

## **Construction noise and vibration Monthly Report – July 2021**

### **Buckinghamshire**

<b>Non-Technical Summary</b>	<b>1</b>
<b>Abbreviations and Descriptions</b>	<b>4</b>
<b>1 Introduction</b>	<b>5</b>
1.2 Measurement Locations	10
<b>2 Summary of Results</b>	<b>12</b>
2.1 Summary of Measured Noise Levels	12
2.2 Exceedances of the LOAEL and SOAEL	16
2.3 Exceedances of Trigger Level	19
2.4 Complaints	19
<b>Appendix A Site Locations</b>	<b>21</b>
<b>Appendix B Monitoring Locations</b>	<b>33</b>
<b>Appendix C Data</b>	<b>45</b>

#### **List of tables**

Table 1: Table of Abbreviations	4
Table 2: Monitoring Locations	10
Table 3: Summary of Measured dB $L_{Aeq}$ Data over the Monitoring Period	13
Table 4: Summary of Measured PPV Data over the Monitoring Period	16
Table 5: Summary of Exceedances of LOAEL and SOAEL	17
Table 6: Summary of Total Exceedances of SOAEL	18
Table 7: Summary of Exceedances of Trigger Levels	19
Table 8: Summary of Complaints	19

# 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 July 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 no works were undertaken during the month of July 2021.
- Noise monitoring was undertaken in the vicinity of Shepherds Furze Farm worksite (ref.: SFF) where excavation works, removal of decommissioned pipeline, site mobilisation works, enabling works, assembly of piling platform, construction of embankments and walls, earthworks and at-grade crossing were undertaken.
- Noise monitoring was undertaken in the vicinity of School Hill Compound worksite (ref.: SHC) where batching plant compound mobilisation was underway.
- Noise monitoring was undertaken in the vicinity of the School Hill UTX worksite (ref.: SHU) where site setup and horizontal drilling works were underway.
- Noise monitoring was undertaken in the vicinity of the Calvert South worksite reference (ref: CALS) where no works were undertaken in the month of July 2021.
- Noise monitoring was undertaken in the vicinity of Quainton Access Road (ref: QAR), where construction of drainage and hardstanding at the Station Road satellite compound, installation of geogrid and aggregates, ground investigations, bearing testing, installation of culvert and construction of concrete slabs were underway.
- Noise monitoring was undertaken in the vicinity of Hall Farm, Bicester Road worksite (ref: HF) where saw cutting of the existing asphalt, asphaltting, excavation works, installation of drainage, ducting, slabs and kerbs, pouring of concrete and backfilling were underway.
- Noise monitoring was undertaken in the vicinity of Little Missenden Vent Shaft worksite (ref.: CVV-LM) where general plant operation, earthworks, ground treatment, installation of structural wall and water treatment were underway.
- Noise monitoring was undertaken in the vicinity of Amersham Vent Shaft worksite (ref.: CVV-AM), where general plant operation, earthworks, installation of structural wall, water treatment, and concrete work, works were underway.
- Noise and vibration monitoring were undertaken in the vicinity of Bottom House Farm Lane worksite (ref.: BHFL), where removal of existing roads, operation of general plant and asphaltting were underway.

- Noise monitoring was undertaken in the vicinity of Chalfont St Giles Vent Shaft worksite (ref.: CSG) where operation of general plant, earthworks, ground and water treatment works, temporary capping of beams and structural wall installation works were underway.
- Noise monitoring was undertaken in the vicinity of Chalfont St Peter Vent Shaft worksite (ref.: CSP), where stockpile management, piling, shaft dewatering and excavation, preparatory works for shaft base slab, operation of general and auxiliary plant and post-treatment injection works were in progress.
- Noise monitoring was undertaken in the vicinity of Load Test Pile 1 worksite (ref.: LTP #1), where compound operation, civil works, earthworks, drainage works, ground investigation works, piling, abutment works, integrity test of concrete piles, River Colne realignment and diversion of Thames water utilities were underway.

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

- Field west of Aylesbury, as part of water utility works.
- Calvert and Turweston, as part of power utility works.
- Wendover Dean where clearance of woodlands and tree plantation works were undertaken.
- Frith Hill, Calvert area where vegetation clearance near Leather Lane, Potter Row and Frith Hill were undertaken.
- Hunts Green Farm, Great Missenden where vegetation clearance, fencing, digging of trial trenching and bore holes were undertaken.
- Waddesdon where installation of boundary fencing, archaeological investigations, vegetation clearance and reptile habitat fencing were undertaken.
- Hartwell where trial archaeological works were undertaken.
- Aylesbury Park Golf Course where archaeological works and installation of boundary fencing were undertaken.
- Great Moor Sailing Club where construction of new access route, installation of slipways and concrete bases for shipping containers were undertaken.
- Putlowes Drive where herds mitigation was undertaken.
- Great Missenden where chalk trial, building of temporary chalk embankment, construction of security plaza, soil stripping for the construction of the access roads were underway.
- Bowood Lane to Leather Lane where grass cutting was underway.

- Road Barn Farm where demolition works were undertaken.
- Chiltern Area where ground investigation and trial holes were undertaken.
- Small Dean Lane where construction of compound and access roads were underway.
- Wendover Batching Plant where construction of concrete slab and vegetation clearance works were undertaken.
- Twyford - West Street where stockpiling was underway.
- Chetwode where de-vegetation was underway.
- A422 Compound where topsoil stripping, construction of temporary pond, installation of instrumentation and measurement and construction of small compound for silos and welfare were undertaken;
- School End - Barton Hill Farm where topsoil stripping, excavation of subsoil, soil stabilisation for road construction, temporary drainage pond and construction of culvert crossing were undertaken;
- A41 Bicester Road Main Compound and Roundabout where construction of the main compound area and roundabout were underway.
- A41 Bicester Road Batch Plant where batch plant setup were undertaken.
- Site access road to A418 Oxford Road Compound where installation of culvert and utility crossing slabs, topsoil stripping and stockpiling were undertaken.
- A418 Oxford Road Main Compound where construction of main compound and stripping of topsoil were undertaken.
- Ground investigation works including rotary borehole drilling and trial pits were undertaken at various location along the HS2 route.
- Vegetation clearance at various location along the HS2 route was undertaken.

There was one exceedance of the HS2 threshold levels for significant noise impacts at HF worksite, which are defined in Information Paper E23 (<https://www.gov.uk/government/publications/hs2-information-papers-environment>), during the reporting period at any monitoring position.

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 1<sup>st</sup> to 31<sup>st</sup> July 2021.

1.1.3 Active 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 no works were undertaken in the month of July 2021.
- Shepherds Furze Farm worksite reference SFF (see plan 2 in Appendix A), where works activities included:
  - excavation works at Charndon Lodge underbridge;
  - dig and replace, and pile cropping works at East West Rail overbridge;
  - removal of the decommissioned pipeline between Gawcott Road and Queens Catherine Road;
  - West Street Compound mobilisation works (including installation of street lighting and wheel wash, setting up the logistics area and car park expansion);
  - enabling works at Addison Road overbridge;
  - Perry Hill overbridge works (including excavating to formation level and assembly of piling platform);

- construction of temporary bridge over Gawcott Road (including construction of both the eastern and western embankments and walls)
- earthworks for Oxford line (including removal of ballast, construction of attenuation pond and preparation for stockpiling) and
- construction of at-grade crossing.
- School Hill Compound worksite reference SHC (see plan 2 in Appendix A), where works activities included:
  - batching plant compound mobilisation including laying of protection slabs, protection of verge along highway plaza, installation of underground utilities and ducting, pouring concrete, expansion of carpark, and erection of batching plant and fit out;
- School Hill UTX worksite reference - SHU (see plan 2 in Appendix A), where works activities included:
  - site setup at Brackley Lane; and
  - horizontal drilling.
- Calvert South Worksite, near Calvert, reference - CALS (see plan 2 in Appendix A), where no works were undertaken in the month of July 2021.
- Quanton Access Road Worksite, reference - QAR (see plan 3 in Appendix A), where works activities included:
  - construction of drainage and hardstanding at Station Road satellite compound;
  - installation of geogrid and aggregates;
  - ground investigation;
  - bearing testing;
  - installation of culvert; and
  - construction of concrete slabs.
- Hall Farm, Bicester Road Worksite, reference – HF (see plan 4 in Appendix A), where works activities included:
  - saw cutting of the existing asphalt;
  - temporary asphaltting of the existing roads;
  - excavation works;
  - installation of drainage, ducting, slabs and kerbs;
  - pouring of blinding concrete; and
  - backfilling with aggregates.



- Colne Valley Viaduct - Little Missenden Vent Shaft worksite reference – CVV-LM (see plan 5 in Appendix A), where works activities included:
  - operation of general plant at site;
  - earthworks including stockpile management;
  - ground pre and post treatment (drilling and grouting);
  - structural wall installation works including civil works; and
  - water treatment.
- Colne Valley Viaduct - Amersham Vent Shaft Worksite, reference – CVV - AM (see plan 6 in Appendix A), where works activities included:
  - operation of general plant at site;
  - earthworks including stockpile management;
  - installation of structural wall including construction of guide walls, excavation, de-sanding, mud treatment, and concreting; and
  - water treatment.
- Bottom House Farm Lane Worksite, reference - BHFL (see plan 7 in Appendix A), where work activities included:
  - removal of existing roads;
  - placing and compacting sub-base; and
  - laying asphalt.
- Colne Valley Viaduct - Chalfont St Giles Vent Shaft Worksite, reference - CVV-CSG (see plan 7 in Appendix A), where works activities included:
  - operation of general plant at site;
  - earthworks (stockpile management);
  - ground post treatment (drilling and grouting) and water treatment;
  - temporary capping of beams (including breakout and formation); and
  - structural wall installation works (concreting).
- Colne Valley Viaduct - Chalfont St Peter Vent Shaft Worksite, reference – CVV-CSP (see plan 8 in Appendix A), where works activities included:
  - operation of general and auxiliary plant at site;
  - stockpile management;
  - basement secant piling works (including construction of guide walls and shallow box retaining wall, contiguous and secant piles, excavation, cutting of contiguous and secant piles)

- preparatory works for shaft base slab;
- shaft dewatering and excavation; and
- post-treatment injection works including dewatering.
- Colne Valley Viaduct - Load Test Pile 1 Worksite, reference – CVV-LTP #1 (see plan 9 in Appendix A), where works activities included:
  - piling for the construction of the jetty;
  - construction of a cofferdam (including sheet piling, excavation, dewatering, installation of waling beams and concrete plugs;
  - main piling works including boring pile, de-sanding, installation of reinforcement cage and concrete pile, break-out of bored pile to prepare pile cap and installation of grout curtain around viaduct pile;
  - Denham Water Ski Club and North Embankment compound operation and de-sanding;
  - civil works, earthworks and drainage works on haul road;
  - north abutment works (including construction of pile wall and yard support);
  - integrity test of concrete piles;
  - ground investigation works;
  - realignment of River Colne; and
  - diversion of Thames water.

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

- Field west of Aylesbury, as part of water utility works.
- Calvert and Turweston, as part of power utility works.
- Wendover Dean where clearance of woodlands and tree plantation works were undertaken.
- Frith Hill, Calvert area where vegetation clearance near Leather Lane, Potter Row and Frith Hill were undertaken.
- Hunts Green Farm, Great Missenden where vegetation clearance, fencing, digging of trial trenching and bore holes were undertaken.
- Waddesdon where installation of boundary fencing, archaeological investigations, vegetation clearance and reptile habitat fencing were undertaken.
- Hartwell where trial archaeological works were undertaken.

- Aylesbury Park Golf Course where archaeological works and installation of boundary fencing were undertaken.
- Great Moor Sailing Club where construction of new access route, installation of slipways and concrete bases for shipping containers were undertaken.
- Putlowes Drive where herds mitigation were undertaken.
- Great Missenden where chalk trial, building of temporary chalk embankment, construction of security plaza, soil stripping for the construction of the access roads were underway.
- Bowood Lane to Leather Lane where grass cutting was underway.
- Road Barn Farm where demolition works were undertaken.
- Chiltern Area where ground investigation and trial holes were undertaken.
- Small Dean Lane where construction of compound and access roads were underway.
- Wendover Batching Plant where construction of concrete slab and vegetation clearance works were undertaken.
- Twyford - West Street where stockpiling was underway.
- Chetwode where de-vegetation was underway.
- A422 Compound where topsoil stripping, construction of temporary pond, installation of instrumentation and measurement and construction of small compound for silos and welfare were undertaken;
- School End - Barton Hill Farm where topsoil stripping, excavation of subsoil, soil stabilisation for road construction, temporary drainage pond and construction of culvert crossing were undertaken;
- A41 Bicester Road Main Compound and Roundabout where construction of the main compound area and roundabout were underway.
- A41 Bicester Road Batch Plant where batch plant setup were undertaken.
- Site access road to A418 Oxford Road Compound where installation of culvert and utility crossing slabs, topsoil stripping and stockpiling were undertaken.
- A418 Oxford Road Main Compound where construction of main compound and stripping of topsoil were undertaken.
- Ground investigation works including rotary borehole drilling and trial pits were undertaken at various locations along the HS2 route.
- Vegetation clearance at various locations along the HS2 route was undertaken.

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 Eighteen noise and one vibration monitoring installations were active in July in the BS area. Table 2 summarises the positions of noise and vibration monitoring installations within the BS area in July 2021.
- 1.2.2 An additional noise monitor (ref.: SE-NMP1) was installed at School End, in proximity to the School End worksite, ref.: SE, on the 16<sup>th</sup> of July.
- 1.2.3 An additional noise monitor (ref.: CVV-DFS-NMP1) was installed at Denham Film Studio, in proximity to the CVV-1MC05 worksite, ref.: CVV-LTP #1, on the 7<sup>th</sup> of July.
- 1.2.4 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
SFF	SFF-NMP1	Shepherds Furze Farm, Calvert
SHC	SHC-NMP1	School Hill Compound, Calvert
SHU	SHU-NMP1	70 Cotswold Way, Calvert
CALS	CALS-NMP1	Site boundary adjacent to Red Kite View, Calvert
QAR	QAR-NMP1	1 Woodlands Farm Cottages, Quainton
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon
CVV-AM	CVV-AM-NMP1	Amersham Vent Shaft Worksite, Whielden Lane, Amersham
CVV-LM	CVV-LM-NMP1	Little Missenden Vent Shaft Worksite, Amersham
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane
	BHFL-Vib1	Pine Cottage, Bottom House Farm Lane
CVV-CSG	CVV-CSG-NMP1	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane
	CVV-CSG-NMP2	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane

<b>Worksite Reference</b>	<b>Measurement Reference</b>	<b>Address</b>
CVW-CSP	CVW-CSP-NMP1	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
	CVW-CSP-NMP2	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
	CVW-CSP-NMP3	Chalfont St Peter Vent Shaft Worksite, Chesham Lane, Chalfont St. Peter
CVW-LTP #1	CVW-LTP #1-NMP1	Northern boundary, Load Test Pile 1 Worksite, Denham Water Ski Club
	CVW-WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham, Denham Garden Village
	CVW-DFS-NMP1	Denham Film Studio, Uxbridge

## 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<sub>Aeq</sub> Data over the Monitoring Period

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly Average L <sub>Aeq,T</sub> (Highest Day L <sub>Aeq,T</sub> )					Saturday Average L <sub>Aeq,T</sub> (highest day L <sub>Aeq,T</sub> )					Sunday / Public Holiday Average L <sub>Aeq,T</sub> (highest day L <sub>Aeq,T</sub> )	
				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	44.4 (50.1)	48.5 (53.0)	44.0 (49.8)	42.8 (52.6)	38.9 (51.8)	41.2 (41.7)	45.2 (45.8)	45.7 (50.5)	45.3 (53.5)	37.0 (43.0)	46.2 (52.6)	37.0 (41.6)
SFF	SFF-NMP1	Shepherds Furze Farm, Calvert	Free-field	69.1 (82.8)	71.2 (76.2)	70.7 (76.7)	61.6 (73.3)	43.4 (65.3)	71.0 (73.1)	69.4 (71.3)	50.7 (58.6)	56.3 (61.6)	58.0 (58.8)	41.6 (47.2)	N/A*
SHC	SHC-NMP1	School Hill Compound, Calvert	Free-field	52.4 (61.6)	61.4 (71.7)	46.1 (50.0)	44.5 (52.6)	42.9 (53.0)	44.9 (46.4)	46.6 (50.0)	44.6 (46.2)	45.5 (53.0)	41.8 (43.8)	45.9 (53.5)	43.3 (47.7)
SHU	SHU-NMP1	70 Cotswold Way, Calvert	Free-field	50.2 (54.3)	53.2 (61.6)	49.0 (60.8)	47.7 (55.9)	44.0 (55.7)	48.4 (48.9)	49.7 (51.3)	52.6 (65.1)	50.2 (64.9)	40.8 (48.6)	53.4 (66.7)	44.2 (52.9)
CALS	CALS-NMP1	Site boundary adjacent to Red Kite View, Calvert	Free-field	60.3 (63.8)	57.4 (60.9)	46.8 (53.3)	46.6 (54.4)	46.3 (57.7)	48.9 (50.5)	48.2 (52.4)	48.6 (49.3)	46.2 (52.3)	42.1 (47.0)	45.3 (52.9)	48.7 (57.3)
QAR	QAR-NMP1	1 Woodlands Farm Cottages, Quainton	Free-field	53.9 (55.6)	52.8 (58.6)	51.3 (58.9)	48.3 (56.6)	43.8 (52.7)	48.5 (49.4)	50.1 (51.8)	50.8 (53.4)	51.3 (66.0)	41.0 (51.1)	49.9 (58.7)	44.0 (51.7)
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon	Free-field	62.0 (64.7)	62.8 (65.2)	62.1 (66.9)	60.4 (64.4)	56.2 (65.4)	59.0 (60.6)	60.9 (61.4)	61.7 (62.6)	60.8 (64.2)	56.0 (66.3)	59.8 (61.9)	55.7 (60.8)
CVV-AM	CVV-AM-NMP1	Whielden Lane, Amersham	Free-field	70.0 (76.5)	71.3 (76.4)	69.0 (73.5)	68.3 (73.0)	63.9 (72.0)	64.8 (68.3)	66.5 (69.2)	69.2 (71.8)	65.8 (71.9)	59.4 (65.5)	67.2 (71.5)	62.0 (68.6)

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$ )					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$ )					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$ )	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
CVV-LM	CVV-LM-NMP1	Little Missenden Vent Shaft Worksite	Free-field	63.7 (66.4)	62.7 (64.3)	62.9 (64.6)	60.1 (62.8)	55.7 (64.6)	60.4 (61.0)	62.0 (62.7)	62.5 (63.2)	61.3 (63.3)	54.5 (58.6)	60.9 (63.6)	56.6 (66.4)
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane	Free-field	52.9 (55.8)	54.0 (57.2)	54.3 (75.1)	51.2 (64.2)	46.4 (54.8)	51.0 (57.1)	52.9 (54.8)	52.5 (54.0)	54.1 (62.2)	45.3 (51.0)	52.3 (60.0)	46.4 (54.1)
CVV-CSG	CVV-CSG-NMP1	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane	Free-field	53.0 (64.8)	56.0 (58.6)	50.7 (54.6)	43.2 (50.4)	43.0 (59.2)	52.2 (55.6)	51.7 (54.0)	44.2 (48.7)	45.8 (56.3)	42.8 (55.2)	46.5 (57.3)	44.7 (54.8)
	CVV-CSG-NMP2	Chalfont St Giles Vent Shaft Worksite, Bottom House Farm Lane	Free-field	53.7 (62.0)	60.3 (64.8)	49.9 (53.9)	45.6 (66.0)	44.0 (67.8)	52.9 (55.1)	57.1 (67.3)	45.2 (49.4)	47.6 (62.5)	43.0 (52.2)	46.6 (56.5)	42.0 (49.3)
CVV-CSP	CVV-CSP-NMP1	Chalfont St Peter Vent Shaft Worksite	Free-field	65.5 (75.5)	68.6 (74.0)	63.2 (76.3)	58.6 (67.2)	51.9 (60.6)	60.7 (64.6)	64.0 (65.2)	61.6 (64.3)	59.4 (64.8)	51.3 (55.9)	57.7 (63.2)	52.2 (60.8)
	CVV-CSP-NMP2	Chalfont St Peter Vent Shaft Worksite	Free-field	46.5 (50.8)	50.3 (53.8)	48.1 (51.9)	45.1 (51.0)	40.1 (59.6)	42.6 (43.5)	47.9 (49.8)	47.0 (49.0)	44.9 (50.1)	37.6 (43.2)	46.0 (51.1)	38.8 (46.7)
	CVV-CSP-NMP3	Chalfont St Peter Vent Shaft Worksite	Free-field	56.0 (57.3)	56.1 (58.0)	55.5 (58.7)	53.4 (57.7)	50.5 (63.3)	52.4 (52.9)	54.8 (55.5)	55.3 (55.9)	53.8 (55.9)	50.3 (61.1)	54.3 (57.3)	50.8 (64.5)
CVV-LTP #1	CVV-LTP #1-NMP1	Northern boundary, Load Test Pile 1 Worksite	Free-field	60.6 (62.6)	61.1 (63.7)	59.7 (62.0)	58.0 (66.5)	54.7 (63.9)	57.4 (58.6)	60.1 (61.1)	59.3 (61.3)	58.6 (66.8)	53.1 (56.8)	58.2 (61.4)	54.2 (61.1)
	CVV-WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham	Free-field	54.0 (56.4)	57.4 (59.5)	55.3 (57.1)	52.2 (55.8)	48.4 (61.2)	51.6 (52.3)	54.7 (55.9)	53.9 (55.9)	52.2 (56.5)	47.1 (55.6)	53.3 (58.6)	47.2 (52.8)

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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
CVV-LTP #1	CVV-DFS-NMP1	Denham Film Studio, Uxbridge	Free-field	46.5 (59.1)	56.0 (61.9)	49.6 (58.6)	51.8 (61.6)	43.5 (57.8)	46.3 (49.6)	48.4 (53.6)	47.4 (55.4)	48.5 (63.2)	48.9 (79.5)	52.5 (62.4)	45.8 (61.1)

\* No data measured by the monitor during the associated monitoring period due to loss of continuous site power to the equipment.

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	0.83 (Z-axis)

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
SFF	SFF-NMP1*	Shepherds Furze Farm, Calvert	Weekday	08:00-18:00	1	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
CALS	CALS-NMP1	Site boundary adjacent to Red Kite View, Calvert	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	2	1
CVV-AM	CVV-AM-NMP1*	Whielden Lane, Amersham	All days	All periods	No exceedance	No exceedance
CVV-LM	CVV-LM-NMP1*	Little Missenden Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
BHFL	BHFL-NMP1	Elm Tree Cottage, Bottom House Farm Lane	Weekday	1900-2200	1	No exceedance

Worksite Reference	Measurement Reference	Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
CVW-CSG	CVW-CSG-NMP1*	Chalfont St Giles Vent Shaft	All days	All periods	No exceedance	No exceedance
	CVW-CSG-NMP2*	Chalfont St Giles Vent Shaft	Weekday Night	1900-2200 2200-0700	1 2	No exceedance
CVW-CSP	CVW-CSP-NMP1*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
	CVW-CSP-NMP2*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
	CVW-CSP-NMP3*	Chalfont St Peter Vent Shaft Worksite	All days	All periods	No exceedance	No exceedance
CVW-LTP #1	CVW-LTP #1-NMP1*	Northern boundary, Load Test Pile 1 Worksite	Night	2200-0700	1	No exceedance
	CVW-WYC-NMP1	Wyatt's Covert, Tilehouse Lane, Denham	Weekday Saturday Sunday Night	1900-2200 1400-2200 0700-2200 2200-0700	5 3 8 48	No exceedance No exceedance No exceedance No exceedance
	CVW-DFS-NMP1	Denham Film Studio, Uxbridge	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
HF	HF-NMP1	Hall Farm, Bicester Road, Waddesdon	1

2.2.7 One exceedance of the SOAEL was recorded due to HS2 construction at HF worksite during July 2021 due to breaking out concrete with hydraulic breakers for drainage works. Exceedances of the LOAEL were recorded at SFF-NMP, 1BHFL-NMP1, CVV-CSG-NMP2, CVV-LTP #1-NMP1 and CVV-WYC-NMP1.

## 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

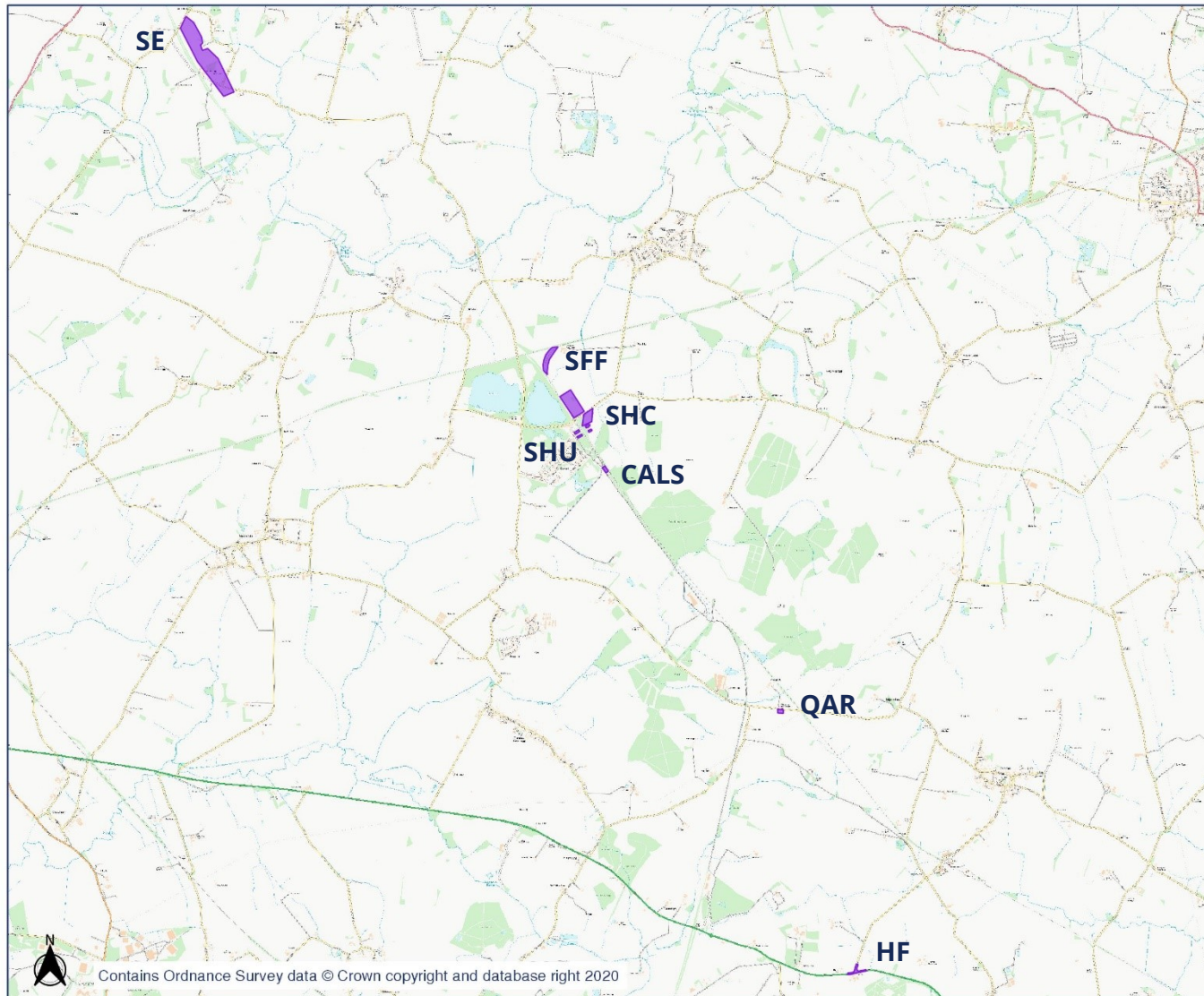
2.4.1 Table 8 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

Table 8: Summary of Complaints

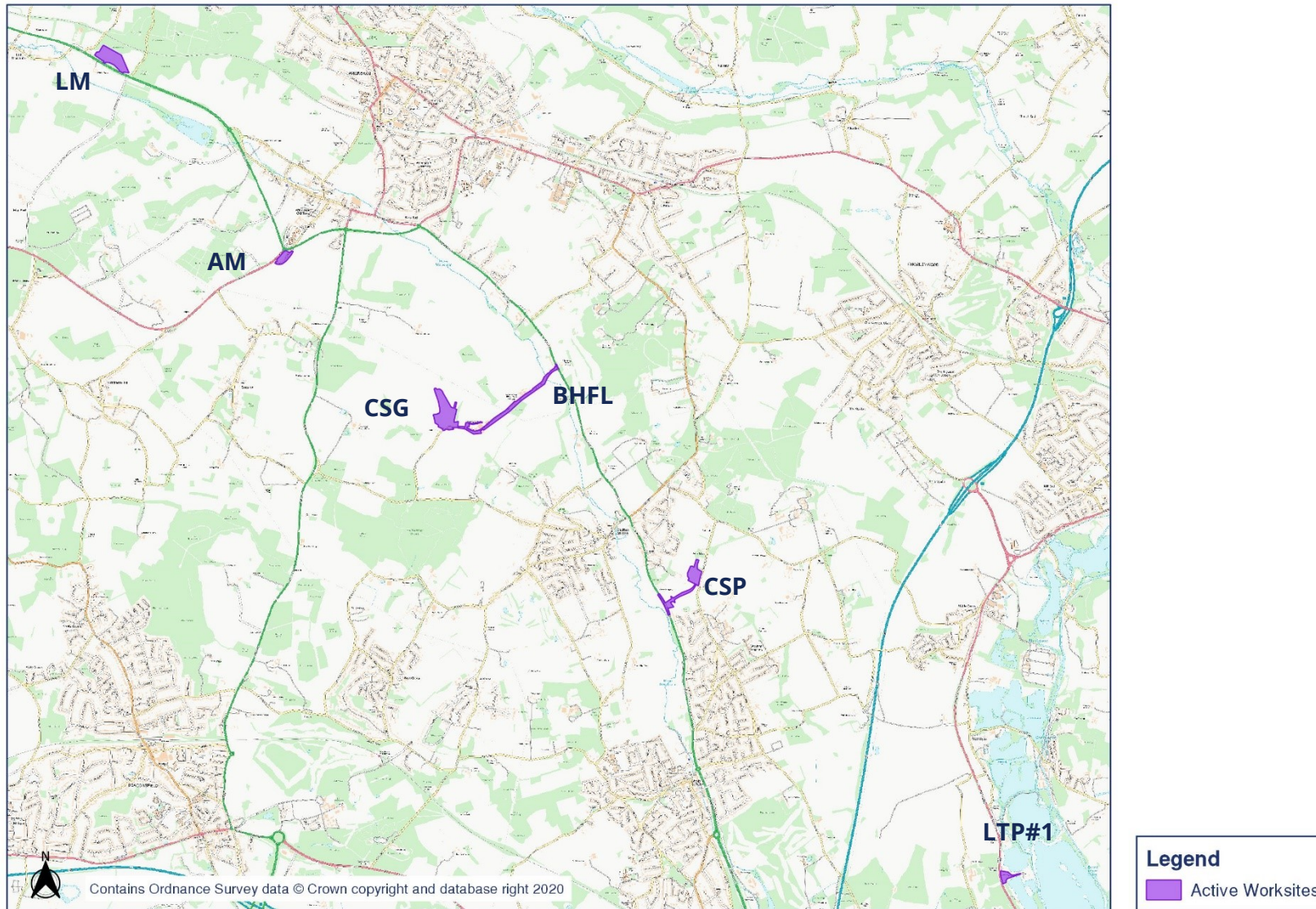
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-42217-C	HF	Complaint regarding ongoing noise and smell from site generator.	The noise was confirmed to be from ongoing HS2 related construction works.	Exploring alternative positions for generator but due to construction requirements the position of generator is likely to remain in current location.
HS2-21-42229-C HS2-21-42230-C	CVV-LTP #1	Complaint regarding noise from vibratory roller.	The noise was confirmed to be from ongoing HS2 related construction works in line with Section 61 consent.	Contractor to work with stakeholder to resolve the issue through direct engagement.
HS2-21-42265-C	CVV-AM	Complaint regarding high pitched beeping noise at night.	The noise was confirmed to be from ongoing HS2 related construction works in line with Section 61 consent.	Site team to investigate if noise can be mitigated.

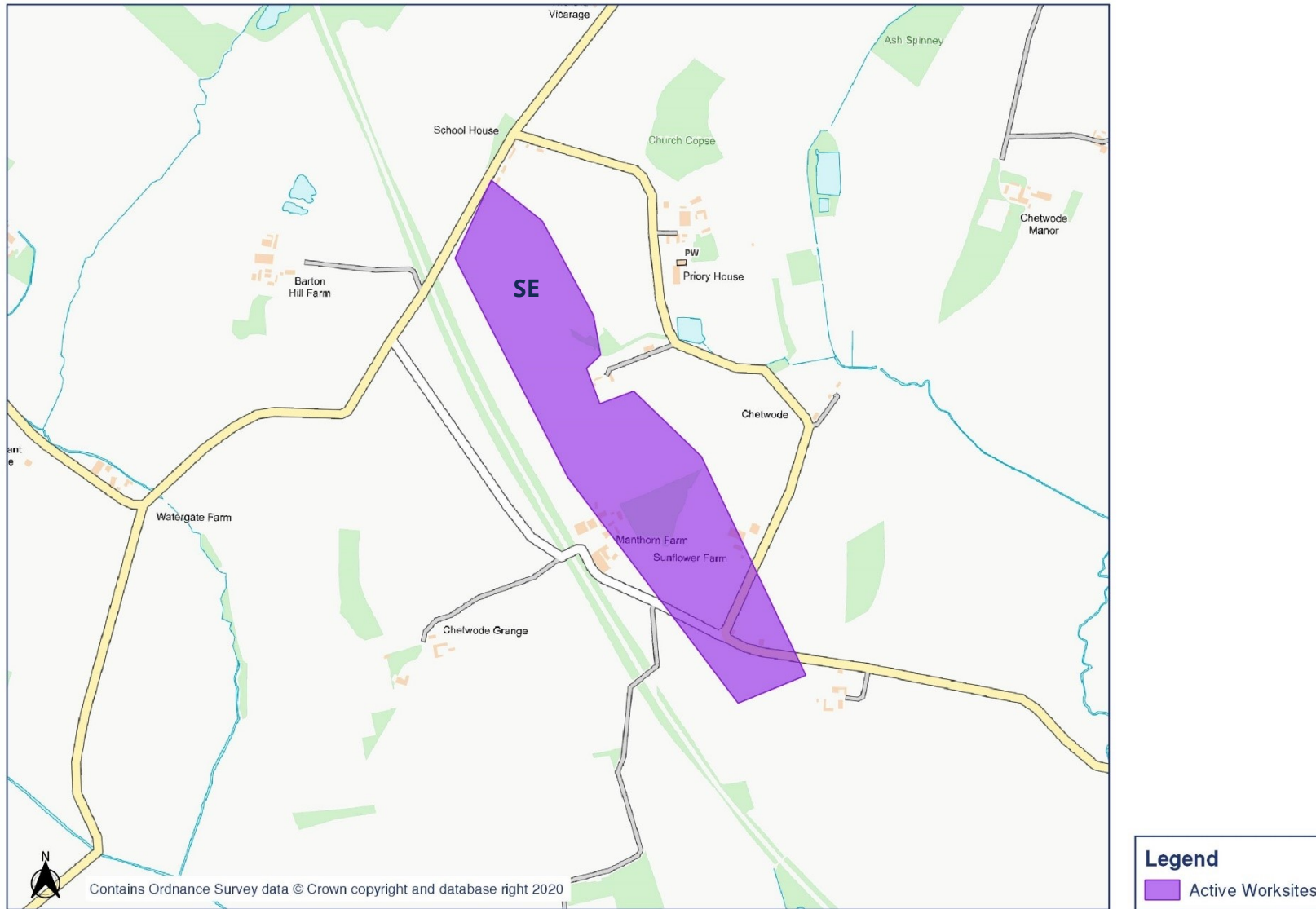
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-21-42299-C	CVV-LTP #1	Complaint regarding night-time noise disturbance due to passing HGV vehicles	Review of traffic assessment does not show any new significant impacts from traffic noise. Property next to a busy road that also contains a high proportion of non HS2 HGVs.	The outcome of investigation was shared with the stakeholder. Stakeholder was assured of further investigation if more information such as the registration plate numbers of HGVs were provided.
HS2-21-42331-C	CVV-LTP #1	Complaint regarding loud drilling noise disturbance for months	The noise was confirmed to be from ongoing HS2 related construction works.	Information was provided to the Stakeholder confirming the works and the implemented mitigation measures. informed about the options available in E23 special cases.
HS2-21-42363-C	CVV-LTP #1	Complaint regarding noise affecting mental health.	The noise was confirmed to be from ongoing HS2 related piling works. Noise, vibration and Air Quality monitors have been place on site and it is observed that the permitted levels have not been breached.	Information was provided to the Stakeholder confirming the works and the implemented mitigation measures. informed about the options available in E23 special cases.
HS2-21-62921-E	N/A	Enquiry regarding humming noise from tunnelling works.	No HS2 related tunnelling works has been carried near the stakeholder's property. The probable course of noise is the Thames tankers pumping sewage throughout the day for past few weeks close to stakeholder's property.	Information regarding the results of investigation was provided to the Stakeholder.
HS2-21-62724-E	CVV-CSP	Enquiry regarding noise disturbance throughout the day.	Stakeholder was informed about the 24/7 works on 12 <sup>th</sup> of July and potential noise disturbance prior to the commencement of works. An offer for temporary accommodation was made prior to the commencement of works.	Offer for temporary accommodation was still available for the stakeholder.

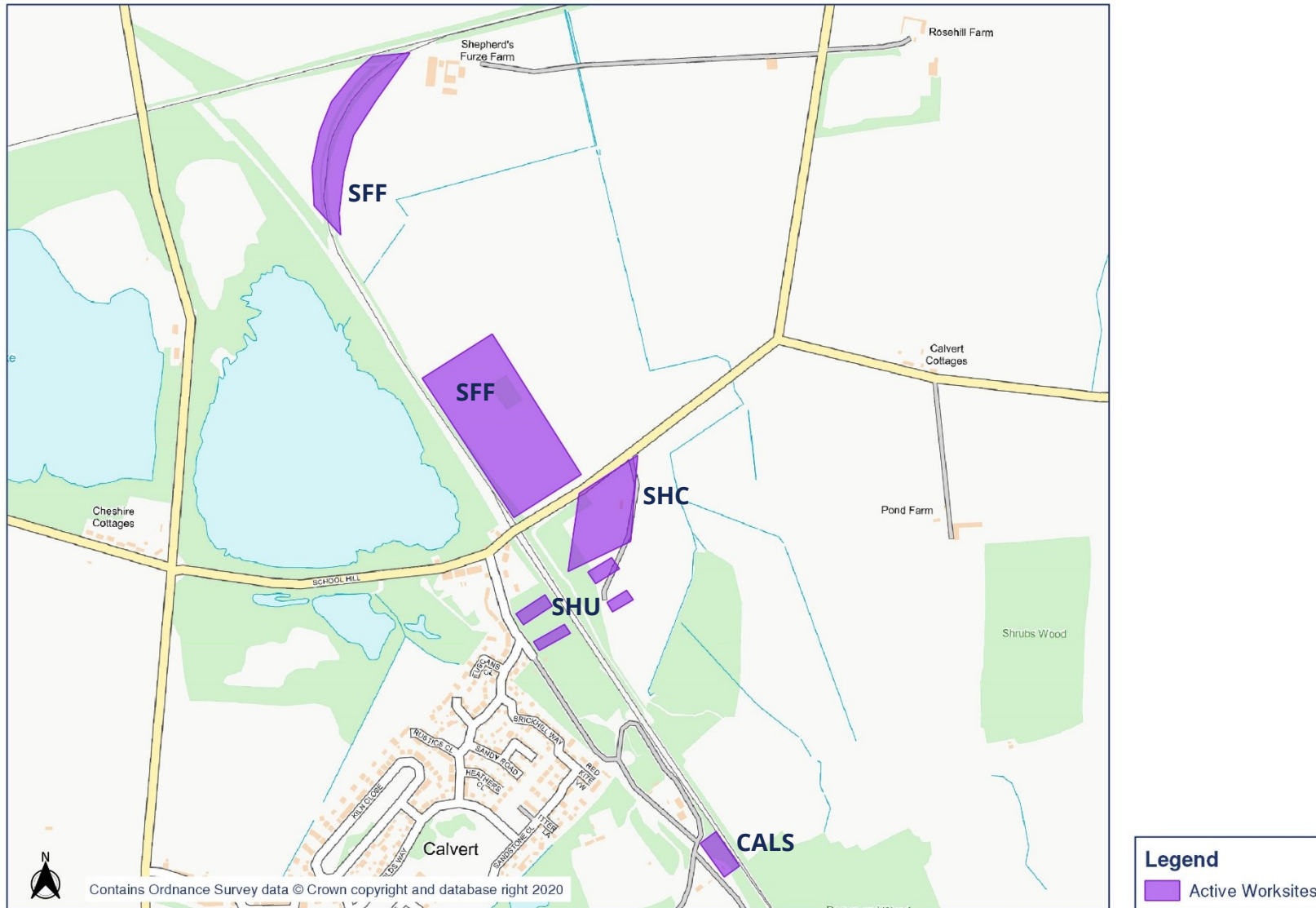
# Appendix A Site Locations



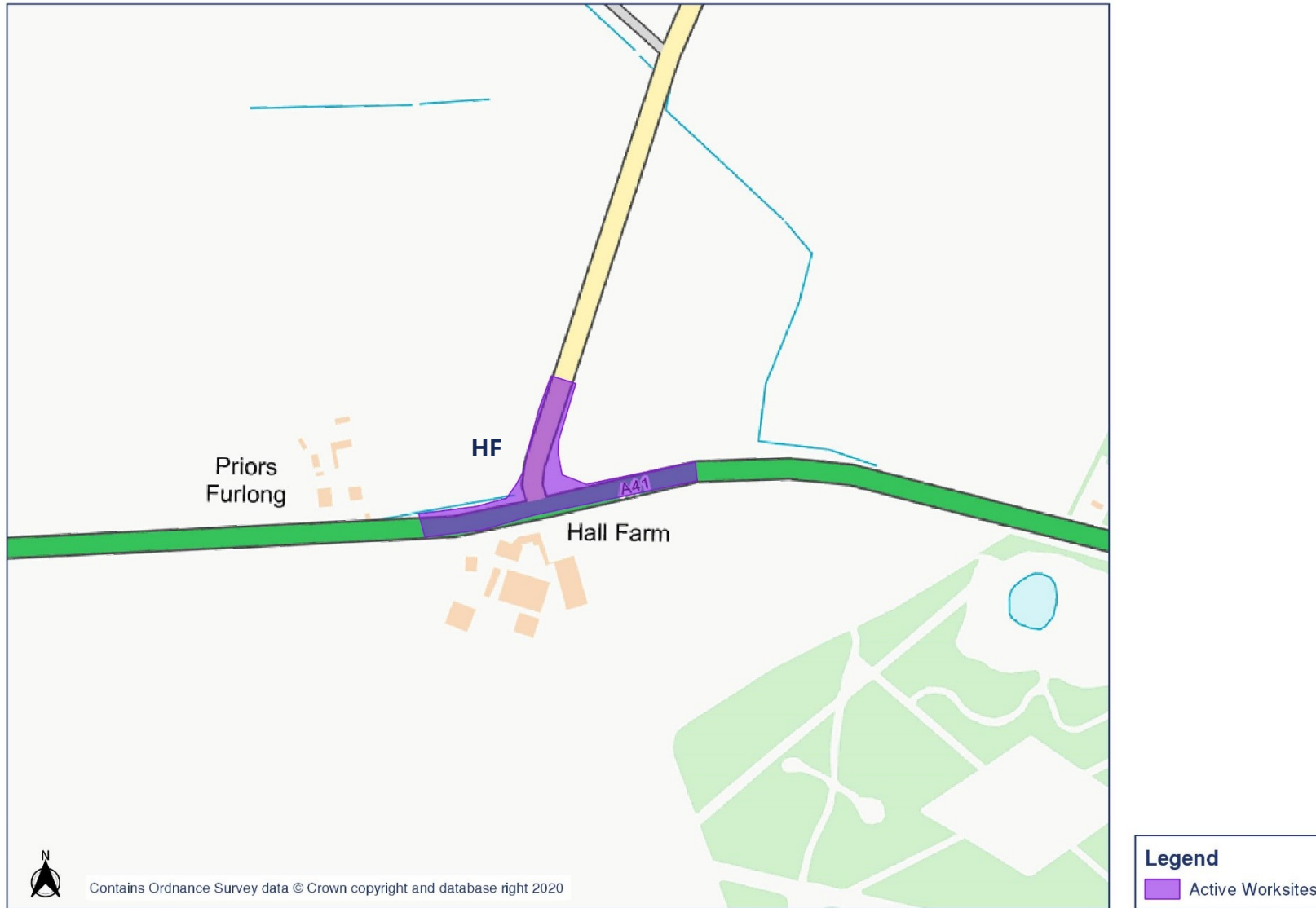




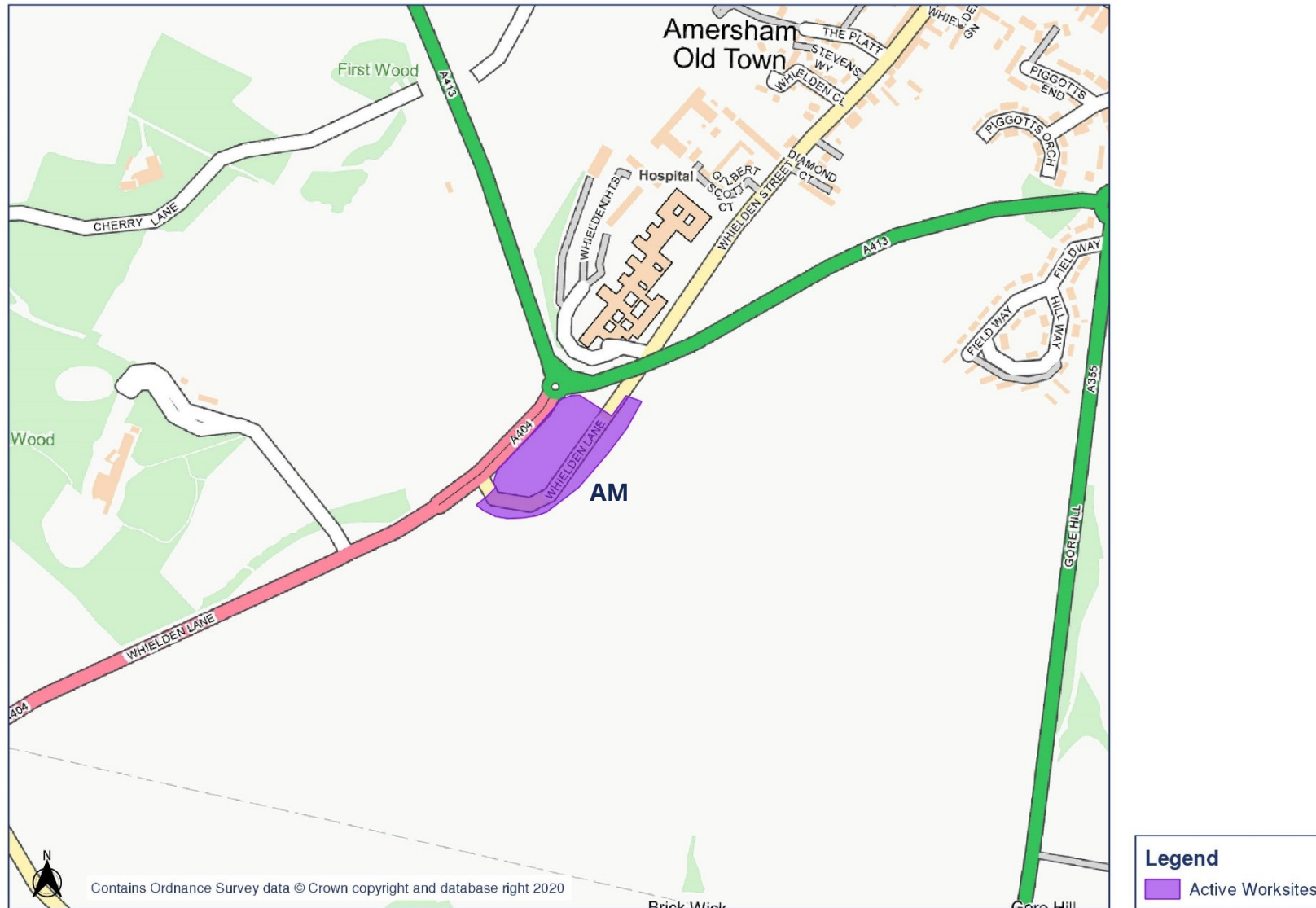


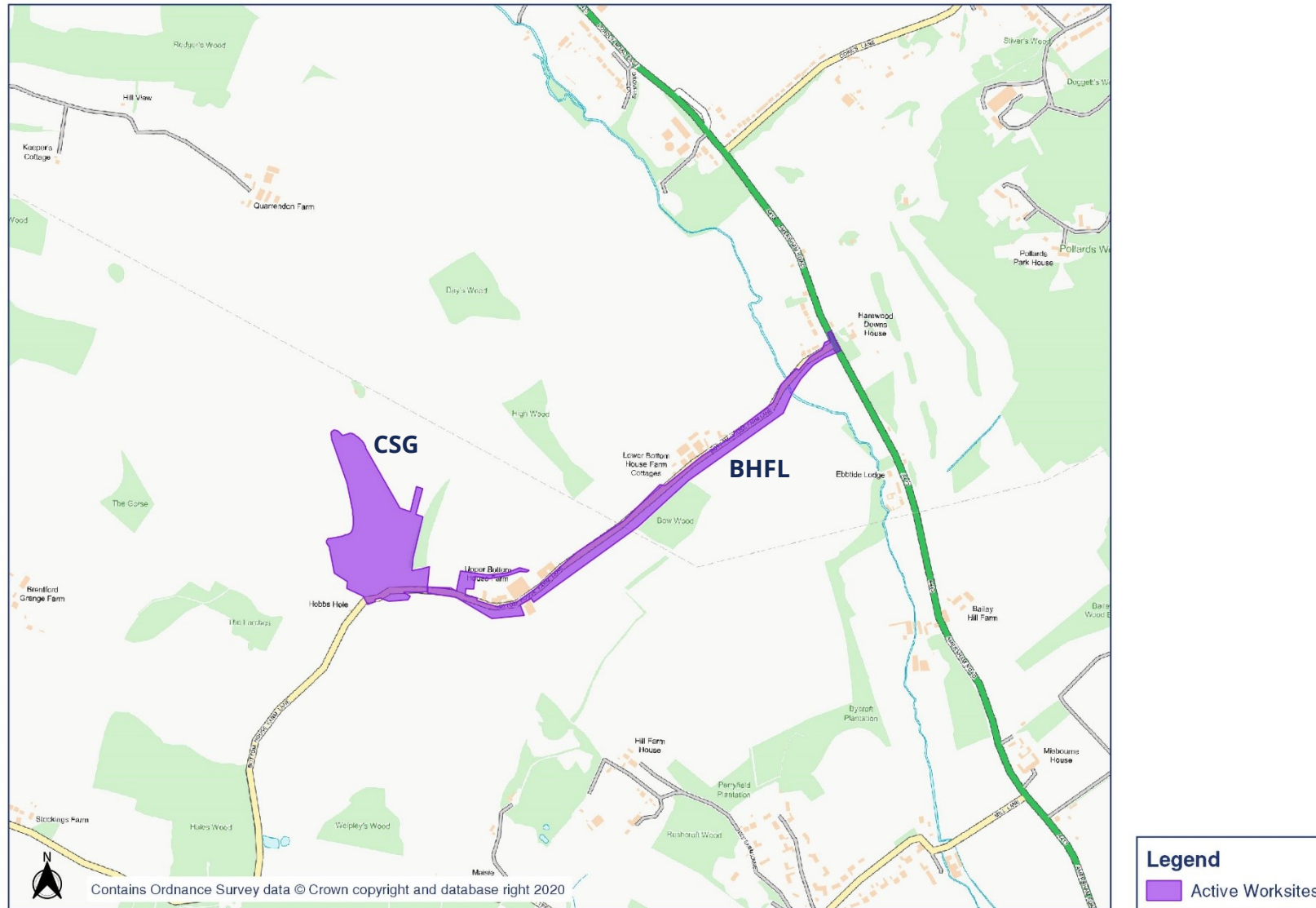




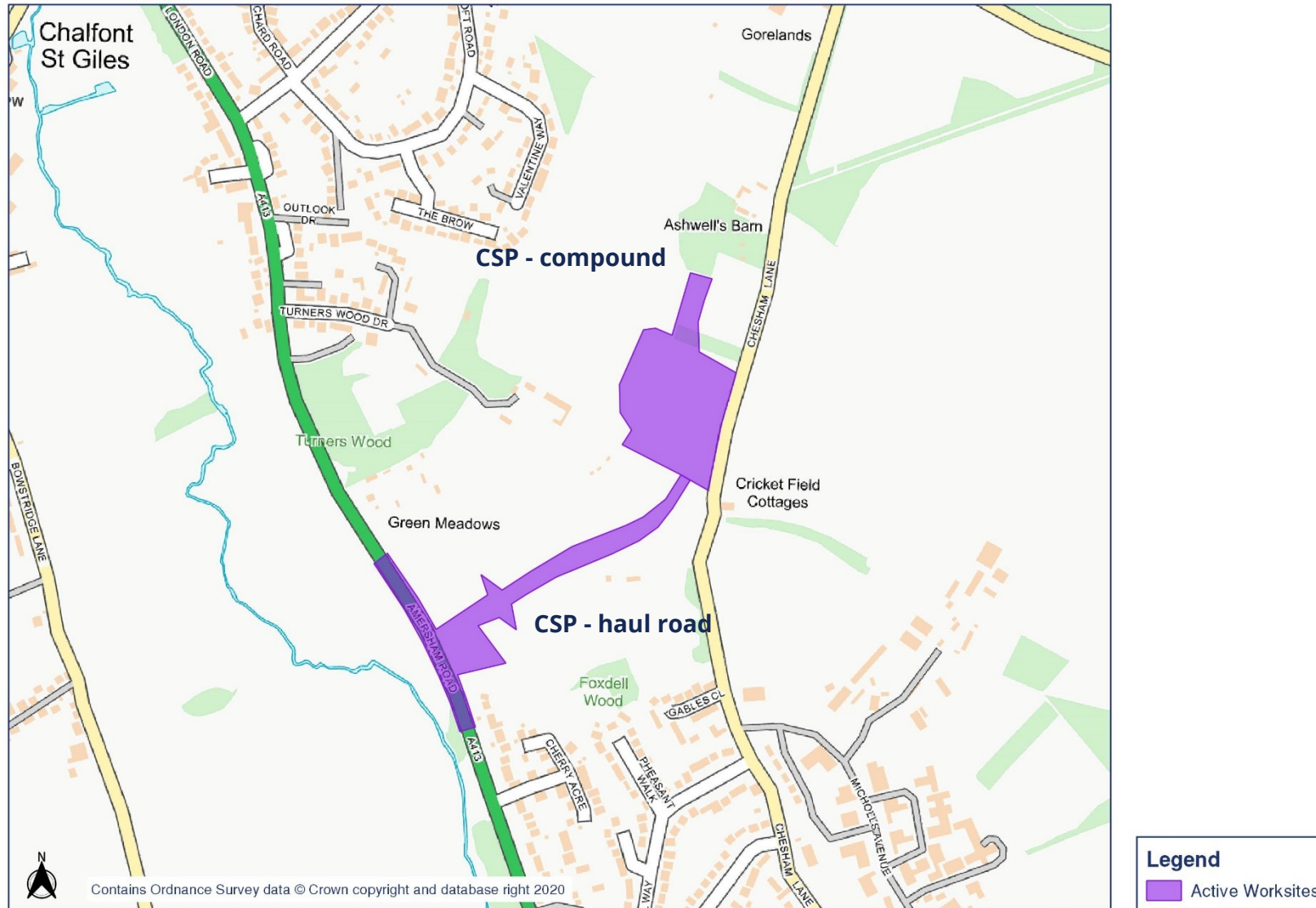


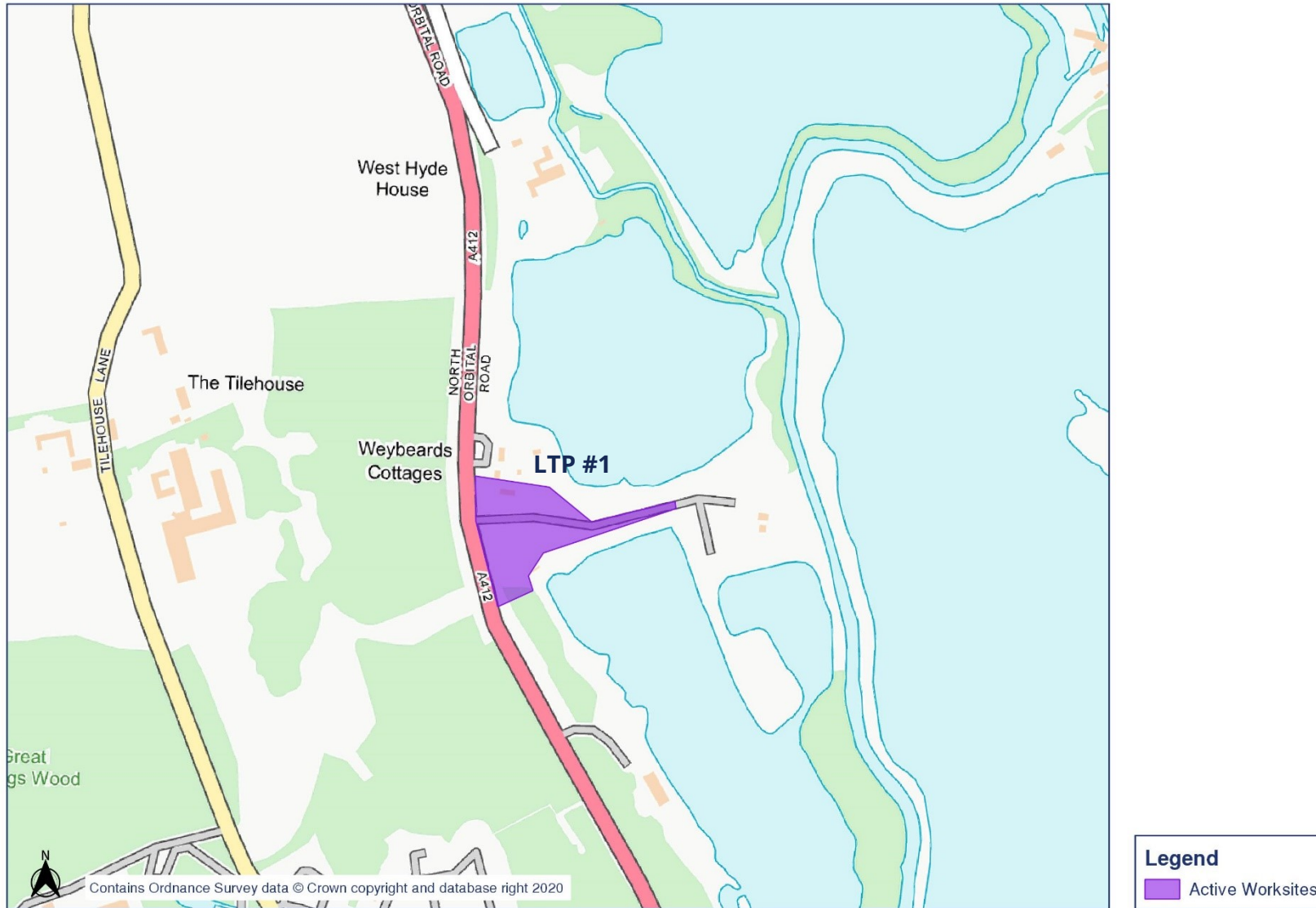




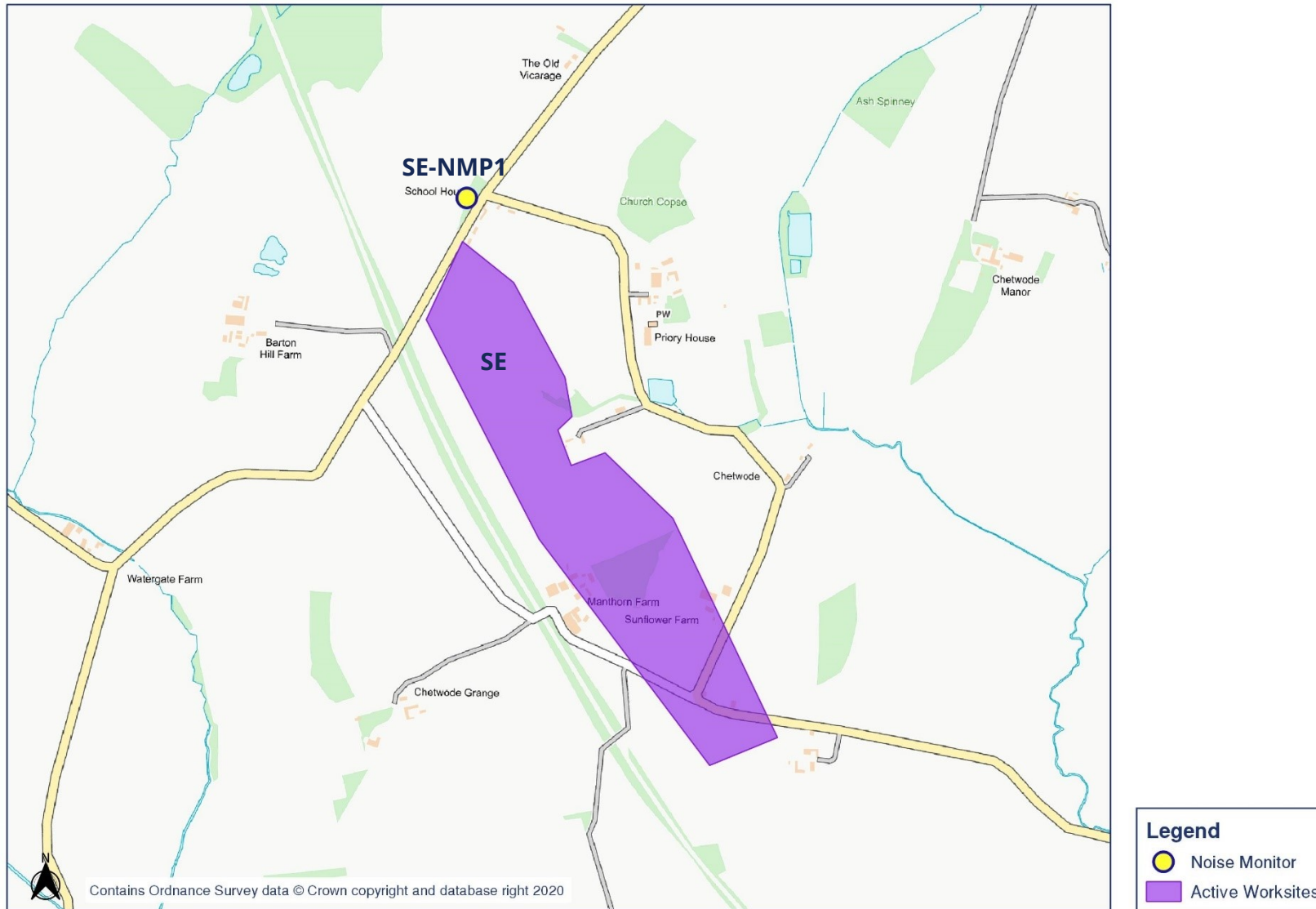


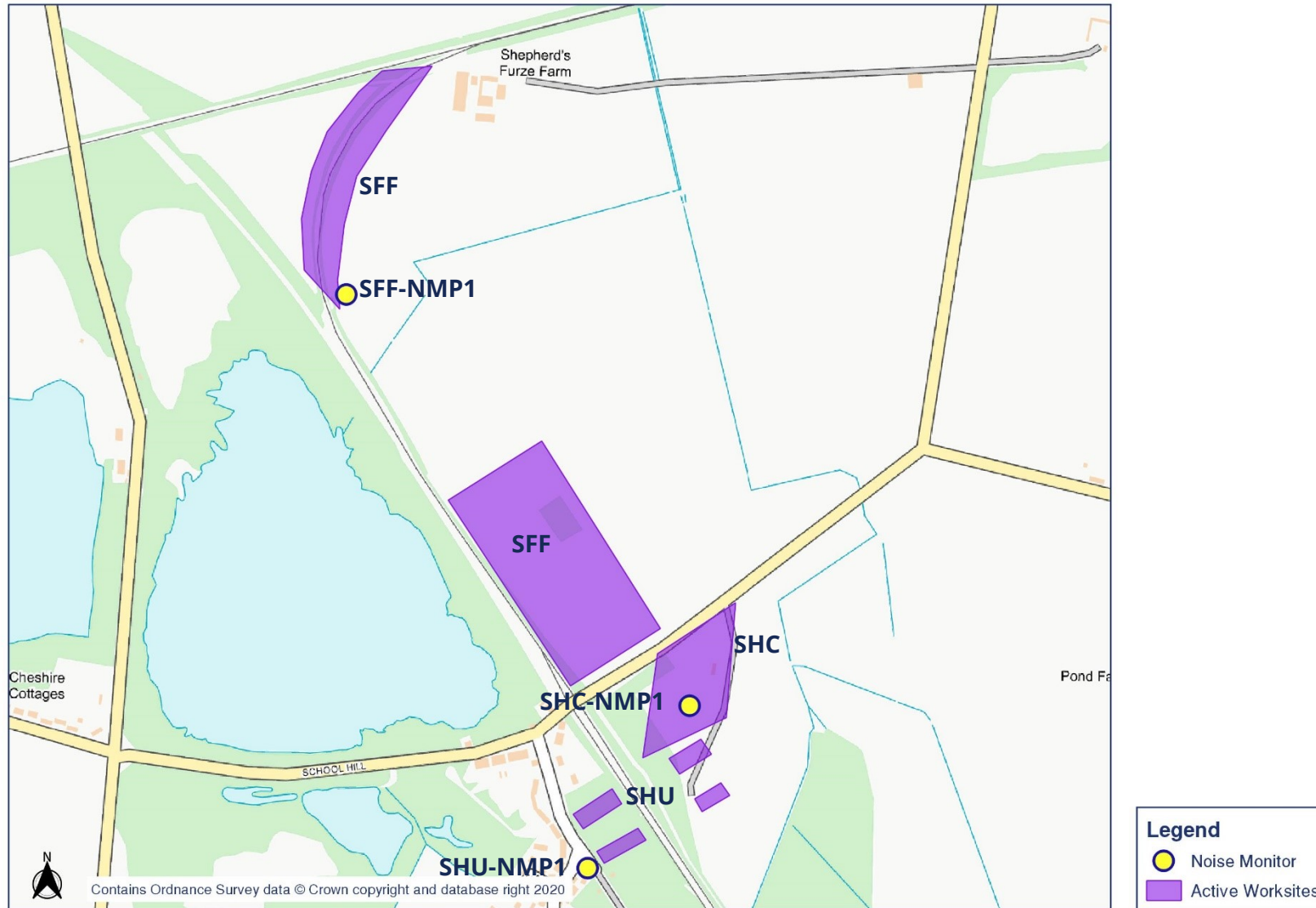


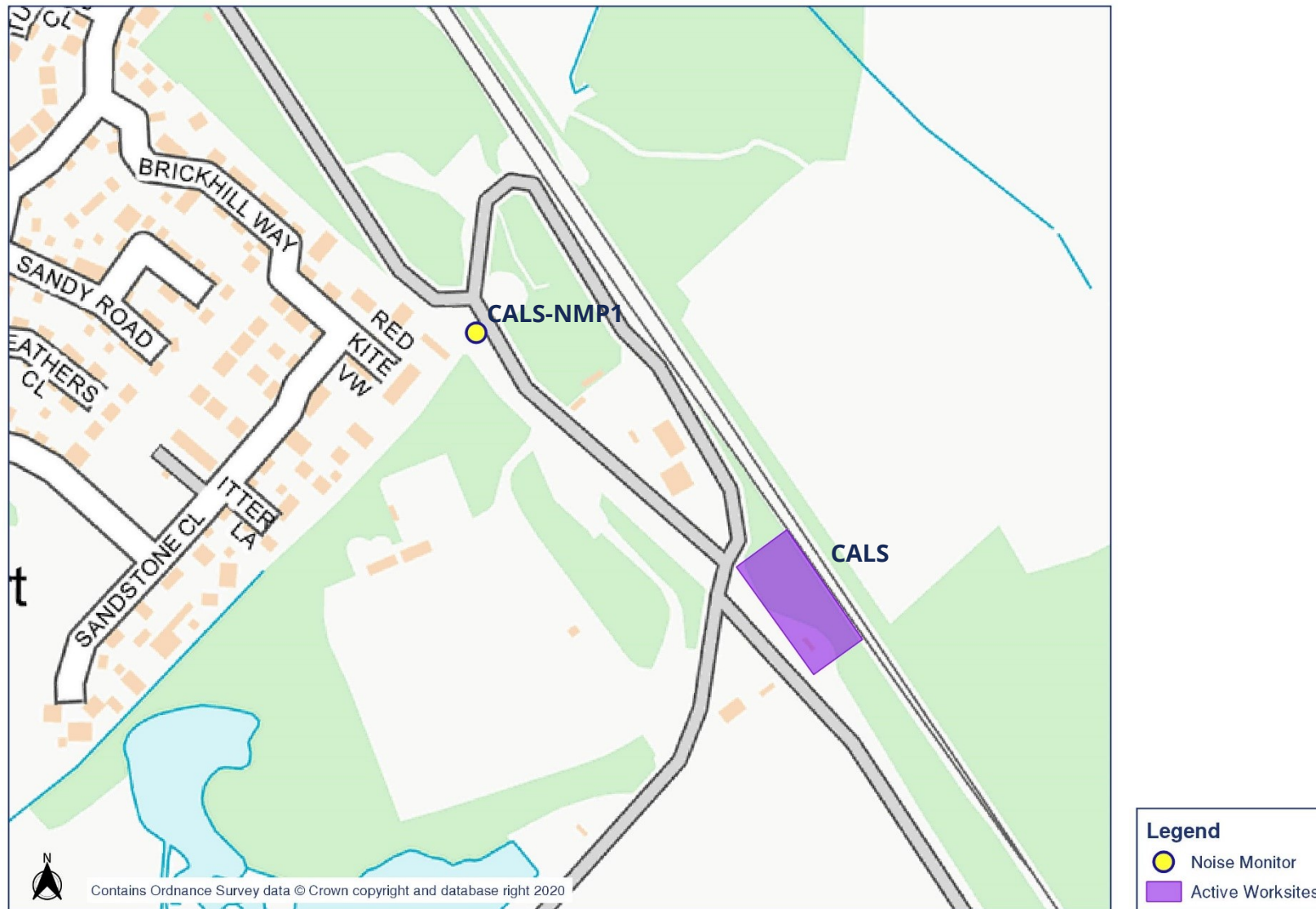




# Appendix B Monitoring Locations





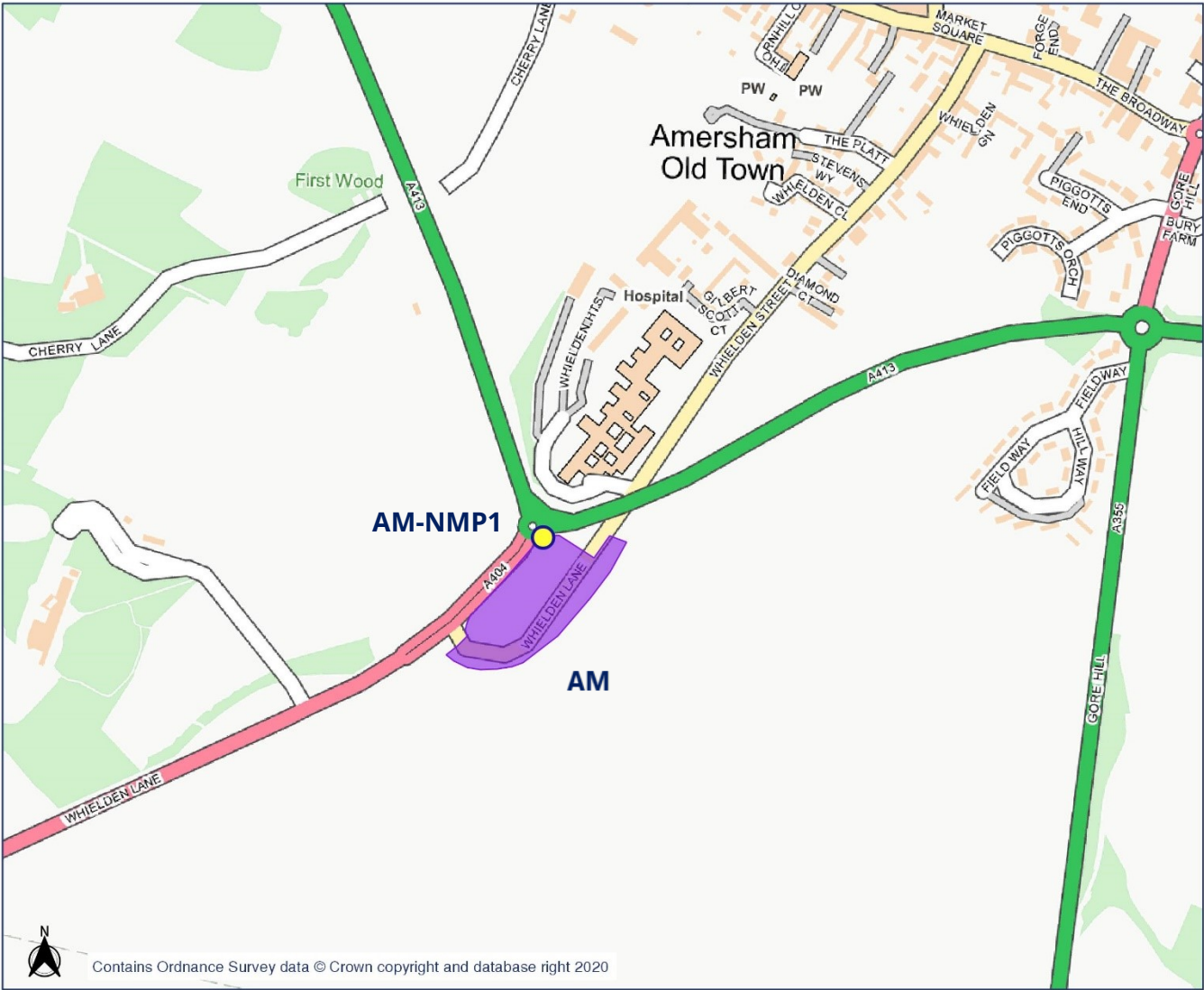


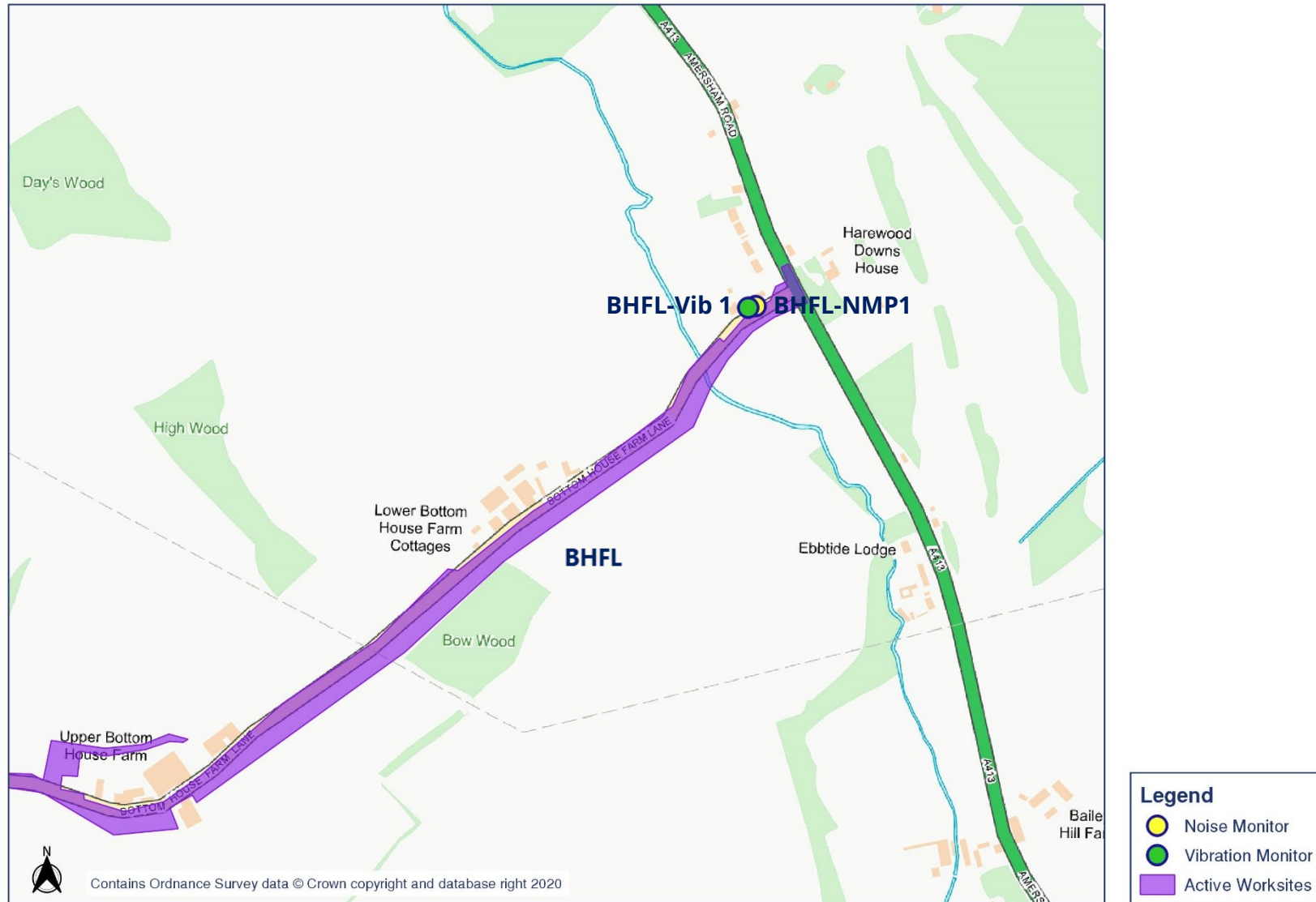


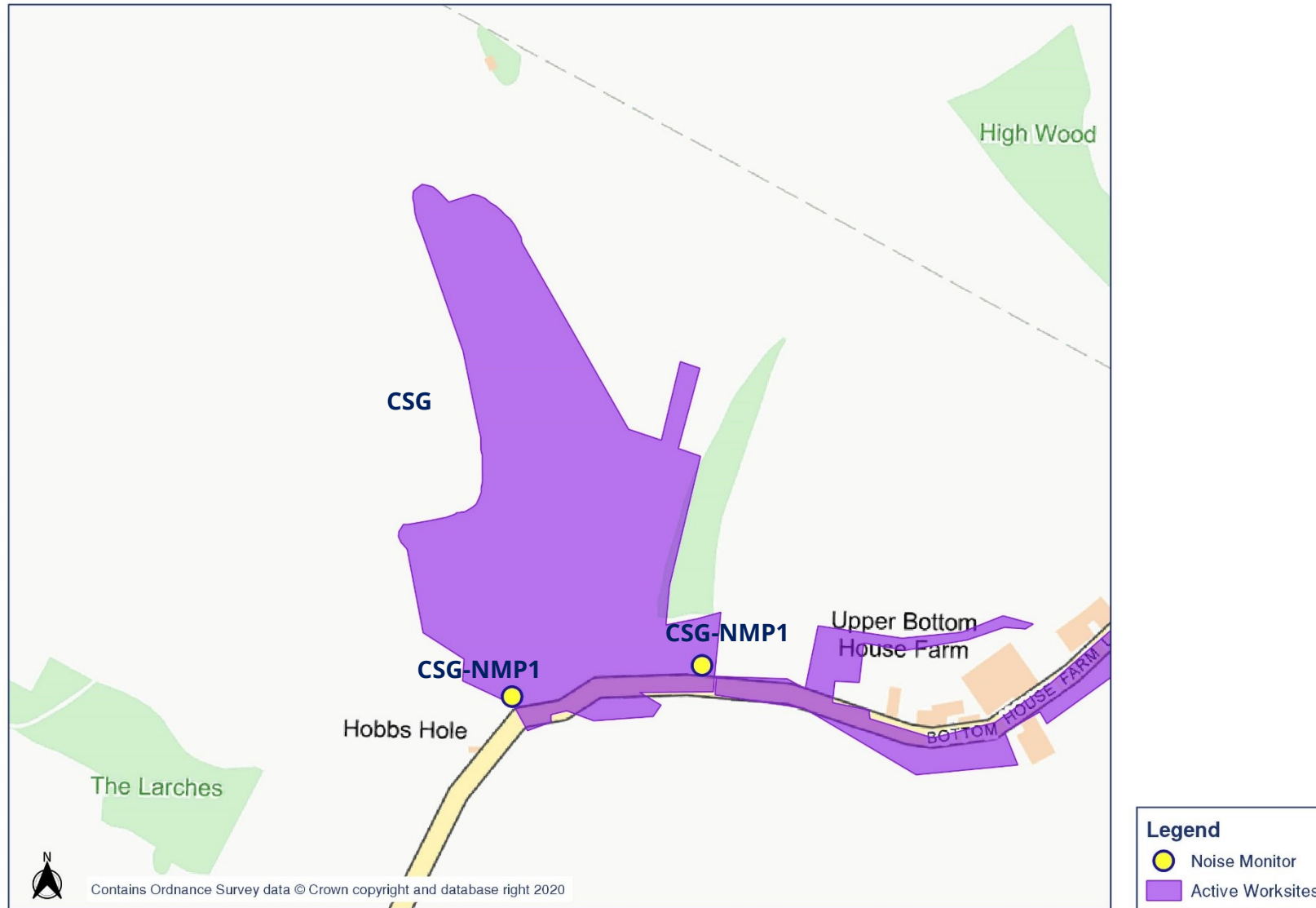


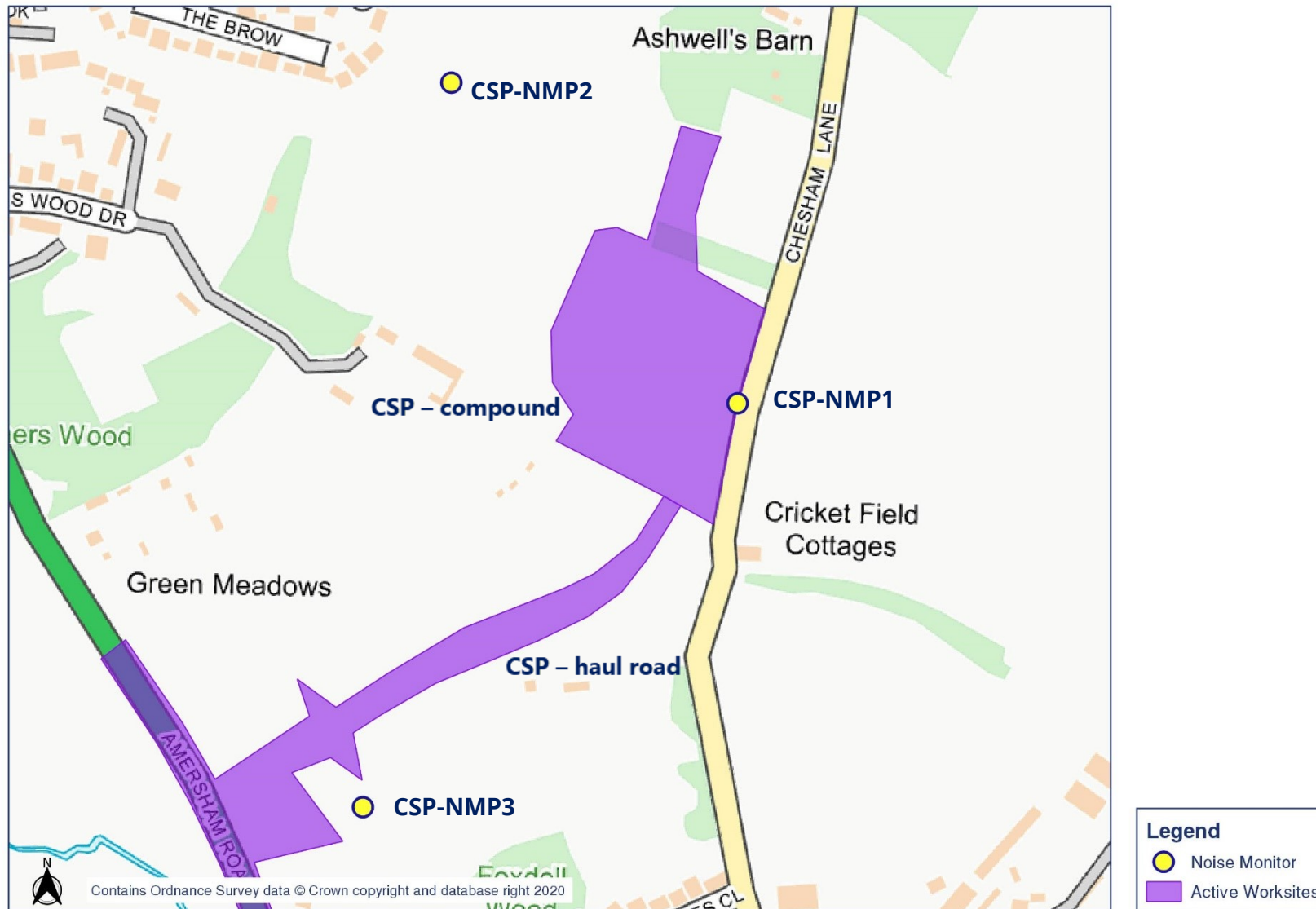












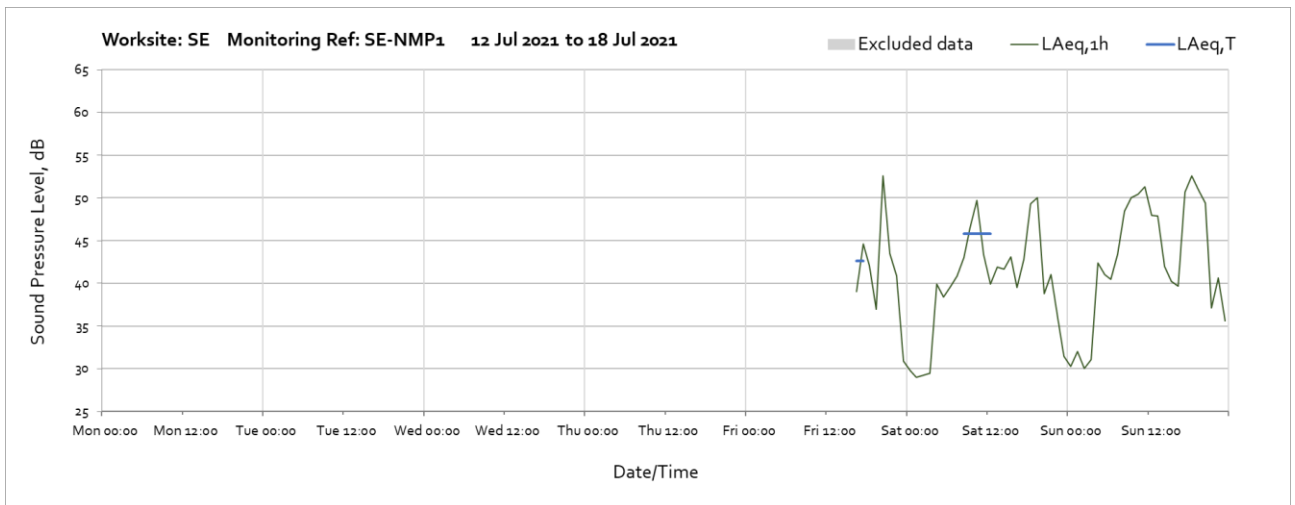


# Appendix C Data

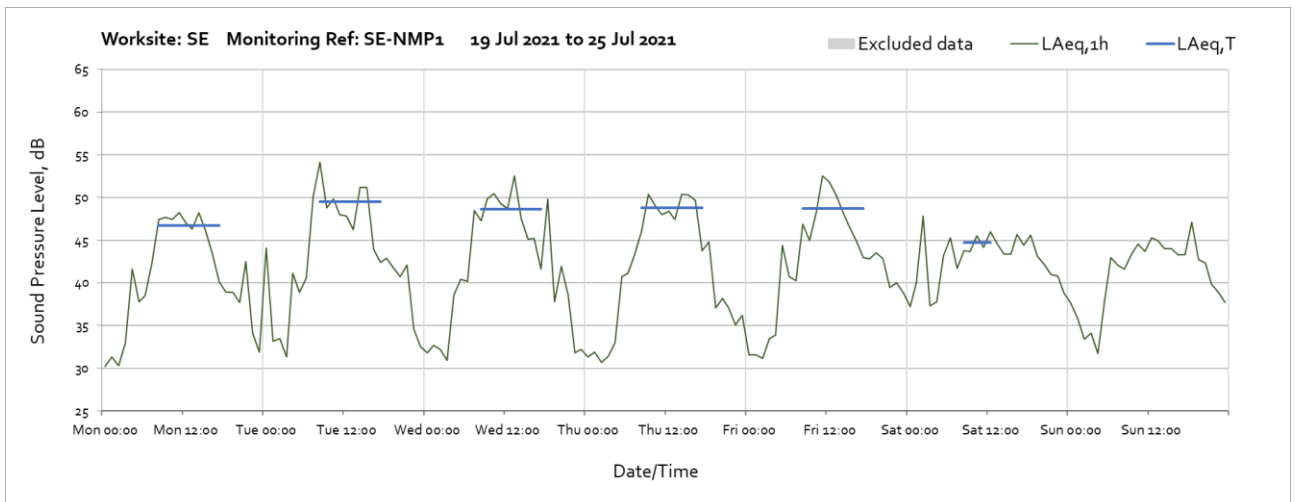
## Noise

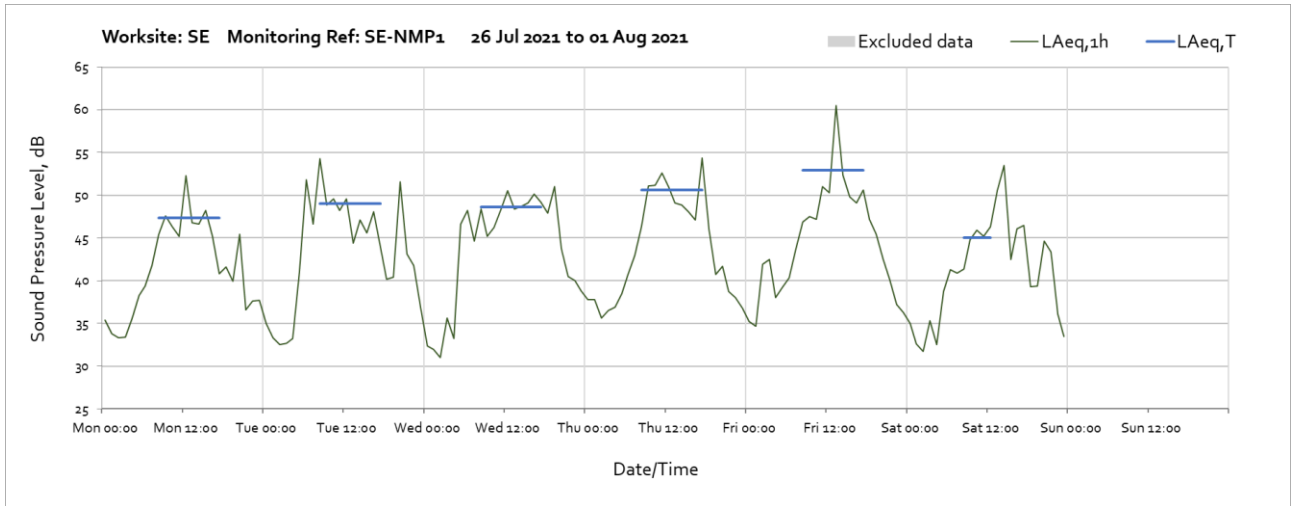
The following graphs show the hourly measured ambient noise level  $L_{Aeq,1h}$  and, where relevant, the averaged noise level  $L_{Aeq,T}$  values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and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

### Worksite: SE – Monitoring Ref: SE-NMP1

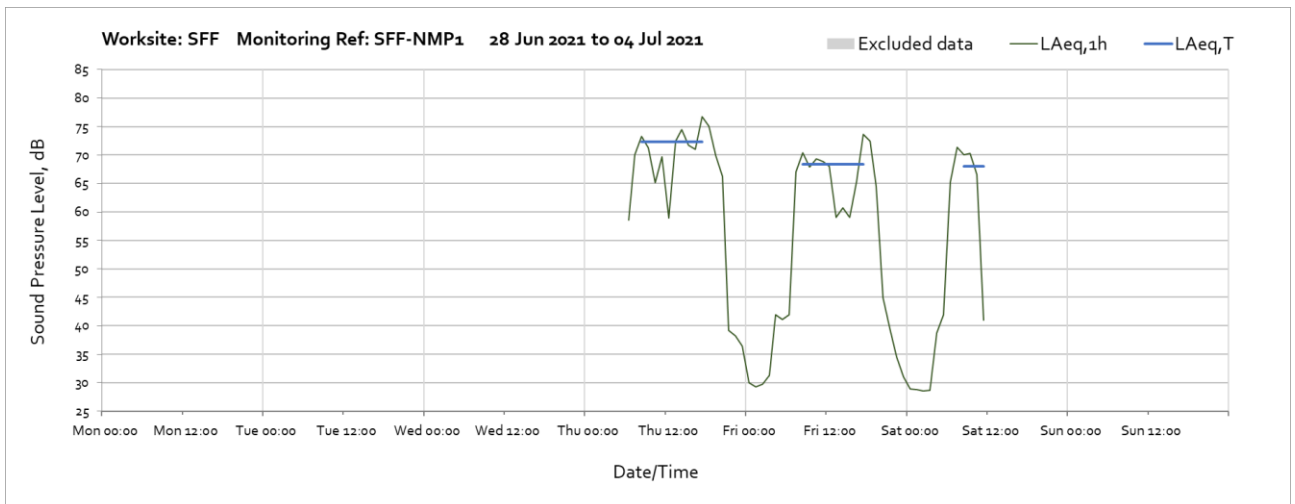


Note: The noise monitor was installed on 16<sup>th</sup> July 2021

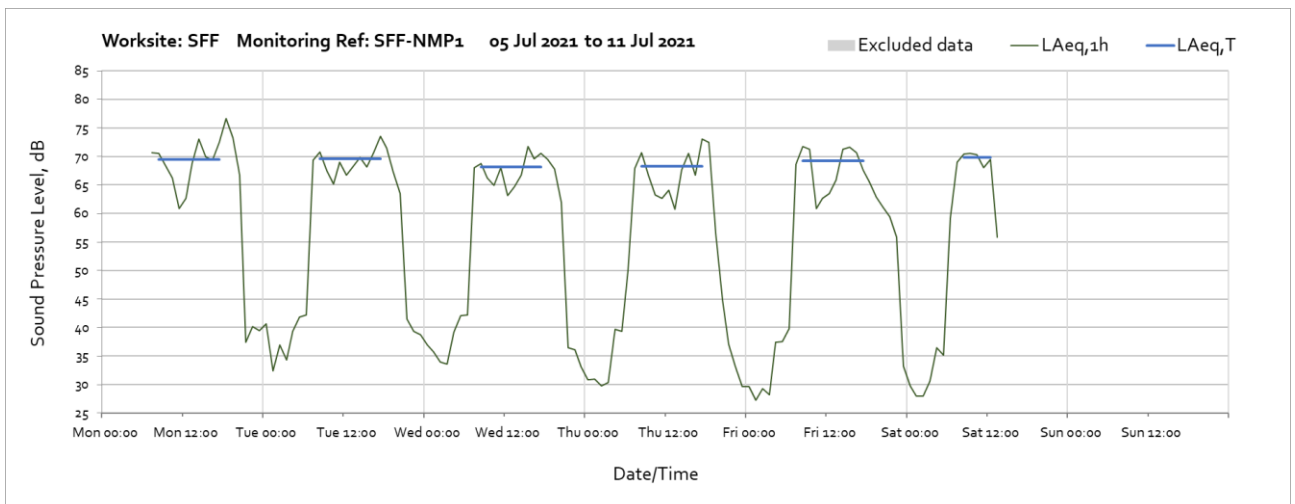




**Worksite: SFF – Monitoring Ref: SFF-NMP1**



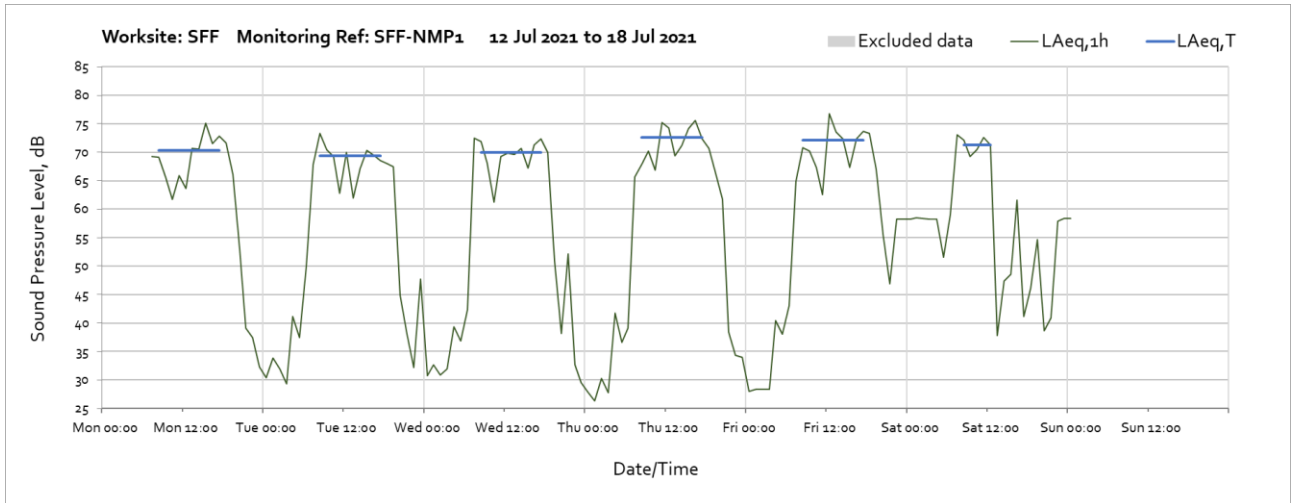
Note: Missing data between 00:00 and 06:00 on Thursday 1<sup>st</sup> of July and between 12:00 on Saturday 3<sup>rd</sup> July and 07:00 on Monday 5<sup>th</sup> July was due to loss of continuous site power to the equipment.



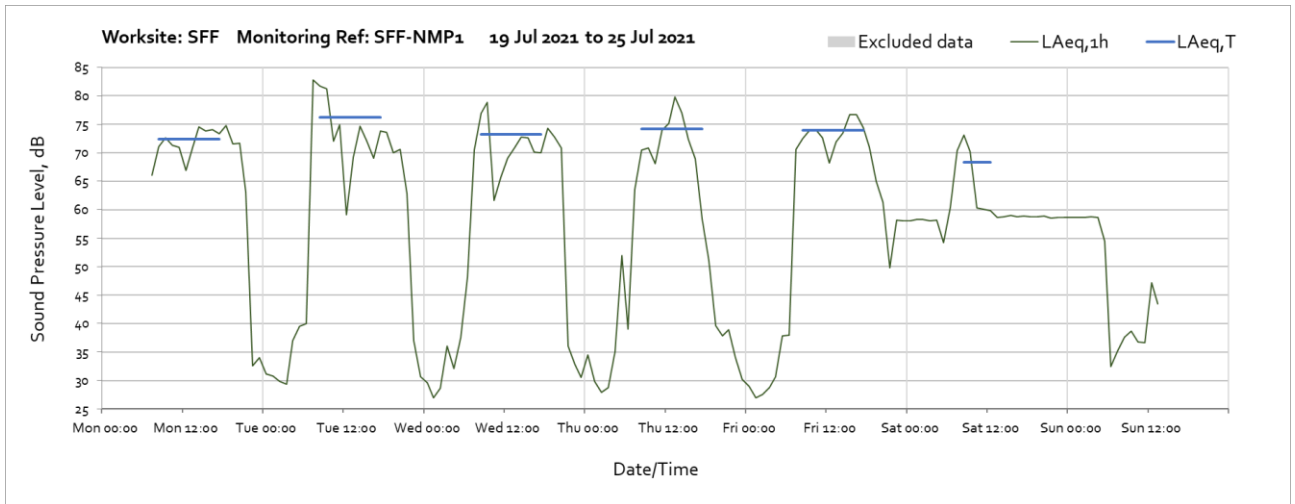
Note: Missing data between 14:00 on Saturday 10<sup>th</sup> July and 07:00 on Monday 12<sup>th</sup> July was due to loss of continuous site power to the equipment.

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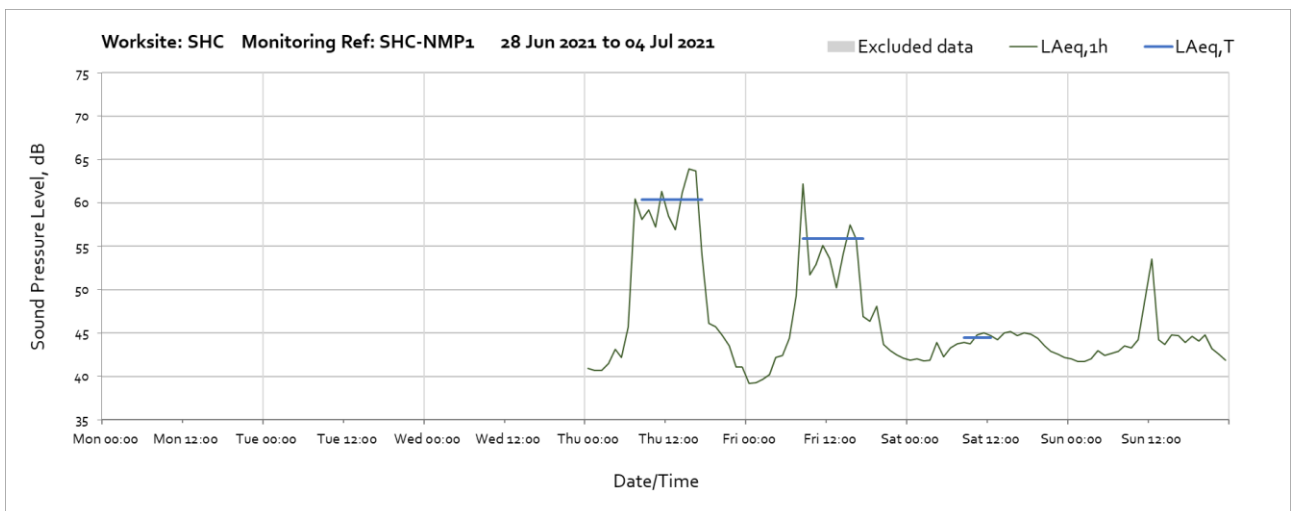


Note: Missing data between 01:00 on Sunday 18<sup>th</sup> July and 07:00 on Monday 19<sup>th</sup> July was due to loss of continuous site power to the equipment.

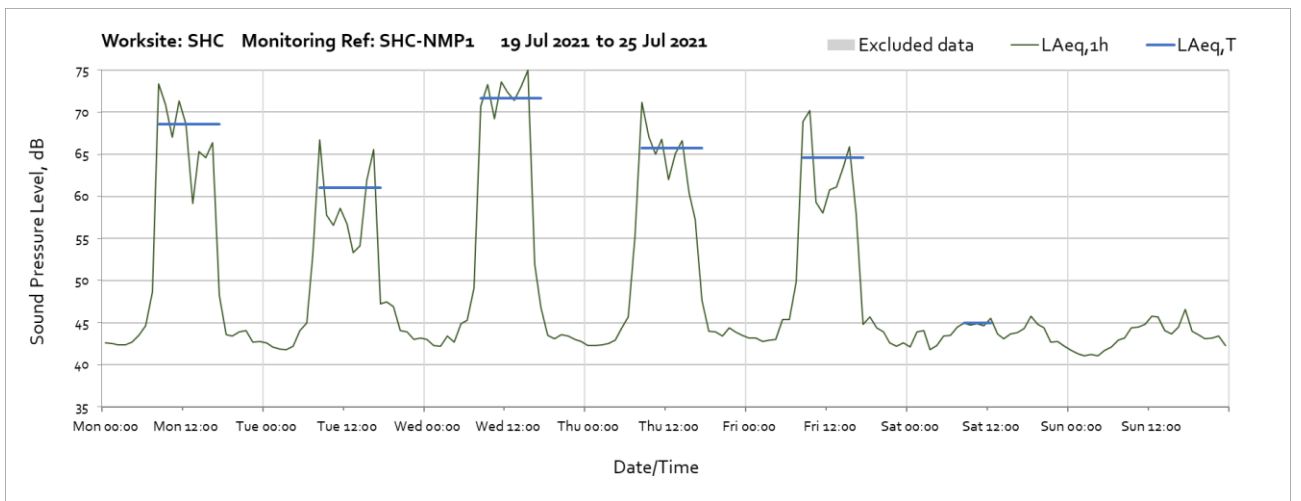
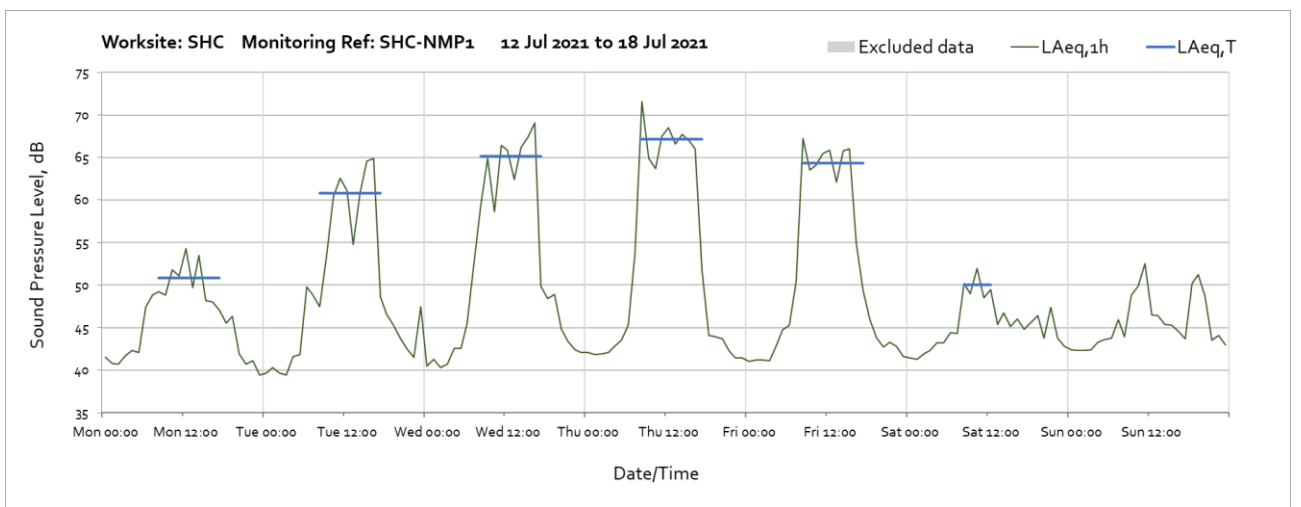
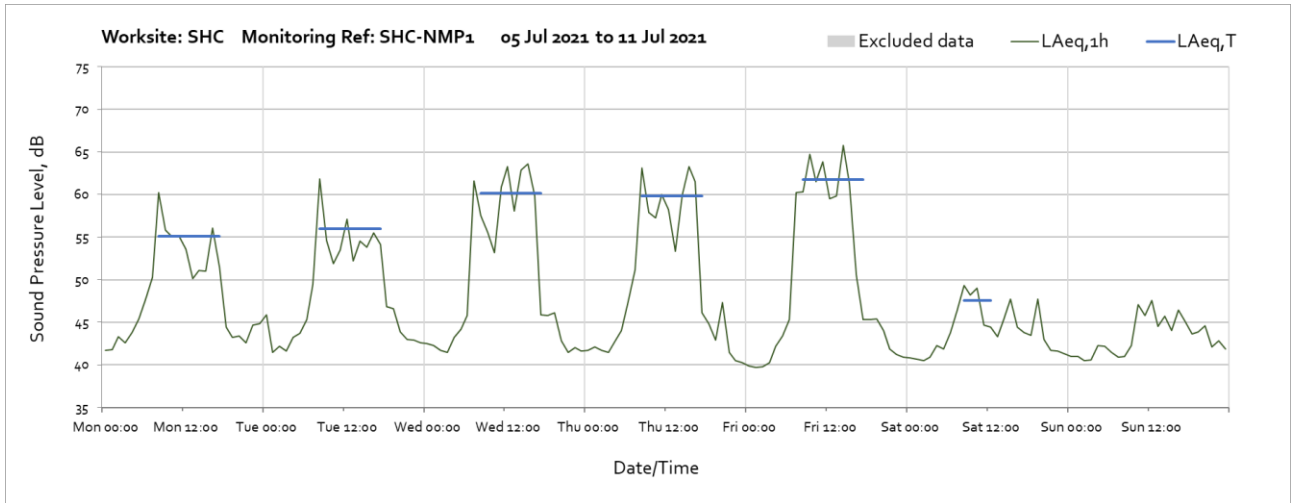


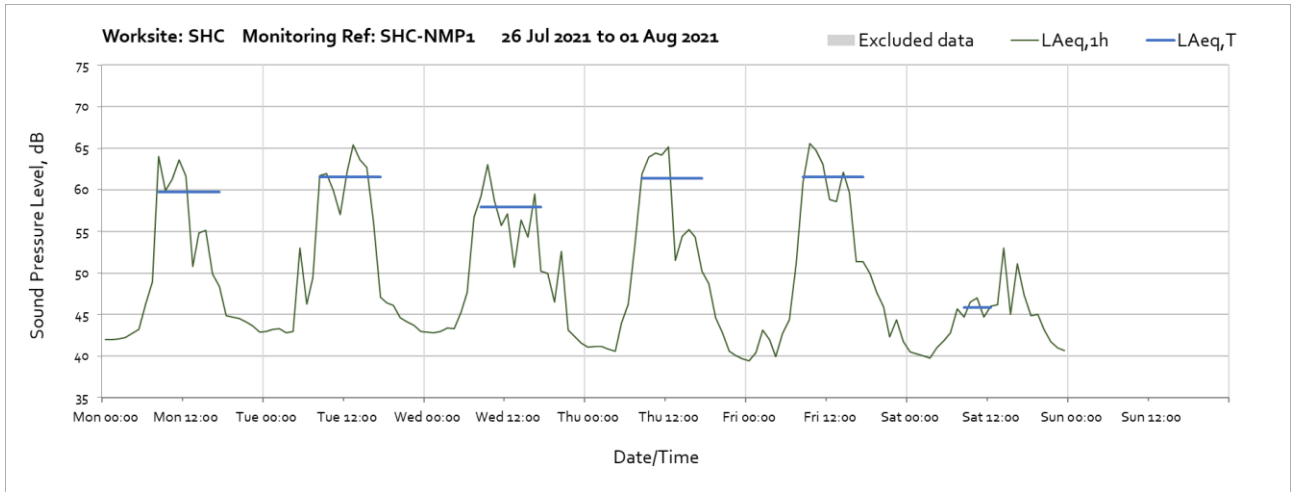
Note: Missing data between 14:00 on Sunday 25<sup>th</sup> July till the end of the month was due to loss of continuous site power to the equipment.

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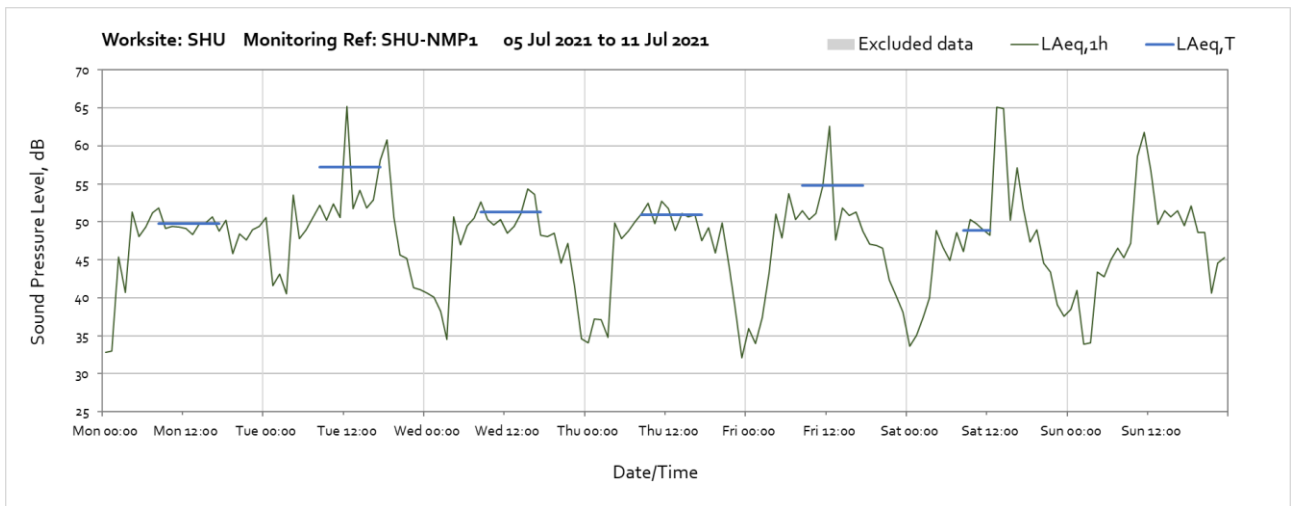
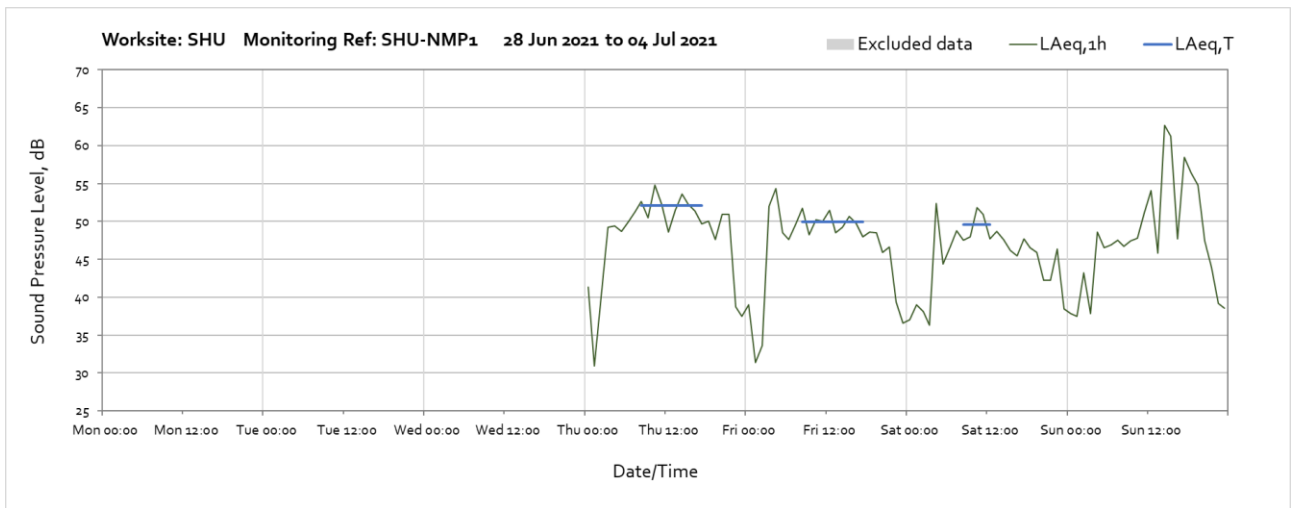


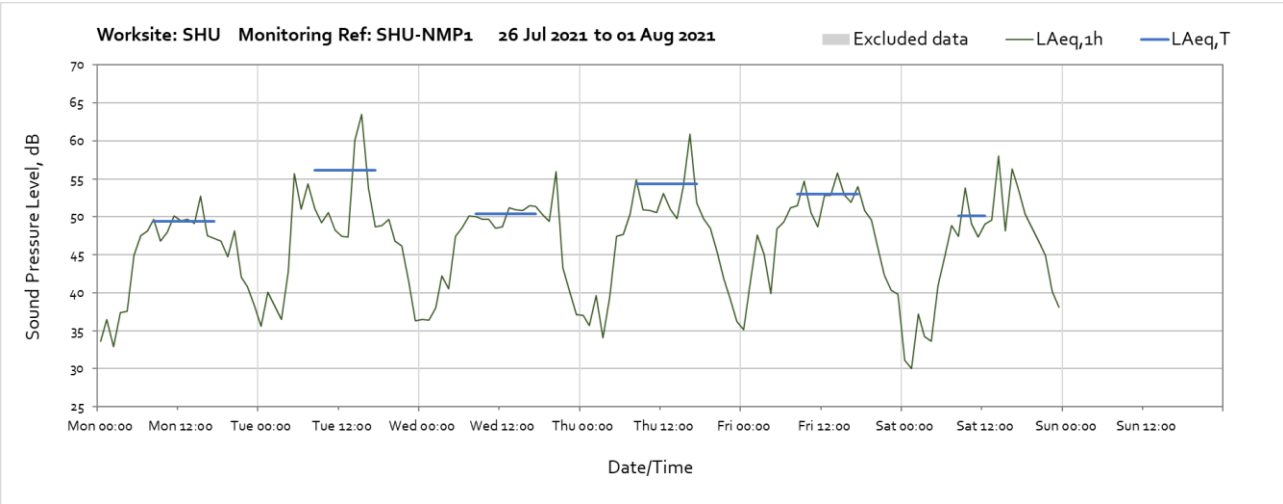
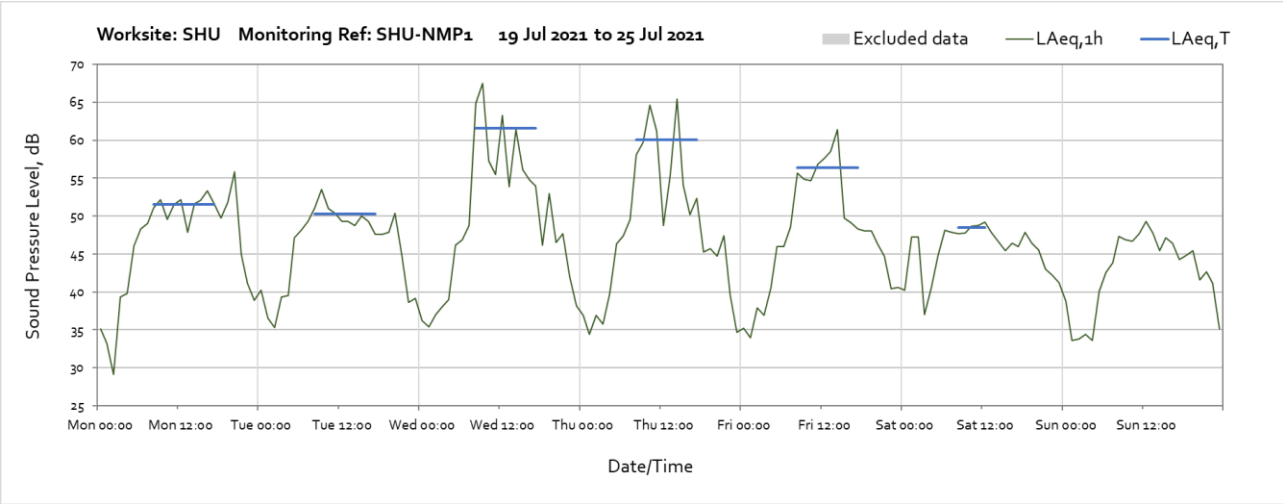
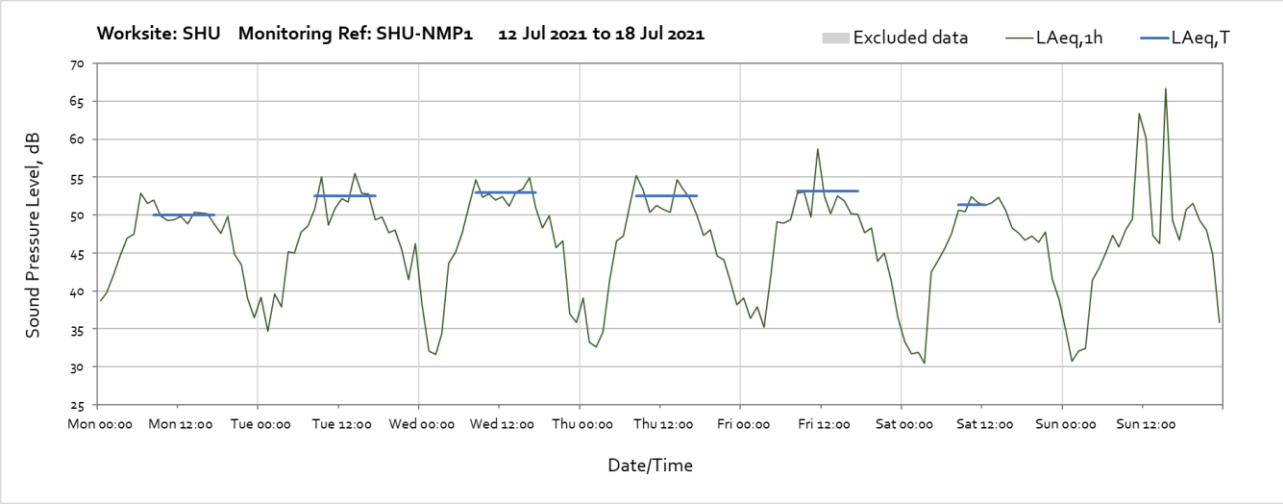
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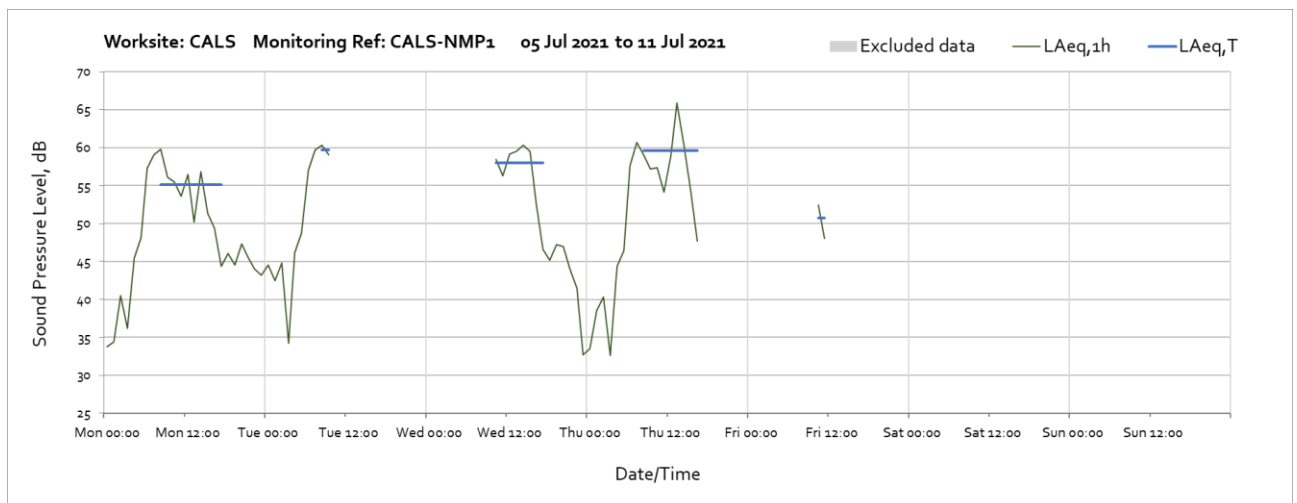
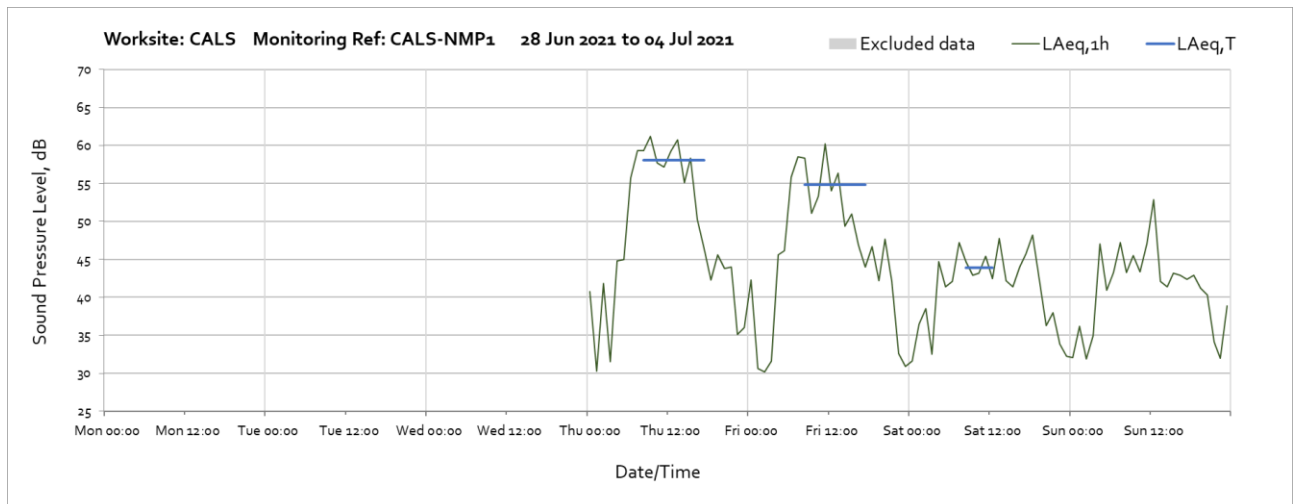


**Worksite: SHU – Monitoring Ref: SHU-NMP1**

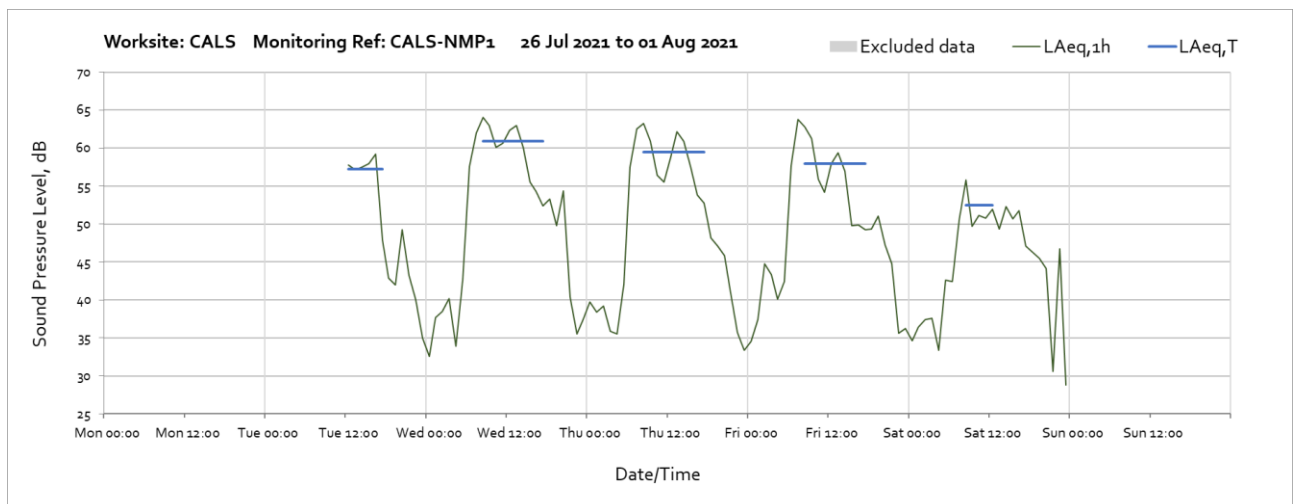




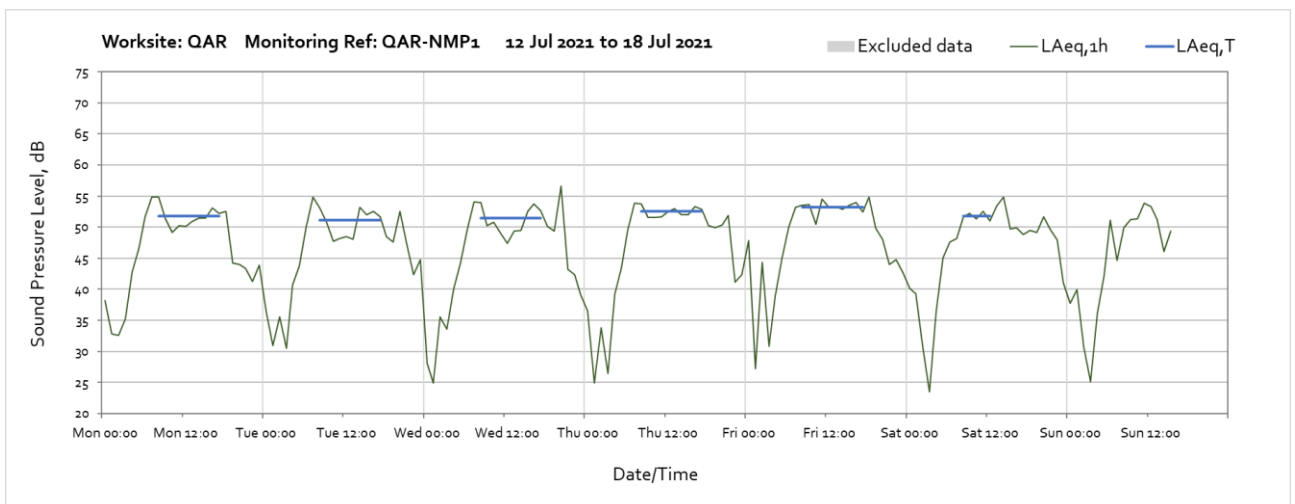
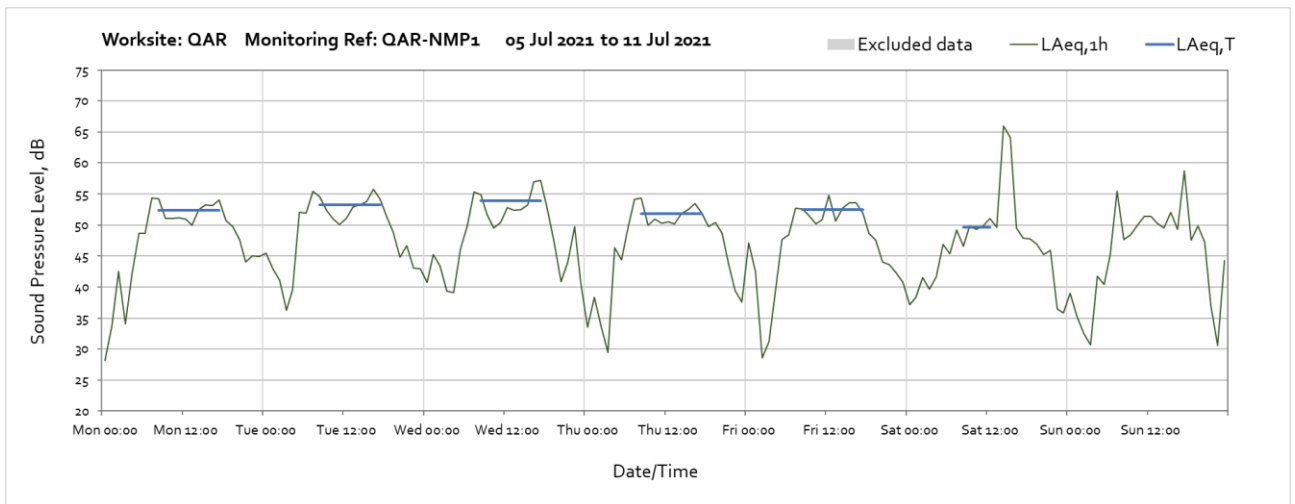
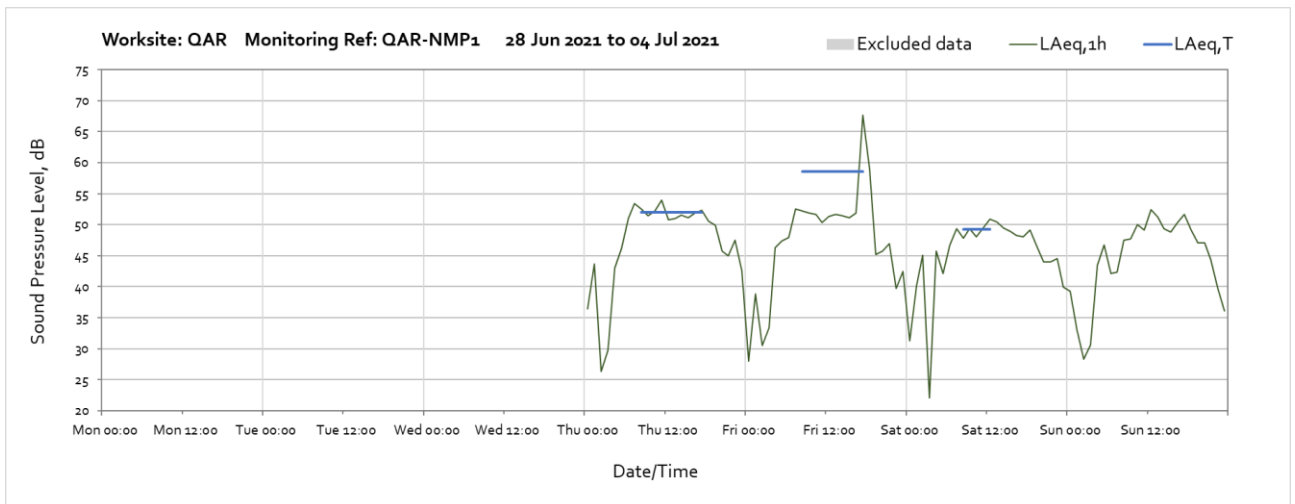
## Worksite: CALS – Monitoring Ref: CALS-NMP1



Note: Missing data between 10:00 on Tuesday 6<sup>th</sup> July and 12:00 on Tuesday 27<sup>th</sup> July was due to insect infestation causing equipment error.

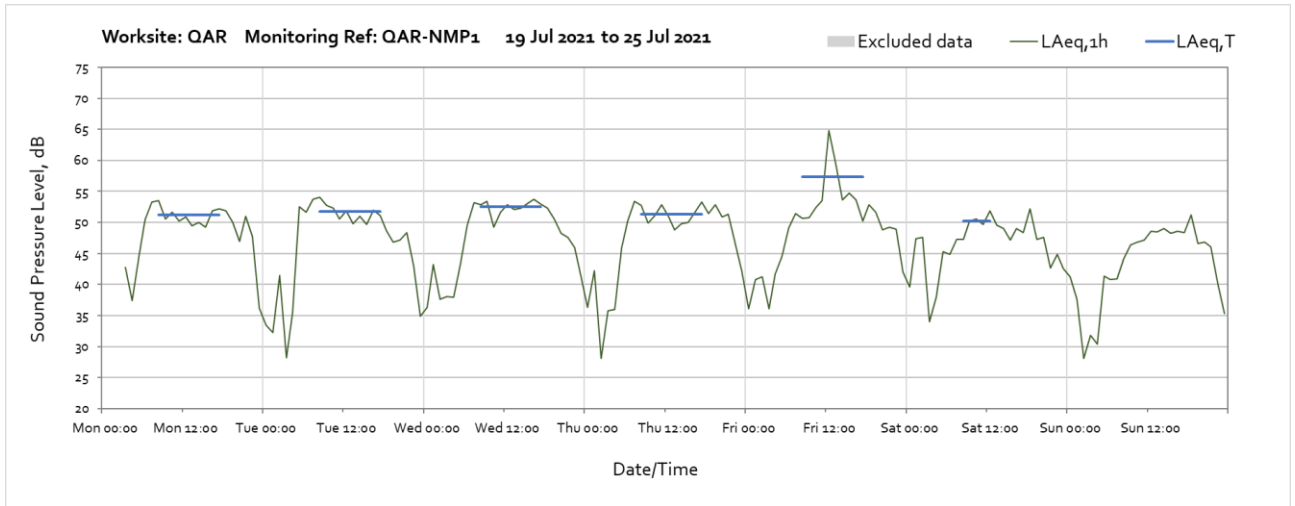


## Worksite: QAR – Monitoring Ref: QAR-NMP1

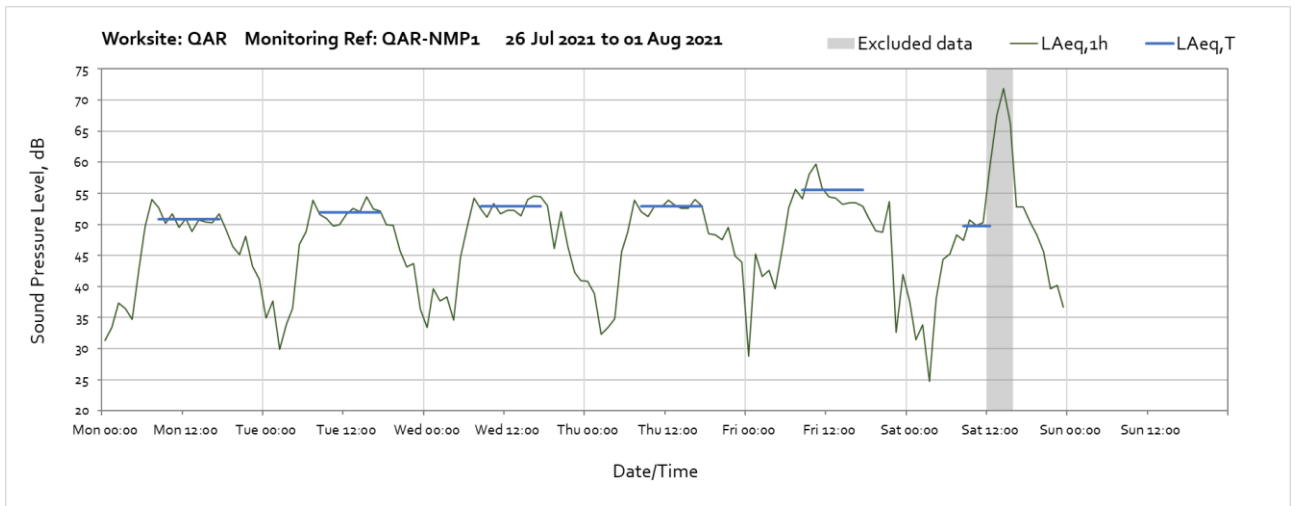


Note: Missing data between 16:00 on Sunday 18<sup>th</sup> July and 00:00 on Monday 19<sup>th</sup> July was due to loss of power to the monitor.

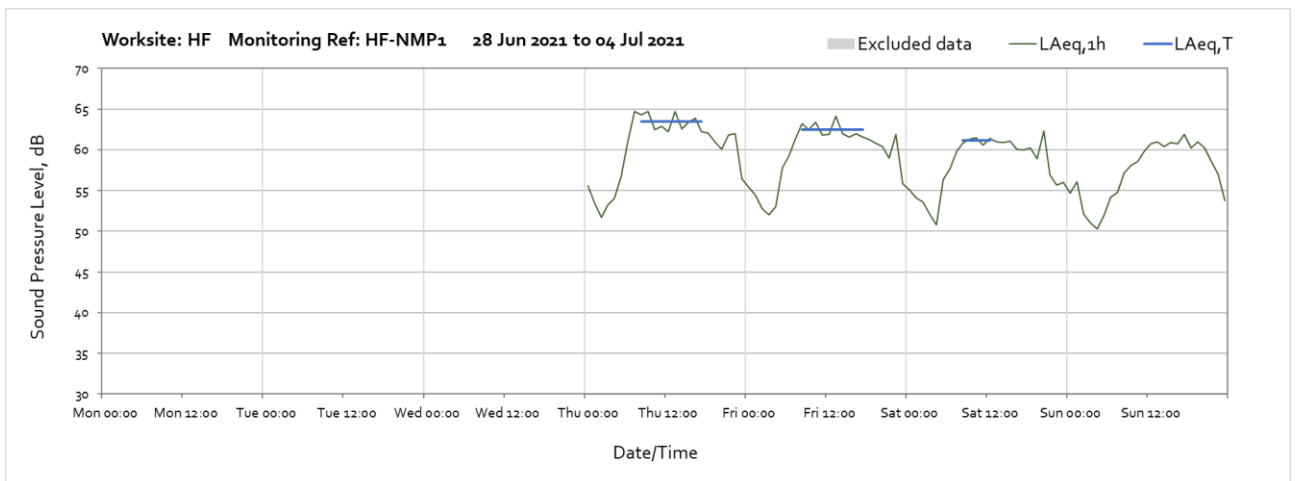
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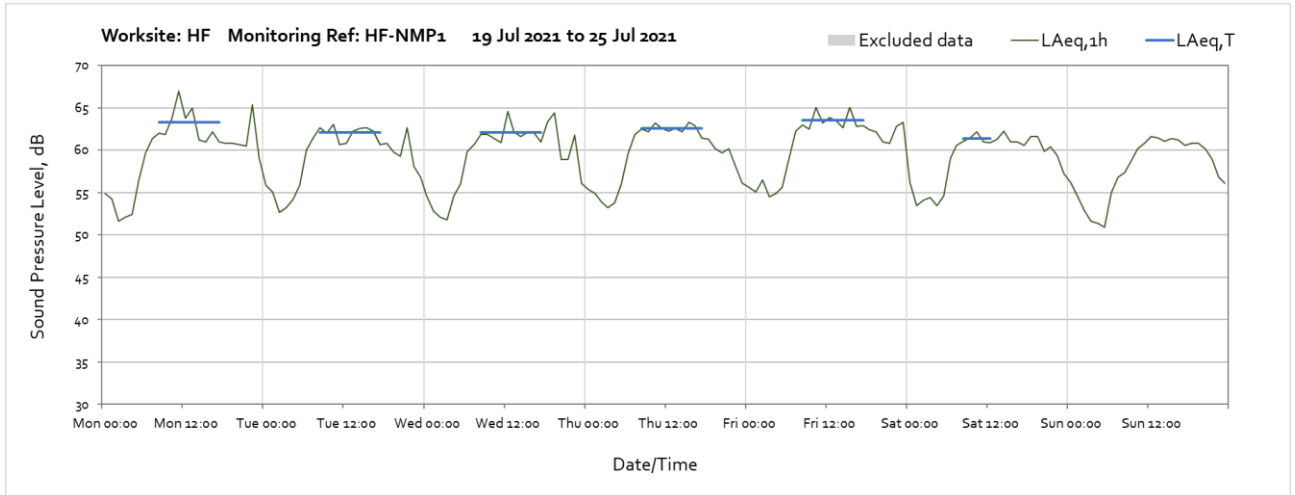
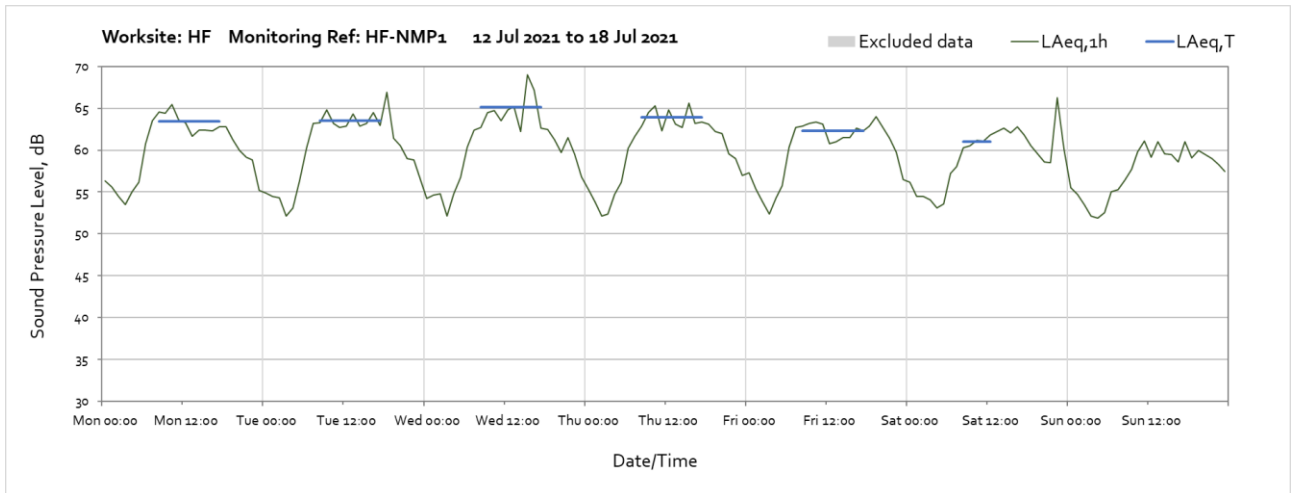
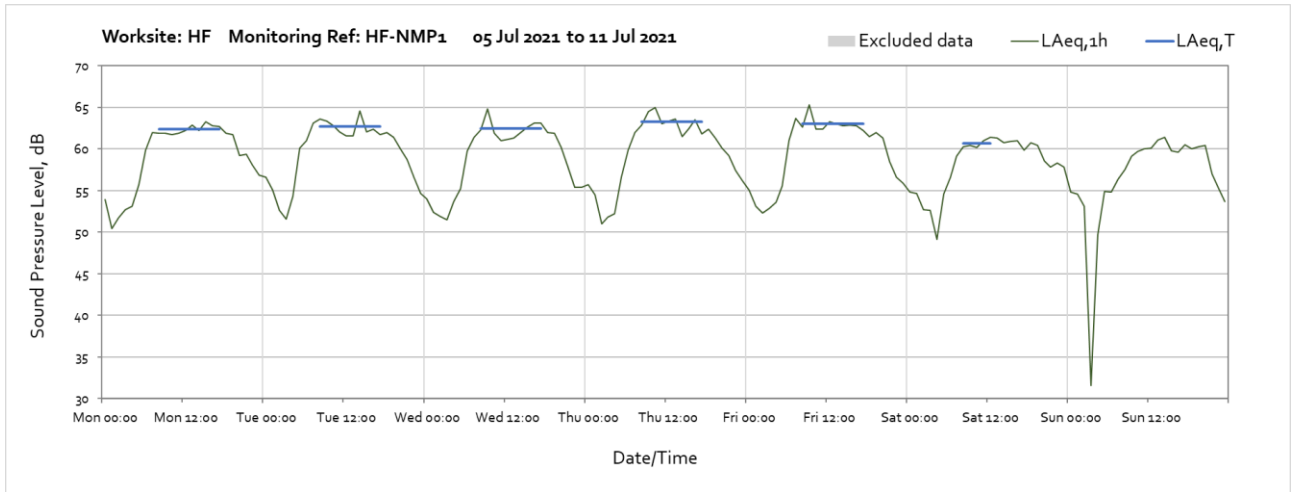


Note: Missing data between 00:00 and 03:00 on Monday 19<sup>th</sup> July was due to loss of power to the monitor.

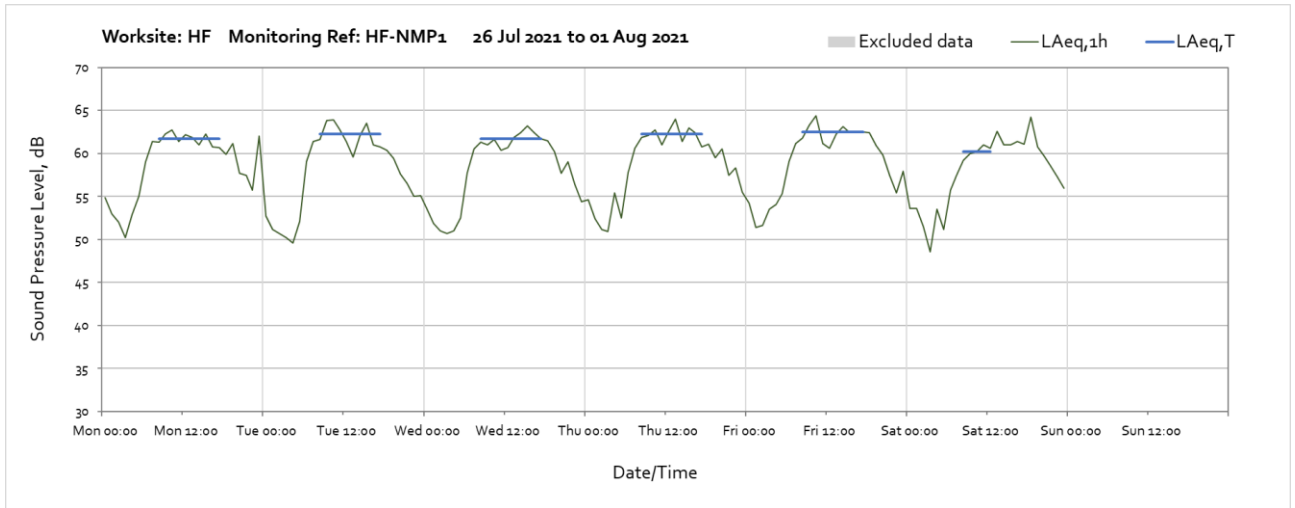


**Worksite: HF – Monitoring Ref: HF-NMP1**

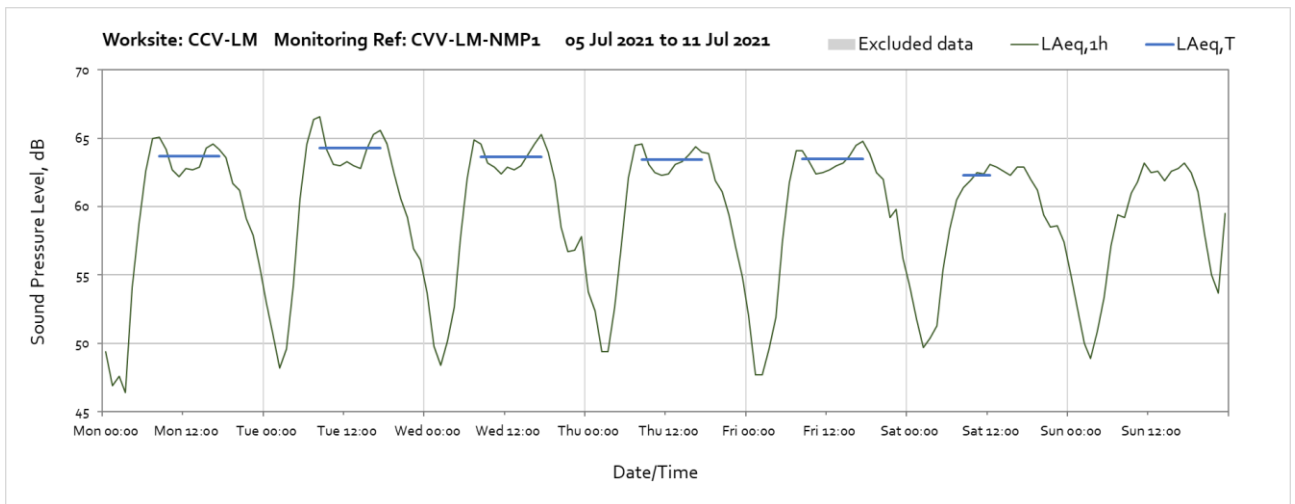
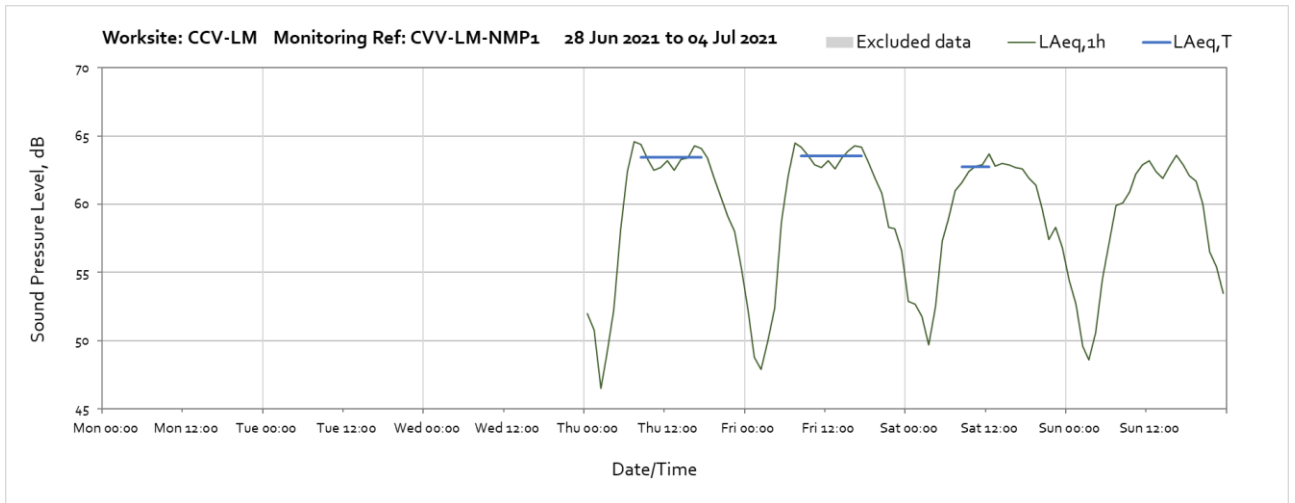


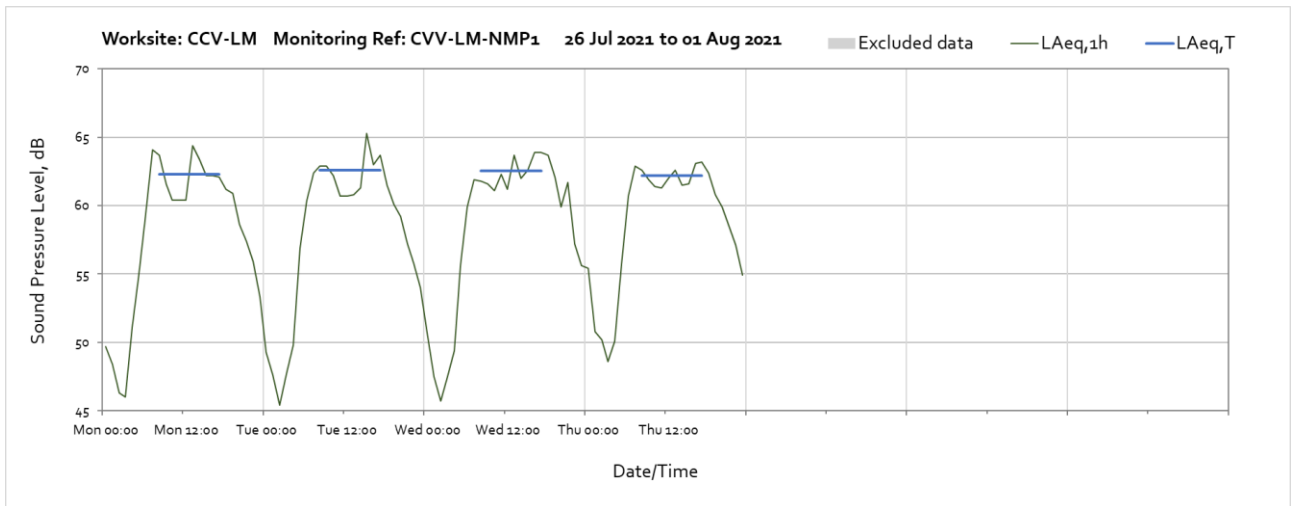
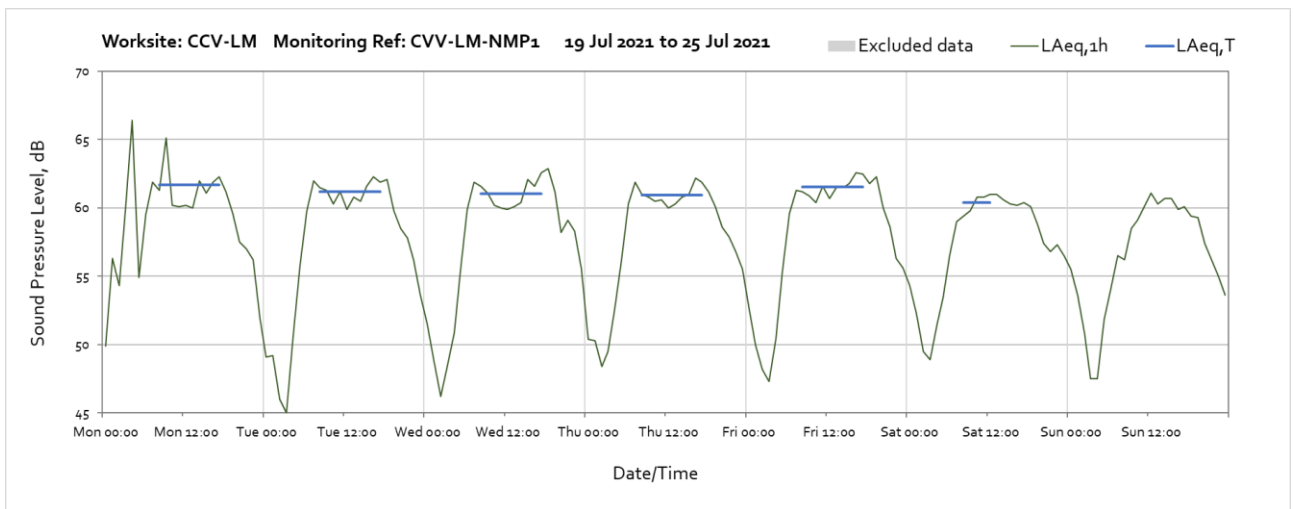
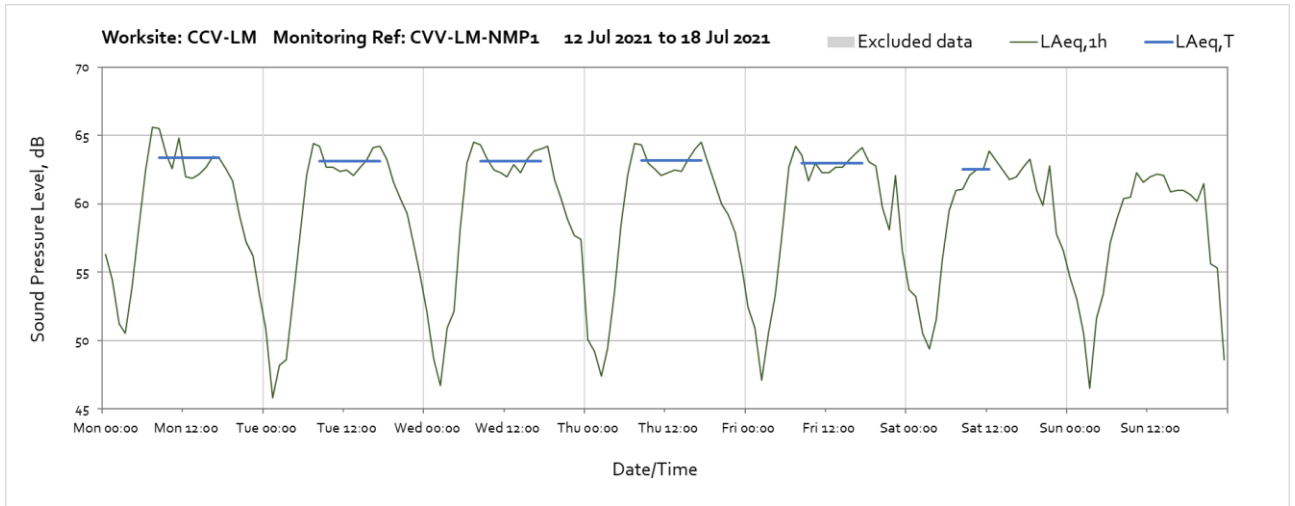




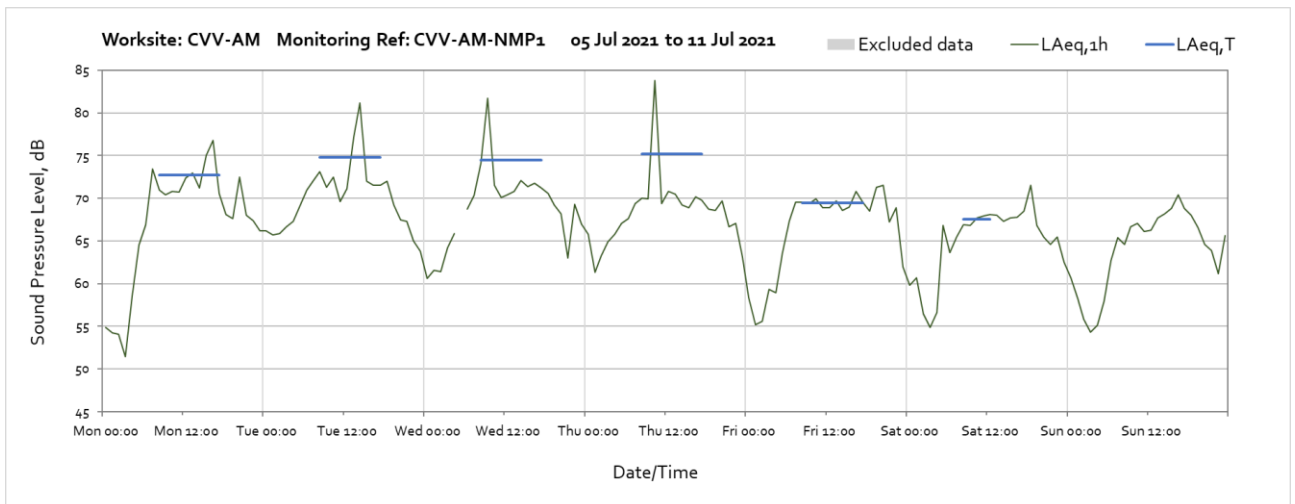
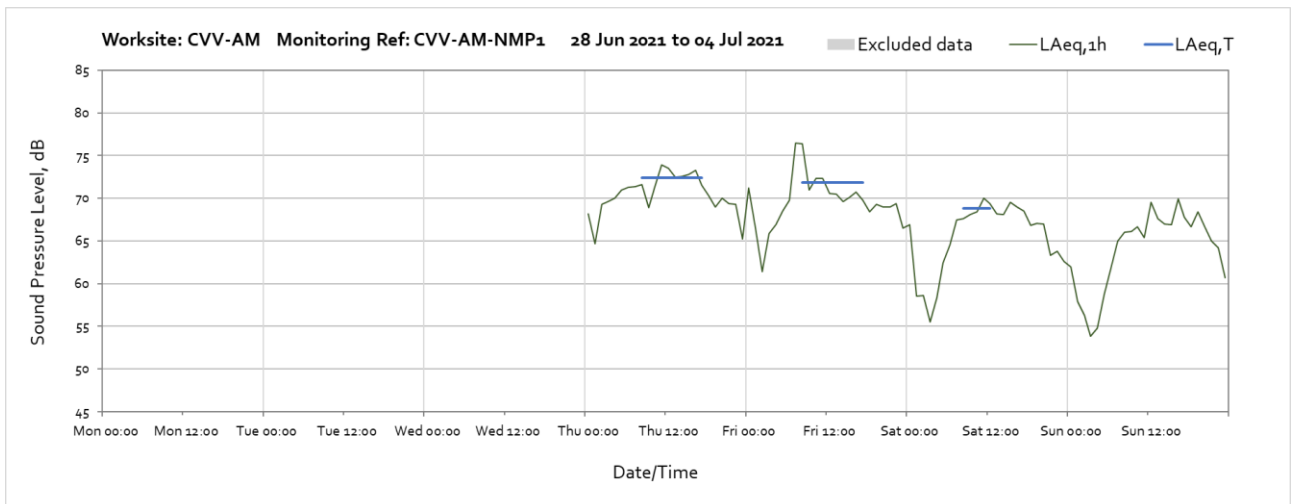


**Worksite: CVV-LM - Monitoring Ref: CVV-LM-NMP1**

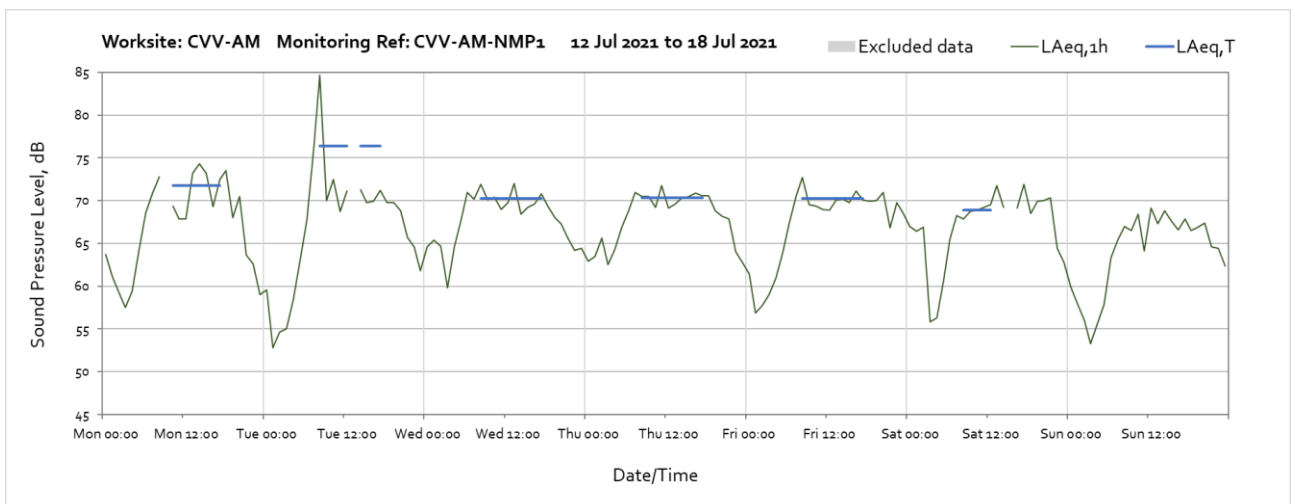




## Worksite: AM – Monitoring Ref: AM-NMP1

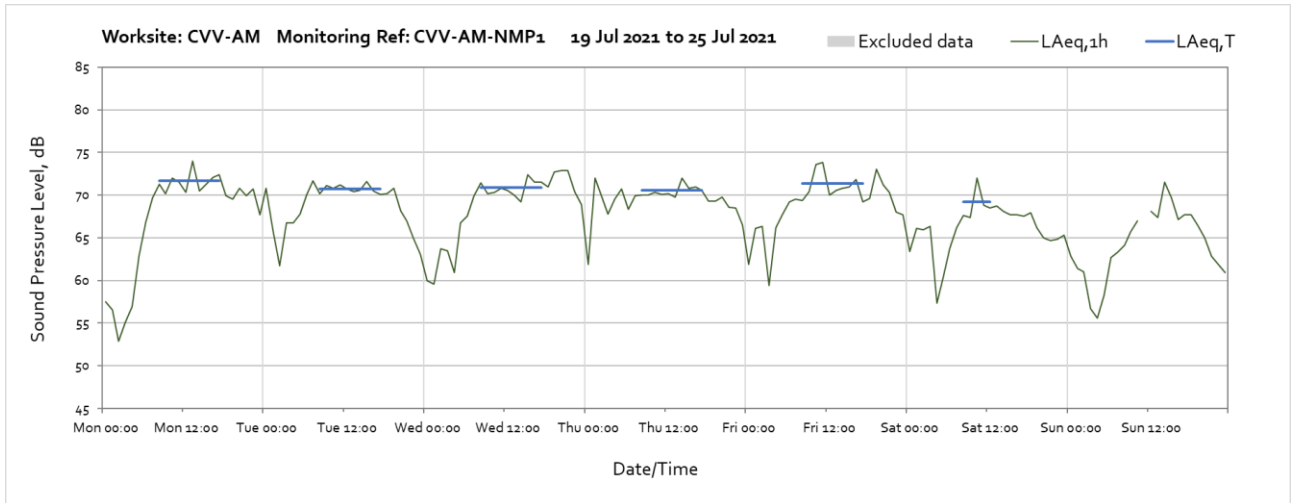


Note: Missing data between 05:00 and 06:00 on Wednesday 7<sup>th</sup> July is due to loss of connection to the monitor.

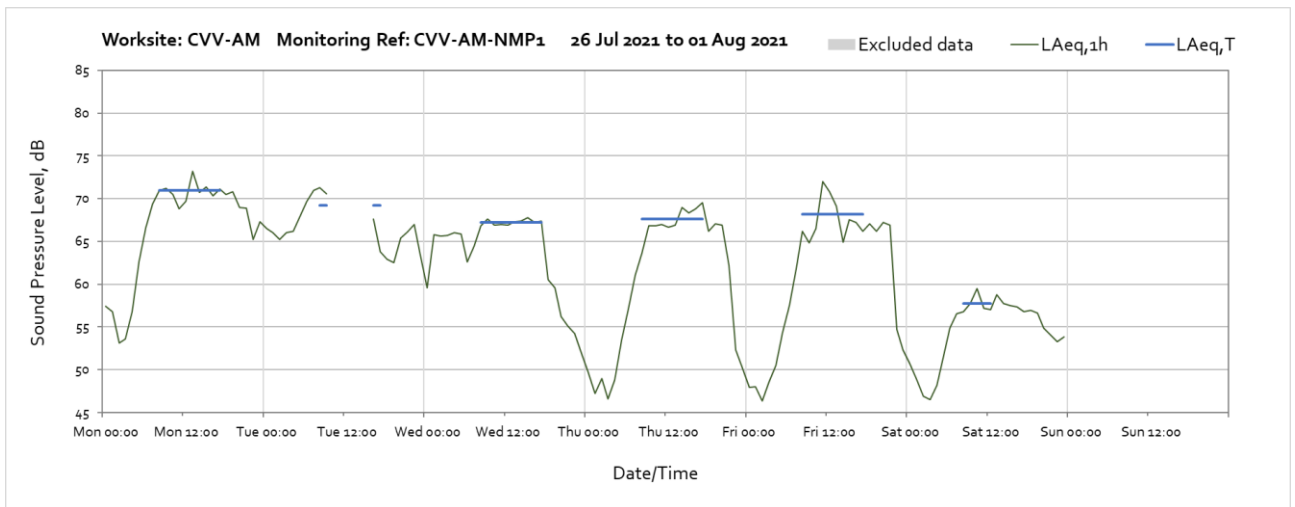


Note: Missing data between 09:00 and 10:00 on Monday 12<sup>th</sup> July, between 13:00 and 14:00 on Tuesday 13<sup>th</sup> July and between 15:00 and 16:00 on Saturday 17<sup>th</sup> July are due to loss of connection to the monitor.

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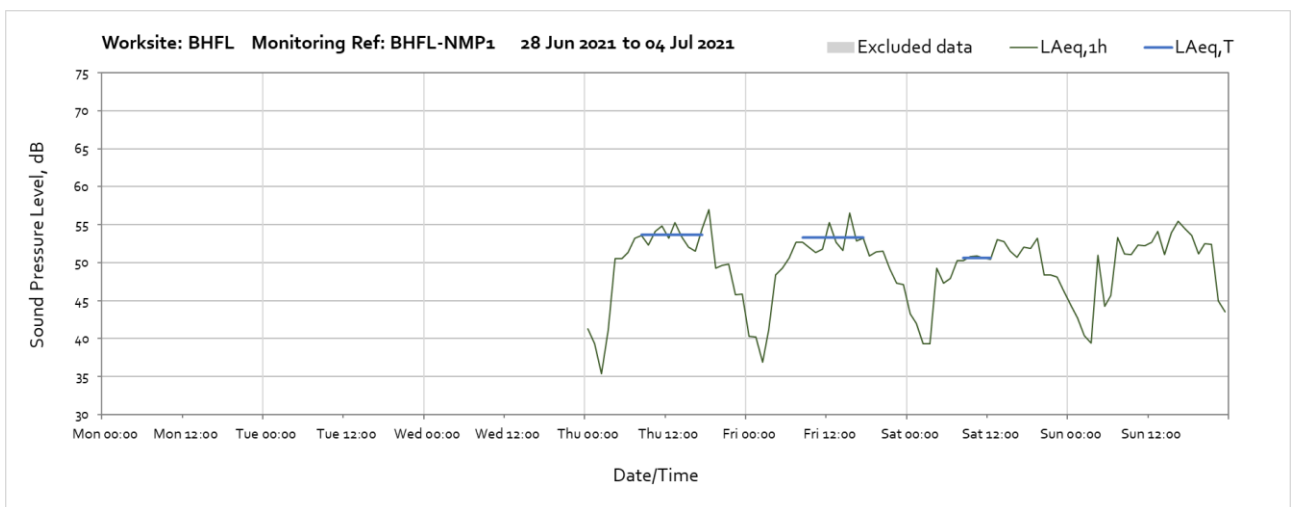


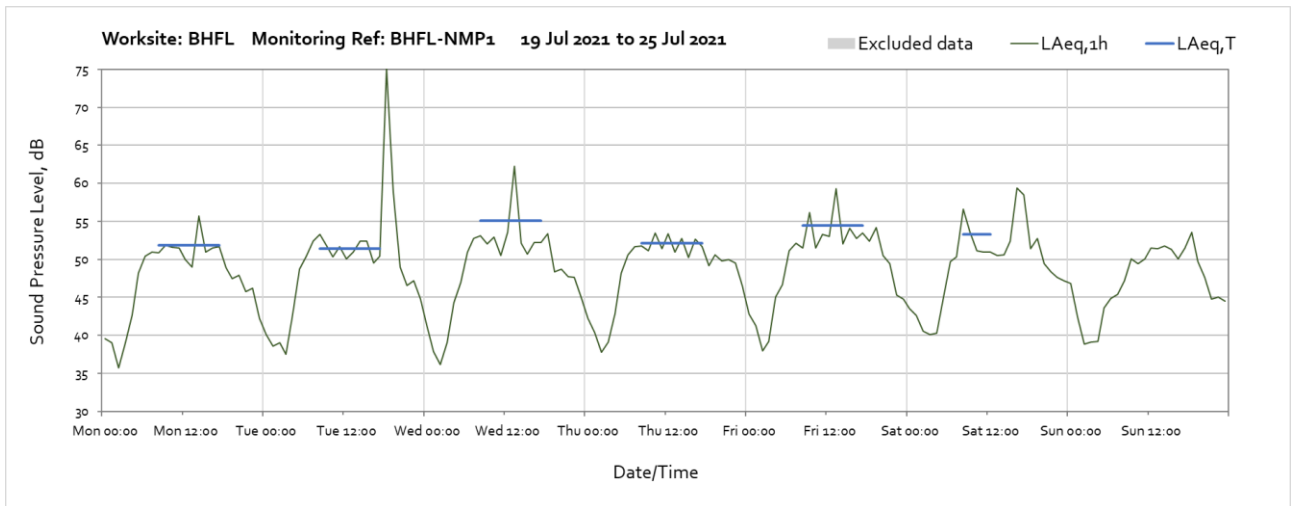
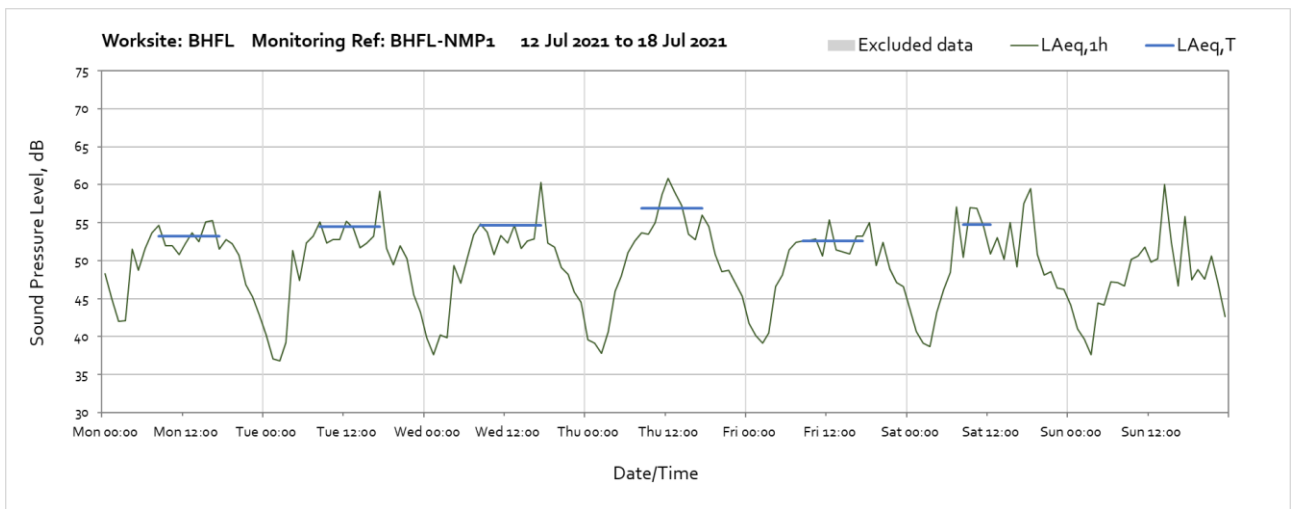
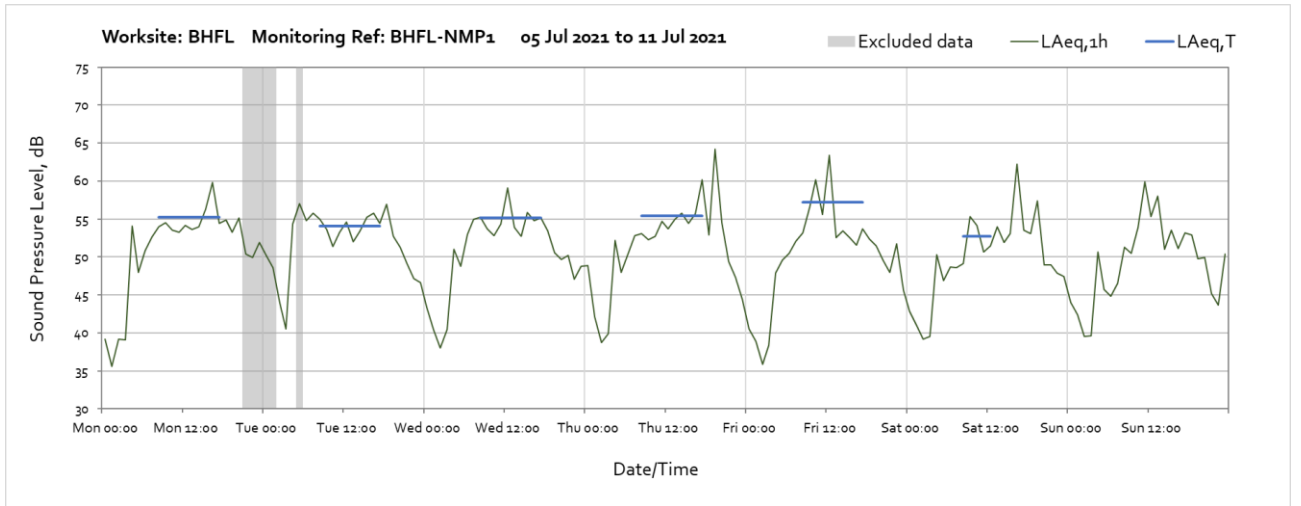
Note: Missing data between 11:00 and 12:00 on Sunday 25<sup>th</sup> July is due to loss of connection to the monitor.

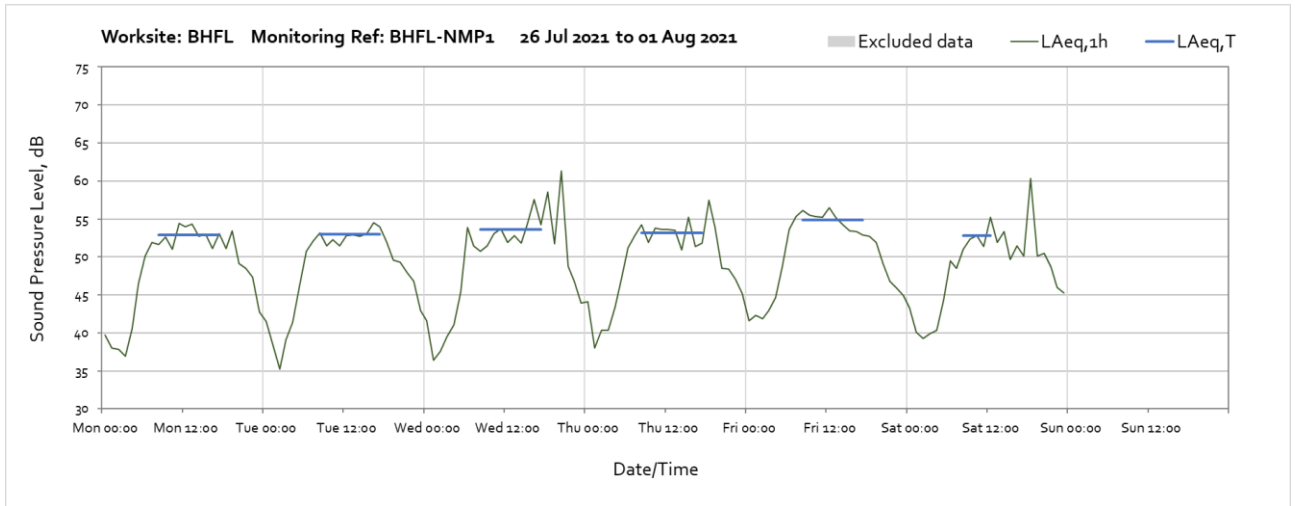


Note: Missing data between 10:00 and 16:00 on Sunday 27<sup>th</sup> July is due to monitor being paused for relocation.

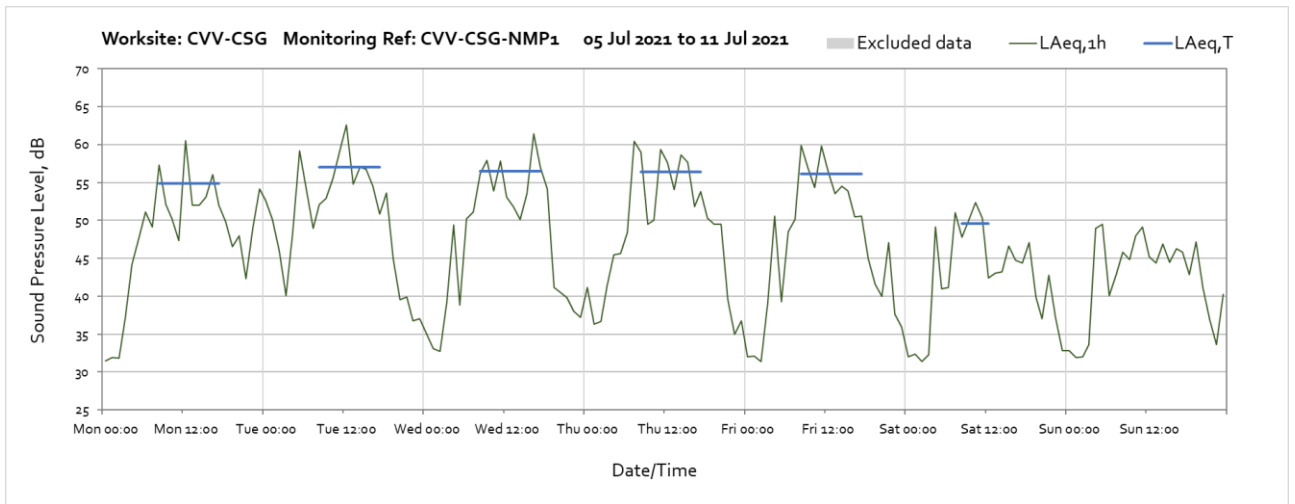
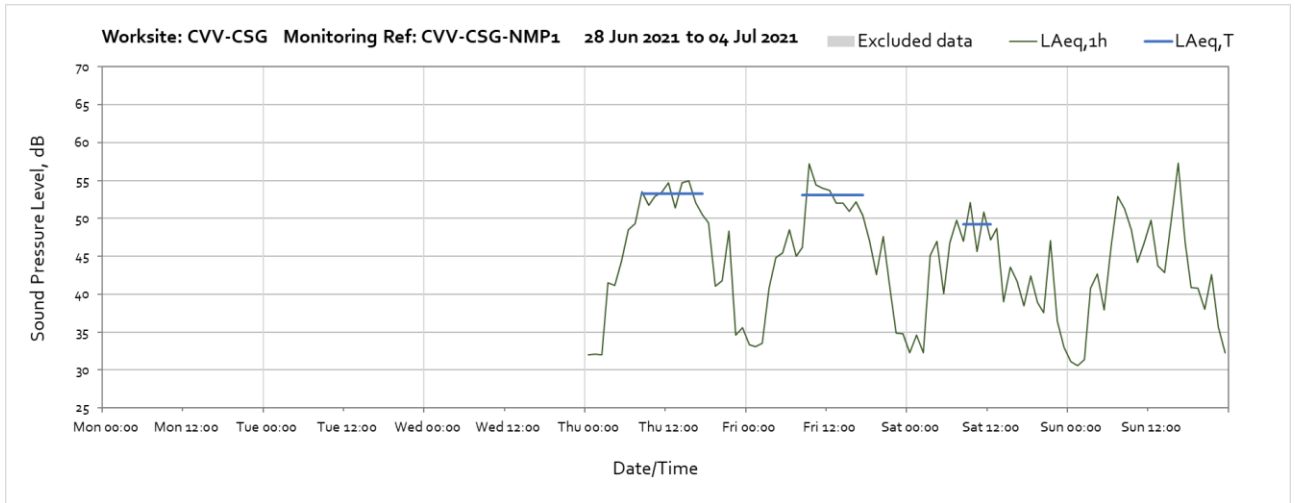
### Worksite: BHFL - Monitoring Ref: BHFL-NMP1

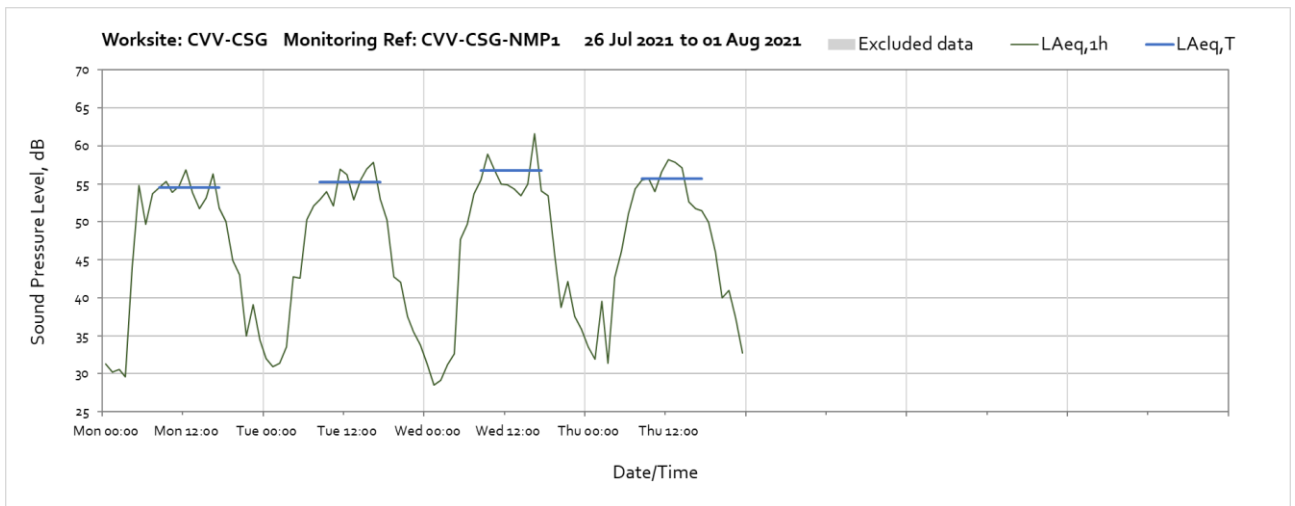
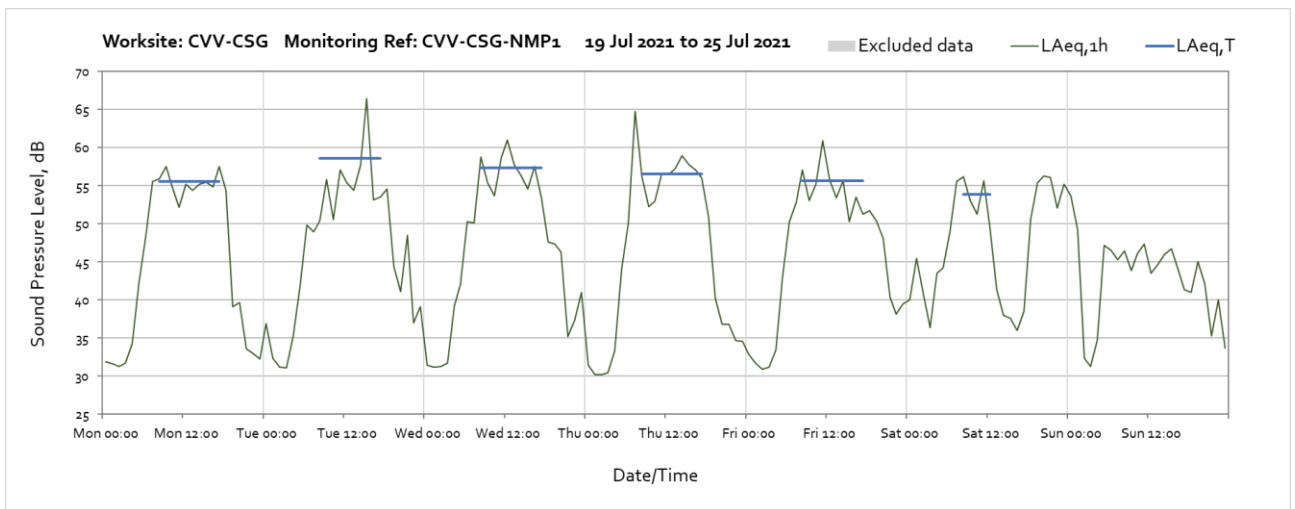
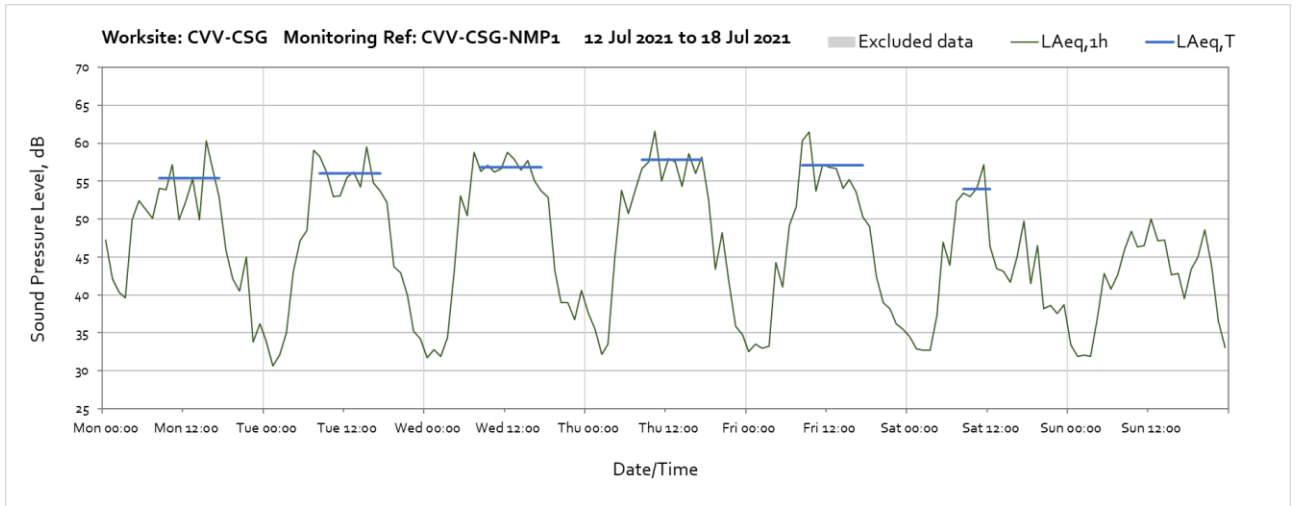




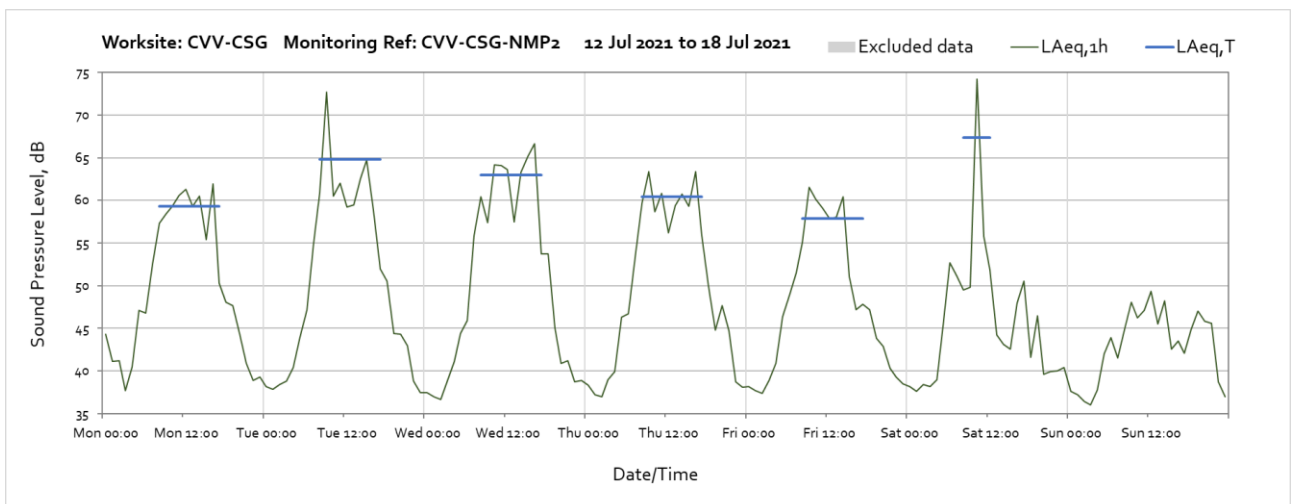
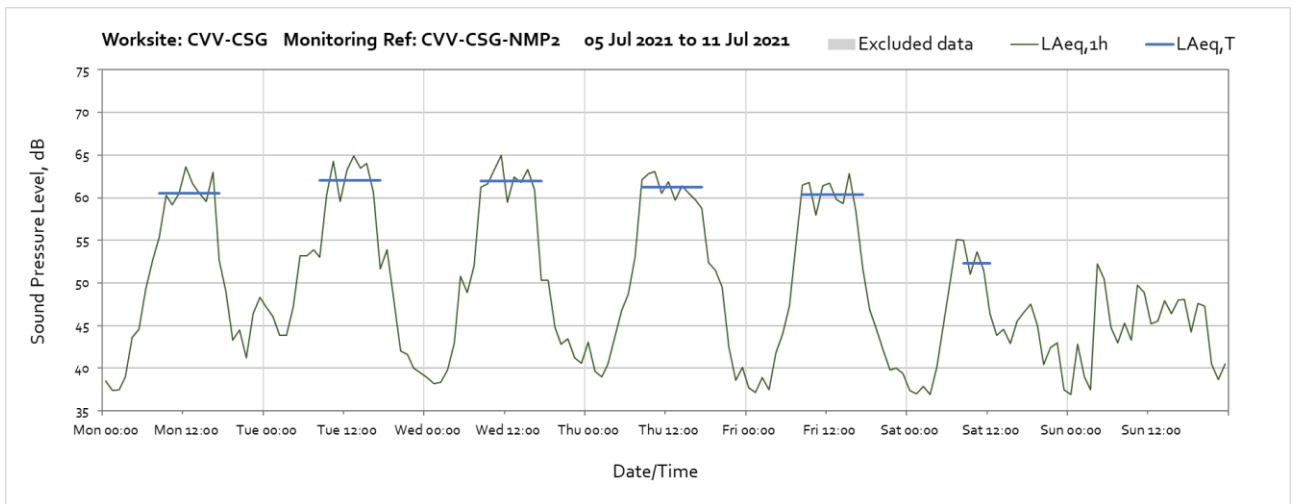
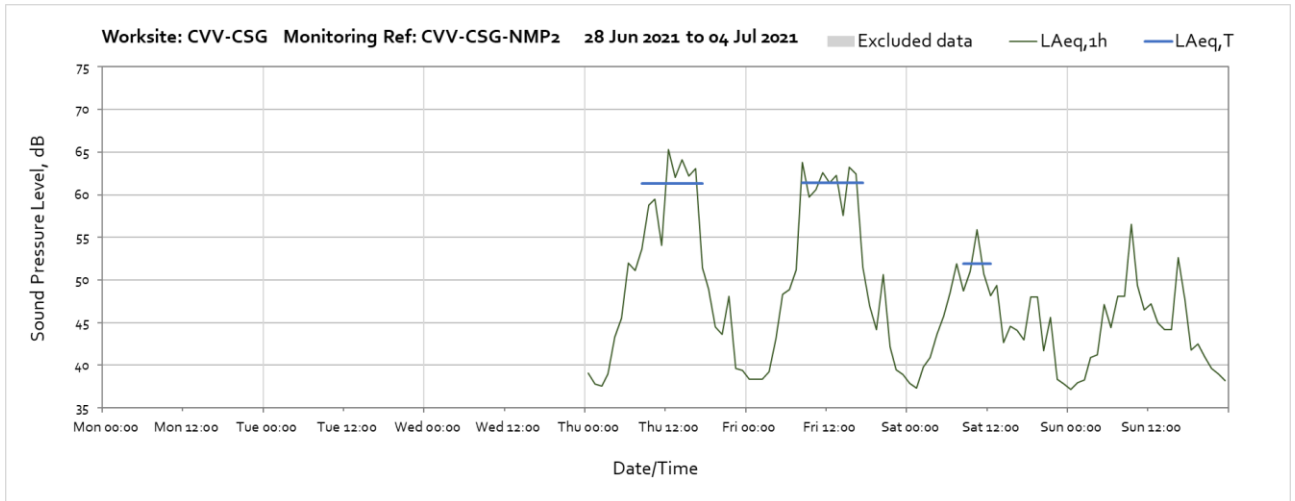


**Worksite: CVV-CSG – Monitoring Ref: CVV-CSG-NMP1**

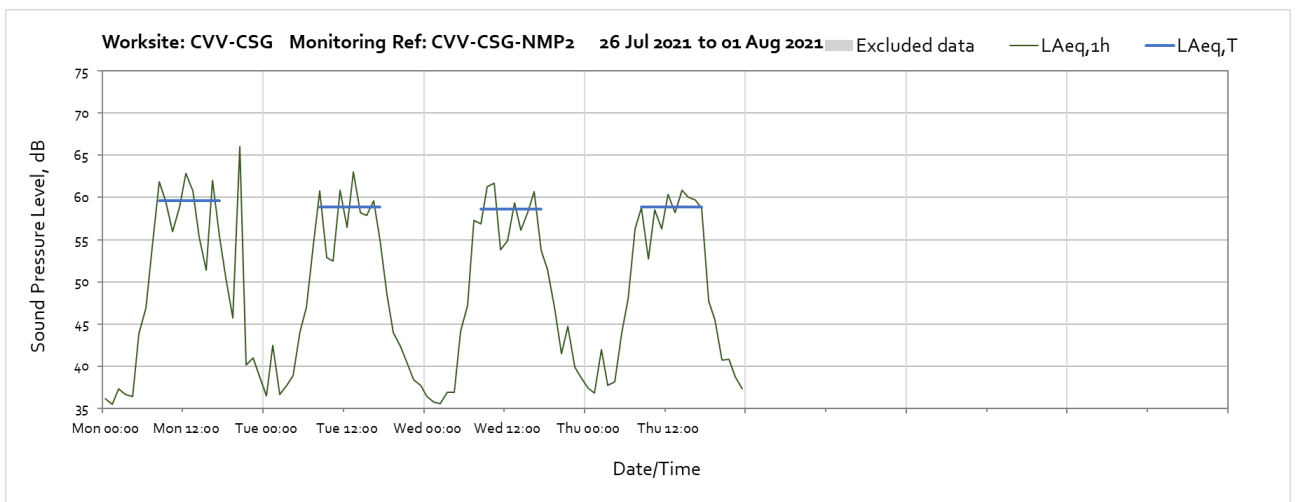
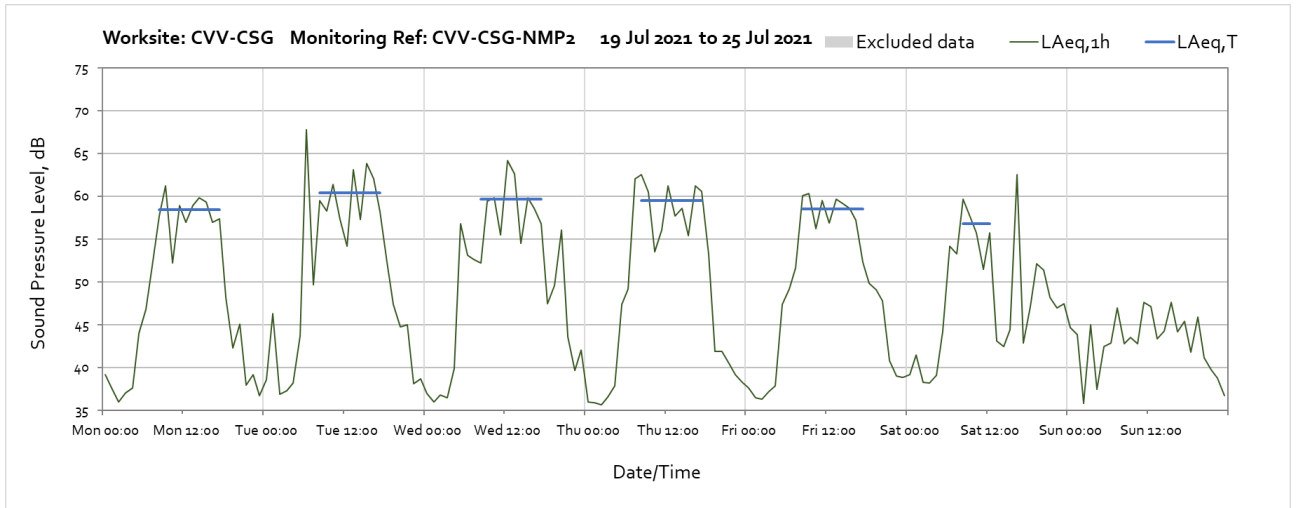




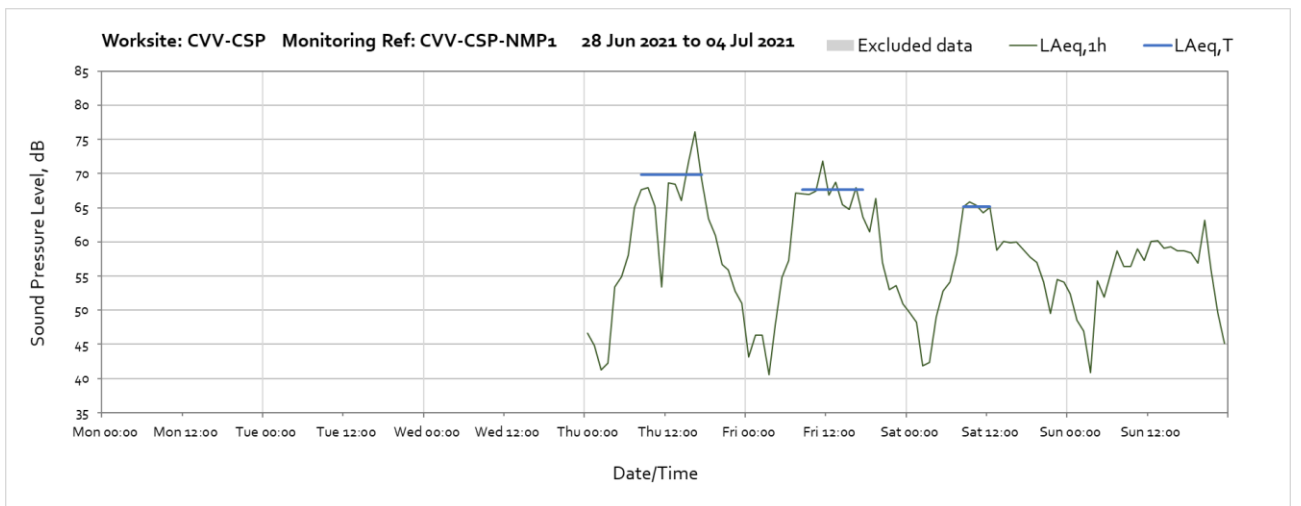
## Worksite: CVV-CSG – Monitoring Ref: CVV-CSG-NMP2

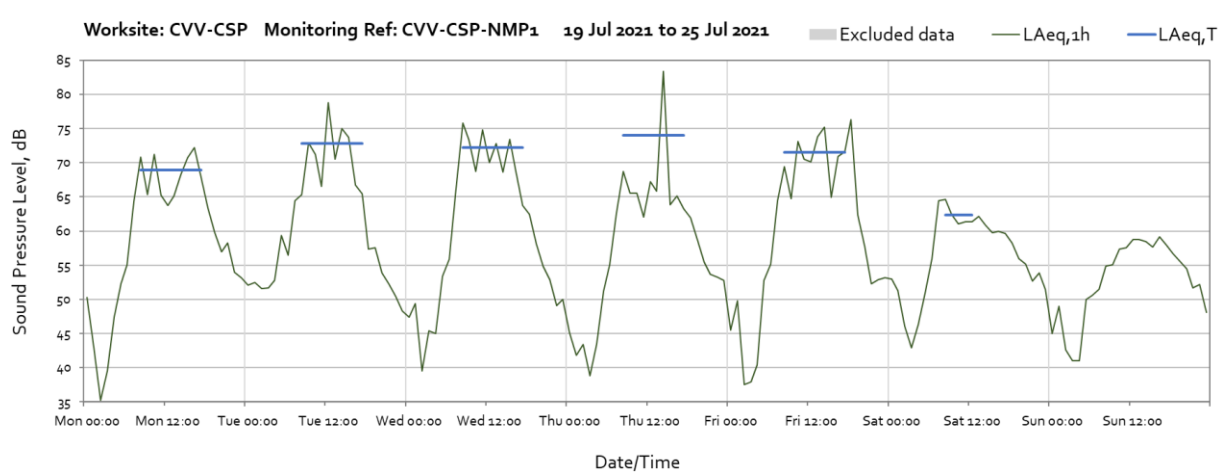
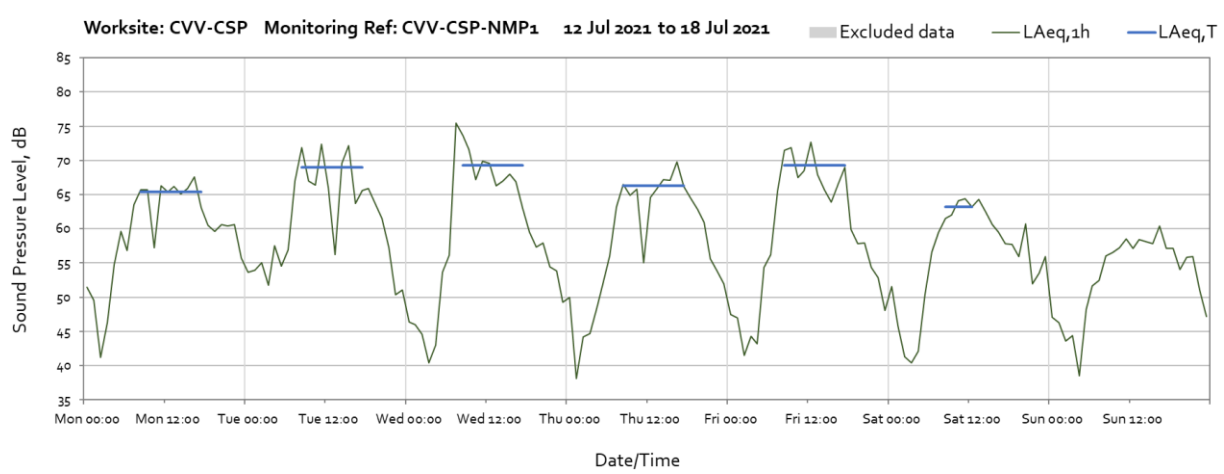
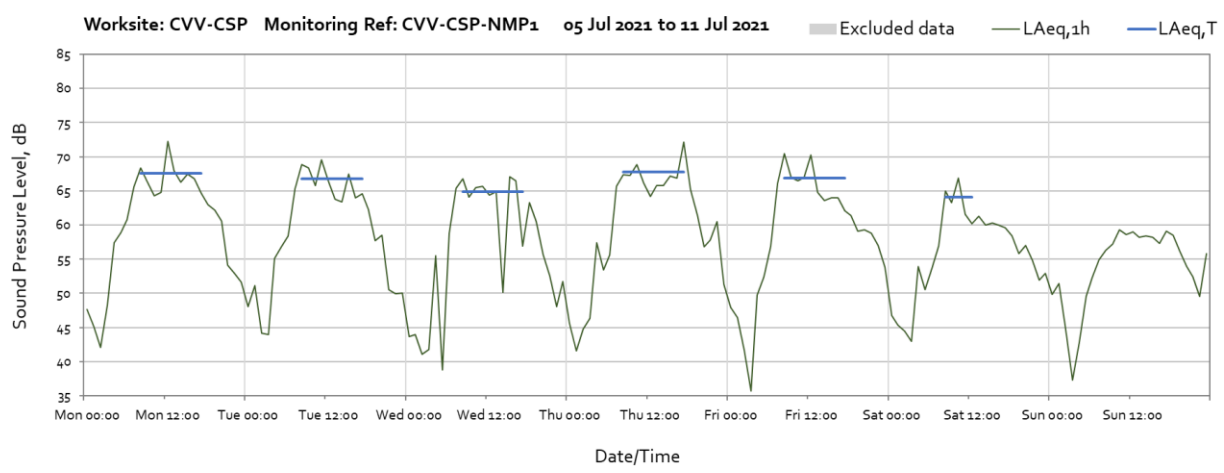




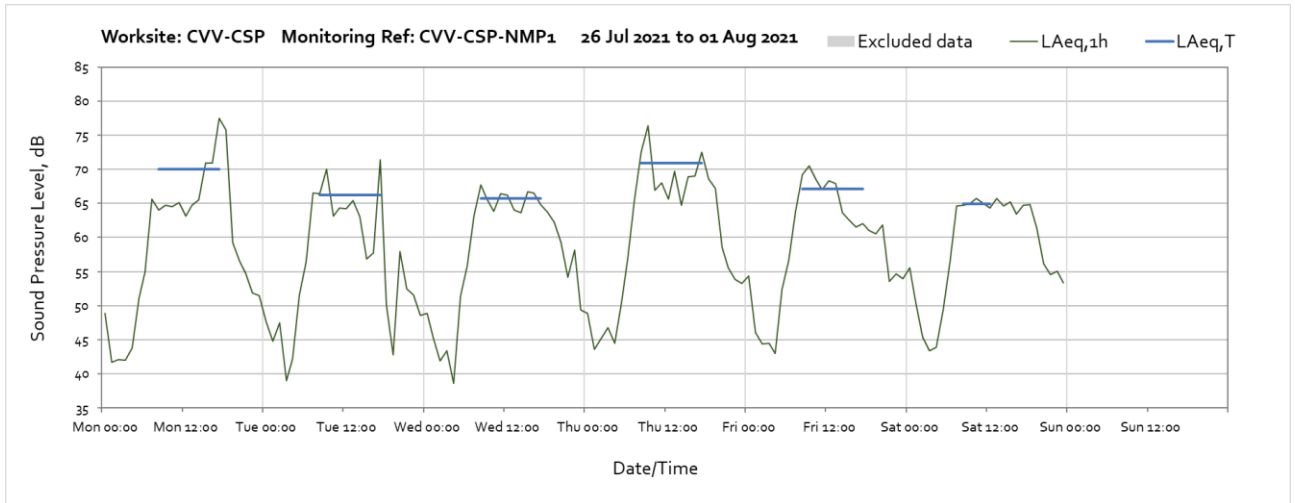


**Worksite: CVV-CSP – Monitoring Ref: CVV-CSP-NMP1**

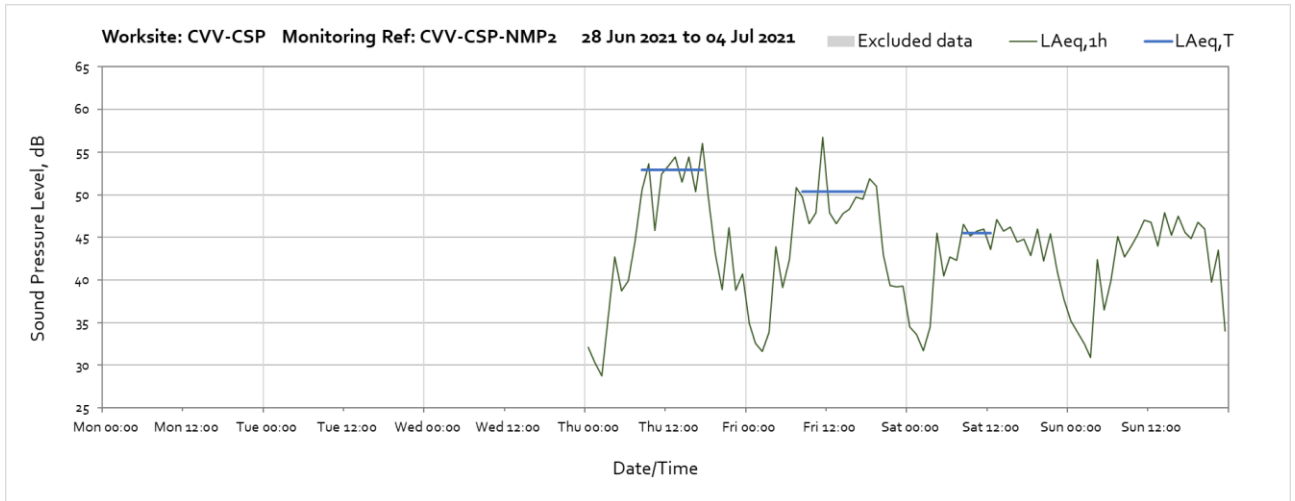


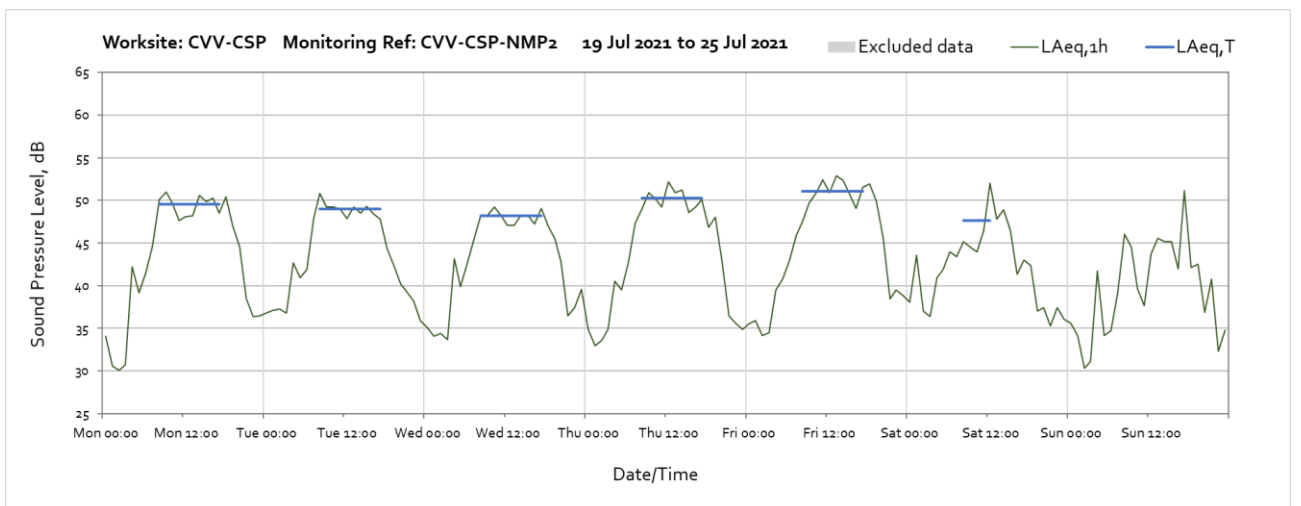
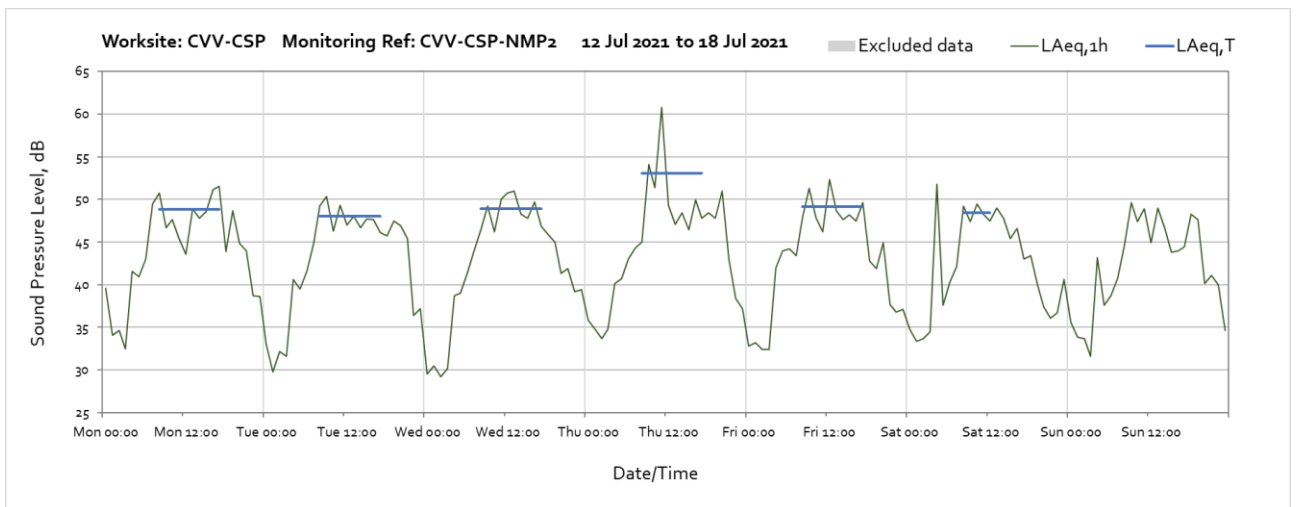
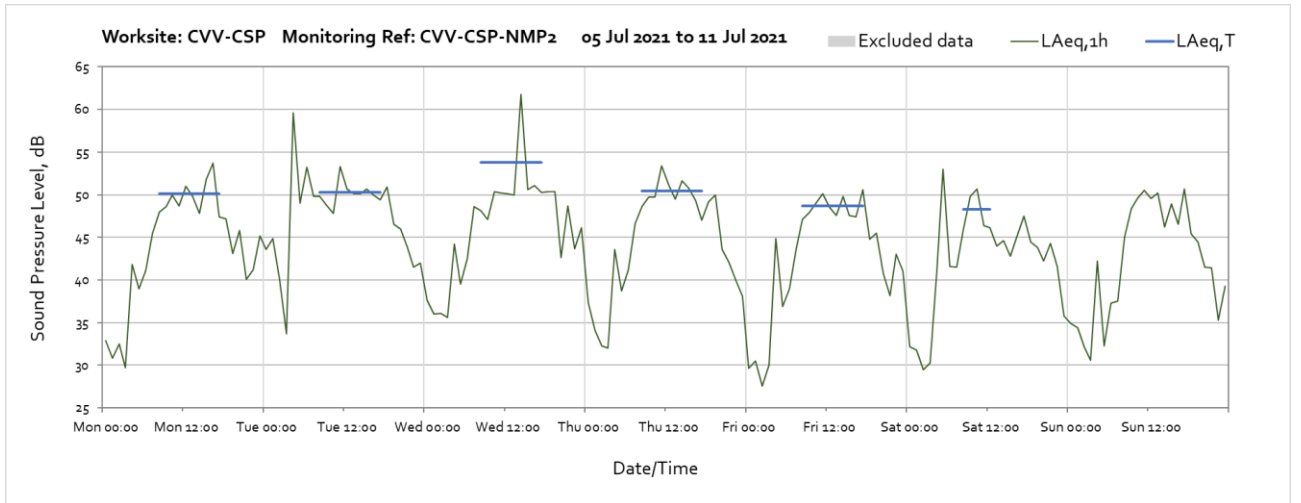


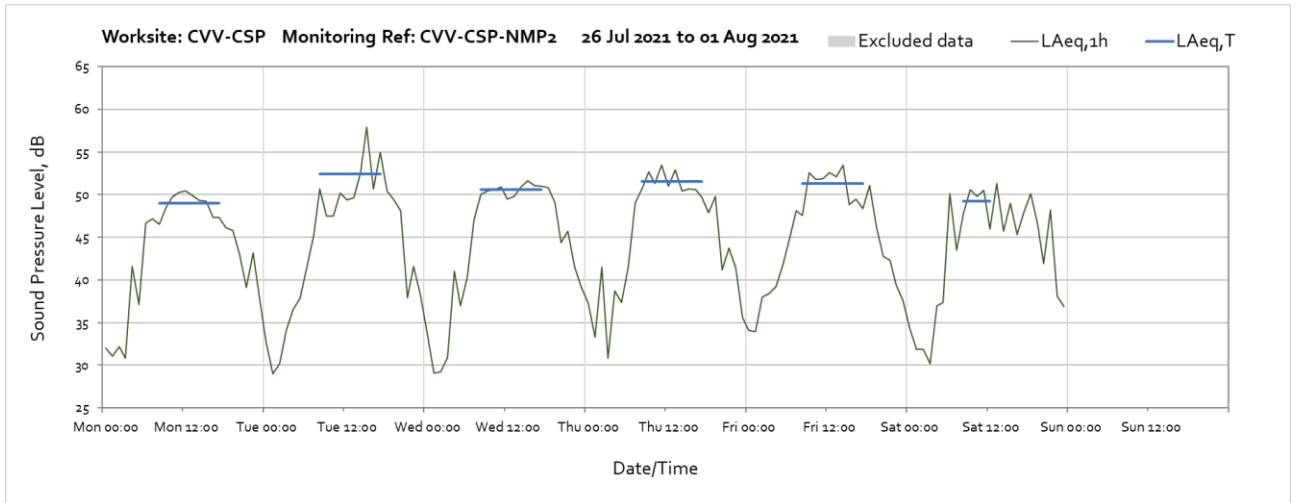
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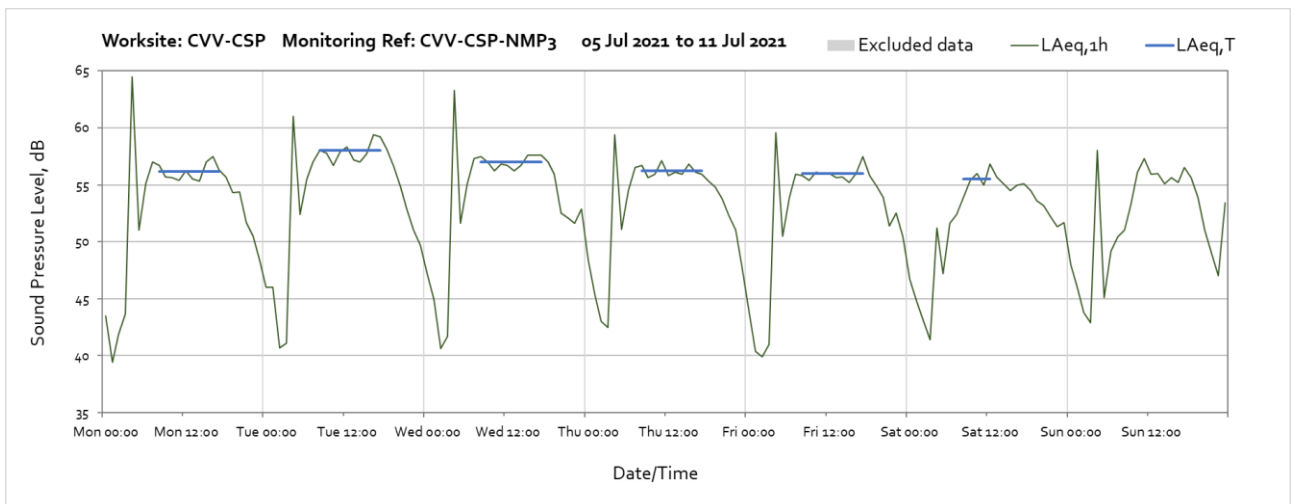
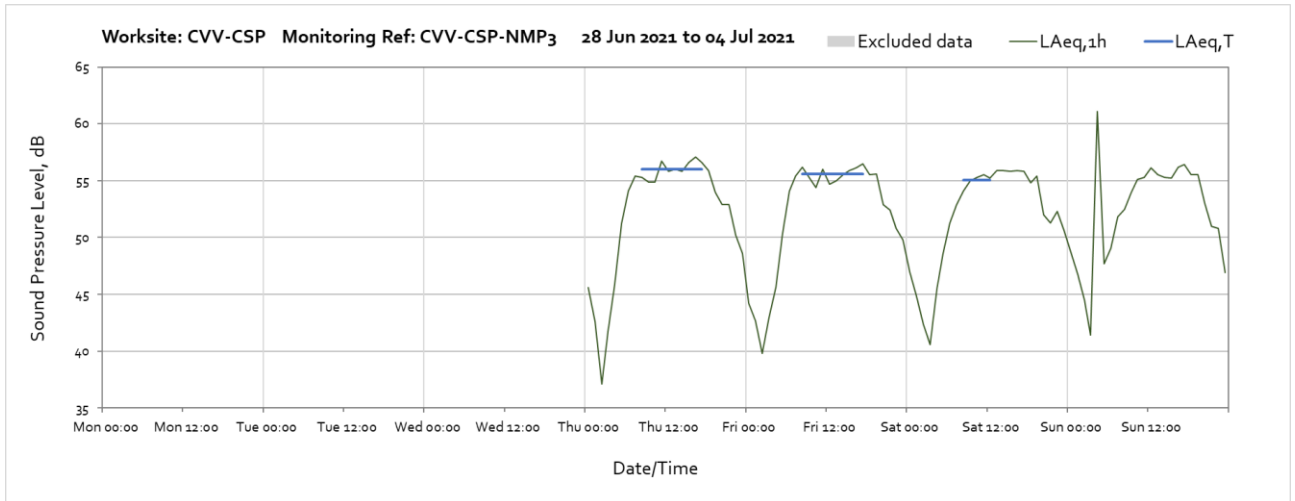
**Worksite: CVV-CSP – Monitoring Ref: CVV-CSP-NMP2**

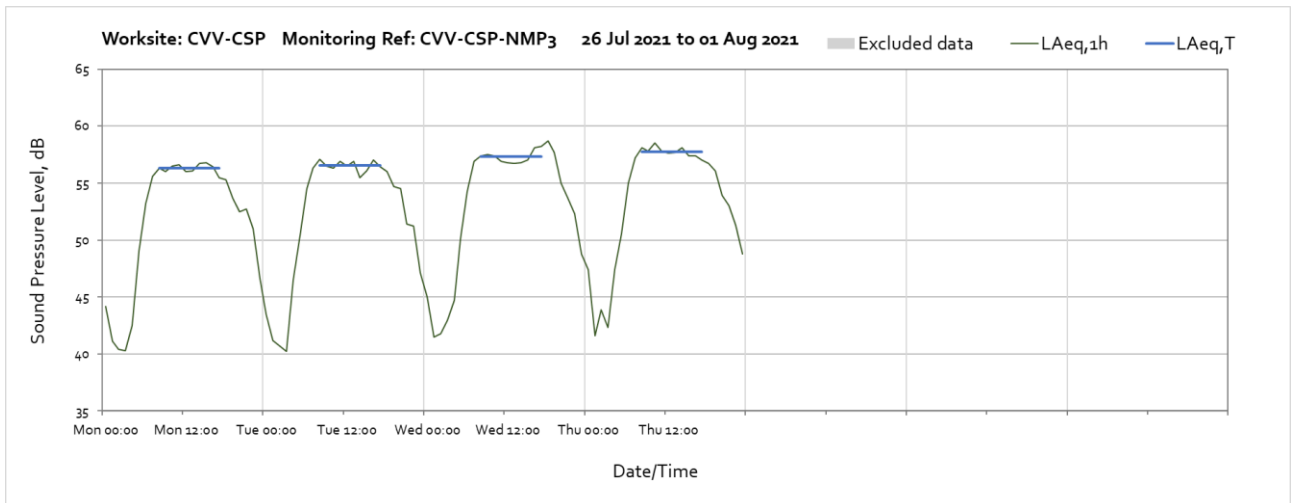
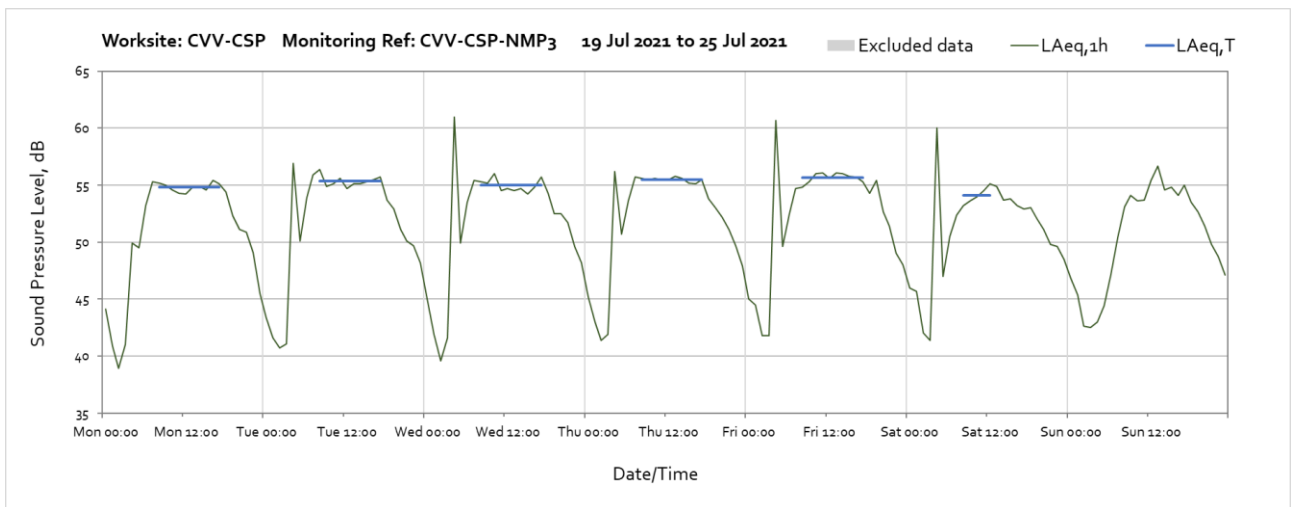
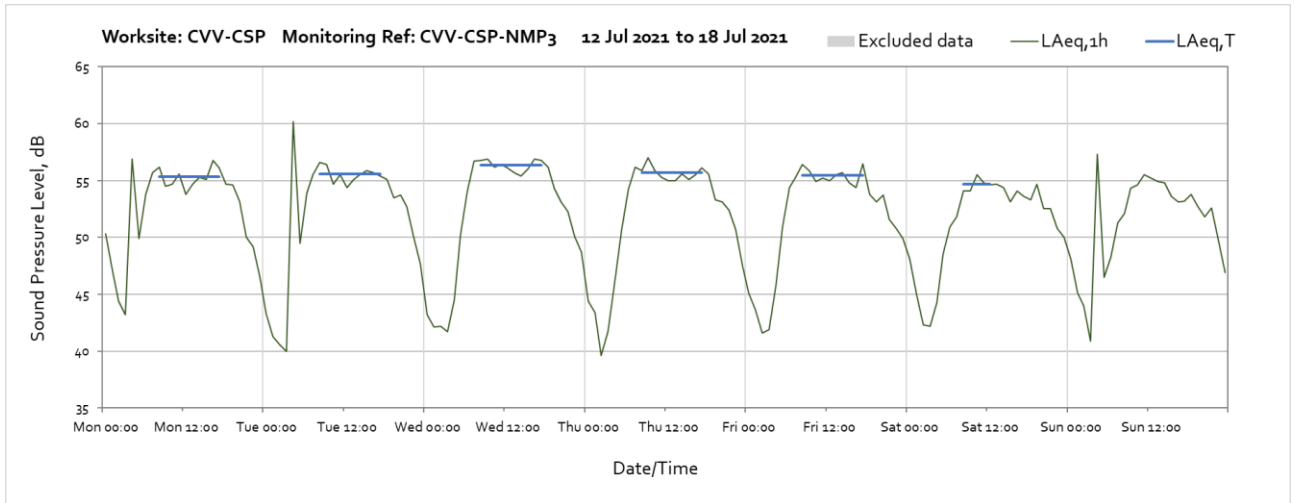




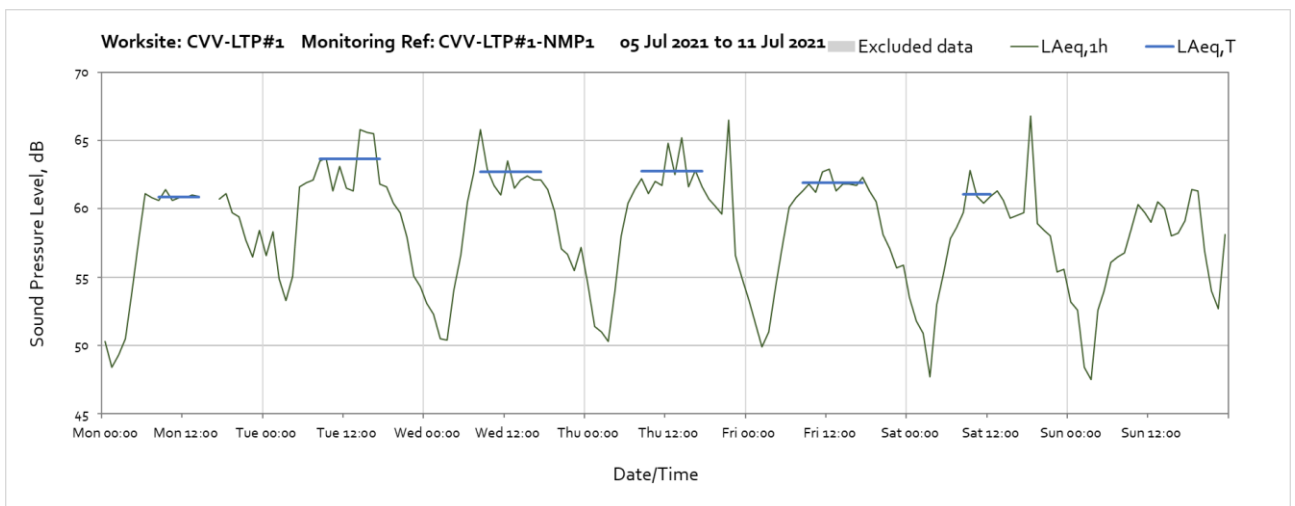
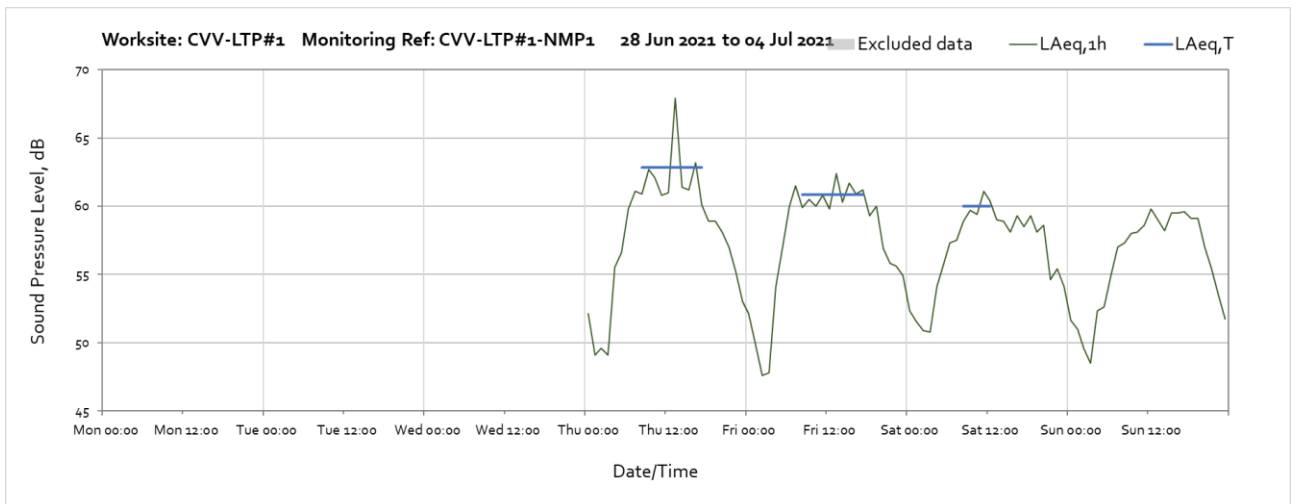


**Worksite: CVV-CSP – Monitoring Ref: CVV-CSP-NMP3**

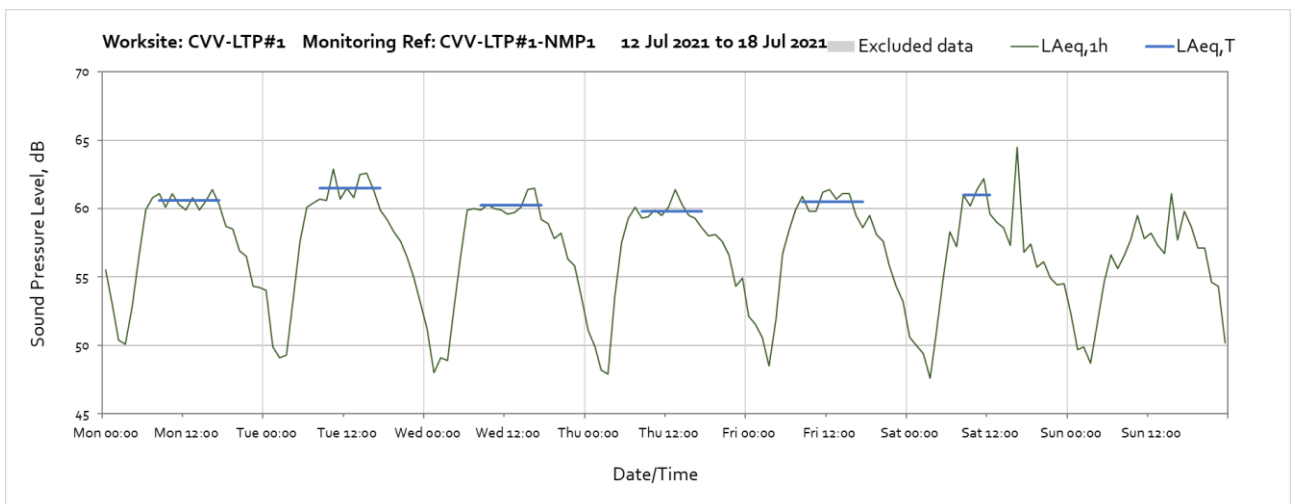


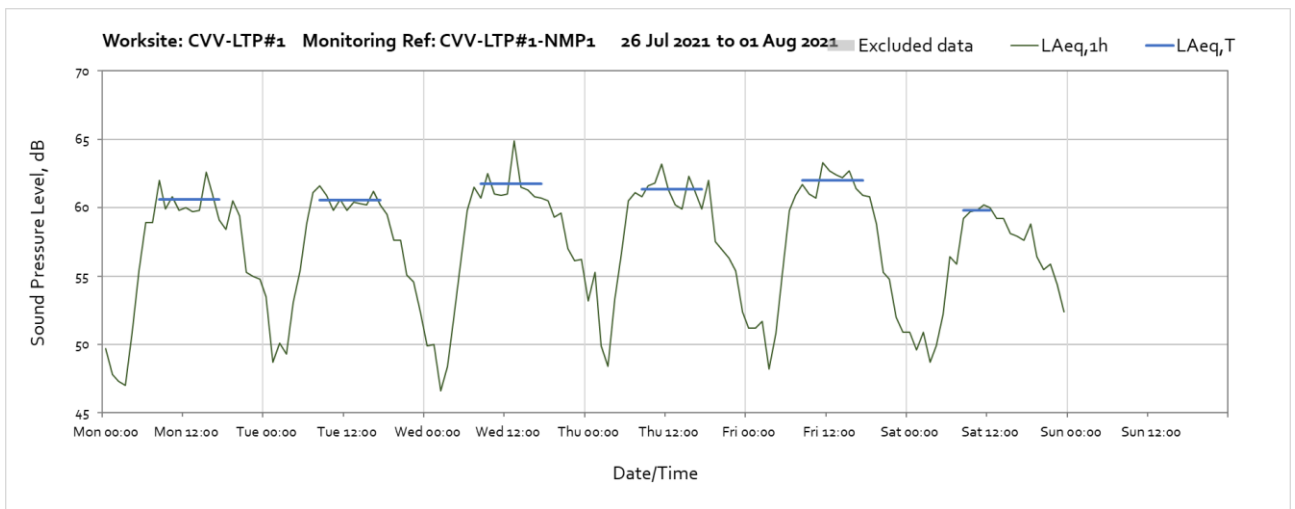
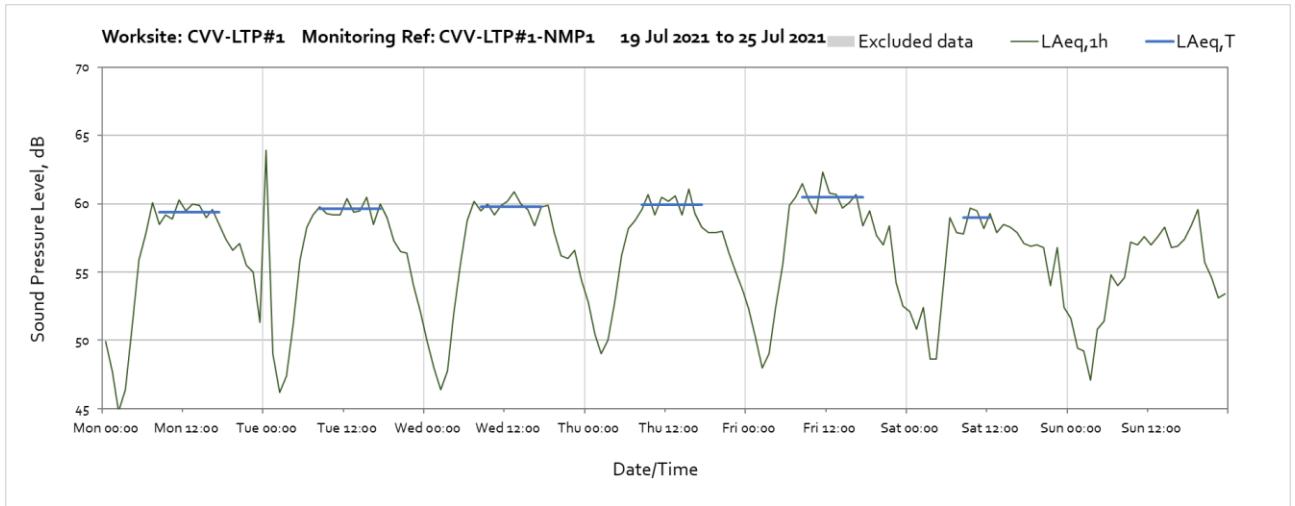


## Worksite: CVV-LPT#1 – Monitoring Ref: CVV-LPT#1-NMP1



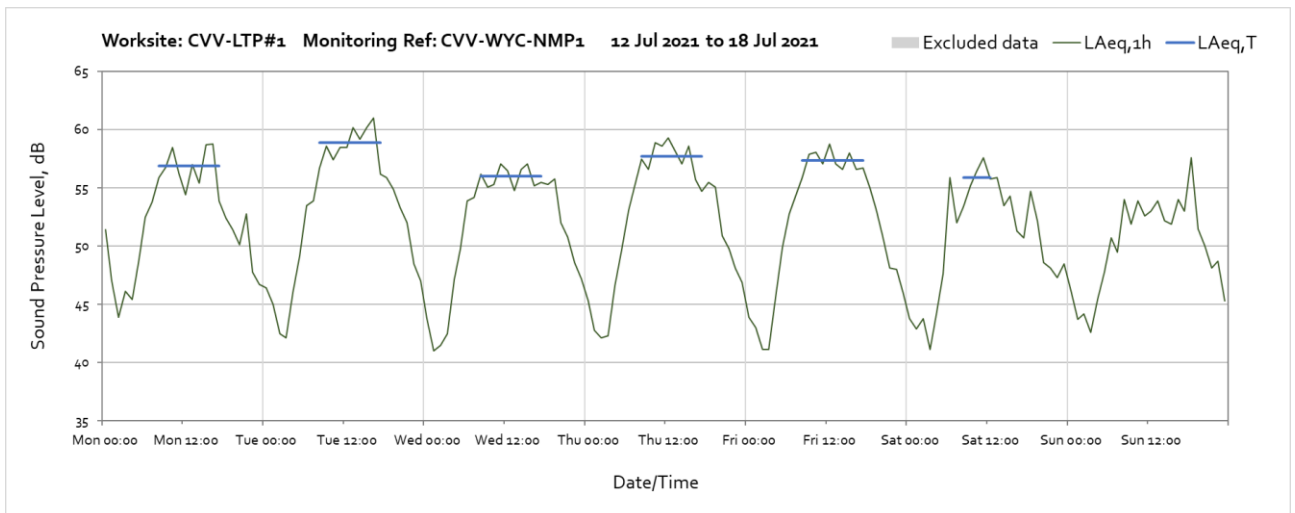
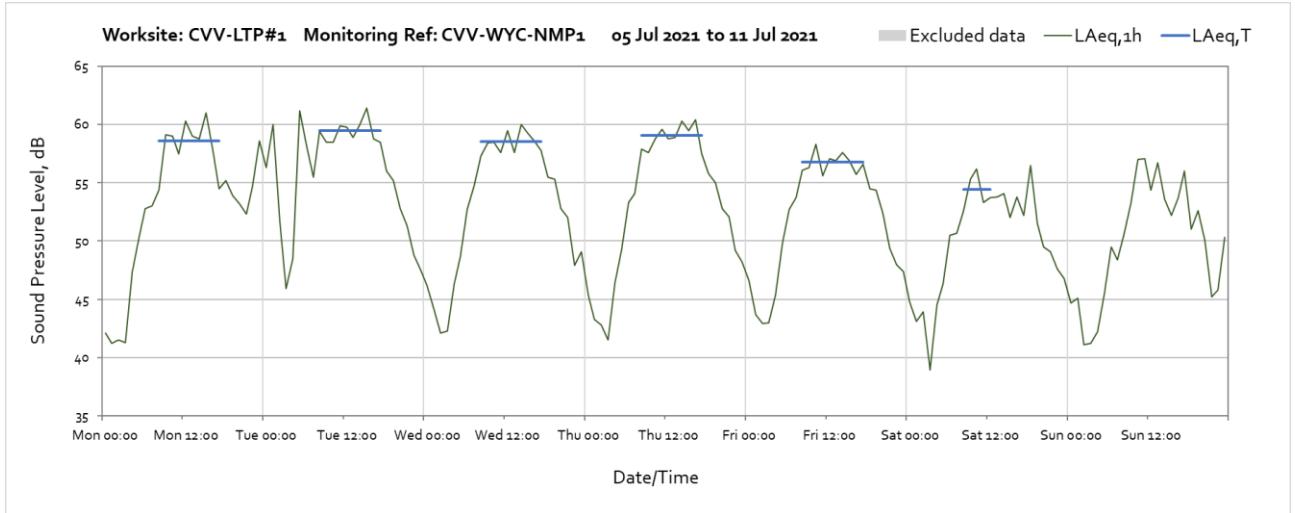
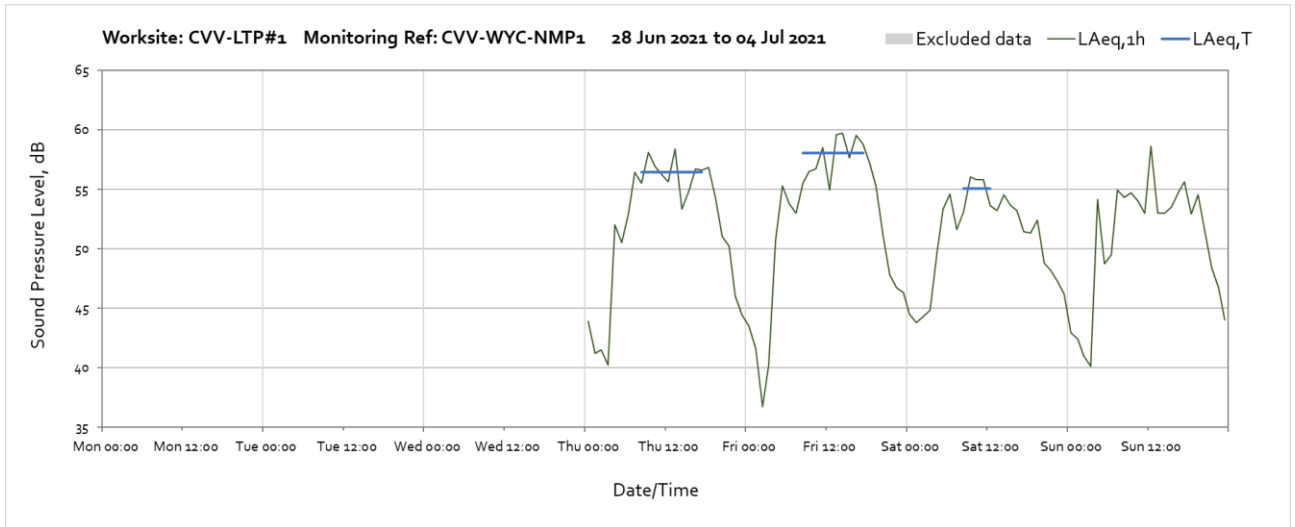
Note: Missing data between 15:00 and 17:00 on Monday 5<sup>th</sup> July is due to monitor being paused for setting updates.



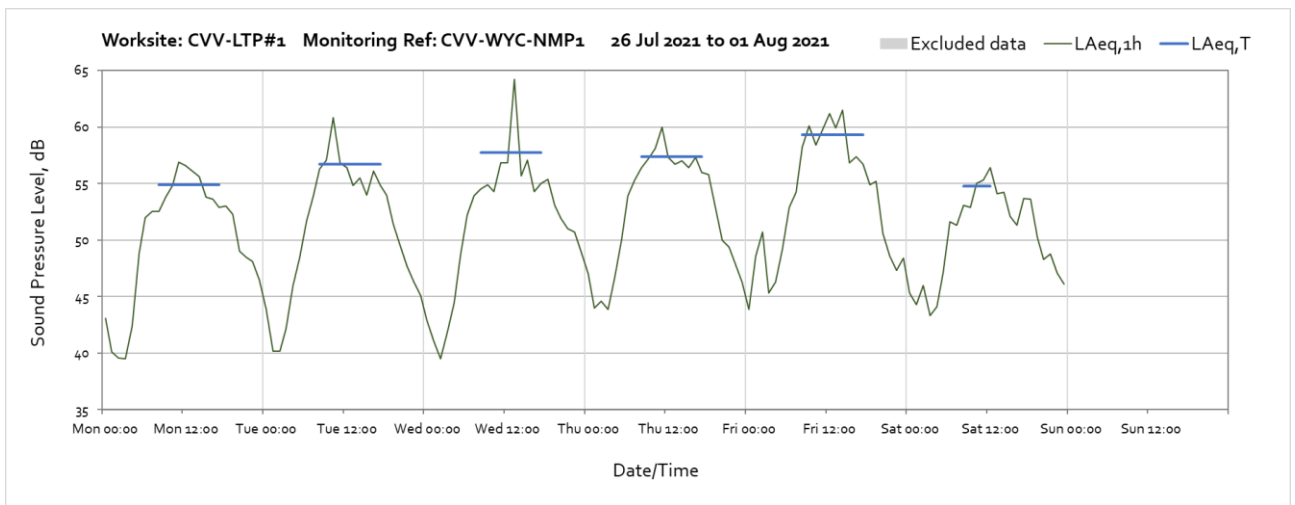
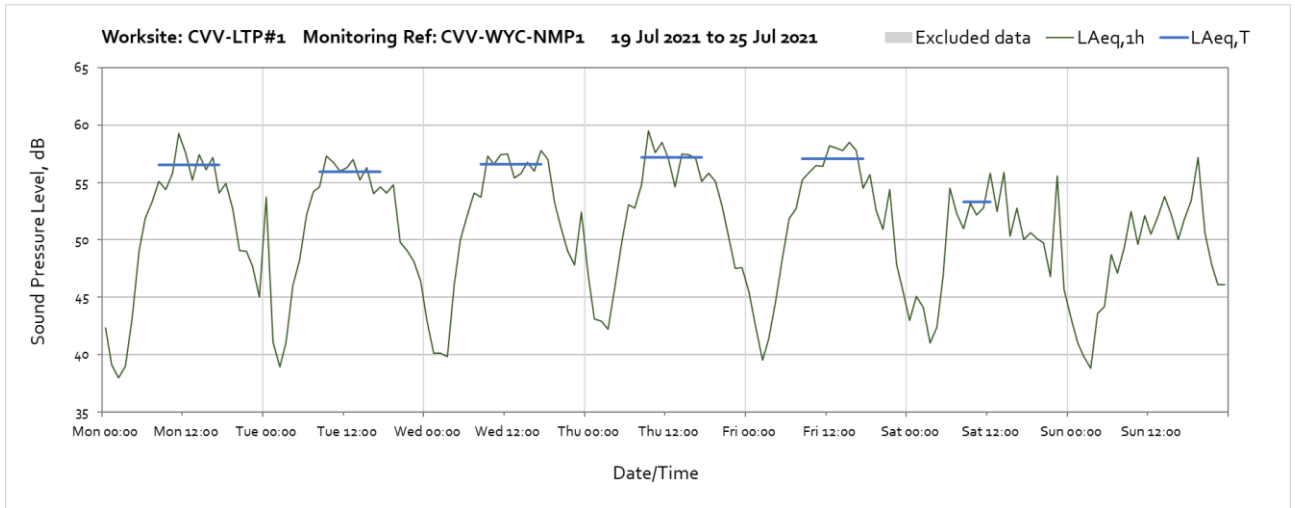




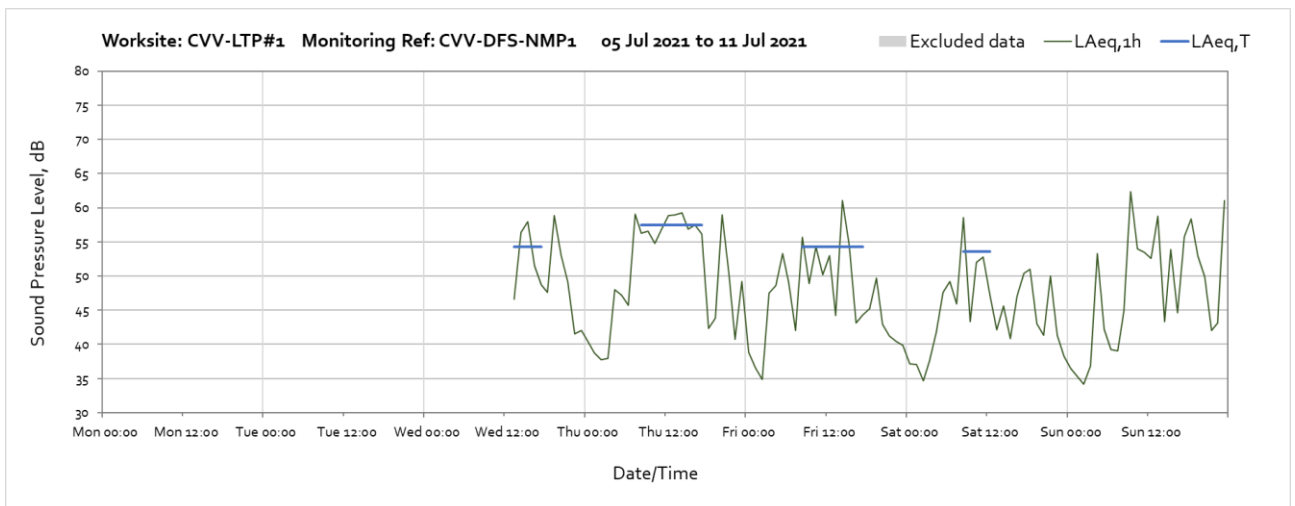
## Worksite: CVV-LTP#1 – Monitoring Ref: CVV-WYC-NMP1



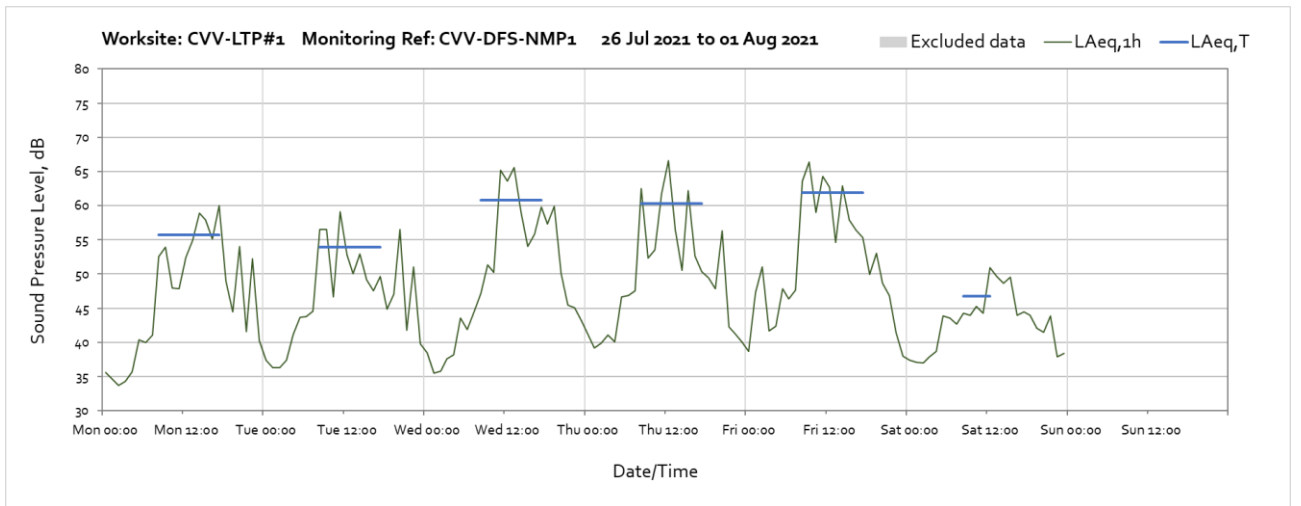
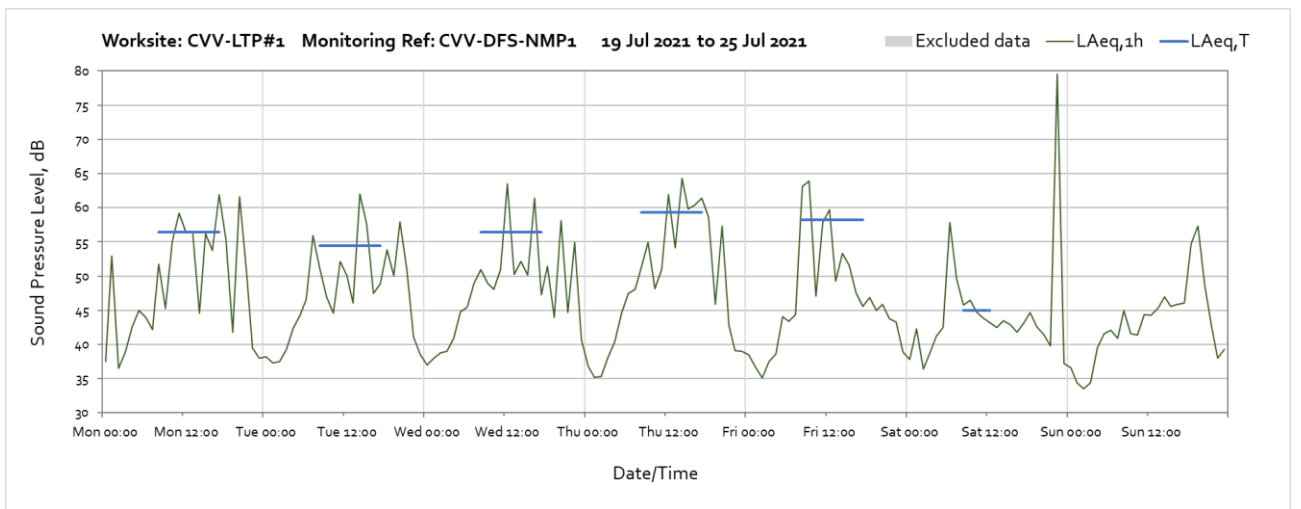
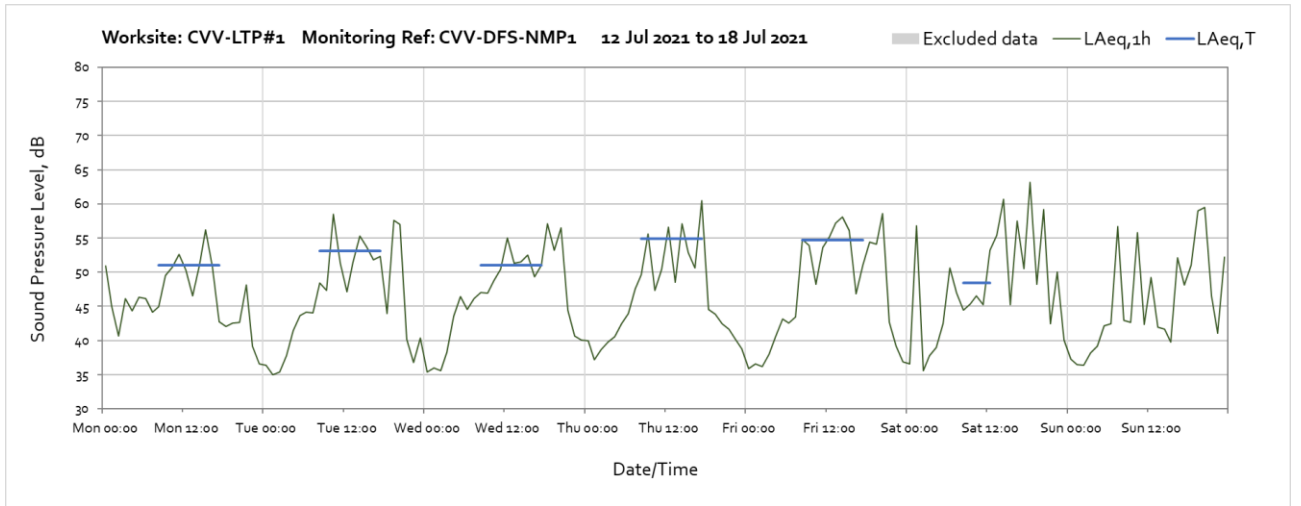
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**Worksite: CVV-LTP#1 – Monitoring Ref: CVV-DFS-NMP1**



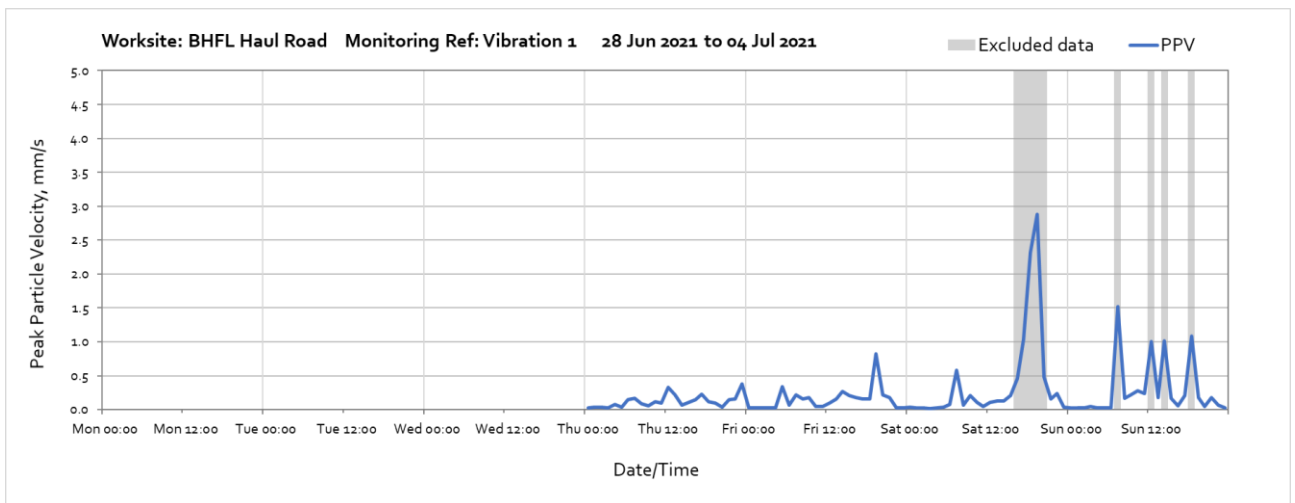
Note: The noise monitor was installed on 7<sup>th</sup> July 2021.



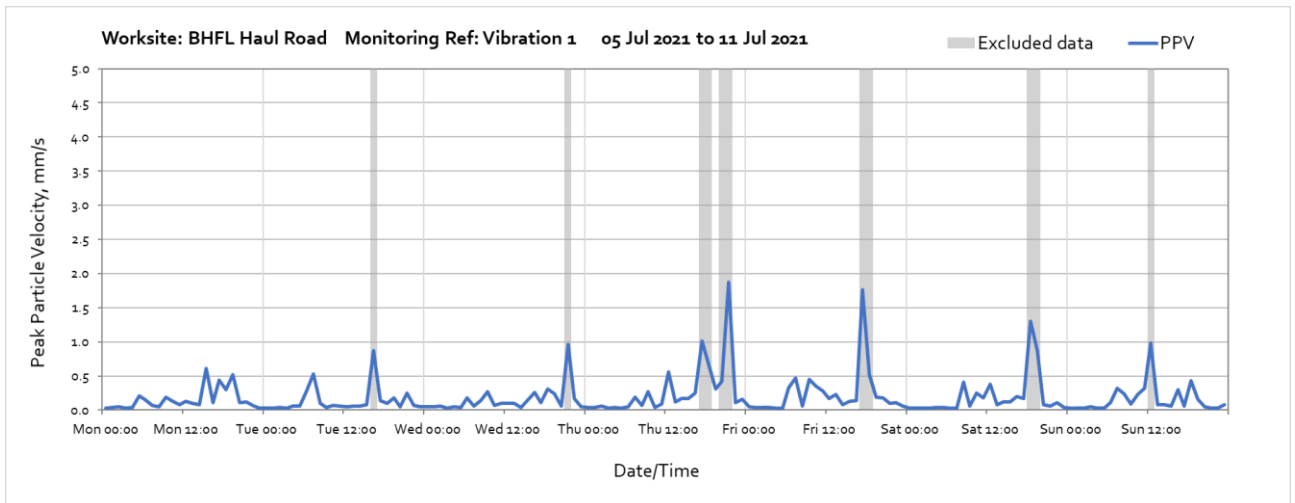
# Vibration

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.

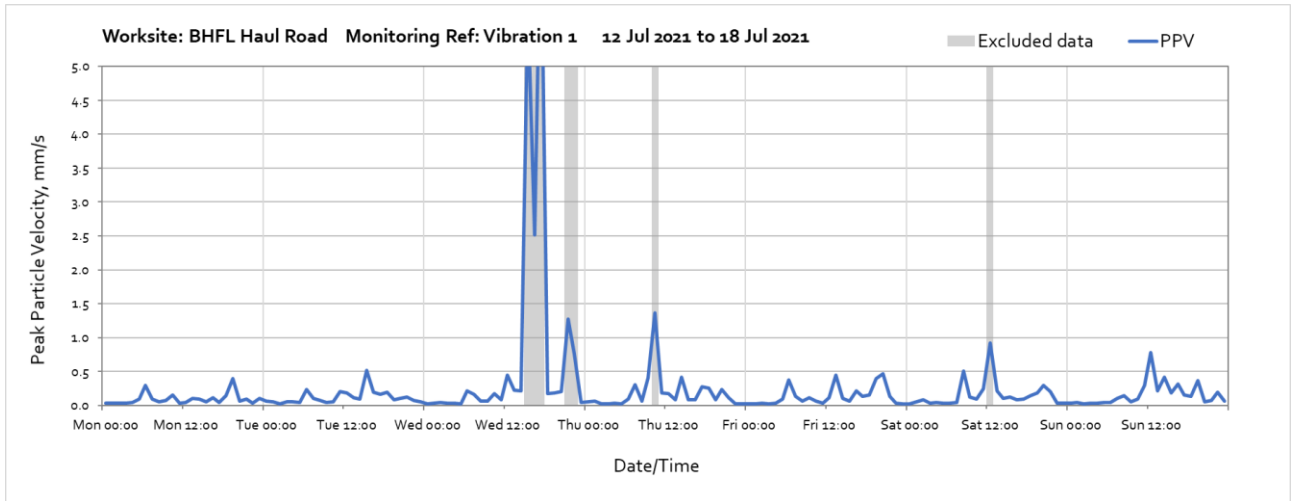
## Worksite: BHFL – Monitoring Ref: BHFL-Vib 1



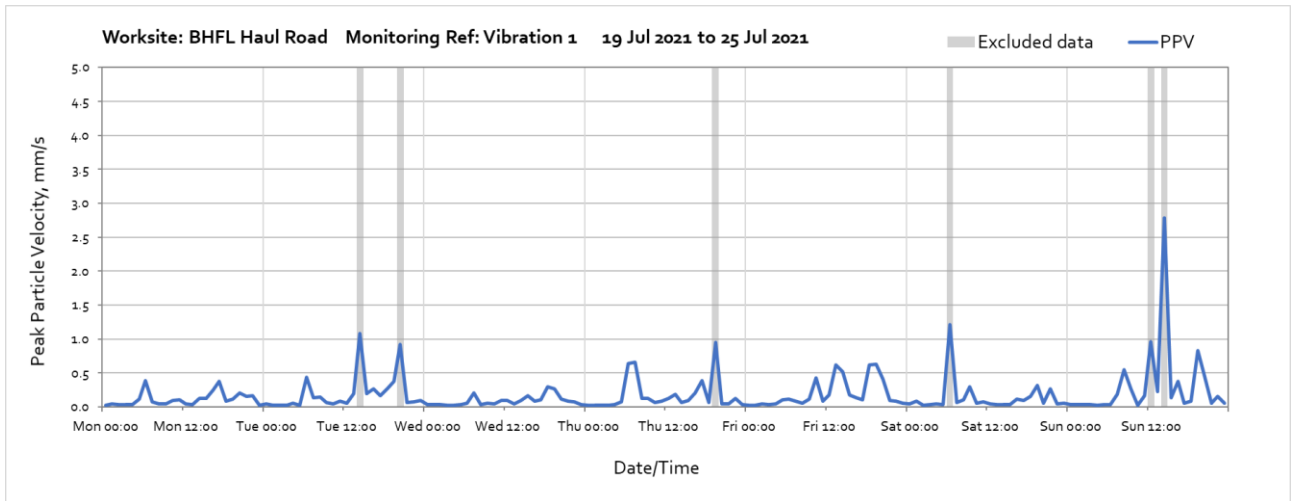
Note: High levels of vibration measured throughout the week were due to local disturbance of the monitor and are not representative of HS2 construction vibration levels.



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