

Construction noise and vibration Monthly Report – December 2021

Buckinghamshire

Non-Technical Summary	1
Abbreviations and Descriptions	4
1 Introduction	5
1.2 Measurement Locations	10
2 Summary of Results	13
2.1 Summary of Measured Noise Levels	13
2.2 Exceedances of the LOAEL and SOAEL	18
2.3 Exceedances of Trigger Level	22
2.4 Complaints	22
Appendix A Site Locations	24
Appendix B Monitoring Locations	39
Appendix C Data	55

List of tables

Table 1: Table of Abbreviations	4
Table 2: Monitoring Locations	11
Table 3: Summary of Measured dB L_{Aeq} Data over the Monitoring Period	14
Table 4: Summary of Measured PPV Data over the Monitoring Period	18
Table 5: Summary of Exceedances of LOAEL and SOAEL	19
Table 6: Summary of Total Exceedances of SOAEL	22
Table 7: Summary of Exceedances of Trigger Levels	22
Table 8: Summary of Complaints	22

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 December 2021.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken in the vicinity of School End worksite (ref.: SE) where roadworks, construction of the culvert crossing, stockpiling and demolition works were undertaken.
- Noise monitoring was undertaken in the vicinity of Rosehill Farm worksite (ref.: RF) where roadworks and drainage works were undertaken.
- Noise monitoring was undertaken in the vicinity of Hermitage Chetwode worksite (ref.: HC), where de-vegetation, bat mitigation and fencing construction works were underway.
- Noise monitoring was undertaken in the vicinity of West Street Overbridge worksite (ref.: WSO) where construction of access roads, drainage installation including excavation of attenuation ponds and minor vegetation removal works were undertaken.
- Noise monitoring was undertaken in the vicinity of School Hill Compound worksite (ref.: SHC) where construction of civil structures within the site compound, underground utility works, and operation of batching plant were underway.
- Noise monitoring was undertaken in the vicinity of the School Hill UTX worksite (ref.: SHU) where utilities works and hedgerow translocation works were underway.
- Noise monitoring was undertaken in the vicinity of the FCC Sidings worksite reference (ref: FCC) where no works took place during the monitoring period.
- Noise monitoring was undertaken in the vicinity of Quainton Access Road (ref: QAR), where fencing and mitigation works were underway.
- Noise monitoring was undertaken in the vicinity of Hall Farm worksite (ref: HF) where removal of site cabins, installation of temporary hardstanding and fencing works were undertaken.
- Noise monitoring was undertaken in the vicinity of Meadoway, Aylesbury worksite (ref: MW) where construction of the A418 Oxford Road Main Compound and piling platform construction were undertaken.

- Noise monitoring was undertaken in the vicinity of Oat Close Worksite (ref: OC) where earthworks were underway.
- Noise monitoring was undertaken in the vicinity of Rocky Lane Embankment worksite (ref: RLE) where roadworks and enabling works for Rocky Lane Compound were underway.
- Noise monitoring was undertaken in the vicinity of Leather Lane worksite (ref: LL) where construction of haul road and installation of attenuation pond were undertaken.
- Noise monitoring was undertaken in the vicinity of South Heath Cutting worksite (ref: SHCW) where construction of haul and access road were undertaken.
- Noise monitoring was undertaken in the vicinity of North Portal Worksite (ref: NP) where site set-up, installation of site hoarding, construction of piling platform and temporary utility works were underway.
- Noise monitoring was undertaken in the vicinity of Chesham Road Worksite (ref: CR) where operation of general plant and shaft construction were undertaken.
- Noise monitoring was undertaken in the vicinity of Little Missenden Vent Shaft worksite (ref.: LM) where operation of general plant, earthworks, stockpile management, construction of diaphragm wall and water treatment works were underway.
- Noise monitoring was undertaken in the vicinity of Amersham Vent Shaft worksite (ref.: AM), where operation of general plant, earthworks, stockpile management, ground treatment works, dewatering works, ground monitoring, shaft excavation works and piling were underway.
- Noise and vibration monitoring were undertaken in the vicinity of Bottom House Farm Lane worksite (ref.: BHFL), where landscaping works and vegetation clearance was underway.
- Noise monitoring was undertaken in the vicinity of Chalfont St Giles Vent Shaft worksite (ref.: CSG) where general plant operations, earthworks, collar construction works, dewatering works and piling were underway.
- Noise monitoring was undertaken in the vicinity of Chalfont St Peter Vent Shaft worksite (ref.: CSP), where operation of general and auxiliary plant, stockpile management, piling, shaft dewatering and excavation works were underway.
- Noise monitoring was undertaken in the vicinity of Load Test Pile 1 worksite (ref.: LTP #1), where piling for the construction of the jetty, construction of a cofferdam, main piling works, fencing construction, civil works, general compound work, ground investigation works, construction of retaining wall, compound operation and de-sanding, realignment of River Colne, construction of

north abutment pile wall, core drilling, water management, haul roadworks, utility works and generator maintenance works were underway.

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

- Twyford & Padbury where bat mitigation, ecology surveys, vegetation clearance, installation of badger and ditch crossing were undertaken.
- Park Hill where bat mitigation works were underway.
- St Mary's Church where demobilisation of archaeological surveys were underway.
- Chetwode and Barton Hill where de-vegetation, archaeology, bat and badger mitigation and fencing works were undertaken.
- Fleet Marston where vegetation clearance and archaeological works were undertaken.
- Hartwell Shape 11a where archaeological works, installation of fencing and ecological mitigations were underway.
- Hunts Green Farm where extension of trenching works and installation of fencing were underway.

There was one (1) exceedance of 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>), during the reporting period.

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

Four (4) complaints were received within the Buckinghamshire area 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 +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 December 2021.

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

- School End worksite reference SE (see Plan 1 in Appendix A), where works activities included:
 - site haul road works;
 - roadworks;
 - construction of the culvert crossing;
 - stockpiling; and
 - demolition works.
- Rosehill Farm (see Plan 1 in Appendix A), where works activities included:
 - roadworks; and
 - drainage works (including installation of attenuation ponds).

- Hermitage Chetwode Worksite reference – HC (see plan 1 in Appendix A), where works activities included:
 - de-vegetation;
 - bat mitigation; and
 - fencing construction.
- West Street Overbridge (see Plan 1 in Appendix A), where works activities included:
 - construction of site access and mass haul roads;
 - drainage installation including excavation of attenuations ponds; and
 - minor vegetation removal .
- School Hill Compound worksite reference SHC (see plan 2 in Appendix A), where works activities included:
 - construction of civil structures within site compound;
 - underground utility works; and
 - batching plant operation.
- School Hill UTX worksite reference - SHU (see plan 2 in Appendix A), where works activities included:
 - roadworks; and
 - hedgerow translocation.
- Noise monitoring was undertaken in the vicinity of the FCC Sidings worksite, reference – FCC (see plan 2 in Appendix A), where no works took place during the monitoring period.
- Quainton Access Road Worksite, reference - QAR (see plan 3 in Appendix A), where works activities included:
 - fencing works; and
 - mitigation works.
- Hall Farm, Bicester Road Worksite, reference – HF (see plan 4 in Appendix A), where works activities included:
 - removal of site cabins; and
 - installation of temporary hardstanding and fencing.
- Meadoway, Aylesbury Worksite, reference – MW (see plan 5 in Appendix A), where works activities included:
 - construction of the A418 Oxford Road Main Compound; and

- piling platform construction, including excavations and construction of aggregate base.
- Oat Close Worksite, reference – OC (see plan 5 in Appendix A), where works activities included:
 - earthworks.
- Rocky Lane Embankment Worksite, reference – RLE (see plan 6 in Appendix A), where works activities included:
 - roadworks, including form works, steel fixing and concrete pouring; and
 - enabling works for Rocky Lane Compound.
- Leather Lane Worksite, reference – LL (see plan 7 in Appendix A), where works activities included:
 - construction of haul road; and
 - installation of attenuation pond.
- South Heath Cutting Worksite, reference – SHCW (see plan 7 in Appendix A), where works activities included:
 - construction of haul road and access road.
- North Portal Worksite, reference – NP (see plan 7 in Appendix A), where works activities included:
 - site set-up and installation of site hoarding;
 - construction of piling platform; and
 - temporary utility works, including water and information technology connections.
- Chesham Road Worksite reference – CR (see plan 7 in Appendix A), where works activities included:
 - operation of general plant; and
 - shaft construction, which included installation of sheet piles, construction of guide collar and excavation.
- Little Missenden Vent Shaft worksite reference LM (see plan 8 in Appendix A), where works activities included:
 - operation of general plant;
 - earthworks including stockpile management;
 - diaphragm wall construction, which included excavation, concreting, de-sanding and mud treatment; and
 - water treatment.

- Amersham Vent Shaft Worksite, reference – AM (see plan 9 in Appendix A), where works activities included:
 - operation of general plant;
 - earthworks including stockpile management;
 - ground water treatment, including drilling and grouting works;
 - dewatering works;
 - ground monitoring;
 - shaft excavation works; and
 - secant piling works.
- Bottom House Farm Lane Worksite, reference - BHFL (see plan 10 in Appendix A), where work activities included:
 - landscaping works; and
 - vegetation clearance.
- Chalfont St Giles Vent Shaft Worksite, reference - CSG (see plan 10 in Appendix A), where works activities included:
 - operation of general plant;
 - earthworks (stockpile management);
 - collar construction works;
 - water treatment; and
 - secant piling works.
- Chalfont St Peter Vent Shaft Worksite, reference – CSP (see plan 11 in Appendix A), where works activities included:
 - operation of general and auxiliary plant on site;
 - basement secant piling works (including construction of guide wall and shallow box retaining wall for contiguous and secant piles, excavation and cutting of piles);
 - roadworks;
 - stockpiling management; and
 - shaft dewatering.
- Colne Valley Viaduct - Load Test Pile 1 Worksite, reference – CW-LTP #1 (see plan 12 in Appendix A), where works activities included:
 - piling for the construction of the jetty;

- construction of a cofferdam (including piling, operation of support plant and excavation);
- main piling works including bored piling, de-sanding, installation of reinforcement cage and concrete piling, break-out of bored pile to prepare pile cap and installation of grout curtain around viaduct pile;
- fencing construction;
- civil works on haul road;
- compound operations;
- ground investigation works;
- construction of retaining wall;
- Denham Water Ski Club and North Embankment compound operation and de-sanding;
- realignment of River Colne;
- construction of north abutment pile wall;
- yard support for north abutment works;
- core drilling for integrity test of concrete piles;
- pumping water management construction; and
- maintenance for generator farms.

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

- Twyford & Padbury where boundary fencing, ecology surveys, bat mitigation, installation of ditch crossings and construction of compound were undertaken.
- Park Hill where bat mitigation works were underway.
- St Mary's Church where demobilisation of archaeological surveys were underway.
- Chetwode where de-vegetation, archaeology, bat mitigation and fencing works were underway.
- Barton Hill where fencing construction and badger and bat mitigation works were undertaken.
- Fleet Marston where vegetation clearance and archaeological works were undertaken.

- Hartwell Shape 11a where archaeological works, installation of fencing and ecological mitigation works were underway.
- Hunts Green Farm were extension of trenching works and installation of fencing were underway.

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

1.2 Measurement Locations

1.2.1 Thirty-four (34) noise and two (2) vibration monitoring installations were active in December in the BS area.

- 1.2.2 Table 2 summarises the positions of noise and vibration monitoring installations within the BS area in December 2021.
- 1.2.3 An additional noise monitor (ref.: PIC-NMP1) was active in December in the proximity of the Chalfont St Giles Vent Shaft Worksite, ref.: CSG.
- 1.2.4 An additional noise monitor (ref.: HC-NMP1) was active in December in the proximity of the Hermitage Chetwode worksite, ref.: HC.
- 1.2.5 The noise monitor ref.: QAR-NMP1 at worksite location Quainton Access Road, ref.: QAR, was removed on the 10th of December as works in the vicinity / at the worksite have ceased.
- 1.2.6 Noise monitoring at monitor FCC-NMP1, installed in proximity of FCC Siding worksite (ref.: FCC), continued to be on hold during the monitoring period due to power supply issues.
- 1.2.7 Maps showing the positions of noise and vibration monitoring installations are presented in Appendix B.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
SE	SE-NMP1	School End, Chetwode
	SE-Vib1	School End, Chetwode
RF	RF-NMP1	Old Stable Cottage, Rosehill Farm, Chetwode
	RF-Vib1	Old Stable Cottage, Rosehill Farm, Chetwode
HC	HC-NMP1	Hermitage, Chetwode
WSO	WSO-NMP1	West Street, Twyford
	WSO-NMP2	Twyford
SHC	SHC-NMP1	School Hill Compound, Calvert
SHU	SHU-NMP1	70 Cotswold Way, Calvert
QAR	QAR-NMP1	Woodlands Barn, Quainton
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon
MW	MW-NMP1	Aylesbury, Buckinghamshire
OC	OC-NMP1	Oat Close, Bishopstone, Aylesbury
RLE	SDVC-NMP1	Rocky Lane, Wendover
	NCAS6-NMP1	Chesham Lane, The Lee, Wendover
	NCAS5-NMP1	Chesham Lane, The Lee, Wendover
LL	HG-NMP1	Hunts Green, Leather Lane, The Lee, South Heath
	GD-NMP1	Grimms Ditch, The Lee, South Heath
SHCW	PR-NMP1	Potters Row, South Heath
	SH-NMP1	Bury Farm, South Heath
NP	NP-NMP1	North Portal worksite, Great Missenden
CR	MDL-NMP1	Meadow Leigh Cottage, Firth Hill, South Heath
AM	AM-NMP1	Amersham Vent Shaft Worksite, Whielden Lane, Amersham
LM	LM-NMP1	Little Missenden, A413, Amersham
	PWC-NMP1	Patricia Holmes, Little Missenden Vent Shaft Worksite, Amersham
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane
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
	PIC-NMP1	Bottom House Farm Lane, Chalfont St Giles
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

Worksite Reference	Measurement Reference	Address
CVV-LTP #1	CVV-LTP #1-NMP1	Northern boundary, Load Test Pile 1 Worksite, Denham Water Ski Club
	CVV-WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham, Denham Garden Village
	CVV-DFS-NMP1	Denham Film Studio, Uxbridge
CVV-MR*	CVV-SVF-NMP1	Savay Farm, Denham Garden Village, Denham, Buckinghamshire

* This worksite is within the London Borough of Hillingdon, for more details on the works taking place please refer to the London Borough of Hillingdon Noise and Vibration Report available at:

<https://www.gov.uk/government/collections/monitoring-the-environmental-effects-of-hs2>

2 Summary of Results

2.1 Summary of Measured Noise Levels

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

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

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekday Average L _{Aeq,T} (Highest Day L _{Aeq,T})					Saturday Average L _{Aeq,T} (highest day L _{Aeq,T})					Sunday / Public Holiday Average L _{Aeq,T} (highest day L _{Aeq,T})	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
SE	SE-NMP1	School End, Chetwode	Free-field	45.0 (52.7)	50.3 (56.4)	41.7 (46.6)	40.3 (50.0)	39.6 (54.8)	41.2 (44.5)	43.7 (47.3)	43.0 (47.4)	42.0 (48.7)	40.8 (50.5)	42.5 (49.7)	39.2 (47.5)
RF	RF-NMP1	Old Stable Cottage, Rosehill Farm, Chetwode	Free-field	47.7 (54.9)	48.9 (60.4)	45.2 (49.2)	46.2 (52.0)	44.3 (54.0)	45.8 (47.2)	48.3 (49.8)	48.6 (50.5)	46.3 (51.1)	45.5 (50.5)	47.1 (54.4)	43.0 (49.8)
HC	HC-NMP1	Hermitage, Chetwode	Free-field	41.7 (48.9)	48.8 (54.7)	40.5 (46.5)	38.6 (49.9)	38.9 (55.2)	43.5 (51.8)	48.4 (51.0)	44.4 (47.3)	43.4 (49.7)	44.1 (50.8)	43.7 (52.4)	34.7 (40.3)
WSO	WSO-NMP1	West Street, Twyford	Free-field	50.1 (53.3)	51.1 (54.2)	45.9 (51.3)	44.0 (50.0)	40.4 (51.6)	47.8 (48.1)	50.7 (52.8)	49.9 (52.0)	48.1 (55.0)	40.5 (47.2)	47.8 (53.3)	39.0 (46.1)
	WSO-NMP2	Twyford	Free-field	42.5 (50.3)	53.1 (63.8)	38.6 (46.1)	38.1 (46.7)	36.1 (48.6)	42.9 (46.9)	45.1 (48.5)	43.1 (46.9)	42.7 (49.6)	39.2 (49.6)	42.2 (56.1)	33.6 (40.6)
SHC	SHC-NMP1	School Hill Compound, Calvert	Free-field	49.4 (52.4)	50.5 (55.5)	45.1 (50.1)	42.7 (52.6)	40.3 (50.6)	43.8 (46.7)	46.9 (48.3)	45.6 (47.1)	45.0 (53.4)	41.4 (54.9)	44.6 (51.7)	39.2 (49.5)
SHU	SHU-NMP1	70 Cotswold Way, Calvert	Free-field	50.0 (53.1)	54.6 (62.3)	44.7 (48.7)	42.2 (49.6)	39.5 (50.0)	46.0 (50.4)	49.7 (50.5)	49.0 (51.7)	46.4 (54.5)	39.6 (47.9)	47.5 (51.9)	38.7 (48.3)

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$)					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
QAR	QAR-NMP1	1 Woodlands Farm Cottages, Quainton	Façade	45.2 (47.2)	47.1 (51.2)	44.0 (48.7)	43.8 (47.8)	43.8 (46.2)	43.6 (43.6)	45.4 (45.4)	46.4 (46.4)	47.8 (50.3)	44.1 (44.1)	47.5 (53.8)	43.4 (44.3)
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon	Free-field	62.2 (64.7)	64.0 (65.7)	63.7 (66.7)	61.1 (64.7)	56.7 (62.3)	58.0 (60.2)	62.3 (63.4)	63.2 (64.6)	61.6 (64.9)	55.9 (59.6)	62.0 (65.2)	57.9 (70.0)
MW	MW-NMP1	Aylesbury, Buckinghamshire	Free-field	62.9 (63.9)	62.2 (64.8)	62.0 (63.2)	60.0 (62.2)	56.3 (62.3)	61.0 (61.4)	63.2 (63.5)	63.2 (63.5)	61.6 (63.3)	56.2 (59.9)	61.9 (64.3)	55.4 (61.7)
OC	OC-NMP1	Oat Close, Bishopstone, Aylesbury	Free-field	48.7 (55.5)	50.1 (56.7)	47.7 (54.7)	48.0 (59.0)	46.9 (63.0)	47.0 (49.5)	47.0 (49.0)	49.5 (50.6)	49.8 (52.8)	49.9 (52.7)	50.5 (52.9)	47.0 (53.7)
RLE	SDVC-NMP1	Rocky Lane, Wendover	Free-field	56.7 (64.1)	57.6 (69.0)	56.3 (63.8)	53.7 (62.7)	50.9 (63.3)	58.9 (61.1)	61.1 (62.6)	61.0 (62.5)	60.0 (63.7)	55.5 (59.5)	60.9 (63.7)	55.1 (62.5)
	NCAS6-NMP1	Chesham Lane, The Lee, Wendover	Free-field	50.7 (52.9)	56.6 (61.9)	50.3 (52.4)	47.8 (51.7)	45.5 (52.0)	50.4 (50.8)	51.4 (52.7)	51.4 (51.4)	50.0 (52.1)	46.5 (50.3)	49.6 (52.1)	42.4 (47.7)
	NCAS5-NMP1	Chesham Lane, The Lee, Wendover	Free-field	56.4 (58.8)	59.1 (62.2)	56.0 (57.8)	53.0 (56.8)	49.2 (60.1)	52.7 (55.0)	55.4 (58.0)	55.3 (57.3)	54.1 (57.7)	48.8 (53.6)	54.9 (57.9)	47.8 (55.9)
LL	HG-NMP1	Hunts Green, Leather Lane, The Lee	Free-field	48.5 (60.2)	50.9 (57.9)	48.0 (58.9)	46.5 (58.8)	45.6 (59.0)	49.4 (51.4)	50.0 (53.4)	46.6 (50.8)	51.6 (58.1)	50.9 (57.4)	48.0 (56.0)	45.1 (54.3)
	GD-NMP1	Grimms Ditch, The Lee, South Heath	Free-field	46.5 (58.3)	50.7 (64.2)	46.6 (51.7)	45.4 (51.5)	42.9 (53.0)	44.7 (48.2)	46.6 (50.7)	46.4 (50.0)	45.7 (53.2)	42.5 (53.7)	45.8 (52.9)	41.4 (48.4)

OFFICIAL

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$)					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
SHCW	PR-NMP1	Potters Row, South Heath	Free-field	48.4 (59.5)	55.1 (65.6)	46.3 (55.8)	44.5 (55.8)	43.1 (55.2)	47.1 (54.3)	56.8 (73.0)	49.5 (55.7)	47.0 (64.2)	43.6 (56.2)	50.7 (71.4)	41.7 (59.0)
	SH-NMP1	Bury Farm, South Heath	Free-field	43.0 (47.8)	53.9 (57.7)	44.6 (49.9)	44.0 (56.2)	41.3 (51.3)	43.9 (44.0)	53.1 (55.4)	48.3 (51.6)	46.2 (53.0)	41.8 (58.4)	43.8 (48.9)	37.0 (41.7)
NP	NP-NMP1	North Portal worksite, Great Missenden	Free-field	49.2 (53.7)	54.9 (63.6)	45.9 (48.1)	43.9 (51.6)	41.4 (54.1)	44.7 (48.1)	50.7 (56.2)	47.2 (52.7)	45.7 (53.8)	43.1 (46.7)	43.8 (48.0)	38.3 (41.5)
CR	MDL-NMP1	Meadow Leigh Cottage, Firth Hill, South Heath	Free-field	56.8 (60.6)	60.7 (73.3)	55.8 (59.8)	53.0 (62.2)	48.1 (56.3)	54.9 (58.6)	60.7 (69.2)	57.1 (58.9)	55.2 (59.0)	48.3 (55.1)	56.0 (65.2)	46.5 (53.3)
AM	AM-NMP1	Whielden Lane, Amersham	Free-field	62.5 (73.0)	65.0 (70.7)	61.5 (66.4)	59.0 (66.2)	53.4 (61.6)	59.1 (60.9)	63.5 (66.0)	61.2 (61.4)	59.5 (62.0)	54.0 (61.0)	59.4 (62.8)	53.1 (60.4)
LM	LM-NMP1	Little Missenden, A413, Amersham	Free-field	60.4 (65.6)	60.5 (62.7)	59.6 (62.1)	56.7 (60.9)	52.2 (62.2)	55.3 (58.0)	59.0 (60.9)	59.4 (60.9)	57.8 (61.5)	51.6 (56.7)	57.9 (61.0)	51.0 (58.3)
	PWC-NMP1	Patricia Holmes, Little Missenden Vent Shaft Worksite, Amersham	Free-field	58.3 (61.2)	58.9 (61.1)	57.7 (59.5)	55.0 (59.6)	50.1 (58.3)	53.9 (56.1)	57.7 (59.6)	58.0 (59.9)	56.1 (60.3)	50.5 (56.3)	56.2 (59.7)	49.1 (57.1)
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane	Free-field	54.9 (58.2)	56.0 (58.9)	53.6 (56.9)	51.6 (55.1)	48.1 (55.7)	51.3 (55.3)	54.1 (55.3)	54.5 (55.3)	55.0 (69.5)	46.9 (49.7)	54.2 (66.1)	46.8 (54.4)
CSG	CSG-NMP1	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane	Free-field	51.5 (61.5)	54.3 (58.2)	42.6 (45.5)	42.0 (48.2)	36.8 (51.3)	44.2 (44.2)	48.5 (48.5)	49.8 (49.8)	45.7 (49.3)	47.9 (51.0)	50.1 (54.9)	42.1 (48.3)

OFFICIAL

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$)					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
	CSG-NMP2	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane	Free-field	52.3 (60.8)	55.4 (64.7)	46.6 (62.0)	45.1 (64.8)	45.5 (55.2)	47.2 (55.6)	48.5 (52.2)	47.6 (51.2)	44.8 (51.4)	45.6 (54.7)	46.9 (54.5)	44.8 (52.2)
	PIC-NMP1	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane	Free-field	52.7 (55.3)	54.3 (56.4)	52.2 (54.0)	51.0 (54.7)	46.8 (50.7)	46.5 (46.5)	53.0 (53.0)	53.6 (53.6)	51.1 (52.1)	48.5 (52.5)	52.4 (56.5)	44.0 (46.8)
CSP	CSP-NMP1	Chalfont St Peter Vent Shaft Worksite	Free-field	56.4 (59.2)	57.1 (63.8)	54.3 (61.0)	51.8 (58.9)	49.0 (56.2)	52.3 (53.5)	57.1 (58.6)	56.0 (58.1)	53.1 (60.4)	48.7 (56.1)	53.4 (60.3)	49.1 (57.3)
	CSP-NMP2	Chalfont St Peter Vent Shaft Worksite	Free-field	46.4 (49.4)	50.3 (53.8)	45.7 (52.1)	44.7 (50.1)	40.6 (51.1)	43.2 (48.1)	47.7 (50.7)	47.4 (51.6)	44.5 (52.8)	41.4 (48.6)	45.4 (52.3)	39.3 (46.8)
	CSP-NMP3	Chalfont St Peter Vent Shaft Worksite	Free-field	57.2 (60.9)	58.3 (60.4)	57.1 (59.7)	55.0 (58.4)	50.6 (58.3)	53.8 (56.7)	57.4 (60.6)	57.7 (60.4)	55.5 (60.3)	49.6 (55.3)	56.1 (60.1)	49.2 (56.3)
CVV-LTP #1	CVV-LTP #1-NMP1	Northern boundary, Load Test Pile 1 Worksite	Free-field	61.5 (64.1)	62.2 (64.3)	60.7 (63.4)	57.6 (63.4)	55.1 (63.4)	56.9 (59.4)	60.0 (62.0)	60.4 (61.5)	58.1 (61.9)	53.7 (58.9)	59.5 (68.1)	53.9 (62.1)
	CVV-WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham	Free-field	57.4 (60.9)	58.3 (61.0)	55.8 (59.0)	52.7 (57.7)	49.9 (57.1)	54.6 (57.0)	56.2 (57.8)	56.8 (57.8)	54.2 (58.2)	49.4 (54.9)	55.5 (63.7)	48.4 (56.6)
	CVV-DFS-NMP1	Denham Film Studio, Uxbridge	Free-field	50.2 (58.7)	50.3 (54.6)	48.6 (59.9)	47.9 (59.0)	44.0 (59.1)	49.8 (52.2)	48.8 (49.7)	48.4 (50.8)	48.4 (57.3)	45.4 (56.5)	48.6 (59.0)	40.5 (48.0)
CVV-MR	CVV-SVF-NMP1	Savay Farm, Denham Garden Village, Denham, Buckinghamshire	Free-field	50.3 (54.5)	50.4 (64.7)	47.7 (55.6)	46.2 (51.1)	43.4 (54.9)	46.9 (48.9)	48.2 (50.1)	47.0 (49.5)	45.7 (50.9)	41.6 (48.3)	45.9 (49.4)	40.9 (49.0)

OFFICIAL

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
SE	SE-Vib 1	School End, Chetwode	6.03* (X-axis)
RF	RF-Vib 1	Old Stable Cottage, Rosehill Farm, Chetwode	1.05 (Z-axis)

*High vibration levels for monitor SE-Vib 1 were due to deliveries at the site. The receptor is located further from the monitoring location therefore vibration levels are expect to be lower.

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
SE	SE-NMP1	School End, Chetwode	All days	All periods	No exceedance	No exceedance
RF	RF-NMP1	Old Stable Cottage, Rosehill Farm, Chetwode	All days	All periods	No exceedance	No exceedance
HC	HC-NMP1	Hermitage, Chetwode	All days	All periods	No exceedance	No exceedance
WSO	WSO-NMP1	West Street, Twyford	All days	All periods	No exceedance	No exceedance
	WSO-NMP2	Twyford	Weekday	08:00-18:00	3	No exceedance
SHC	SHC-NMP1*	School Hill Compound, Calvert	All days	All periods	No exceedance	No exceedance
SHU	SHU-NMP1	70 Cotswold Way, Calvert	All days	All periods	No exceedance	No exceedance
QAR	QAR-NMP1	Woodlands Barn, 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
MW	MW-NMP1	Aylesbury, Buckinghamshire	All days	All periods	No exceedance	No exceedance
OC	OC-NMP1	Oat Close, Bishopstone, Aylesbury	All days	All periods	No exceedance	No exceedance
RLE	SDVC-NMP1	Rocky Lane, Wendover	Weekday Saturday	08:00-18:00 08:00-13:00	16 1	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
	NCAS6-NMP1	Chesham Lane, The Lee, Wendover	All days	All periods	No exceedance	No exceedance
	NCAS5-NMP1	Chesham Lane, The Lee, Wendover	Weekday	08:00-18:00	1	No exceedance
LL	HG-NMP1	Hunts Green, Leather Lane, The Lee, South Heath	All days	All periods	No exceedance	No exceedance
	GD-NMP1	Grimms Ditch, The Lee, South Heath	Weekday	08:00-18:00	1	No exceedance
SHCW	PR-NMP1	Potters Row, South Heath	Weekday Saturday	08:00-18:00 08:00-13:00	2 1	No exceedance 1
	SH-NMP1	Bury Farm, South Heath	All days	All periods	No exceedance	No exceedance
NP	NP-NMP1	North Portal worksite, Great Missenden	Weekday	08:00-18:00	1	No exceedance
CR	MDL-NMP1	Meadow Leigh Cottage, Firth Hill, South Heath	Weekday Saturday	08:00-18:00 08:00-13:00	6 1	No exceedance No exceedance
AM	AM-NMP1*	Whielden Lane, Amersham	All days	All periods	No exceedance	No exceedance
LM	LM-NMP1*	Little Missenden Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
	PWC-NMP1	Patricia Holmes, Little Missenden Vent Shaft Worksite, Amersham	All days	All periods	No exceedance	No exceedance
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane	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	Weekday	08:00-18:00	2	No exceedance
	PIC-NMP1	Chalfont St Giles Vent Shaft	All days	All periods	No exceedance	No exceedance
CSP	CSP-NMP1*	Chalfont St Peter Vent Shaft Worksite	Weekday	08:00-18:00	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
CVV-LTP #1	CVV-LTP #1-NMP1*	Northern boundary, Load Test Pile 1 Worksite	All days	All periods	No exceedance	No exceedance
	CVV-WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham	All days	All periods	No exceedance	No exceedance
	CVV-DFS-NMP1	Denham Film Studio, Uxbridge	All days	All periods	No exceedance	No exceedance
CVV-MR	CVV-SVF-NMP1	Savay Farm, Denham Garden Village, Denham, Buckinghamshire	Weekday	08:00-18:00	1	No exceedance

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

2.2.6 Exceedances of the LOAEL were recorded at 10 monitoring locations during December 2021.

2.2.7 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
PR-NMP1	Potters Row, South Heath	Potters Row, South Heath	1

2.2.8 One exceedance of the SOAEL at monitoring location PR-NMP1 was recorded due to HS2 construction works during core hours on a Saturday in December 2021.

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.

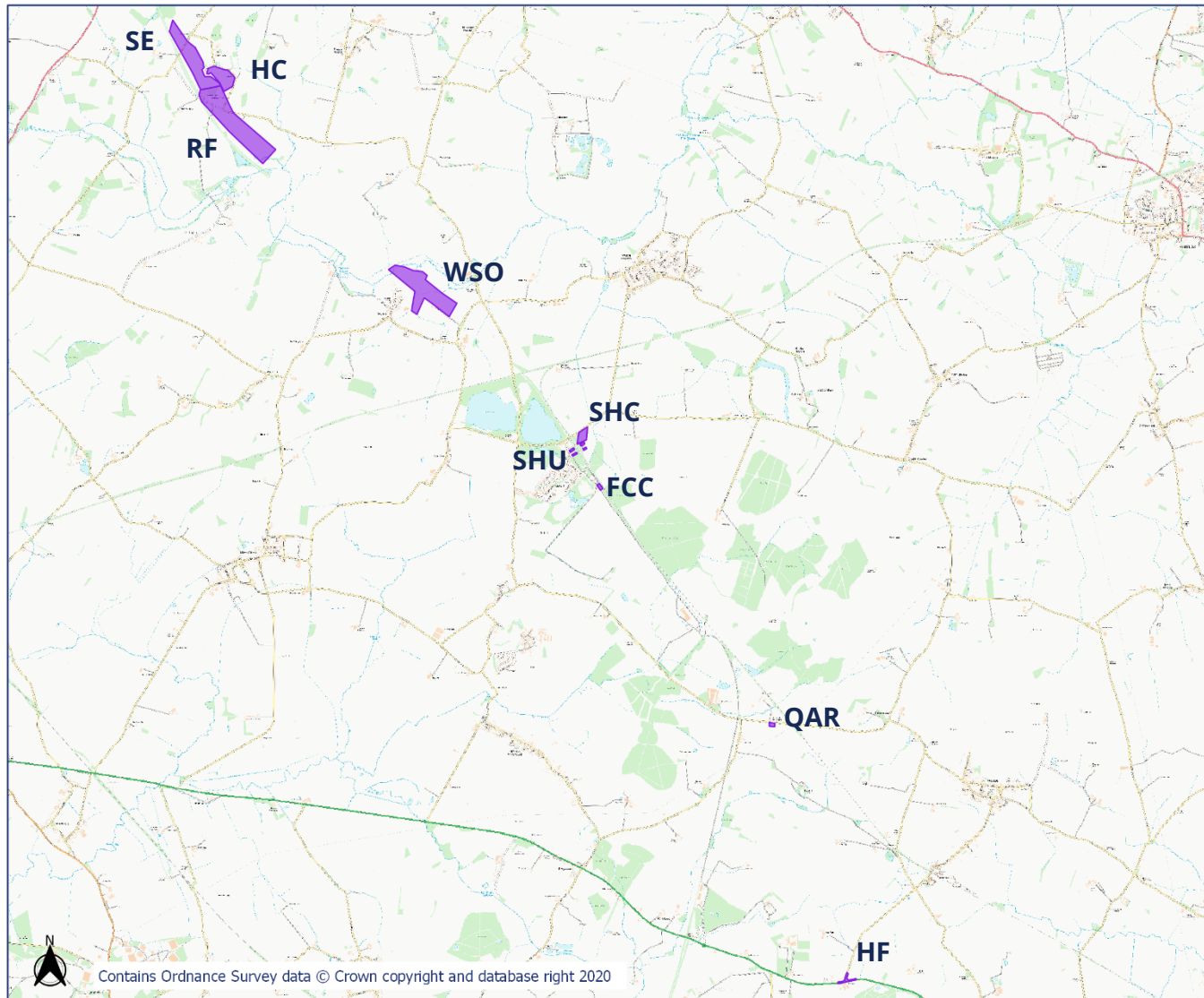
Table 8: Summary of Complaints

Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-43090-C	RLE	Noise disturbance from works overnight at Wendover Dean.	Consent was granted for works due to works in question needing to be conducted when no trains were active. The residents were advised in advance of works and stakeholder in question was within those notified.	A member of site team visited stakeholder's address with a portable noise monitor. Section 61 levels were not exceeded.

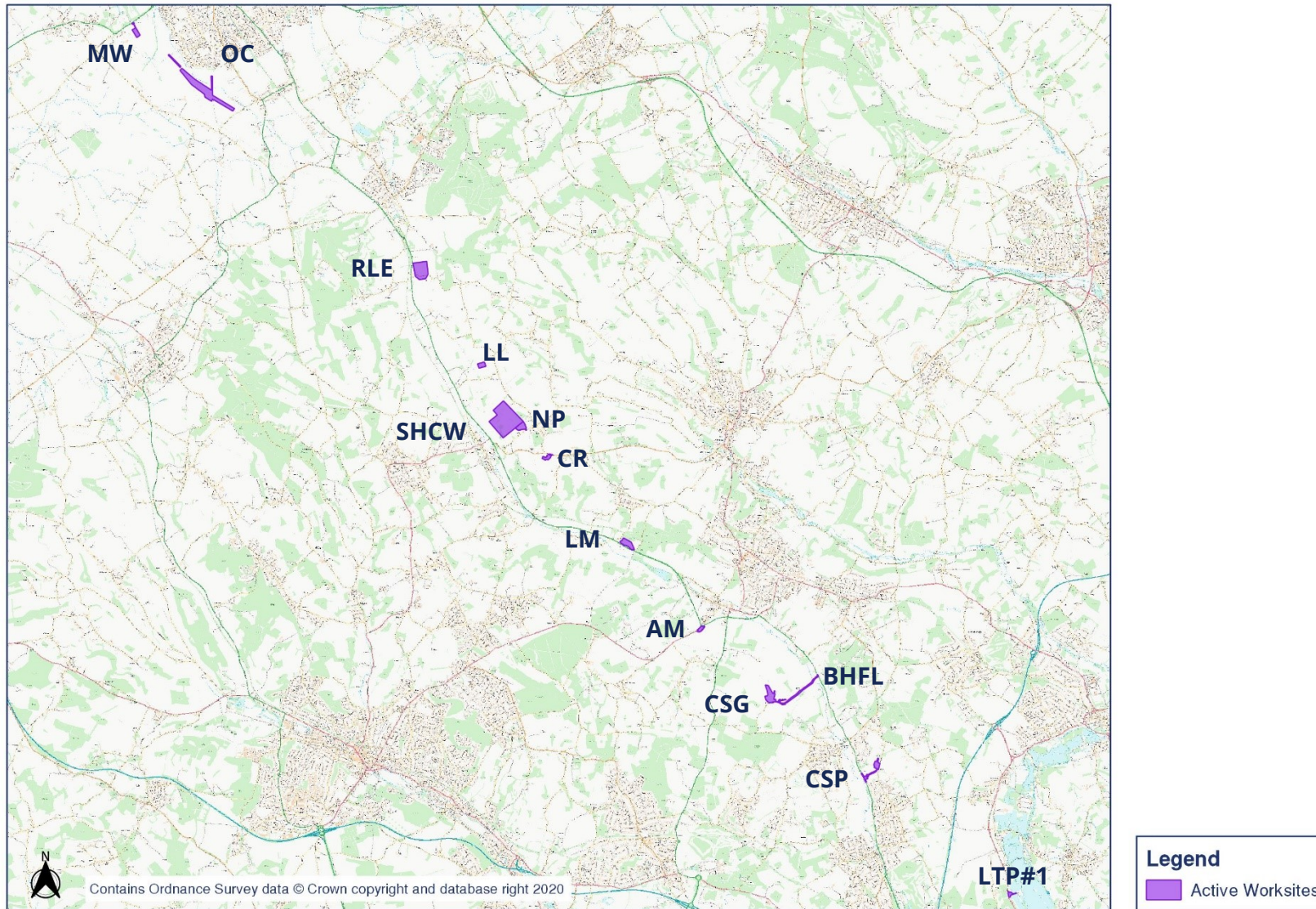
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-43091-C	RLE	Noise and vibration disturbance at night from works at Wendover.	Consent was granted for works due to works in question needing to be conducted when no trains were active. The residents were advised in advance of works and stakeholder in question was within those notified.	A member of site team visited stakeholder's address with a portable noise monitor. Section 61 levels were not exceeded.
HS2-21-43094-C	RLE	Noise disturbance from drilling at night at Wendover.	Consent was granted for works due to works in question needing to be conducted when no trains were active. The residents were advised in advance of works and stakeholder in question was within those notified.	A member of site team visited stakeholder's address with a portable noise monitor. Section 61 levels were not exceeded.
HS2-21-43041-C	SHCW	Constant night & early morning noise disturbance from compound area near proposed north portal.	Noise monitoring demonstrates compliance with Section 61 requirements.	Discussion with stakeholder regarding noise and light disturbances. The site generators have since been relocated further away from the stakeholder's property with view of minimising noise levels.

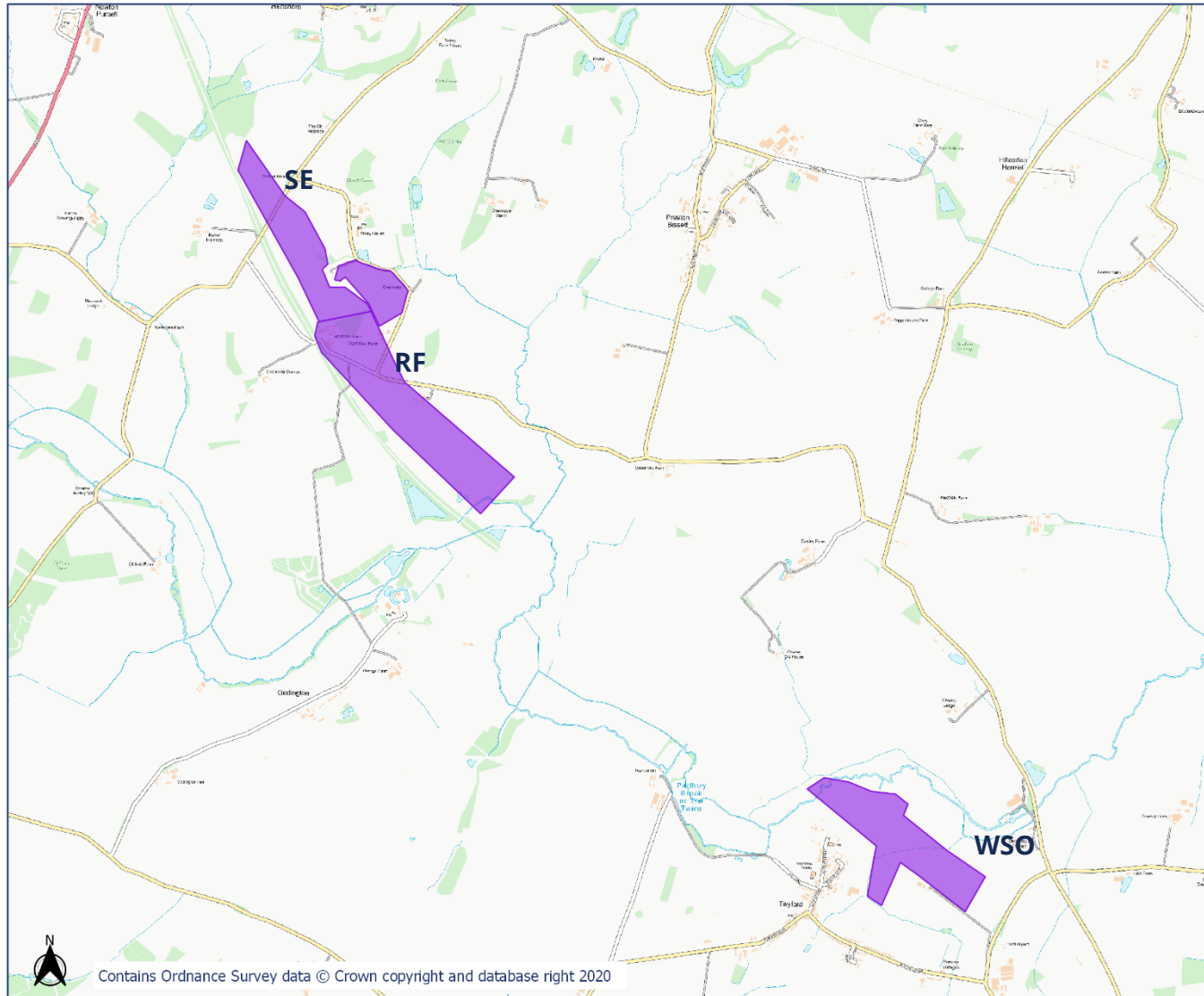
Appendix A Site Locations

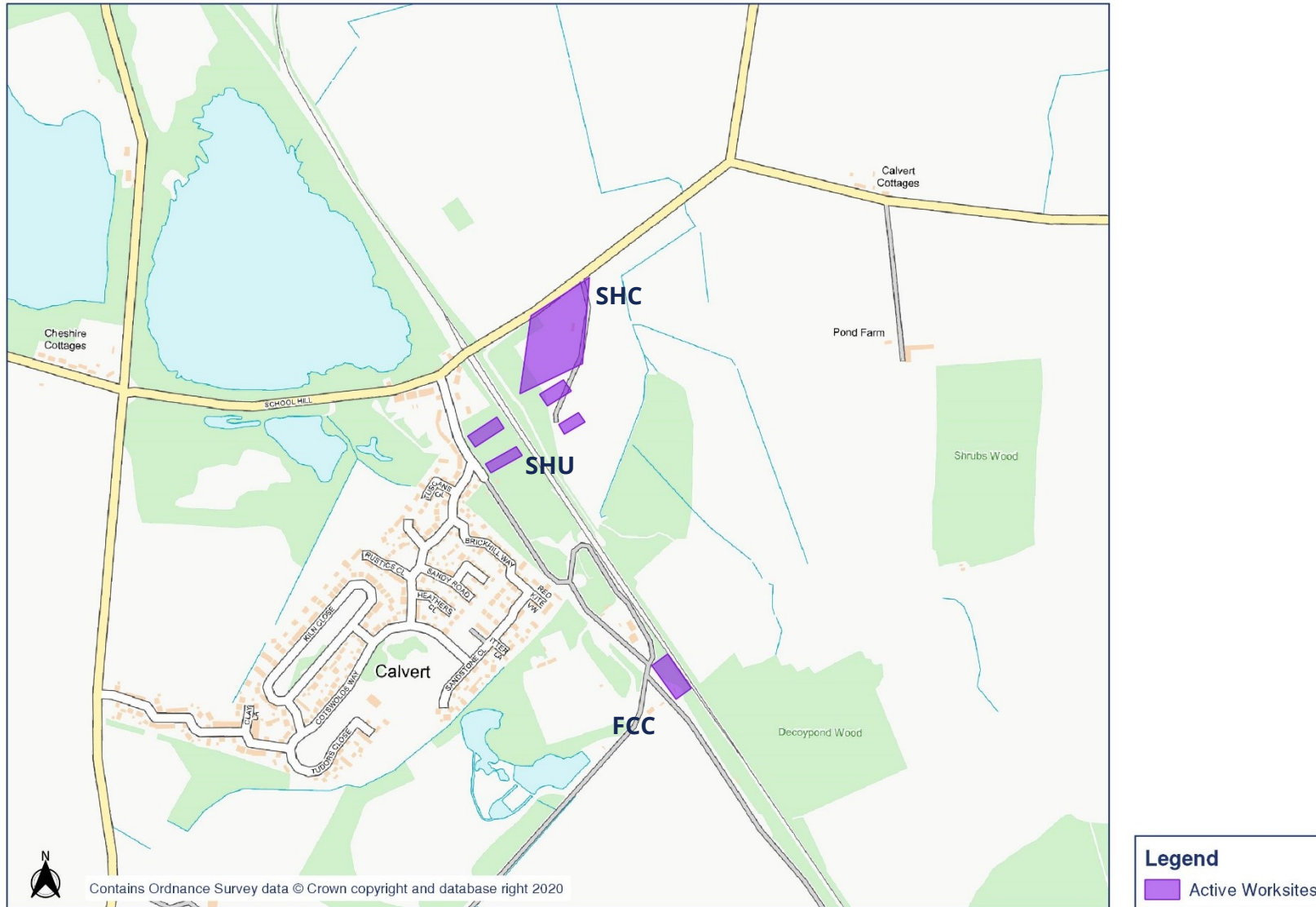
HS2 Worksite Identification Plan - Overview 1



OFFICIAL

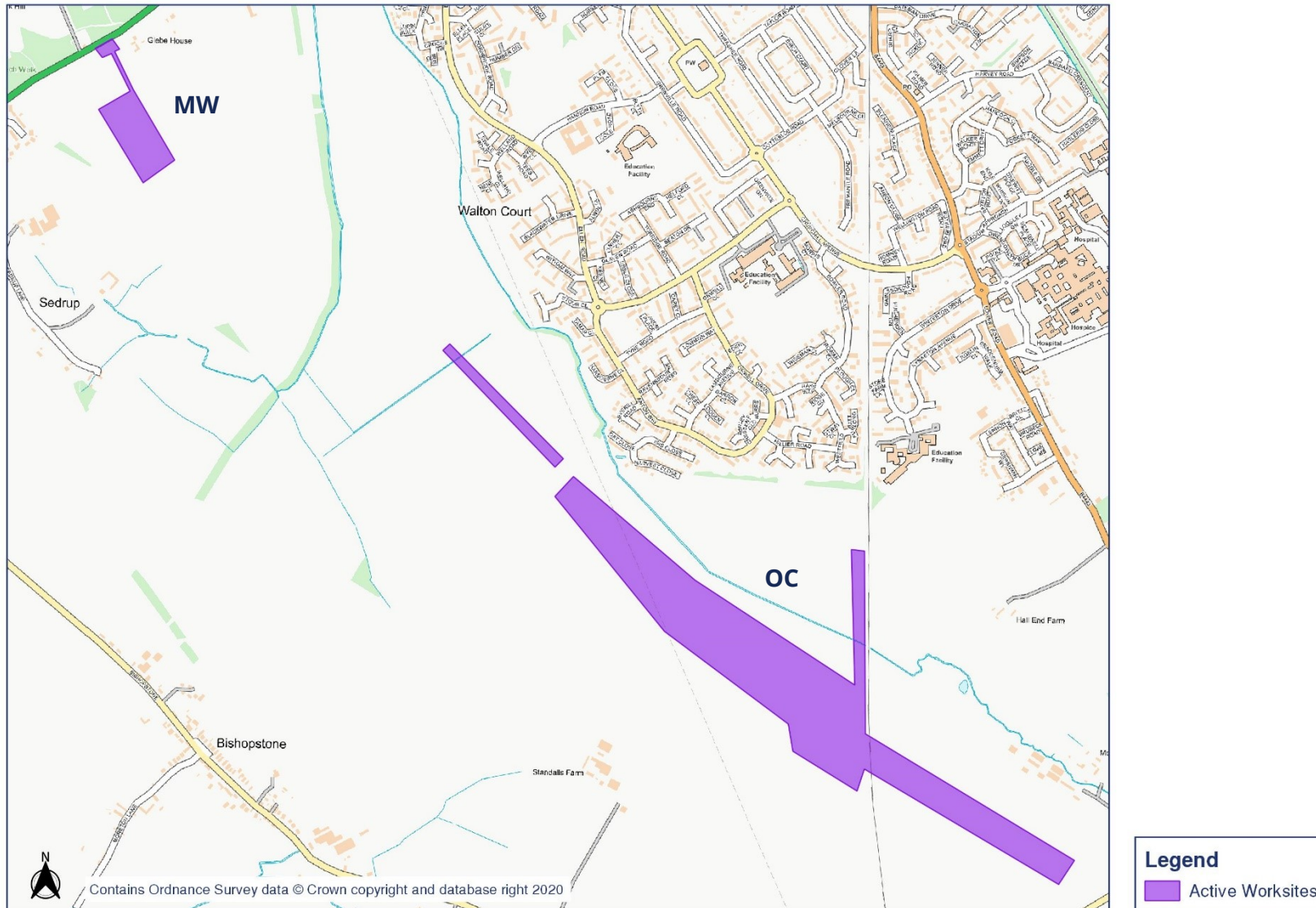


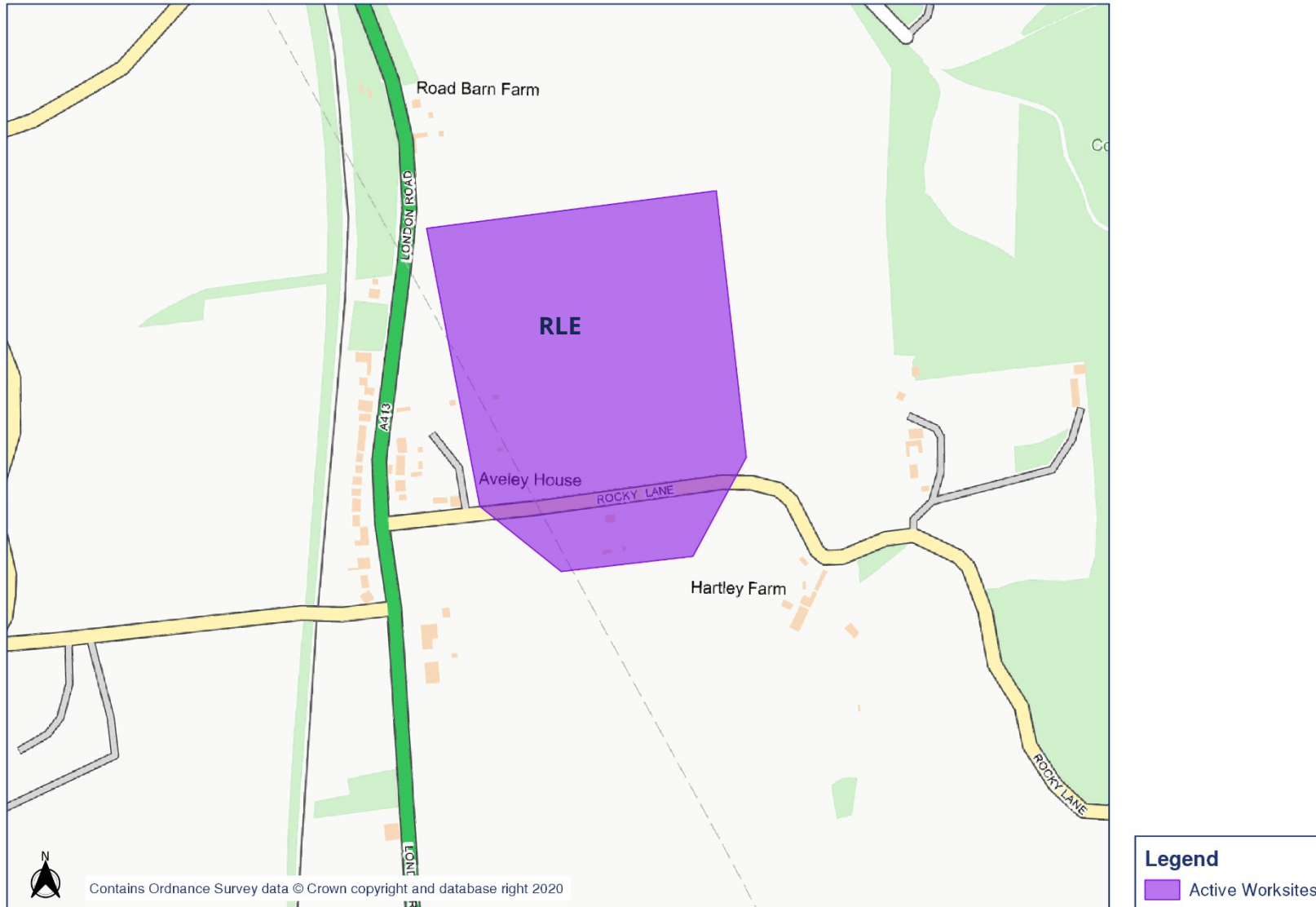


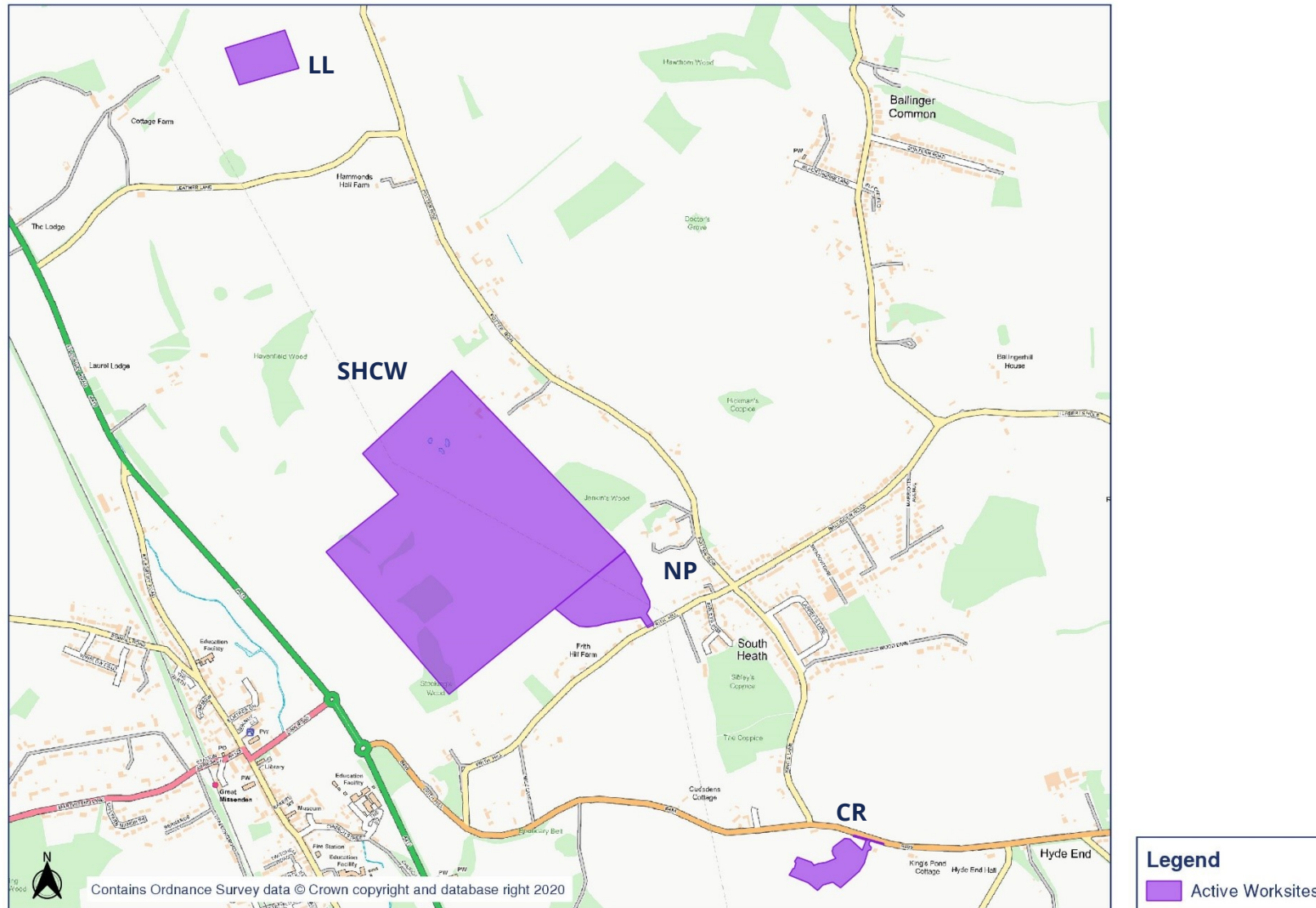




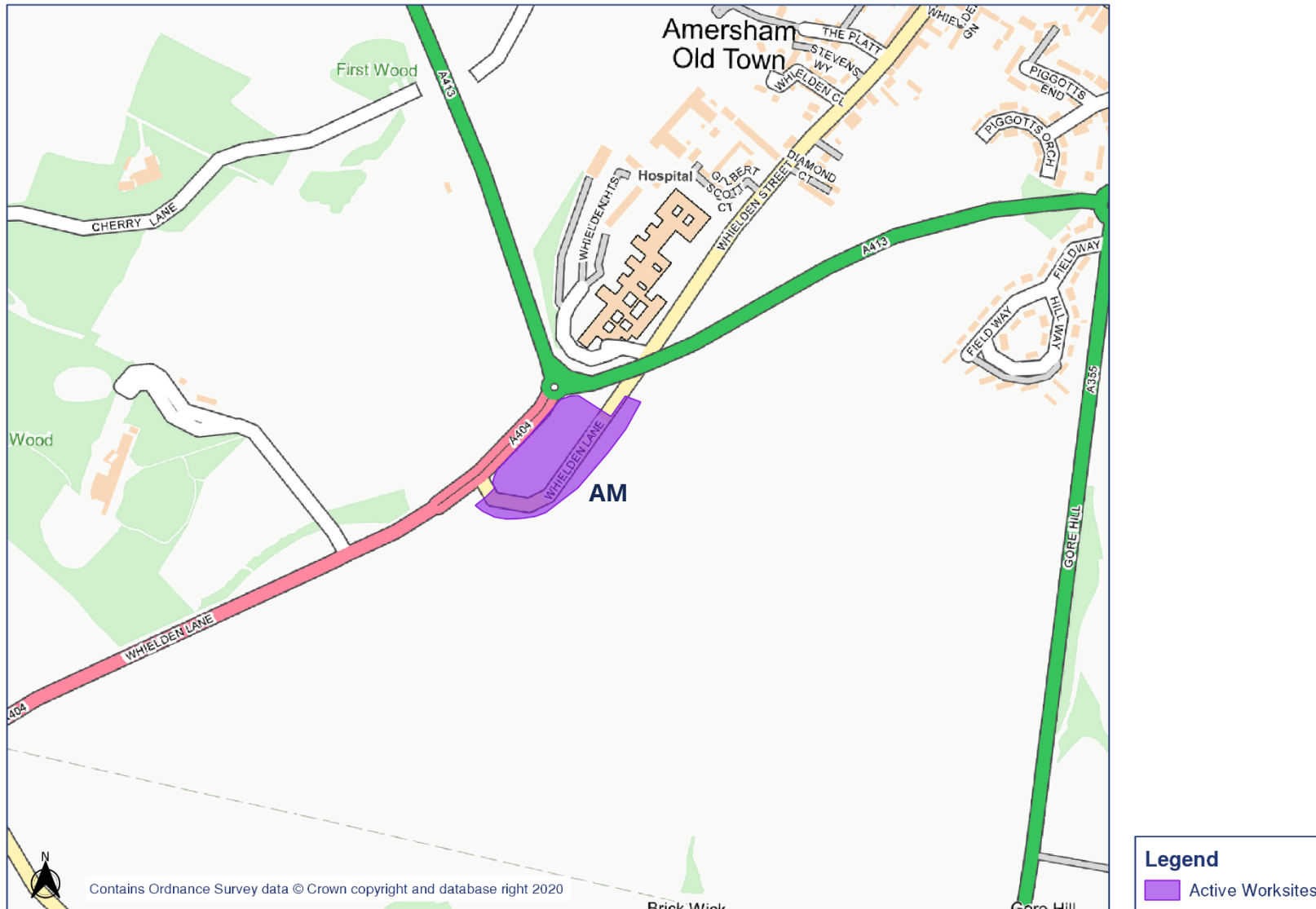


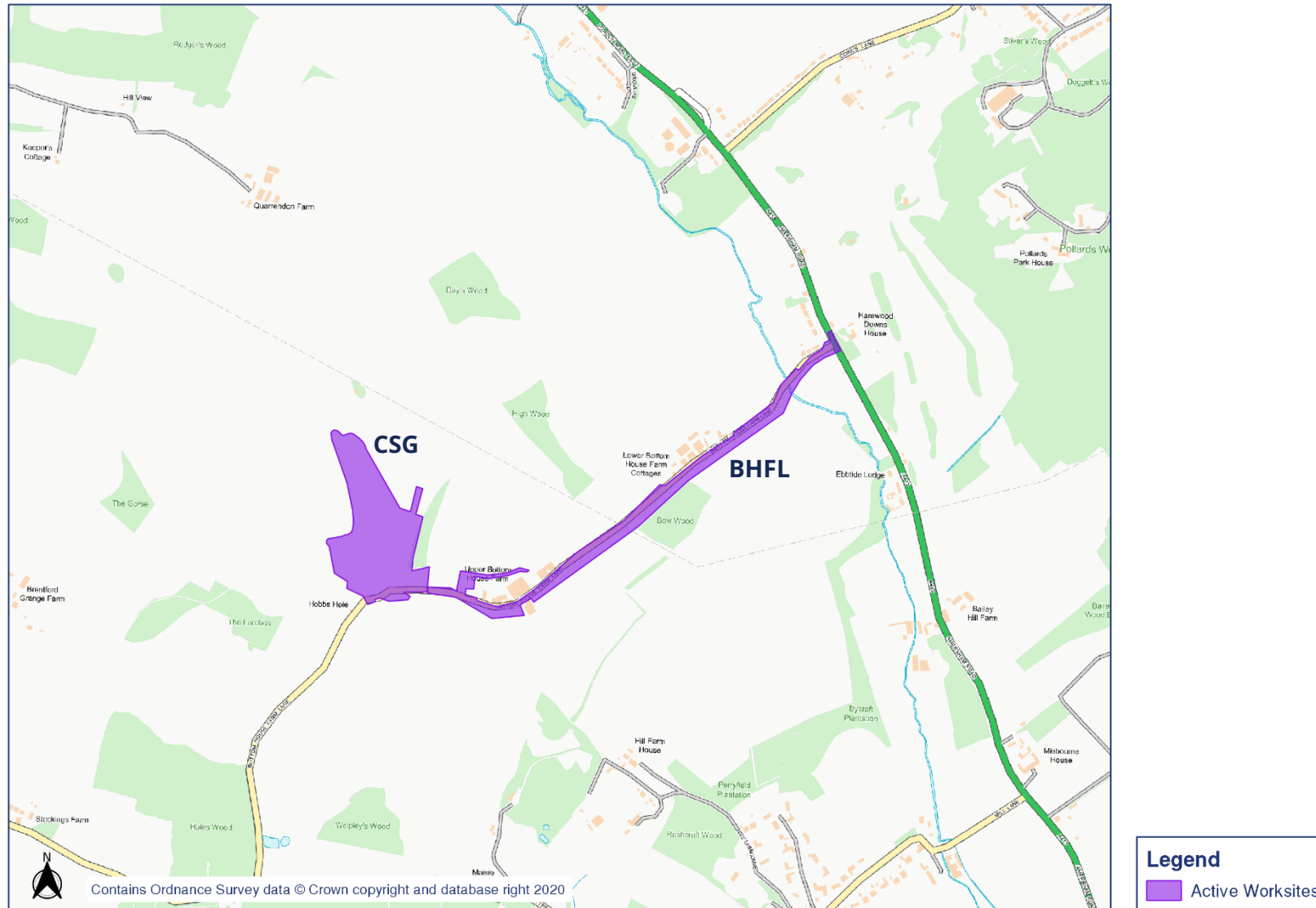


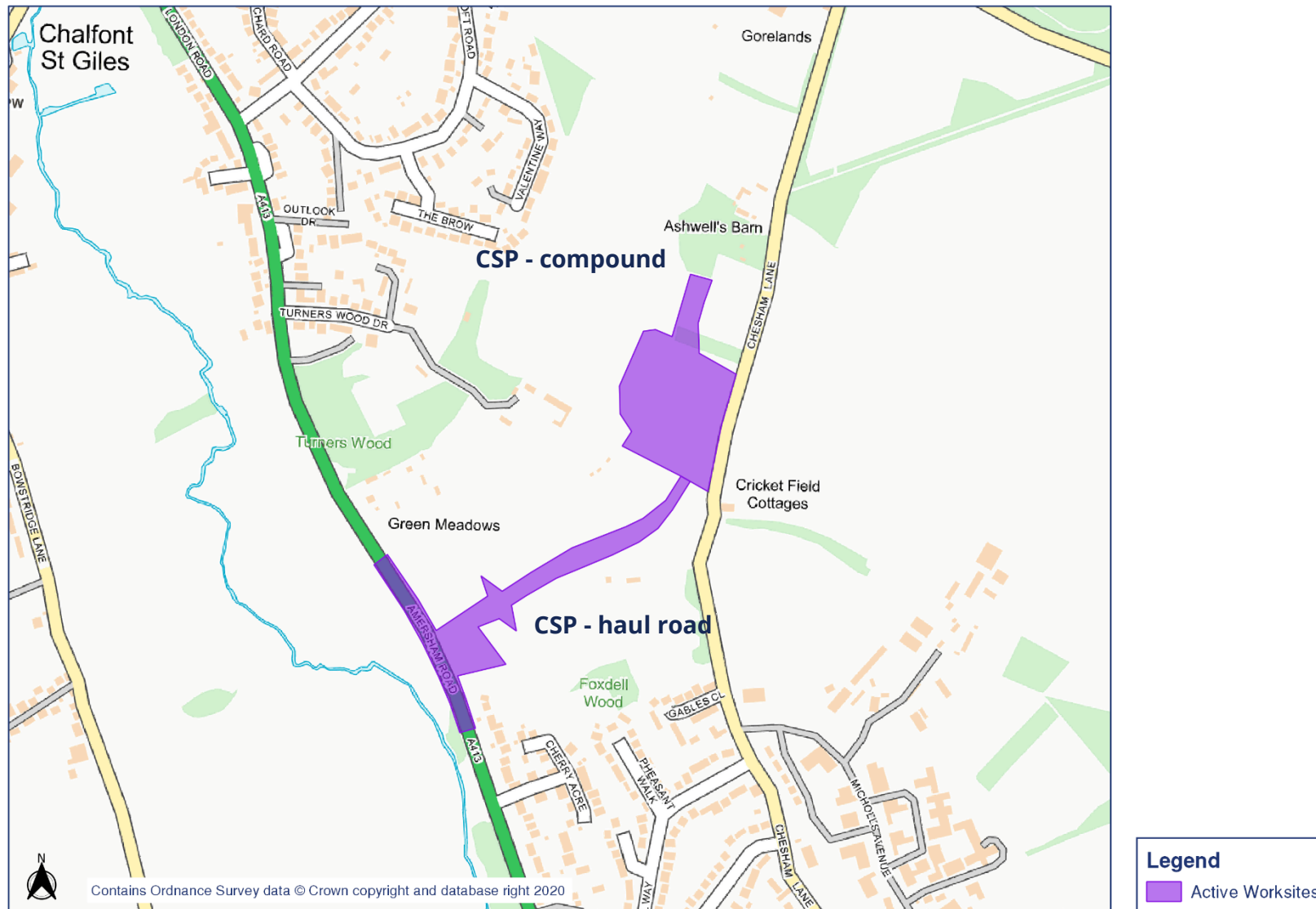






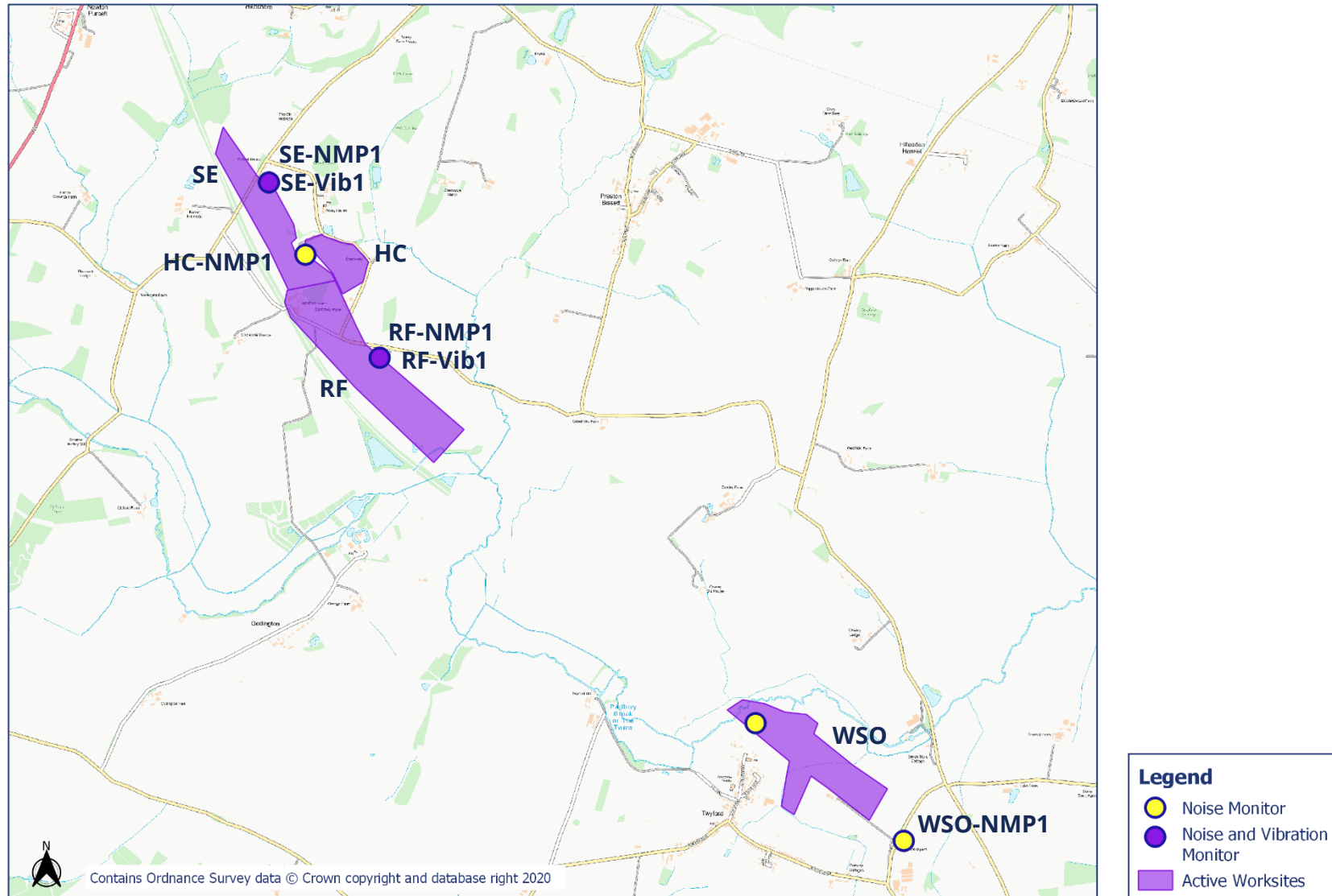


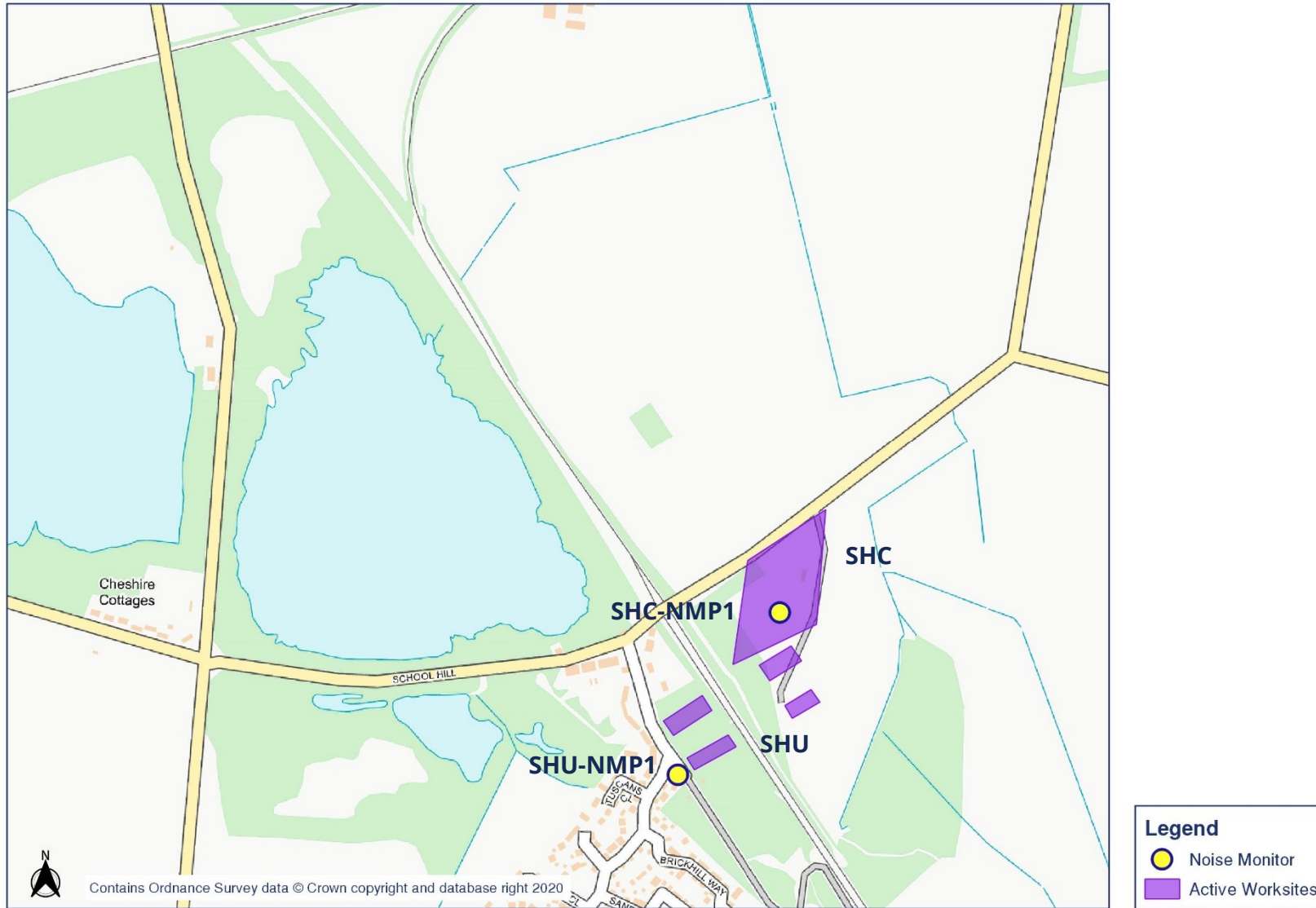


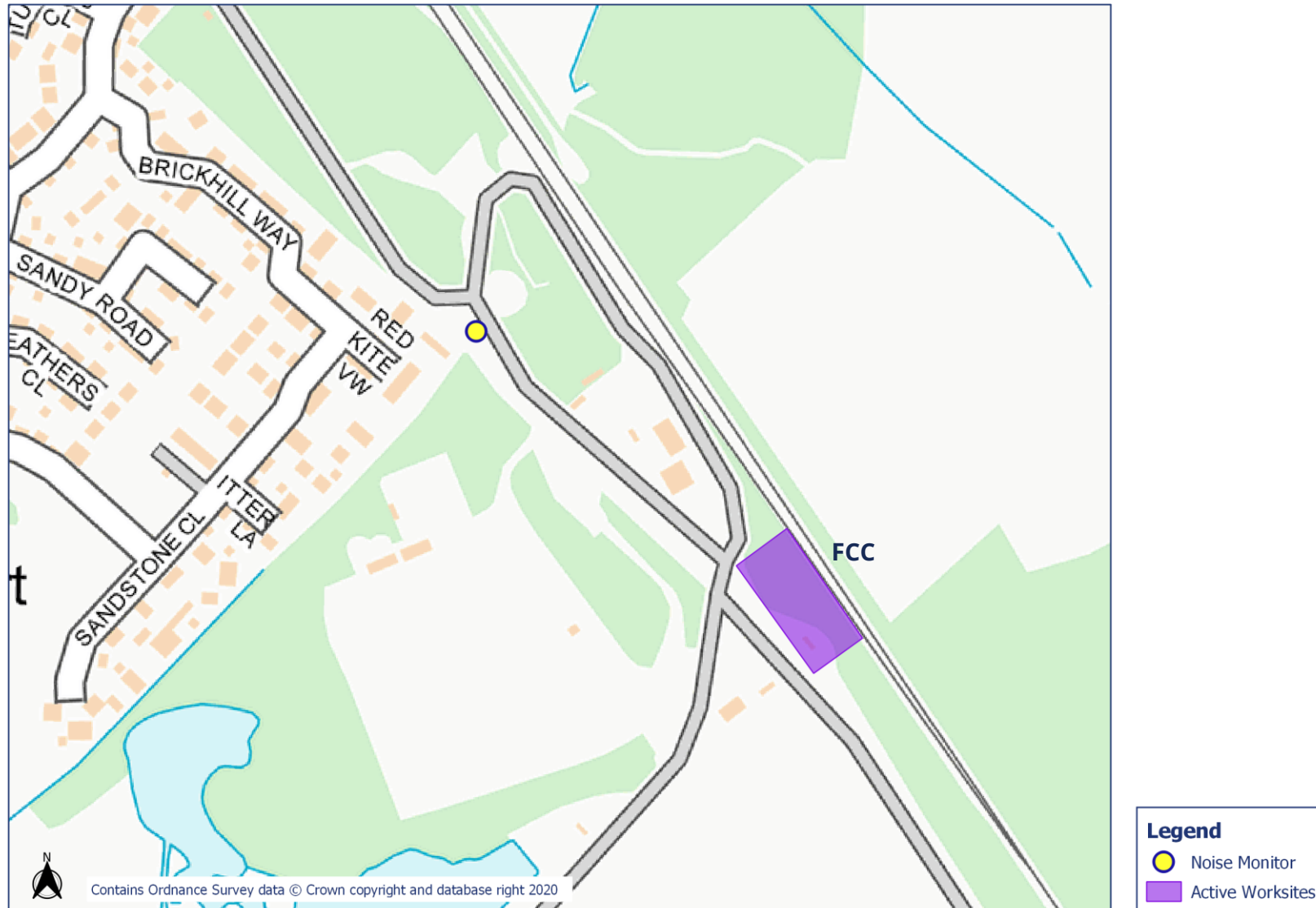




Appendix B Monitoring Locations

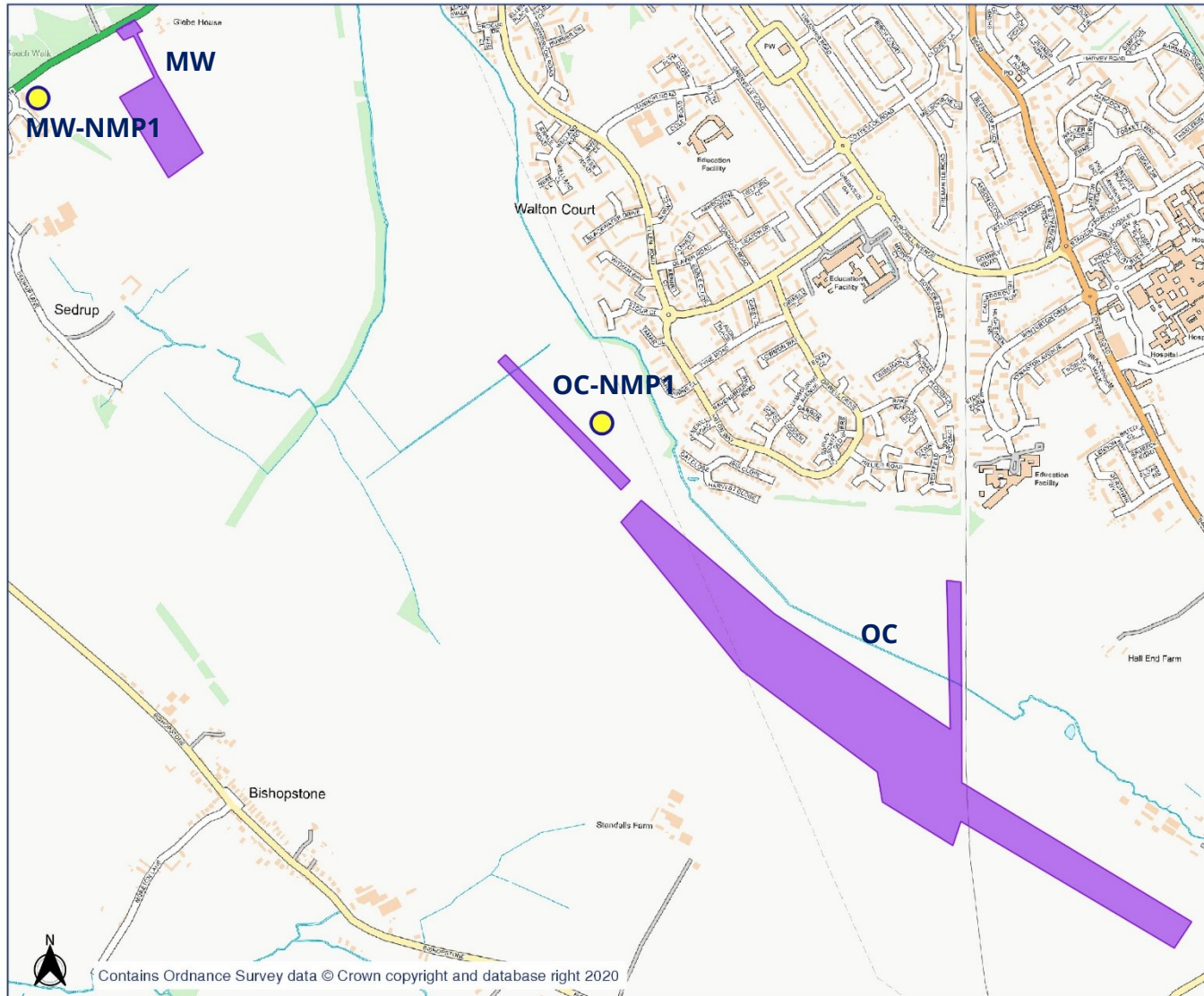






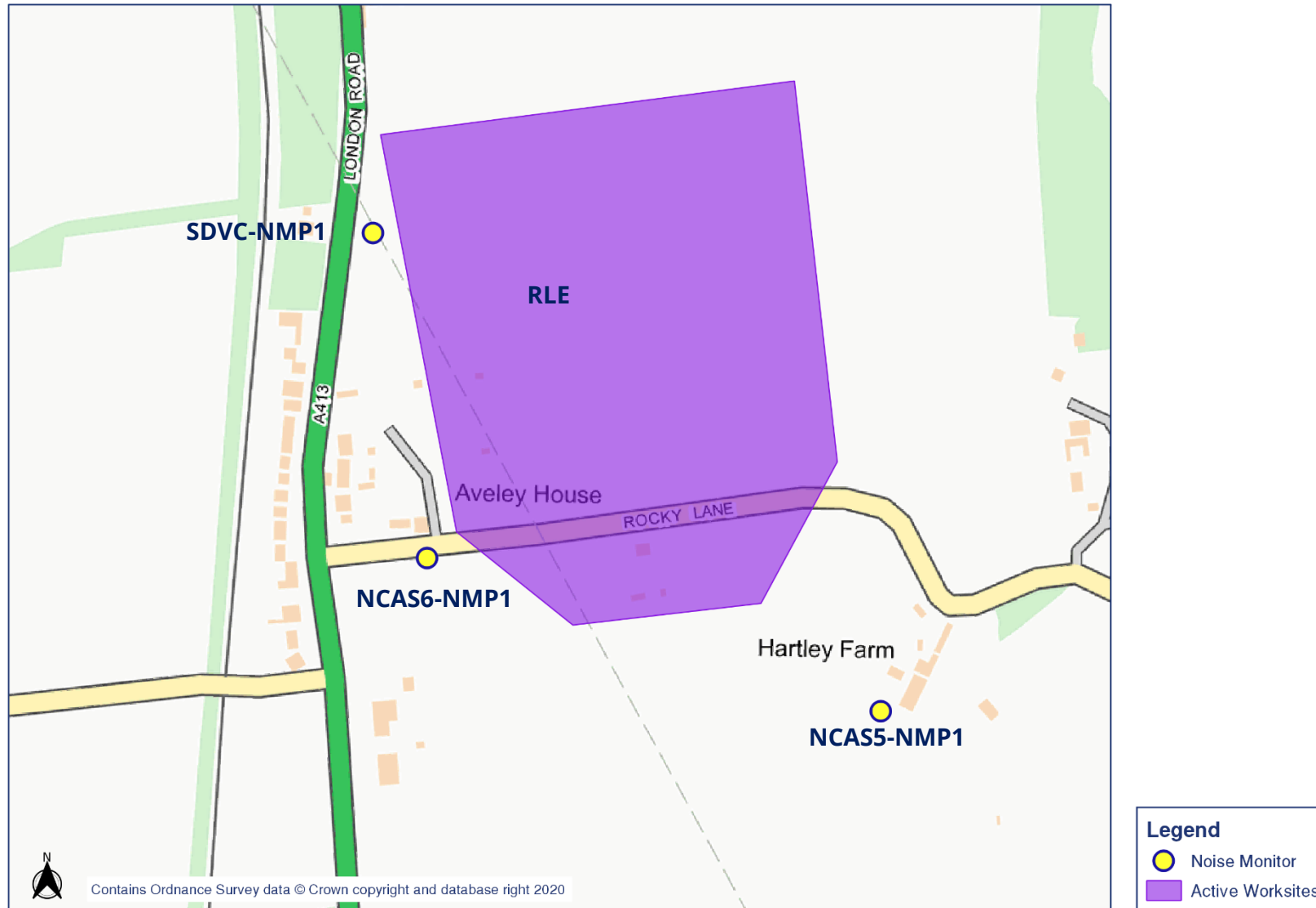


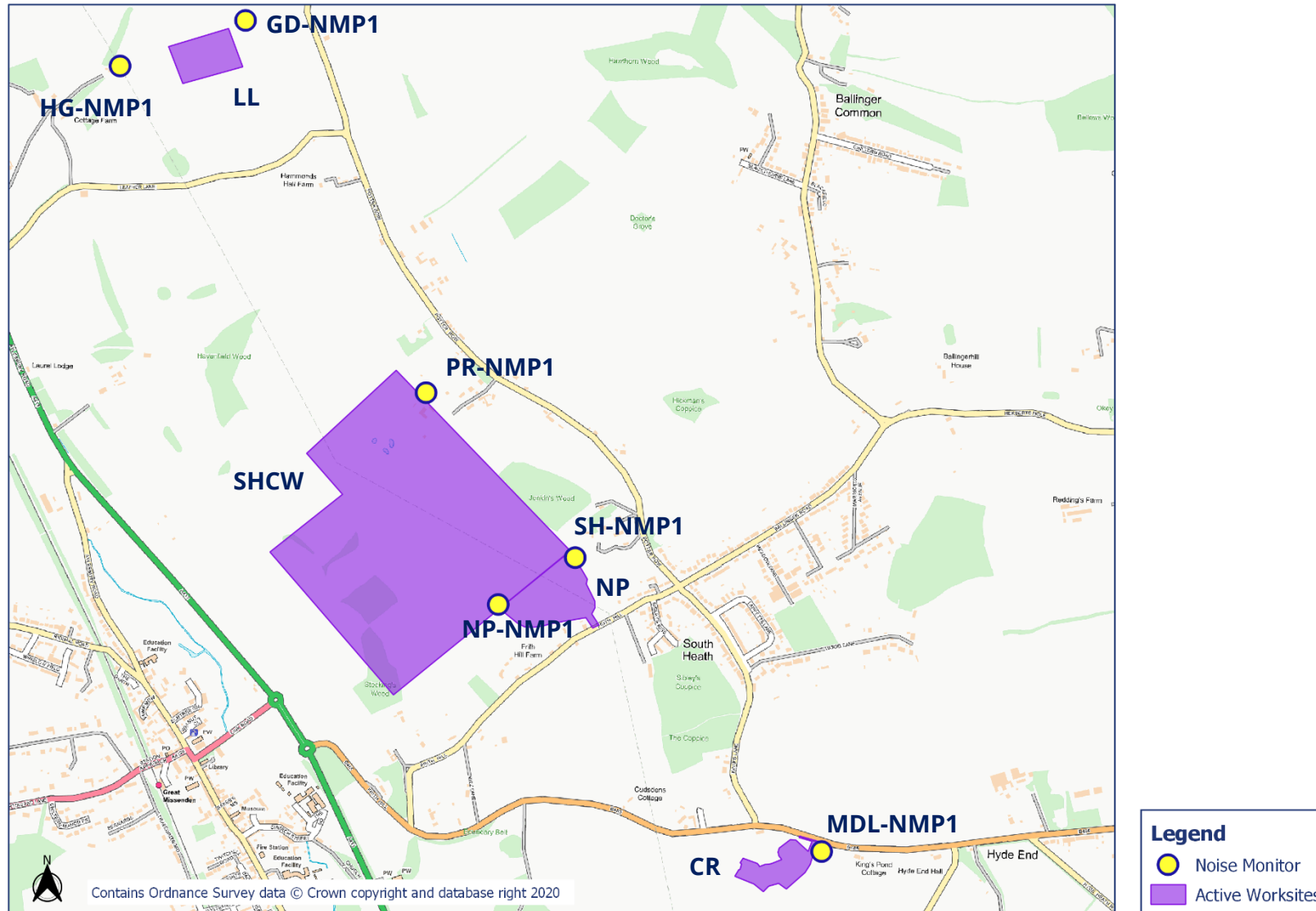




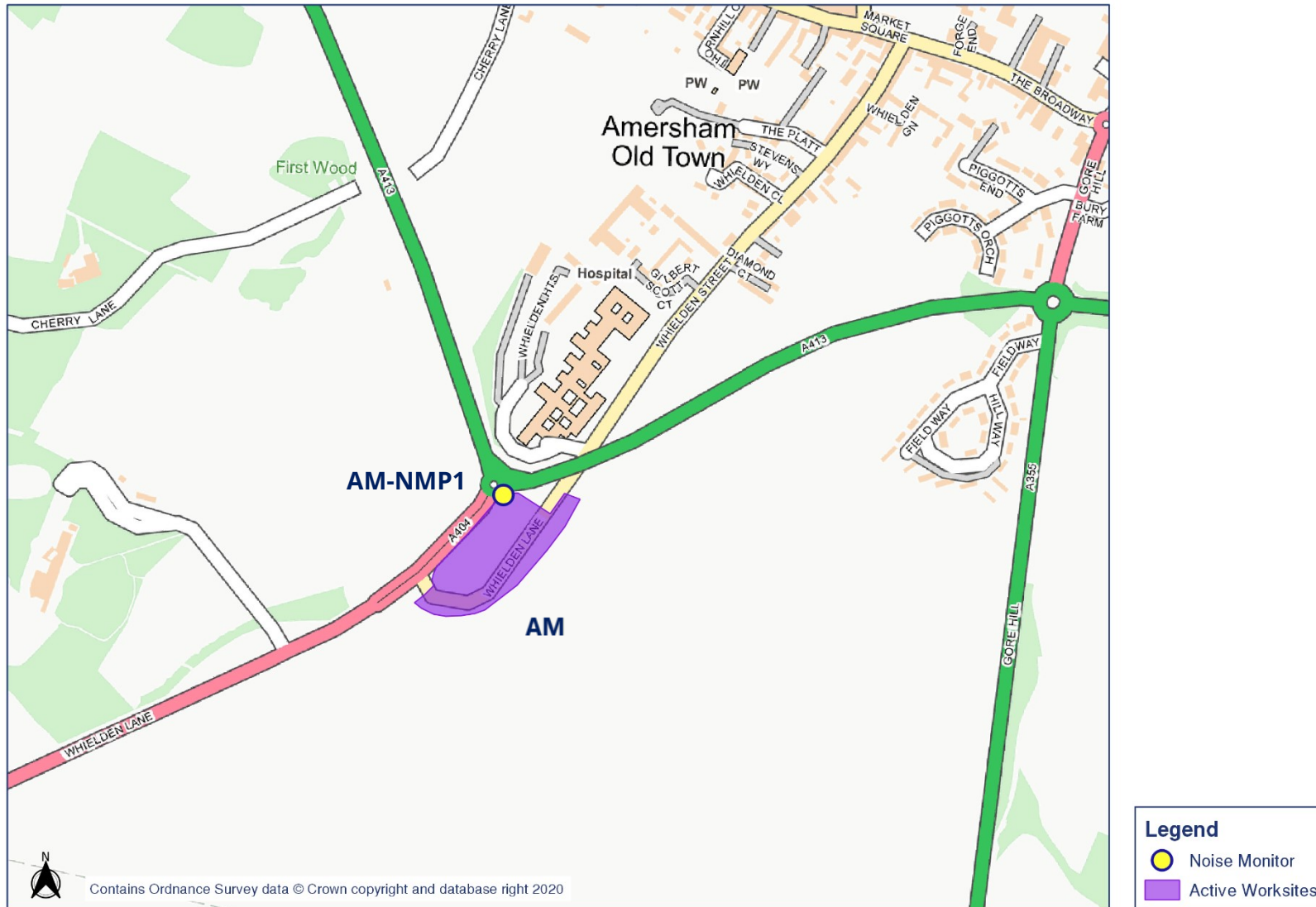
Legend

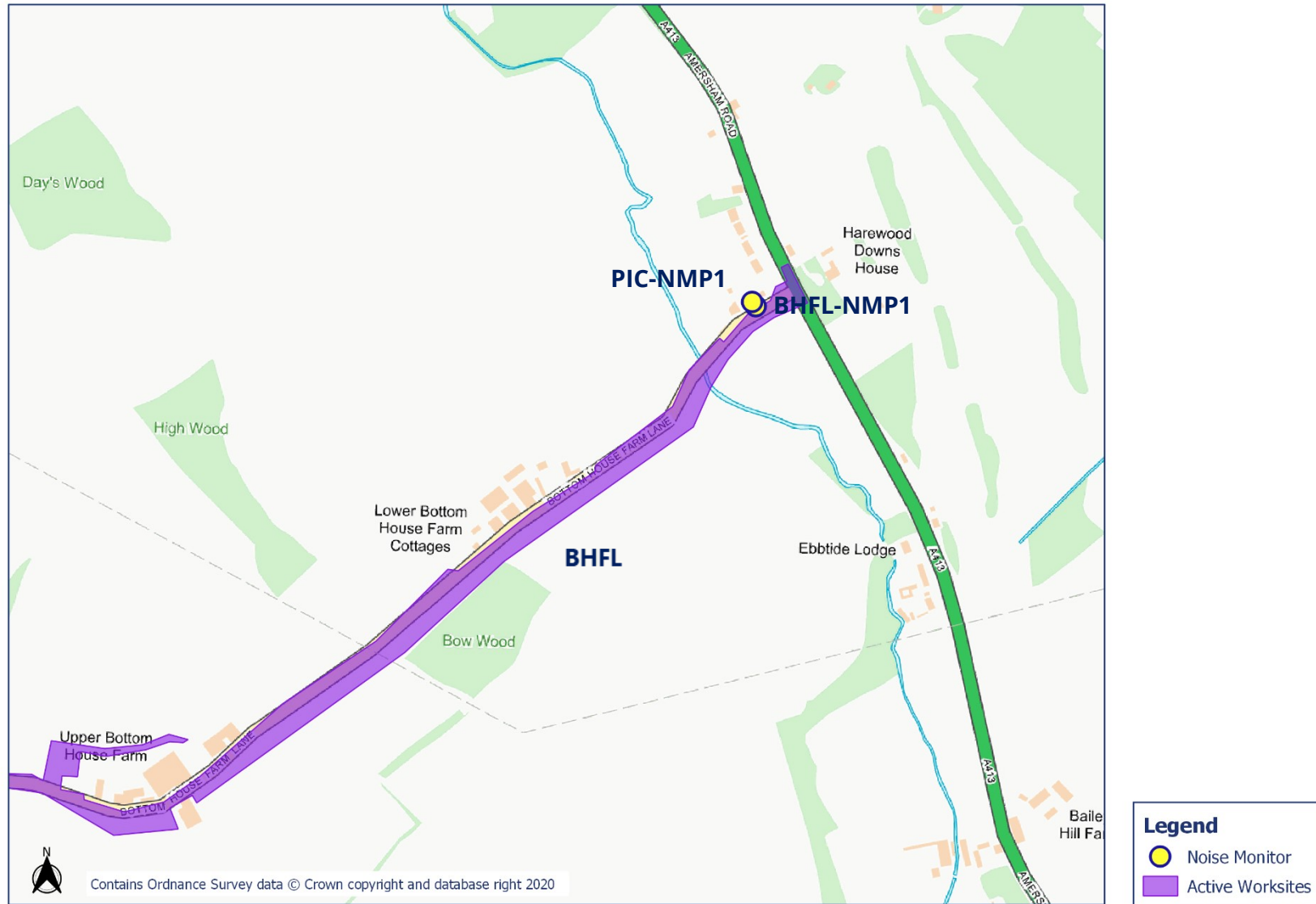
- Noise Monitor
- Active Worksites

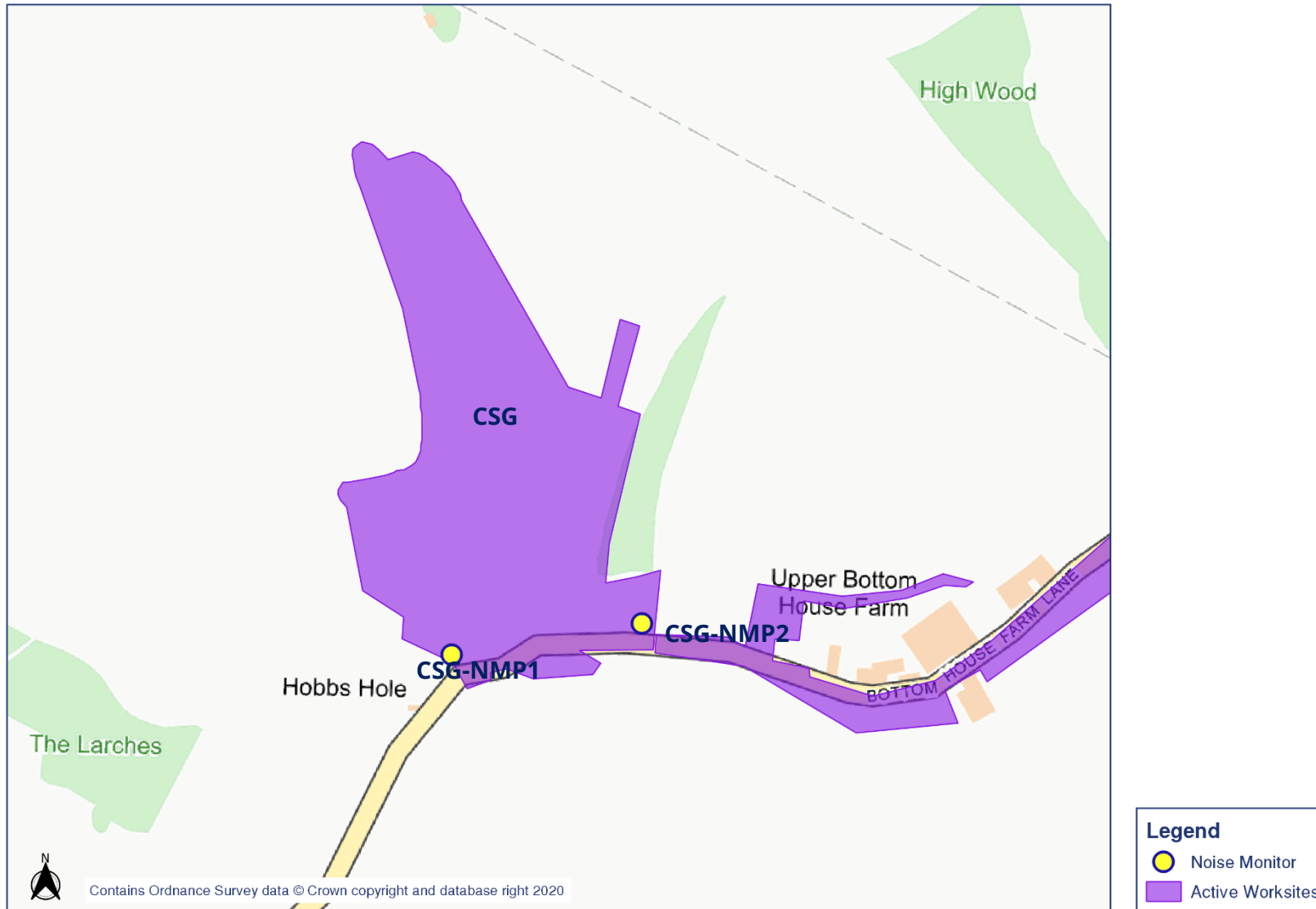


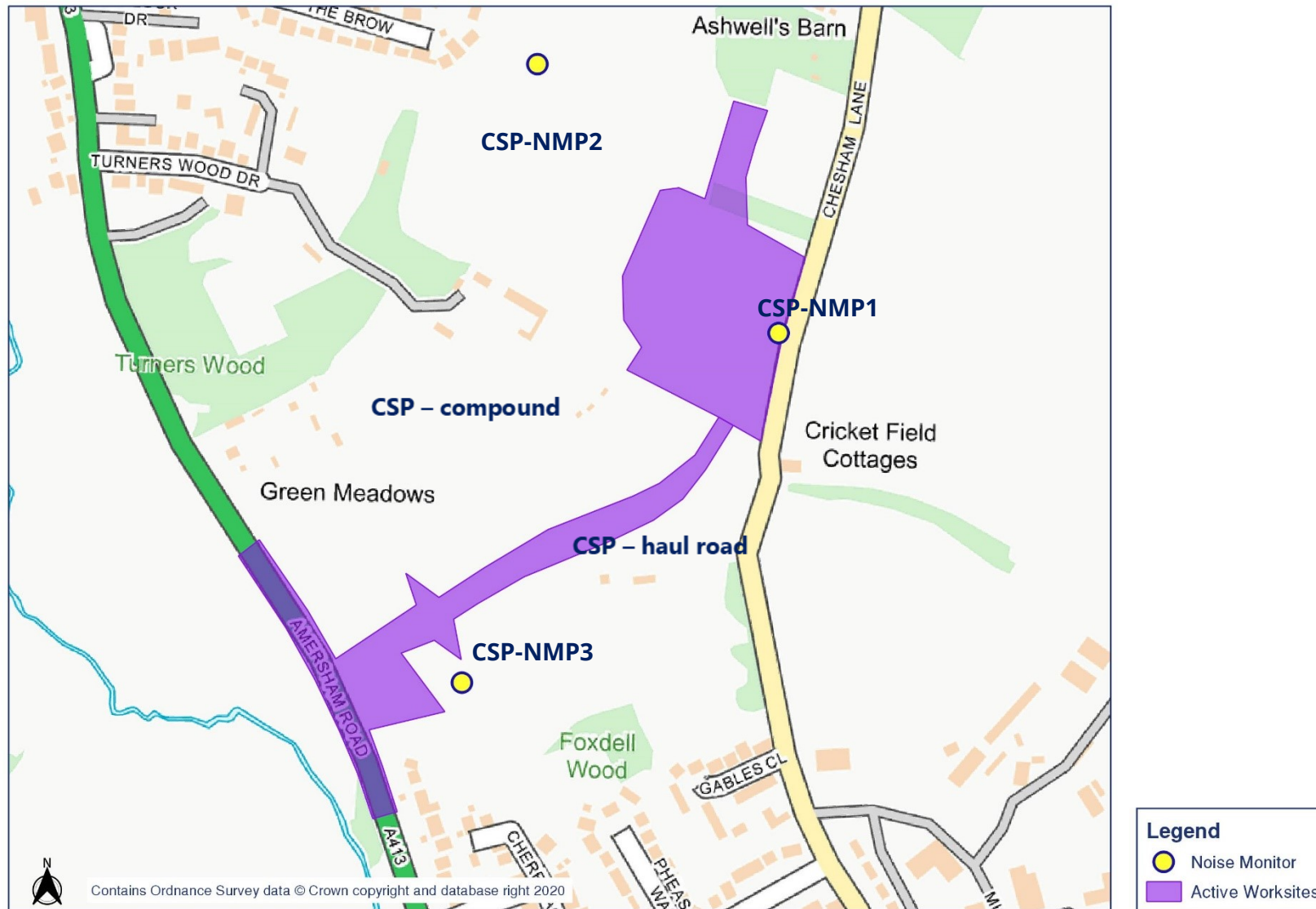






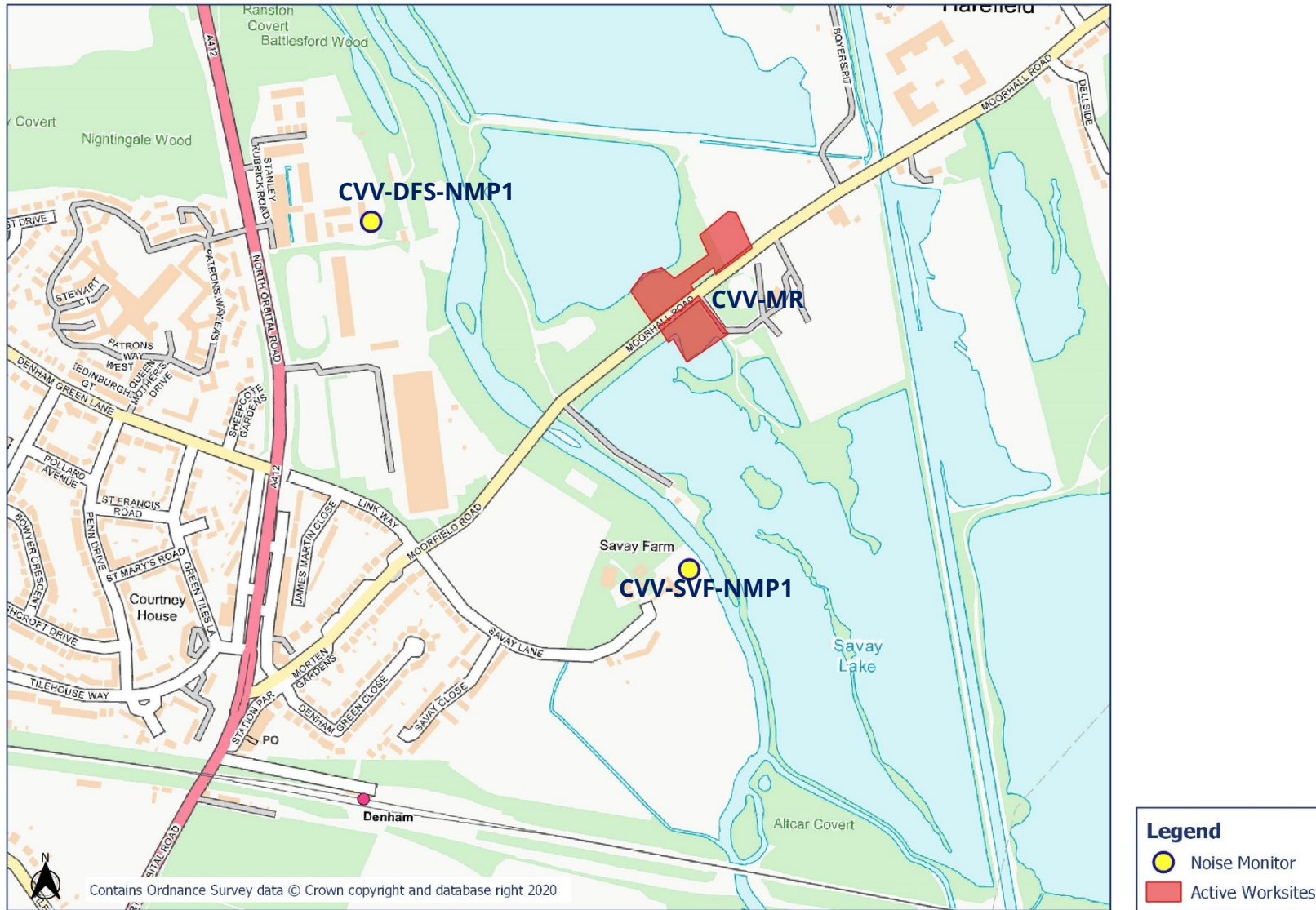








HS2 Noise and Vibration Monitoring Plan - 15

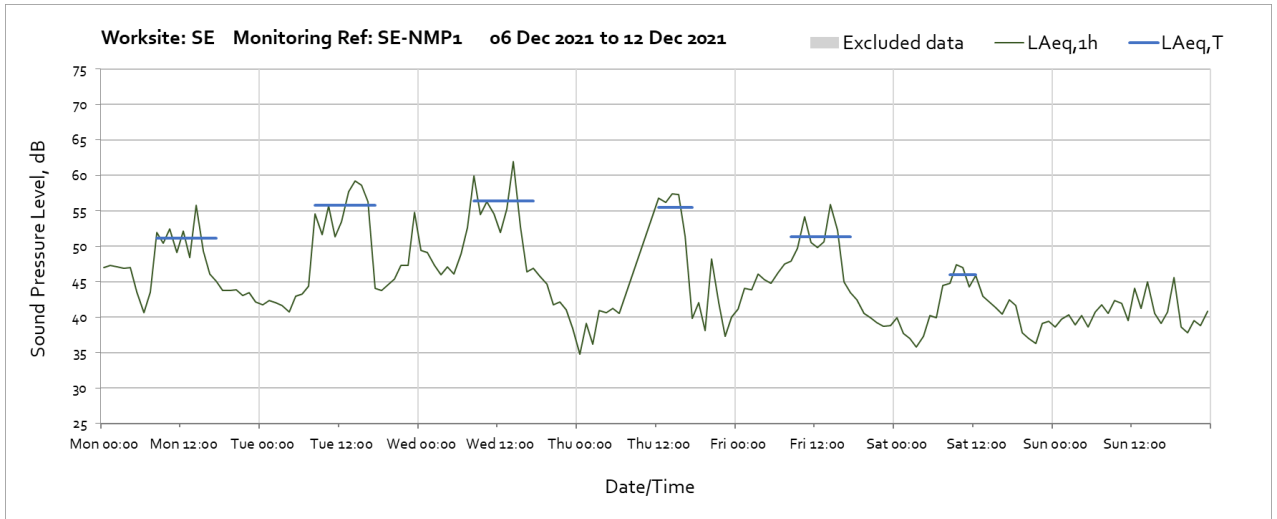
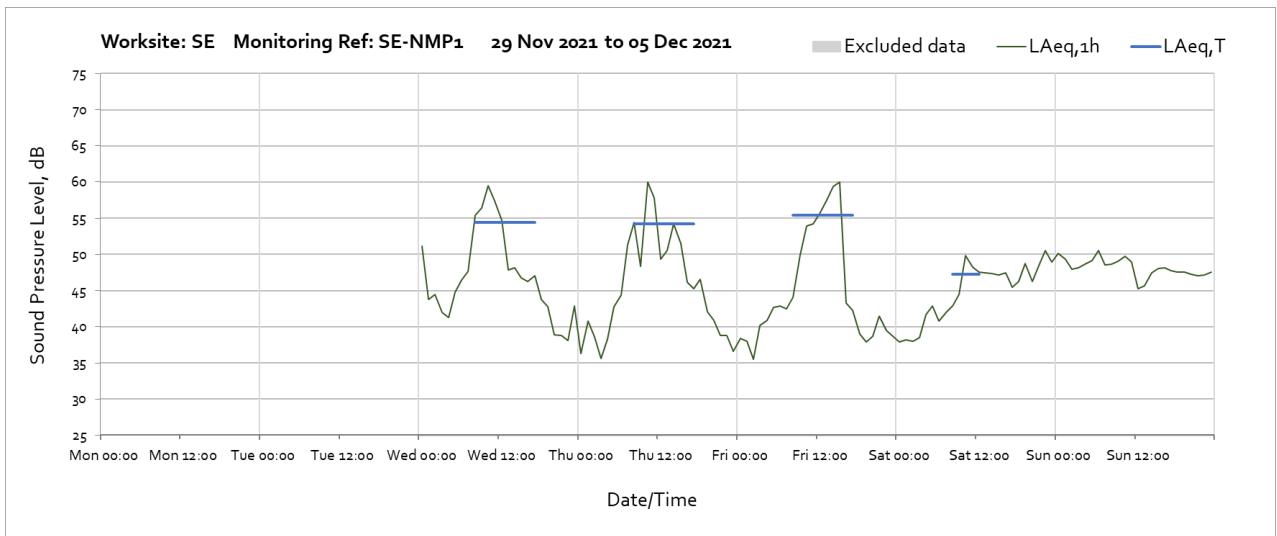


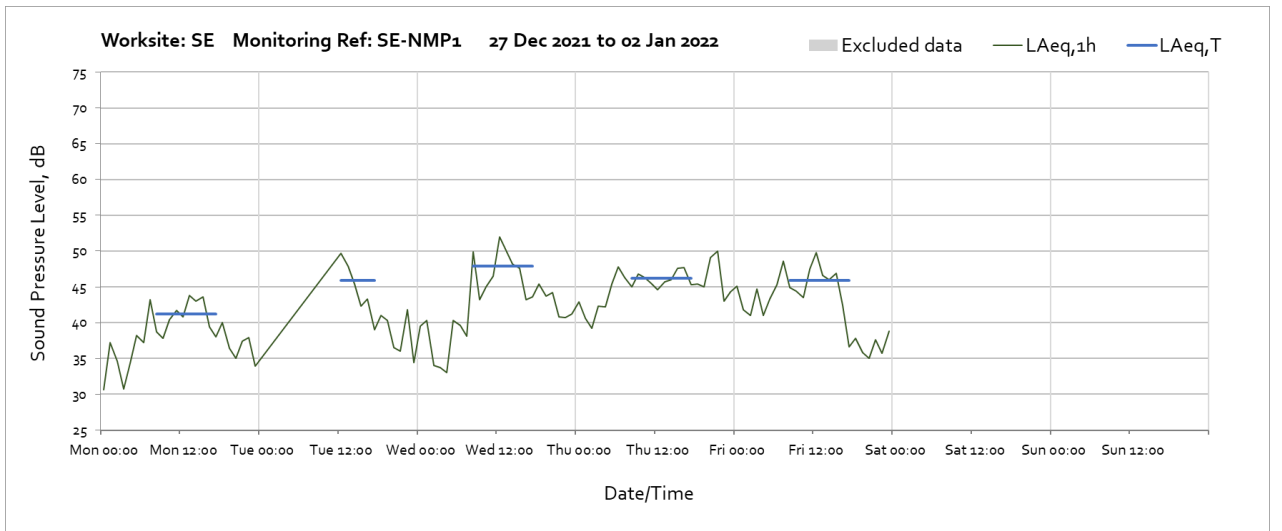
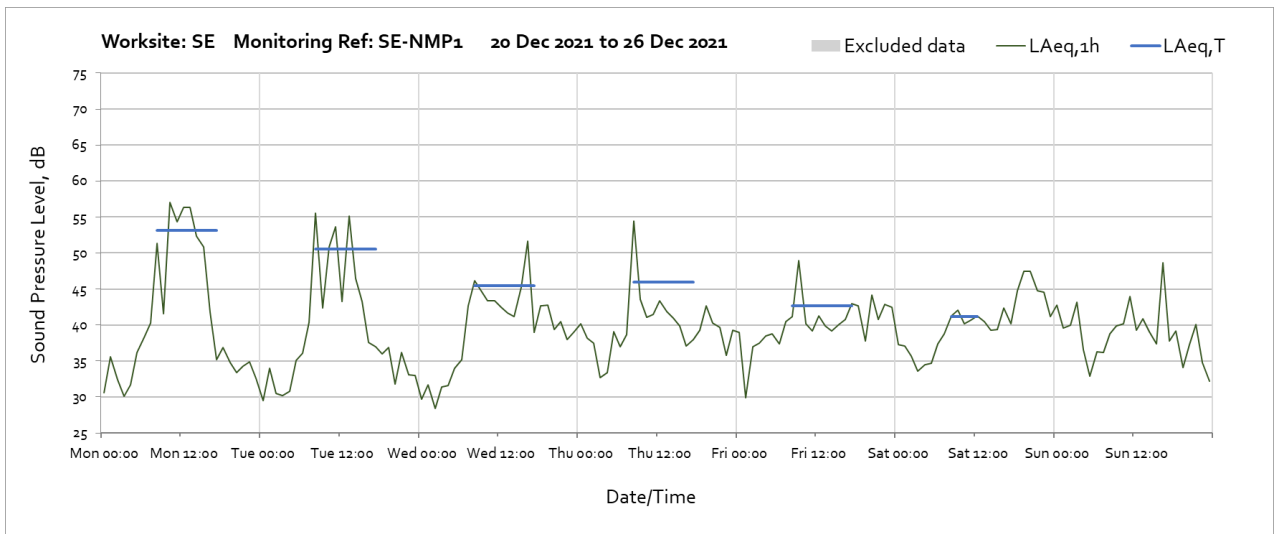
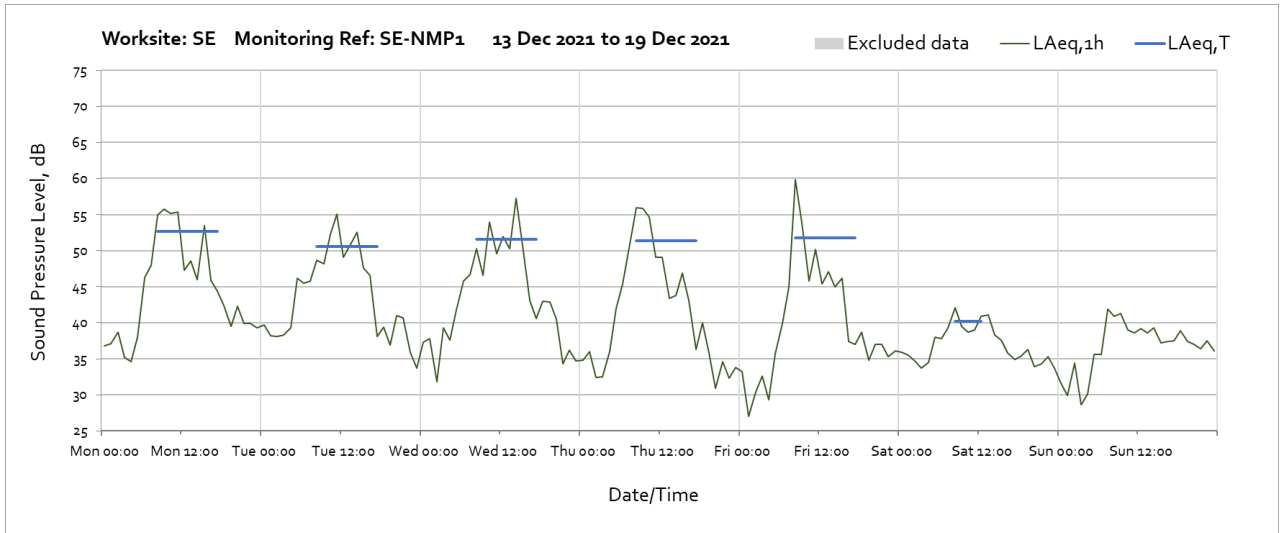
Appendix C Data

Noise

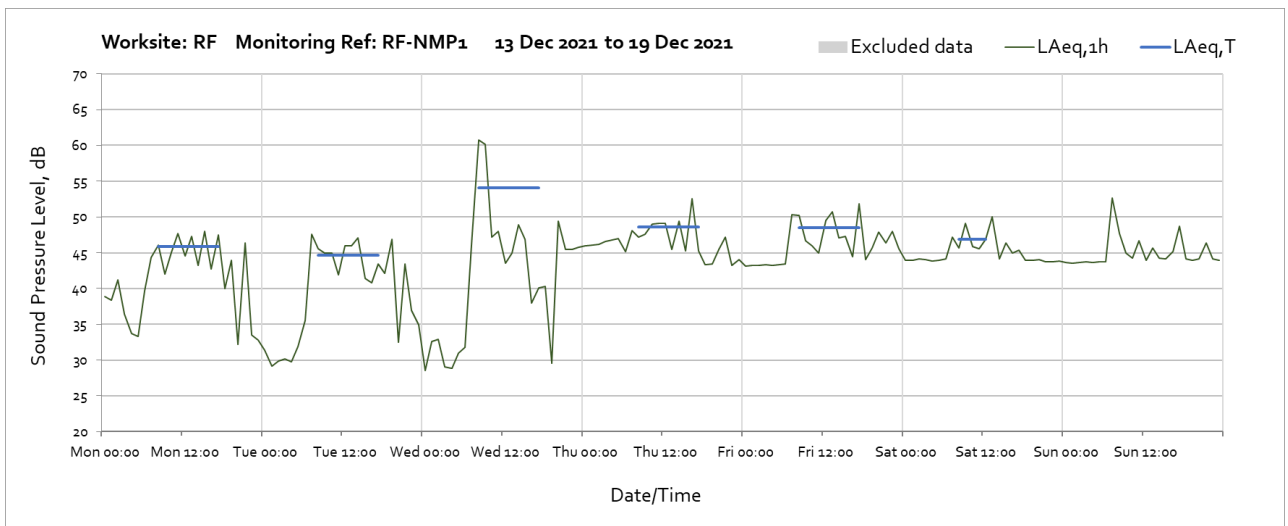
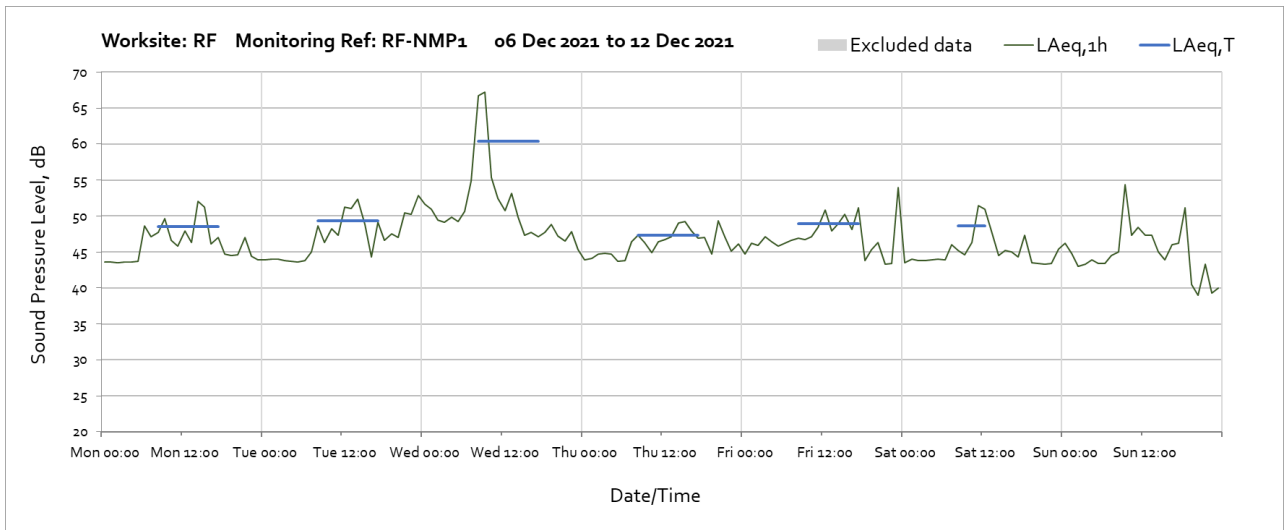
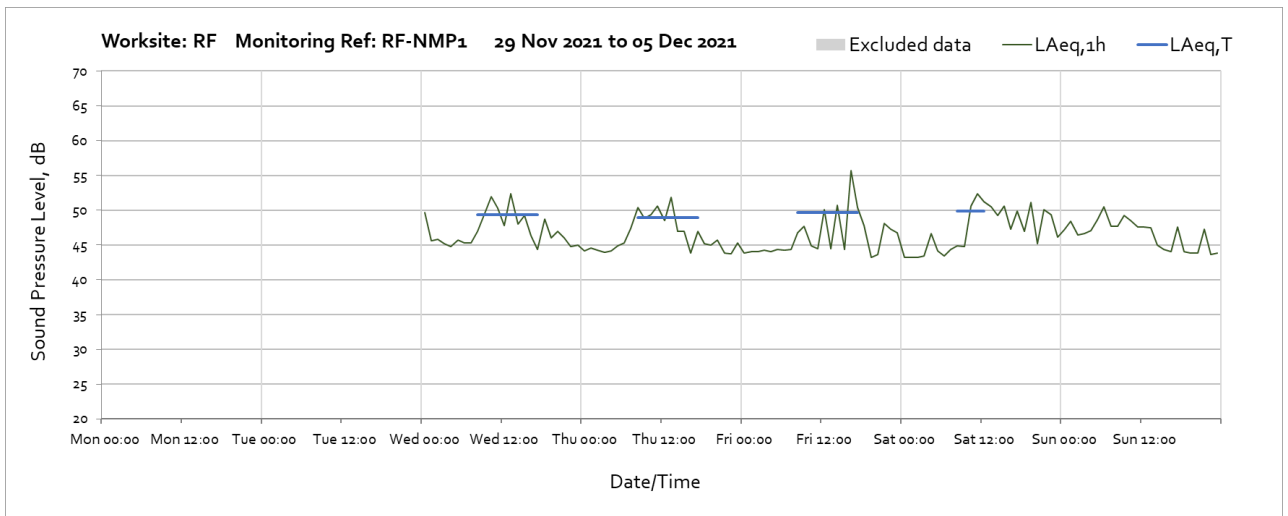
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have been excluded from the calculation of the $L_{Aeq,T}$ values in Table 3 of the main report.

Worksite: SE – Monitoring Ref: SE-NMP1

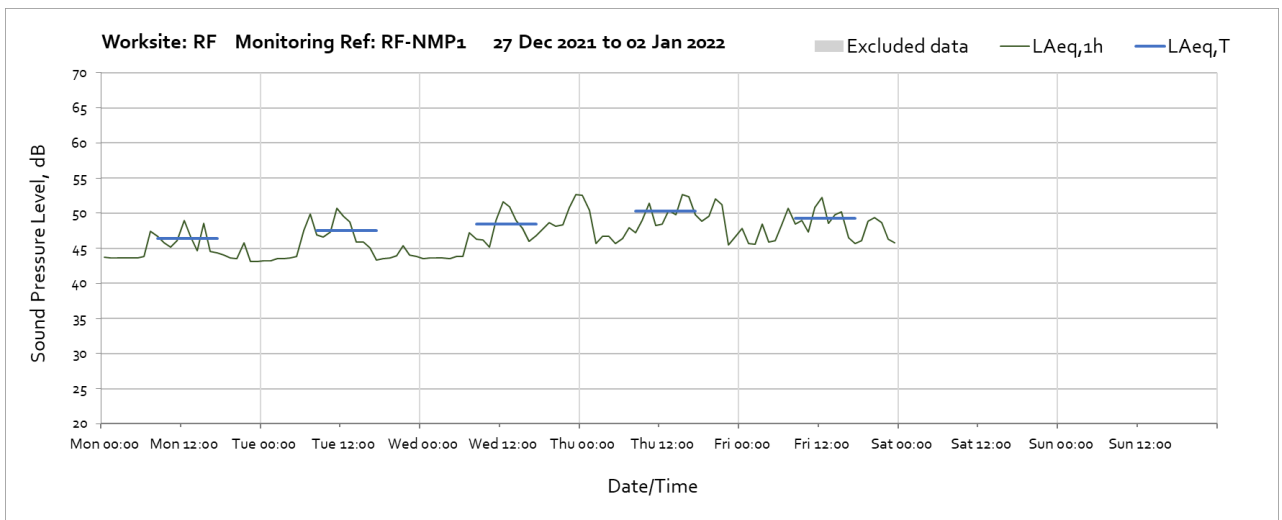
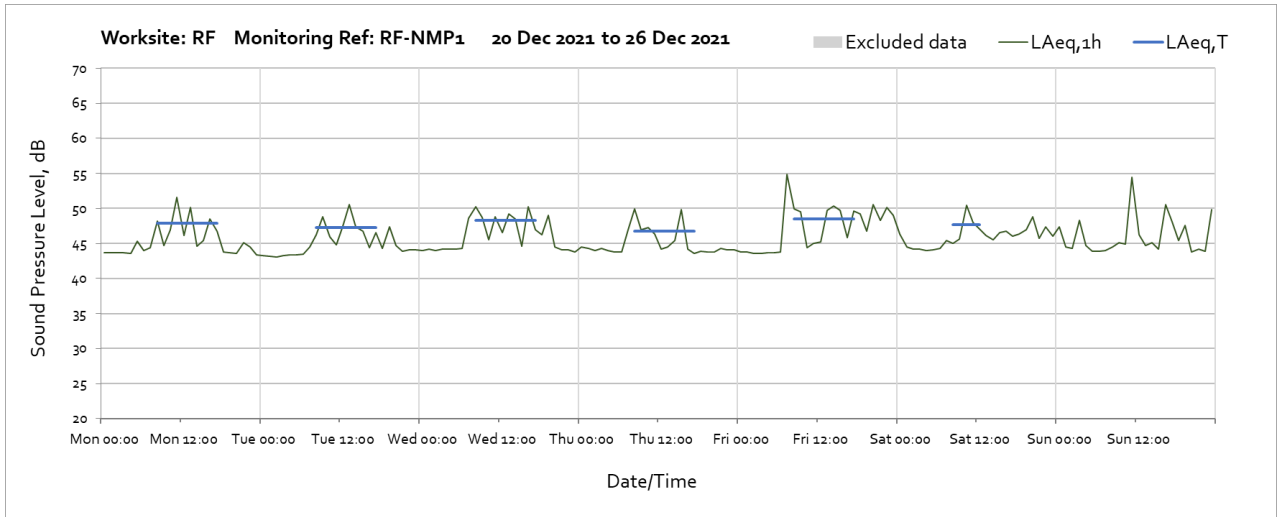


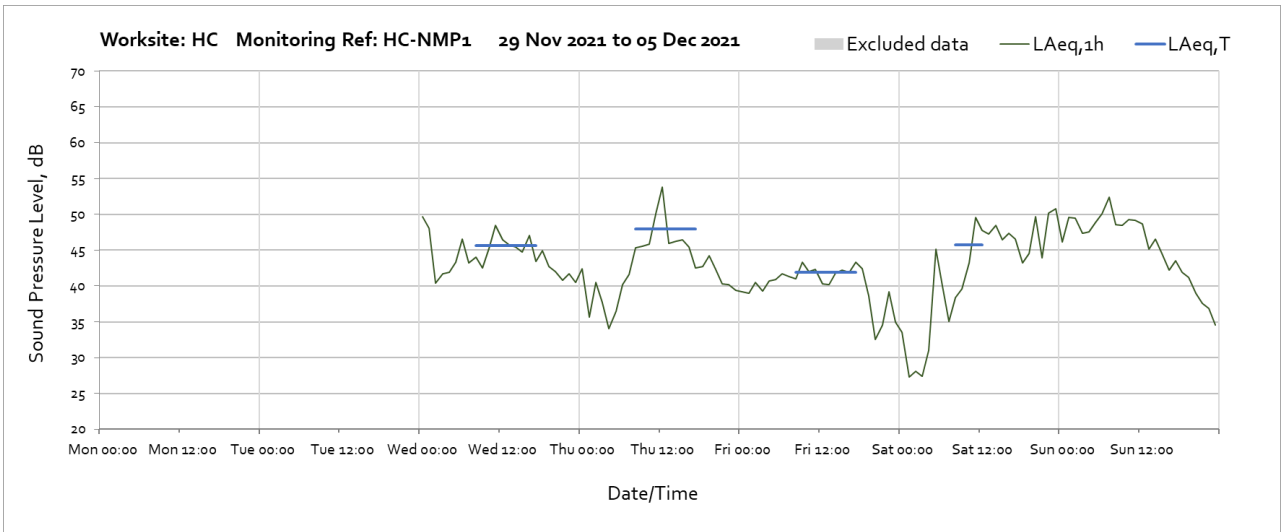


Worksite: RF – Monitoring Ref: RF-NMP1

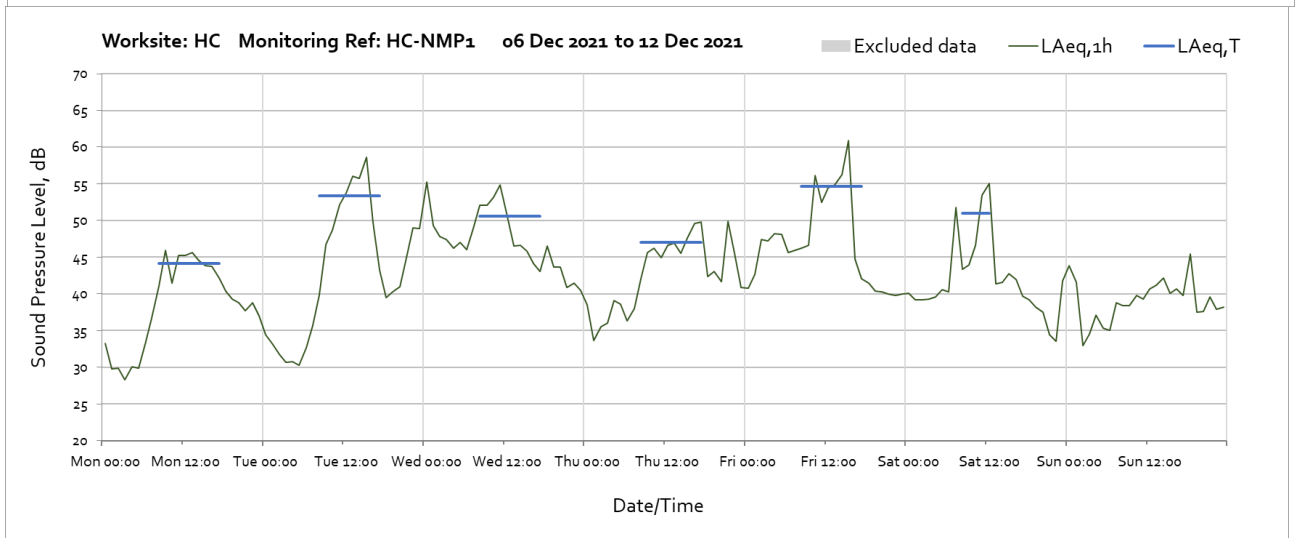
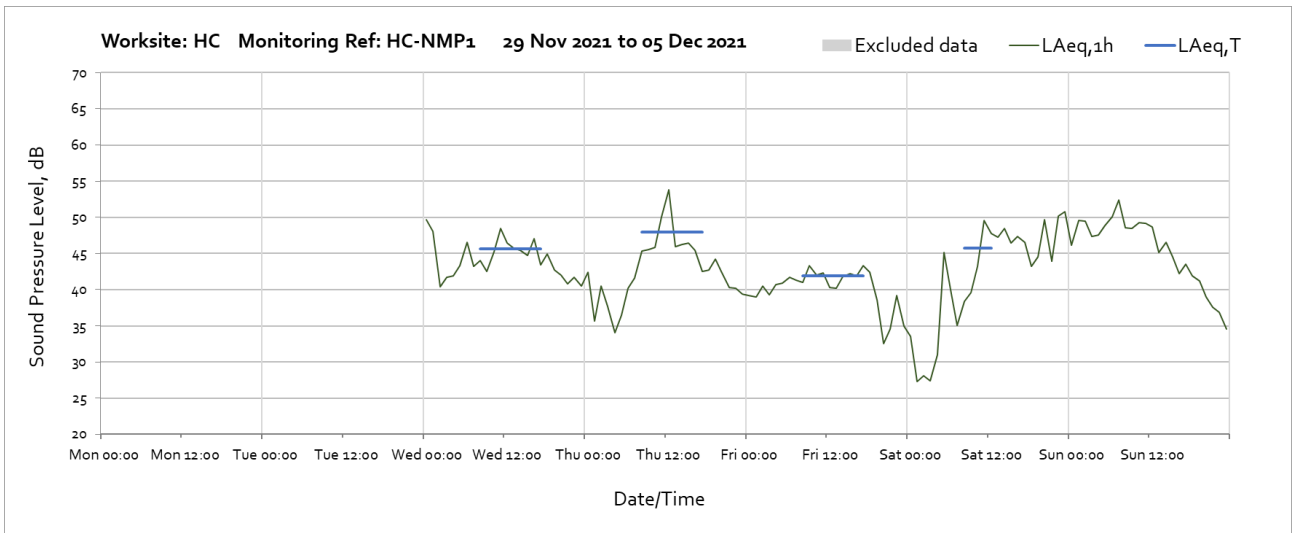


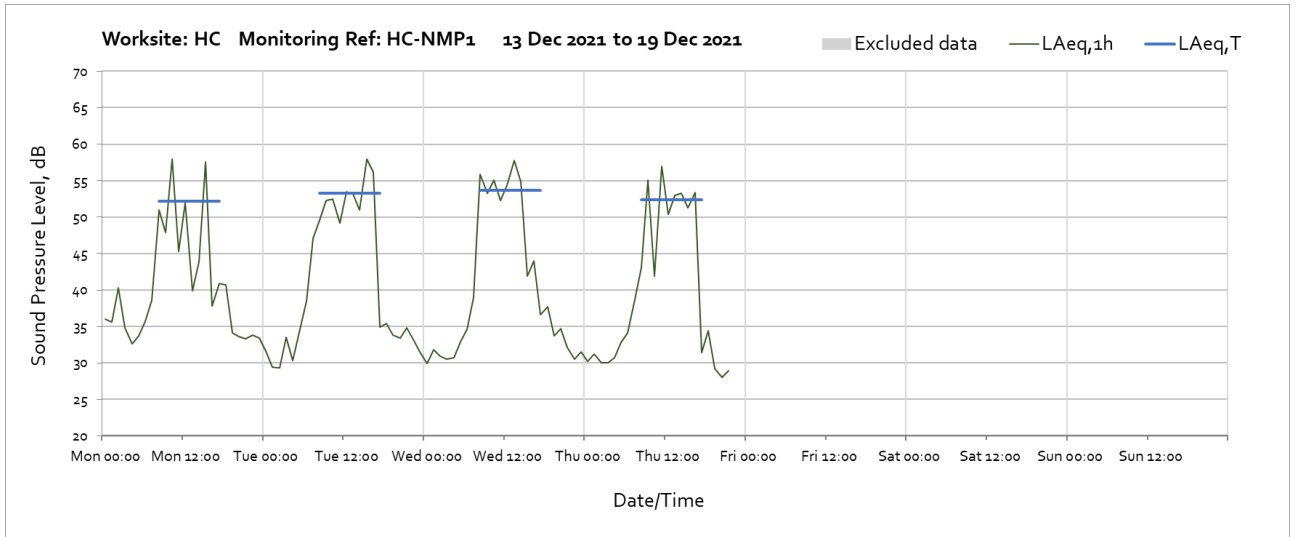
OFFICIAL





Worksite: HC - Monitoring Ref: HC-NMP1



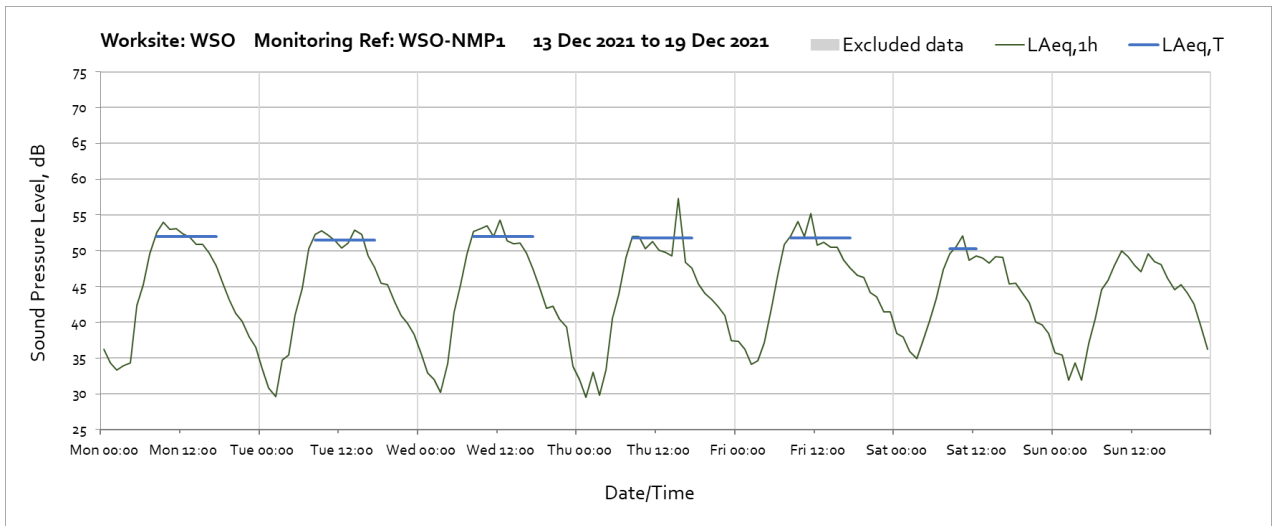
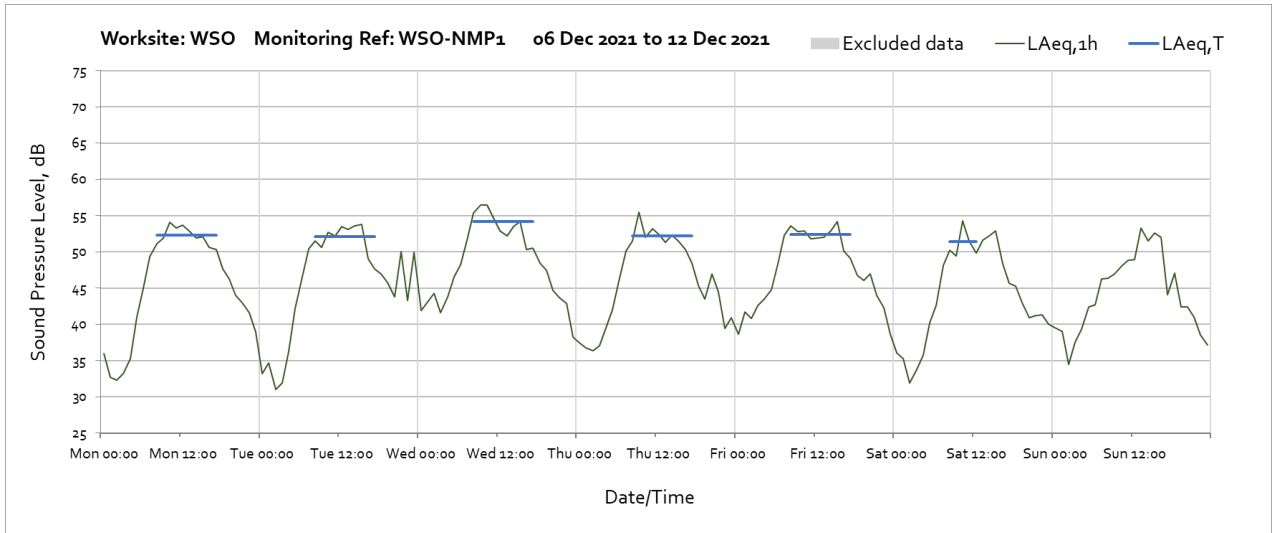
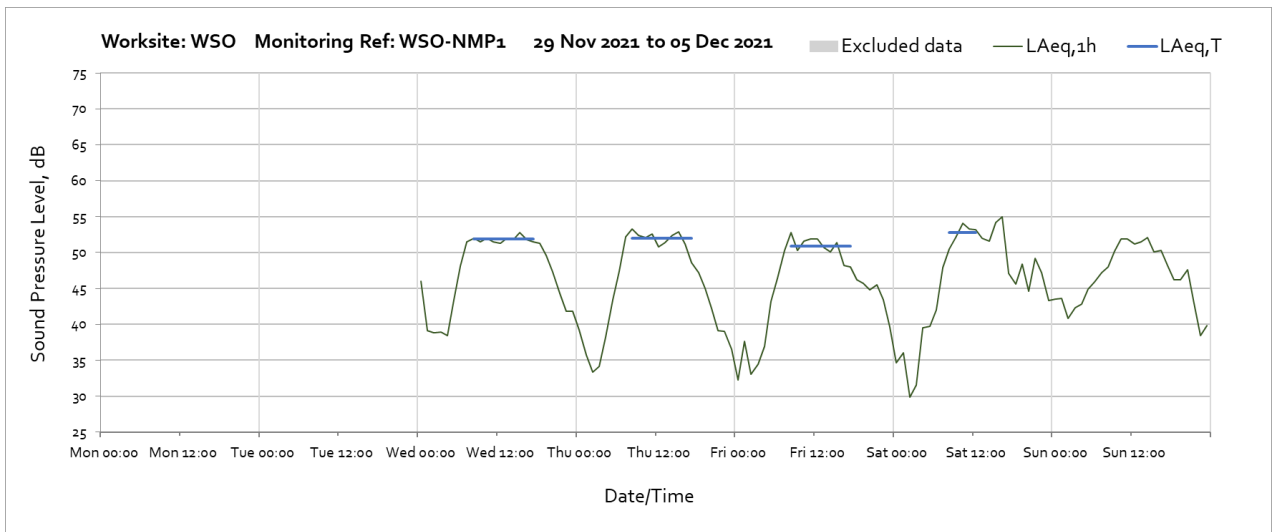


Note: Missing data between 22:00 on the 16th December and 12:00 on the 28th December was due to loss of power to the monitoring station from lack of sufficient solar energy to keep the battery charged. Installation of wind turbine to provide additional energy is currently being pursued.

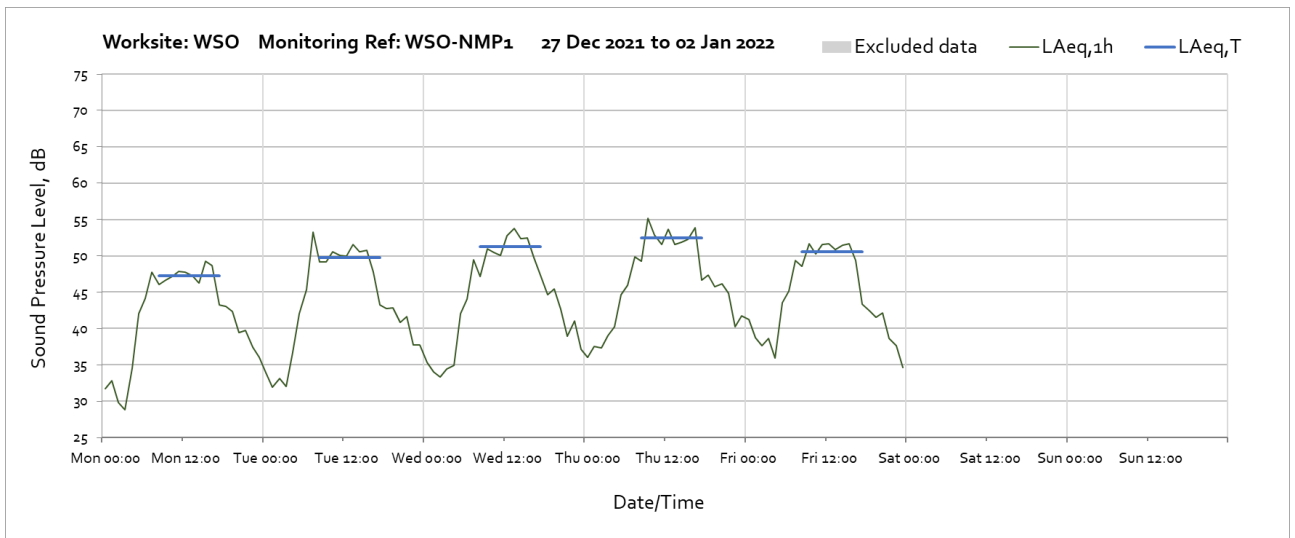
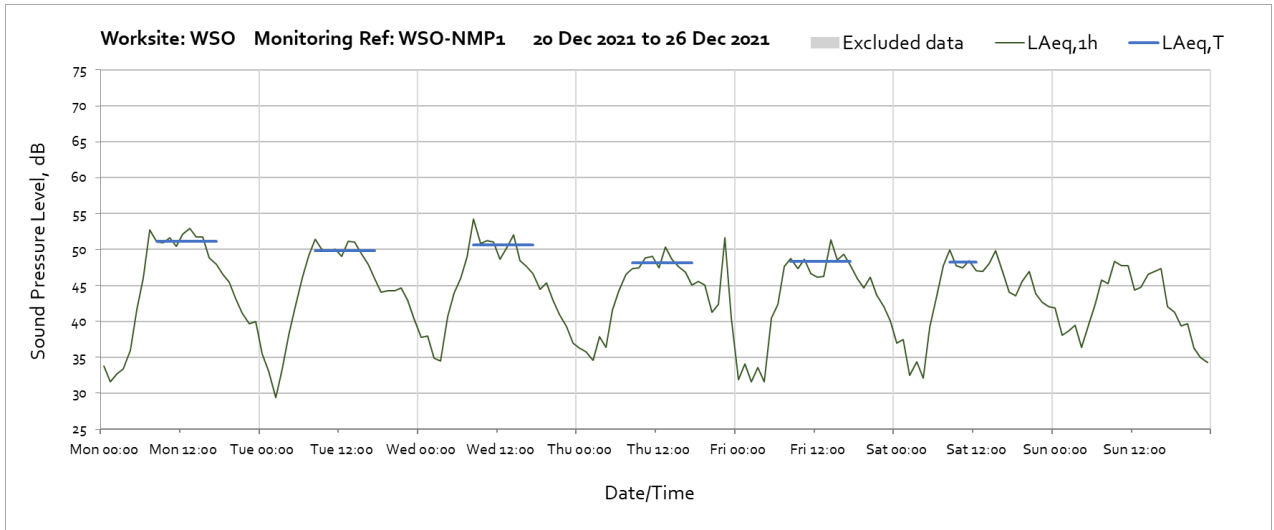


Note: Missing data between 22:00 on the 16th December and 12:00 on the 28th December was due to loss of power to the monitoring station from lack of sufficient solar energy to keep the battery charged. Installation of wind turbine to provide additional energy is currently being pursued.

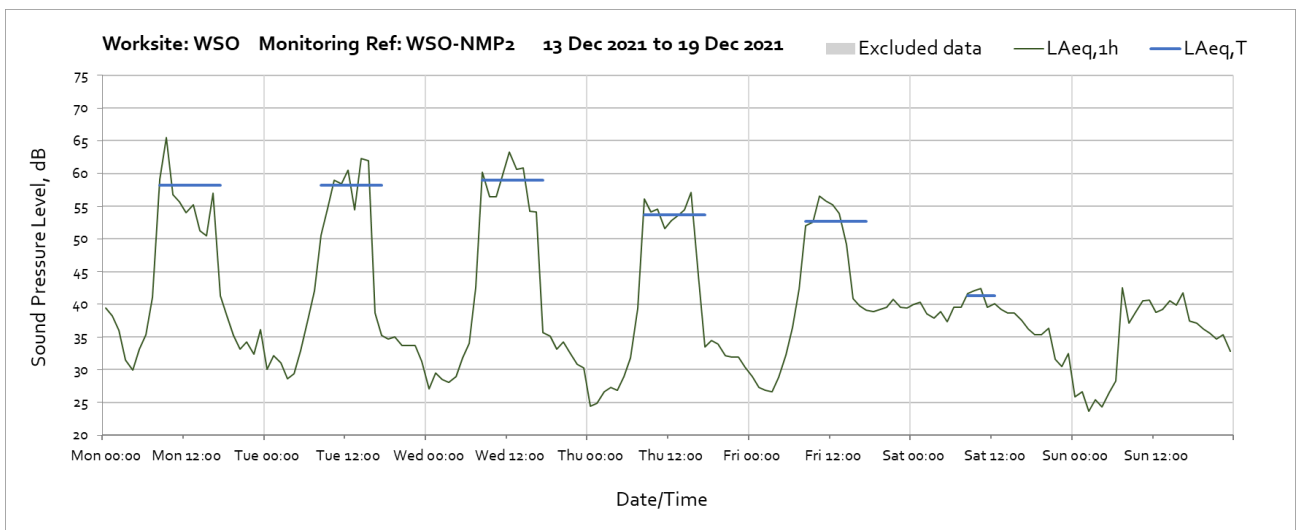
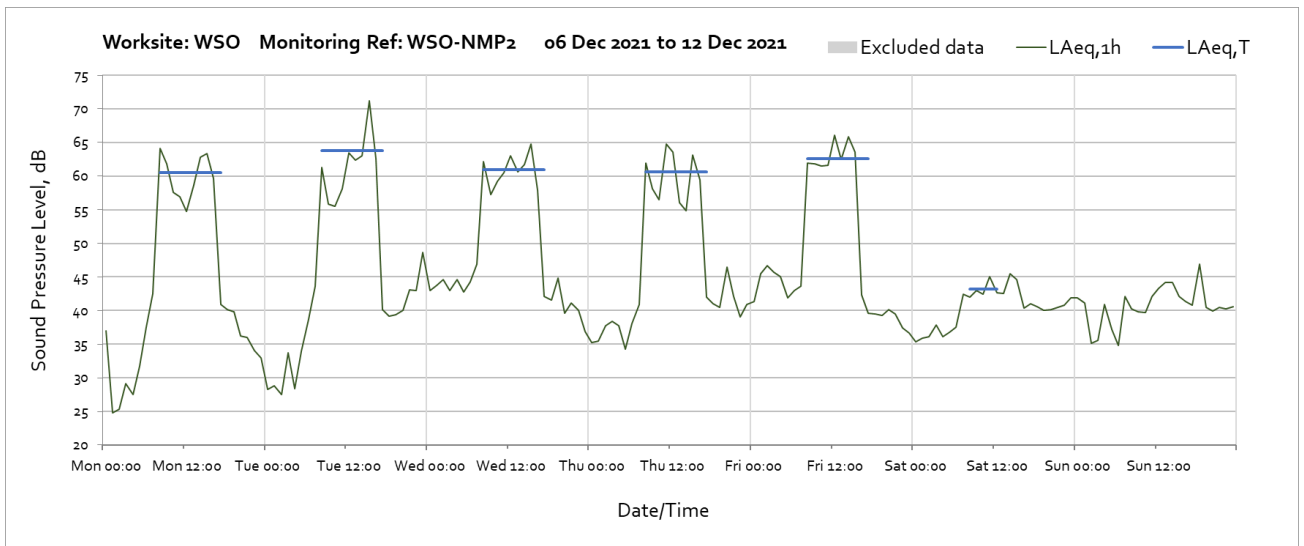
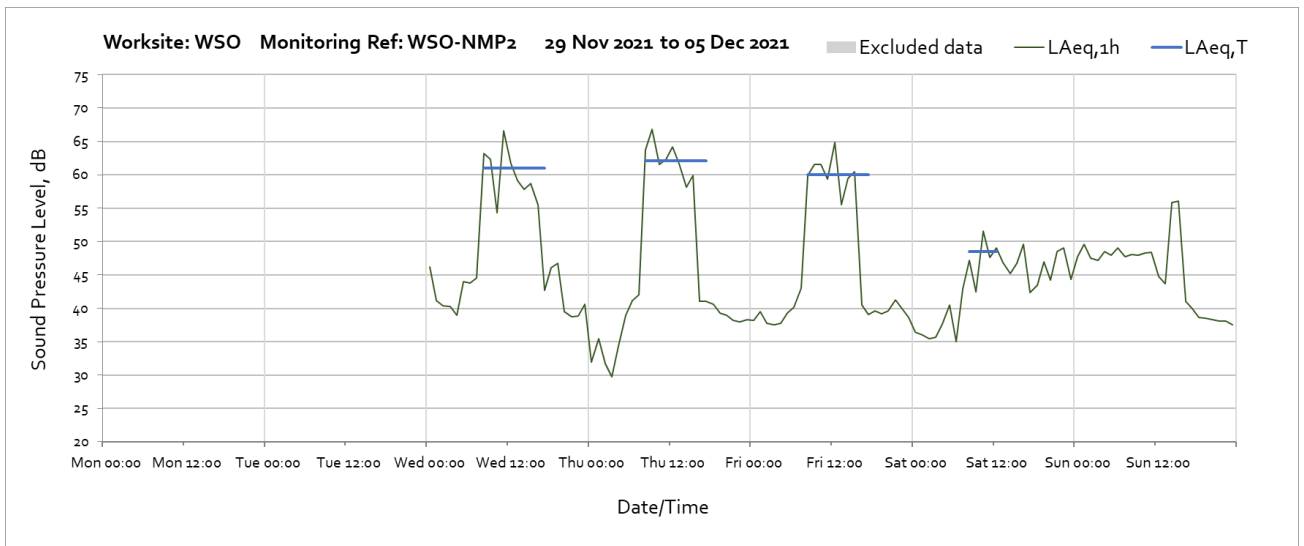
Worksite: WSO – Monitoring Ref: WSO-NMP1



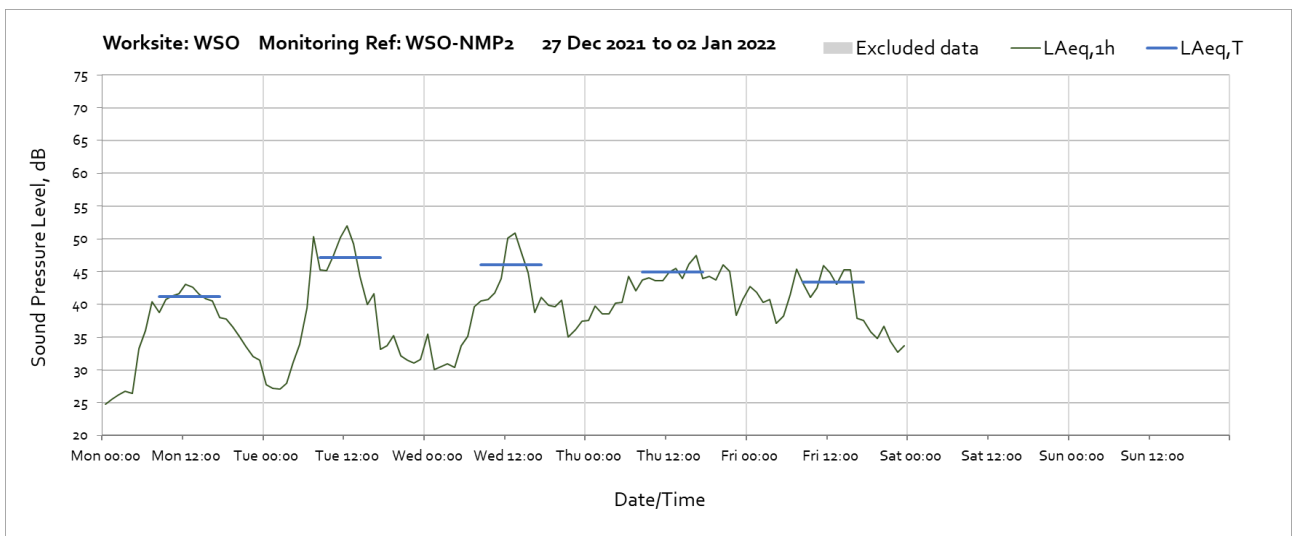
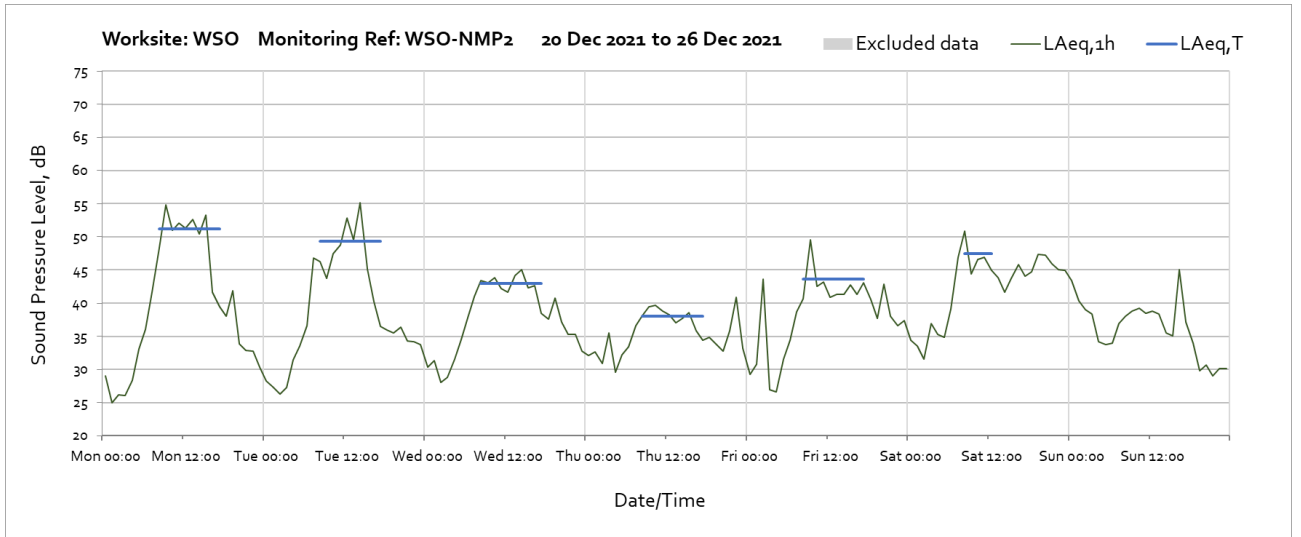
OFFICIAL



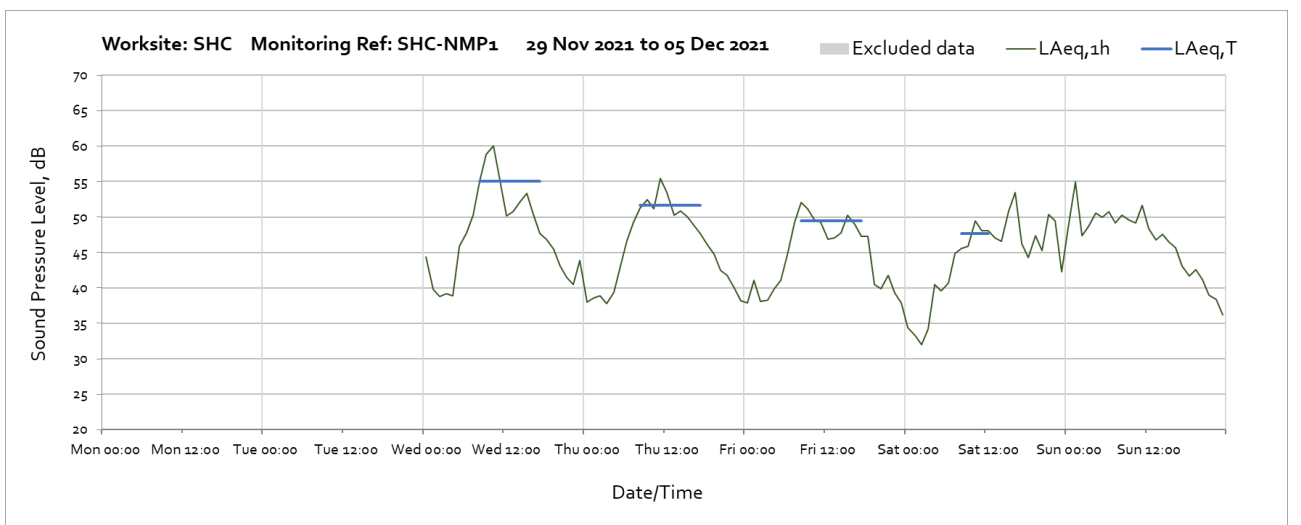
Worksite: WSO – Monitoring Ref: WSO-NMP2

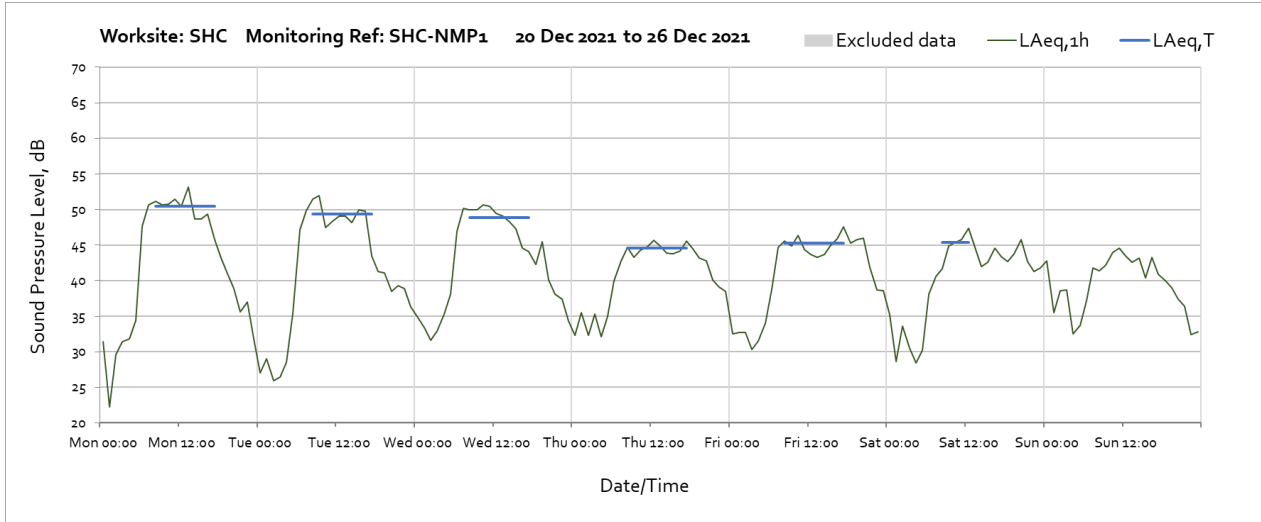
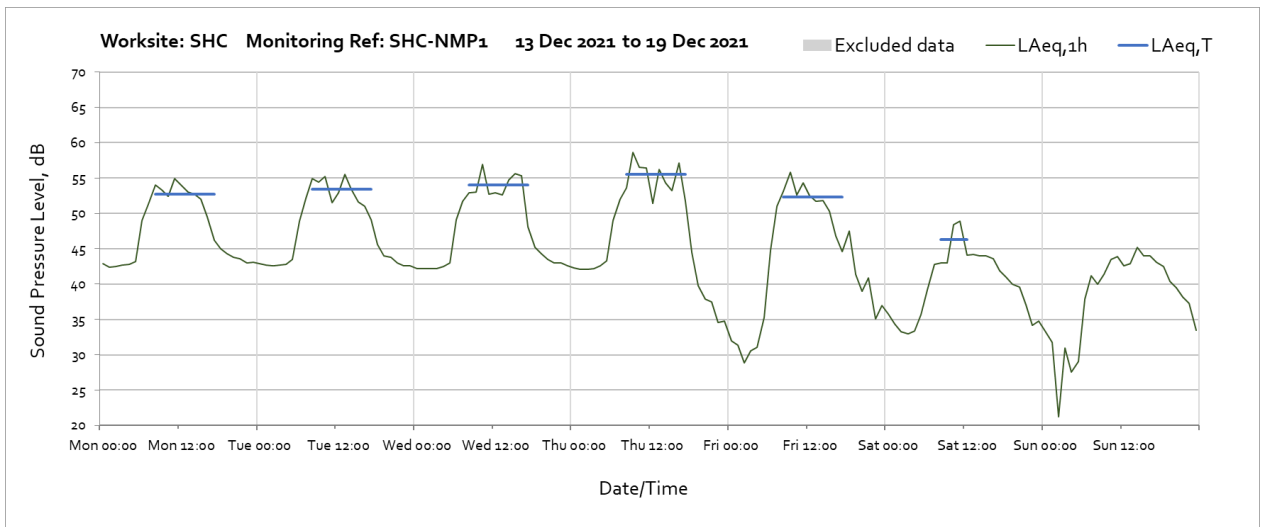
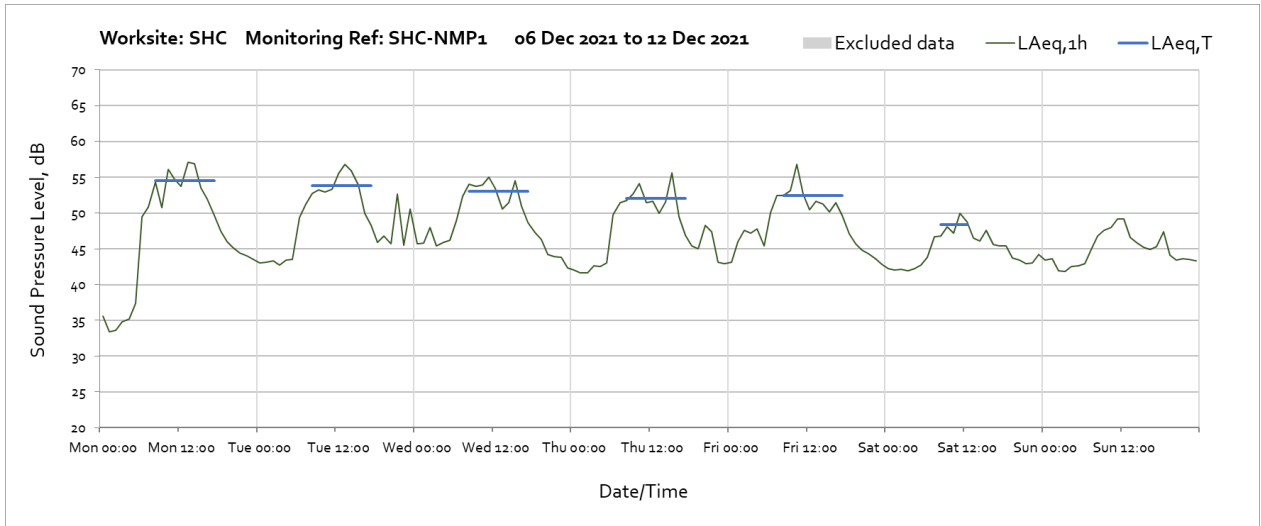


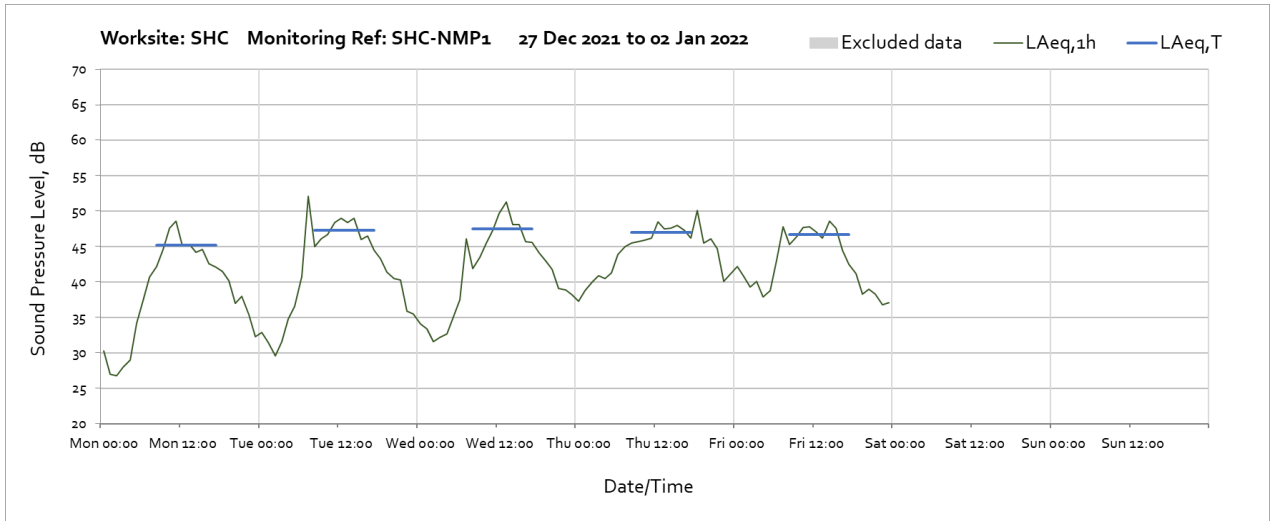
OFFICIAL



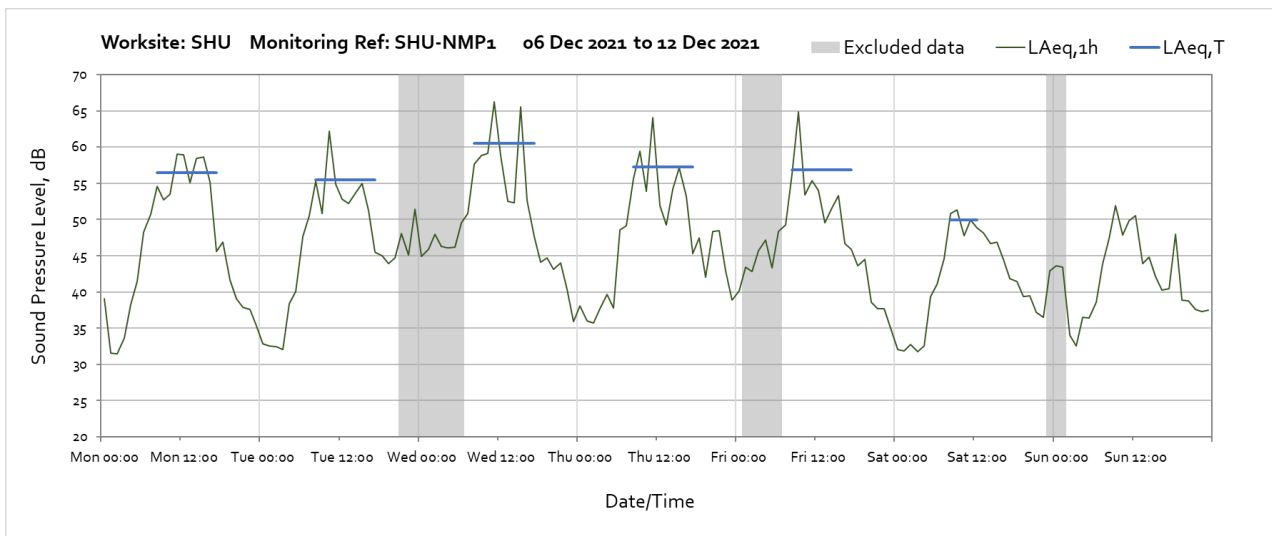
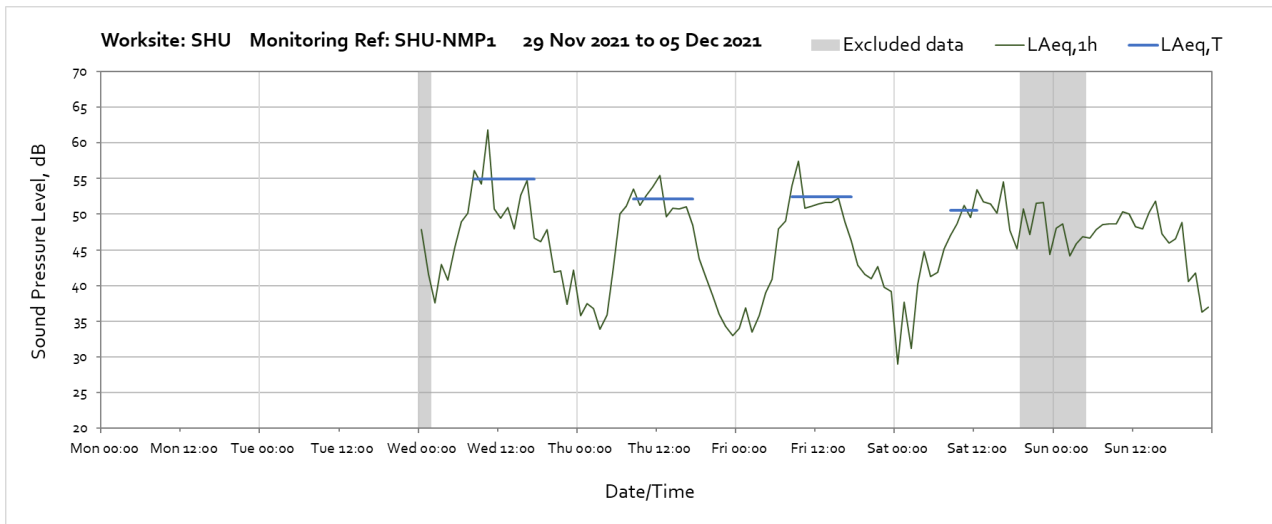
Worksite: SHC – Monitoring Ref: SHC-NMP1

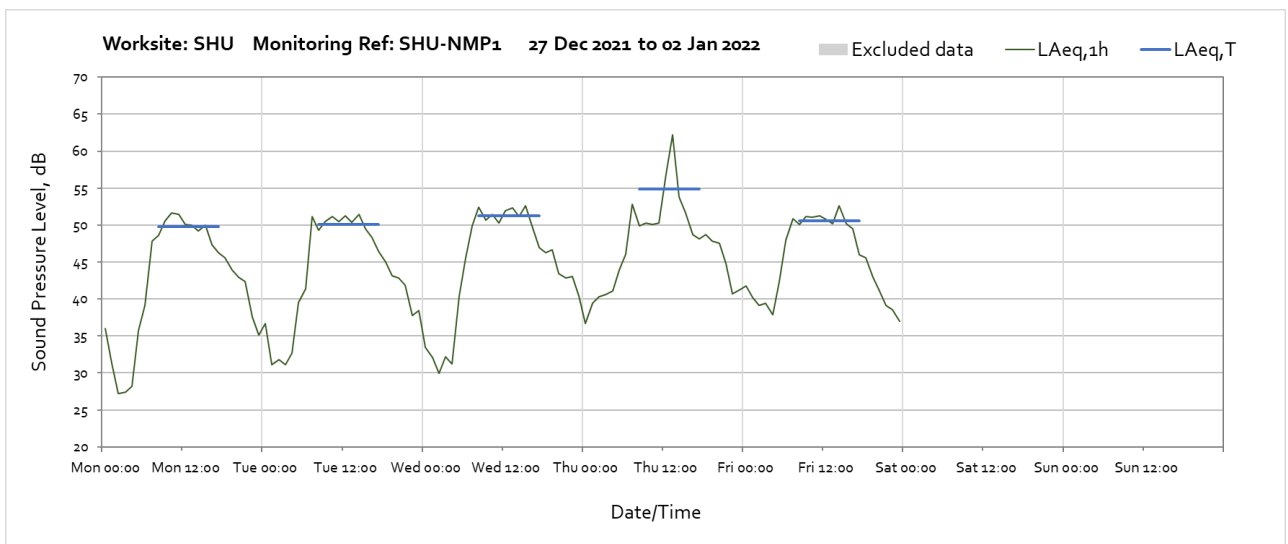
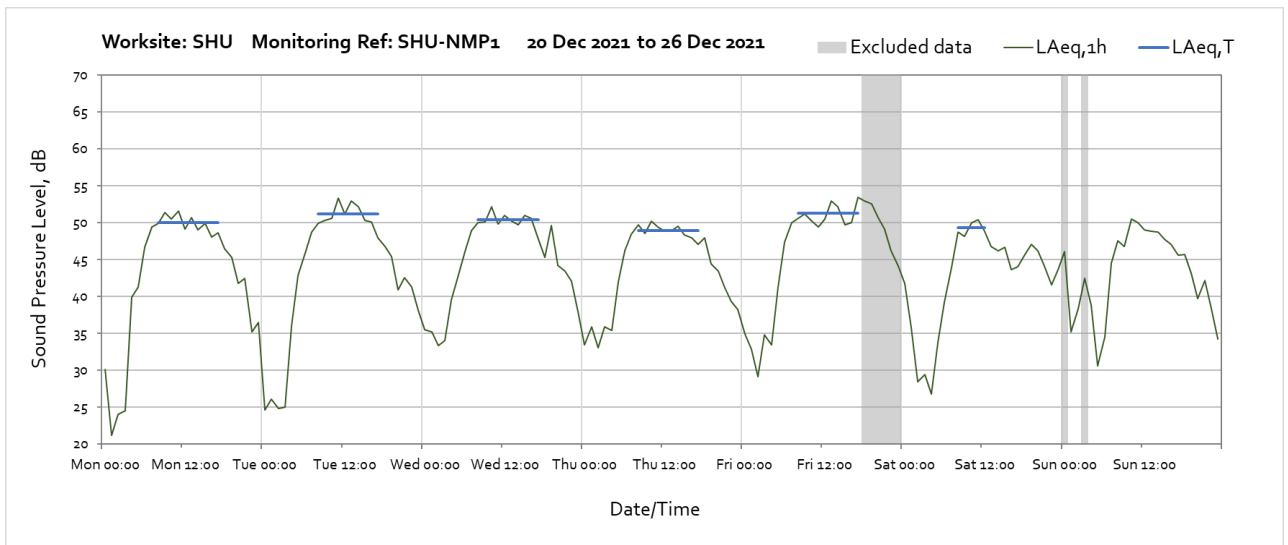
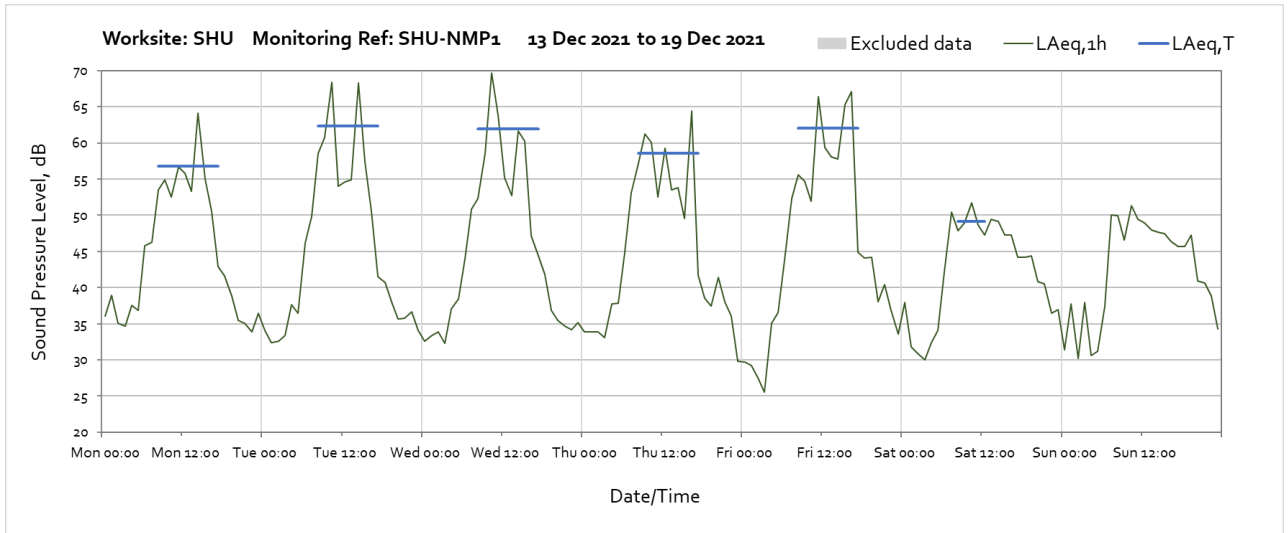




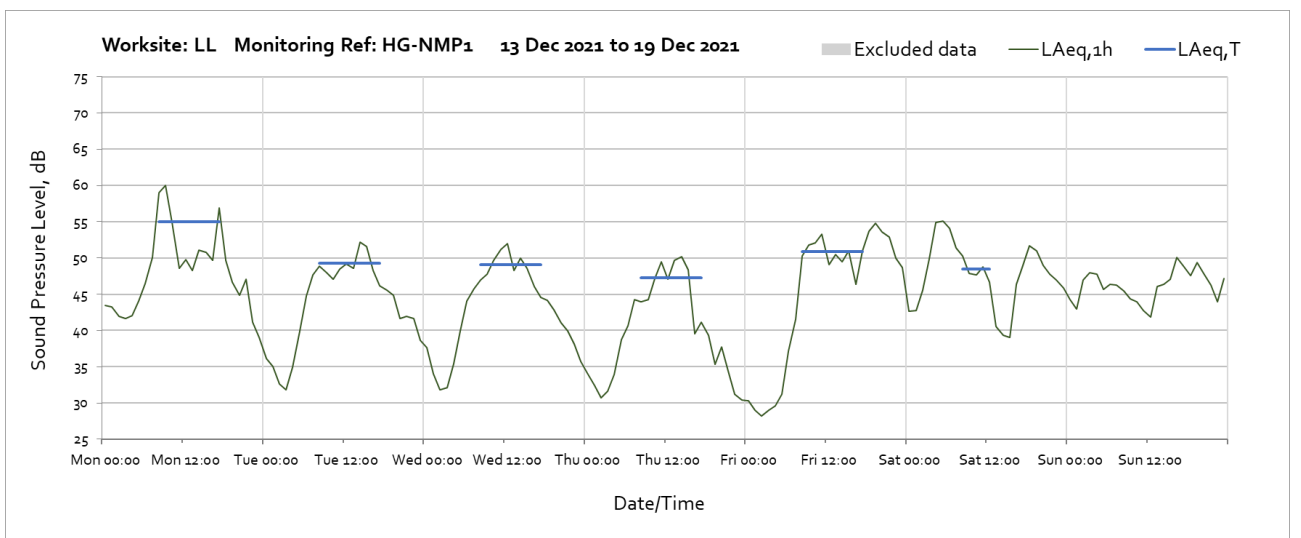
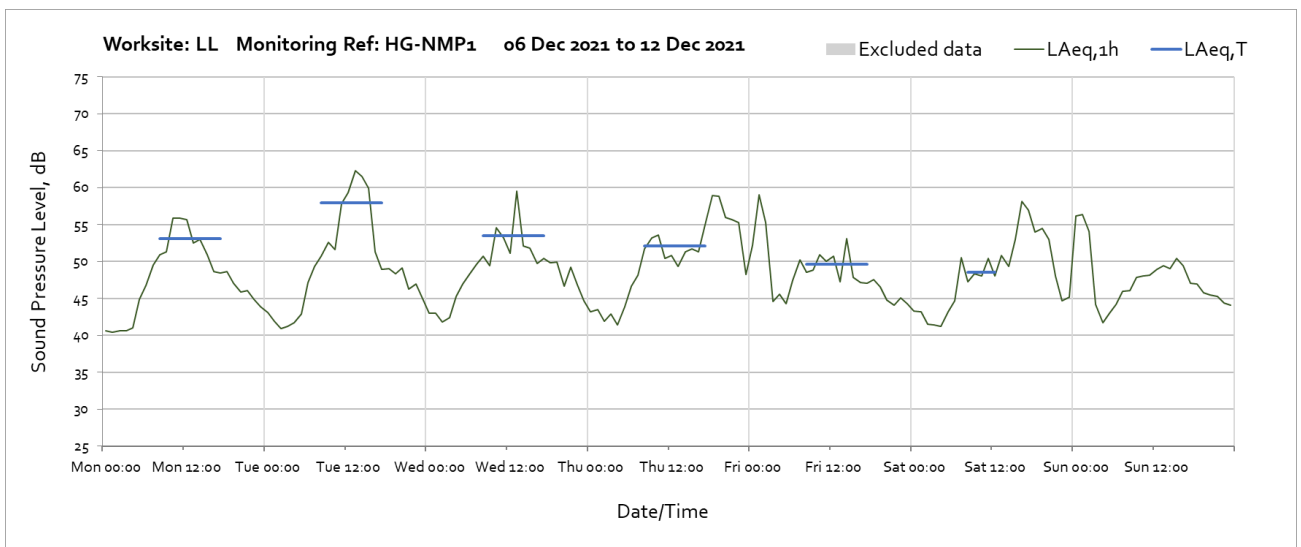
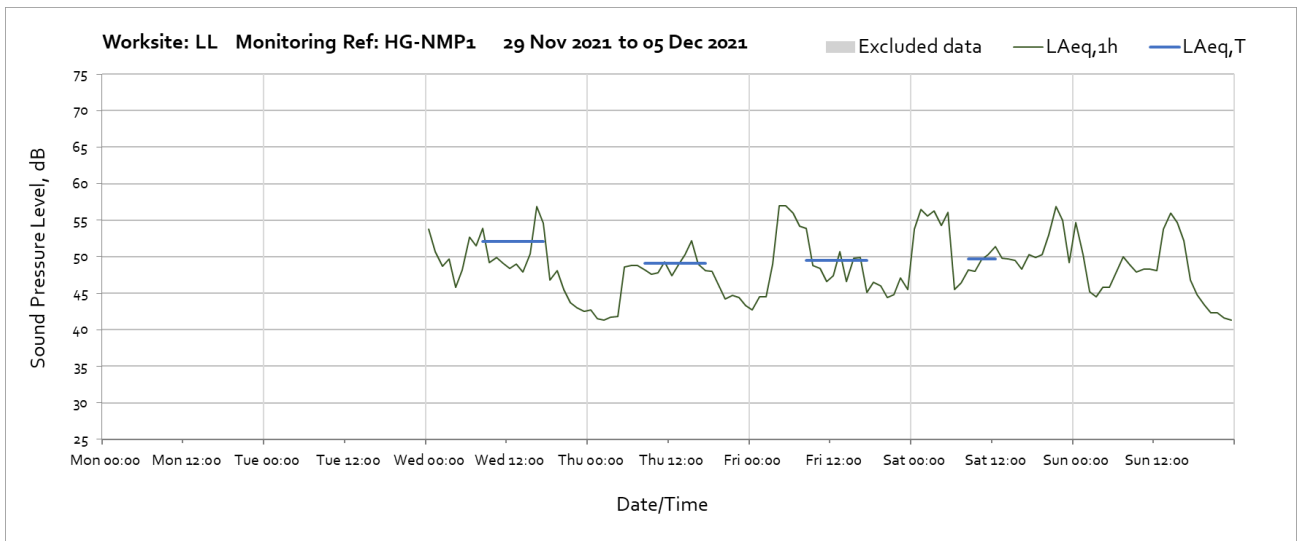


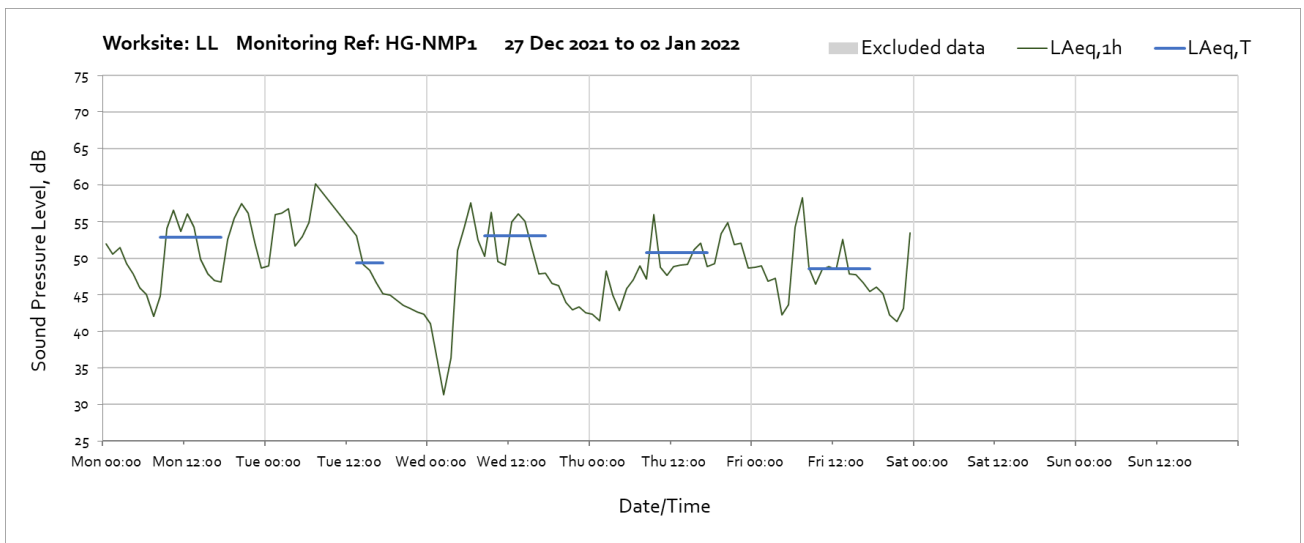
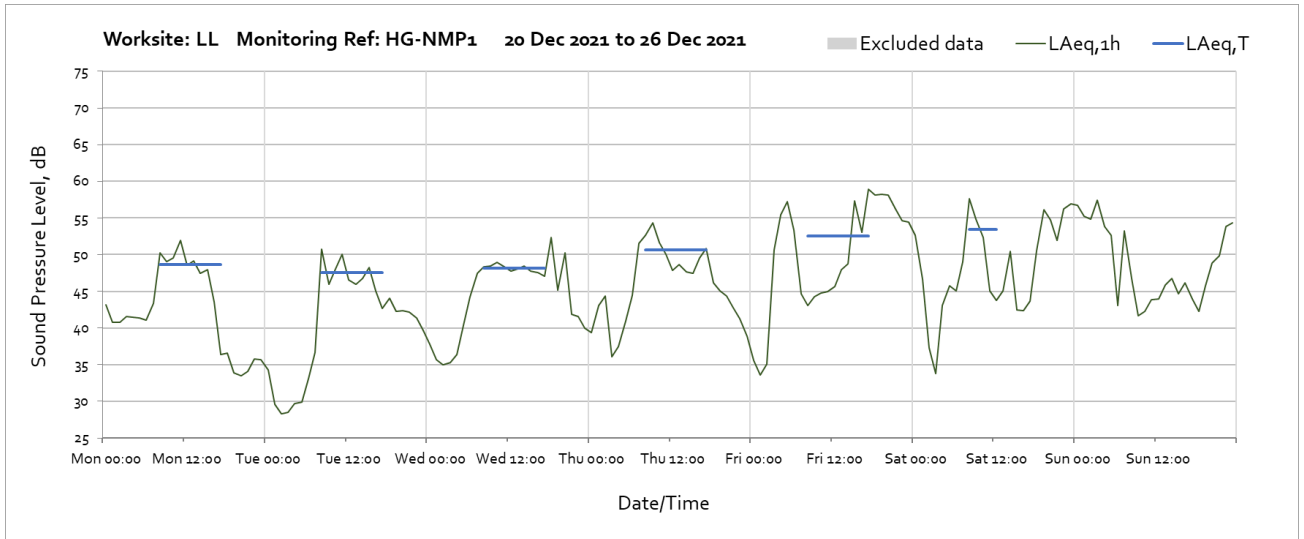
Worksite: SHU – Monitoring Ref: SHU-NMP1



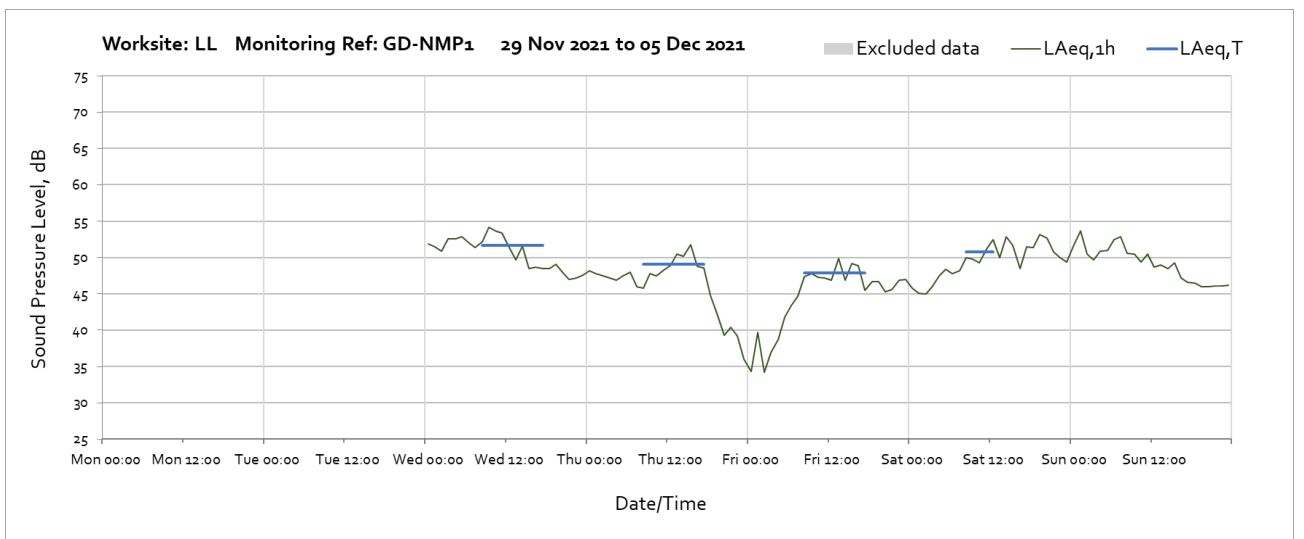


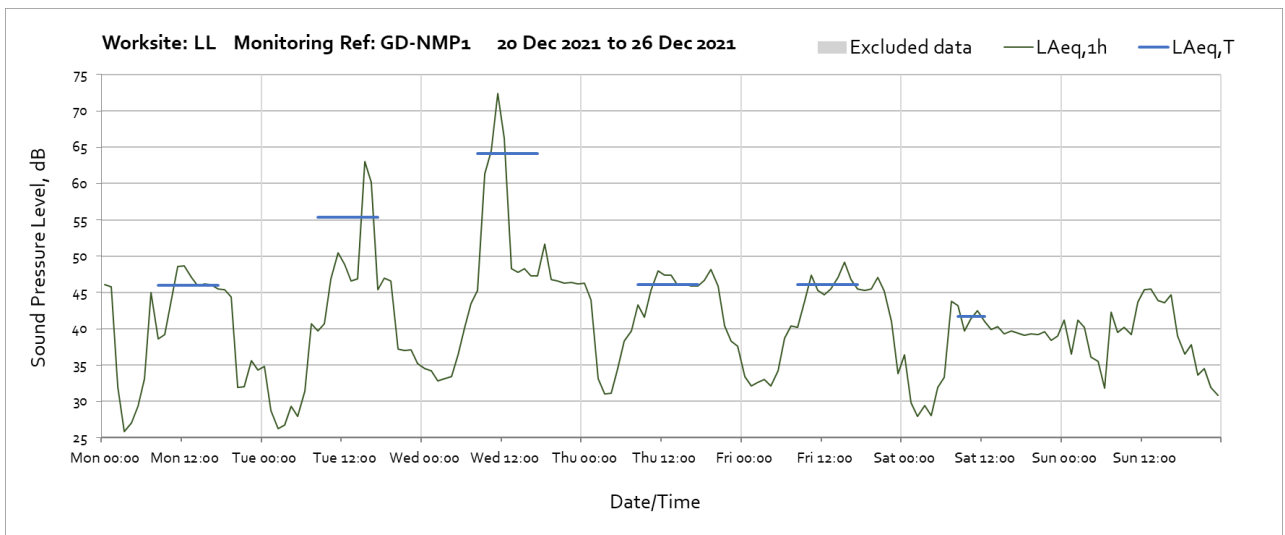
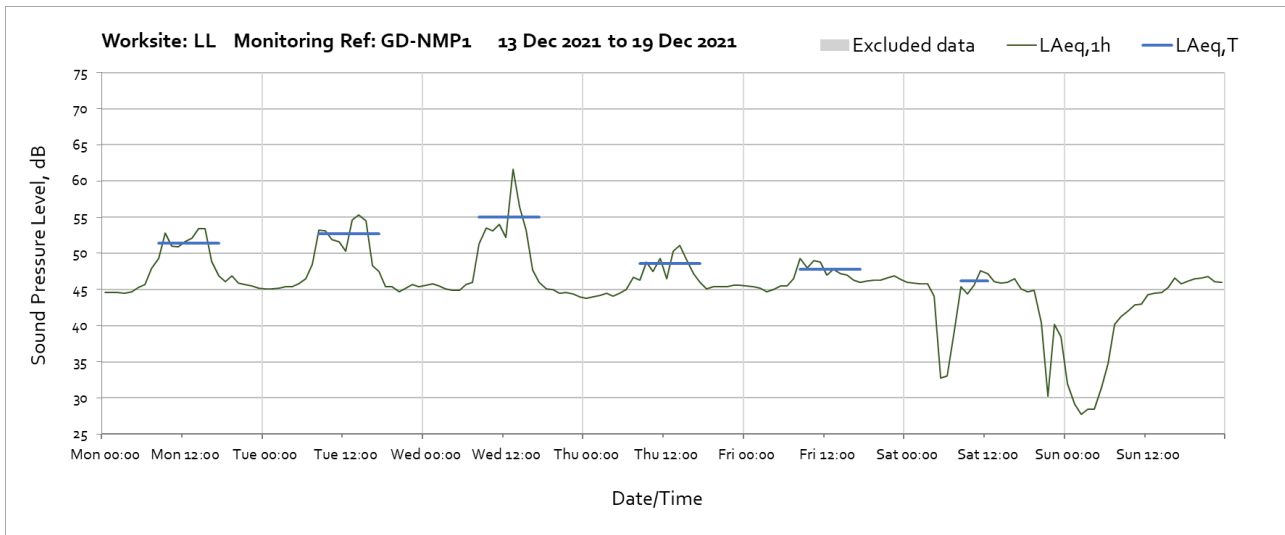
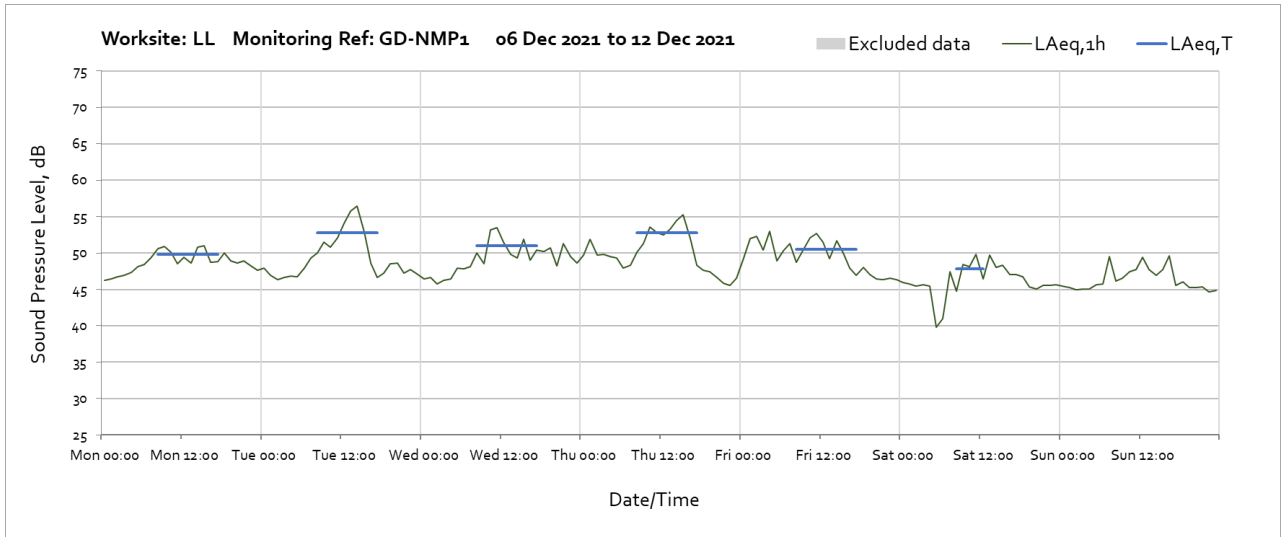
Worksite: LL - Monitoring Ref: HG-NMP1

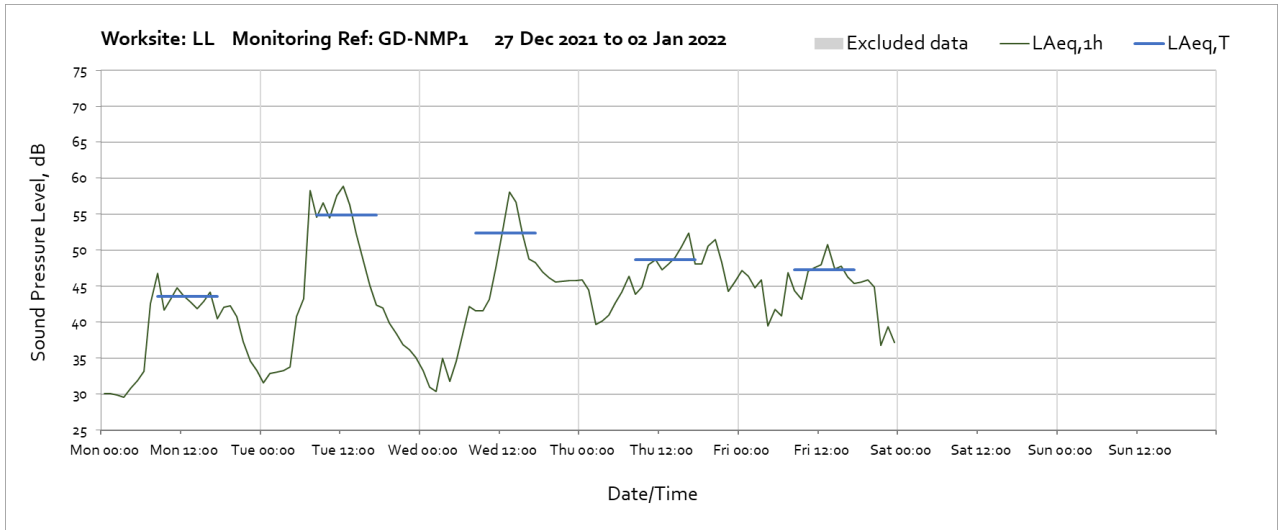




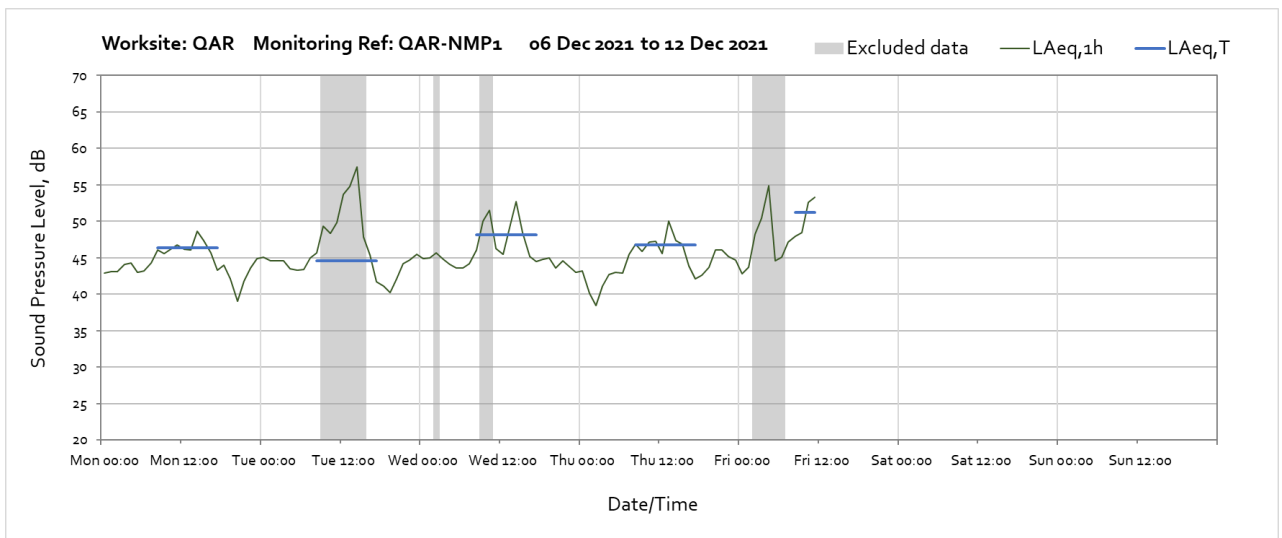
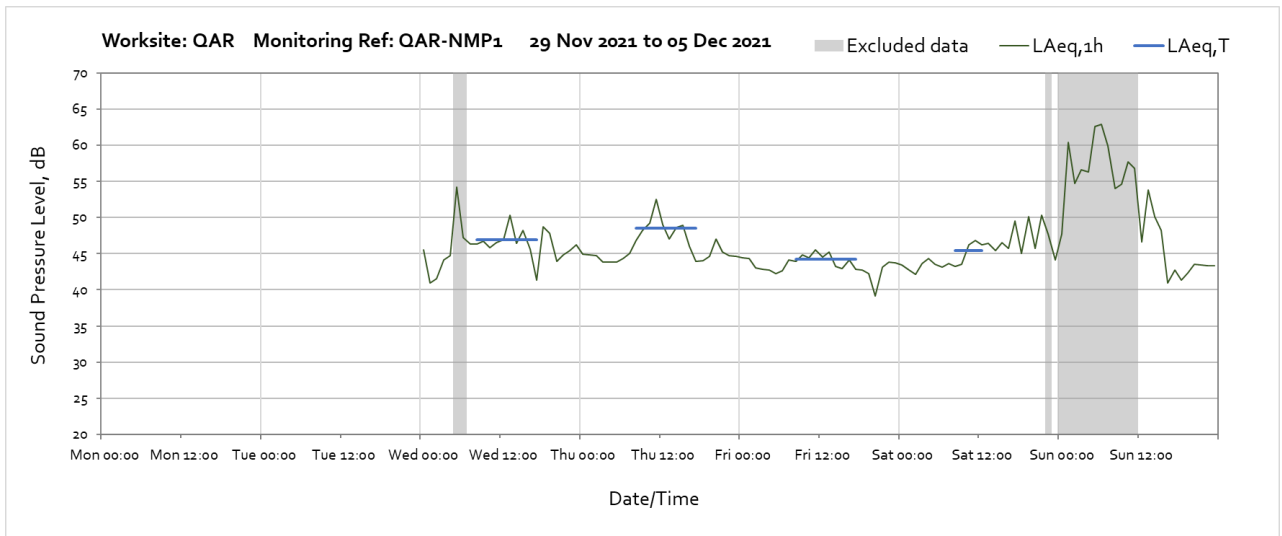
Worksite: LL - Monitoring Ref: GD-NMP1







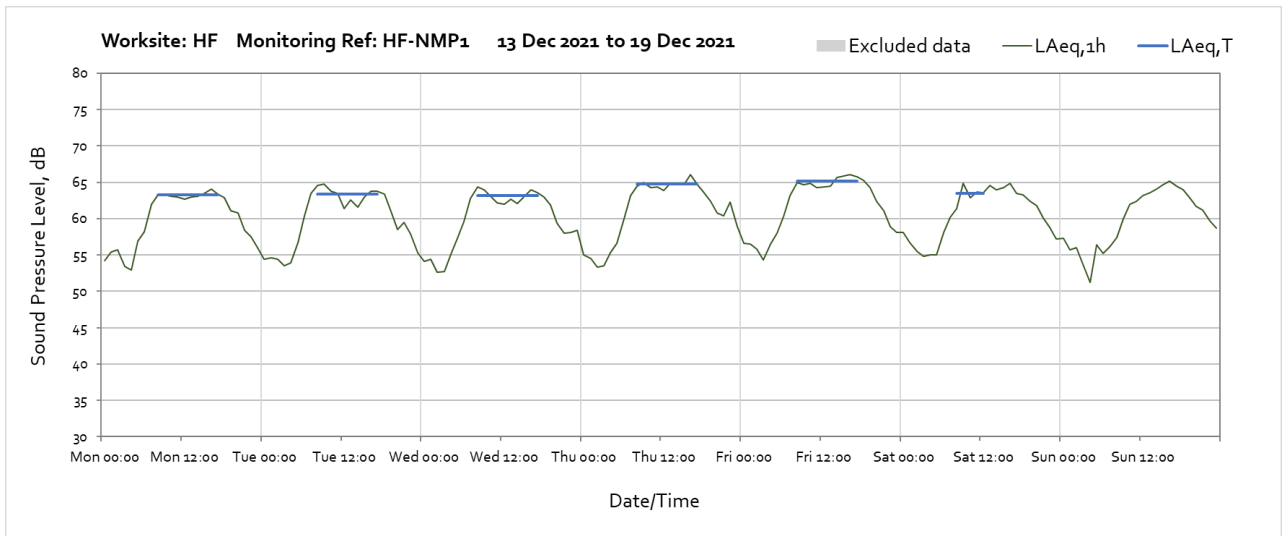
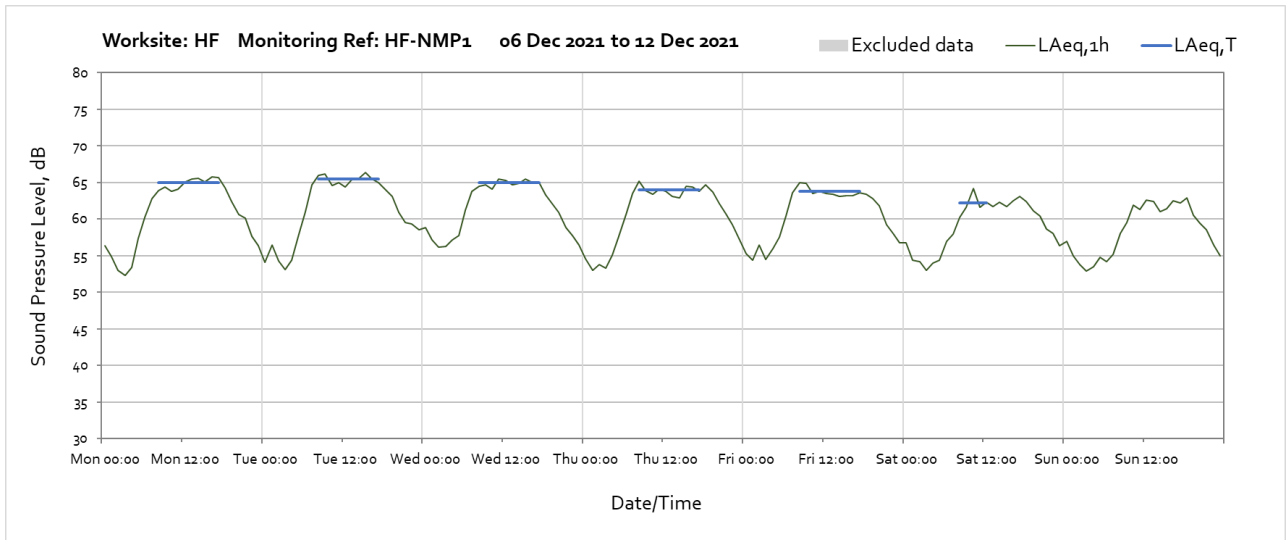
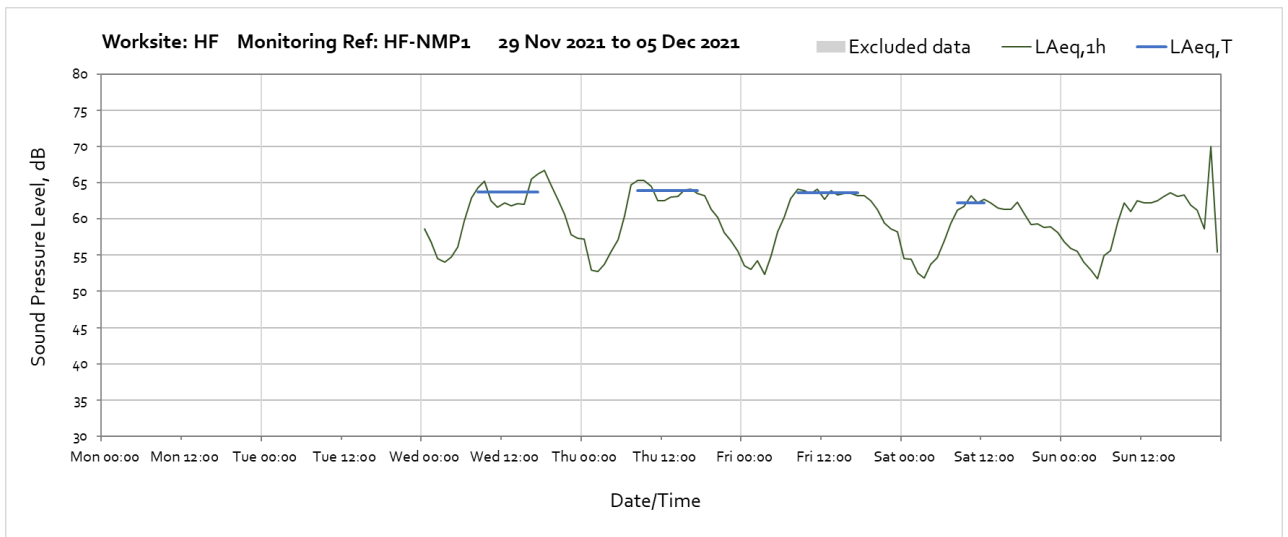
Worksite: QAR – Monitoring Ref: QAR-NMP1

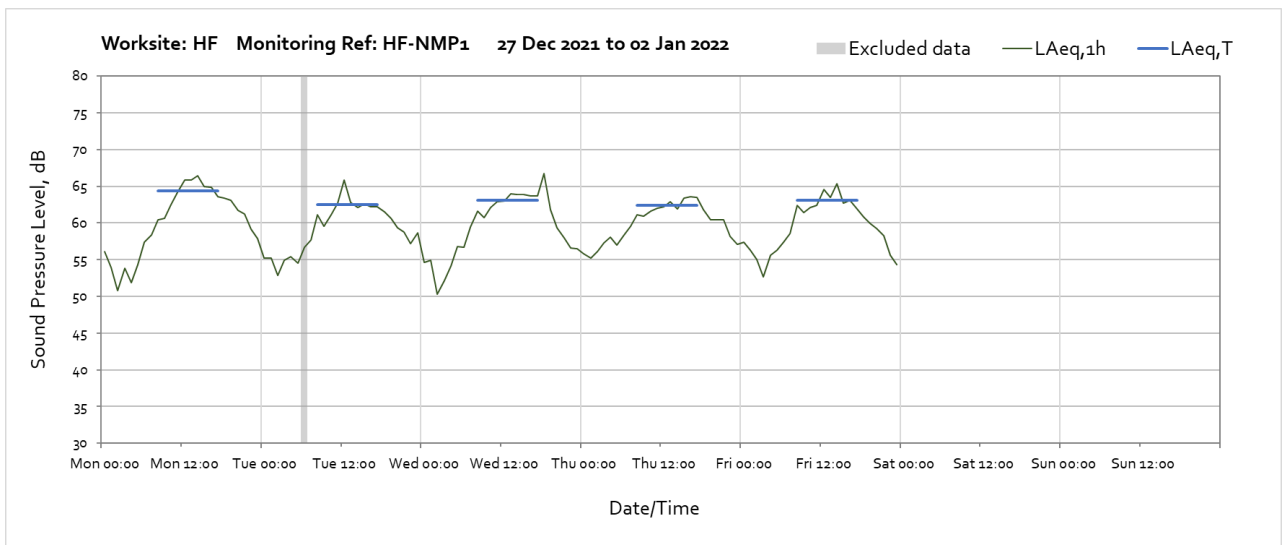
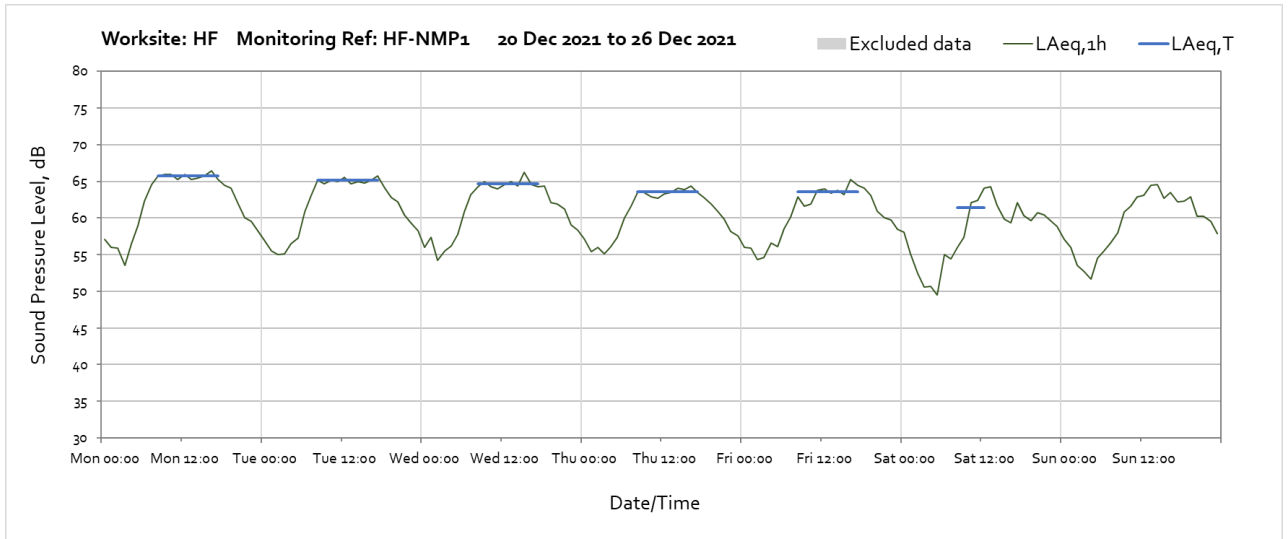


Note: Missing data from 12:00 on the 12th December was due to the monitor being removed.

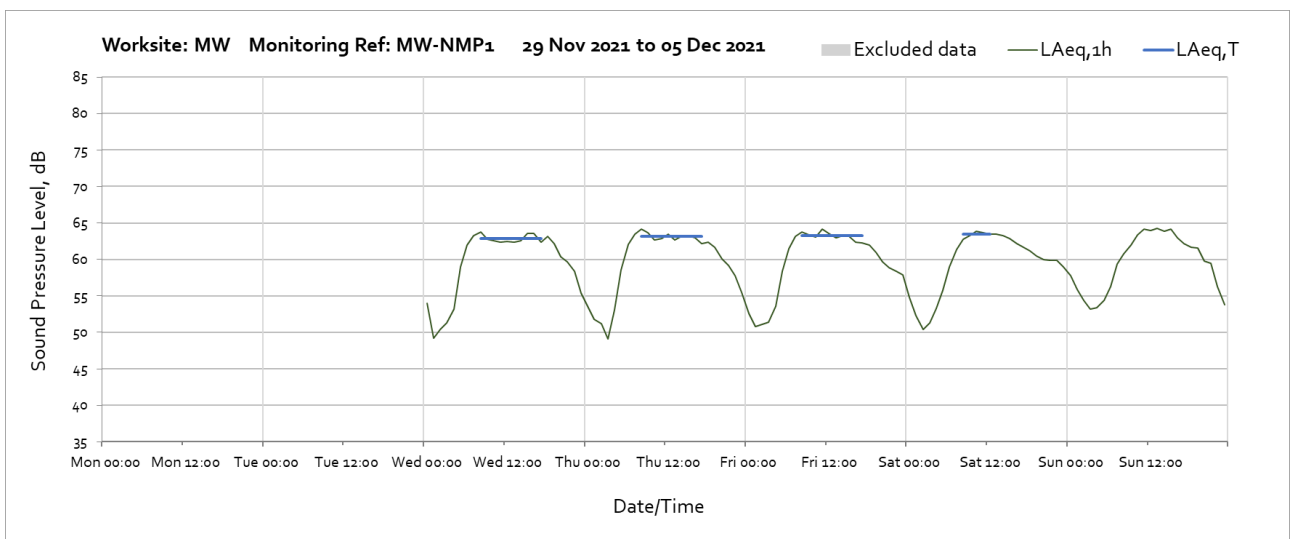
OFFICIAL

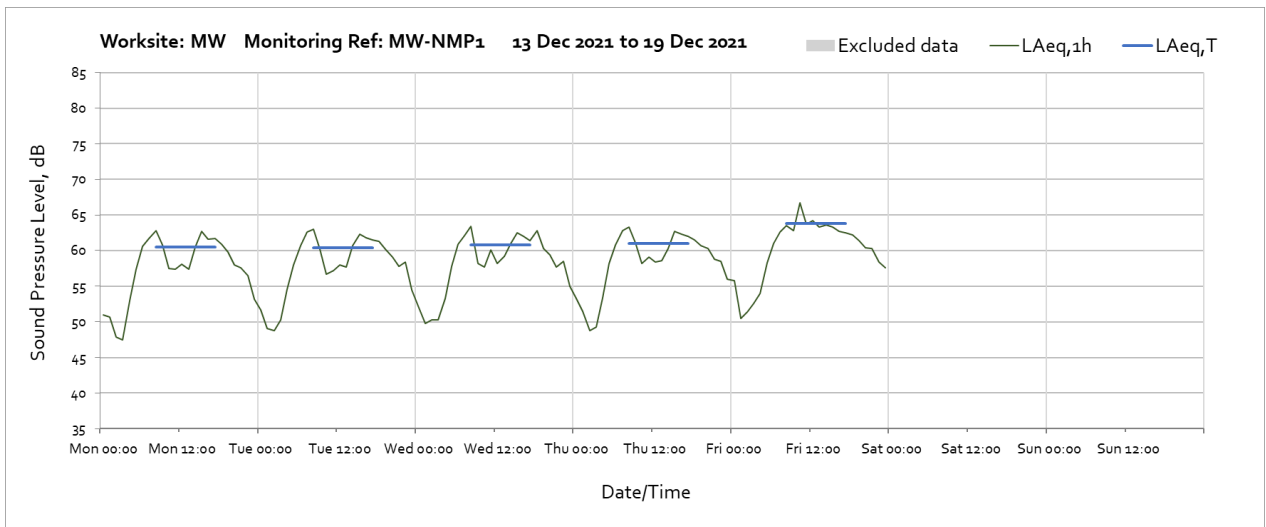
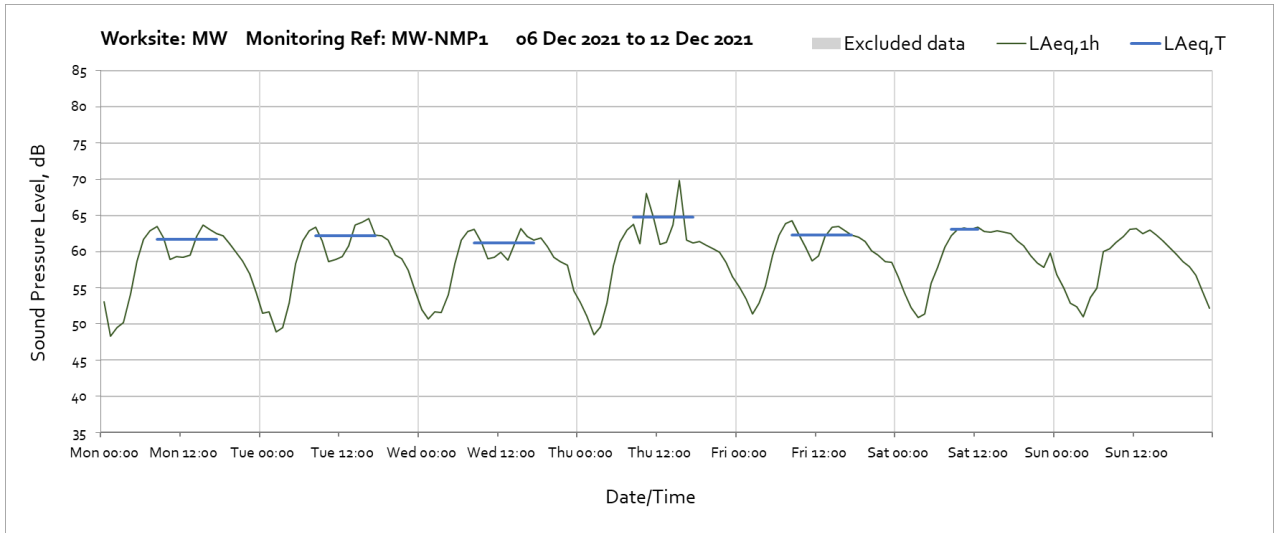
Worksite: HF - Monitoring Ref: HF-NMP1





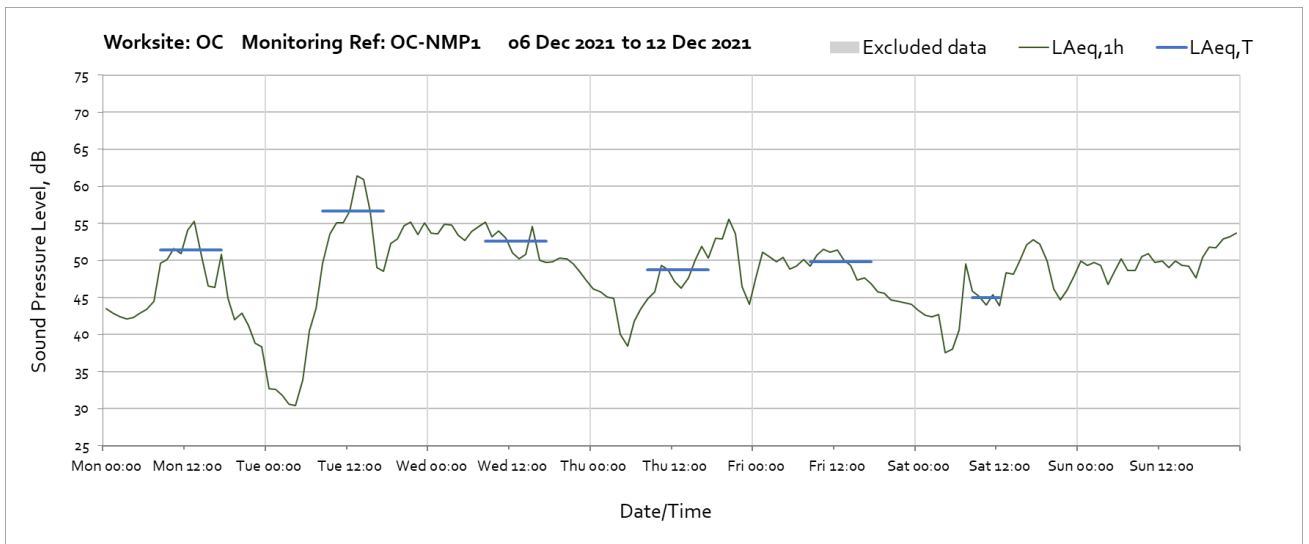
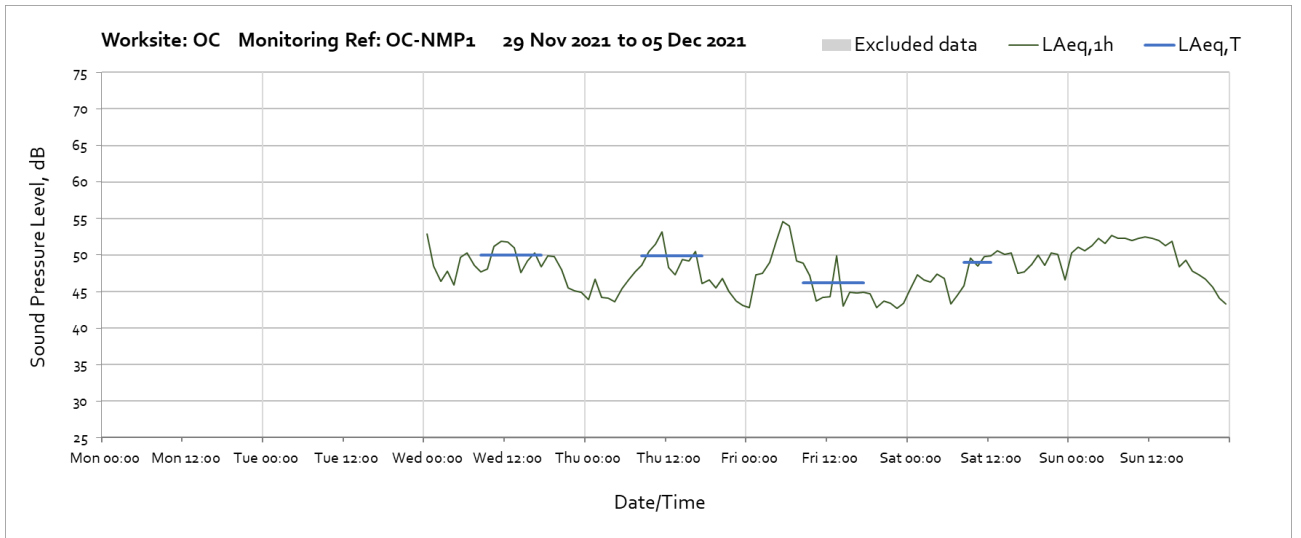
Worksite: MW – Monitoring Ref: MW-NMP1

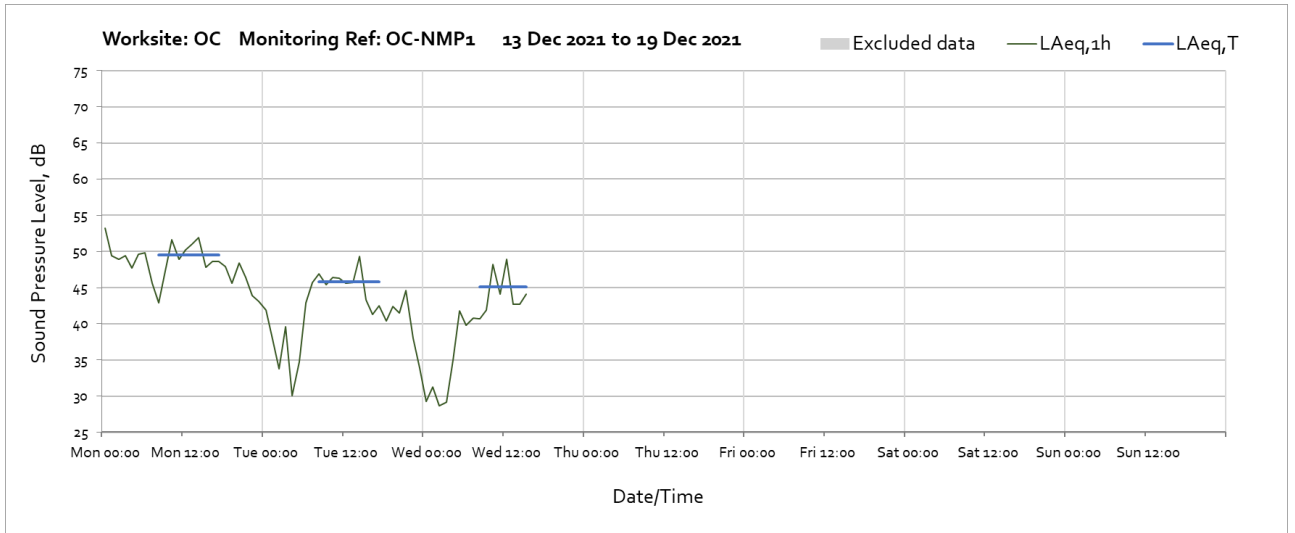




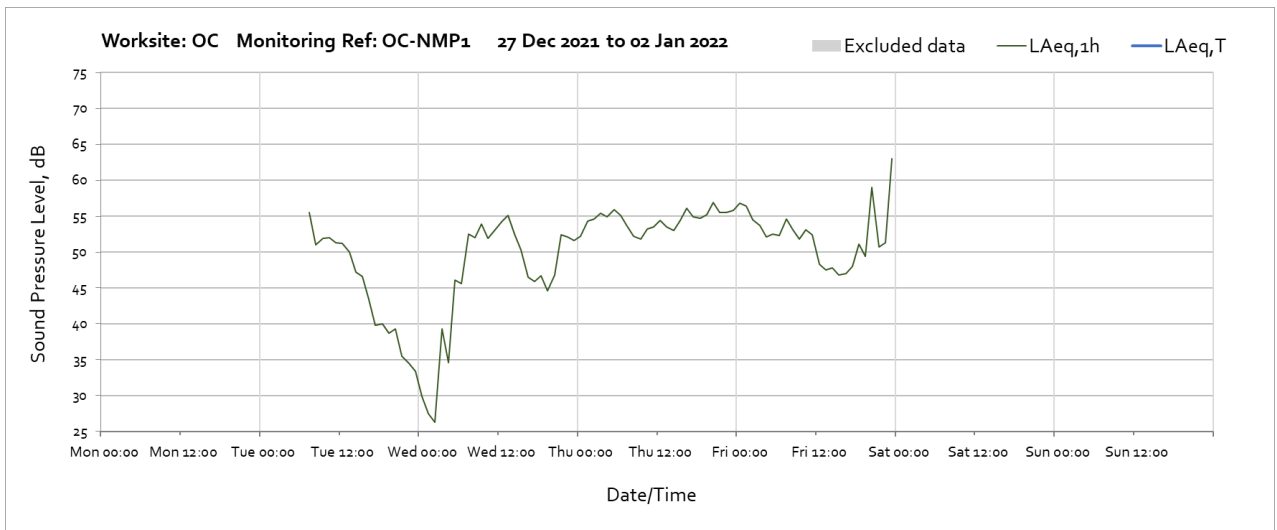
Note: Missing data from 00:00 on the 18th December till the end of December was due to technical issues from the charging controller. The battery and charge controller have now been replaced.

Worksite: OC – Monitoring Ref: OC-NMP1



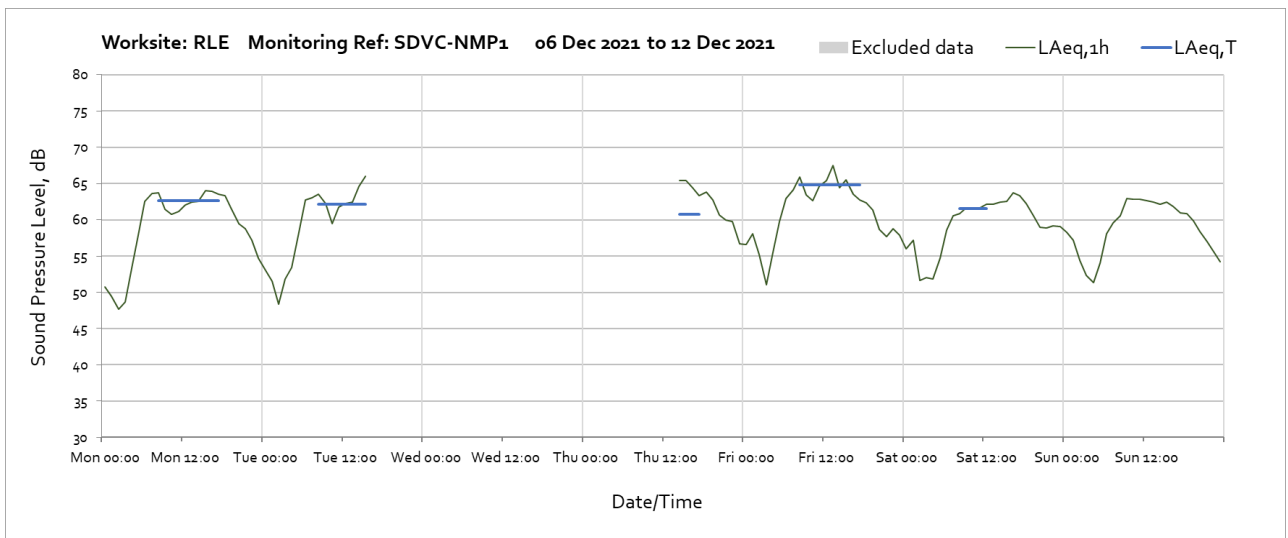
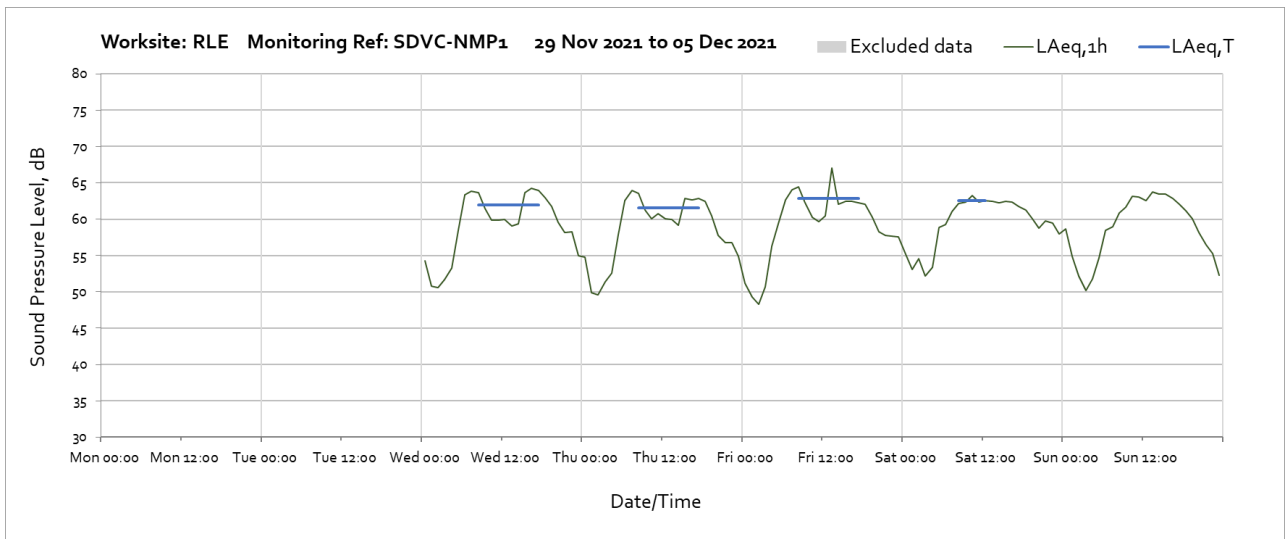


Note: Missing data between 16:00 on the 15th December and 07:00 on the 28th December was due to loss of power to the monitor. Inspection is taking place to ensure this does not happen again.

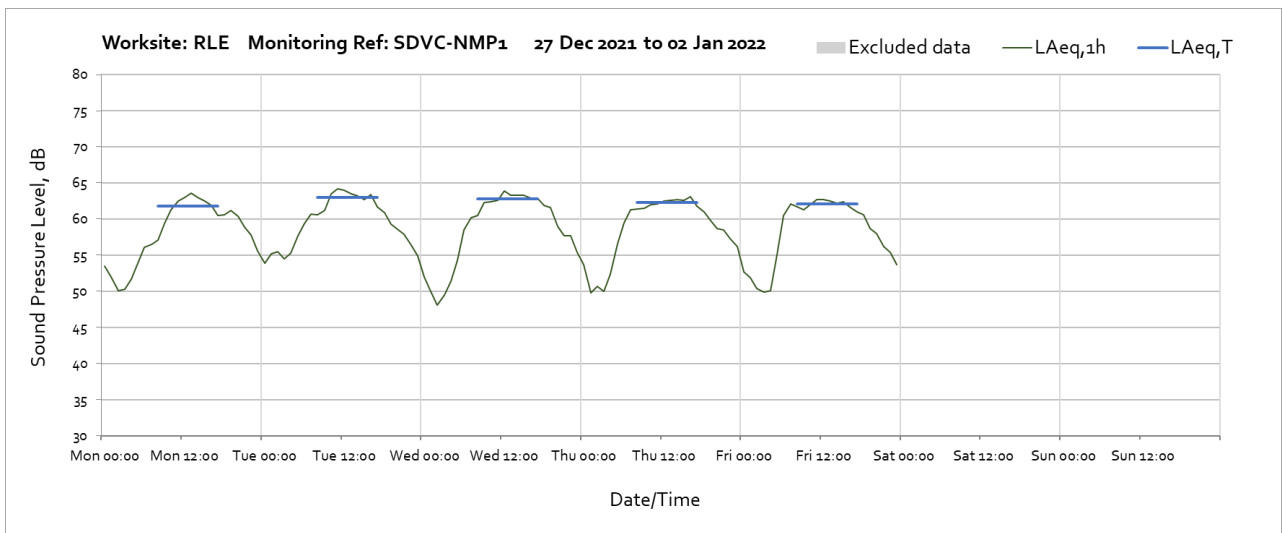
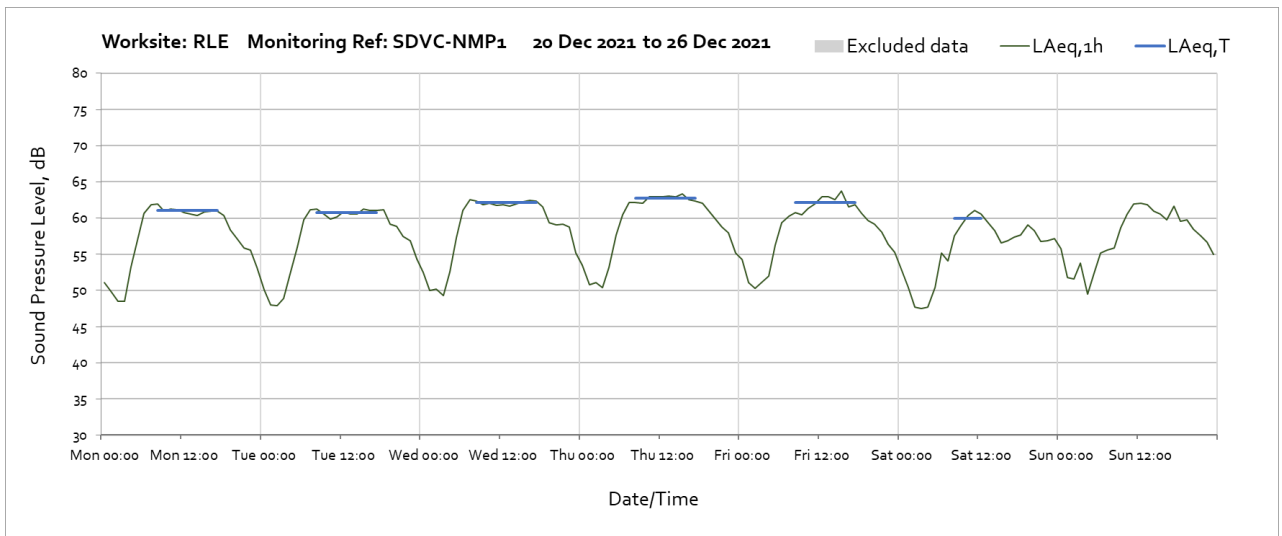
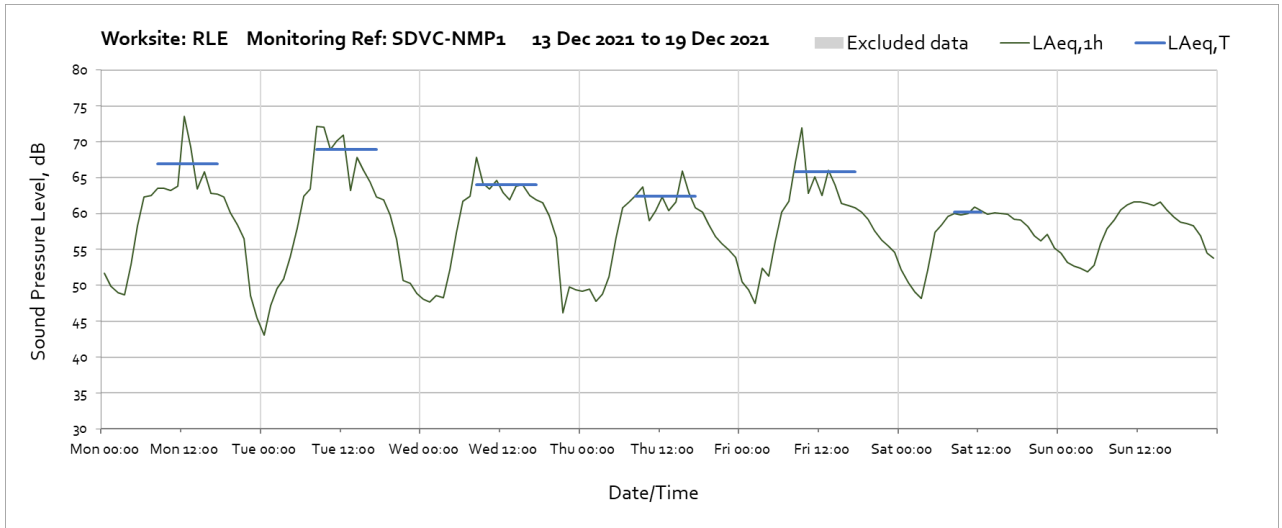


Note: Missing data between 16:00 on the 15th December and 07:00 on the 28th December was due to loss of power to the monitor. Inspection is taking place to ensure this does not happen again.

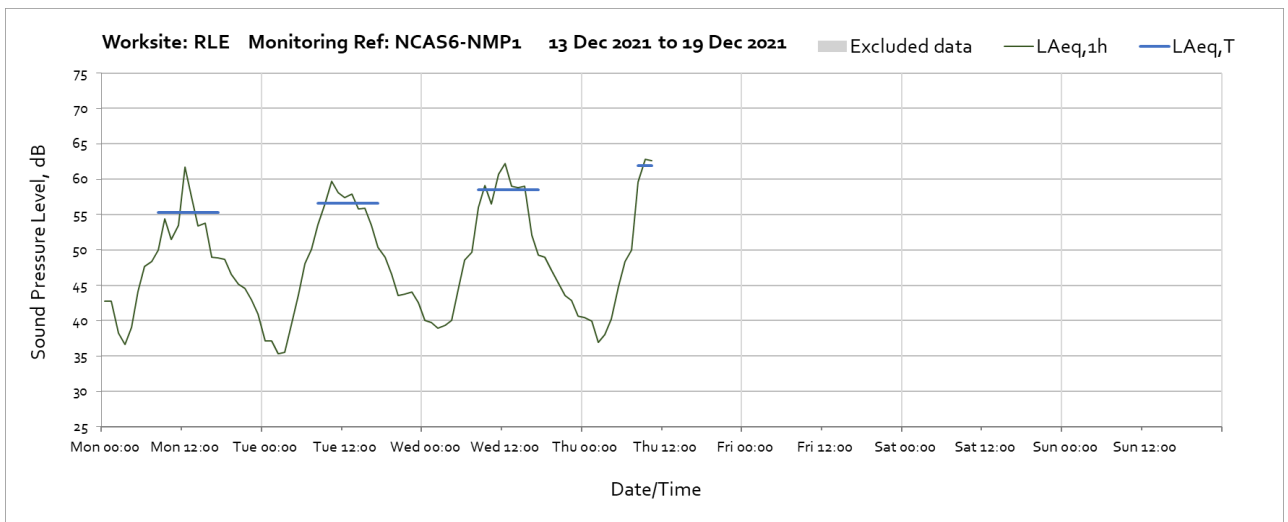
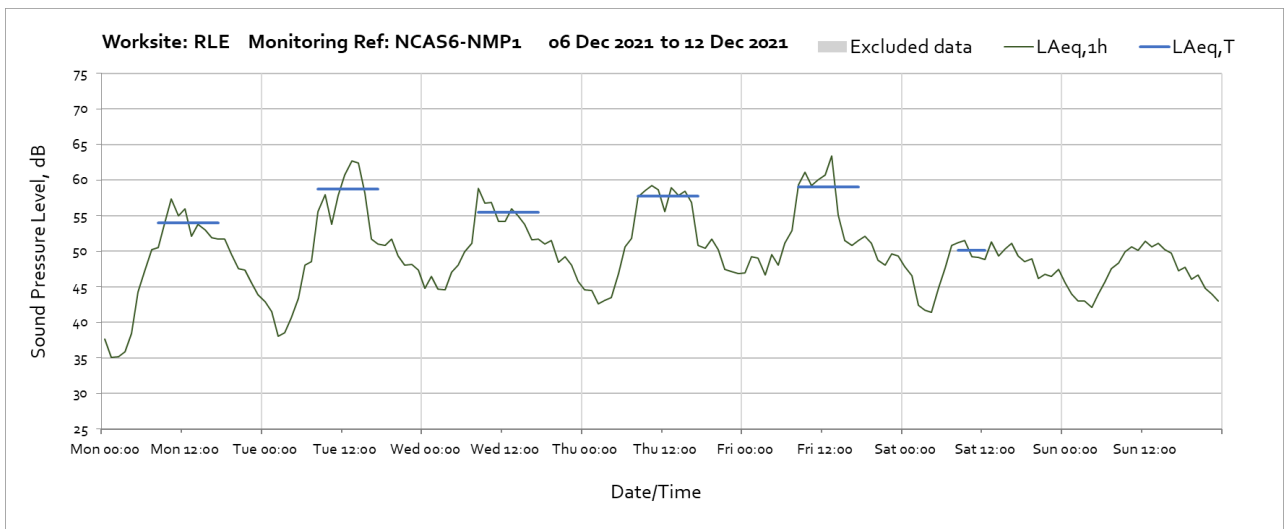
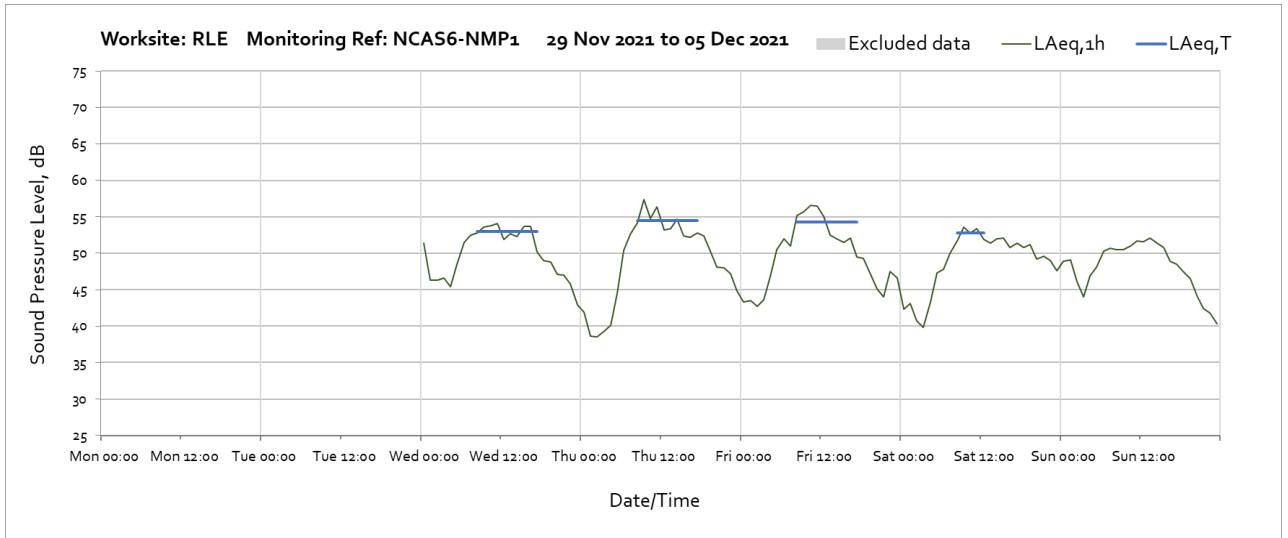
Worksite: RLE – Monitoring Ref: SDVC-NMP1



Note: Missing data between 16:00 on the 7th December and 14:00 on the 9th December was due to loss of solar power because of lack of sunlight and no wind turbine power source. Wind turbine power source will be installed soon to prevent issue occurring again.

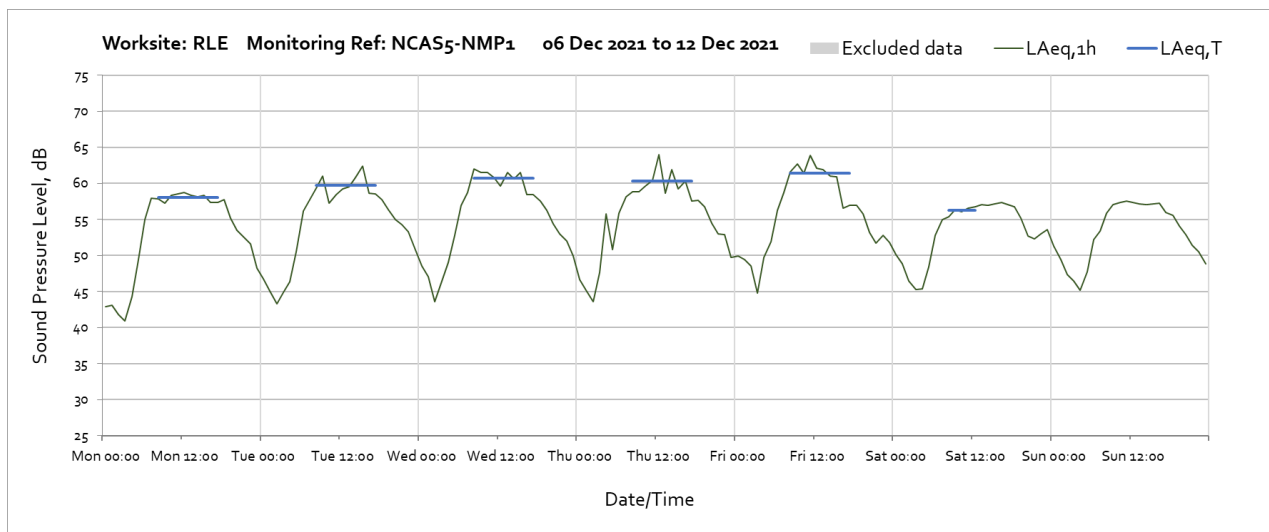
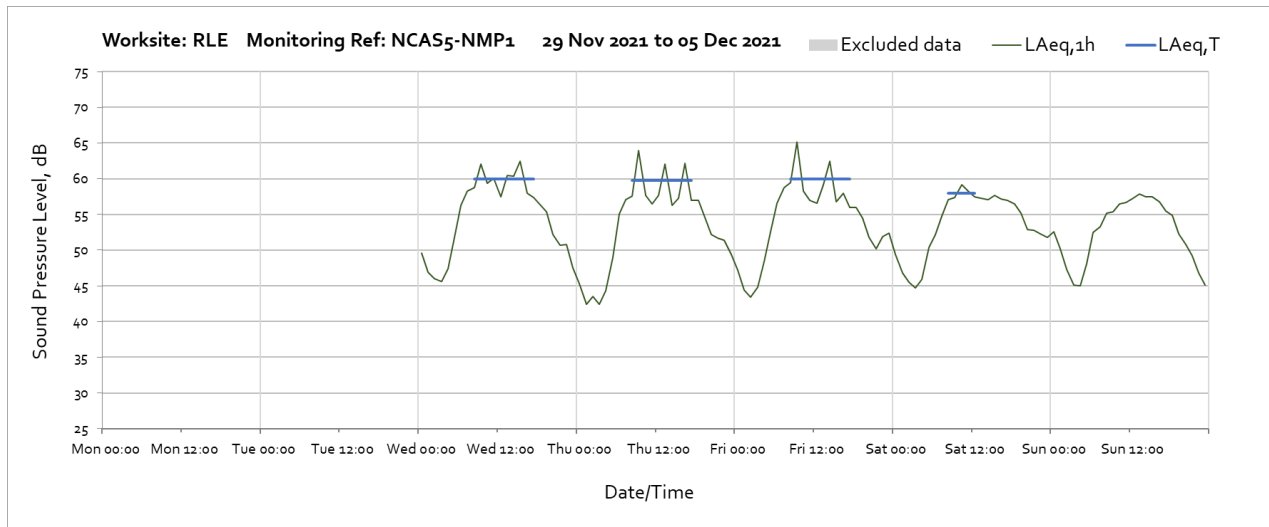


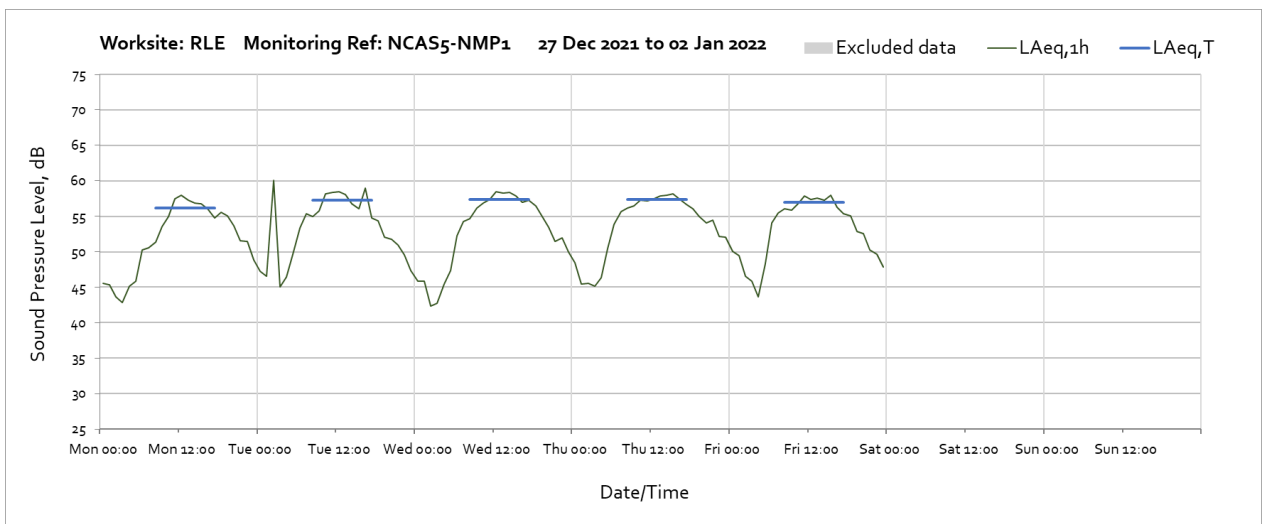
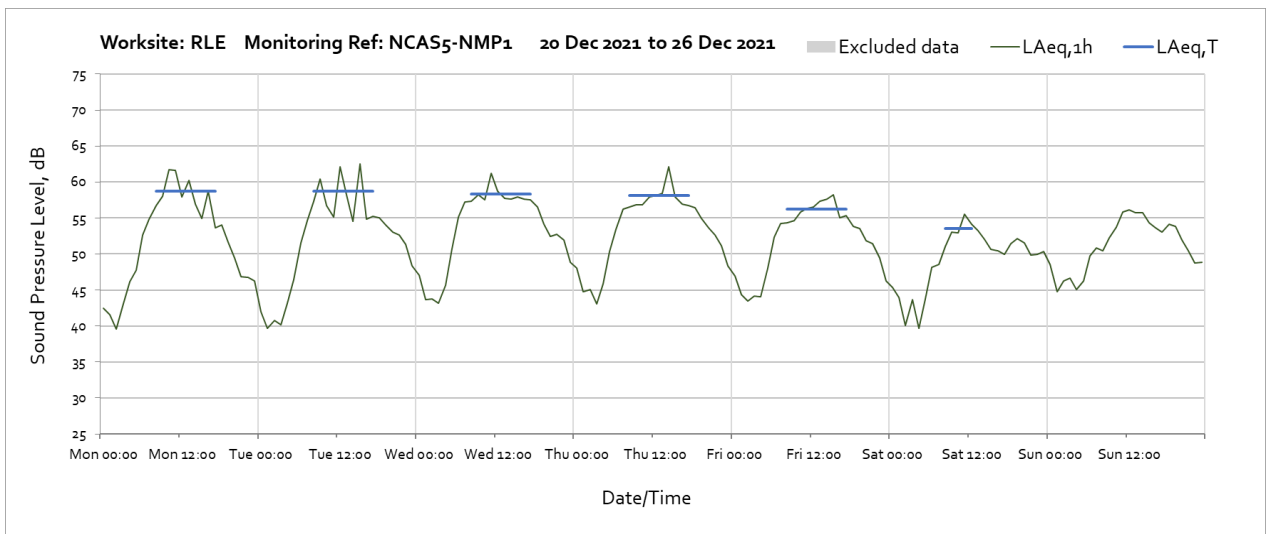
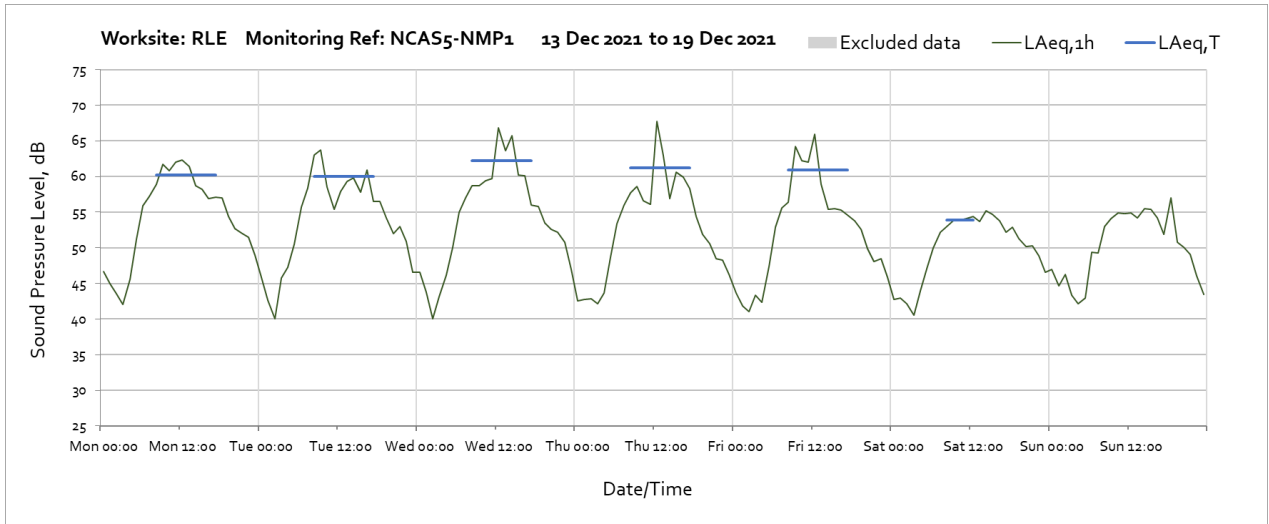
Worksite: RLE - Monitoring Ref: NCAS6-NMP1



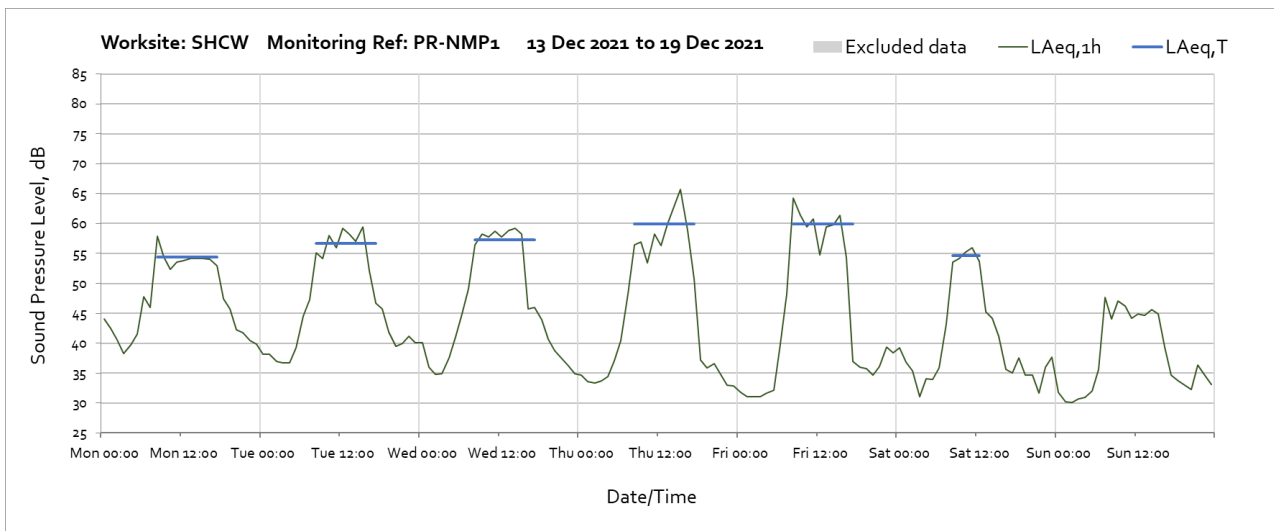
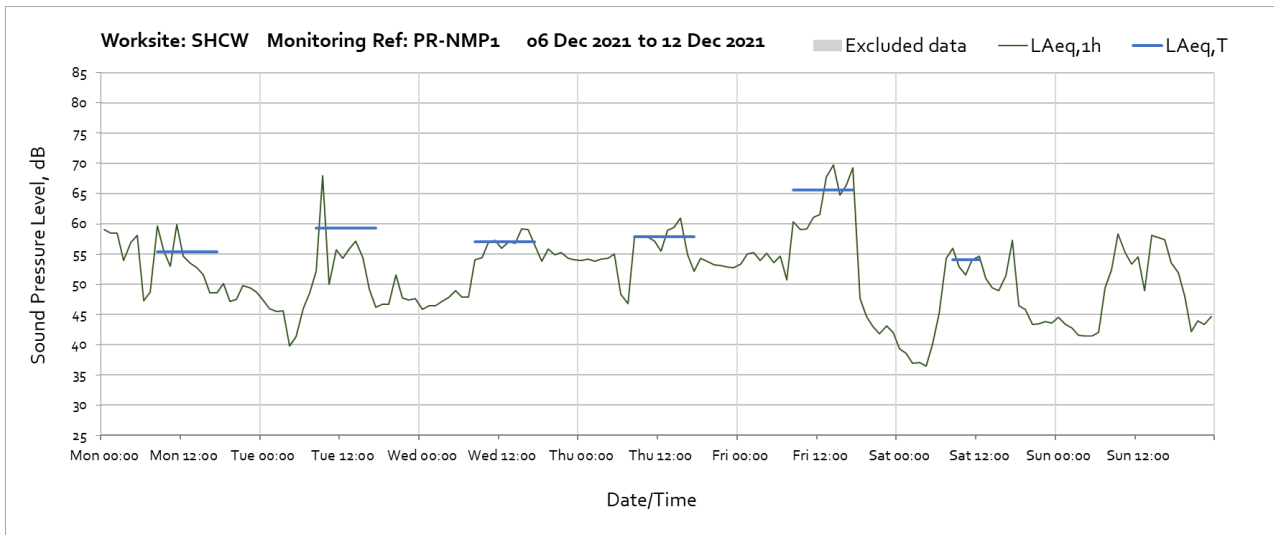
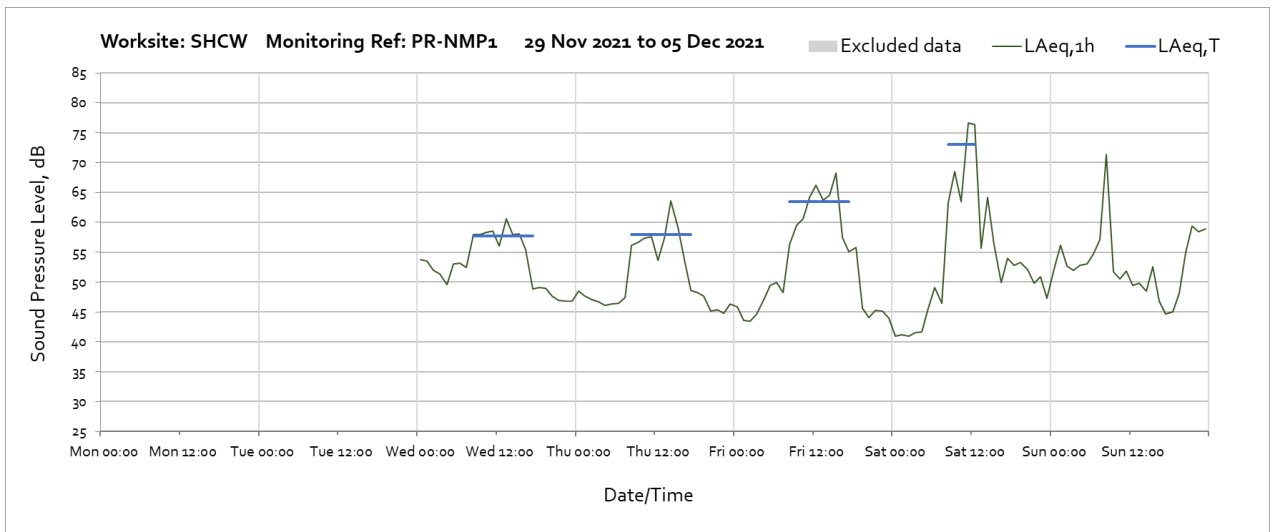
Note: Missing data from 11:00 on the 16th December till the end of December was due to loss of solar power because of lack of sunlight and no wind turbine power source. Wind turbine power source will be installed soon to prevent issue occurring again.

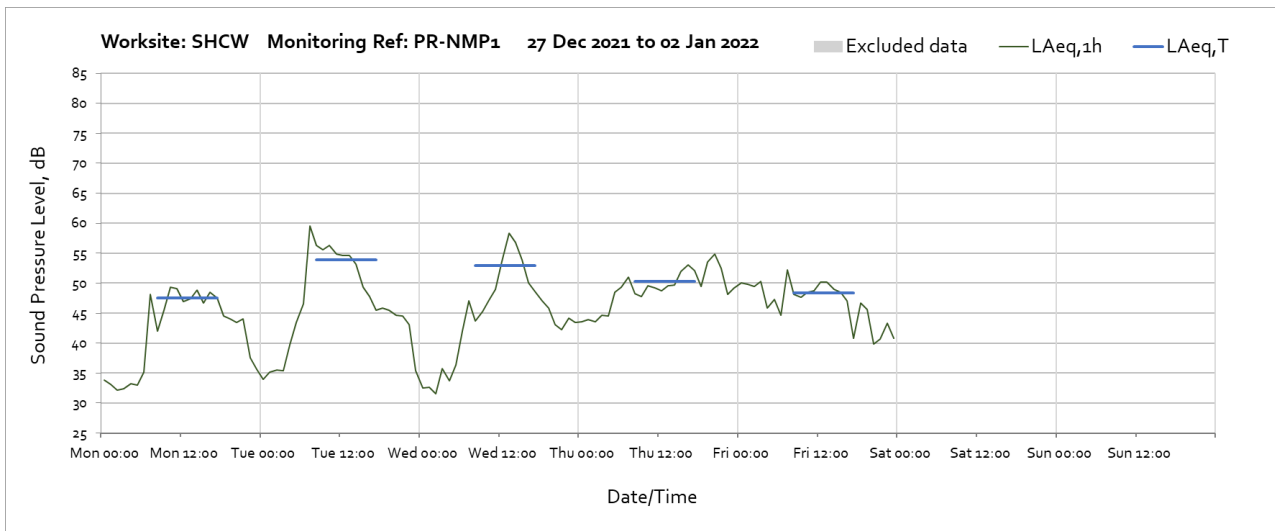
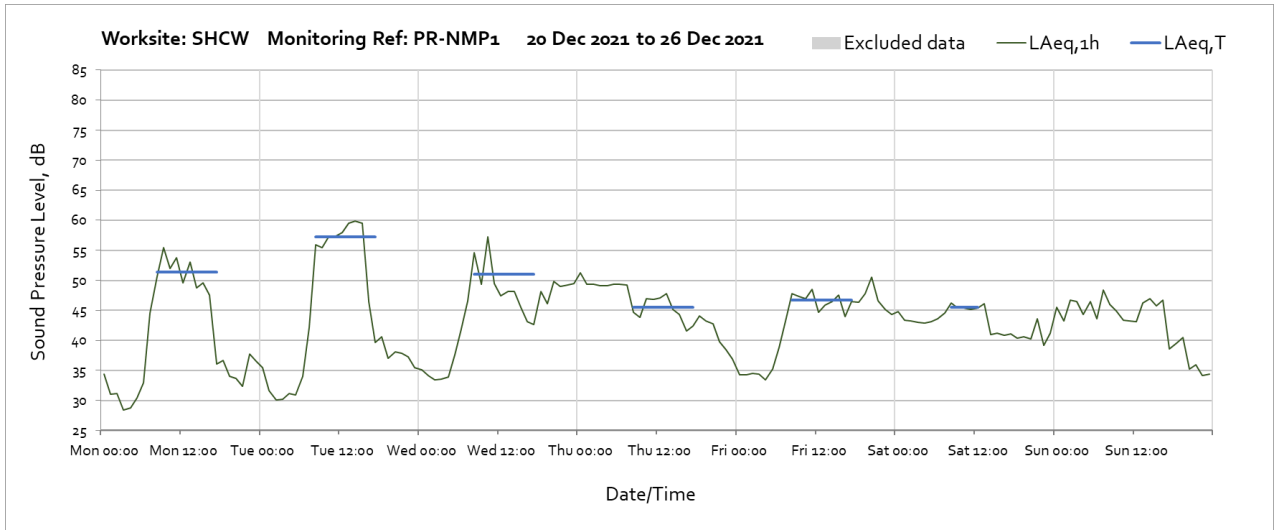
Worksite: RLE – Monitoring Ref: NCAS5-NMP1



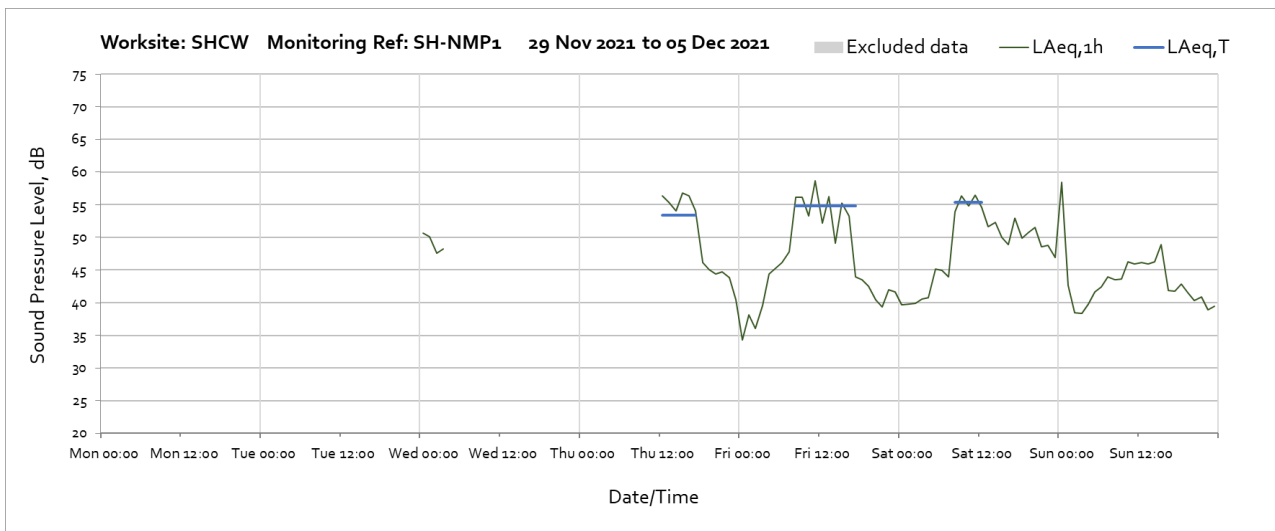


Worksite: SHCW – Monitoring Ref: PR-NMP1

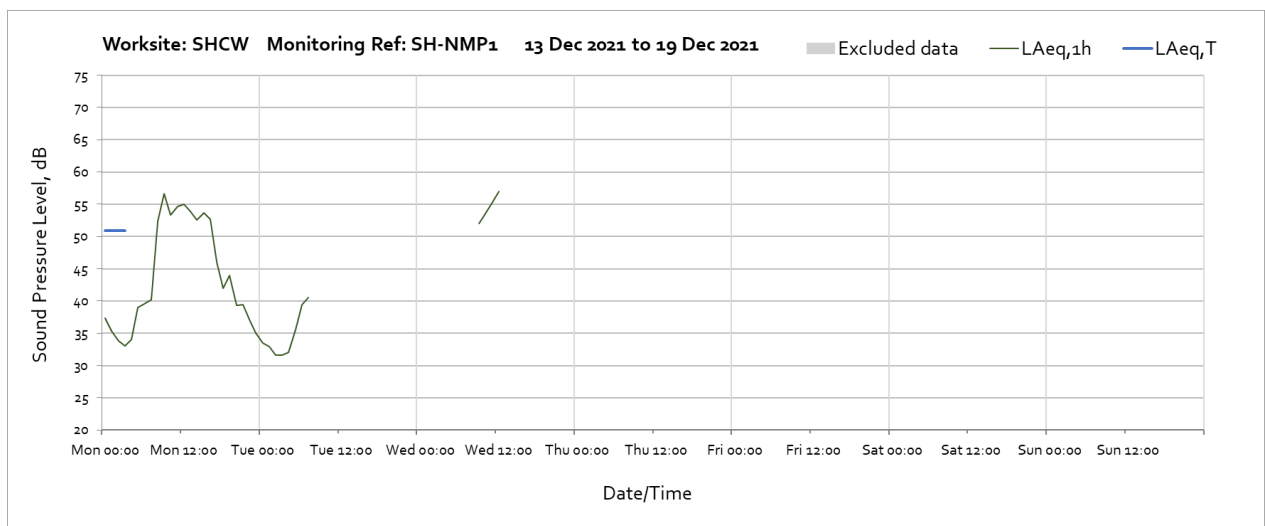
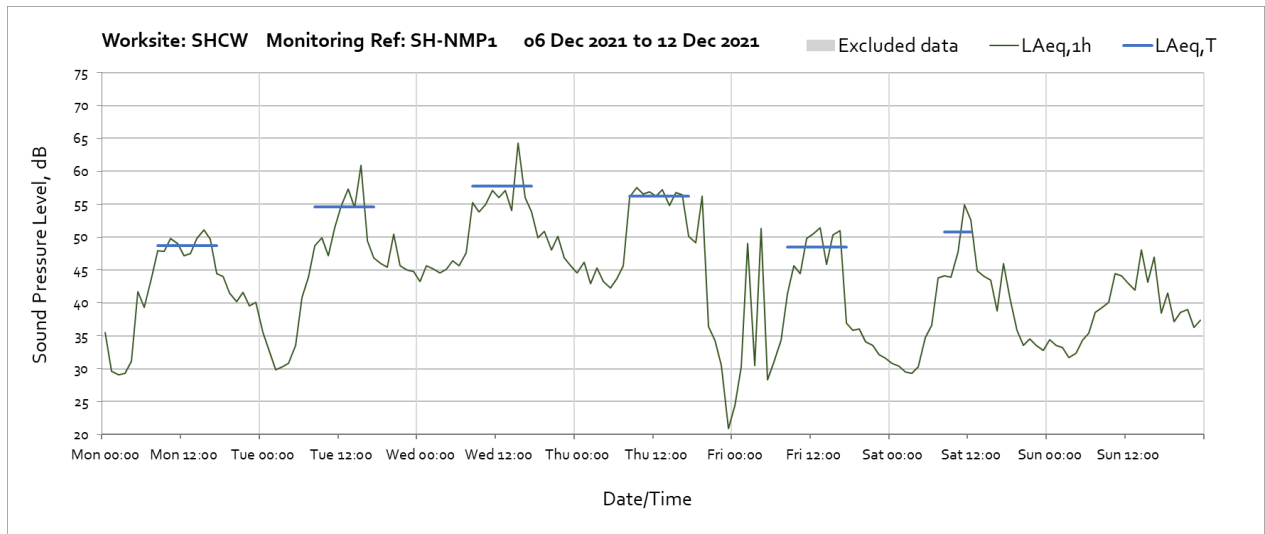




Worksite: SHCW - Monitoring Ref: SH-NMP1

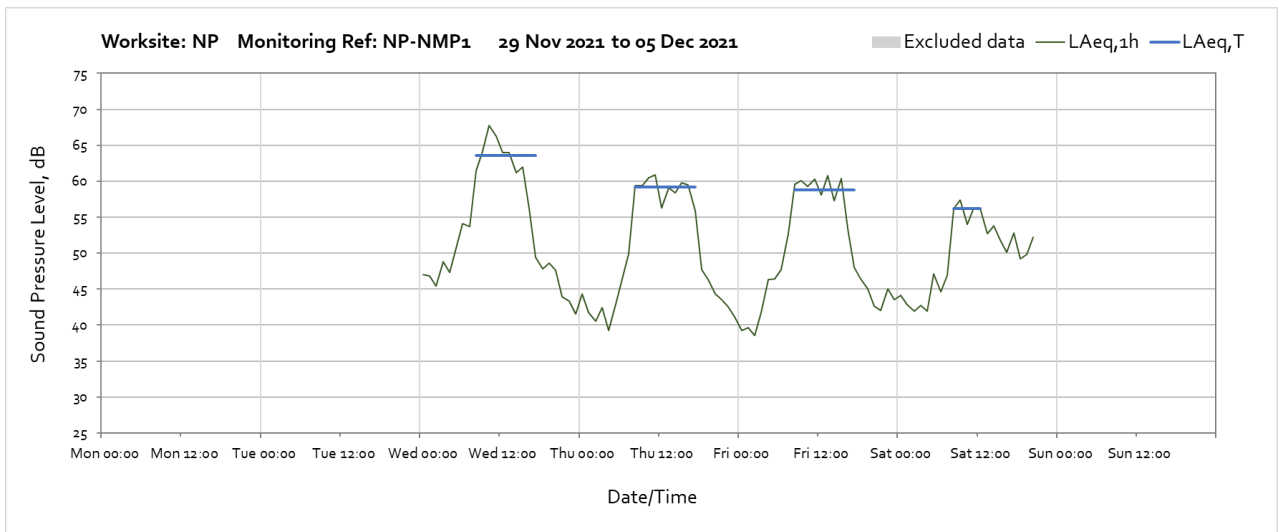


Note: Missing data between 04:00 on the 1st December until 12:00 on the 2nd December was due to loss of solar power because of lack of sunlight and no wind turbine power source. Wind turbine power source will be installed soon to prevent issue occurring again.

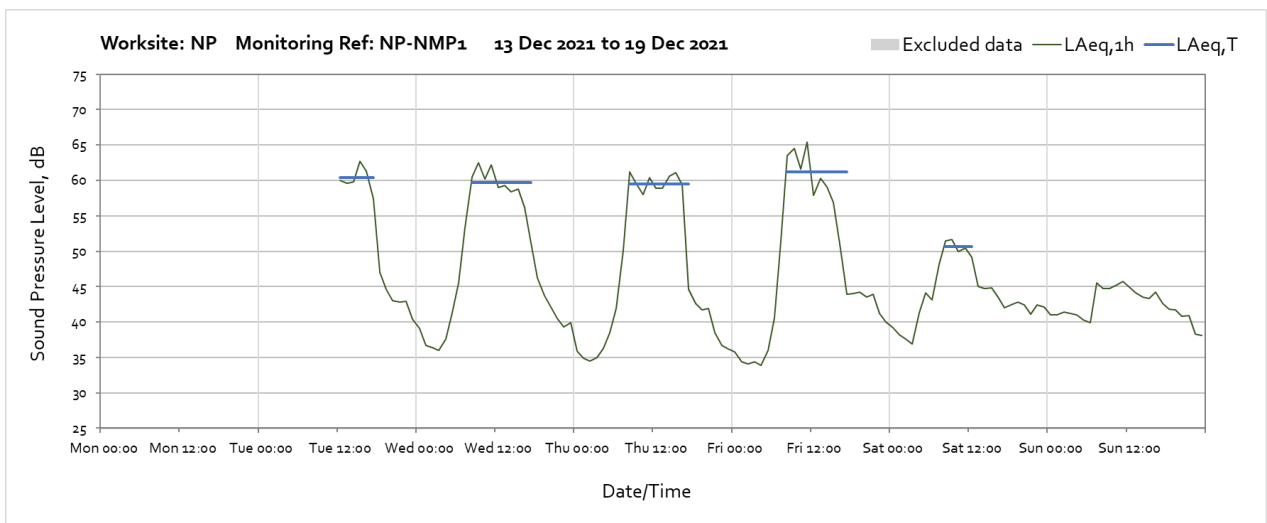


Note: Missing data between 08:00 on the 14th December until 09:00 on the 15th Decemember was due to loss of solar power because of lack of sunlight and no wind turbine power source. Wind turbine power source will be installed soon to prevent issue occurring again.

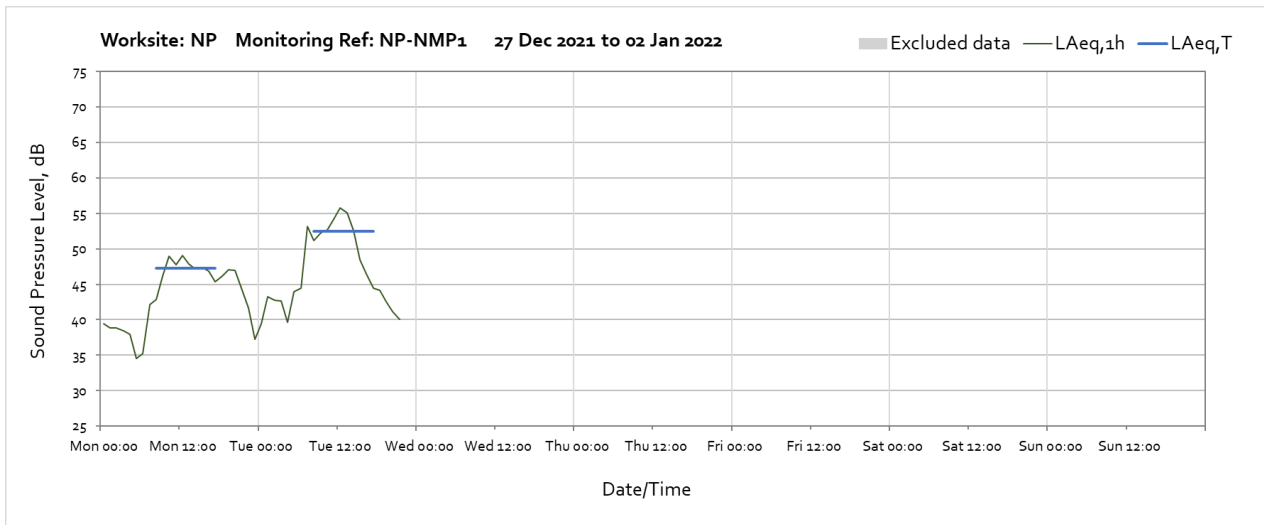
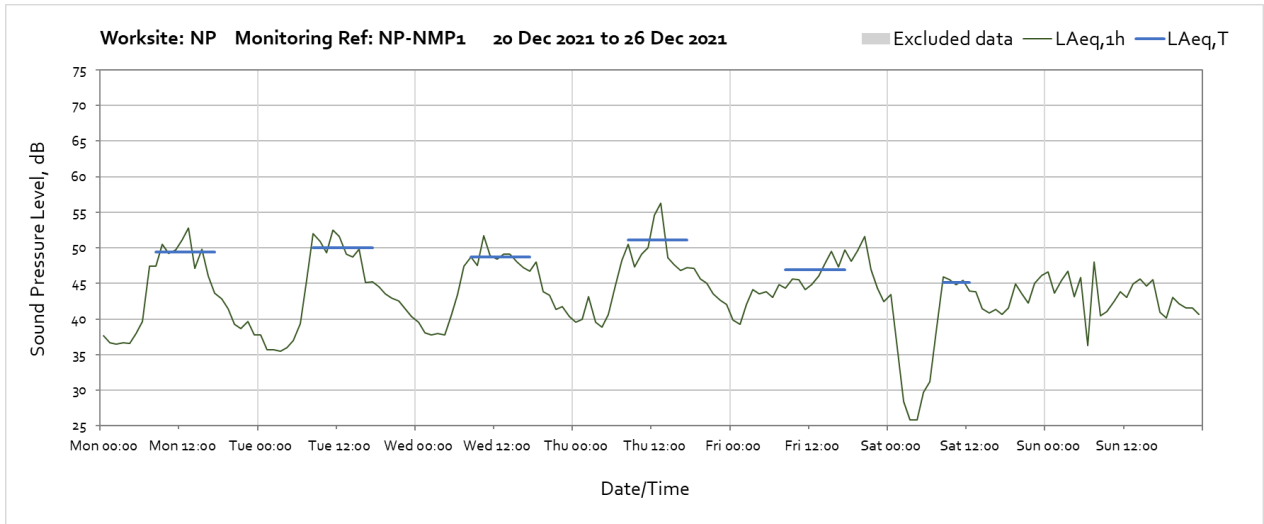
Worksite: NP – Monitoring Ref: NP-NMP1



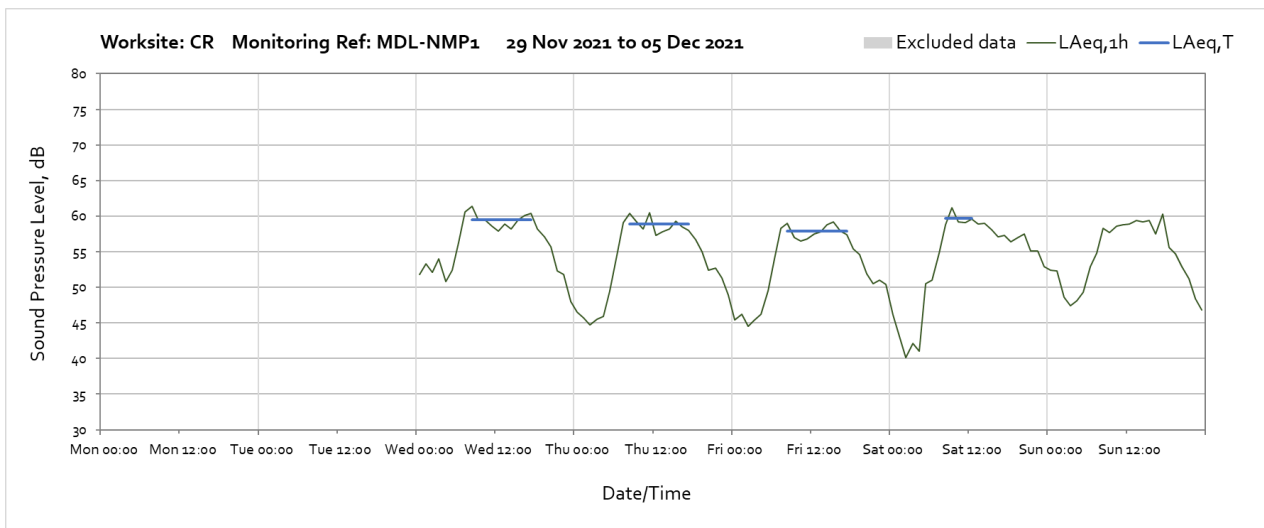
Note: Missing data from 21:00 on the 4th December until 12:00 on the 14th December was due to loss of power from external batteries. The monitor will have mains power to prevent loss of data in the future.

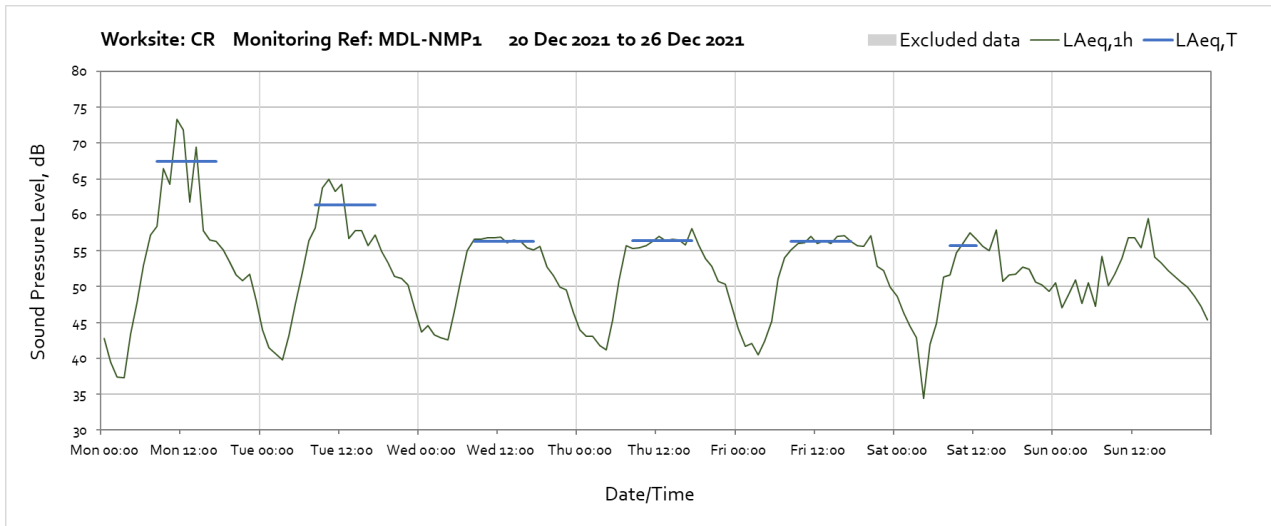
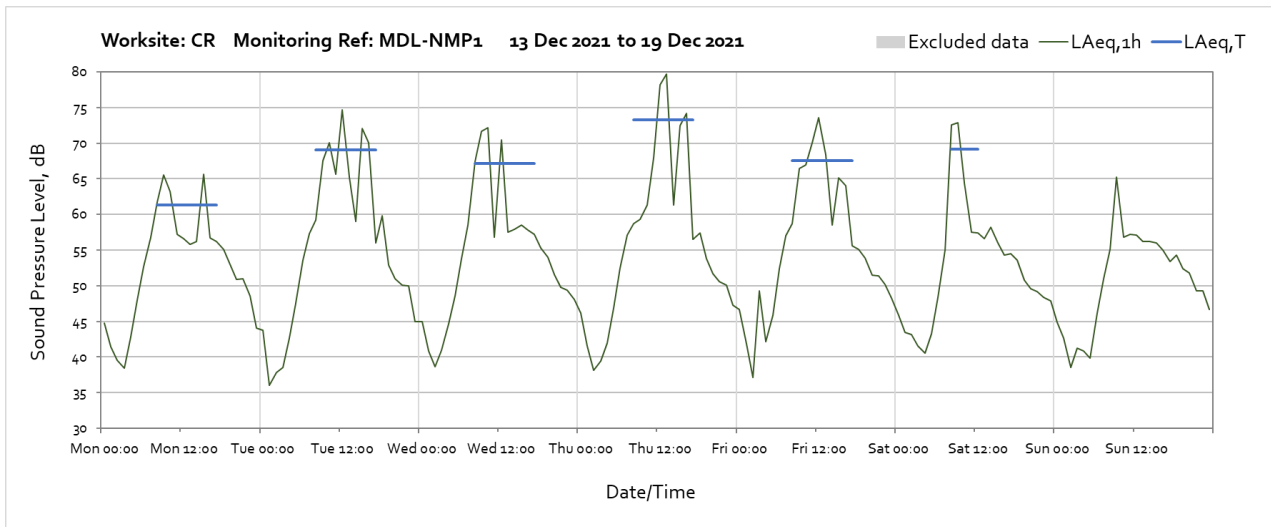
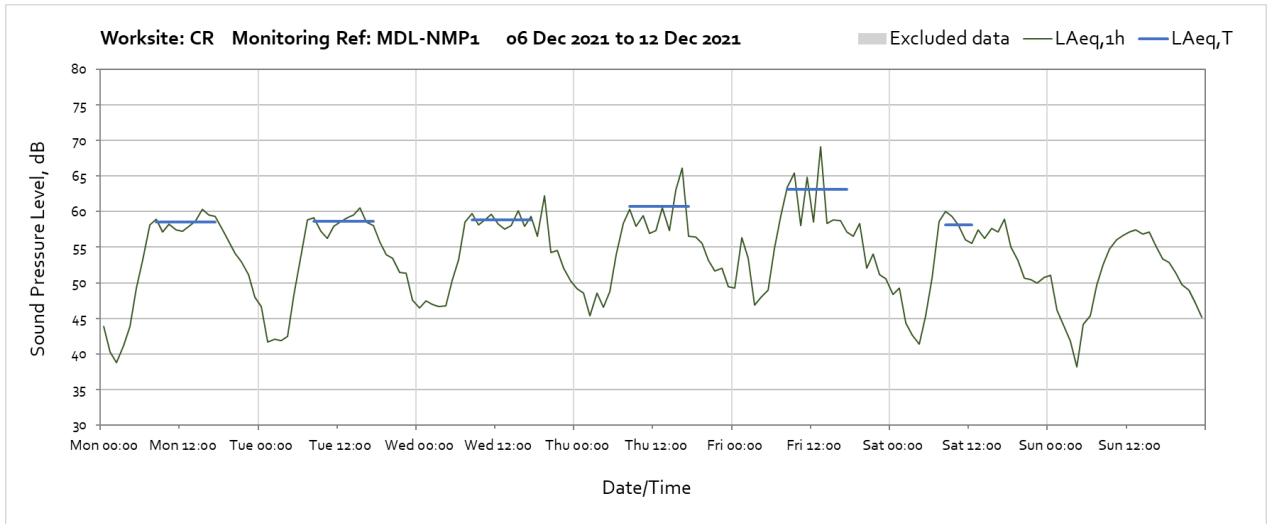


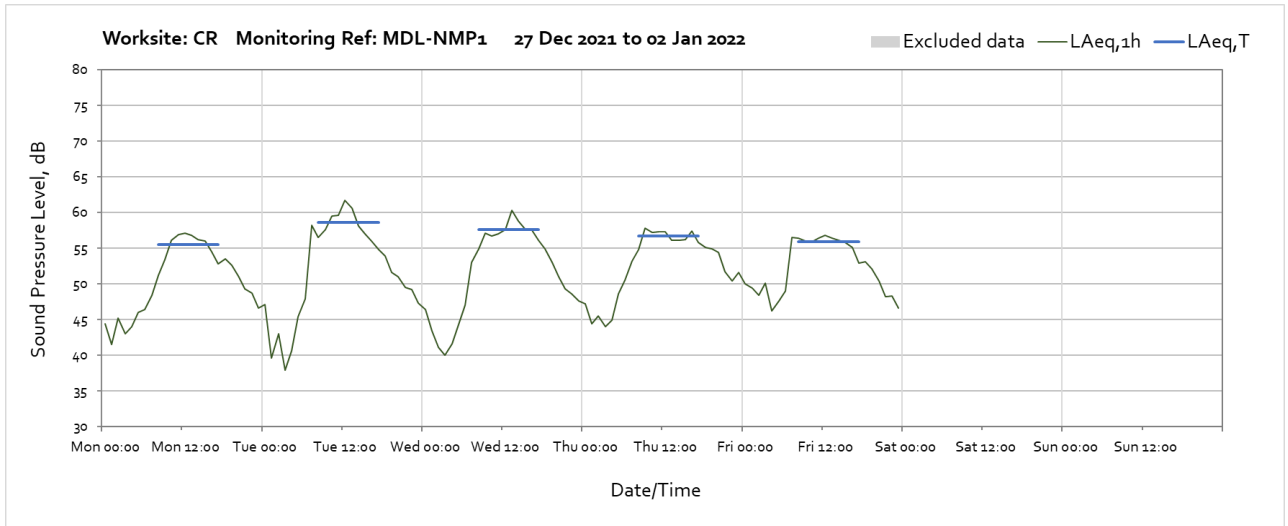
Note: Missing data from 21:00 on the 4th December until 12:00 on the 14th December was due to loss of power from external batteries. The monitor will have mains power to prevent loss of data in the future.



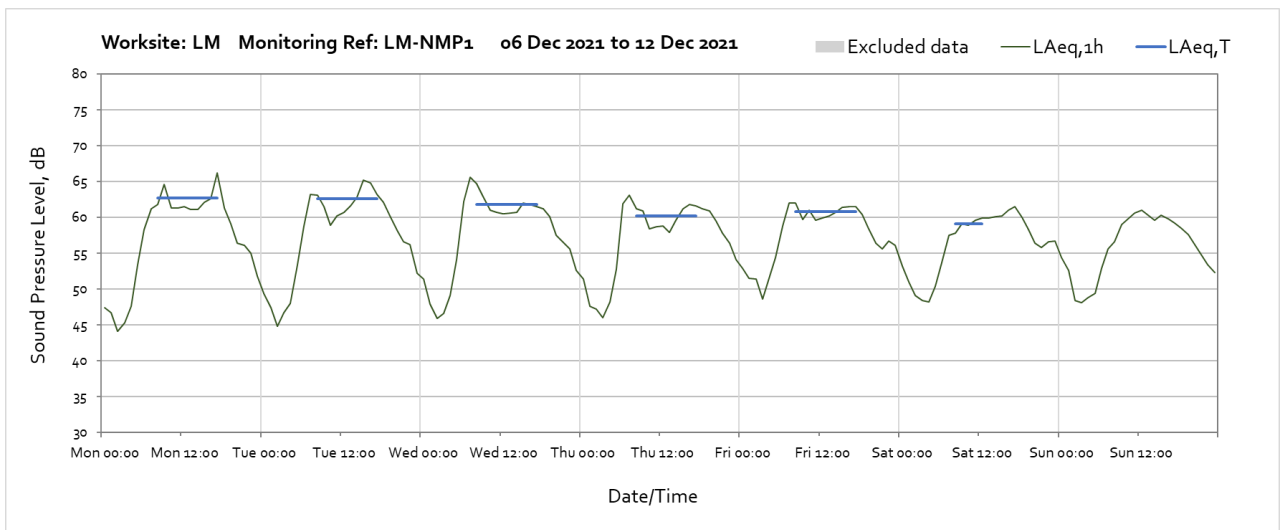
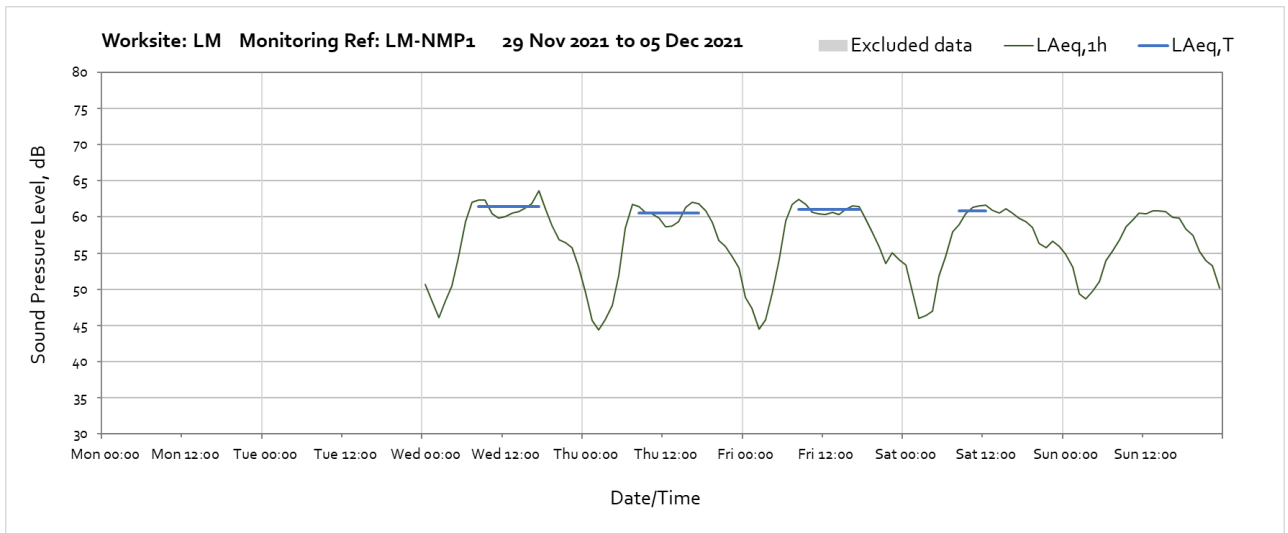
Worksite: CR – Monitoring Ref: MDL-NMP1

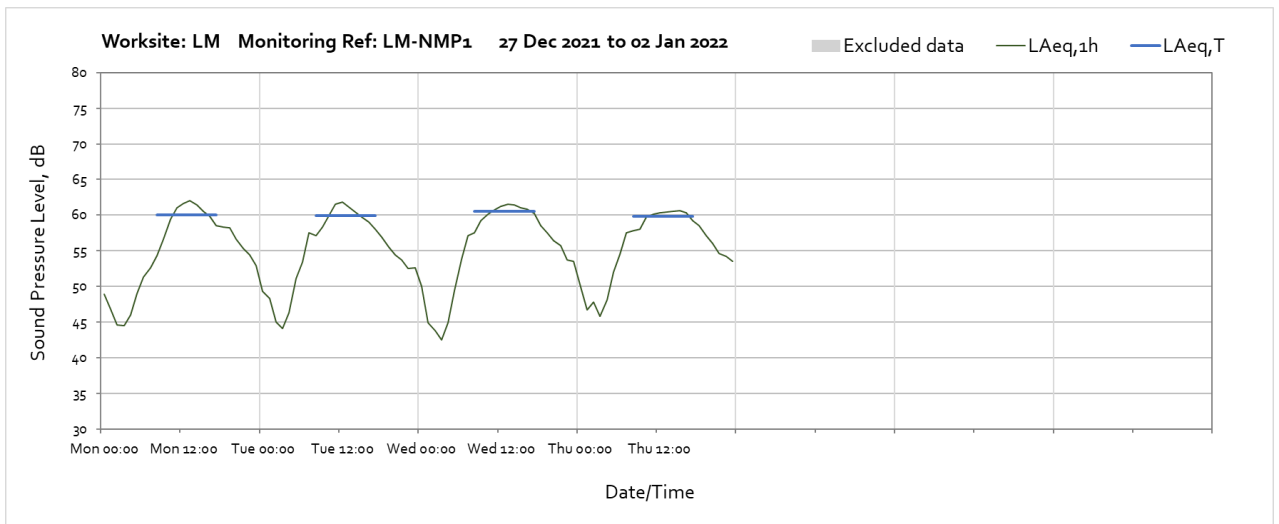
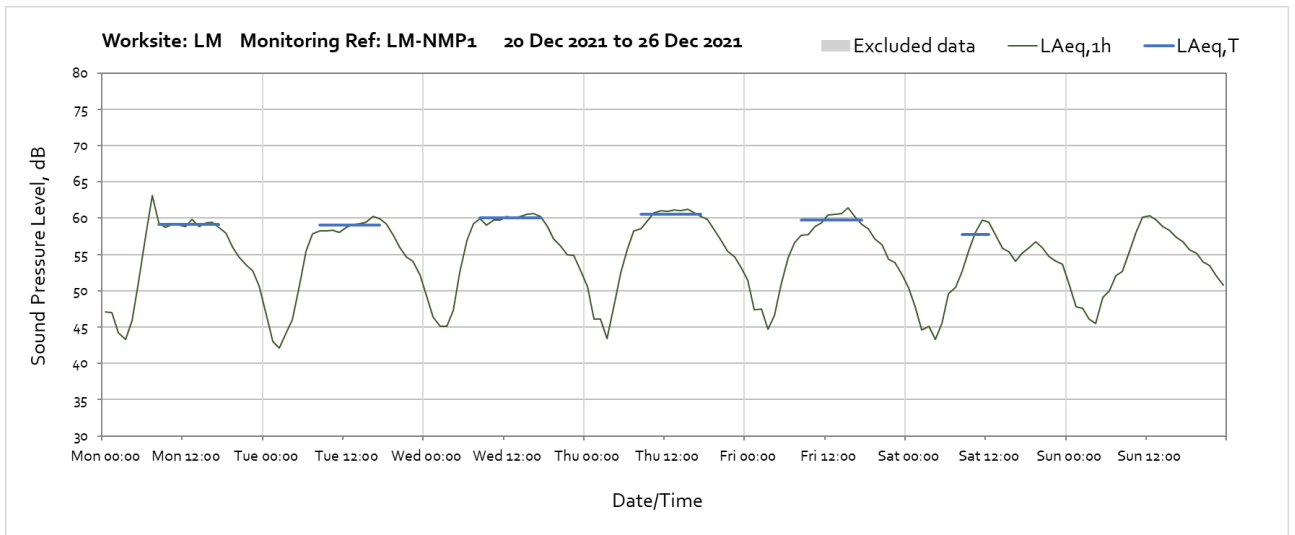
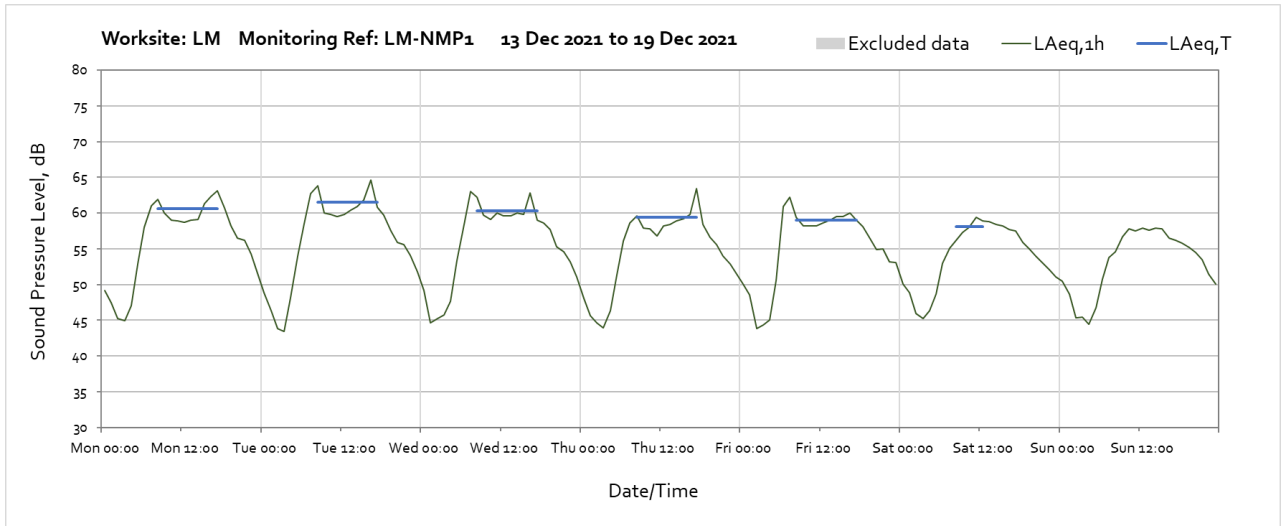




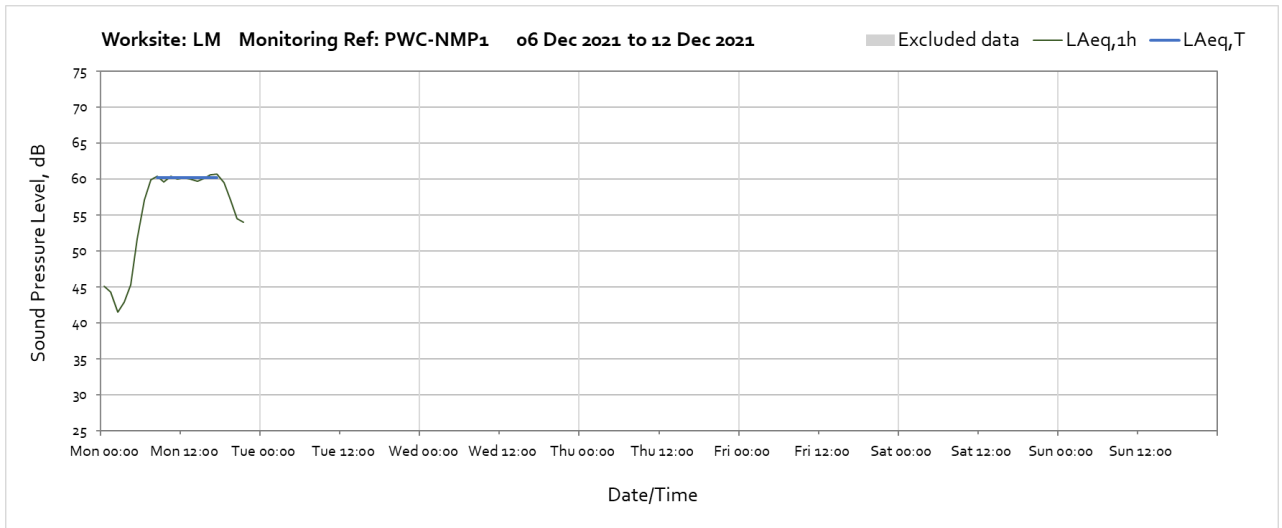
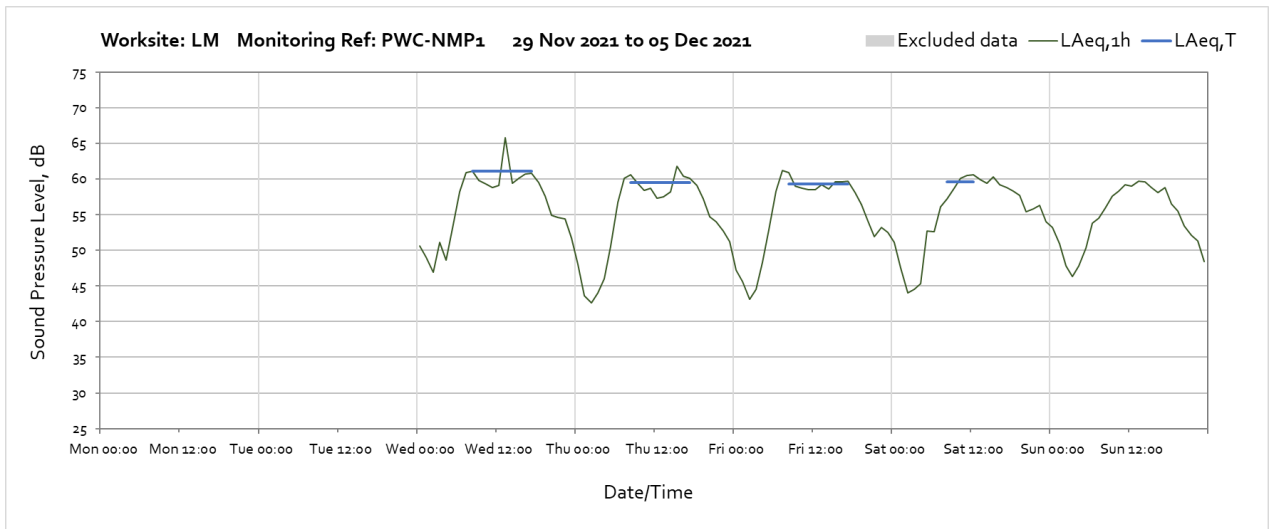


Worksite: LM - Monitoring Ref: LM-NMP1

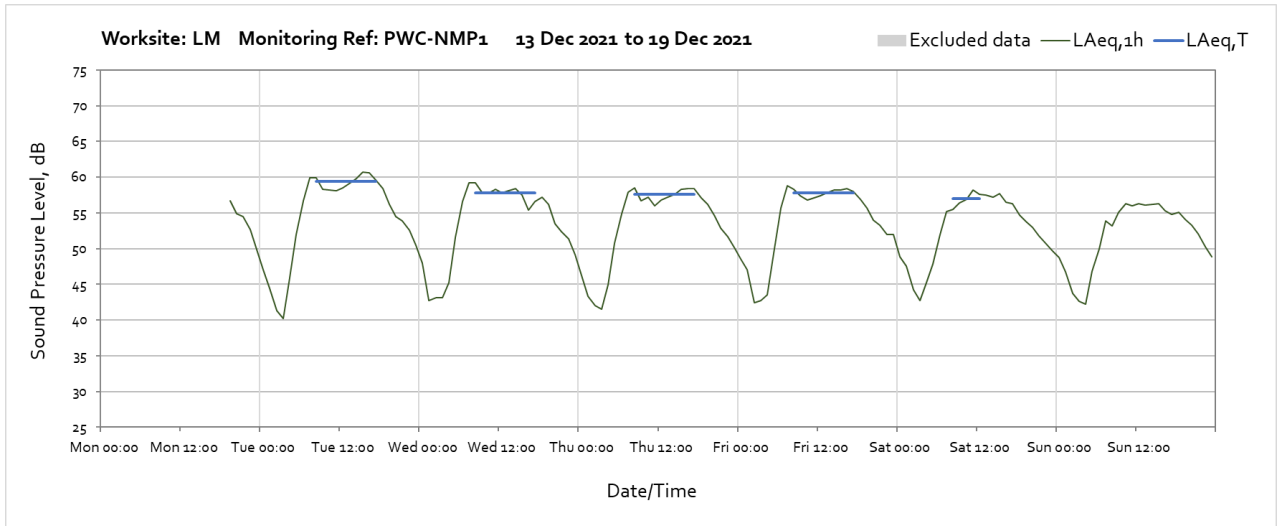




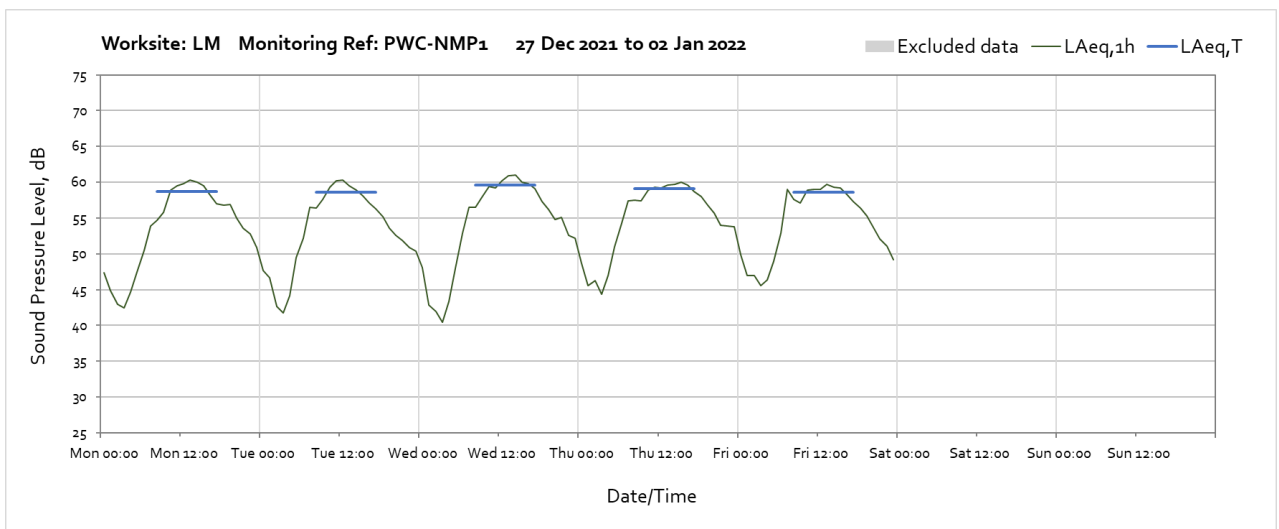
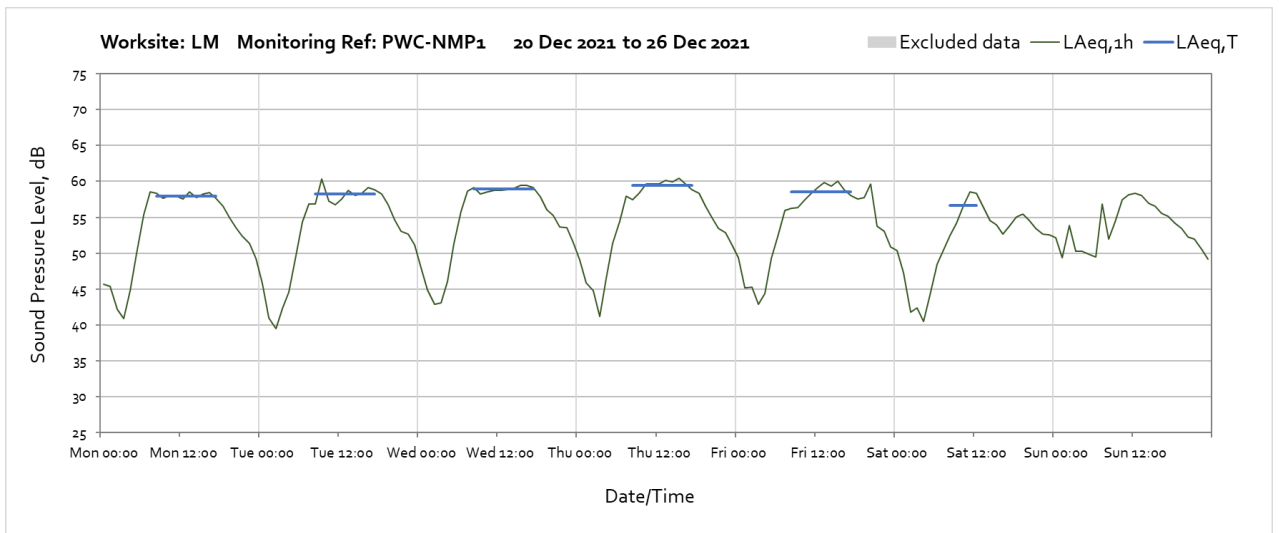
Worksite: LM – Monitoring Ref: PWC-NMP1



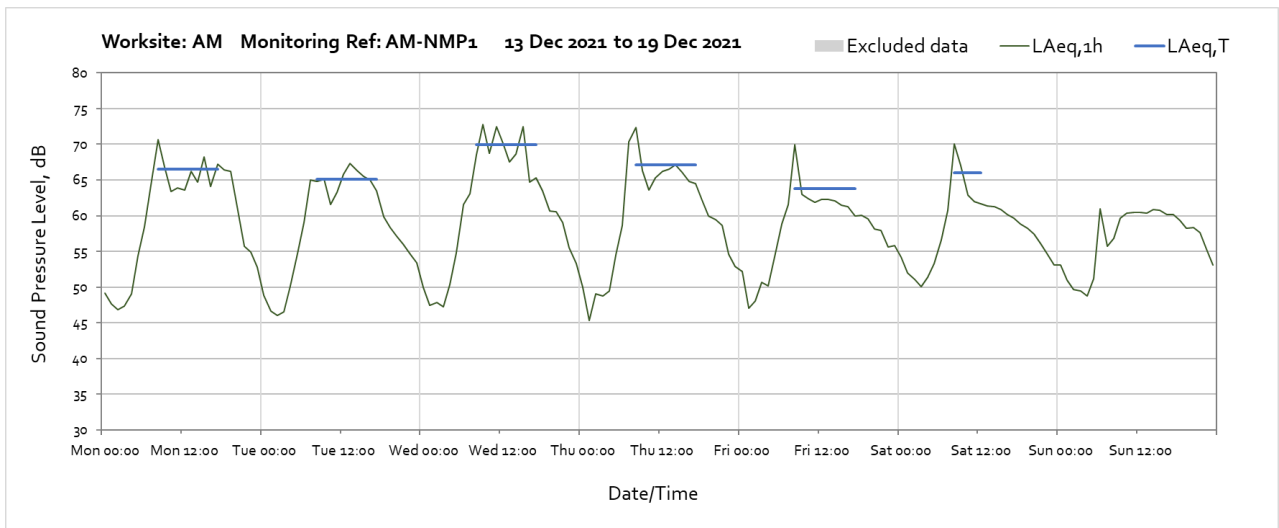
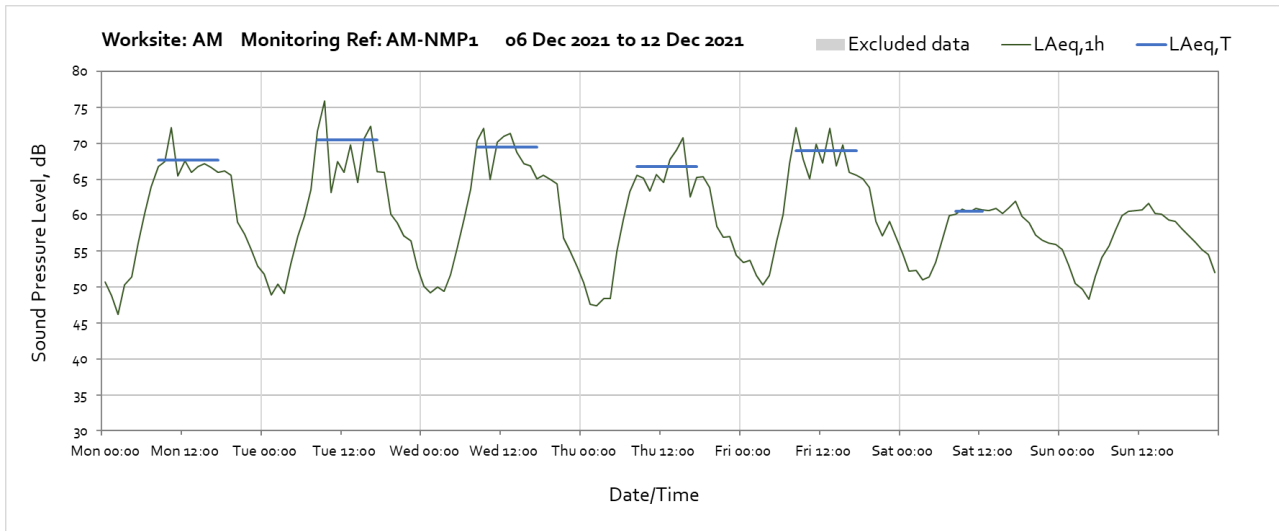
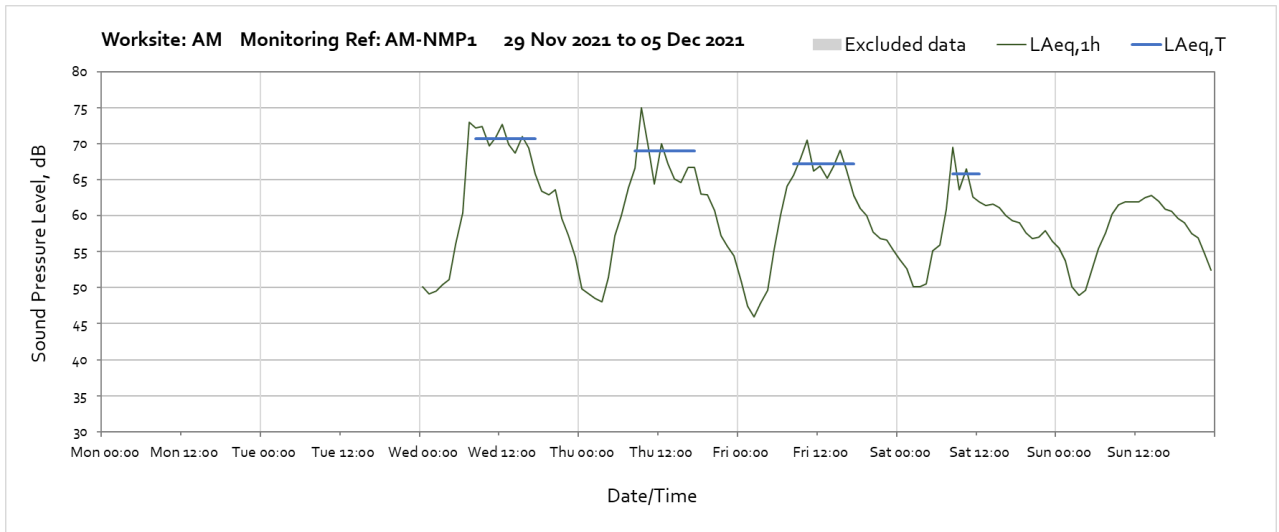
Note: Missing data from 22:00 on the 6th December till 19:00 on the 13th December was due to loss of power from external batteries. The monitor is expected to have mains power going forward.



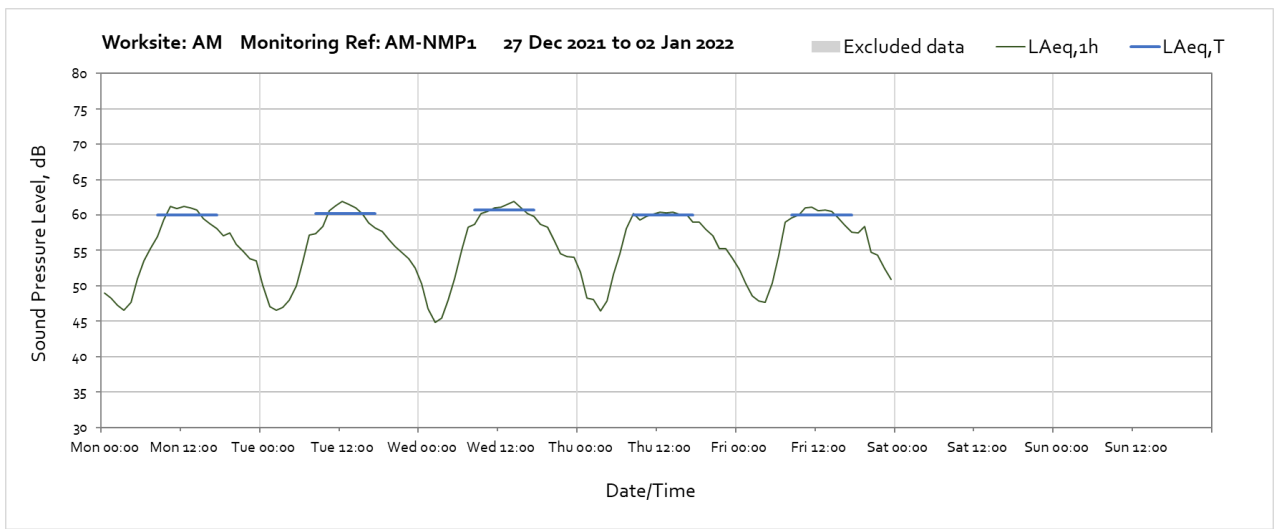
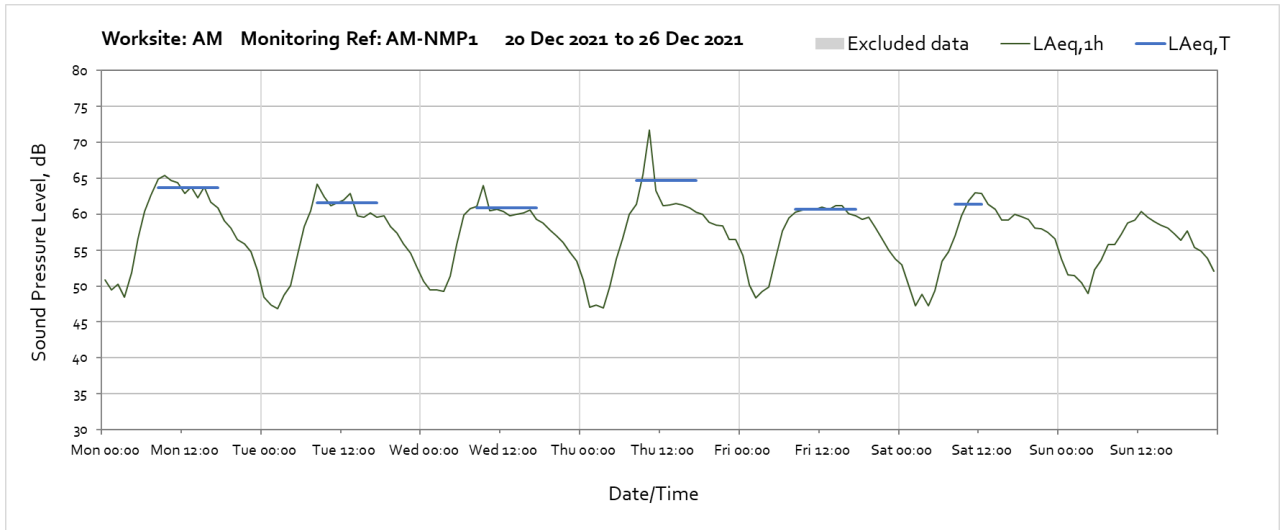
Note: Missing data from 22:00 on the 6th December till 19:00 on the 13th December was due to loss of power from external batteries. The monitor is expected to have mains power going forward.



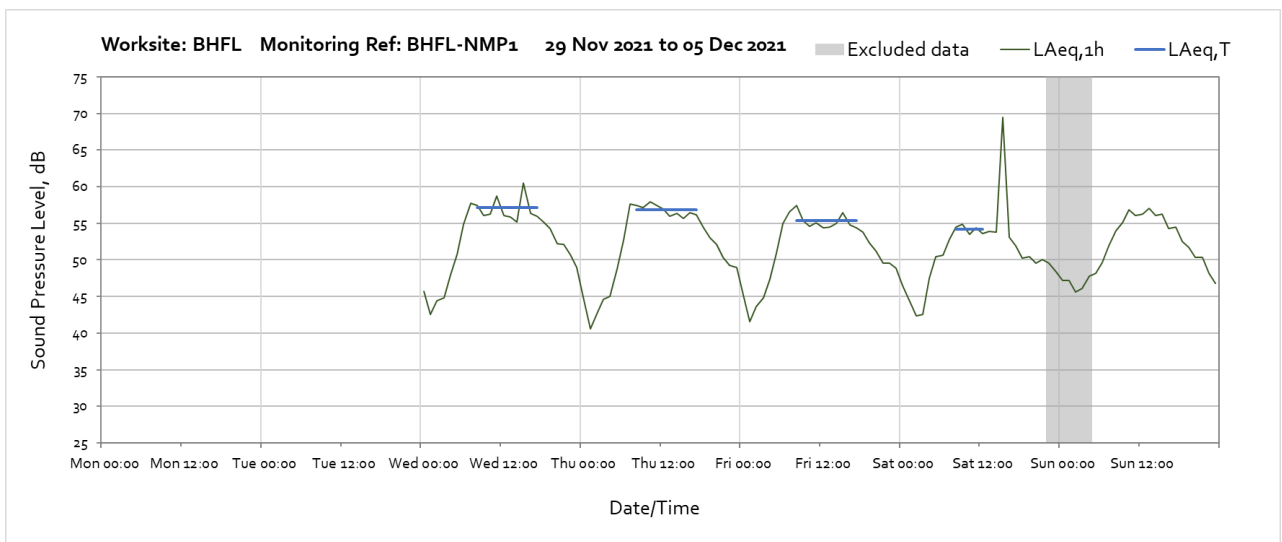
Worksite: AM - Monitoring Ref: AM-NMP1

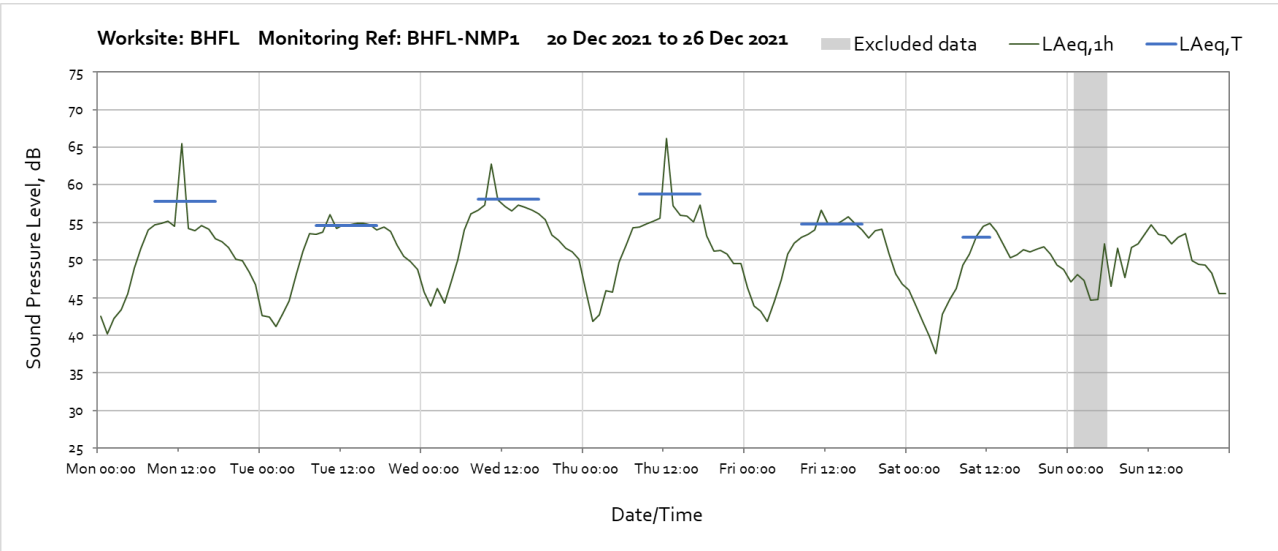
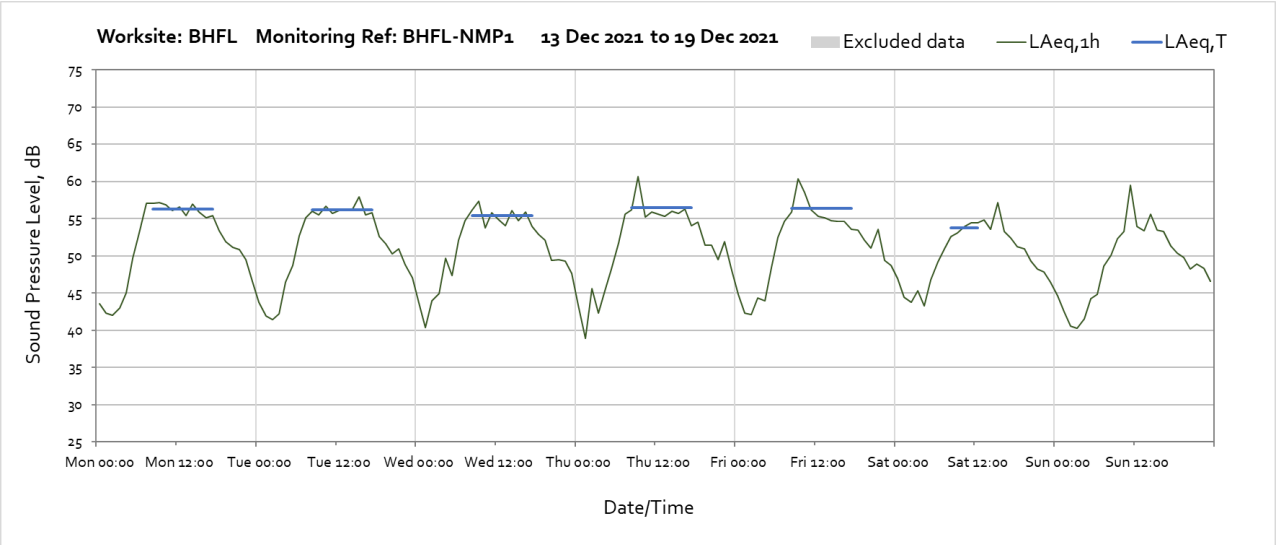
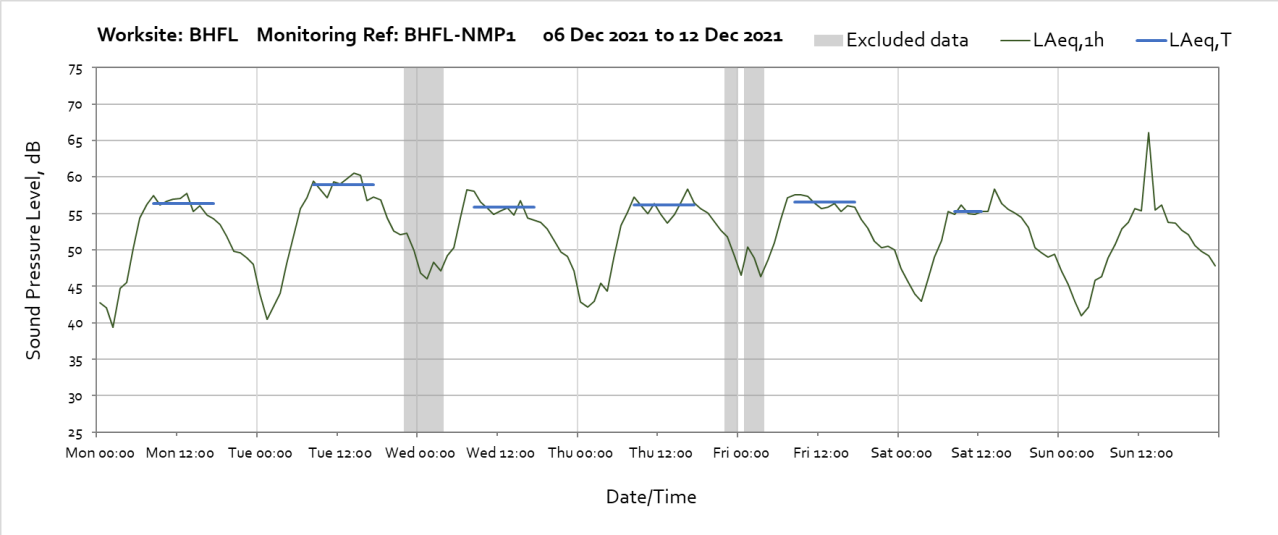


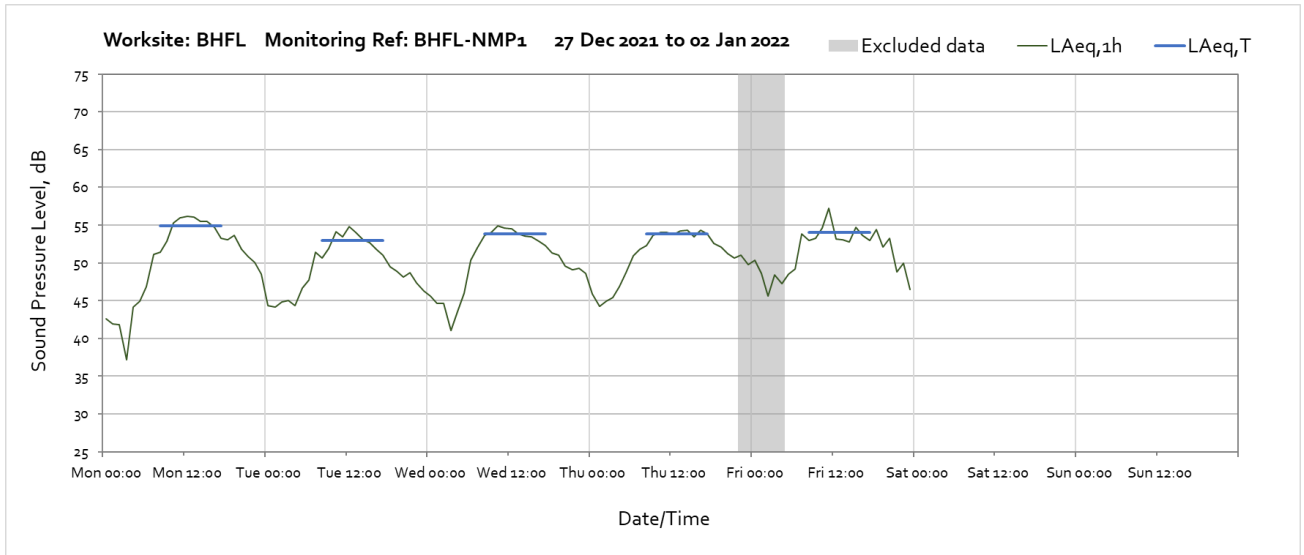
OFFICIAL



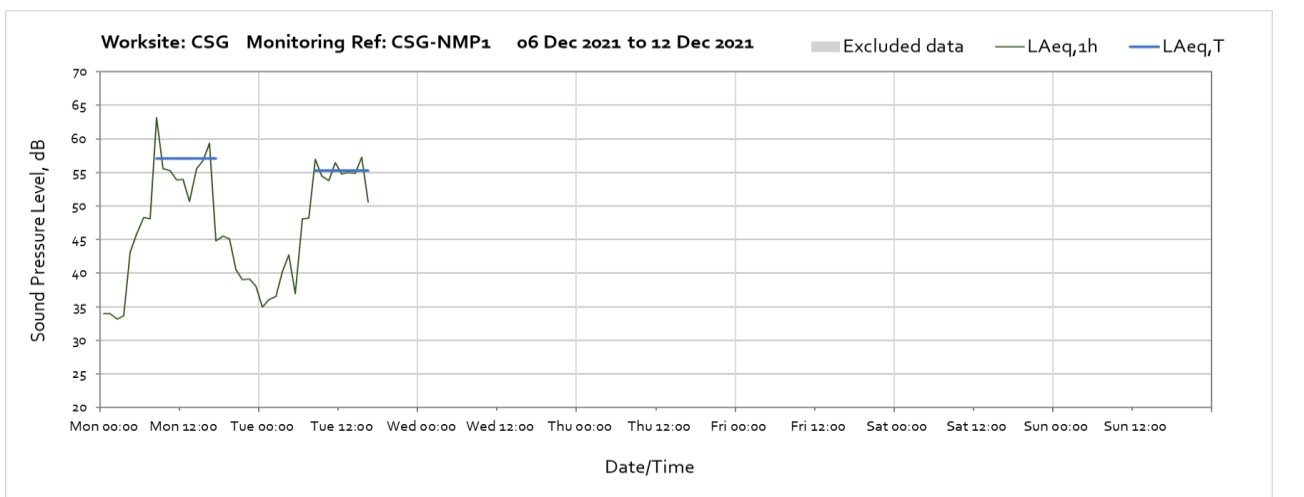
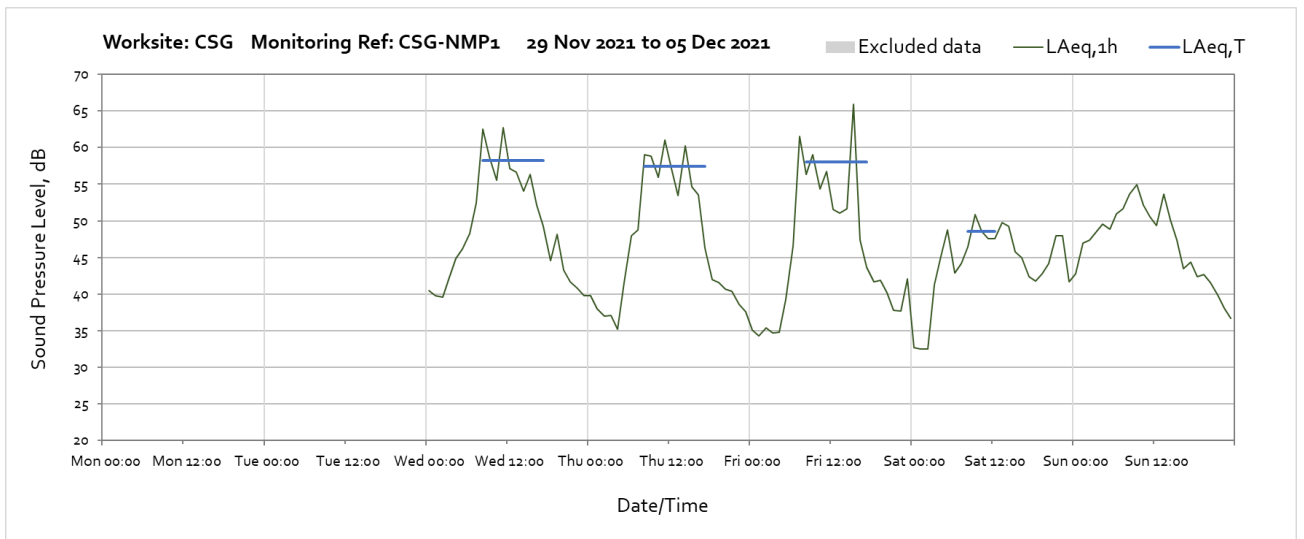
Worksite: BHFL - Monitoring Ref: BHFL-NMP1





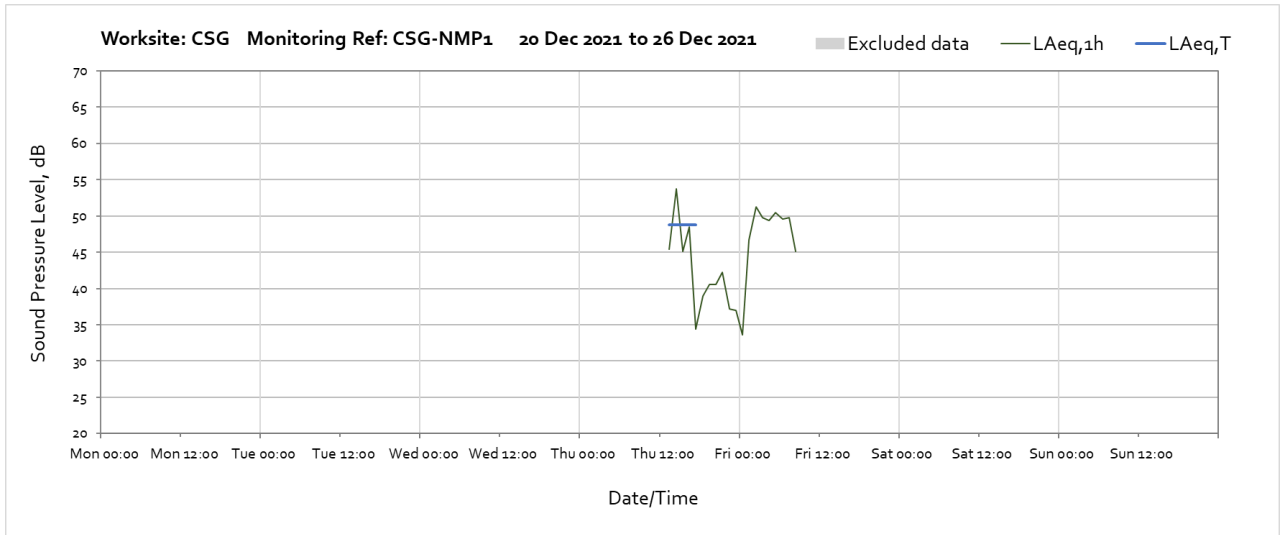


Worksite: CSG – Monitoring Ref: CSG-NMP1

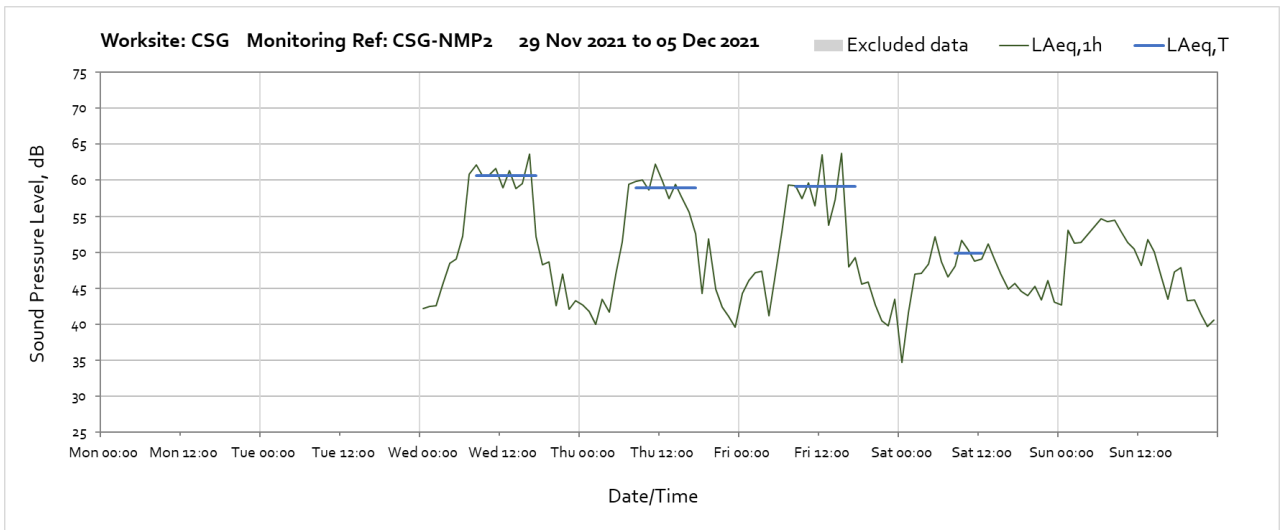


Note: Missing data between 17:00 on the 7th December until 13:00 on the 23rd December was due to a fault with the power supply to this monitor. The power supply fault has been rectified to help prevent loss of data in the future.

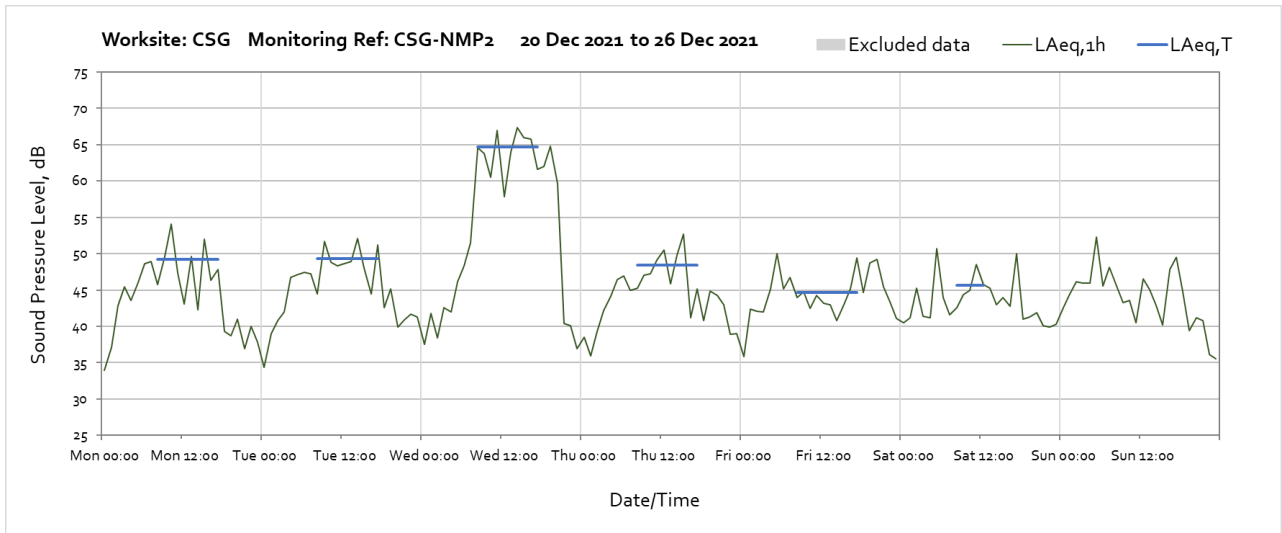
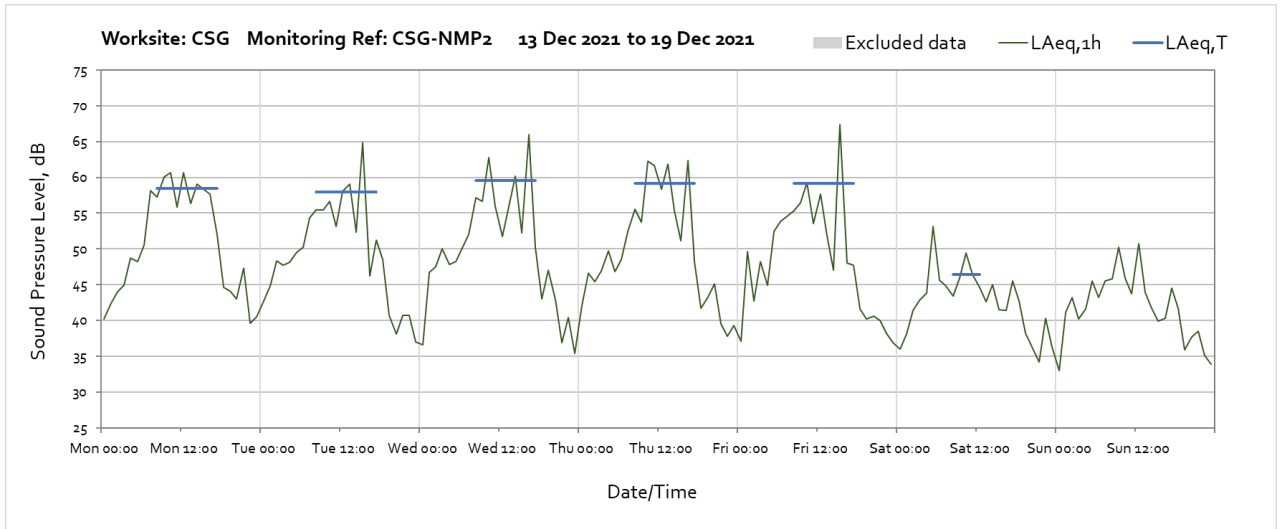
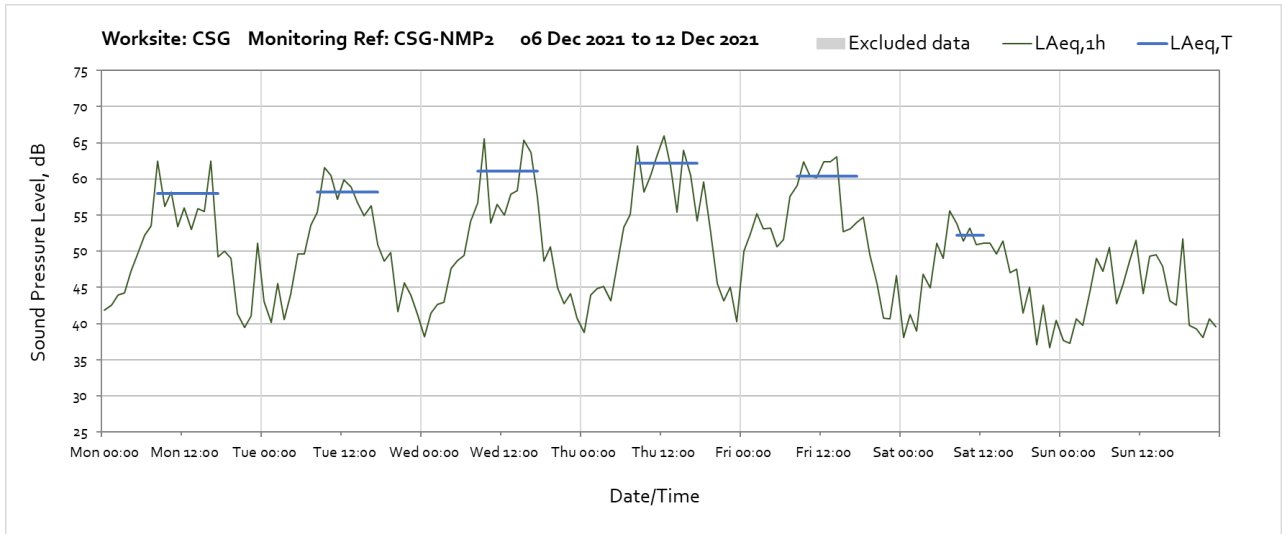
OFFICIAL

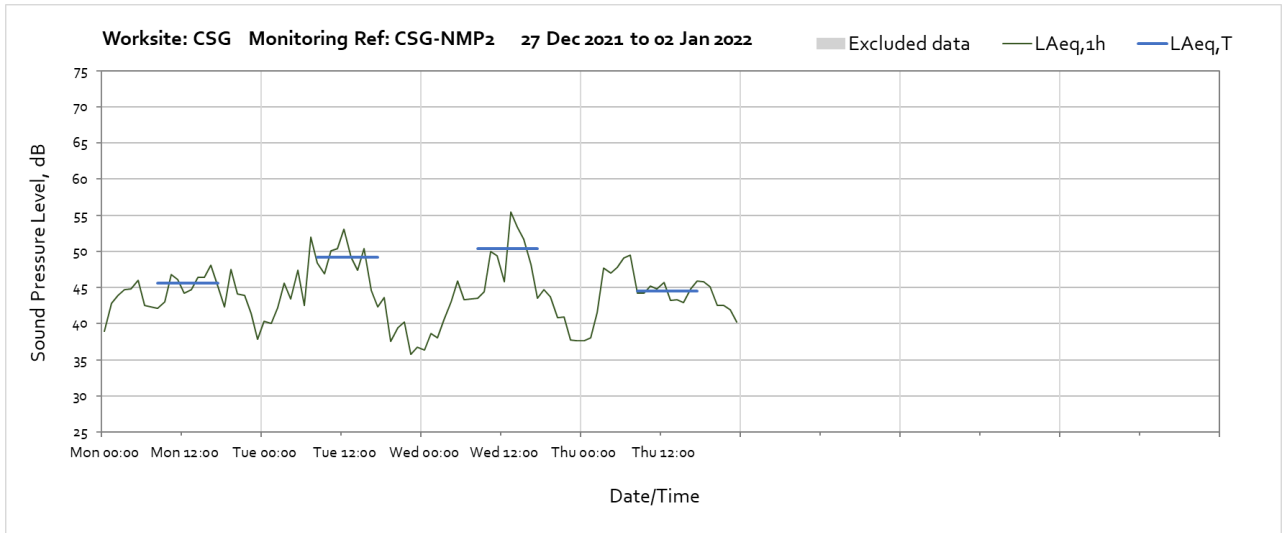


Note: Missing data between 17:00 on the 7th December until 13:00 on the 23rd December and between 09:00 on the 24th December until the end of December was due to a fault with the power supply to this monitor. The power supply fault has been rectified to help prevent loss of data in the future.

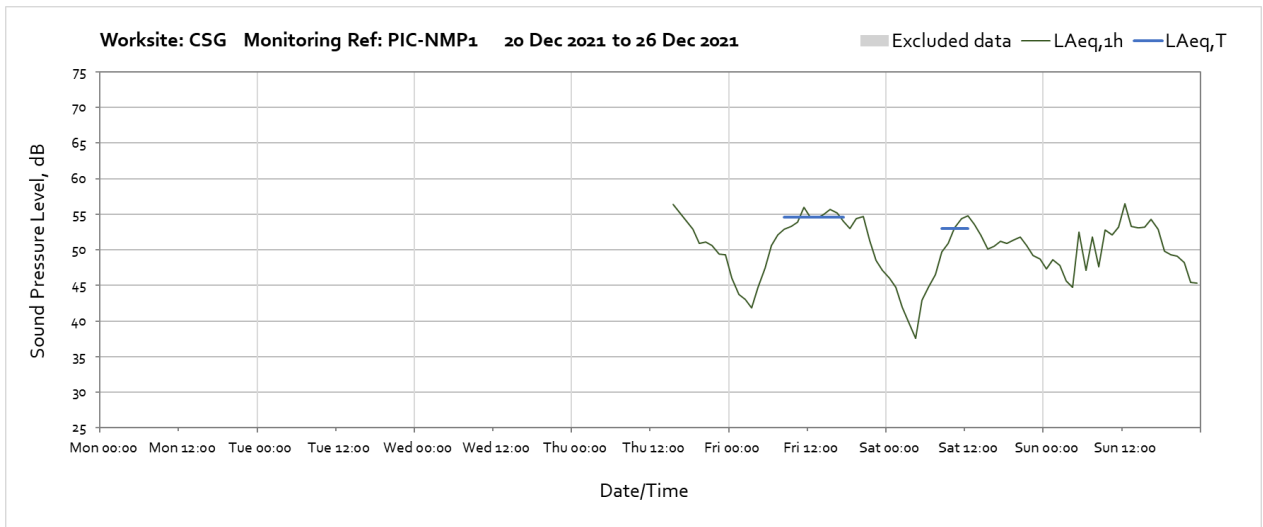


Worksite: CSG – Monitoring Ref: CSG-NMP2

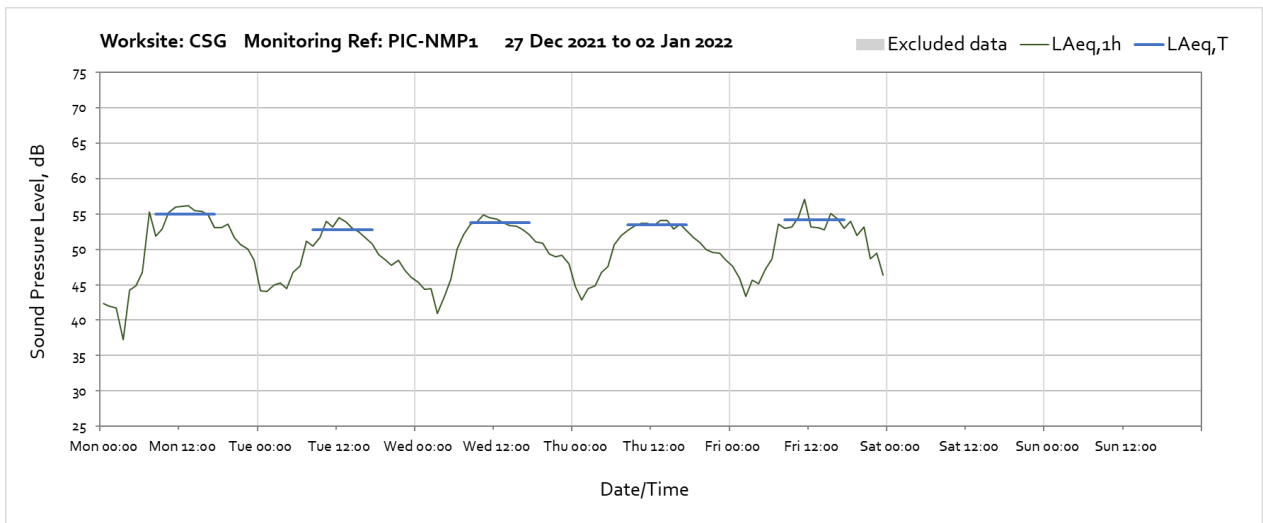




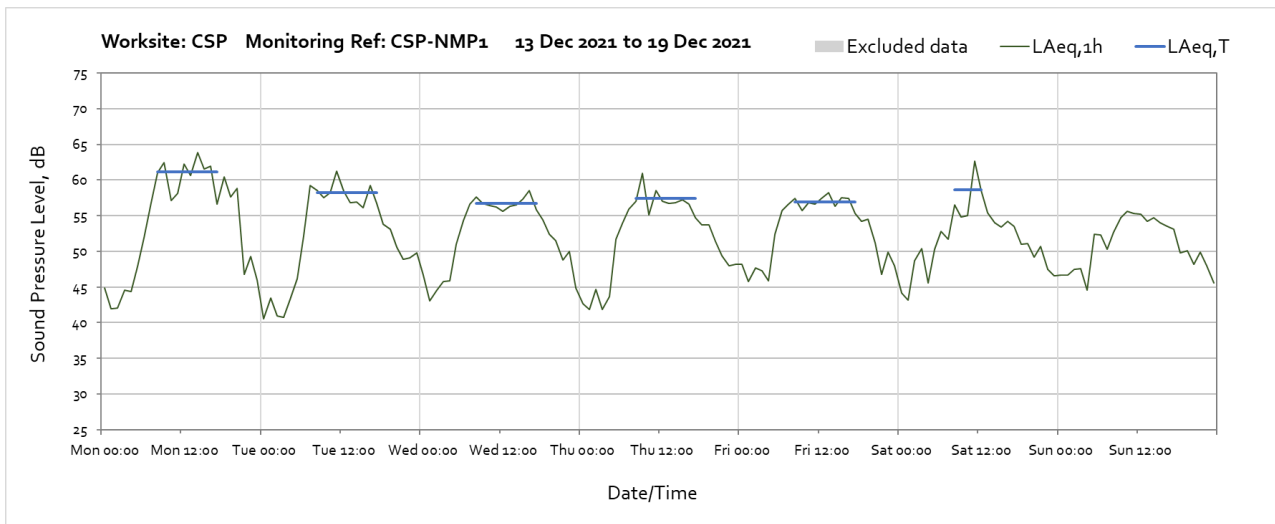
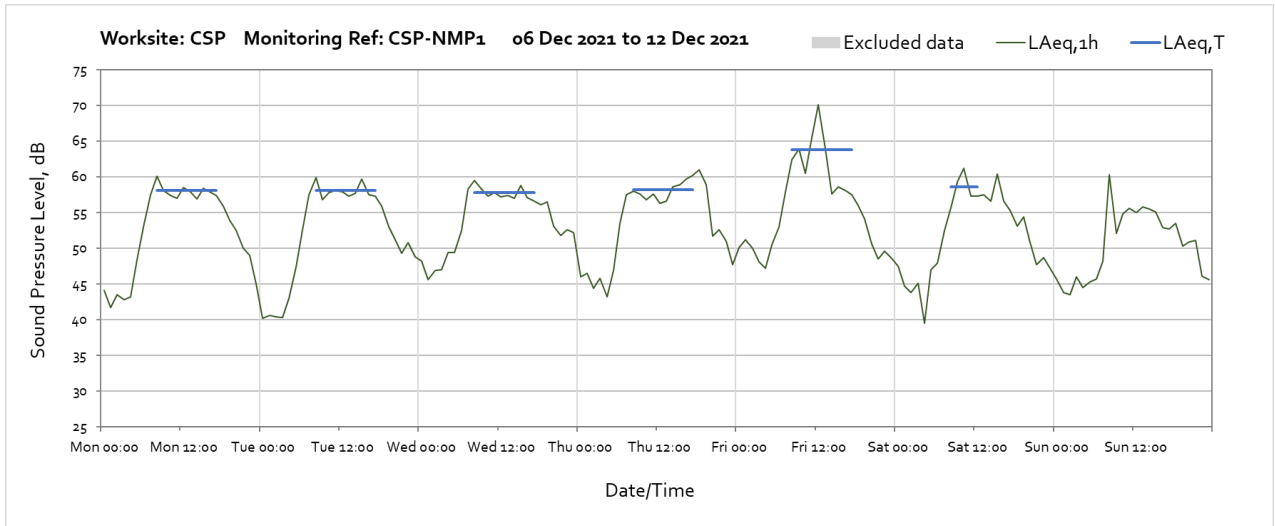
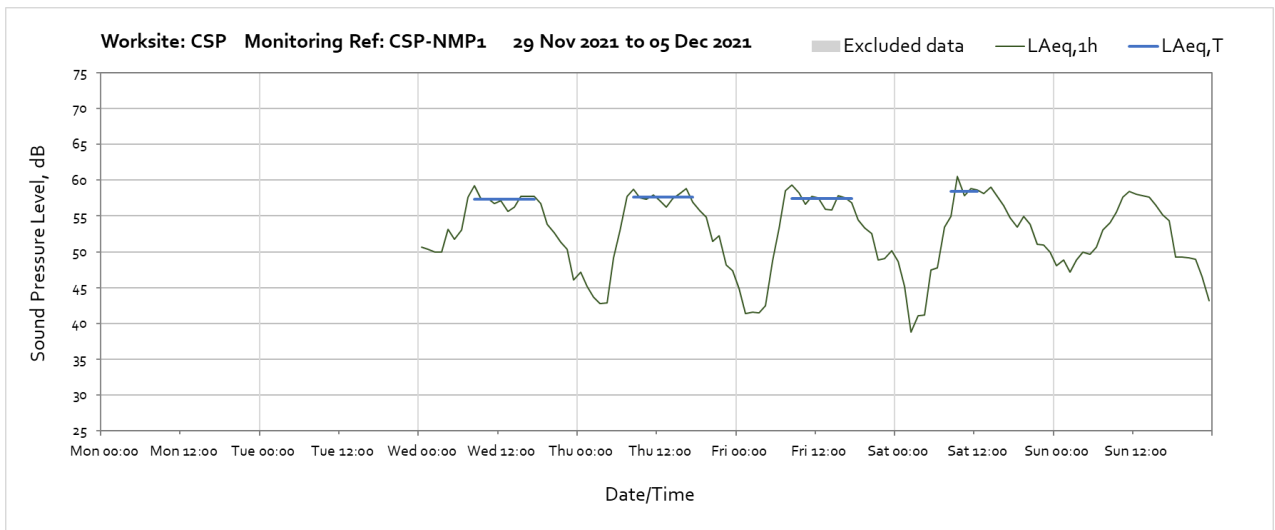
Worksite: CSG - Monitoring Ref: PIC-NMP1

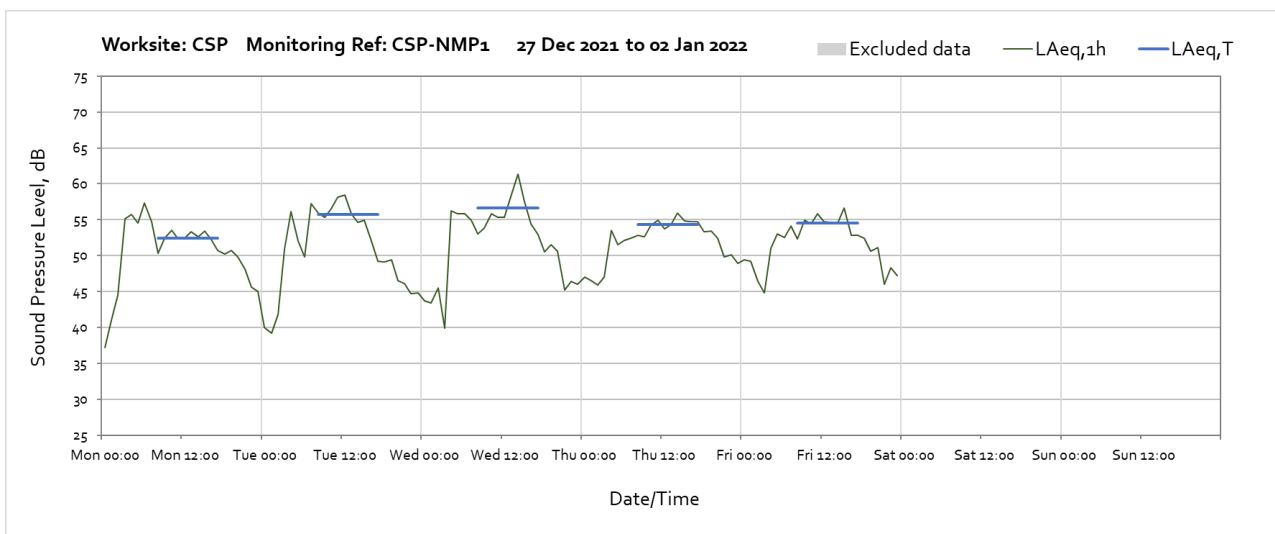
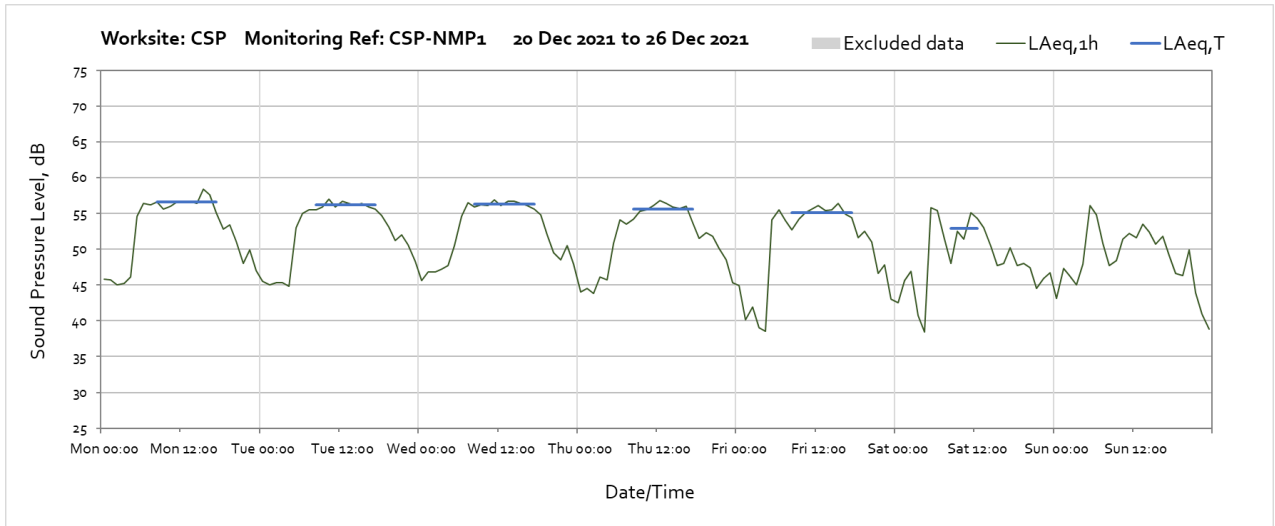


Note: Monitor was installed on the 23rd December.

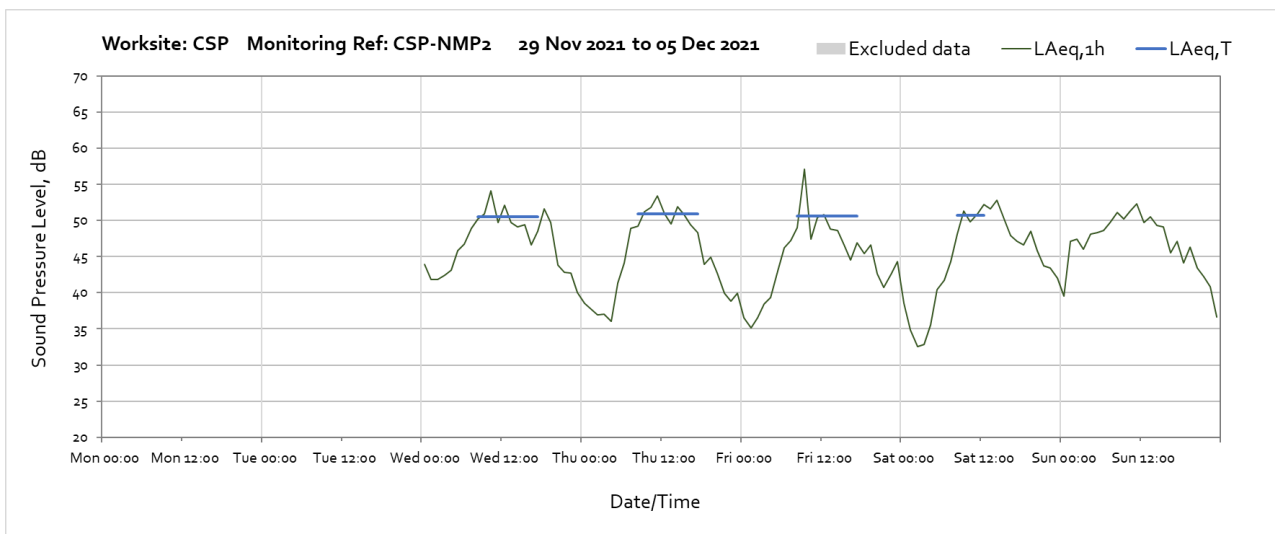


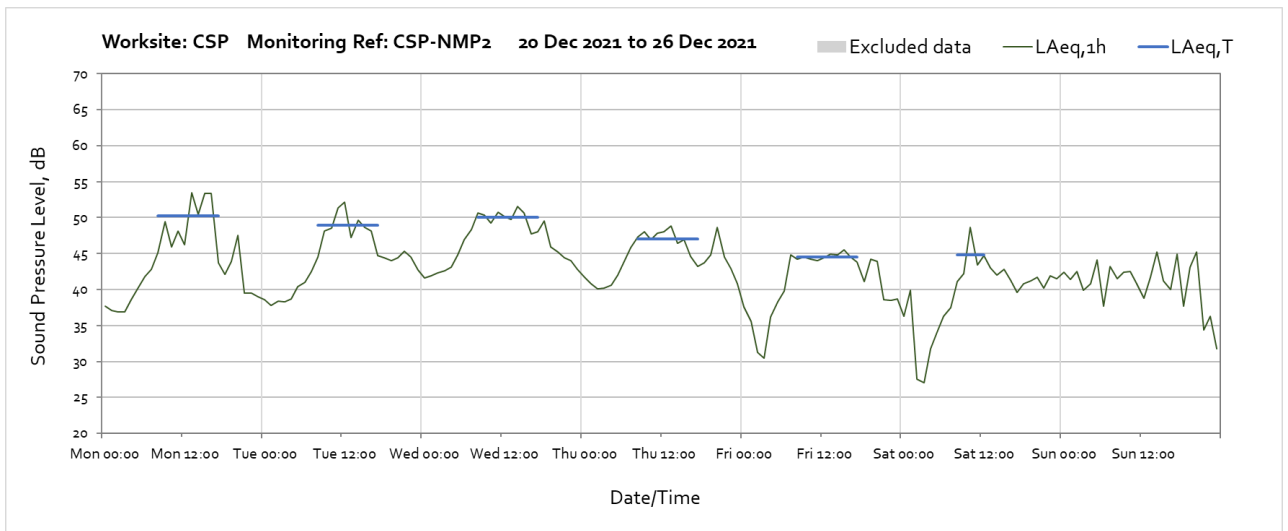
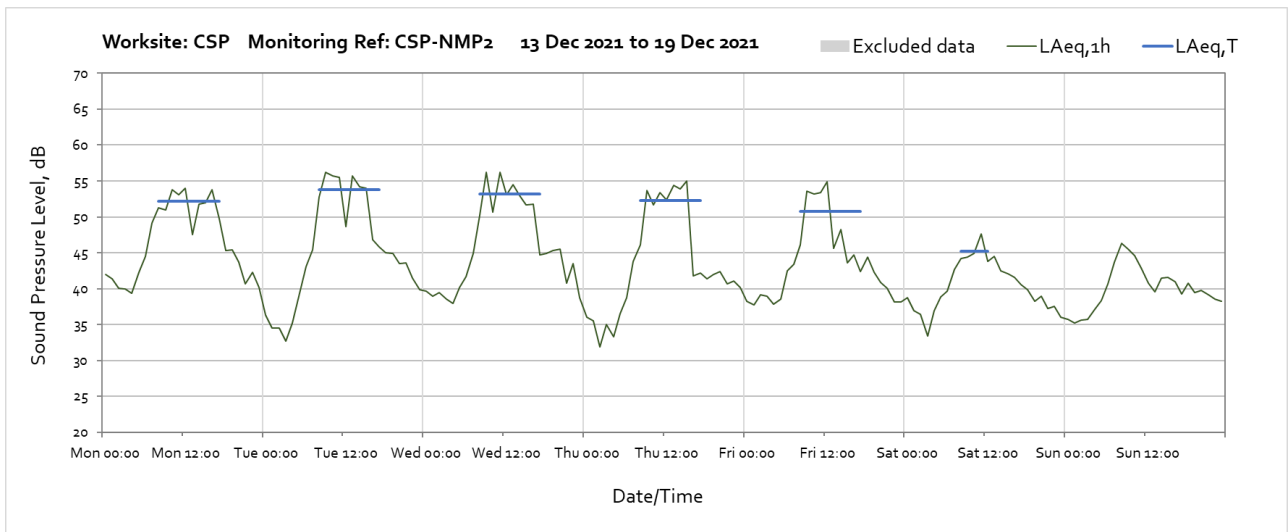
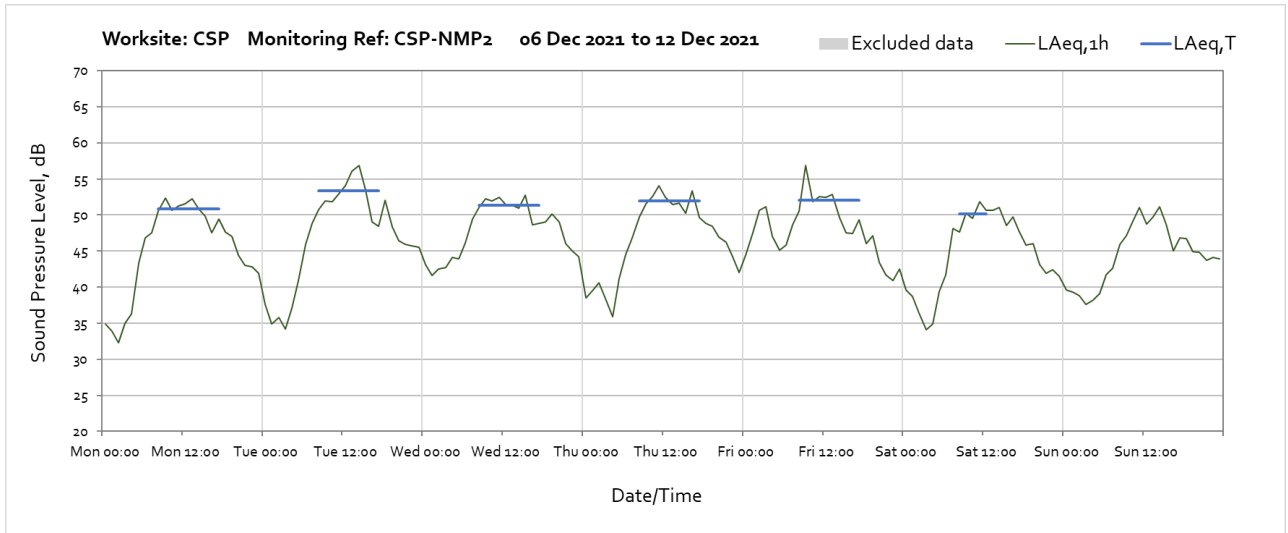
Worksite: CSP – Monitoring Ref: CSP-NMP1

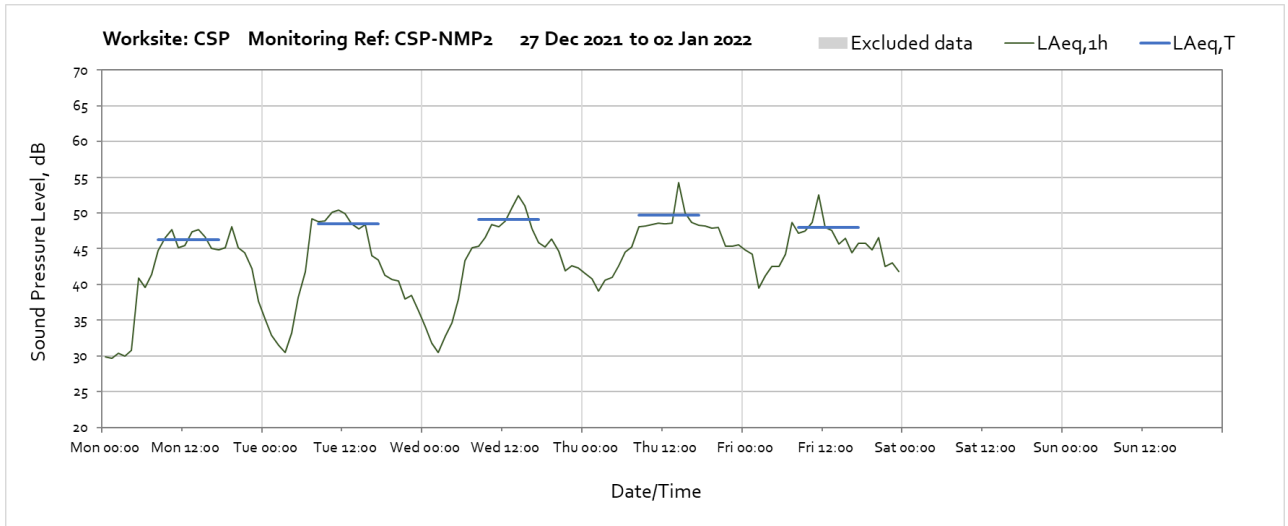




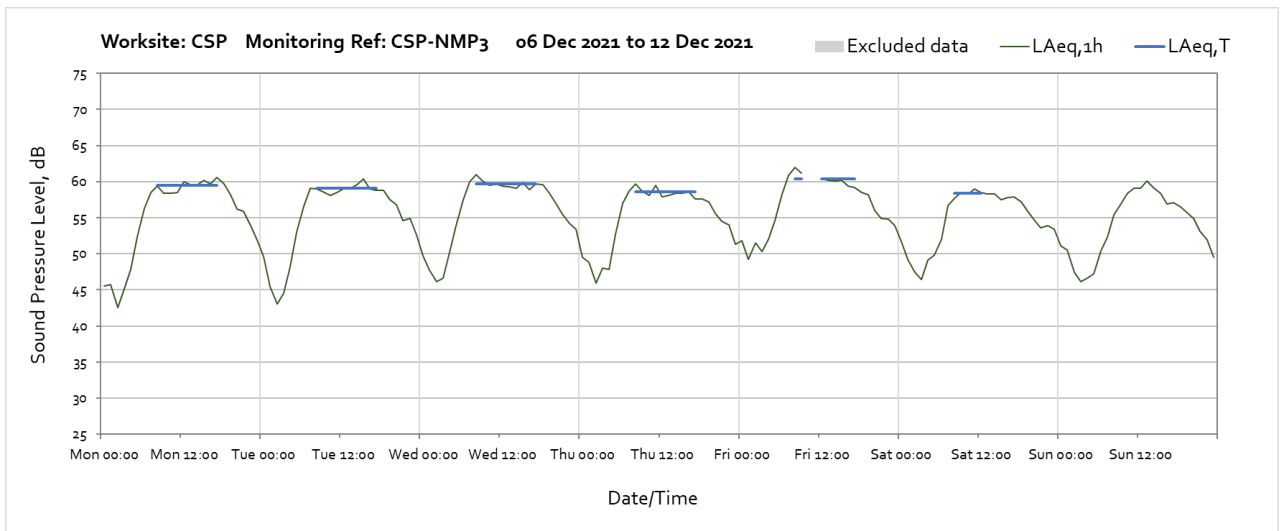
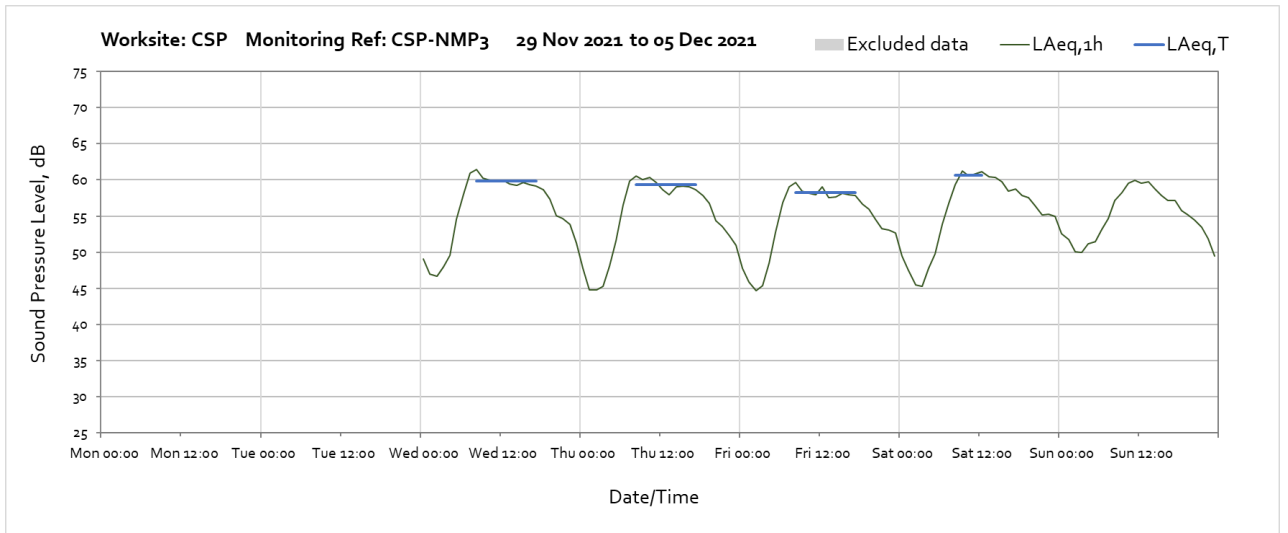
Worksite: CSP – Monitoring Ref: CSP-NMP2





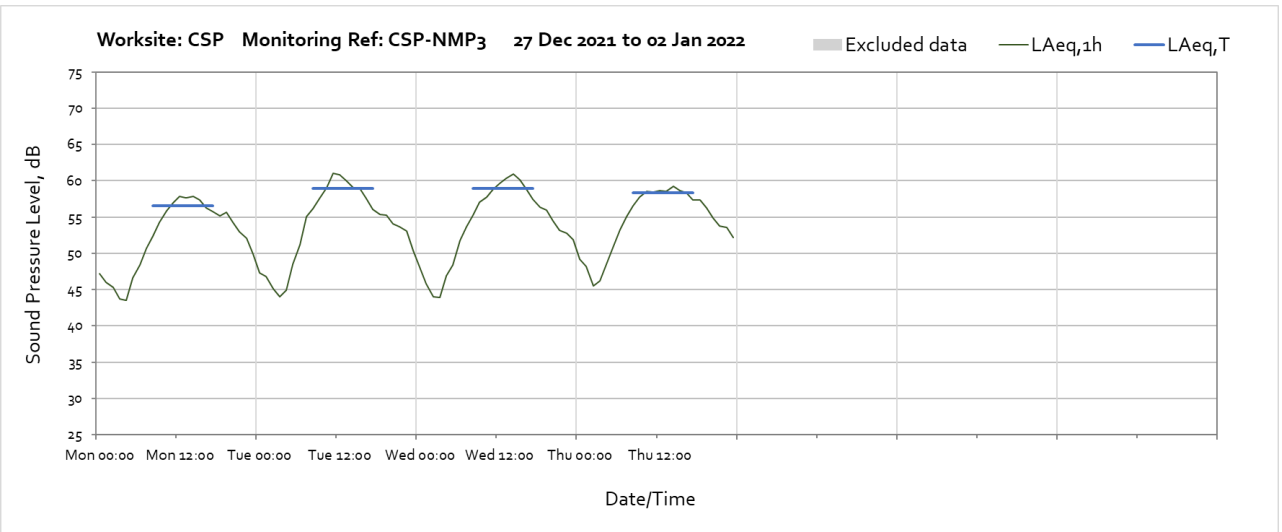
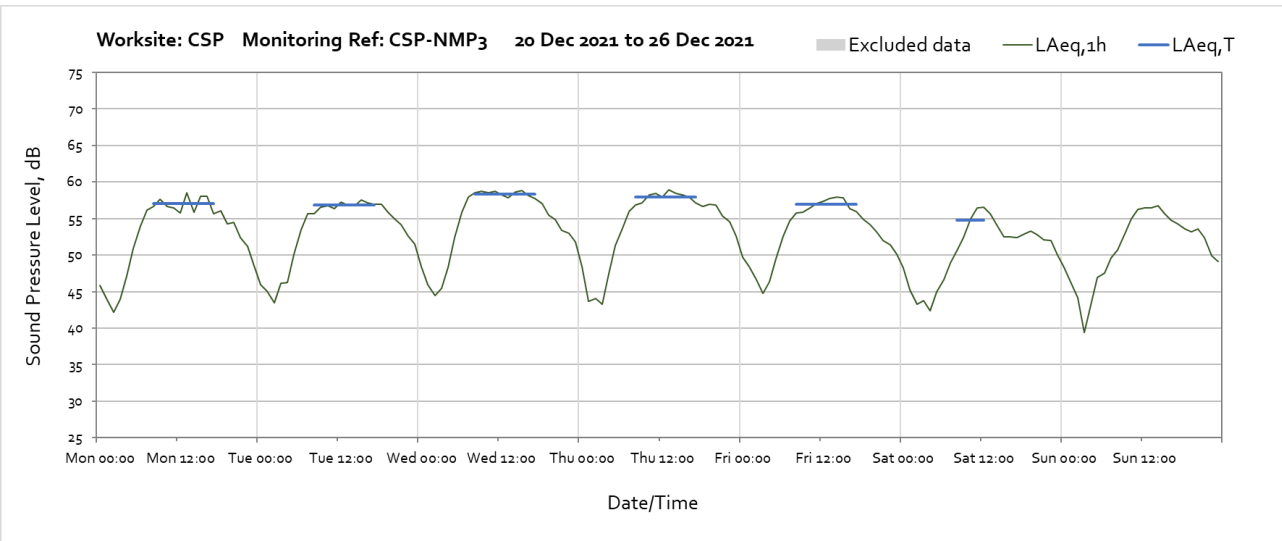
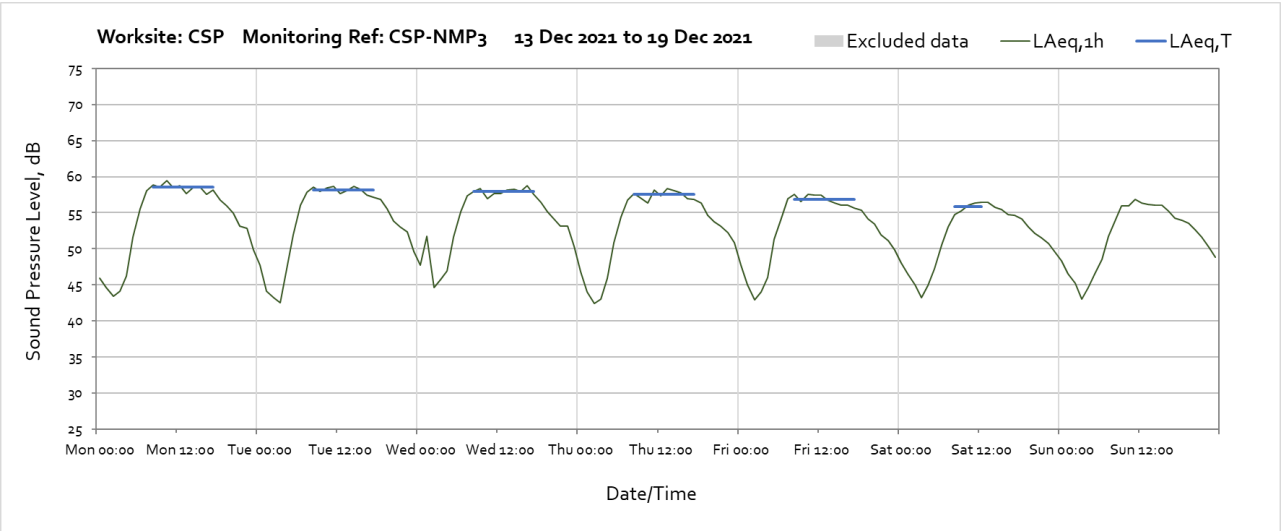


Worksite: CSP - Monitoring Ref: CSP-NMP3

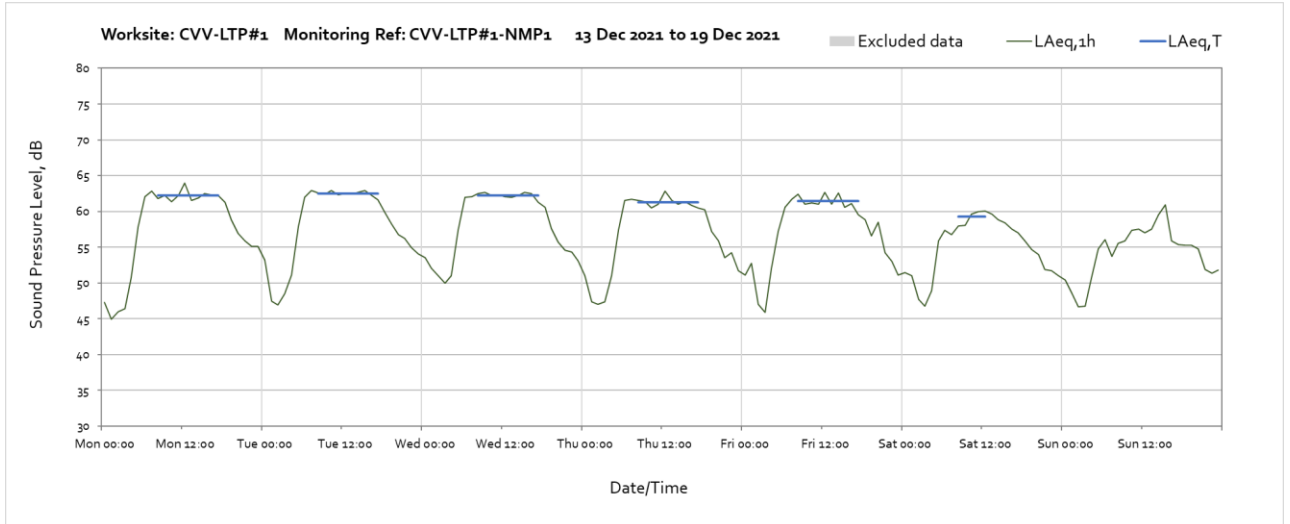
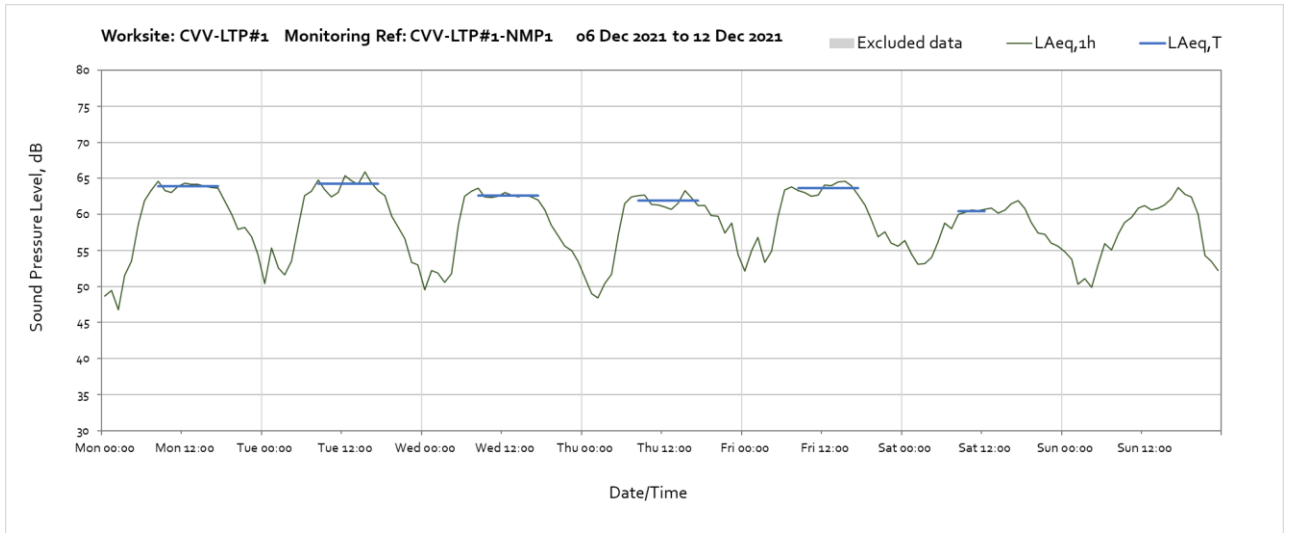
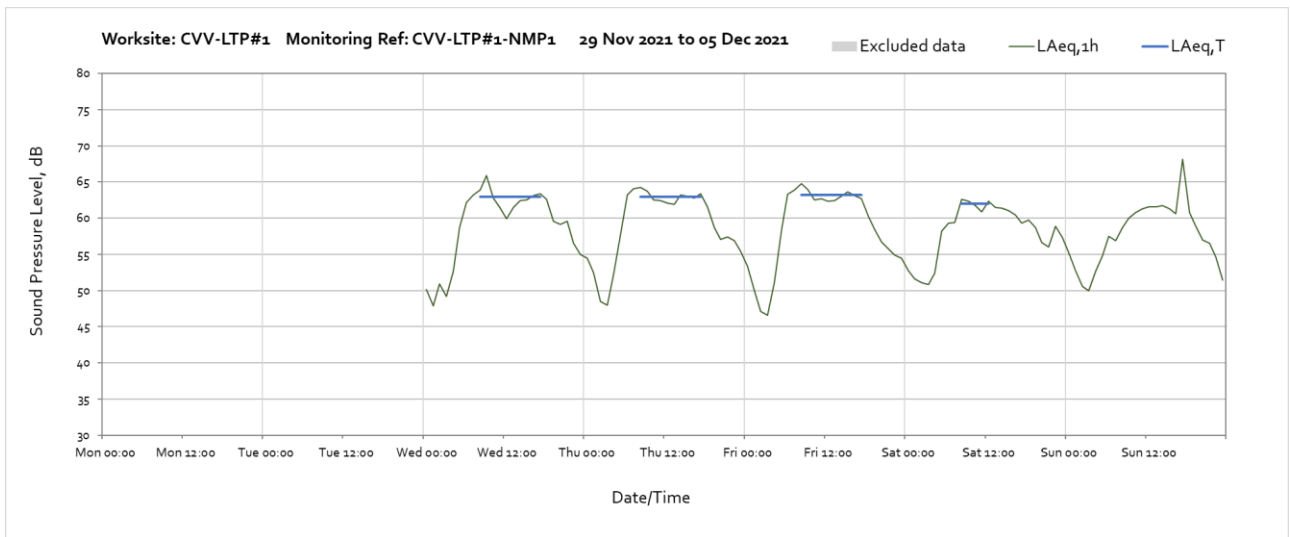


Note: Missing data between 10:00 and 12:00 on the 10th December was due to monitor maintenance.

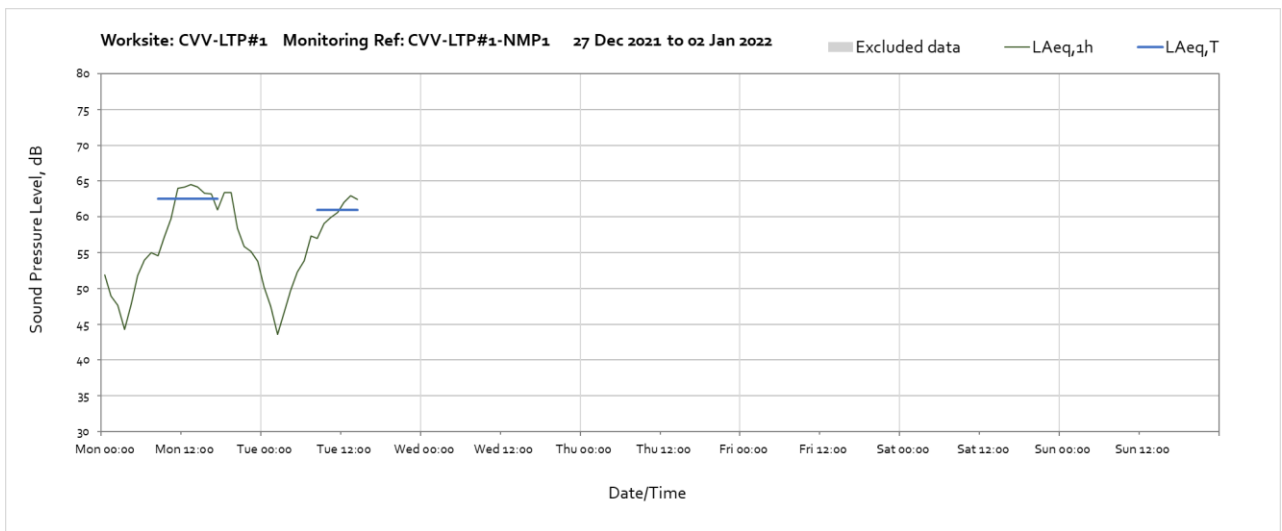
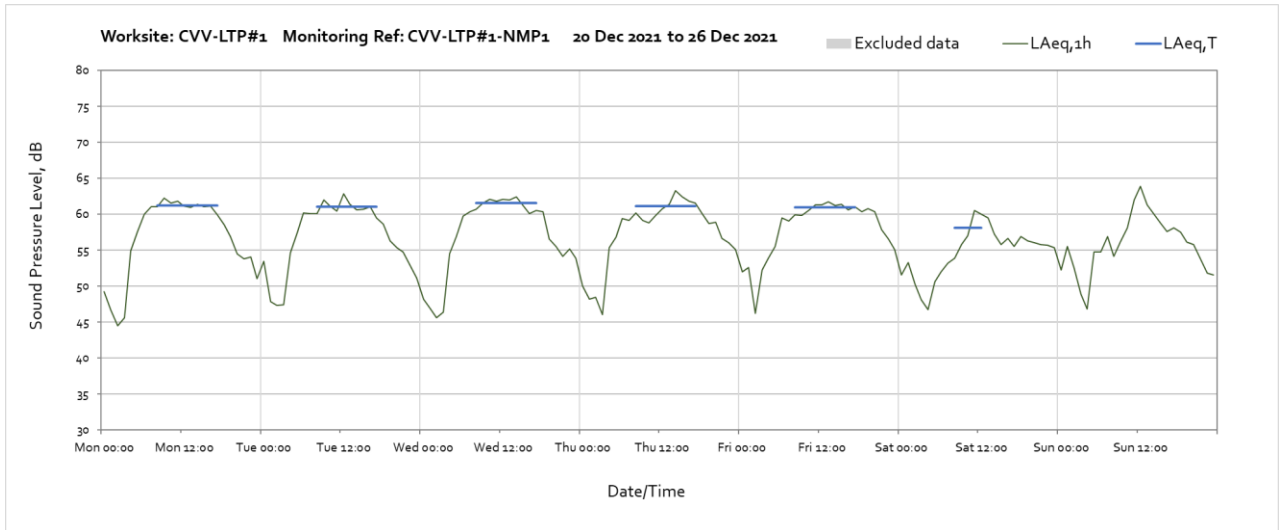
OFFICIAL



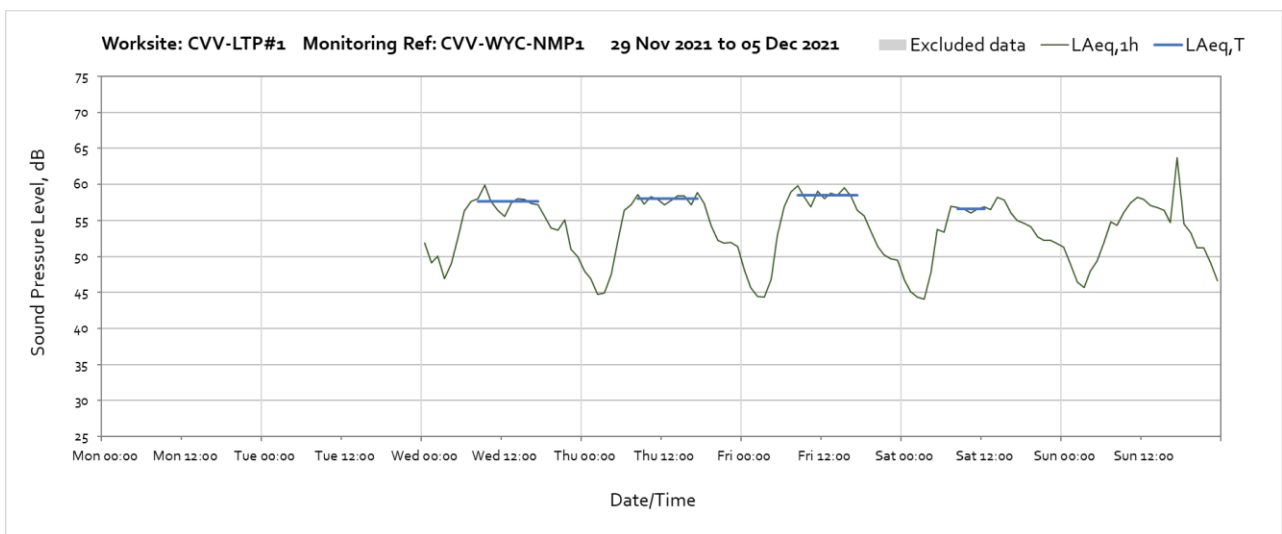
Worksite: CVV-LPT#1 – Monitoring Ref: CVV-LPT#1-NMP1

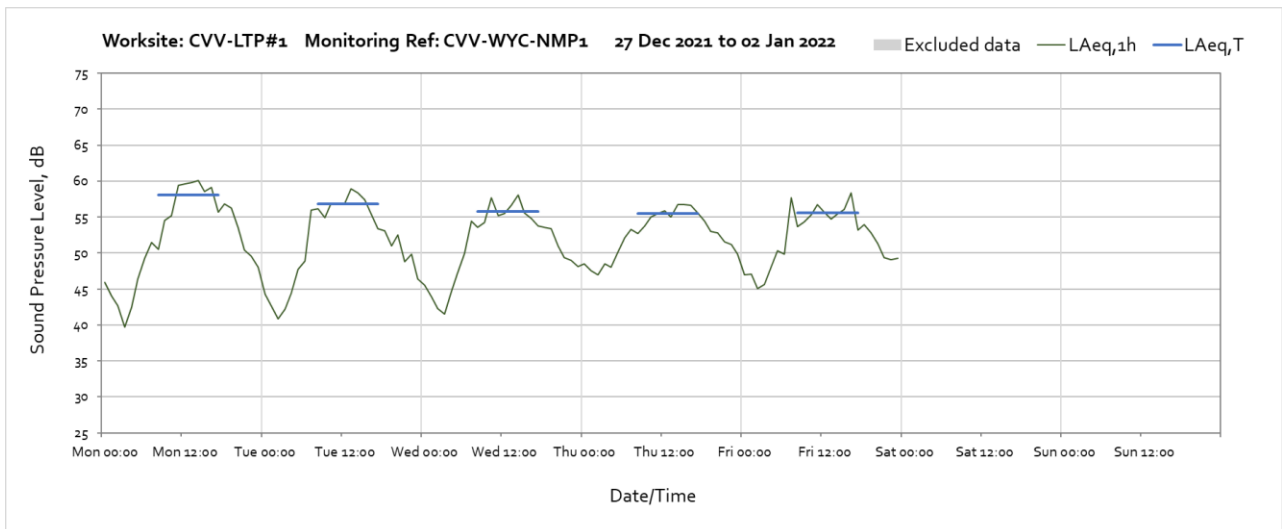
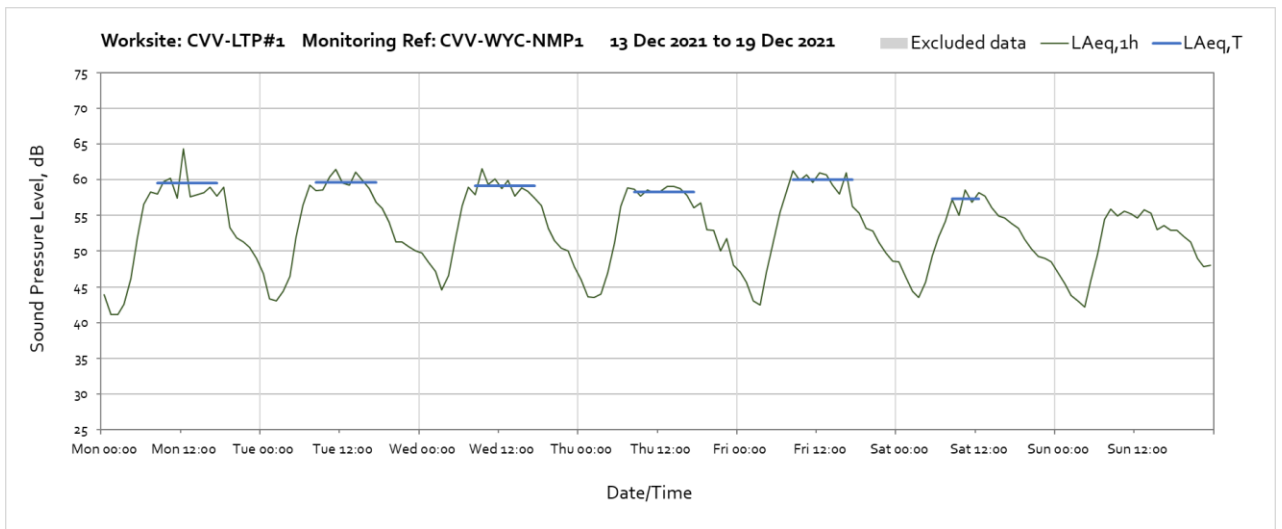
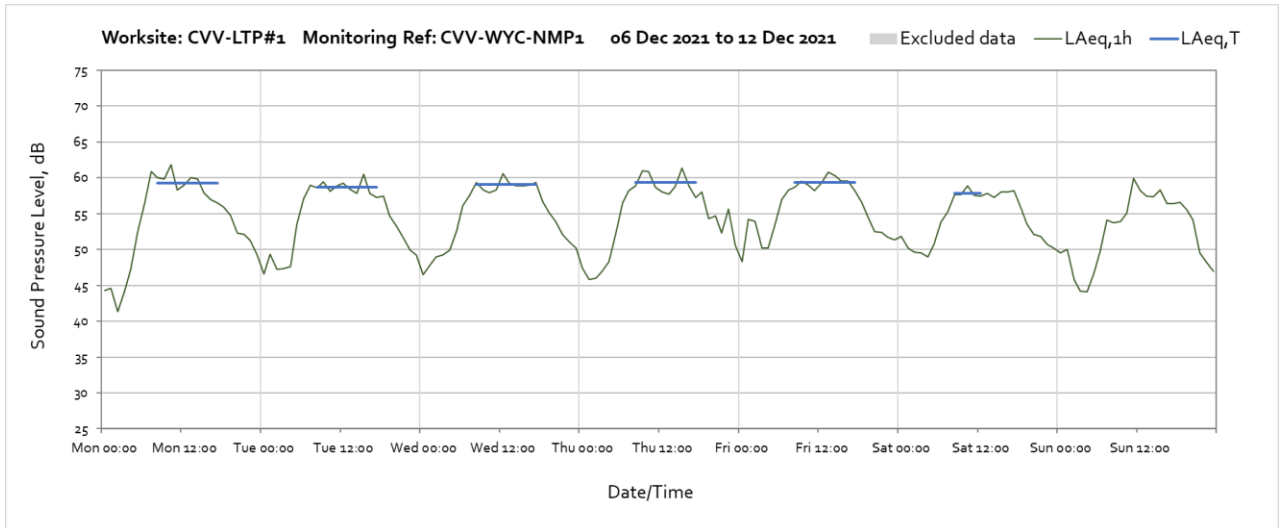


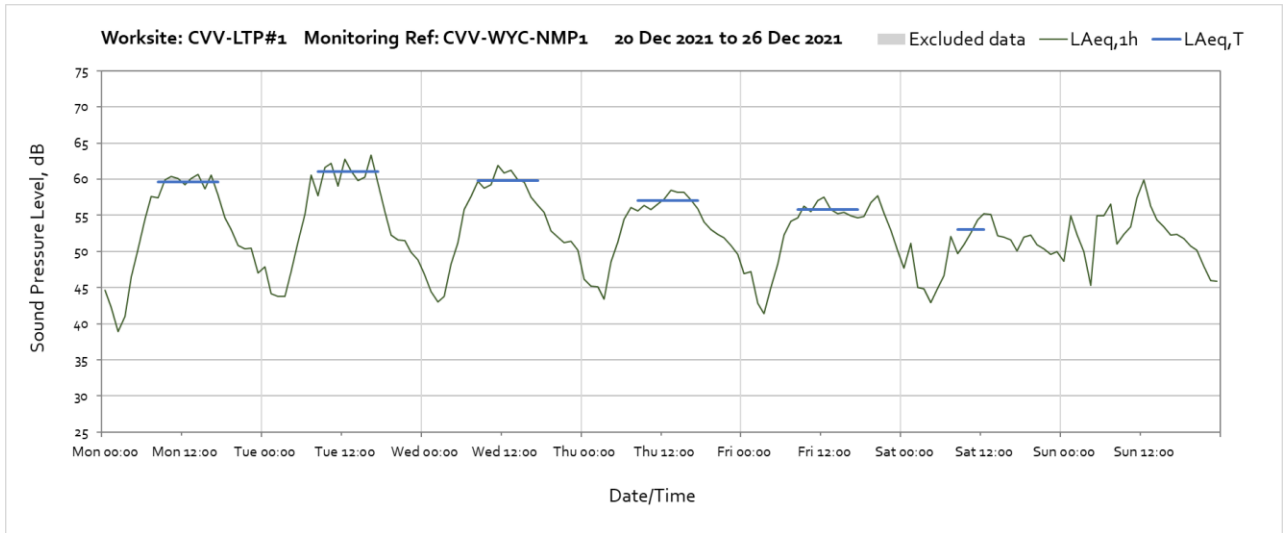
OFFICIAL



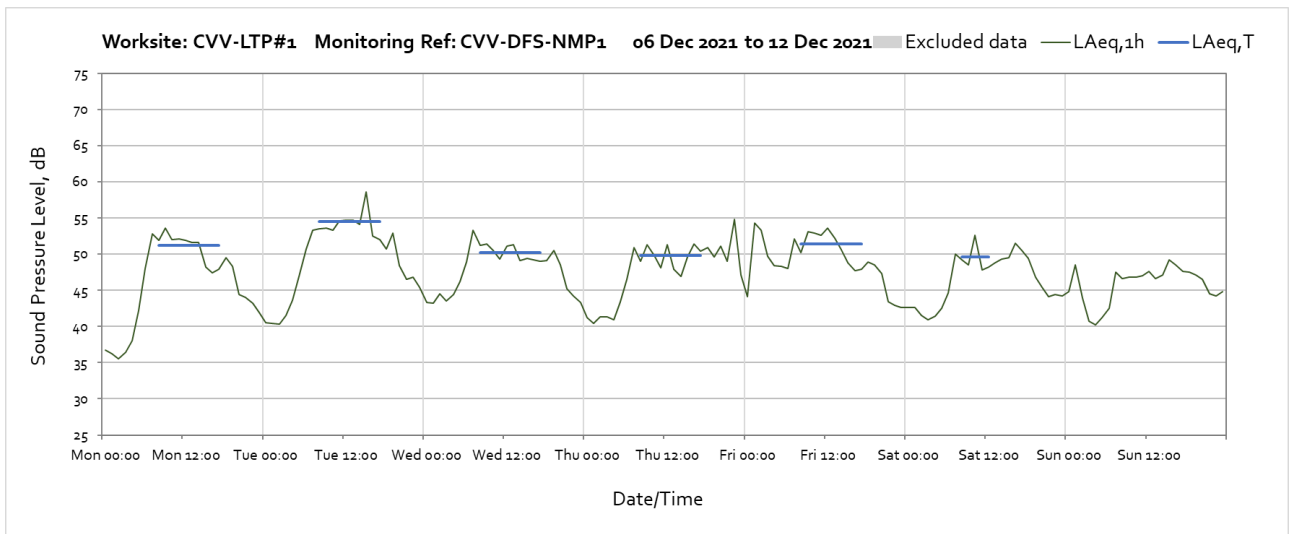
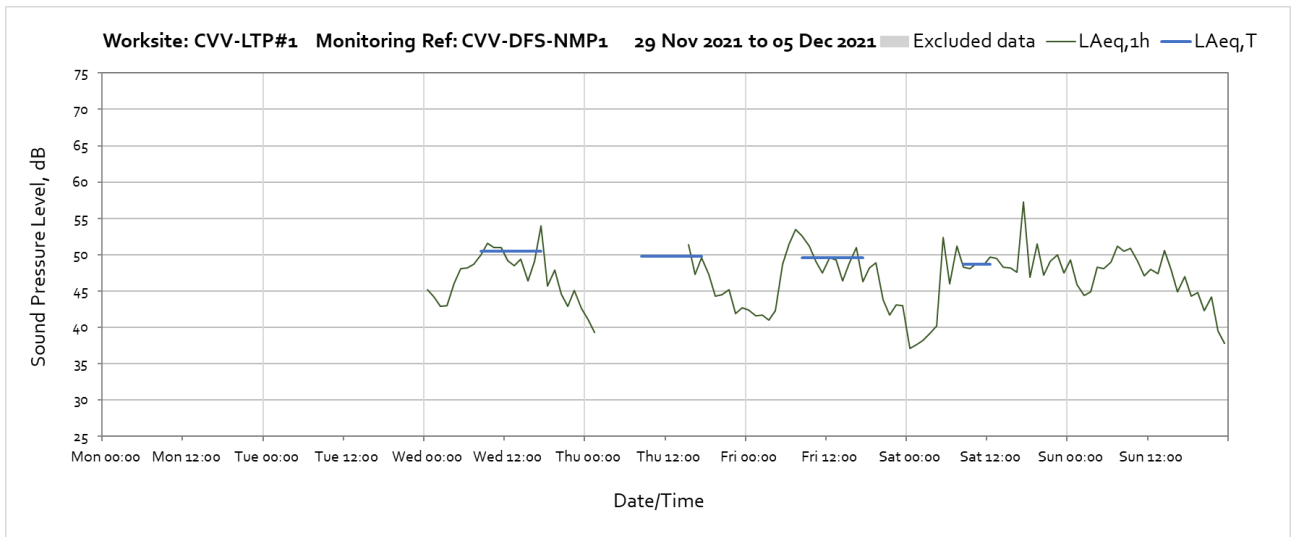
Worksite: CVV-LPT#1 - Monitoring Ref: CVV-WYC-NMP1

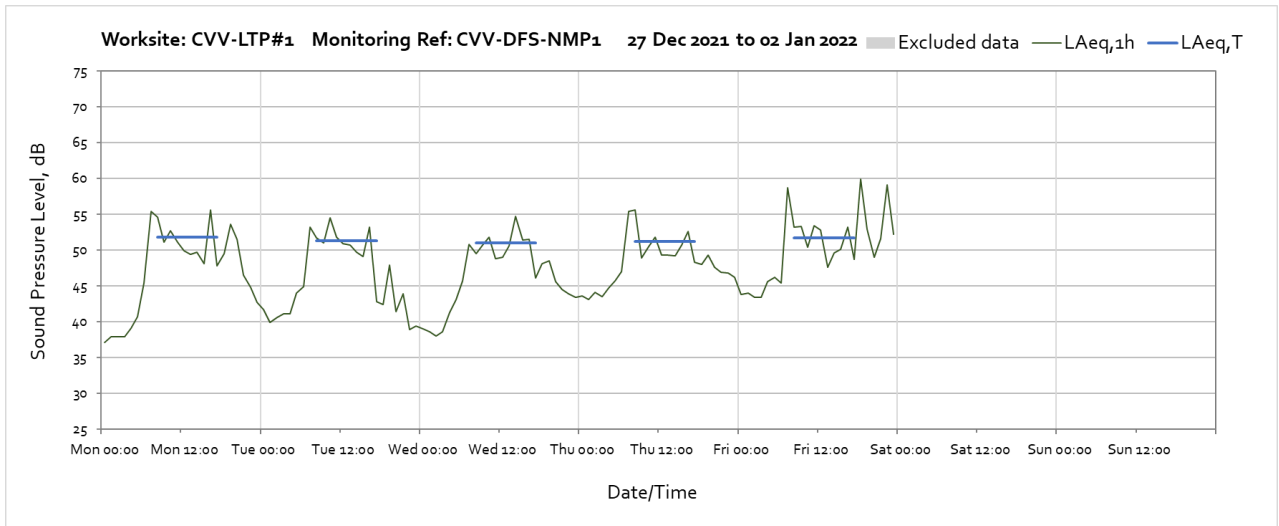
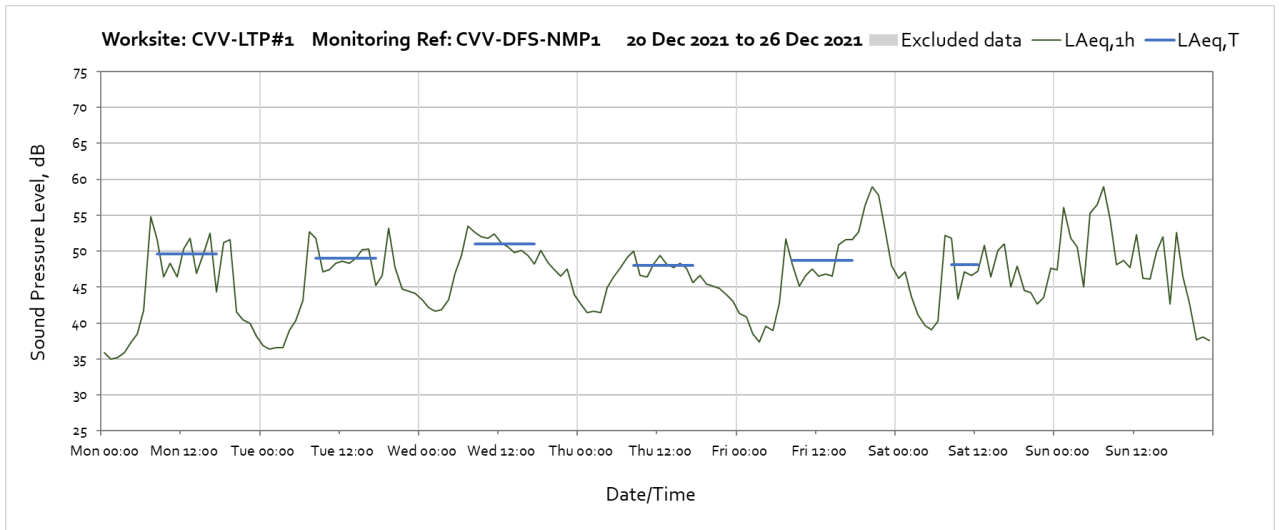
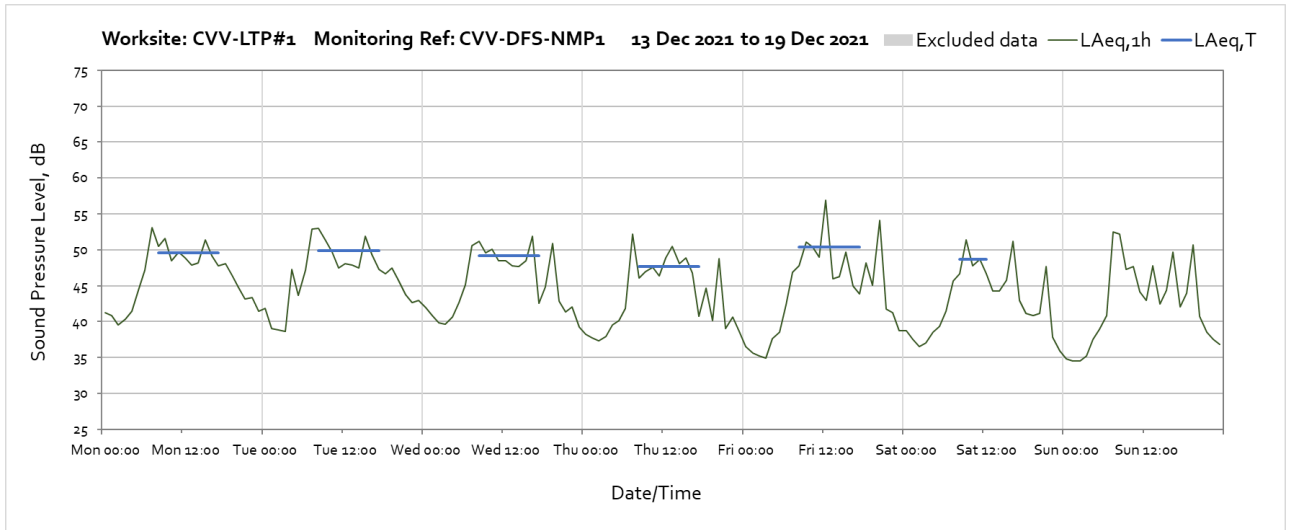




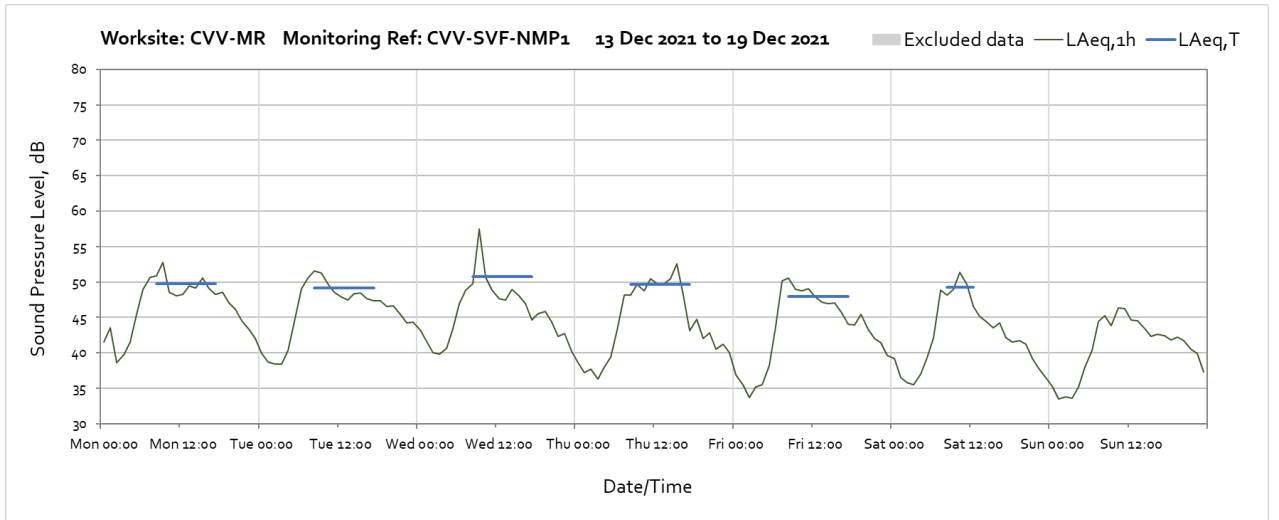
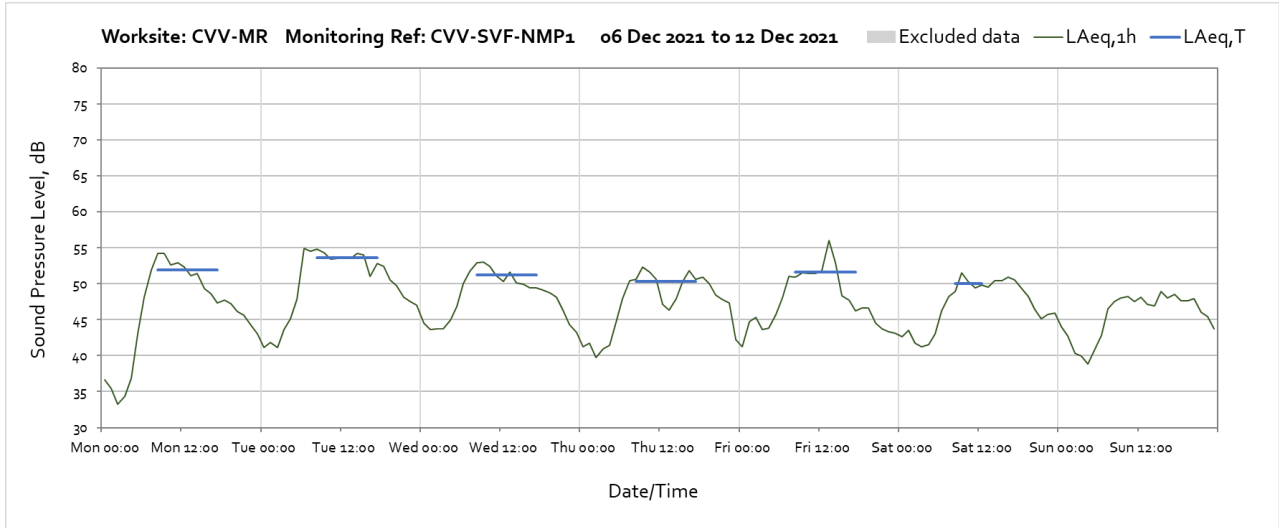
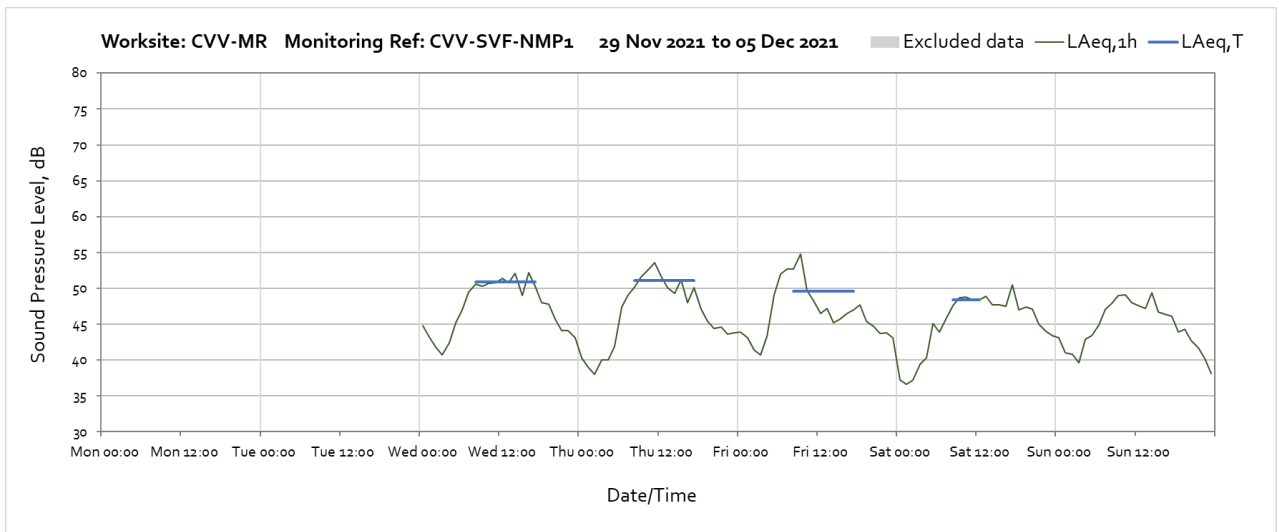


Worksite: CVV-LTP#1 - Monitoring Ref: CVV-DFS-NMP1

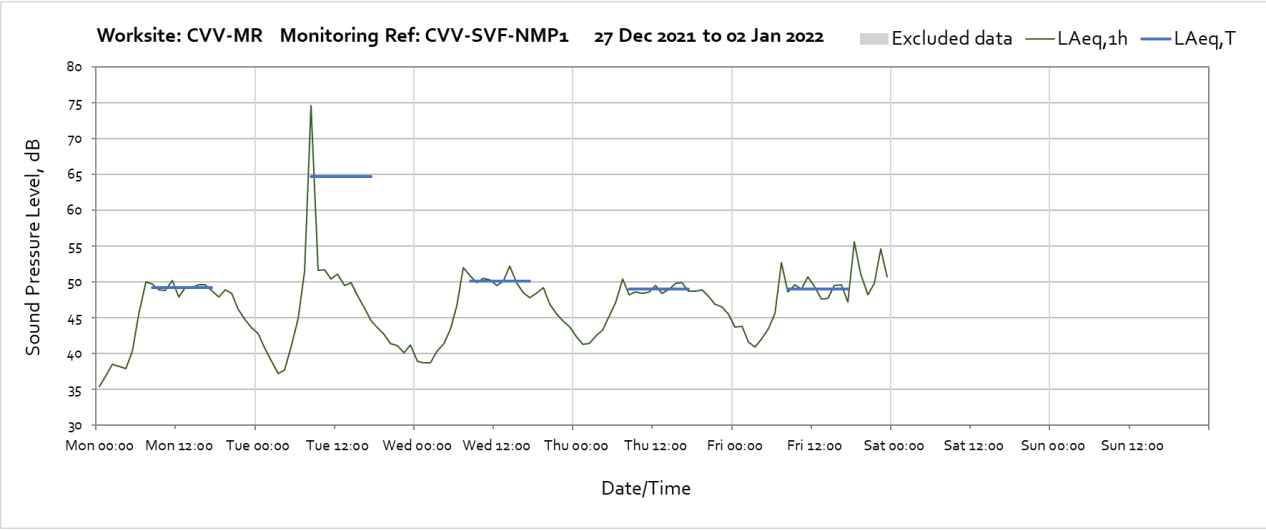
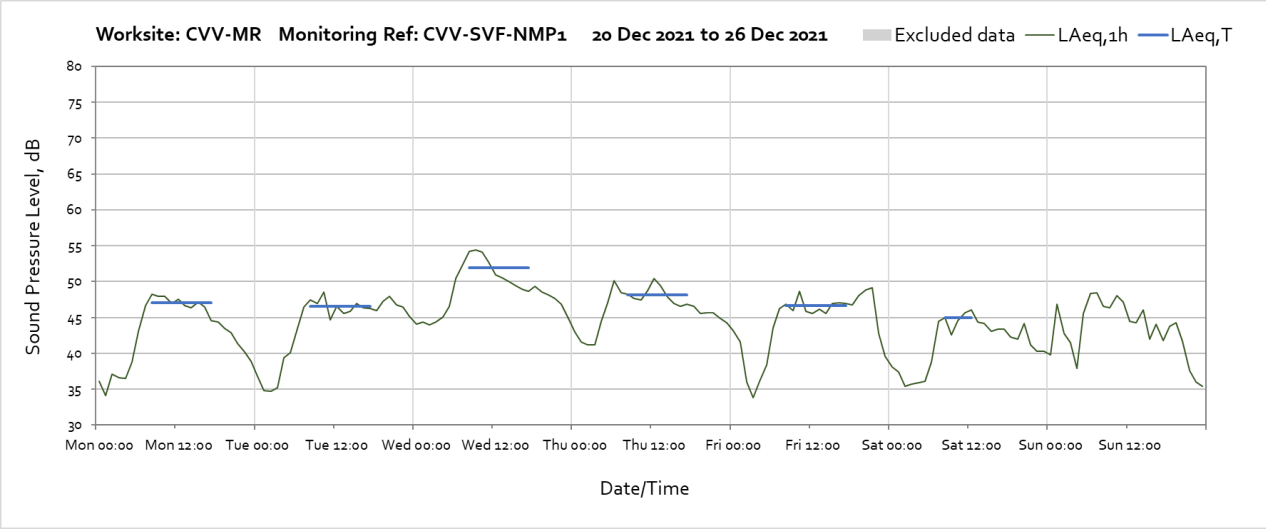




Worksite: CVV-MR - Monitoring Ref: CVV-SVF-NMP1



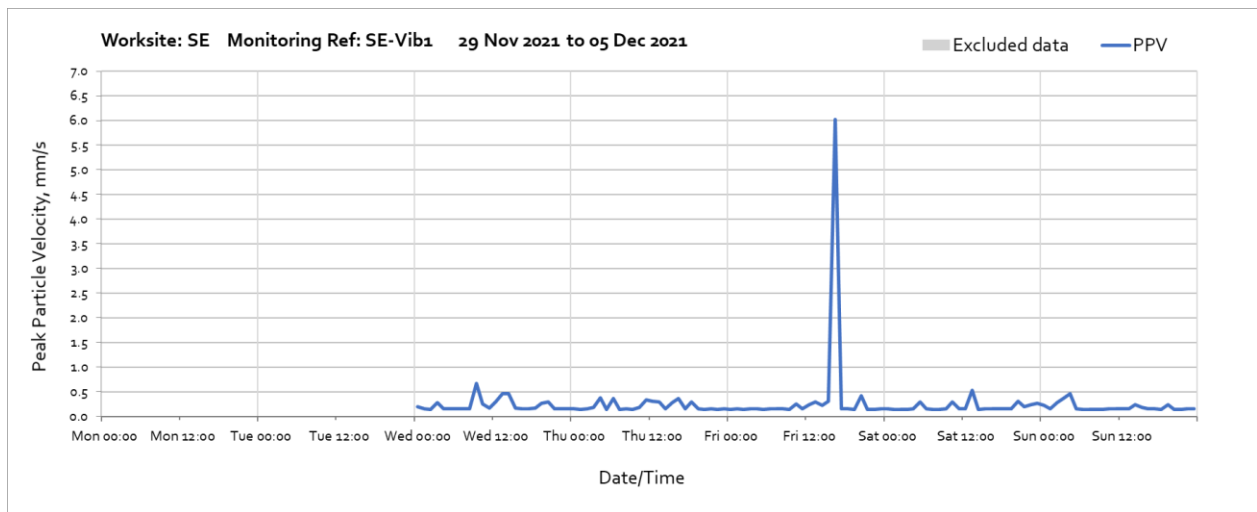
OFFICIAL



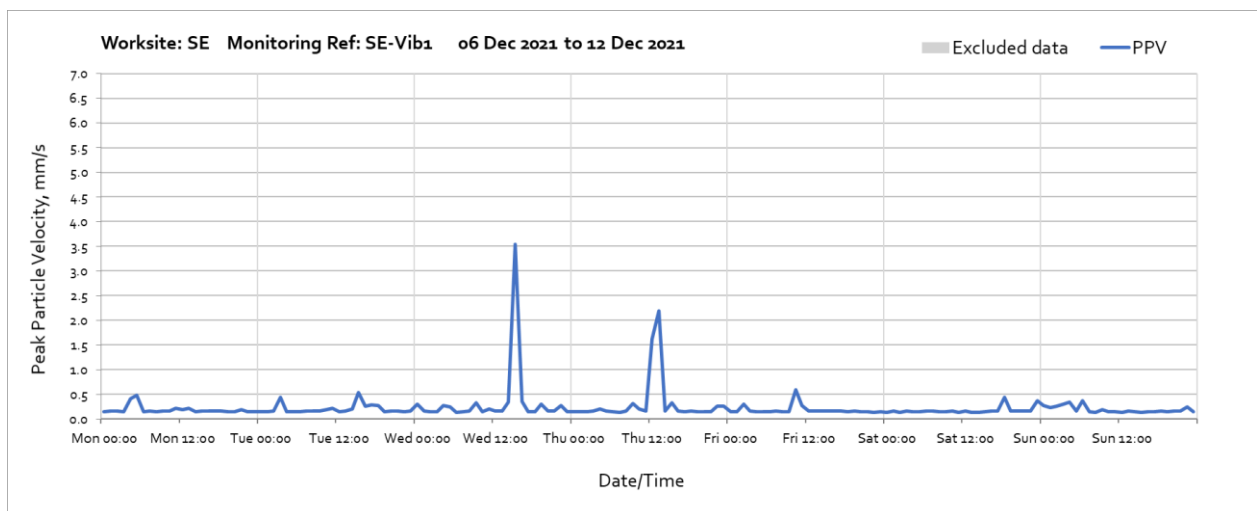
Vibration

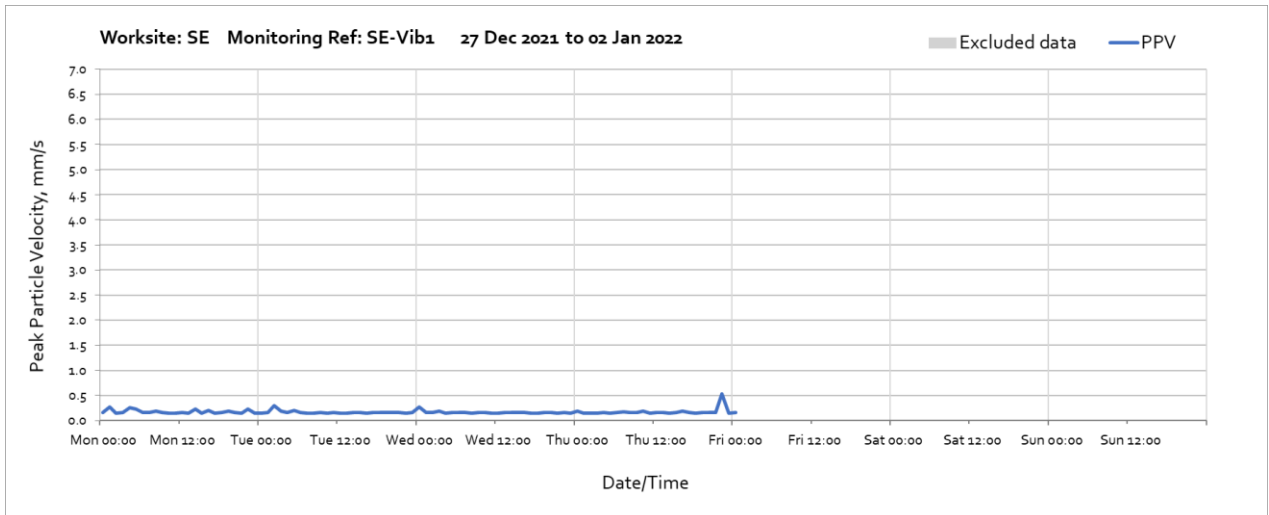
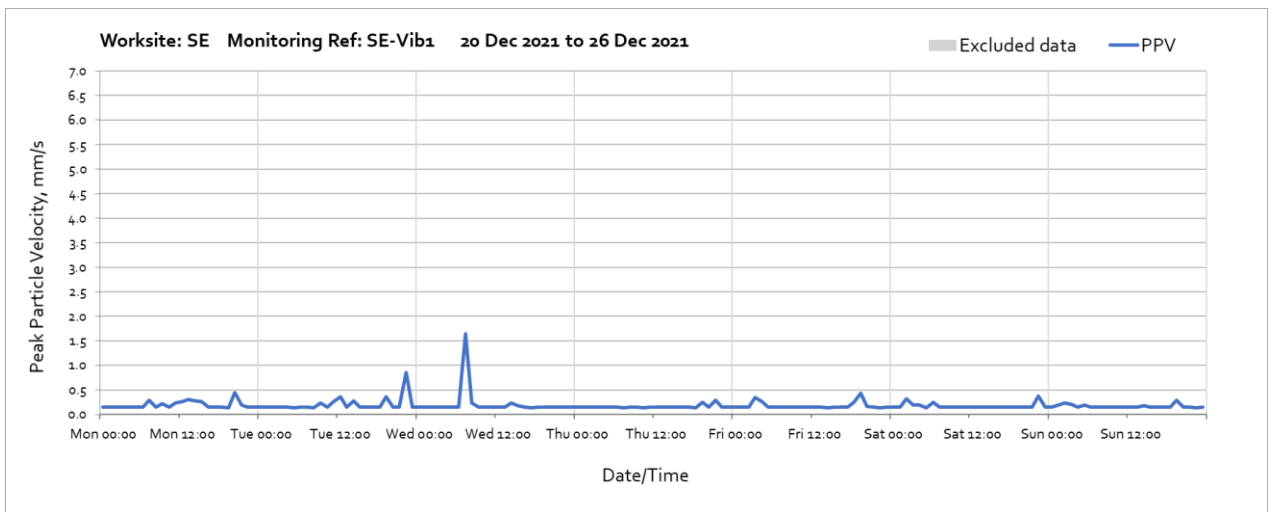
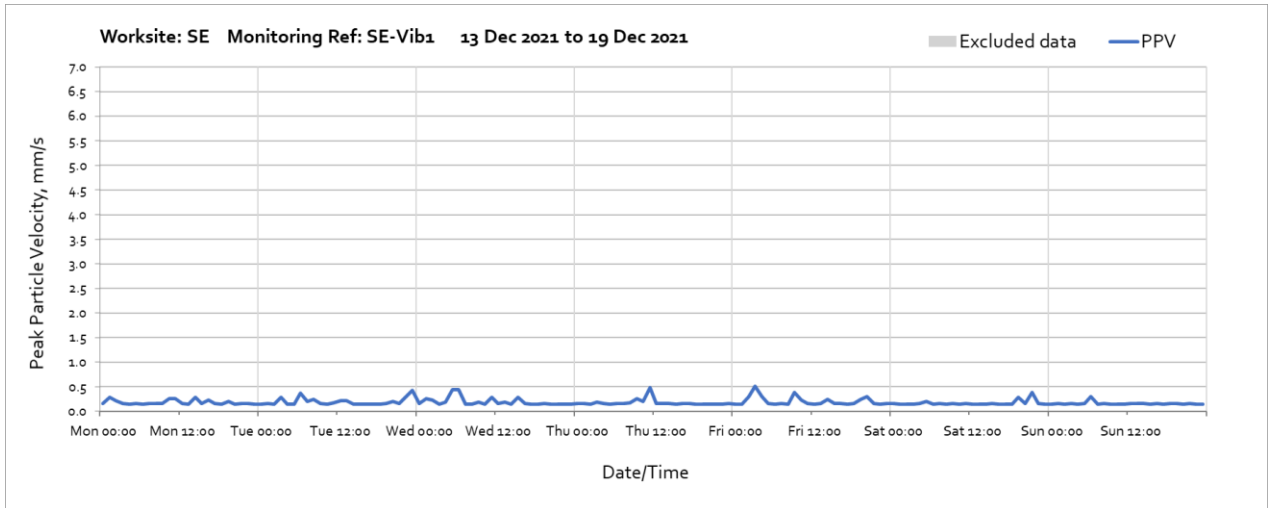
The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the highest PPV of the three orthogonal axes x, y and z. Where high values of PPV were caused by local interference with the vibration monitor, which are not representative 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: SE – Monitoring Ref: SE-Vib 1



Note: High levels of vibration measured between 16:00 and 17:00 on Friday 3rd December were due to deliveries to the work site. The receptor is located further from the monitoring location therefore vibration levels are expect to be lower.





Worksite: RF – Monitoring Ref: RF-Vib1

