HS2

May 2021

Construction noise and vibration Monthly Report – March 2021

Buckinghamshire

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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 monitoring carried out within Buckinghamshire (BS) during the month of March 2021.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken in the vicinity of Quainton Access Road (ref: QAR), where construction of Station Road satellite compound, installation of hardstanding, construction of access roads, utility works, installation of drainage and vegetation clearance works were underway.
- Noise and vibration monitoring were undertaken in the vicinity of Bottom House Farm Lane worksite (ref.: BHFL), where general site maintenance, relocation of fencing and footpaths, installation of drainage, earthworks, surfacing of residential accesses, completion of junction works and utility works were underway.
- Noise monitoring was undertaken in the vicinity of Chalfont St Giles Vent Shaft worksite (ref.: CSG) where earthworks, structural wall installation works, construction of access roads, compound set up, fencing works, installation of utilities and drainage, excavations and piling works were in progress.
- Noise monitoring was undertaken in the vicinity of Chalfont St Peter Vent Shaft worksite (ref.: CSP), where stockpile management and structural wall installation works were in progress.
- Noise monitoring was undertaken in the vicinity of Load Test Pile 1 worksite (ref.: LTP #1), where utility works, compound operation, construction of compound access roads, earthworks, drainage works, haul roads construction works, ground investigation works, piling and River Colne to the Grand Union Canal removal works were underway.
- Noise monitoring was undertaken in the vicinity of Amersham Vent Shaft worksite (ref.: AM), where site setup; construction of internal roads, carpark, footpaths, and fencing; utility and drainage works; and excavation and piling preparation works were underway.
- Noise monitoring was undertaken in the vicinity of Hall Farm, Bicester Road Worksite (ref: HF) where utility works, vegetation clearance and re-surfacing works were underway.
- Noise monitoring was undertaken in the vicinity of Little Missenden Vent Shaft worksite (ref.: LM) where compound setup works including installation of hardstanding, installation of facilities, drainage works, surfacing woks, construction

of compound roads and parking, pond construction, installation of retaining wall around shaft and site and fencing works were underway.

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

- Amersham as part of water pipeline and pumping station works;
- Aylesbury as part of gas works;
- Calvert where electricity diversion works; compounds set up works; ground investigations including trial holes; utility works; clearance of vegetation and fencing; haul road, access roads and drainage activities; and material train deliveries were underway;
- Turwestone where electricity diversion works and groundworks for bat house construction were underway;
- A41/Bicester Road where construction of compound area and roundabout connection between A41 and Bicester Road were underway;
- A418 Oxford Road and Risborough Road (Aylesbury) where temporary compound enabling works were underway;
- Great Missenden where compound construction for ground investigation and chalk embankment trial works, devegetation works, expansion of permanent pond and construction of temporary chalk embankment were underway;
- Small Dean and Leather Lane where vegetation clearance works were underway;
- Bowood Lane where installation of kerbs, minor excavation works and installation of ducting and reinforcement works (previous concrete pouring) were in progress;
- Twyford where compound access road creation, soil stripping and culvert installation works were underway;
- Westbury where devegetation activities, compound soil stripping and stoning works where underway;
- east of Denham where electricity diversion works was underway;
- Hartwell where trial trenching works were underway;
- Waddeson where fencing and vegetation clearance works were underway;
- Aylesbury Golf Course where habitat surveys, fencing and trapping works and clearance of vegetation works where underway;
- Great Moore where mobilisation to site and welfare set up, construction of new access road, car park and boat bay works, new gate access point, spillway works, container base and drainage works were underway; and

- Fleet Marston where vegetation clearance works and compound access setup works were underway

The HS2 threshold levels for significant noise impacts, which are defined in Information Paper E23 (https://www.gov.uk/government/publications/hs2-information-papers-environment) were exceeded on six occasions due to HS2 works in the Local Authority Area during March 2021.

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

Seven complaints were received within Buckinghamshire during the monitoring period. A description of complaints, the results of investigations and any action 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.

1.1.2 Monitoring data and interpretive reports are to be provided to each relevant local authority on a monthly basis and shall include a summary of the construction activities occurring, the data recorded over the monitoring period, any complaints received, any periods in exceedance of agreed trigger levels, the results of any investigations and any actions taken or mitigation measures implemented. This report provides noise data, and interpretation thereof, for monitoring carried out by HS2 within the Buckinghamshire (BS) Local Authority area for the period 1st to 31st March 2021.

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

- Quainton Access Road Worksite, reference - QAR (see plan 2 in Appendix A), where works activities included:
  - construction of the Station Road Satellite Compound;
  - installation of hardstanding;
  - construction of access roads;
  - utility works;
  - installation of drainage systems including attenuation ponds; and
  - vegetation clearance.
- Bottom House Farm Lane Worksite, reference - BHFL (see plan 3 in Appendix A), where work activities included:
  - general site maintenance and relocation of fencing and footpaths;
  - installing drainage (excavate trenches, place pipes, backfill trench and close membrane);

- earthworks (compaction, stockpile management, construction of landowner accesses, batter finishing works and topsoiling);
- surfacing of residential accesses at junction including planning, levelling and surfacing resident accesses;
- roadworks at junction involving levelling and replacing hot rolled asphalt, white lining, installation of traffic detector loops, application of high friction surfacing, installation of traffic signals and commissioning; and
- utility works (relocation of telegraph poles).

- Chalfont St Giles Vent Shaft Worksite, reference - CSG (see plan 4 in Appendix A), where works activities included:
  - earthworks (stockpile management);
  - ground pre and post treatment (drilling and grouting) ;
  - structural wall installation works including civil works, excavation, construct guidewalls, desanding, mud treatment, concreting, delivery and assembly;
  - car park finishes, utilities & drainage ;
  - installation of gates and access road to site/offices ;
  - installation of edge protection posts and fence above retaining wall; and
  - excavation to shaft piling platform level.
- Chalfont St Peter Vent Shaft Worksite, reference - CSP (see plan 5 in Appendix A), where works activities included:
  - stockpile management; and
  - structural wall installation works including diaphragm wall excavation, rebar and concreting.
- Load Test Pile 1 Worksite, reference - LTP #1 (see plan 6 in Appendix A), where works activities included:
  - utility works;
  - construction of compound access roads including earthworks and drainage;
  - compound operation and desanding;
  - civil works, earthworks, and drainage on haul roads;
  - ground investigation works;
  - piling works (cofferdam sheet piling and pier foundations piles);
  - River Colne to the Grand Union Canal removal works; and

- preparation works and start construction of the viaduct next to the A412.

- Amersham Vent Shaft Worksite, reference - AM (see plan 7 in Appendix A), where works activities included:
  - site setup;
  - construct bell mouth, gate and wheel wash;
  - construct new footpath, internal site roads and car park;
  - utilities and drainage works;
  - installation of gates and access road to site/offices;
  - installation of edge protection posts and fence above retaining wall; and
  - excavations to shaft piling platform level.
- Hall Farm, Bicester Road Worksite, reference – HF (see plan 8 in Appendix A), where works activities included:
  - utility diversion works (telecommunications and electricity);
  - vegetation clearance; and
  - asphalting works (plane down existing surface and install regulating layer).
- Little Missenden Vent Shaft worksite reference - LM (see plan 9 in Appendix A), where works activities included:
  - construction/installation of compound's pond, storage, reinforcement, drainage, crane bases, workshop areas, car parking and roads;
  - install piling mat and other hardstanding;
  - construction of retaining wall around permanent site and shaft;
  - water recharge wells and dewatering route to River Misbourne;
  - construction of swales, ditches, and water treatment unit with settlement tank;
  - site hoarding and fencing;
  - establishing satellite compound offices, welfare facilities and stores; and
  - bellmouth permanent surfacing woks.

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

- Amersham as part of water pipeline and pumping station works;
- Aylesbury as part of gas works;

- Calvert where work activities included:
  - compounds set up works and establishing new compounds;
  - ground investigation works including trial holes;
  - utility works;
  - clearance of vegetation and fencing;
  - haul road, access roads and drainage activities; and
  - train deliveries of material.
- Turwestone where electricity diversion works and groundworks for bat house construction were underway.
- A41/Bicester Road where work activities included:
  - construction of compound; and
  - construction of roundabout connection between A41 and Bicester Road.
- A418 Oxford Road and Risborough Road (Aylesbury) where temporary compound enabling works were underway.
- Great Missenden, where work activities included:
  - compound construction for ground investigation and devegetation works;
  - cabin installation and compound set-up for chalk embankment trial;
  - expansion of permanent pond; and
  - construction of temporary chalk embankment.
- Small Dean and Leather Lane where vegetation clearance works were underway.
- Bowood Lane Bowood Lane where work activities included:
  - installation of kerbs;
  - minor excavation works; and
  - installation of ducting and reinforcement works (previous concrete pouring).
- Twyford where compound construction activities included:
  - construction of access road;
  - soil stripping; and
  - culvert installation.
- Westbury where compound construction activities included:
  - clearance of vegetation; and

- soil stripping and stoning up of compound.

- East of Denham where electricity diversion works was underway.
- Hartwell where trial trenching works were underway.
- Waddeson where fencing and vegetation clearance works were underway.
- Aylesbury Golf Course where habitat surveys, fencing and trapping works and clearance of vegetation works where underway.
- Great Moore where mobilisation to site and welfare set up, construction of new access road, car park and boat bay works, new gate access point, spillway works, container base and drainage works were underway.
- Fleet Marston where vegetation clearance works and compound access setup works were underway

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

1.2 Measurement Locations

1.2.1 Twelve noise and one vibration monitoring installations were active in March in the BS area. Table 2 summarises the position of noise monitoring installations within the BS area in March 2021.

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

1.2.3 The noise monitors CSG-NMP1 and CSG-NMP2 were installed at Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane, worksite ref.: CSG, on the 17th of March.

1.2.4 The noise monitor LM-NMP1 was installed at Little Missenden Vent Shaft Worksite, Amersham, worksite ref.: LM, on the 1st of March.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
CSP	CSP-NMP1	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
	CSP-NMP2	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
	CSP-NMP3	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
LTP #1	LTP #1-NMP1	Northern boundary, Load Test Pile 1 Worksite, Denham Water Ski Club
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane
	BHFL-Vib 1	Pine Cottage, Bottom House Farm Lane
AM	AM-NMP1	Amersham Vent Shaft Worksite, Whielden Lane, Amersham
QAR	QAR-NMP1	1 Woodlands Farm Cottages, Quainton
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon
CSG	CSG-NMP1	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane
	CSG-NMP2	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane
LM	LM-NMP1	Little Missenden Vent Shaft Worksite, Amersham

2 Summary of Results

2.1 Summary of Measured Noise Levels

2.1.1 Table 3 presents a summary of the measured noise levels at each monitoring location over the reporting period. The $L_{Aeq,T}$ is presented for each of the relevant time periods averaged over the calendar month, along with the highest single period $L_{Aeq,T}$ that was found to occur within the month.

Table 3: Summary of Measured dB LAeq 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
CSP	CSP-NMP1	Chalfont St Peter Vent Shaft Worksite	Free-field	68.4 (81.4)	68.7 (71.2)	64.2 (66.0)	61.8 (66.5)	58.7 (64.4)	62.8 (66.1)	64.7 (66.0)	63.7 (64.2)	61.7 (64.8)	57.8 (59.3)	60.9 (63.9)	58.5 (63.8)
	CSP-NMP2	Chalfont St Peter Vent Shaft Worksite	Free-field	51.7 (58.6)	52.1 (58.2)	49.6 (59.2)	47.1 (57.8)	46.1 (58.3)	50.0 (51.4)	50.2 (54.1)	49.5 (51.9)	47.7 (55.6)	45.3 (52.3)	48.5 (56.4)	45.4 (50.9)
	CSP-NMP3	Chalfont St Peter Vent Shaft Worksite	Free-field	57.6 (62.1)	56.7 (59.1)	55.9 (58.5)	53.0 (56.6)	50.0 (63.6)	54.9 (57.2)	56.9 (59.7)	57.7 (59.5)	55.7 (59.0)	48.0 (57.6)	55.2 (59.0)	49.0 (57.1)
LTP #1	LTP #1-NMP1	Northern boundary, Load Test Pile 1 Worksite	Free-field	63.0 (65.2)	62.7 (63.6)	61.7 (64.6)	58.6 (63.1)	57.2 (66.0)	60.5 (61.2)	61.0 (62.0)	63.6 (67.3)	59.8 (62.1)	54.5 (60.7)	59.7 (64.6)	56.8 (65.3)
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane	Free-field	53.3 (56.1)	56.3 (58.9)	51.3 (54.0)	49.4 (61.2)	49.7 (64.4)	49.5 (51.0)	52.8 (56.2)	51.6 (53.7)	49.9 (57.6)	42.5 (50.8)	49.7 (56.6)	45.2 (52.5)
AM QAR	AM-NMP1	Whielden Lane, Amersham	Free-field	70.6 (72.0)	71.1 (73.5)	68.7 (70.0)	65.4 (70.2)	61.6 (70.5)	66.8 (67.5)	69.5 (70.5)	69.0 (70.4)	68.1 (72.4)	59.4 (63.7)	67.7 (71.8)	61.2 (68.7)
	QAR-NMP1	1 Woodlands Farm Cottages, Quainton	Free-field	54.6 (56.9)	53.9 (56.5)	50.3 (55.4)	45.2 (52.9)	45.3 (54.8)	52.5 (53.1)	51.8 (52.7)	51.0 (51.6)	50.0 (58.5)	43.6 (51.1)	51.0 (59.7)	45.0 (54.2)
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon	Free-field	65.0 (67.5)	65.0 (67.6)	64.5 (67.8)	60.8 (65.3)	57.7 (67.1)	62.3 (62.9)	63.8 (64.5)	64.4 (65.7)	62.8 (65.5)	56.8 (59.7)	62.4 (65.8)	58.5 (64.0)

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
CSG	CSG-NMP1	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane	Free-field	50.3 (53.2)	57.5 (59.7)	46.7 (51.0)	41.7 (50.0)	42.3 (50.7)	48.1 (48.8)	51.1 (53.8)	52.3 (55.0)	47.1 (56.4)	39.8 (44.3)	44.8 (51.2)	41.0 (47.3)
	CSG-NMP2	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane	Free-field	54.1 (60.1)	59.2 (64.0)	50.3 (53.3)	49.2 (51.8)	49.5 (60.6)	51.3 (51.5)	53.5 (53.9)	54.5 (55.8)	52.0 (57.4)	50.1 (53.3)	49.8 (54.3)	49.7 (51.9)
LM	LM-NMP1	Little Missenden Vent Shaft Worksite	Free-field	67.4 (70.2)	67.8 (75.4)	65.7 (66.9)	61.5 (65.0)	58.1 (66.8)	64.2 (67.0)	66.5 (72.5)	65.6 (65.9)	64.0 (66.1)	56.6 (61.4)	63.5 (66.9)	58.3 (66.1)

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

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

Worksite Reference	Measurement Reference	Monitor Address	Highest PPV measured in any axis, mm/s
BHFL	BHFL-Vib 1	Pine Cottage, Bottom House Farm Lane	1.27 (Z-axis) *

*Renovation works were taking place throughout March 2021 in the property where vibration monitor BHFL-Vib 1 is installed. Although the most significantly affected levels have been excluded the measured levels presented are also likely to be affected.

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

2.2 Exceedances of the LOAEL and SOAEL

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

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

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

2.2.4 Where reported construction noise levels exceed the LOAEL and SOAEL at nearby receptors, relevant periods will be identified. Summary statistics to evaluate ongoing qualification for noise insulation and temporary rehousing are also presented where relevant.

2.2.5 Table 5 presents a summary of recorded exceedances of the LOAEL and SOAEL over the reporting period, including the number of exceedances during each time period.

Table 5: Summary of Exceedances of LOAEL and SOAEL

Worksite Reference	Measurement Reference	Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
CSP	CSP-NMP1*	Chalfont St Peter Vent Shaft Worksite	Weekday	0700-0800	1	No exceedance
	CSP-NMP2*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
	CSP-NMP3*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
LTP #1	LTP #1-NMP1	Northern boundary, Load Test Pile 1 Worksite	All days	All periods	No exceedance	No exceedance
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane	Weekday Saturday Sunday Night	1900-2200 1400-2200 0700-2200 2200-0700	7 1 1 35	No exceedance No exceedance No exceedance 19
AM	AM-NMP1*	Whielden Lane, Amersham	All days	All periods	No exceedance	No exceedance
QAR	QAR-NMP1	1 Woodlands Farm Cottages, Quainton	All days	All periods	No exceedance	No exceedance
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon	All days	All periods	No exceedance	No exceedance

Worksite Reference	Measurement Reference	Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
CSG	CSG-NMP1*	Chalfont St Giles Vent Shaft	All days	All periods	No exceedance	No exceedance
	CSG-NMP2*	Chalfont St Giles Vent Shaft	Night	2200-0700	1	No exceedance
LM	LM-NMP1*	Little Missenden Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance

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

2.2.6 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
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane	6

2.2.7 Six exceedances of the SOAEL were recorded due to HS2 construction works during March 2021 at monitoring location BHFL-NMP1 for out of core working hours as a result of overnight works at junction.

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

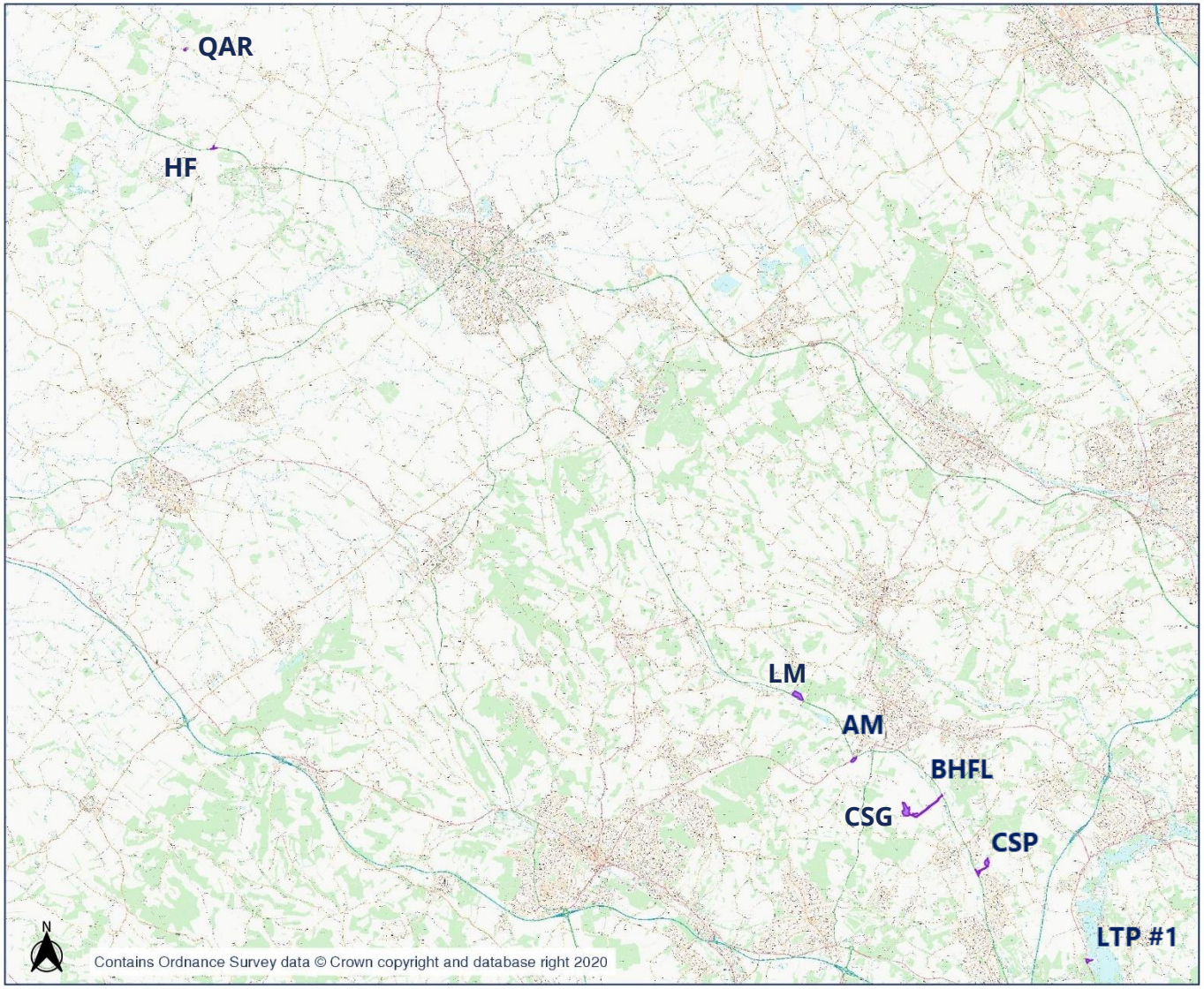
2.4.1 Table 8 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

Table 8: Summary of Complaints

Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-41513-C	Moorhall Road site	High pitched noises heard early in morning.	No HS2 works that could have caused this reported disturbance.	Results of investigation confirmed to stakeholder
HS2-21-41536-C	BHFL	Vibrations felt during day.	Contractor confirmed nearest works is over a mile away and this was unlikely to have been the cause.	Results of investigation confirmed to stakeholder
HS2-21-41683-C	AM	Noise from machinery starting before 8am	Remains under investigation	Deliveries planned to avoid arrival before 08:00 where practicable.
HS2-21-41578-C	Fairford Leys - Aylesbury	General noise disturbances during day.	Construction is ongoing at site.	Following complaint generator was changed and noise monitoring equipment will be installed for a minimum of one week and monitored.
HS2-21-41564-C	HP17 8QH	Droning noise during day and at night	Site visit undertaken by contractor and road noise louder than generator on site. In addition, generator is a hybrid so switches off when electrical items not in use. No other source of noise from site.	Results of investigation confirmed to stakeholder and asked stakeholder to return if they have any further info as to source of noise as nothing located that could be causing the issue.
HS2-21-41533-C	AM	Vibrations caused house to shake	Caused by roller on site, which was being used to create an internal road.	On site team amended the method of compaction they were using once the issue was raised.
HS2-21-41503-C	Calvert	Banging noises from site	Noise is related to rail aggregate deliveries being offloaded. Banging noises are often associated with offloading materials from wagons.	Stakeholder informed that noises relate to rail aggregate deliveries and that depending on wind directions some noise may be heard from the material being offloaded from wagons.

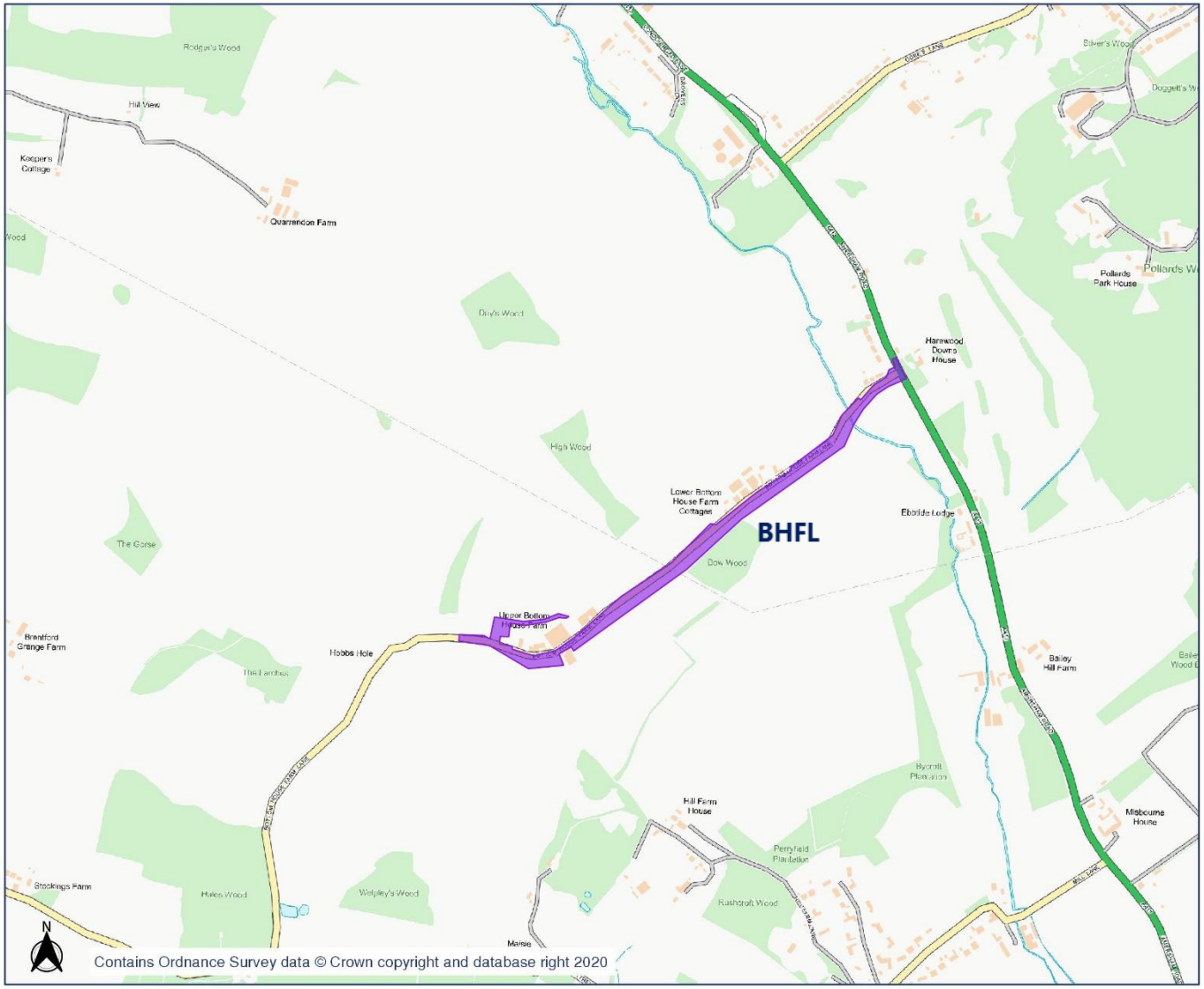
Appendix A Site Locations

Worksite identification plan - 1

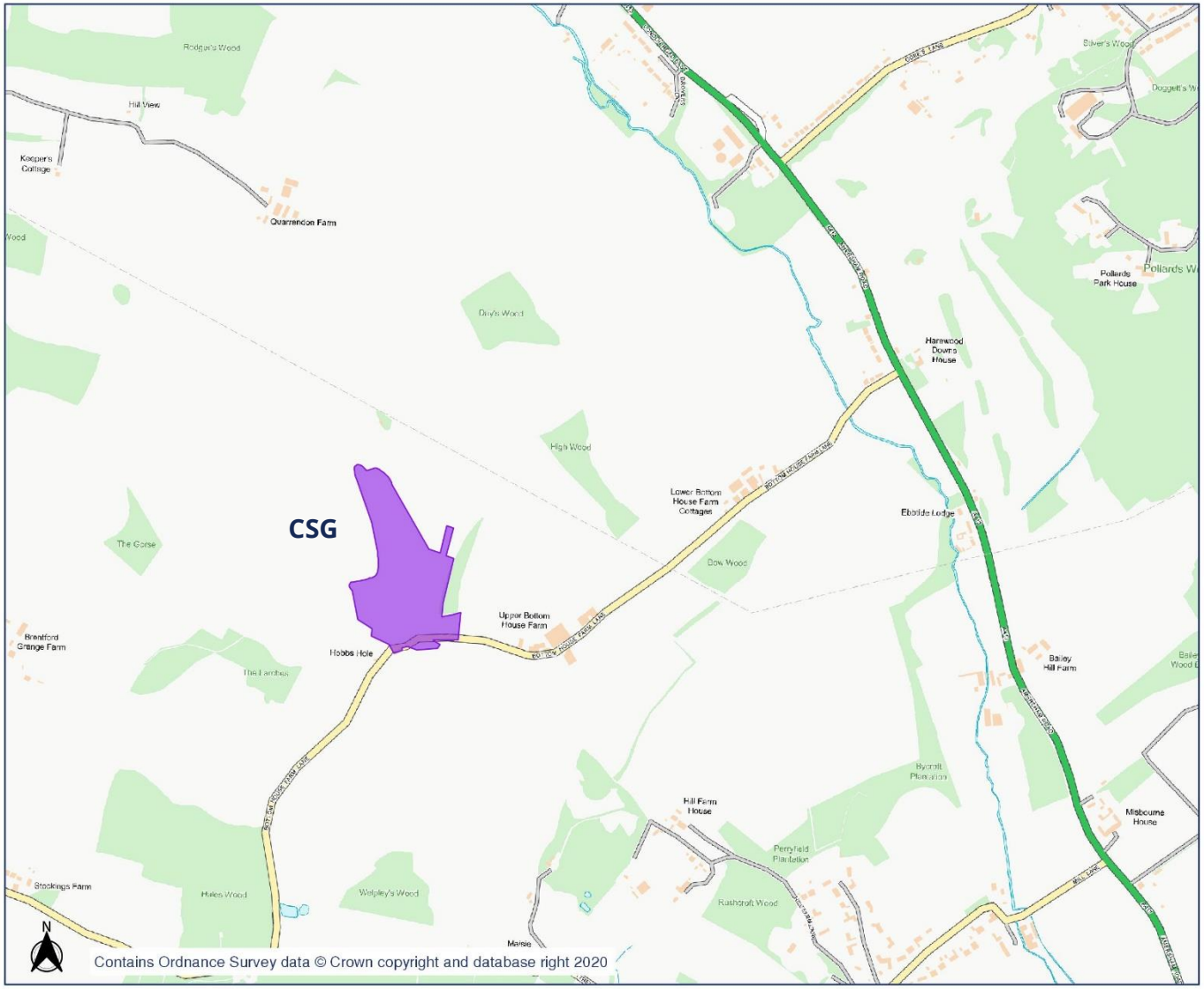


Worksite identification plan - 2

Worksite identification plan - 3



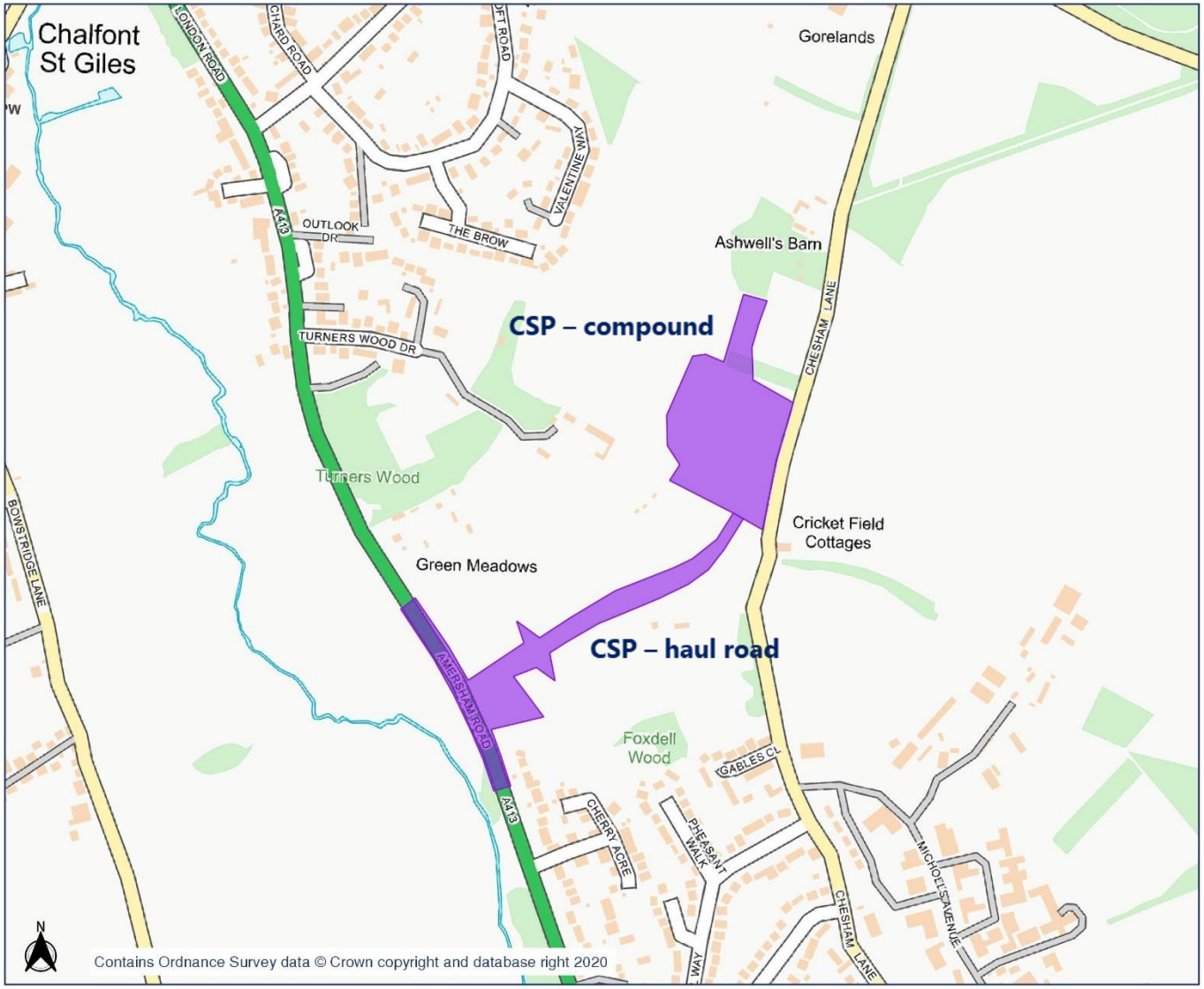
Worksite identification plan - 4



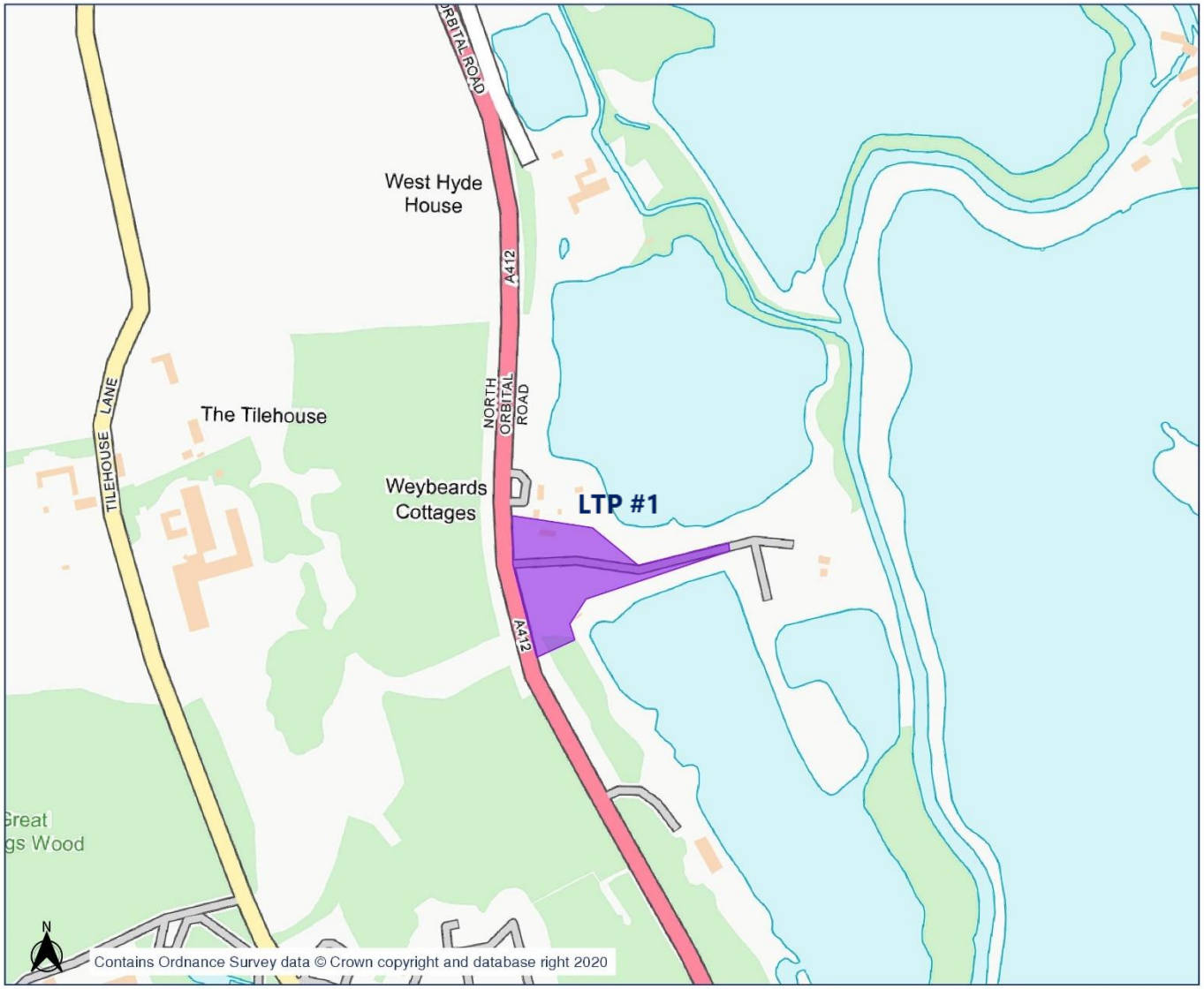
Legend

Active worksites

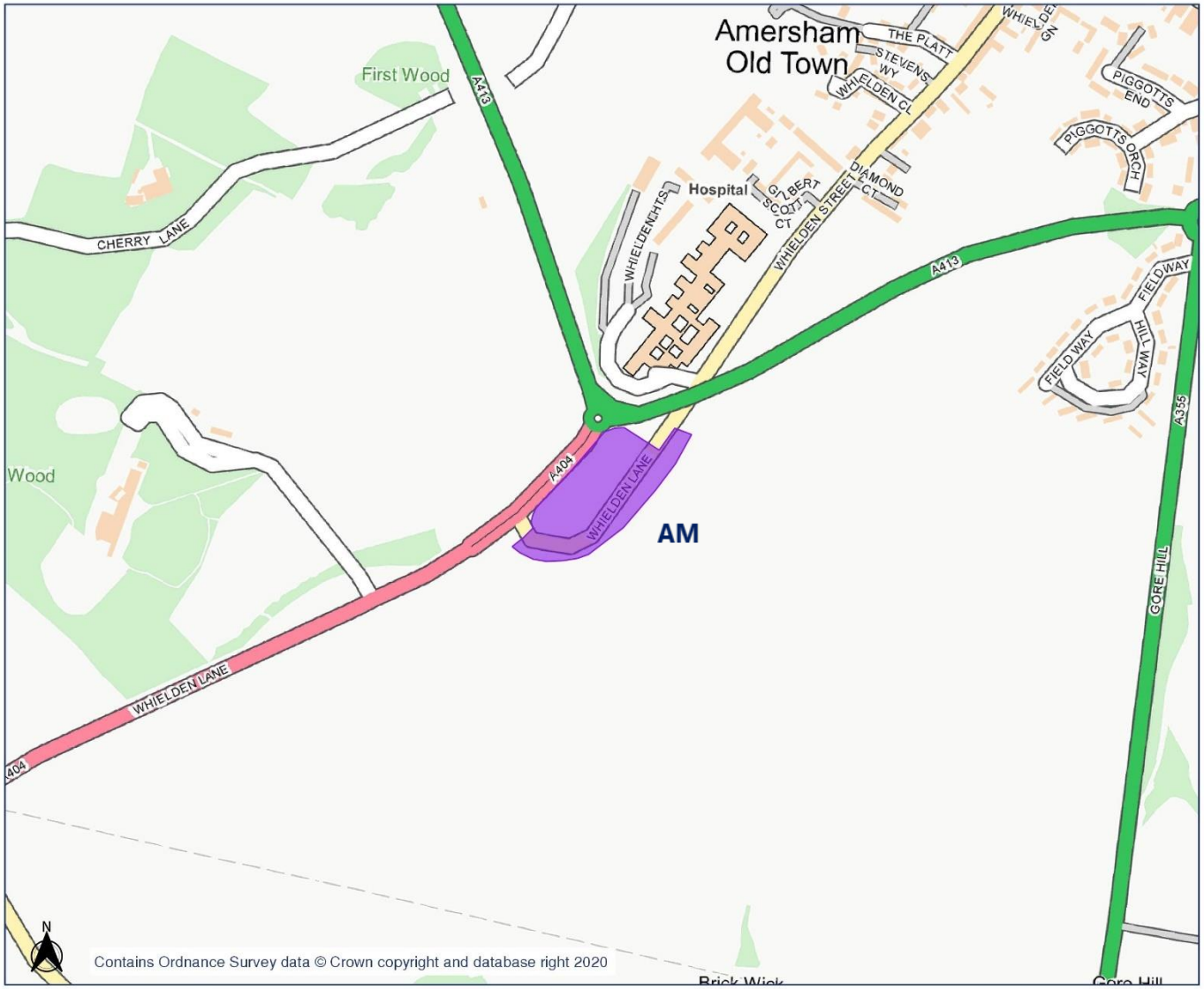
Worksite identification plan - 5



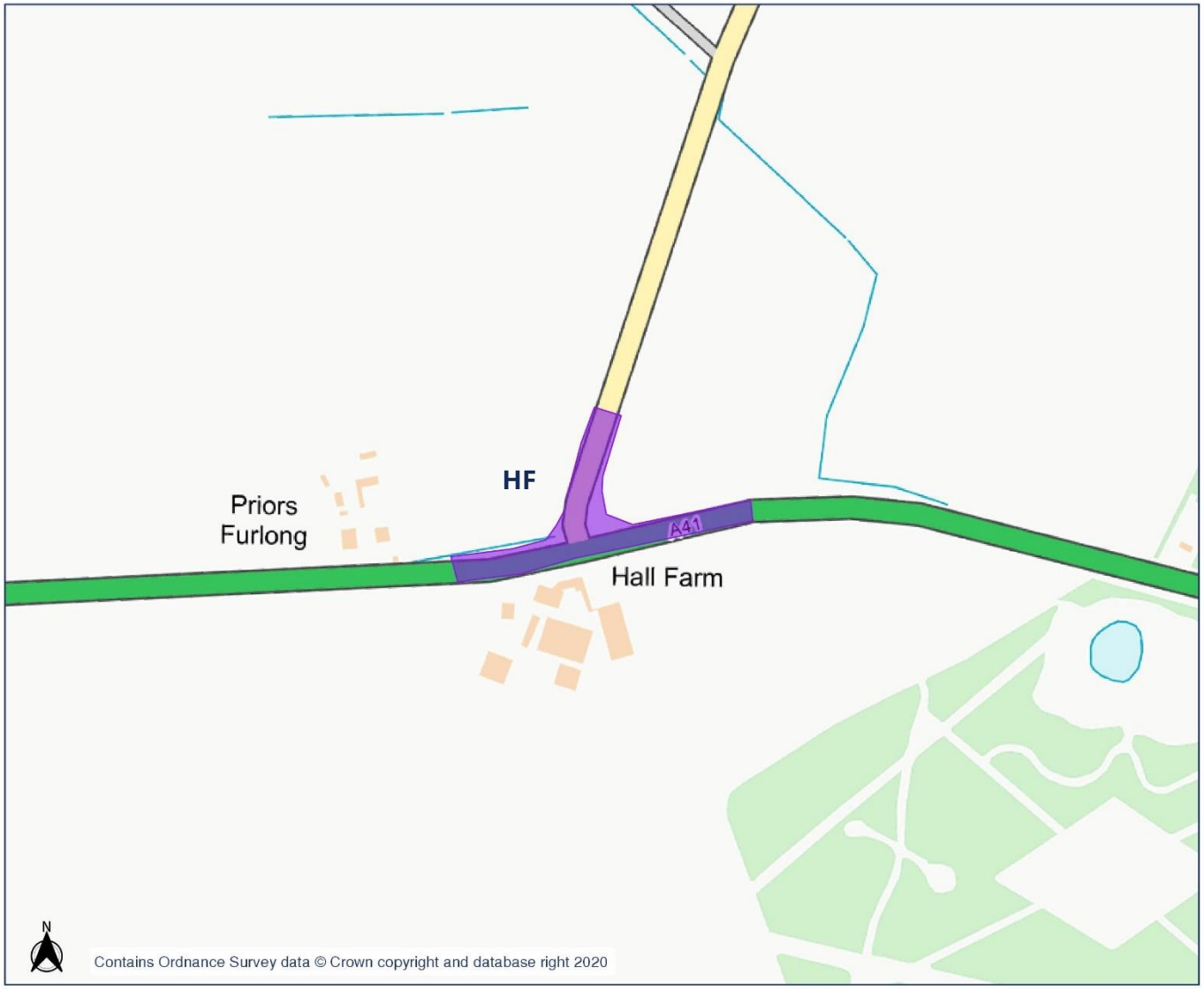
Worksite identification plan - 6



Worksite identification plan - 7



Worksite identification plan - 8

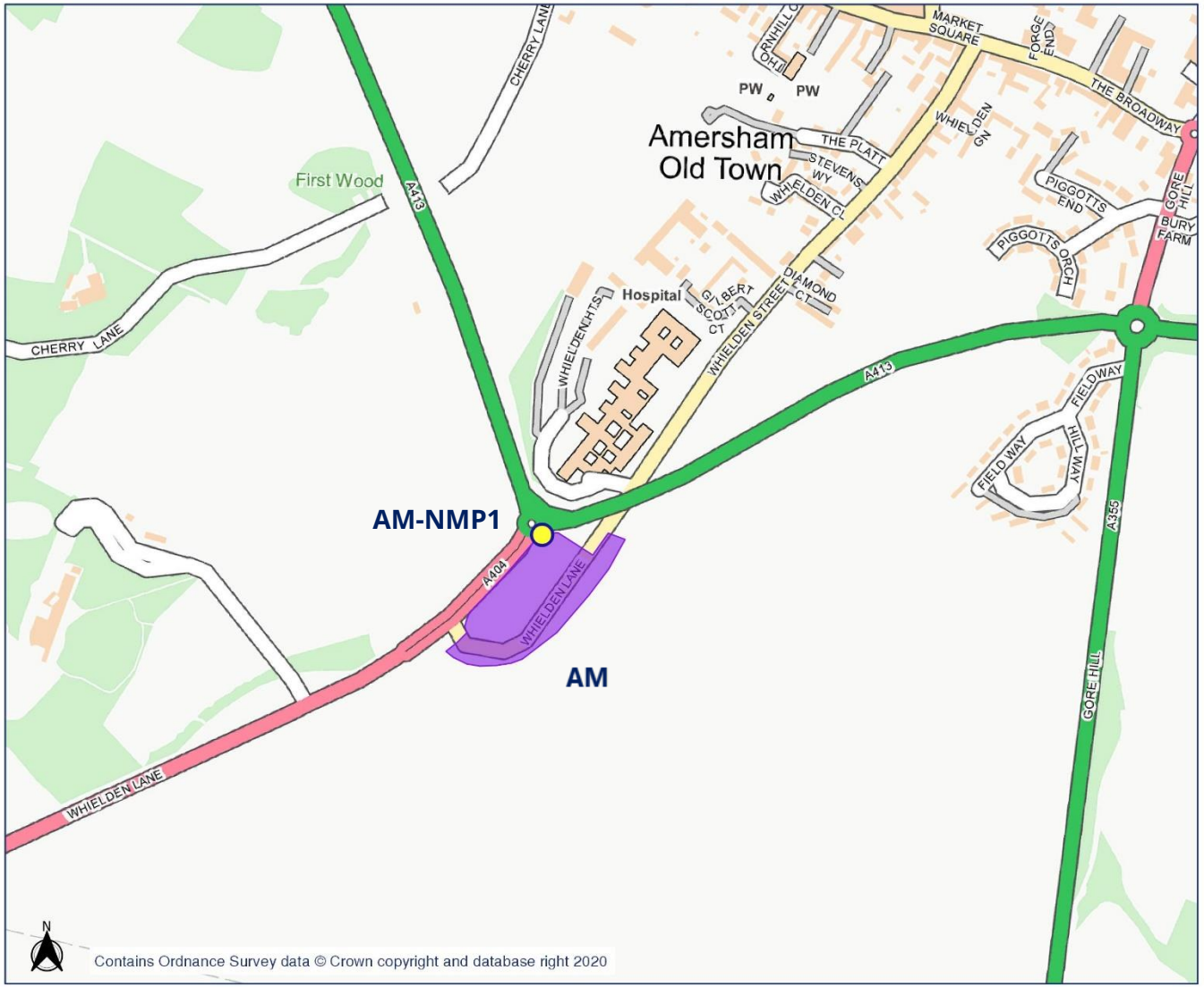


Worksite identification plan - 9

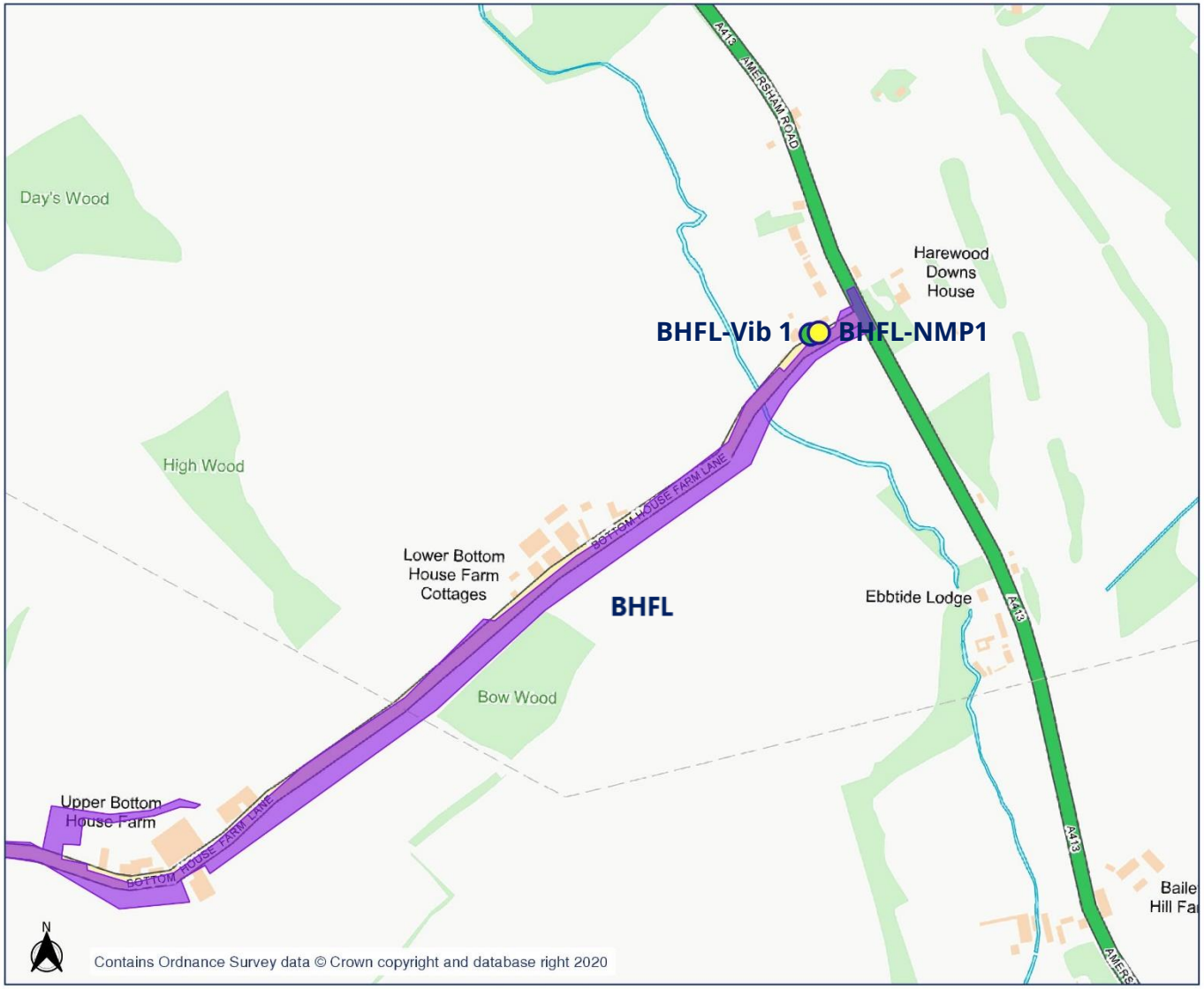
Appendix B Monitoring Locations

Noise monitoring plan - 1

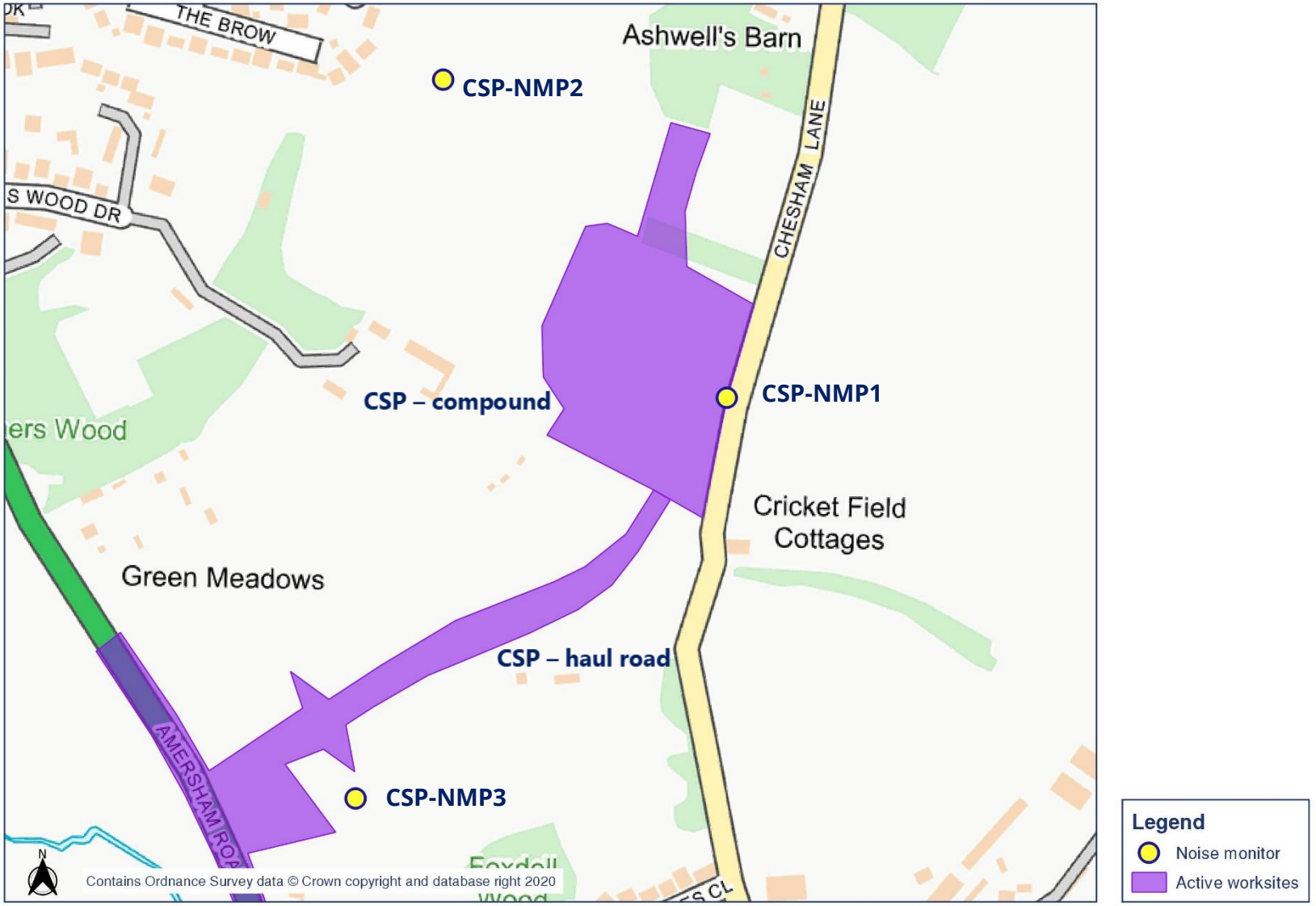
Noise monitoring plan - 2



Noise monitoring plan - 3



Noise monitoring plan - 4



Noise monitoring plan - 5

HS2

Noise monitoring plan - 6

HS2

Noise monitoring plan - 7

Noise monitoring plan - 8

Appendix C Data

Noise

The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have been excluded from the calculation of the $L_{Aeq,T}$ values in **Error! Reference source not found.** of the main report.

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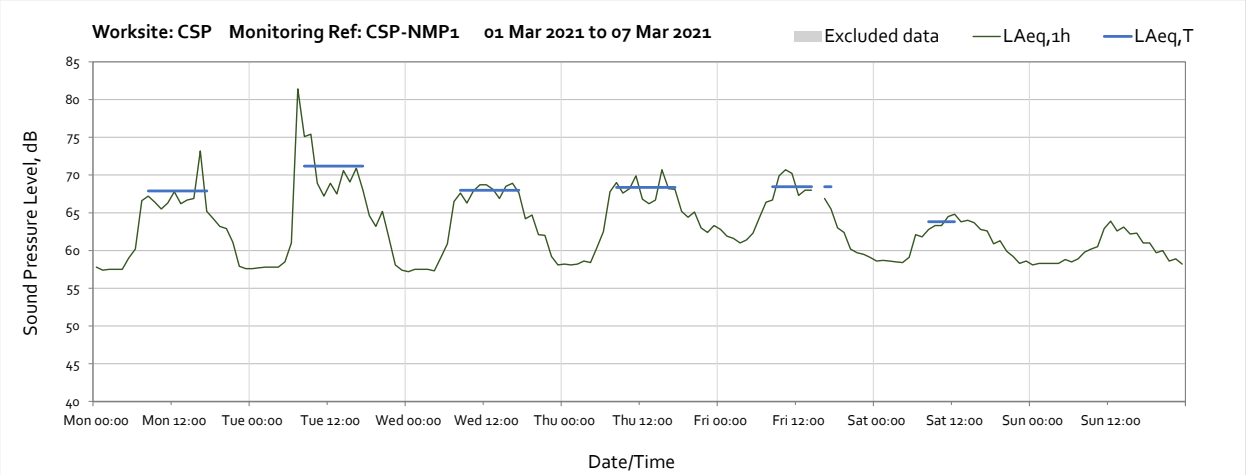
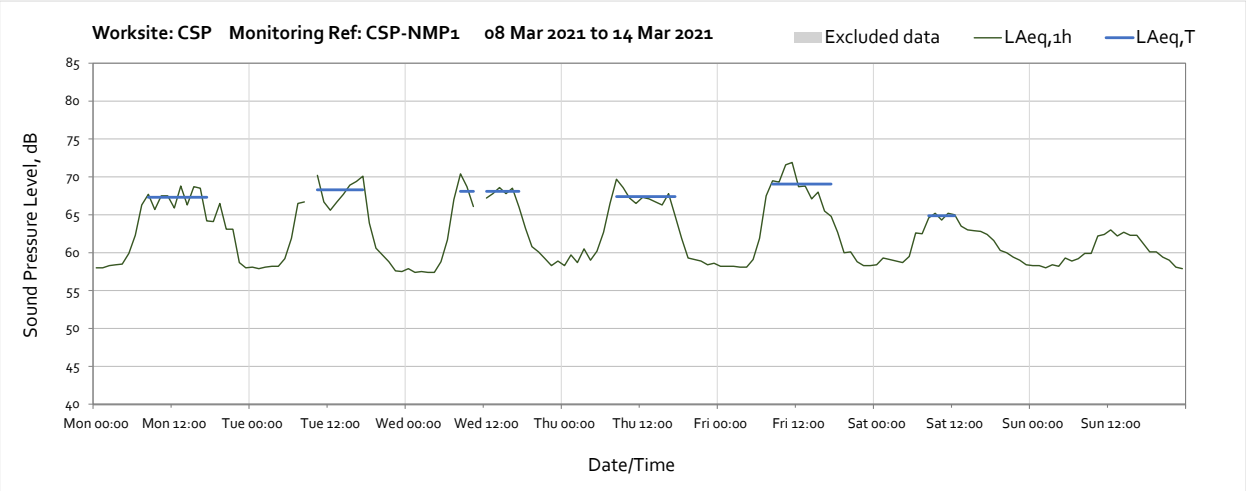
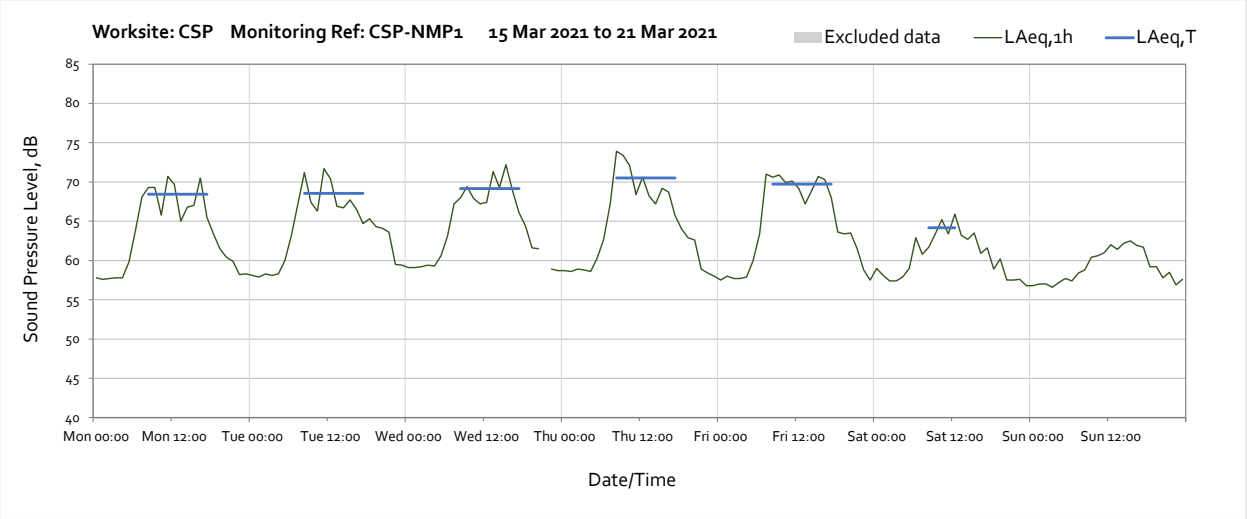


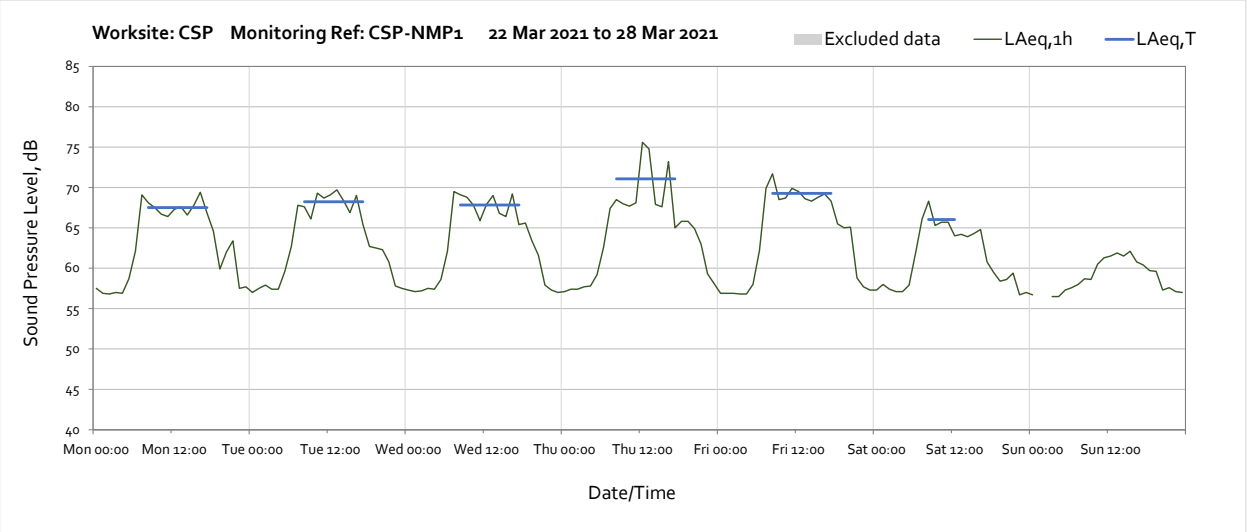
Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments.



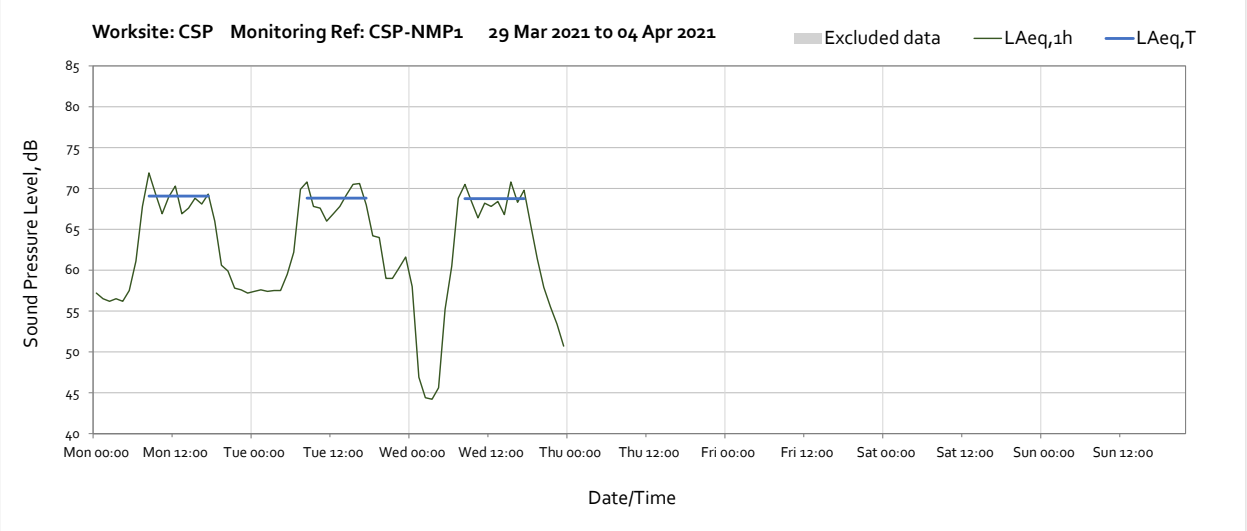
Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments.



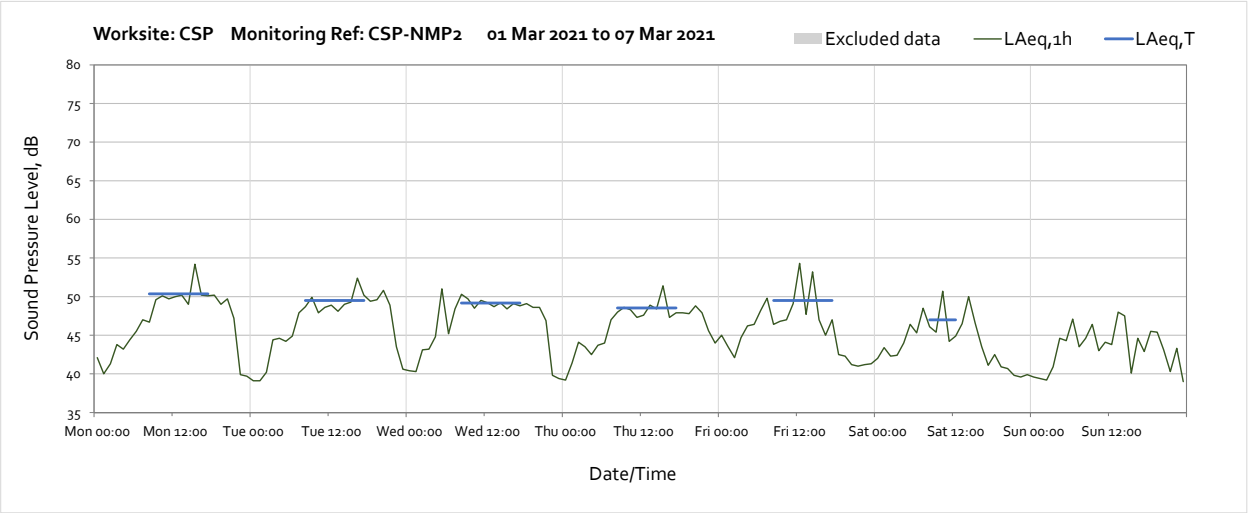
Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments.

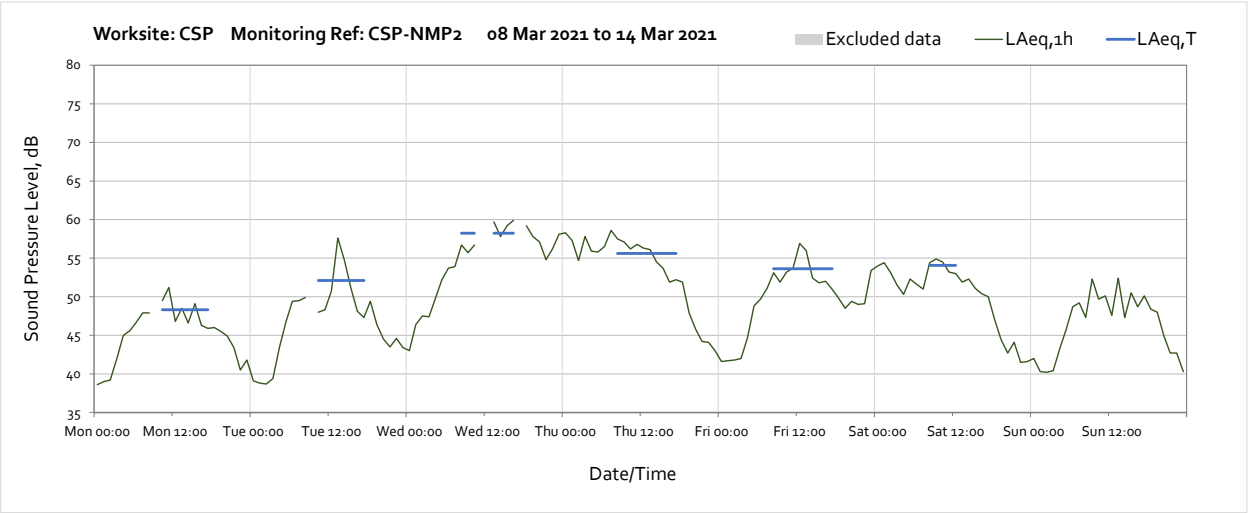


Note: Missing data between 01:00 and 03:00 on Sunday 28th March was due to the clock change (start of BST).

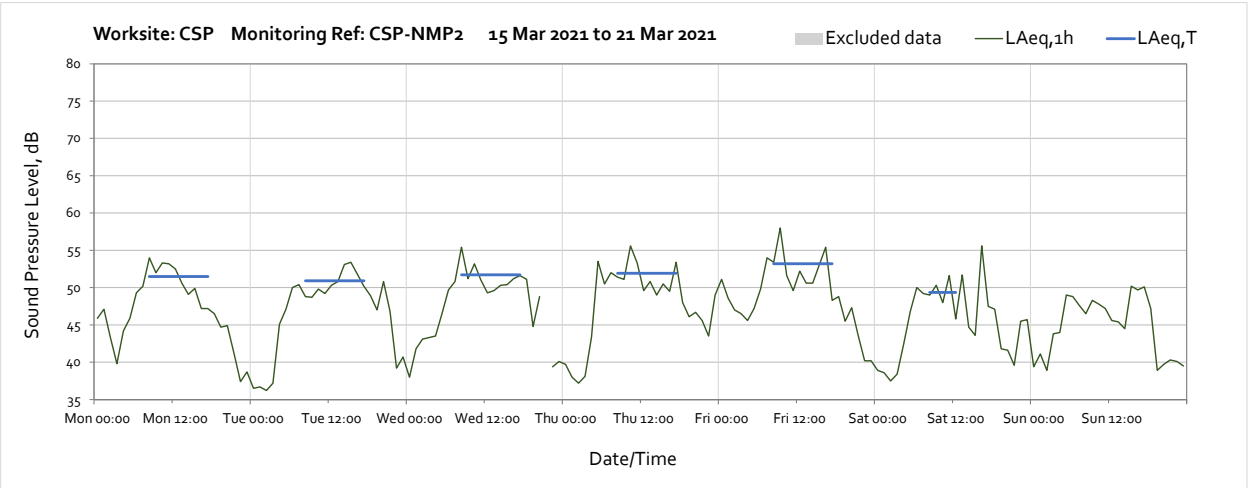


Worksite: CSP – Monitoring Ref: CSP-NMP2

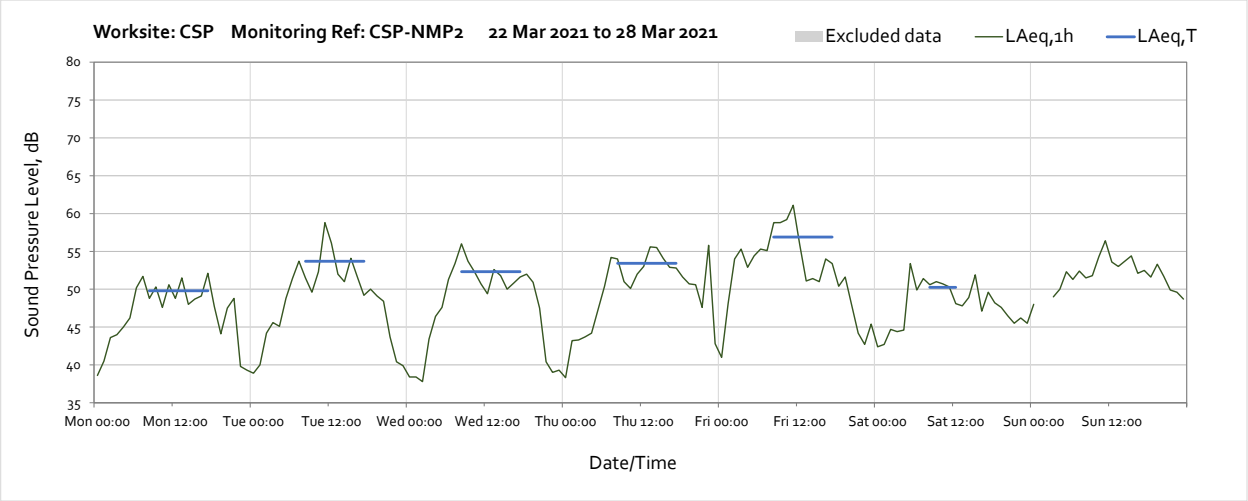




Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments.



Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments.



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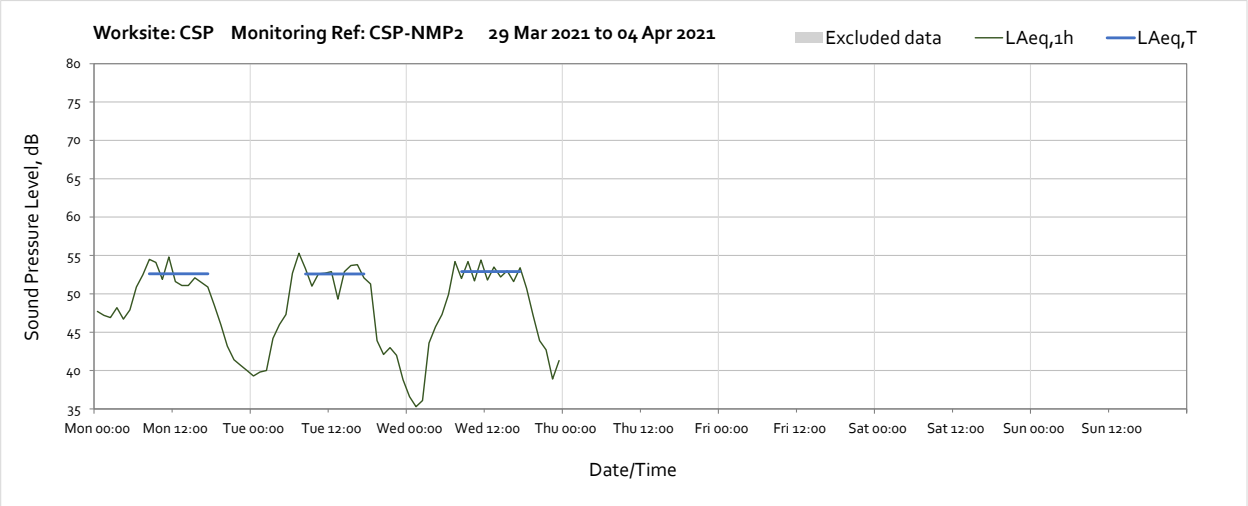

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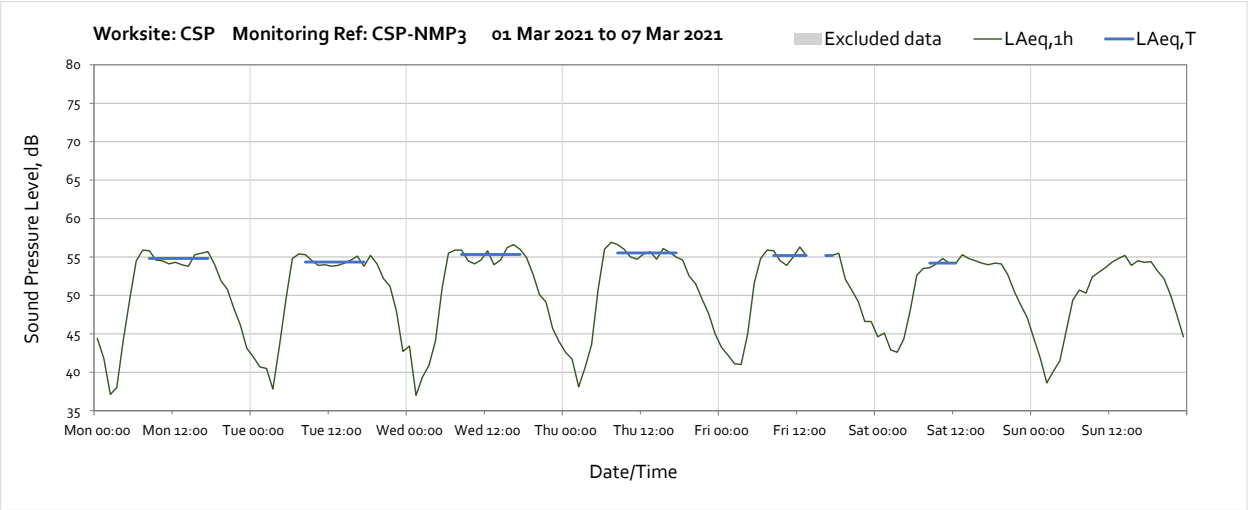
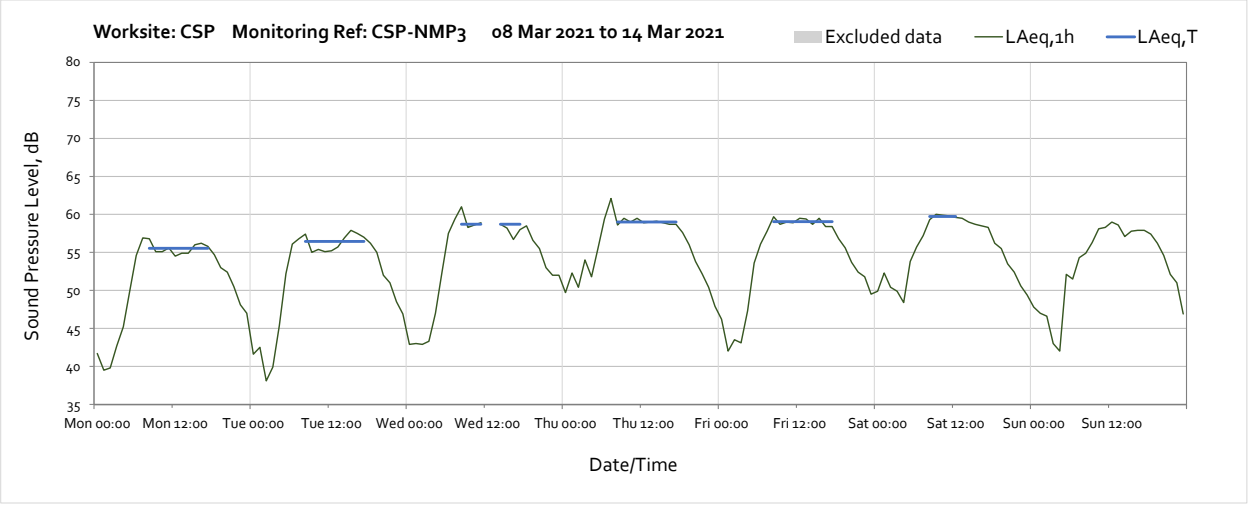
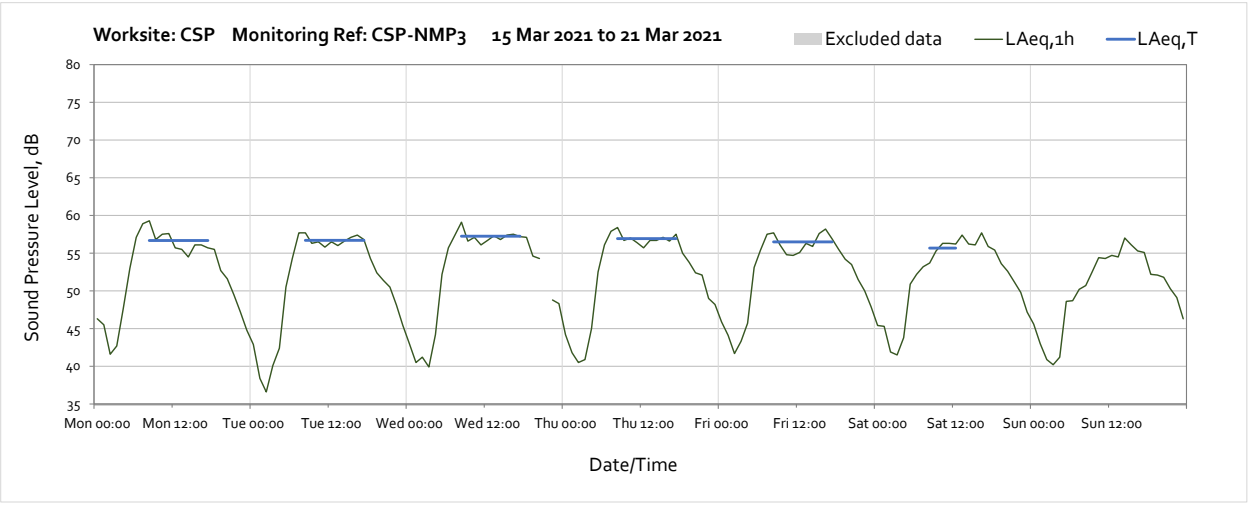


Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments.



Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments.



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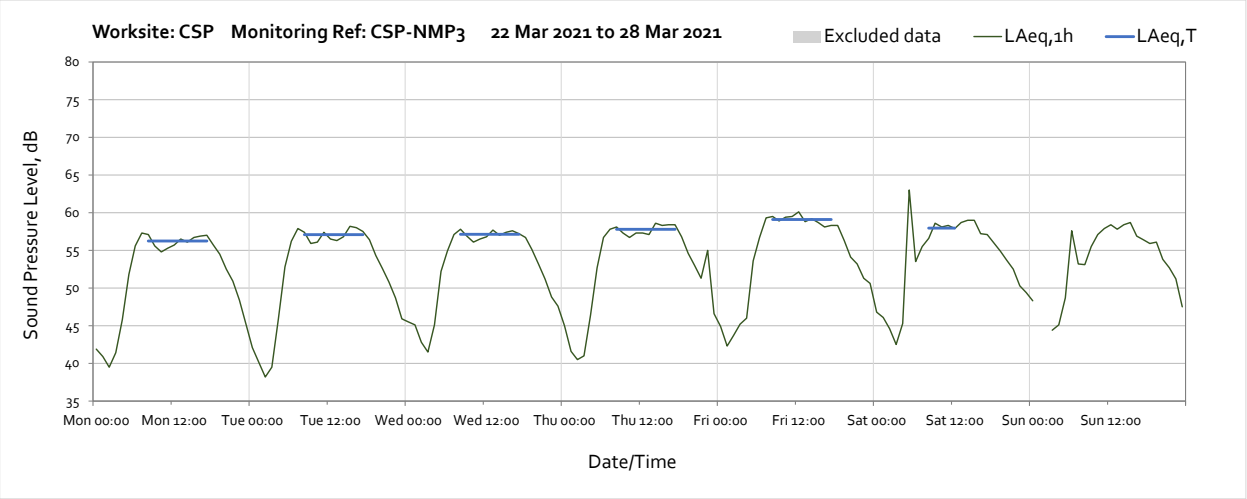
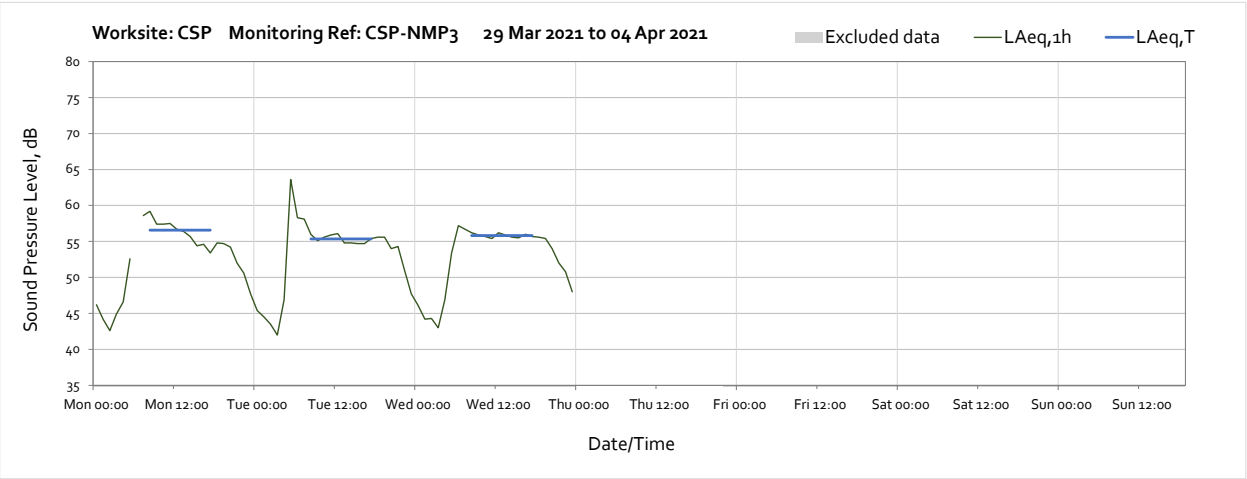
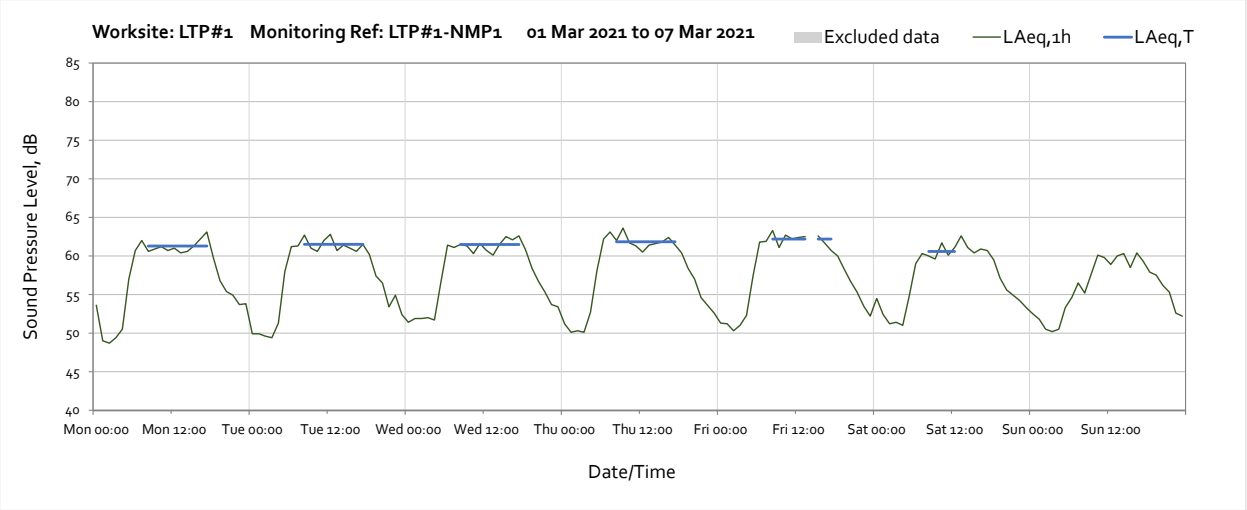


Note: Missing data between 01:00 and 03:00 on Sunday 28th March was due to the clock change (start of BST).



Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments.

Worksite: LPT#1 – Monitoring Ref: LPT#1-NMP1



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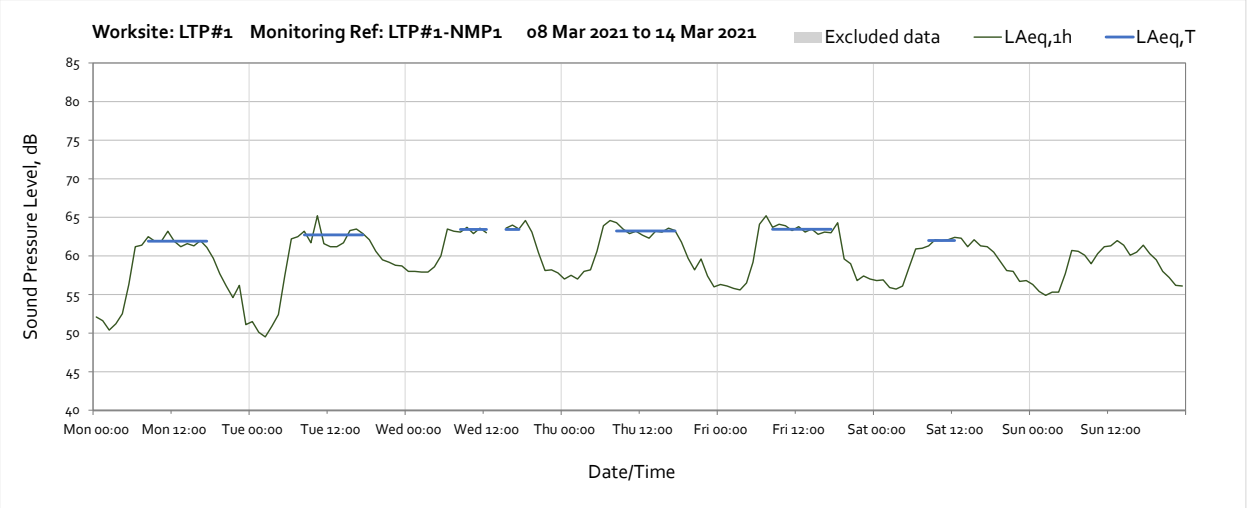

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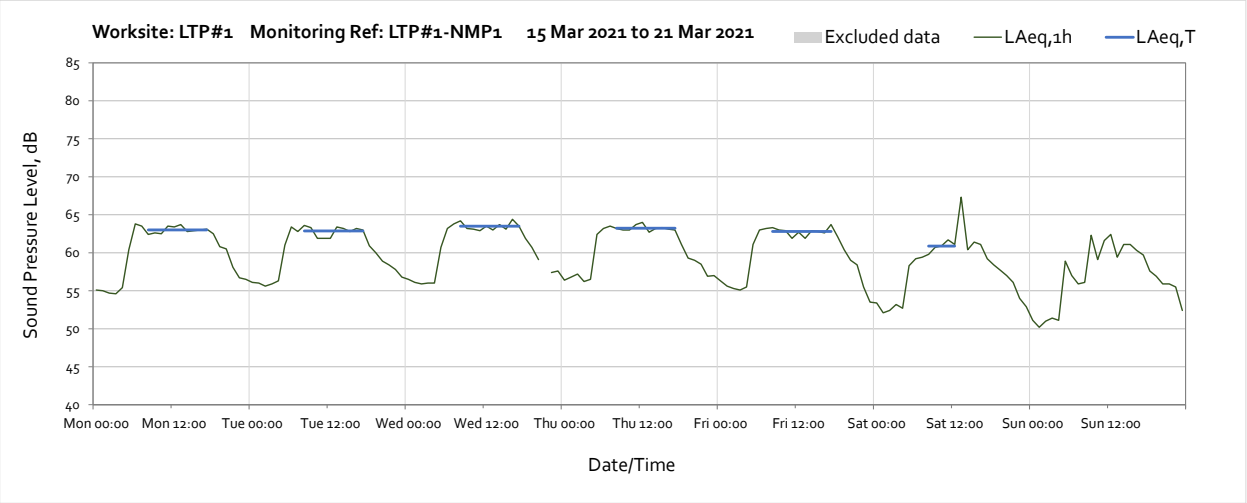

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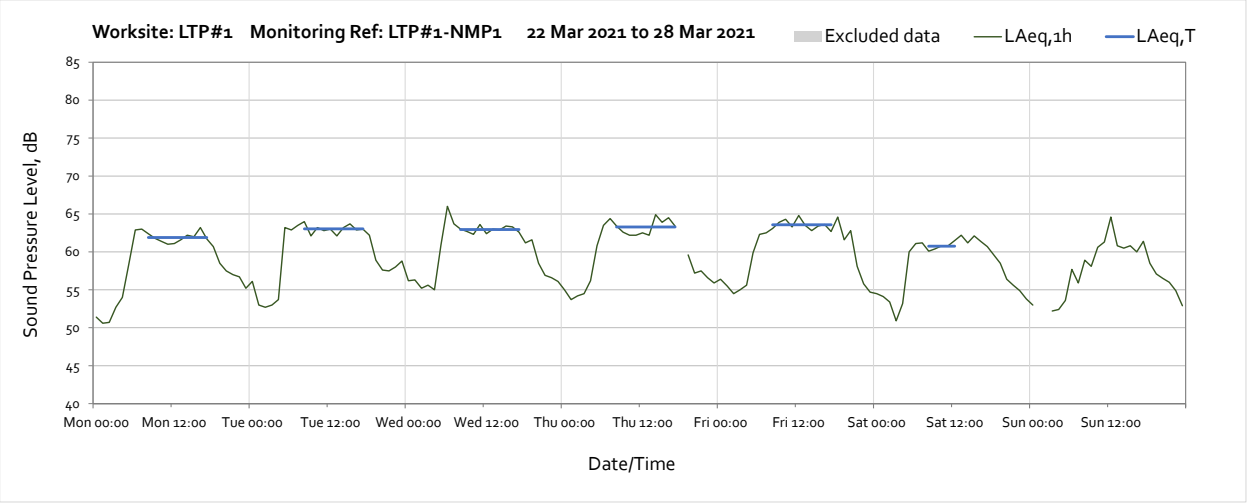
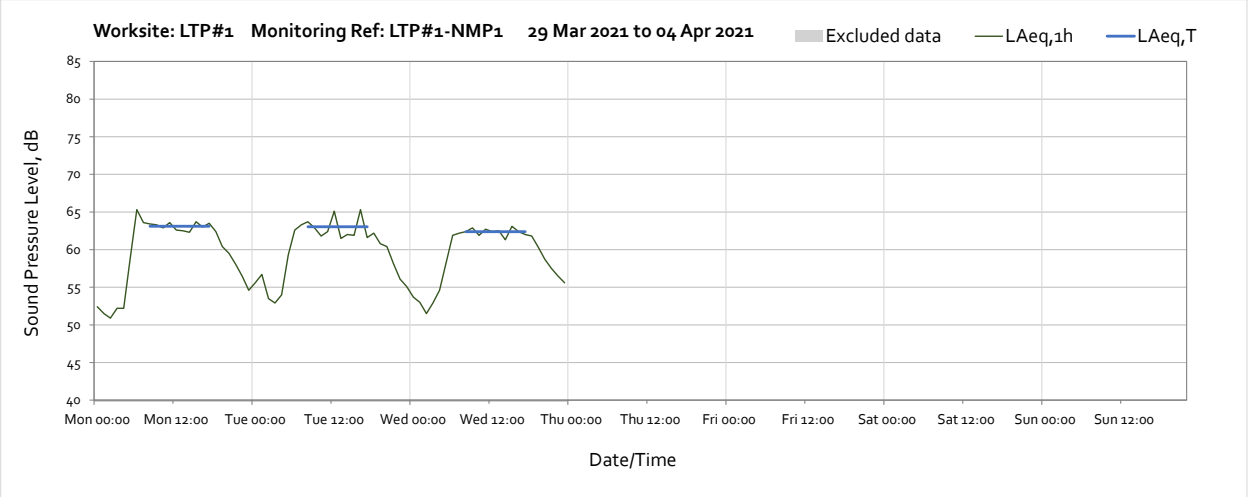
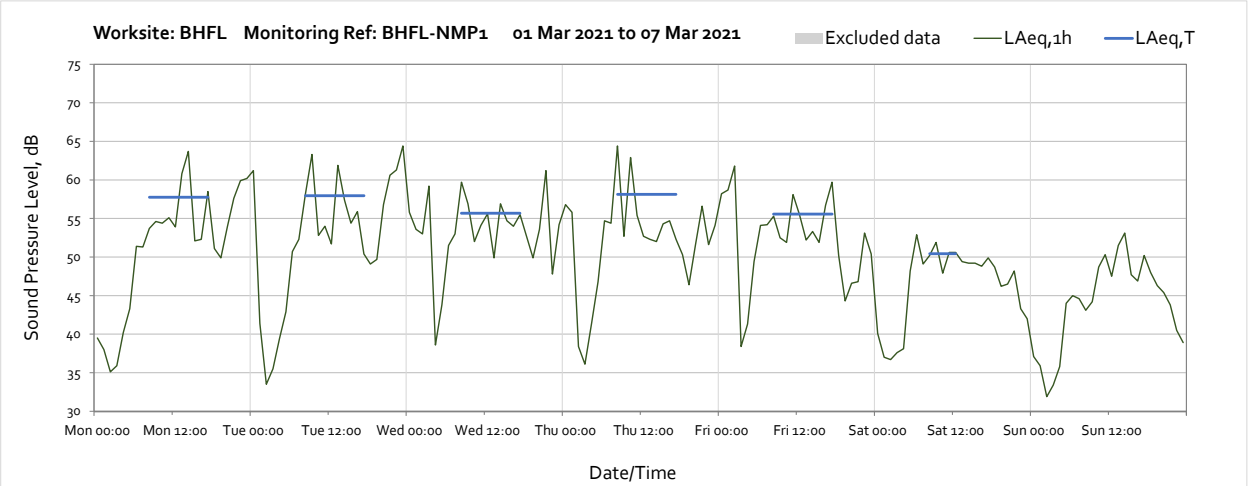
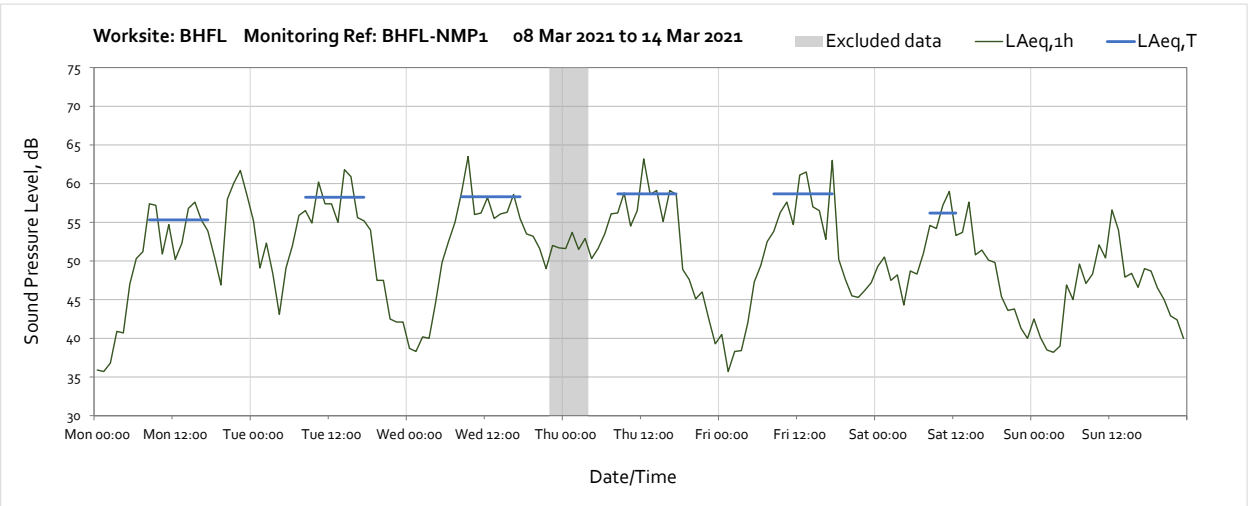


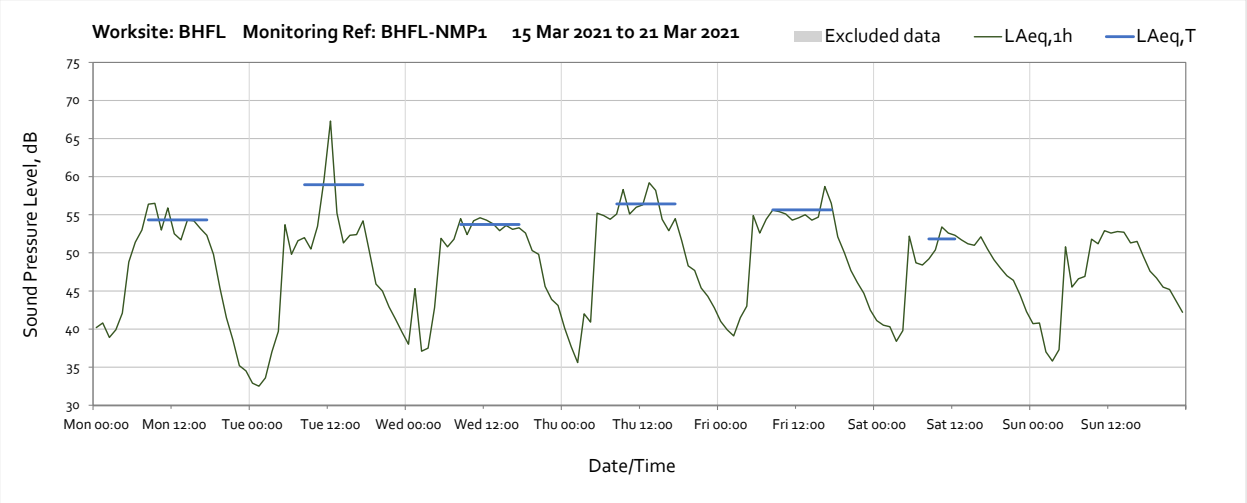
Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments. Missing data between 01:00 and 03:00 on Sunday 28th March was due to the clock change (start of BST).

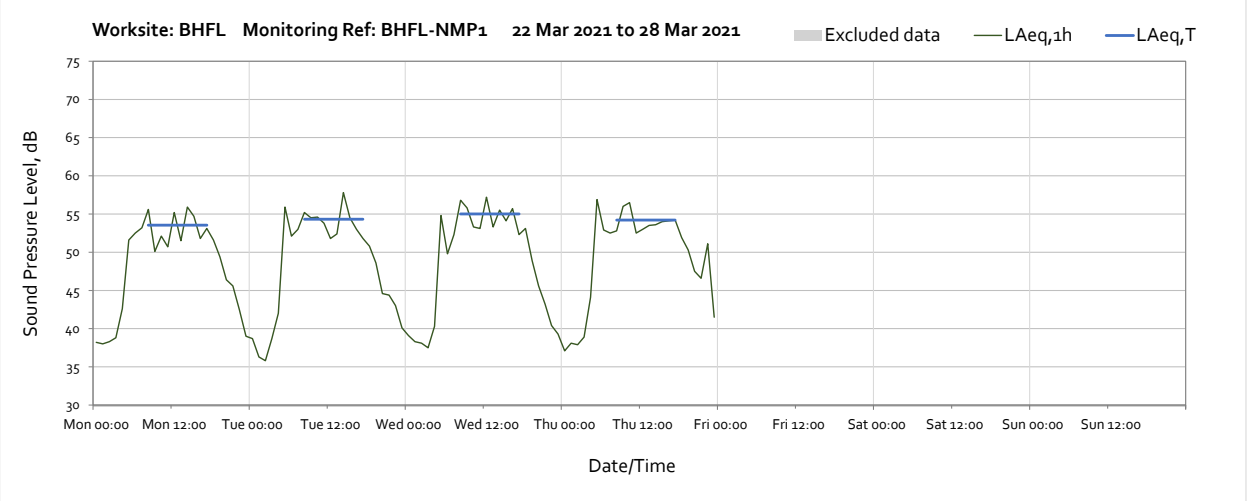


Worksite: BHFL – Monitoring Ref: BHFL-NMP1



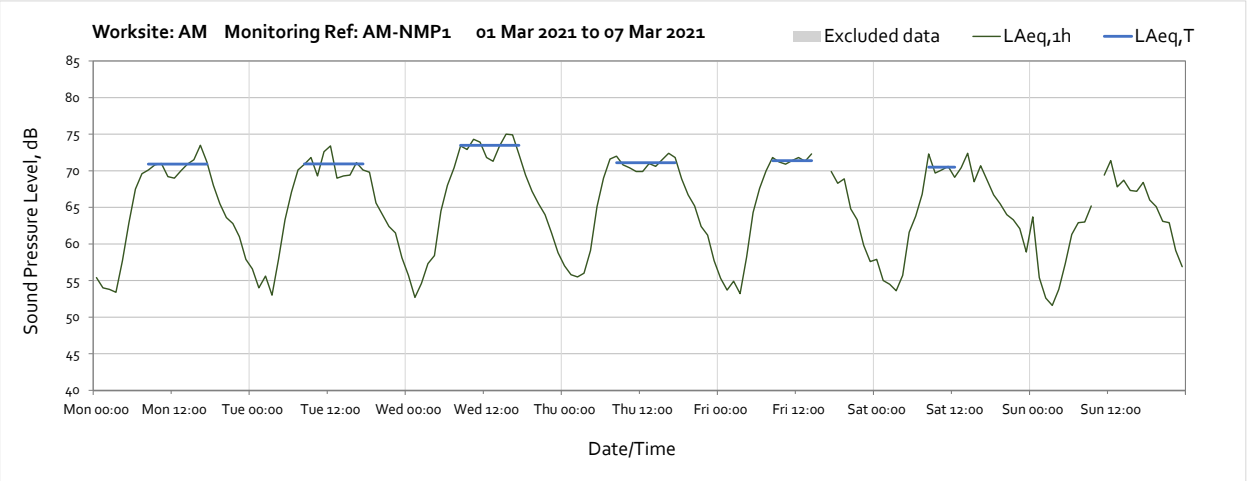




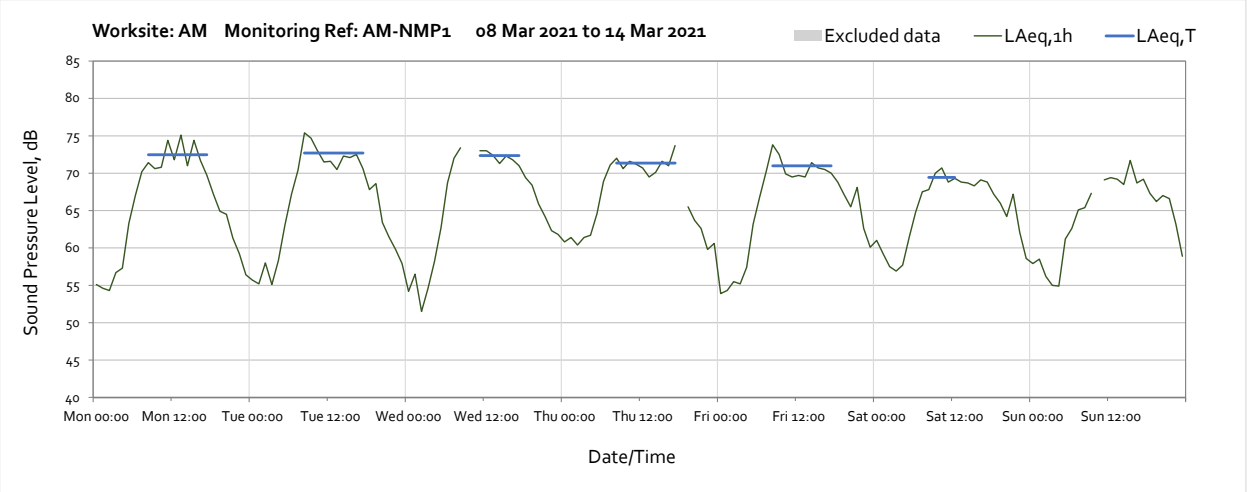


Missing data from 00:00 on Friday 26th March until 23:00 on Wednesday 31st March was due to the power supply being turned off by the resident.

Worksite: AM – Monitoring Ref: AM-NMP1



Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments.



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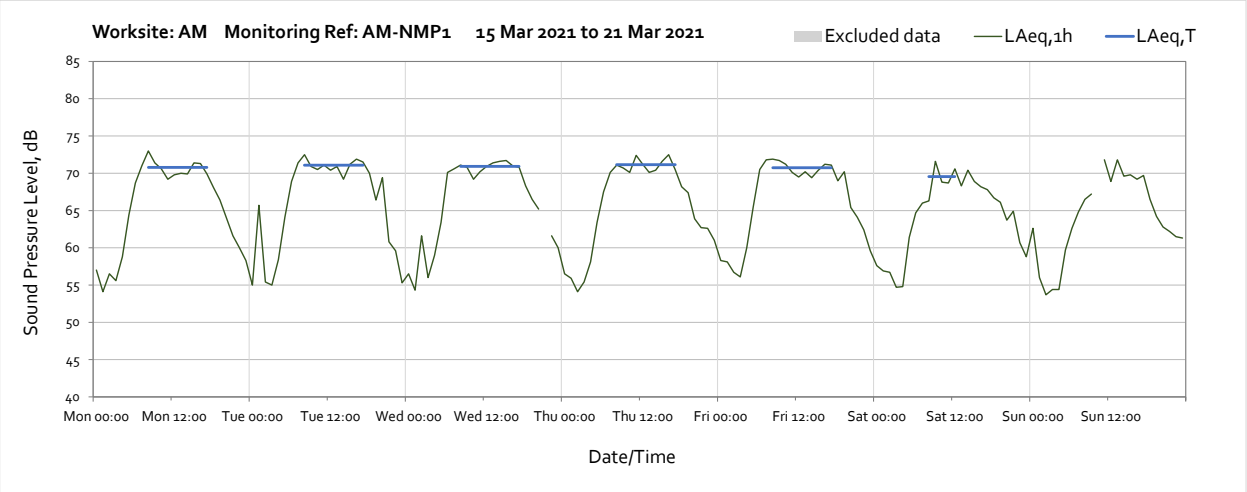
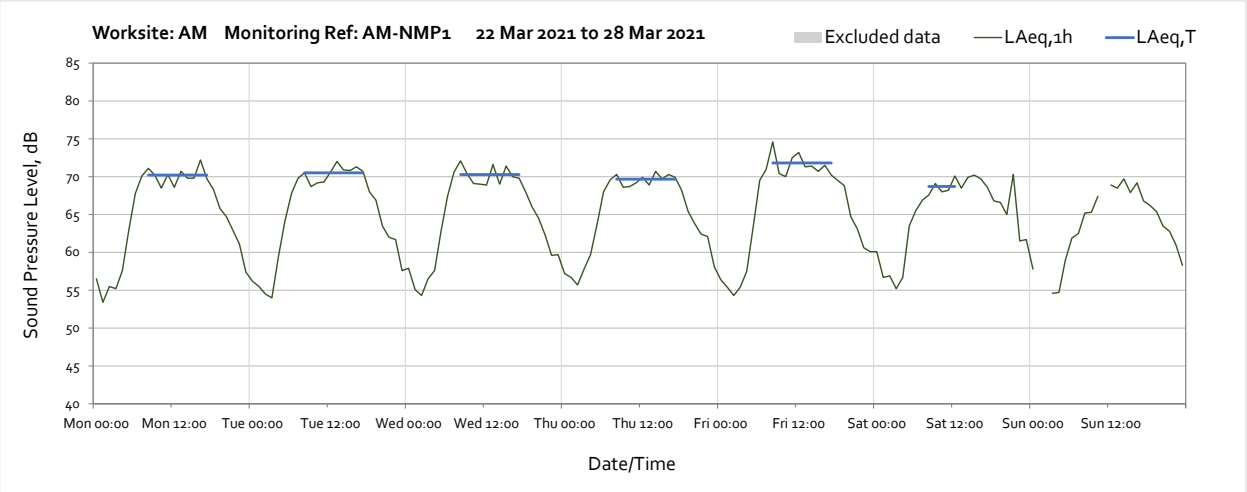
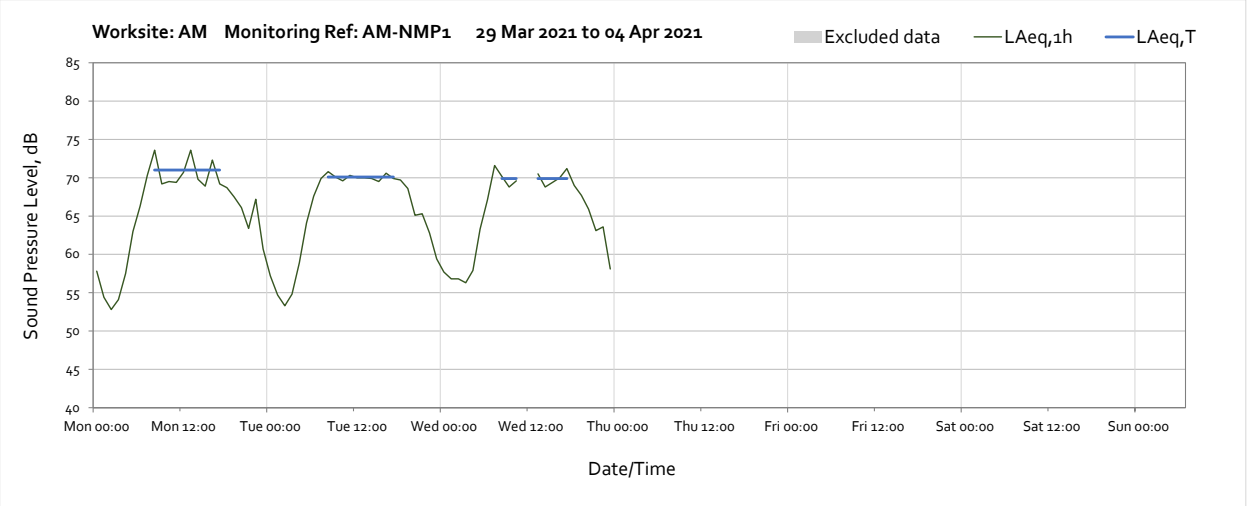


Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments.

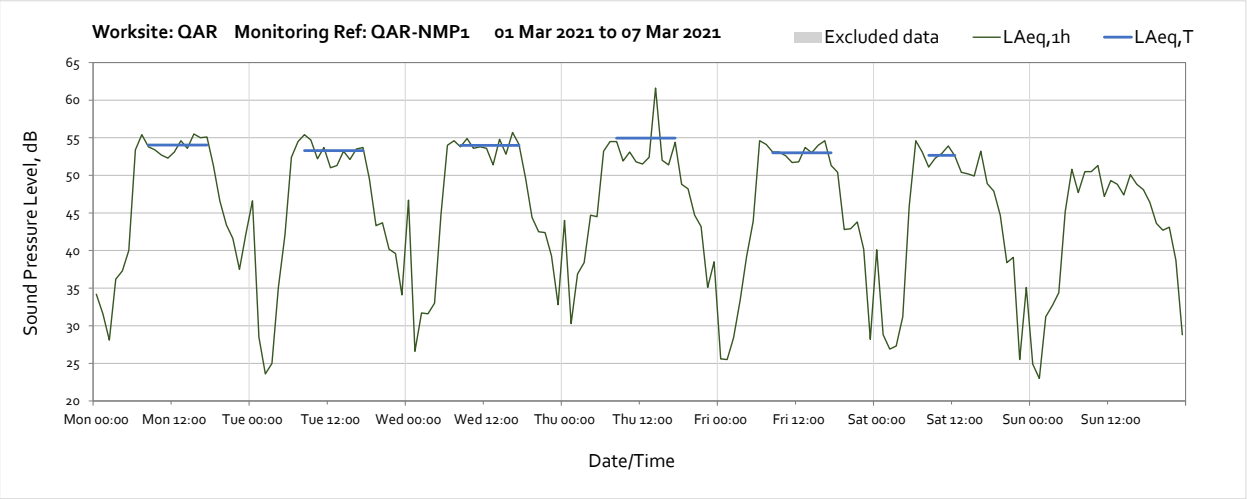


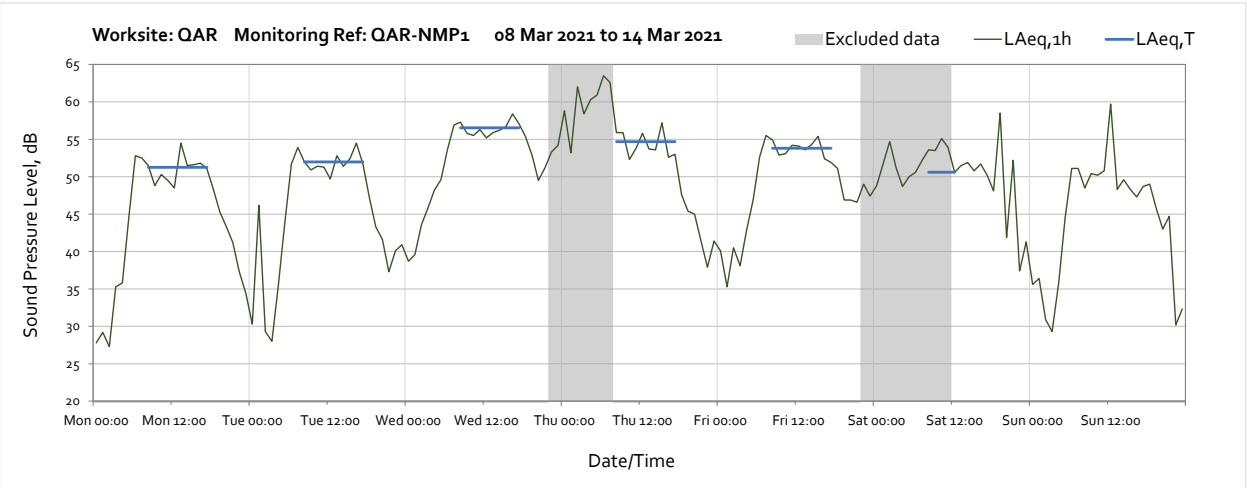
Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments. Missing data between 01:00 and 03:00 on Sunday 28th March was due to the clock change (start of BST).

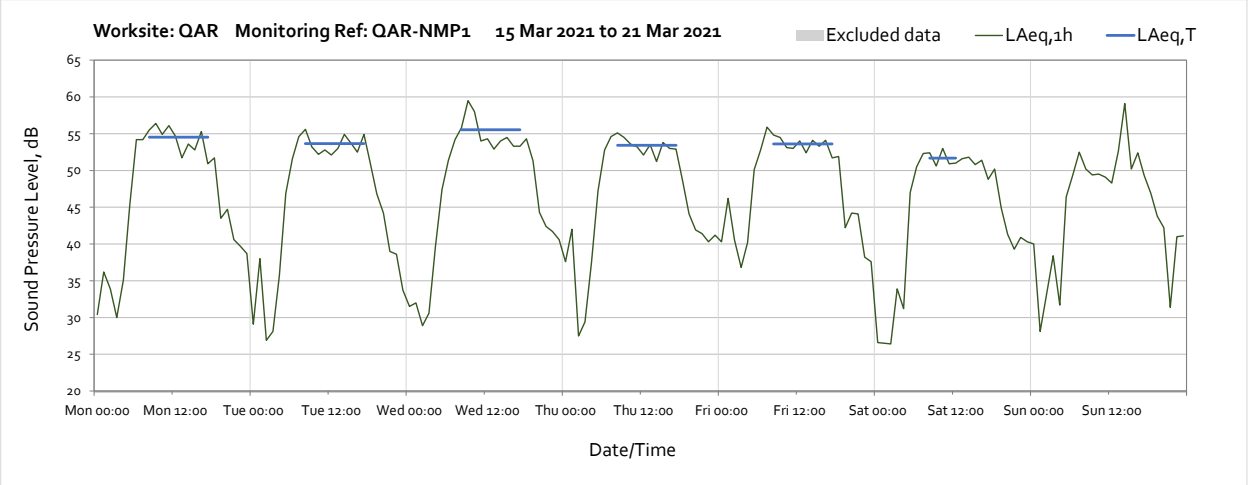


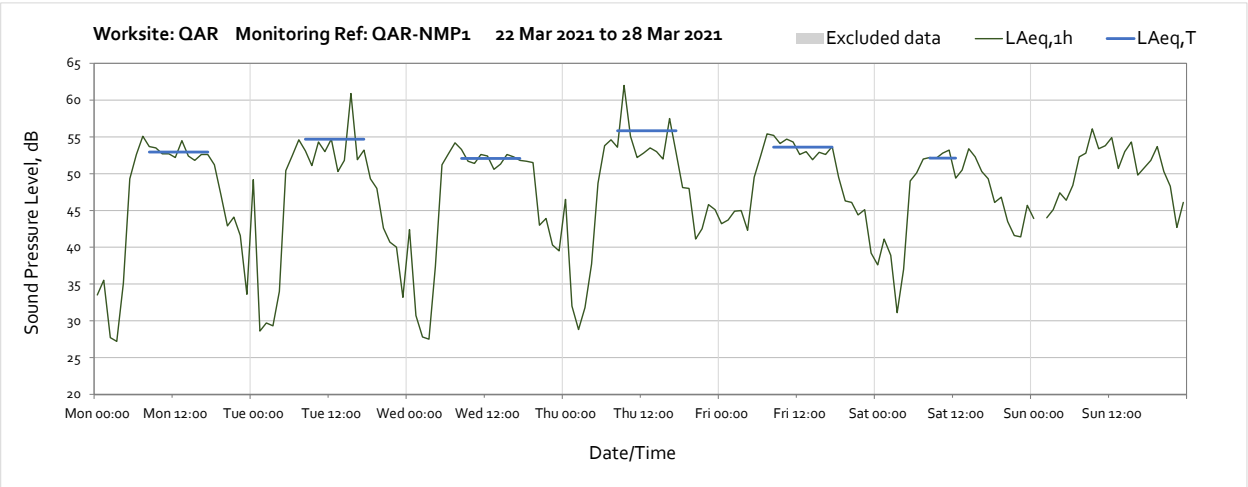
Note: Missing data sporadically throughout March was due to the monitoring being paused during maintenance operations and setting adjustments.

Worksite: QAR – Monitoring Ref: QAR-NMP1

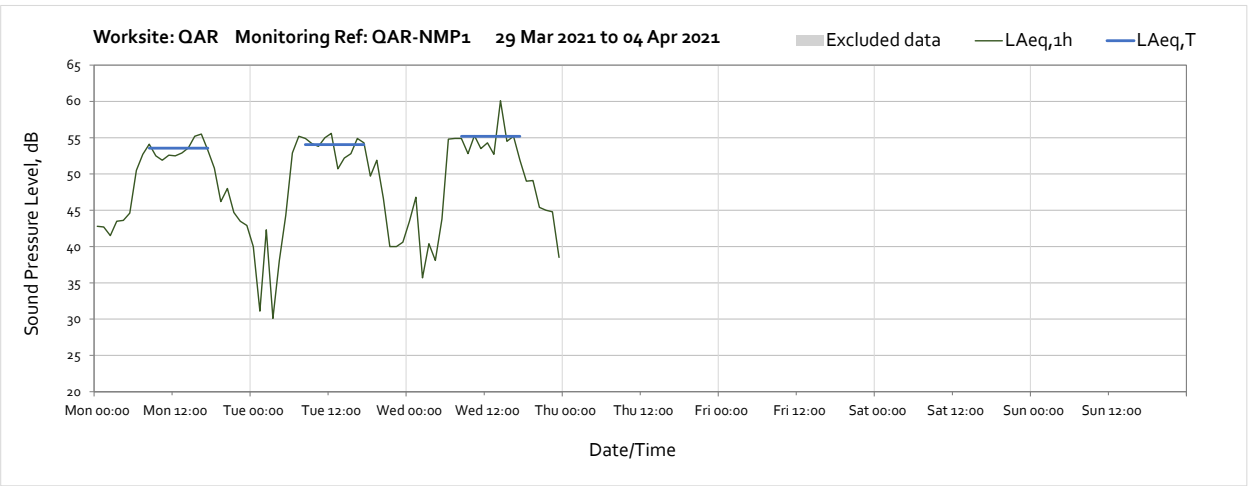




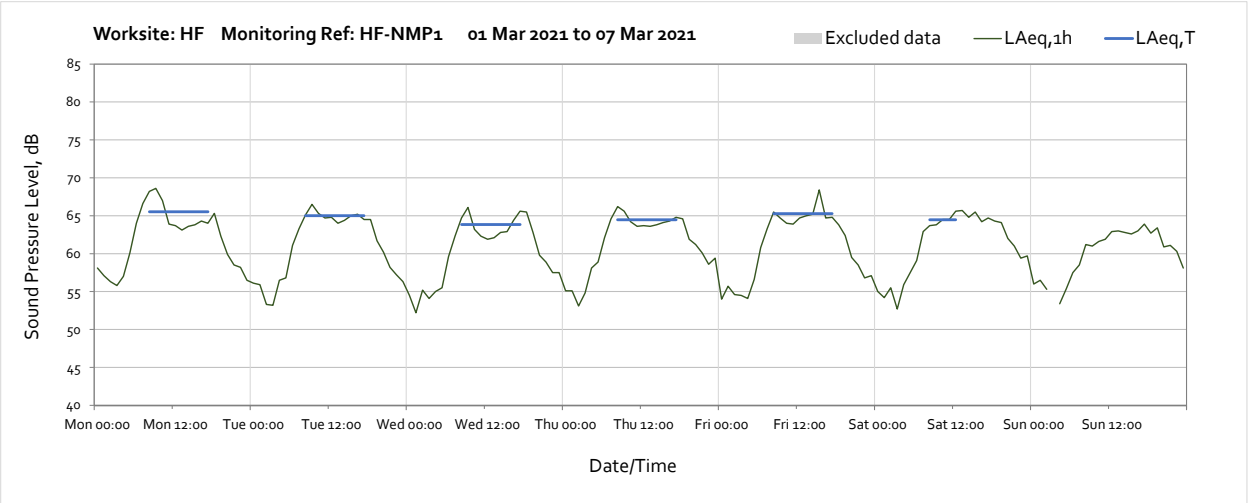




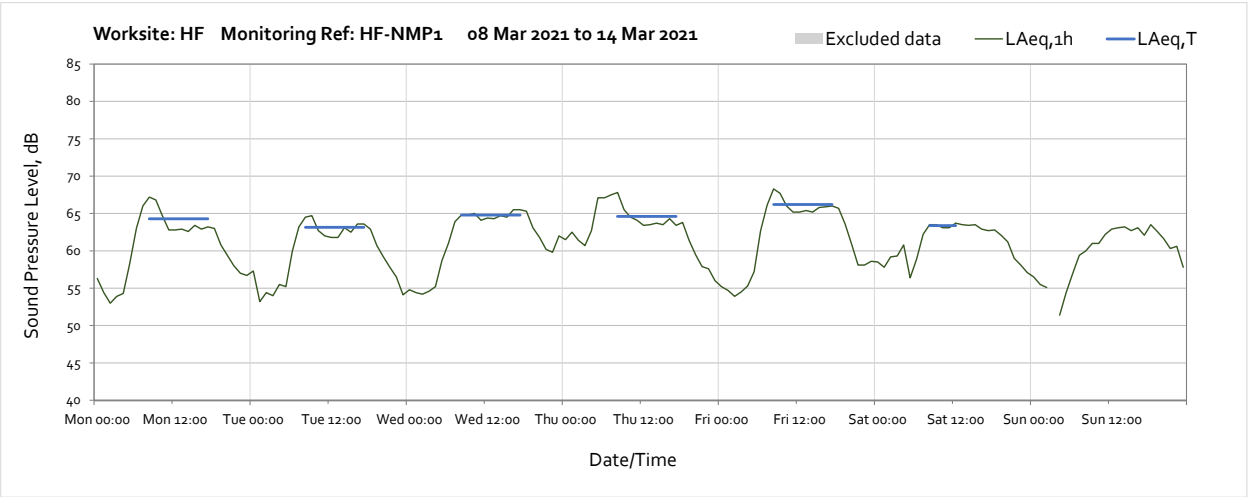
Note: Missing data between 01:00 and 02:00 on Sunday 28th March was due to the clock change (start of BST).



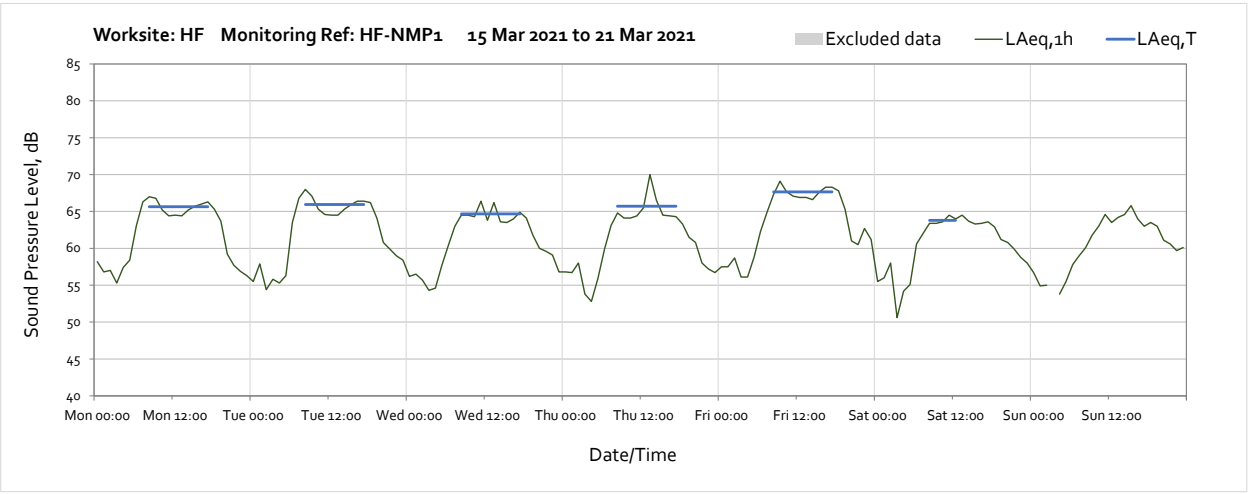
Worksite: HF – Monitoring Ref: HF-NMP1



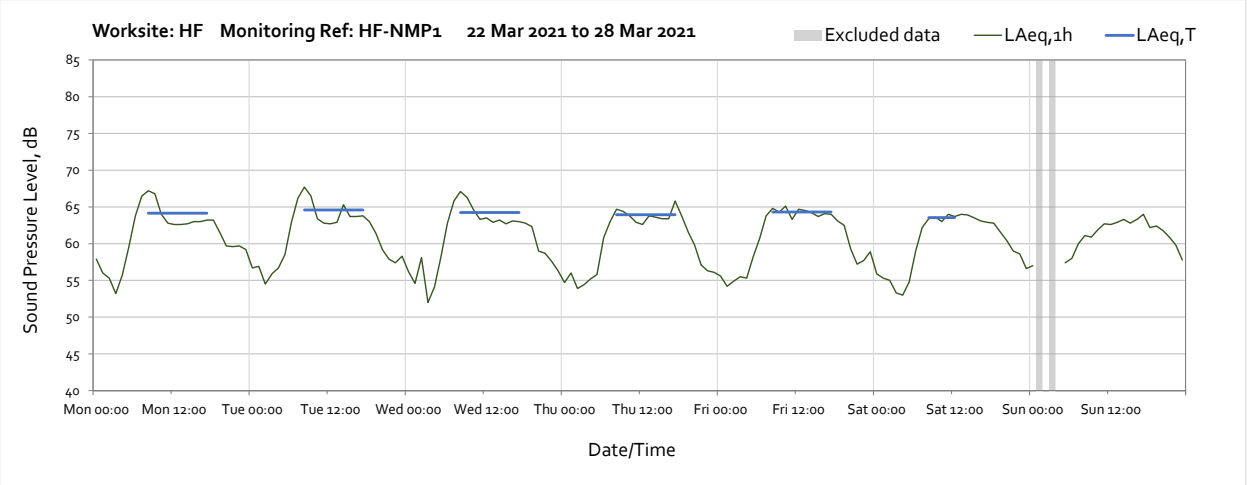
Note: Missing data sporadically throughout March was due to equipment failure.



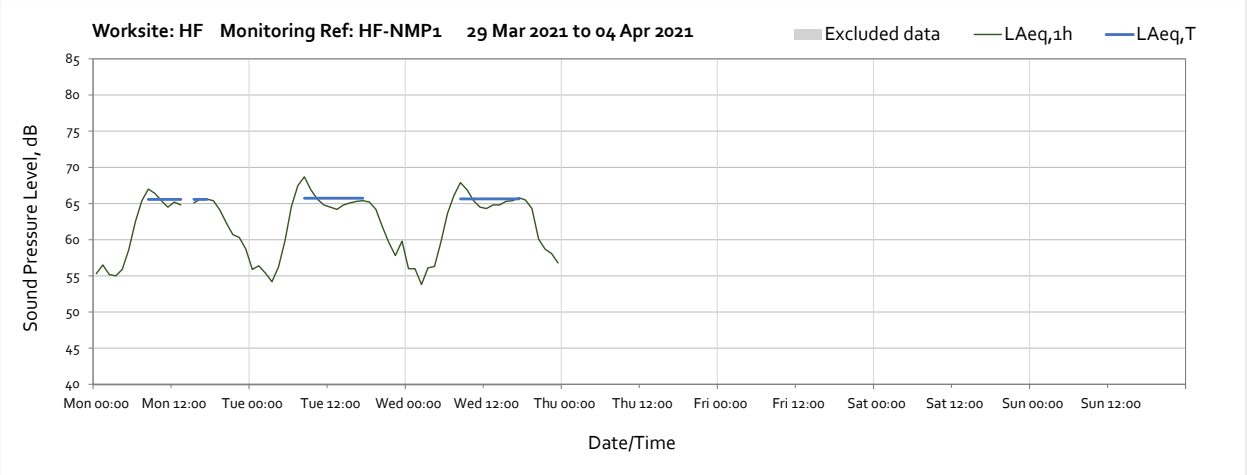
Note: Missing data sporadically throughout March was due to equipment failure.



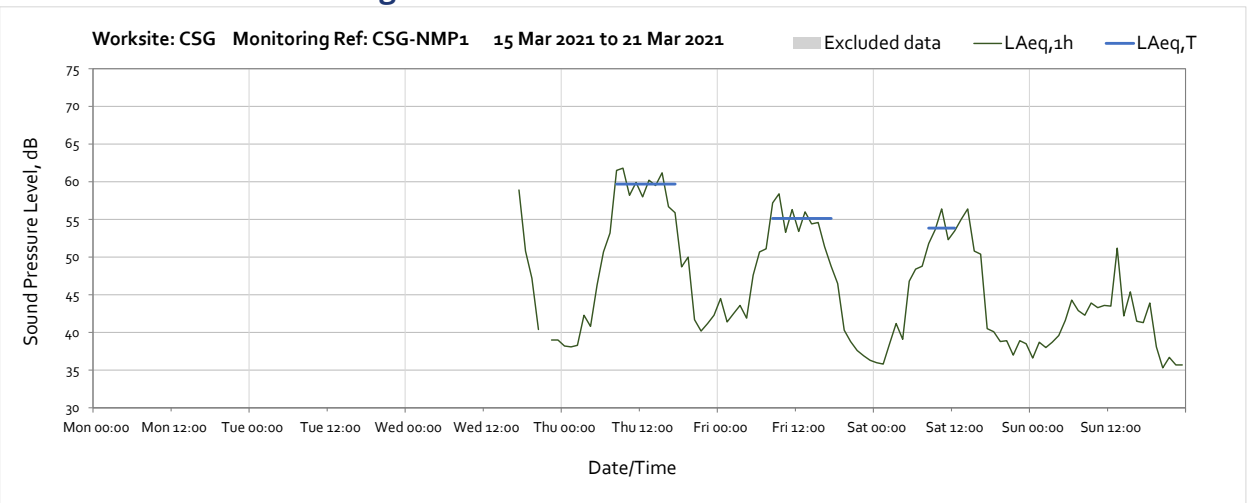
Note: Missing data sporadically throughout March was due to equipment failure.



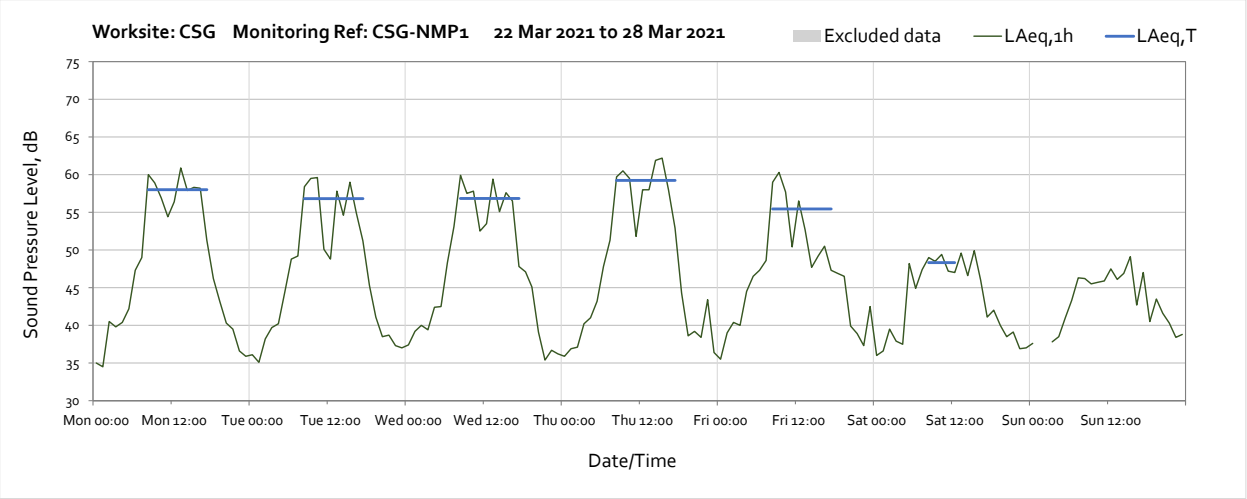
Note: Missing data sporadically throughout March was due to equipment failure.



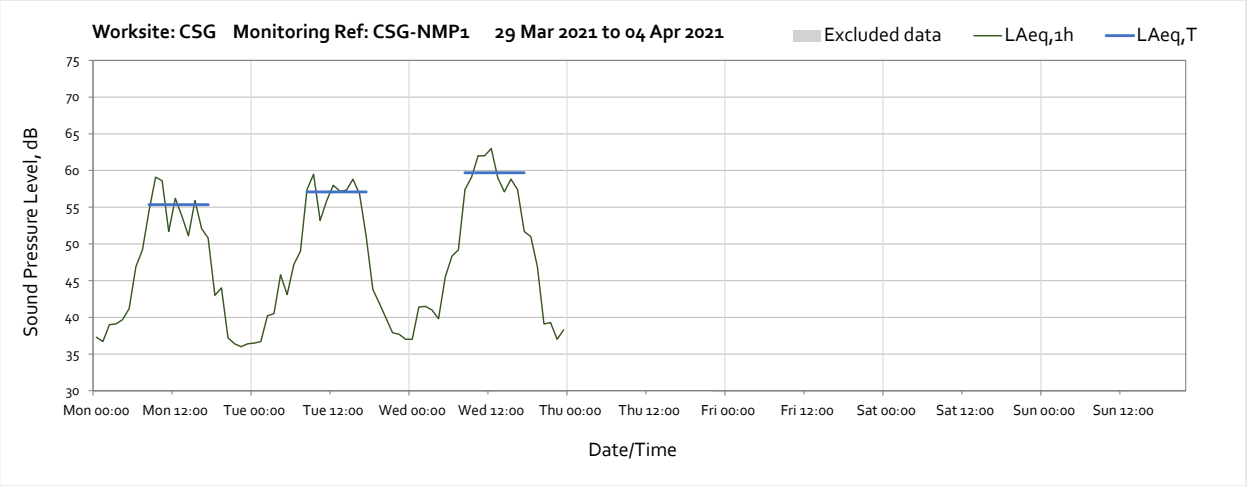
Worksite: CSG – Monitoring Ref: CSG-NMP1



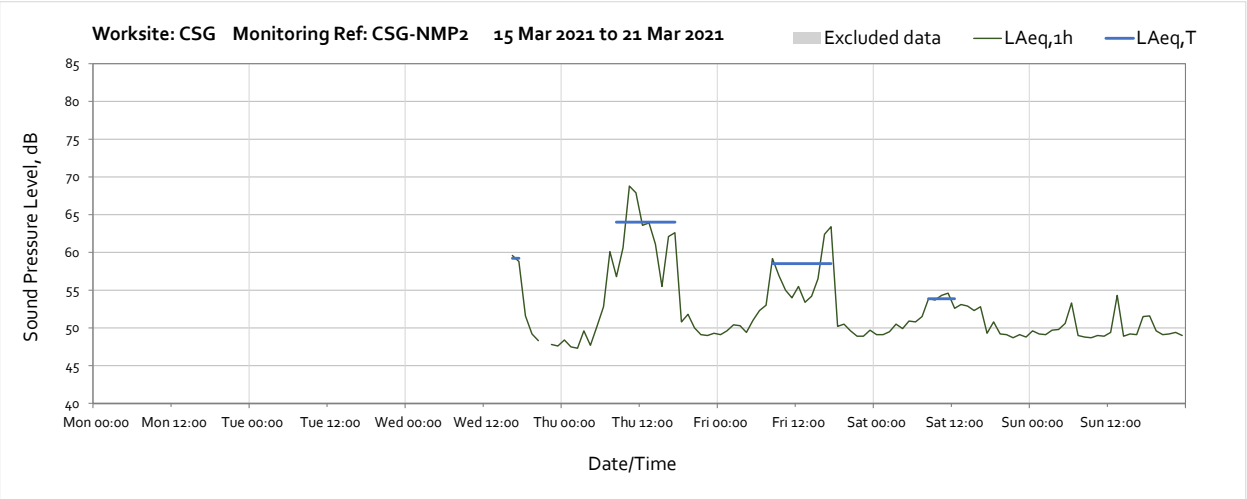
Note: Monitor deployed at 17:00 on Wednesday 17th March. Missing data between 21:00 and and 22:00 on Wednesday was due to the monitoring being paused to set up security alarms.



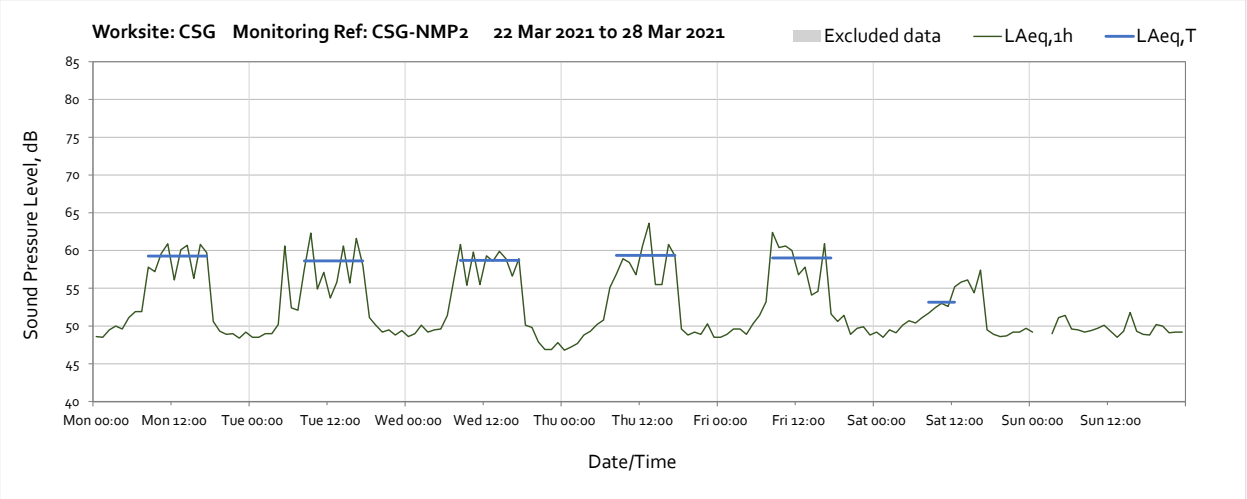
Missing data between 01:00 and 03:00 on Sunday 28th March was due to the clock change (start of BST).



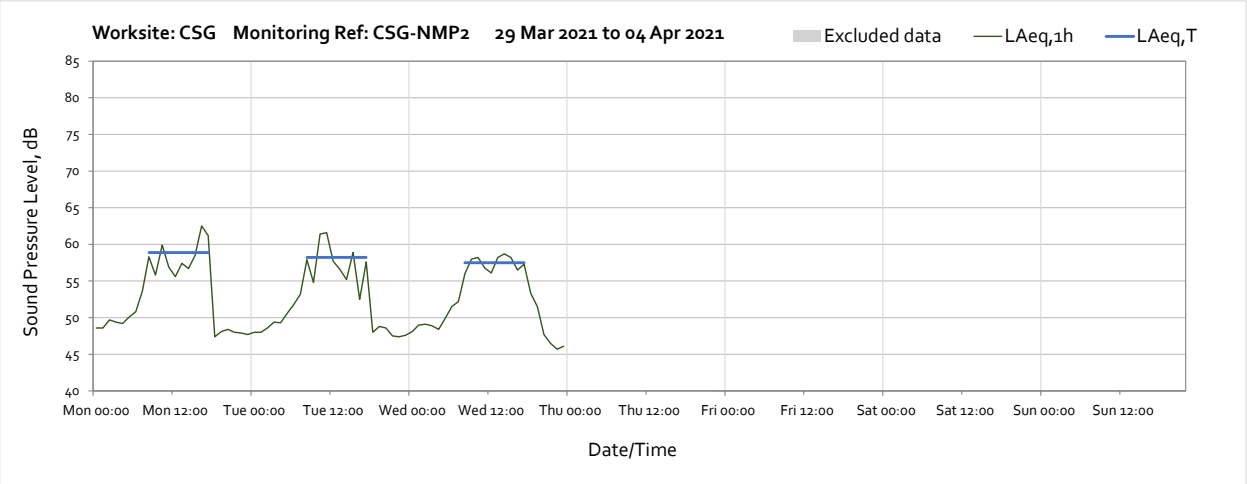
Worksite: CSG – Monitoring Ref: CSG-NMP2



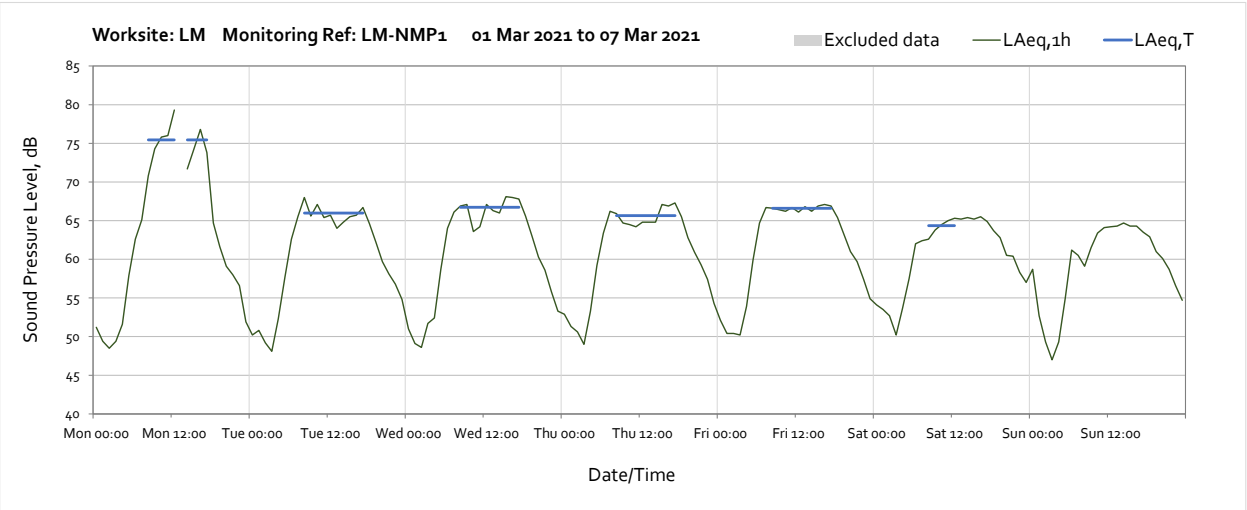
Note: Monitor deployed at 16:00 on Wednesday 17th March. Missing data between 21:00 and and 22:00 on Wednesday 17th March was due to the monitoring being paused to set up security alarms.



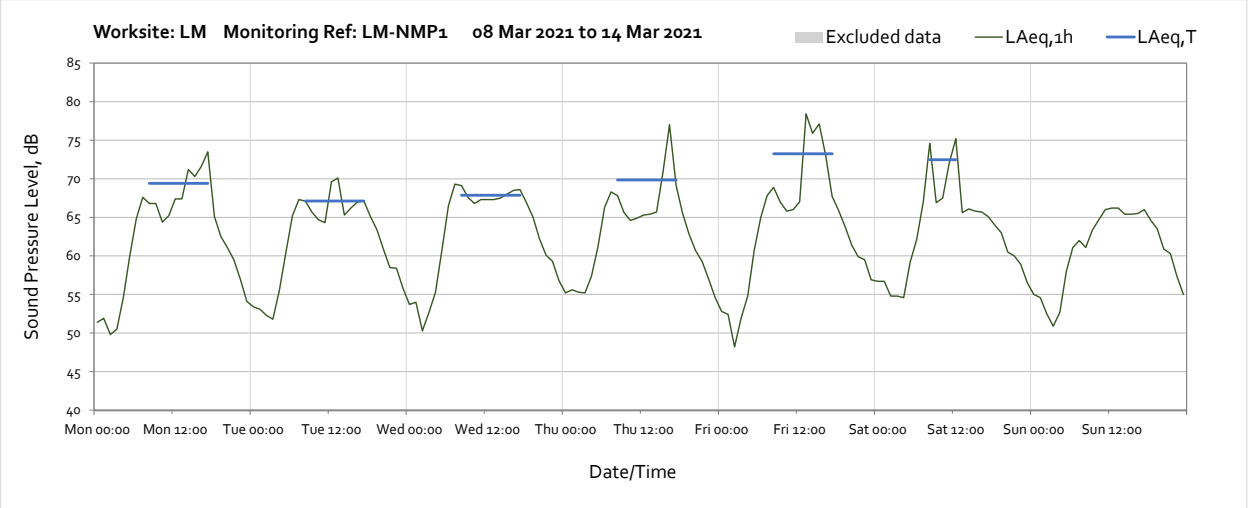
Missing data between 01:00 and 03:00 on Sunday 28th March was due to the clock change (start of BST).

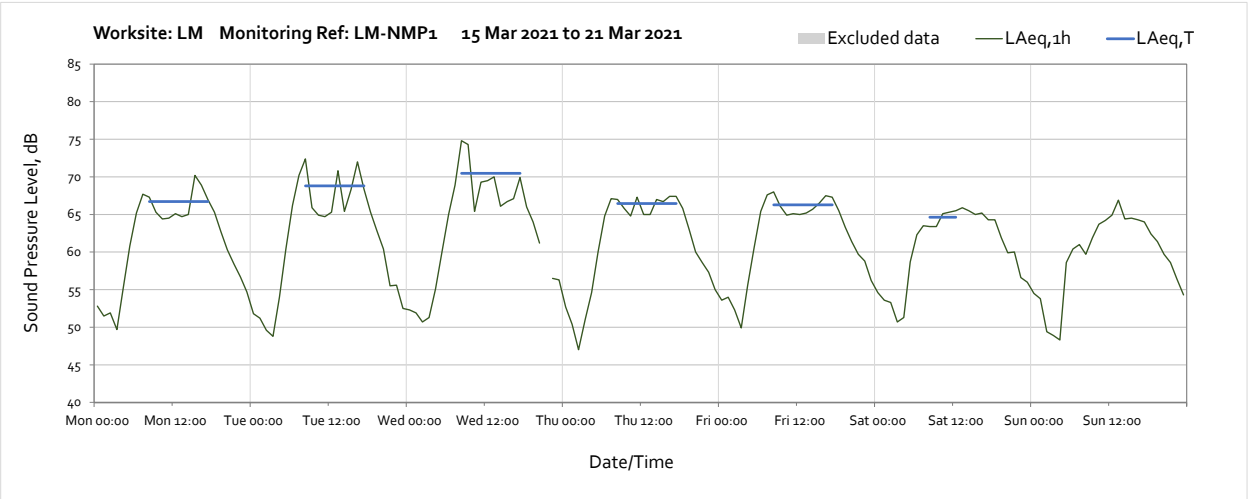


Worksite: LM – Monitoring Ref: LM-NMP1

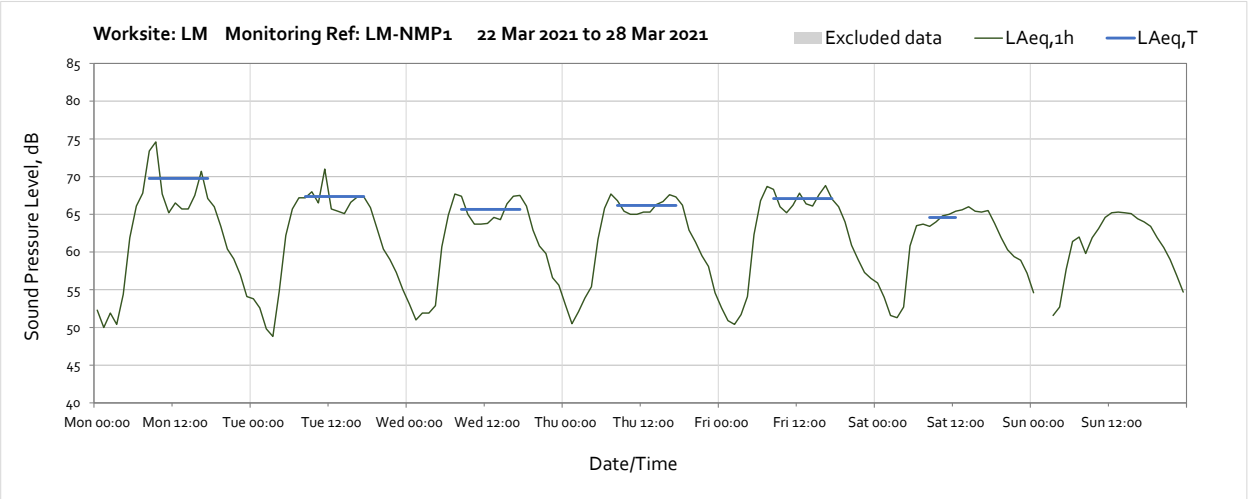


Note: Missing data between 13:00 and 14:00 on Monday 1st March was due to the monitor being stopped for maintenance.

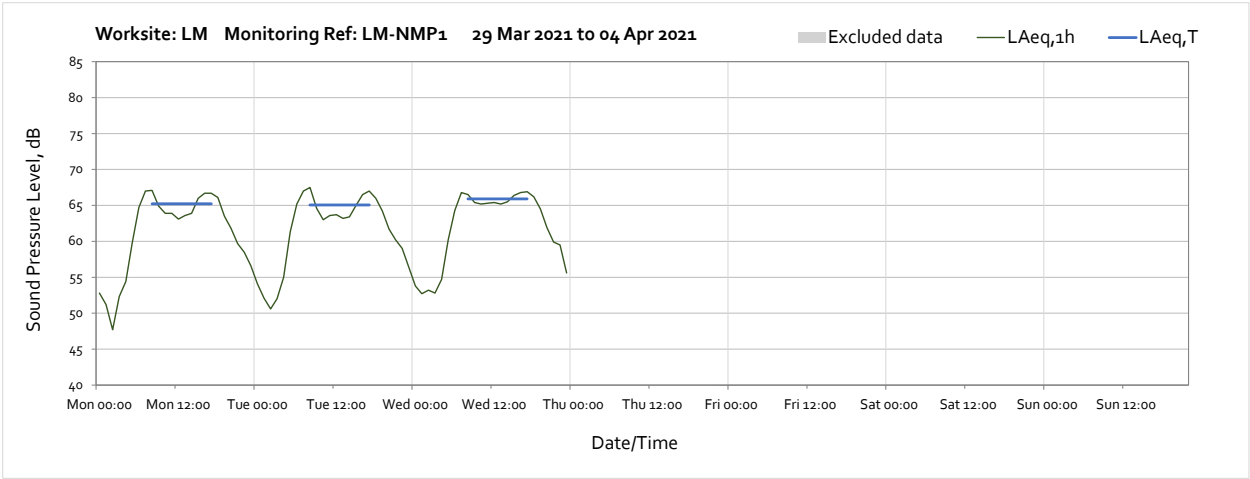




Note: Missing data between 21:00 and 22:00 on Wednesday 17th March was due to the monitoring being paused to set up security alarms.



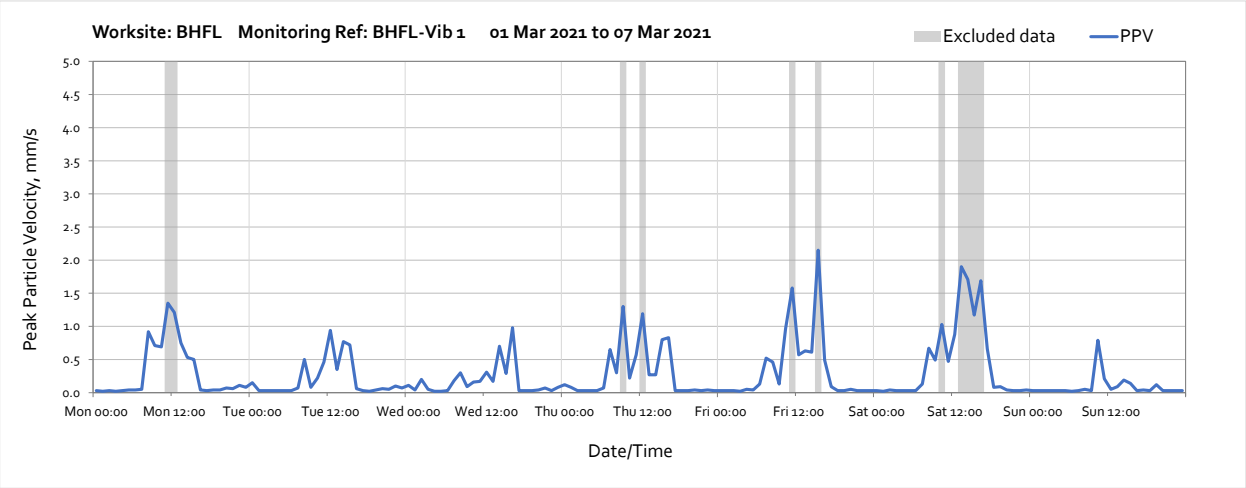
Missing data between 01:00 and 03:00 on Sunday 28th March was due to the clock change (start of BST).


Worksite: LM Monitoring Ref: LM-NMP1 29 Mar 2021 to 04 Apr 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

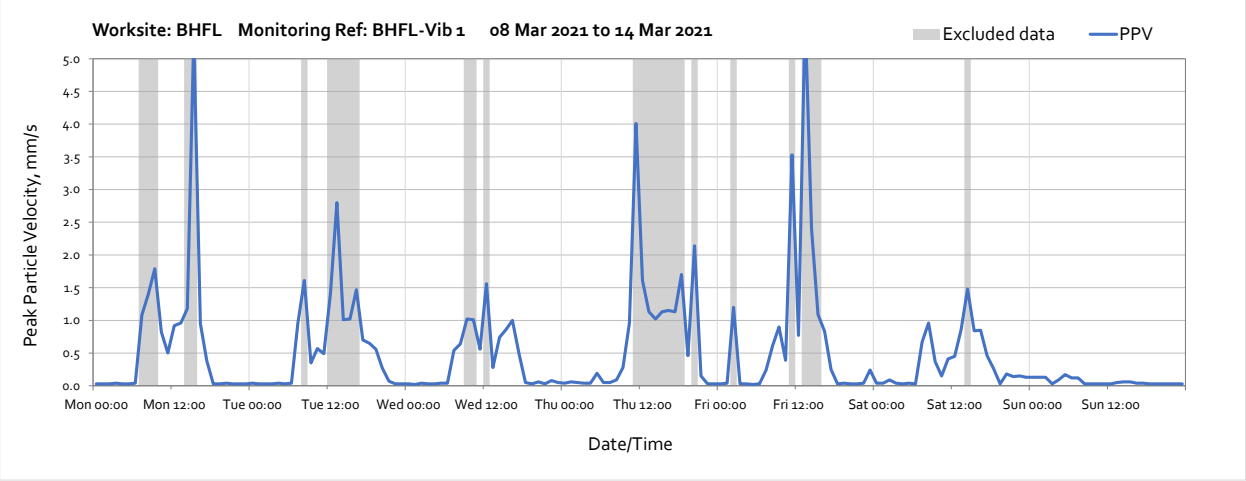
Vibration

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

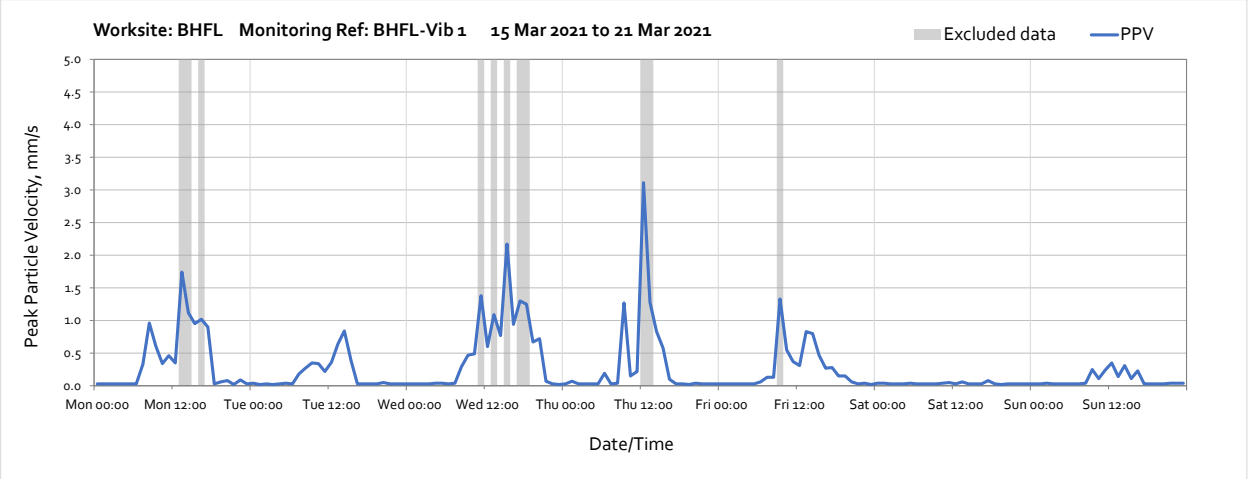
Worksite: BHFL – Monitoring Ref: BHFL-Vib 1



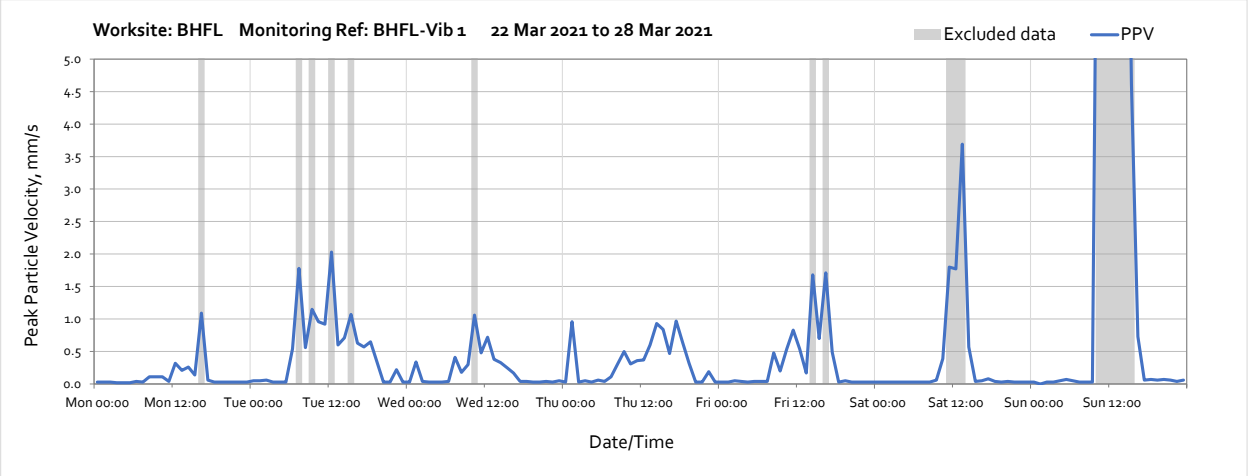
Note: High PPV values greyed out were due to renovation works in the property.



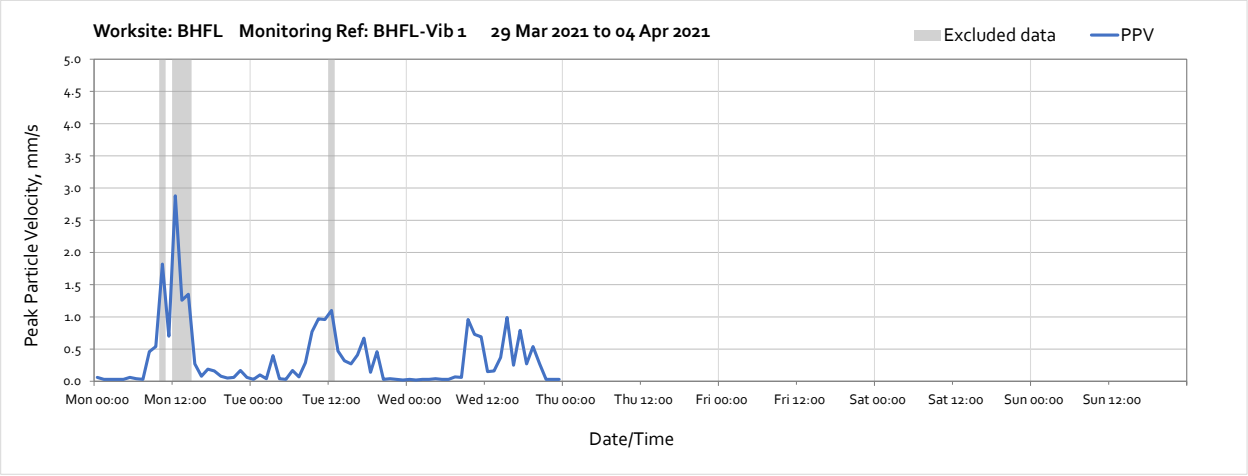
Note: High PPV values greyed out were due to renovation works in the property.



Note: High PPV values greyed out were due to renovation works in the property.



Note: High PPV values greyed out were due to renovation works in the property.



Note: High PPV values greyed out were due to renovation works in the property.