

Construction Noise and Vibration Monthly Report – April 2022

Warwick District Council

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Non-Technical Summary

This Noise and Vibration Monitoring Report fulfils HS2 Limited's commitment detailed in the Environmental Minimum Requirements (EMRs), Annex 1, Code of Construction Practice, to present the results of noise and vibration monitoring carried out within Warwick District Council (WDC) area during the month of April 2022.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken at the Burton Green Tunnel worksite (ref.: BGT), where work activities included pond discharge works.
- Noise monitoring was undertaken at Bockenden Cutting (ref.: BC), where work activities included pond discharge works, Crackley compound operation and plant crossing works.
- Noise monitoring was undertaken at the A429 Kenilworth Road Overbridge (ref.: A429KRO), where work activities included plant crossing works, excavation works, temporary W164 diversion works and drainage works, pond excavation and discharge works, earthworks, stockpiling and pond discharge.
- Noise monitoring was undertaken at the A46 Compound (ref.: A46C), where work activities included excavation works, construction of structures, stockpile relocation and civilisation, installation of pond fencing, platform construction, maintenance yard preparation works and temporary drainage installation works.
- Noise monitoring was undertaken at the Stoneleigh Park (ref.: SP), where work activities included trial holes works, hoarding construction, drainage and plant crossing works.
- Noise monitoring was undertaken at the Cubbington Road (ref.: CR), where work activities included line stabilisation works, pond construction, commissioning and installation of conveyor section and vegetation clearance.
- Noise monitoring was undertaken at Fosseyway Diversion (ref.: FD), where work activities included construction of the northern Welsh Road roundabout, vegetation clearance, moving of stockpiles, installation of sleeves for lighting columns and fencing works.
- Noise monitoring was undertaken at Offchurch Cutting (ref.: OC), where work activities included pond construction works, drainage ditches, earthworks, stone laying (car park), fencing works, stockpiling, trial holes, conveyor installation and commissioning and line stabilisation.

There were two (2) exceedances of the HS2 threshold levels for significant noise impacts, which are defined in Information Paper E23

(<https://www.gov.uk/government/publications/hs2-information-papers-environment>), during the reporting period.

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

Twelve (12) complaints were received during the monitoring period. A description of the complaints, the results of investigations and any actions taken are detailed in Table 7 of this report.

Abbreviations and Descriptions

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

Table 1: Table of Abbreviations

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

1 Introduction

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

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

1.1.2 Monitoring data and interpretive reports are to be provided to each relevant local authority on a monthly basis and shall include a summary of the construction activities occurring, the data recorded over the monitoring period, any complaints received, any periods in exceedance of agreed trigger levels, the results of any investigations and any actions taken or mitigation measures implemented. This report provides noise data, and interpretation thereof, for monitoring carried out by HS2 within the Warwick District Council (WDC) area for the period 1st to 30th April 2022.

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

- Burton Green Tunnel worksite (ref.: BGT, see plan 1 in Appendix A), where work activities included:
 - pond discharge works.
- Bockenden Cutting (ref.: BC, see plan 1 in Appendix A), where work activities included:
 - pond discharge works;
 - Crackley compound operation; and
 - Crackley lane plant crossing works.
- A429 Kenilworth Road Overbridge (ref.: A429KRO, see plan 2 in Appendix A), where work activities included:
 - plant crossing works;
 - excavation works;

- temporary diversion works and drainage works;
 - pond discharge works and pond excavation, including draining and backfilling;
 - earthworks; and
 - stockpiling.
- A46 Compound, (ref.: A46C, see plan 3 in Appendix A), where work activities included:
 - excavation works;
 - construction of structures;
 - stockpile relocation and civilisation;
 - installation of pond fencing;
 - platform construction;
 - maintenance yard preparation works; and
 - temporary drainage installation works.

excavation works, construction of structures, stockpile relocation and civilisation, installation of pond fencing, platform construction, maintenance yard preparation works and temporary drainage installation works Stoneleigh Park, (ref.: SP, see plan 3 in Appendix A), where work activities included:

- trial hole works;
 - hoarding construction;
 - drainage works; and
 - plant crossing works.
- Cubbington Road (ref.: CR, see plan 4 in Appendix B), where work activities included:
 - line stabilisation works;
 - pond construction;
 - commissioning and installation of conveyor sections; and
 - vegetation clearance and road works.
 - Fosseway Diversion (ref.: FD, see plan 5 in Appendix A), where work activities included:
 - construction of the northern Welsh Road roundabout;

- vegetation clearance;
 - moving of stockpiles;
 - installation of sleeves for lighting columns; and
 - fencing construction.
- Offchurch Cutting worksite (ref.: OC, see plan 5 in Appendix A), where work activities included:
 - pond construction;
 - drainage ditches;
 - earthworks;
 - stone laying (car park);
 - fencing works;
 - stockpiling;
 - trial holes;
 - conveyor installation and commissioning; and
 - line stabilisation.

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 Sixteen (16) noise monitoring installations were active in April in the WDC area. Table 2 summarises the position of the noise monitoring installations within the WDC area in April 2022.
- 1.2.2 Noise monitors SV-N1 and SV-N2 in proximity of Stoneleigh Park worksite (worksite ref.: SP) were installed in the month of April.
- 1.2.3 The noise monitor FD-N2 in proximity of Fosseway Diversion worksite (worksite ref.: FD) was reinstalled in a new location on 15th April.
- 1.2.4 Maps showing the position of the noise and vibration monitoring installations are presented in Appendix B.

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Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
Burton Green Tunnel (BGT)	BGT-N1	301 Cromwell Lane, Burton Green, Warwick, Warwickshire
	BGT-N2	Broadwell Woods Caravan Park, Red Lane, Burton Green, Warwick, Warwickshire
Bockenden Cutting (BC)	BC-N1	Thistle Estate, Red Lane, Burton Green, Warwick, Warwickshire
A429 Kenilworth Road Overbridge (A429KRO)	A429KRO-N1	Millburn Grange, Coventry Road, Kenilworth
	A429KRO-N2	Brookview, Milburn Grange, Coventry Road, Kenilworth
	A429KRO-N3	16 Kenilworth Road, Kenilworth
A46 Compound (A46C)	A46C-N1	Kingswood Farmhouse, Dalehouse Lane, Kenilworth
Cubbington (CR)	CR-N1	Wychwood, Cubbington Road, Leamington Spa
Fosseway Diversion (FD)	FD-N1	Burnt Heath Cottages, Long Itchington Rd, Offchurch, Leamington Spa
	FD-N2	Welsh Road, Leamington Spa
Offchurch Cutting (OC)	OC-N1	Welsh Road, Offchurch, Leamington
	OC-N2	Valley Fields, Offchurch, Leamington Spa
	OC-N3	Brickyard Cottage, Welsh Road, Offchurch, Warwick
Stoneleigh Park (SP)	SP-N2	Stoneleigh Park, Kenilworth
	SV-N1	The Barnyard Crewe Ln, Stoneleigh, Kenilworth
	SV-N2	5 Birmingham Rd, Stoneleigh, Coventry

2 Summary of Results

2.1 Summary of Measured Noise Levels

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

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

Worksite Reference	Measurement Reference	Site Address	Free-Field or Façade Measurement	Weekday Average L _{Aeq,T} (Highest Day L _{Aeq,T})					Saturday Average L _{Aeq,T} (Highest Day L _{Aeq,T})					Sunday / Public Holiday Average L _{Aeq,T} (Highest Day L _{Aeq,T})	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
BGT	BGT-N1	301 Cromwell Lane, Burton Green,	Free-field	48.6 (51.9)	55.8 (60.9)	45.3 (49.3)	43.3 (48.3)	42.5 (54.3)	47.8 (48.9)	49.5 (51.9)	45.2 (47.3)	44.6 (49.8)	40.1 (48.4)	45.6 (50.7)	41.5 (49.4)
	BGT-N2	Broadwell Woods Caravan Park, Red Lane, Burton Green,	Free-field	48.8 (57.4)	59.4 (66.5)	45.2 (59.0)	43.2 (56.3)	42.4 (59.3)	45.3 (48.2)	48.5 (58.1)	45.2 (57.0)	45.3 (60.2)	40.4 (51.2)	43.9 (51.9)	39.8 (47.3)
BC	BC-N1	Thistle Estate, Red Lane, Burton Green	Free-field	45.5 (51.6)	46.2 (51.1)	43.2 (52.8)	41.3 (51.9)	43.2 (54.3)	45.4 (46.2)	44.9 (48.4)	43.8 (50.7)	44.5 (53.7)	40.7 (52.7)	43.5 (48.4)	43.6 (53.7)
A429KRO	A429KRO-N1	Millburn Grange, Coventry Road, Kenilworth	Free-field	56.6 (57.6)	57.0 (58.4)	56.2 (58.4)	54.7 (60.7)	53.0 (67.3)	53.8 (54.6)	55.6 (56.8)	54.7 (56.1)	55.0 (58.0)	51.8 (65.6)	54.3 (56.3)	51.8 (63.3)
	A429KRO-N2	Brookview, Millburn Grange, Coventry Road, Kenilworth	Free-field	52.8 (54.7)	54.8 (56.7)	49.4 (53.2)	49.1 (53.6)	46.9 (54.1)	48.2 (49.5)	49.6 (53.4)	47.8 (49.3)	48.0 (51.9)	45.4 (54.9)	46.4 (50.5)	43.8 (52.2)
	A429KRO-N3	16 Kenilworth Road, Kenilworth	Free-field	50.5 (54.9)	54.8 (59.0)	52.6 (57.7)	51.6 (57.9)	49.0 (57.4)	50.7 (52.4)	51.5 (53.5)	49.9 (51.5)	49.7 (56.5)	44.5 (59.2)	48.0 (66.8)	43.8 (53.3)
A46C	A46C-N1	Kingswood Farmhouse, Dalehouse Lane, Kenilworth	Free-field	58.5 (62.4)	57.9 (62.7)	57.9 (62.0)	56.3 (60.7)	53.6 (61.4)	55.7 (56.2)	55.7 (59.0)	55.5 (59.2)	55.7 (60.6)	52.2 (56.1)	56.4 (60.8)	52.7 (61.0)
CR	CR-N1	Wychwood, Cubbington Road, Lillington	Free field	55.5 (59.6)	56.7 (60.5)	56.0 (59.4)	52.7 (57.1)	48.1 (57.7)	52.0 (54.0)	55.3 (56.7)	56.0 (57.0)	54.1 (57.6)	47.8 (55.1)	53.7 (58.0)	47.9 (55.2)

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Worksite Reference	Measurement Reference	Site Address	Free-Field or Façade Measurement	Weekday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$)					Saturday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$)					Sunday / Public Holiday Average $L_{Aeq,T}$ (Highest Day $L_{Aeq,T}$)	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
FD	FD-N1	Burnt Heath Cottages Long Itchington Rd, Offchurch	Free-field	50.9 (58.8)	60.9 (69.6)	49.6 (55.8)	47.3 (74.0)	44.9 (62.0)	48.0 (50.9)	51.8 (66.1)	48.9 (51.8)	50.8 (60.4)	44.6 (56.8)	47.9 (56.2)	43.4 (52.5)
	FD-N2	Welsh Road, Leamington Spa	Free-field	60.3 (67.2)	59.5 (63.5)	59.8 (66.2)	55.1 (63.5)	51.5 (59.8)	56.0 (57.3)	58.0 (59.3)	56.8 (58.9)	56.3 (61.6)	49.4 (54.8)	57.5 (63.4)	50.1 (58.8)
OC	OC-N1	Welsh Road, Offchurch	Free-field	49.7 (52.8)	52.0 (56.2)	49.1 (52.4)	44.5 (49.2)	42.6 (52.6)	46.6 (49.8)	49.2 (53.2)	44.5 (46.9)	46.4 (52.7)	39.7 (48.5)	44.6 (53.6)	41.3 (49.9)
	OC-N2	Valley Fields, Hunningham Road, Offchurch	Free field	50.0 (54.5)	57.5 (67.5)	45.9 (54.4)	44.7 (50.8)	44.7 (59.5)	49.4 (53.0)	50.3 (53.4)	45.6 (46.9)	46.8 (50.8)	43.2 (50.9)	46.2 (50.4)	44.4 (52.4)
	OC-N3	Brickyard Cottage, Welsh Road, Offchurch	Free-field	54.1 (59.0)	54.0 (62.5)	52.7 (55.8)	48.9 (54.3)	46.6 (57.8)	50.3 (51.5)	50.8 (51.9)	50.3 (51.7)	49.9 (54.2)	43.8 (51.0)	50.2 (59.2)	46.0 (55.0)
SP	SP-N2	Stoneleigh Park, Kenilworth	Free-field	52.9 (55.8)	55.9 (62.5)	49.6 (56.1)	45.4 (51.8)	42.6 (52.1)	47.4 (48.9)	52.4 (53.1)	51.2 (55.2)	50.0 (56.3)	41.1 (48.1)	47.7 (55.3)	42.3 (51.7)
	SV-N1	The Barnyard Crewe Ln, Stoneleigh, Kenilworth	Free-field	58.6 (61.6)	58.3 (61.6)	57.8 (60.5)	54.2 (59.1)	50.3 (63.5)	54.5 (55.1)	57.2 (58.6)	57.6 (59.2)	56.0 (59.9)	50.4 (55.1)	55.1 (59.0)	49.3 (58.6)
	SV-N2	5 Birmingham Rd, Stoneleigh, Coventry	Free-field	55.0 (55.2)	52.9 (53.2)	50.8 (52.7)	48.0 (54.2)	47.8 (55.8)	51.1 (51.4)	52.1 (52.5)	52.8 (53.3)	53.6 (62.6)	47.4 (54.3)	50.8 (54.4)	48.4 (54.2)

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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 reported construction noise levels exceed the LOAEL and SOAEL, 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 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
BGT	BGT-N1*	301 Cromwell Lane, Burton Green, Warwick, Warwickshire	All days	All periods	No exceedances	No exceedances
	BGT-N2*	Broadwell Woods Caravan Park, Red Lane, Burton Green, Warwick, Warwickshire	All days	All periods	No exceedances	No exceedances
BC	BC-N1*	Thistle Estate, Red Lane, Burton Green, Warwick, Warwickshire	All days	All periods	No exceedances	No exceedances
A429KRO	A429KRO-N1*	Millburn Grange, Coventry Road, Kenilworth	All days	All periods	No exceedances	No exceedances
	A429KRO-N2*	Brookview, Milburn Grange, Coventry Road, Kenilworth	All days	All periods	No exceedances	No exceedances
	A429KRO-N3*	16 Kenilworth Road, Kenilworth	All days	All periods	No exceedances	No exceedances
A46C	A46C-N1	Kingswood Farmhouse, Dalehouse Lane, Kenilworth	All days	All periods	No exceedances	No exceedances
CR	CR-N1	Wychwood, Cubbington Road, Lillington, Leamington Spa	All days	All periods	No exceedances	No exceedances
FD	FD-N1	Burnt Heath Cottages Long Itchington Rd,	Weekday Night Saturdays	0800-1800 2200-0700 0800-1300	5 11 1	No exceedances 8 No exceedances

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
		Offchurch, Leamington Spa		1400-2200	4	
	FD-N2	Welsh Road, Leamington Spa	Night Saturdays	2200-0700 1400-2200	9 4	3 No exceedances
OC	OC-N1*	Welsh Road, Offchurch, Leamington,	All days	All periods	No exceedances	No exceedances
	OC-N2*	Valley Fields, Hunningham Road, Offchurch, Leamington Spa	Weekdays	08:00-18:00	5	No exceedance
	OC-N3	Brickyard Cottage, Welsh Road, Offchurch, Warwick	All days	All periods	No exceedances	No exceedances
SP	SP-N2	Stoneleigh Park, Kenilworth	Weekdays	08:00-18:00	1	No exceedance
	SV-N1	The Barnyard Crewe Ln, Stoneleigh, Kenilworth	All days	All periods	No exceedances	No exceedances
	SV-N2	5 Birmingham Rd, Stoneleigh, Coventry	All days	All periods	No exceedances	No exceedances

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

2.2.6 LOAEL exceedances have been recorded at noise monitoring location BGT-N2, SP-N2, FD-N1, FD-N2 and OC-N2 during weekdays, Saturdays and night-time hours.

2.2.7 For the purpose of assessing eligibility for noise insulation or temporary rehousing, multiple exceedances of the SOAEL in a 24-hour period would be counted as a single exceedance during that day. Over the reporting period, the overall number of SOAEL exceedances at each measurement location is shown in Table 5 and may be lower than the total sum of individual exceedances reported in Table 4 for each location.

Table 5: Summary of Total Exceedances of SOAEL

Worksite Reference	Measurement Reference	Monitor Address	Total of SOAEL exceedances in the month
FD	FD-N1	Burnt Heath Cottages Long Itchington Rd, Offchurch, Leamington Spa	2
FD	FD-N2	Welsh Road, Leamington Spa	1

2.2.8 3 night-time SOAEL exceedances at monitoring location ref.: FD-N1 and FD-N2 were due to HS2 construction works during April 2022.

2.3 Exceedances of Trigger Level

2.3.1 Table 6 provides a summary of exceedances of the Section 61 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 6: 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

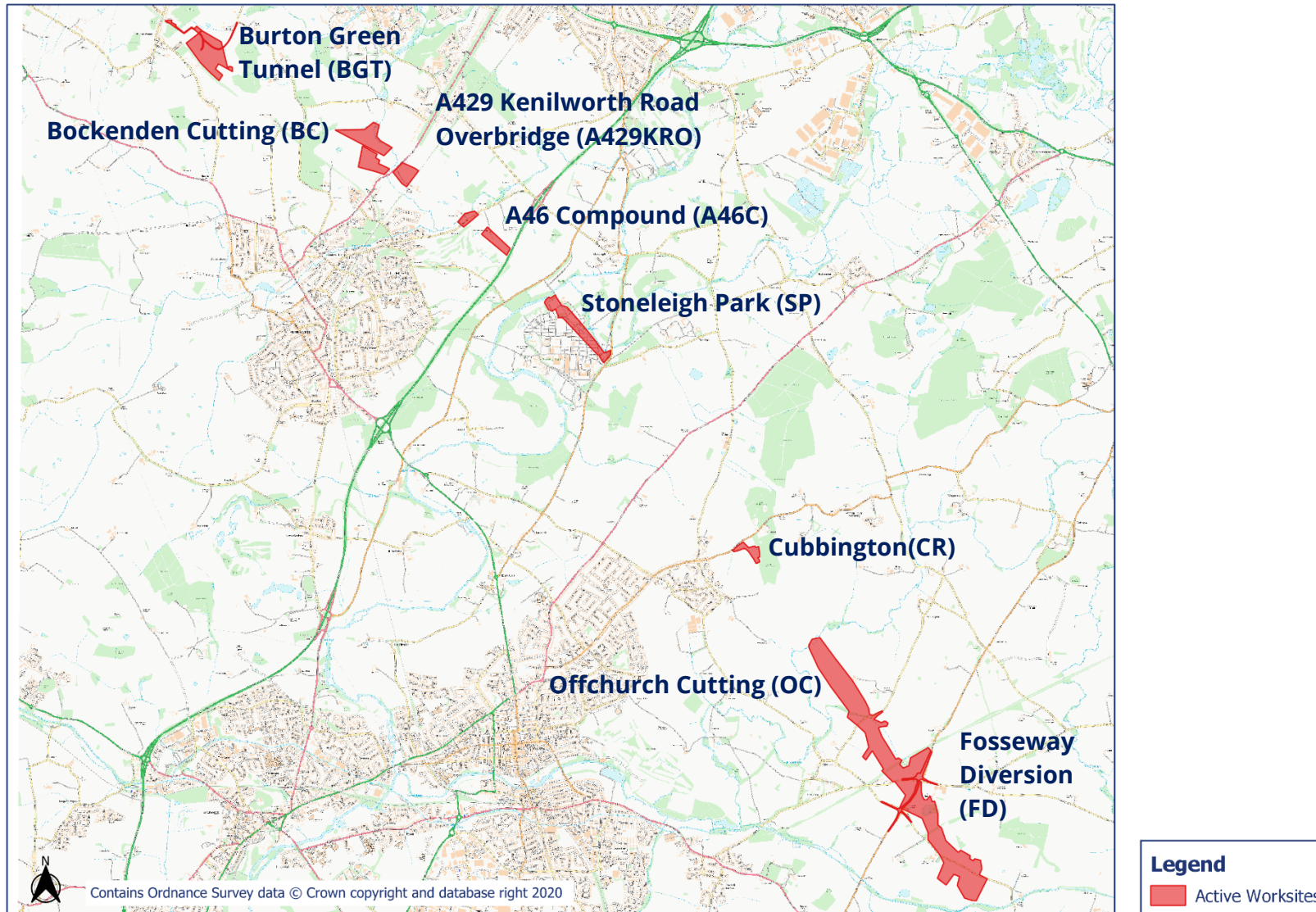
2.4.1 Table 7 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

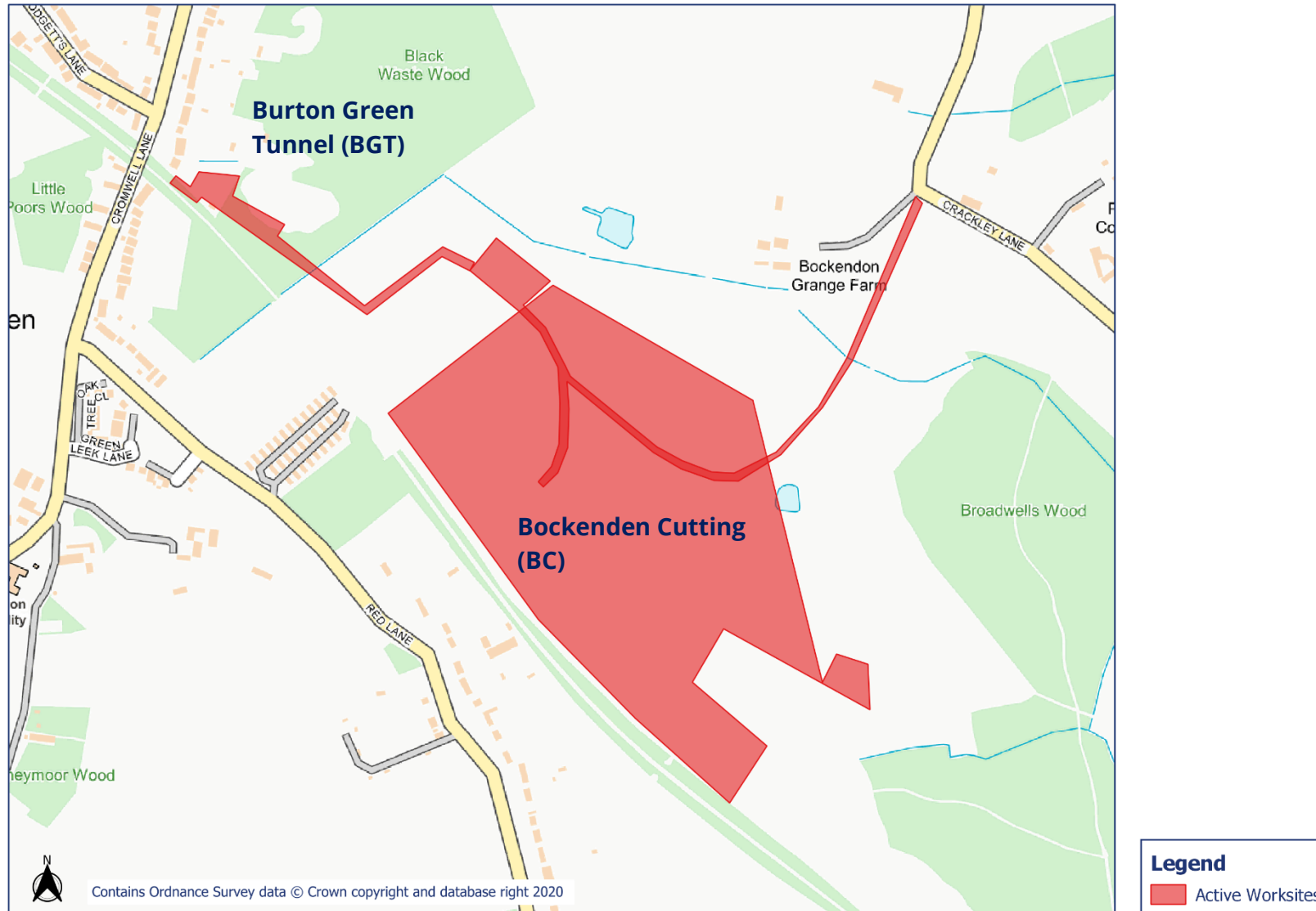
Table 7: Summary of Complaints

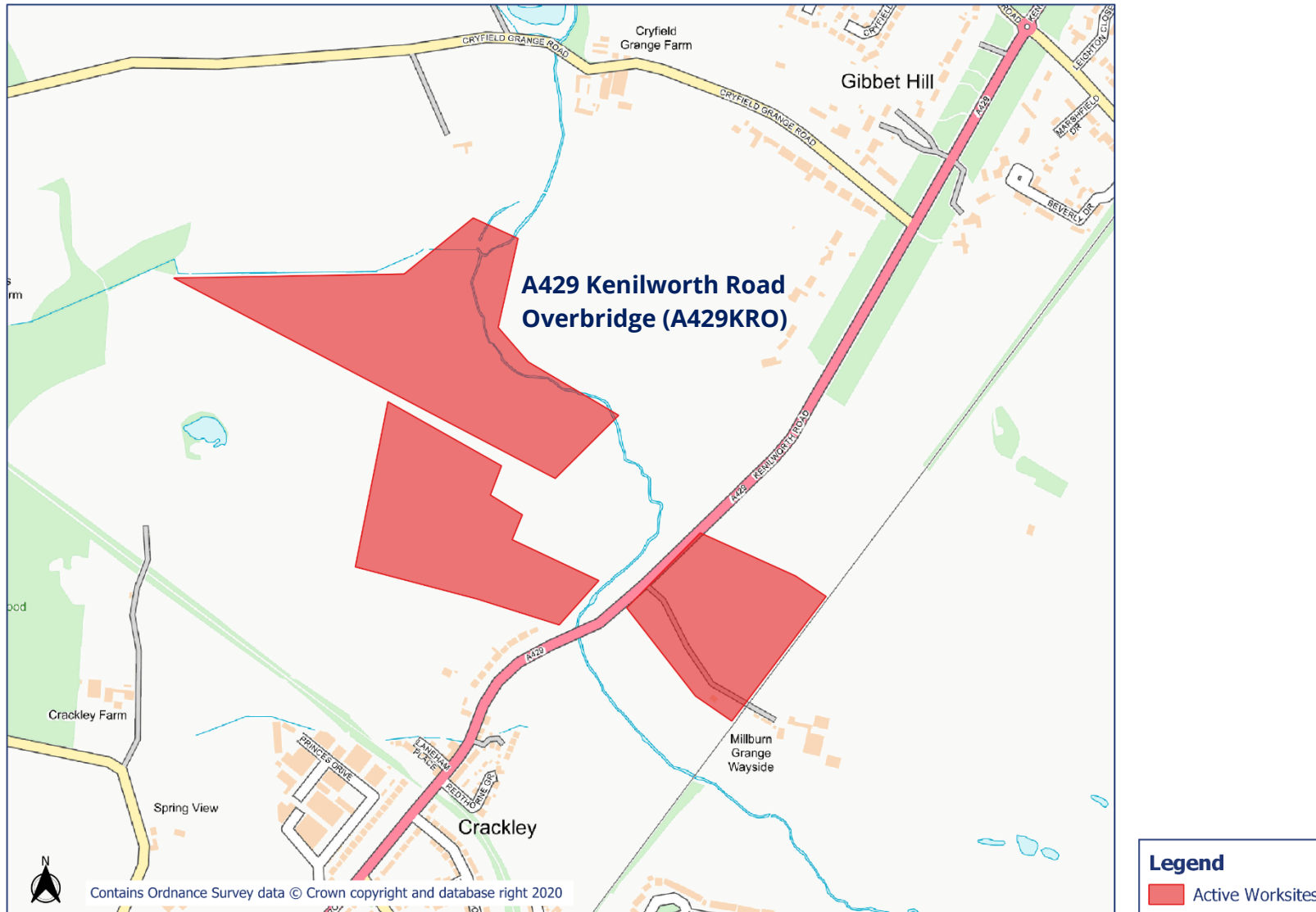
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
HS2-22-43505-C HS2-22-43507-C HS2-22-43514-C	BC	Complaint due to general noise and vibration disturbance from construction works.	Investigations show that pilings was underway at the time of complaint. Works were found to be in line with Section 61 consent conditions.	Further mitigation measures are being investigated which including meeting with local stakeholders to further understand the issue.
HS2-22-43504-C HS2-22-43512-C HS2-22-43516-C	BC	Complaint due to noise and vibration disturbance from	Investigations showed that a pump used for collecting	Pump and generator have been removed from site to reduce

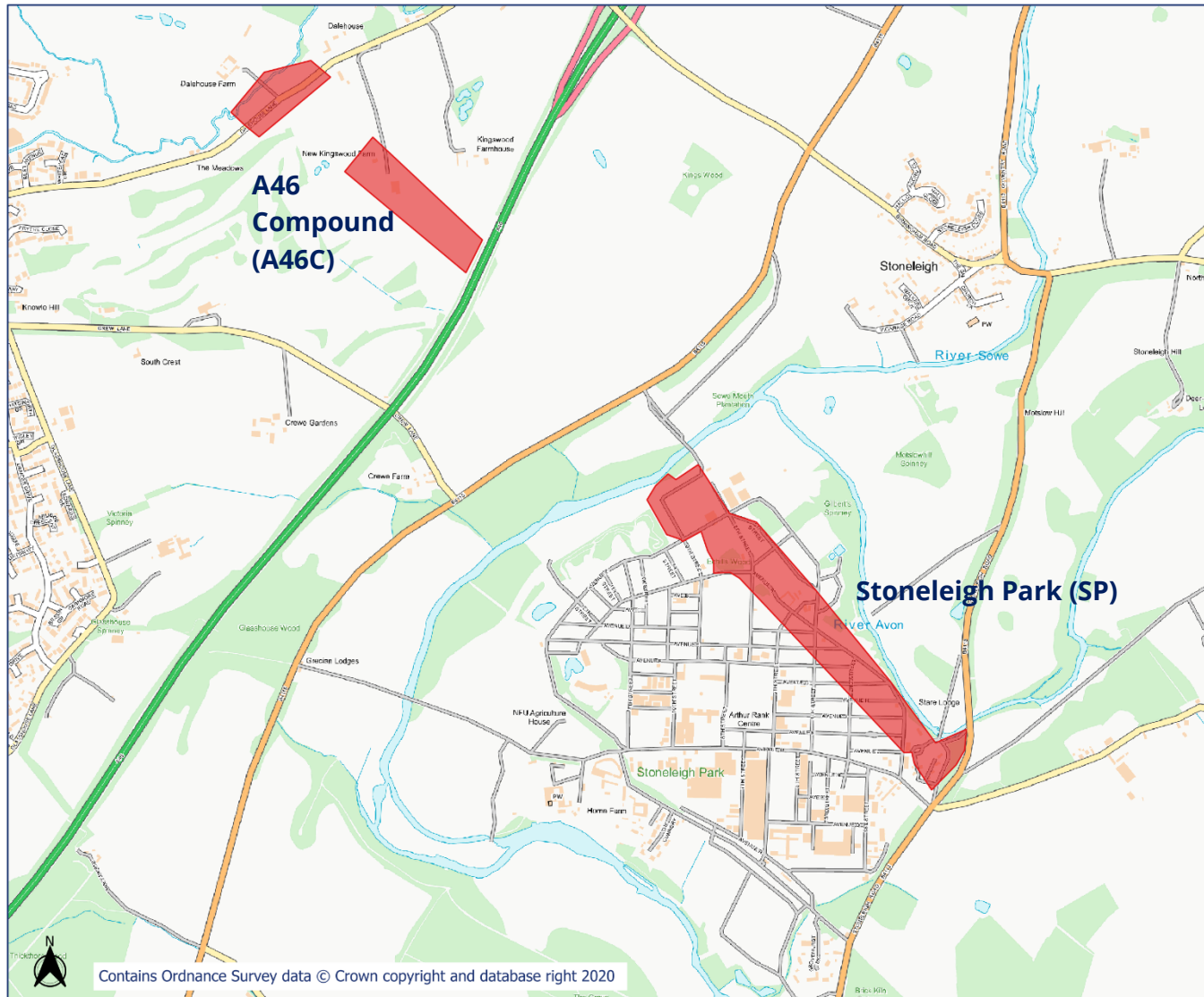
HS2-22-43522-C HS2-22-43523-C HS2-22-43524-C HS2-22-43525-C		construction works in daytime and night-time.	run off water into a constructed pool. Works have been undertaken in line with Section 61 consent.	night noise levels. A meeting with affected residents has been scheduled to discuss ongoing concerns.
HS2-22-43509-C	OC	Complaint due to construction noise at night-time.	Works have been undertaken in line with Section 61 consent.	Stakeholder has been contacted and information about the results of investigations have been provided.
HS2-22-43574-C	BC	Complaint due to ongoing vibration noises becoming intrusive.	Works have been undertaken in line with Section 61 consent.	The area will continue to be monitored for any exceedances or disturbance.

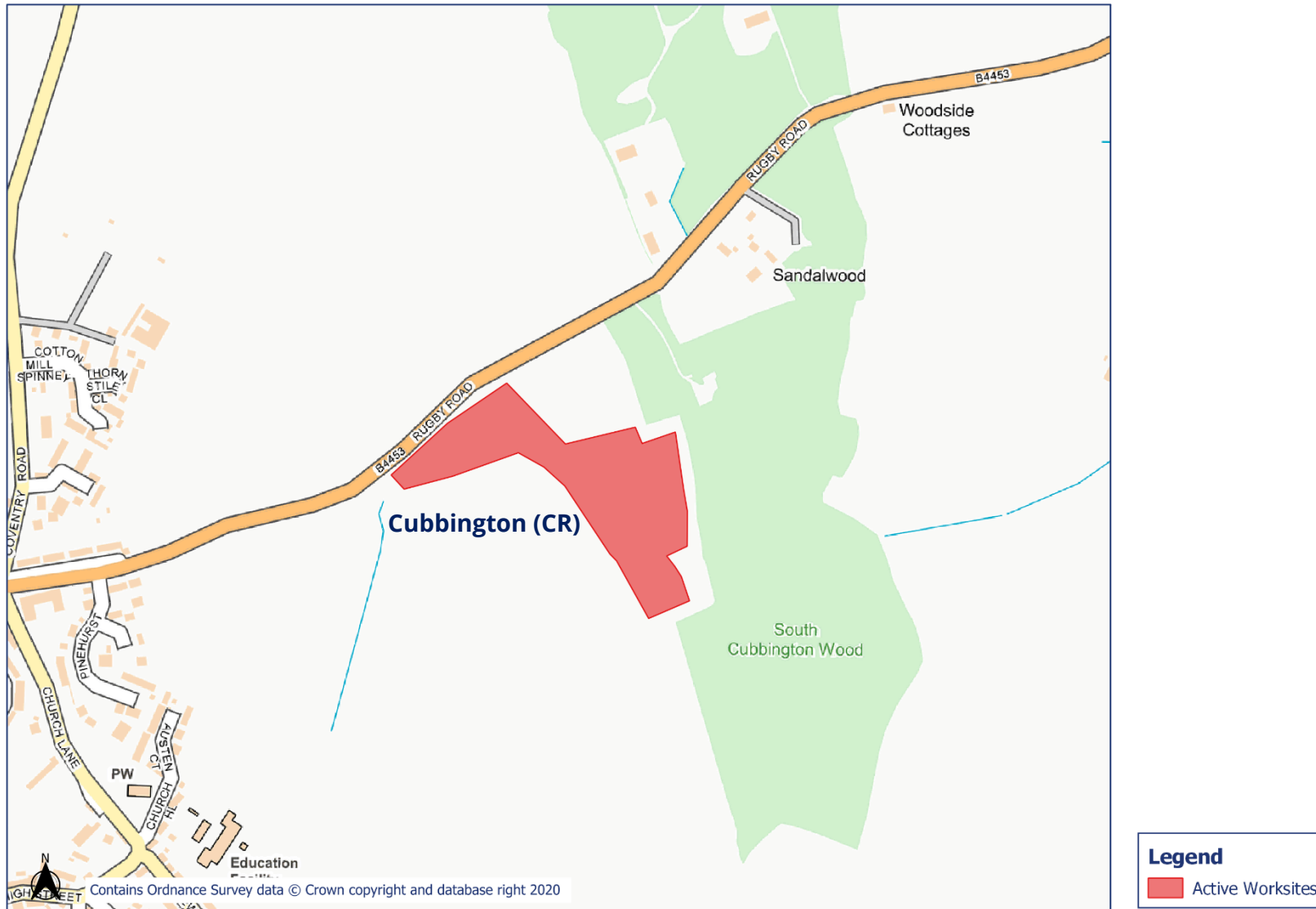
Appendix A Site Locations

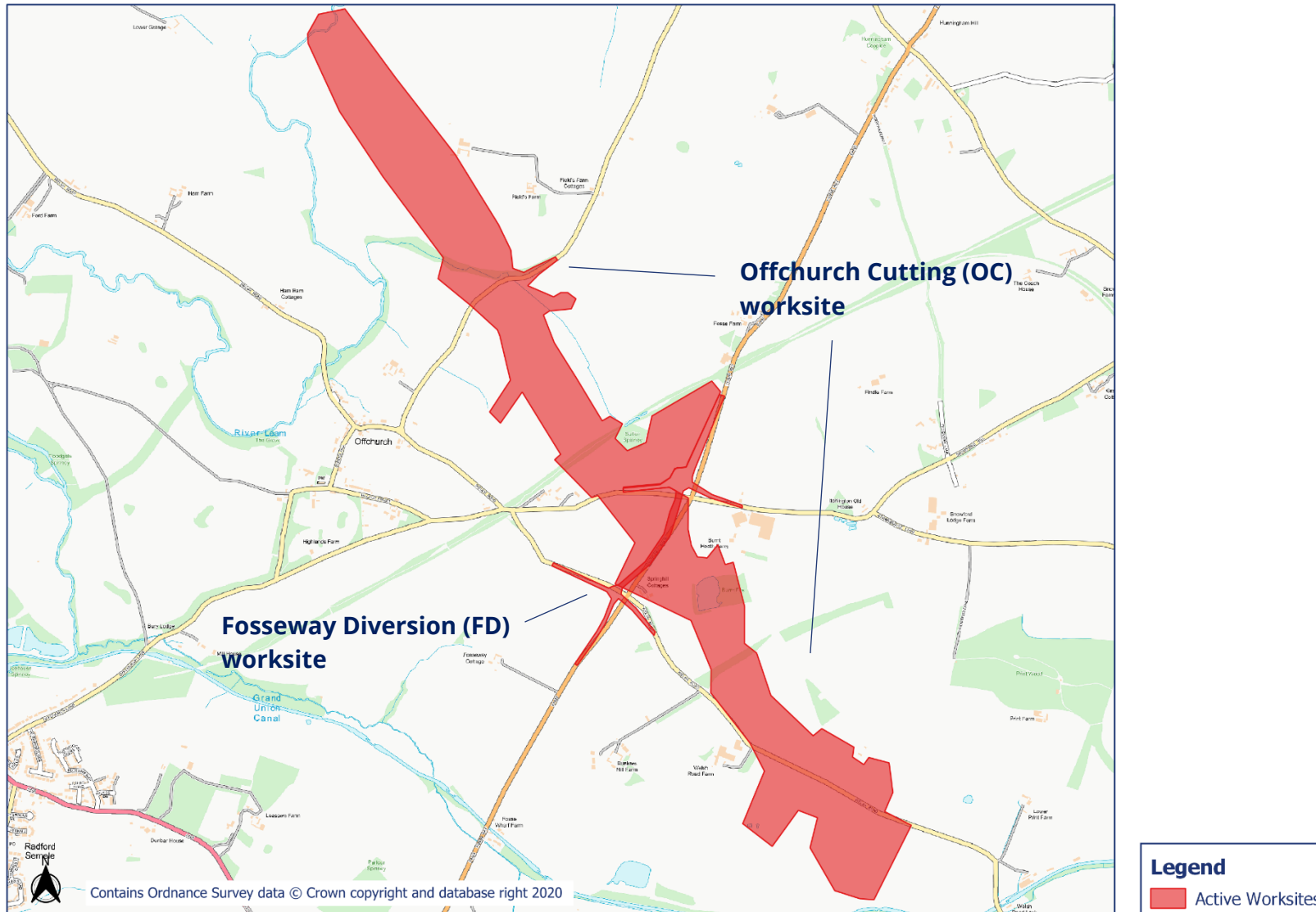




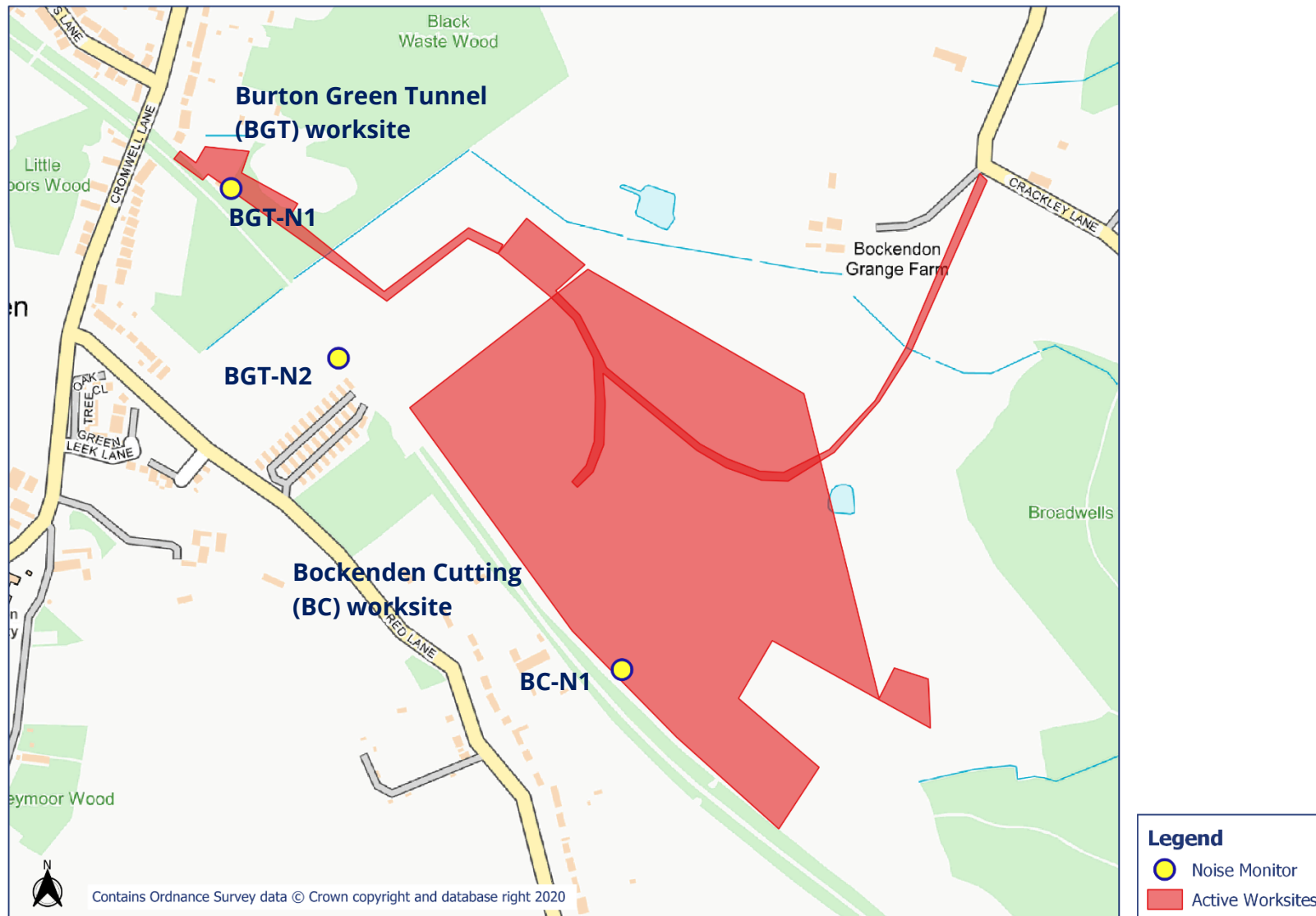




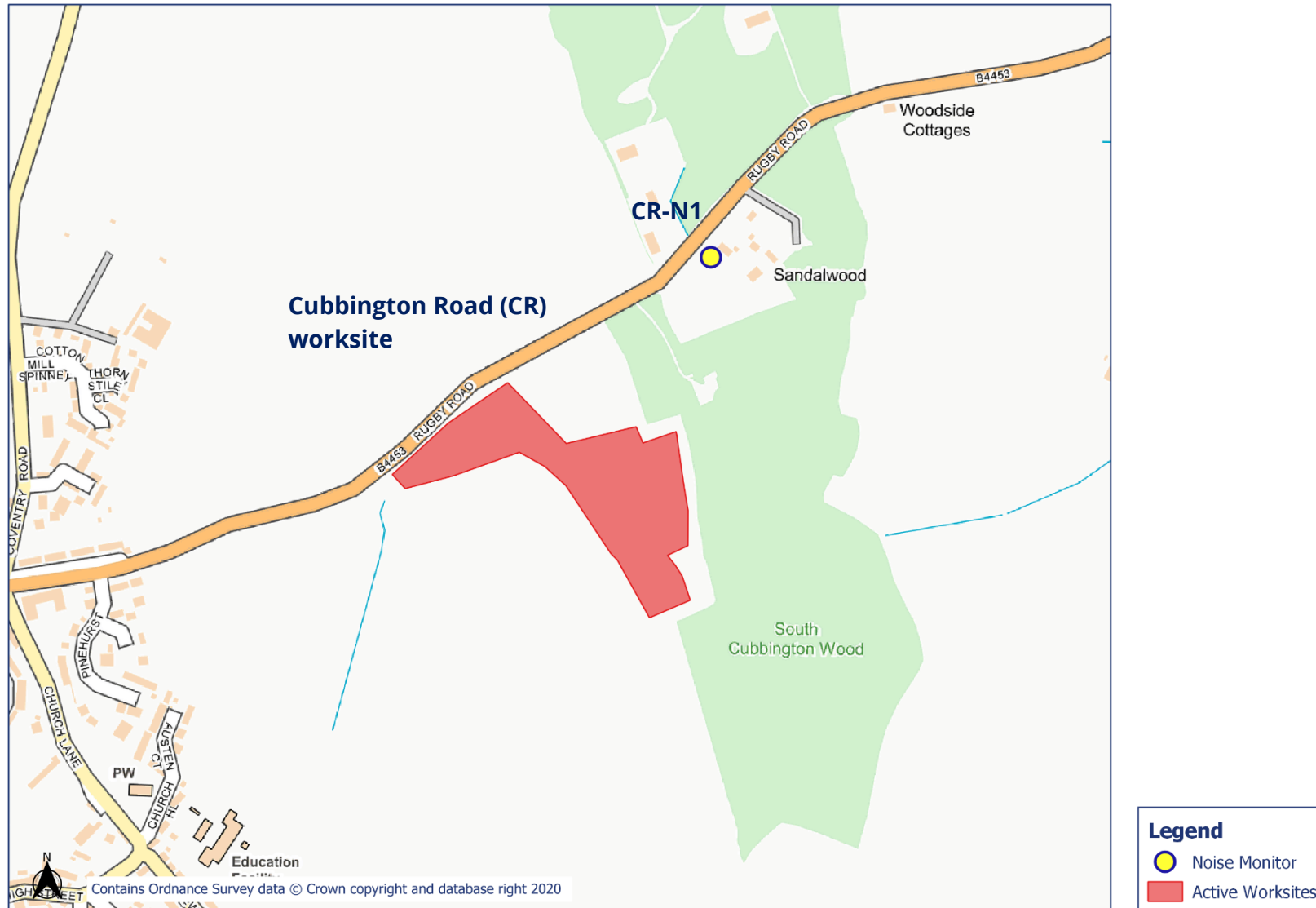


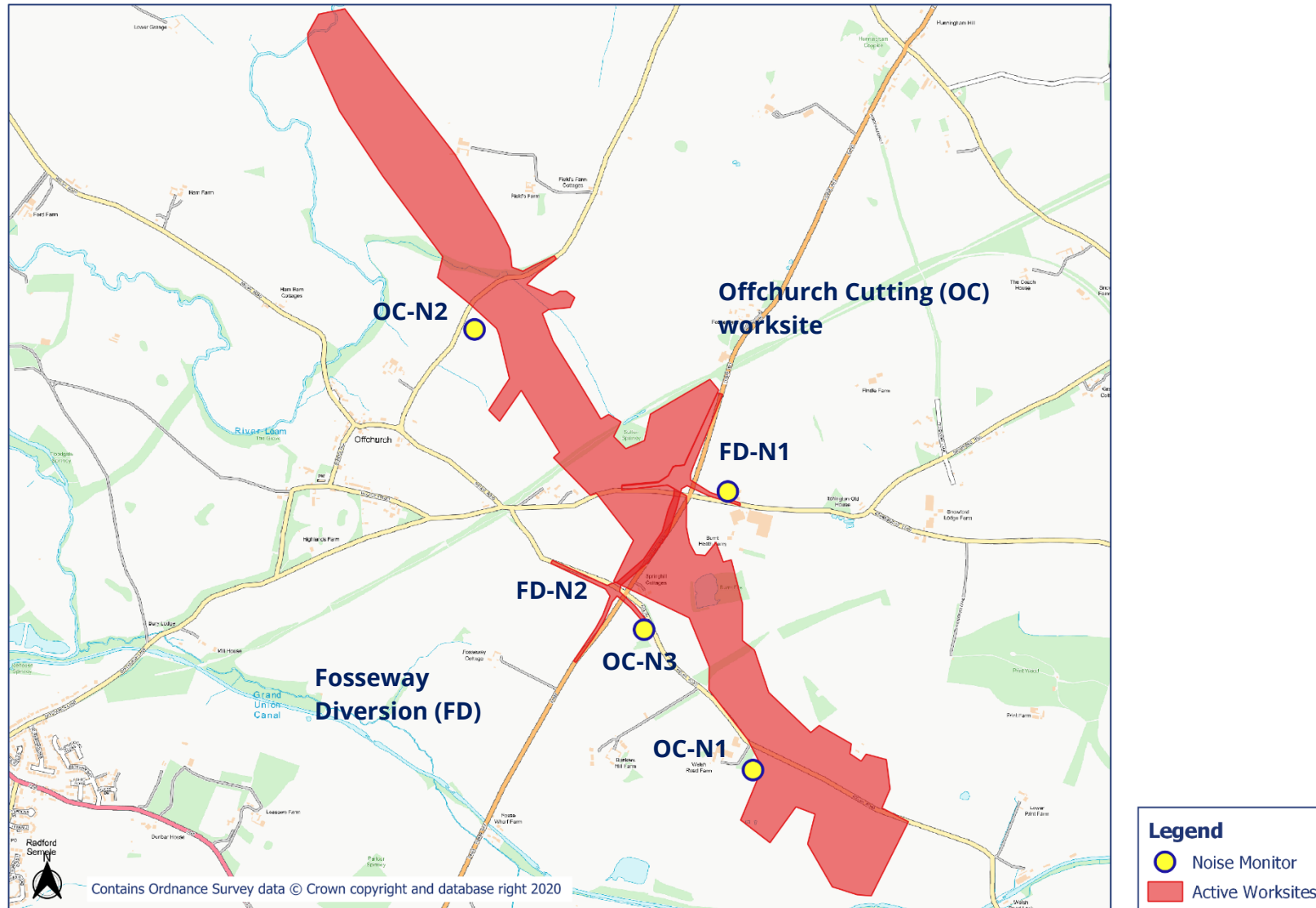


Appendix B Monitoring Locations







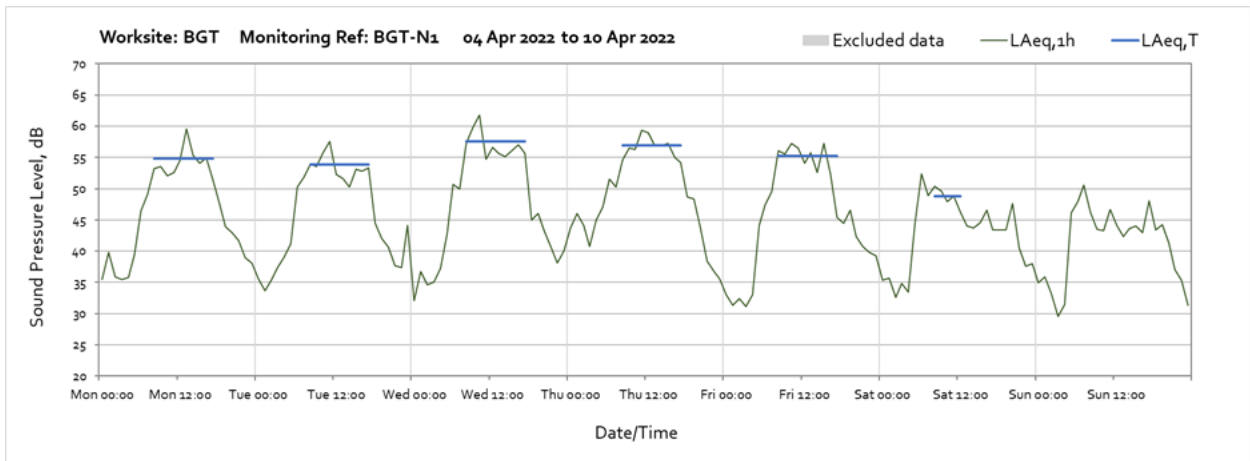
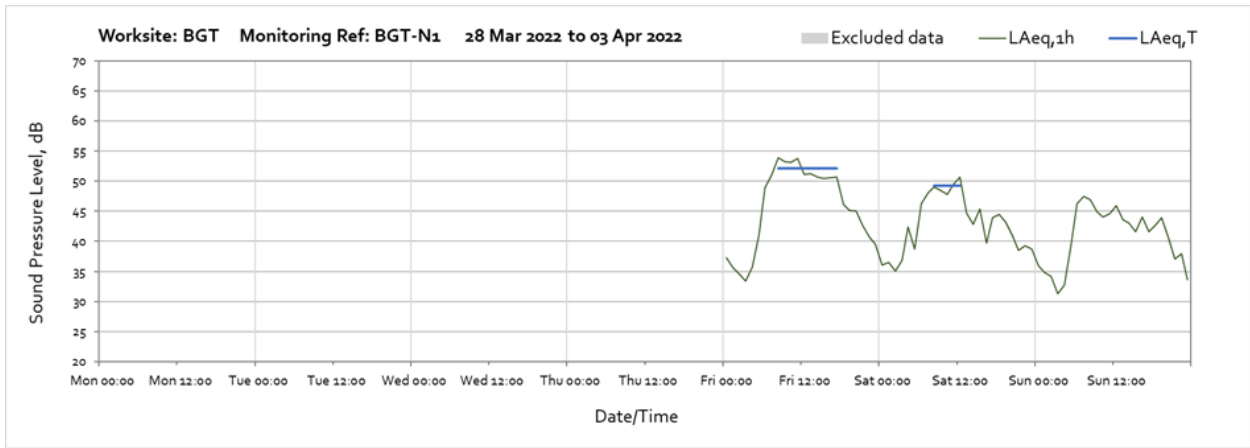


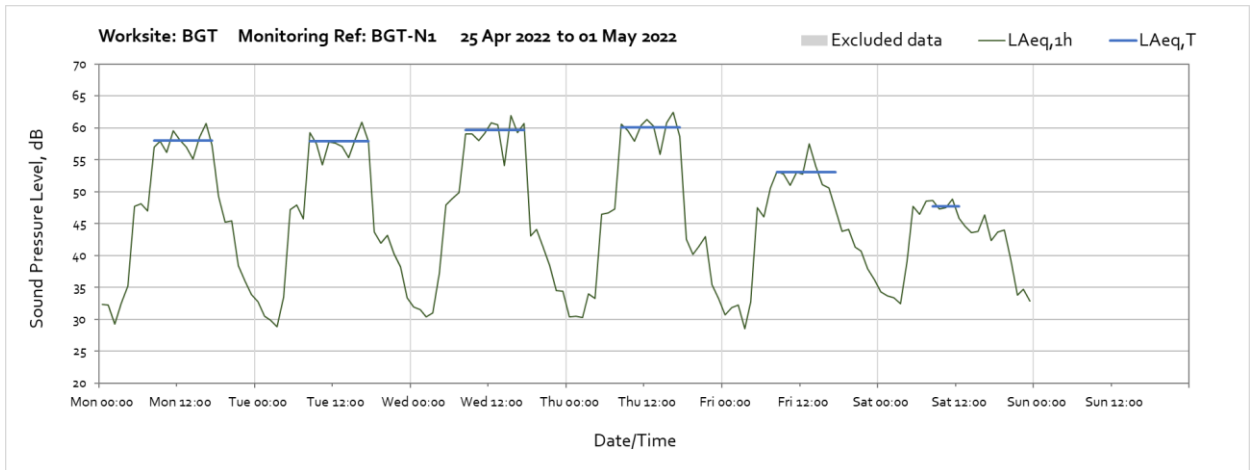
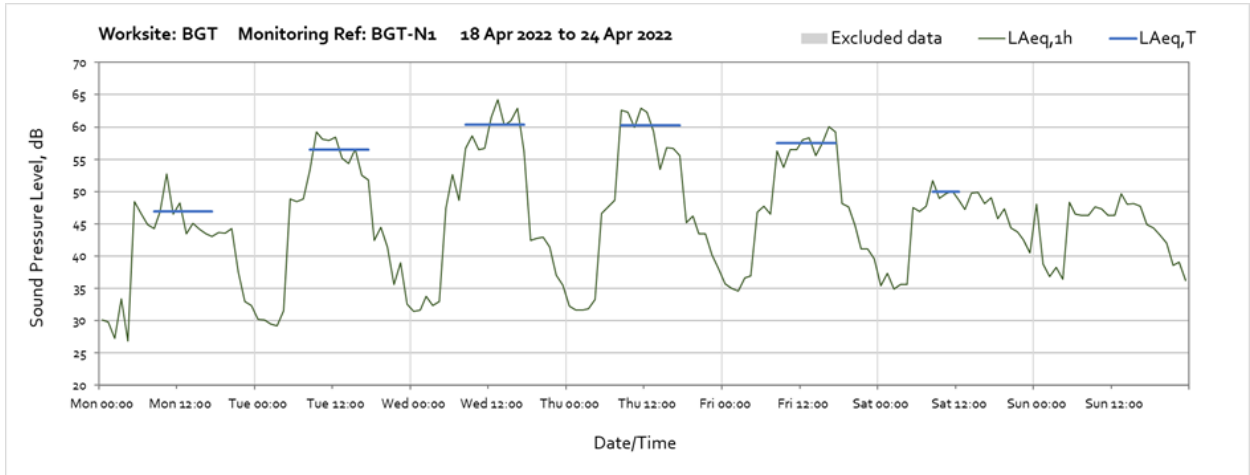
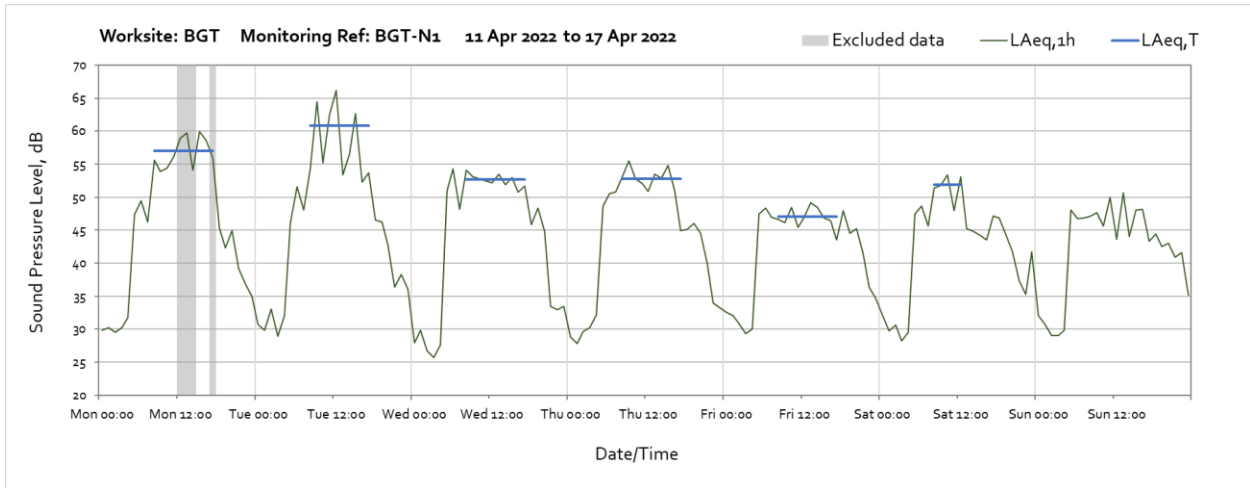
Appendix C Data

Noise

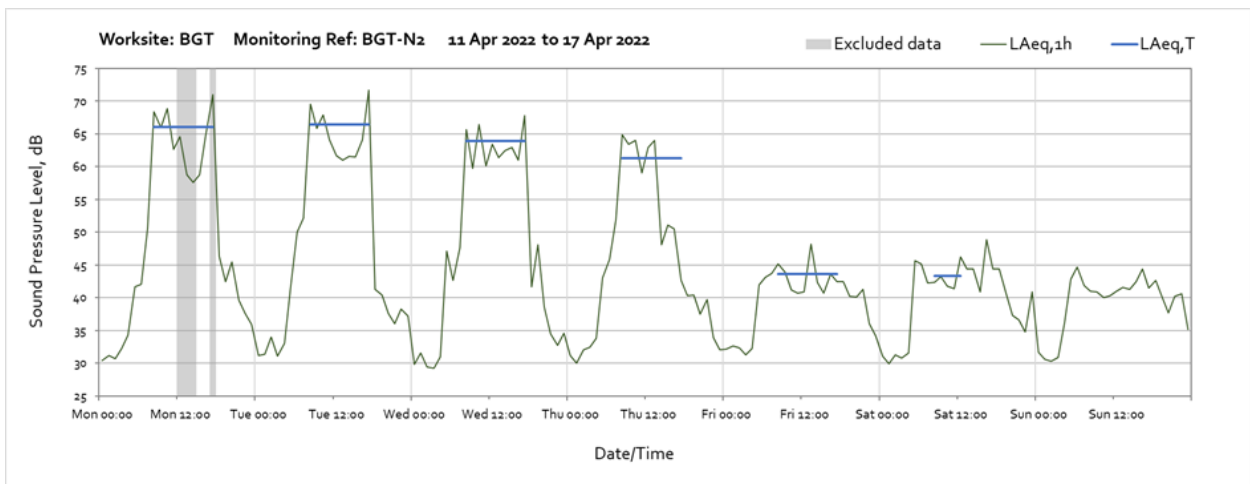
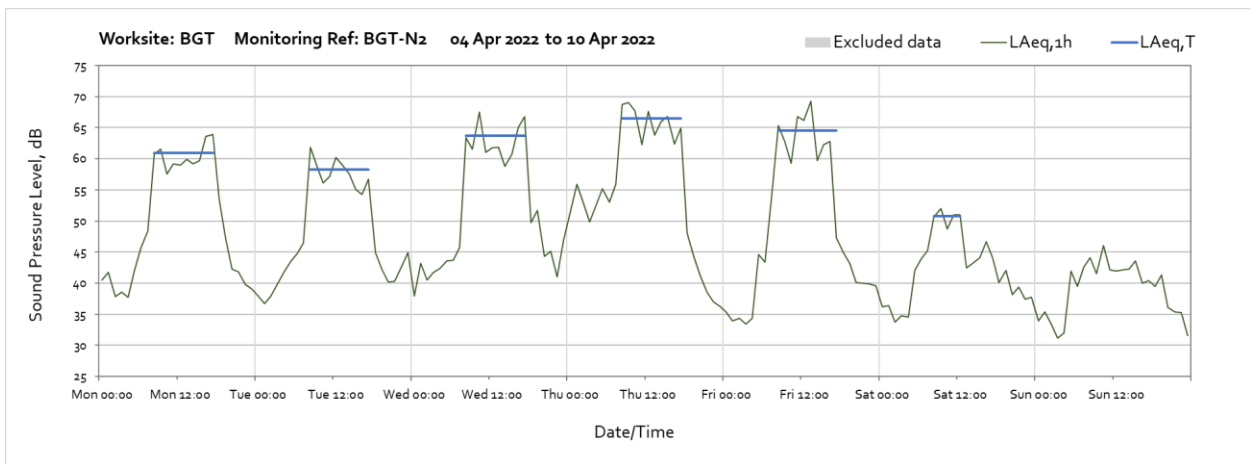
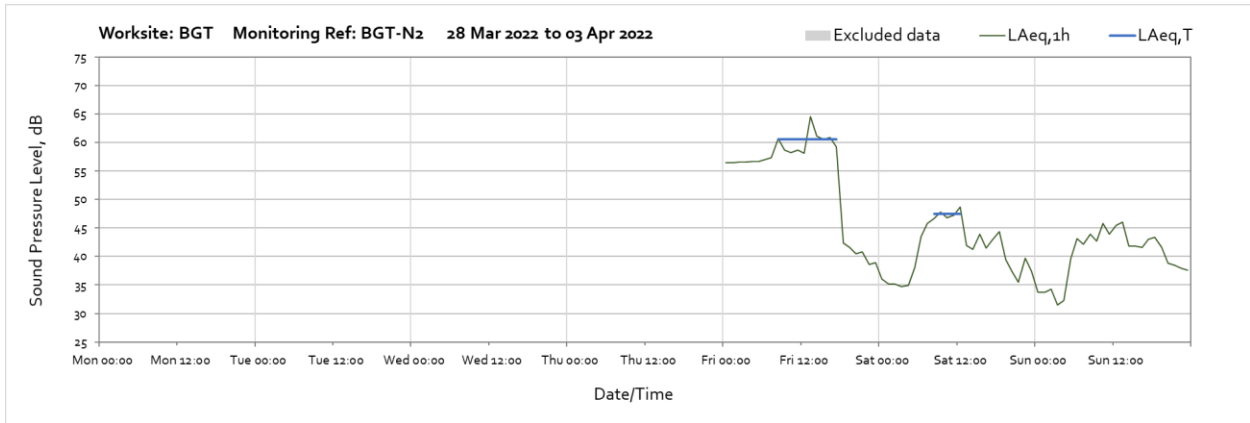
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have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

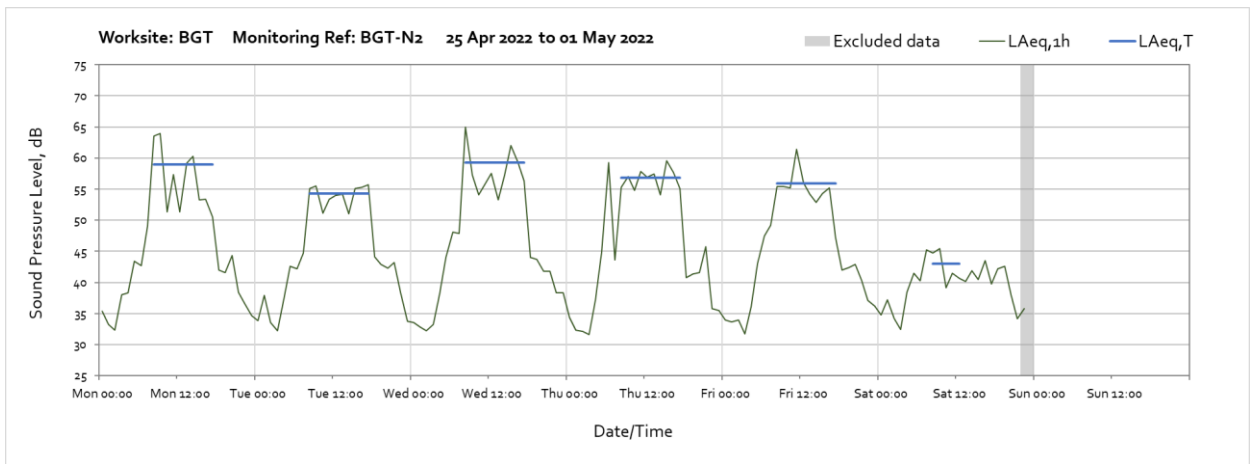
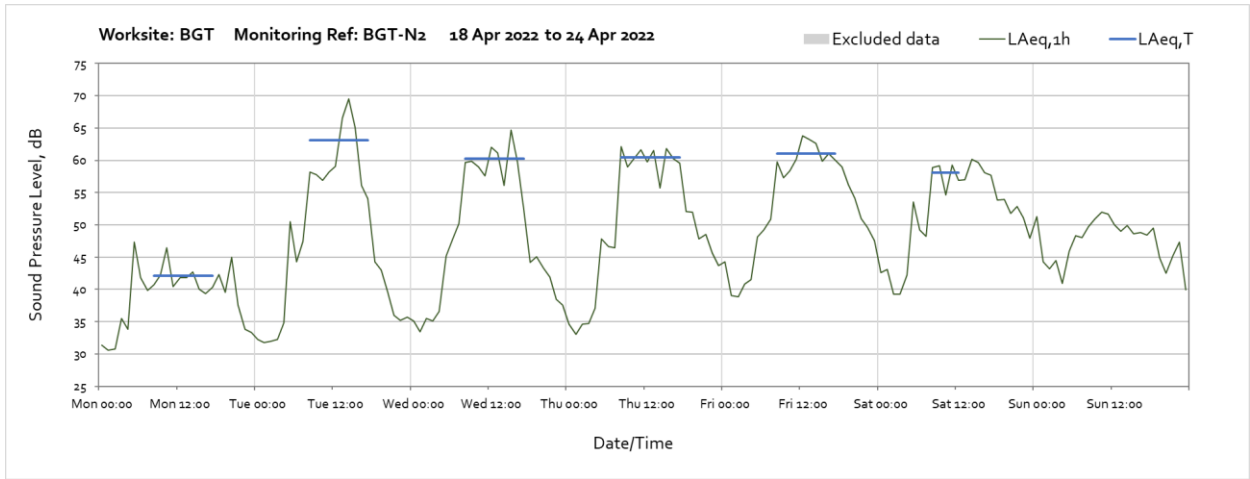
Worksite: BGT - Monitoring Ref: BGT-N1





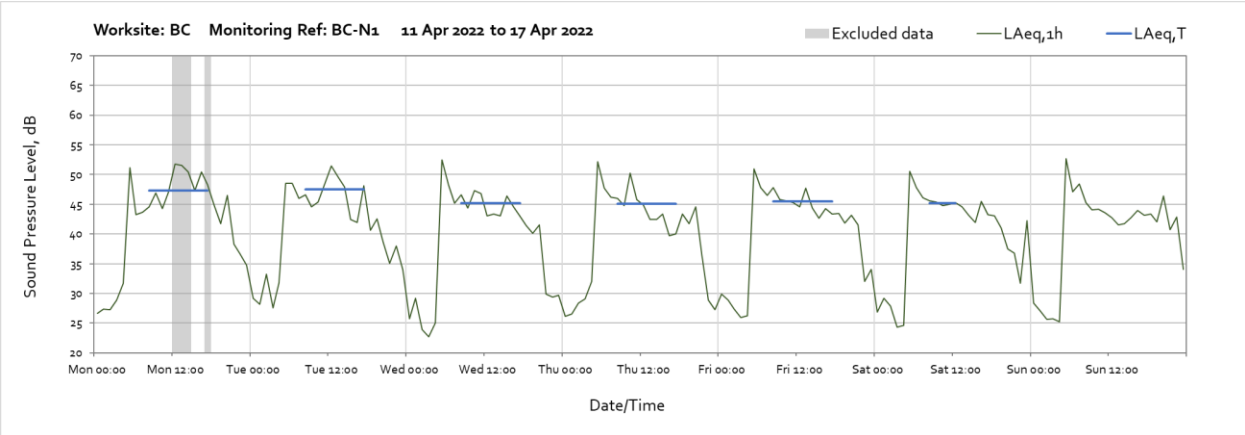
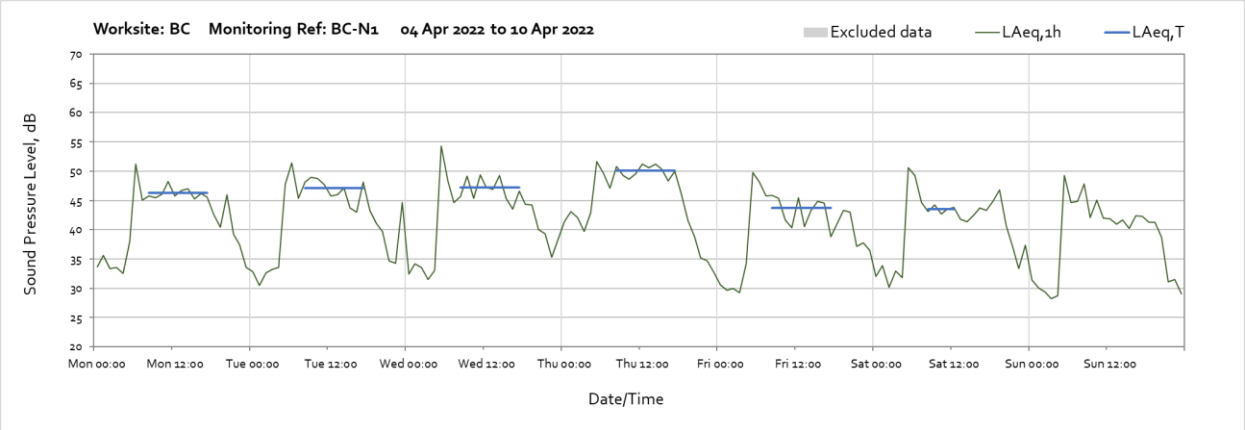
Worksite: BGT – Monitoring Ref: BGT-N2

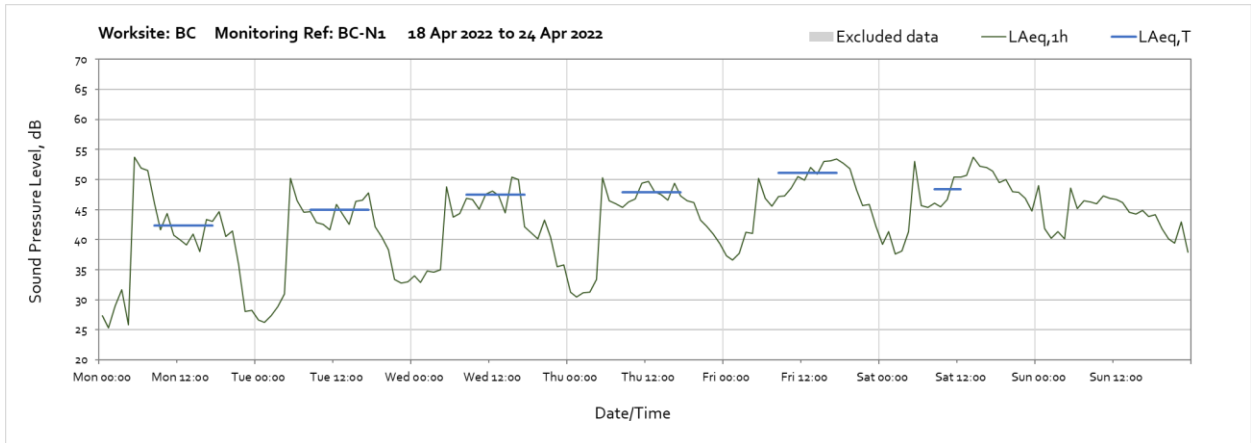




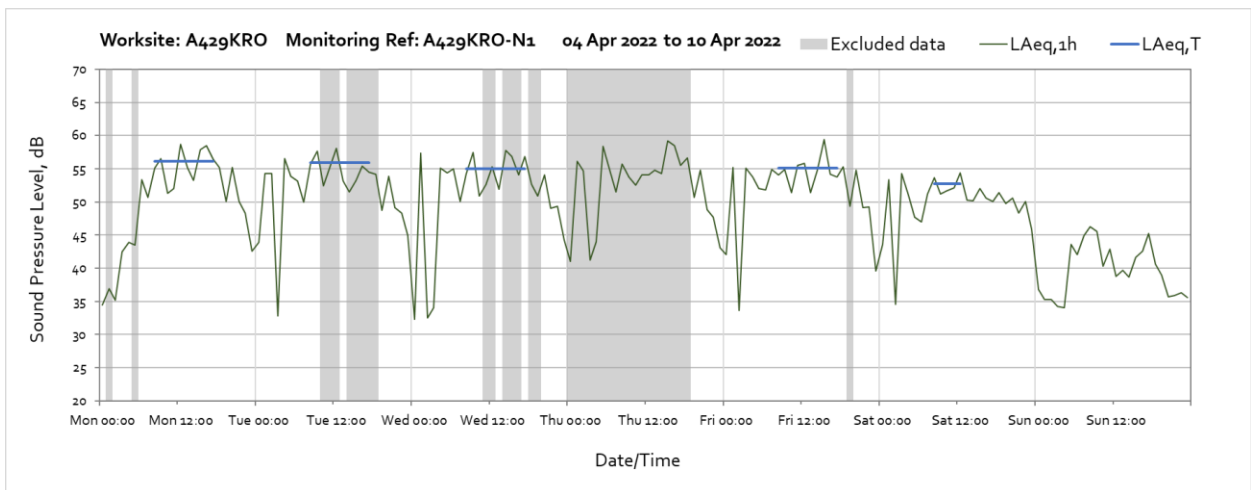
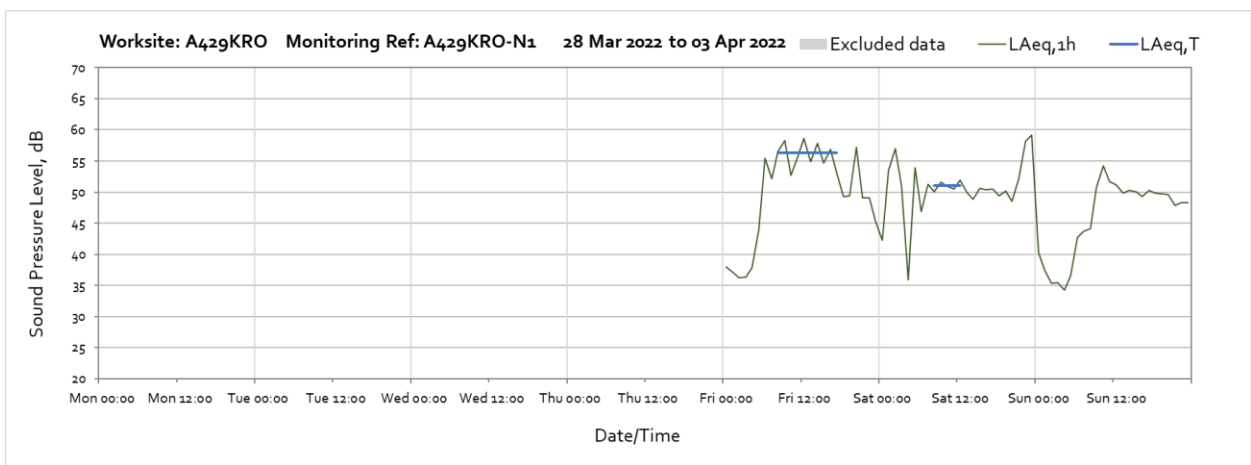
Worksite: BC – Monitoring Ref: BC-N1

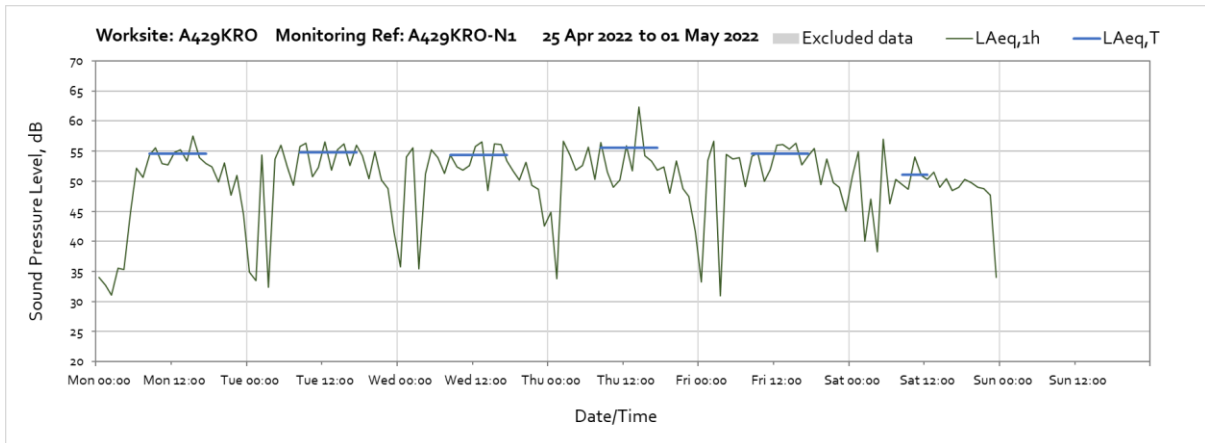
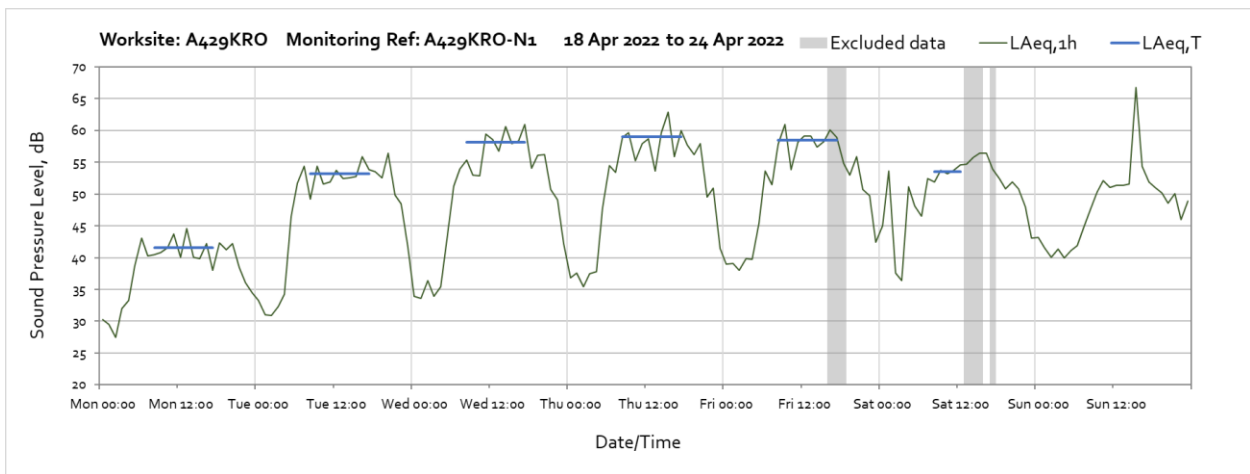
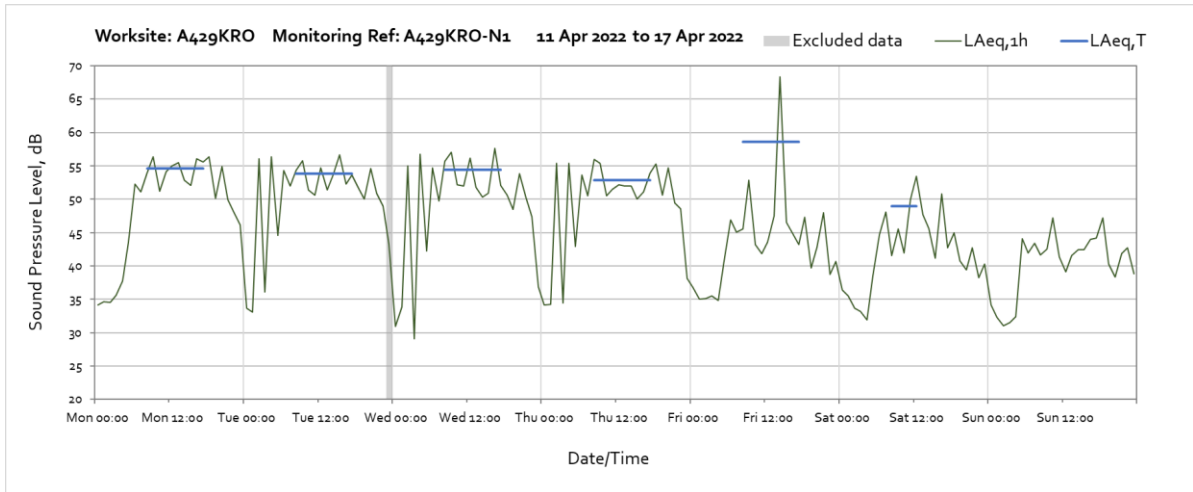




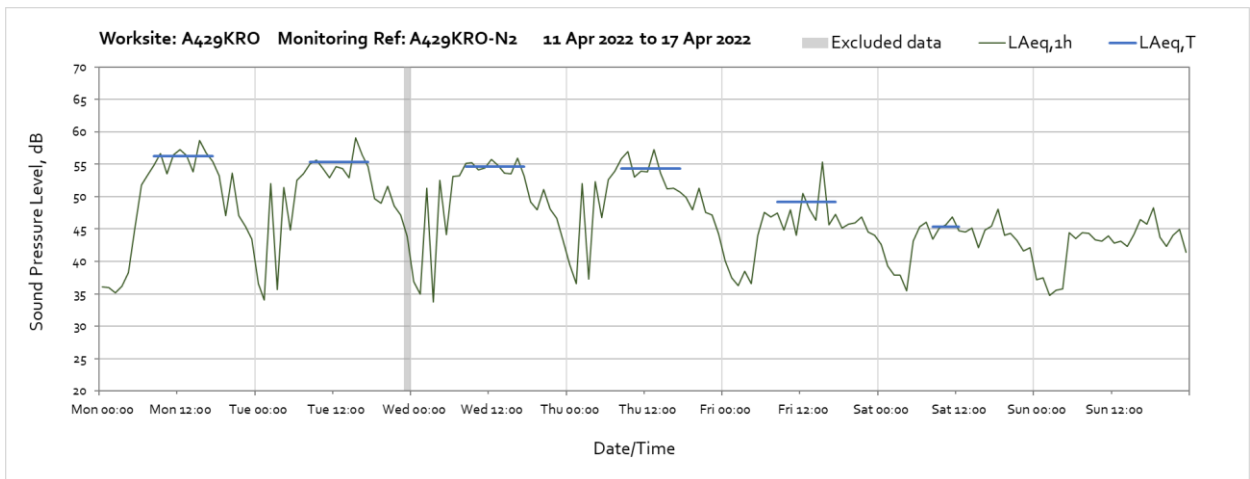
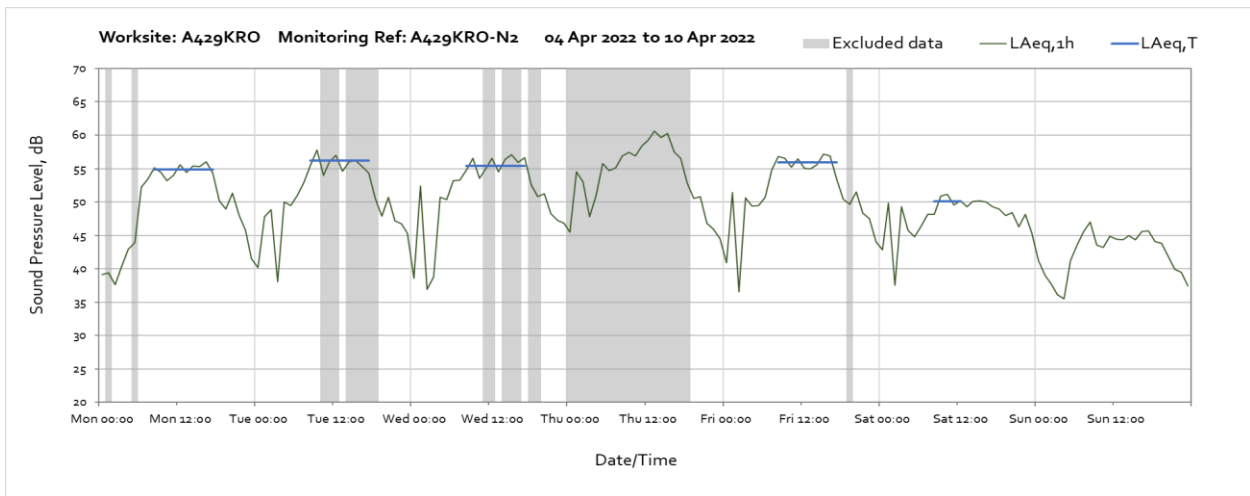
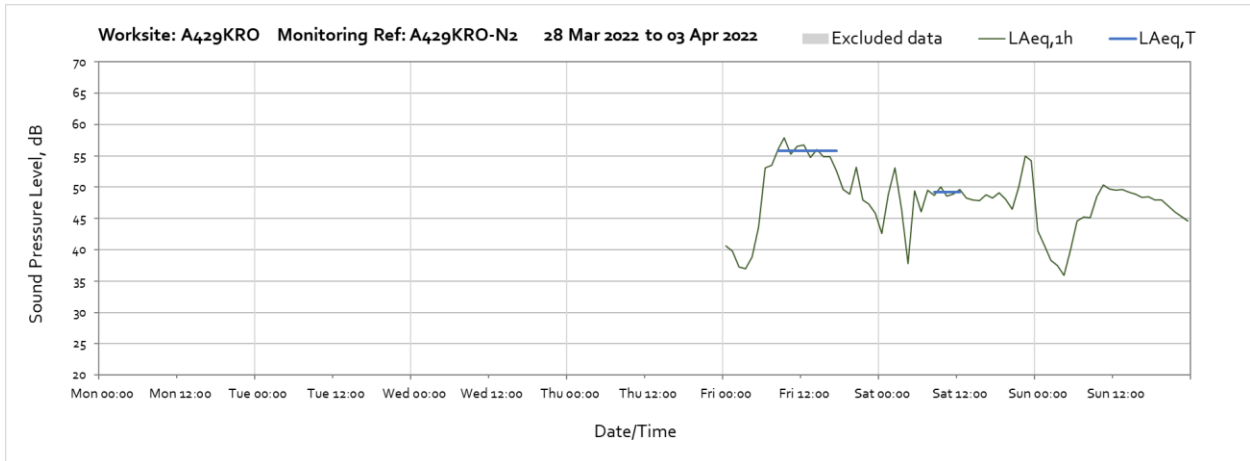


Worksite: A429KRO - Monitoring Ref: A429KRO-N1

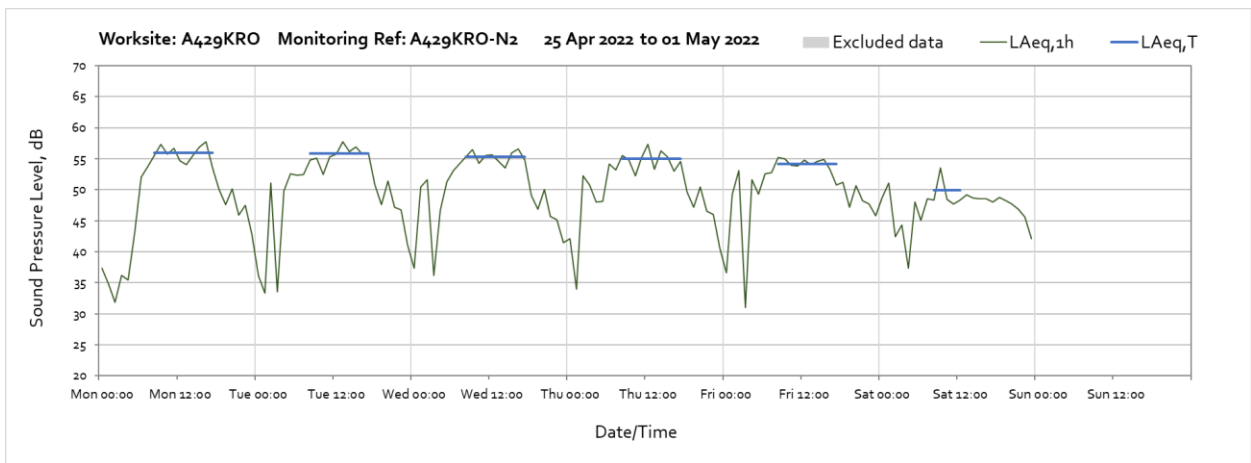
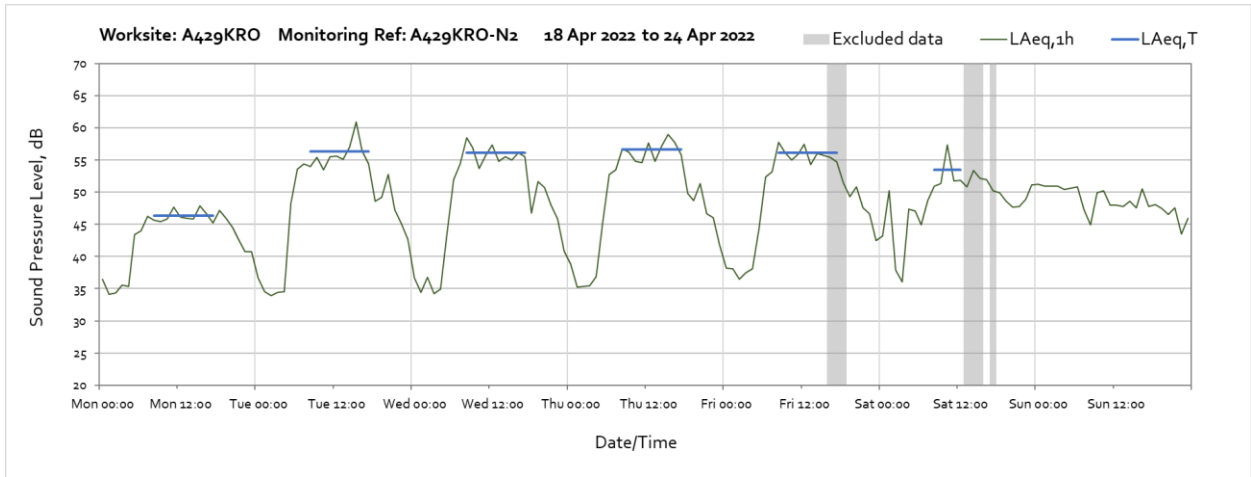




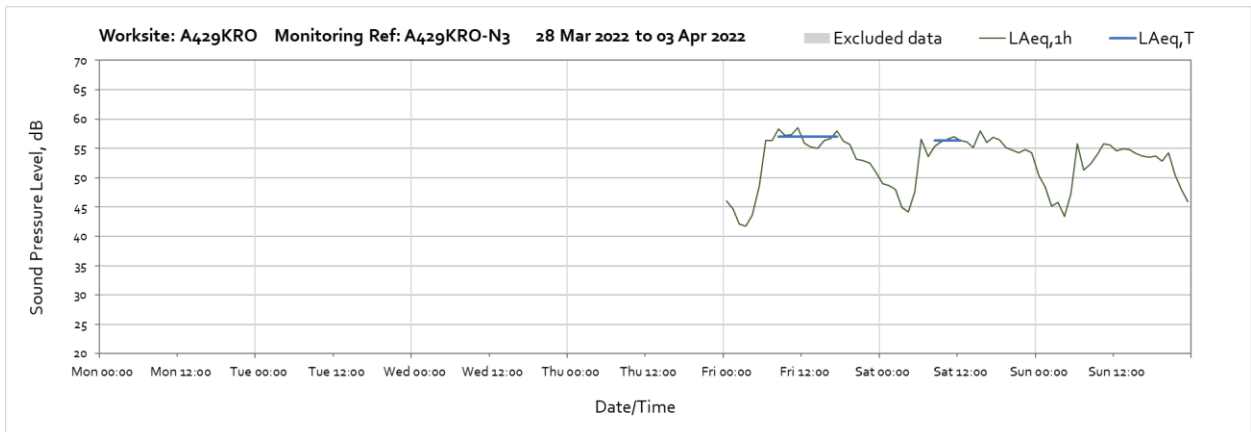
Worksite: A429KRO – Monitoring Ref: A429KRO-N2

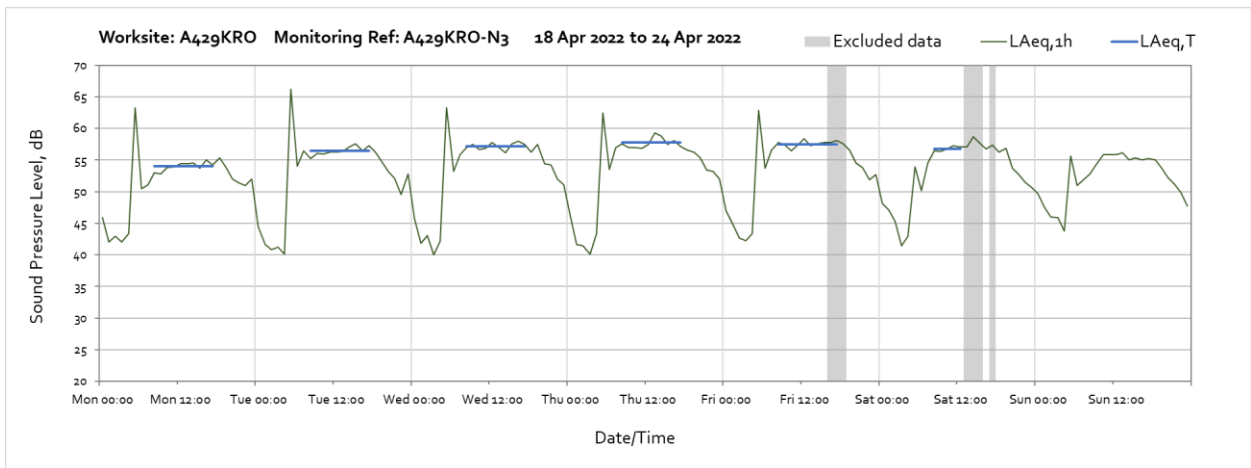
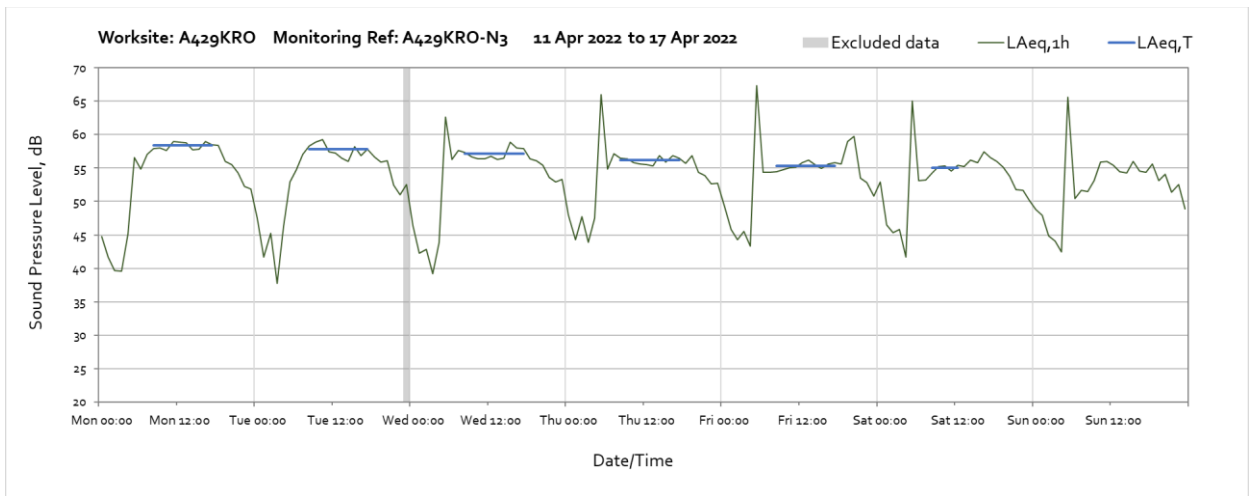
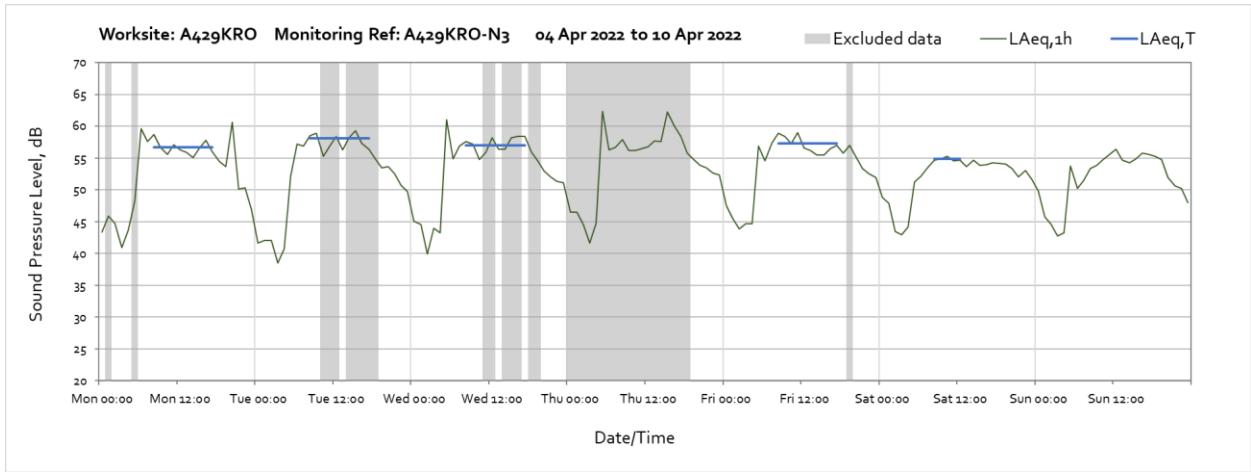


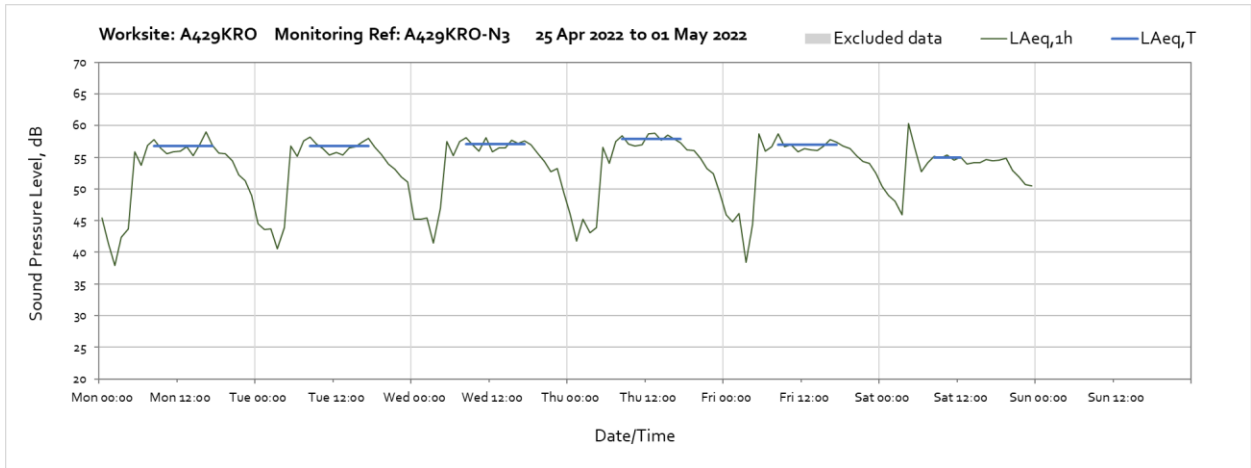
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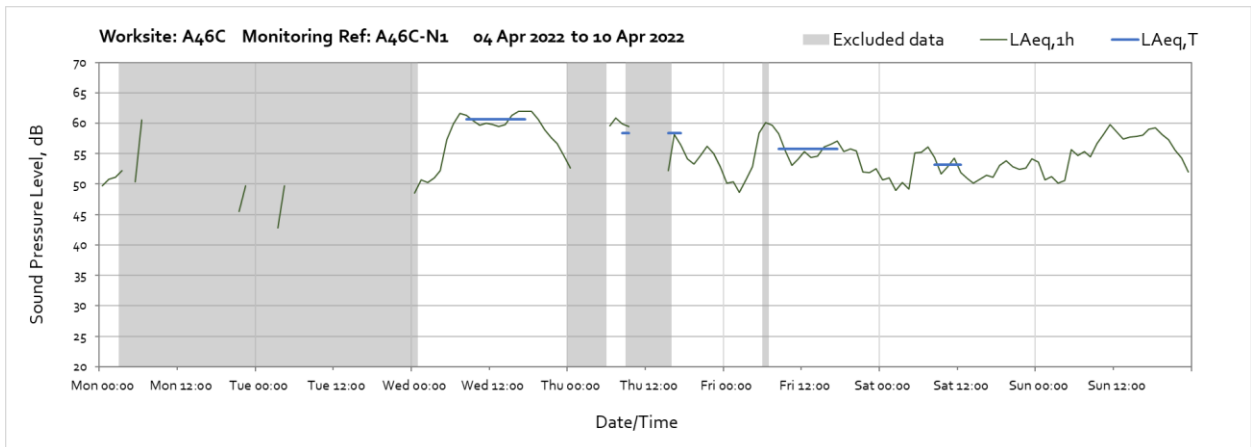
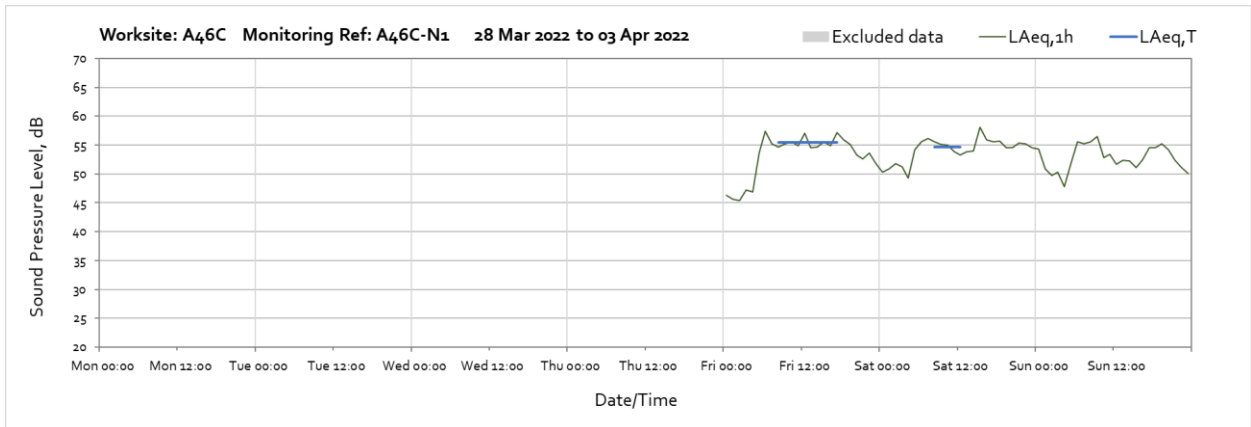
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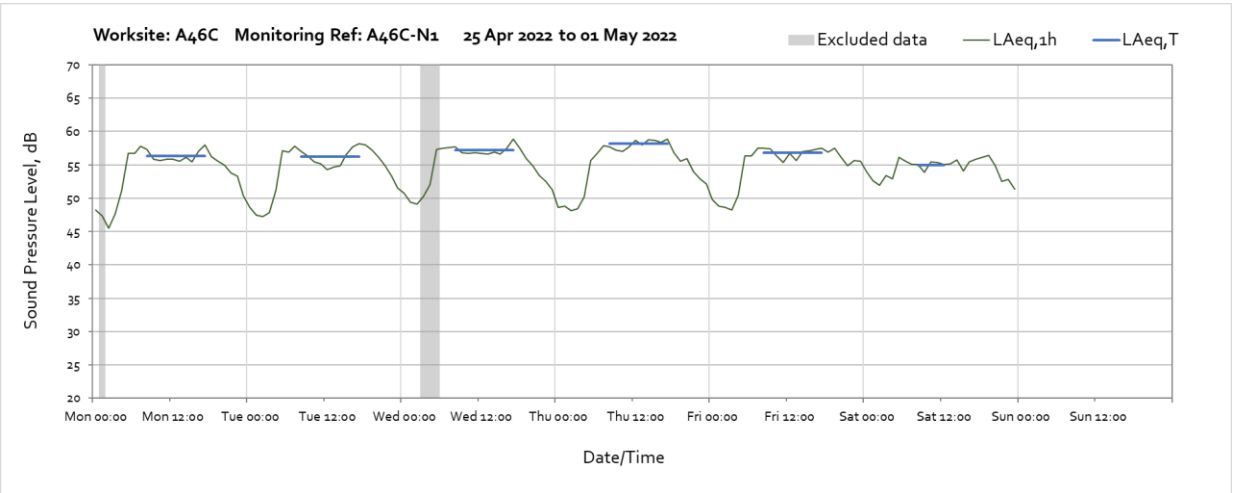
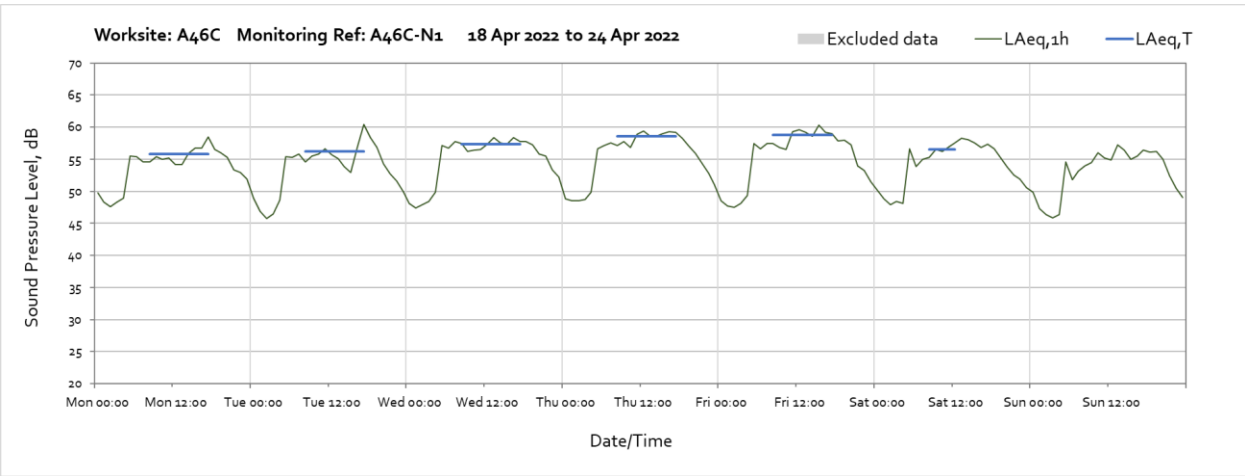
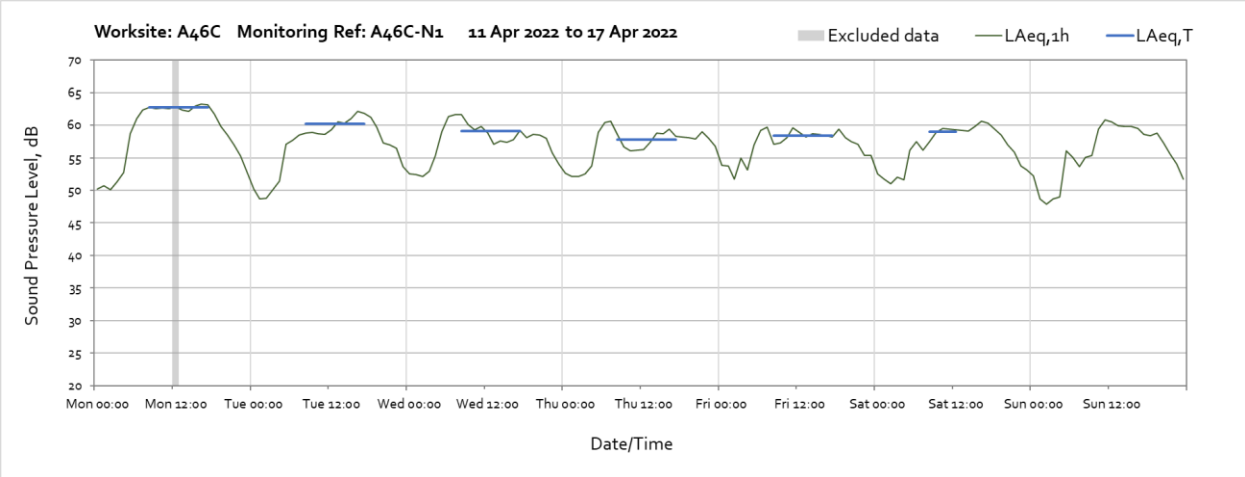




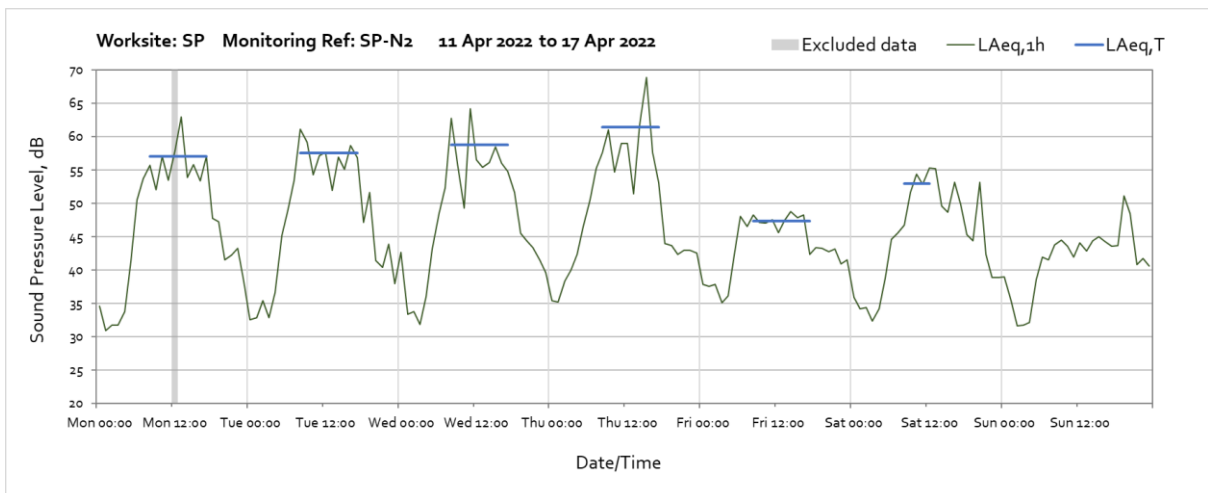
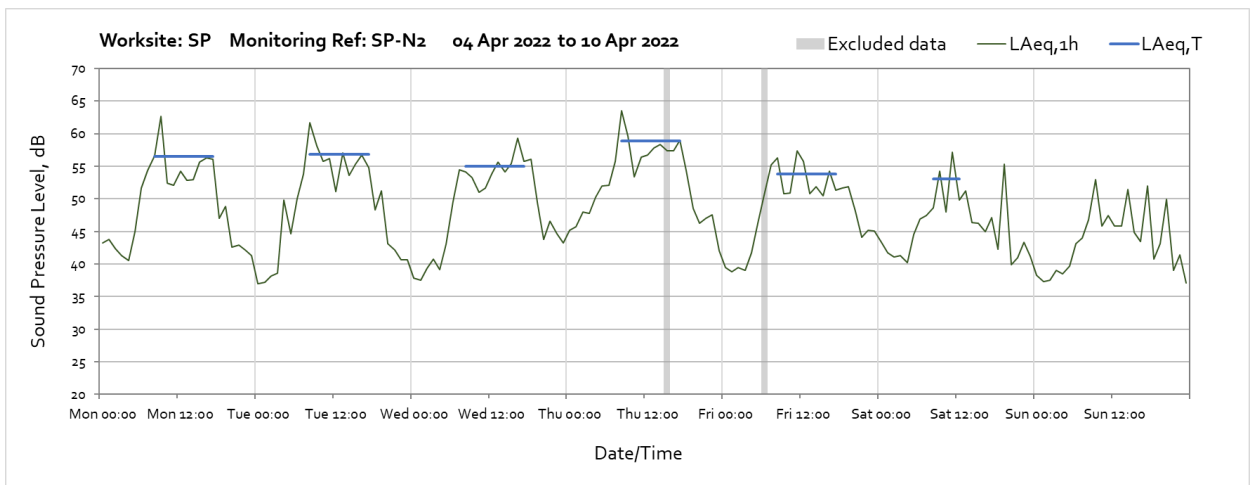
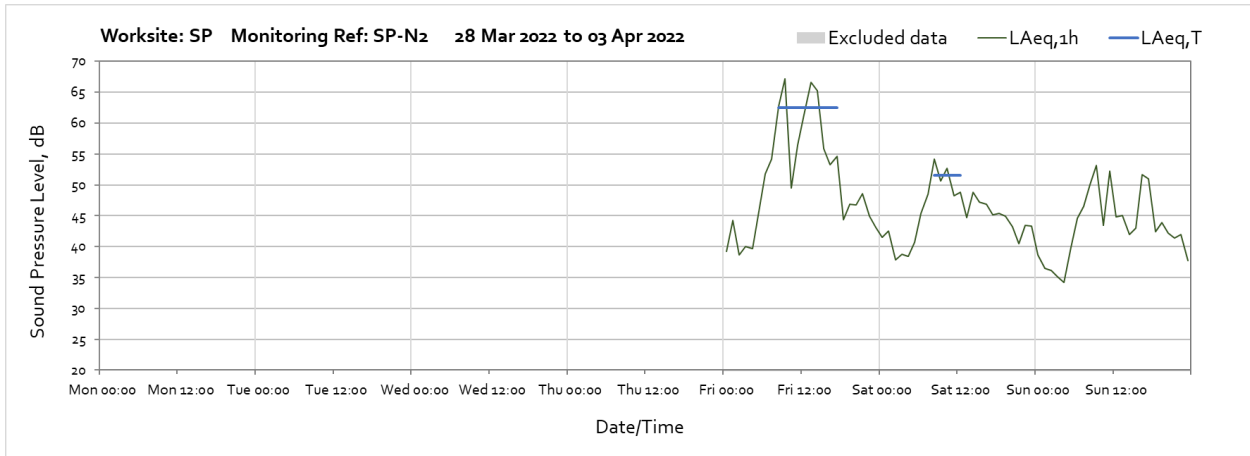
Worksite: A46C – Monitoring Ref: A46C-N1

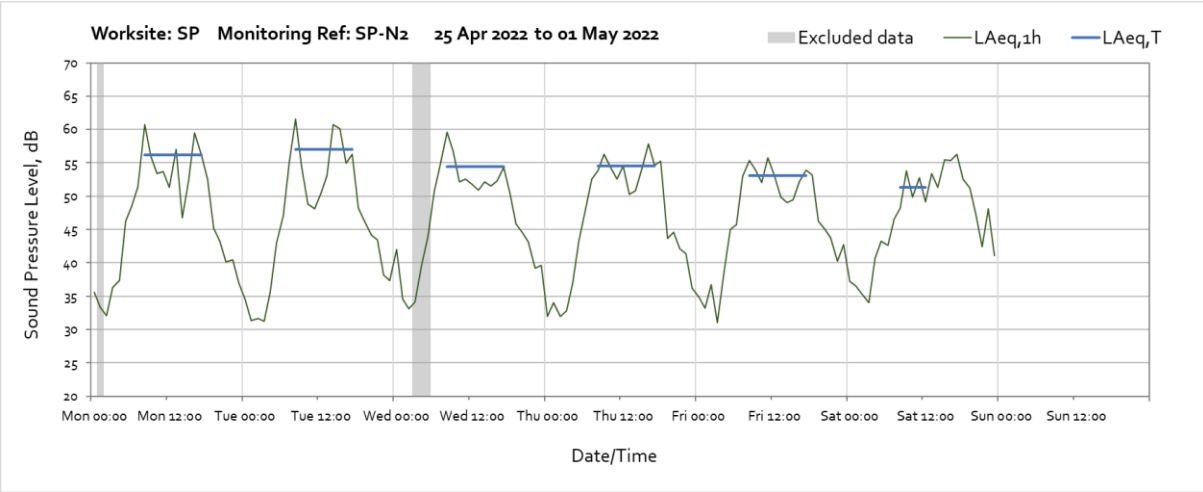
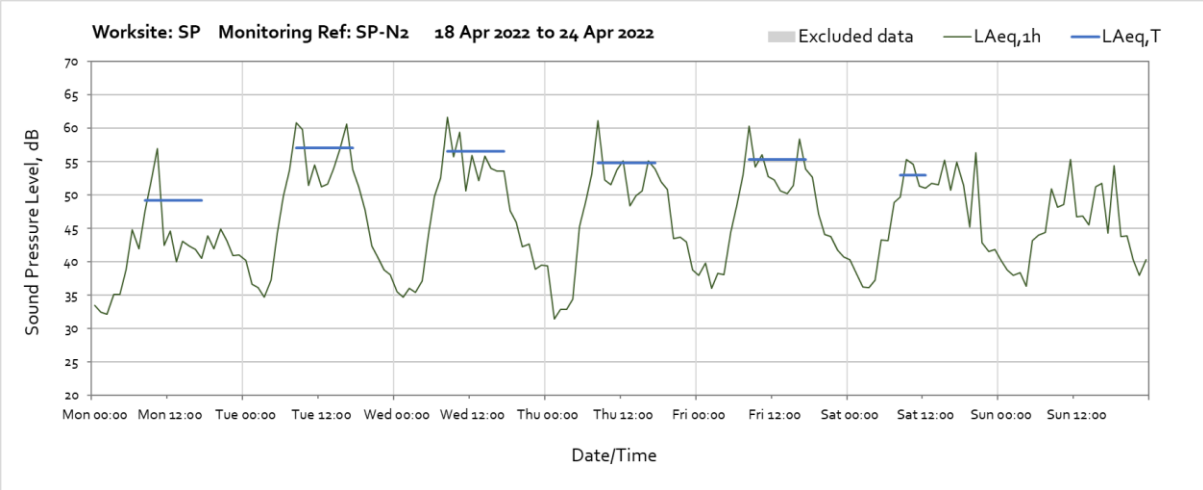


Note: Missing data between 04:00 on 4th April and 00:00 on 6th April, 01:00 till 06:00 on 7th April and 10:00 till 15:00 on 7th April were due to issues with weather monitoring equipment.

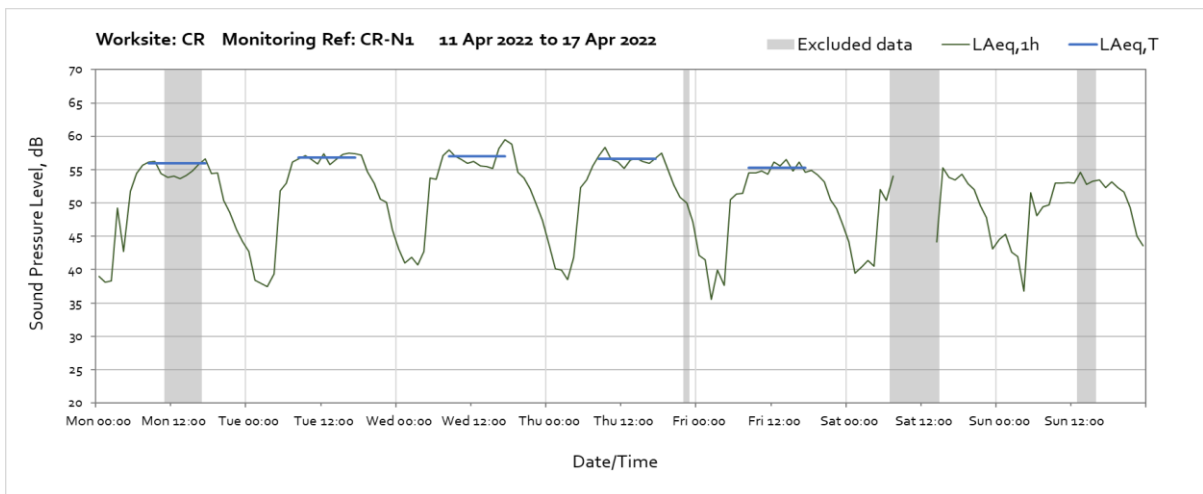
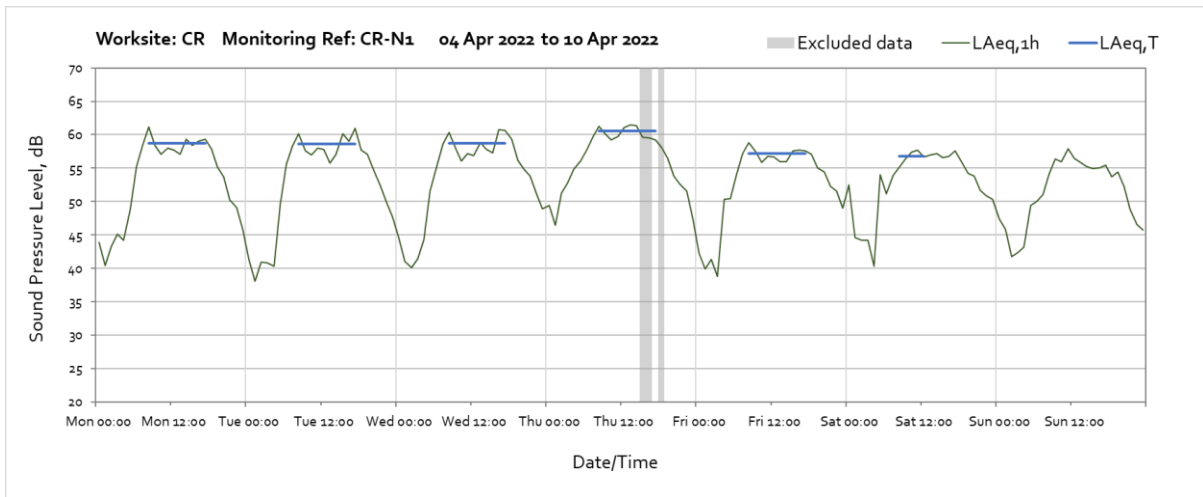
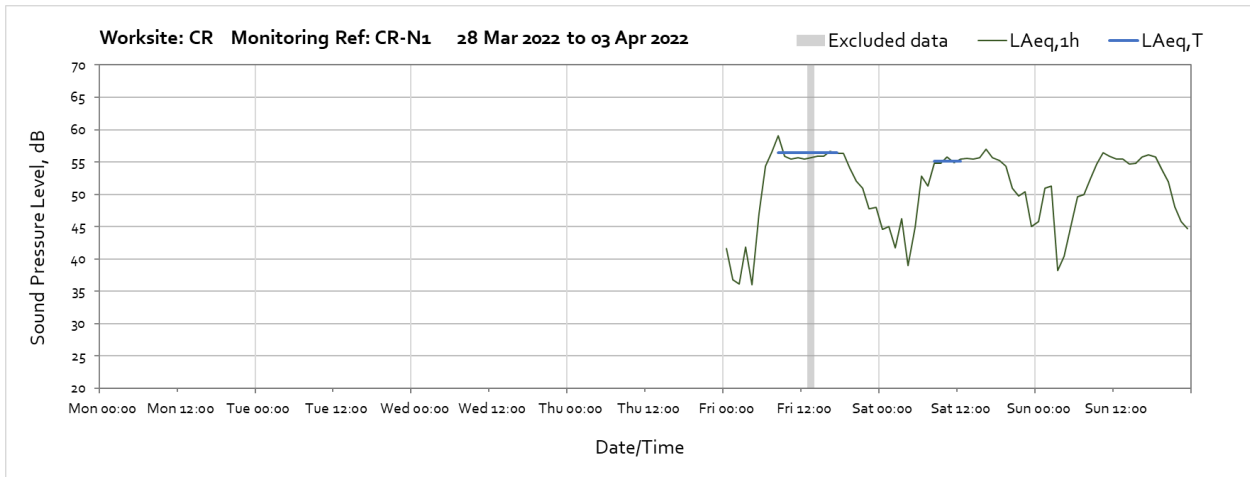


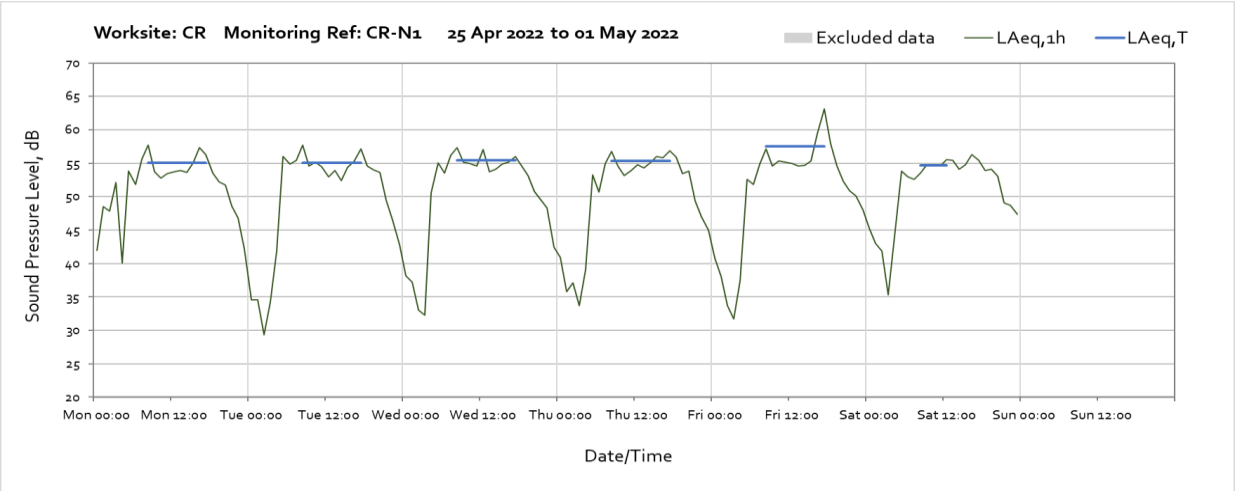
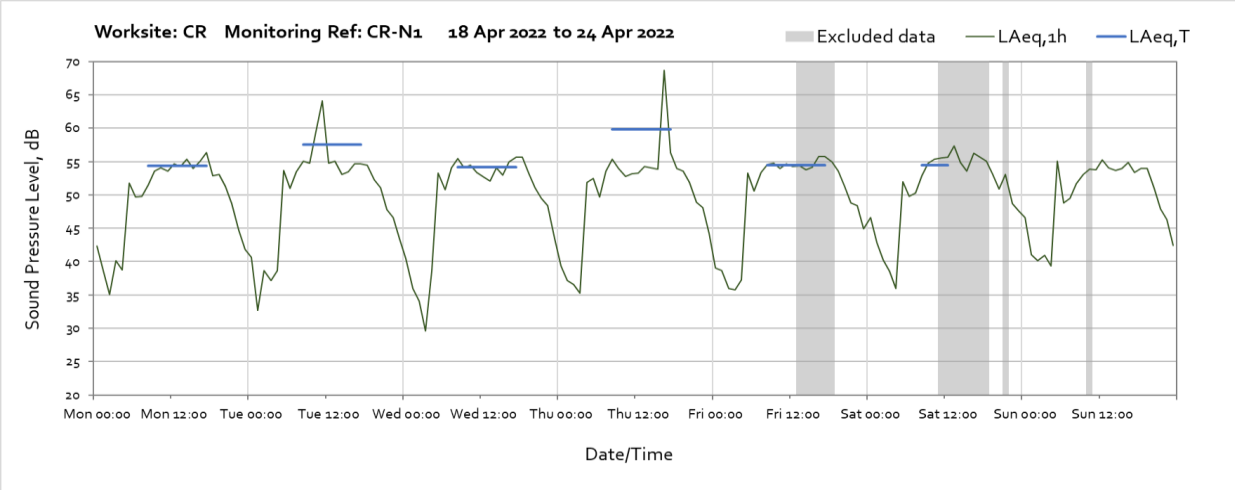
Worksite: SP – Monitoring Ref: SP-N2



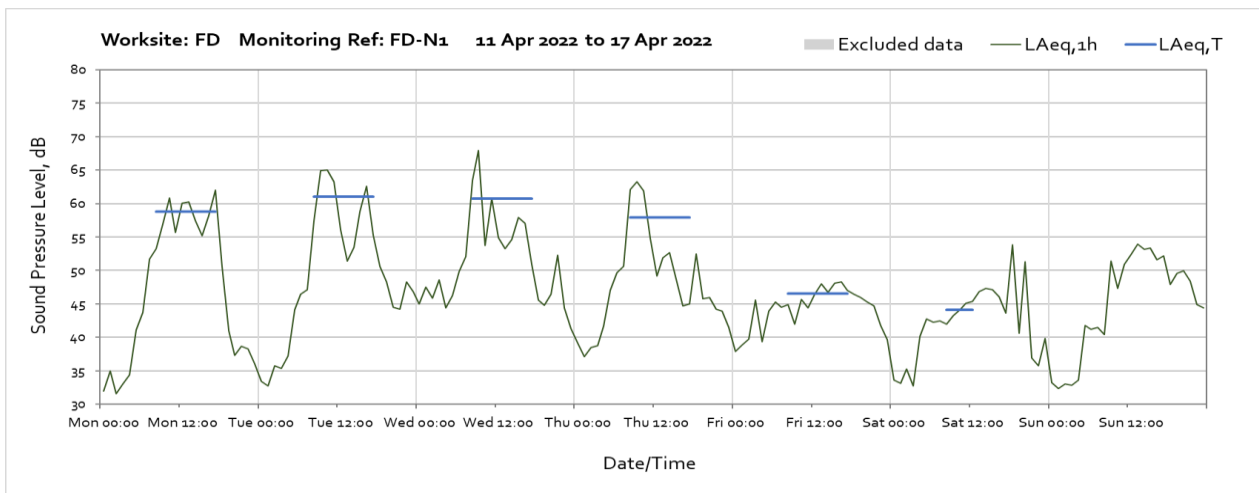
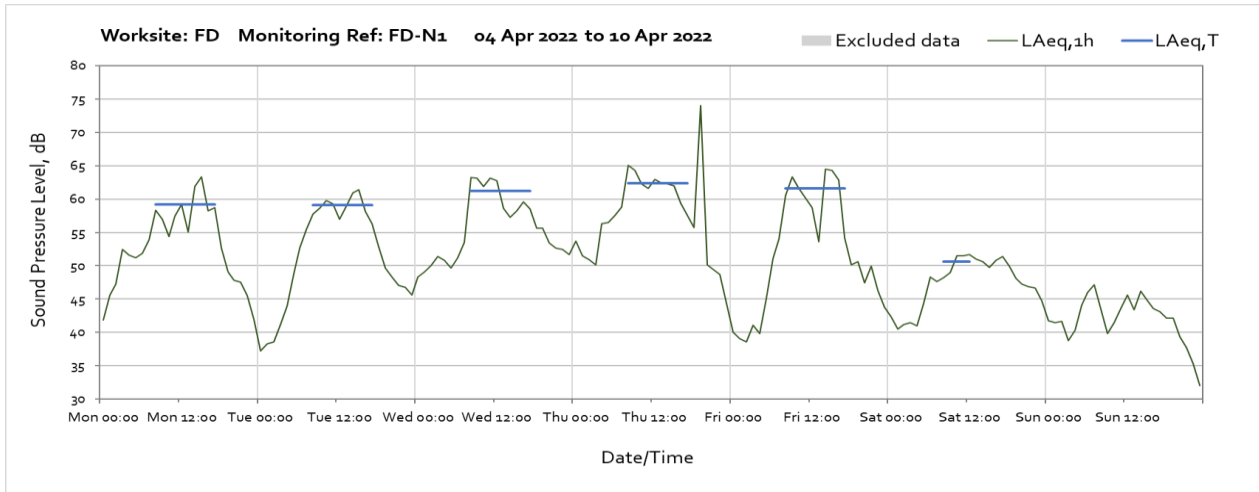
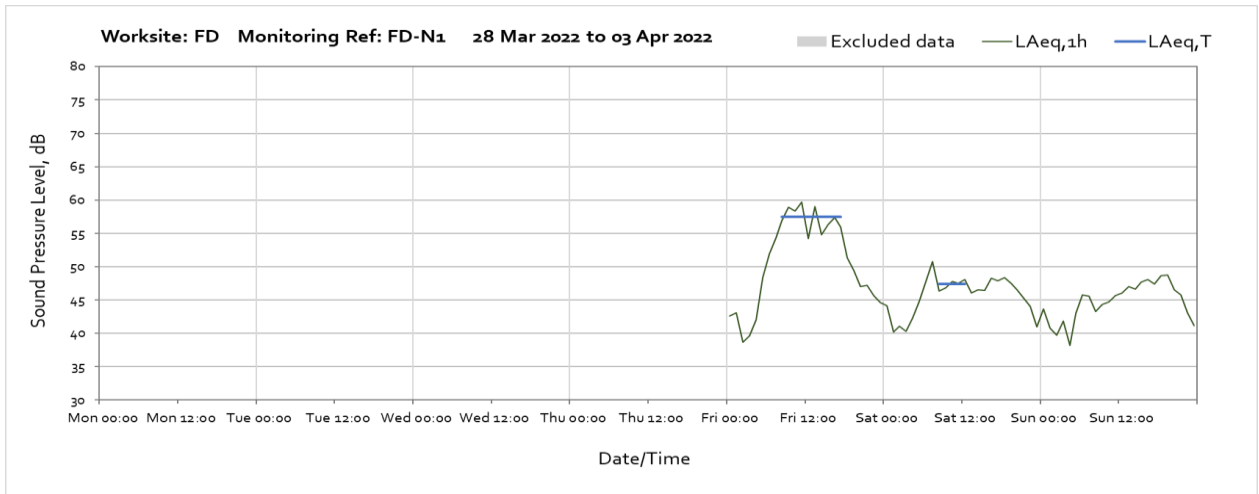


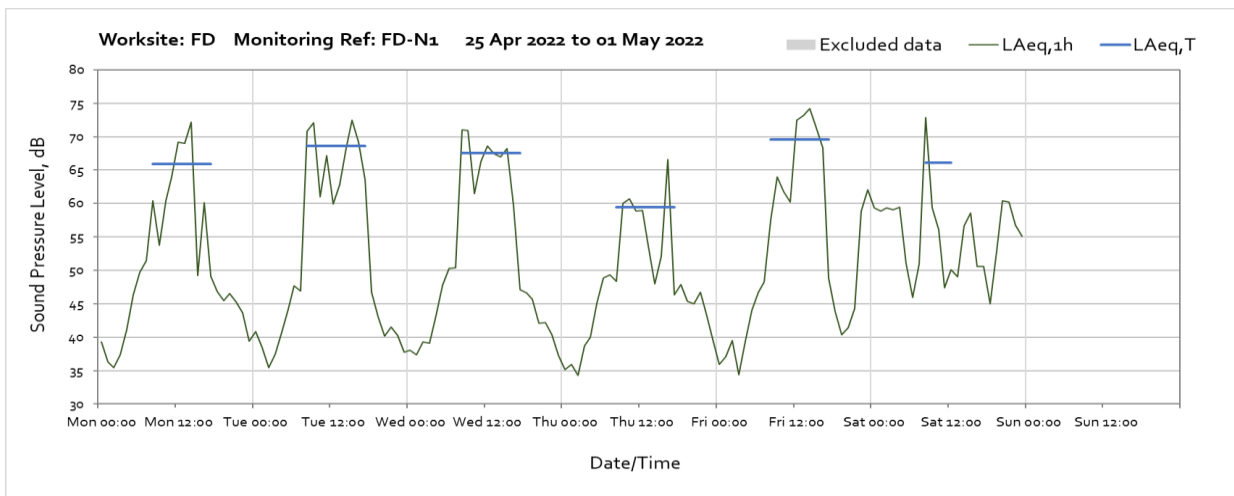
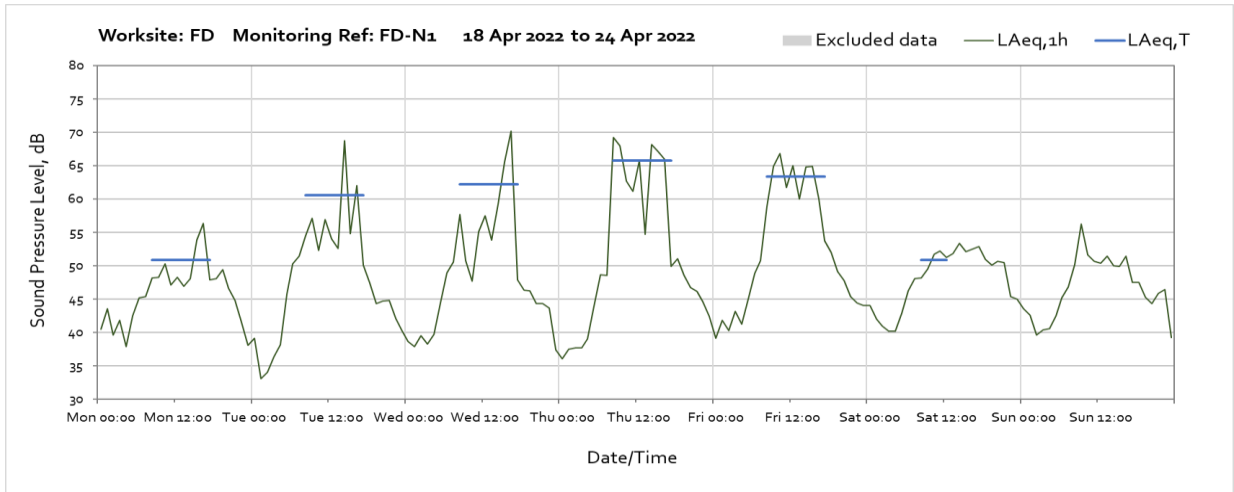
Worksite: CR – Monitoring Ref: CR-N1



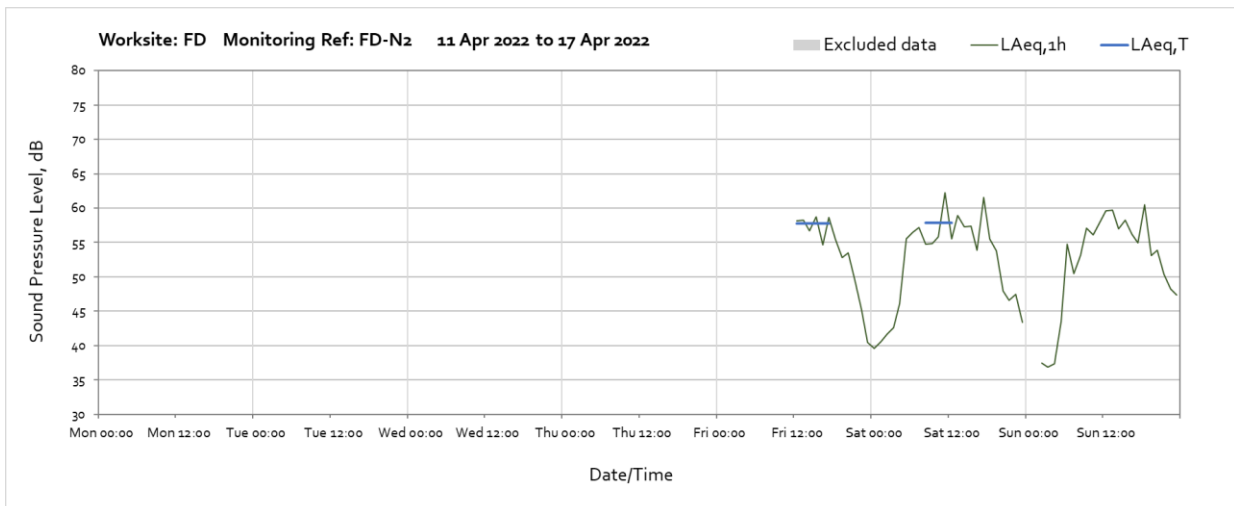


Worksite: FD - Monitoring Ref: FD-N1

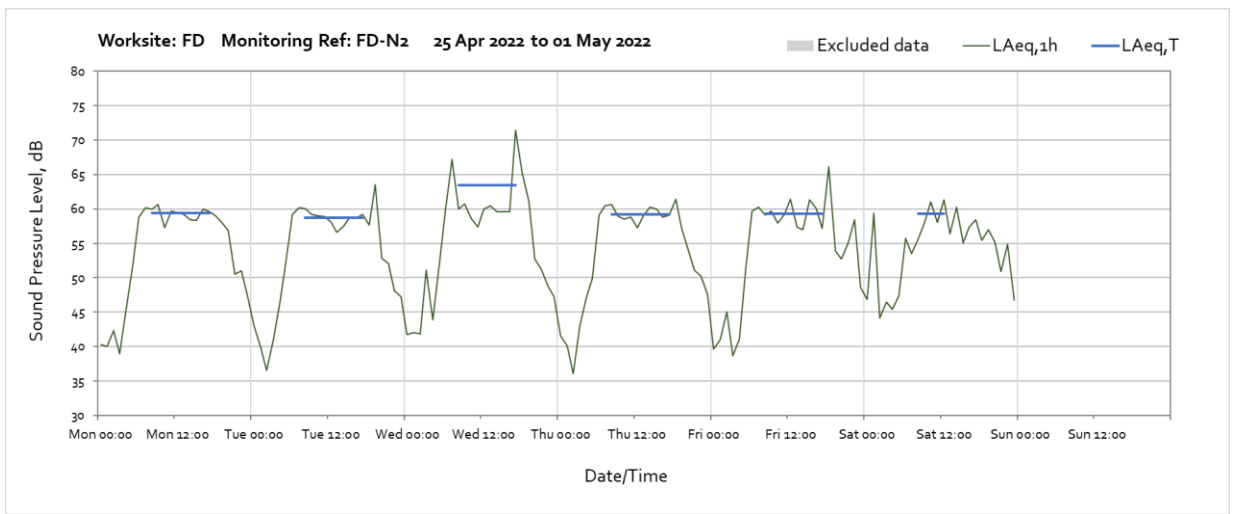
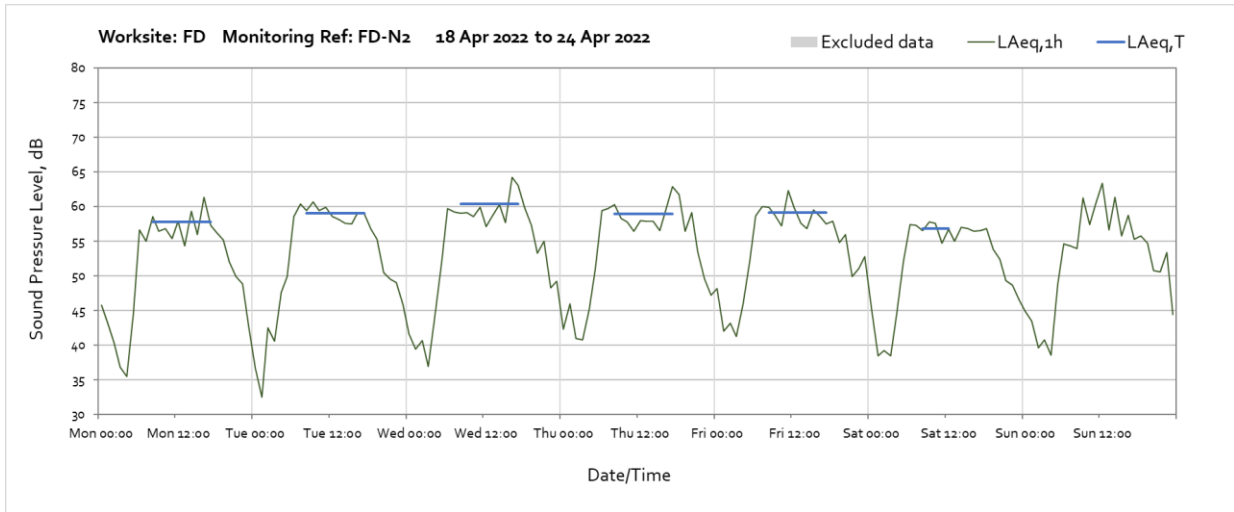




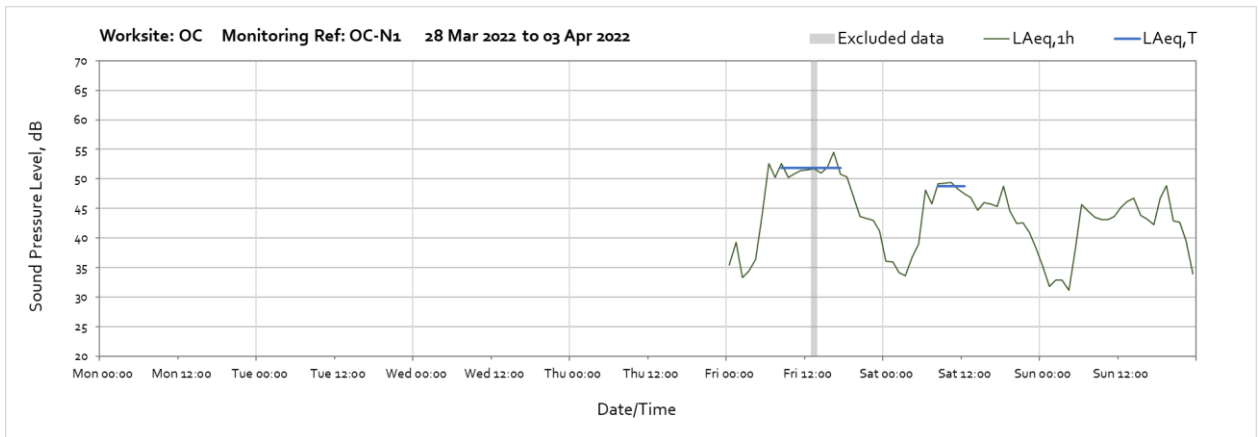
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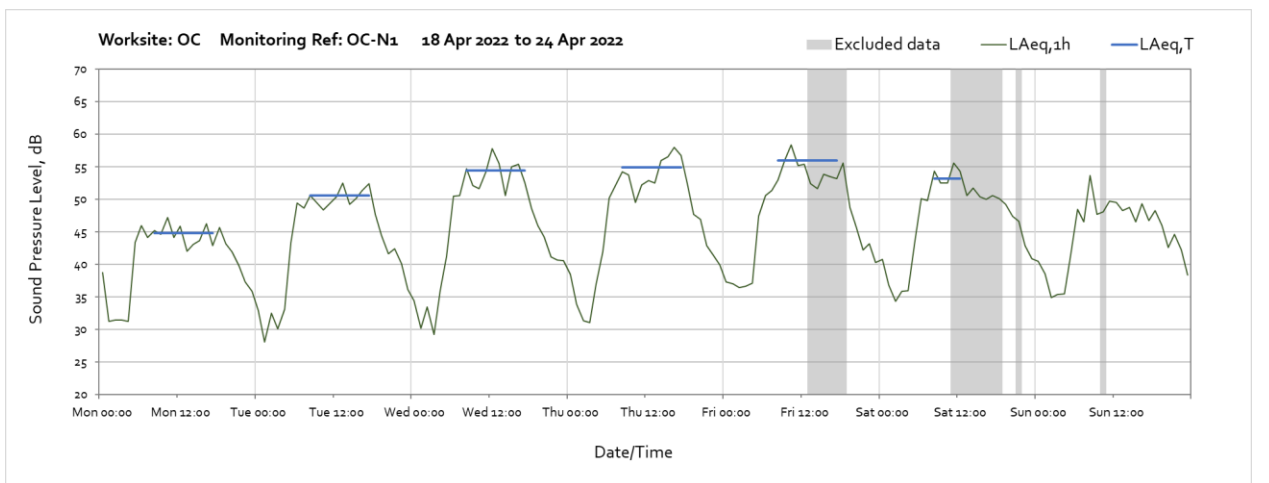
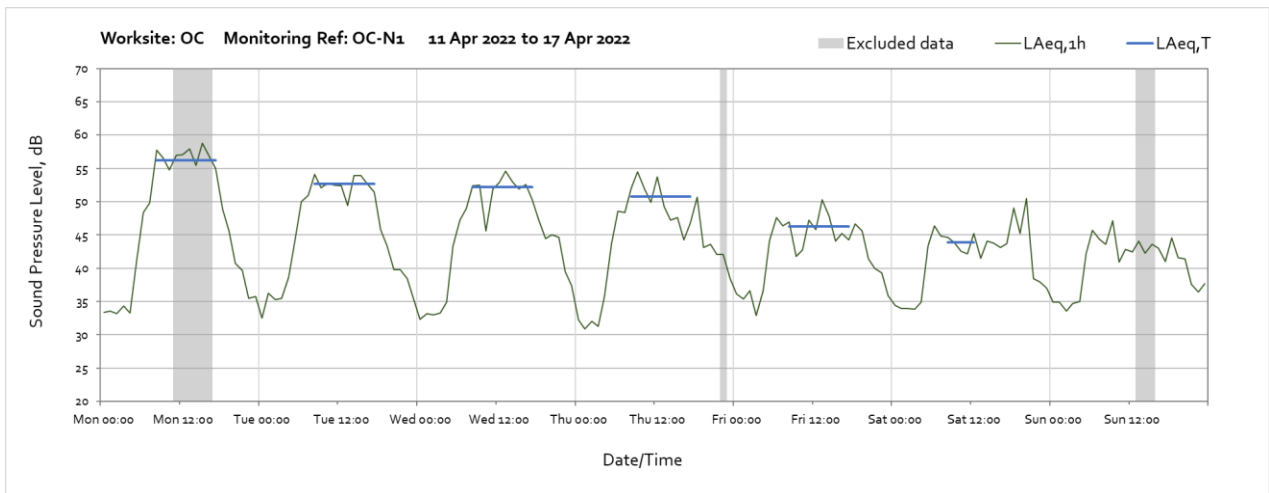
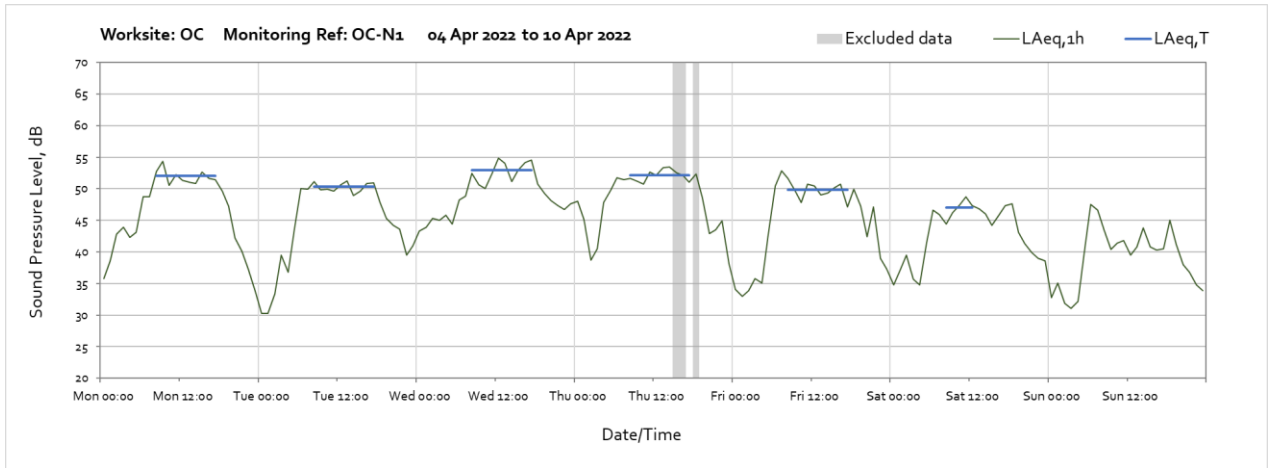


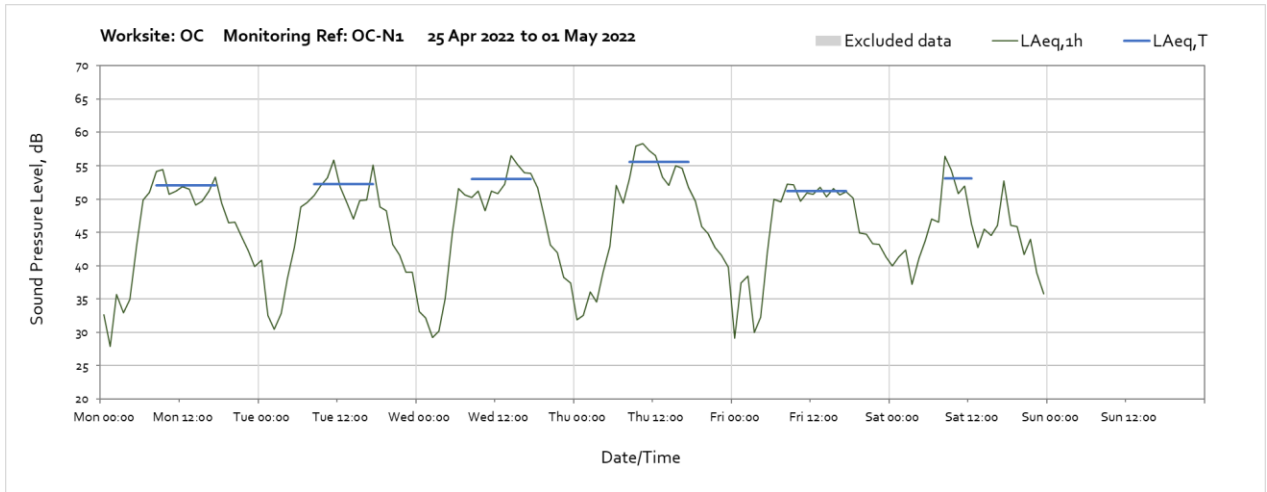
Note: Monitor was installed at 12:00 on 15th April 2022. Missing data between 00:00 and 02:00 on 17th April 2022 was due to the noise equipment updating.



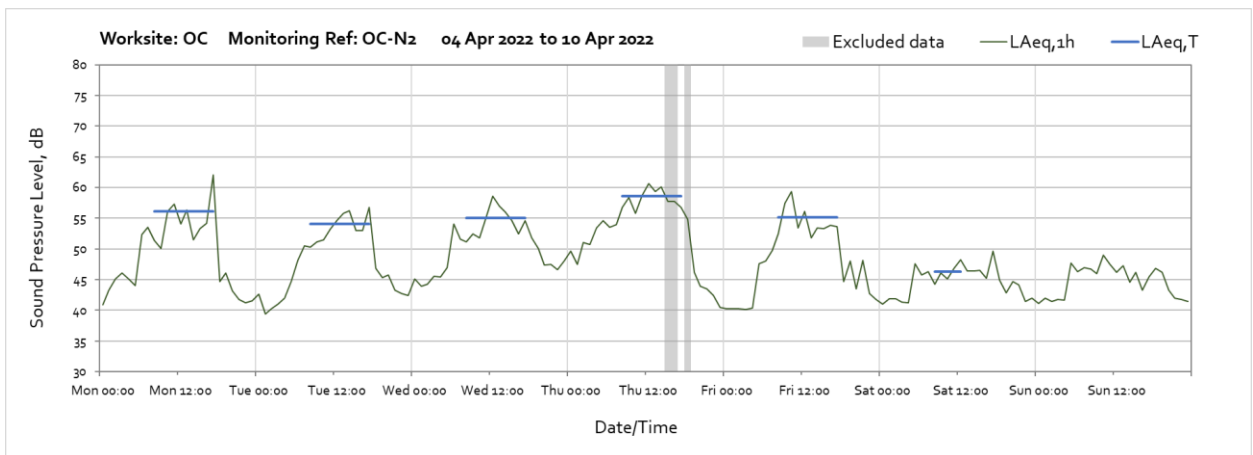
Worksite: OC – Monitoring Ref: OC-N1

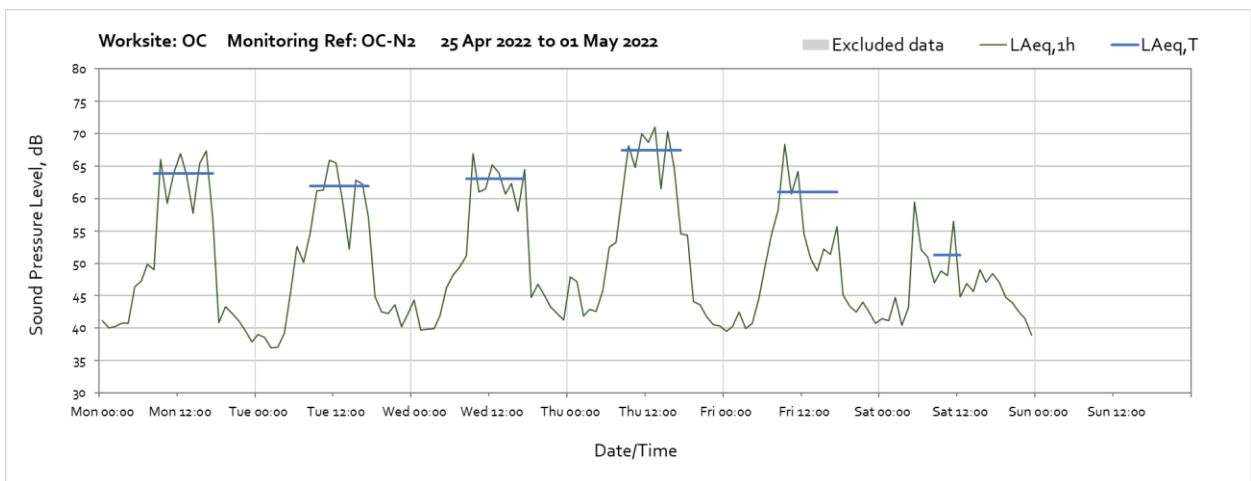
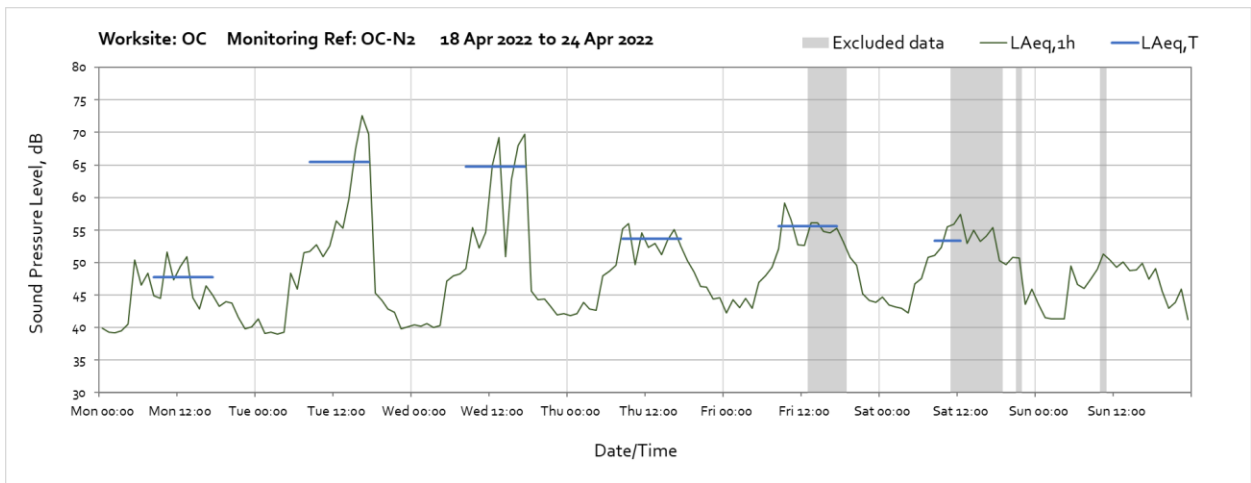
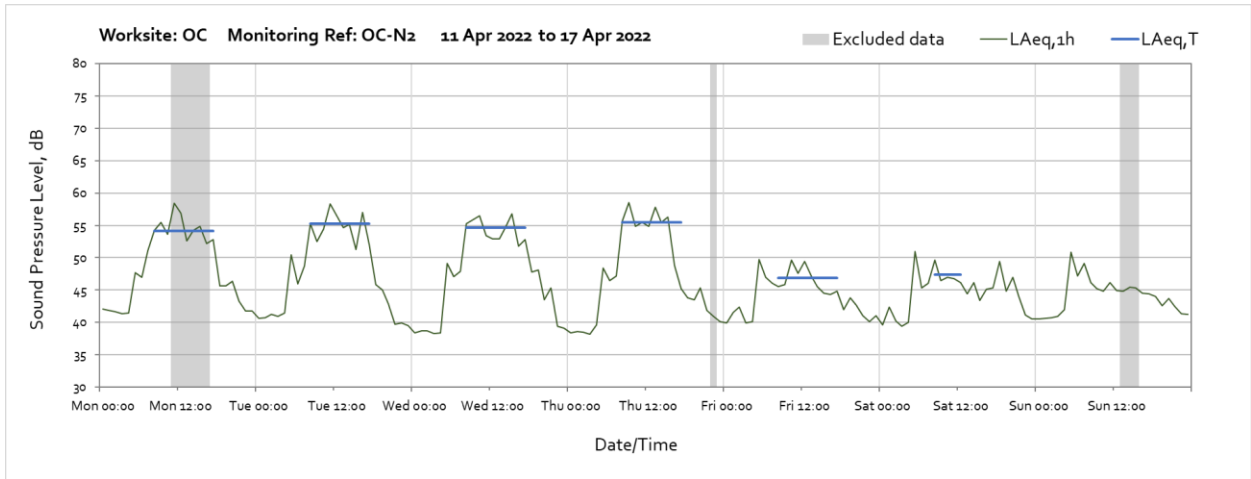




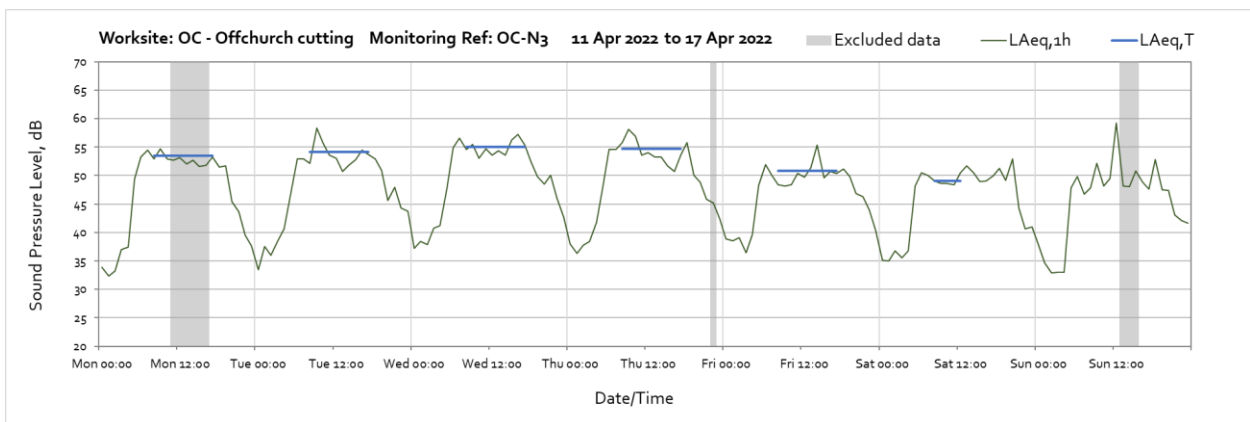
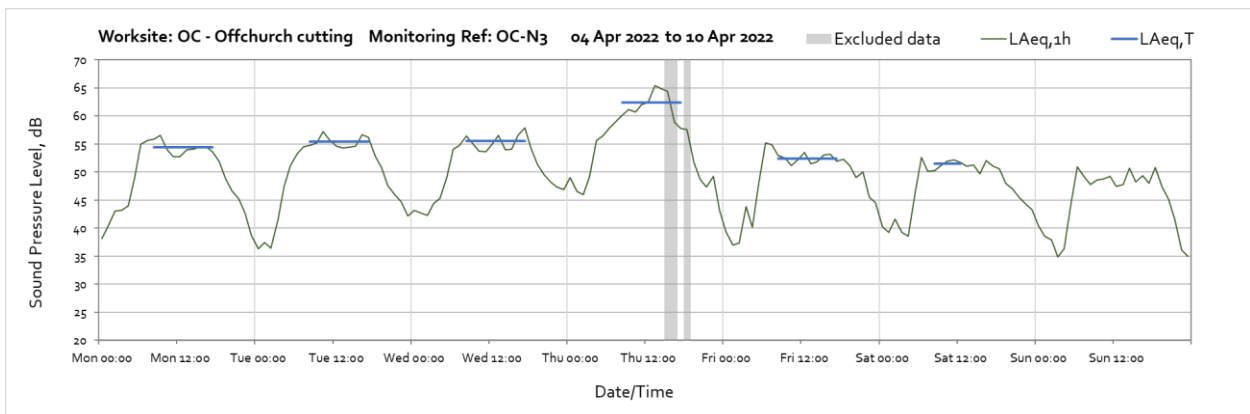
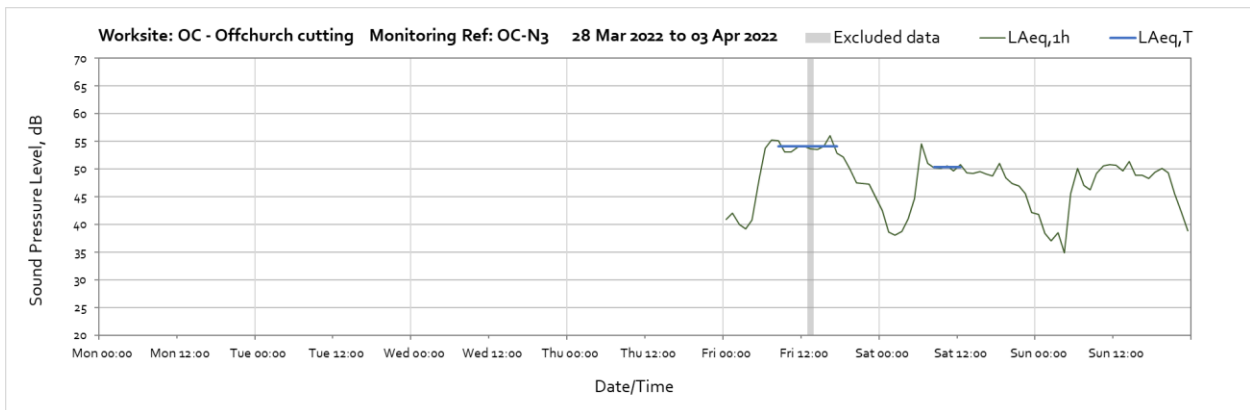


Worksite: OC – Monitoring Ref: OC-N2

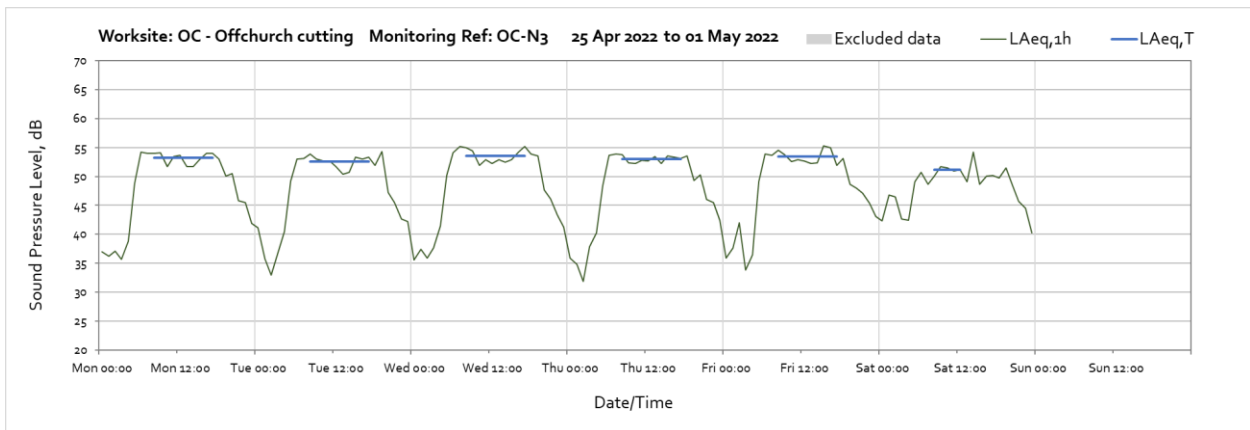
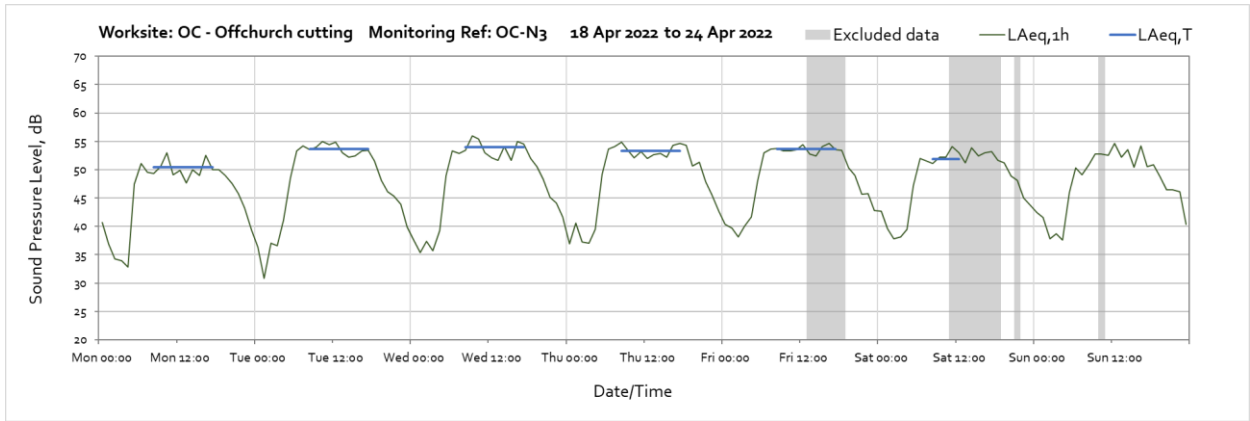




Worksite: OC - Monitoring Ref: OC-N3

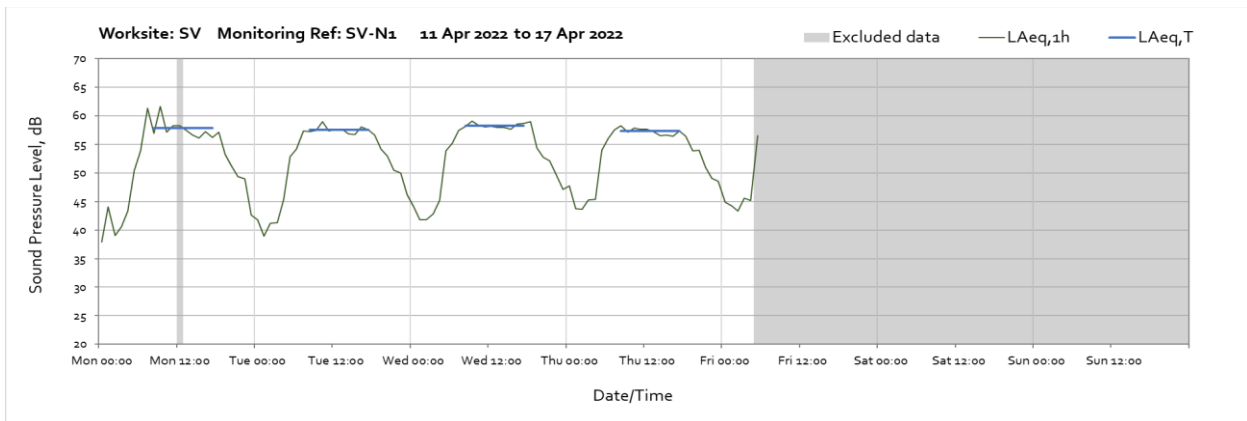
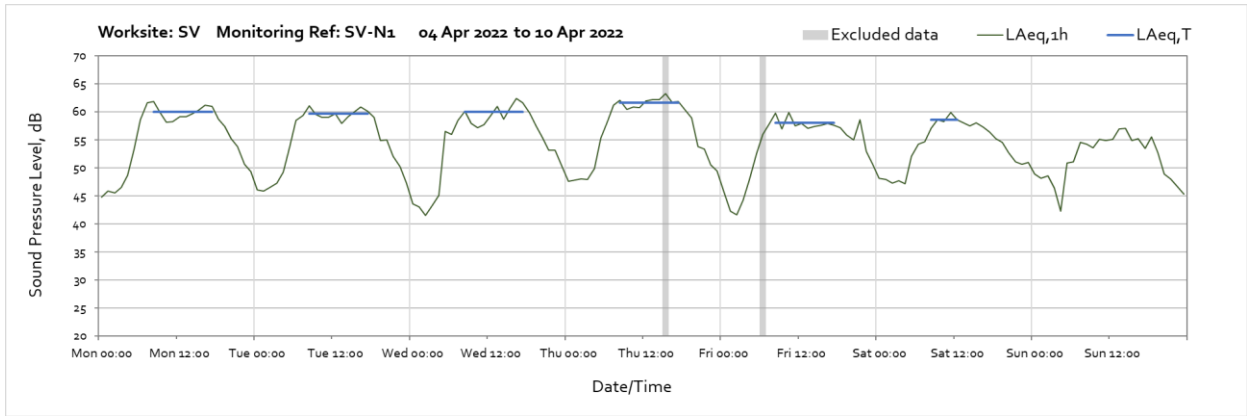


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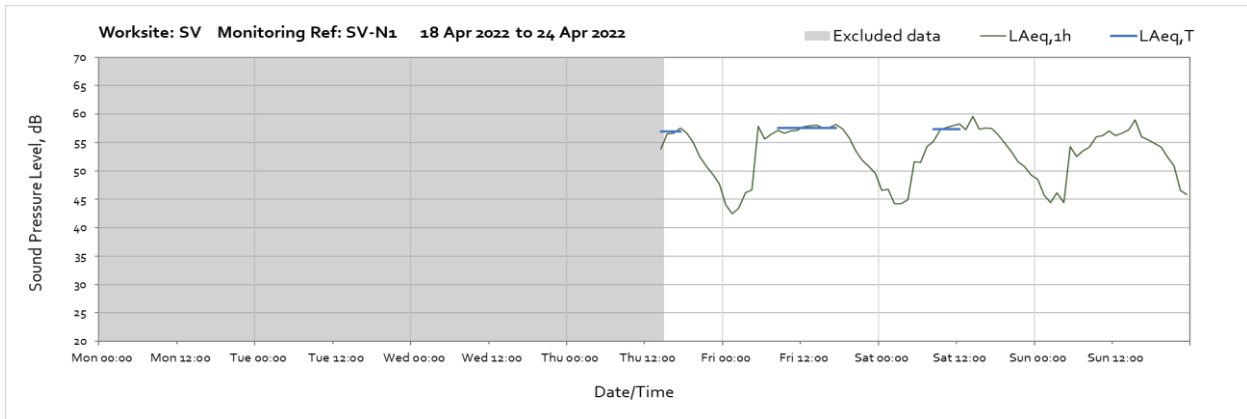


Worksite: SV - Monitoring Ref: SV-N1





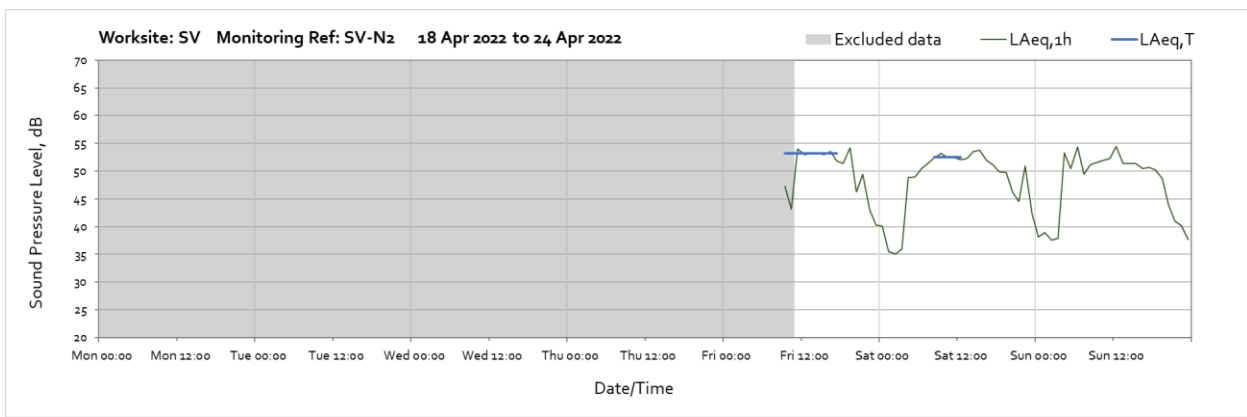
Note: Missing data between 05:00 on 15th April to 14:00 on 21st April was due to weather monitoring equipment issues.



Note: Missing data between 05:00 on 15th April to 14:00 on 21st April was due to weather monitoring equipment issues



Worksite: SV – Monitoring Ref: SV-N2



Note: Monitor SV-N2 was installed at 09:00 on 22nd April 2022.

