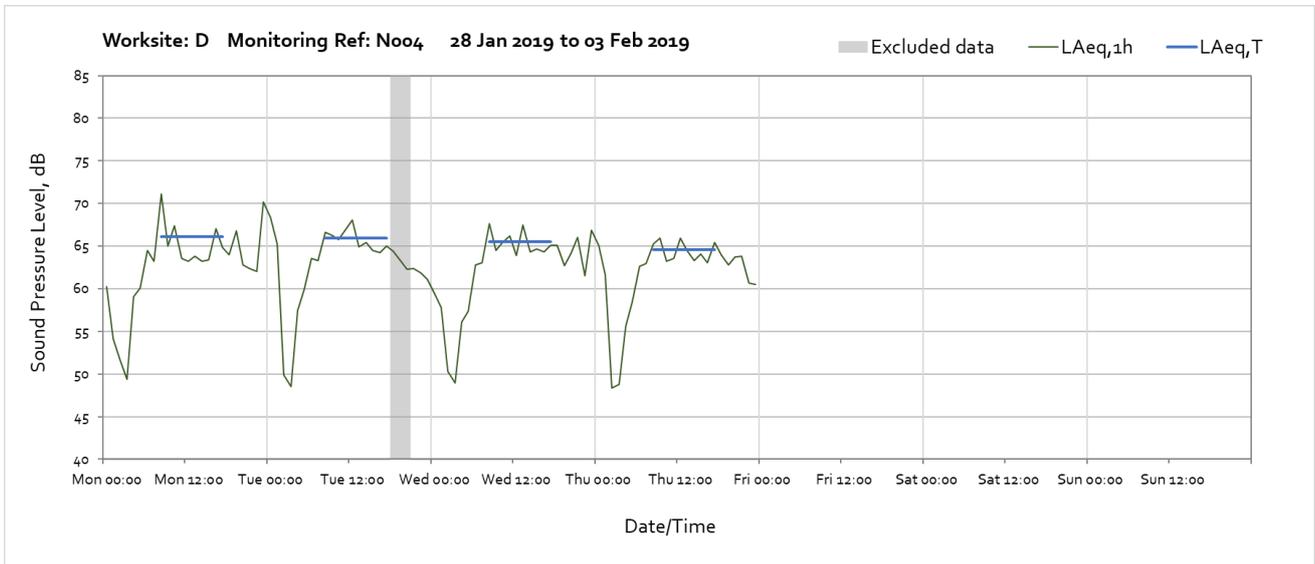
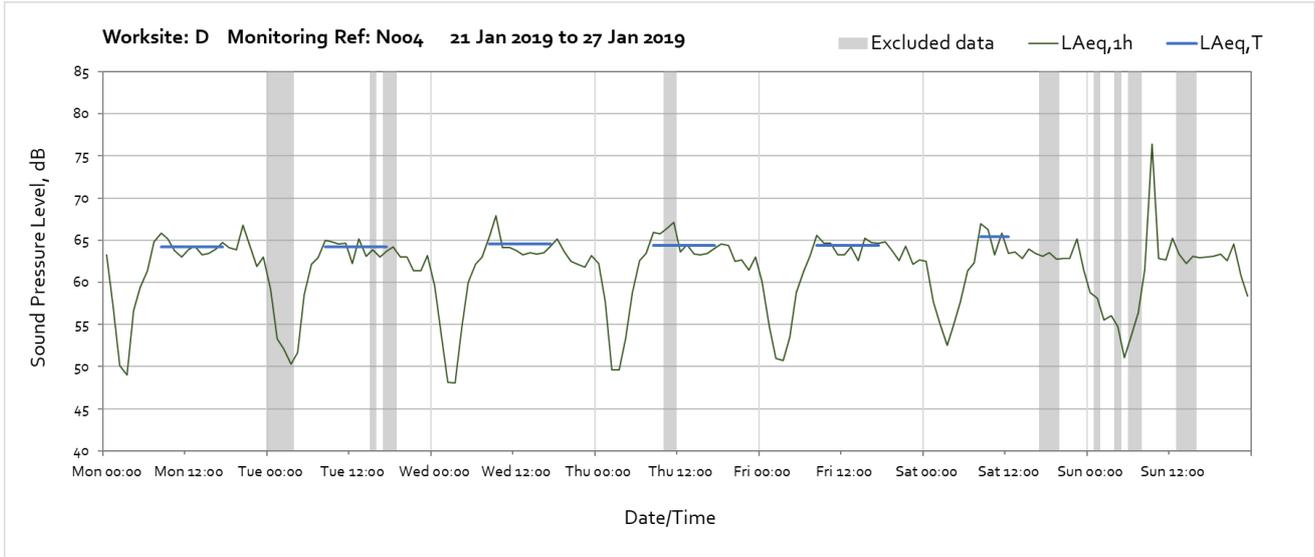


Worksite: D – Monitoring Ref: N004

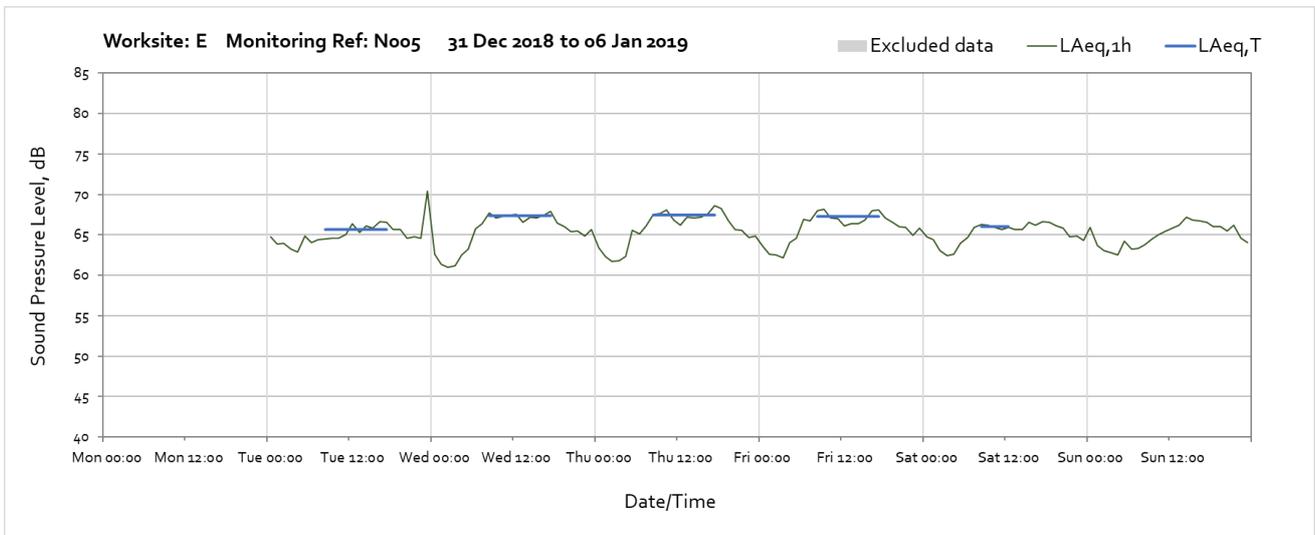


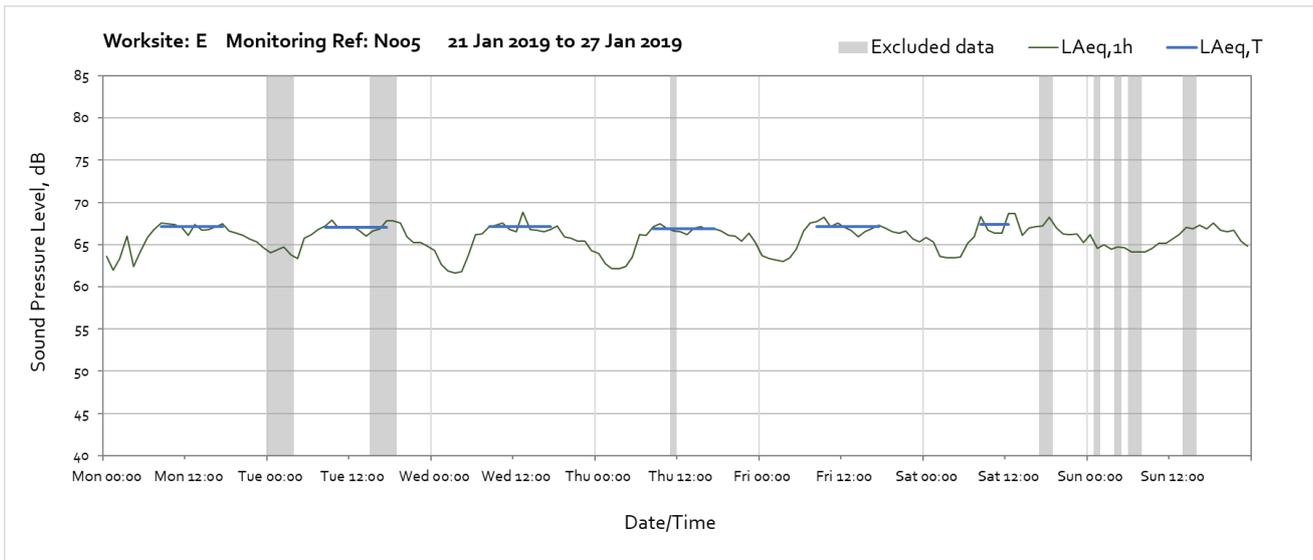
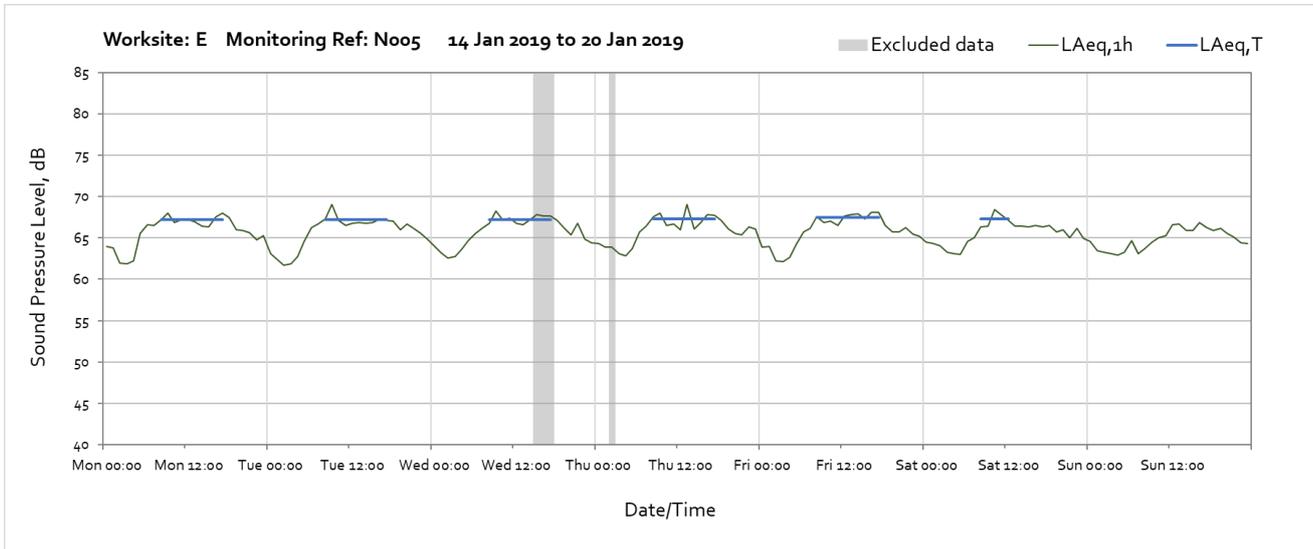
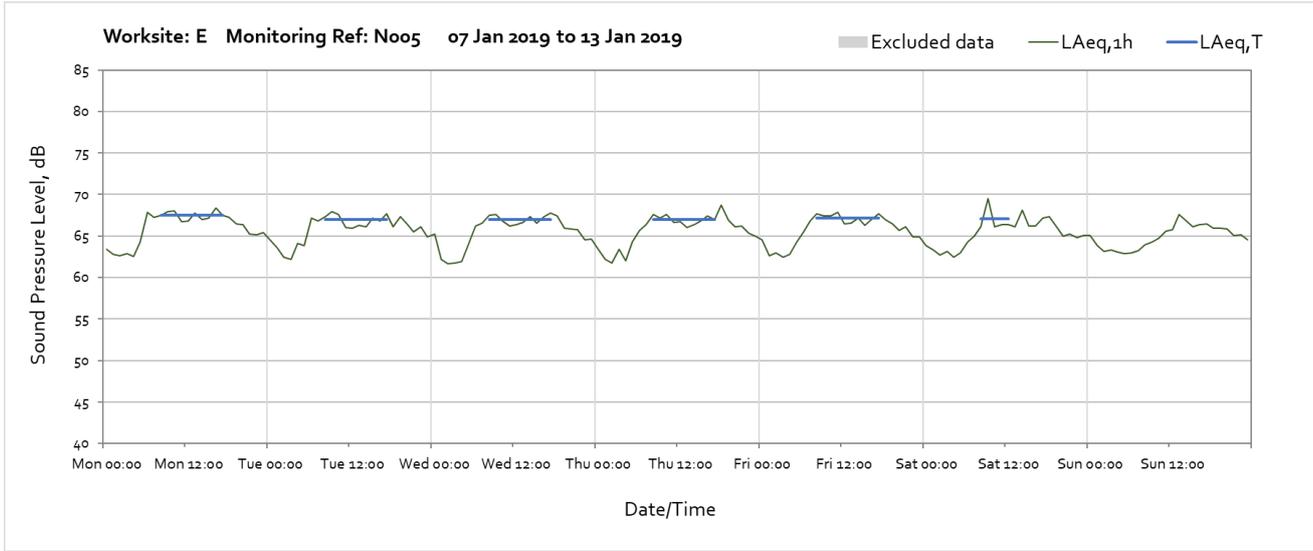
Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

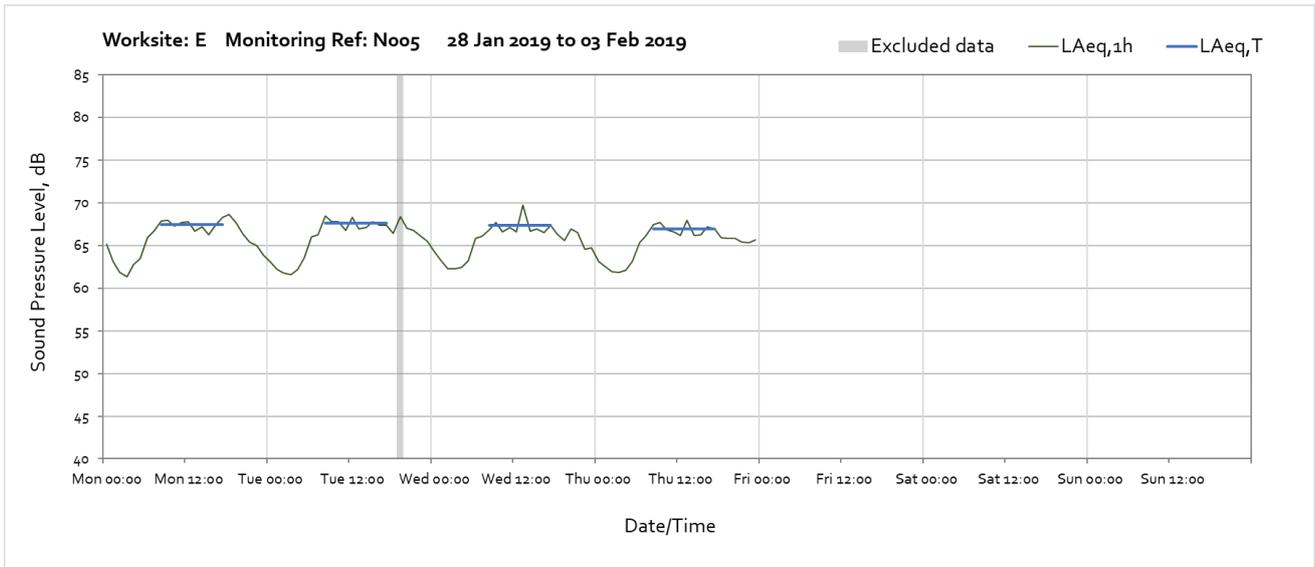




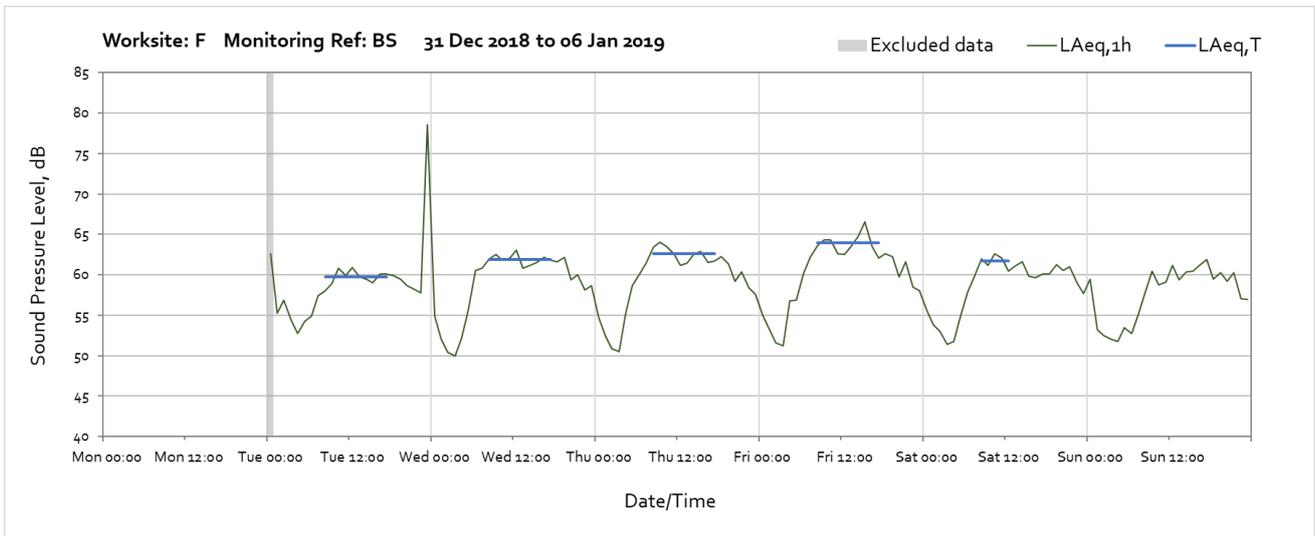
Worksite: E – Monitoring Ref: N005



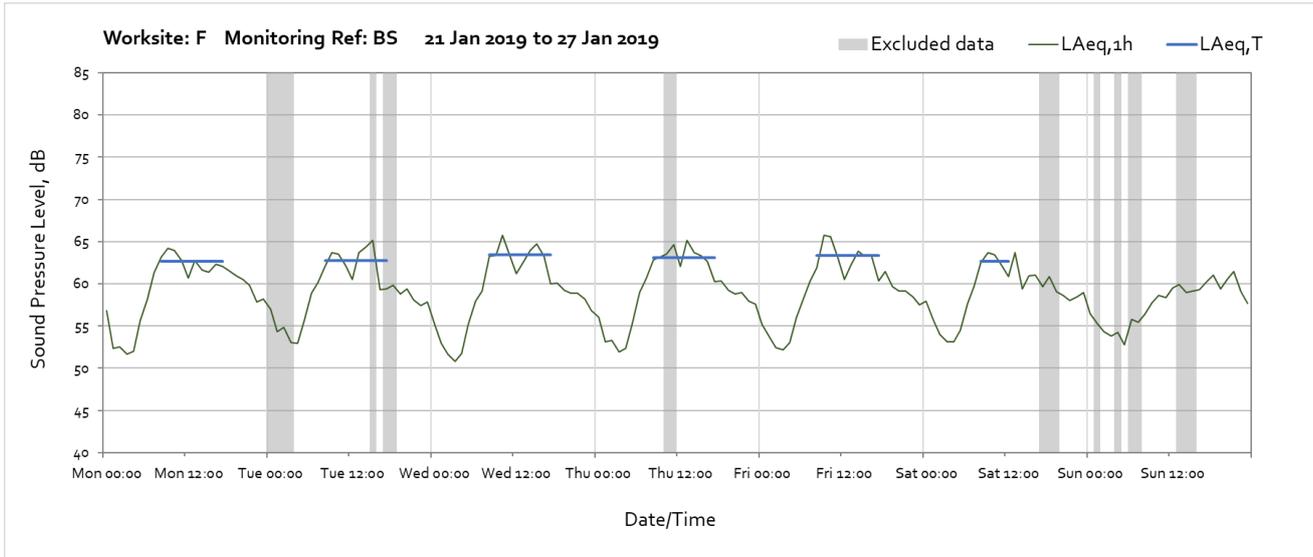
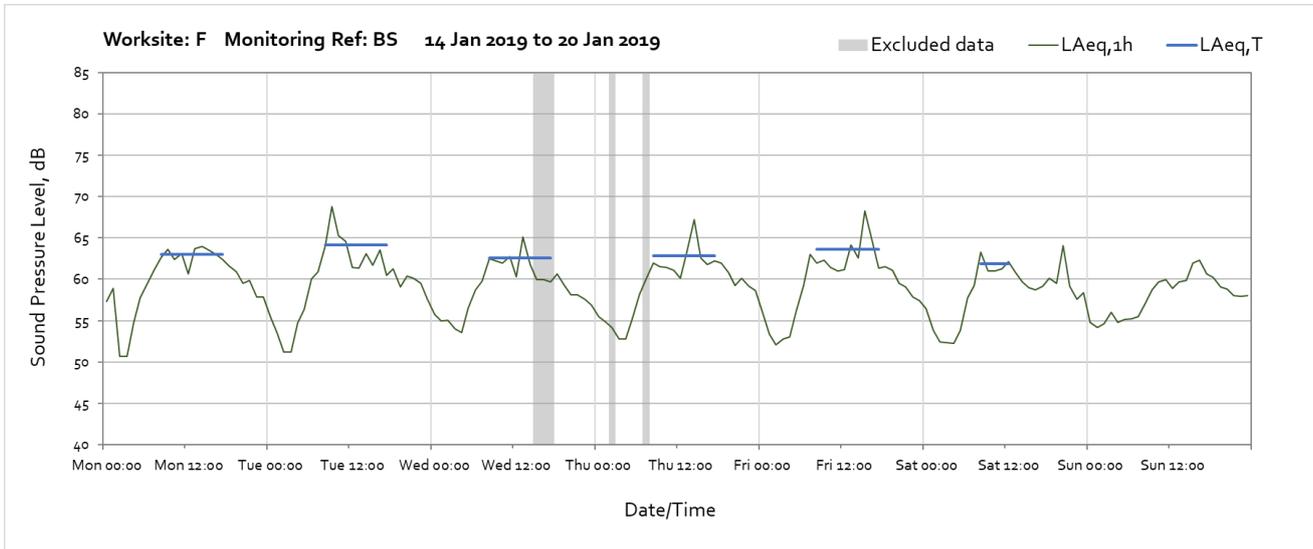
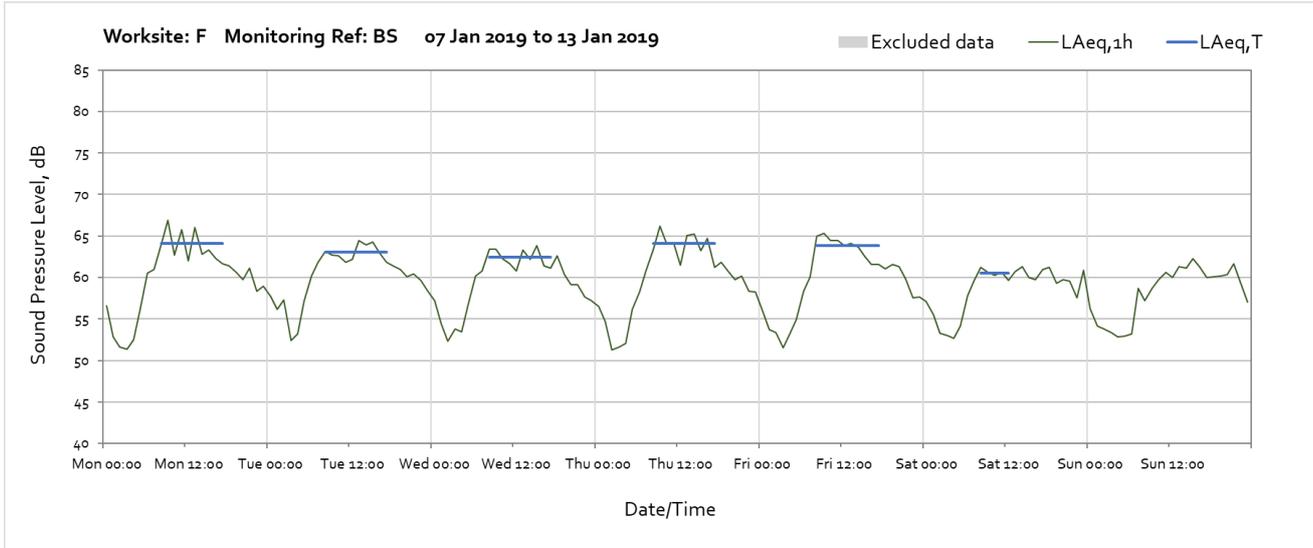


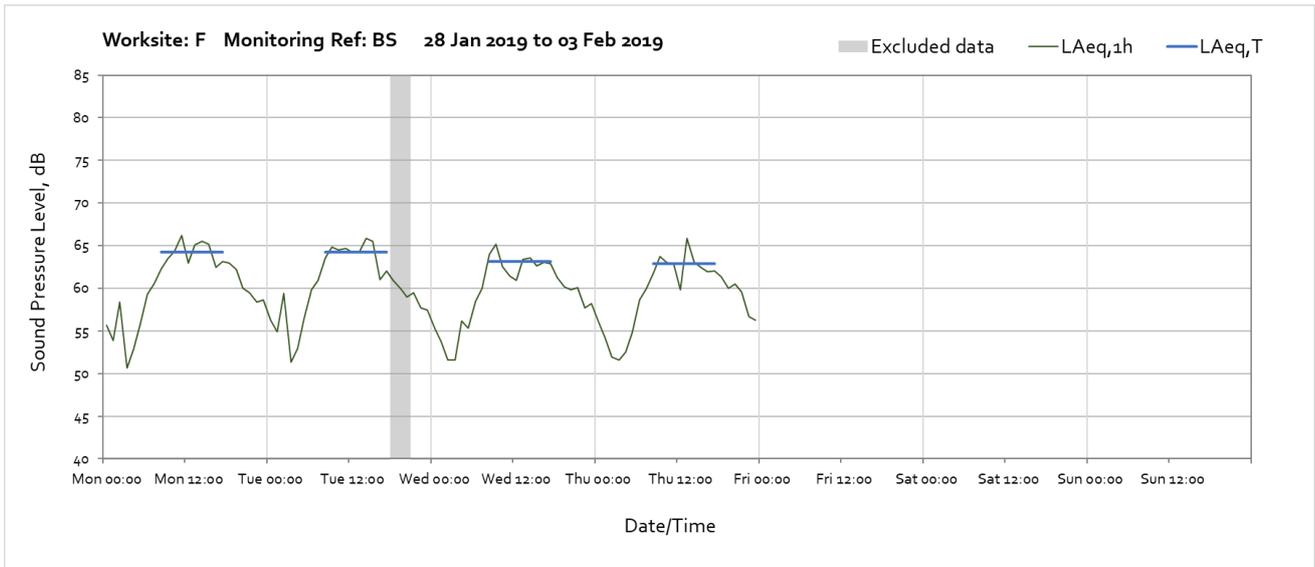


Worksite: F – Monitoring Ref: BS

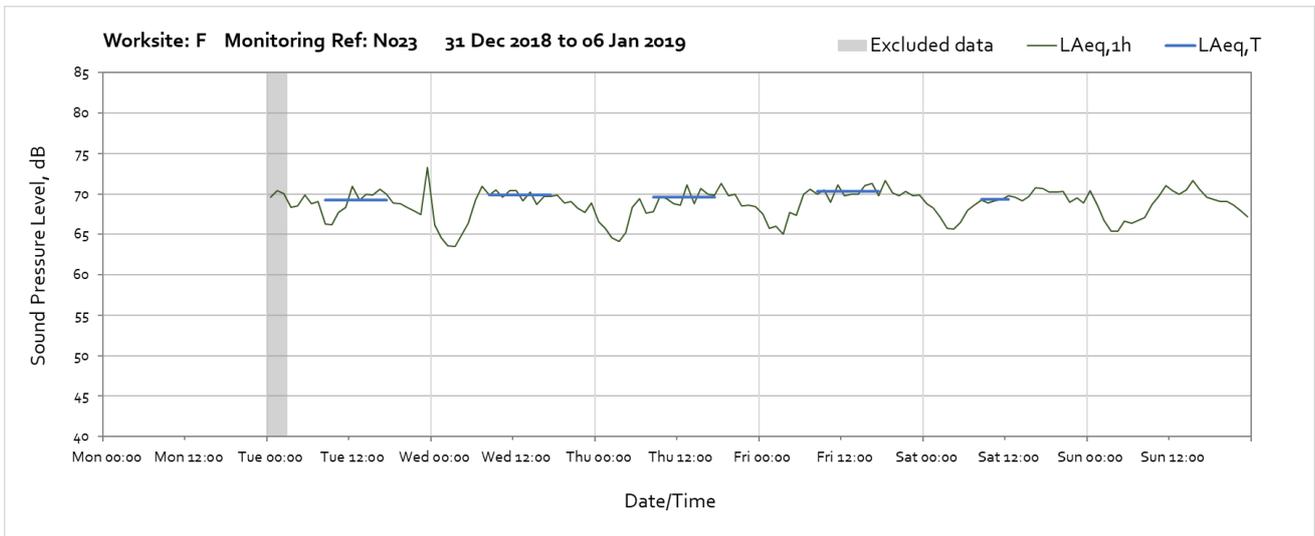


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

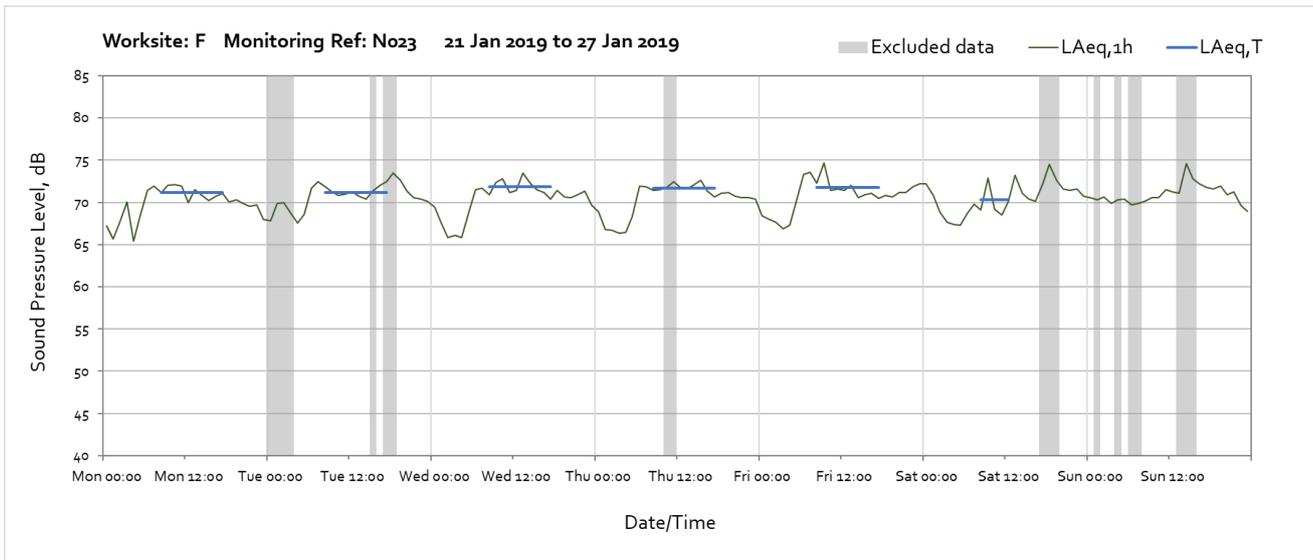
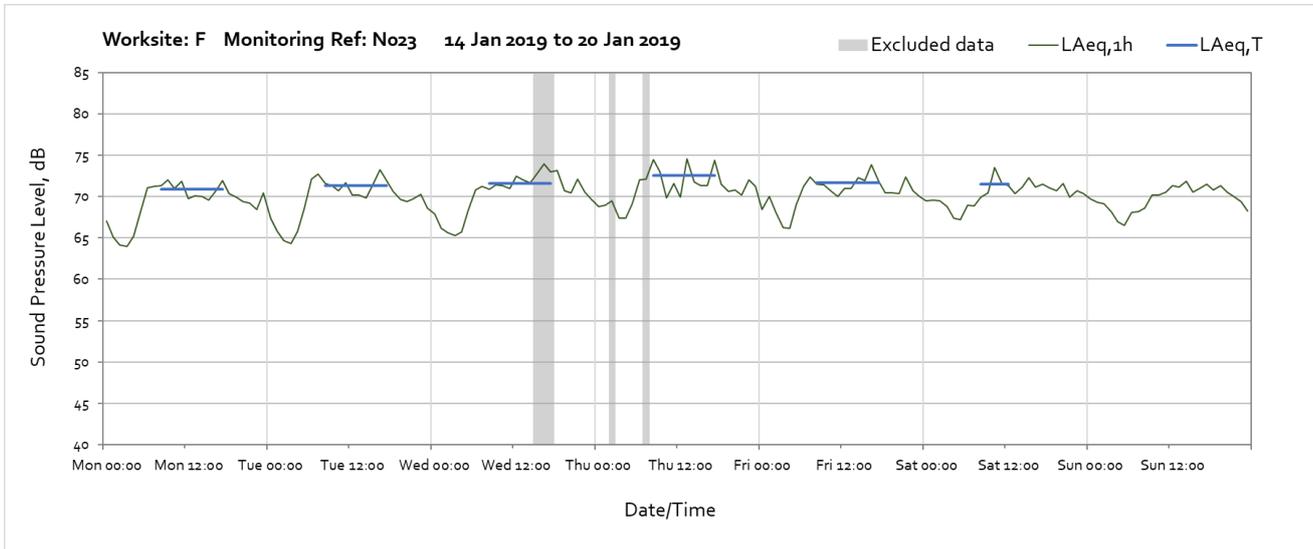
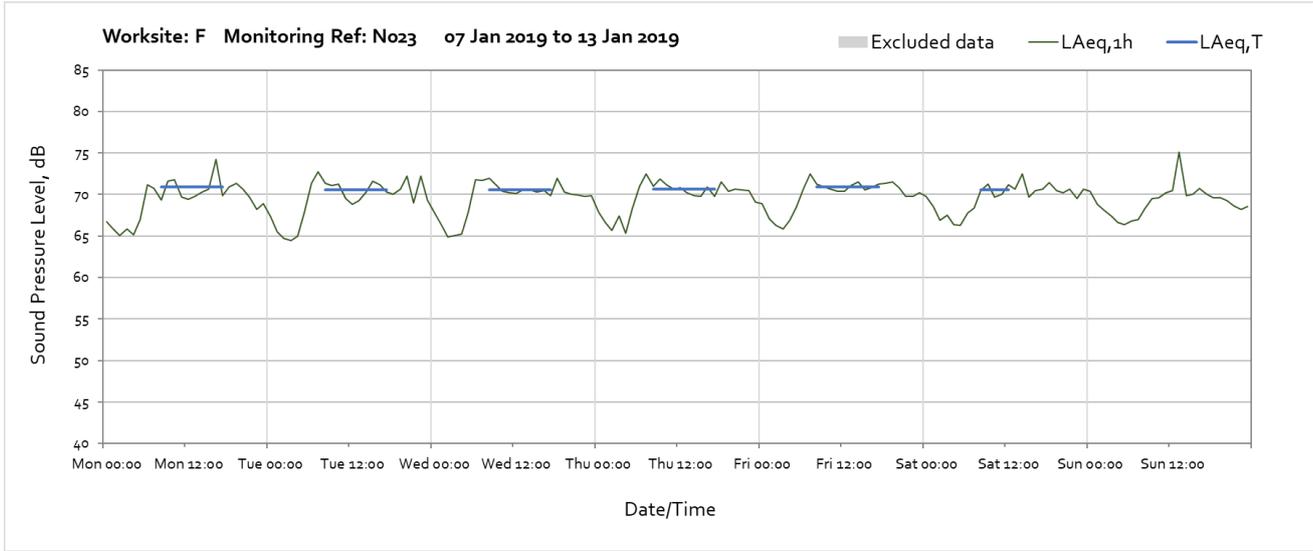


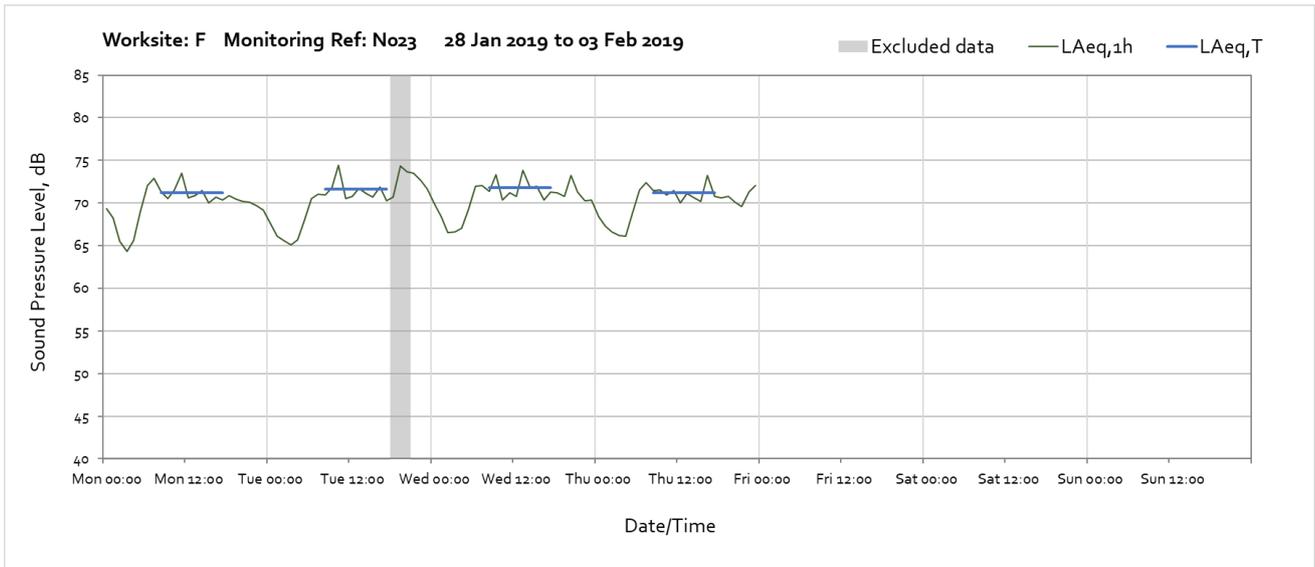


Worksite: F – Monitoring Ref: N023

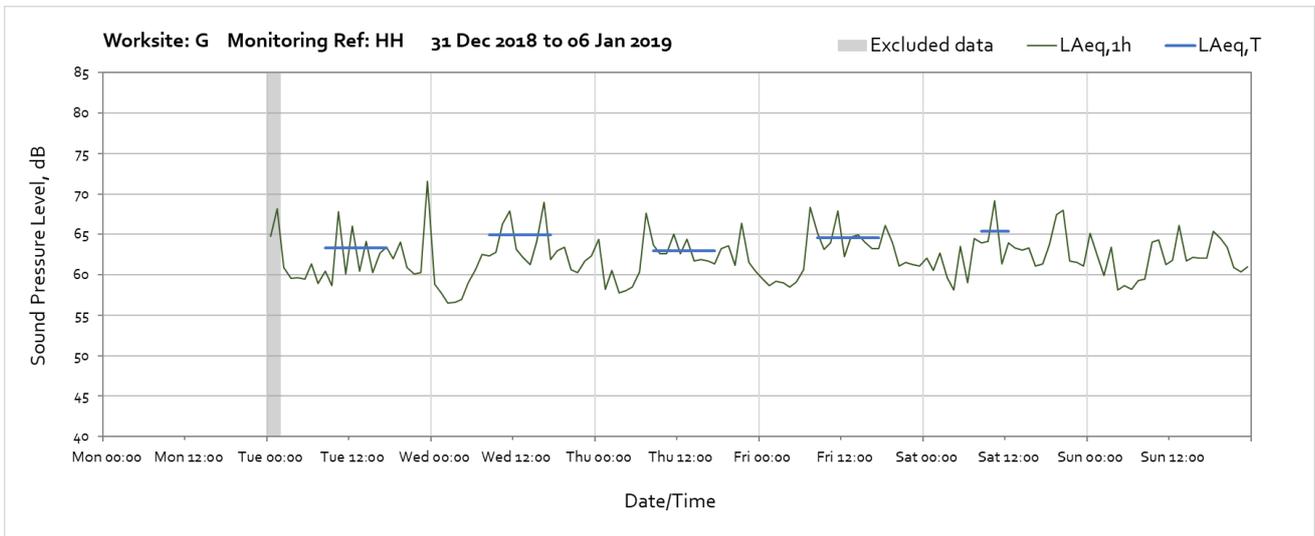


Note – High noise levels on the early hours of the 1st January were due to New Year's Eve celebrations and have been excluded to calculate values in Table 5.

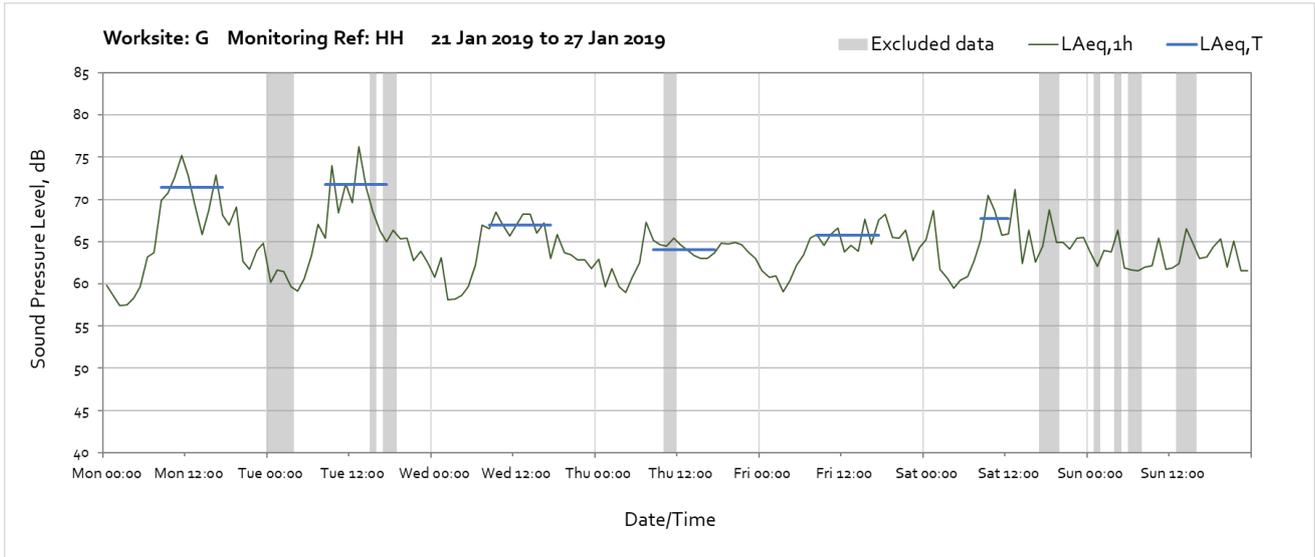
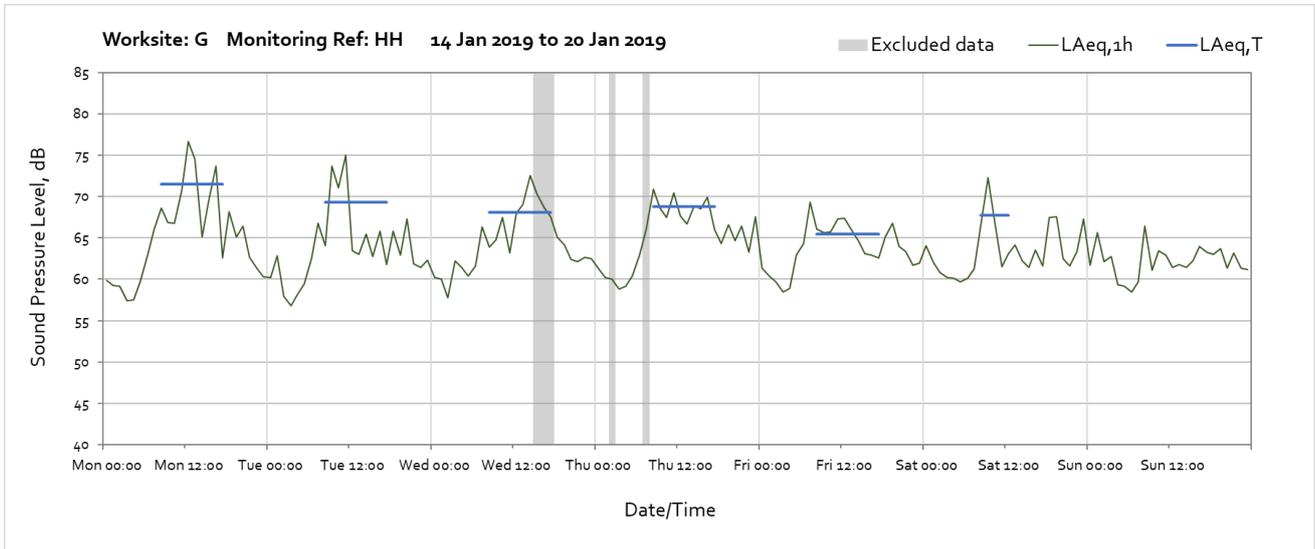
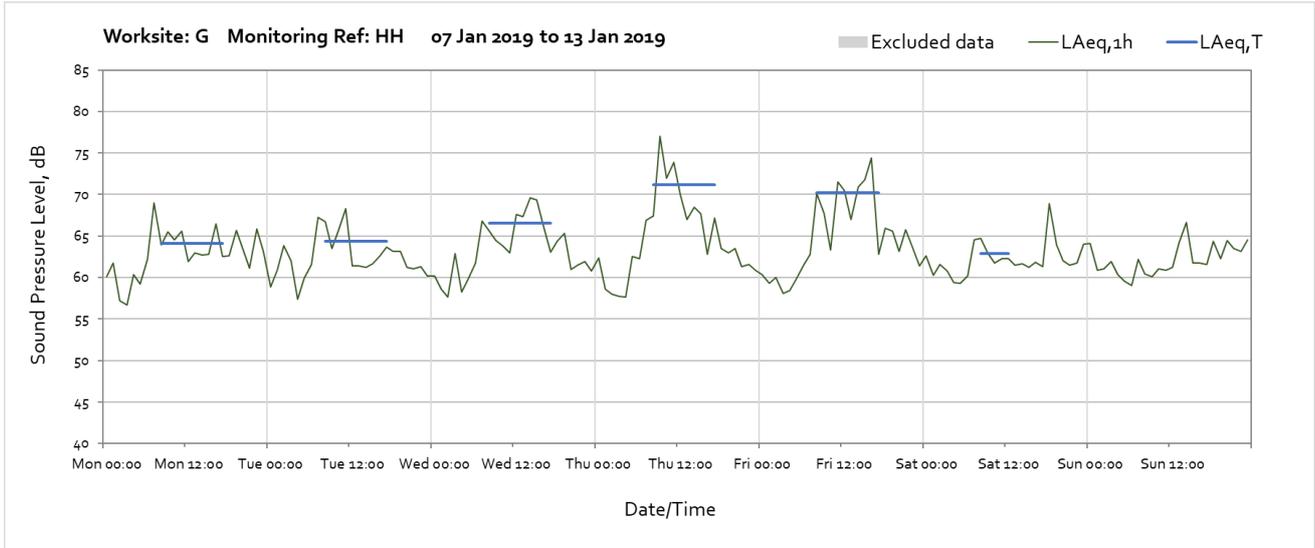


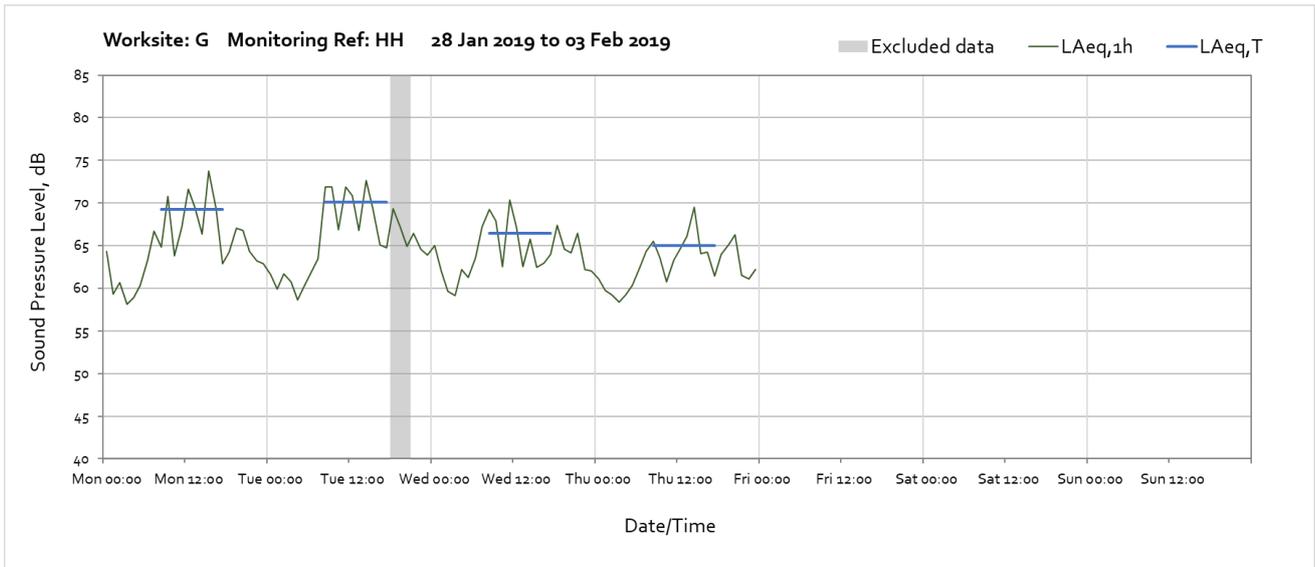


Worksite: G – Monitoring Ref: HH

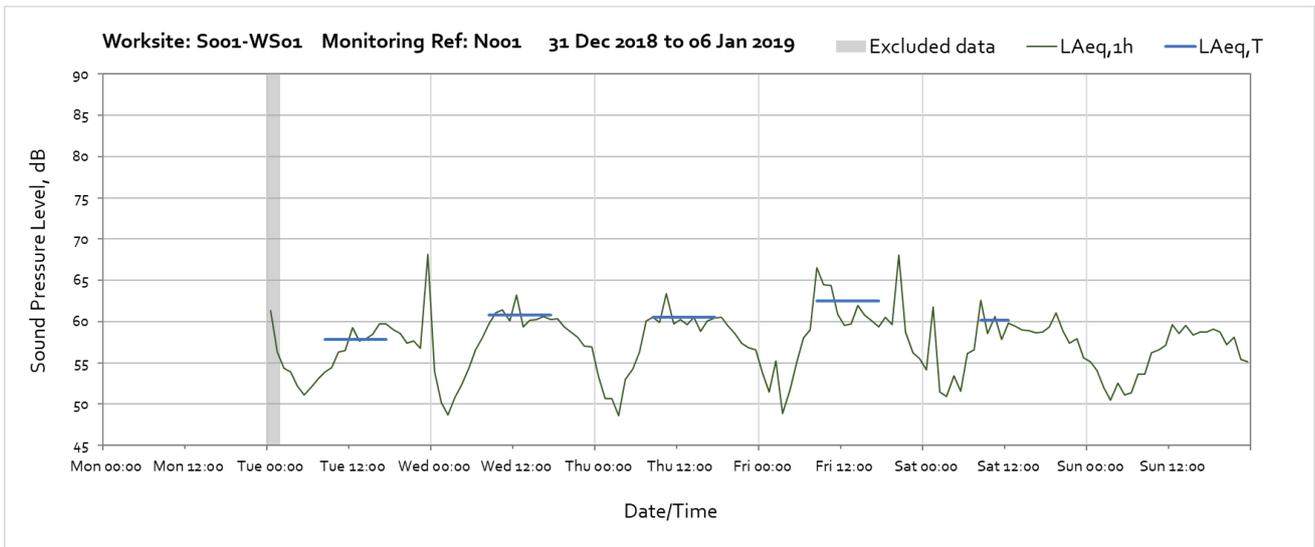


Note – High noise levels on the early hours of the 1st January were due to New Year's Eve celebrations and have been excluded to calculate values in Table 5.

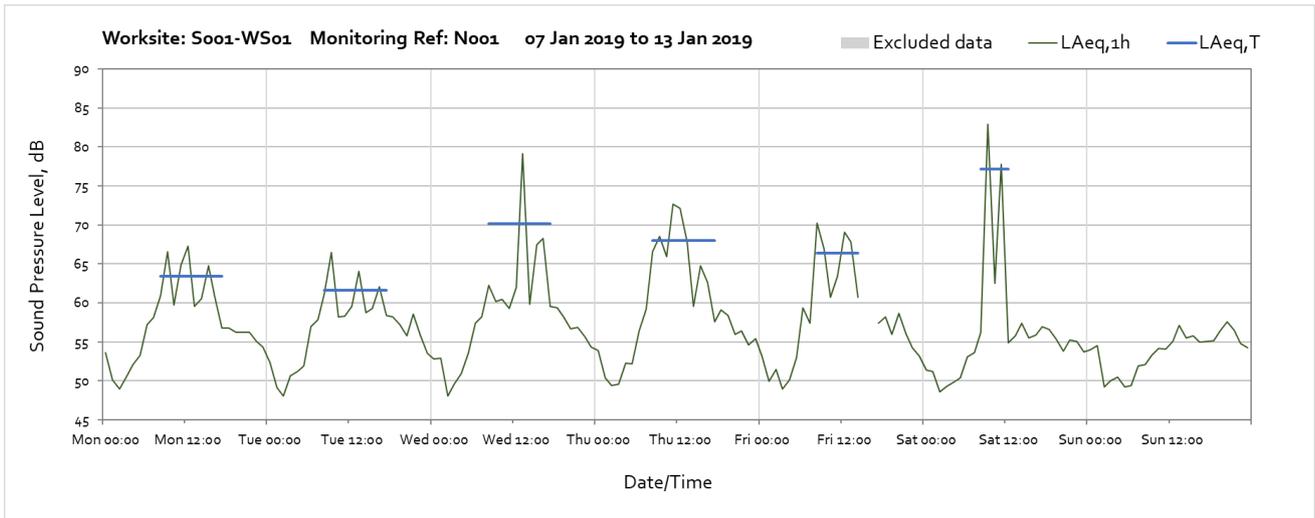




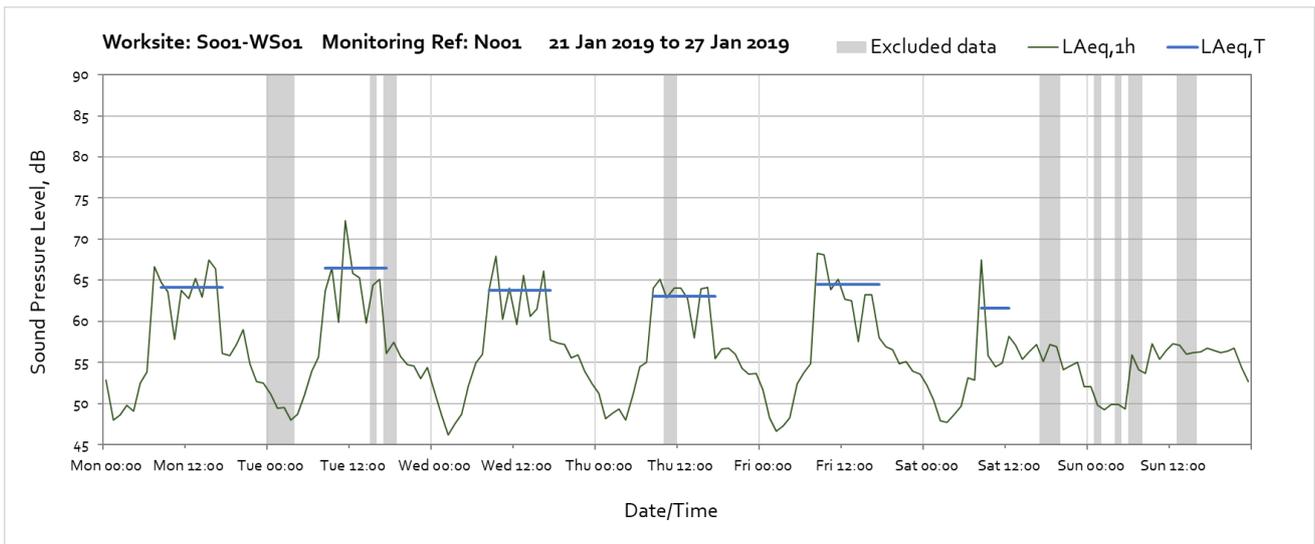
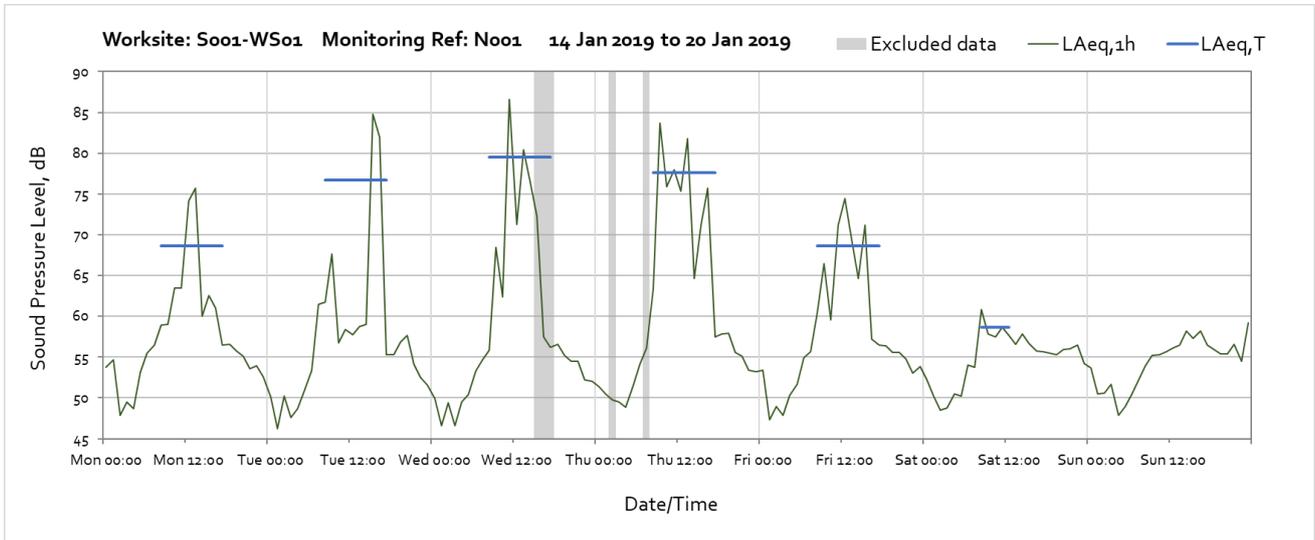
Worksite: S001-WS01 – Monitoring Ref: N001

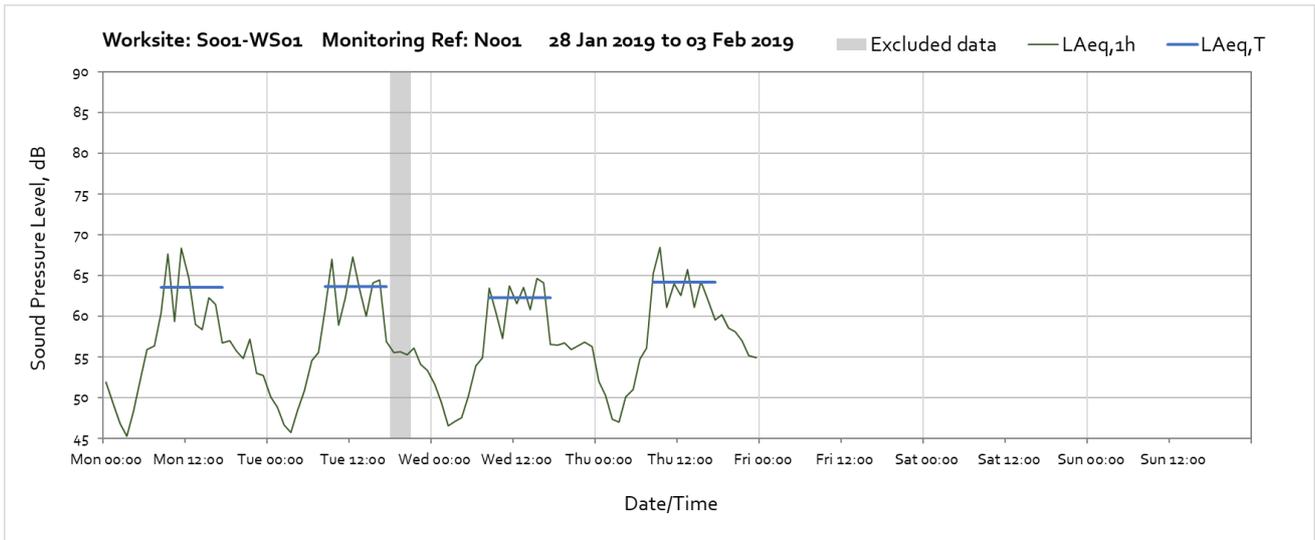


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

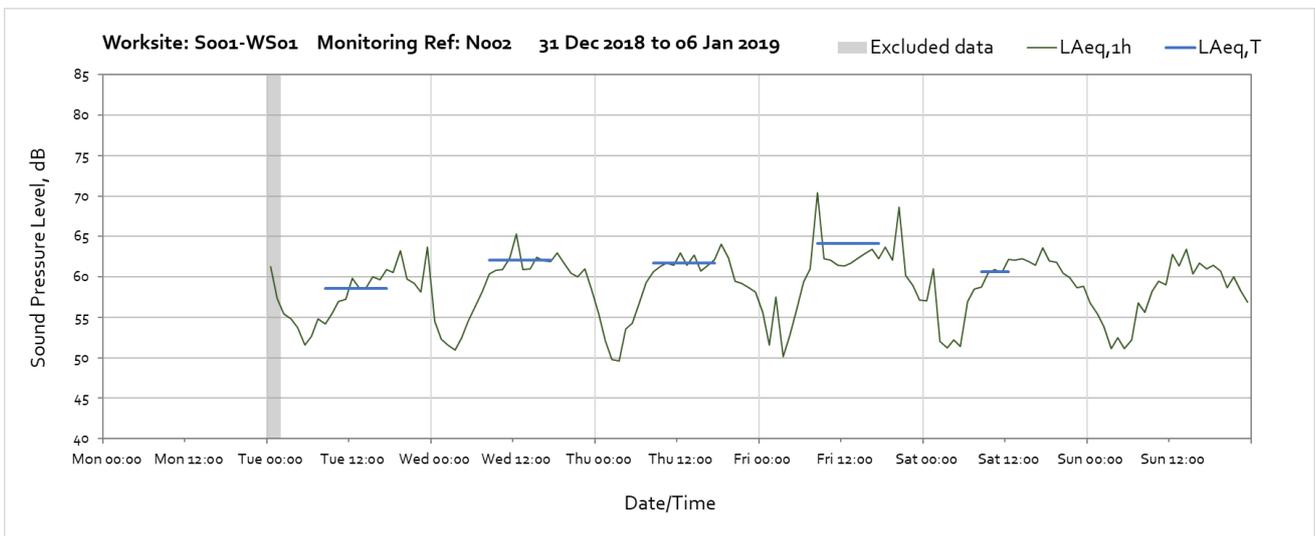


Note – Missing data between 15:00 and 17:00 on Friday 11th January due to a loss of power at the noise monitor.

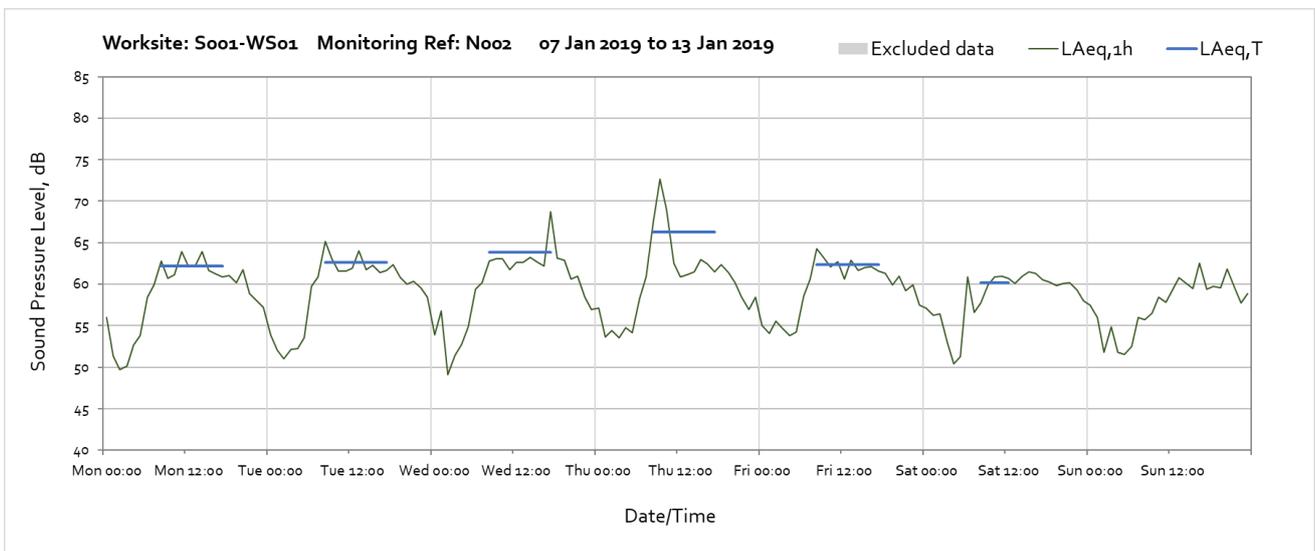


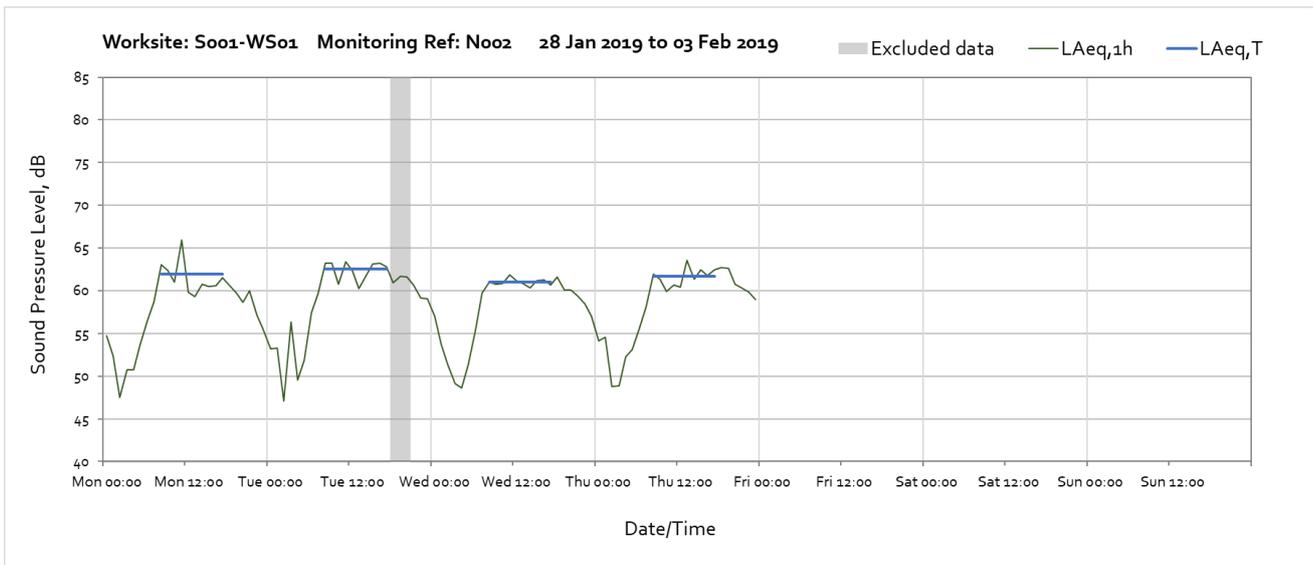
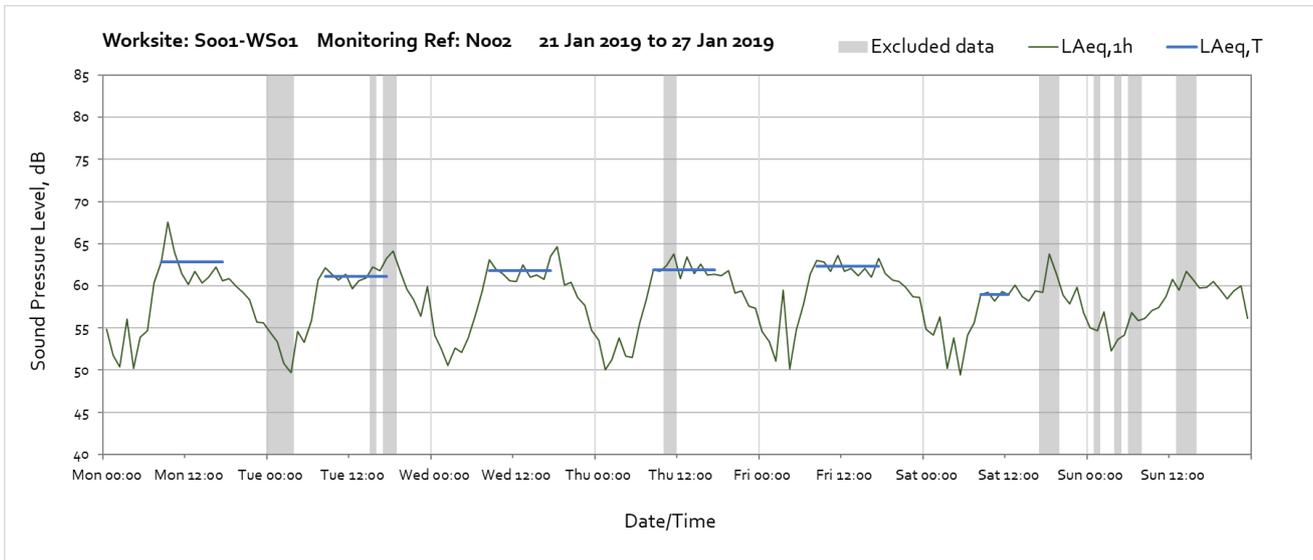
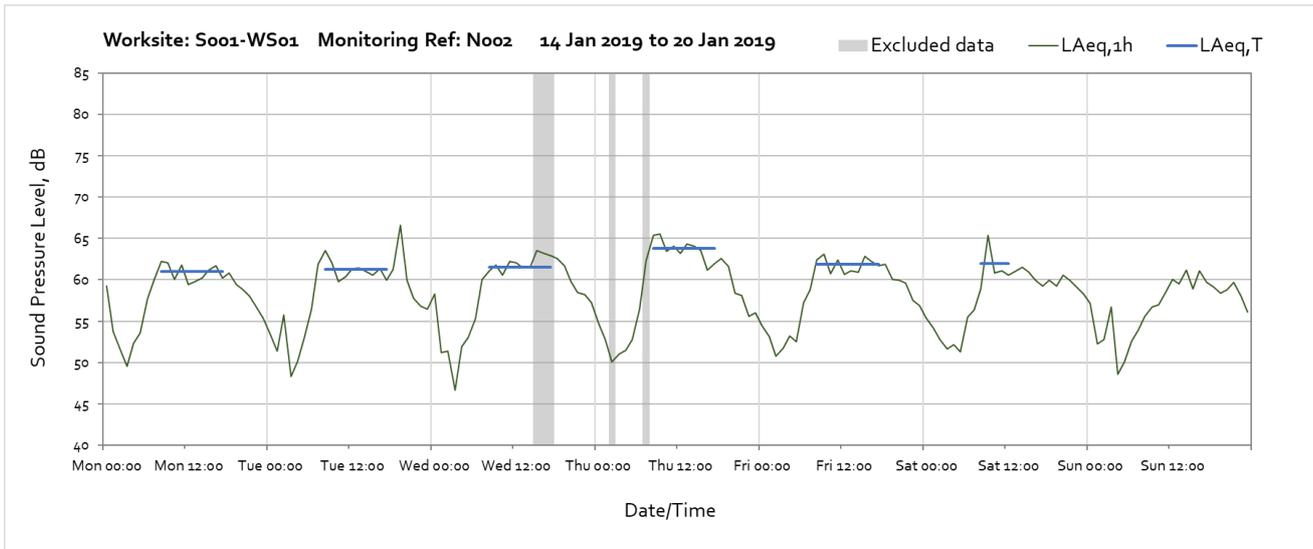


Worksite: S001-WS01 – Monitoring Ref: N002

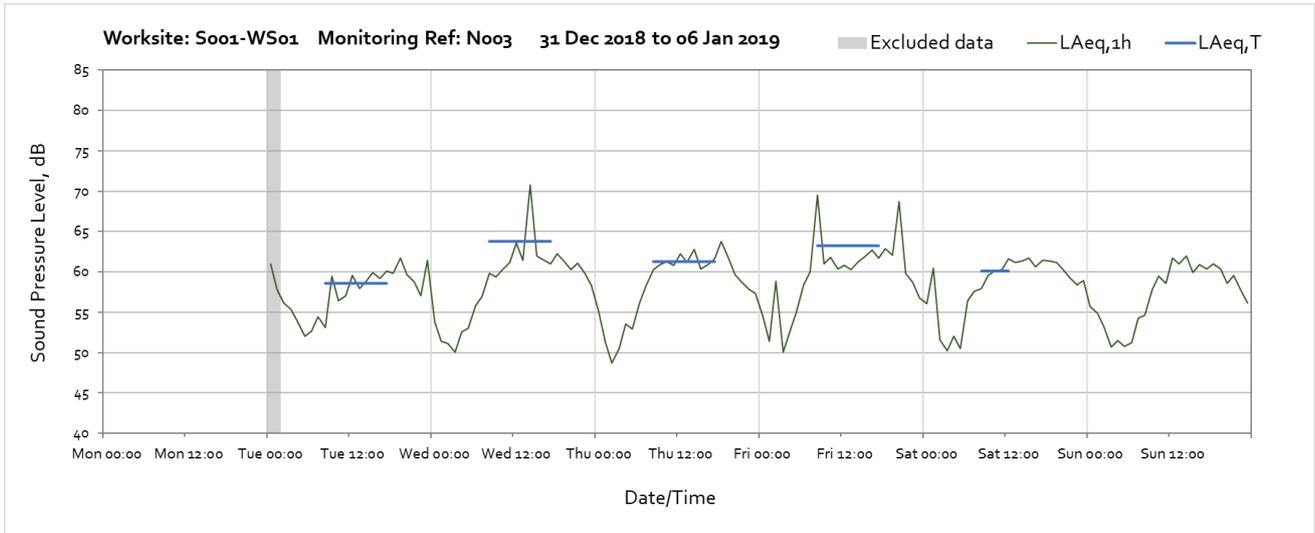


Note – High noise levels on the early hours of the 1st January were due to New Year's Eve celebrations and have been excluded to calculate values in Table 5.

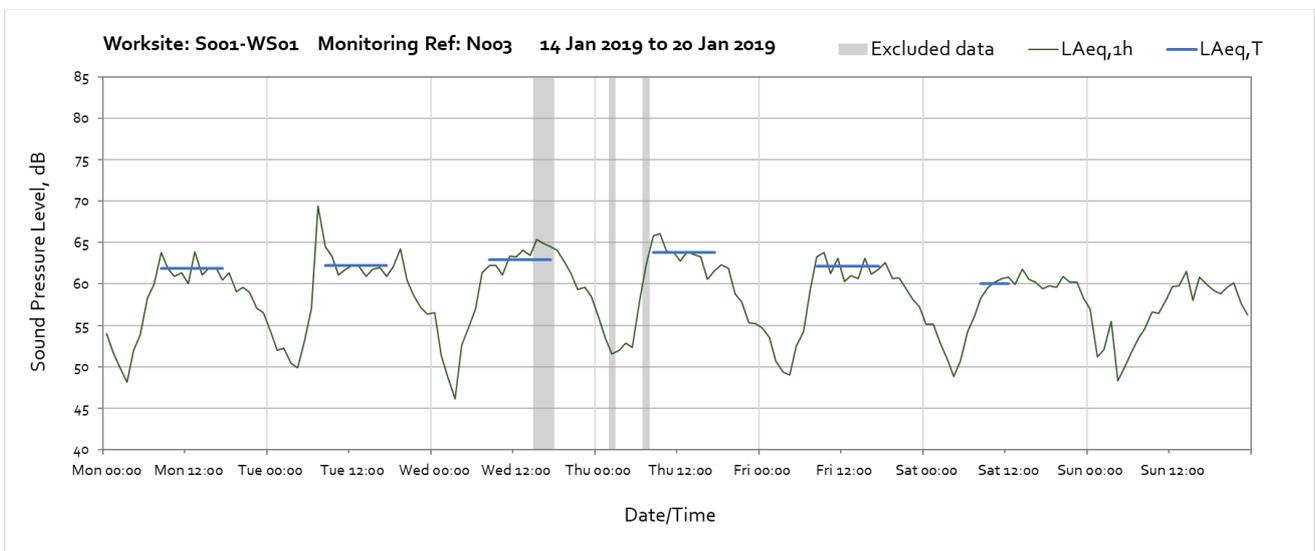
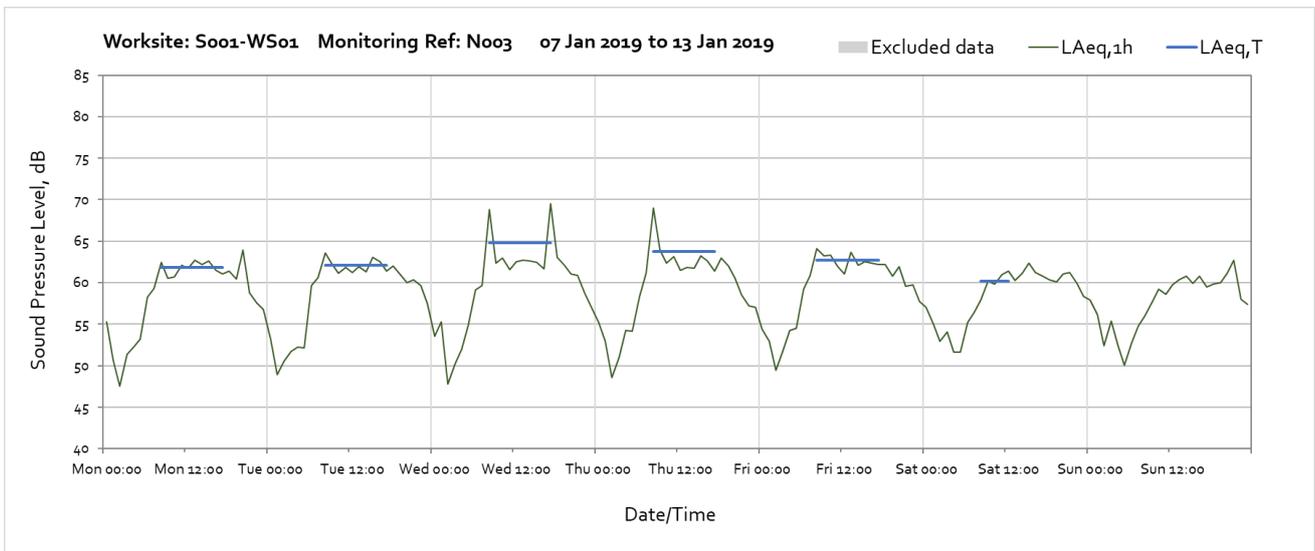


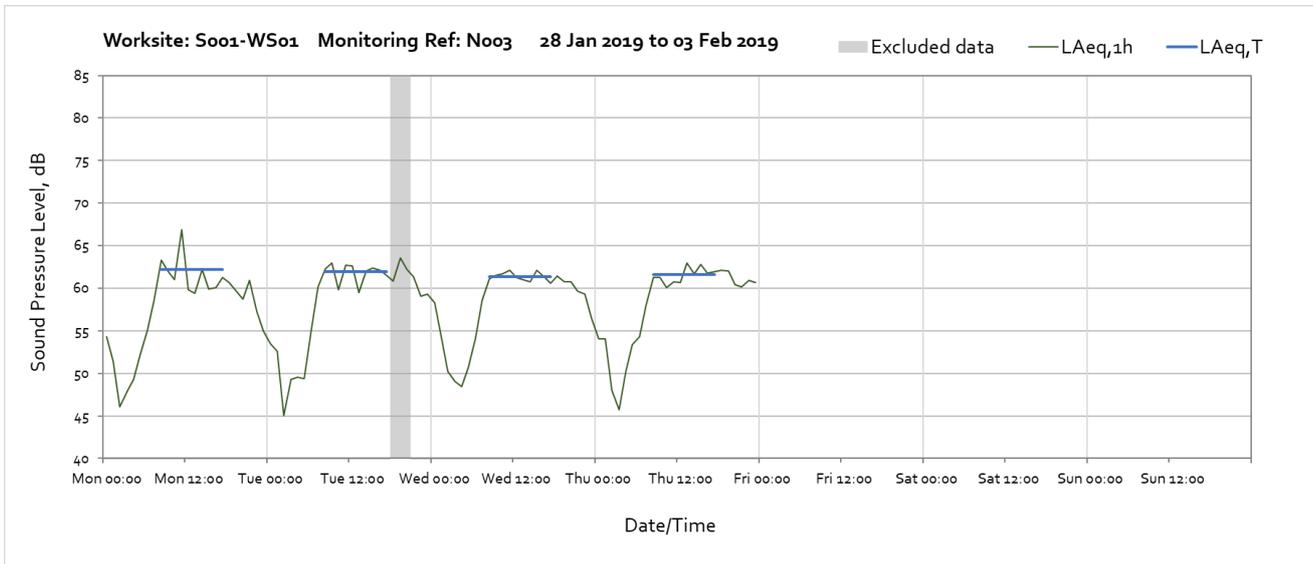
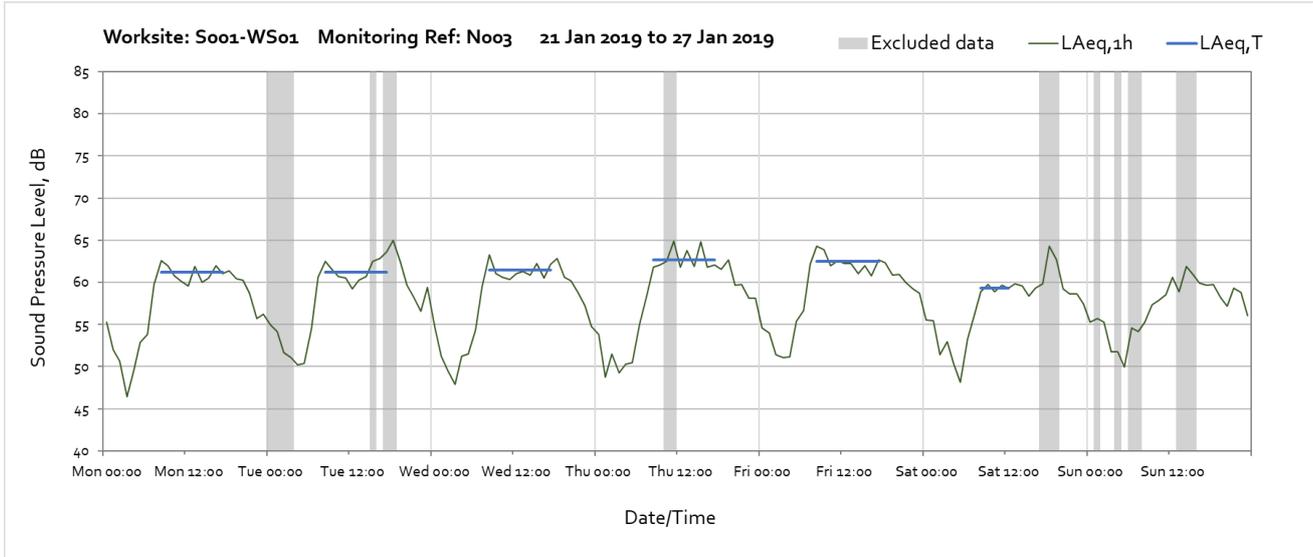


Worksite: S001-WS01 – Monitoring Ref: N003

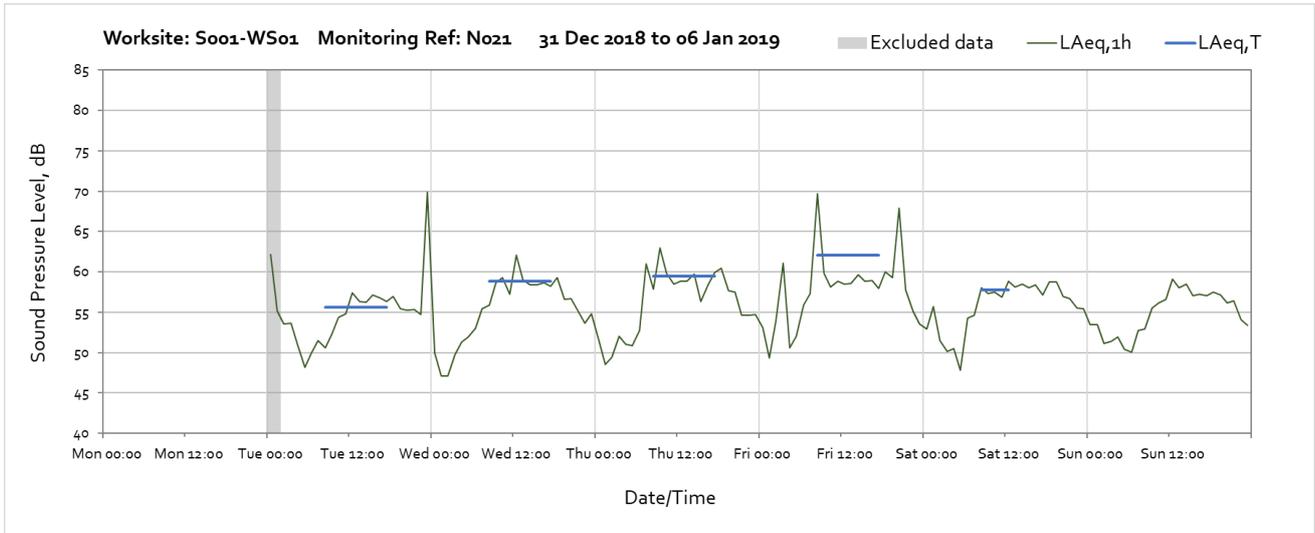


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

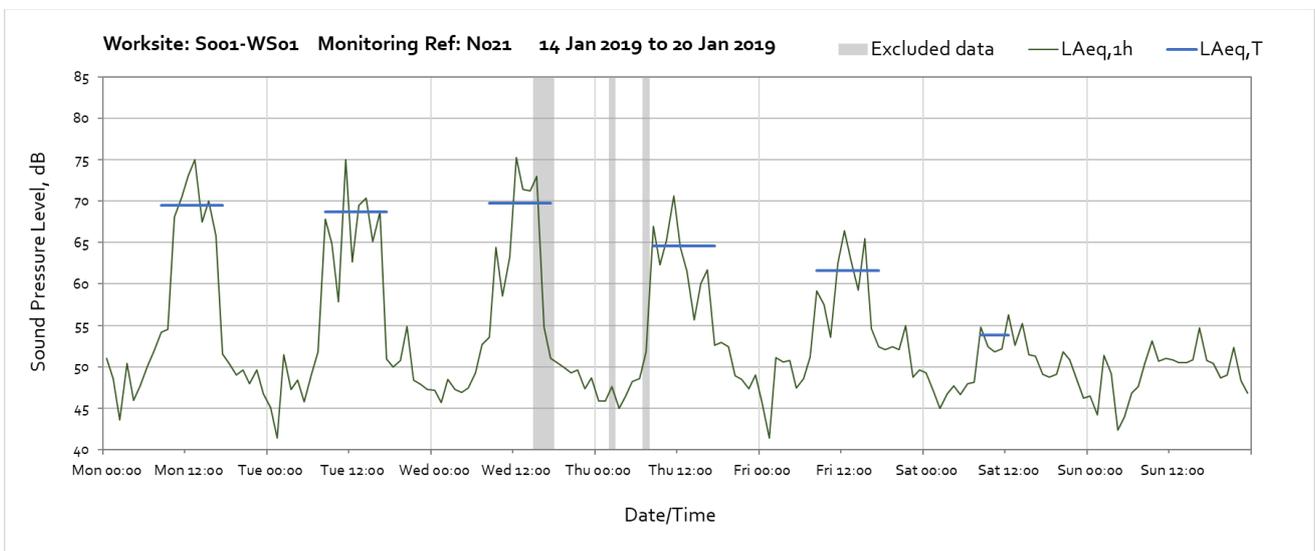
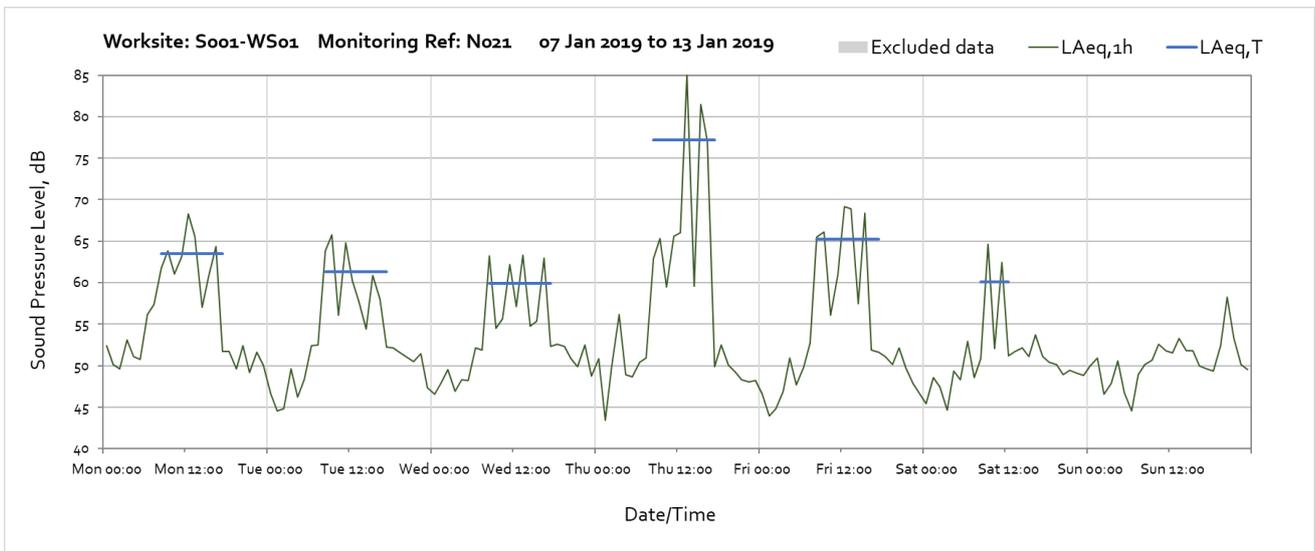


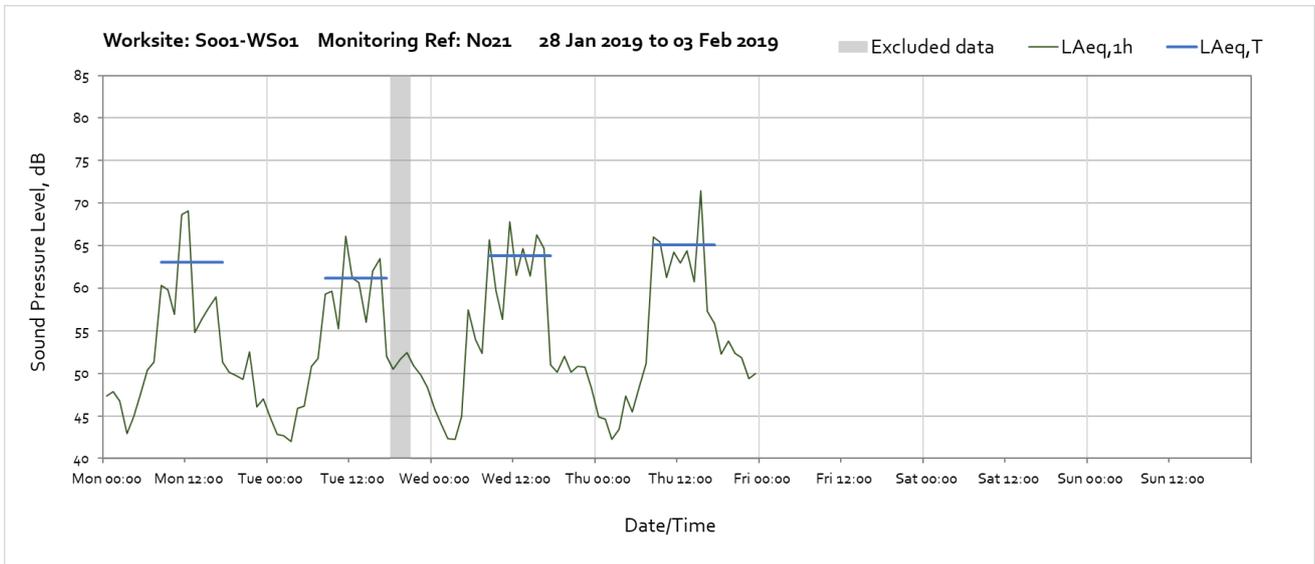
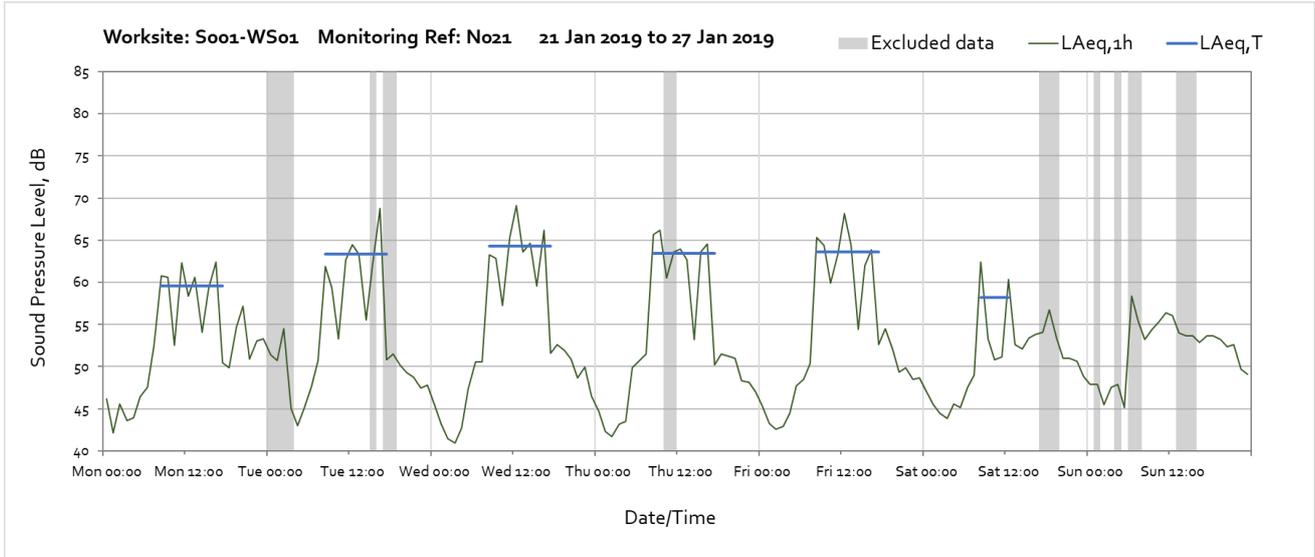


Worksite: S001-WS01 – Monitoring Ref: N021

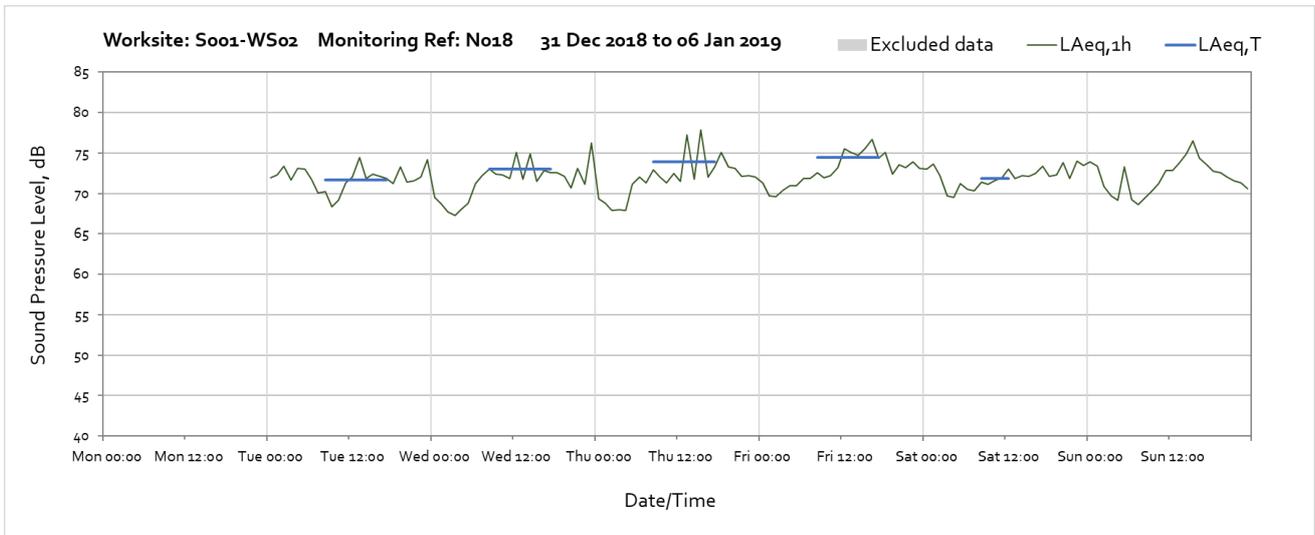


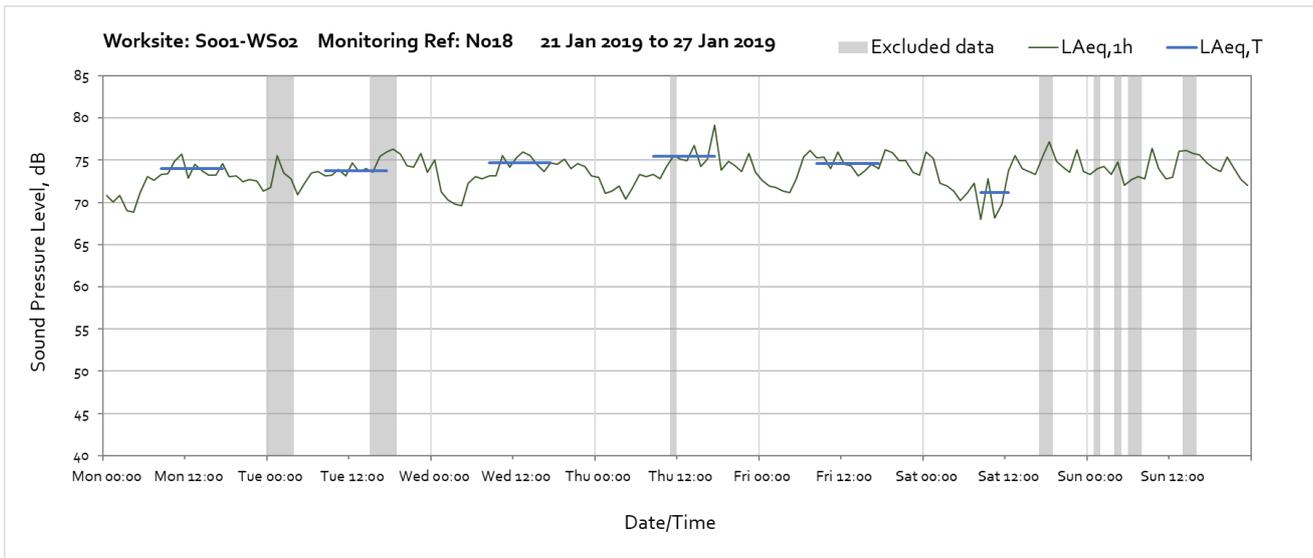
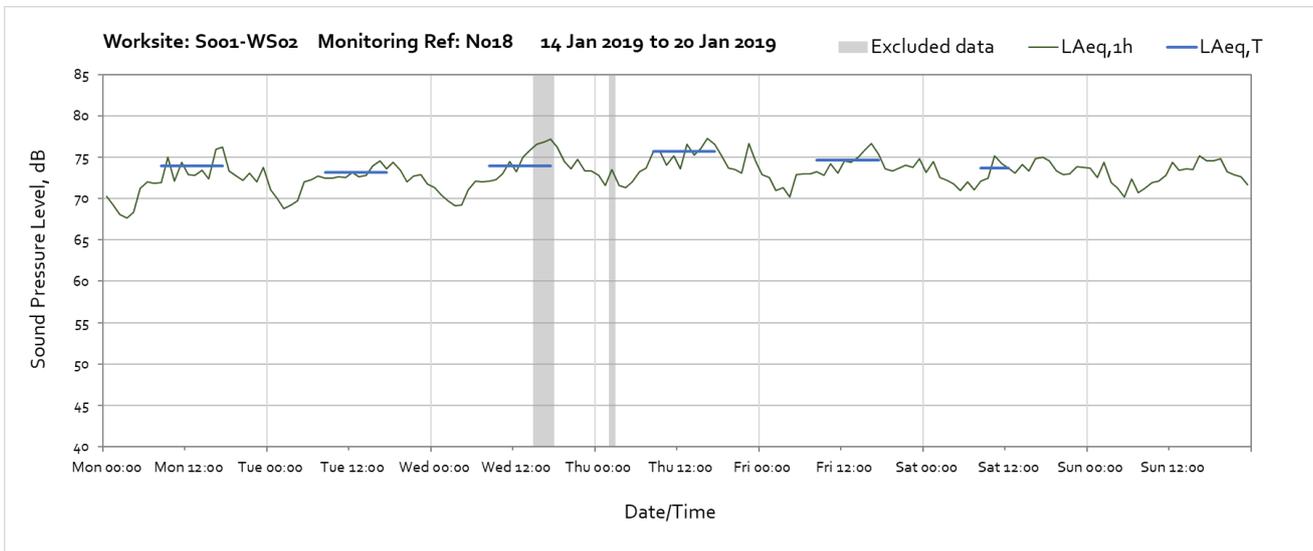
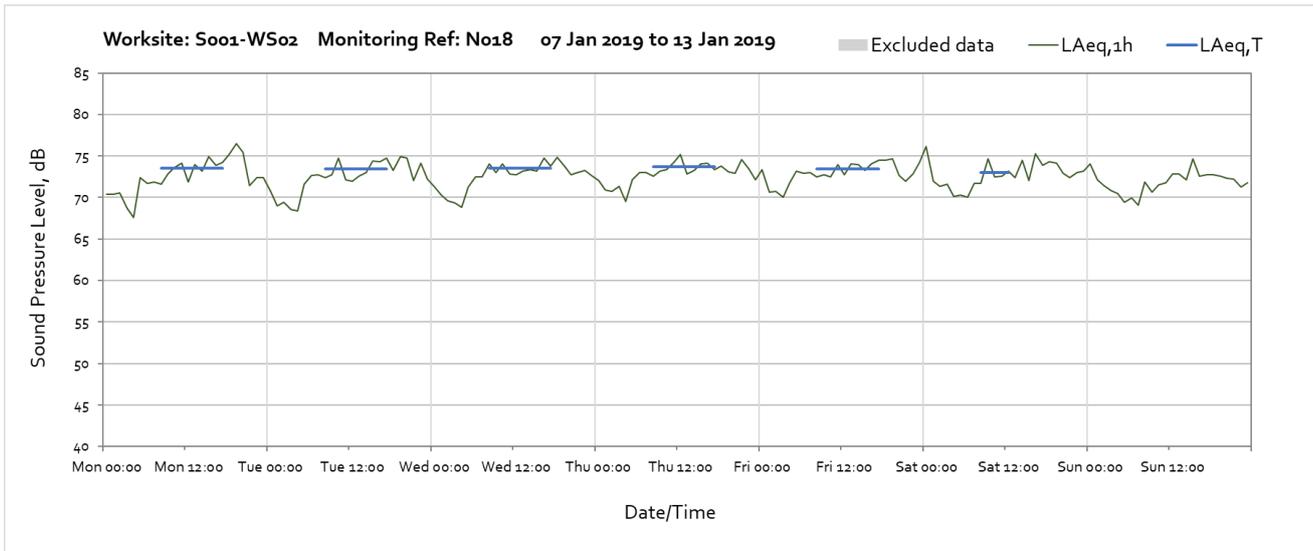
Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

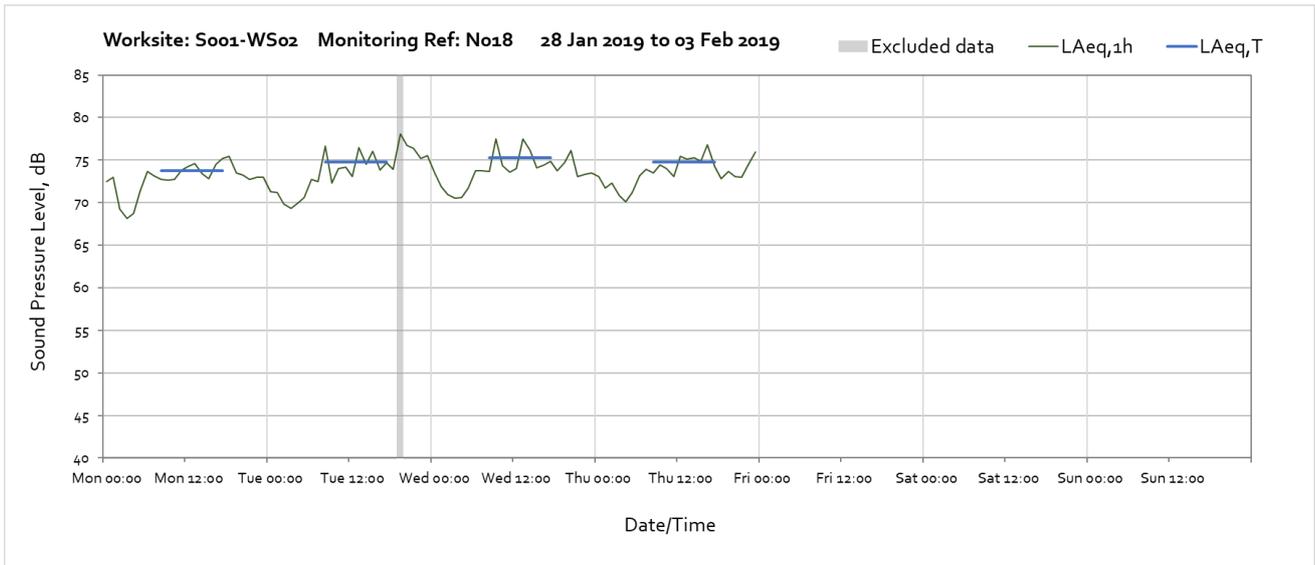




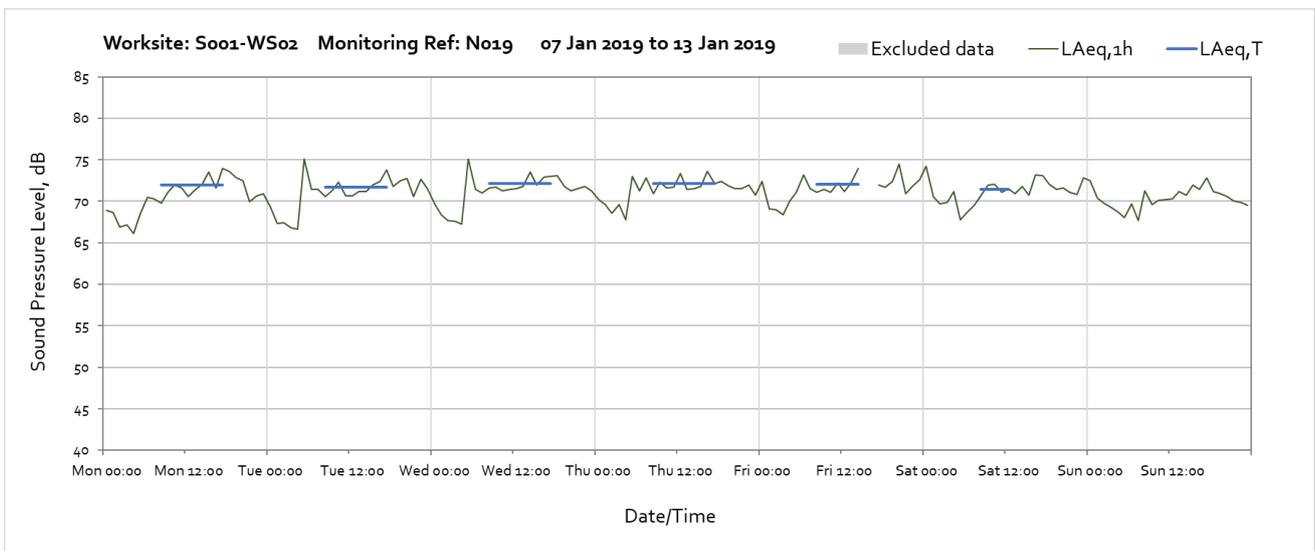
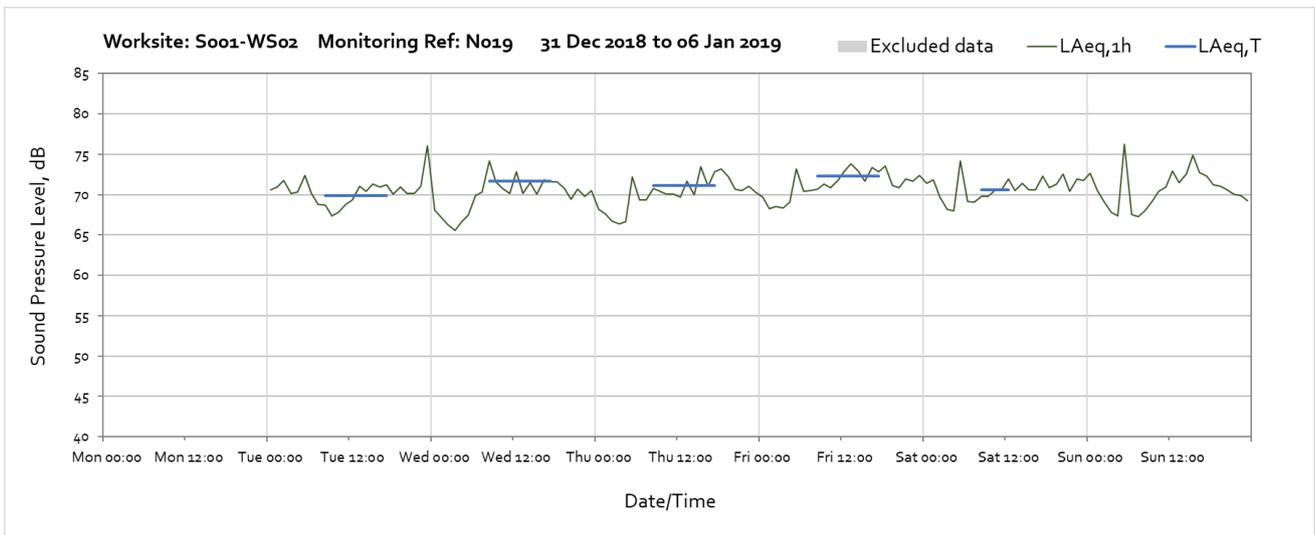
Worksite: S001-WS02 – Monitoring Ref: N018



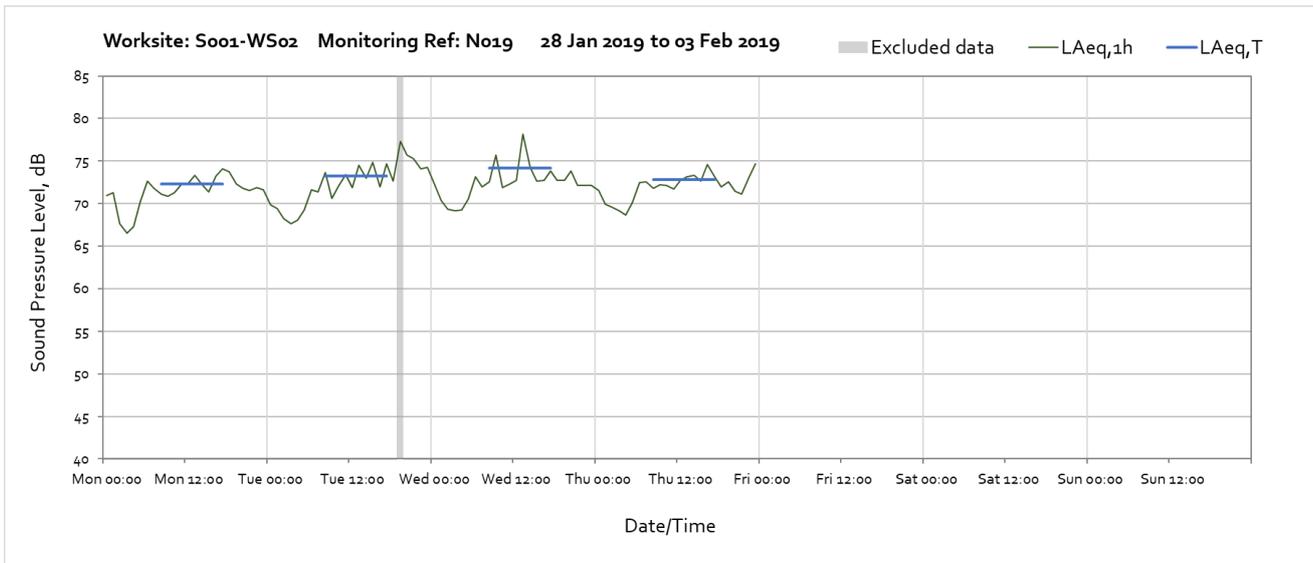
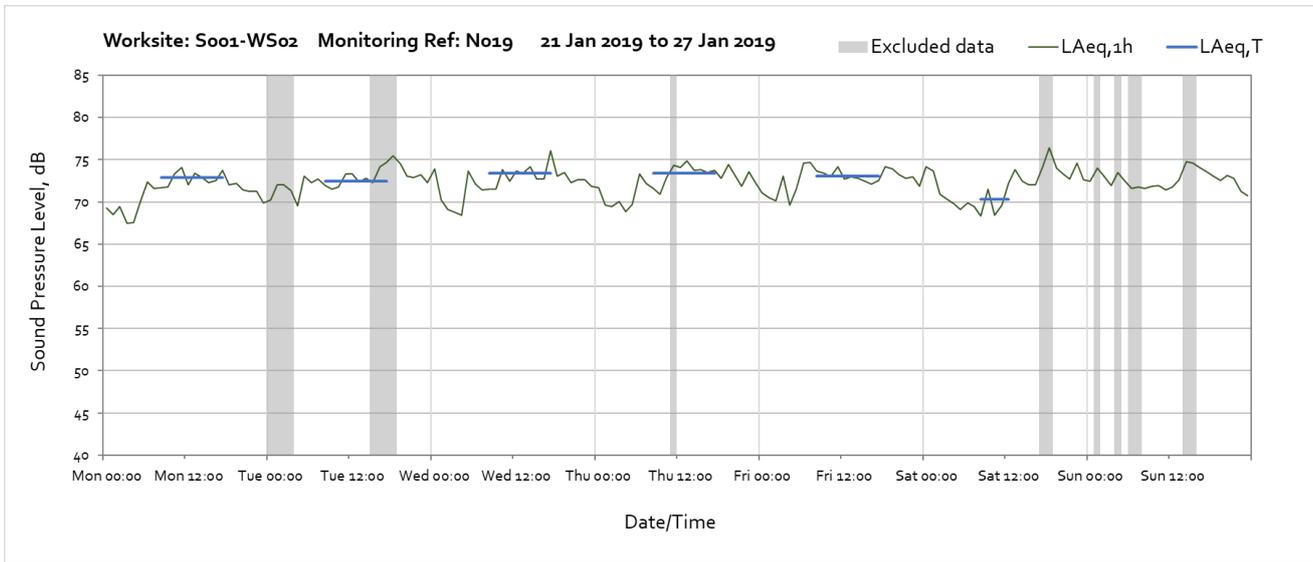
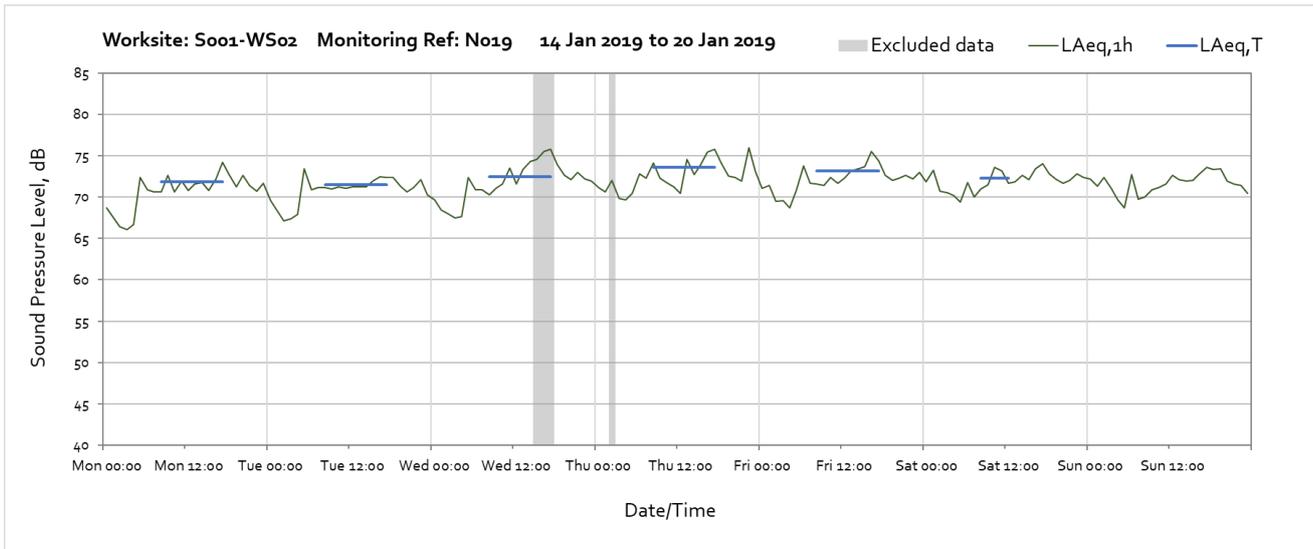




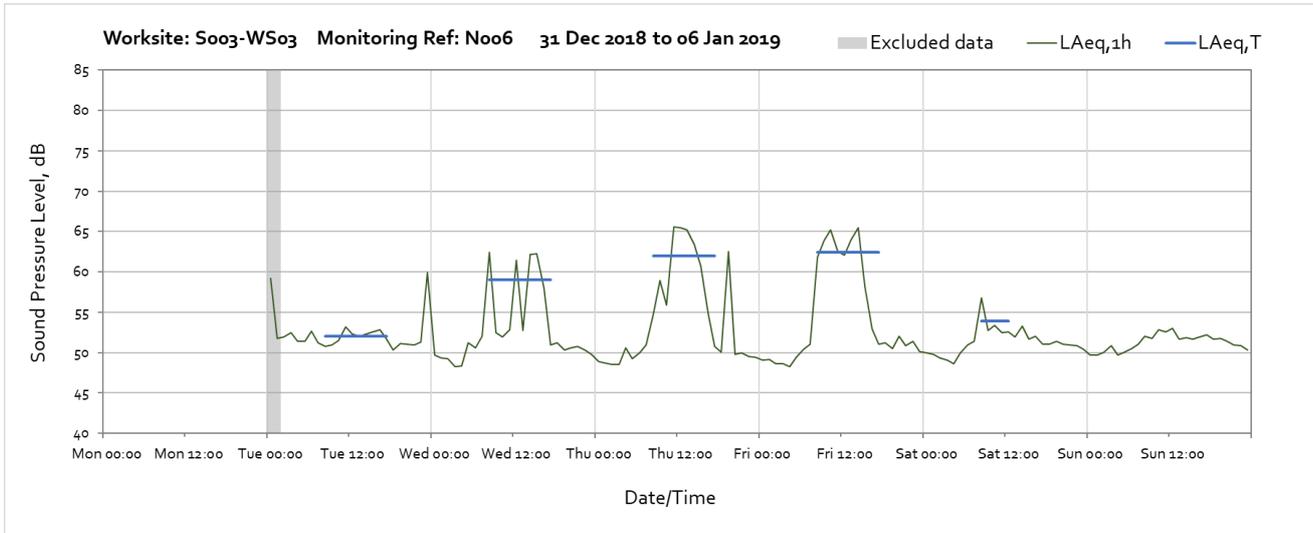
Worksite: S001-WS02 – Monitoring Ref: N019



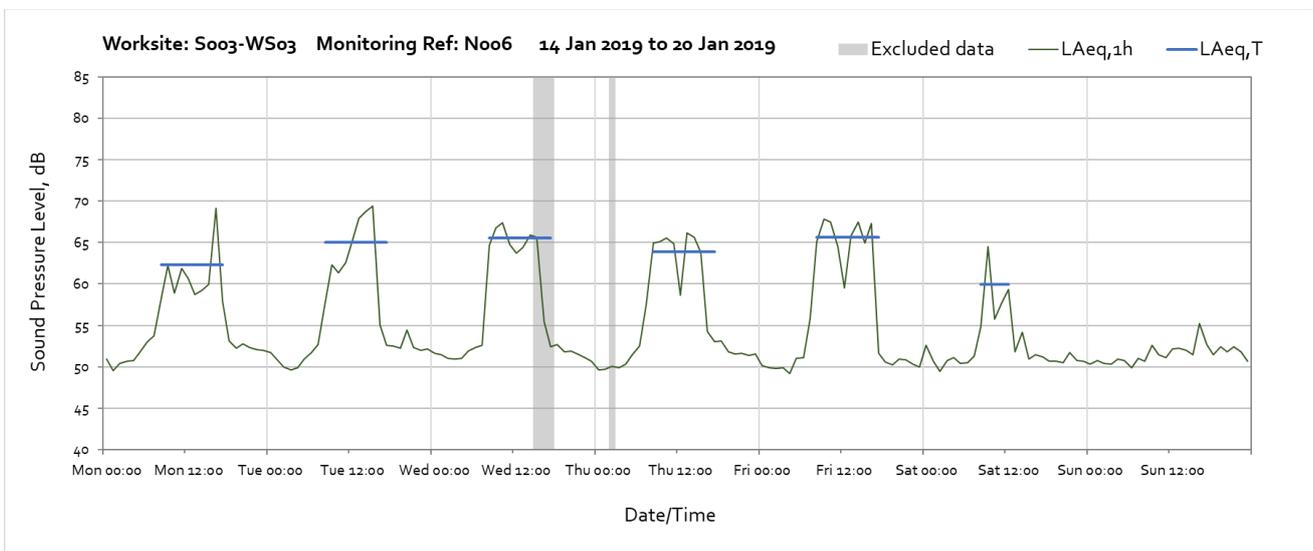
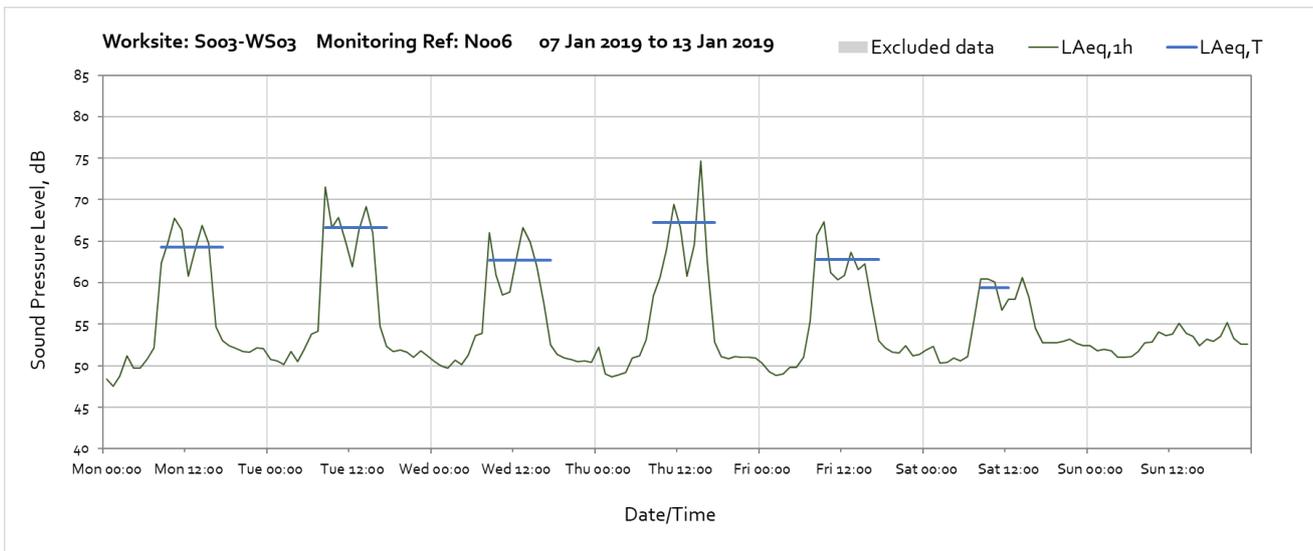
Note – Missing data between 15:00 and 17:00 on Friday 11th January due to a loss of power at the noise monitor.

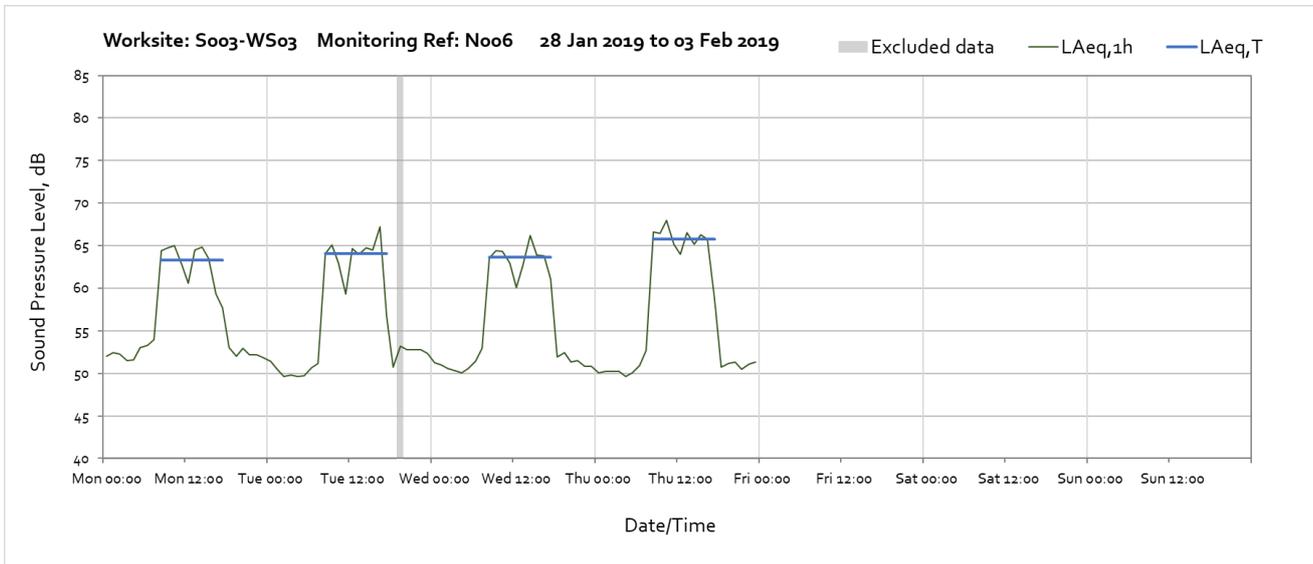
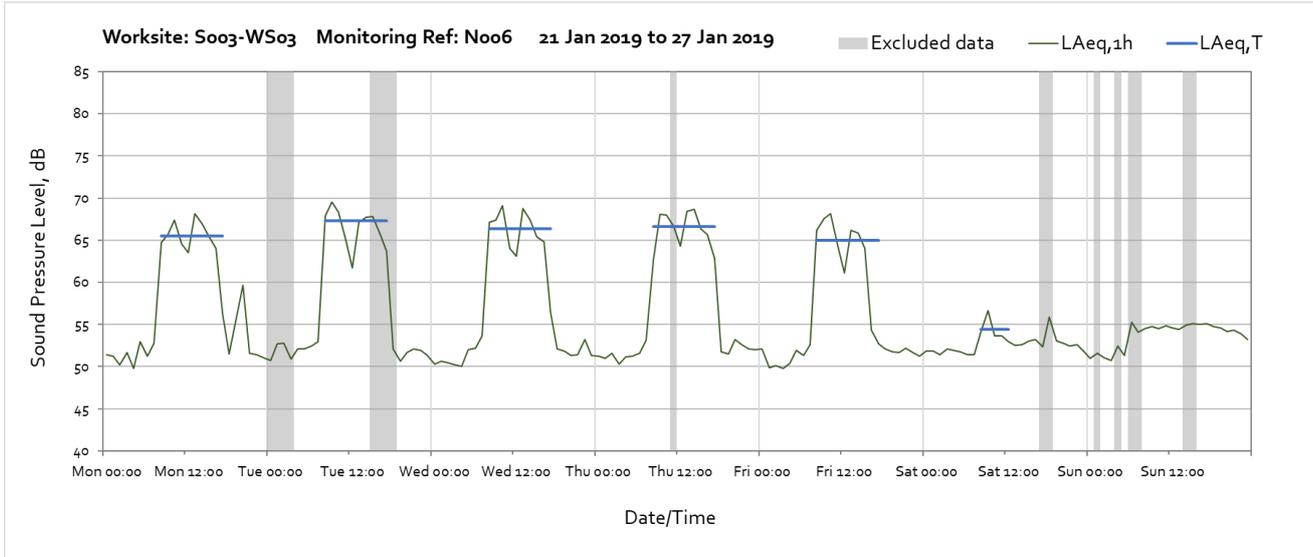


Worksite: S003-WS03 – Monitoring Ref: N006

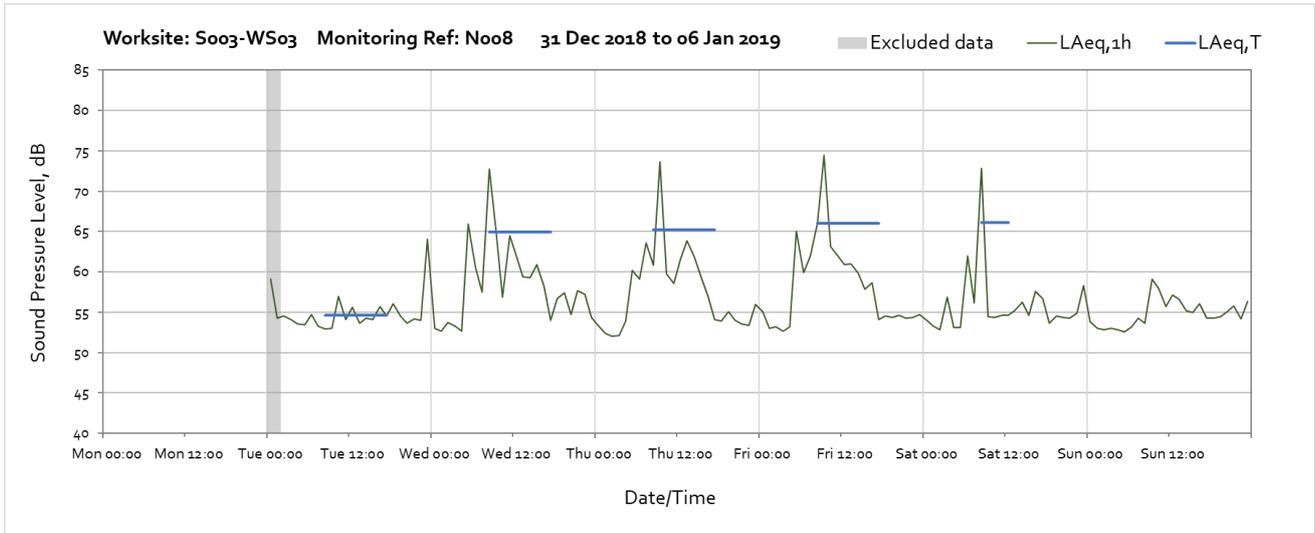


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

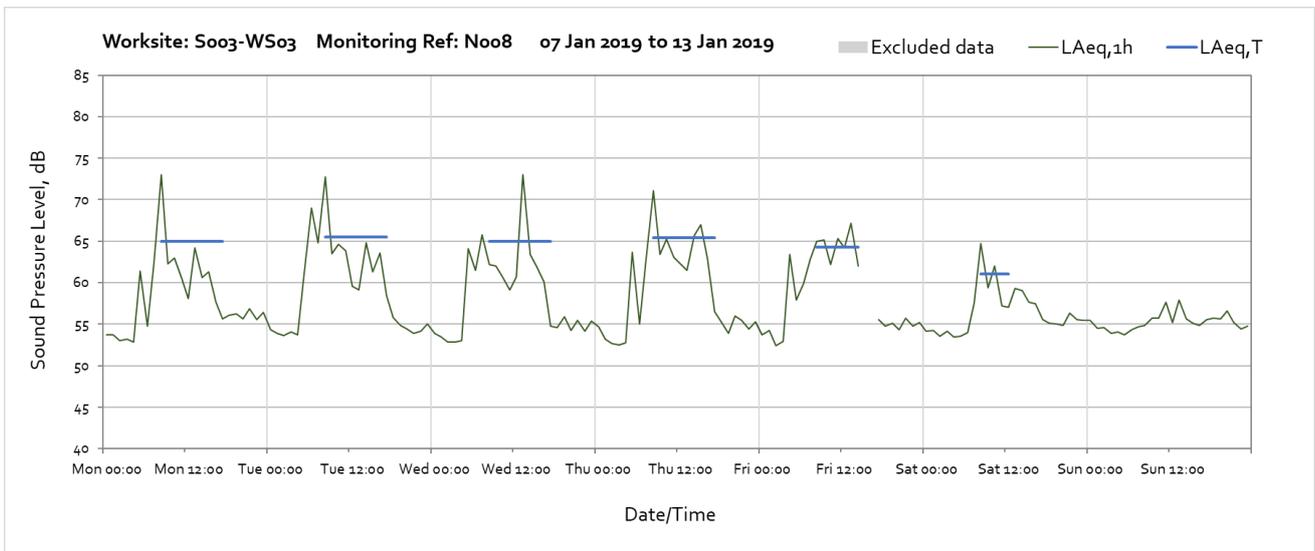




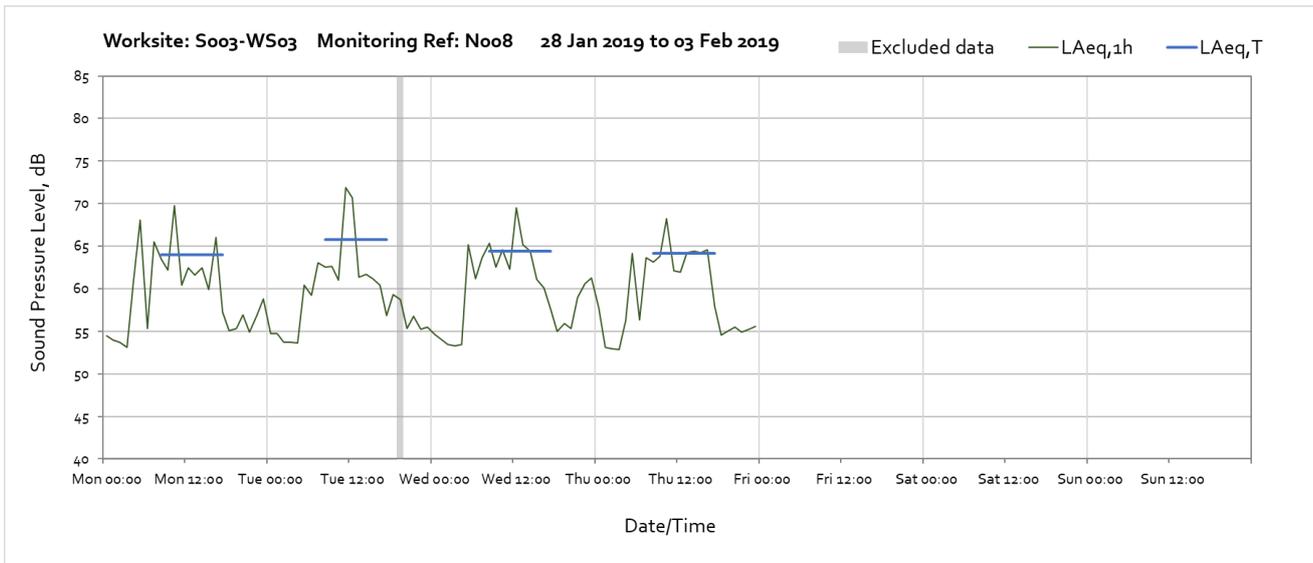
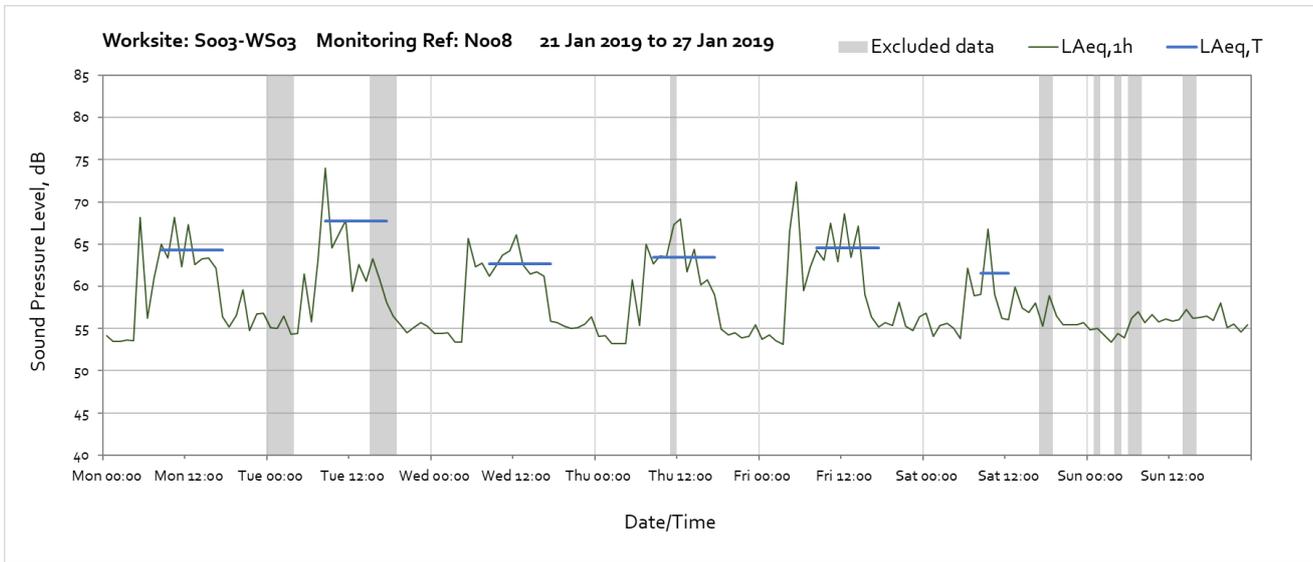
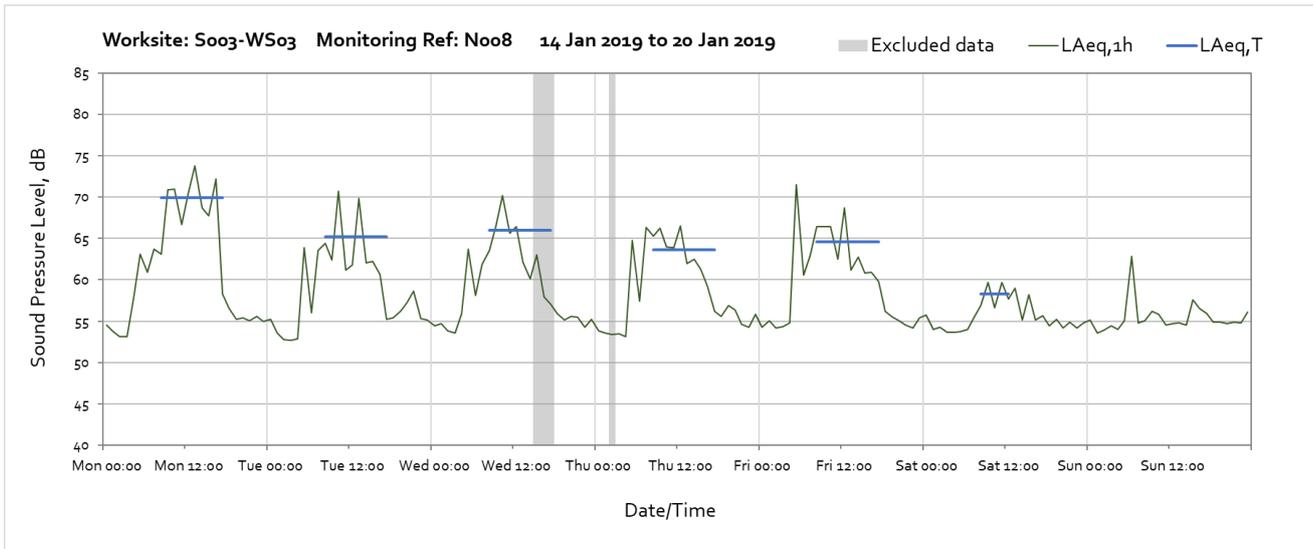
Worksite: S003-WS03 – Monitoring Ref: N008



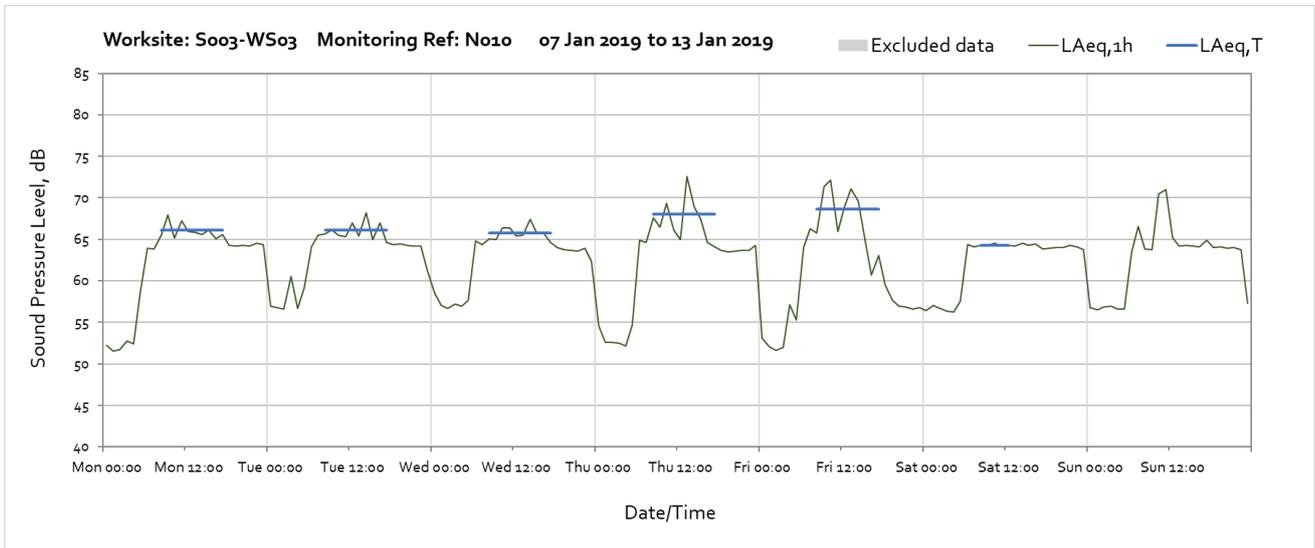
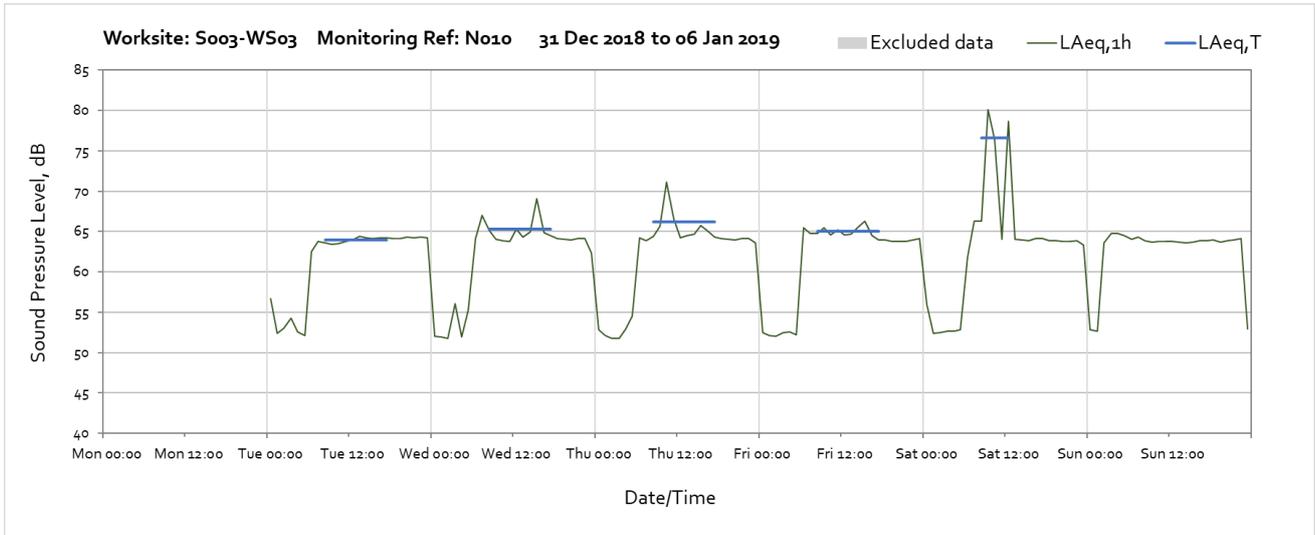
Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

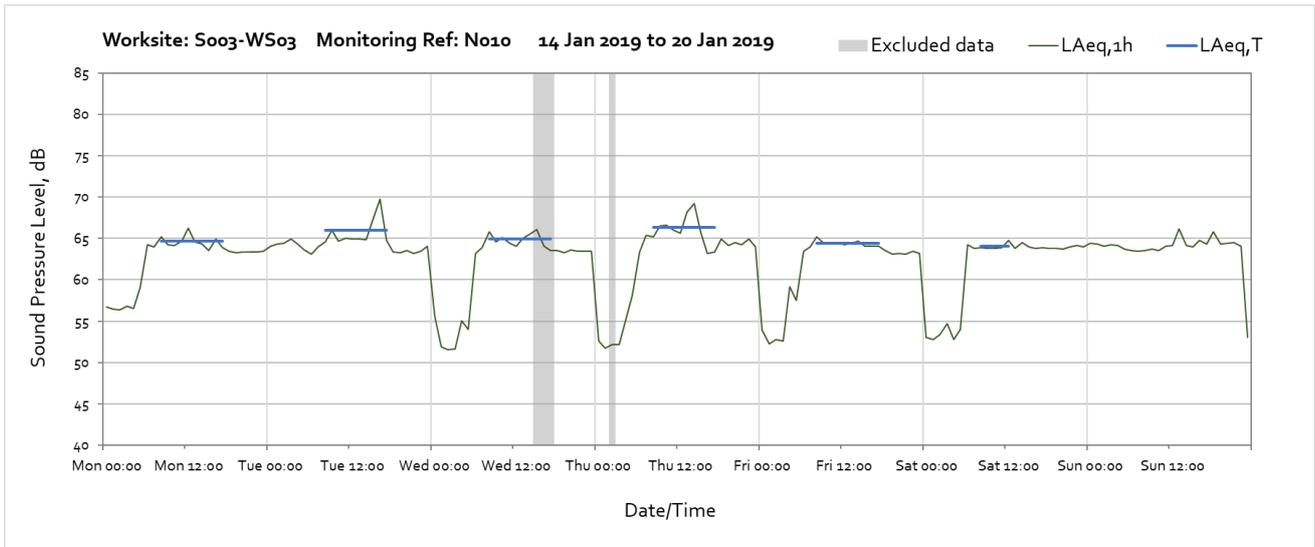


Note – Missing data between 15:00 and 17:00 on Friday 11th January due to a loss of power at the noise monitor.

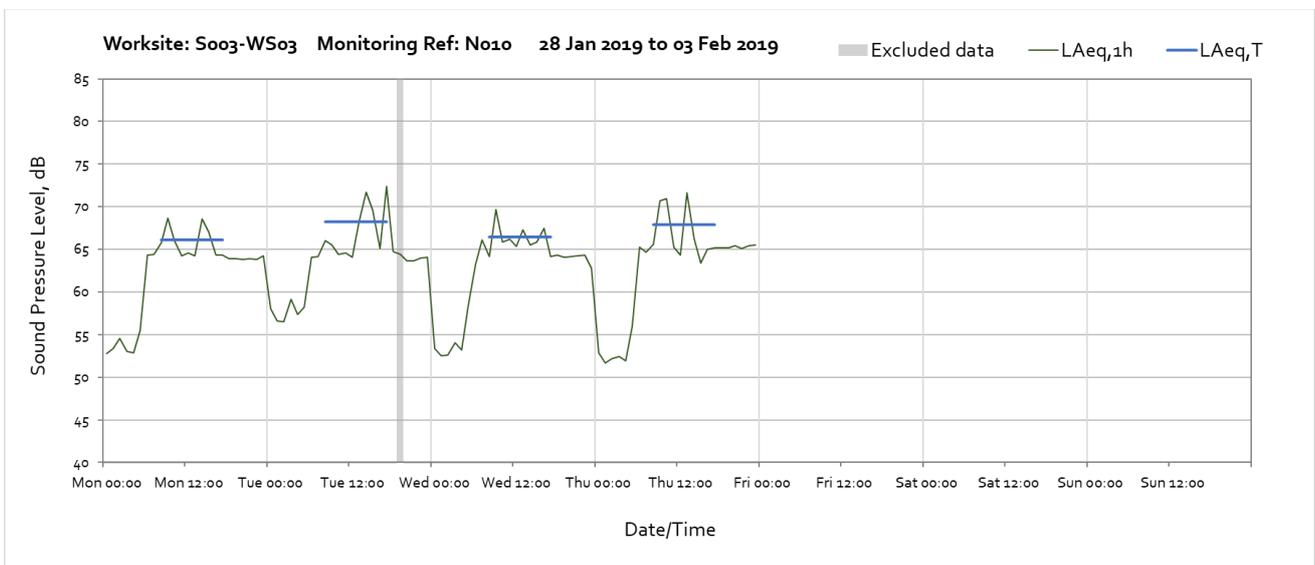
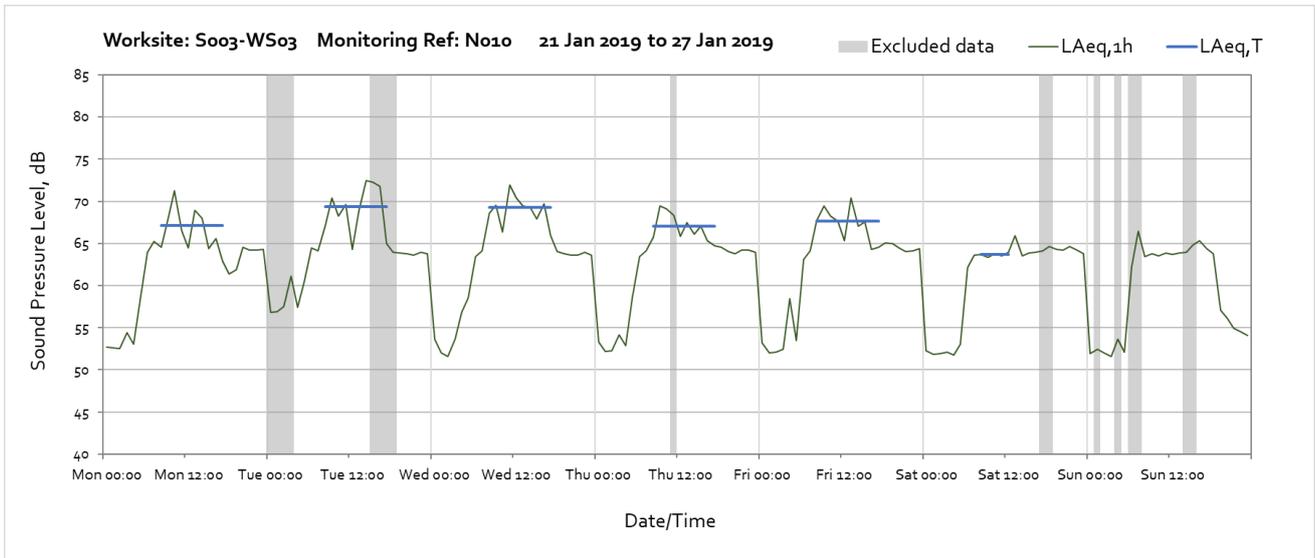


Worksite: S003-WS03 – Monitoring Ref: N010

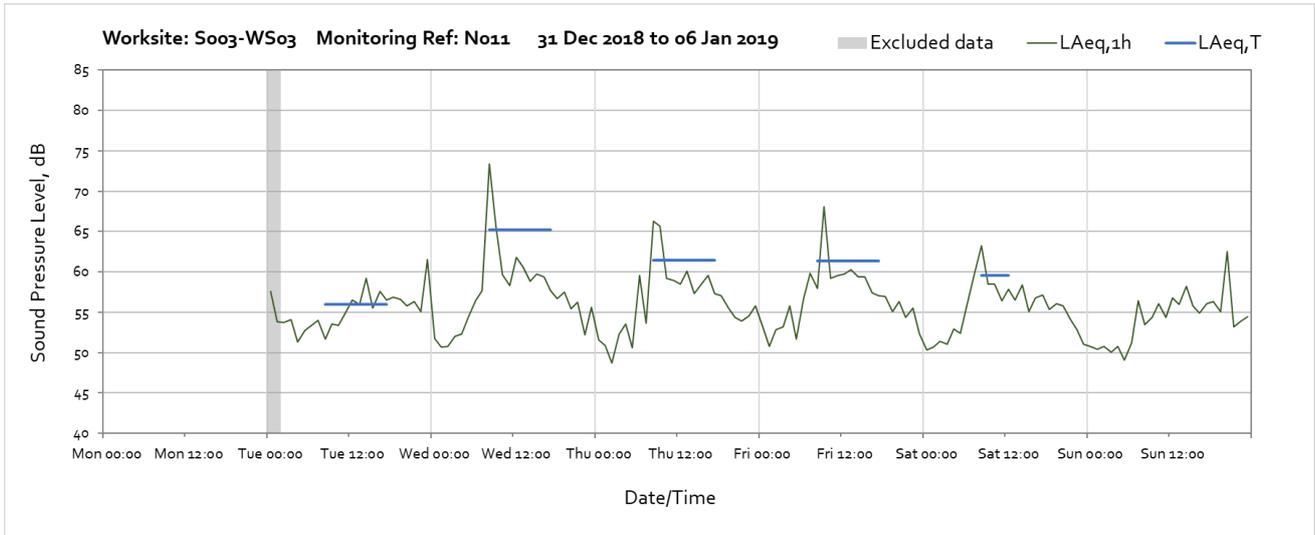




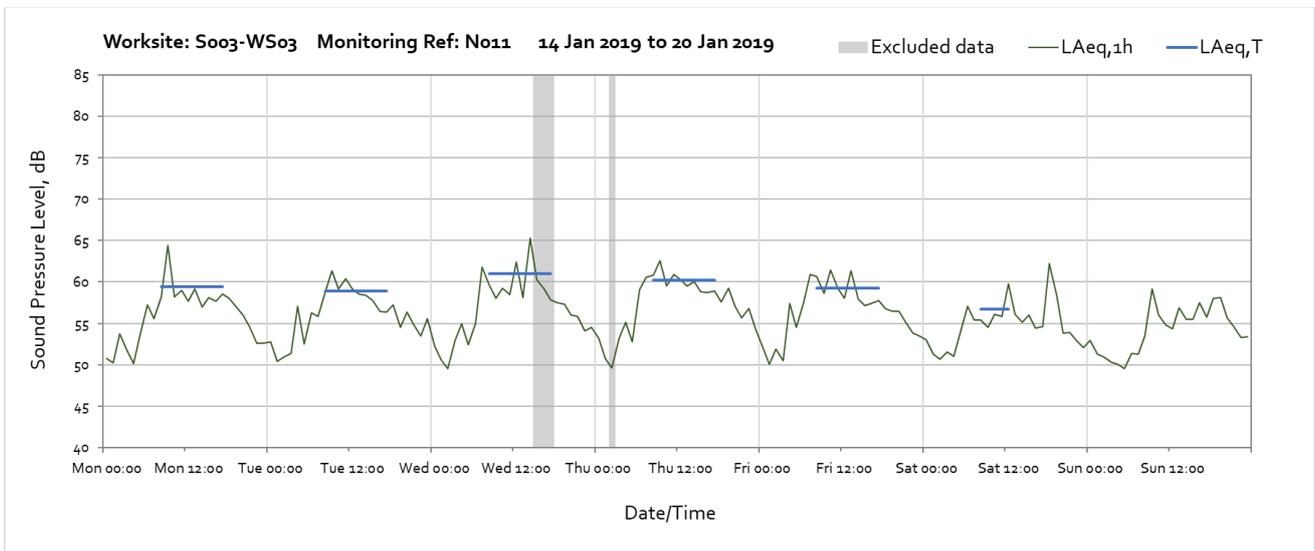
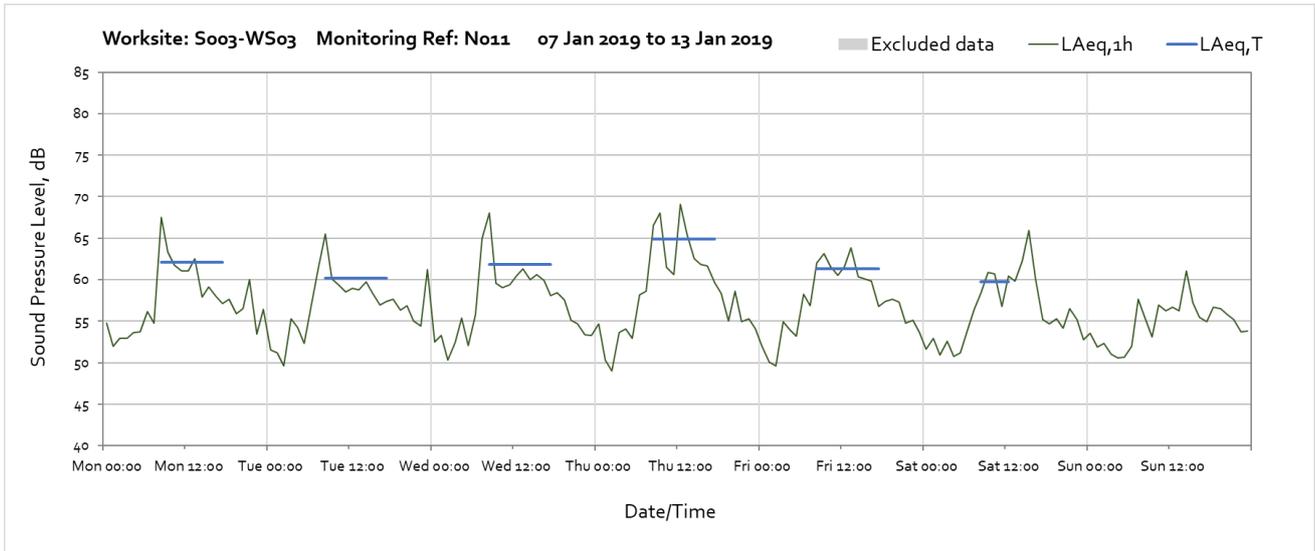
Note – High noise levels during the night of the 14th and 19th January are thought to be due to noise from mechanical plant at a nearby hotel. No HS2 construction activities were taking place in proximity to this location during this period

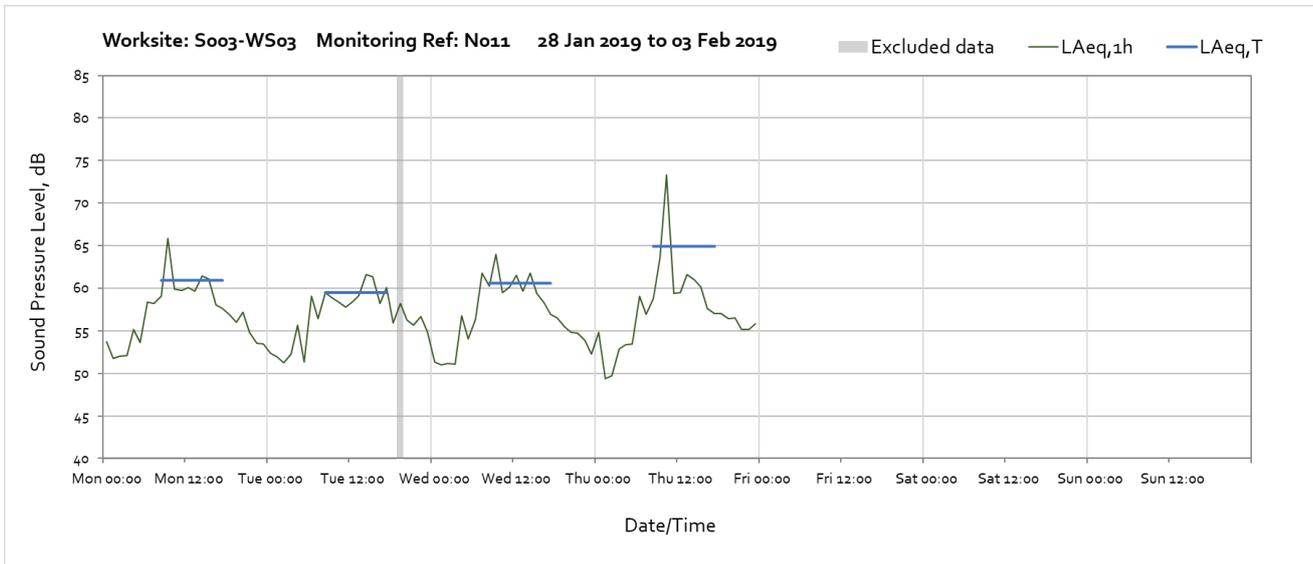
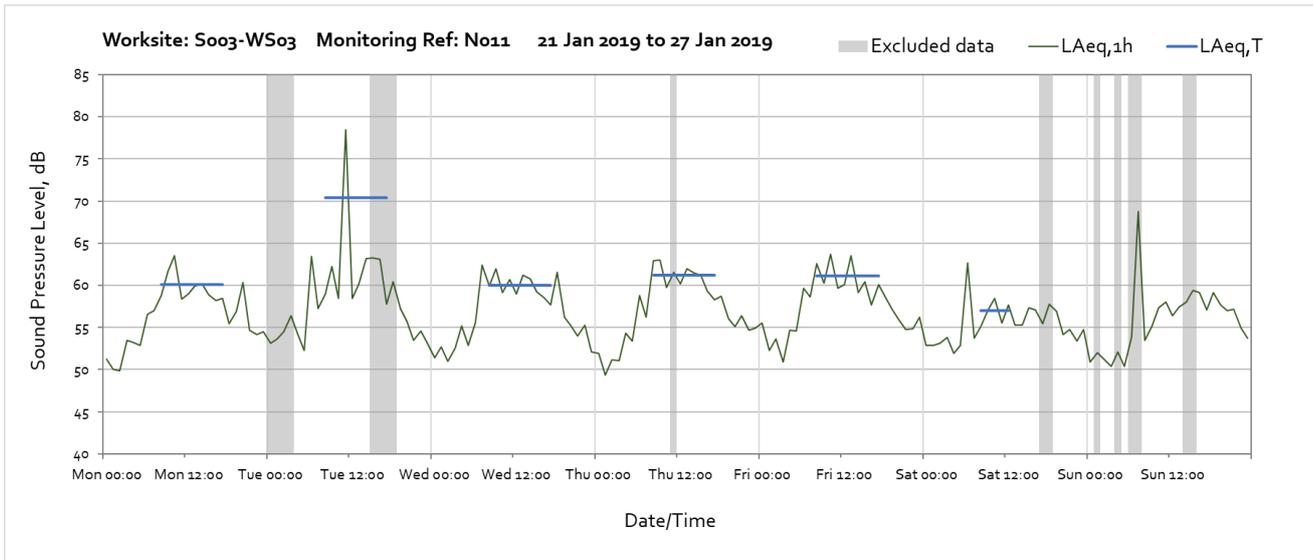


Worksite: S003-WS03 – Monitoring Ref: N011

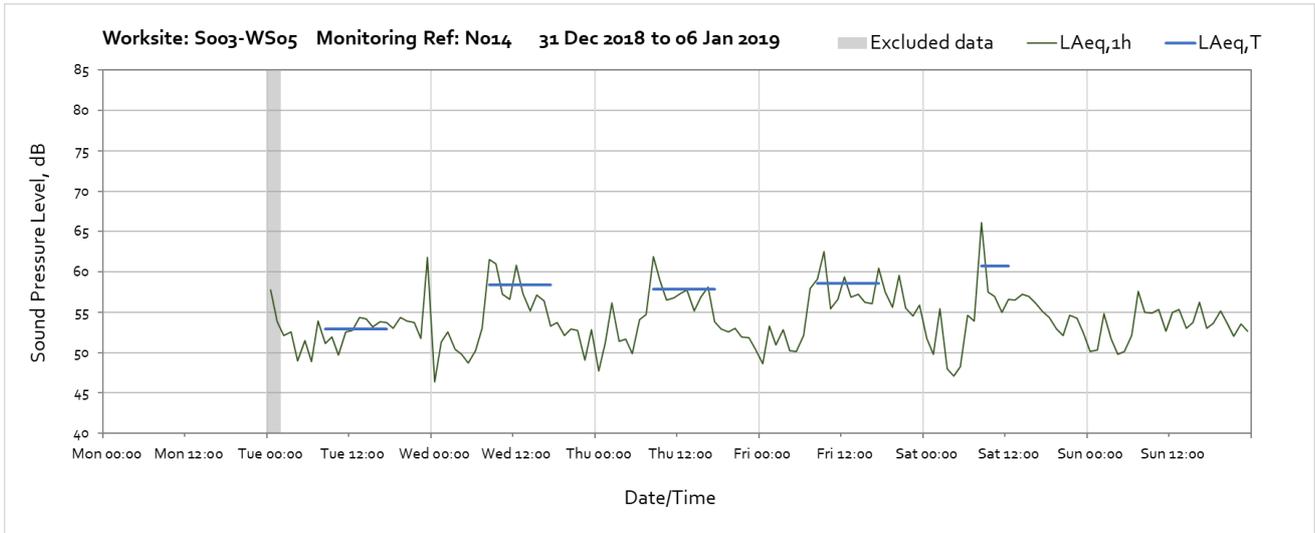


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

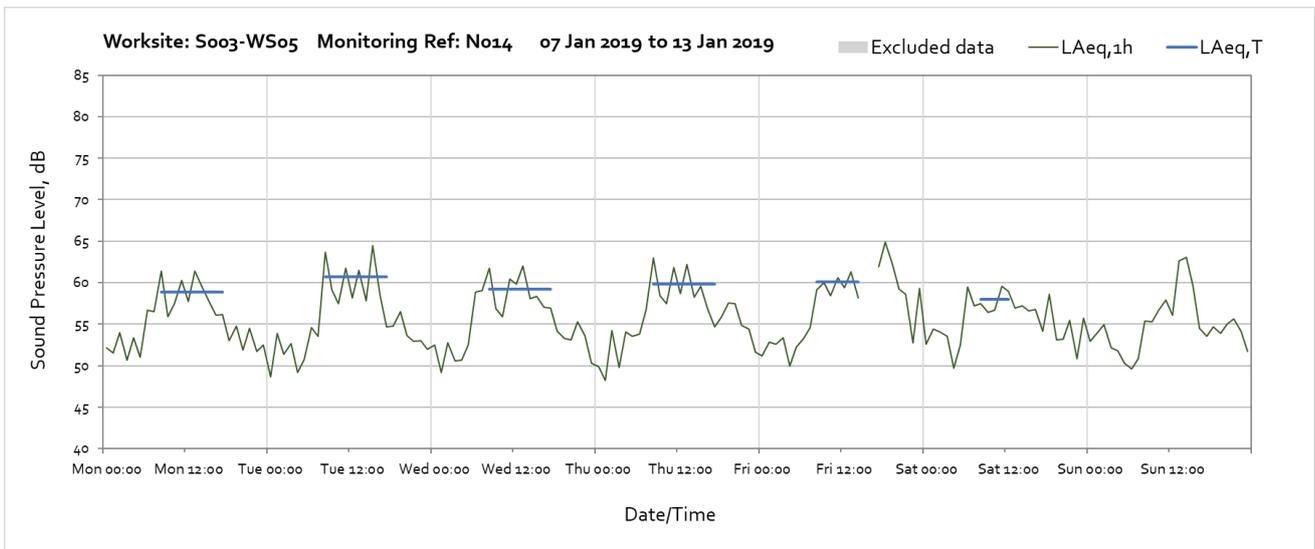




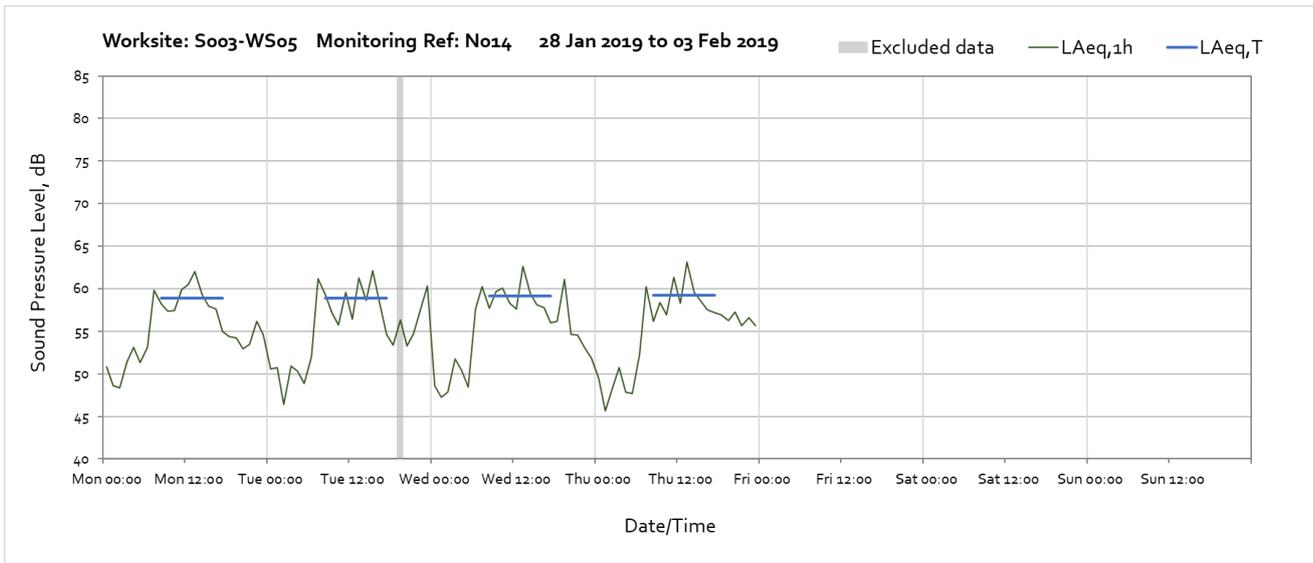
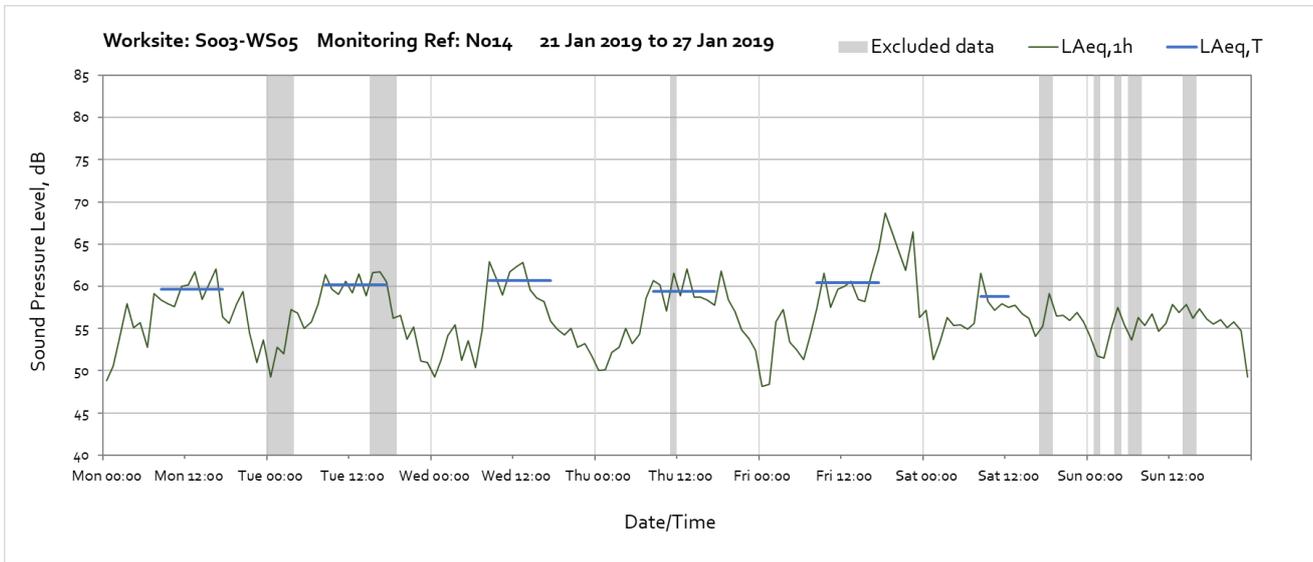
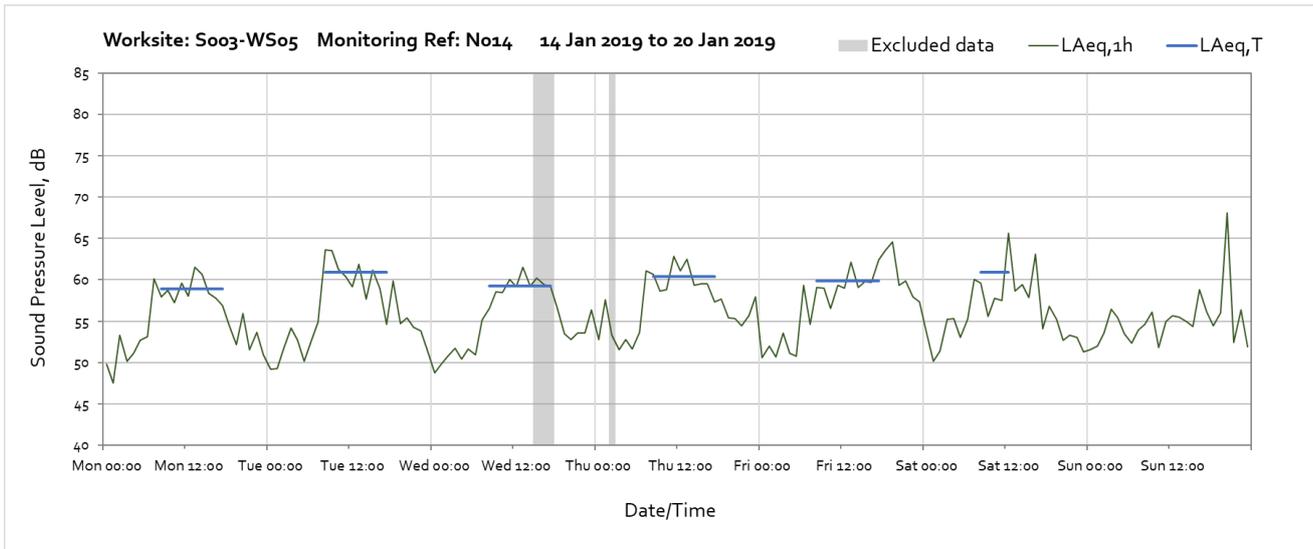
Worksite: S003-WS05 – Monitoring Ref: N014



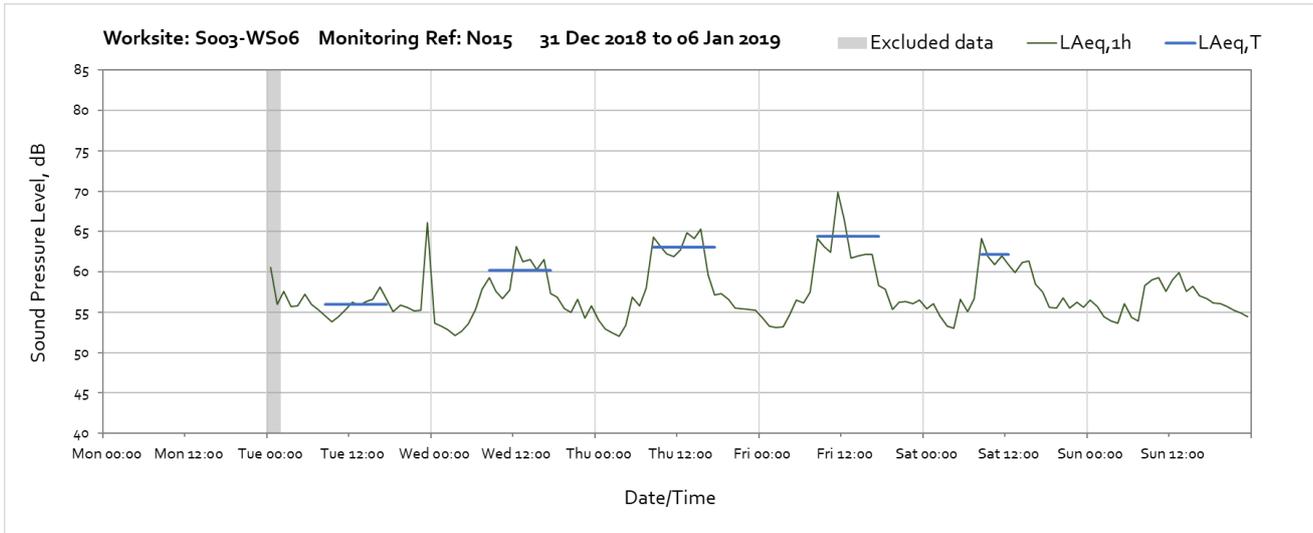
Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.



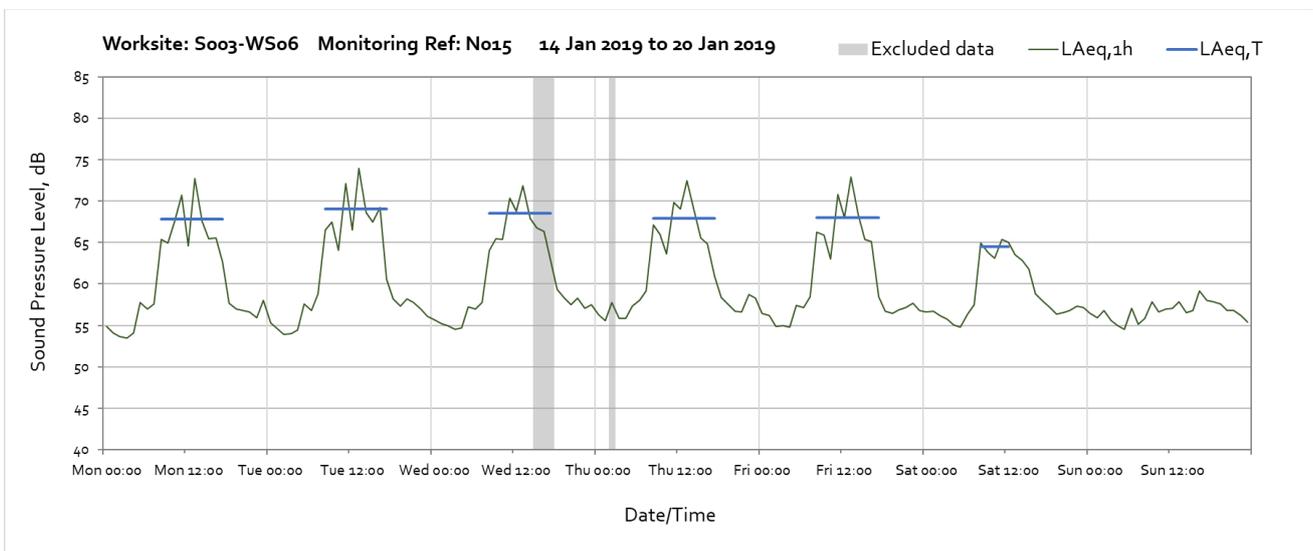
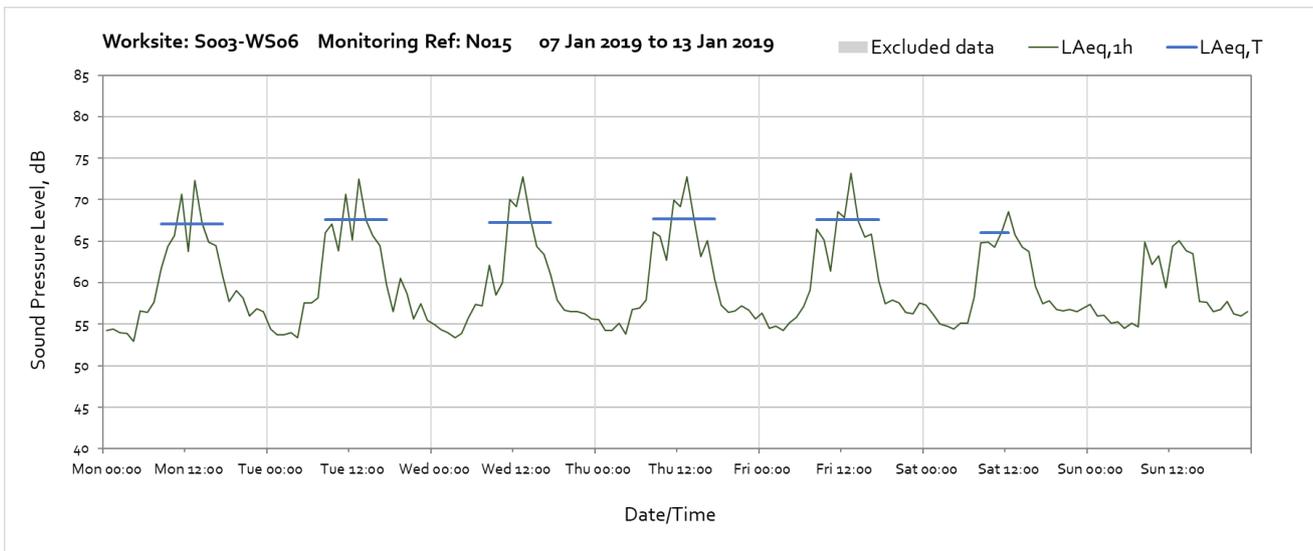
Note – Missing data between 15:00 and 17:00 on Friday 11th January due to a loss of power at the noise monitor.

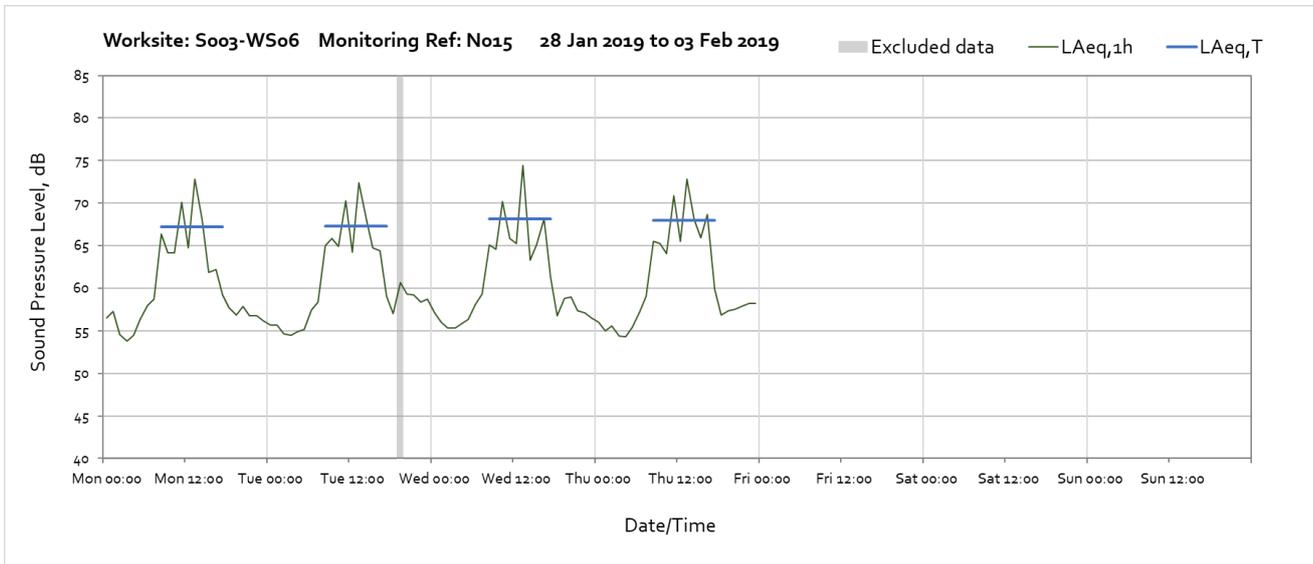
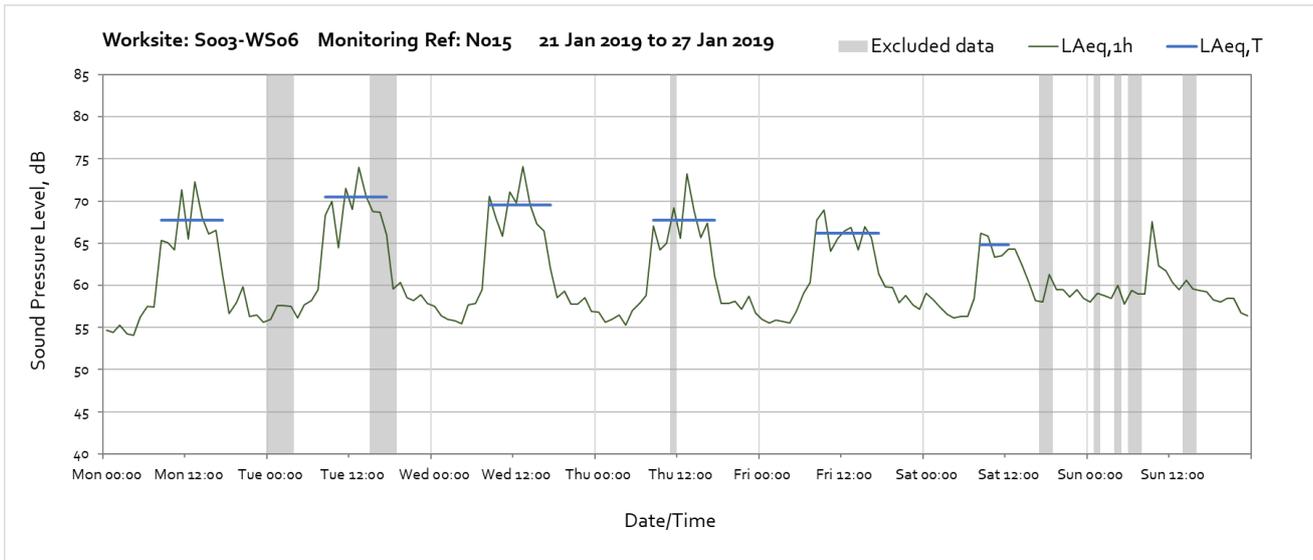


Worksite: S003-WS06 – Monitoring Ref: N015

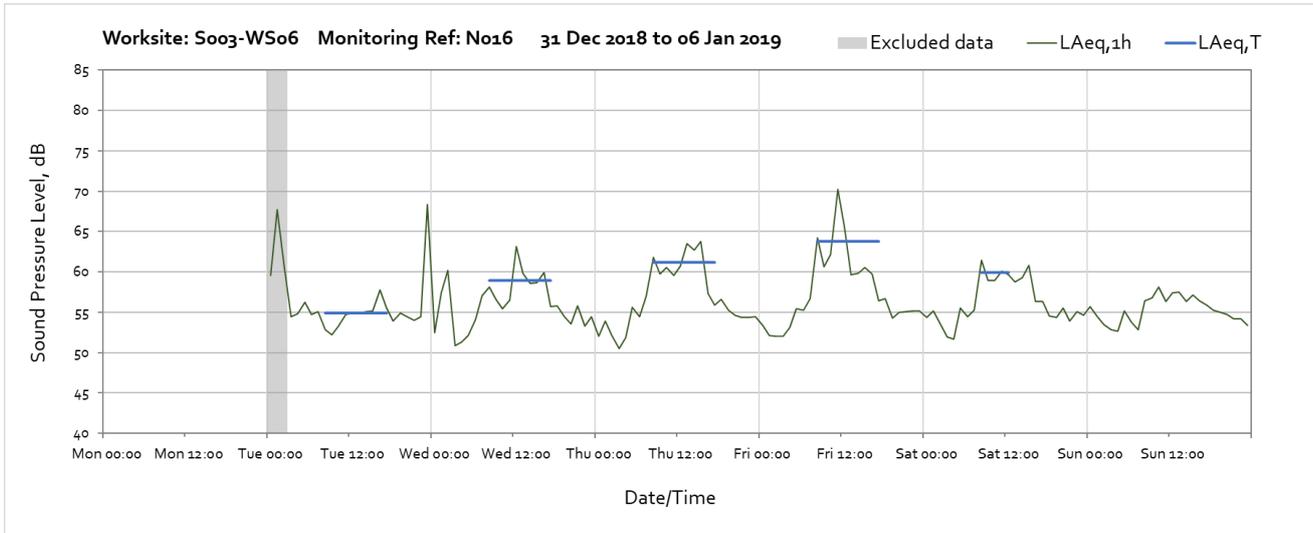


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

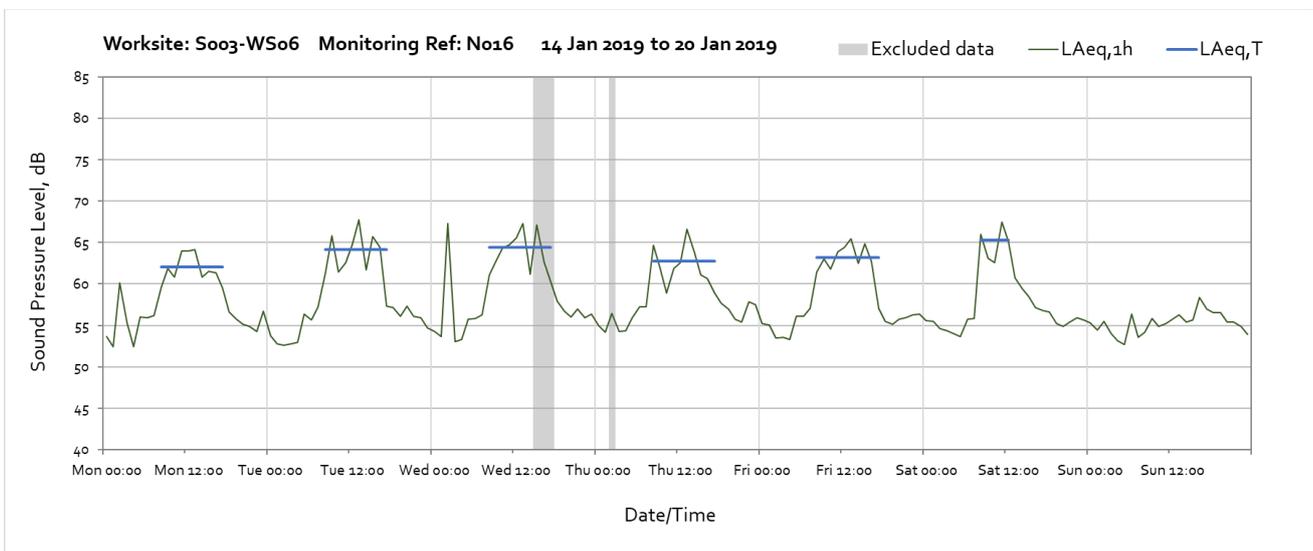
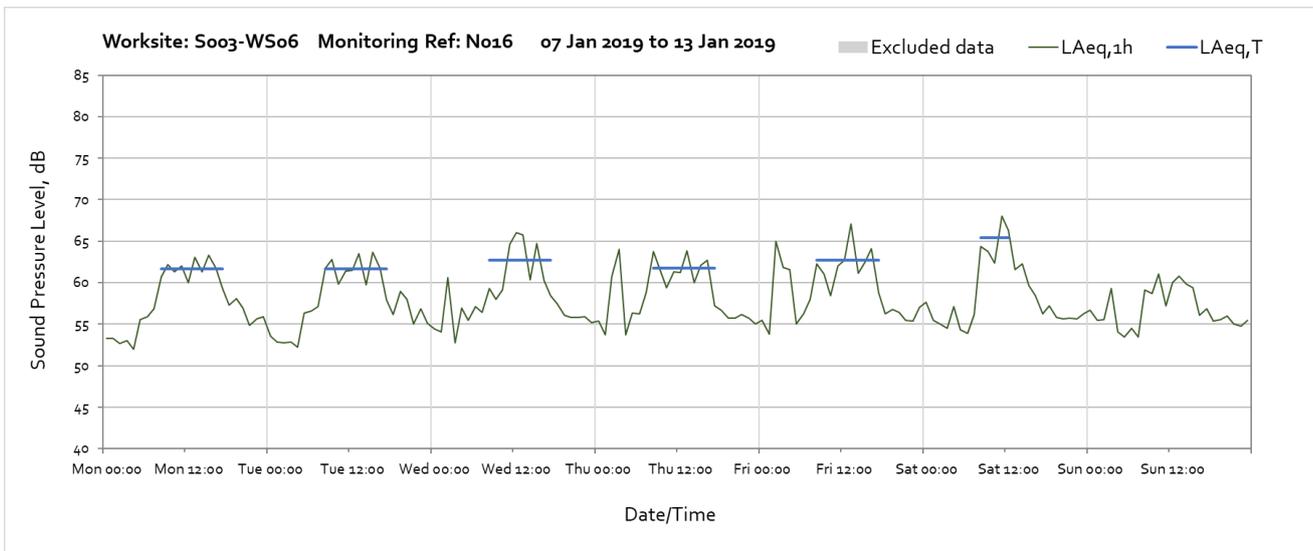


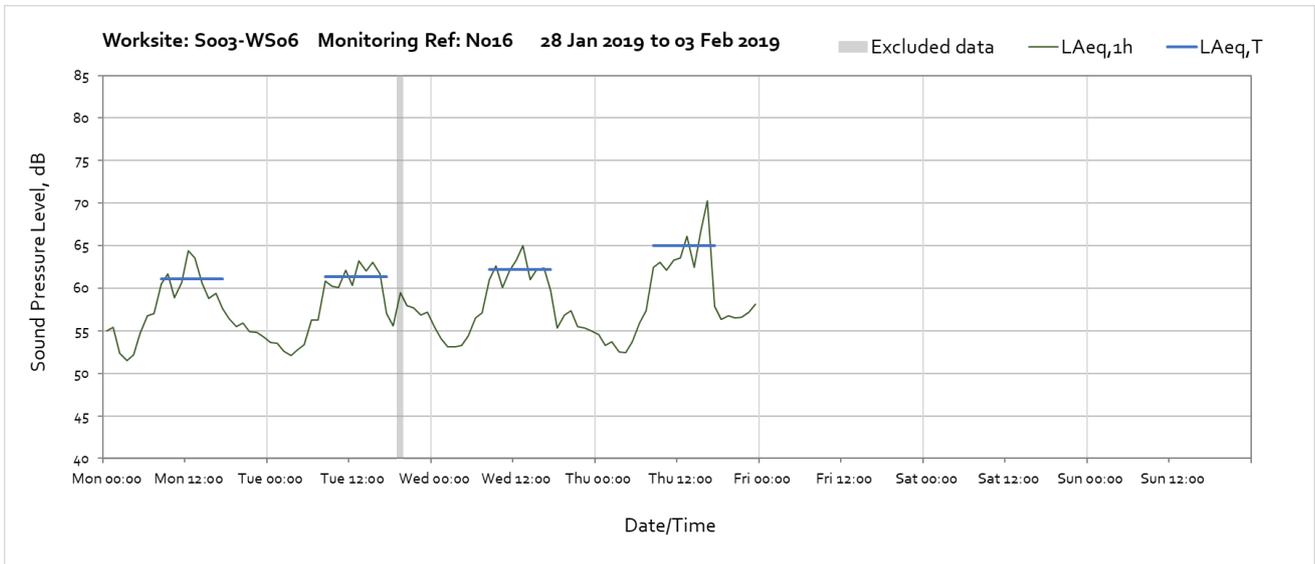
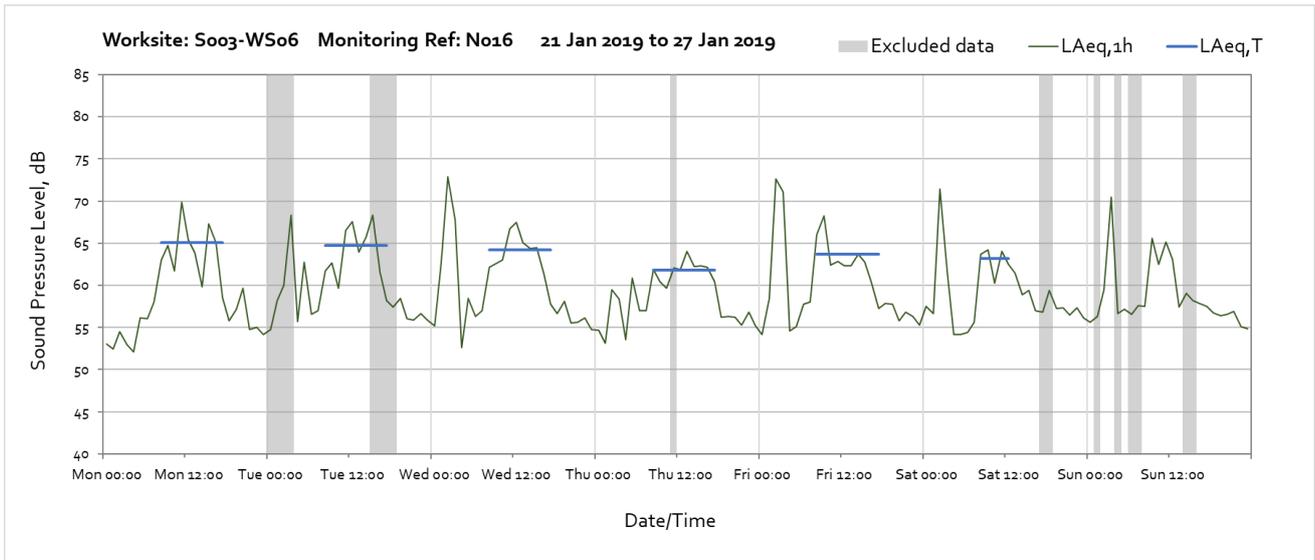


Worksite: S003-WS06 – Monitoring Ref: N016

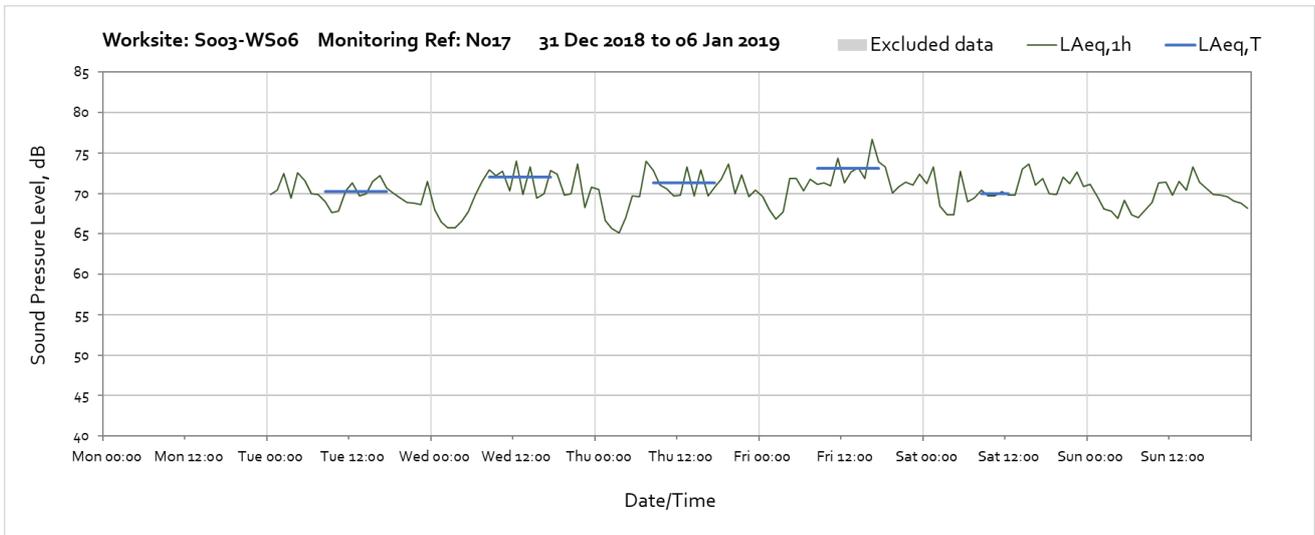


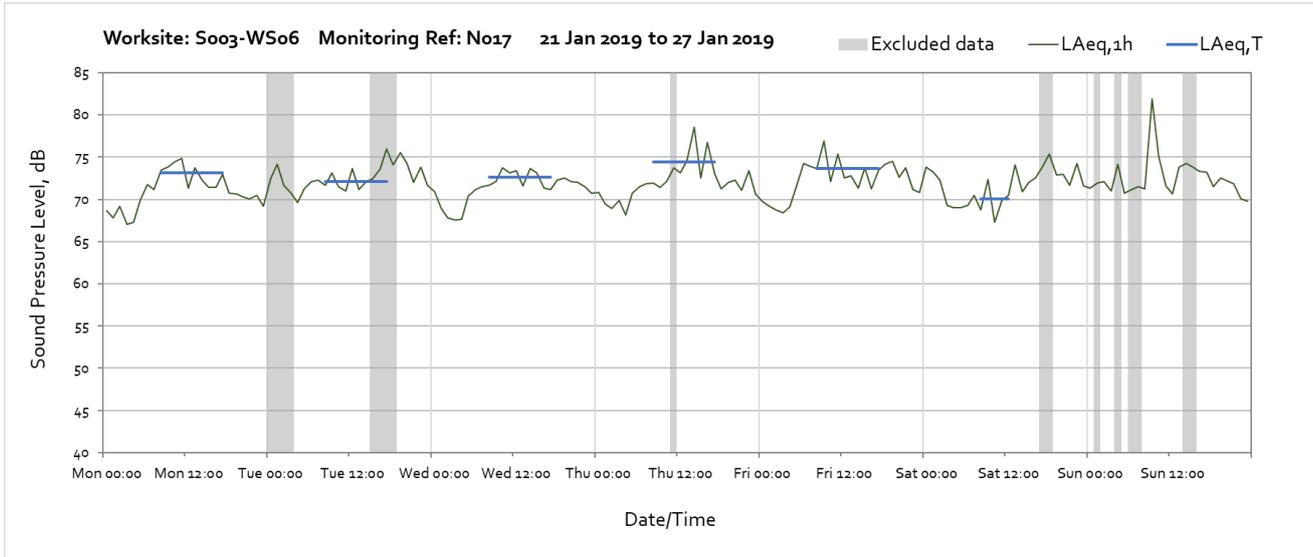
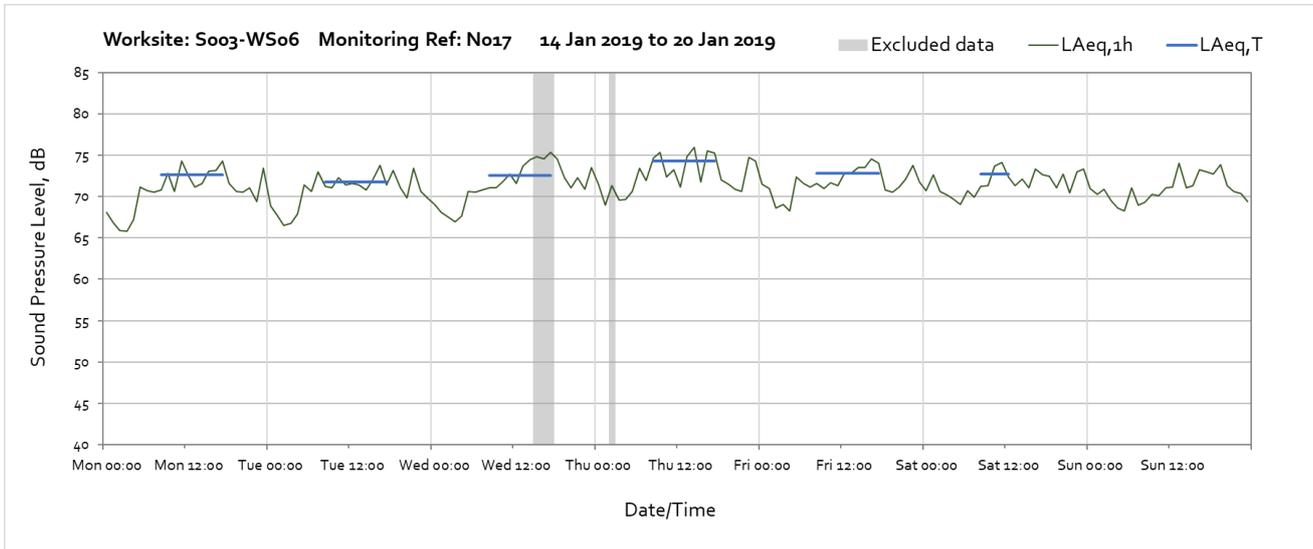
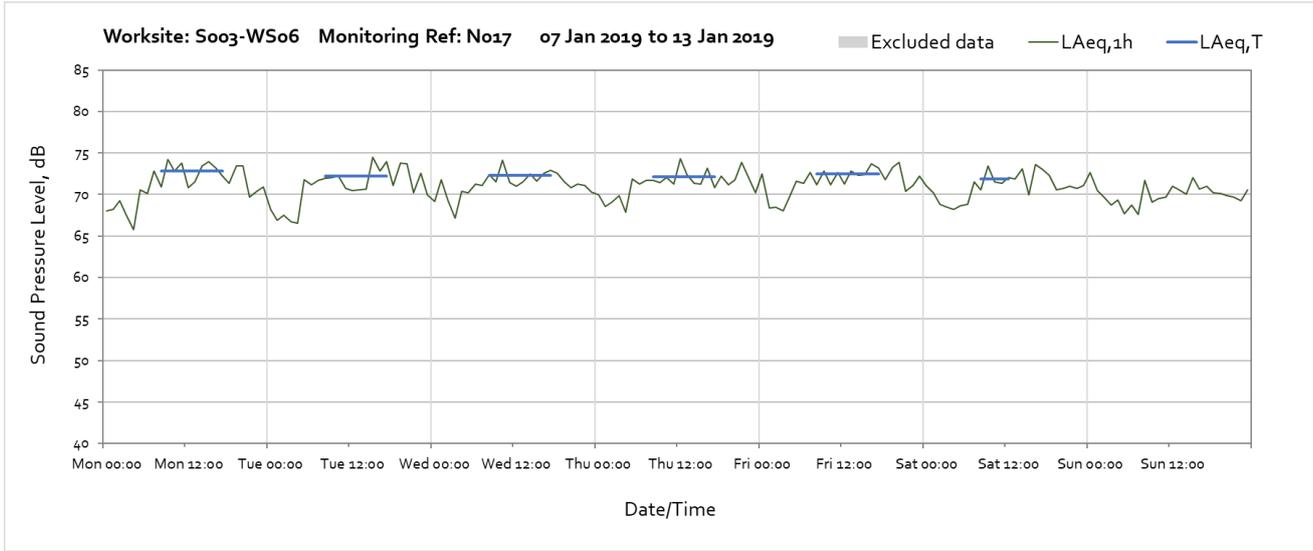
Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

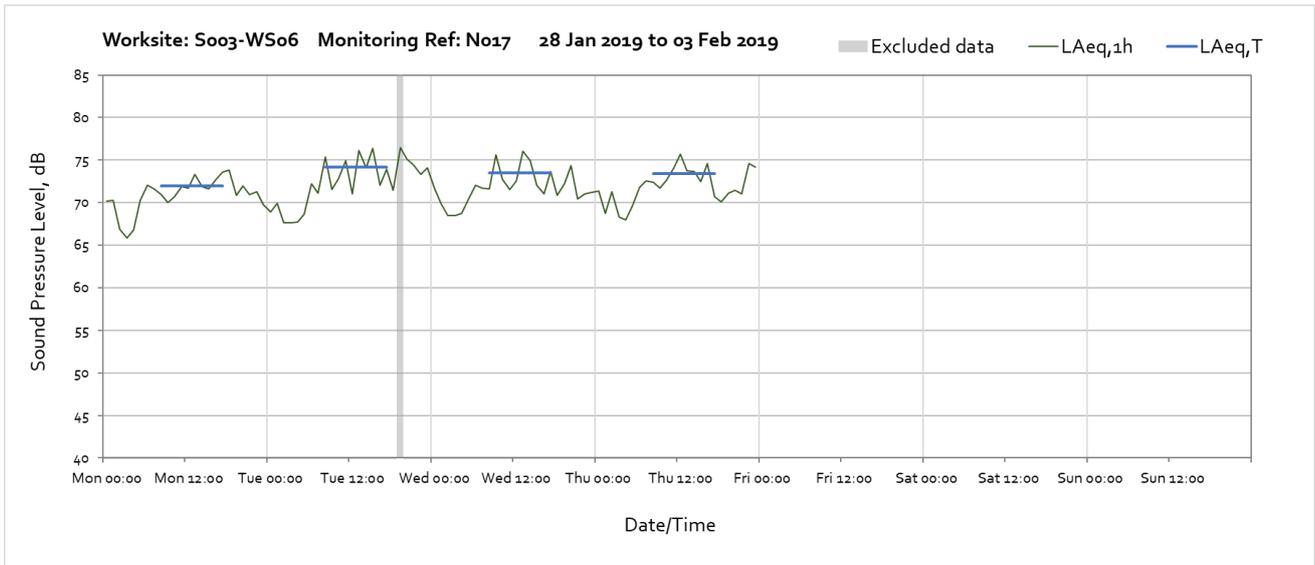




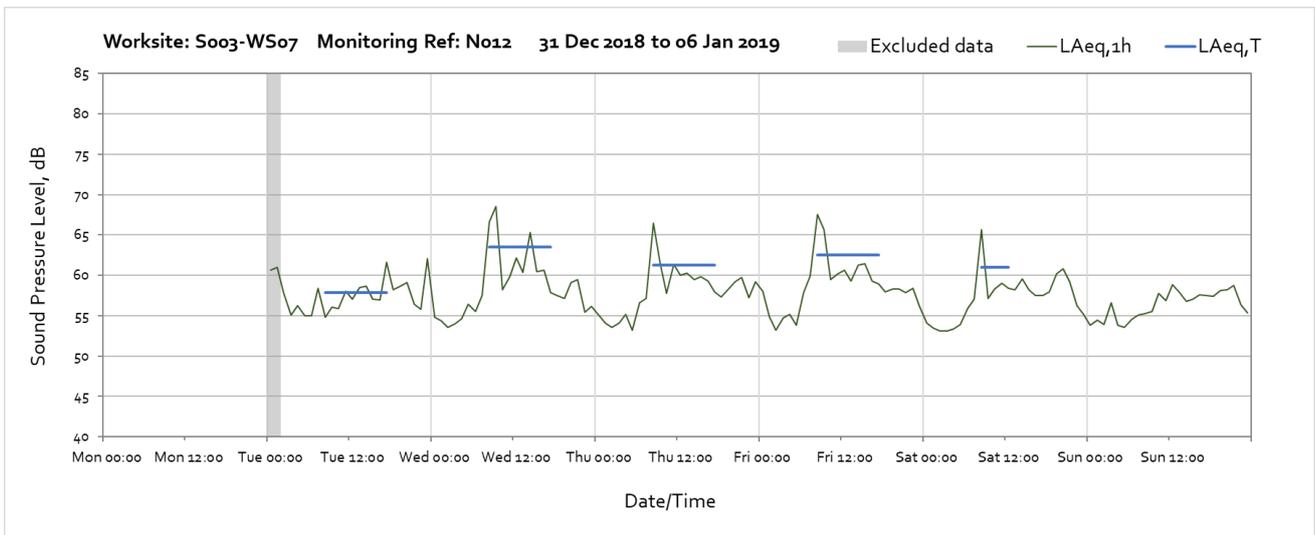
Worksite: S003-WSo6 – Monitoring Ref: N017



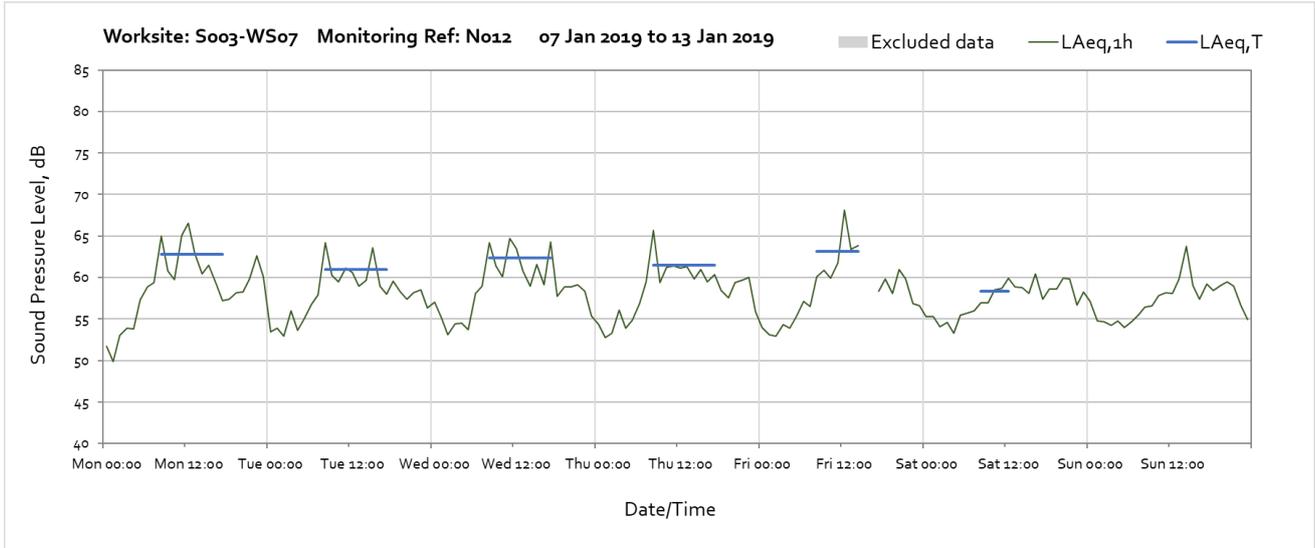




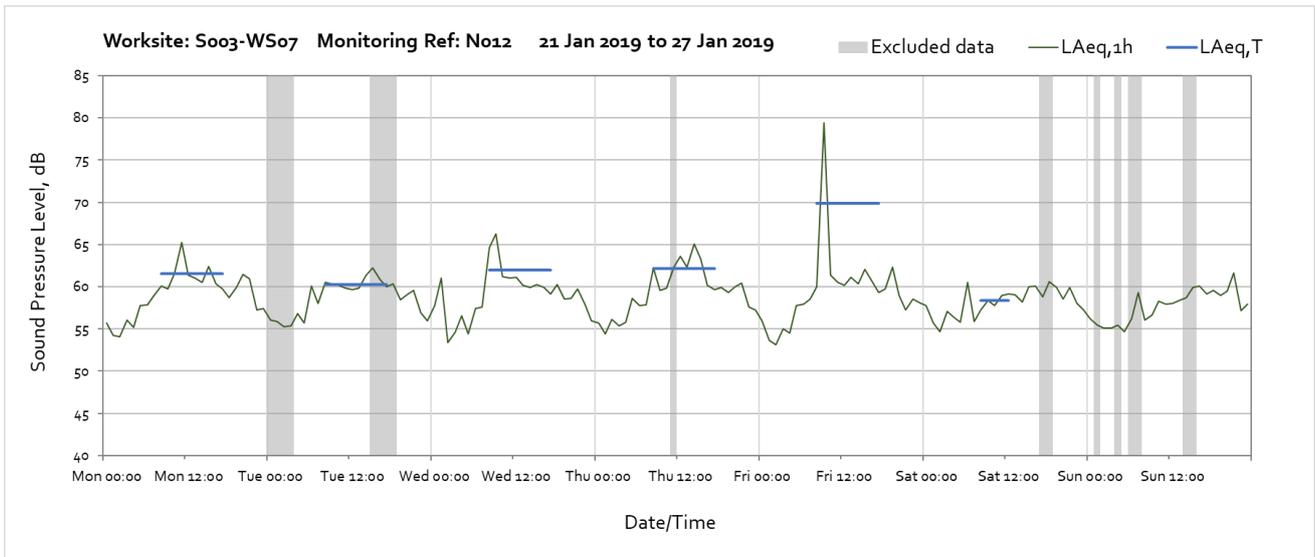
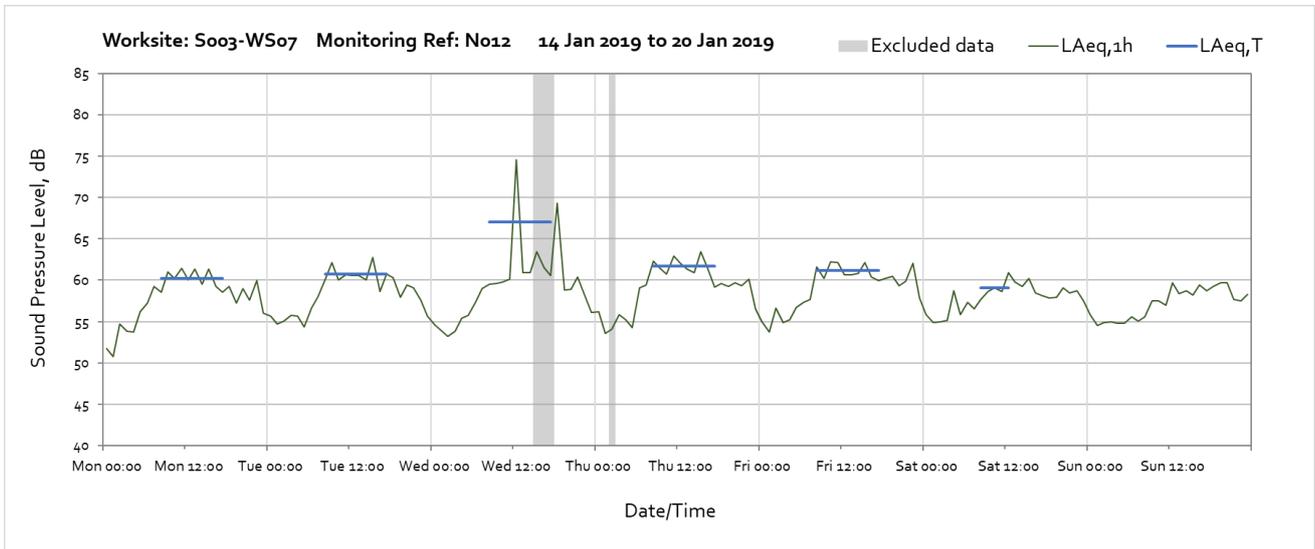
Worksite: S003-WSo7 – Monitoring Ref: N012

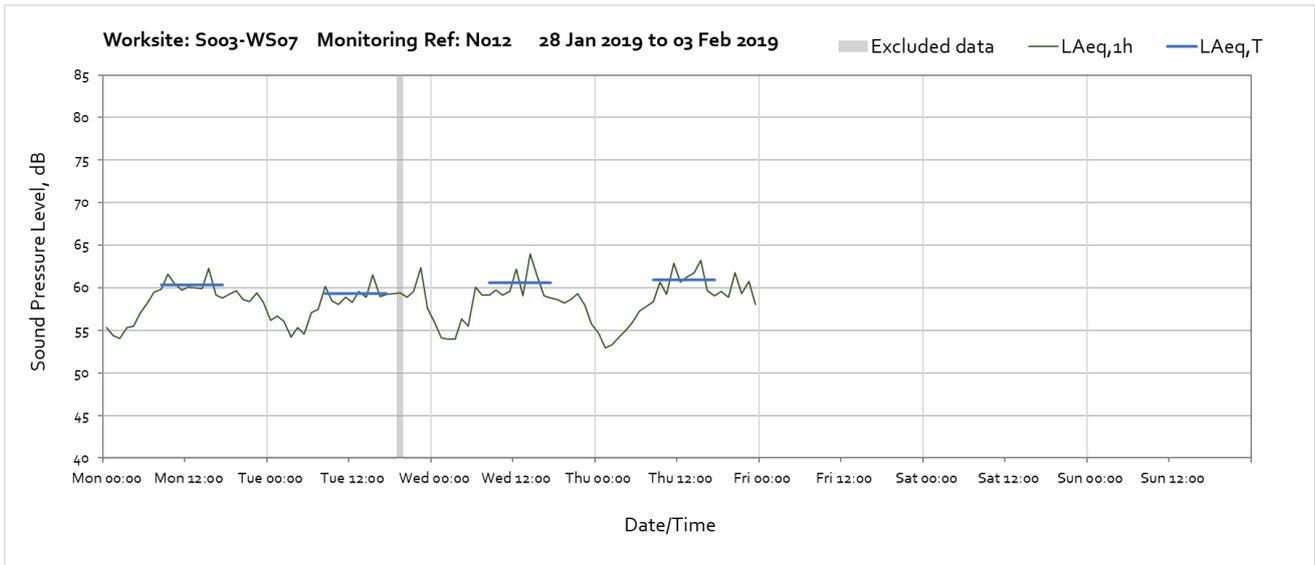


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

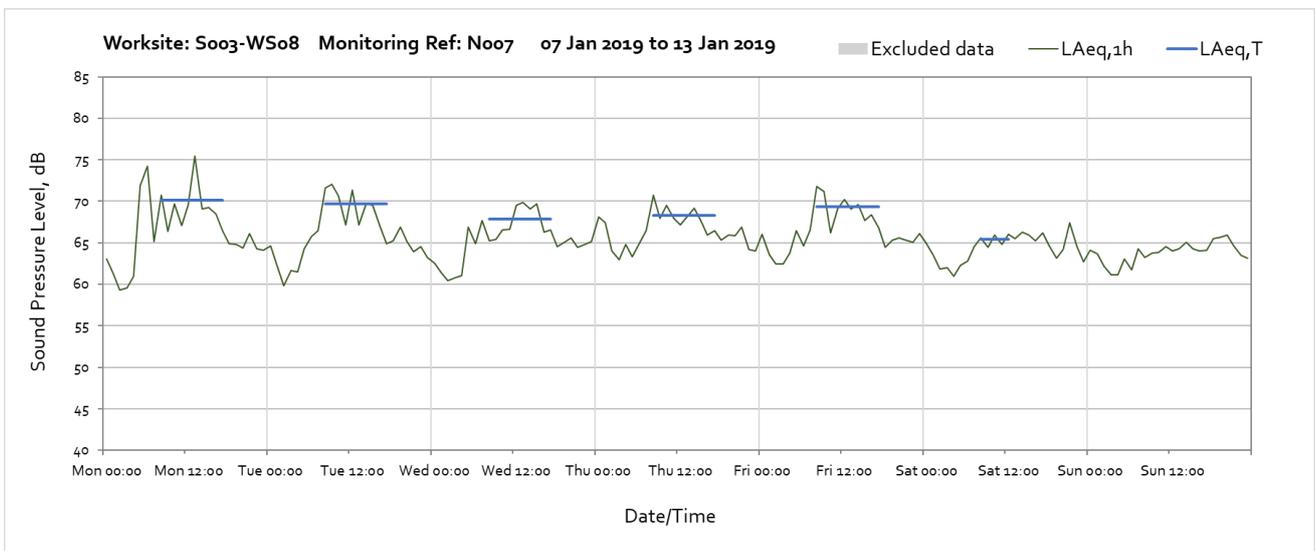
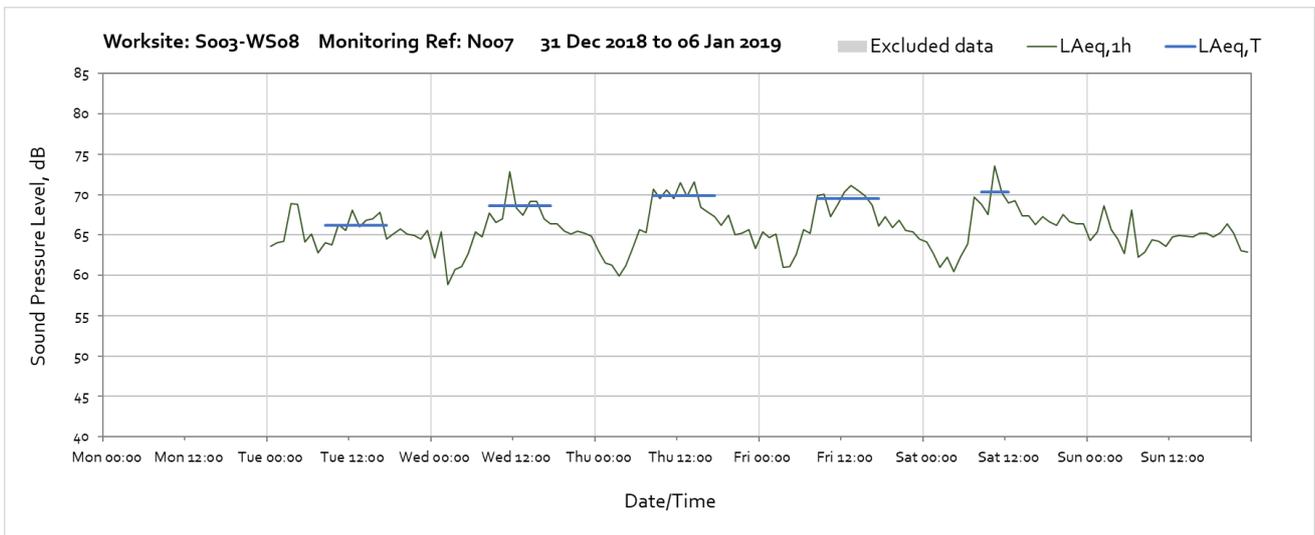


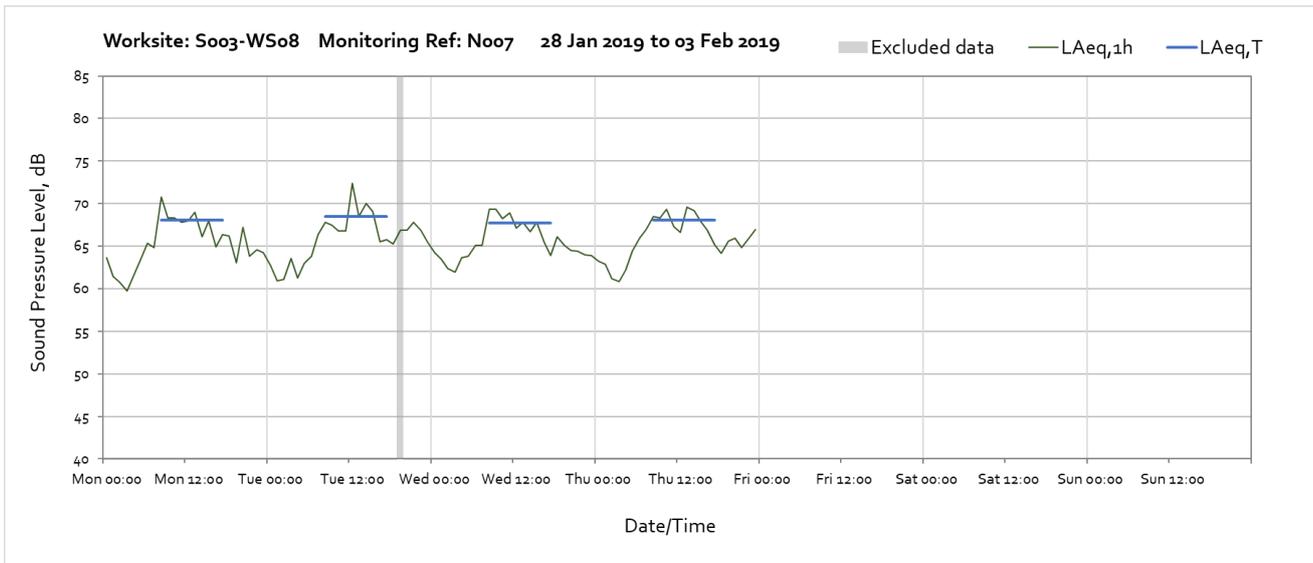
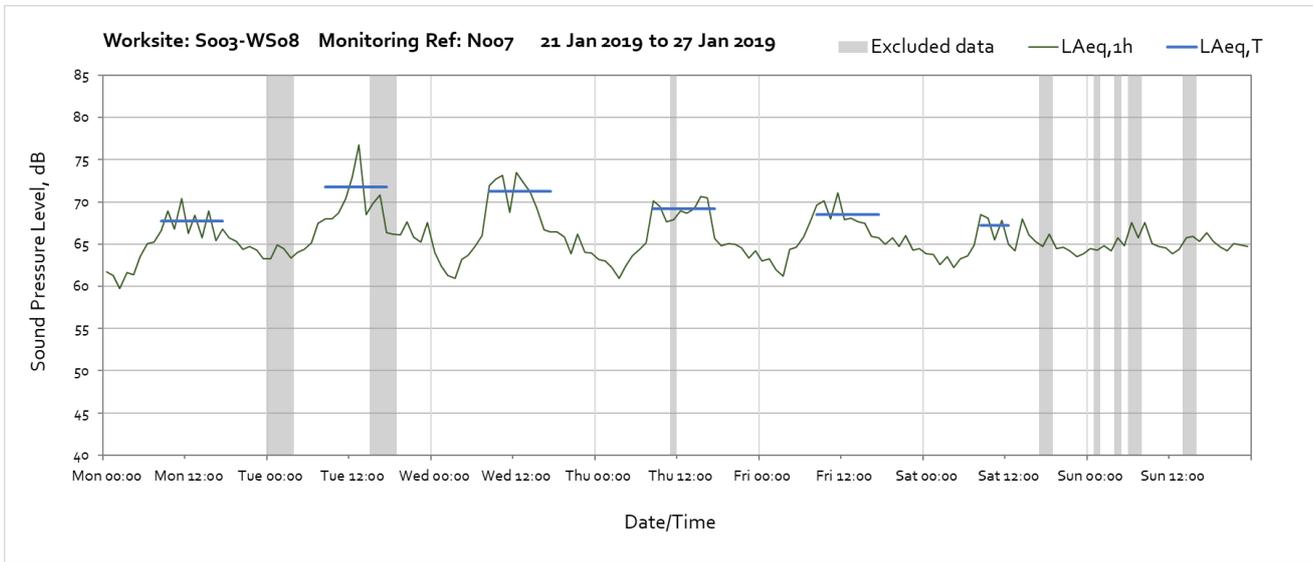
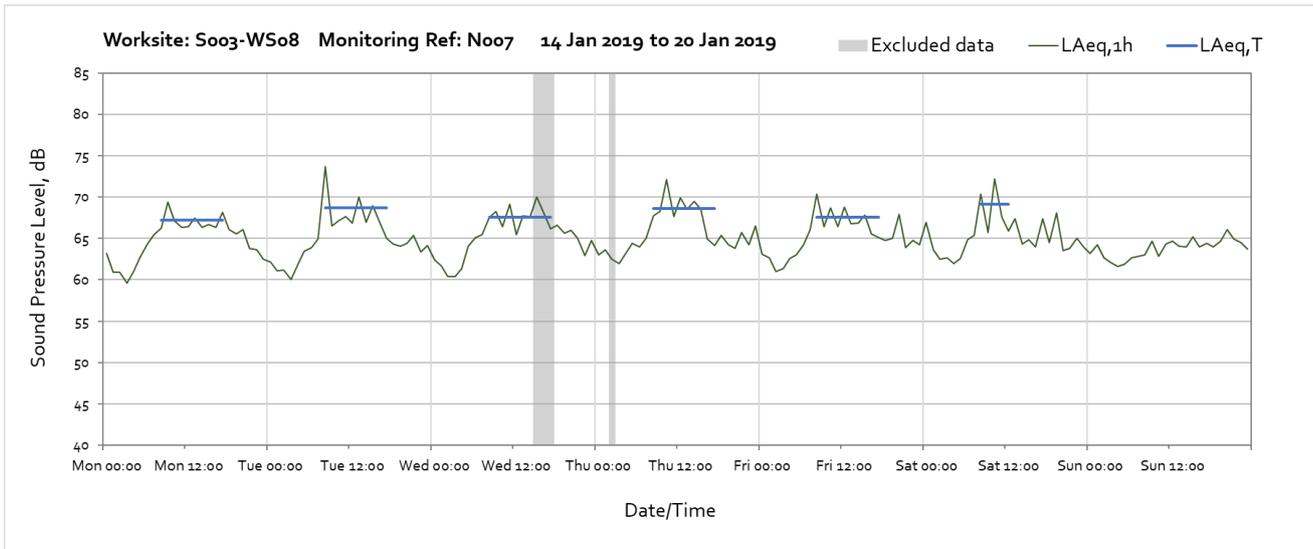
Note – Missing data between 15:00 and 17:00 on Friday 11th January due to a loss of power at the noise monitor.



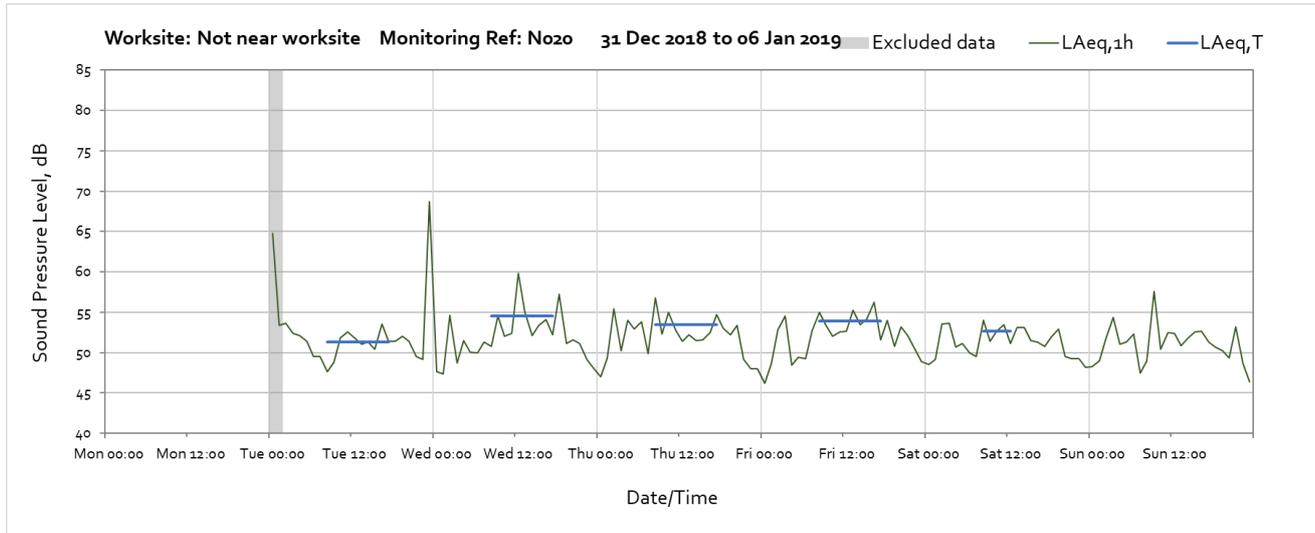


Worksite: S003-WS08 – Monitoring Ref: N007

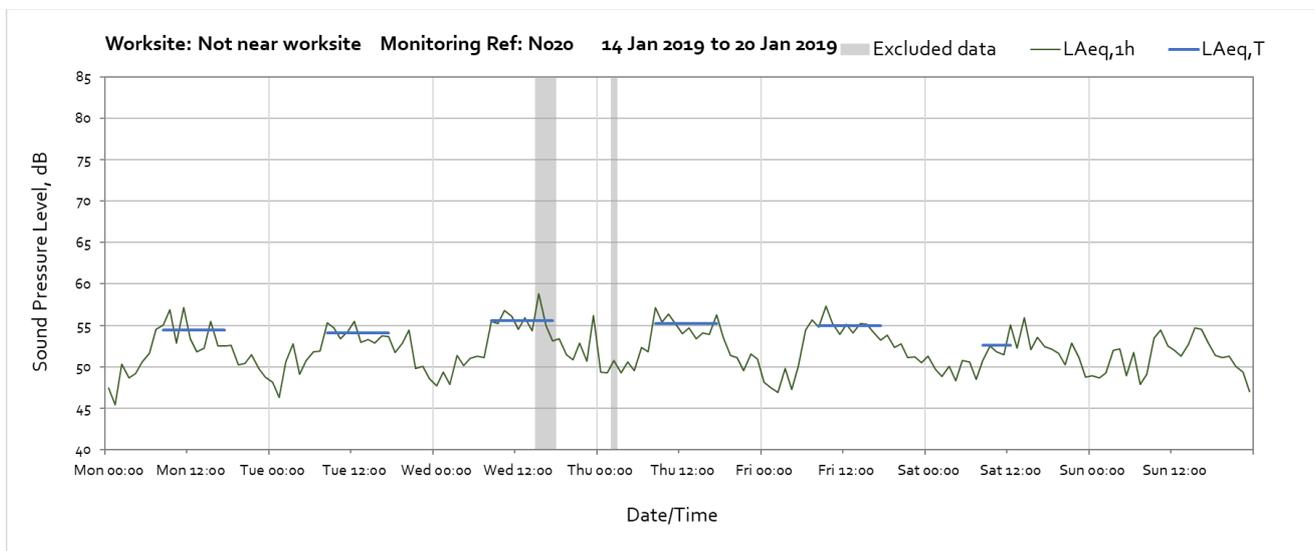
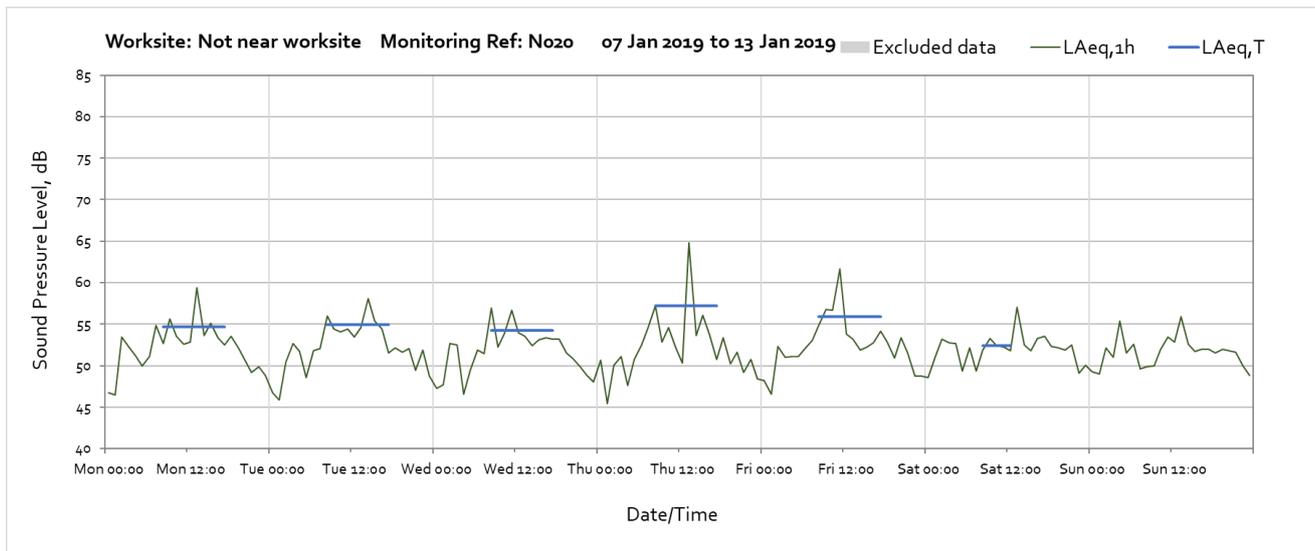


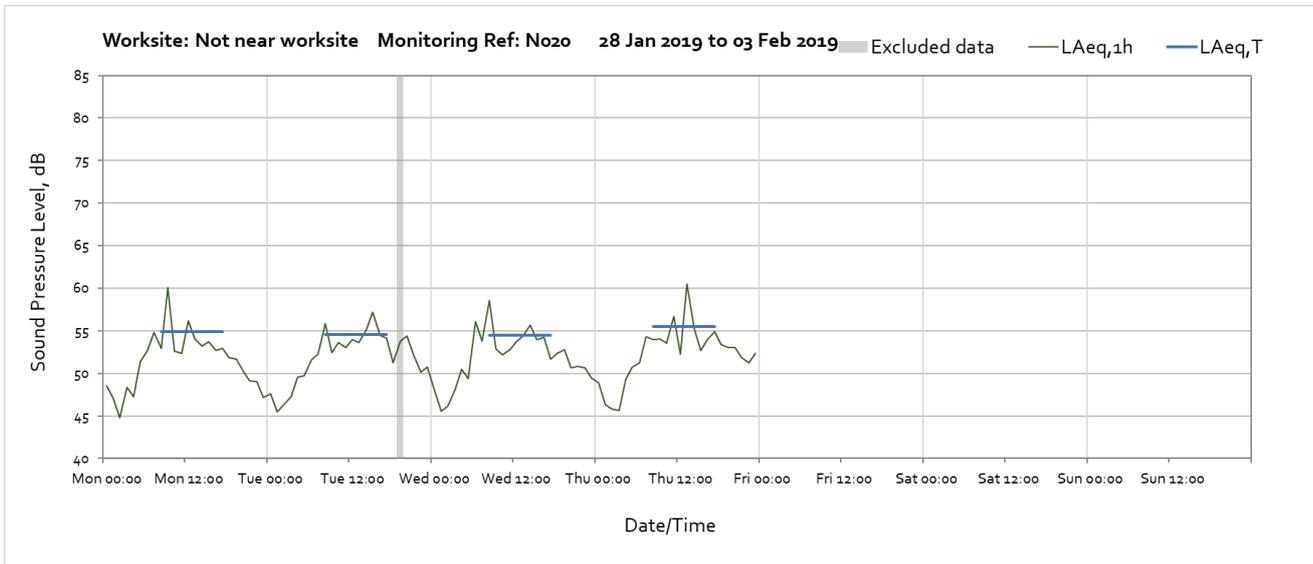
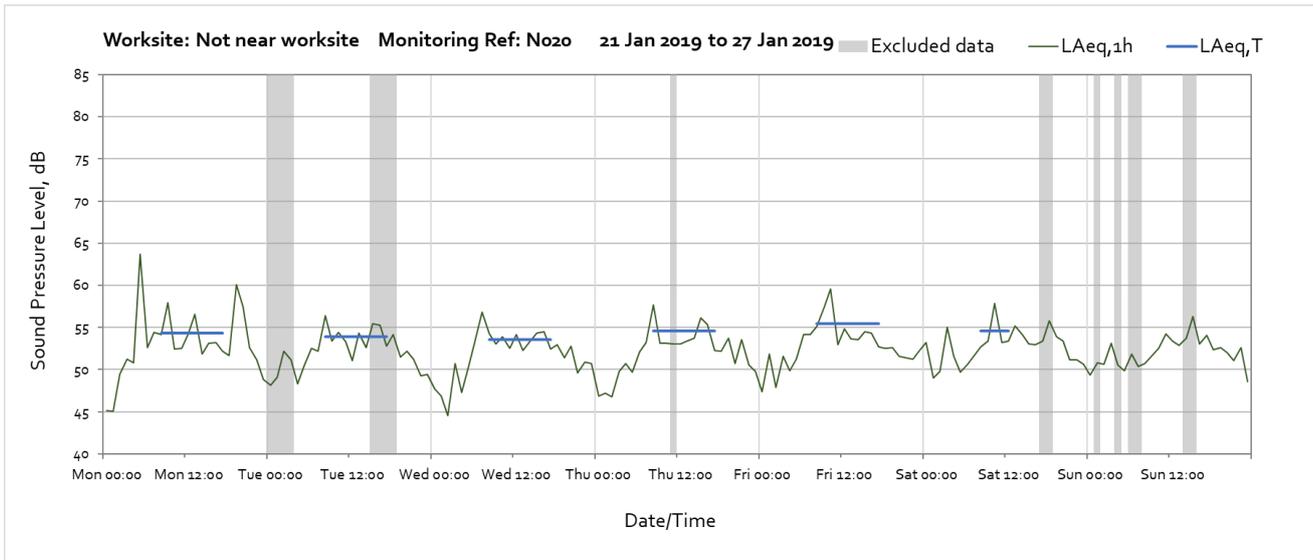


Monitoring Ref: N020

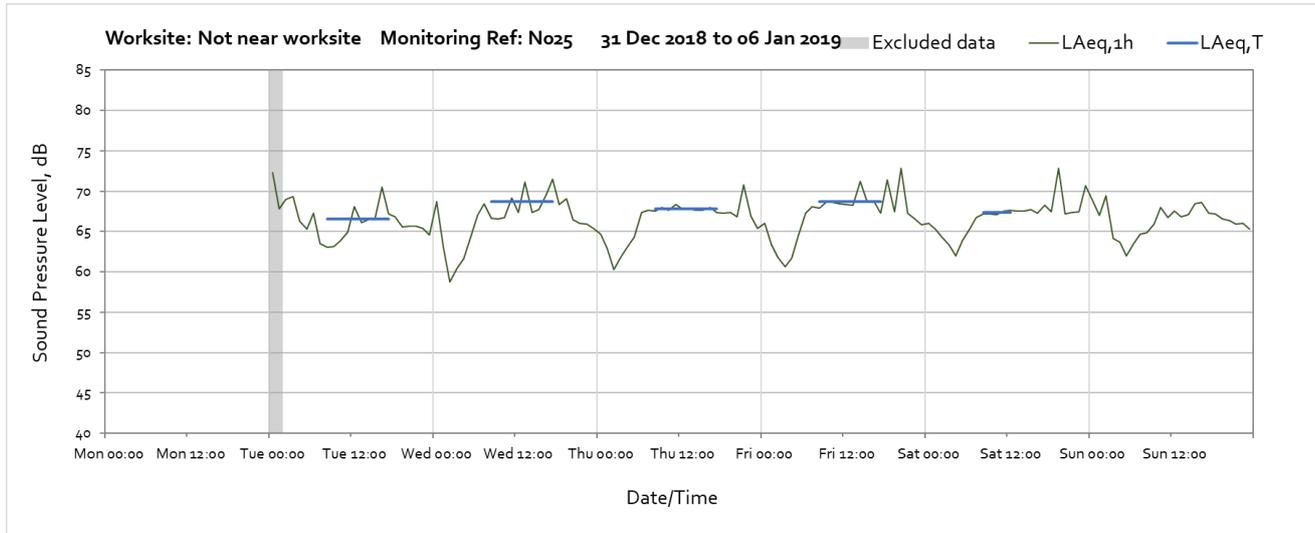


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

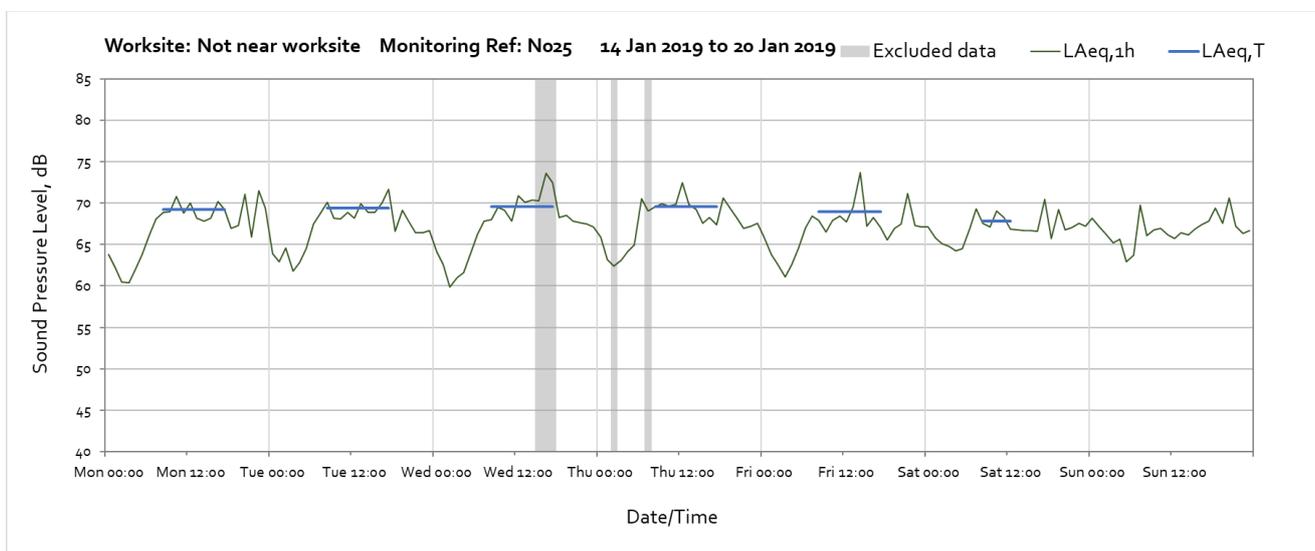
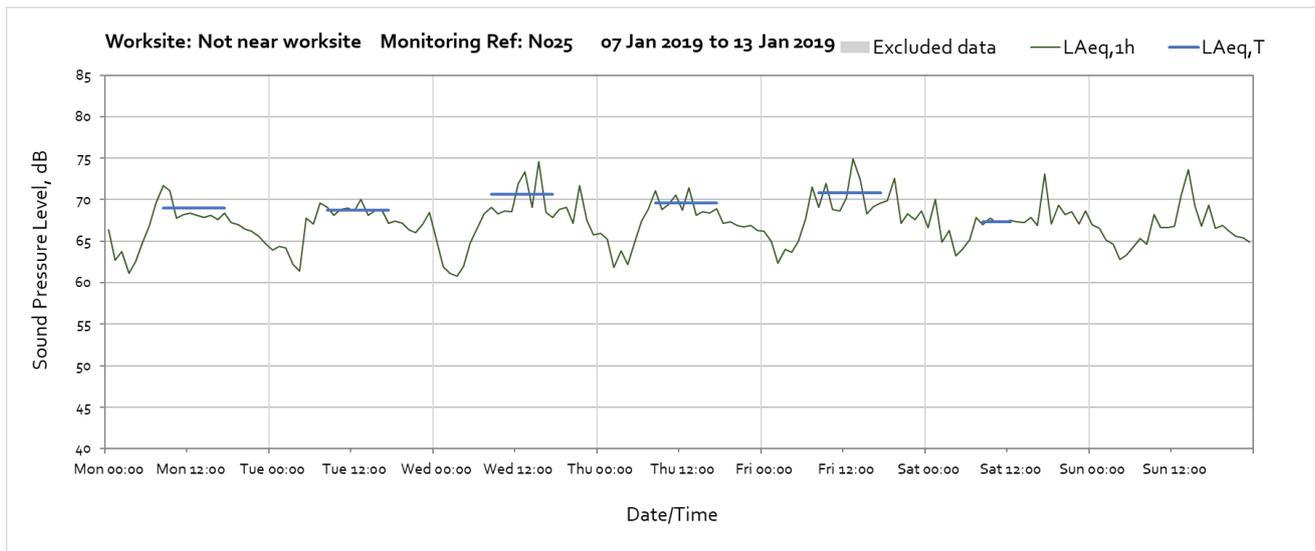


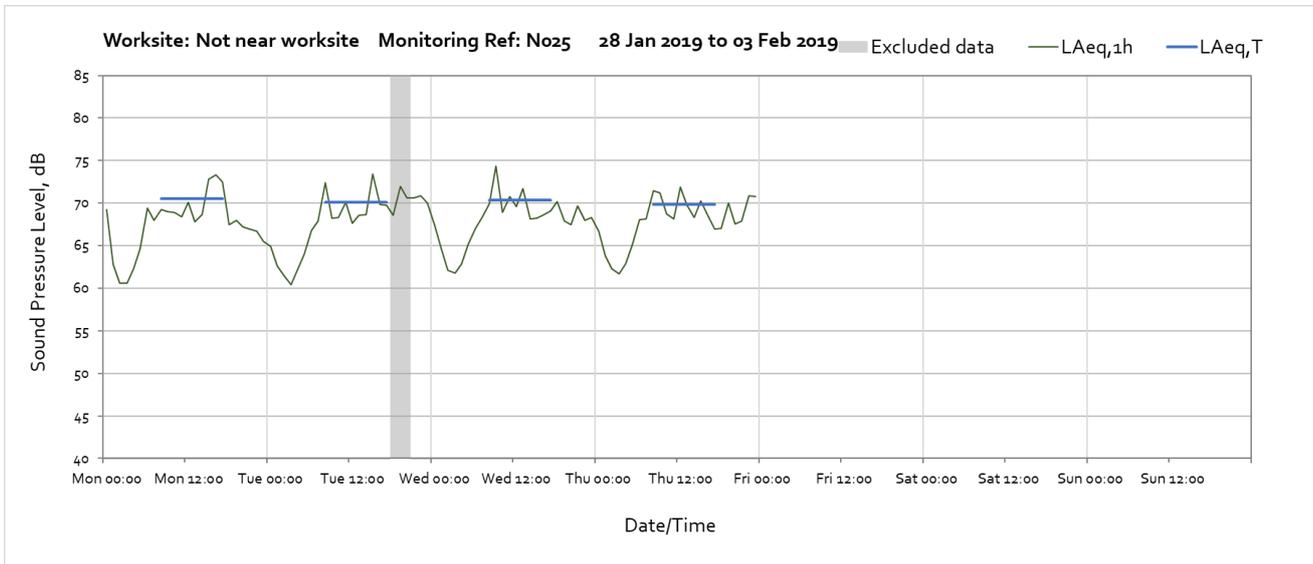
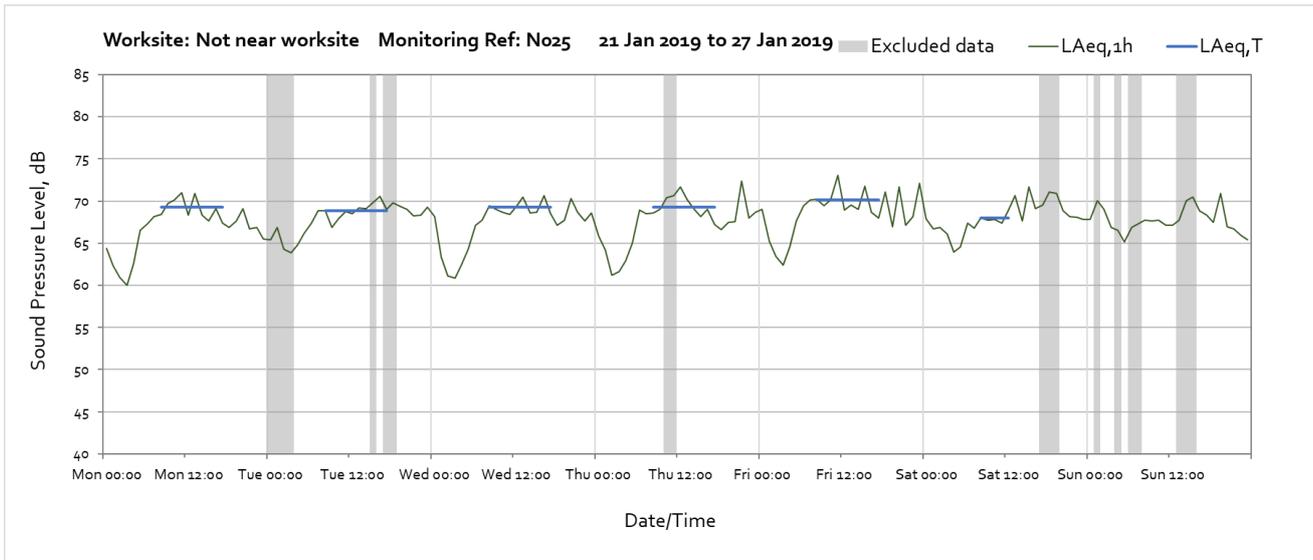


Monitoring Ref: N025

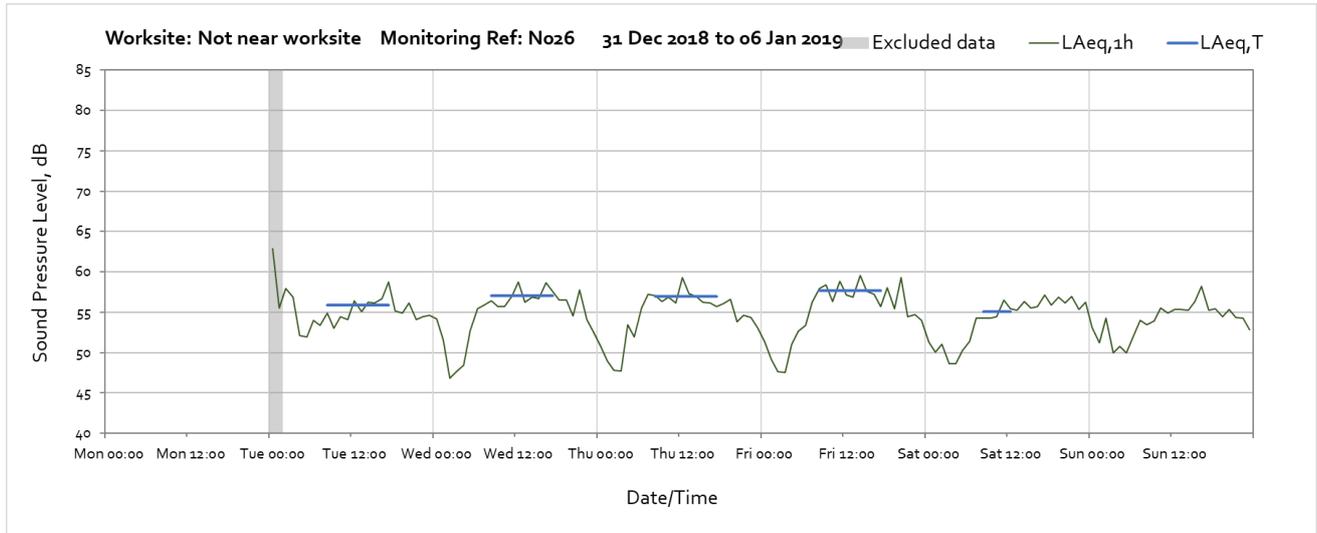


Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

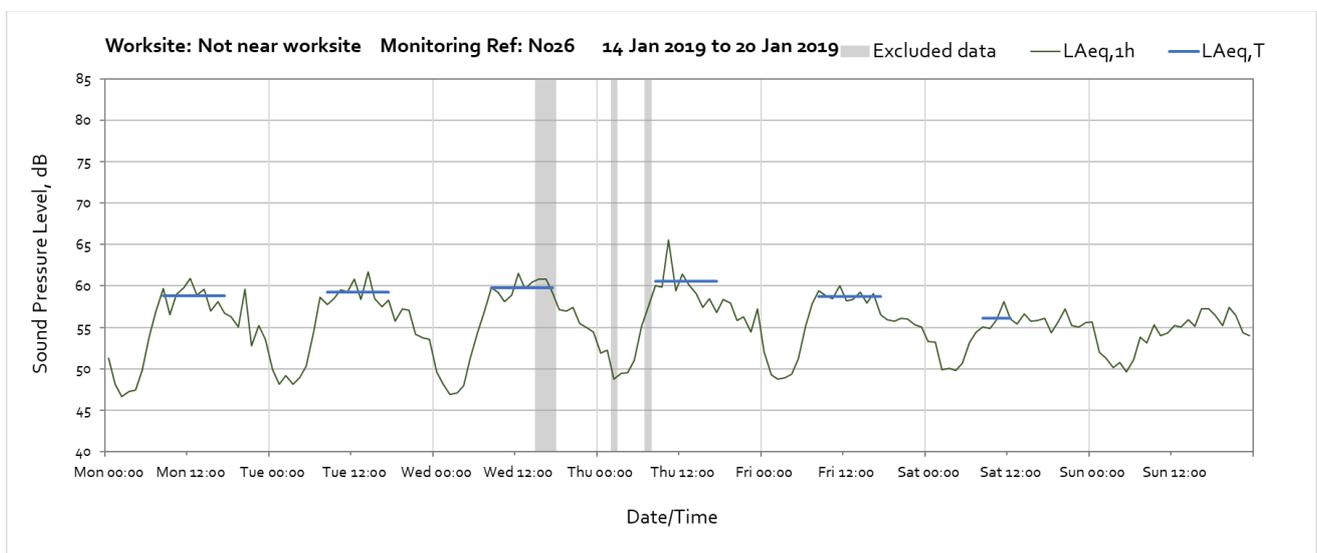
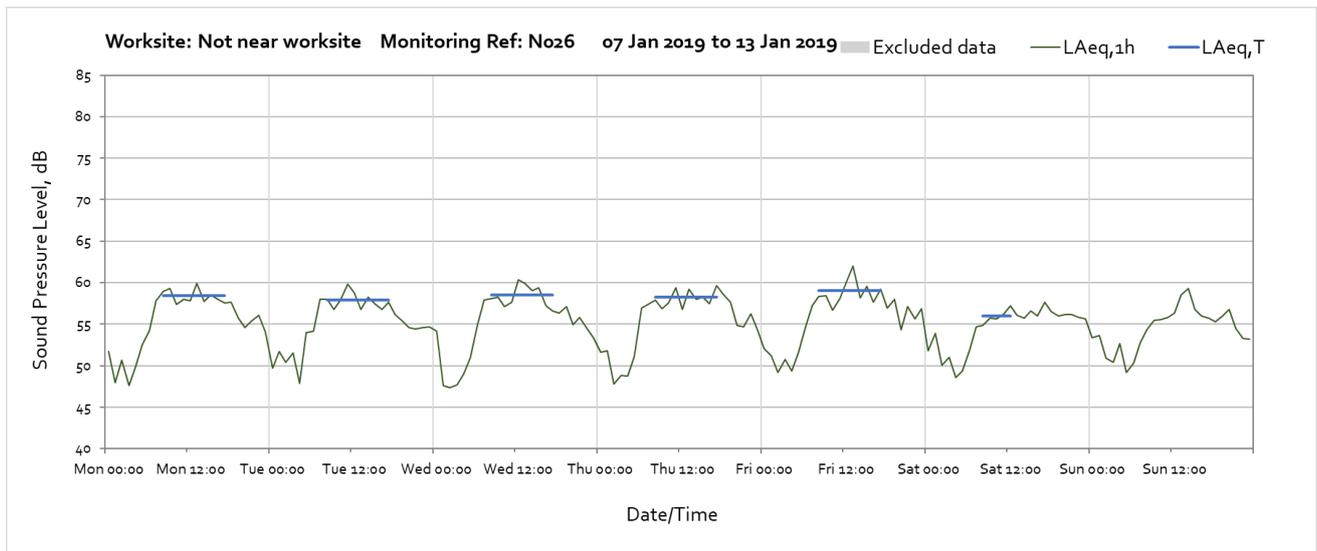


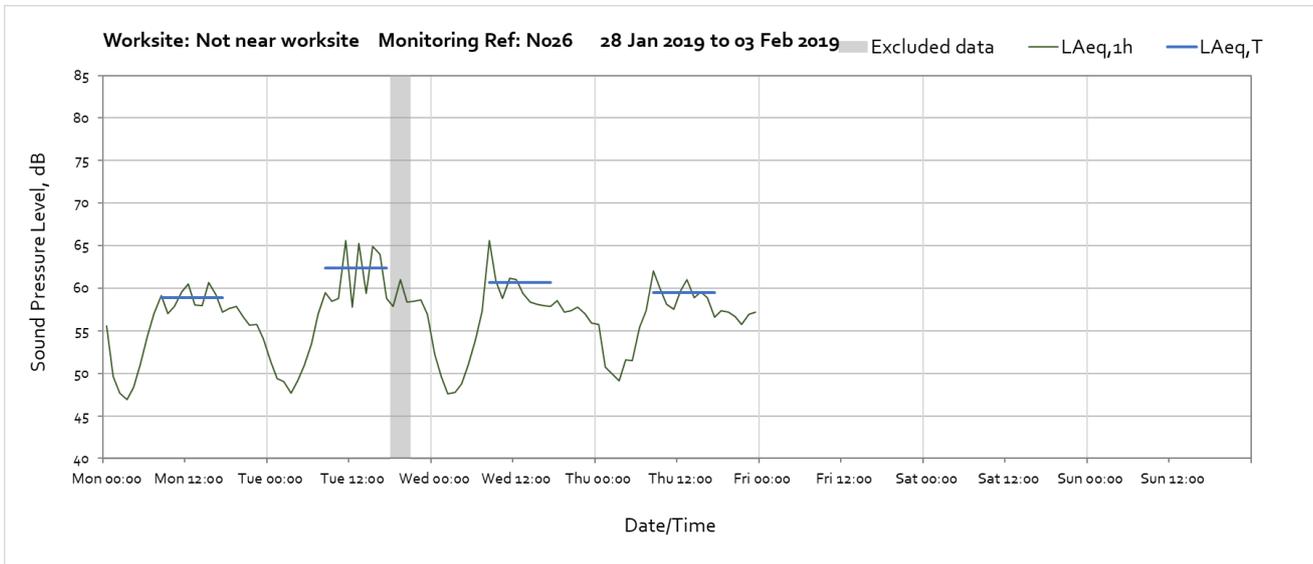
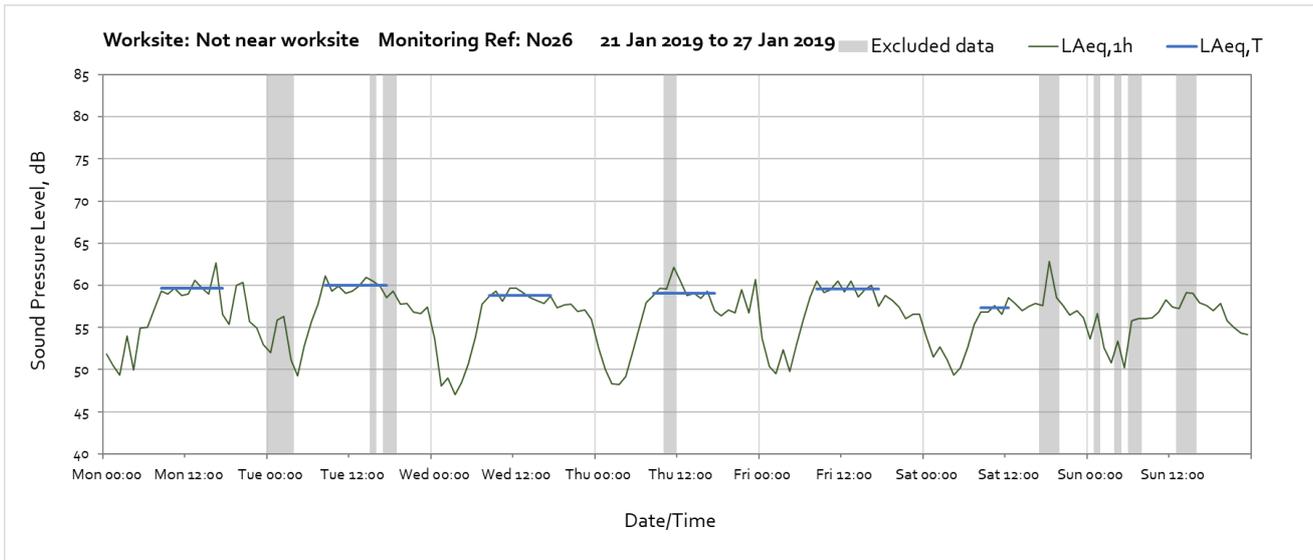


Monitoring Ref: N026



Note – High noise levels on the early hours of the 1st January were due to New Year’s Eve celebrations and have been excluded to calculate values in Table 5.

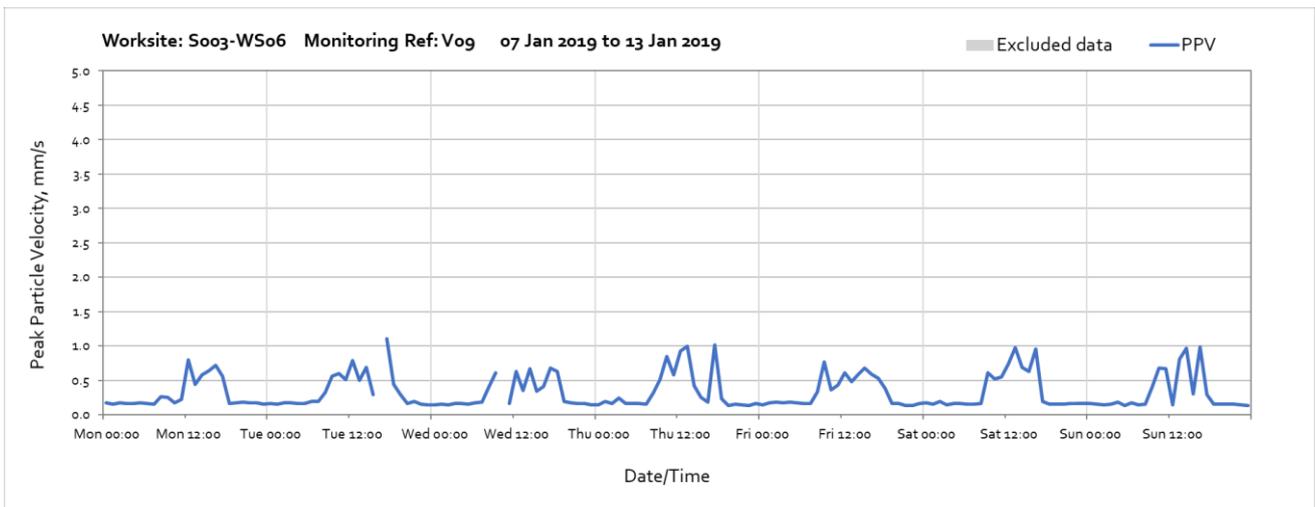
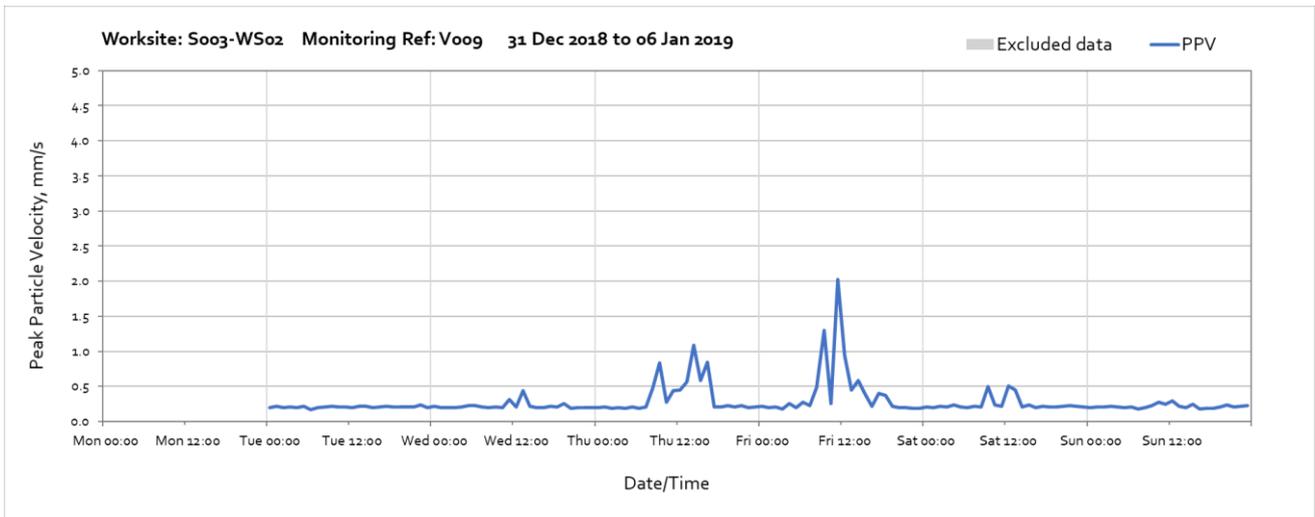




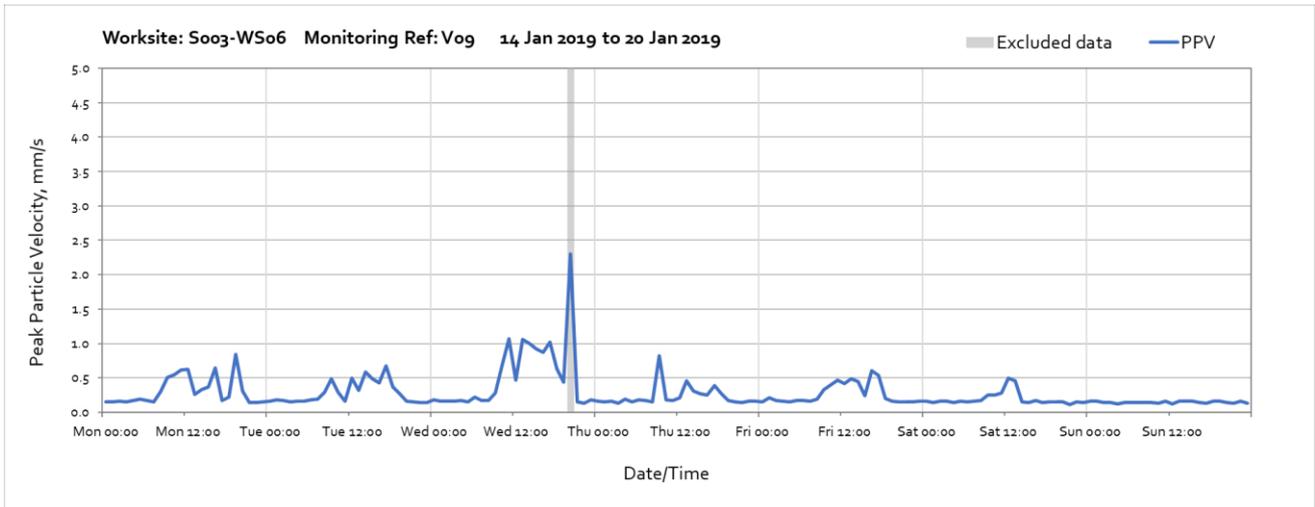
Vibration

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.

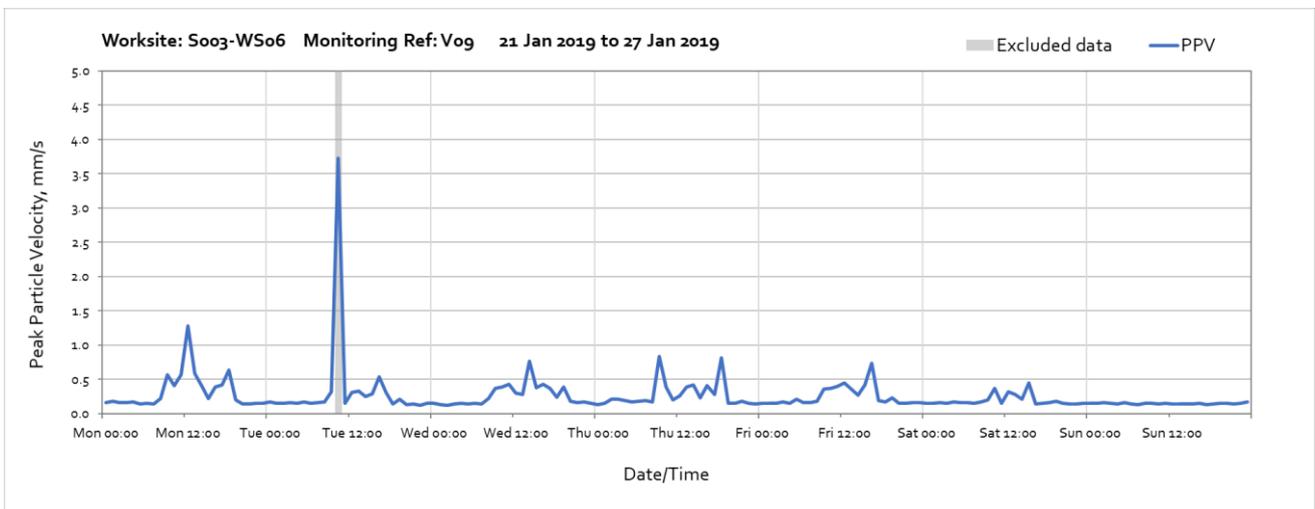
Worksite: S003-WS02 – Monitoring Ref: V09



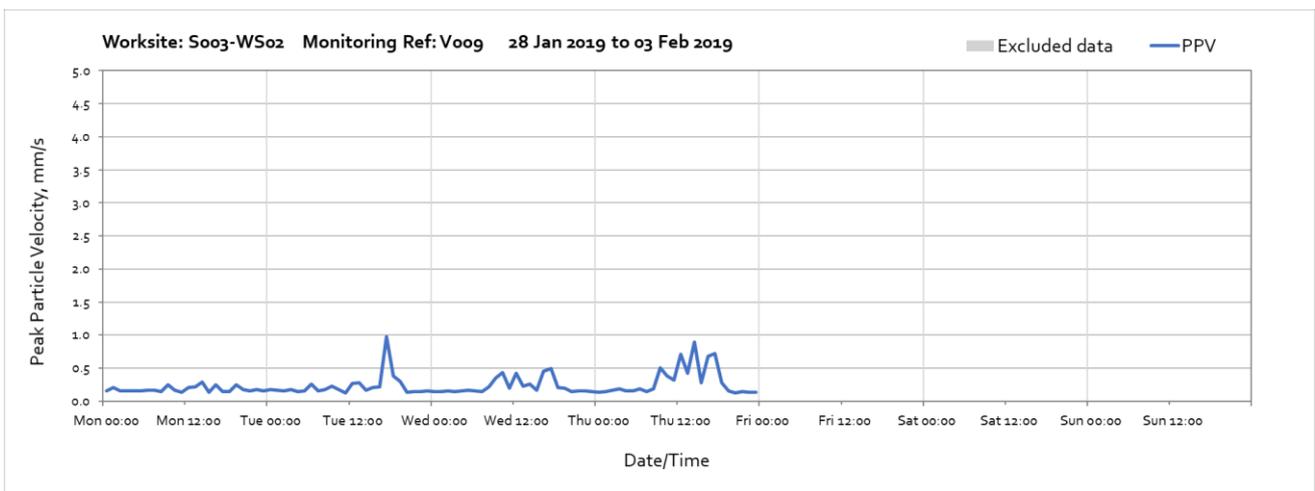
Note – Missing data at 16:00 on the 8th January and at 10:00 on the 9th January were during handling of the vibration monitor.



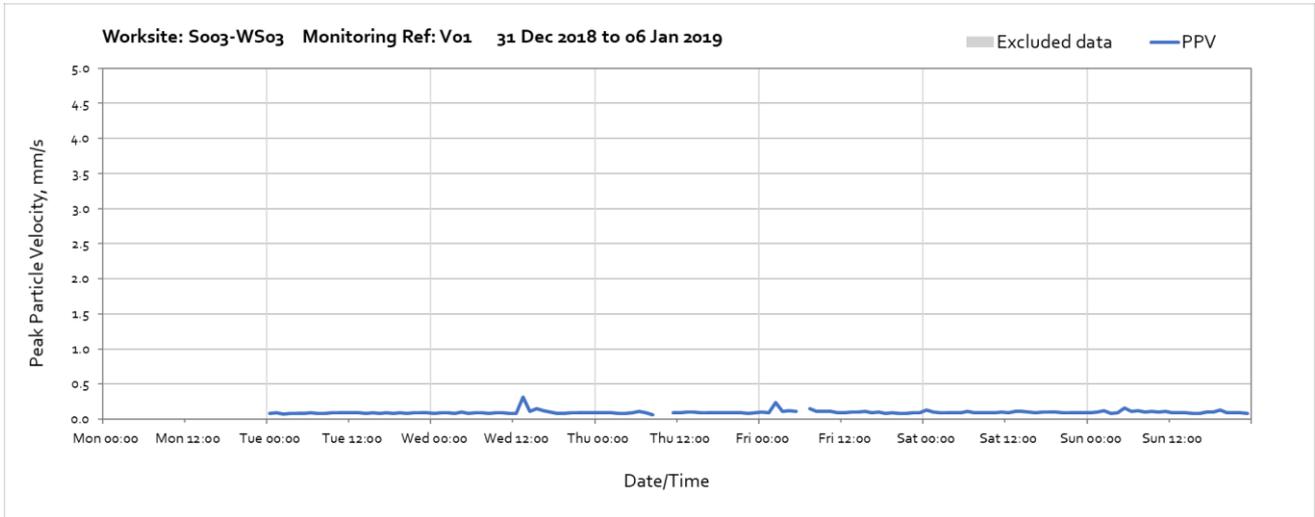
Note – High vibration levels at 20:00 on the 16th January were due to localized vibration events in close proximity to the monitor and were not due to HS2 construction works.



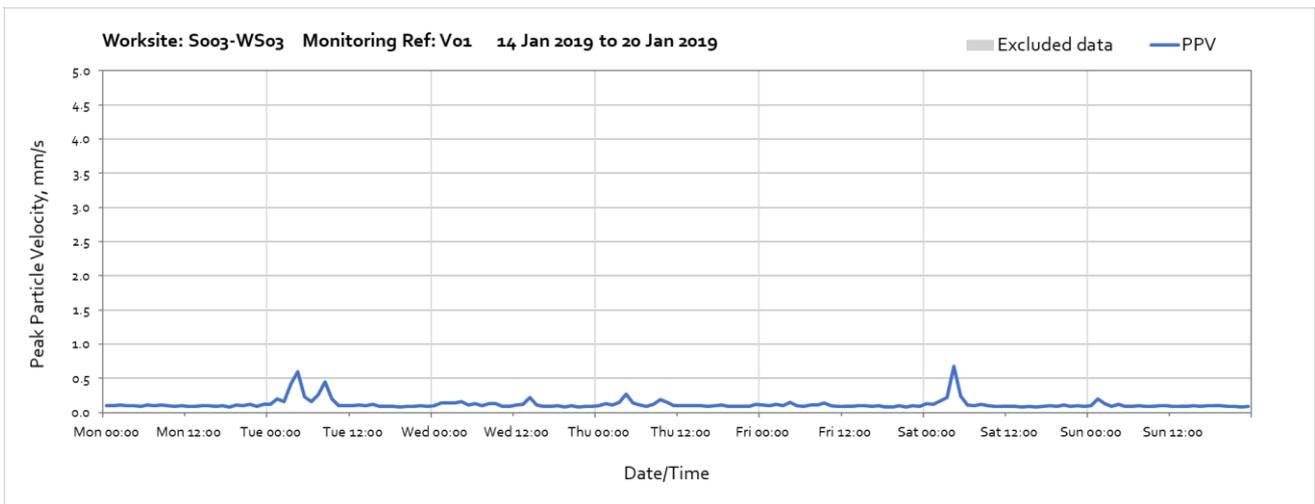
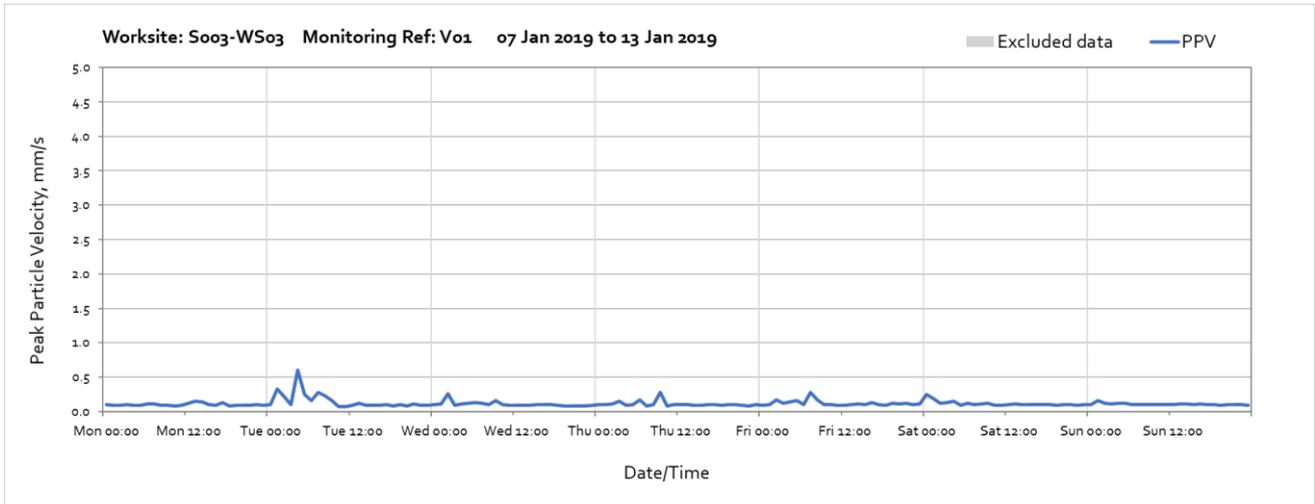
Note – High vibration levels at 10:00 on the 22nd January were due to localized vibration events in close proximity to the monitor and were not due to HS2 construction works.

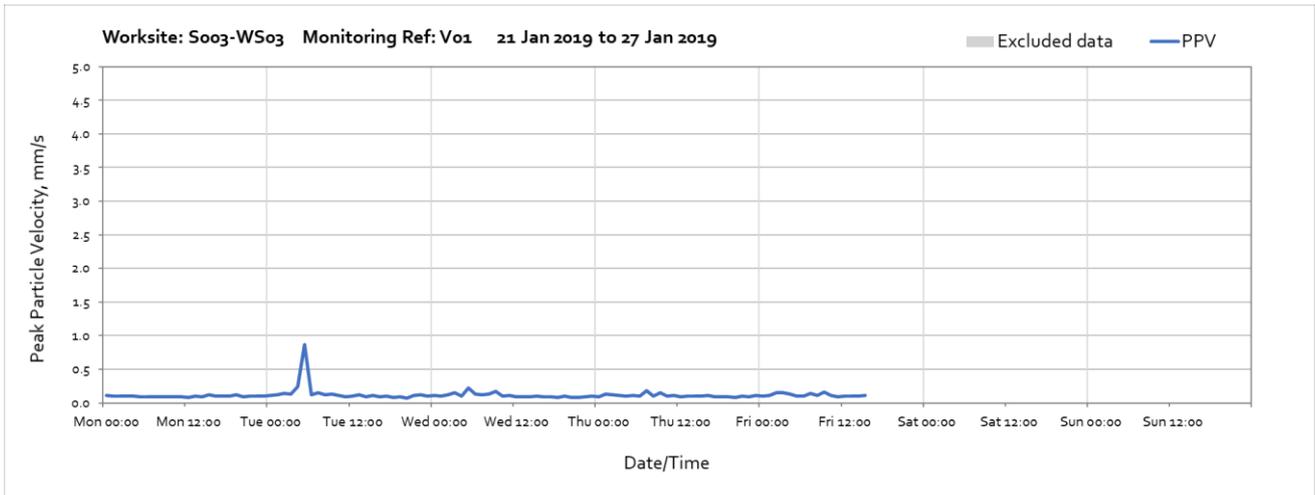


Worksite: S003-WS03 – Monitoring Ref: V01



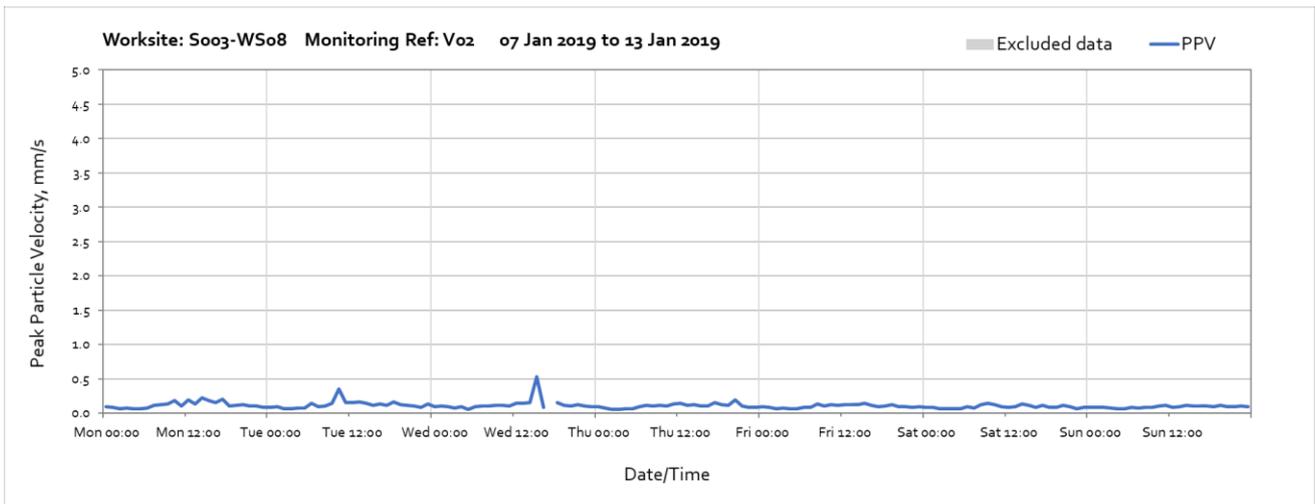
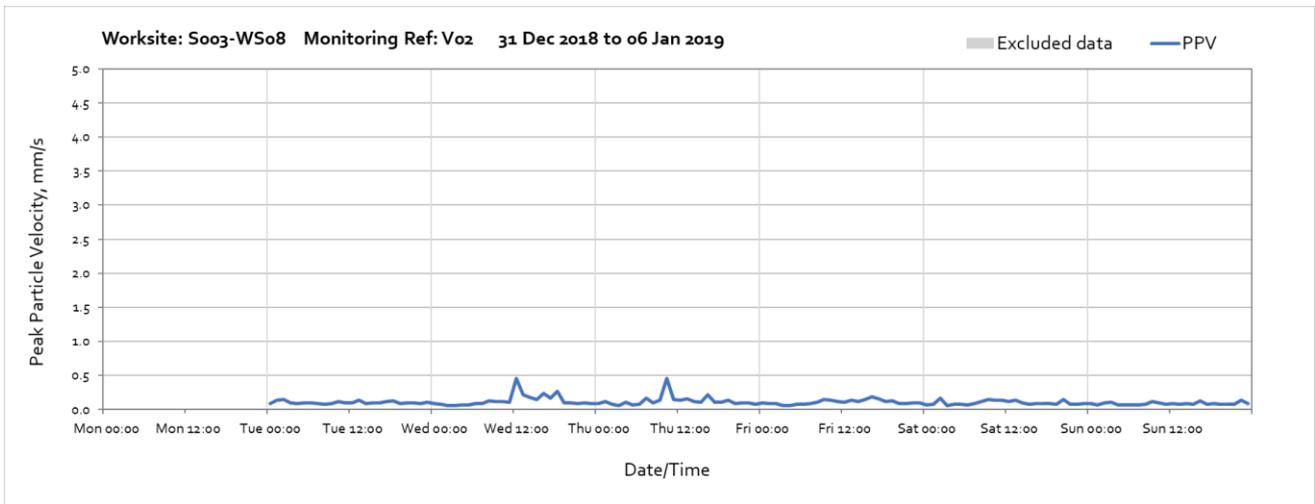
Note – Missing data between 09:00 and 11:00 on the 3rd January were during handling of the vibration monitor.
 Missing data at 6:00 on the 4th January due to temporary disruption.



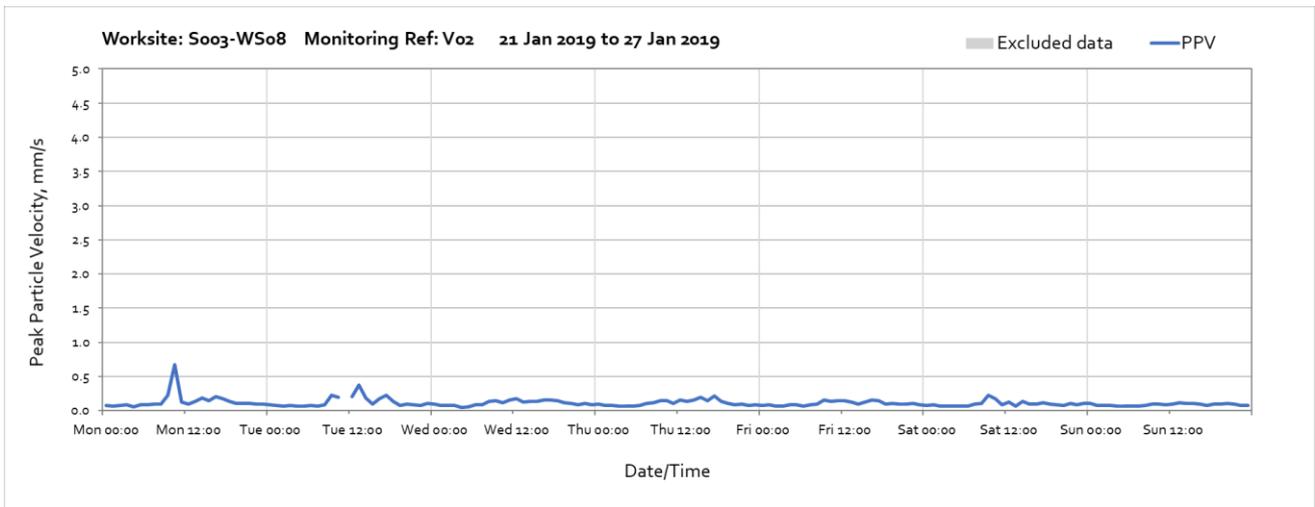
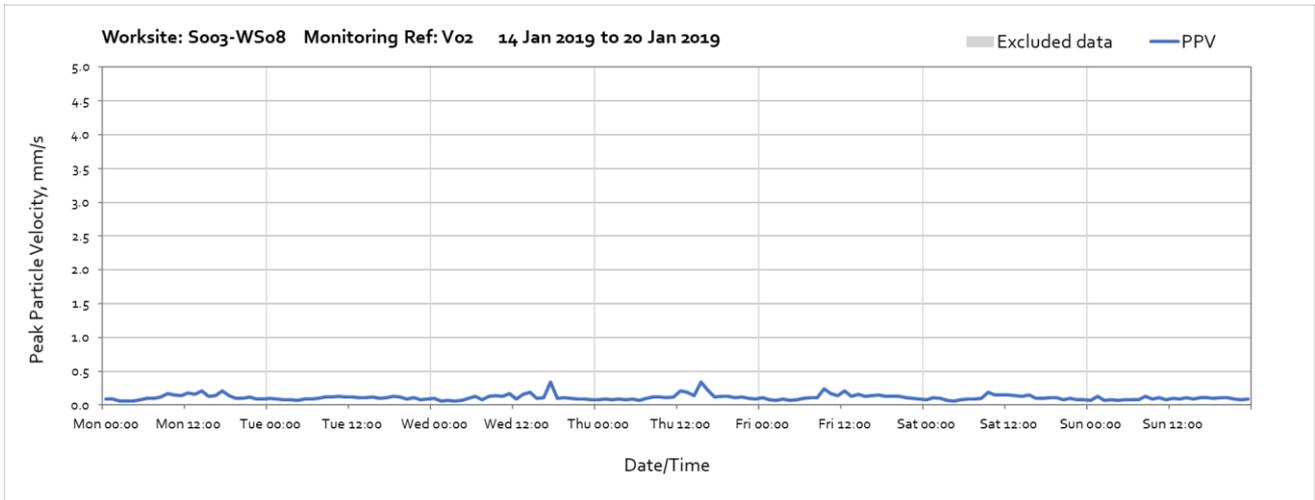


Note – Missing data from 16:00 on the 25th December until the end of the month due to a power failure..

Worksite: S003-WS08 – Monitoring Ref: V02



Note – Missing data at 16:00 on the 9th January were during handling of the vibration monitor.



Note – Missing data at 11:00 on the 22nd January were during handling of the vibration monitor.

