HS2

August 2020

Construction noise and vibration Monthly Report – July 2020

London Borough of Ealing

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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 the London Borough of Ealing (LBE) (including one monitoring location in the London Borough of Hammersmith and Fulham) during the month of July 2020.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken in the vicinity of the Atlas Road worksite (ref. S001-WS02), where concrete stockpile, slab breakout, backfilling works, vegetation clearance, excavation works were undertaken.
- Noise and vibration monitoring were undertaken in the vicinity of the Willesden EuroTerminal worksite (ref. S001-WS03), where vegetation clearance works, track works, concrete breakout, site drainage installation, hoarding strengthening works were undertaken.
- Noise monitoring was undertaken in the vicinity of the Victoria Road worksite (ref. S002-WS01), where earthworks, mains power works and utility diversion works were underway.
- Noise monitoring was undertaken in the vicinity of the Flat Iron compound (within worksite ref. S002-WS01), where excavation works were carried out.
- Noise and vibration monitoring were also undertaken in proximity of the Old Oak Common depot worksite (ref. S004-WS01), where no construction activities took place during July 2020.
- Noise monitoring was undertaken in proximity of the Mandeville Road Badminton Close compound (ref. BC Compound), where no construction activities took place during July 2020.

Further works were also undertaken at Perivale in Horsenden Lane as part of utilities work diversions, and at the Green Park Way Ventilation Shaft.

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.

No complaints were received during the monitoring period

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 London Borough of Ealing (LBE) (including one monitoring location in the London Borough of Hammersmith and Fulham) during the month for the period 1st to 31st July 2020.

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

- Atlas Road worksite, ref. S001-WS02 (see plan 2 in Appendix A), where work activities included:
    - Concrete stockpiled for crushing, slab breakout, backfilling works, vegetation clearance, excavation of trial holes, drainage jetting, painting of hoardings, installation of power connection for tunnel boring machine, HS2 substation build and fit-out.
- Willesden EuroTerminal worksite, ref. S001-WS03 (see plan 2 in Appendix A), where work activities included:
    - Aggregates materials placement and compaction for working platform, vegetation clearance, preparation for concrete pours, track works, concrete breakout, site drainage installation, hoarding strengthening works, drainage investigation and jetting, installation of welfare cabins.

- Victoria Road worksite, ref. S002-WS01 (see plan 3 in Appendix A), where work activities included:
    - Continued earthworks operations including construction of working platforms and haul roads, removal of localised foundations, mains power works in the south-eastern part of the site, installation of additional offices and welfare cabins, repair of water pipes and utility diversion works.
- Flat Iron compound, within worksite ref. S002-WS01 (see plan 3 in Appendix A), where work activities included:
    - Excavation of trial holes in Braitrim House car park and at former Waitrose site.
- Noise and vibration monitoring was undertaken in proximity of the Old Oak Common depot worksite (ref. S004-WS01) (located in the London Borough of Hammersmith and Fulham), where no construction activities took place during July 2020.
- Noise monitoring was undertaken in proximity of the Mandeville Road Badminton Close compound (ref. BC Compound), where no construction activities took place during July 2020.

1.1.3 Further works were undertaken at:

- The Green Park Way Ventilation Shaft including site clearance, vegetation clearance, removal of concrete wall between the existing site and Network Rail land, construction of hard standings for welfare units and installation of new barriers and gates, installation of new cabins and generators.
- Horsenden Lane, Perivale as part of the utilities diversion (water mains diversion).

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 Thirteen noise and three vibration monitoring installations were active in July in the LBE area. Table 2 summarises the position of noise and vibration monitoring installations within the LBE area in July 2020.

1.2.2 One additional vibration monitor (V051) was installed near the Old Oak Common depot worksite (ref. S004-WS01), on the 16th of July 2020.

1.2.3 Maps showing the position of noise and vibration monitoring installations are presented in Appendix B.

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
S001-WS02	N032	Shaftesbury Gardens
	N033	Outside The Collective, Atlas Road / Victoria Road
S001-WS03	N034	Stephenson Street (north)
	N035	Stephenson Street (south)
	N041	Junction of Stephenson Street / Goodhall Street
	V052	Stephenson Street (north)
S002-WS01	N029	Braitrim House, Victoria Road
	N030	Boden House Car Park
	N031	School Road, outside Acton Business Centre
	N049	Flat Iron compound railway fence, Victoria Rd North Acton
	N050	Acton Square, outside North Acton Station
S004-WS01	N027	Old Oak Common Lane
	N028	Old Oak Common Lane, Hilltop Works
	V045	Old Oak Common Lane
	V051	Kildun Court, Old Oak Common Lane
BC Compound	N040	Badminton Close

2 Summary of Results

2.1 Summary of Measured Noise and Vibration Levels

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

Table 3: Summary of Measured dB LAeq Data over the Monitoring Period.

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade measurement	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
S001-WS02	N032	Shaftesbury Gardens	Free-field	65.5 (74.8)	65.4 (78.1)	64.6 (70.0)	63.9 (76.4)	61.8 (80.7)	61.7 (62.7)	63.6 (64.5)	64.5 (65.4)	63.7 (66.5)	59.7 (63.0)	62.5 (65.2)	59.7 (63.8)
	N033	Outside The Collective, Atlas Road/Victoria Road	Free-field	67.3 (68.7)	67.4 (69.0)	66.1 (71.8)	64.7 (70.6)	62.0 (73.1)	63.8 (64.9)	65.1 (66.0)	65.2 (65.9)	64.6 (66.7)	60.8 (64.0)	64.7 (71.9)	61.4 (65.9)
S001-WS03	N034	Stephenson Street (north)	Free-field	51.2 (53.7)	56.2 (59.6)	54.2 (61.4)	51.9 (59.6)	46.2 (54.1)	49.2 (52.3)	53.0 (56.2)	51.4 (52.8)	50.9 (57.9)	45.5 (52.2)	52.3 (59.4)	46.4 (52.5)
	N035	Stephenson Street (south)	Free-field	54.9 (57.3)	57.4 (62.0)	52.2 (56.7)	49.7 (57.2)	47.2 (55.7)	51.6 (53.4)	53.7 (55.6)	51.9 (55.6)	49.3 (53.6)	47.3 (54.6)	51.0 (59.6)	47.0 (52.7)
	N041	Junction of Stephenson Street/Goodhall Street	Free-field	54.3 (59.1)	56.1 (60.6)	55.1 (59.2)	53.7 (57.7)	48.9 (56.0)	50.1 (51.7)	58.7 (68.4)	53.3 (54.2)	54.7 (65.8)	49.1 (54.0)	52.8 (57.1)	48.2 (53.3)

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade measurement	Weekday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
S002-WS01	N029	Braitrim House, Victoria Road	Free-field	50.6 (59.2)	55.9 (58.3)	51.0 (54.7)	52.2 (59.4)	51.1 (60.6)	47.3 (50.4)	51.7 (55.6)	52.9 (55.5)	49.1 (54.9)	45.7 (53.3)	49.5 (60.3)	51.5 (66.1)
	N030	Bodens car park	Free-field	54.5 (60.2)	58.1 (59.9)	54.1 (56.8)	52.1 (60.5)	50.0 (59.8)	50.8 (52.5)	53.4 (54.8)	52.6 (54.3)	51.8 (54.9)	49.1 (53.0)	52.5 (59.7)	49.6 (54.2)
	N031	School Road, outside Acton Business Centre	Free-field	59.2 (63.7)	62.4 (64.7)	58.7 (69.3)	55.9 (61.9)	52.9 (61.9)	57.0 (60.9)	57.8 (60.8)	59.3 (61.7)	57.7 (64.8)	52.4 (58.3)	57.7 (67.3)	53.0 (61.3)
	N049	Flat Iron compound	Free-field	51.9 (55.8)	57.4 (61.3)	52.9 (60.7)	53.3 (58.6)	53.8 (65.7)	49.3 (51.9)	52.2 (53.7)	52.6 (53.6)	50.6 (55.3)	47.3 (52.5)	51.8 (61.6)	52.7 (58.4)
	N050	Acton Square, outside North Acton Station	Free-field	63.6 (65.7)	62.9 (66.2)	63.0 (72.9)	61.6 (69.1)	57.9 (67.3)	59.4 (61.1)	60.2 (60.6)	62.0 (63.0)	61.1 (62.5)	57.5 (61.8)	61.2 (70.8)	57.7 (67.1)
S004-WS01	N027	Old Oak Common Lane	Free-field	62.2 (64.7)	63.3 (67.8)	61.7 (63.7)	58.8 (62.0)	56.9 (68.2)	58.8 (60.8)	61.1 (64.4)	60.4 (61.9)	60.3 (65.5)	57.2 (61.5)	58.5 (61.7)	56.8 (61.9)
	N028	Old Oak Common Lane, Hilltop Works	Free-field	67.9 (69.9)	68.3 (70.6)	67.5 (69.3)	65.7 (71.3)	62.1 (72.5)	64.0 (65.3)	65.8 (66.8)	66.9 (67.5)	66.1 (70.4)	61.4 (66.5)	64.3 (66.6)	61.6 (66.5)
BC Compound	N040	Badminton Close	Free-field	53.2 (58.2)	54.2 (56.4)	53.7 (56.3)	53.5 (56.0)	50.6 (56.1)	53.6 (54.5)	54.3 (55.4)	53.8 (56.0)	53.8 (56.0)	50.8 (55.6)	54.0 (58.8)	50.7 (55.0)

2.1.2 Table 4 presents a summary of the measured vibration levels at each 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
S001-WS03	V052	Stephenson Street (north)	1.40 (Z-axis)
S004-WS01	V045	Old Oak Common Lane	0.77 (Z-axis)
S004-WS01	V051	Stephenson Street (north)	1.77 (Y-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 SOAEL

2.2.1 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."

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

2.2.3 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.

2.2.4 Table 5 presents a summary of recorded exceedances of the SOAEL at each measurement location 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	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of SOAEL
S001-WS02	N032	Shaftesbury Gardens	All days	All periods	No exceedance
	N033	Outside The Collective, Atlas Road / Victoria Road	All days	All periods	No exceedance
S001-WS03	N034	Stephenson Street (north)	All days	All periods	No exceedance
	N035	Stephenson Street (south)	All days	All periods	No exceedance
	N041	Junction of Stephenson Street / Goodhall Street	All days	All periods	No exceedance
S002-WS01	N029	Braitrim House, Victoria Road	All days	All periods	No exceedance
	N030	Bodens Car Park	All days	All periods	No exceedance
	N031	School Road, outside Acton Business Centre	All days	All periods	No exceedance
	N049	Flat Iron compound	All days	All periods	No exceedance
	N050	Acton Square, outside North Acton Station	All days	All periods	No exceedance
S004-WS01	N027	Old Oak Common Lane	All days	All periods	No exceedance
	N028	Old Oak Common Lane, Hilltop Works	All days	All periods	No exceedance
BC Compound	N040	Badminton Close	All days	All periods	No exceedance

2.2.5 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 6 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 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

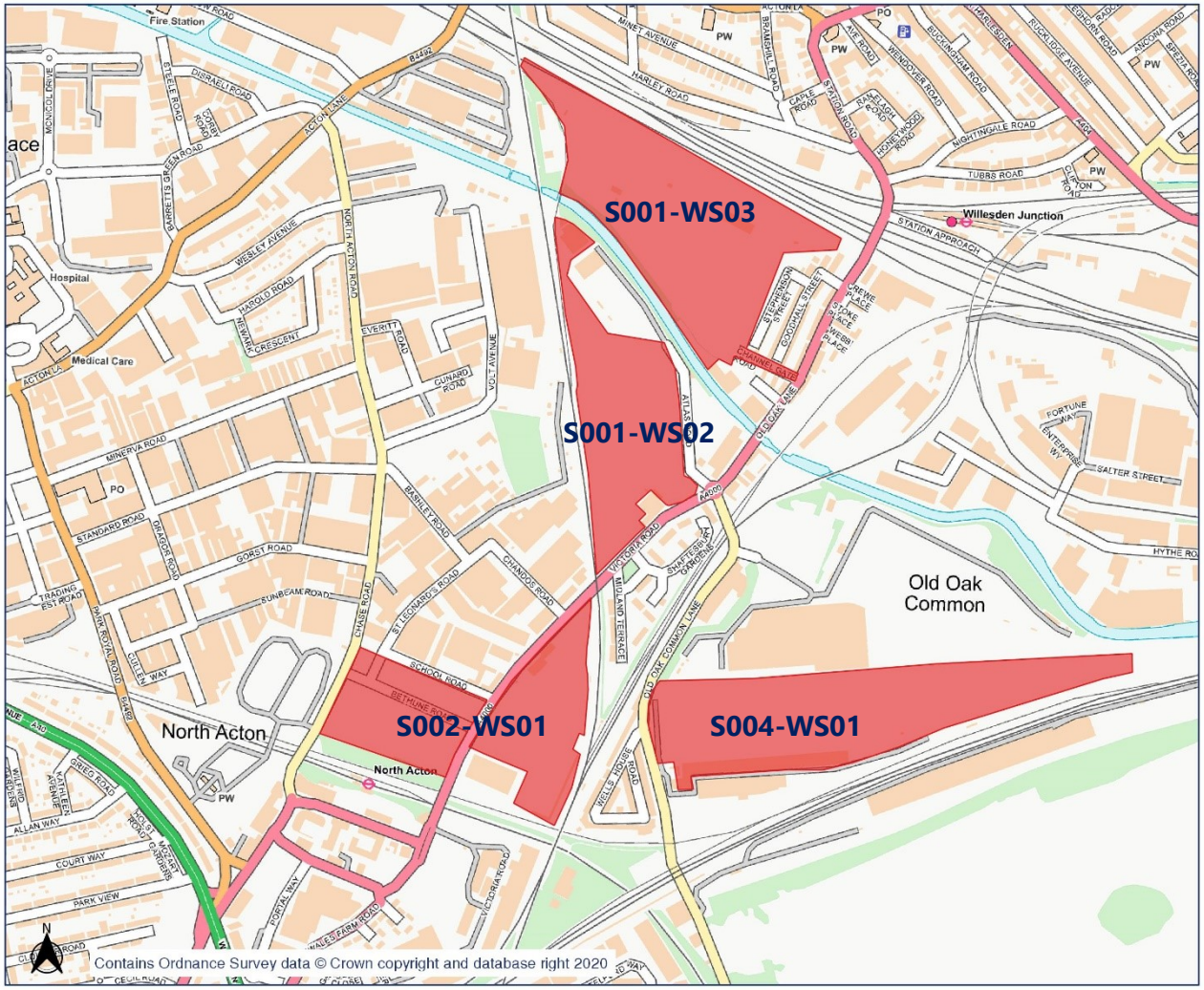
2.4.1 Table 7 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

Table 7: Summary of Complaints.

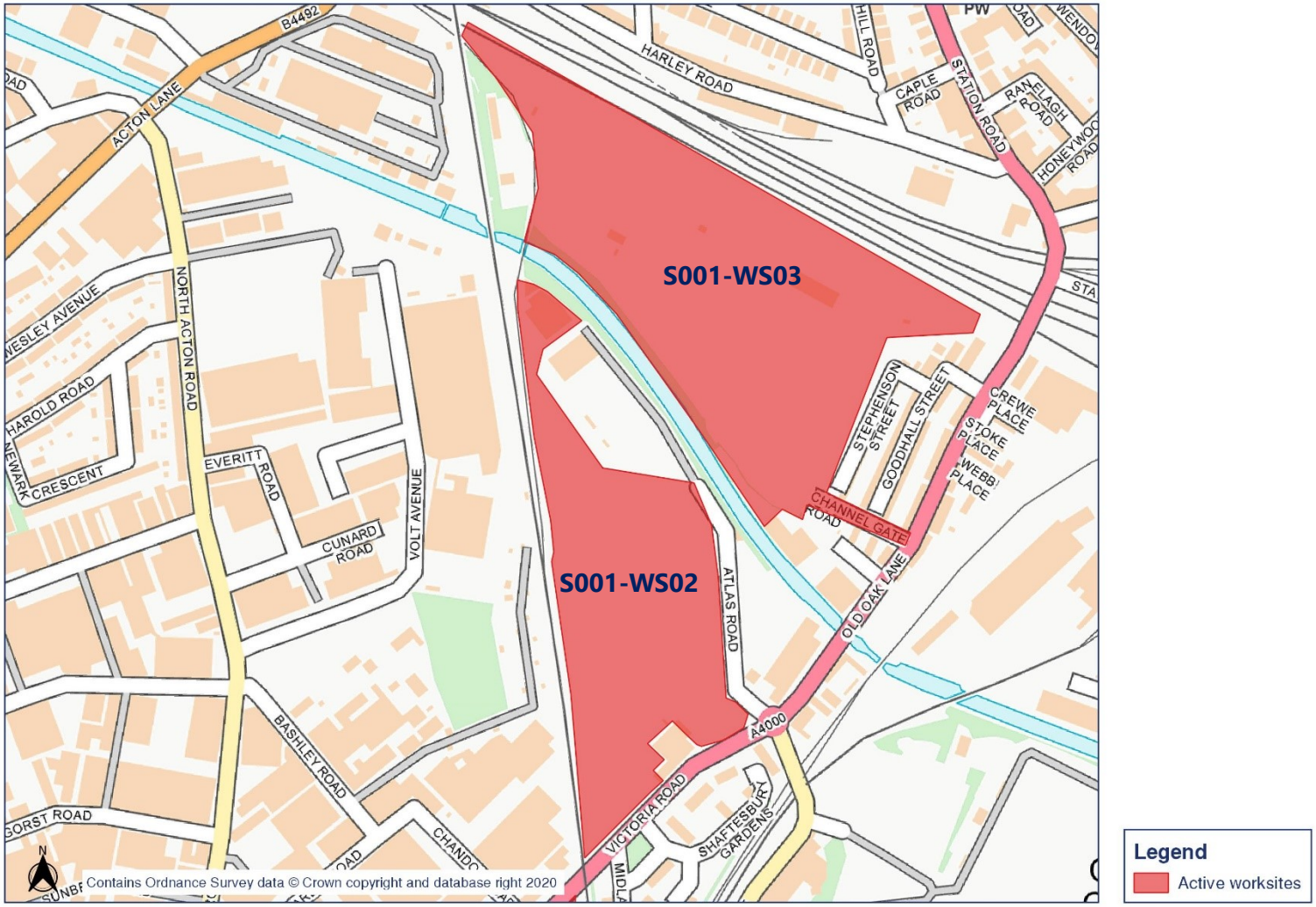
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
-	-	-	-	-

Appendix A Site Locations

HS2 Worksite identification plan - 1



HS2 Worksite identification plan - 2



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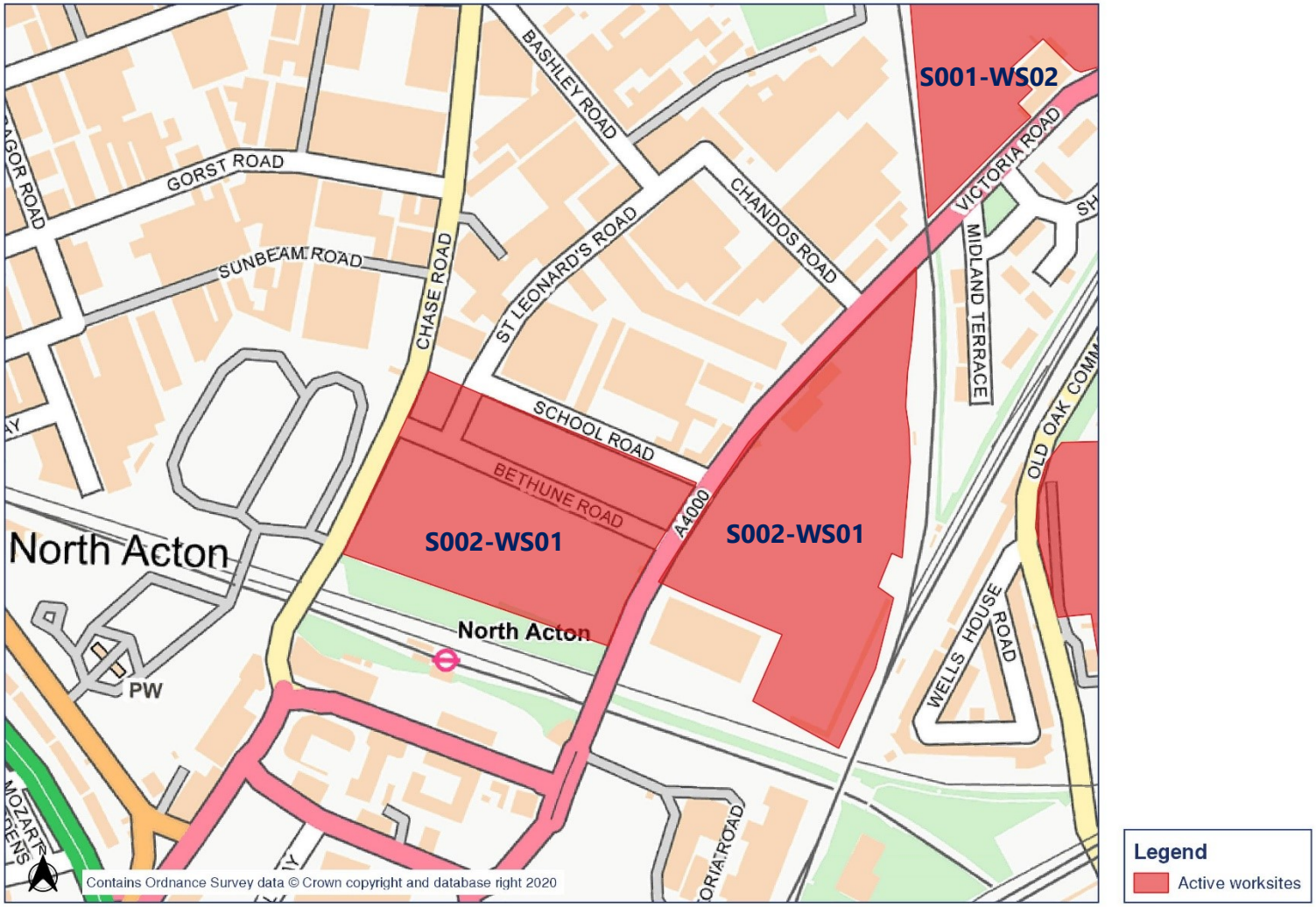
Worksite identification plan - 3



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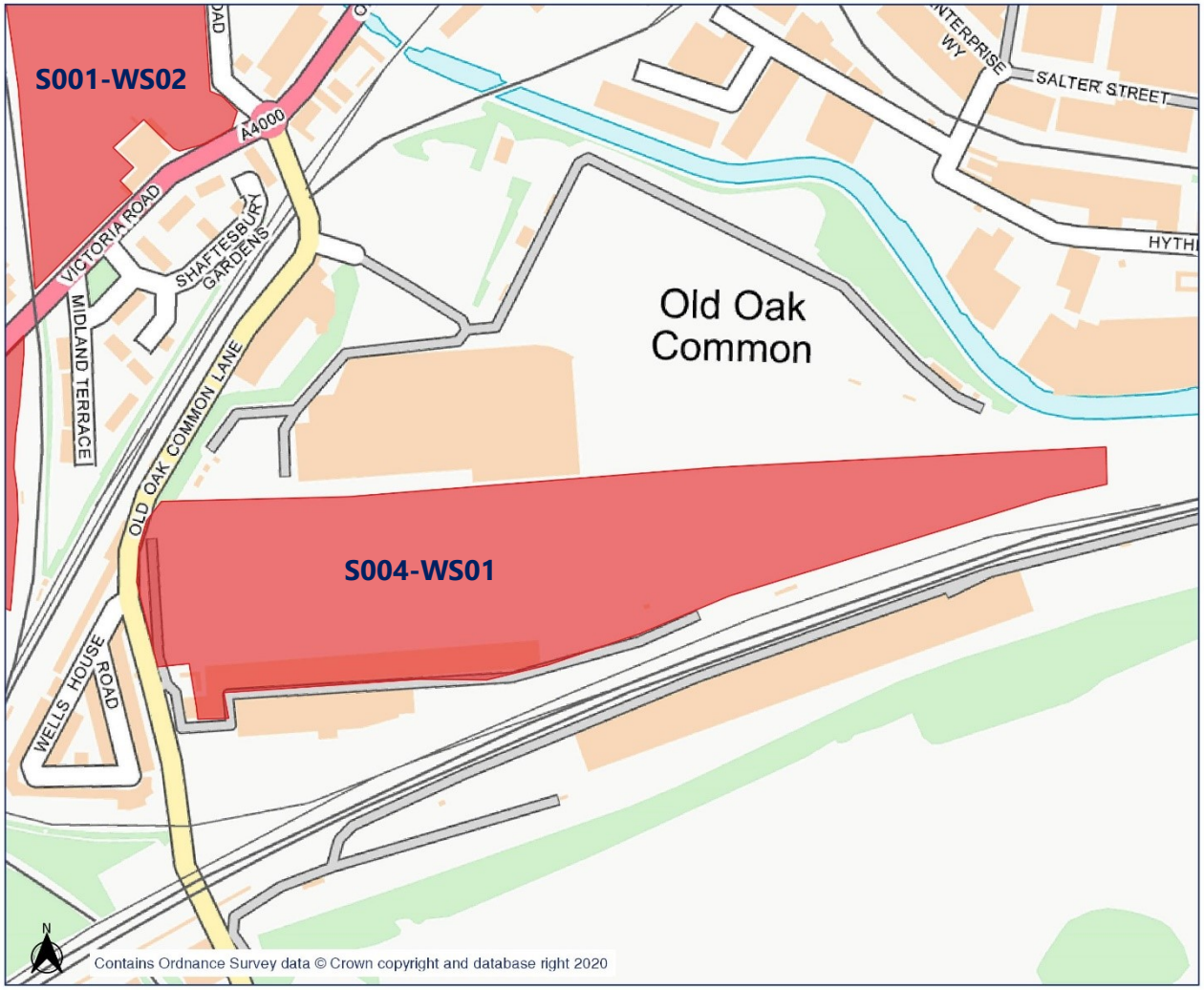
Worksite identification plan - 4

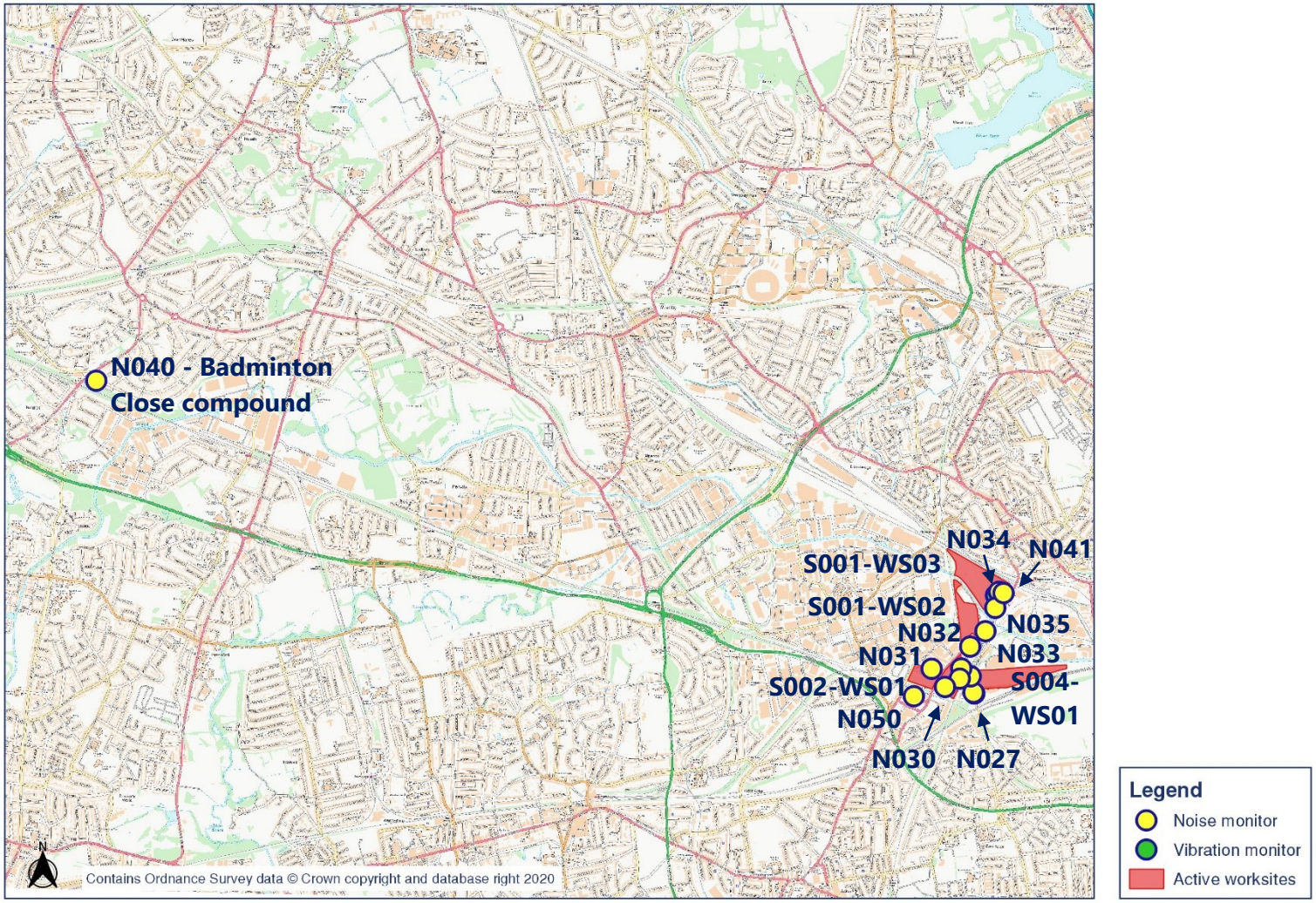


Legend

Active worksites

Appendix B Monitoring Locations

HS2 Noise and vibration monitoring plan - 1



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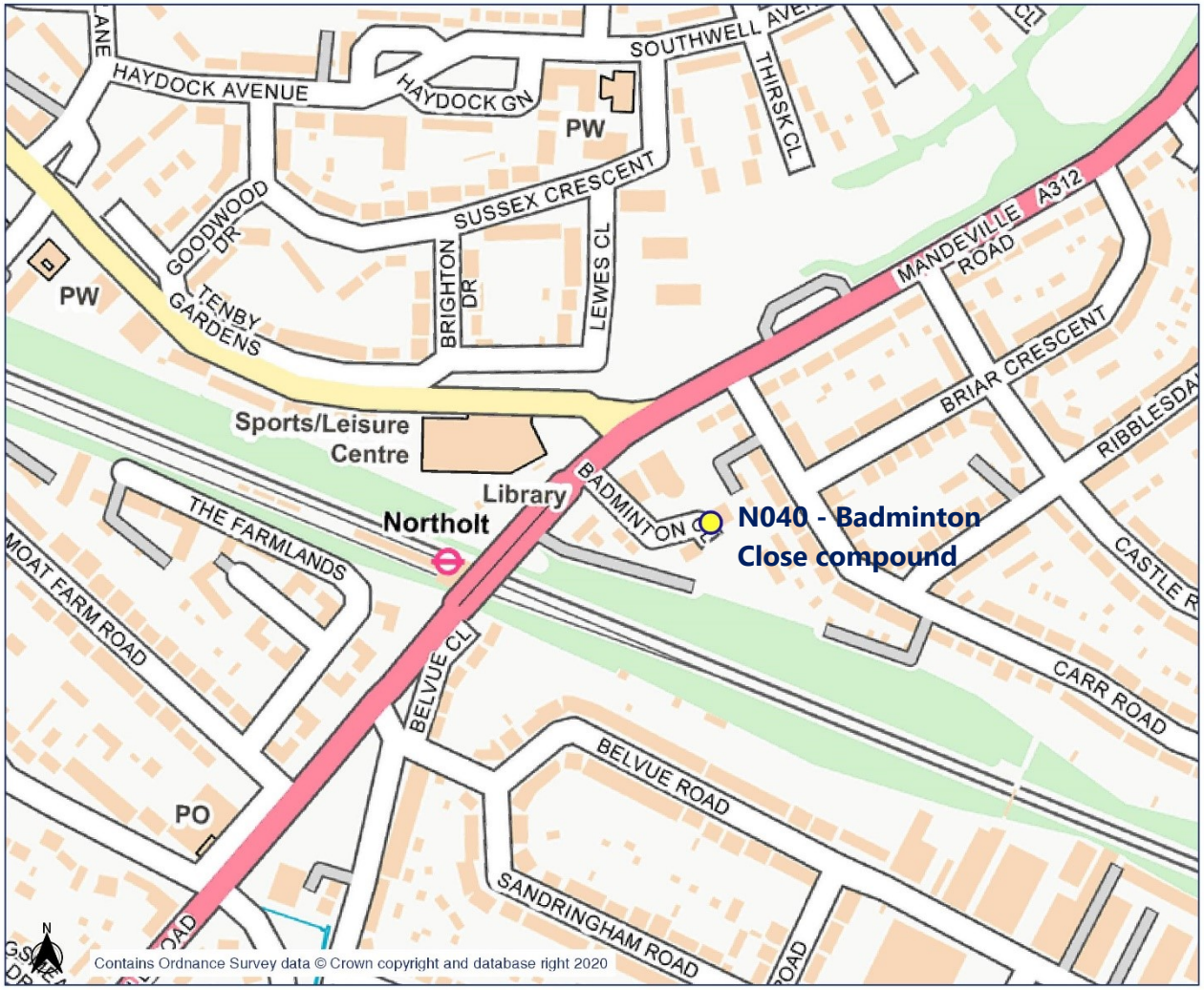
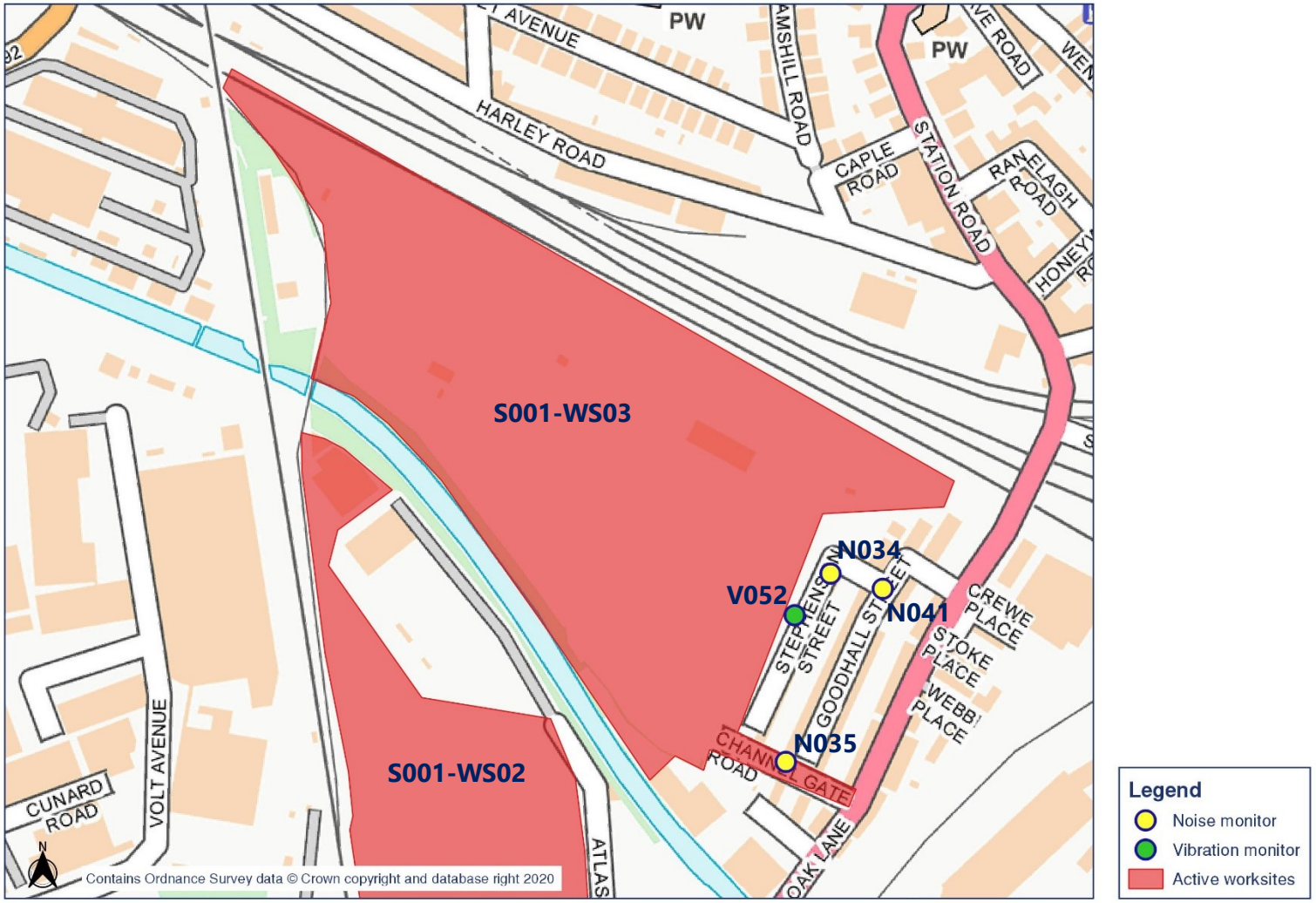


HS2 Noise and vibration monitoring plan - 3



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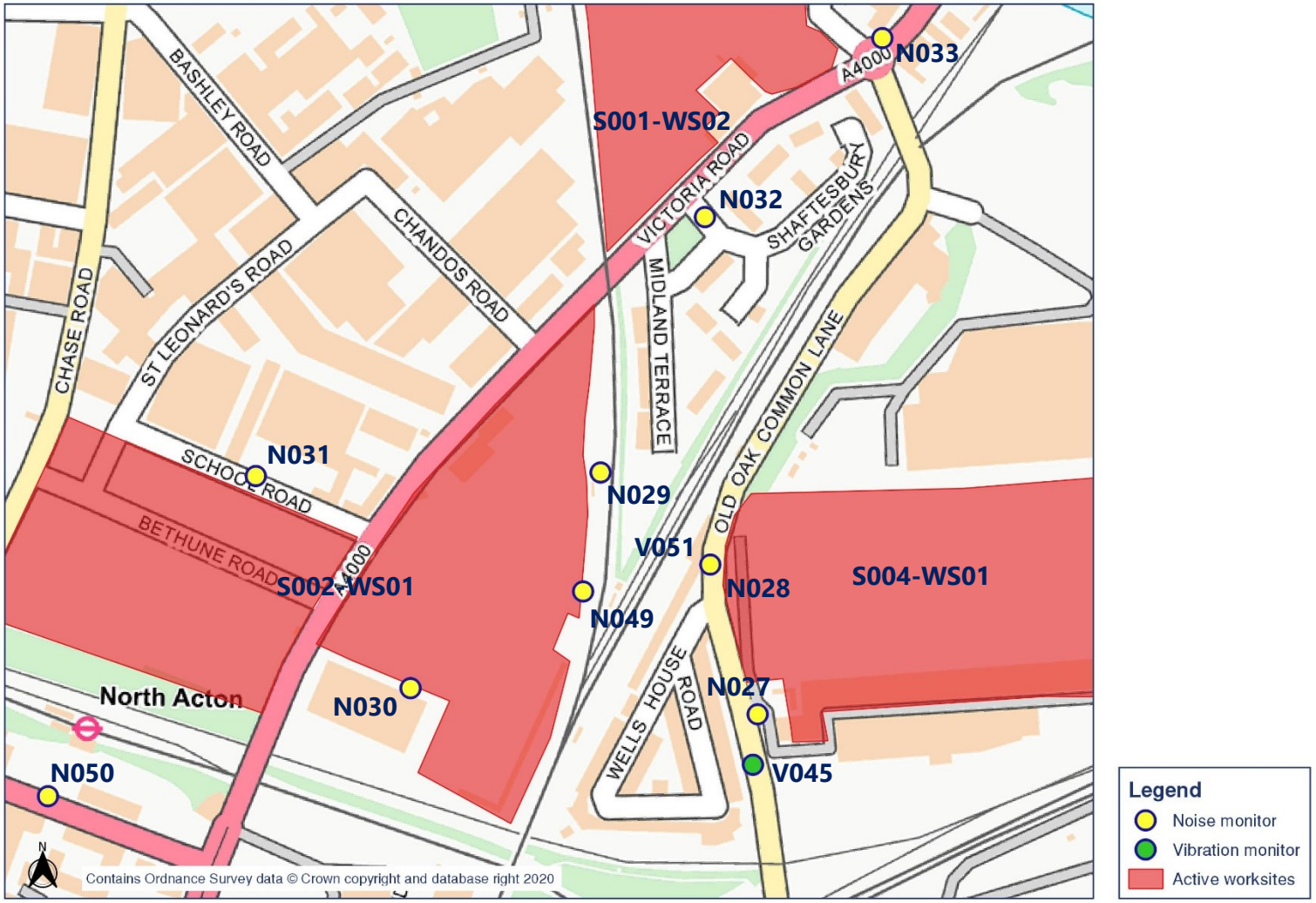
Noise monitoring plan - 4

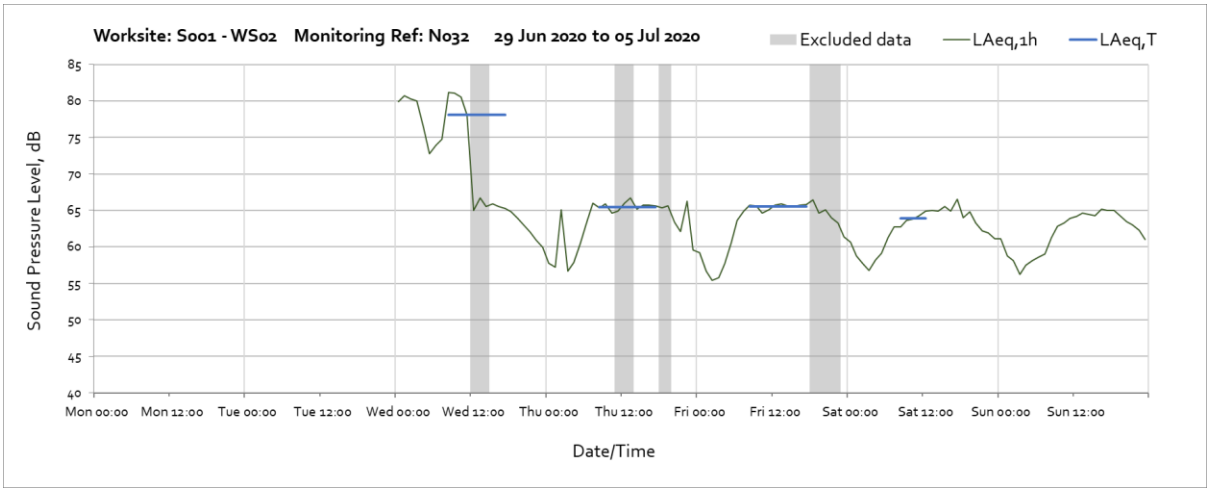


Appendix C Data

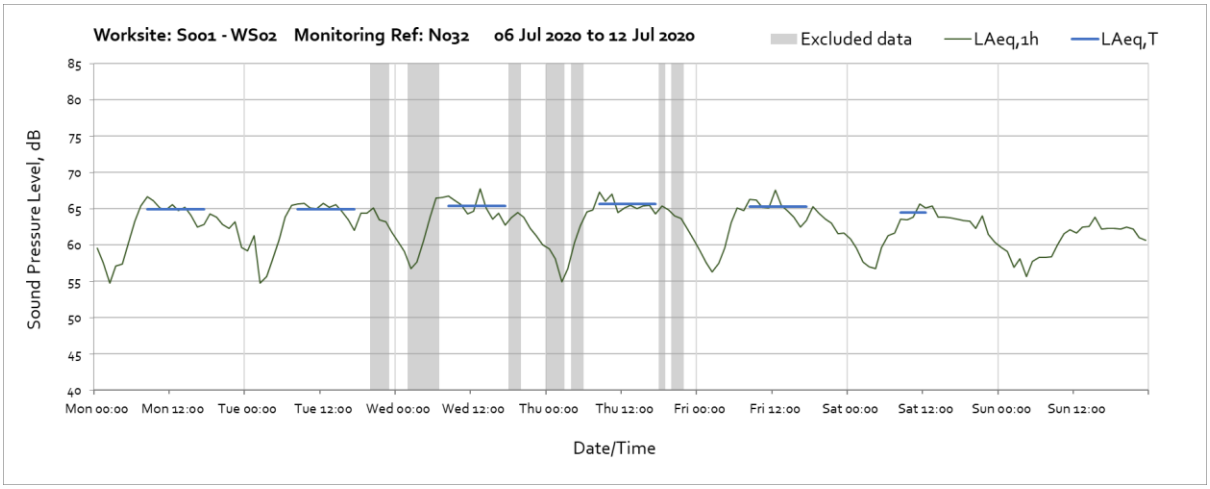
Noise

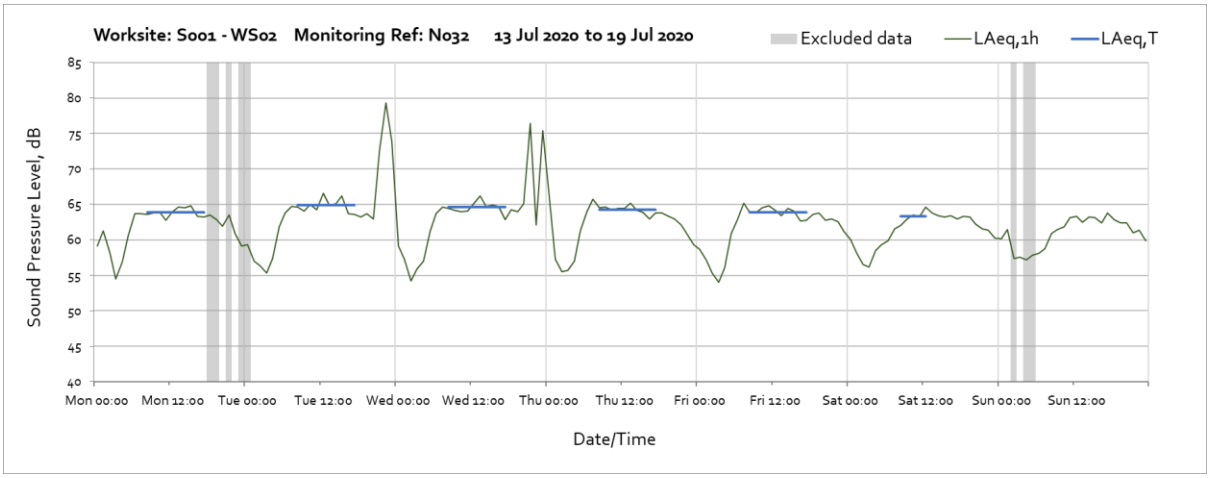
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods with adversely weather affected noise levels are greyed out and have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

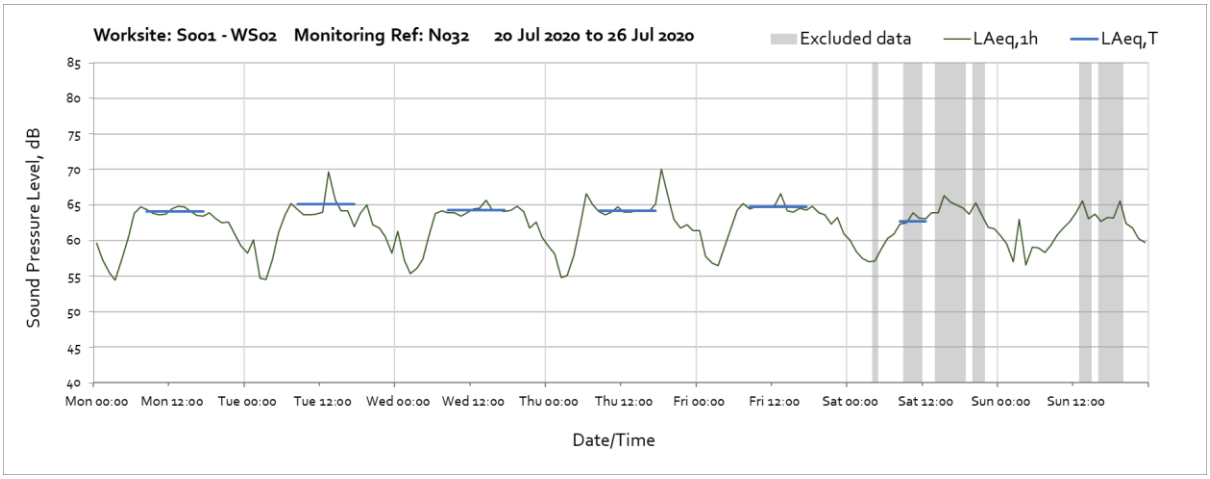
Worksite: S001-WS02 – Monitoring Ref: N032



Note: High noise levels measured on Wedensday 1st of July were due to non-HS2 related works being undertaken in proximity to the monitor and is not representative of HS2 construction noise levels.




Worksite: S001 - WS02 Monitoring Ref: No32 13 Jul 2020 to 19 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: S001 - WS02 Monitoring Ref: No32 20 Jul 2020 to 26 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
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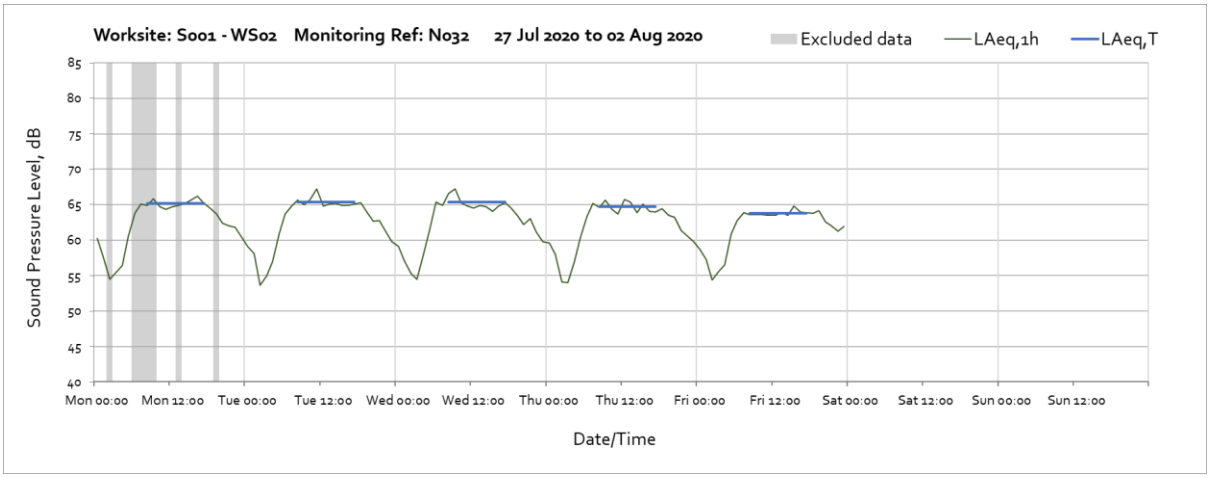
Date/Time


Worksite: S001 - WS02 Monitoring Ref: No32 27 Jul 2020 to 02 Aug 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
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Wed 12:00
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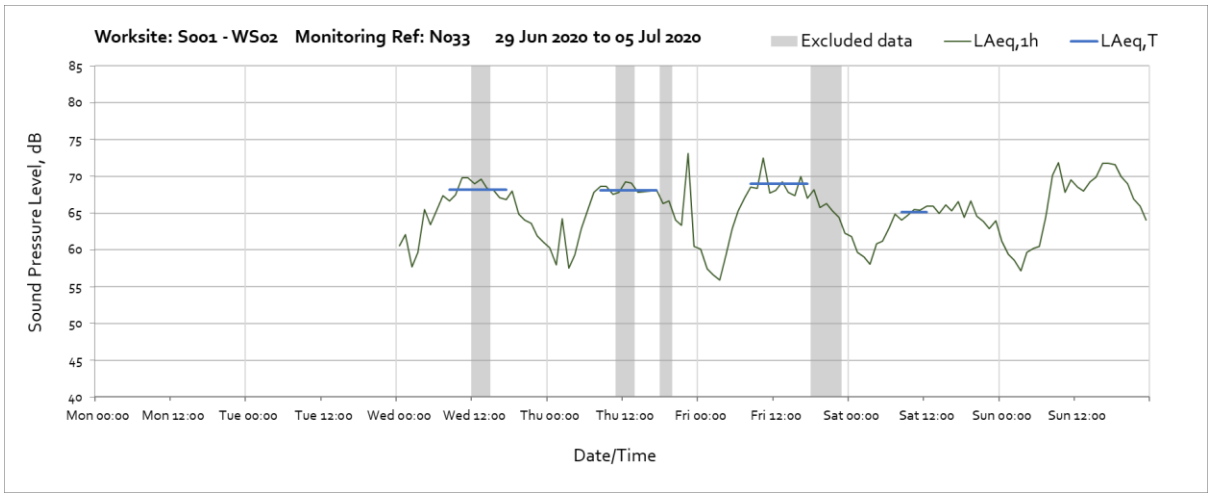
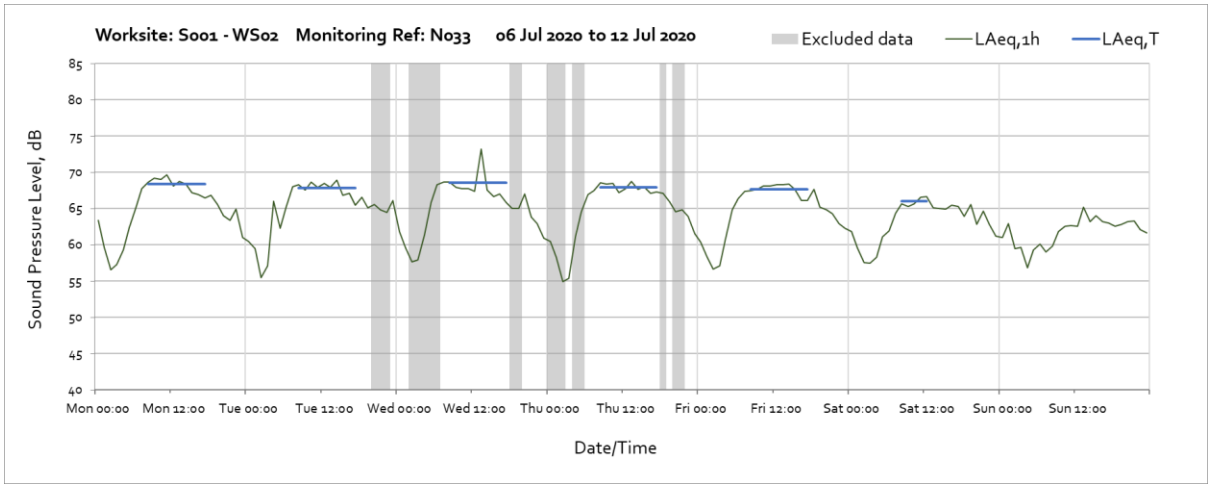
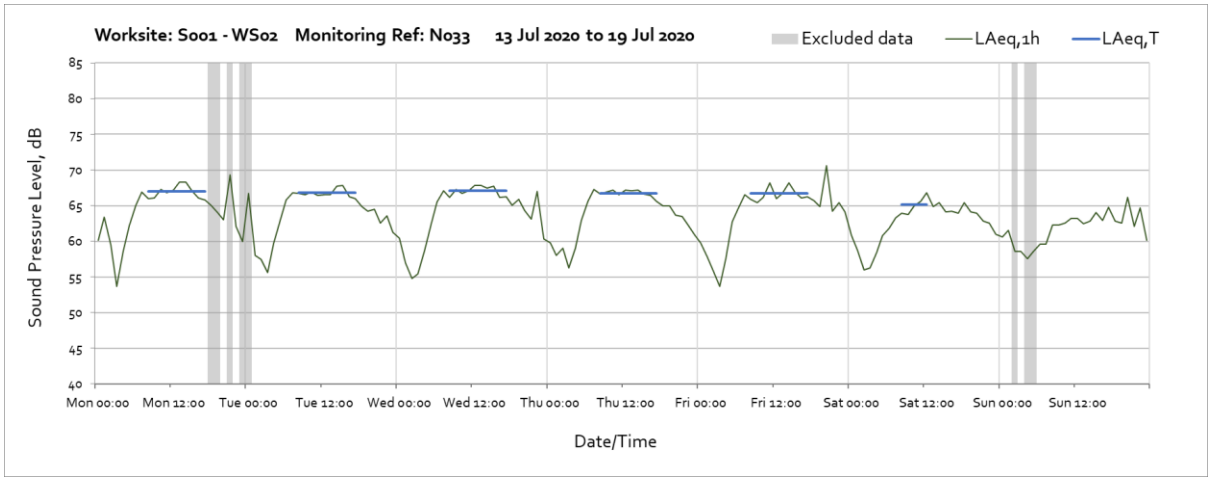
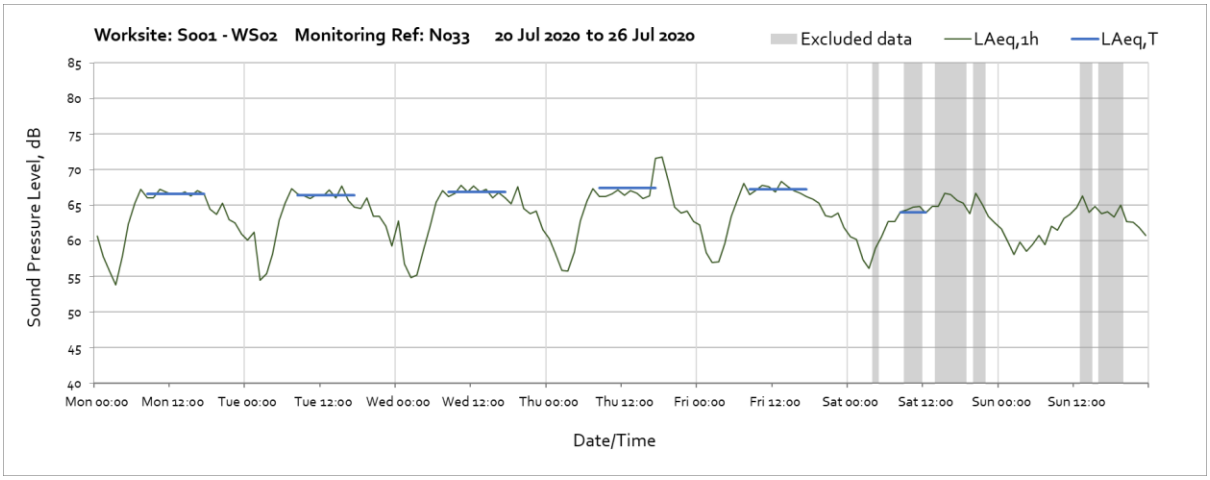
Sun 00:00
Sun 12:00
Date/Time

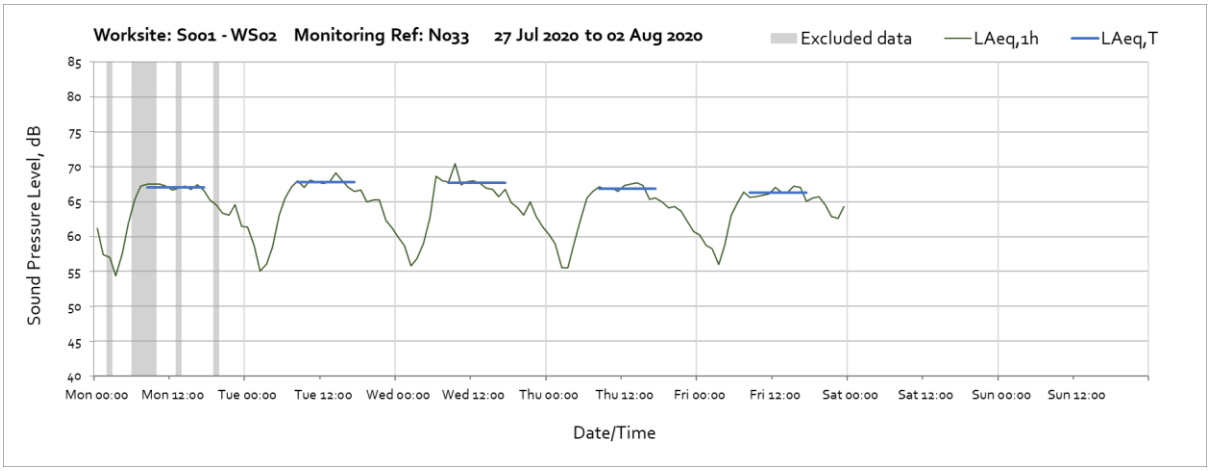
Worksite: S001-WS02 – Monitoring Ref: N033



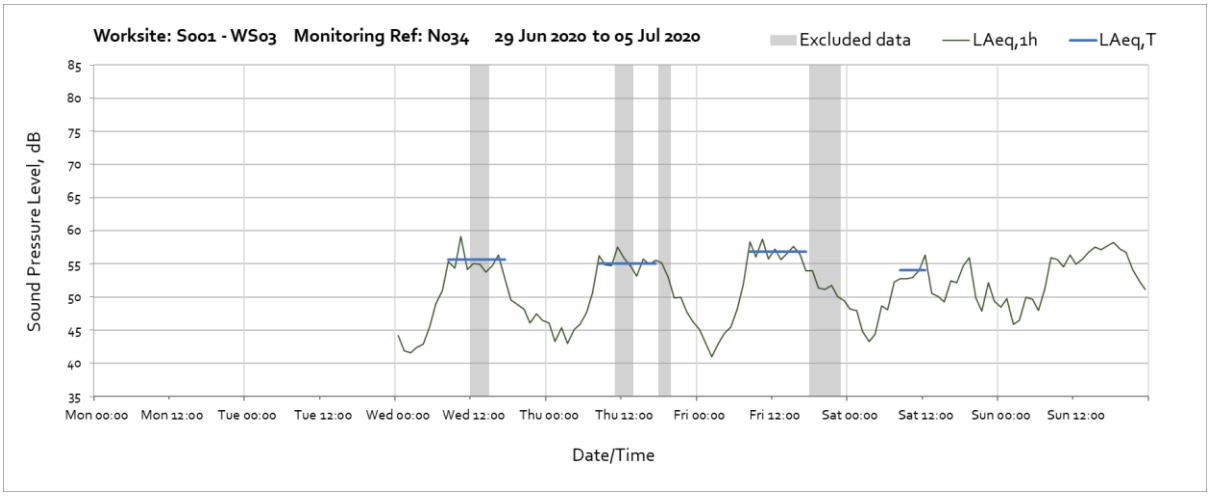


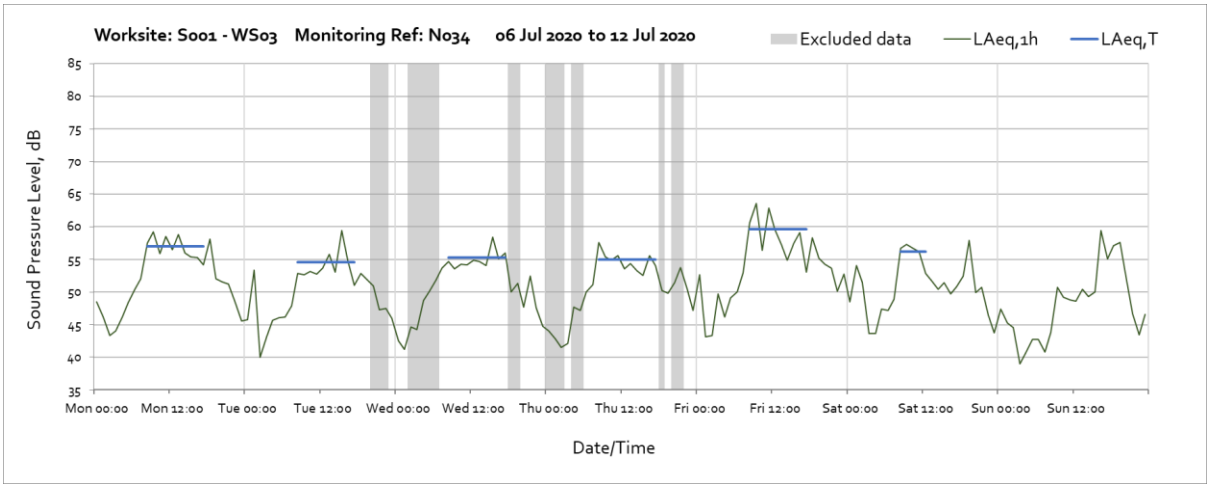






Worksite: S001-WS03 – Monitoring Ref: N034




Worksite: S001 - WS03 Monitoring Ref: N034 06 Jul 2020 to 12 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
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60
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45
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35
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
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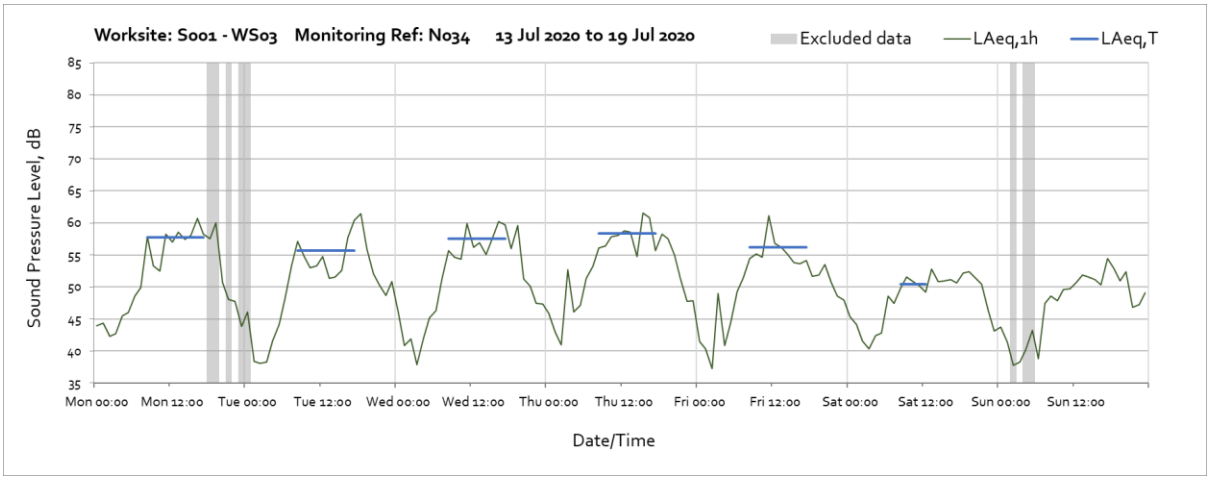
Sun 00:00
Sun 12:00
Date/Time


Worksite: S001 - WS03 Monitoring Ref: N034 13 Jul 2020 to 19 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
35
Mon 00:00
Mon 12:00
Tue 00:00
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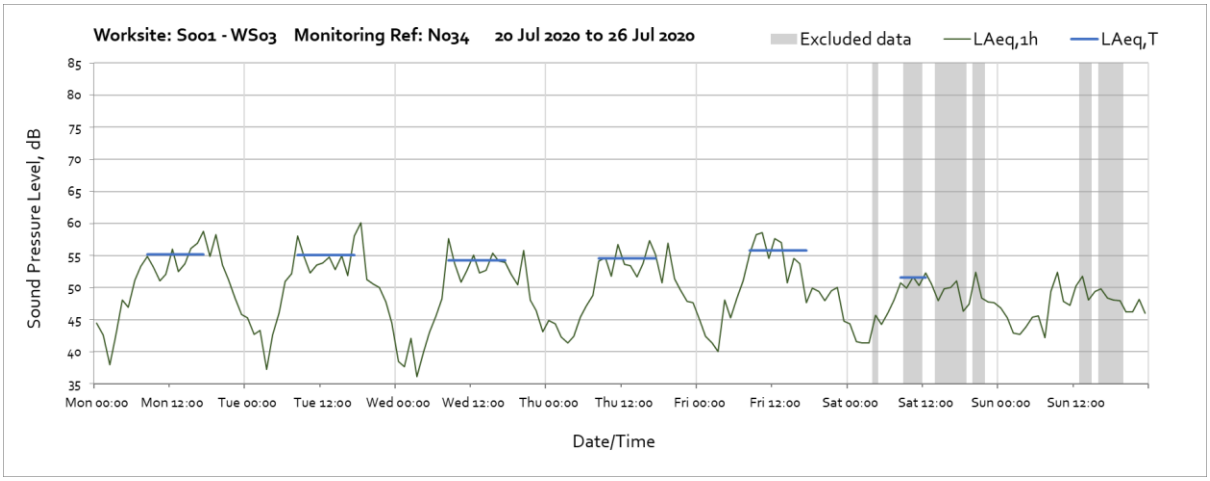
Sun 00:00
Sun 12:00
Date/Time


Worksite: S001 - WS03 Monitoring Ref: N034 20 Jul 2020 to 26 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
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60
55
50
45
40
35
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
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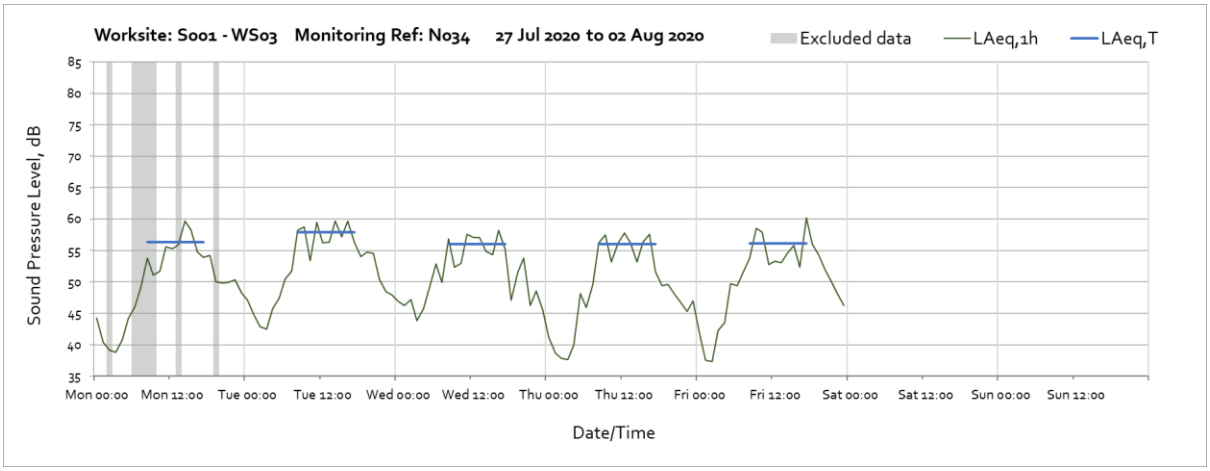
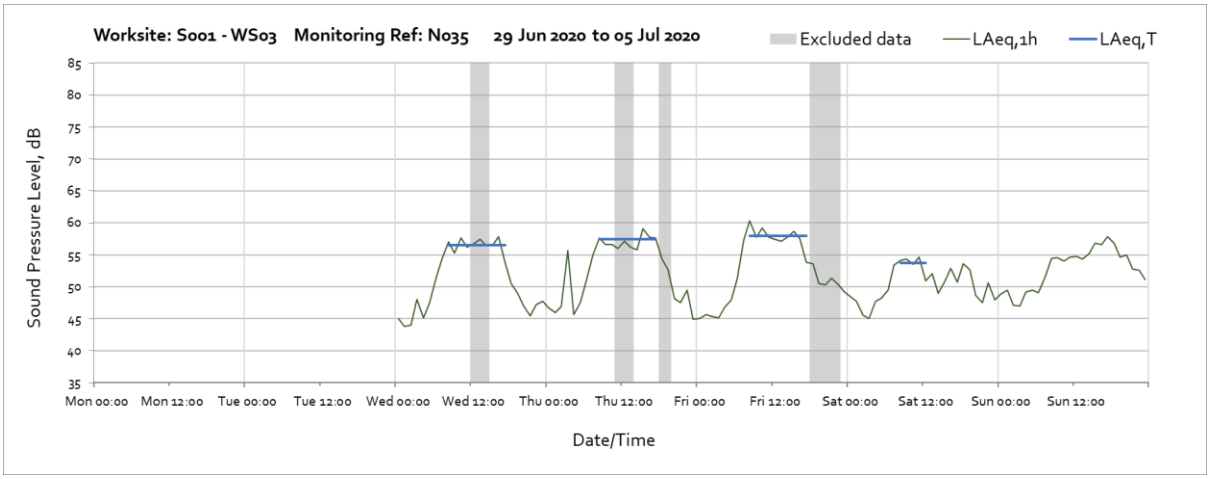
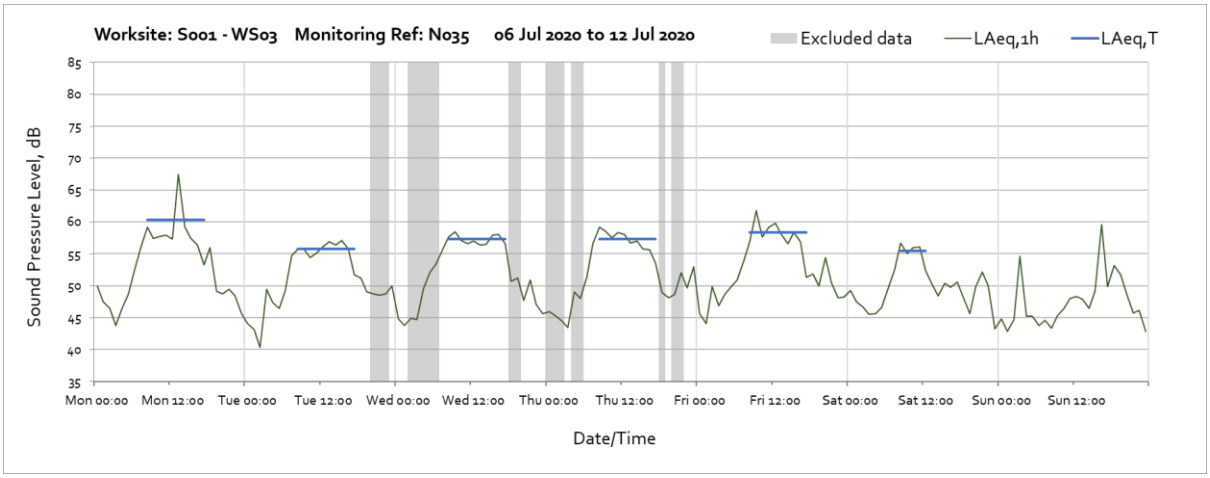
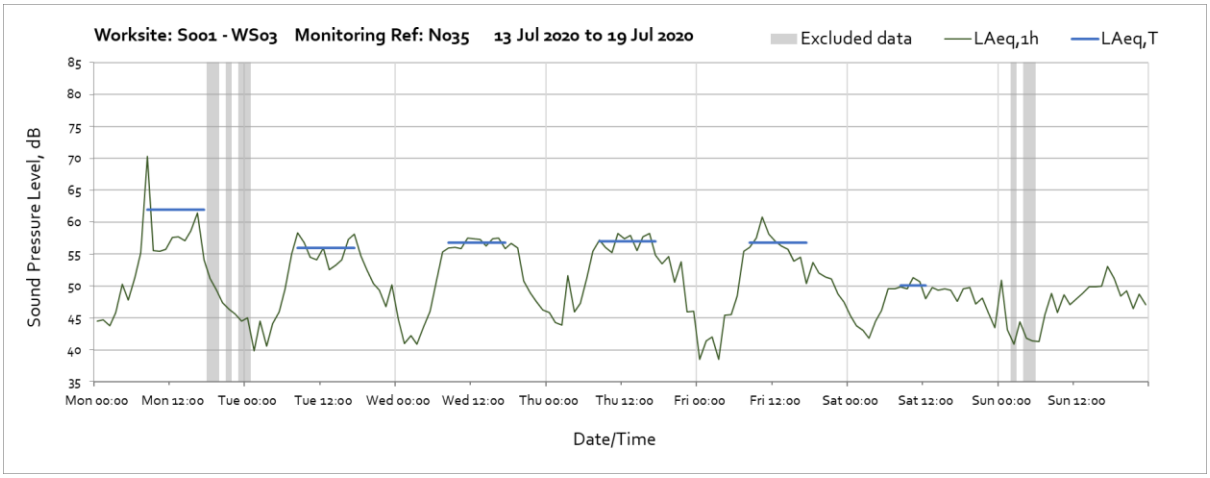
Date/Time



Worksite: S001-WS03 – Monitoring Ref: N035






Worksite: S001 - WS03 Monitoring Ref: N035 13 Jul 2020 to 19 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
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60
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50
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40
35
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
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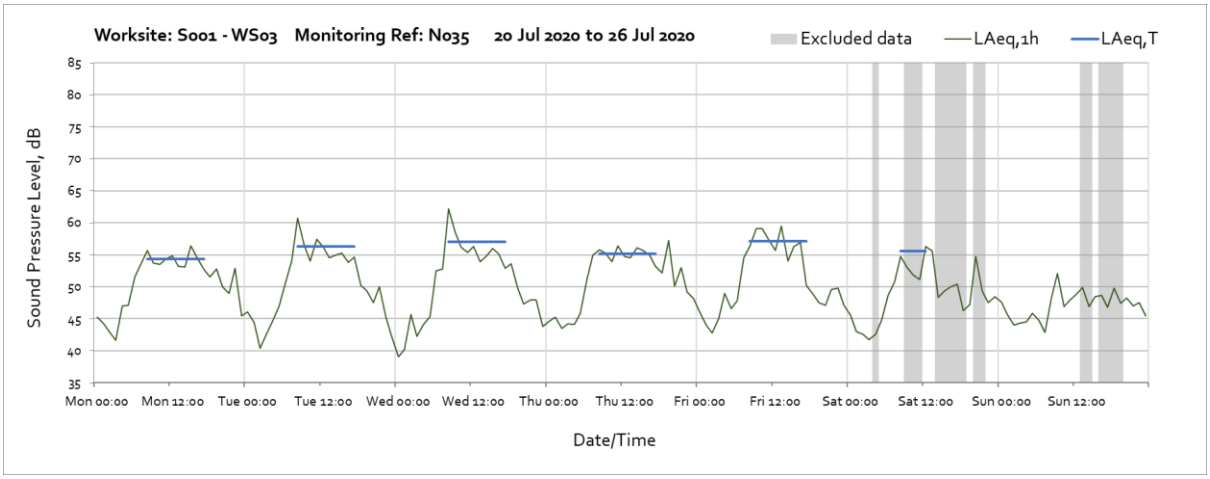
Date/Time


Worksite: S001 - WS03 Monitoring Ref: N035 20 Jul 2020 to 26 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
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60
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50
45
40
35
Mon 00:00
Mon 12:00
Tue 00:00
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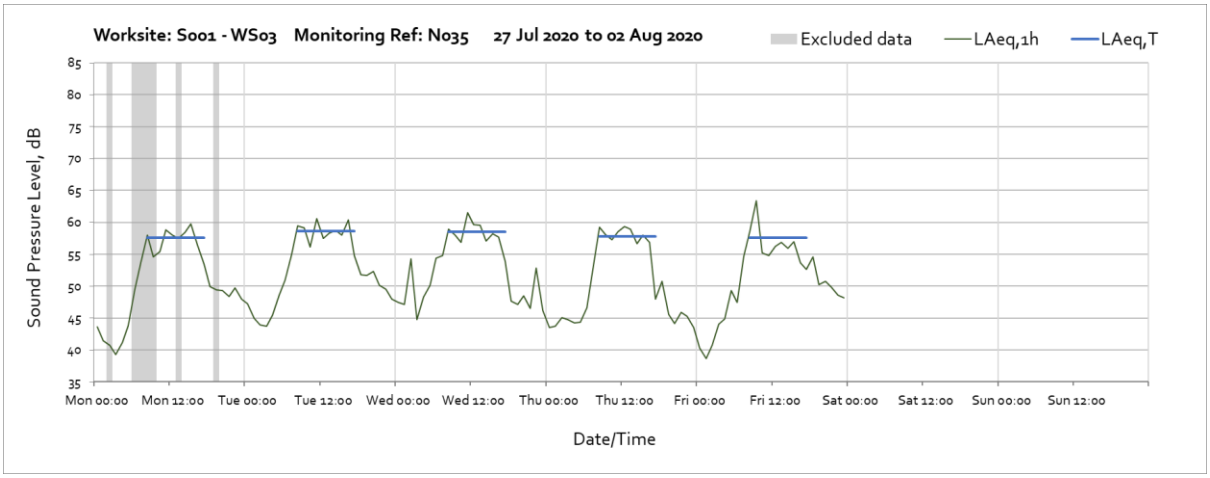
Date/Time


Worksite: S001 - WS03 Monitoring Ref: N035 27 Jul 2020 to 02 Aug 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
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60
55
50
45
40
35
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
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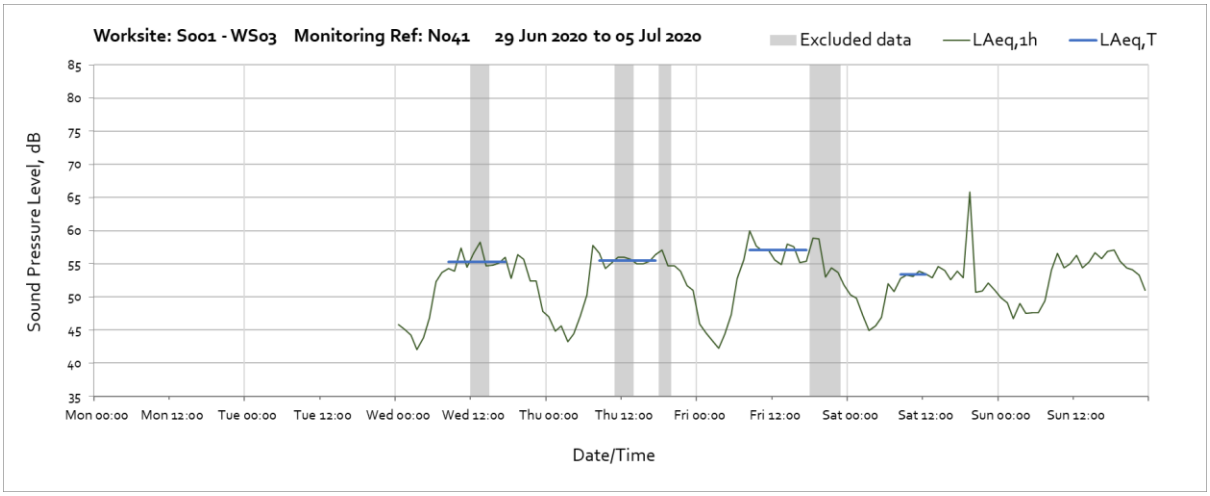
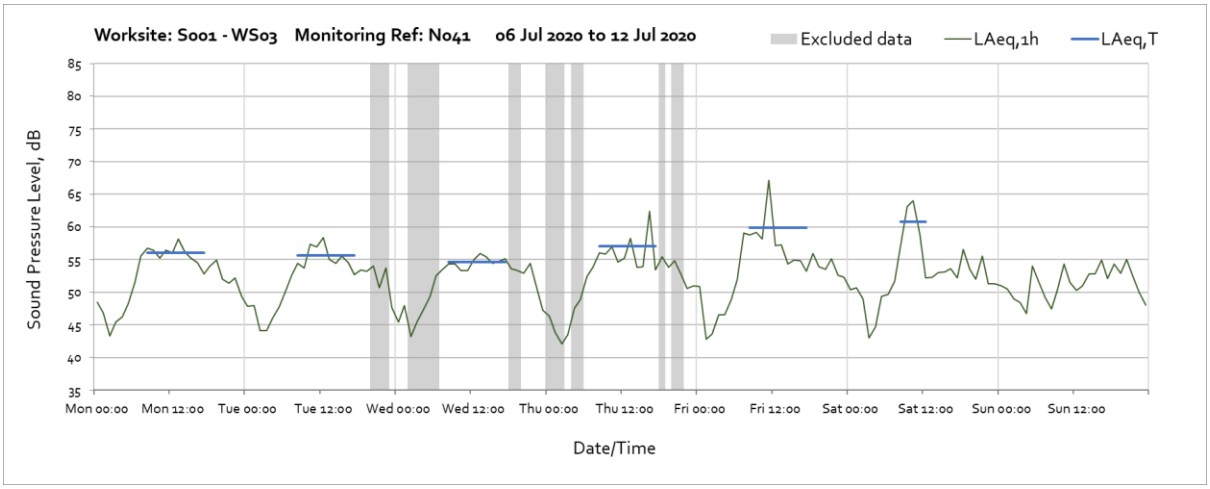
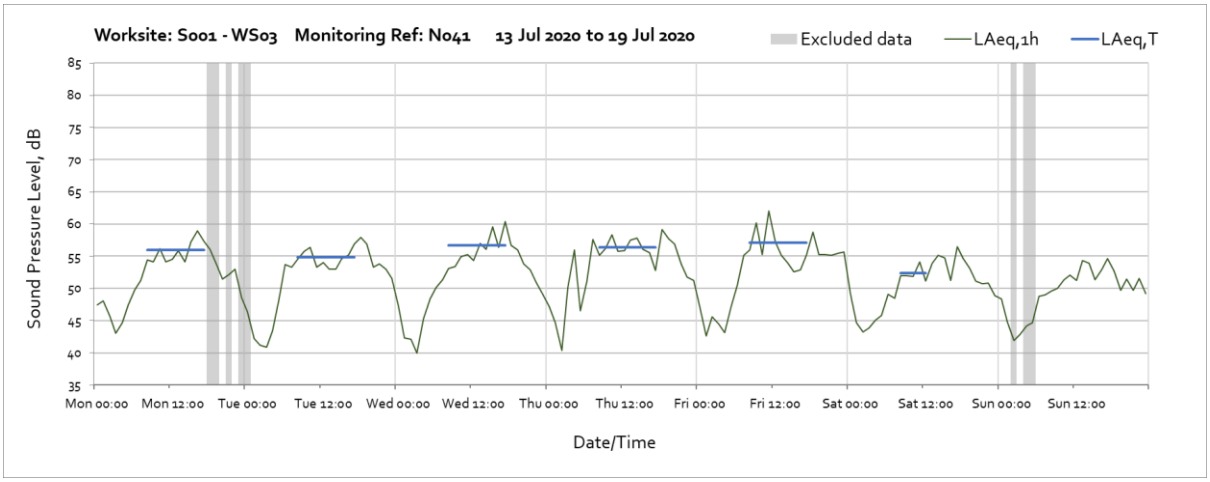
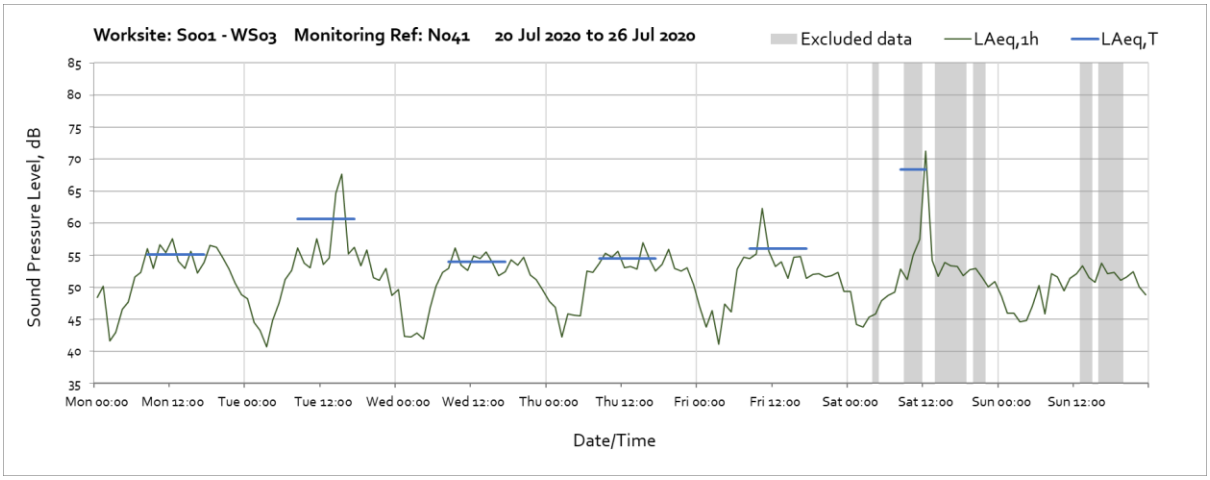
Sun 00:00
Sun 12:00
Date/Time

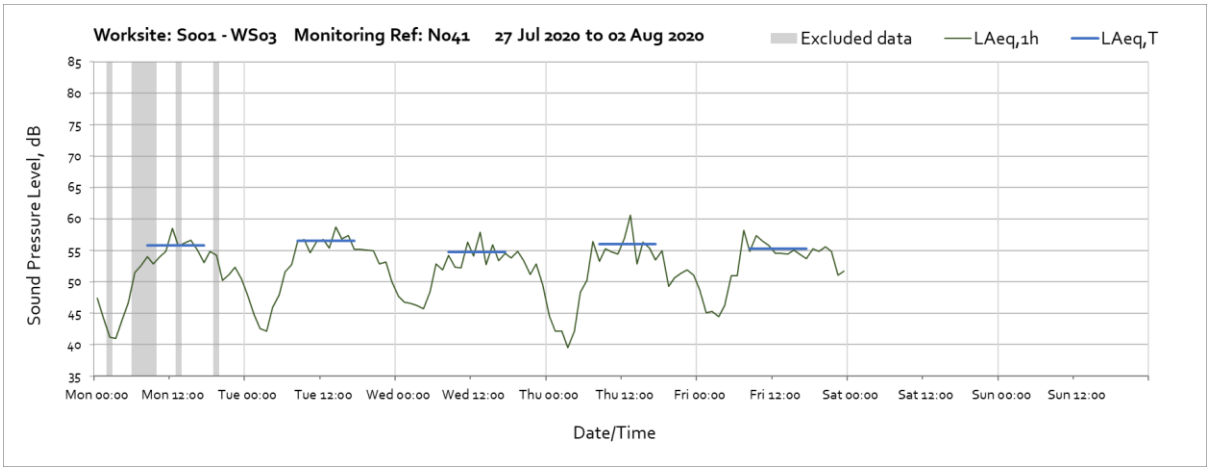
Worksite: S001-WS03 – Monitoring Ref: N041



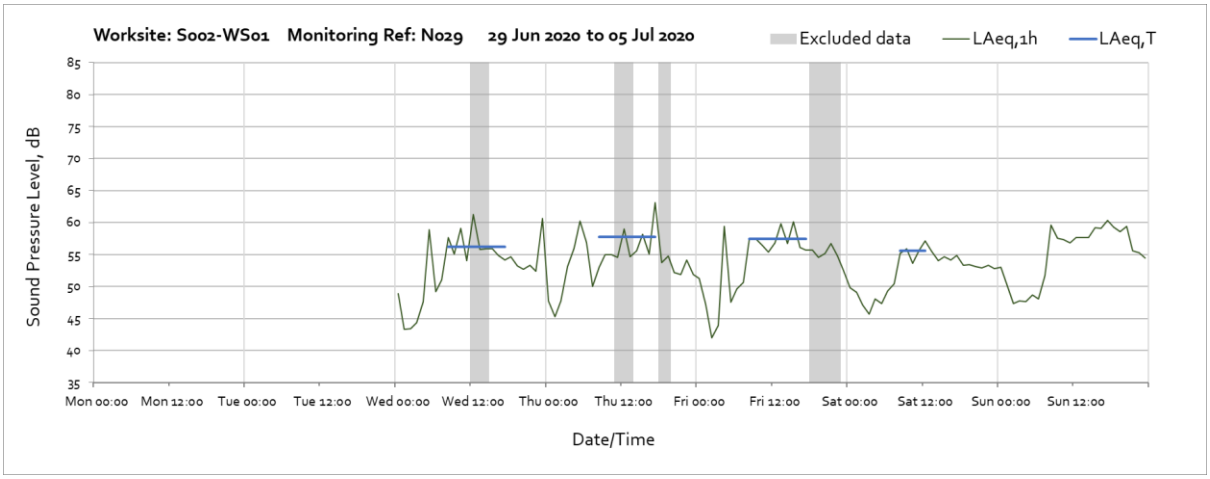


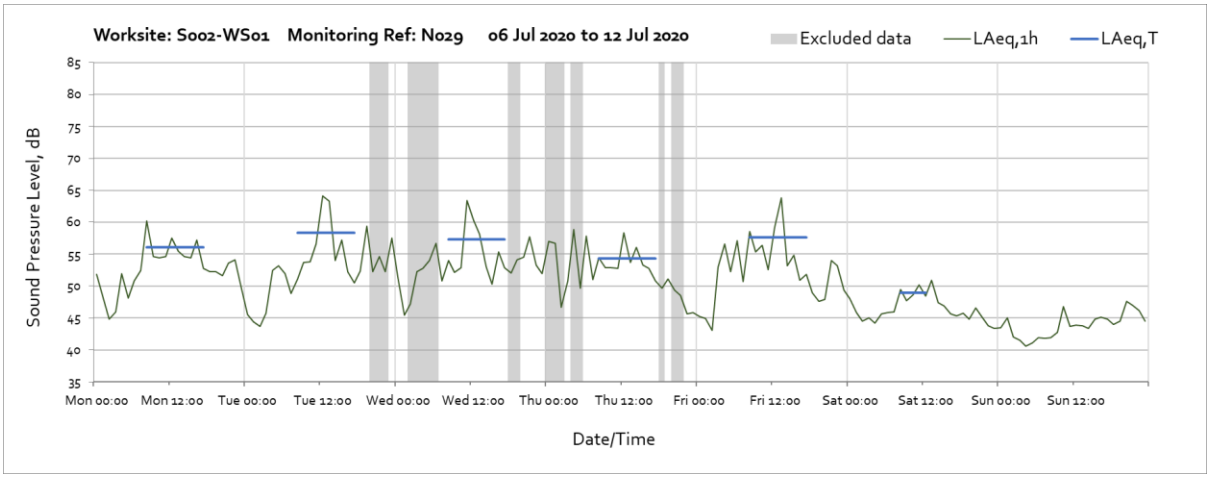






Worksite: S002-WS01 – Monitoring Ref: N029




Worksite: S002-WS01 Monitoring Ref: N029 06 Jul 2020 to 12 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
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60
55
50
45
40
35
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
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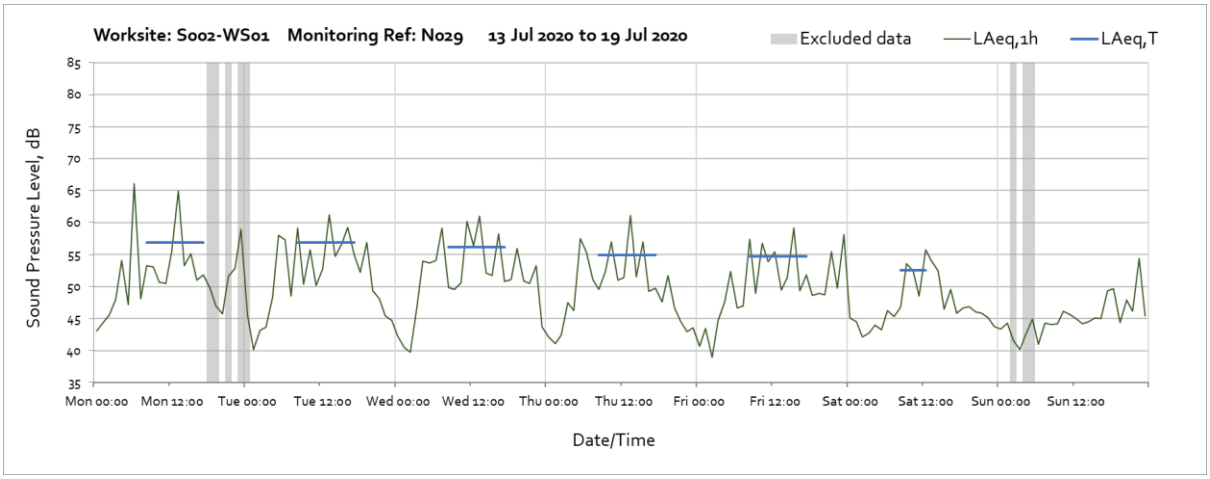
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: S002-WS01 Monitoring Ref: N029 13 Jul 2020 to 19 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
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60
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50
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Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
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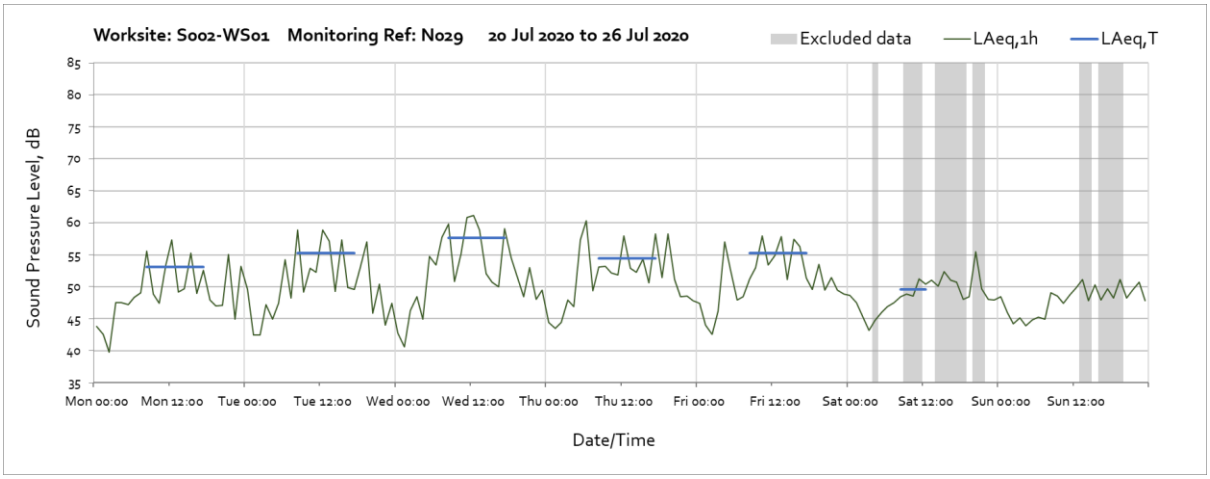
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: S002-WS01 Monitoring Ref: N029 20 Jul 2020 to 26 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
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45
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Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
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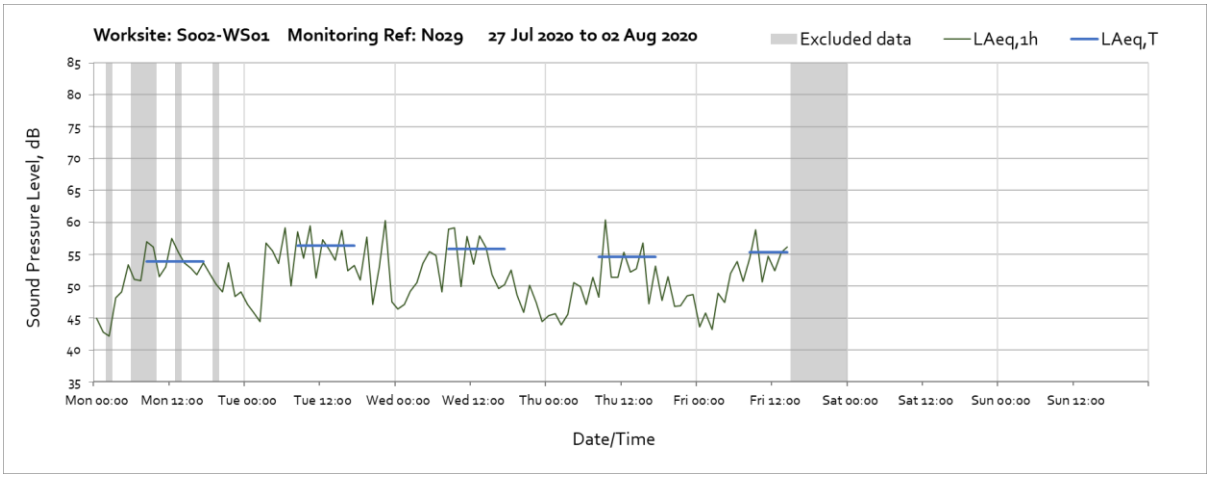
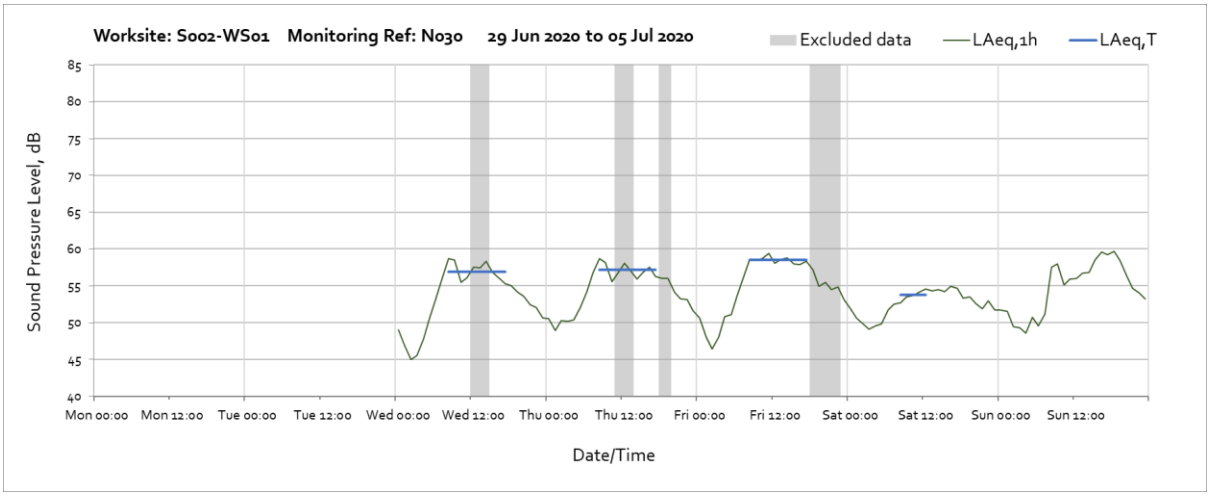
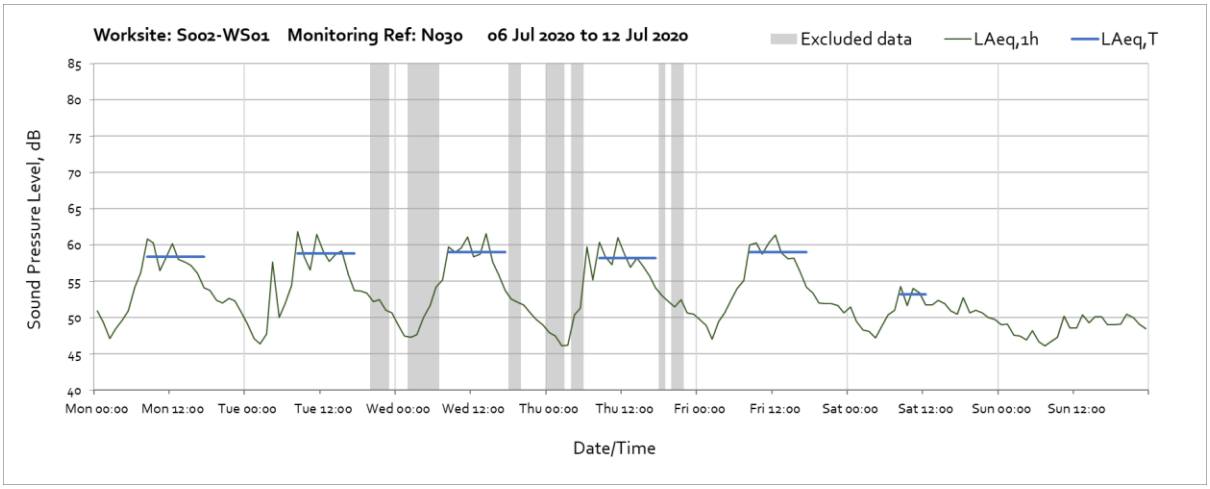
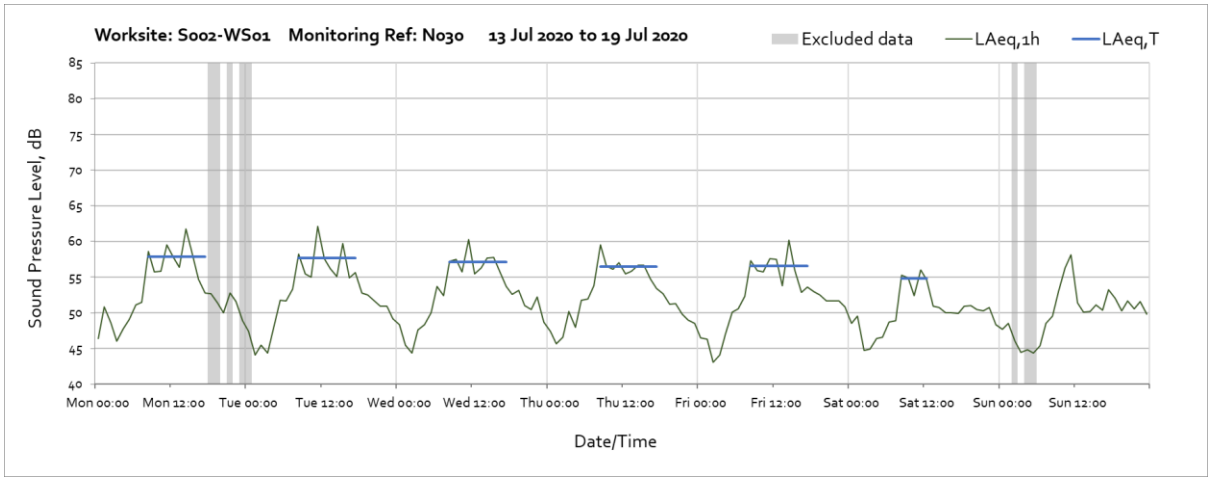
Sun 12:00
Date/Time



Worksite: S002-WS01 – Monitoring Ref: N030






Worksite: S002-WS01 Monitoring Ref: N030 13 Jul 2020 to 19 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
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60
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50
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40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
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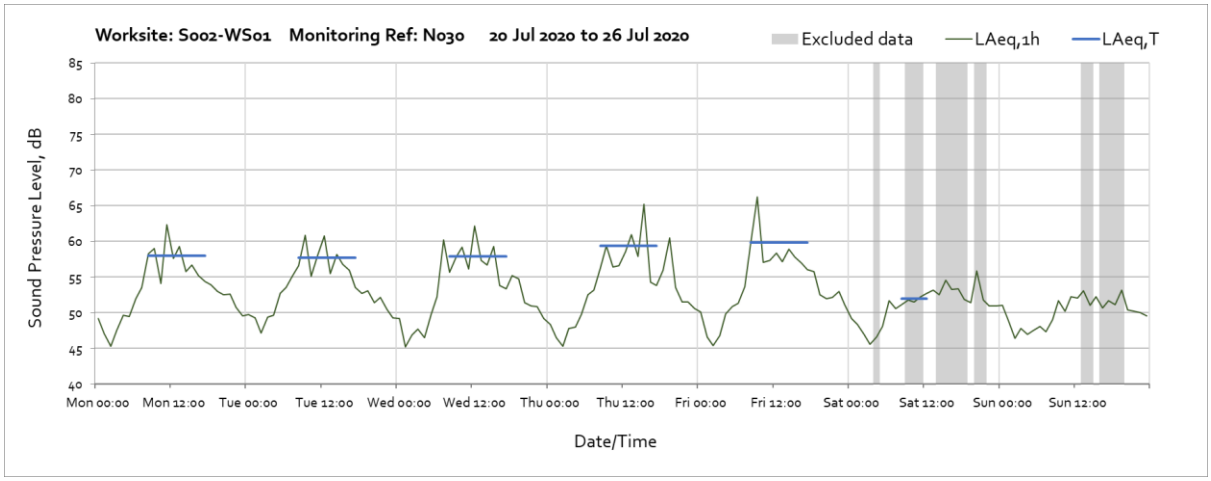
Sun 12:00
Date/Time


Worksite: S002-WS01 Monitoring Ref: N030 20 Jul 2020 to 26 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
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65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
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Sat 12:00
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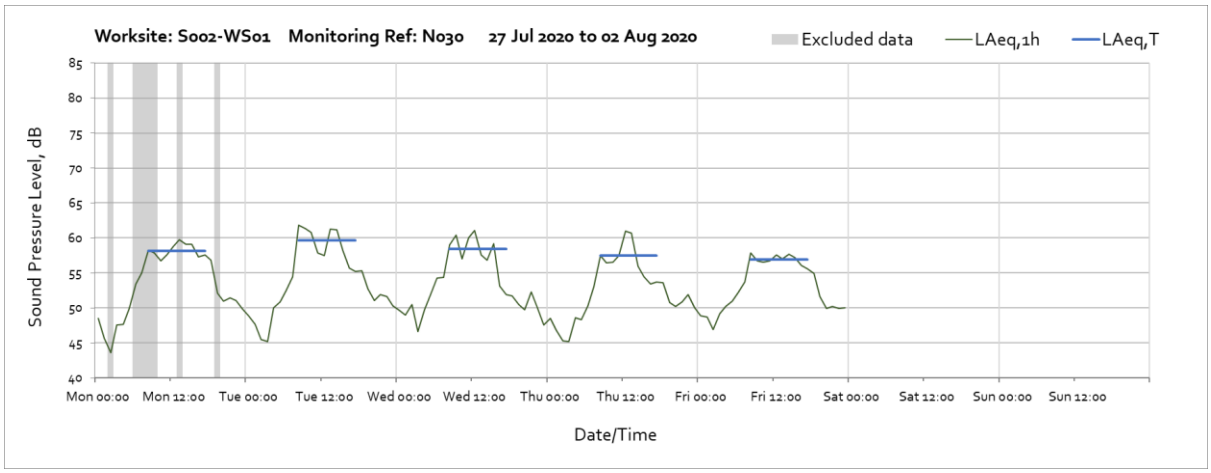
Sun 12:00
Date/Time


Worksite: S002-WS01 Monitoring Ref: N030 27 Jul 2020 to 02 Aug 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
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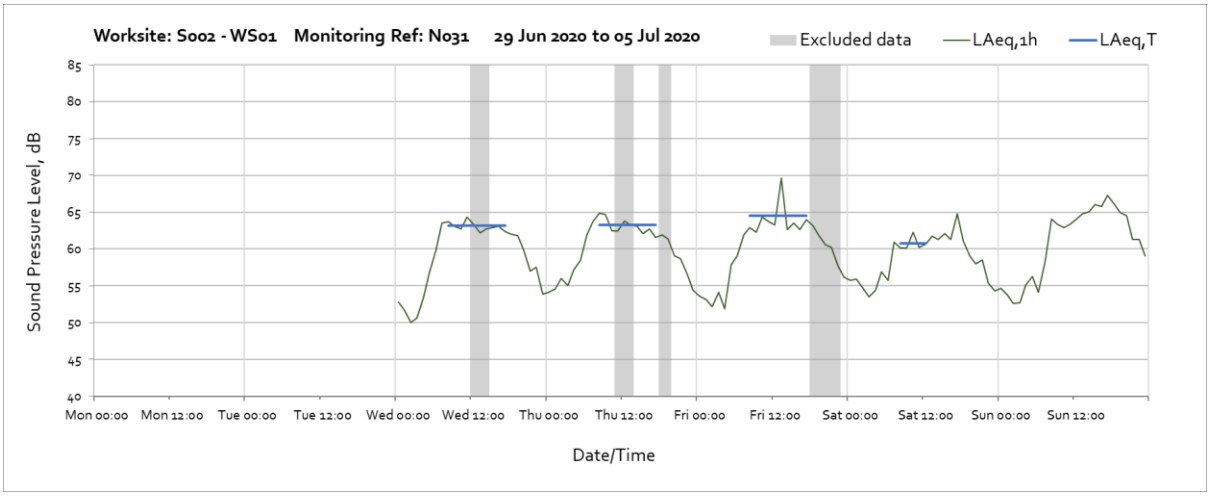
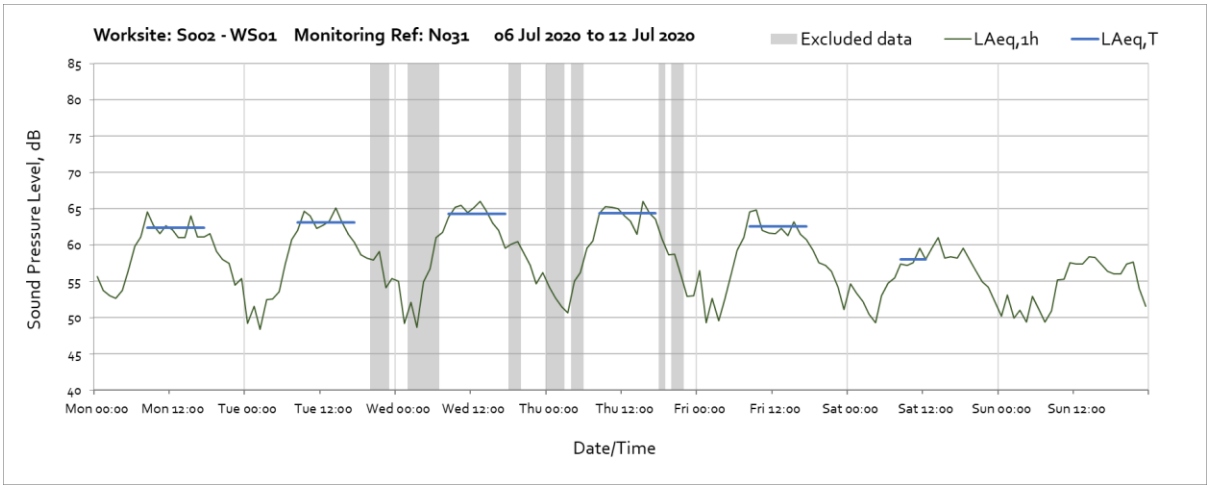
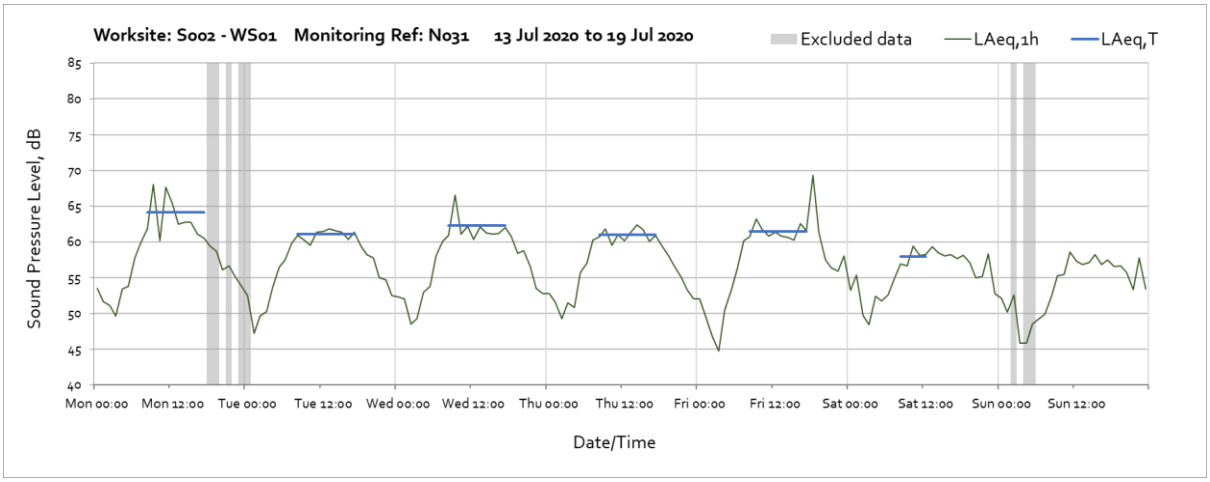
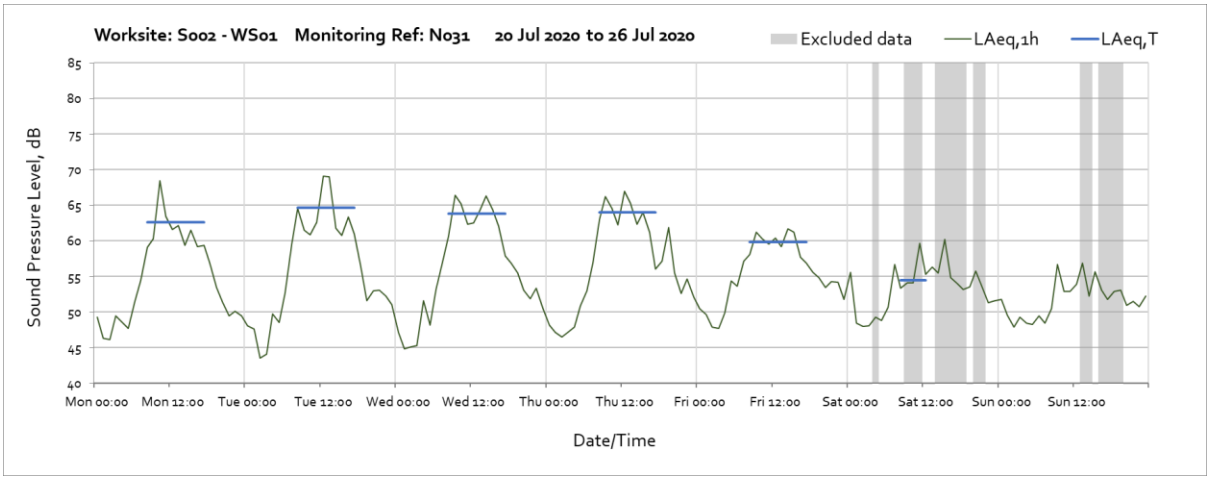
Sun 00:00
Sun 12:00
Date/Time

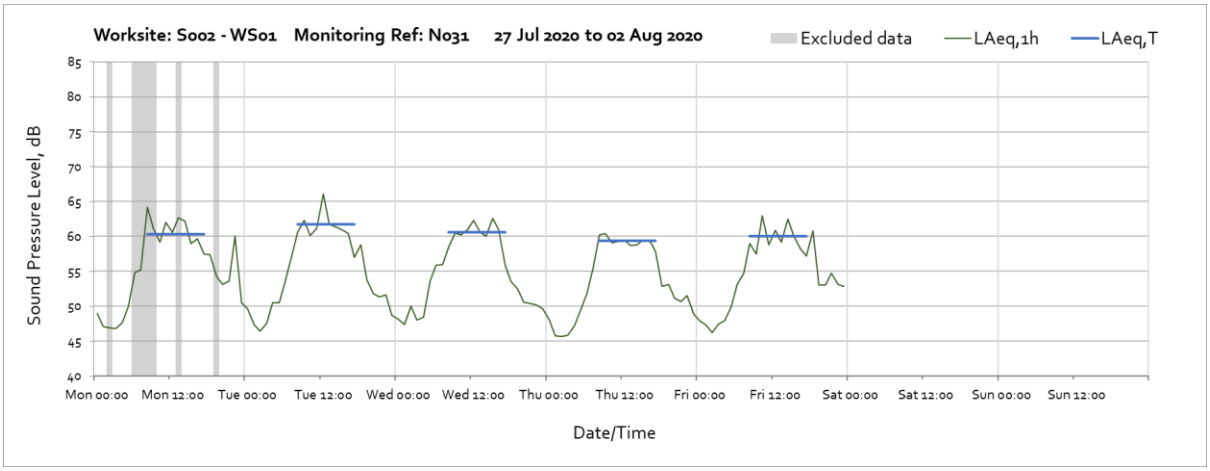
Worksite: S002-WS01 – Monitoring Ref: N031



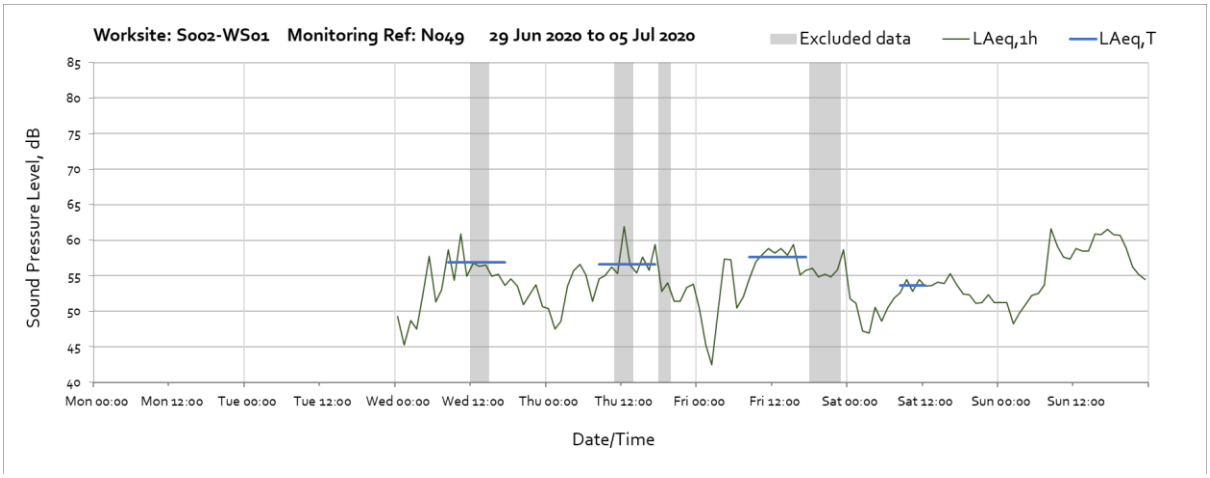


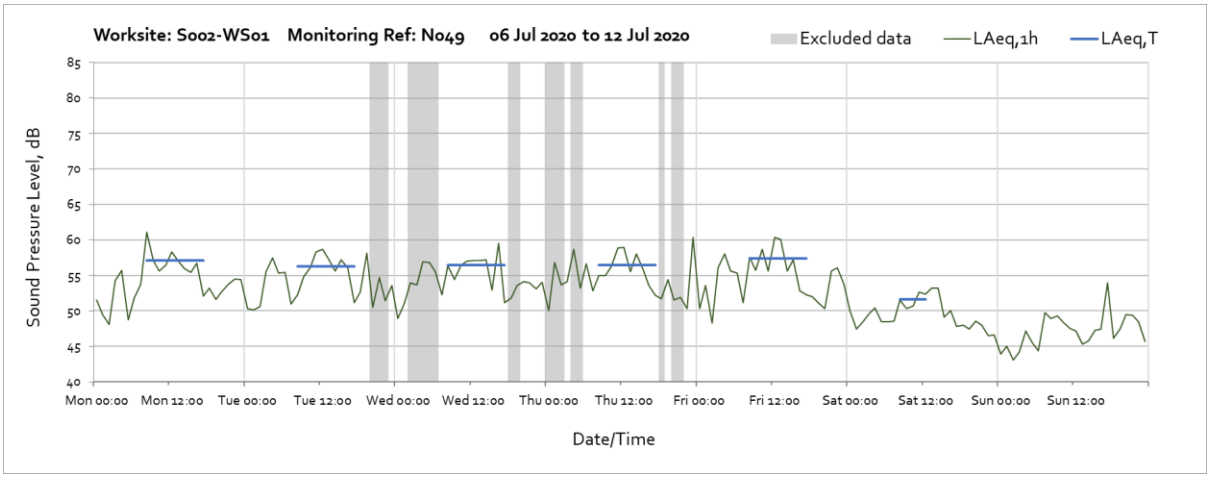






Worksite: S002-WS01 – Monitoring Ref: N049




Worksite: S002-WS01 Monitoring Ref: N049 06 Jul 2020 to 12 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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75
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Tue 12:00
Wed 00:00
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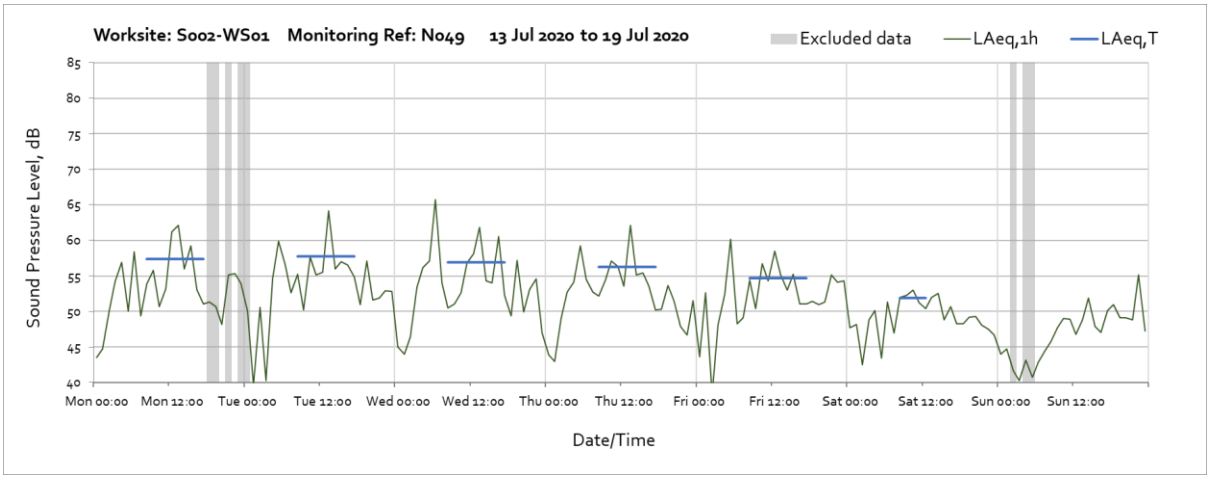
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: S002-WS01 Monitoring Ref: N049 13 Jul 2020 to 19 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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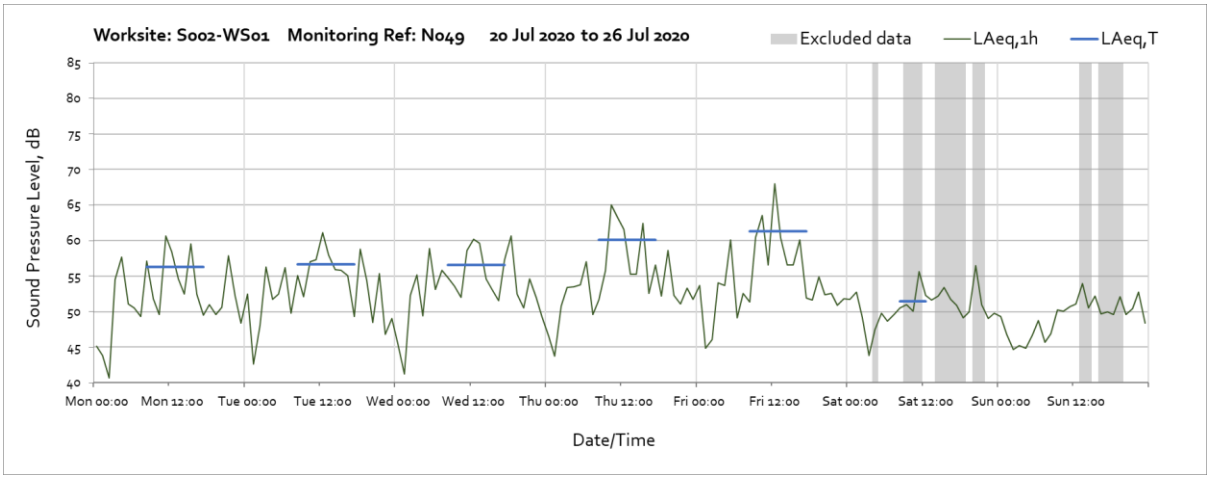
Sun 12:00
Date/Time


Worksite: S002-WS01 Monitoring Ref: N049 20 Jul 2020 to 26 Jul 2020
Excluded data
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LAeq,T
Sound Pressure Level, dB
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80
75
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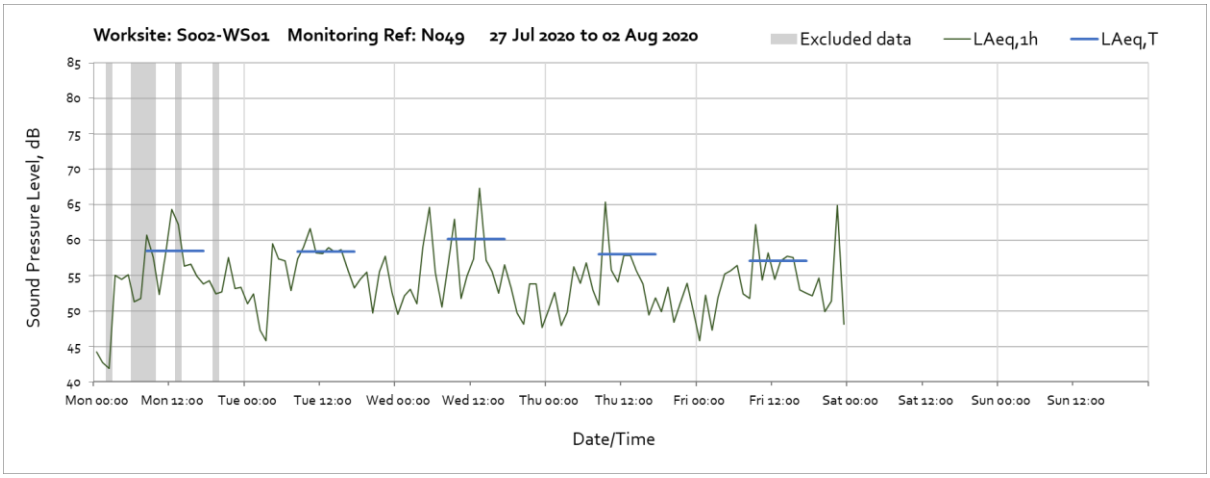
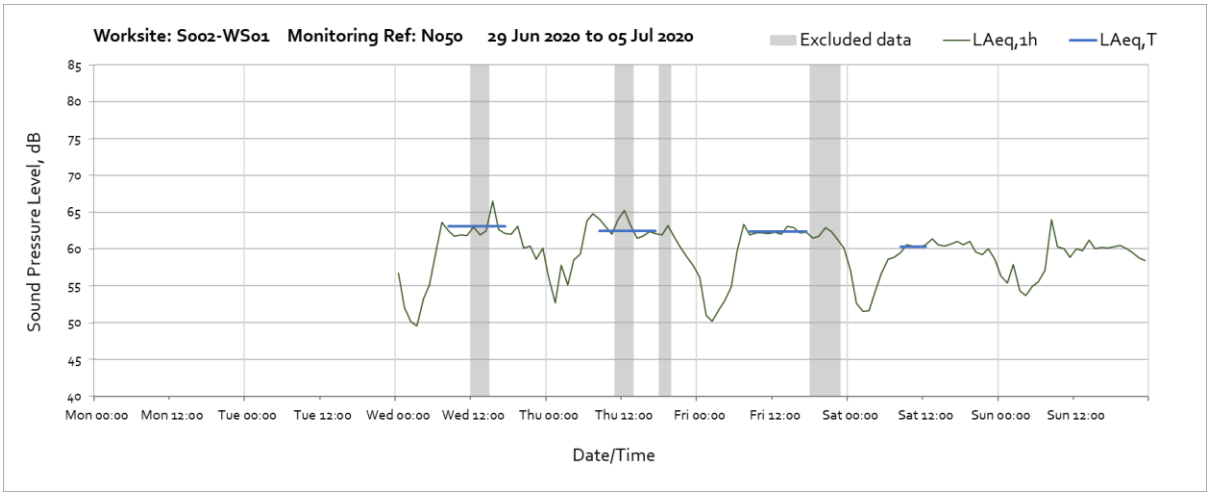
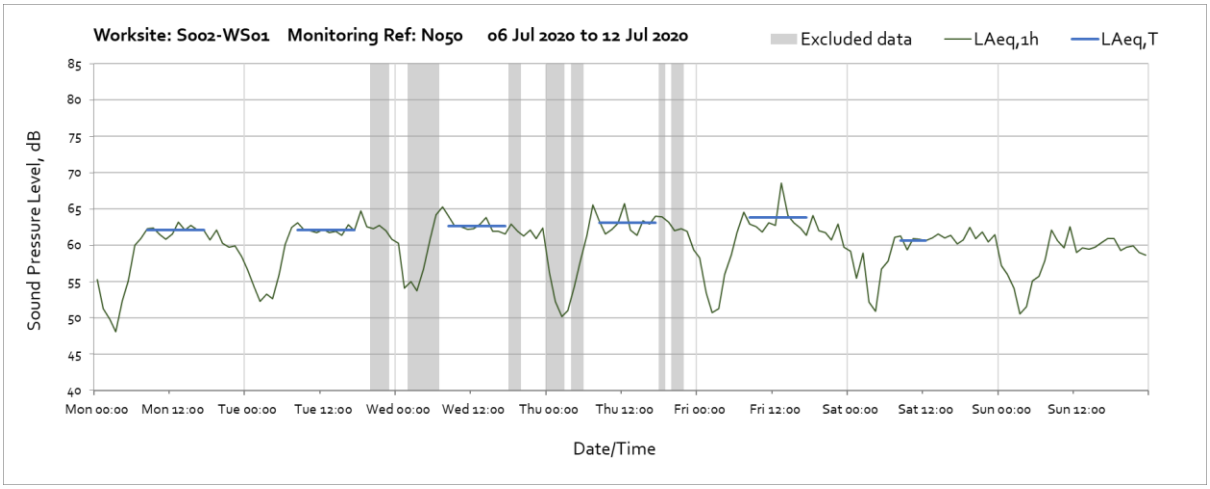
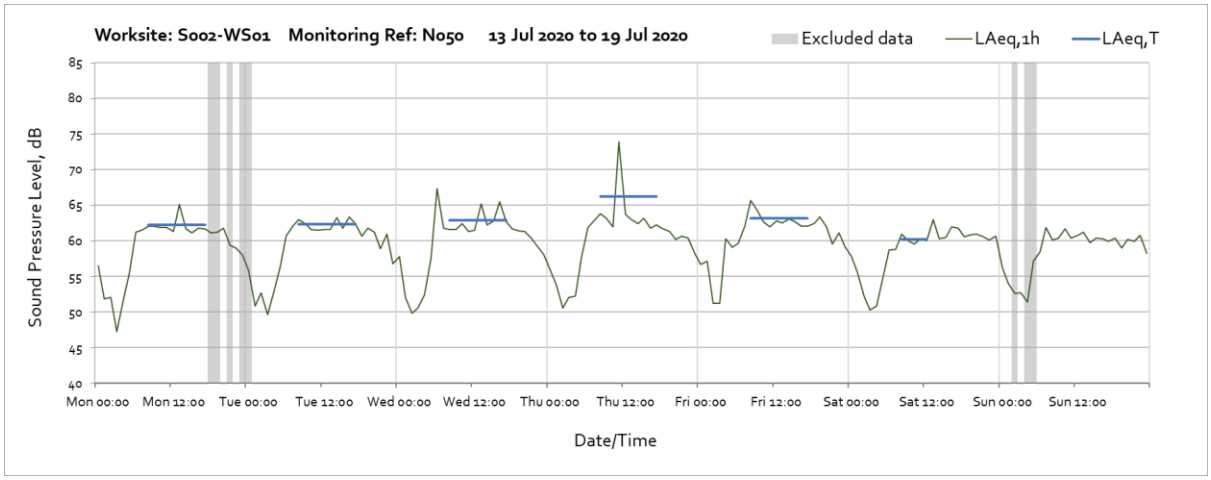
Date/Time

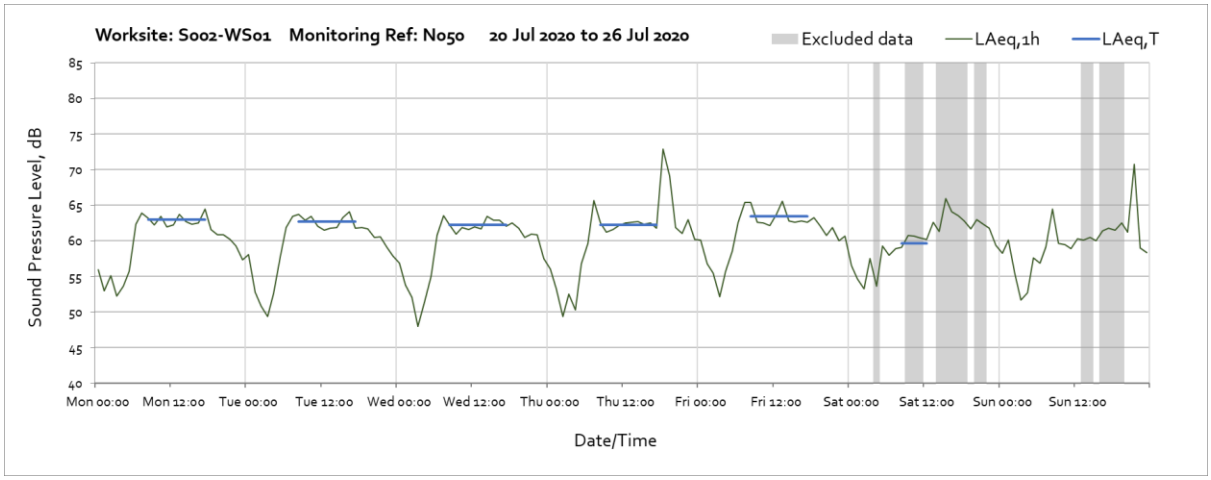


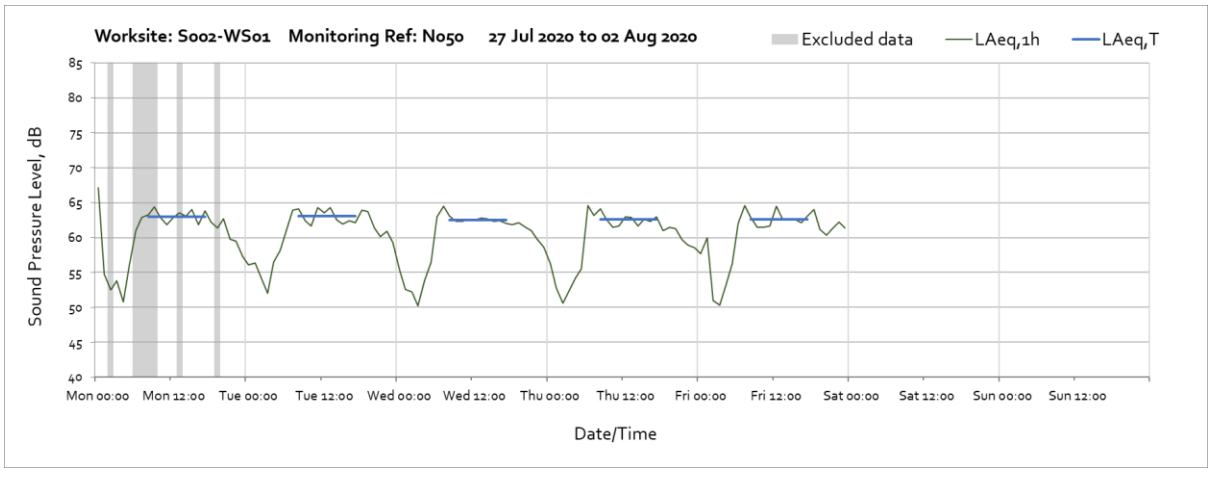
Worksite: S002-WS01 – Monitoring Ref: N050



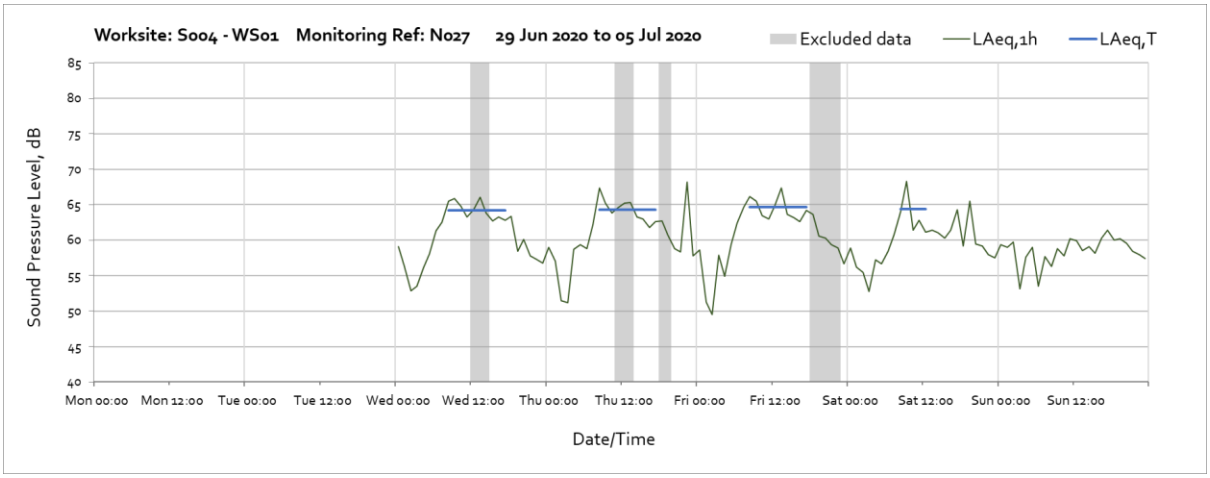


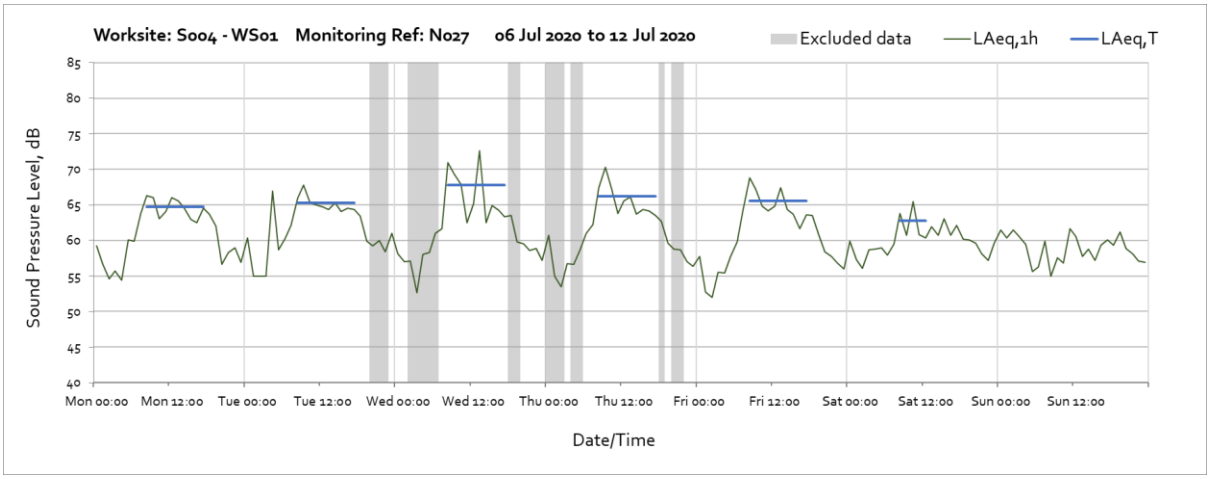

Worksite: S002-WS01 Monitoring Ref: N050 13 Jul 2020 to 19 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

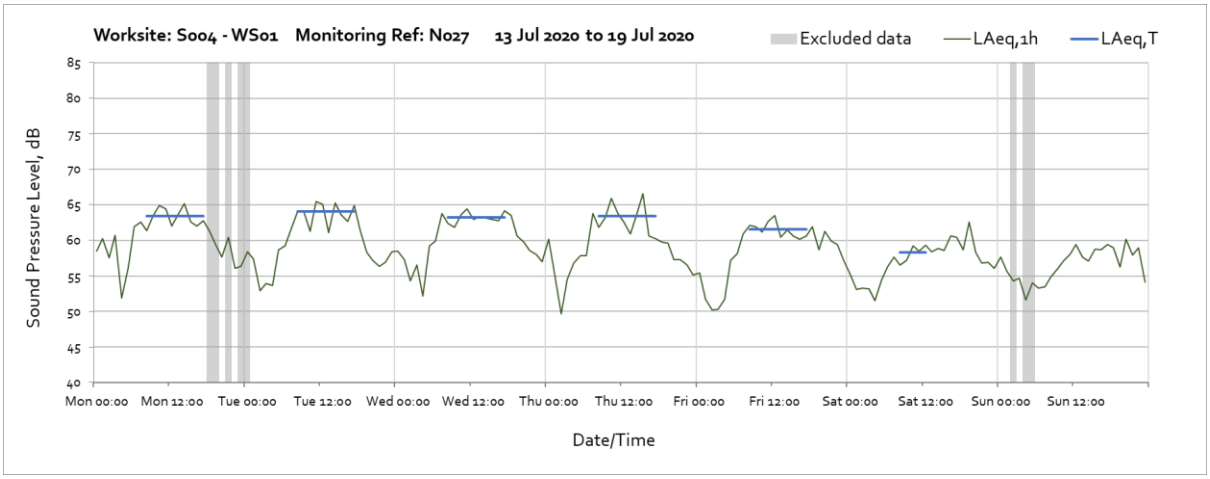

Worksite: S002-WS01 Monitoring Ref: N050 20 Jul 2020 to 26 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

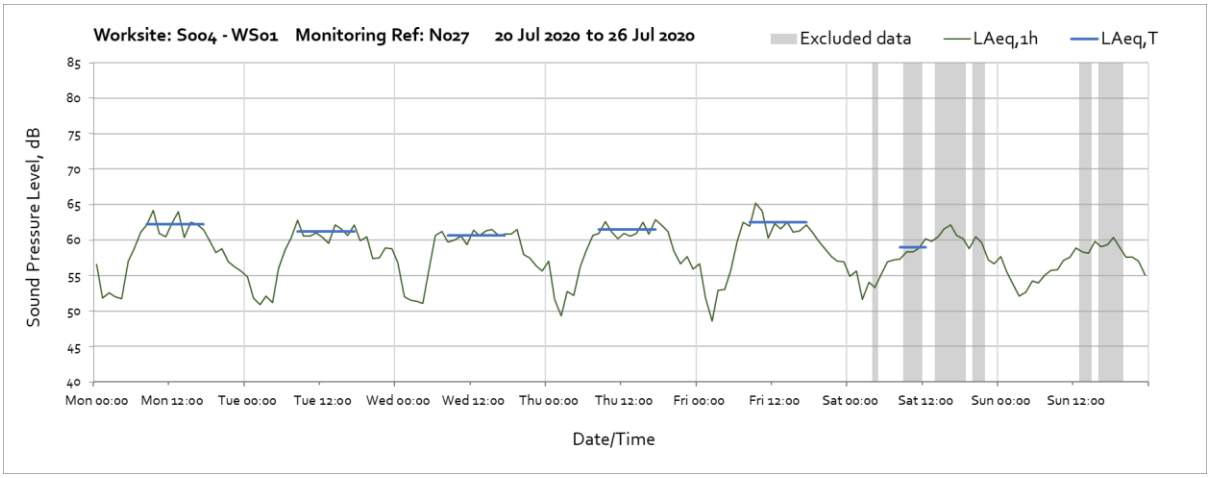

Worksite: S002-WS01 Monitoring Ref: N050 27 Jul 2020 to 02 Aug 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

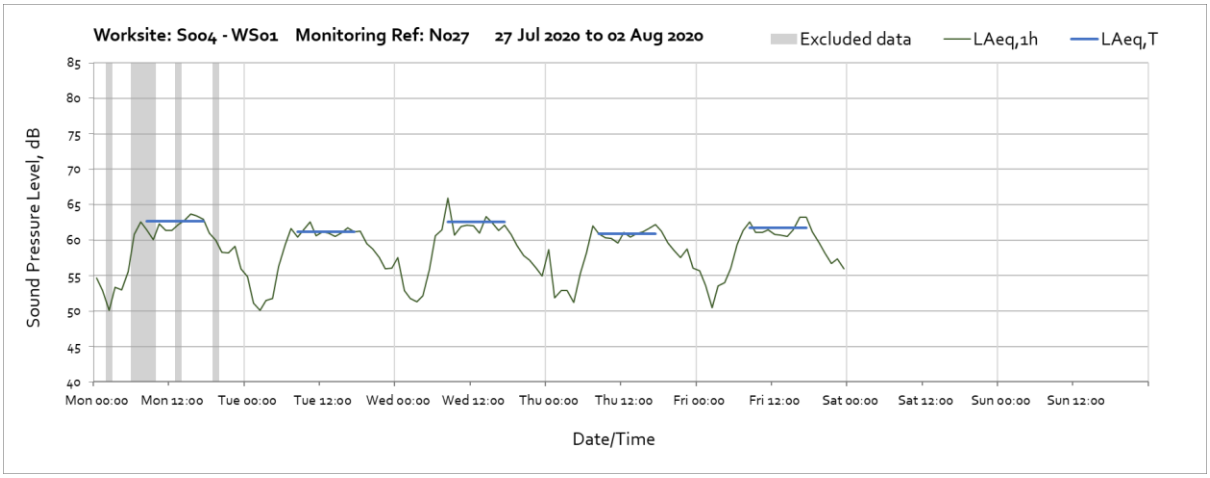
Worksite: S004-WS01 – Monitoring Ref: N027



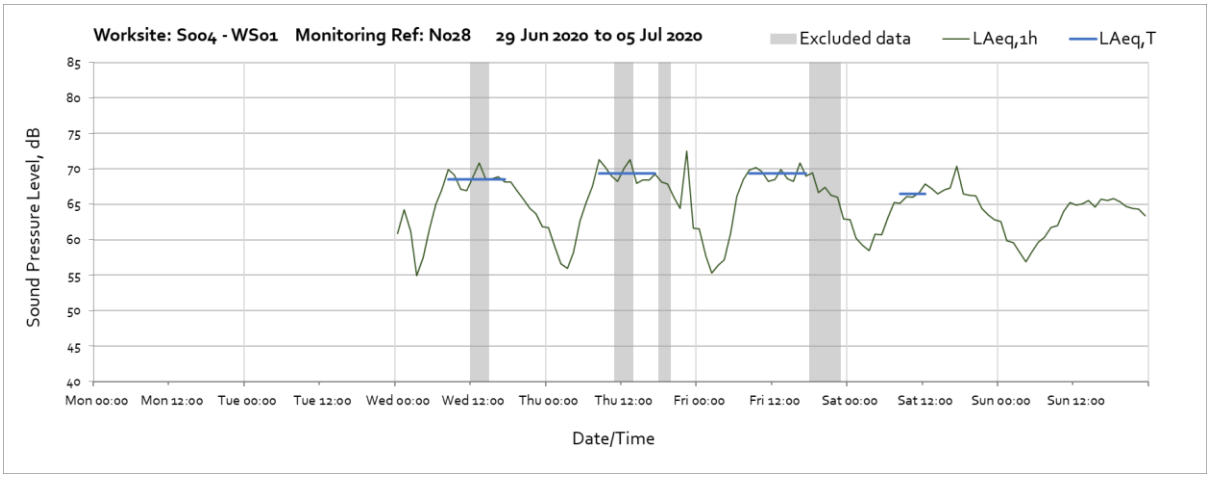


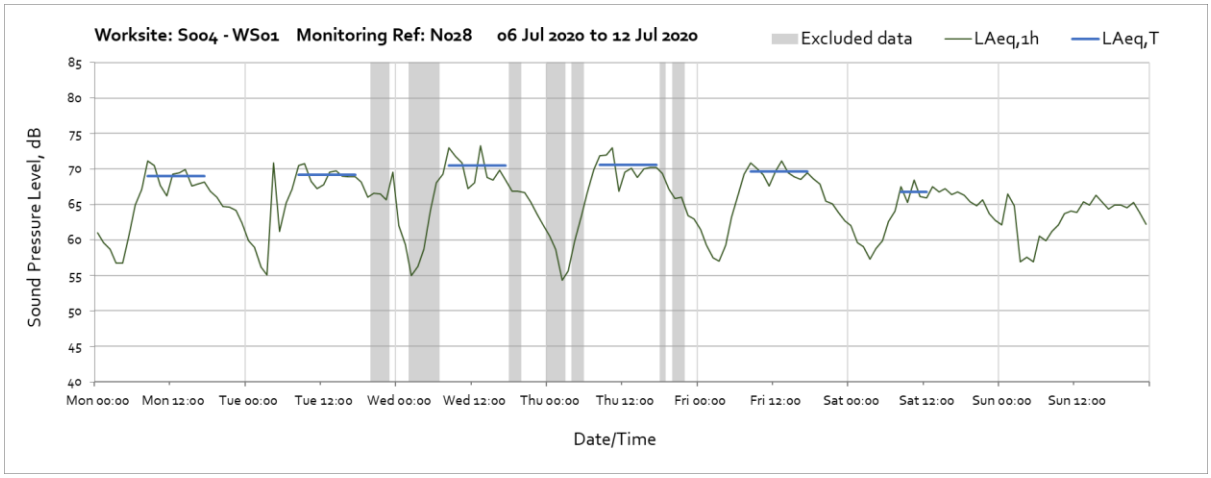


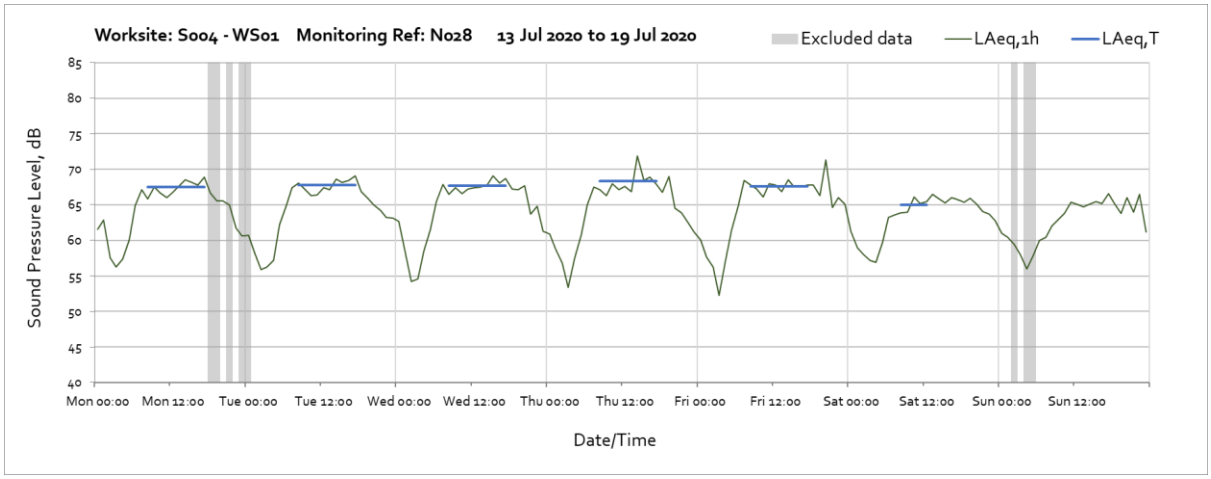


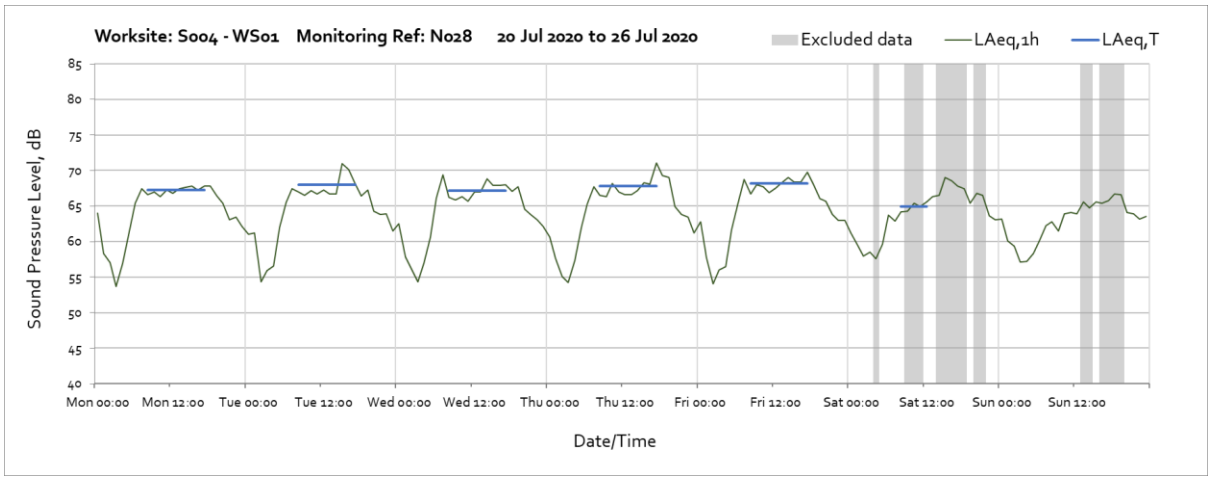


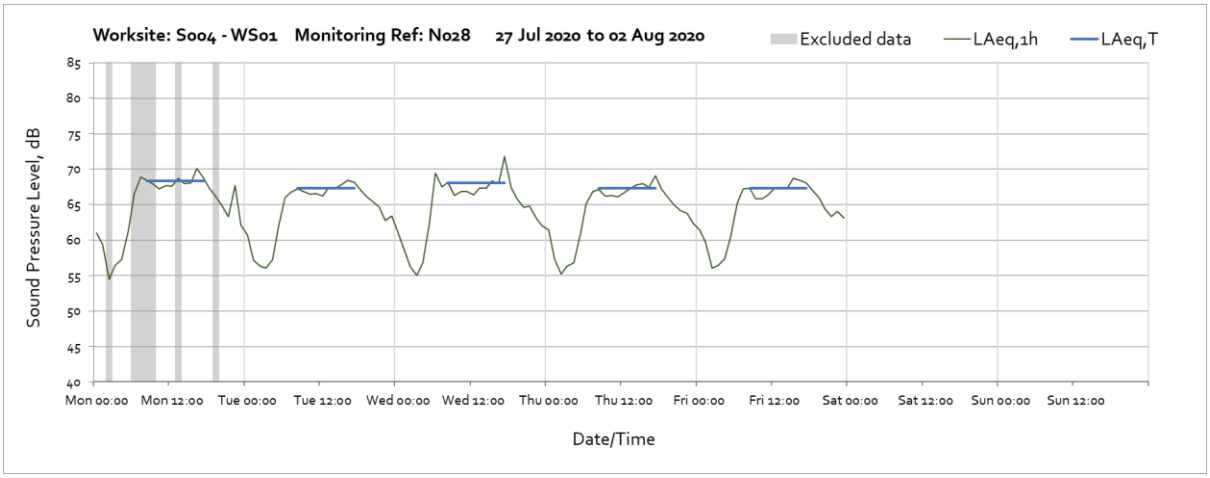
Worksite: S004-WS01 – Monitoring Ref: N028



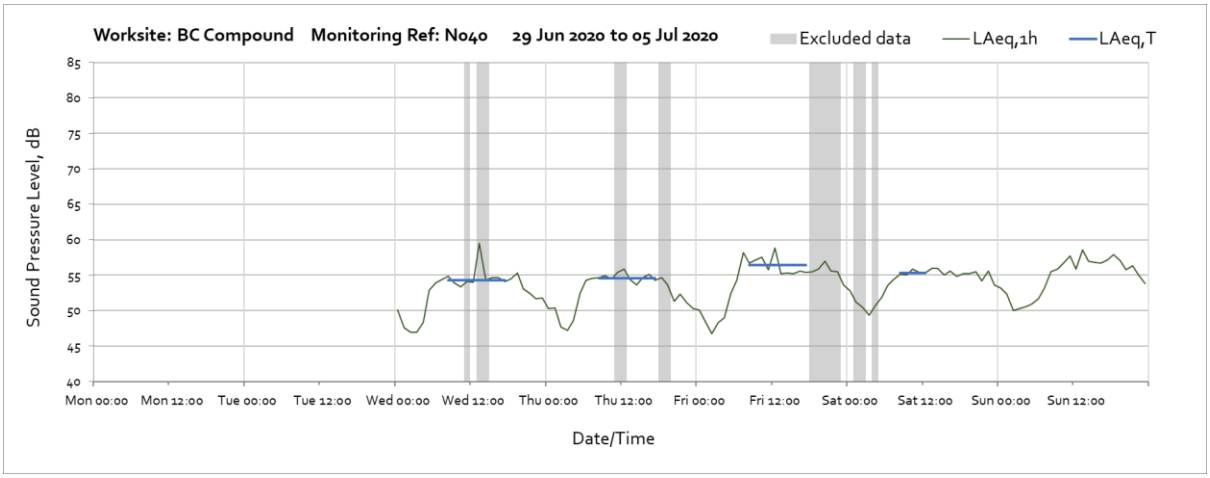

Worksite: S004 - WS01 Monitoring Ref: N028 06 Jul 2020 to 12 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

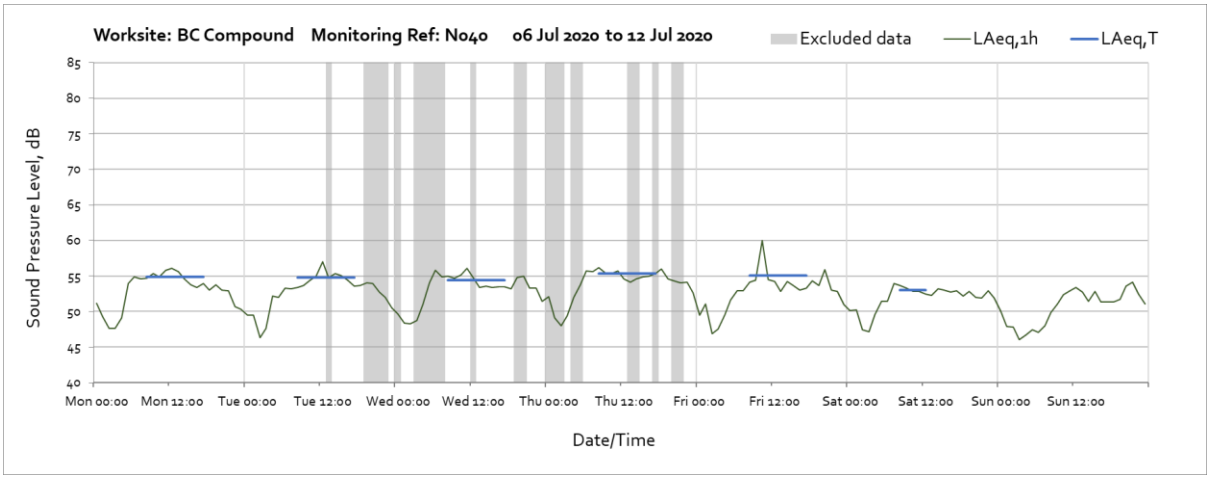

Worksite: S004 - WS01 Monitoring Ref: N028 13 Jul 2020 to 19 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

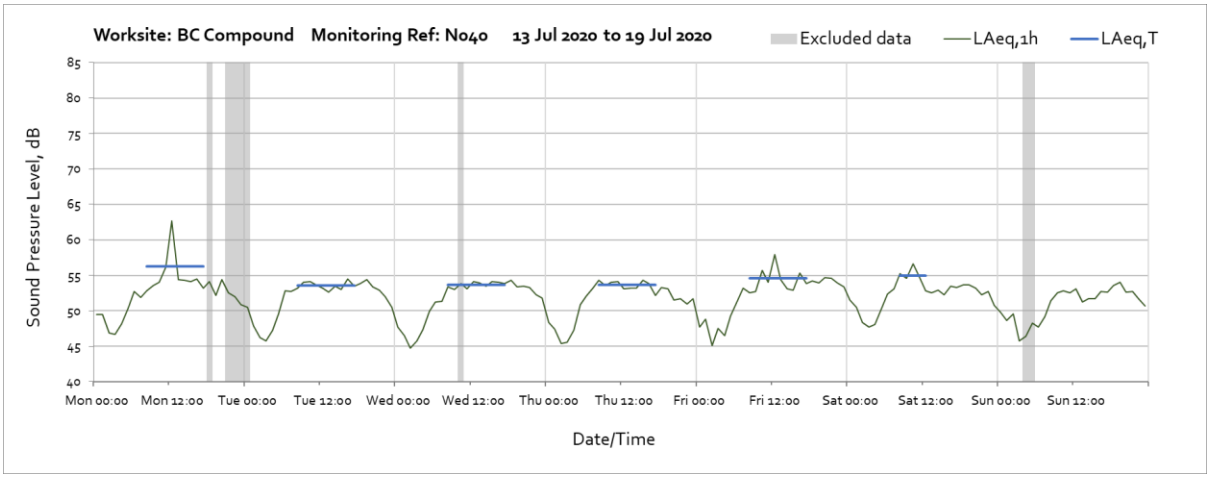

Worksite: S004 - WS01 Monitoring Ref: N028 20 Jul 2020 to 26 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

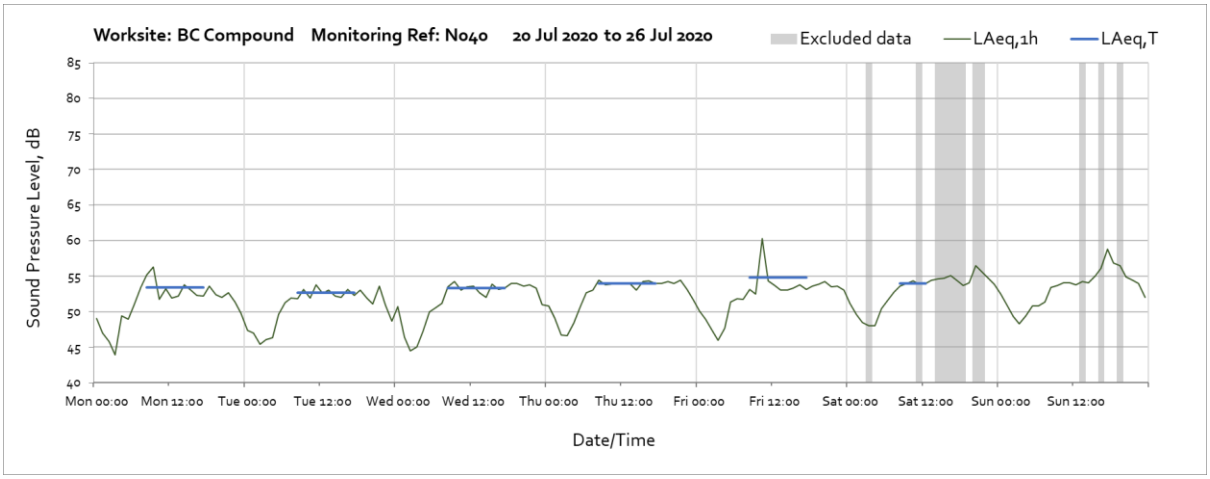


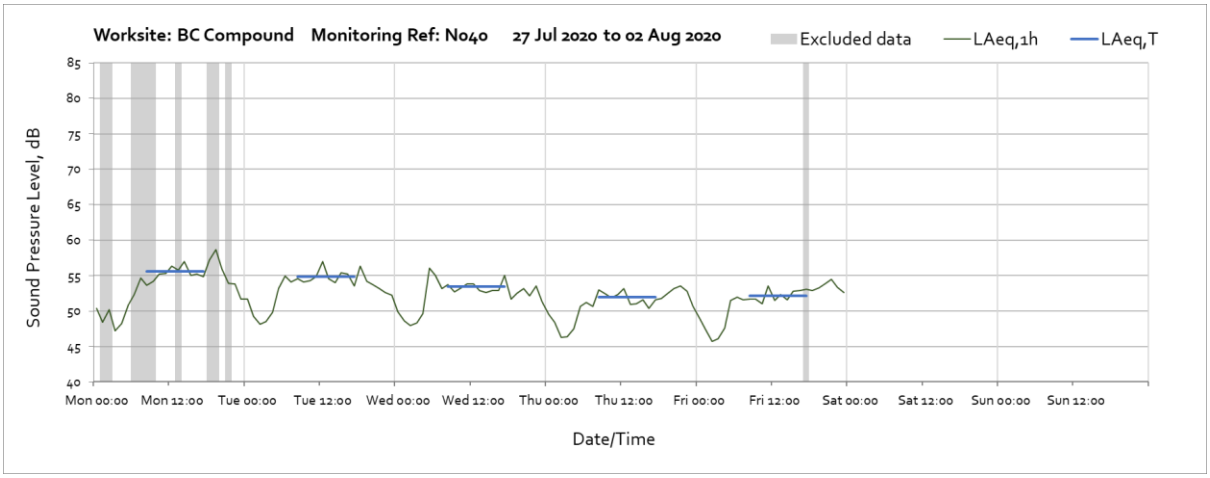
Worksite: BC Compound – Monitoring Ref: N040






Worksite: BC Compound Monitoring Ref: No40 13 Jul 2020 to 19 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

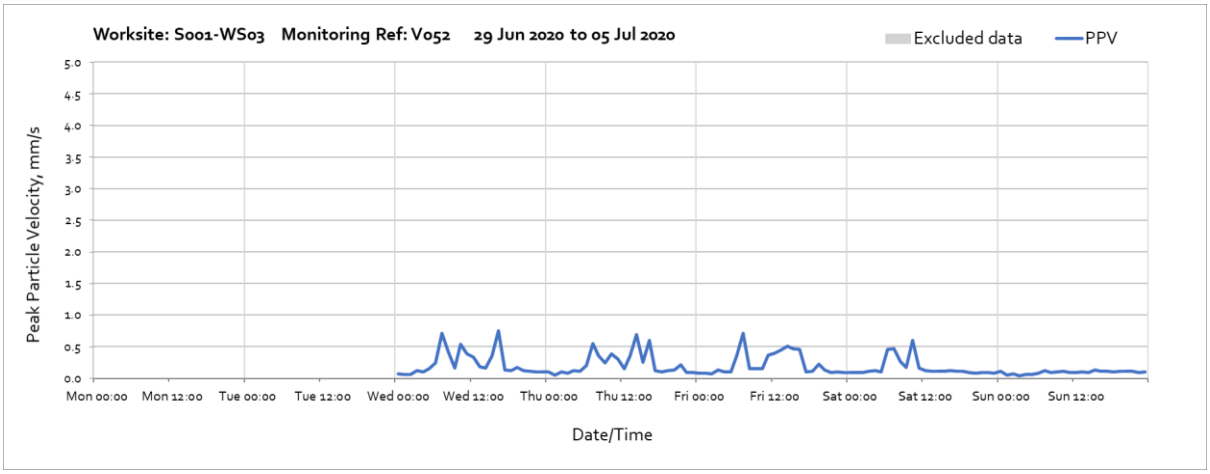

Worksite: BC Compound Monitoring Ref: No40 20 Jul 2020 to 26 Jul 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

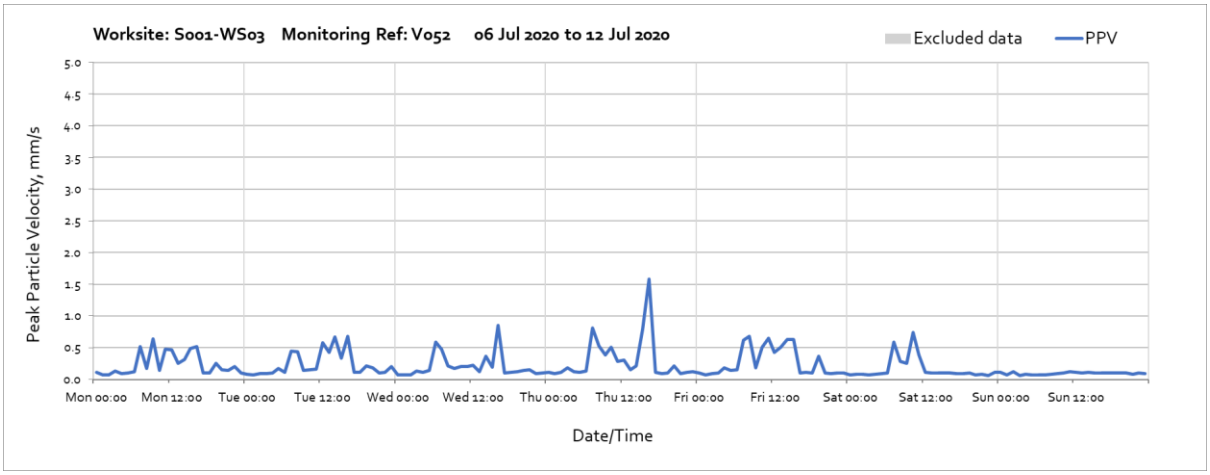

Worksite: BC Compound Monitoring Ref: No40 27 Jul 2020 to 02 Aug 2020
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
70
65
60
55
50
45
40
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

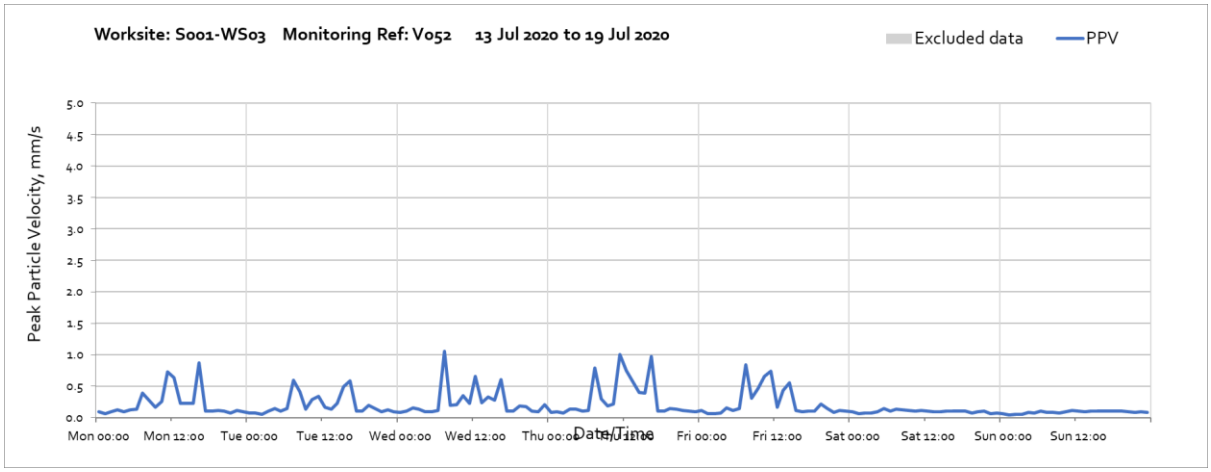
Vibration

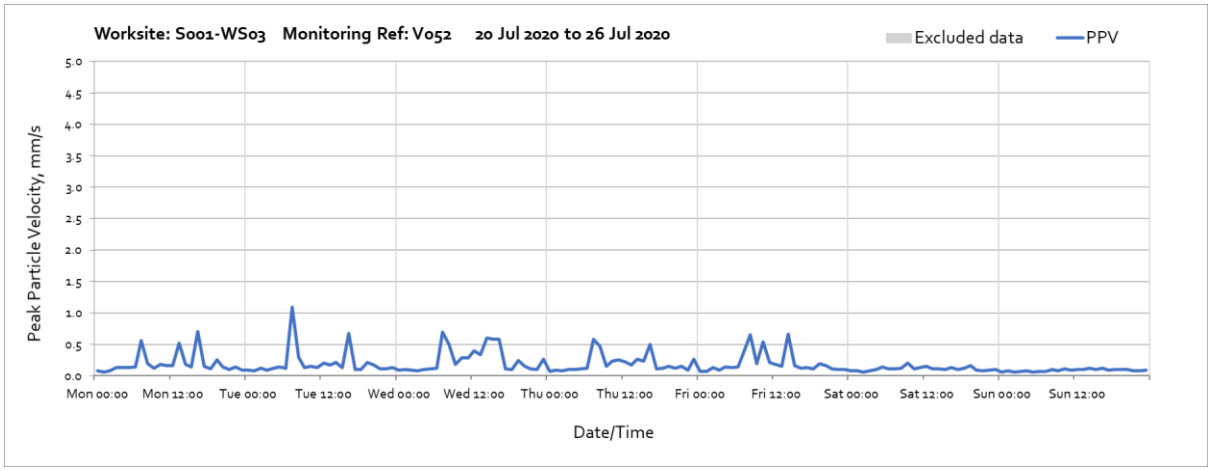
The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the resultant PPV due to vibration components on three orthogonal axis x, y and z. Where high values of PPV were caused by local interference with the vibration monitor, which 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.

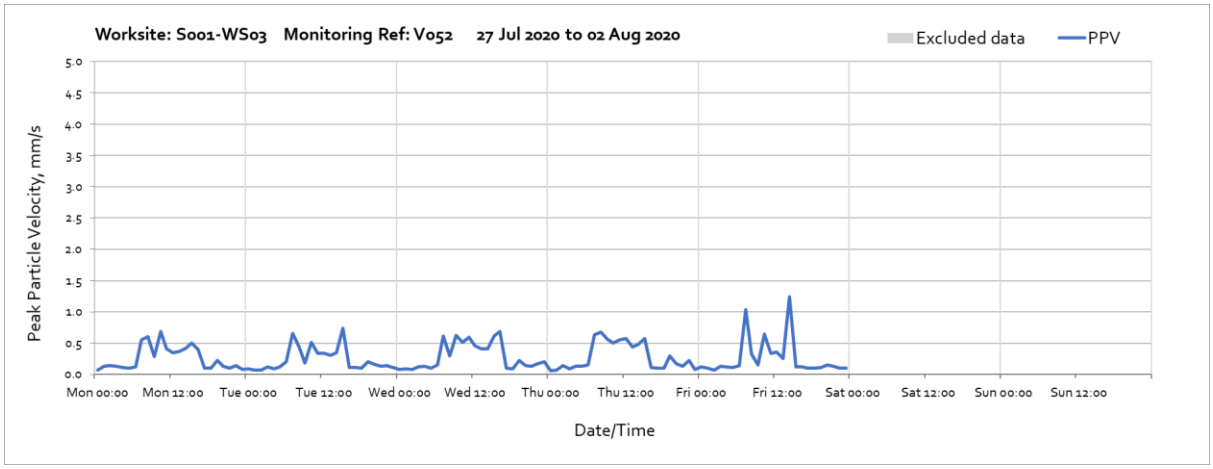
Worksite: S001-WS03 – Monitoring Ref: V052



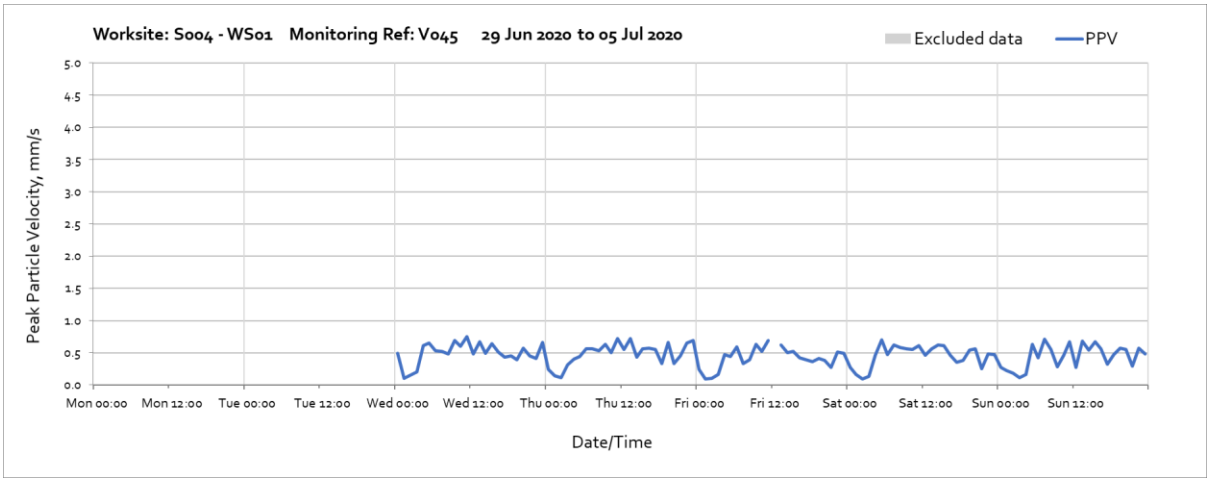



Worksite: S001-WS03 Monitoring Ref: V052 13 Jul 2020 to 19 Jul 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

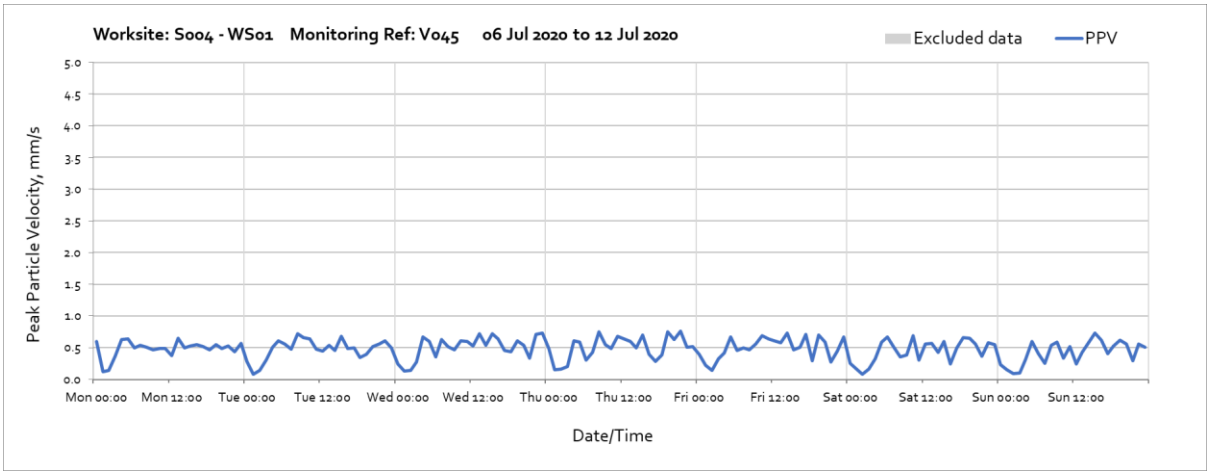

Worksite: S001-WS03 Monitoring Ref: V052 20 Jul 2020 to 26 Jul 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

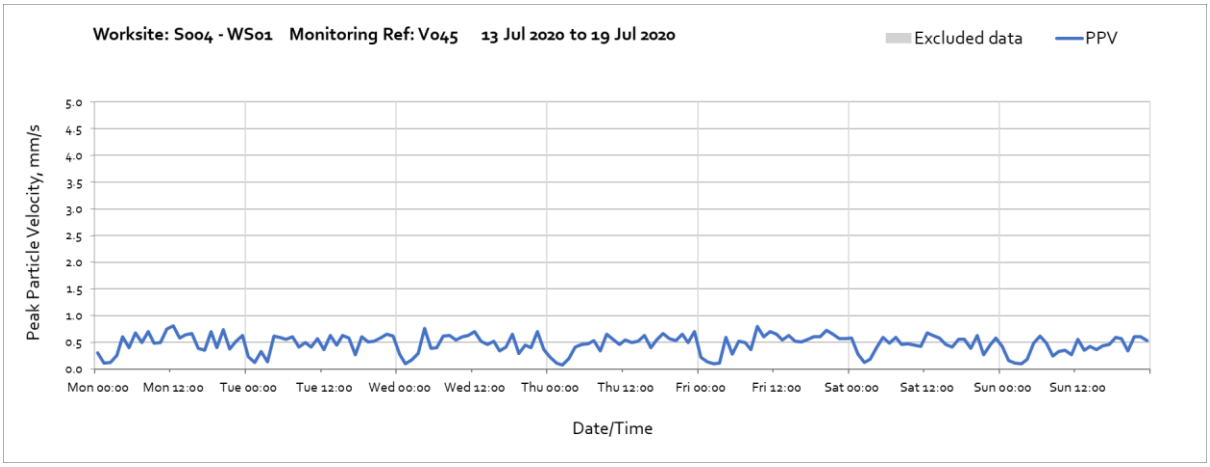

Worksite: S001-WS03 Monitoring Ref: V052 27 Jul 2020 to 02 Aug 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time

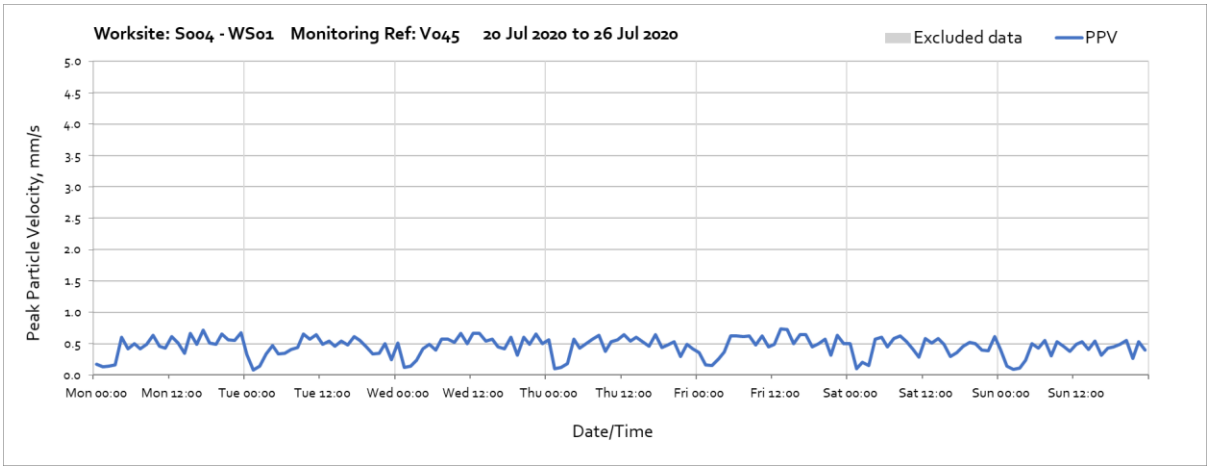
Worksite: S004-WS01 – Monitoring Ref: V045

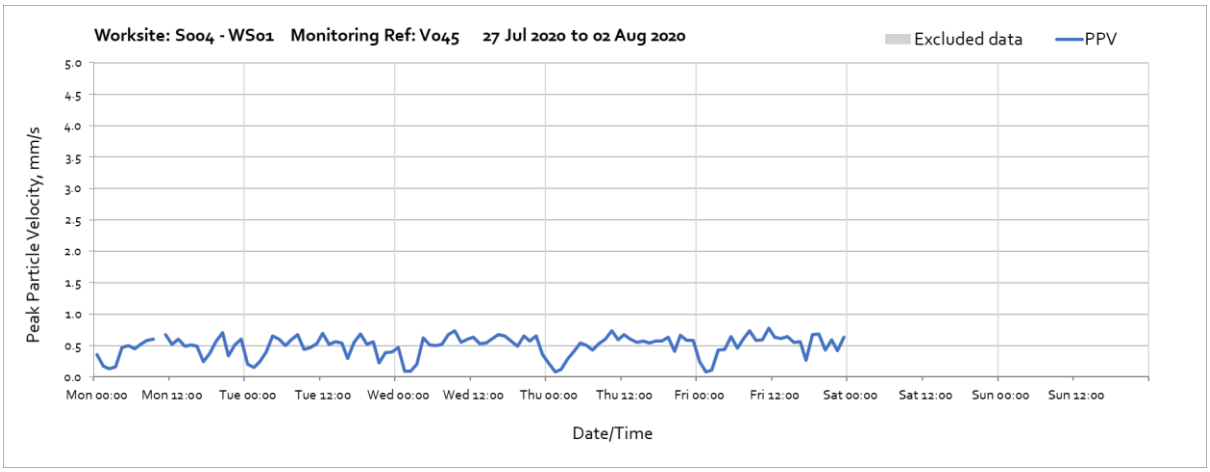


Note: Missing data between 12:00 and 13:00 on Friday 3rd July was due to routine mainetance of the monitoring station.



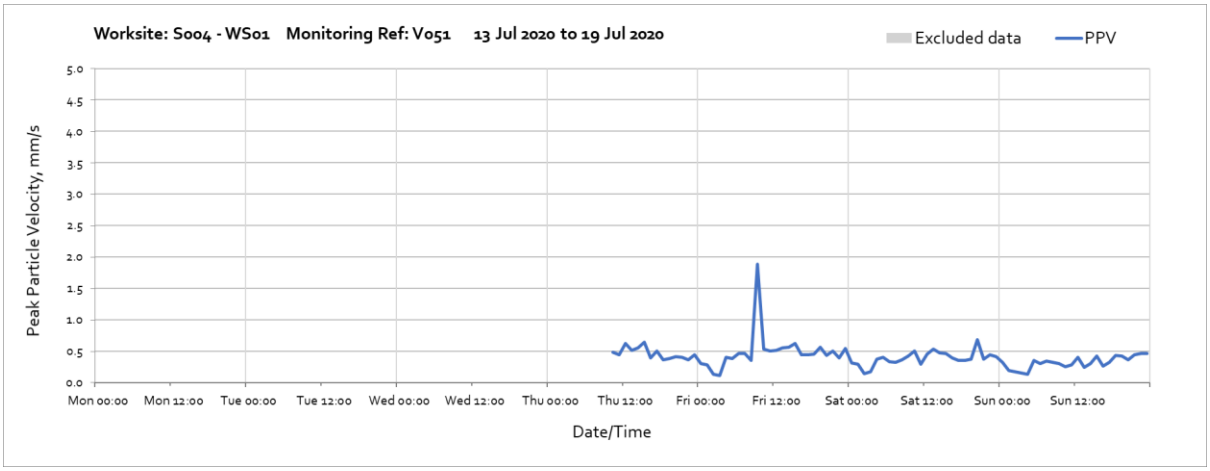




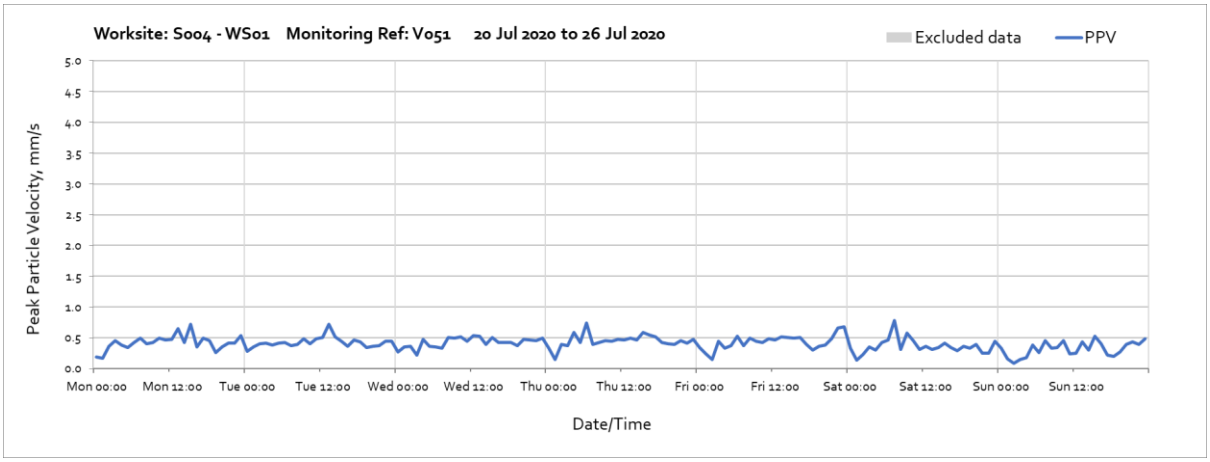


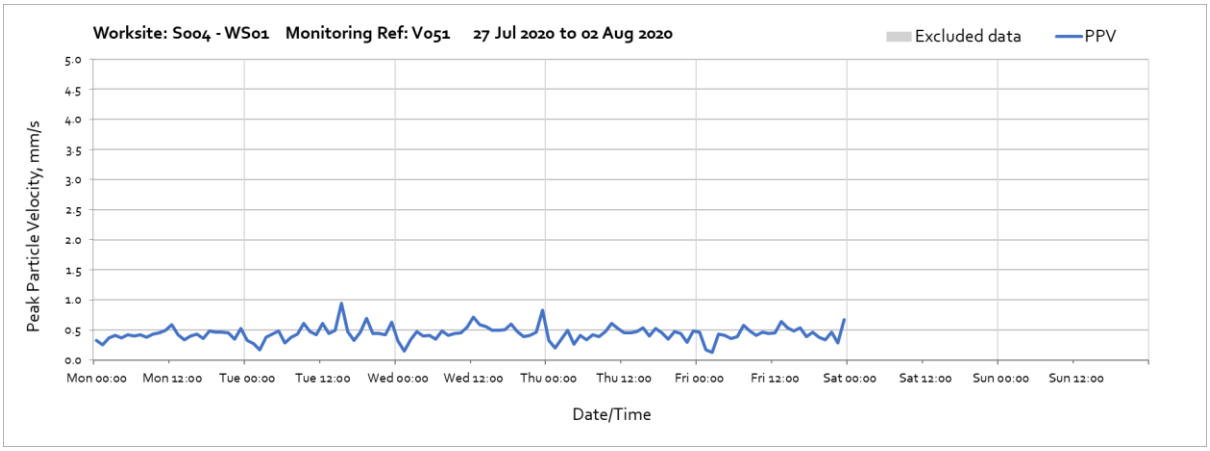
Note: Missing data between 11:00 and 12:00 on Monday 27th July was due to routine maintenance of the monitoring station.

Worksite: S004-WS01 – Monitoring Ref: V051



Note: The monitor was installed at 10:00 on the 16th of July 2020.


Worksite: S004 - WS01 Monitoring Ref: V051 20 Jul 2020 to 26 Jul 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time


Worksite: S004 - WS01 Monitoring Ref: V051 27 Jul 2020 to 02 Aug 2020
Excluded data
PPV
Peak Particle Velocity, mm/s
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
Thu 00:00
Thu 12:00
Fri 00:00
Fri 12:00
Sat 00:00
Sat 12:00
Sun 00:00
Sun 12:00
Date/Time