

## **Construction noise and vibration Monthly Report – July 2020**

**Buckinghamshire**

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# Non-Technical Summary

This Noise and Vibration Monitoring Report fulfils HS2 Limited's commitment detailed in the Environmental Minimum Requirements (EMRs), Annex 1, Code of Construction Practice, to present the results of noise monitoring carried out within Buckinghamshire (BS) during the month of July 2020.

Within this period noise monitoring was undertaken in the vicinity of the following worksites:

- Bottom House Farm Lane worksite (ref.: BHFL), where drainage, earthworks and site management activities were underway.
- Chalfont St Peter Vent Shaft worksite (ref.: CSP) where drainage, fencing, vegetation clearance, wall and site mobilisation activities were underway.
- Load Test Pile 1 worksite (ref.: LTP #1) where ground excavation and compaction, repositioning of car parking and site cabin installation activities were underway.
- Amersham Vent Shaft worksite (ref.: AM) where site mobilisation, earthworks, piling platform and trial hole activities were underway.

Further works were also undertaken at Northmoor, Chalfont St. Giles and Amersham as part of water pipeline works; Frith Hill, Wendover, Aylesbury, Quainton, Mixbury, Calvert and Turweston as part of electricity diversion works; Aylesbury, Quainton and Perry Hill as part of gas pipeline works.

There were no exceedances of the HS2 threshold levels for significant noise impacts 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.

Three complaints were received during the monitoring period. A description of complaints, the results of investigations and any actions taken are detailed in Table 6 of this report.

# Abbreviations and Descriptions

The abbreviations, descriptions and project terminology used within this report can be found in Table 1.

Table 1: Table of Abbreviations

Acronym/Term	Definition
$L_{Aeq,T}$	See equivalent continuous sound pressure level
Ambient sound	A description of the all-encompassing sound at a given location and time which will include sound from many sources near and far. Ambient sound can be quantified in terms of the equivalent continuous sound pressure level, $L_{pAeq,T}$
Decibel(s), or dB	Between the quietest audible sound and the loudest tolerable sound there is a million to one ratio in sound pressure (measured in Pascal (Pa)). Because of this wide range, a level scale called the decibel (dB) scale, based on a logarithmic ratio, is used in sound measurement. Audibility of sound covers a range of approximately 0-140dB.
Decibel(s) A-weighted, or dB(A)	The human ear system does not respond uniformly to sound across the detectable frequency range and consequently instrumentation used to measure sound is weighted to represent the performance of the ear. This is known as the 'A weighting' and is written as 'dB(A)'.
Equivalent continuous sound pressure level, or $L_{Aeq,T}$	An index used internationally for the assessment of environmental sound impacts. It is defined as the notional unchanging level that would, over a given period of time (T), deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating sound levels can be described in terms of an equivalent single figure value, typically expressed as a decibel level.
Exclusion of data	Measurement of noise levels can be affected by weather conditions such as prolonged periods of rain, winds speeds higher than 5m/s and snow/ice ground cover. Noise levels measured during these periods are considered not representative of normal noise conditions at the site and, for the purposes of this report, are excluded from the assessment of exceedances and calculation of typical noise levels and are also greyed out in charts. Identifiable incongruous noise and vibration events not attributable to HS2 construction noise are also excluded.
Façade	A facade noise level is the noise level 1m in front of a large reflecting surface. The effect of reflection, is to produce a slightly higher (typically +2.5 to +3 dB) sound level than it would be if the reflecting surface was not there.
Free-field	A free-field noise level is the noise level measured at a location where no reflective surfaces, other than the ground, lies within 3.5 metres of the microphone position.
LOAEL	Lowest Observed Adverse Effect Level - the level above which adverse effects on health and quality of life can be detected.
Peak particle velocity, or PPV	Instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position. The PPV is a simple indicator of perceptibility and risk of damage to structures due to vibration. It is usually measured in mm/s.
SOAEL	Significant Observed Adverse Effect Level - the level above which significant adverse effects on health and quality of life occur.
Sound pressure level	The parameter by which sound levels are measured in air. It is measured in decibels. The threshold of hearing has been set at 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dB at a distance of 1 metre and a change of 3dB in a time varying sound signal is commonly regarded as being just detectable. A change of 10dB is subjectively twice, or half, as loud.
Vibration dose value, or VDV	An index used to evaluate human exposure to vibration in buildings. While the PPV provides information regarding the magnitude of single vibration events, the VDV provides a measure of the total vibration experienced over a specified period of time (typically 16h daytime and 8h night-time). It takes into account the magnitude, the number and the duration of vibration events and can be used to quantify exposure to continuous, impulsive, occasional and intermittent vibration. The vibration dose value is measured in $m/s^{1.75}$ .

# 1 Introduction

1.1.1 HS2 is required to undertake noise (and vibration) monitoring as necessary to comply with the requirements of the High Speed Rail (London-West Midlands) Environmental Minimum Requirements, including specifically Annex 1: Code of Construction Practice, in addition to any monitoring requirements arising from conditions imposed through consents under Section 61 of the Control of Pollution Act, 1974 or through Undertakings & Assurances given to third parties. Such monitoring may be undertaken for the following purposes:

- monitoring the impact of construction works;
- to investigate complaints, incidents and exceedance of trigger levels; or
- monitoring the effectiveness of noise and vibration control measures.

Monitoring data and interpretive reports are to be provided to each relevant local authority on a monthly basis and shall include a summary of the construction activities occurring, the data recorded over the monitoring period, any complaints received, any periods in exceedance of agreed trigger levels, the results of any investigations and any actions taken or mitigation measures implemented. This report provides noise data, and interpretation thereof, for monitoring carried out by HS2 within the Buckinghamshire Local Authority area (BS) for the period 1<sup>st</sup> to 31<sup>st</sup> July 2020.

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

- Bottom House Farm Lane - BHFL (see plan 2 in Appendix A), where work activities included:
  - Drainage activities, including excavating trenches and levelling, laying geomembrane, installing attenuation crates, backfilling trenches, stockpiling excavated materials, installing pipes and duct for water mains.
  - Earthworks activities, including stockpiling, topsoil stripping, installation of aggregate material and compaction.
  - Site management activities, including cleaning of track matting, dust suppression and installation of fencing.
- Chalfont St Peter Vent Shaft - CSP (see plan 3 in Appendix A), where work activities included:
  - Drainage works, installation of concrete slabs for site installations, fencing, diaphragm wall mobilisation, formation of infiltration pond, ducting and services installation, access road surfacing and kerbing.

- Load Test Pile 1 - LTP #1 (see plan 4 in Appendix A), where work activities included:
  - Minor excavation and compaction works, repositioning of skip bins and car park, craneage of welfare cabins on site.
- Amersham Vent Shaft - AM (see plan 5 in Appendix A), where work activities included:
  - Site mobilisation, vegetation clearance, soil stripping and earthworks, aggregate deliveries and stockpiling of materials, formation of the piling platform and trial hole excavation.

1.1.3 Further works were also undertaken at Northmoor, Chalfont St. Giles and Amersham as part of water pipeline works; Frith Hill, Wendover, Aylesbury, Quainton, Mixbury, Calvert and Turweston as part of electricity diversion works; Aylesbury, Quainton and Perry Hill as part of gas pipeline works.

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

## 1.2 Measurement Locations

1.2.1 Six noise monitoring installations were active in July in the BS area. Table 2 summarises the position of noise monitoring installations within the BS area in July 2020.

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

1.2.3 Two additional noise monitors (NMP4 and NMP5) were installed at Chalfont St Peter Vent Shaft, worksite ref.: CSP, on the 17<sup>th</sup> of July 2020.

1.2.4 One noise monitor (NMP6) was installed at Amersham Vent Shaft, worksite AM, on the 30<sup>th</sup> of July 2020.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
CSP	NMP1	Chesham Lane, Chalfont St. Peter
	NMP4	Chesham Lane, Chalfont St. Peter
	NMP5	Chesham Lane, Chalfont St. Peter
LTP #1	NMP2	Along worksite northern boundary
BHFL	NMP3	Elm Tree Cottage, Bottom House Farm Lane
AM	NMP6	Whielden Lane, Amersham

## 2 Summary of Results

### 2.1 Summary of Measured Noise Levels

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

Table 3: Summary of Measured dB 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
CSP	NMP1	Chesham Lane, Chalfont St. Peter	Free-field	62.3 (66.5)	65.9 (70.9)	61.6 (66.0)	58.1 (65.1)	52.9 (66.7)	59.9 (63.1)	62.9 (65.3)	62.4 (65.9)	60.5 (67.1)	53.6 (61.3)	60.0 (65.8)	54.1 (64.4)
	NMP4	Chesham Lane, Chalfont St. Peter	Free-field	42.6 (47.8)	53.4 (63.0)	43.8 (50.2)	41.8 (46.6)	38.6 (49.9)	45.0 (48.0)	48.3 (48.4)	47.7 (49.7)	44.5 (47.3)	36.1 (44.1)	46.7 (51.8)	38.3 (44.8)
	NMP5	Chesham Lane, Chalfont St. Peter	Free-field	48.1 (51.8)	53.9 (61.1)	49.3 (51.9)	47.4 (53.8)	42.6 (51.0)	46.4 (50.2)	53.9 (59.5)	51.7 (54.6)	49.9 (52.8)	39.1 (43.4)	49.1 (53.6)	41.0 (47.1)
LTP #1	NMP2	Along worksite northern boundary	Free-field	62.1 (63.9)	61.9 (63.8)	60.7 (62.4)	58.4 (62.4)	56.0 (64.5)	59.2 (60.3)	60.2 (61.8)	61.2 (61.9)	59.4 (64.1)	53.3 (56.9)	59.7 (62.4)	55.9 (64.0)
BHFL	NMP3	Elm Tree Cottage, Bottom House Farm Lane	Free-field	55.5 (57.2)	56.7 (65.4)	53.9 (56.9)	51.2 (56.0)	48.6 (57.5)	52.1 (52.8)	54.0 (54.8)	54.0 (54.6)	53.3 (59.3)	47.6 (59.2)	52.1 (55.3)	48.5 (56.0)
AM	NMP6	Whielden Lane, Amersham	Free-field	70.2 (70.2)	70.9 (72.4)	69.7 (70.5)	66.1 (69.3)	63.9 (73.0)	- <sup>(1)</sup> (-) <sup>(1)</sup>	- <sup>(1)</sup> (-) <sup>(1)</sup>	- <sup>(1)</sup> (-) <sup>(1)</sup>	- <sup>(1)</sup> (-) <sup>(1)</sup>	- <sup>(1)</sup> (-) <sup>(1)</sup>	- <sup>(1)</sup> (-) <sup>(1)</sup>	- <sup>(1)</sup> (-) <sup>(1)</sup>

<sup>(1)</sup> The monitor was installed on the 30<sup>th</sup> of July and no noise data were collected for these periods at this monitor in July.



2.1.2 Appendix C presents graphs of the noise 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). 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 construction noise levels exceed the SOAEL, relevant periods will be identified, and summary statistics provided in order to evaluate ongoing qualification for noise insulation and temporary rehousing.

2.2.5 Table 4 presents a summary of recorded exceedances of the LOAEL and SOAEL at each measurement location over the reporting period, including the number of exceedances during each time period.

Table 4: Summary of Exceedances of LOAEL and SOAEL.

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
CSP	NMP1	Chesham Lane, Chalfont St. Peter	Weekday	0800-1800	10	No exceedance
	NMP4	Chesham Lane, Chalfont St. Peter	Weekday	0800-1800	No exceedance	No exceedance
	NMP5	Chesham Lane, Chalfont St. Peter	Weekday	0800-1800	No exceedance	No exceedance
LTP #1	NMP2	Along worksite northern boundary	Weekday	0800-1800	No exceedance	No exceedance
BHFL	NMP3	Elm Tree Cottage, Bottom House Farm Lane	Weekday	0800-1800	1	No exceedance
AM	NMP6	Whielden Lane, Amersham	Weekday	0800-1800	2	No exceedance

2.2.6 No exceedances of the SOAEL were recorded due to HS2 construction works during July 2020.

## 2.3 Exceedances of Trigger Level

2.3.1 Table 5 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 5: 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
-	-	-	-	-	-

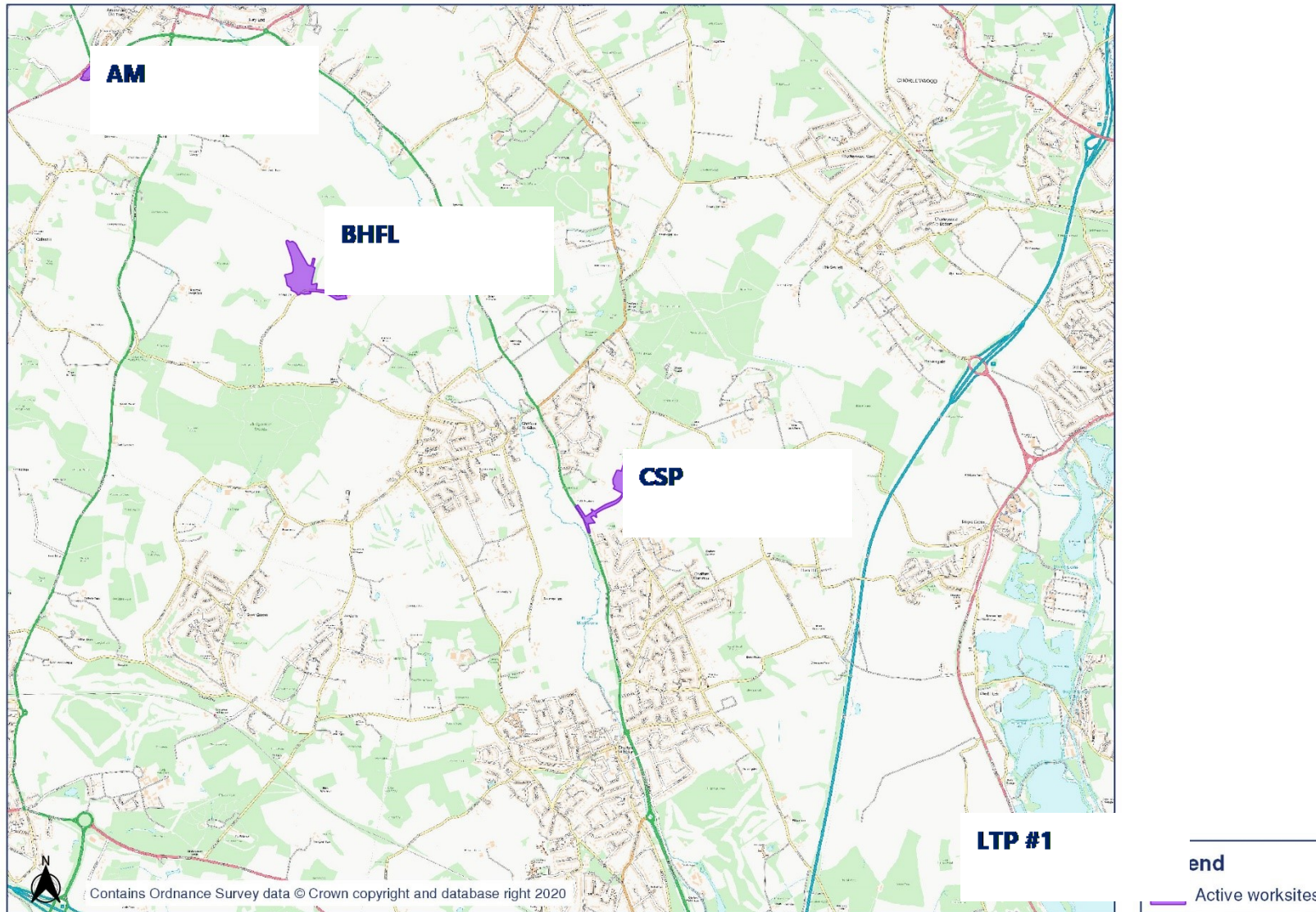
## 2.4 Complaints

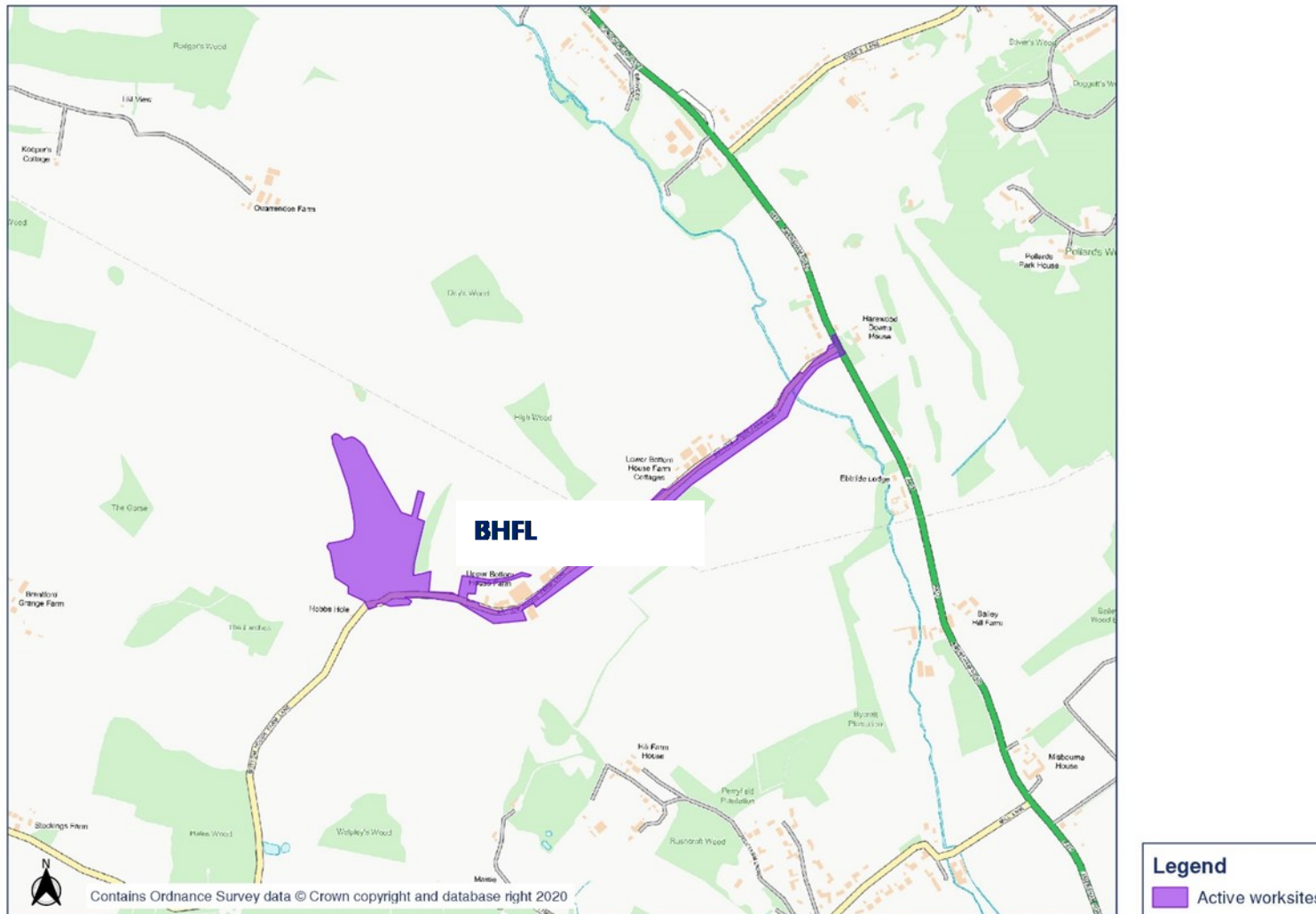
2.4.1 Table 6 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

Table 6: Summary of Complaints.

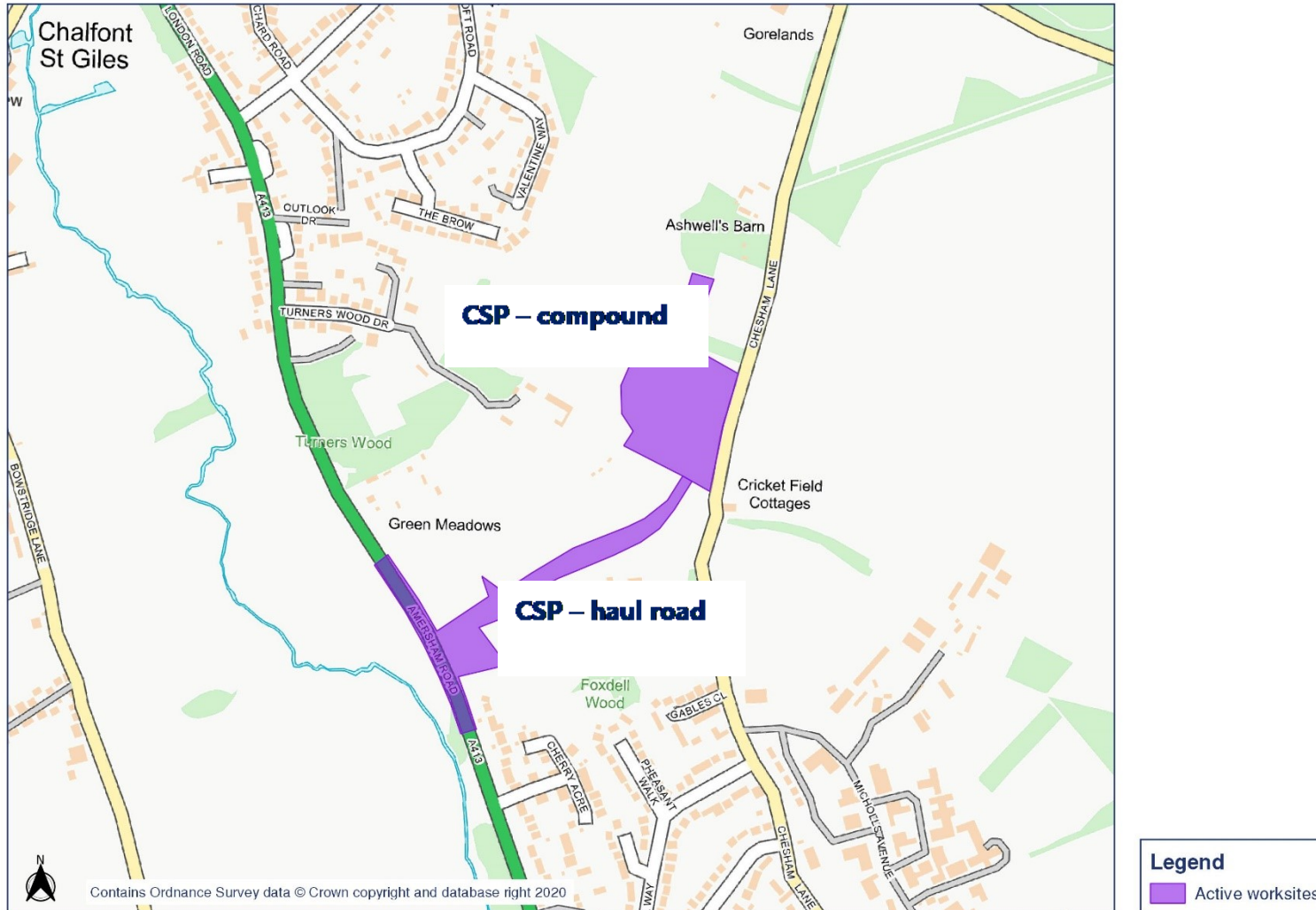
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-20-41935-E	CSP	Complaint regarding vibration within property.	The effects described were associated with the haul road, which was operated in accordance with the section 61 consents.	The resident was contacted and HS2 is considering further mitigation under special cases procedure.
HS2-20-40271-C	CSP	Complaint relating to vibrations felt in house due to passing HGVs.	Temporary access road to the HS2 site now diverts HGVs from village.	Information provided to resident to record dates, times and vehicle information if there are any future issues.
HS2-20-40244-C	Utility Diversions	Complaint from a resident near Wendover regarding generator noise heard after 8pm.	A generator is used for short periods at night to provide power for 24h security within the compound, in line with BPM.	Site operatives informed of complaint and re-briefed to minimise noise during night-time periods, including use of generator.

# Appendix A Site Locations



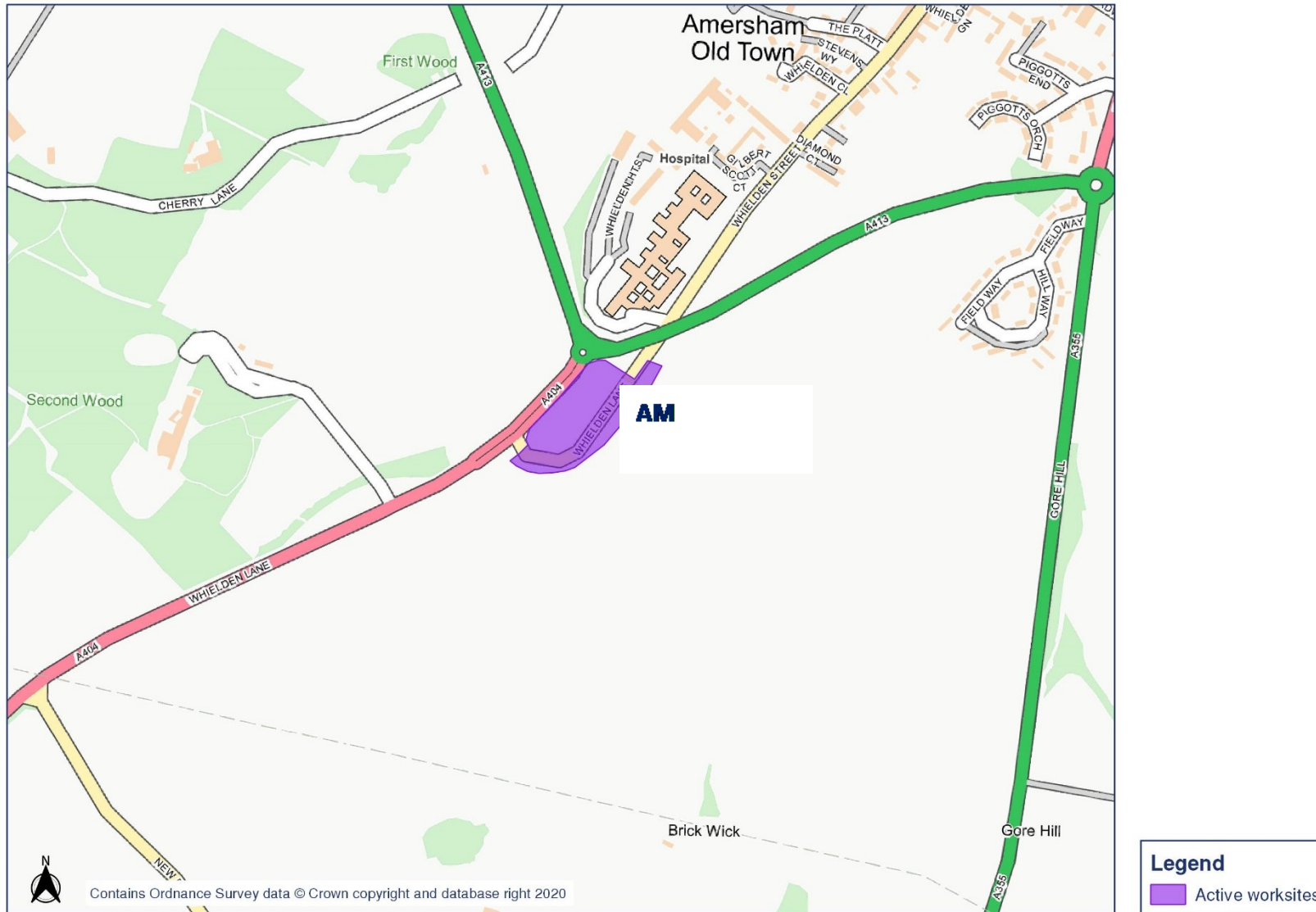




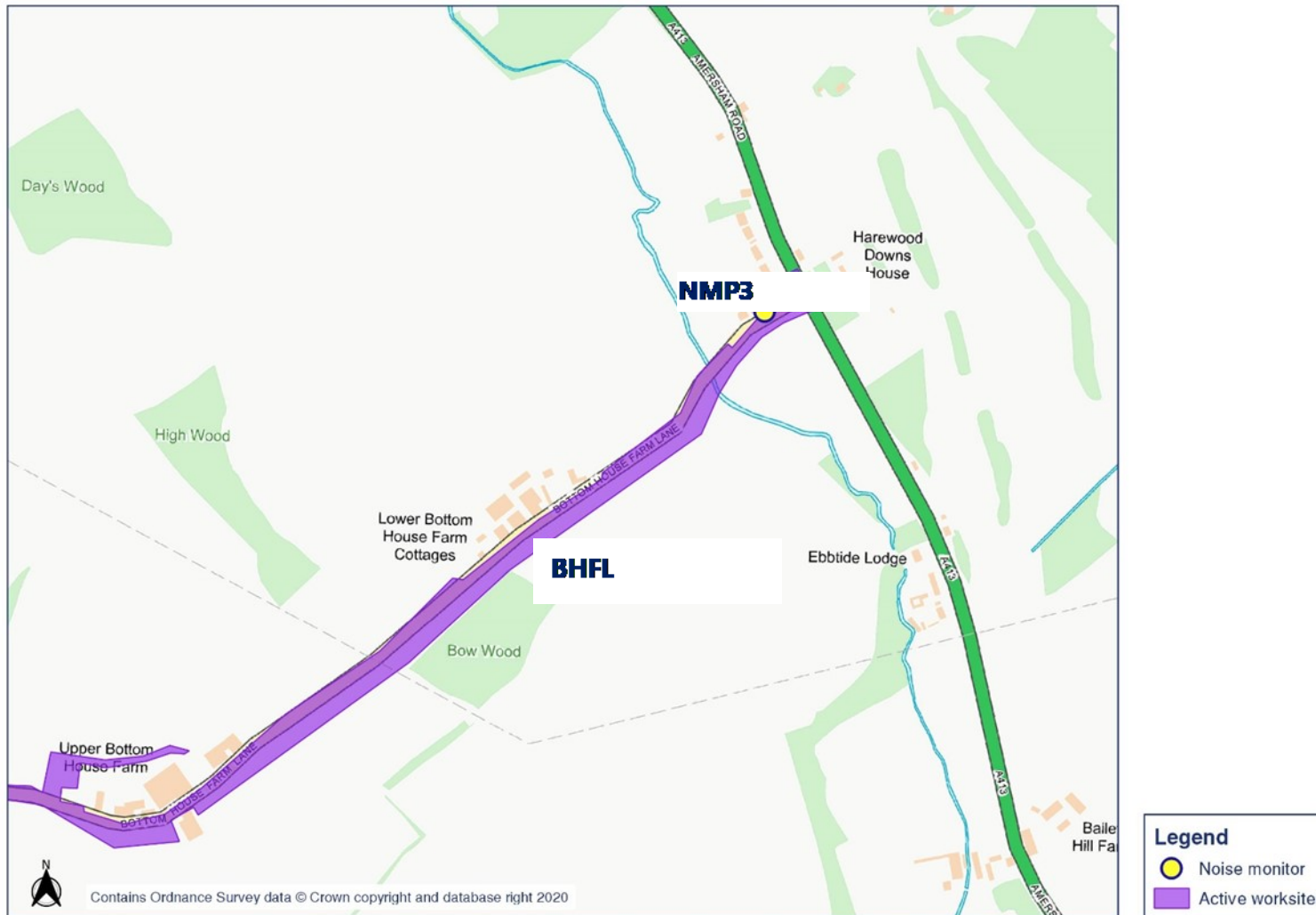


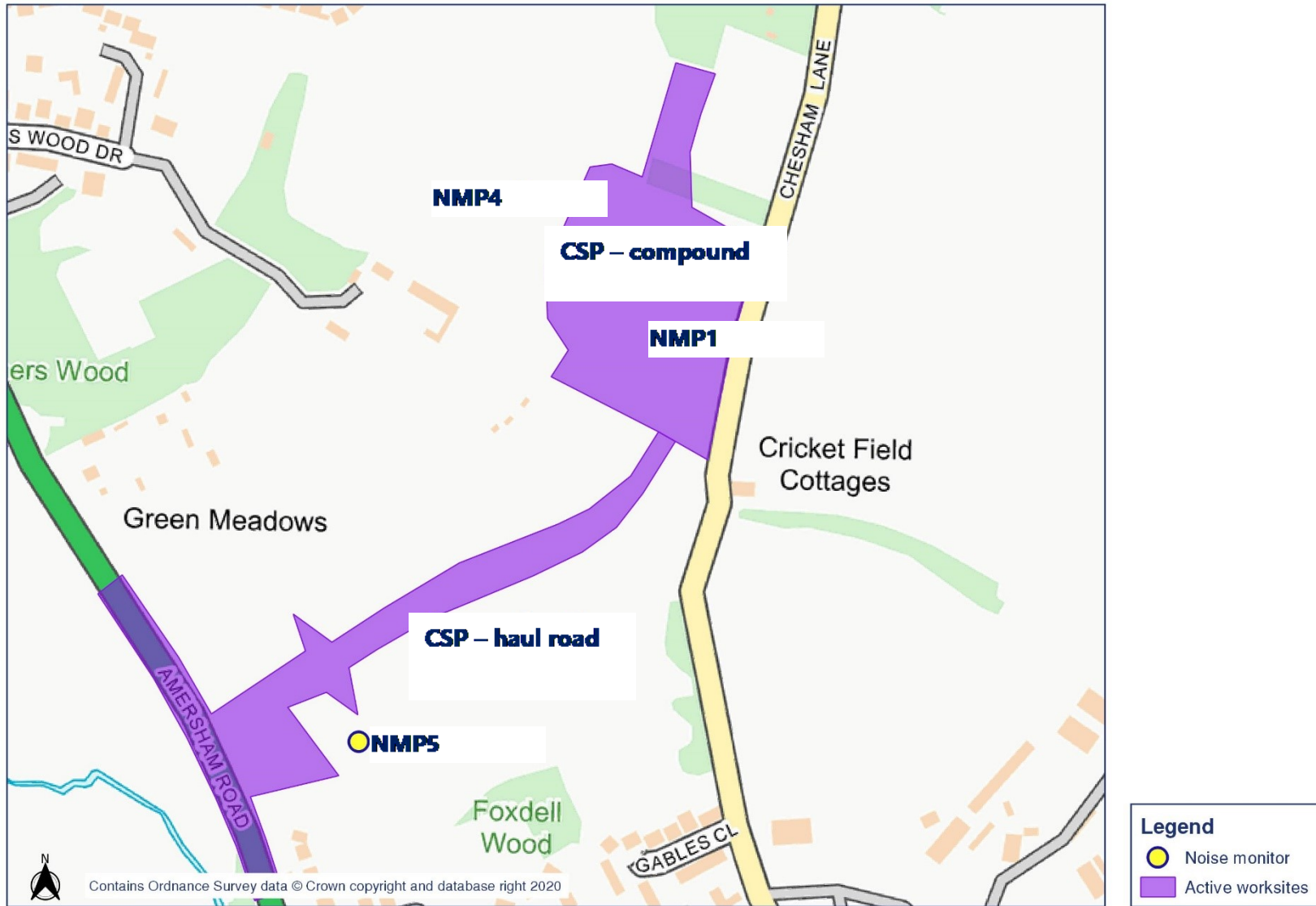






# Appendix B Monitoring Locations







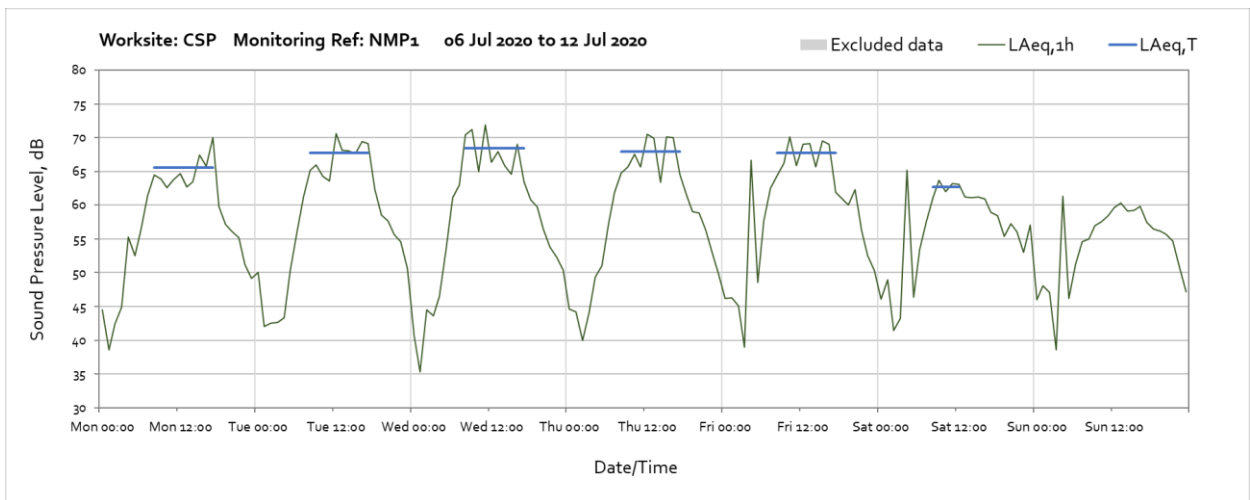
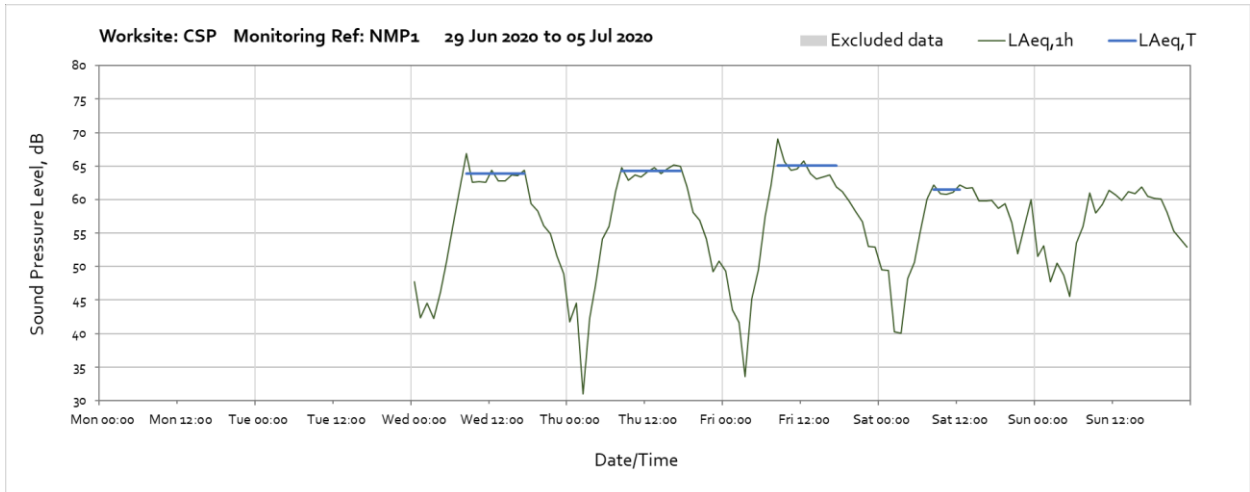


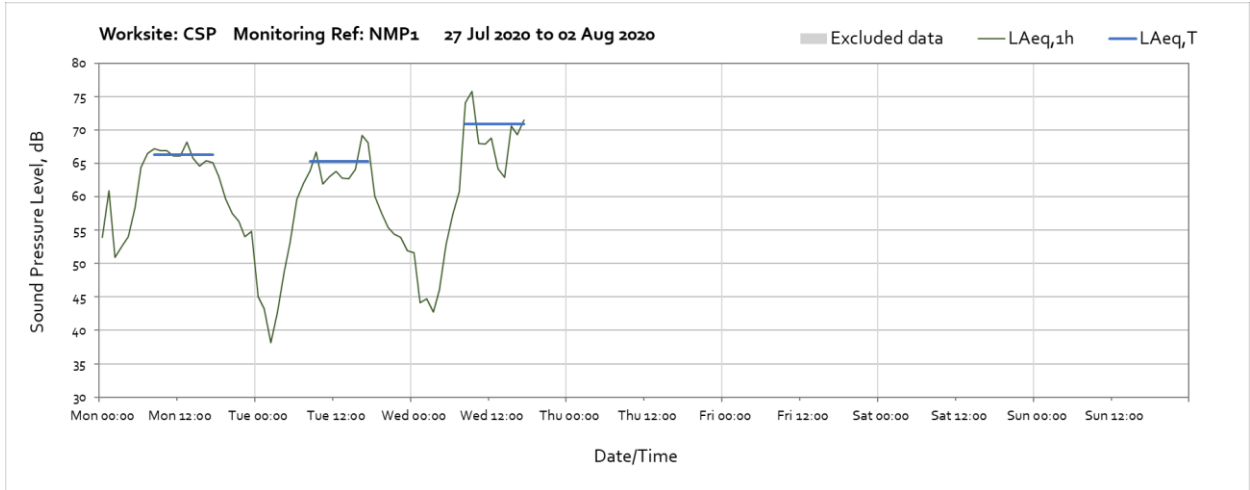
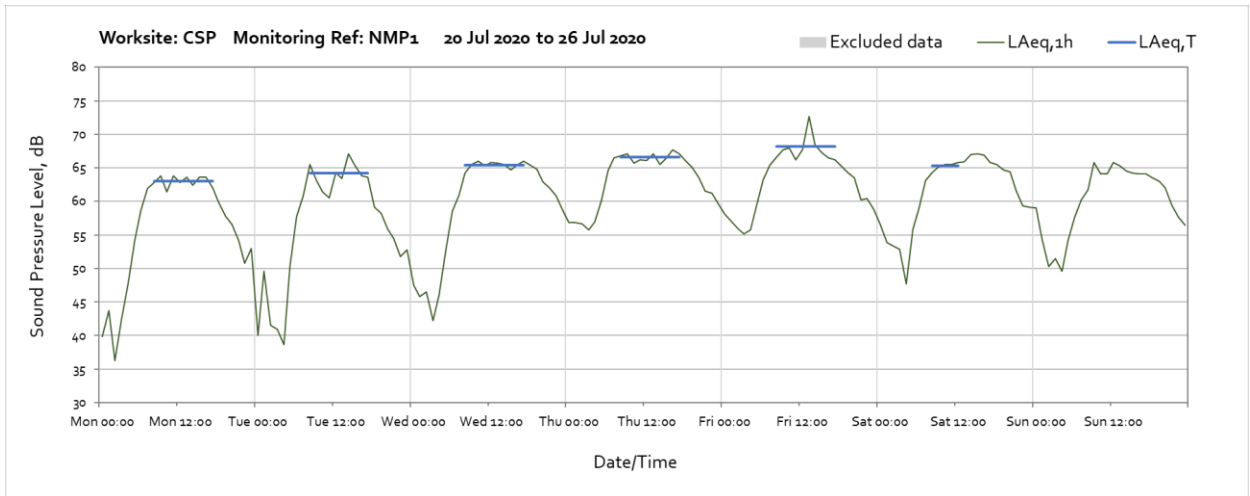
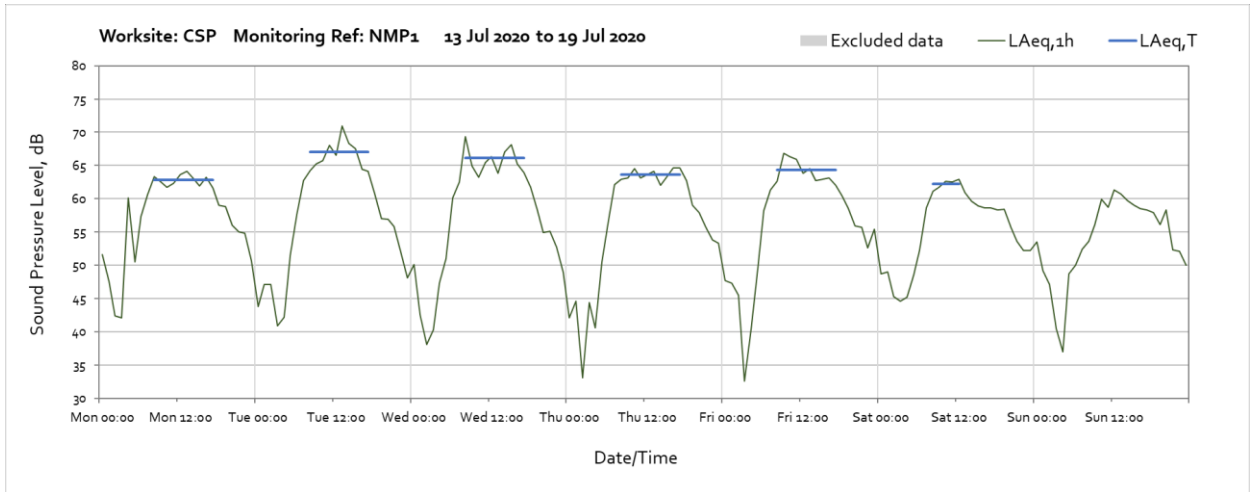


# Appendix C Data

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

## Worksite: CSP – Monitoring Ref: NMP1

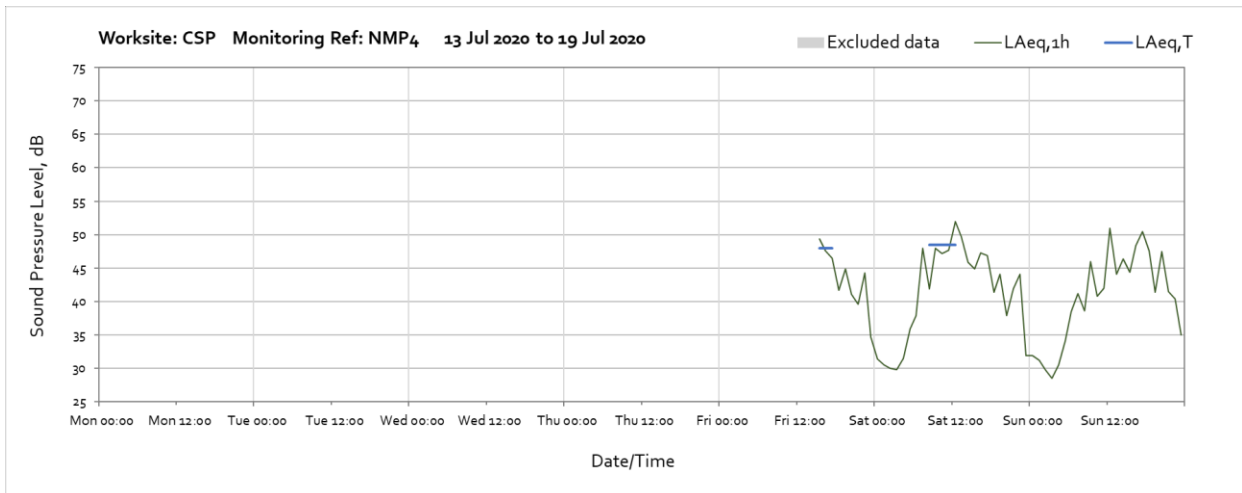




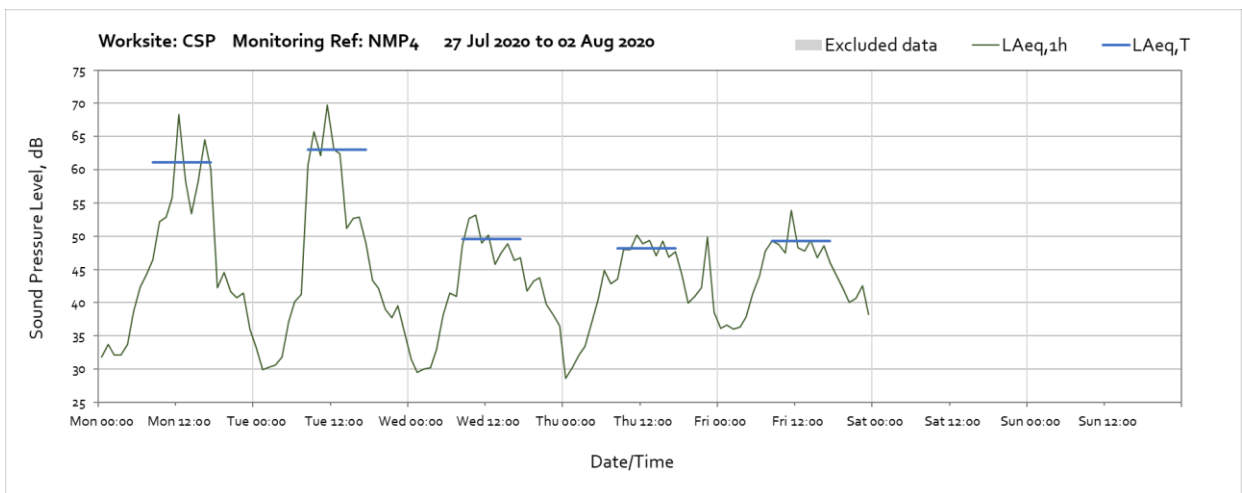
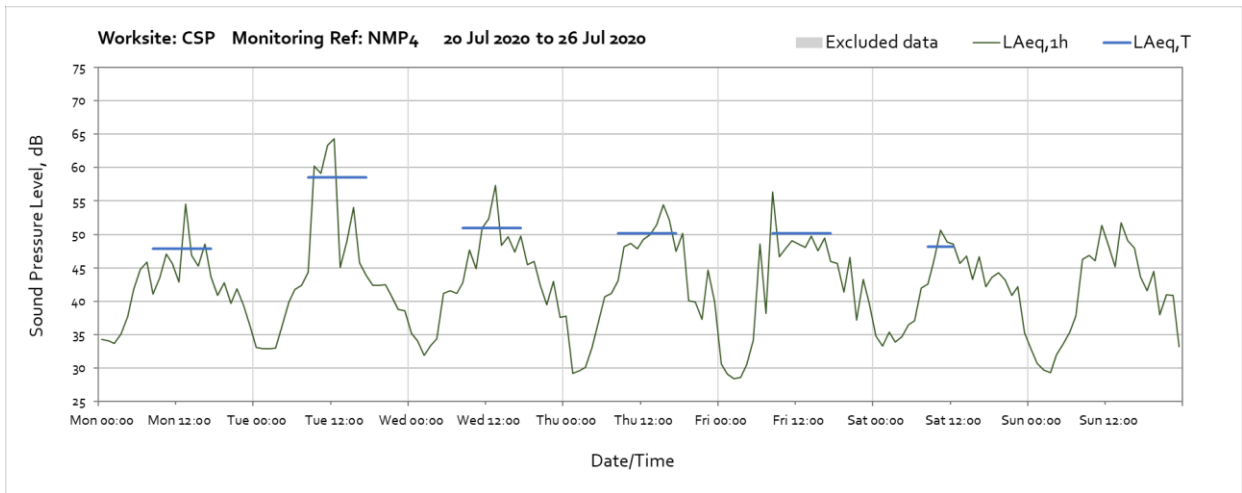
Note: Missing data between 18:00 on 29<sup>th</sup> July and end of the month was due to loss of power at the monitoring station.



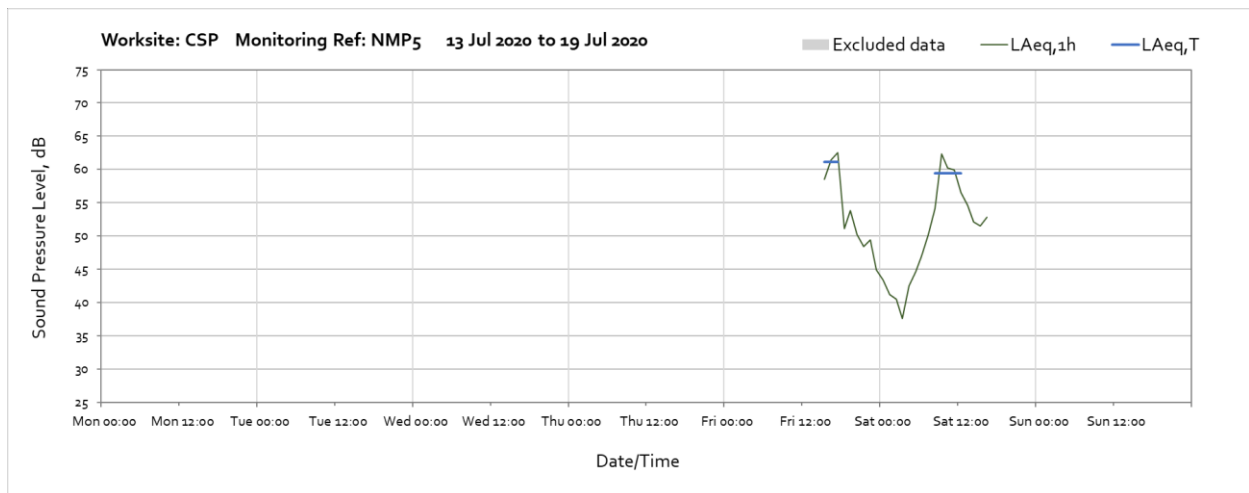
## Worksite: CSP – Monitoring Ref: NMP4



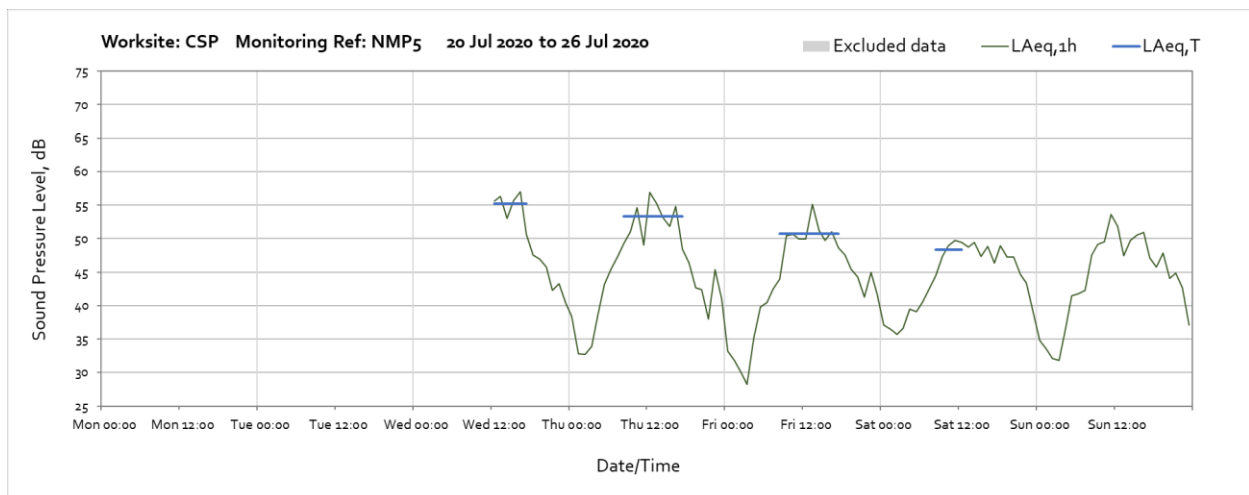
Note: The noise monitor was installed at 15:00 on the 17<sup>th</sup> of July.



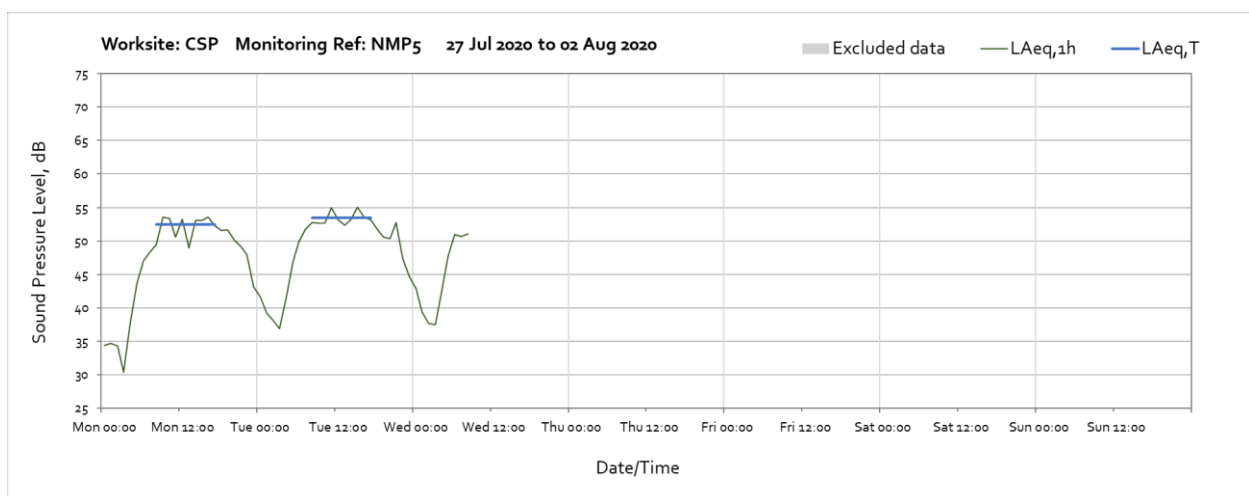
## Worksite: CSP – Monitoring Ref: NMP5



Note: Missing data between 17:00 on 18<sup>th</sup> July and 23:00 on 19<sup>th</sup> July was due to loss of power at the monitoring station.



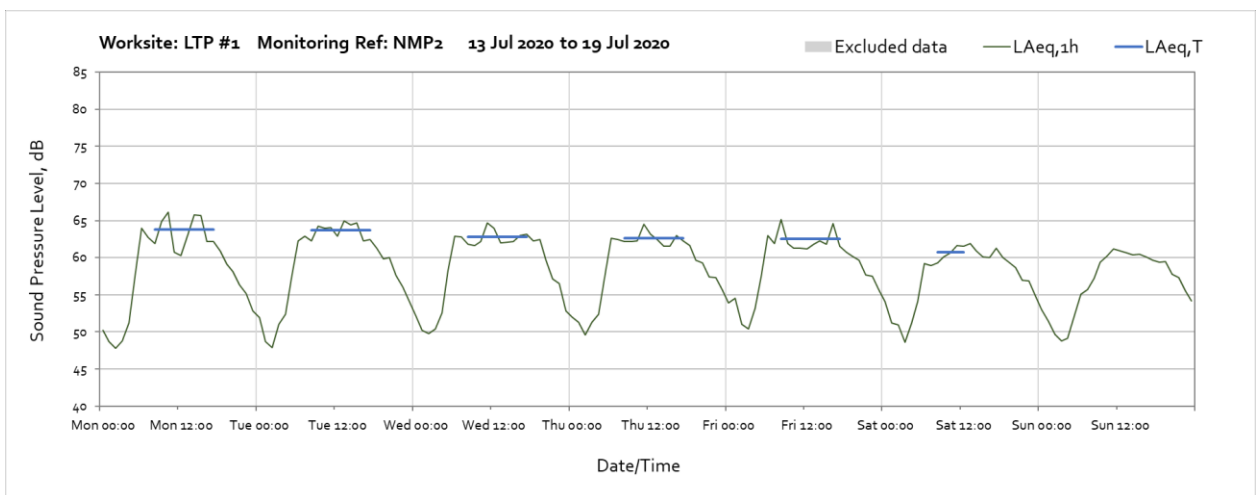
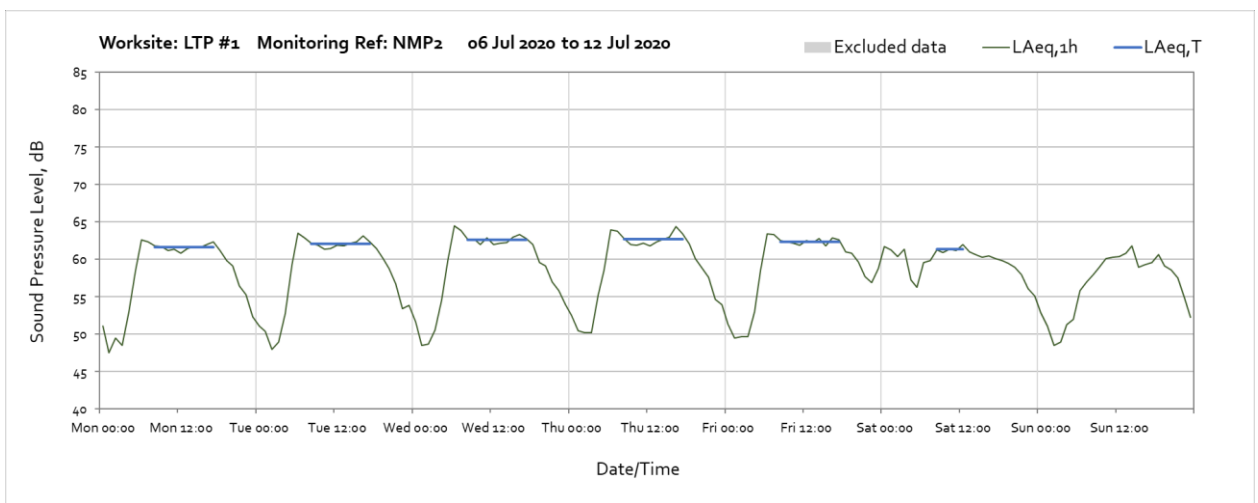
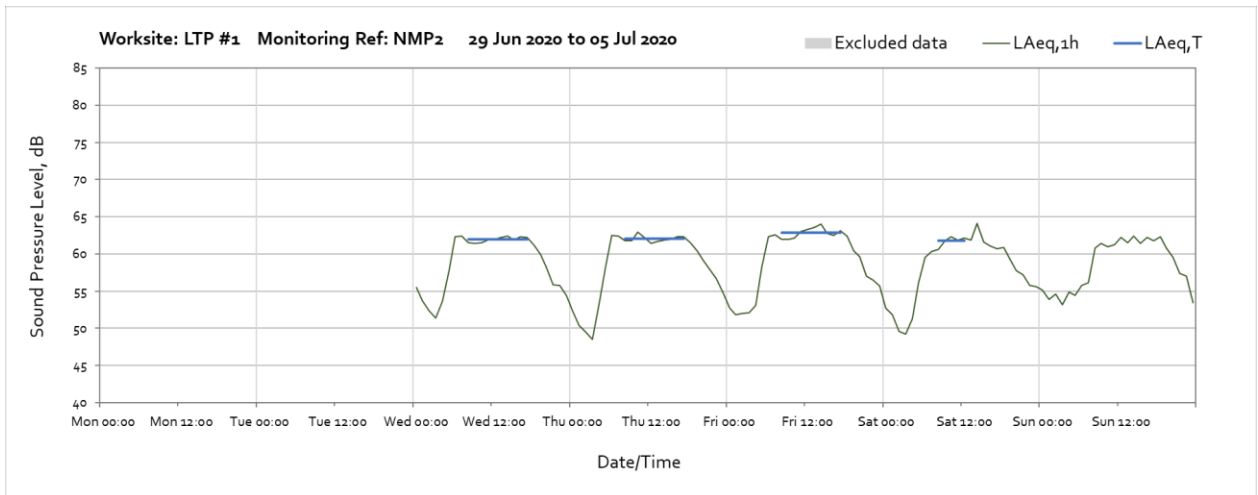
Note: Missing data between 00:00 on 20<sup>th</sup> July and 11:00 on 22<sup>nd</sup> July was due to loss of power at the monitoring station.

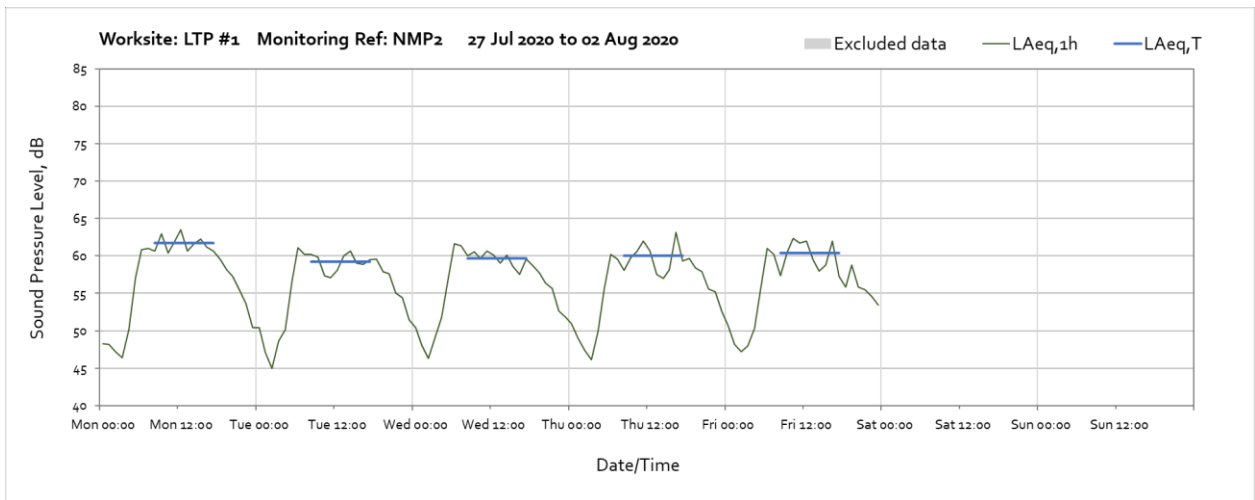
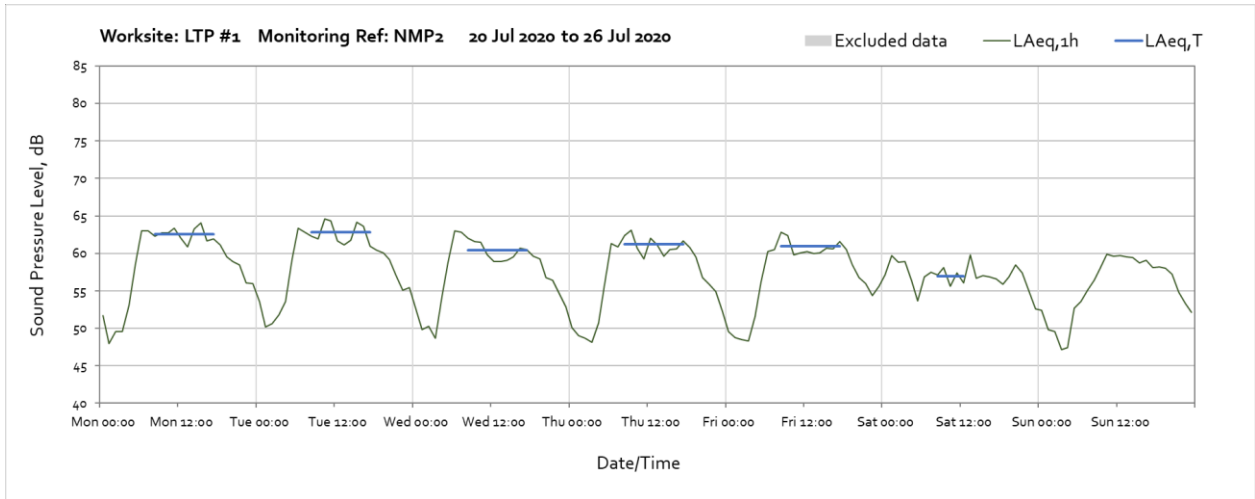


Note: Missing data between 08:00 on 29<sup>th</sup> July and end of the month was due to loss of power at the monitoring station.

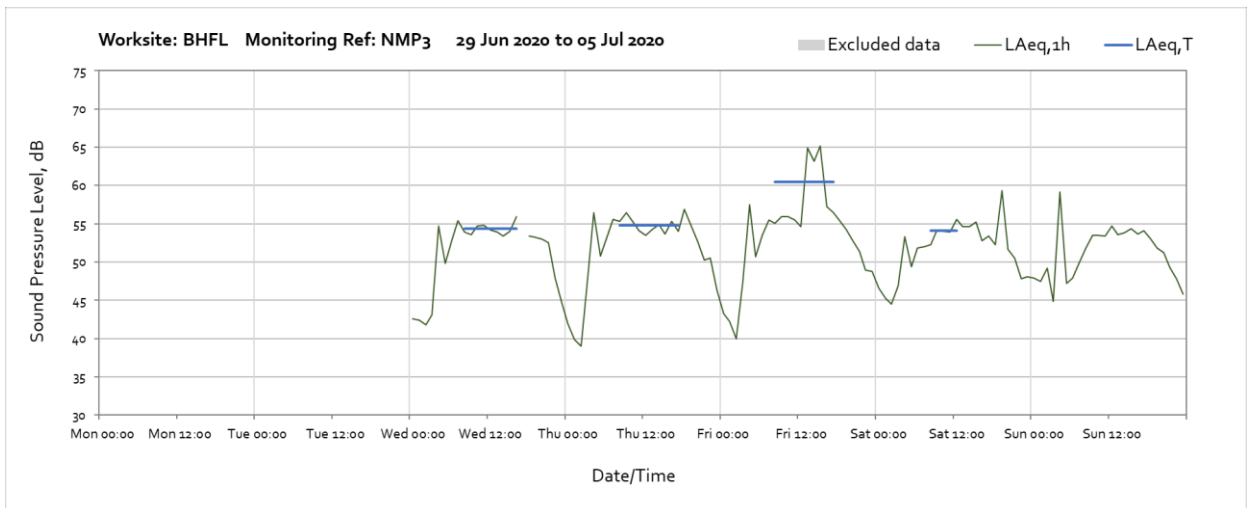
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## Worksite: LPT #1 – Monitoring Ref: NMP2

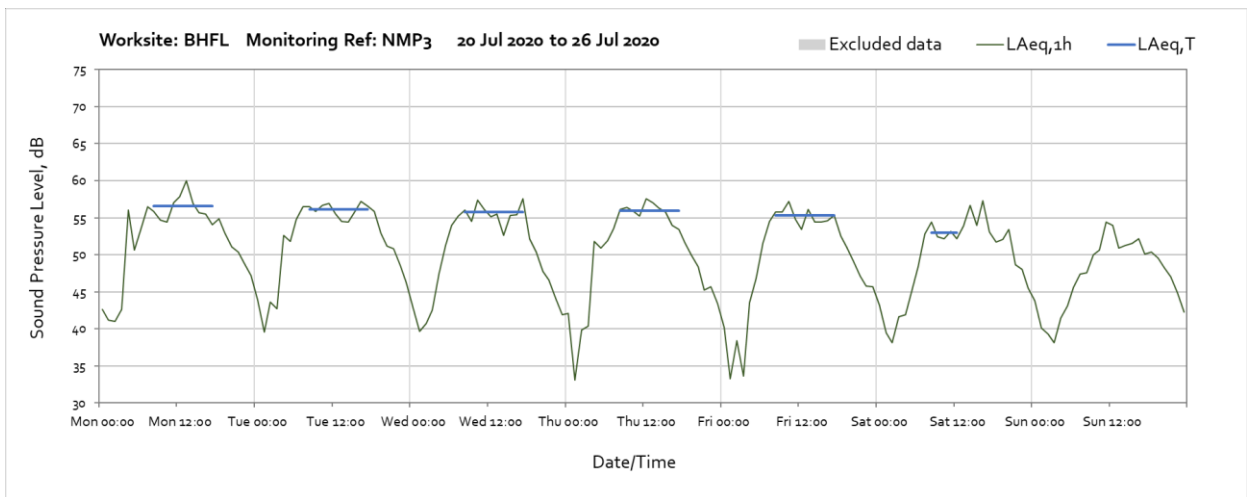
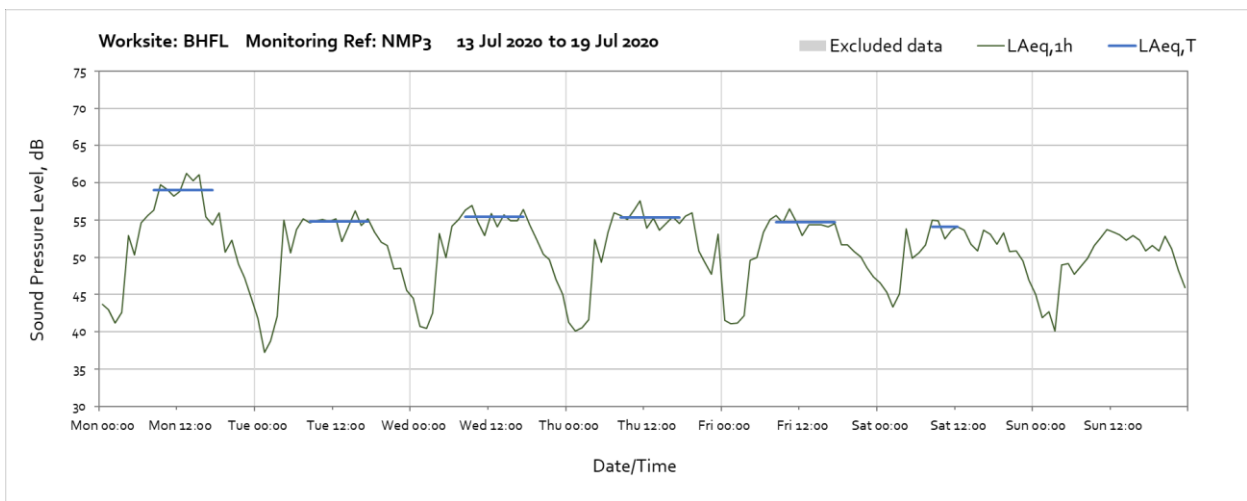
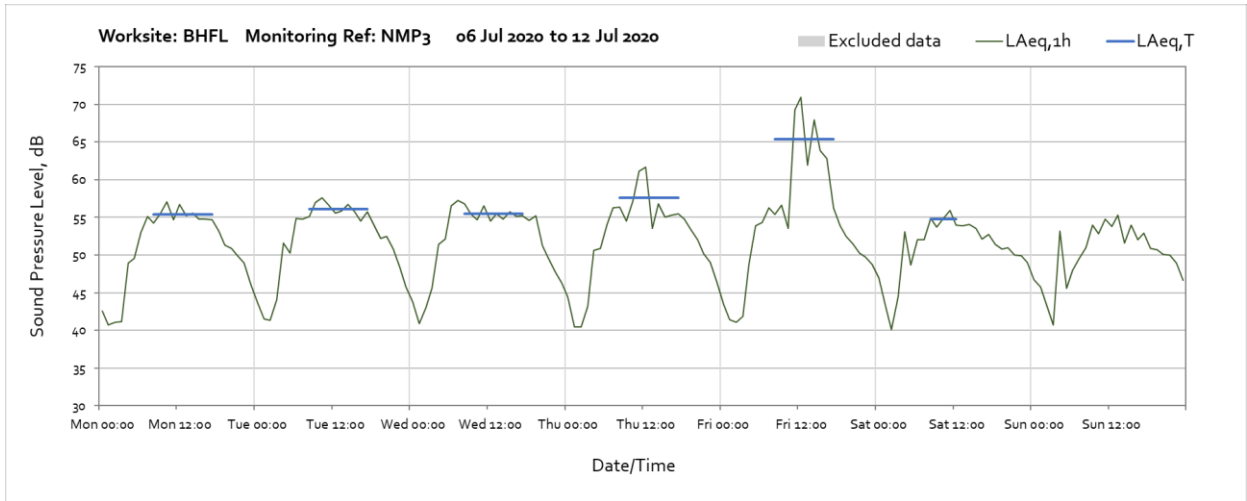


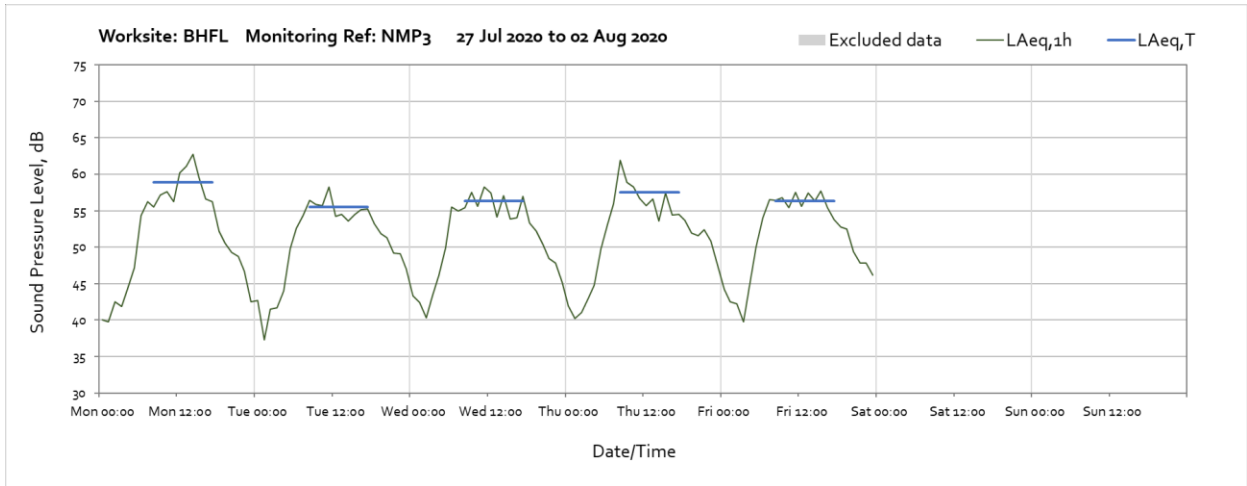


**Worksite: BHFL – Monitoring Ref: NMP3**

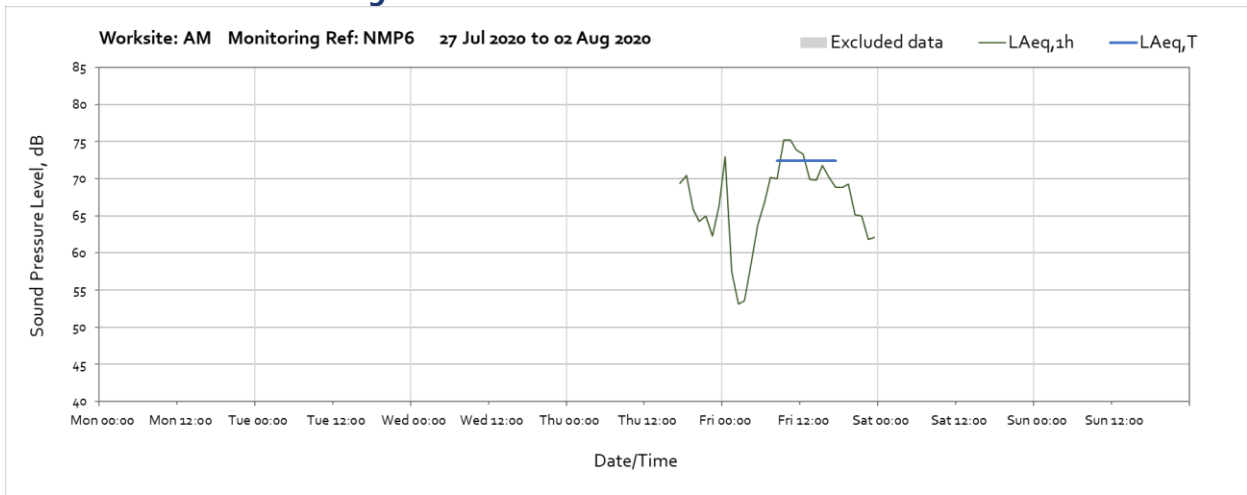


Note: Missing data on 17:00 on 1<sup>st</sup> July was due to routine maintenance of the monitoring station.





**Worksite: CSP – Monitoring Ref: NMP6**



Note: The noise monitor was installed at 17:00 on the 30<sup>th</sup> of July.