HS2

October 2021

Construction noise and vibration Monthly Report – August 2021

Solihull Metropolitan District

gov.uk/hs2

List of tables

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 Solihull Metropolitan District (SMD) during the month of August 2021.

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

- Birmingham Interchange Highways Worksite (ref.: WP062), where earthworks, drainage and highway construction were underway.
- A45 Overbridge Satellite Worksite (ref.: A45OS), where demolition and demobilisation works were underway.
- A452 compound (ref.: A452), where no works (or activities) were undertaken in August 2021.
- Park Lane Worksite (ref.: PL) where hydroseeding, material movement and utility diversion works were undertaken.
- Balsall Common Viaduct Worksite (ref.: BCV) where deepening of the existing utility services and construction of plant crossing works was undertaken.
- Carol Green Rail Underbridge Worksite (ref.: CGRU), where stockpiling, transportation of plant onto the site and vegetation clearance activities were underway.
- Waste Lane Overbridge and Satellite Worksite (ref.: WLOS) where installation of piling platforms, site vehicle and heavy plant movements, construction of haul road and site access road, earthworks, construction of bentonite plant, stockpiling and temporary excavation of South Portal Tunnel structure were undertaken.

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

- Between Meriden Road & Diddington Lane (diversion of water main).

There were no 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.

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.

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 Solihull Metropolitan District (SMD) for the period 1st to 31st August 2021.

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

- Birmingham Interchange Highway / WP062 worksite, reference - WP062 (see plan 1 in Appendix A), where work activities included:
  - drainage and earthworks for construction of ramp up to the new bridge over the M42; and
  - construction of the new carriageway at the existing M42 island.
- A45 Overbridge Satellite worksite, reference – A45OS (see plan 2 in Appendix A), where work activities included:
  - demolition works; and
  - demobilisation works.
- A452 worksite, reference - A452 (see plan 3 in Appendix A), where the worksite was inactive with no construction activity undertaken in the month of August.
- Park Lane worksite, reference - PL (see plan 3 and 4 in Appendix A), where work activities included:
  - hydroseeding;

- material movement; and
- utility diversion along Park Lane central reservation

- Balsall Common Viaduct worksite, reference - BCV (see plan 5 in Appendix A), where work activities included:
  - deepening the existing utility services; and
  - construction of plant crossings.
- Carol Green Rail Underbridge worksite, reference - CGRU (see plan 5 in Appendix A), where work activities included:
  - material stockpiling;
  - transportation of plant to the site; and
  - vegetation clearance.
- Waste Lane Overbridge and Satellite worksite, reference WLOS (see plan 5 in Appendix A), where work activities included:
  - installation of piling platforms;
  - site vehicle and heavy plant movements;
  - construction of haul road between Cromwell Lane and Waste Lane and site access road;
  - earthworks on Kenilworth Greenway;
  - construction of bentonite plant;
  - material stockpiling; and
  - temporary excavation of South Portal Tunnel structure.

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

- Between Meriden Road & Diddington Lane (diversion of water main).

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

1.2 Measurement Locations

1.2.1 Thirteen noise and two vibration monitoring installations were active in August in the SMD area. Table 2 summarises the position of noise and vibration monitoring installations within the SMD area in August 2021.

1.2.2 The noise monitors at Waste Lane Overbridge and Satellite worksite have been renamed to be consistent across all internal documents.

1.2.3 The noise monitor WLOS-2 was reinstated on 10th August 2021 after it was removed in July due to a serious ant infestation causing damage to equipment.

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

Table 2: Monitoring Locations

Worksite Reference	Measurement Reference	Address
WP062	WP062-1	Birmingham Business Park, Solihull Parkway, Solihull
	WP062-2	Holiday Inn Express, Bickenhill Parkway, Solihull
A45 Overbridge Satellite	A45OS-1	Traffix and Adjuvo offices, Coventry Road, Solihull
	A45OS-V1	Traffix and Adjuvo offices, Coventry Road, Solihull
A452 compound	A452-1	Marsh House Farm, Brandocks Marsh, Solihull
Park Lane	PL-1	Park Lane, Balsall Common, Solihull
	PL-2	The Laurel, Lavender Hall Lane, Balsall Common, Solihull
	PL-3	Holly Acre Lodge, Kenilworth Road, Solihull
	PL-4	Top Lodge, Kenilworth Road, Solihull
Balsall Common Viaduct	BCV-1	Cherry Tree Cottage, Truggist Lane, Balsall Common, Solihull
Carol Green Rail Underbridge	CGRU-1	The Stables, Truggist Lane, Balsall Common, Solihull
Waste Lane Overbridge and Satellite	WLOS-1	19 Hodgetts Lane, Burton Green, Warwickshire
	WLOS-2	Little Beanitt Farm, Waste Lane, Balsall Common, Solihull
	WLOS-3	Dragonflies, Waste Lane, Balsall Common, Solihull
	WLOS-V1	19 Hodgetts Lane, Burton Green, Warwickshire

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	Weekly Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
WP062	WP062-1	Birmingham Business Park	Free-field	61.3	63.0	59.6	59.1	56.4	57.4	62.0	60.6	59.5	55.3	60.8	56.6
				(64.3)	(70.0)	(63.8)	(68.0)	(64.8)	(61.6)	(65.5)	(68.7)	(72.1)	(68.3)	(70.8)	(63.5)
	WP062-2	Holiday Inn Express	Free-field	62.8	61.5	60.7	59.5	57.9	59.0	60.2	60.2	59.0	53.9	58.6	55.9
				(72.2)	(64.2)	(64.9)	(64.5)	(63.6)	(61.4)	(61.5)	(61.4)	(64.4)	(59.5)	(64.9)	(62.1)
A45 Overbridge Satellite	A45OS-1	Traffix and Adjuvo offices	Free-field	63.4	61.8	60.5	60.2	57.7	56.0	56.7	60.5	59.2	59.3	63.2	57.3
				(67.5)	(65.3)	(61.5)	(64.6)	(65.0)	(56.0)	(56.7)	(62.4)	(62.0)	(73.8)	(69.4)	(61.3)
A452 Compound	A452-1	Marsh House Farm	Free-field	45.9	45.1	45.2	43.3	40.7	47.7	46.1	43.5	44.3	40.6	42.6	39.6
				(47.3)	(48.5)	(46.3)	(47.1)	(48.6)	(47.7)	(46.1)	(46.7)	(47.4)	(46.5)	(45.9)	(49.2)
Park Lane	PL-1	Park Lane	Free-field	56.3	59.5	49.3	46.2	43.3	47.7	49.7	46.8	48.8	47.8	46.3	41.2
				(61.9)	(63.8)	(52.1)	(55.8)	(52.9)	(47.7)	(49.7)	(50.5)	(52.3)	(76.2)	(52.2)	(49.7)
	PL-2	The Laurel	Free-field	45.5	47.0	47.5	44.7	39.3	44.4	47.6	46.9	50.2	40.1	43.9	39.2
				(46.4)	(49.4)	(53.0)	(50.0)	(46.4)	(44.4)	(47.6)	(48.8)	(56.3)	(46.4)	(47.5)	(46.8)
	PL-3	Holly Acre Lodge	Free-field	51.5	52.5	52.9	48.8	44.6	49.7	53.0	51.8	49.9	48.1	48.5	44.9
				(52.9)	(56.9)	(54.2)	(52.8)	(52.6)	(49.7)	(53.0)	(53.3)	(54.7)	(67.8)	(58.4)	(57.1)
	PL-4	Top Lodge	Free-field	65.8	67.5	63.9	61.6	58.4	61.8	66.4	65.5	64.5	54.2	63.3	55.9
				(71.3)	(70.6)	(70.9)	(70.3)	(71.6)	(66.4)	(69.3)	(69.5)	(70.4)	(63.9)	(73.0)	(67.8)

Worksite Reference	Measurement Reference	Site Address	Free-field or Façade Measurement	Weekly Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Saturday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)					Sunday / Public Holiday Average $L_{Aeq,T}$ (highest day $L_{Aeq,T}$)	
				0700 - 0800	0800 - 1800	1800 - 1900	1900 - 2200	2200 - 0700	0700 - 0800	0800 - 1300	1300 - 1400	1400 - 2200	2200 - 0700	0700 - 2200	2200 - 0700
Balsall Common Viaduct	BCV-1	Cherry Tree Cottage	Free-field	47.4 (50.8)	53.8 (59.3)	47.6 (51.8)	46.7 (49.8)	45.8 (52.9)	48.1 (52.3)	51.3 (55.8)	49.0 (52.0)	48.9 (53.7)	40.2 (48.9)	48.4 (53.7)	44.7 (49.7)
Carol Green Rail Underbridge	CGRU-1	The Stables	Free-field	53.1 (64.1)	56.9 (66.2)	50.4 (61.0)	48.8 (59.8)	47.8 (54.8)	48.9 (53.3)	50.3 (54.4)	49.7 (54.4)	50.6 (57.1)	43.1 (56.2)	51.3 (63.4)	46.6 (52.5)
Waste Lane Overbridge and Satellite WP062	WLOS-1	19 Hodgetts Lane	Free-field	41.6 (47.8)	62.8 (70.0)	40.9 (48.6)	39.6 (50.3)	34.7 (43.3)	40.4 (42.1)	47.4 (66.0)	40.3 (42.2)	40.5 (47.6)	37.1 (46.7)	42.1 (53.0)	34.5 (43.1)
	WLOS-2	Waste Lane (East)	Free-field	60.9 (62.2)	63.5 (68.9)	60.6 (61.5)	57.9 (62.4)	51.3 (58.6)	55.7 (56.6)	59.8 (60.4)	60.1 (60.9)	58.7 (61.4)	50.9 (55.2)	58.9 (62.2)	50.9 (58.1)
	WLOS-3	Waste Lane (West)	Free-field	57.6 (61.0)	60.0 (65.6)	57.9 (64.7)	54.7 (59.8)	48.3 (56.8)	52.9 (53.7)	57.1 (58.8)	56.9 (58.0)	55.9 (59.8)	47.1 (57.4)	54.7 (58.0)	47.0 (54.2)

2.1.2 Table 4 presents a summary of the measured vibration levels at the monitoring location over the reporting period. The highest PPV measured during the monitoring along any axis is presented in the table.

Table 4: Summary of Measured PPV Data over the Monitoring Period

Worksite Reference	Measurement Reference	Monitor Address	Highest PPV measured in any axis, mm/s
A45OS	A45OS-V1	Traffix and Adjuvo offices, Coventry Road, Solihull	5.17* (X-axis)
WLOS	WLOS-V1	19 Hodgetts Lane, Burton Green, Warwickshire, CV8 1PH	6.79* (Y-axis)

* High vibration levels are due to construction activities undertaken in proximity of the vibration monitor. The nearest residential receptors are further from the works and vibration levels at the receptor will therefore be lower.

2.1.3 Appendix C presents graphs of the noise and vibration monitoring data over the month for each of the measurement locations. Noise data presented consists of the hourly L_{Aeq} values and, where relevant, the $L_{Aeq,T}$ values (where the time period T has been taken to be the averaging period as specified in Table 1 of HS2 Information Paper E23). Vibration data presented consist of hourly PPV values. The full data set for the monitoring equipment can be found at the following location: https://data.gov.uk/dataset/24542ae7-dd44-444f-b259-871c4cc43b5e/environmental-monitoring-data.

2.2 Exceedances of the LOAEL and SOAEL

2.2.1 The lowest observed adverse effect level (LOAEL) is defined in the Planning Practice Guidance – Noise (PPG) as the level above which "noise starts to cause small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life".

2.2.2 The significant observed adverse effect level (SOAEL) is defined in the 'Planning Practice Guidance – Noise' as the level above which "noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area."

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

2.2.4 Where reported construction noise levels exceed the LOAEL and SOAEL, relevant periods will be identified. Summary statistics to evaluate ongoing qualification for noise insulation and temporary rehousing are also presented where relevant.

2.2.5 Table 5 presents a summary of recorded exceedances of the LOAEL and SOAEL 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 LOAEL	Number of exceedances of SOAEL
WP062	WP062-1	Birmingham Business Park	All Days	All Periods	Not applicable*	Not applicable*
	WP062-2	Holiday Inn Express	All Days	All Periods	Not applicable*	Not applicable*
A45 Overbridge Satellite	A45OS-1	Traffix and Adjuvo offices	Weekday	All Periods	Not applicable	Not applicable
A452 Compound	A452-1	Marsh House Farm	Weekday	All Periods	No exceedance	No exceedance
Park Lane	PL-1**	Park Lane	Weekday	All Periods	No exceedance	No exceedance
	PL-2**	The Laurel	Weekday	All Periods	No exceedance	No exceedance
	PL-3	Holly Acre Lodge	Weekday	All Periods	No exceedance	No exceedance
	PL-4	Top Lodge	Weekday Saturday	0800-1800 0800-1300	21 3	No exceedance
Balsall Common Viaduct	BCV-1**	Cherry Tree Cottage	Weekday	All Periods	No exceedance	No exceedance
Carol Green Rail Underbridge	CGRU-1**	The Stables	Night	All Periods	No exceedance	No exceedance
Waste Lane Overbridge and Satellite	WLOS-1**	19 Hodgetts Lane	Weekday	0800-1800	3	No exceedance
	WLOS-2**	Waste Lane (East)	All Days	All Periods	No exceedance	No exceedance

Worksite Reference	Measurement Reference	Site Address	Day (Weekday, Saturday, Sunday, Night)	Time period	Number of exceedances of LOAEL	Number of exceedances of SOAEL
	WLOS-3**	Waste Lane (West)	All Days	0800-1800	1	No exceedance

*The defined LOAEL and SOAEL criteria are not applicable to non-residential properties.

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

2.2.6 No exceedances of SOAEL were recorded due to HS2 construction works during August 2021. LOAEL exceedances were recorded during core working hours at monitor PL-4, WLOS-1 and WLOS-3.

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

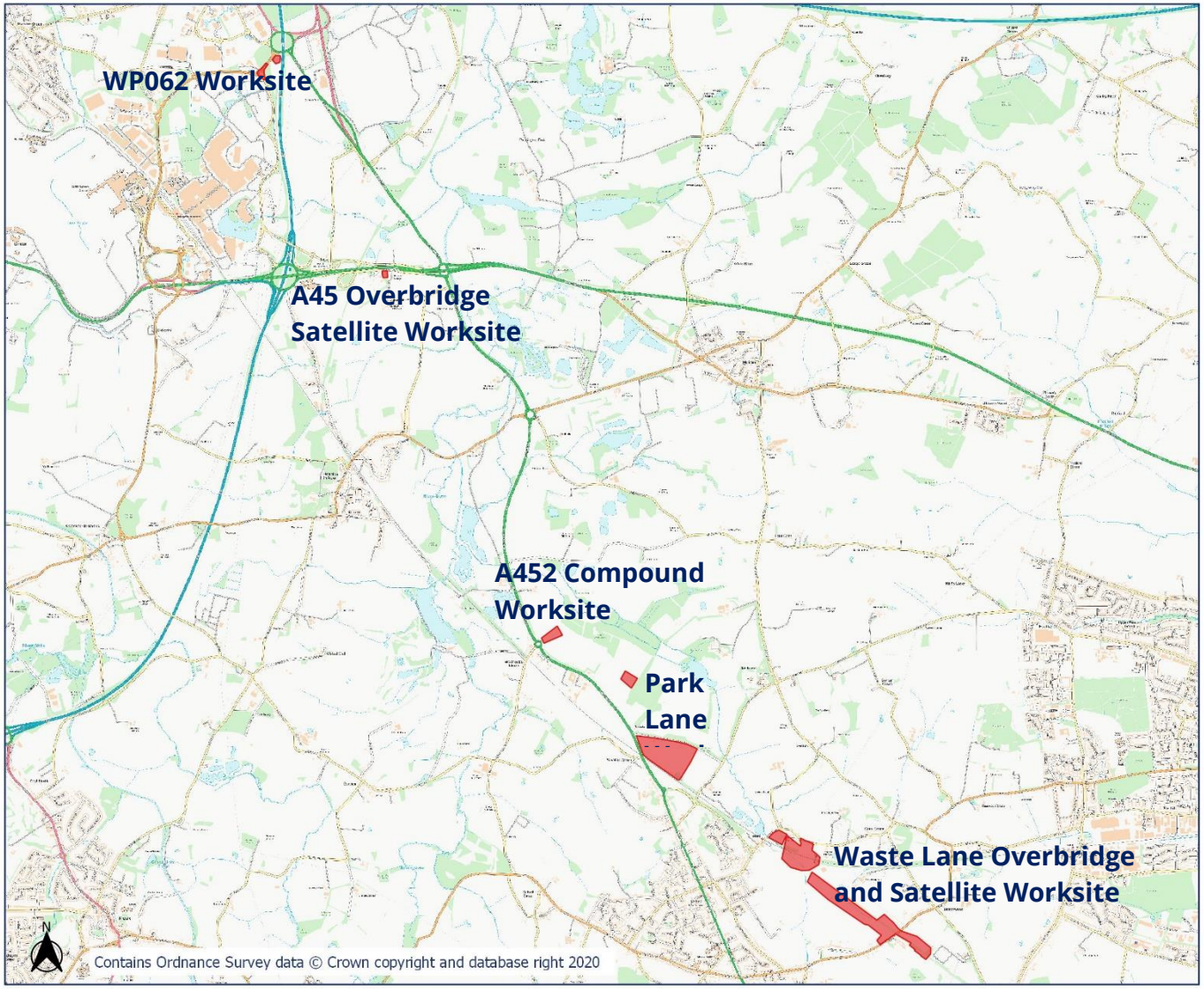
2.4.1 Table 7 provides a summary of complaint information related to noise and vibration received during the reporting period, along with the findings of any investigation.

Table 7: Summary of Complaints

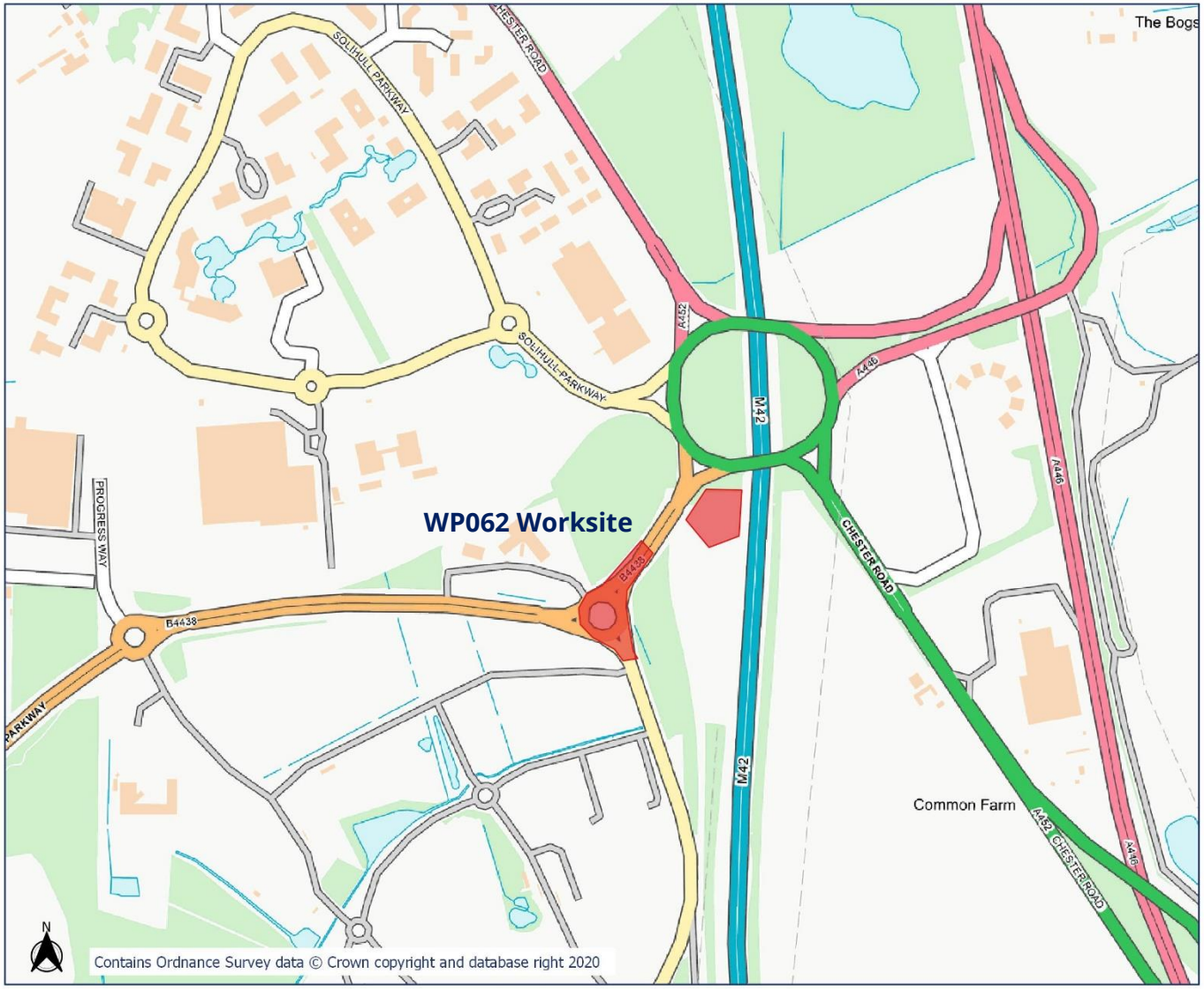
Complaint Reference Number	Worksite Reference	Description of Complaint	Results of Investigation	Actions Taken
-	-	-	-	-

Appendix A Site Locations

HS2 Worksite Identification Plan - Overview



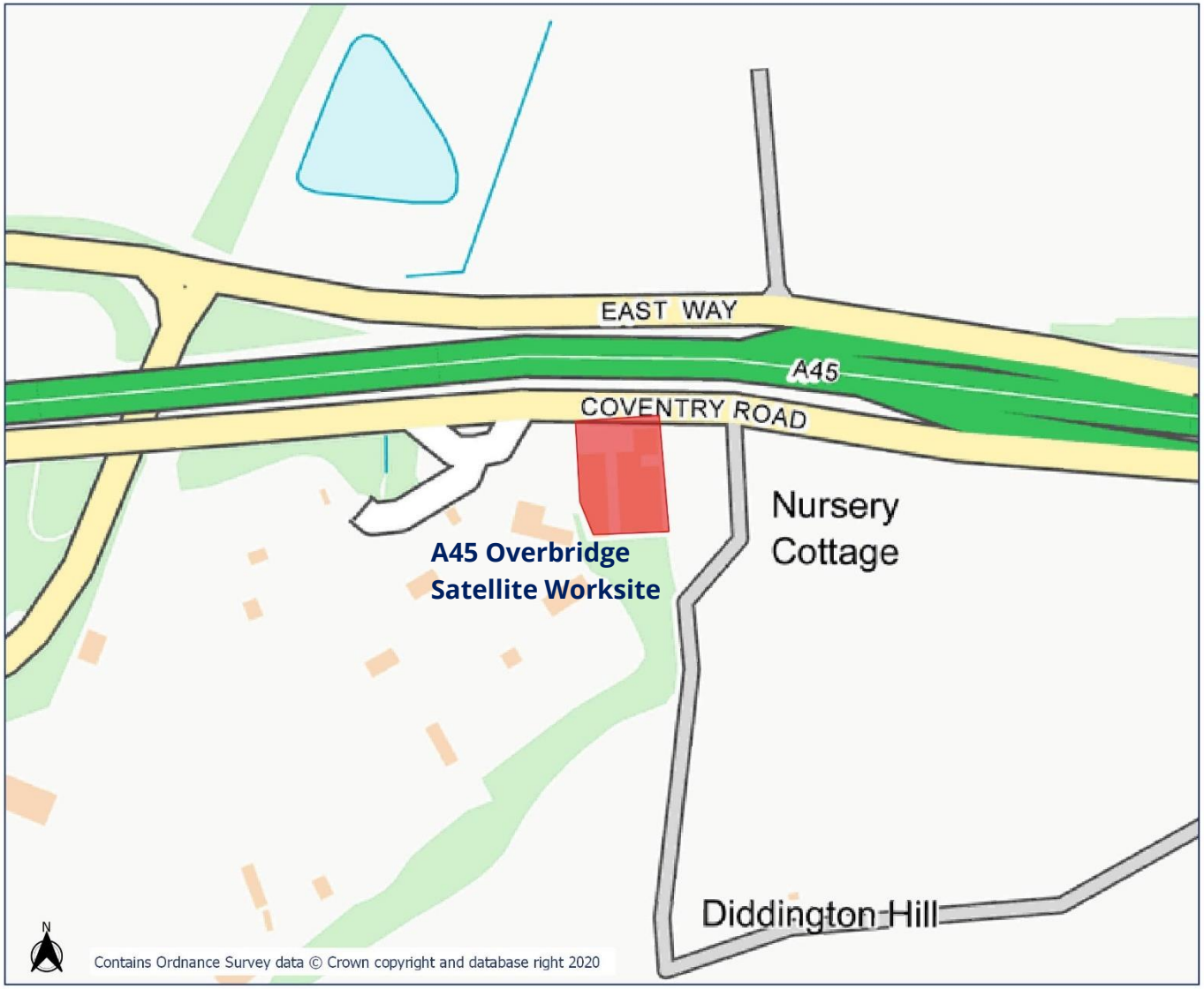
Worksite Identification Plan - 1



Legend

Active worksites

Worksite Identification Plan - 2



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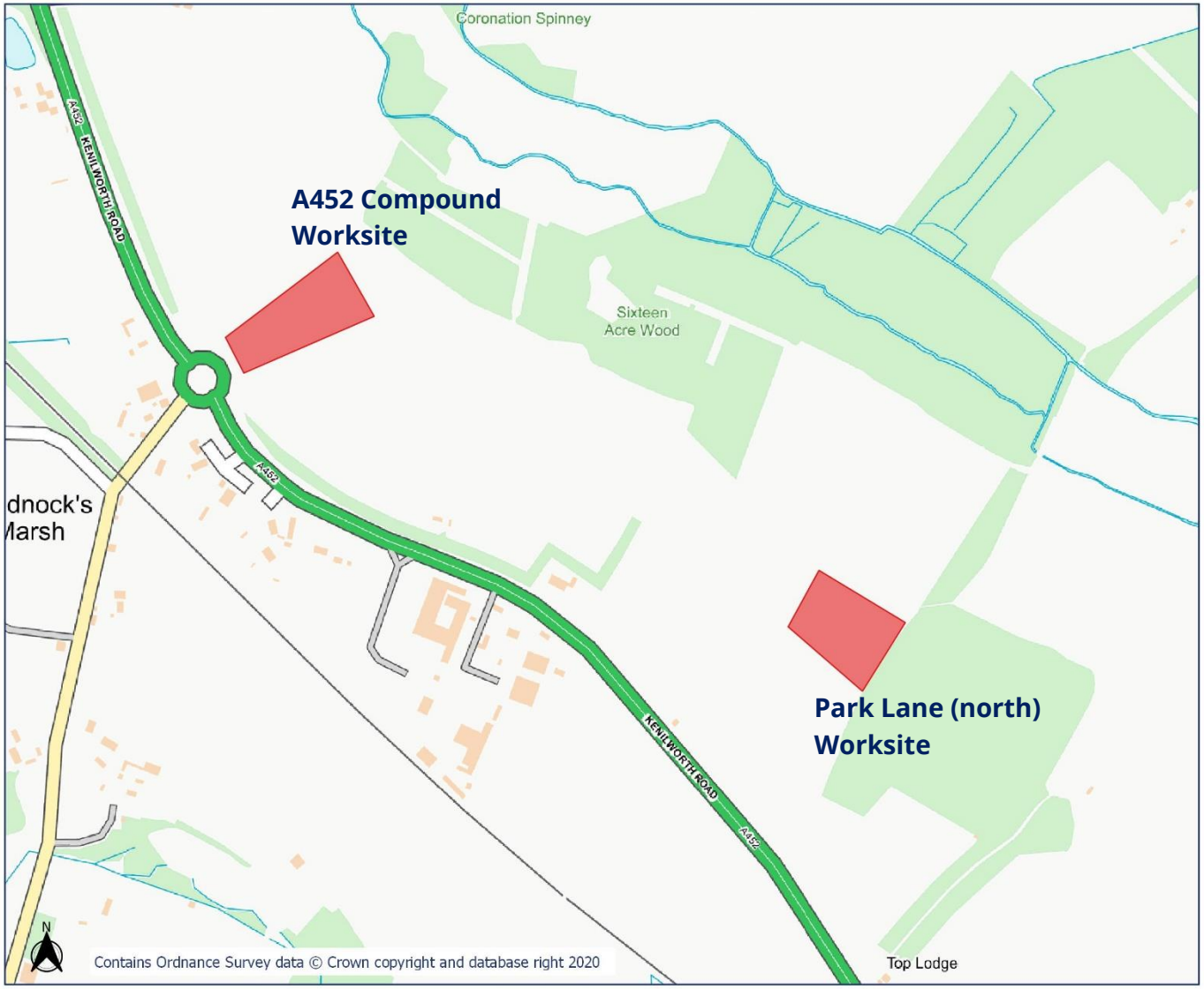

Worksite Identification Plan - 4

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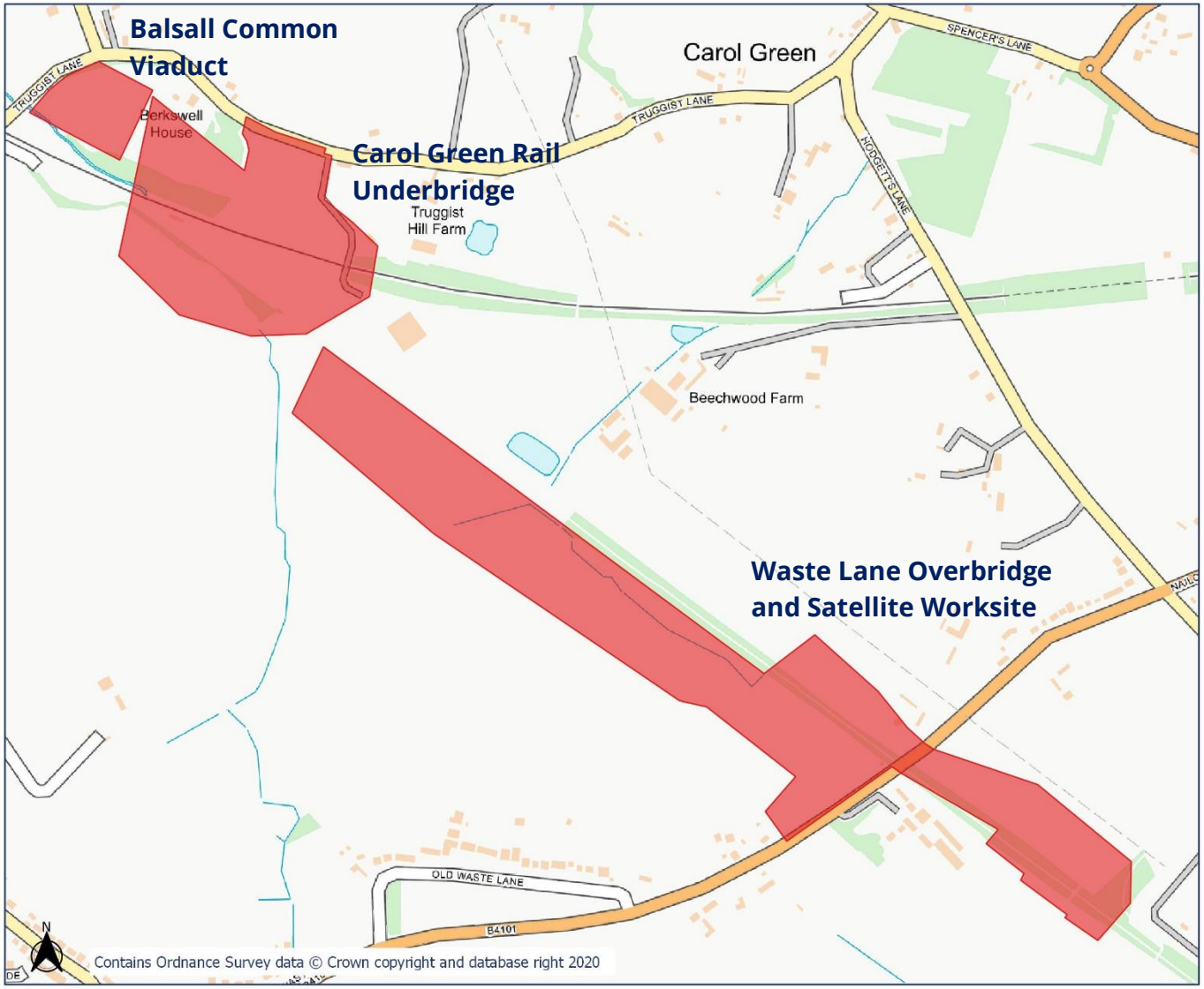
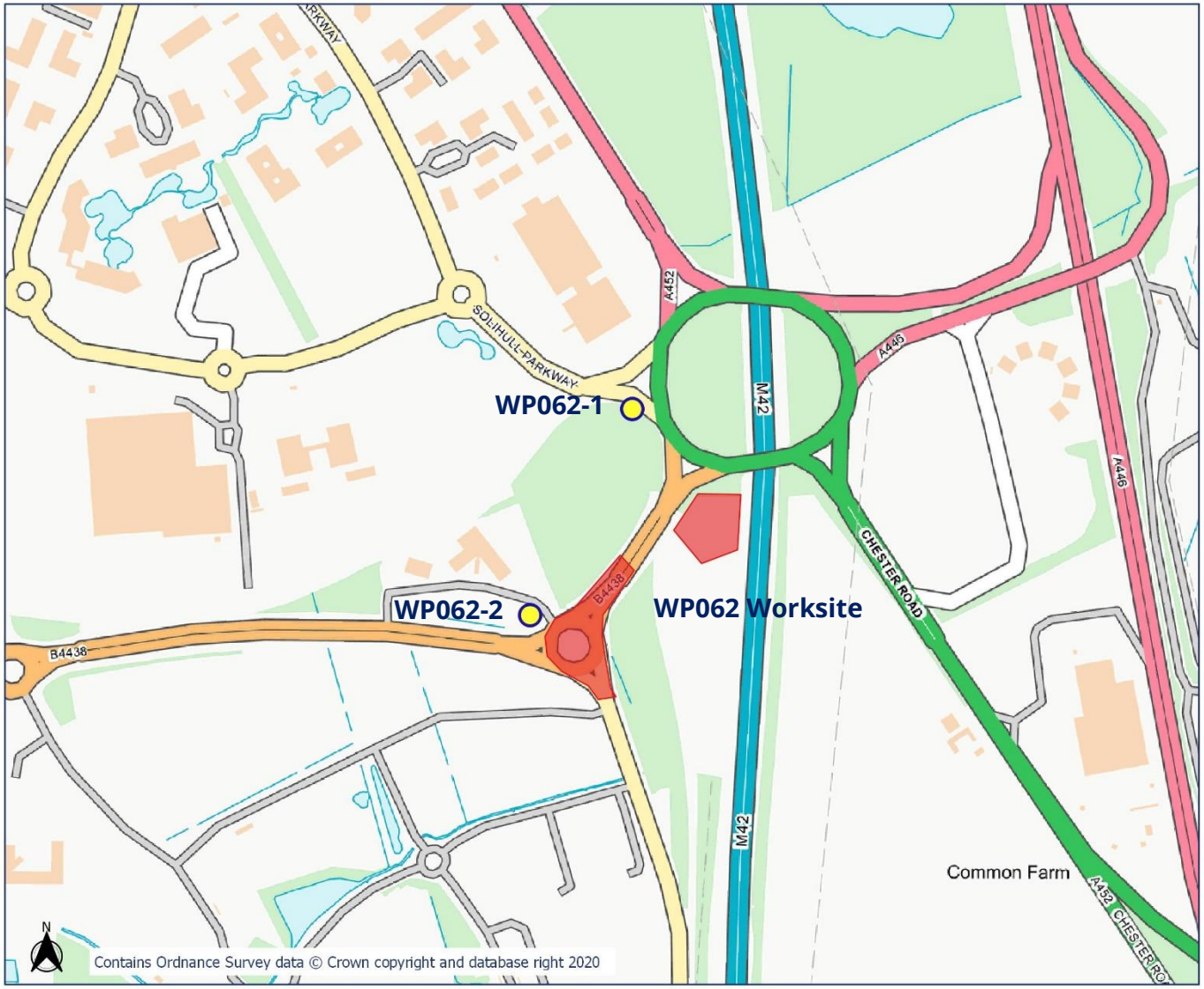
Active Worksites

Worksite Identification Plan - 5



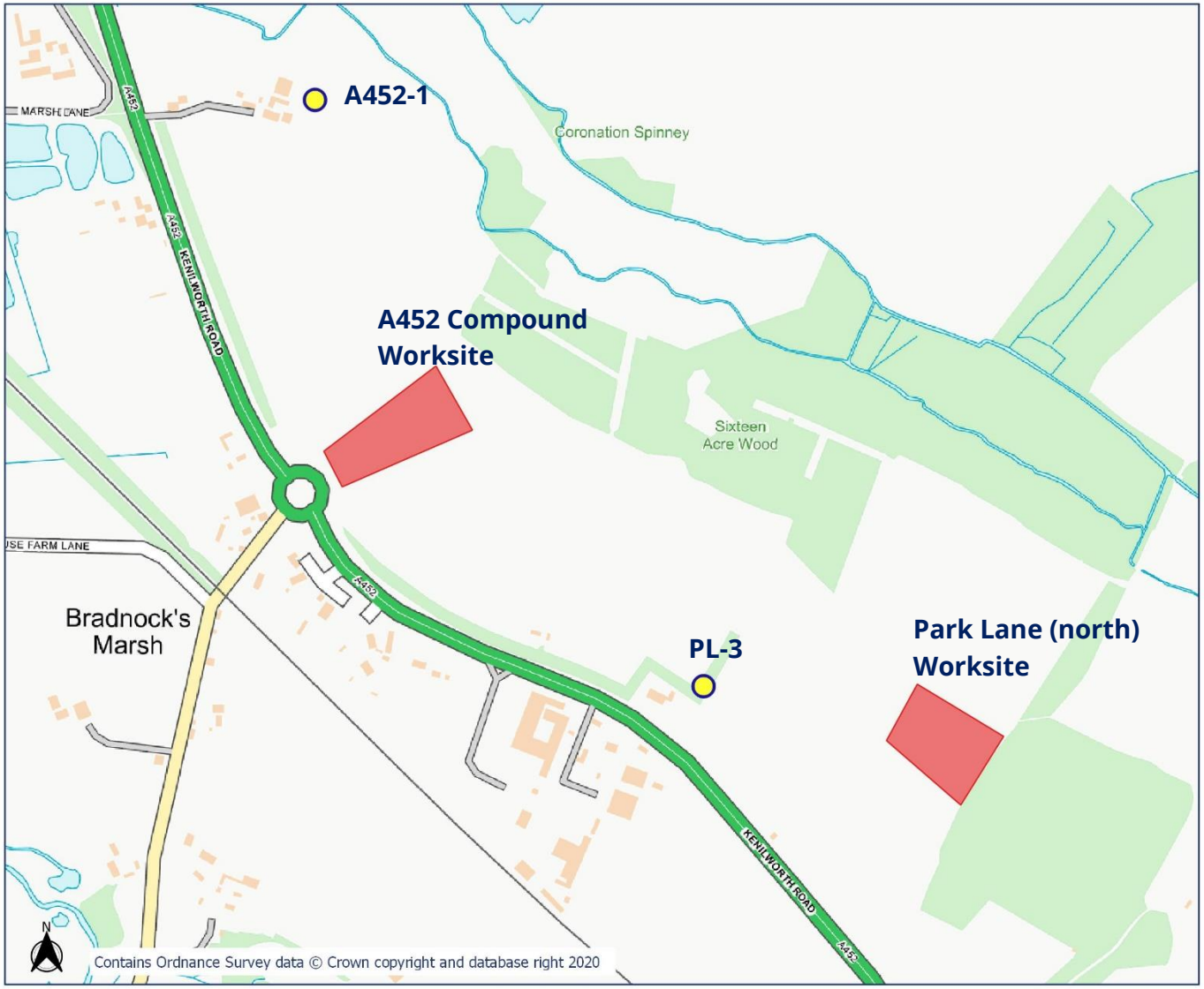
Appendix B Monitoring Locations

Noise Monitoring Plan - 1



Noise Monitoring Plan - 2

Noise Monitoring Plan - 3



Noise Monitoring Plan - 4

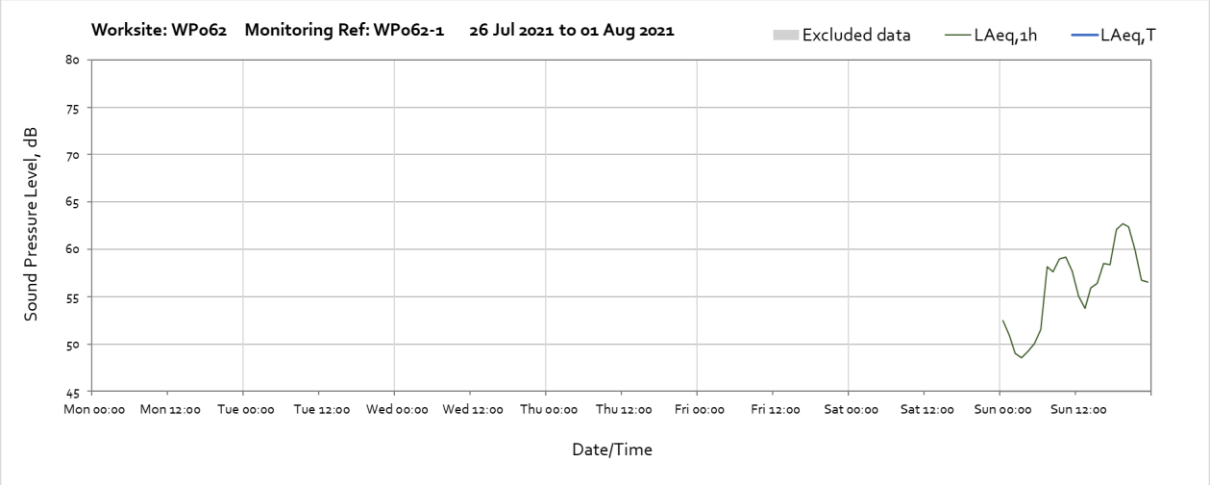
Noise Monitoring Plan - 5

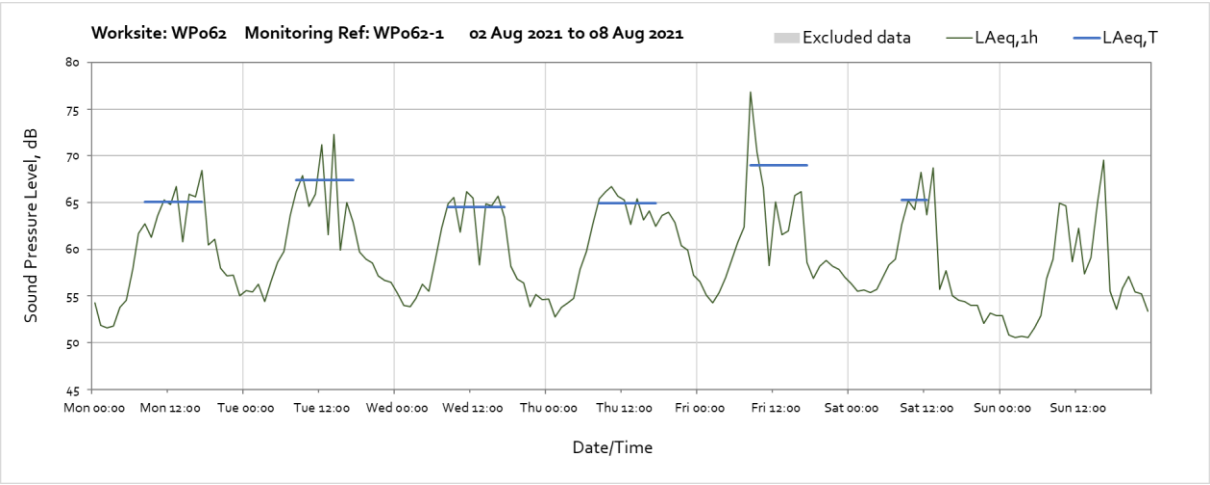
Appendix C Data

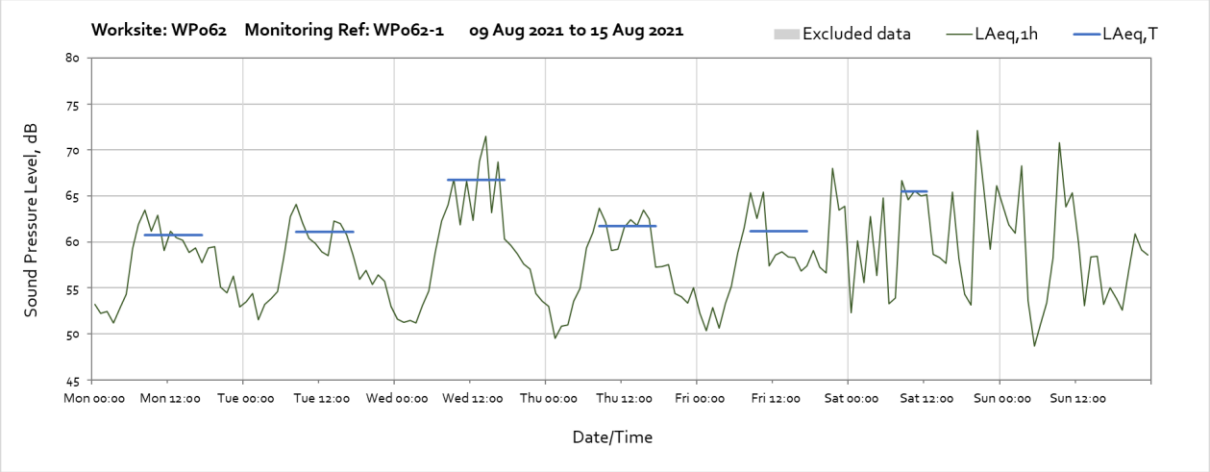
Noise

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: WP062 – Monitoring Ref: WP062-1






Worksite: WP062 Monitoring Ref: WP062-1 09 Aug 2021 to 15 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
75
70
65
60
55
50
45
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
Wed 00:00
Wed 12:00
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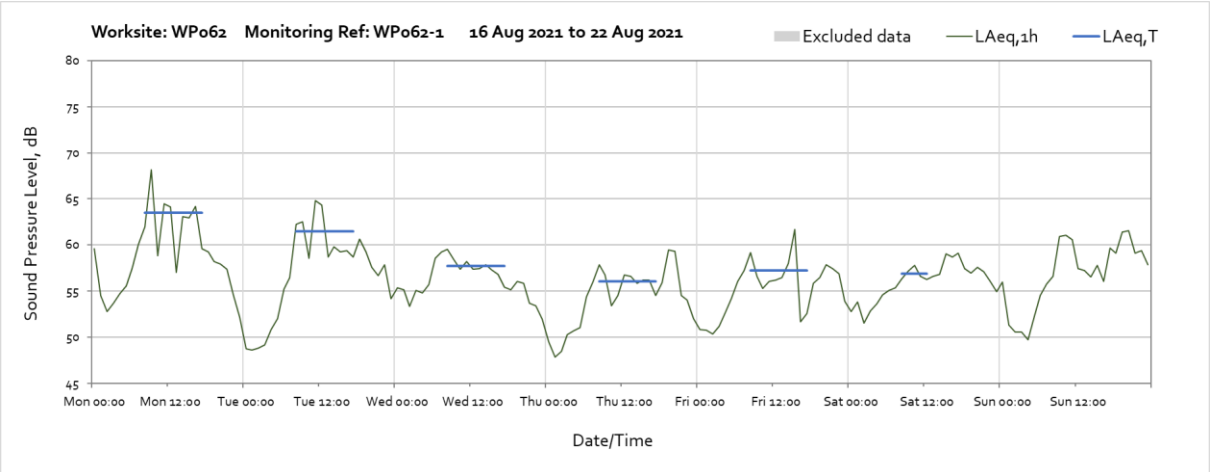
Date/Time


Worksite: WP062 Monitoring Ref: WP062-1 16 Aug 2021 to 22 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
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60
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45
Mon 00:00
Mon 12:00
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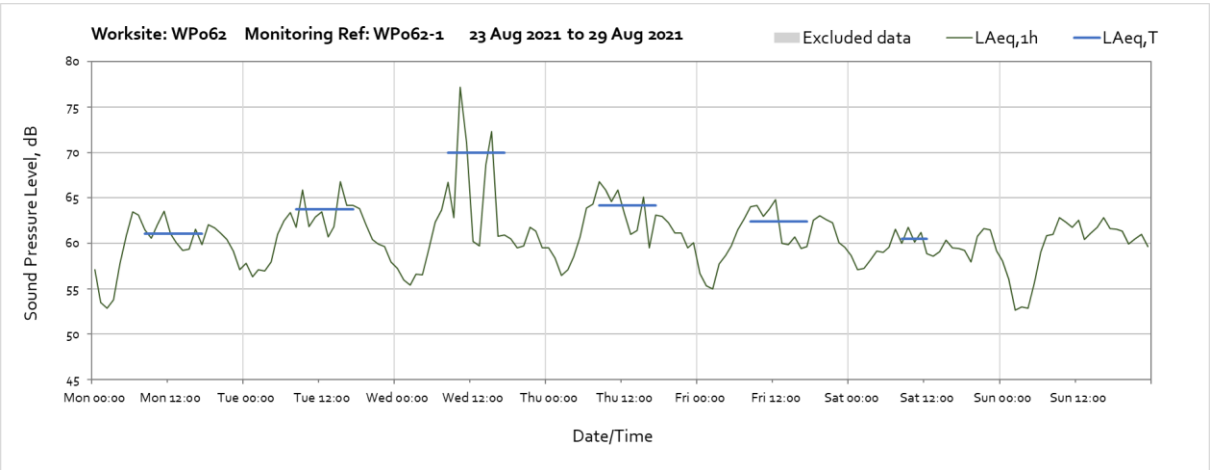
Date/Time


Worksite: WP062 Monitoring Ref: WP062-1 23 Aug 2021 to 29 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
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70
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55
50
45
Mon 00:00
Mon 12:00
Tue 00:00
Tue 12:00
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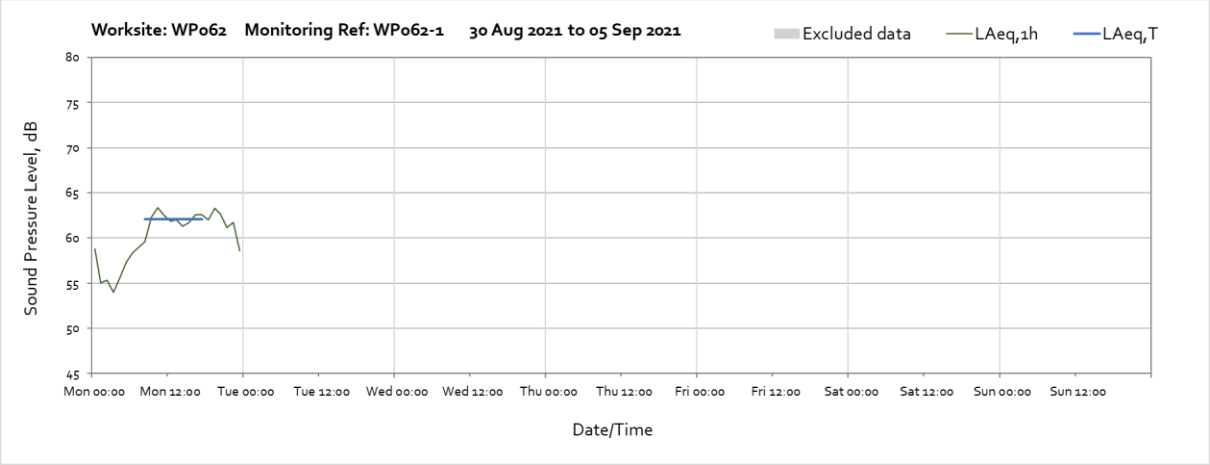
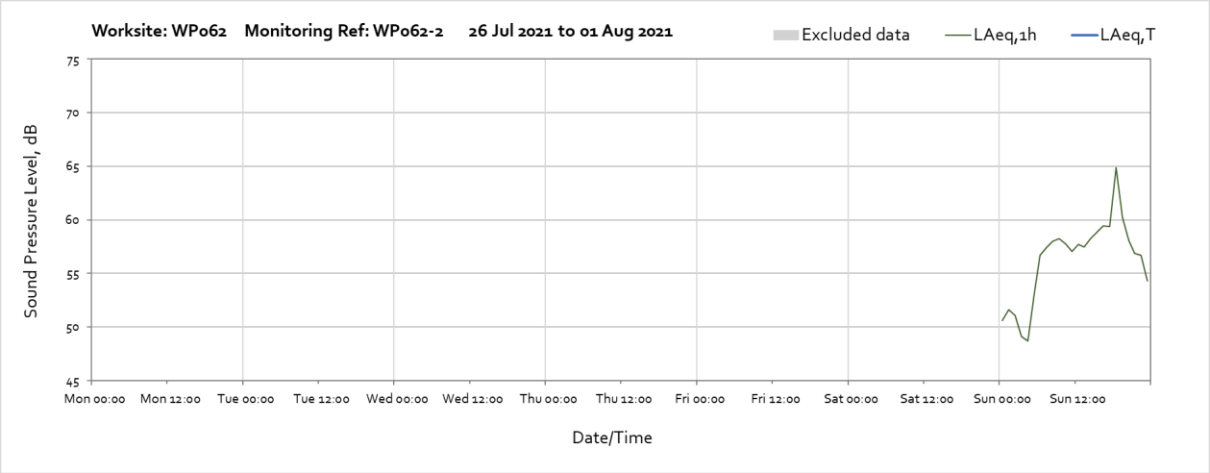
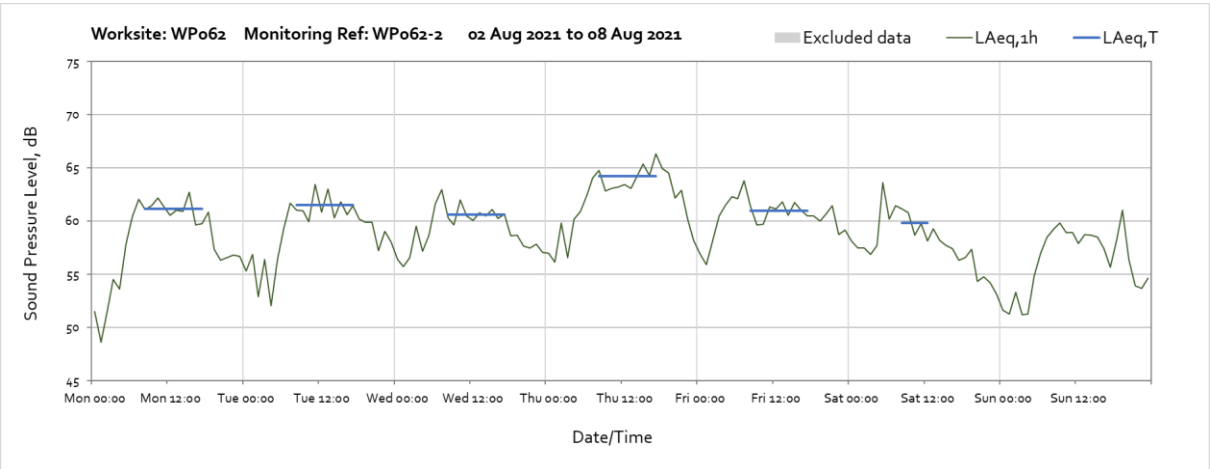
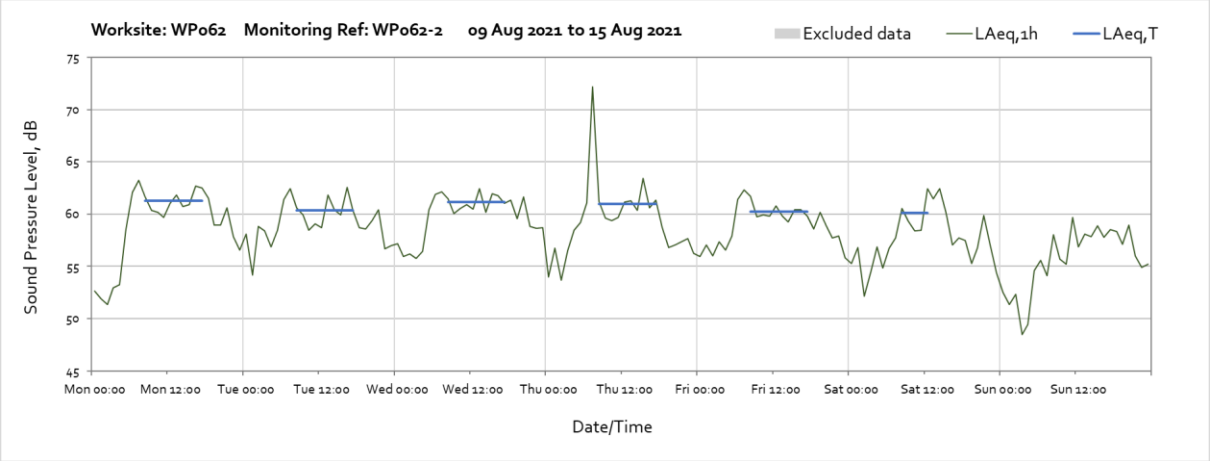
Date/Time



Worksite: WP062 – Monitoring Ref: WP062-2






Worksite: WP062 Monitoring Ref: WP062-2 09 Aug 2021 to 15 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
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55
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Mon 00:00
Mon 12:00
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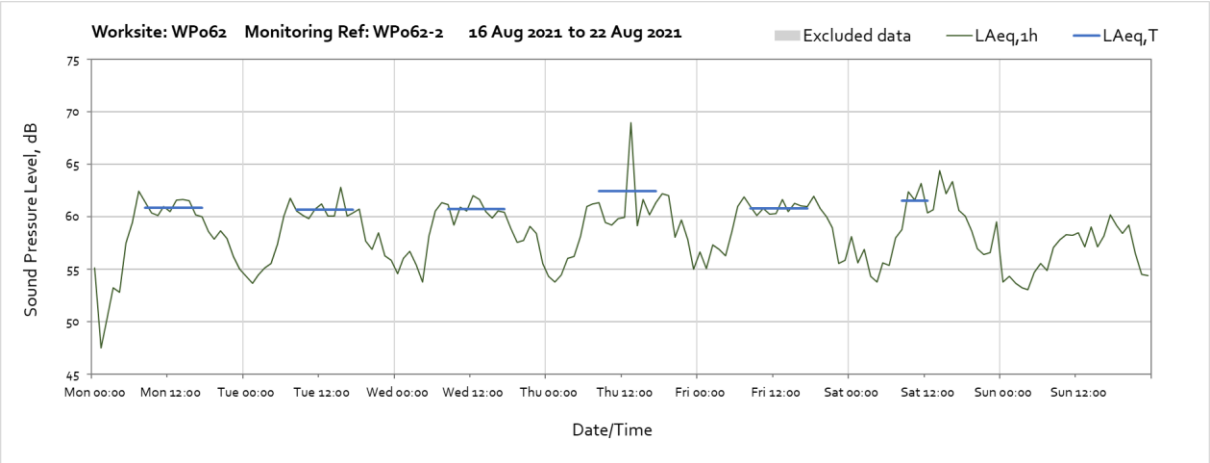
Date/Time


Worksite: WP062 Monitoring Ref: WP062-2 16 Aug 2021 to 22 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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Mon 00:00
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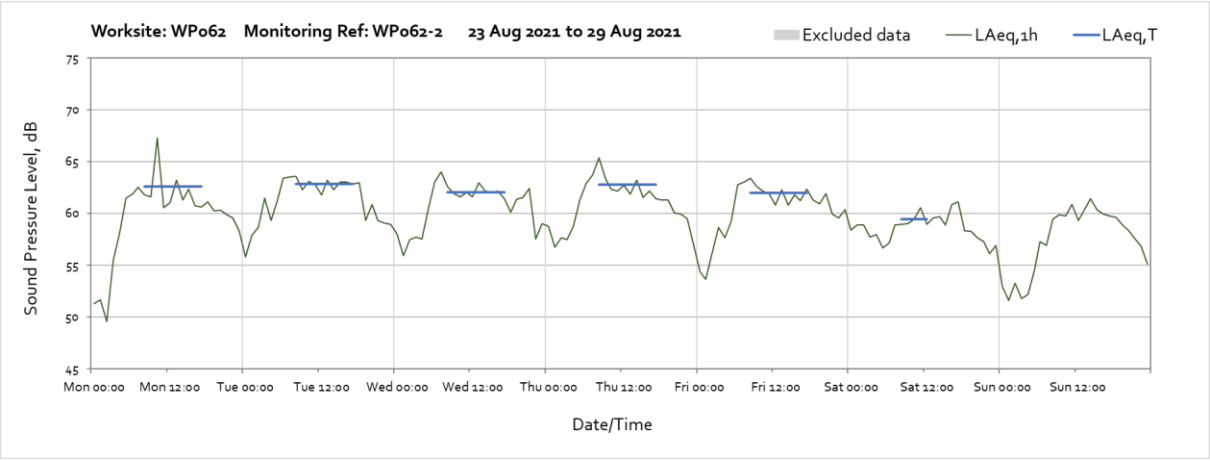
Date/Time


Worksite: WP062 Monitoring Ref: WP062-2 23 Aug 2021 to 29 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
75
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45
Mon 00:00
Mon 12:00
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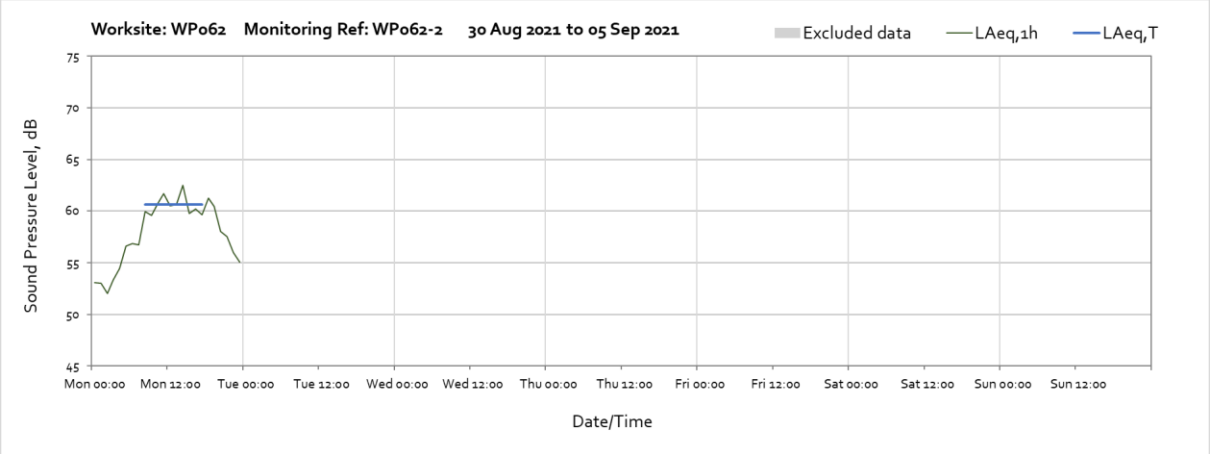
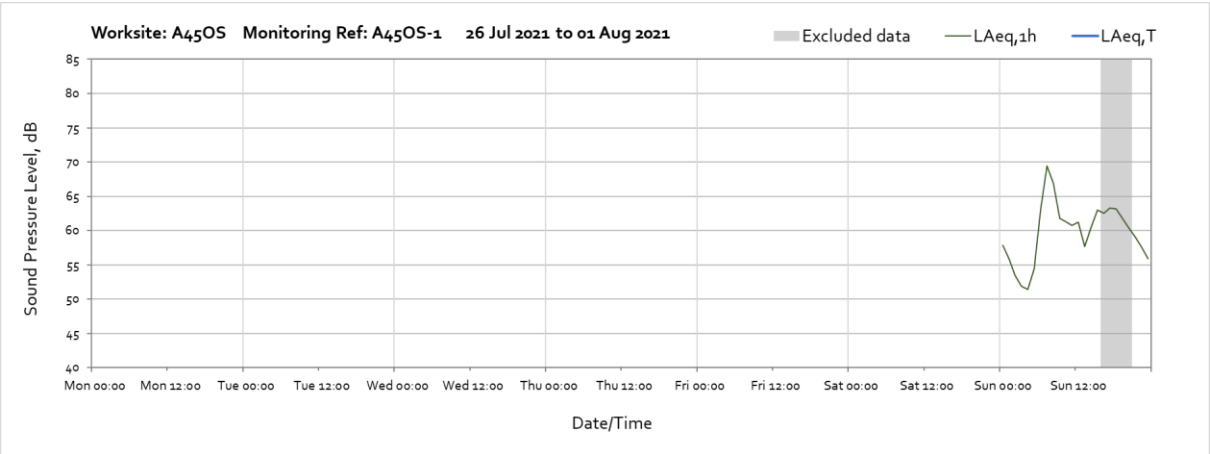
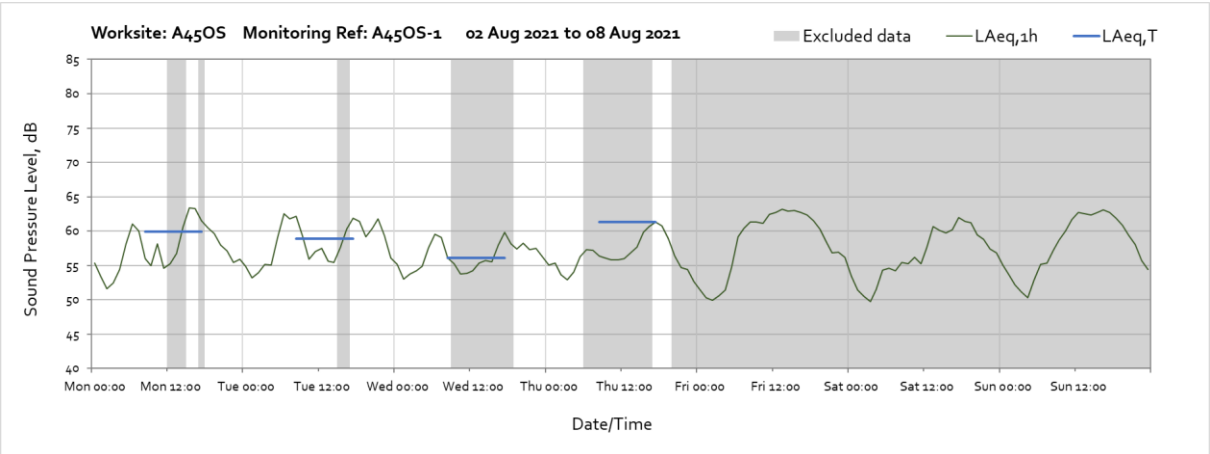
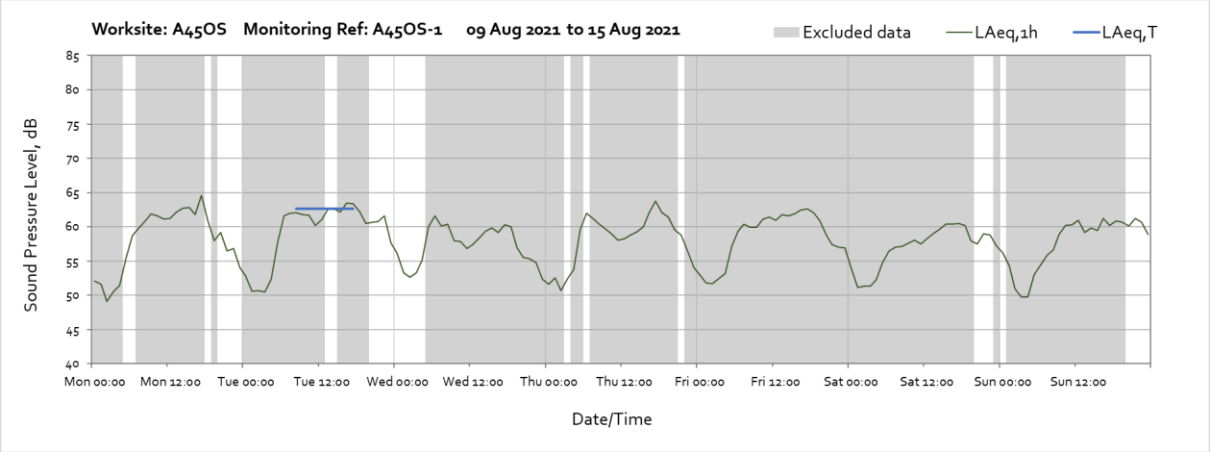
Date/Time



Worksite: A45OS – Monitoring Ref: A45OS-1






Worksite: A45OS Monitoring Ref: A45OS-1 09 Aug 2021 to 15 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
80
75
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60
55
50
45
40
Mon 00:00
Mon 12:00
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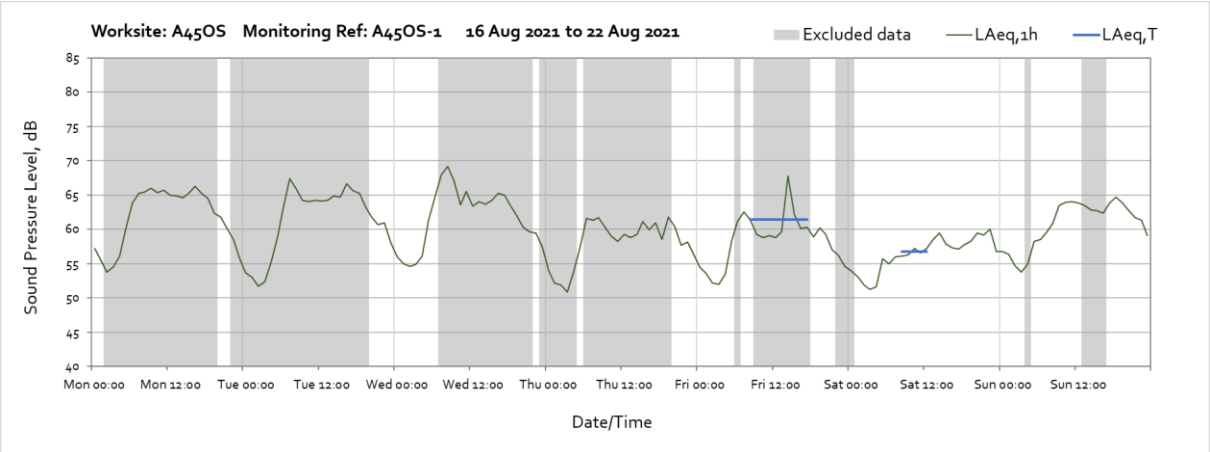
Date/Time


Worksite: A45OS Monitoring Ref: A45OS-1 16 Aug 2021 to 22 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
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65
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Mon 12:00
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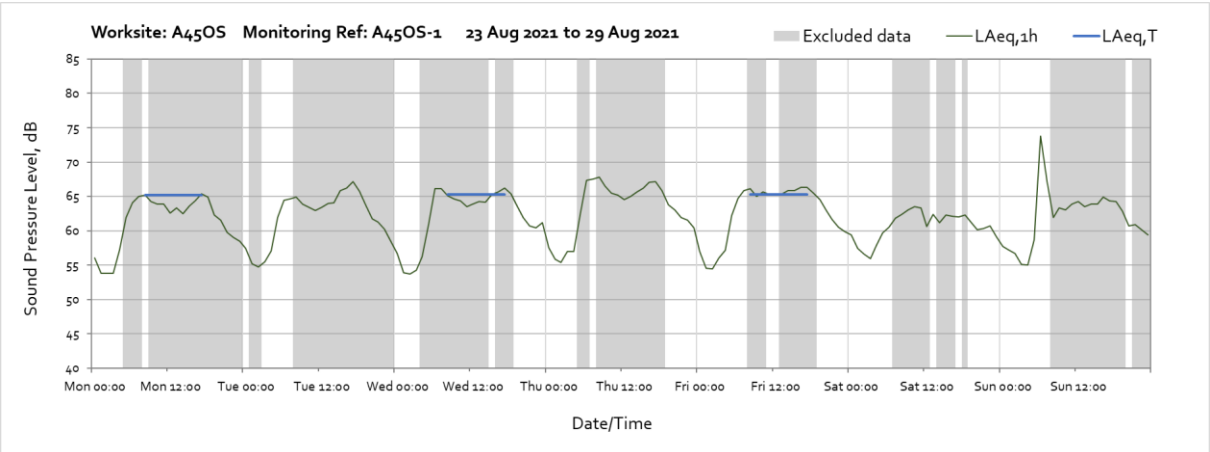
Date/Time


Worksite: A45OS Monitoring Ref: A45OS-1 23 Aug 2021 to 29 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
85
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75
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65
60
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Mon 00:00
Mon 12:00
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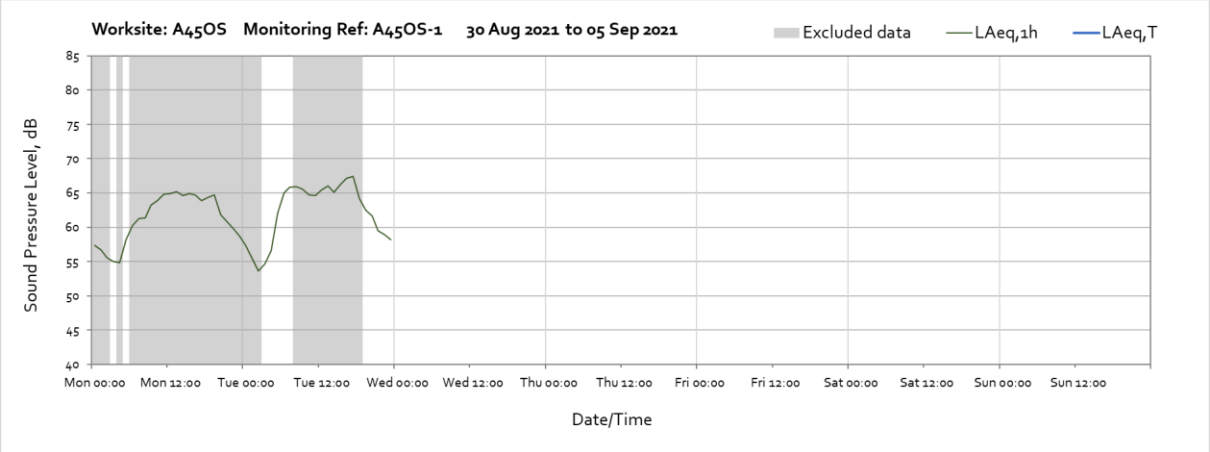
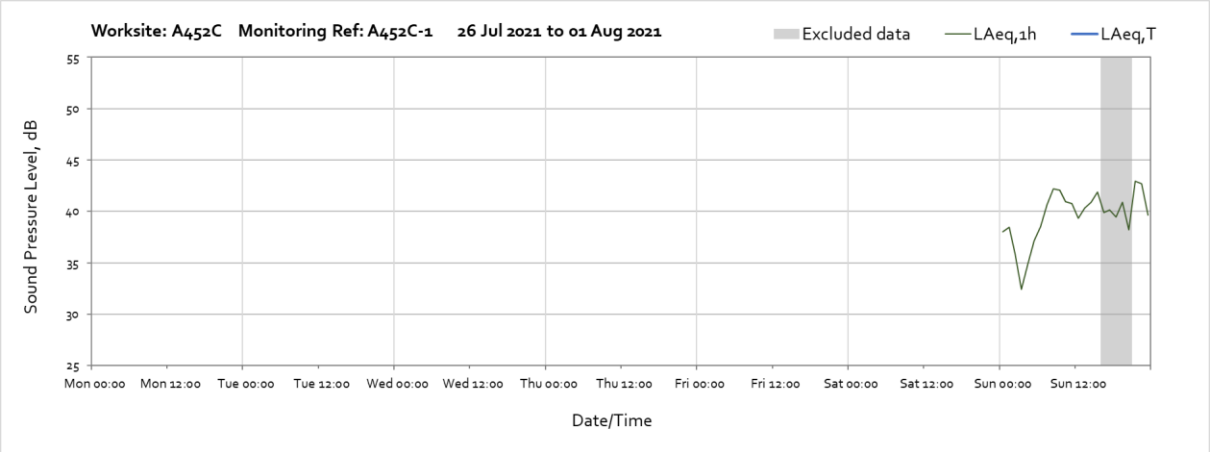
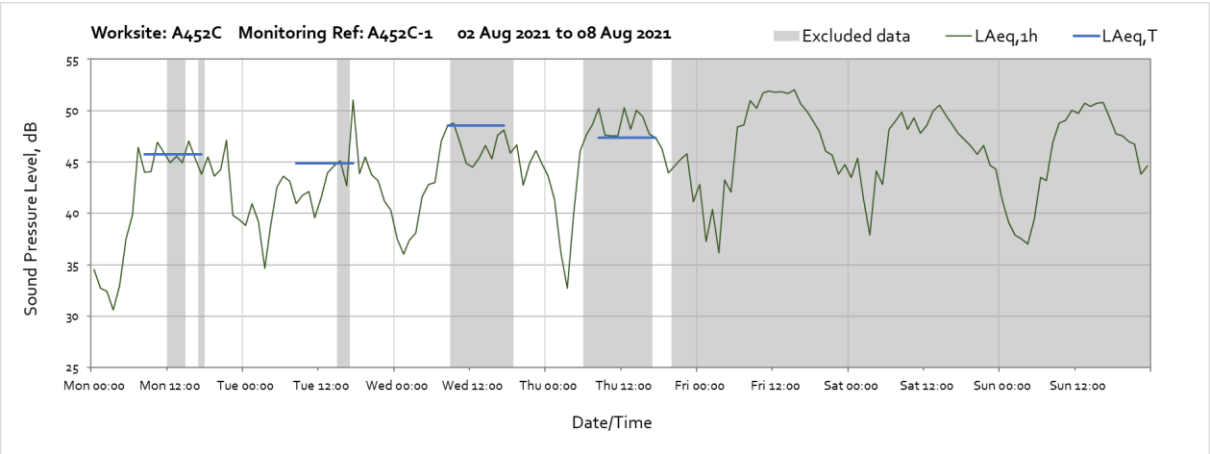
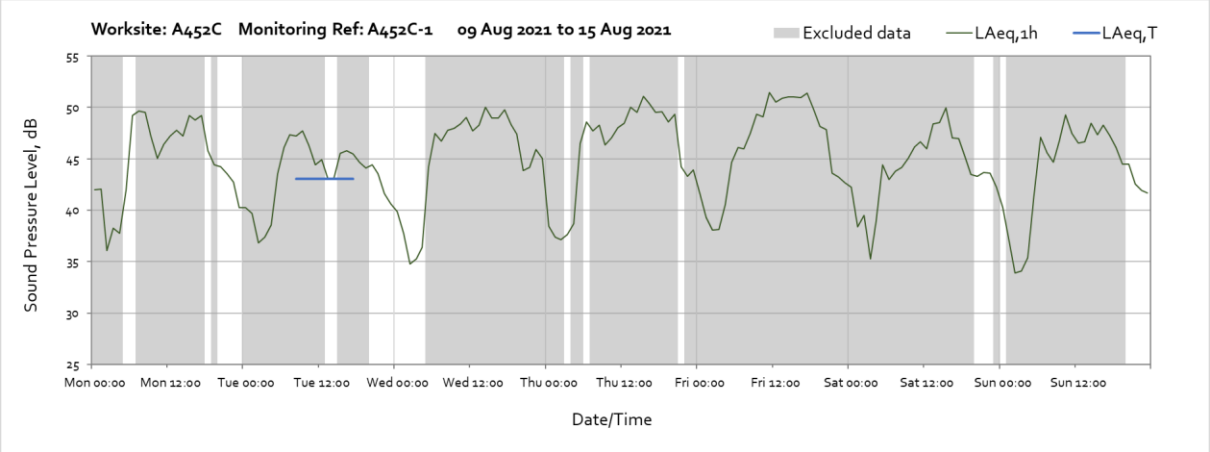
Date/Time



Worksite: A452 Compound – Monitoring Ref: A452-1






Worksite: A452C Monitoring Ref: A452C-1 09 Aug 2021 to 15 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
55
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35
30
25
Mon 00:00
Mon 12:00
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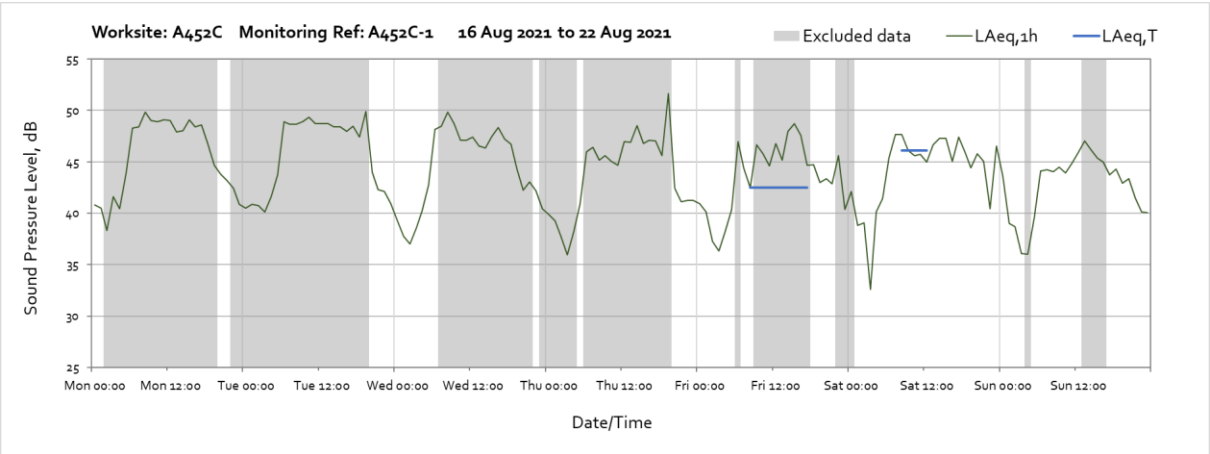
Date/Time


Worksite: A452C Monitoring Ref: A452C-1 16 Aug 2021 to 22 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
55
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Mon 00:00
Mon 12:00
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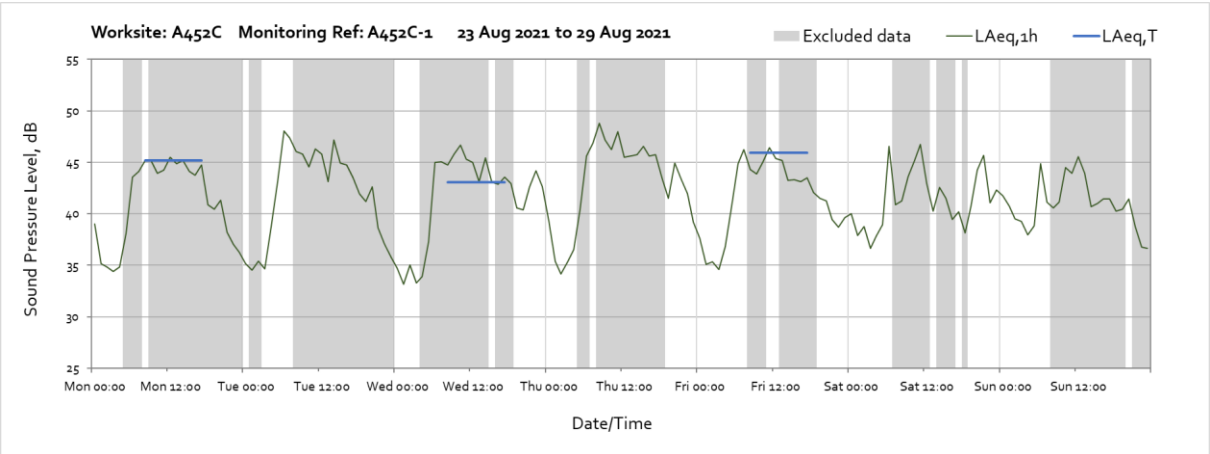
Date/Time


Worksite: A452C Monitoring Ref: A452C-1 23 Aug 2021 to 29 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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Mon 00:00
Mon 12:00
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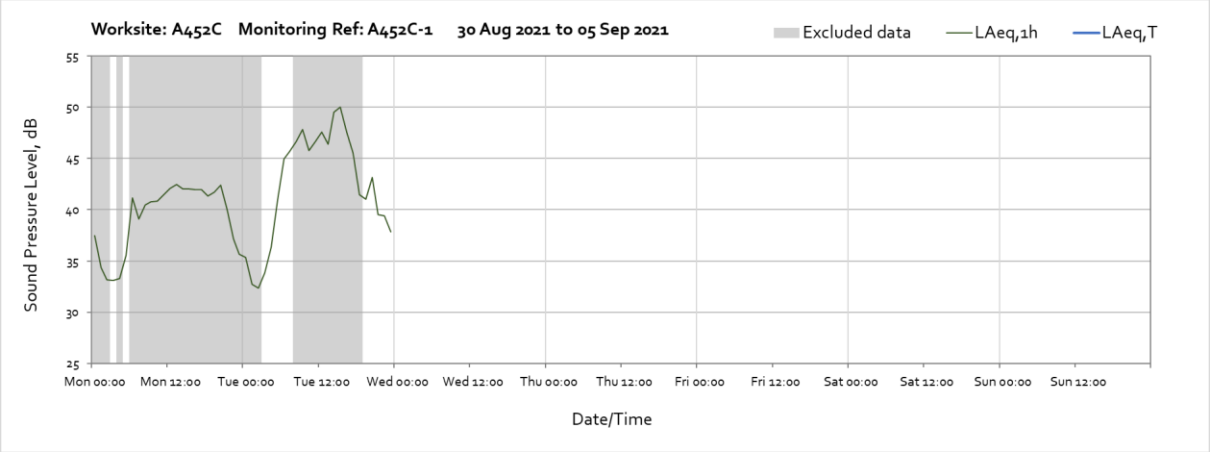
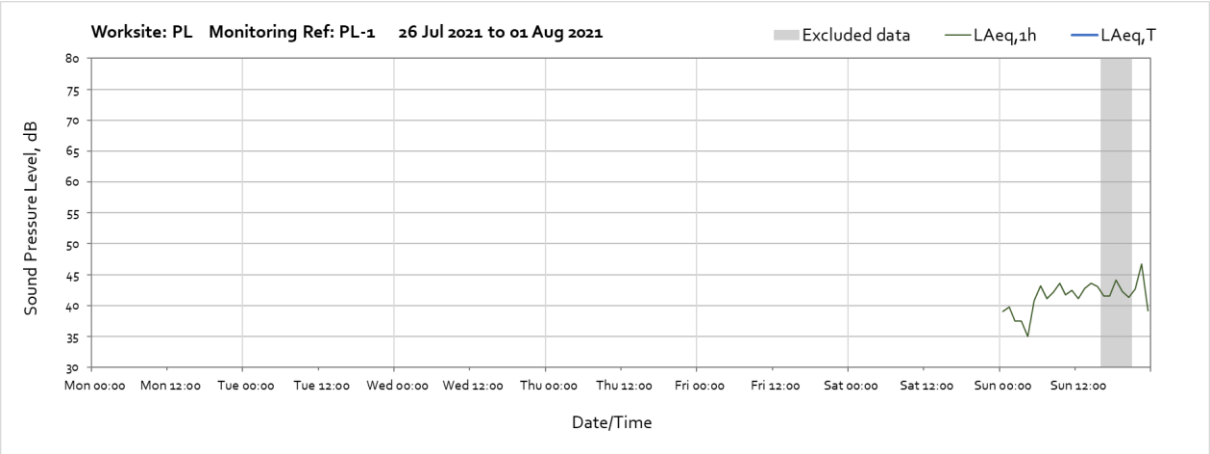
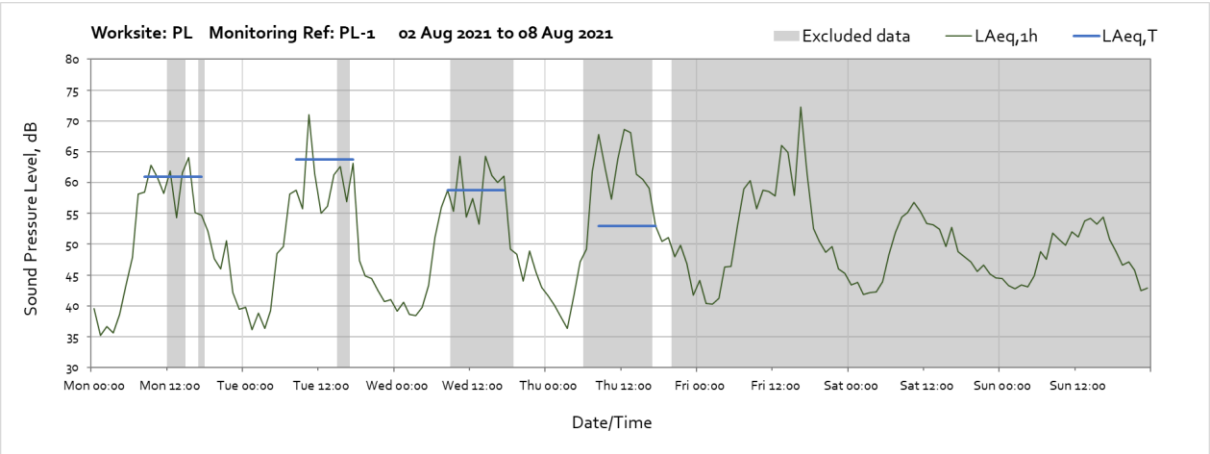
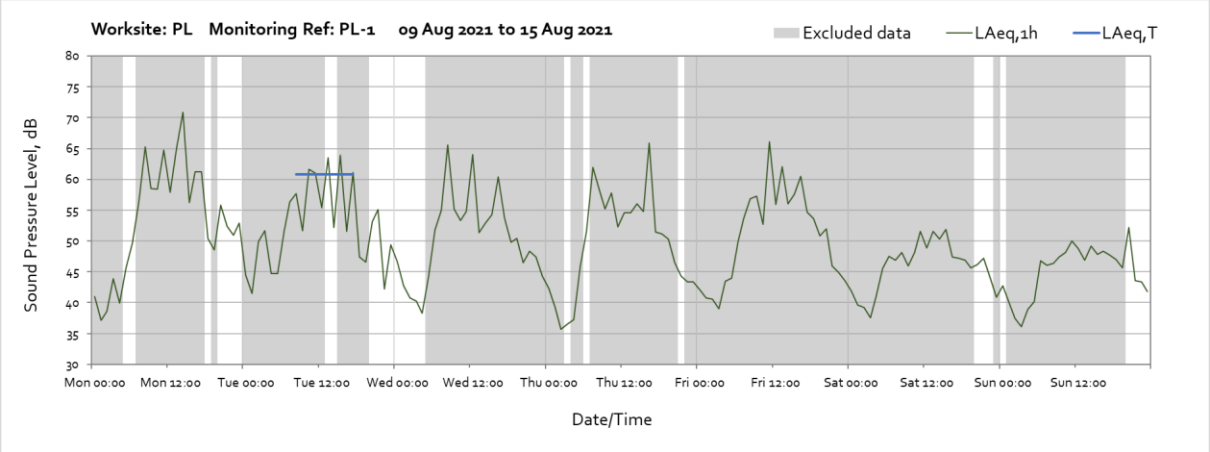
Date/Time



Worksite: Park Lane – Monitoring Ref: PL-1






Worksite: PL Monitoring Ref: PL-1 09 Aug 2021 to 15 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
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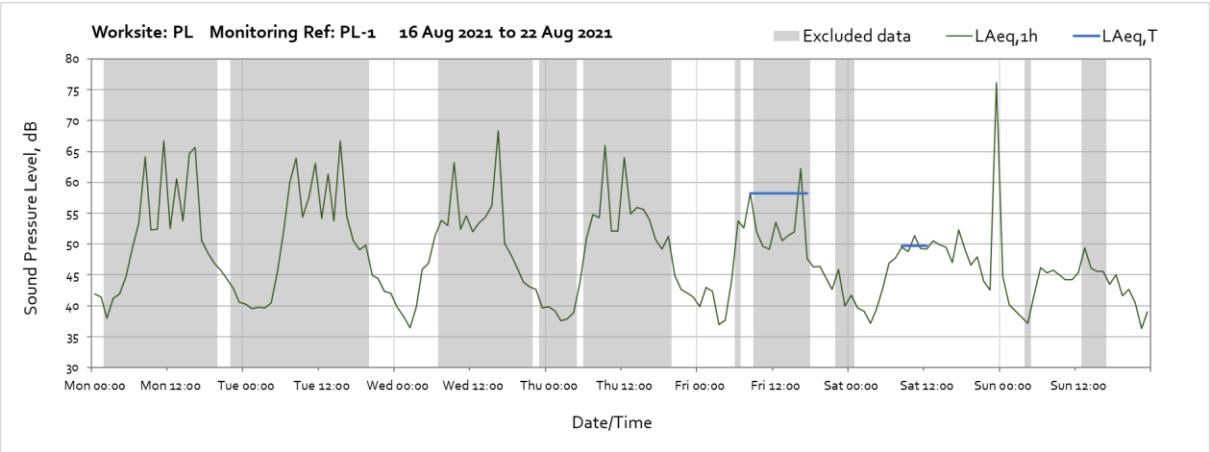
Date/Time


Worksite: PL Monitoring Ref: PL-1 16 Aug 2021 to 22 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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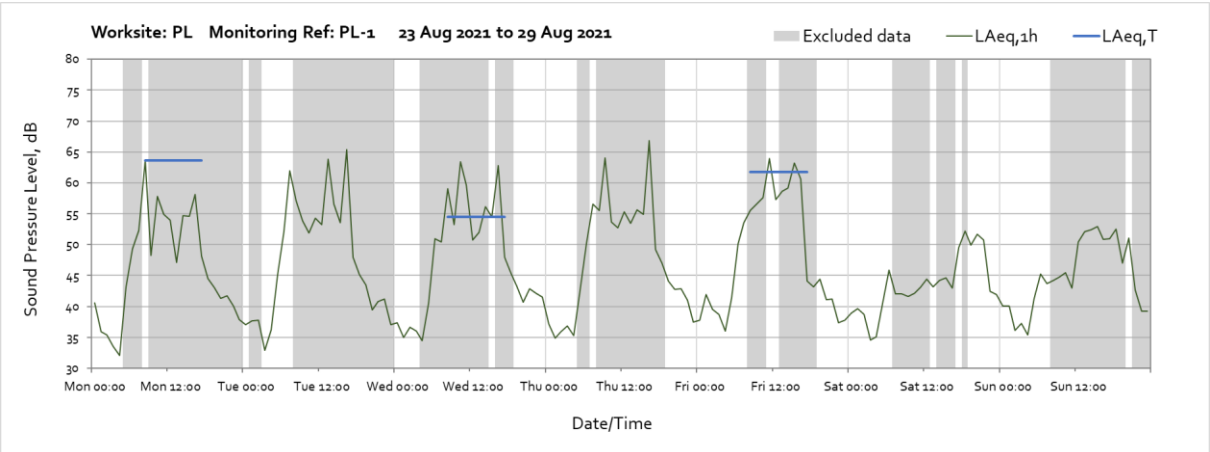
Date/Time


Worksite: PL Monitoring Ref: PL-1 23 Aug 2021 to 29 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
80
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Mon 00:00
Mon 12:00
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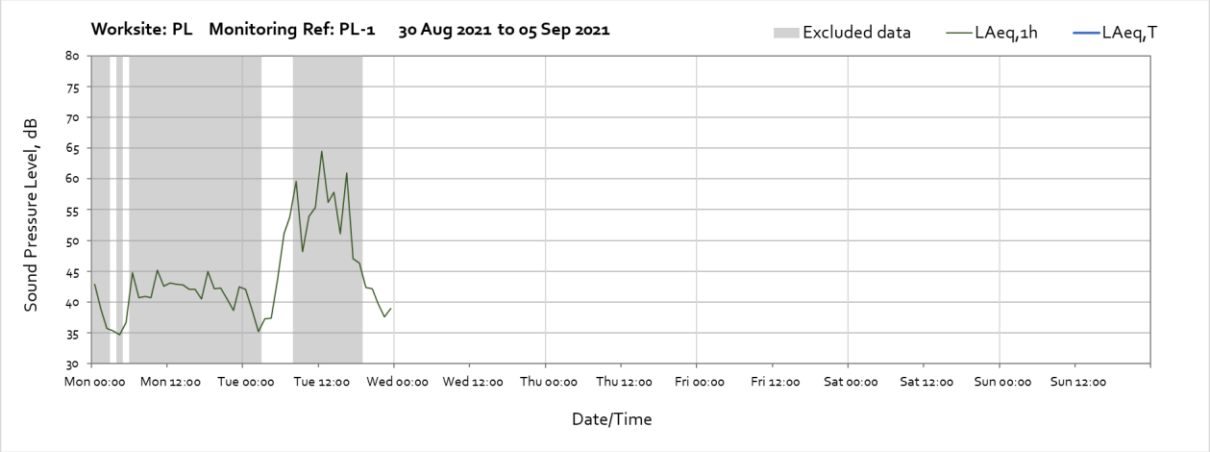
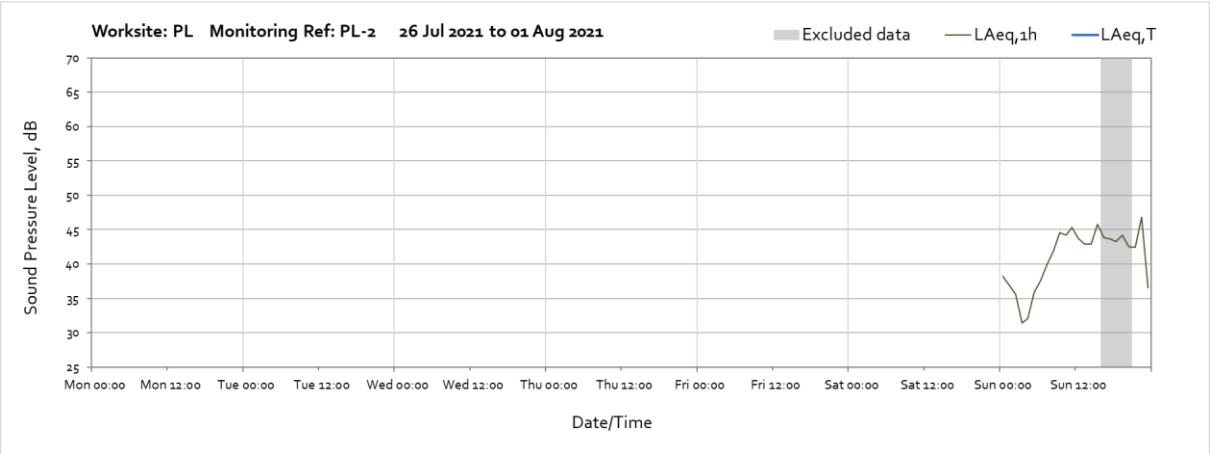
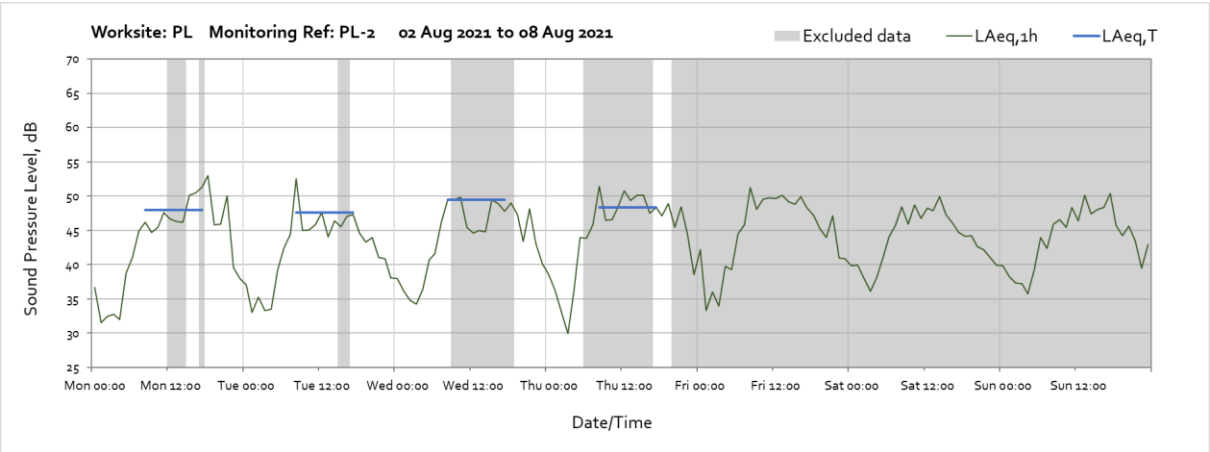
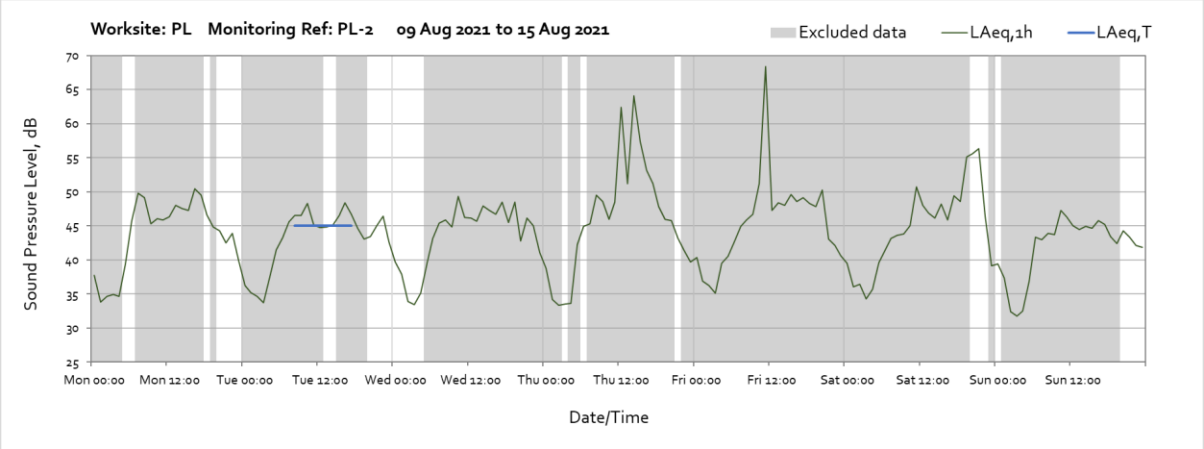
Date/Time



Worksite: Park Lane – Monitoring Ref: PL-2






Worksite: PL Monitoring Ref: PL-2 09 Aug 2021 to 15 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
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45
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35
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Mon 00:00
Mon 12:00
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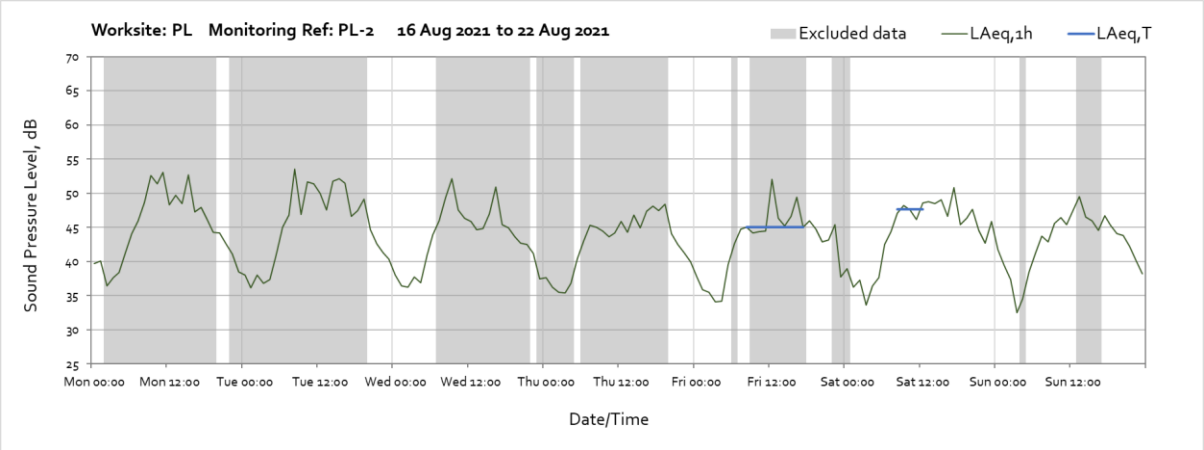
Date/Time


Worksite: PL Monitoring Ref: PL-2 16 Aug 2021 to 22 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
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45
40
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Mon 00:00
Mon 12:00
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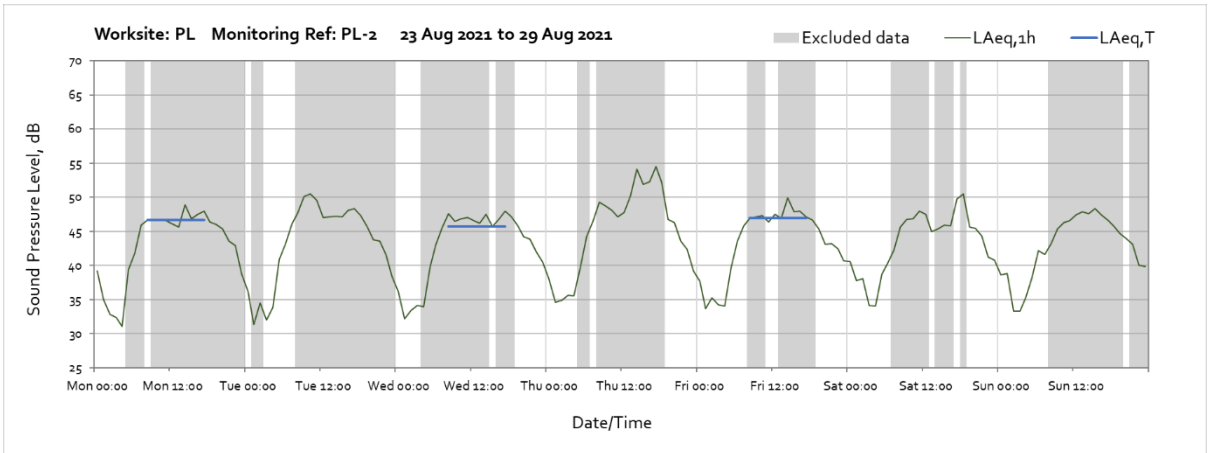
Date/Time


Worksite: PL Monitoring Ref: PL-2 23 Aug 2021 to 29 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
70
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Mon 00:00
Mon 12:00
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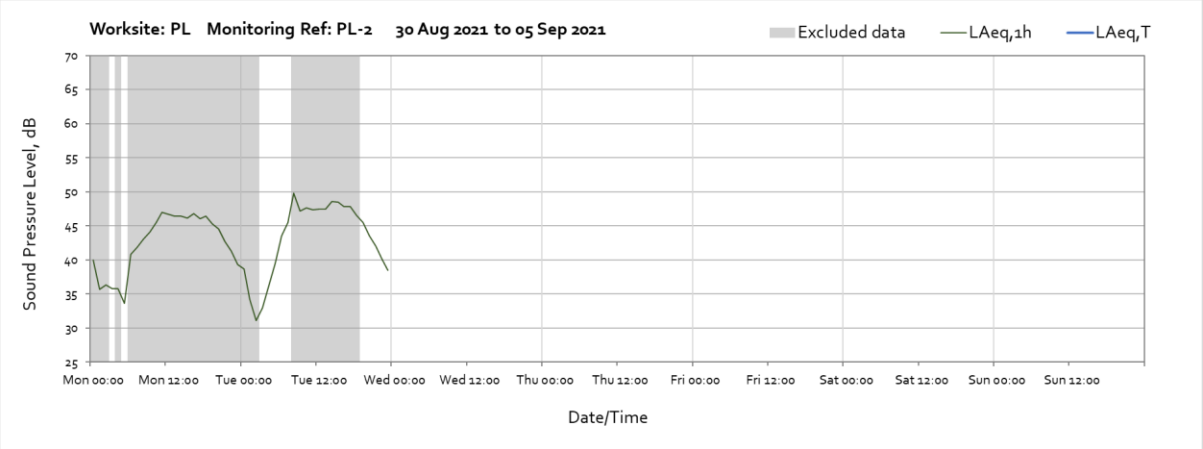
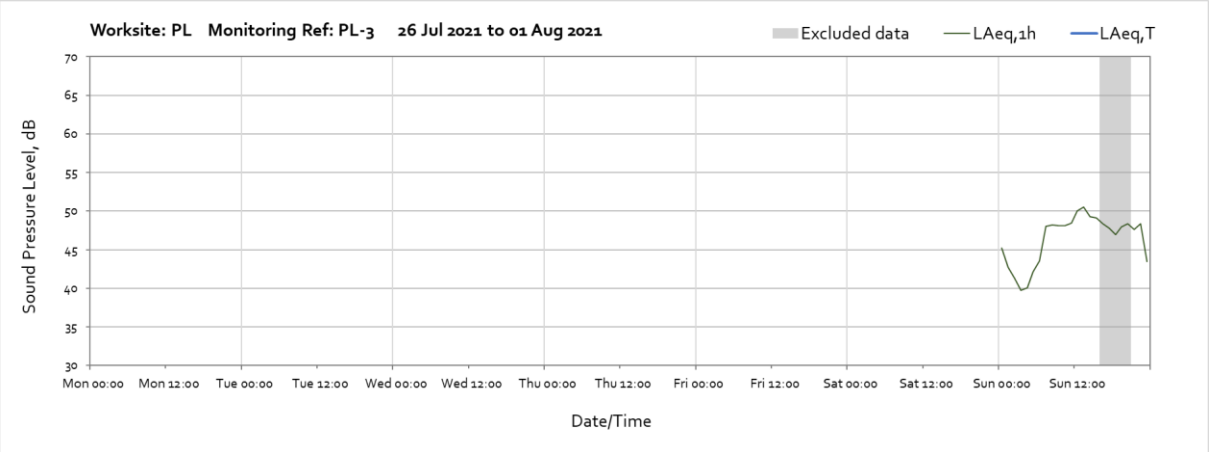
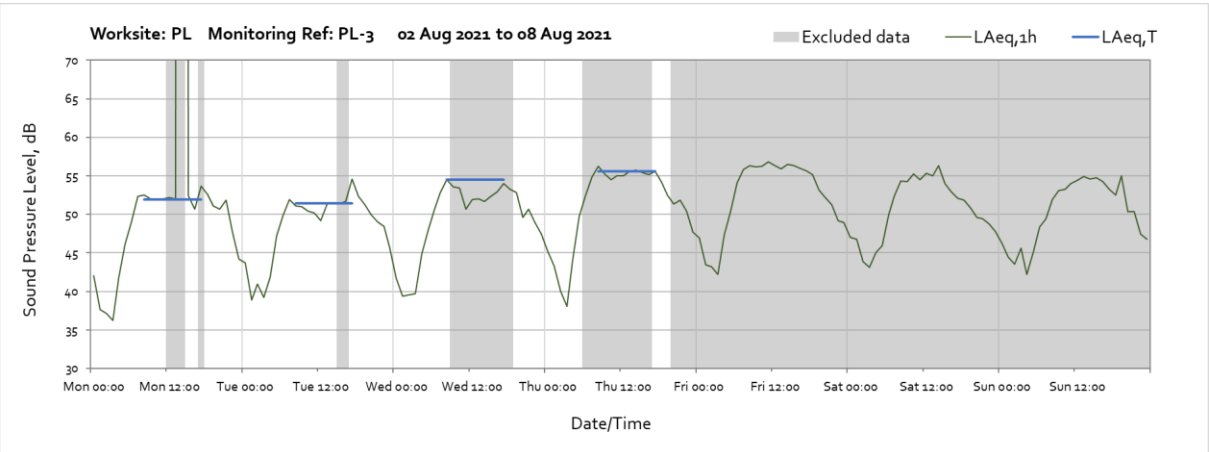
Sun 12:00
Date/Time

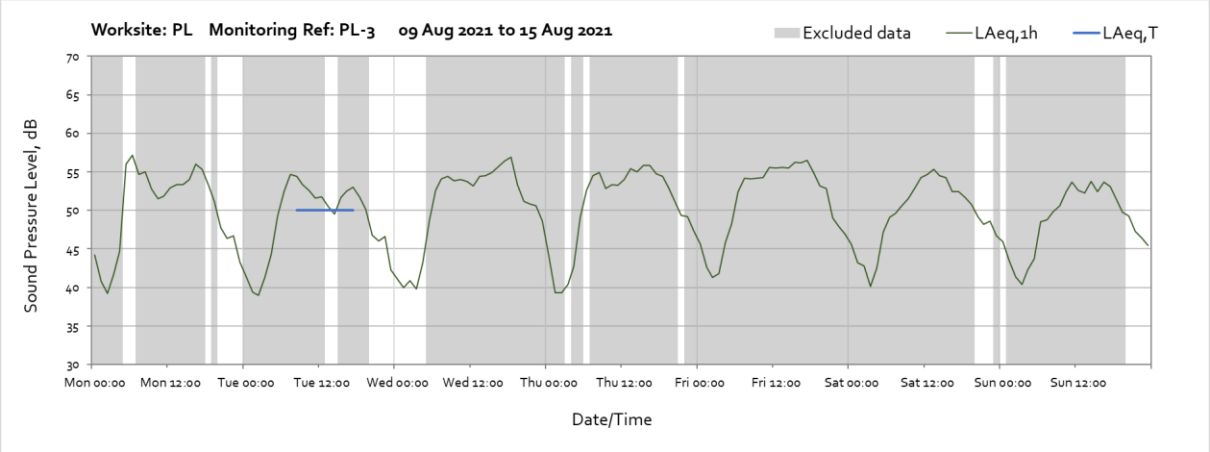


Worksite: Park Lane – Monitoring Ref: PL-3





Note: High noise levels between 14:00 and 15:00 on Monday 2nd August were due to communication error between the NL-52 (noise monitor) and the embedded system.


Worksite: PL Monitoring Ref: PL-3 09 Aug 2021 to 15 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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Mon 00:00
Mon 12:00
Tue 00:00
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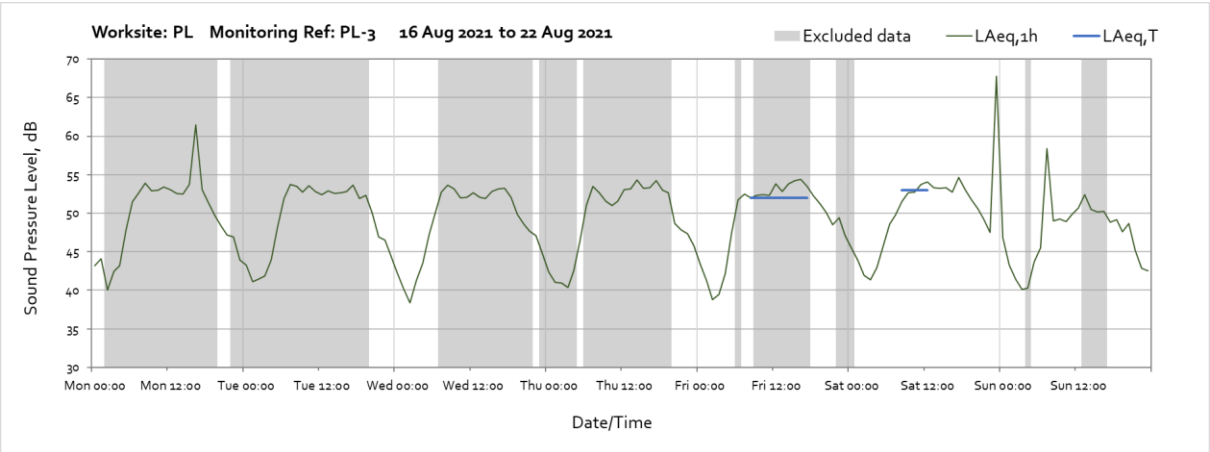
Date/Time


Worksite: PL Monitoring Ref: PL-3 16 Aug 2021 to 22 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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Mon 00:00
Mon 12:00
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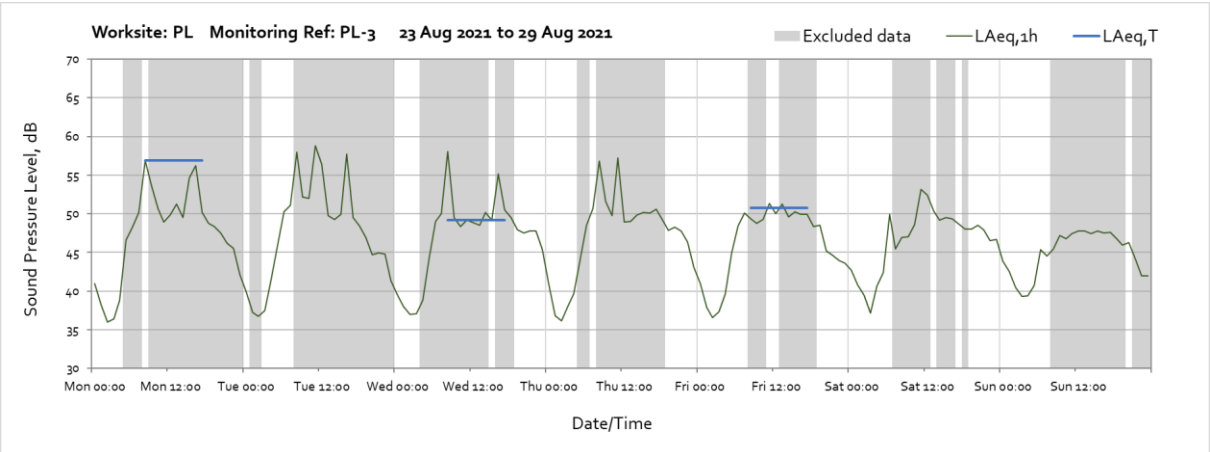
Date/Time


Worksite: PL Monitoring Ref: PL-3 23 Aug 2021 to 29 Aug 2021
Excluded data
LAeq,1h
LAeq,T
Sound Pressure Level, dB
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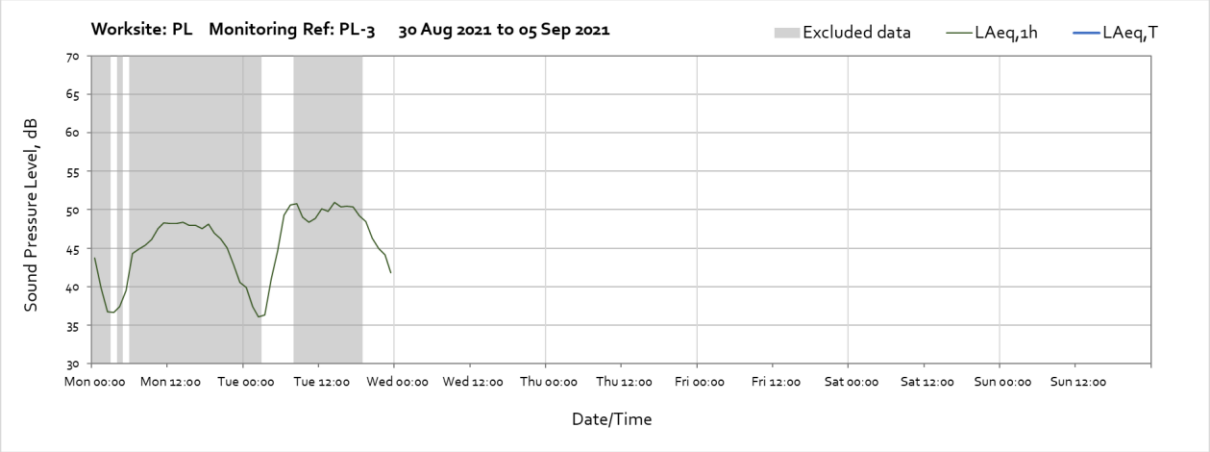
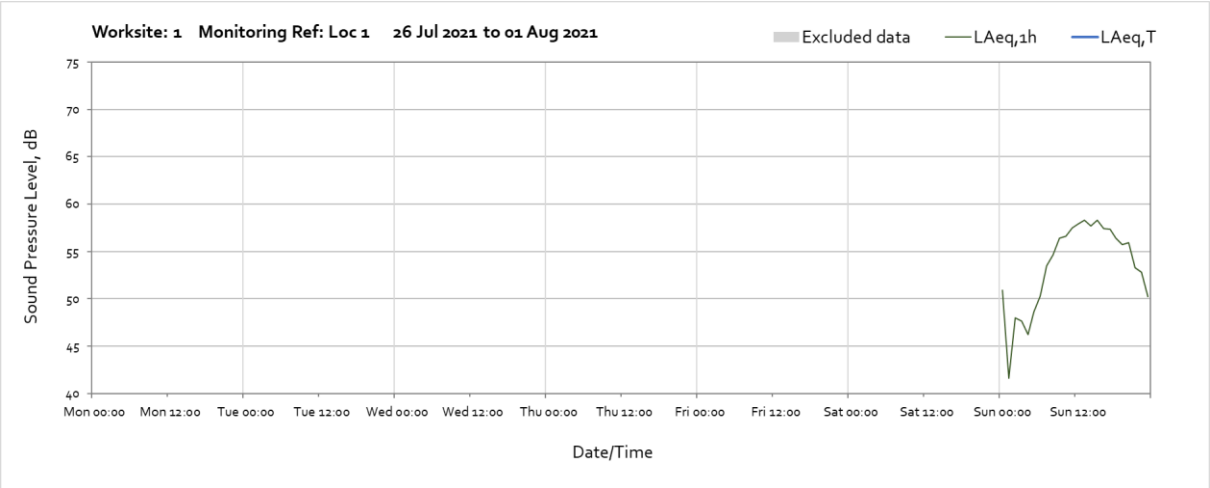
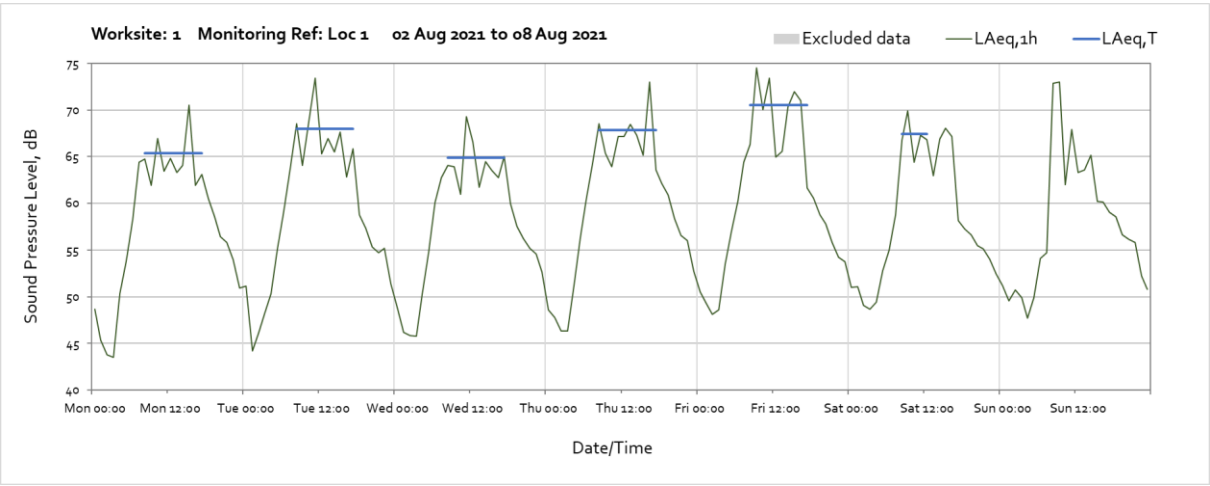
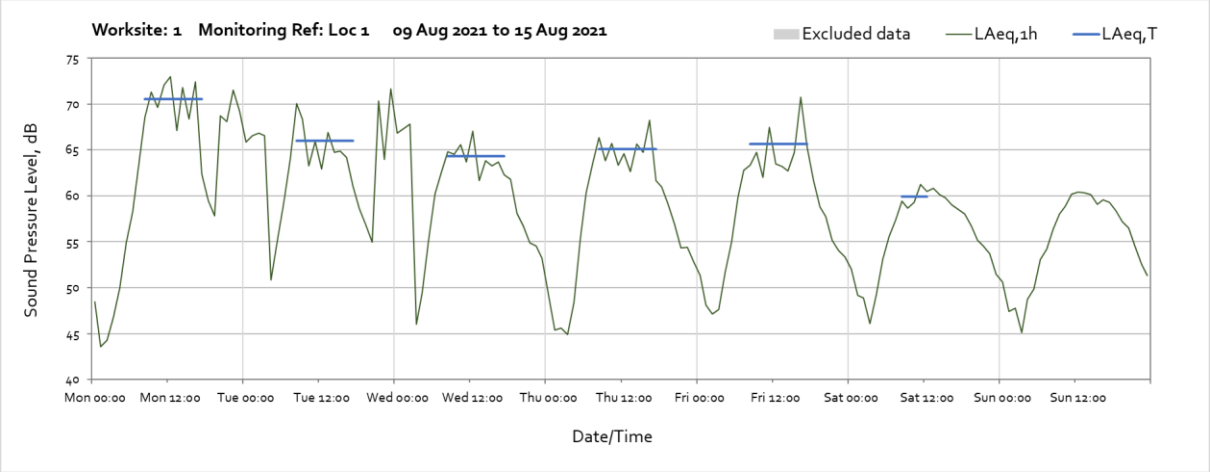


Worksite: Park Lane – Monitoring Ref: PL-4



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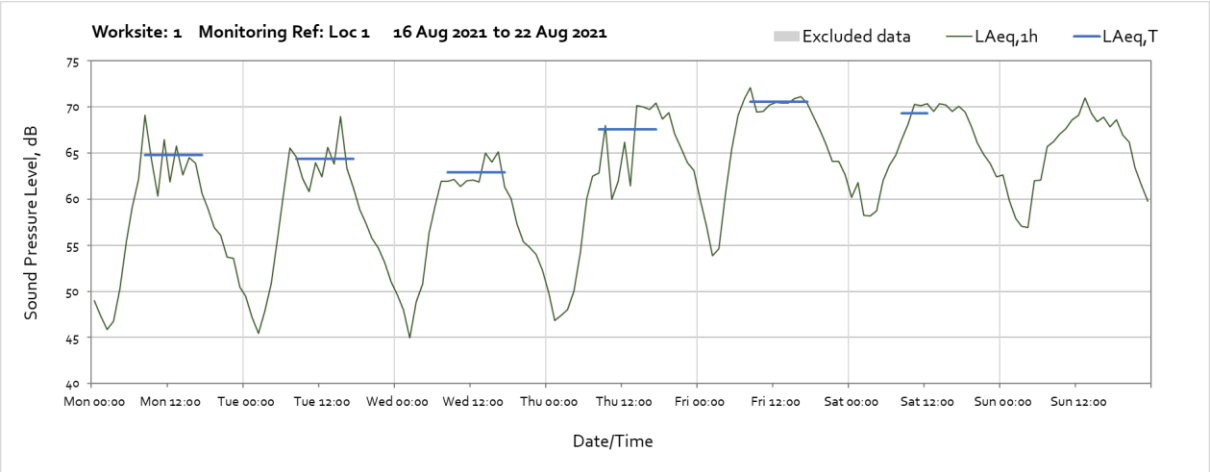
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Sound Pressure Level, dB
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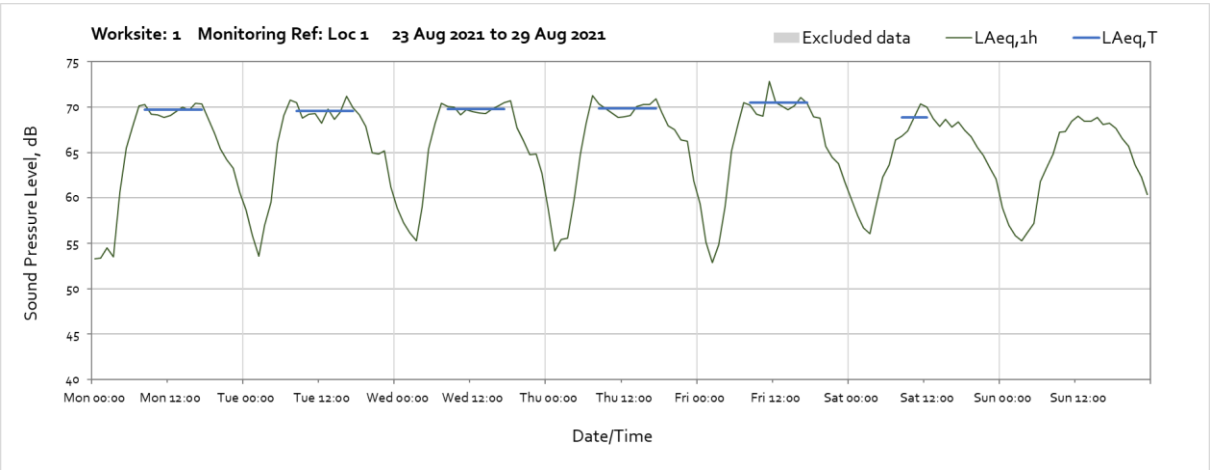
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Sound Pressure Level, dB
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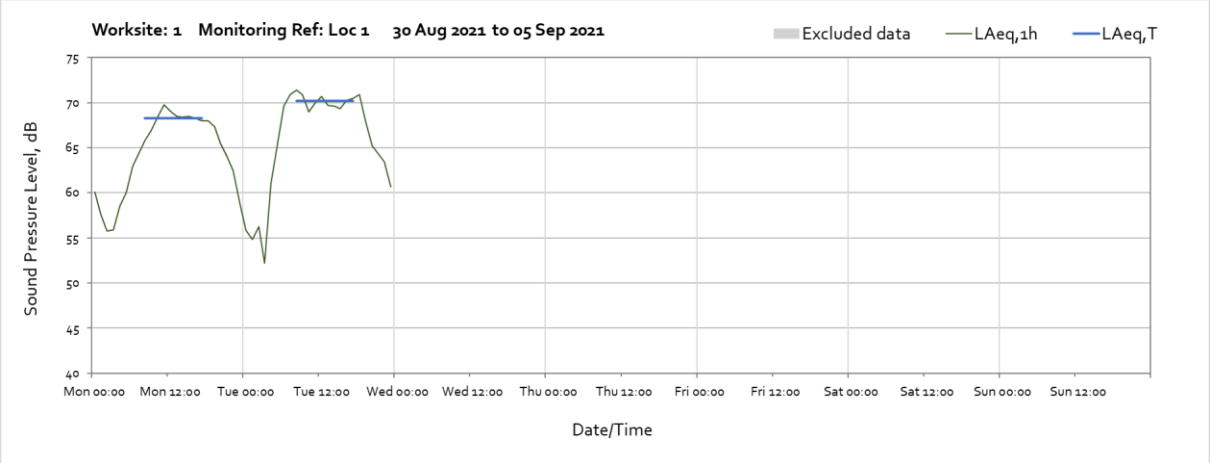

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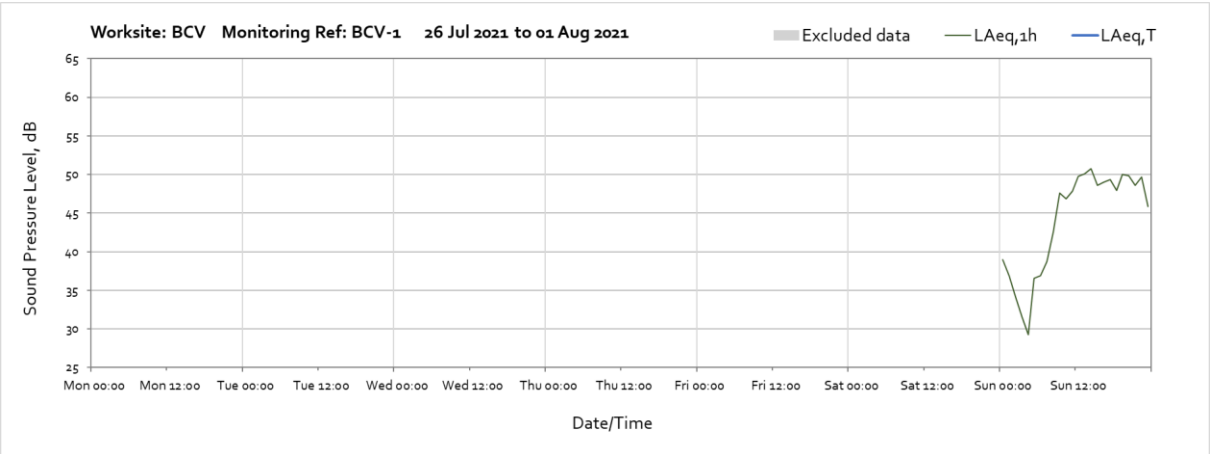

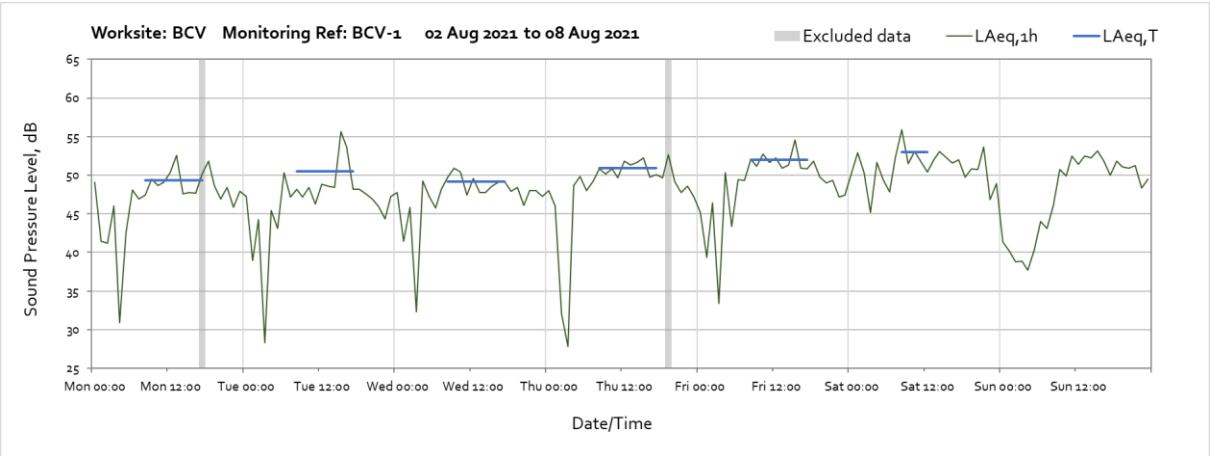

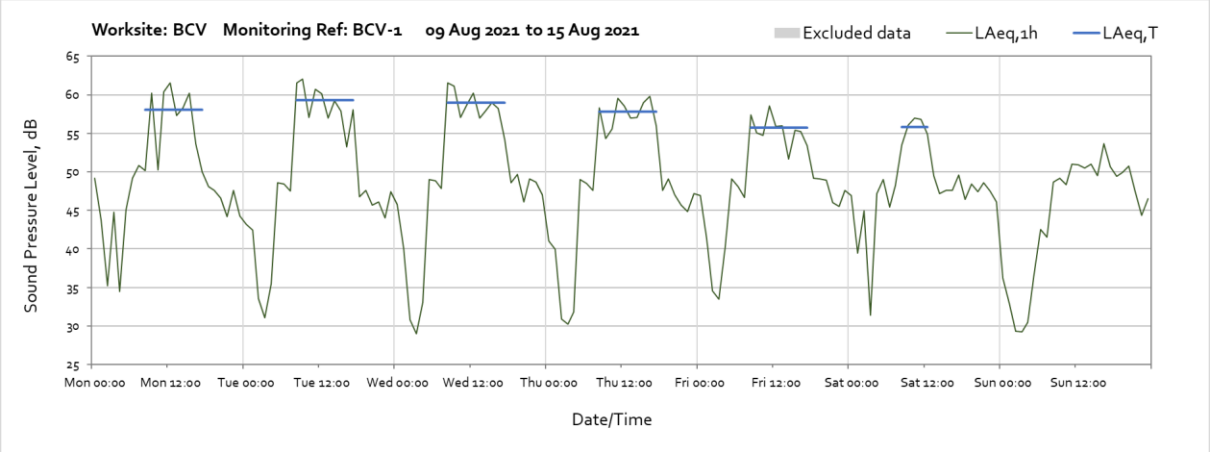
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LAeq,T
Sound Pressure Level, dB
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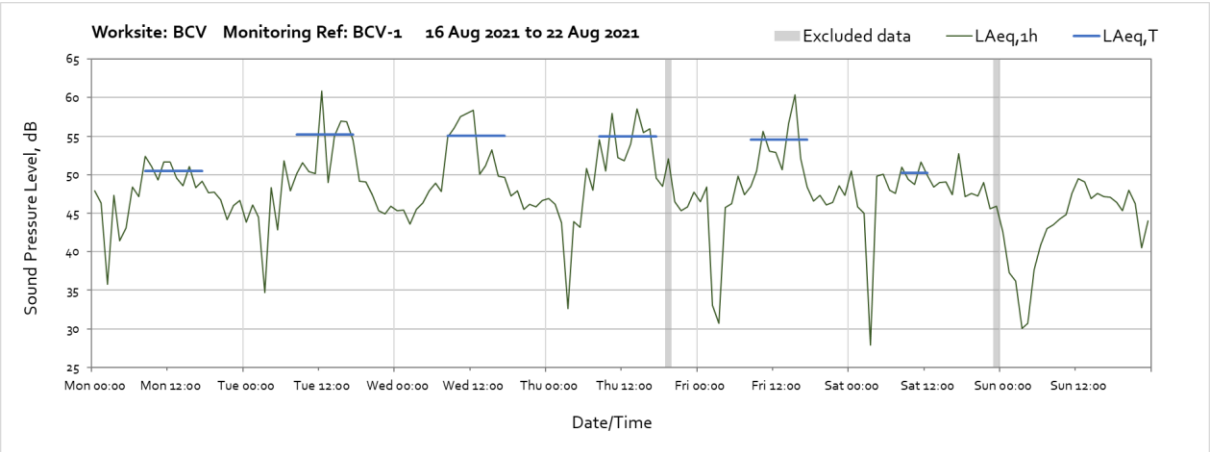
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Sound Pressure Level, dB
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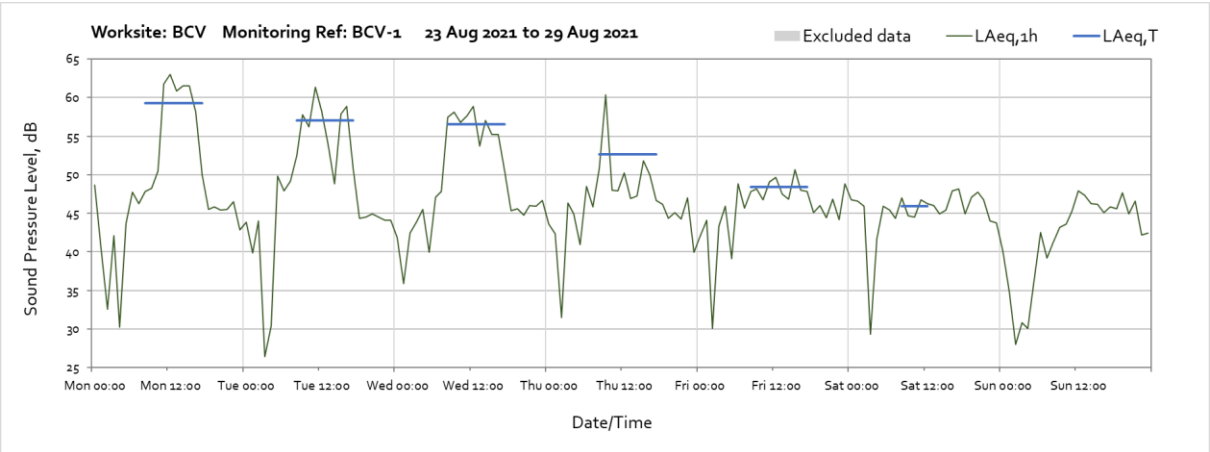
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Sound Pressure Level, dB
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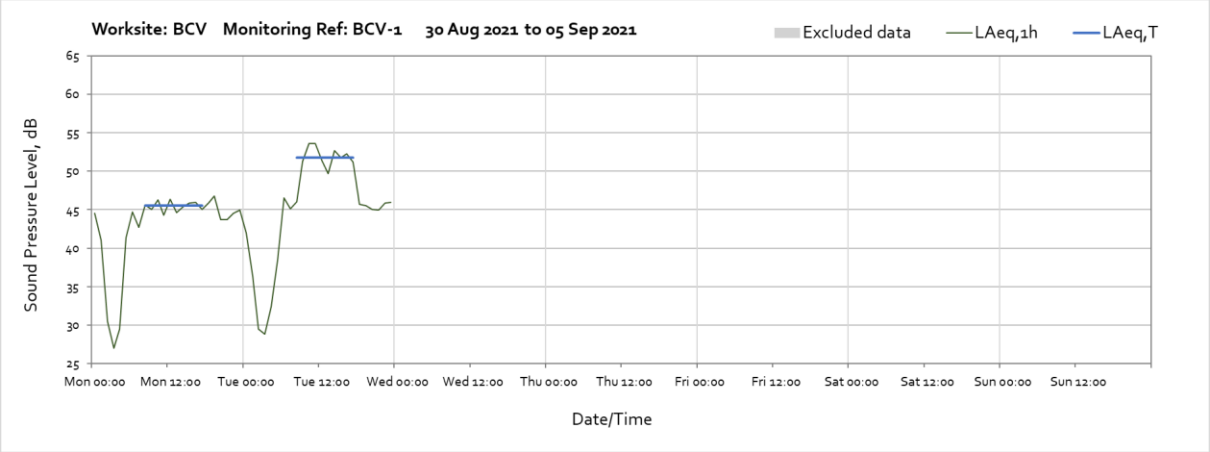
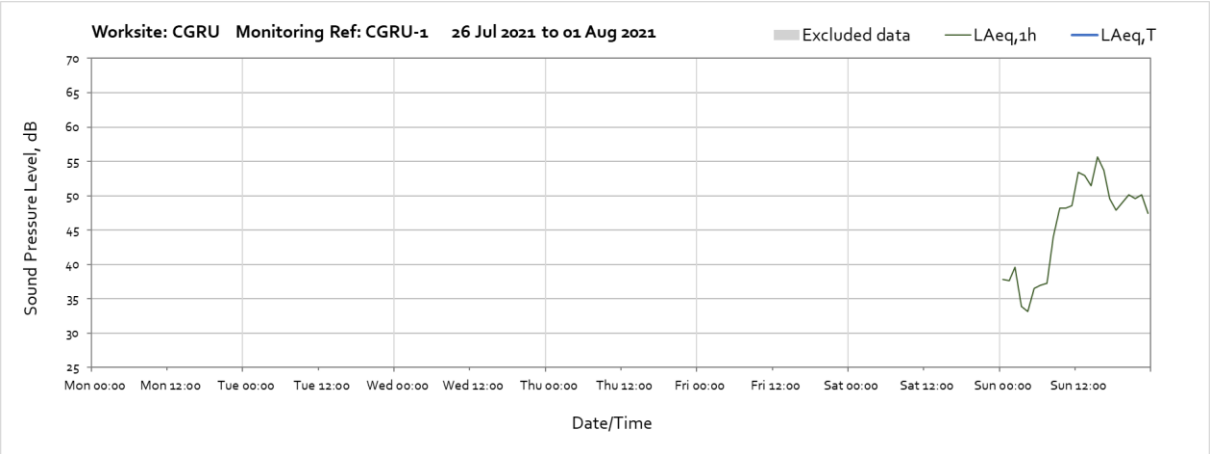
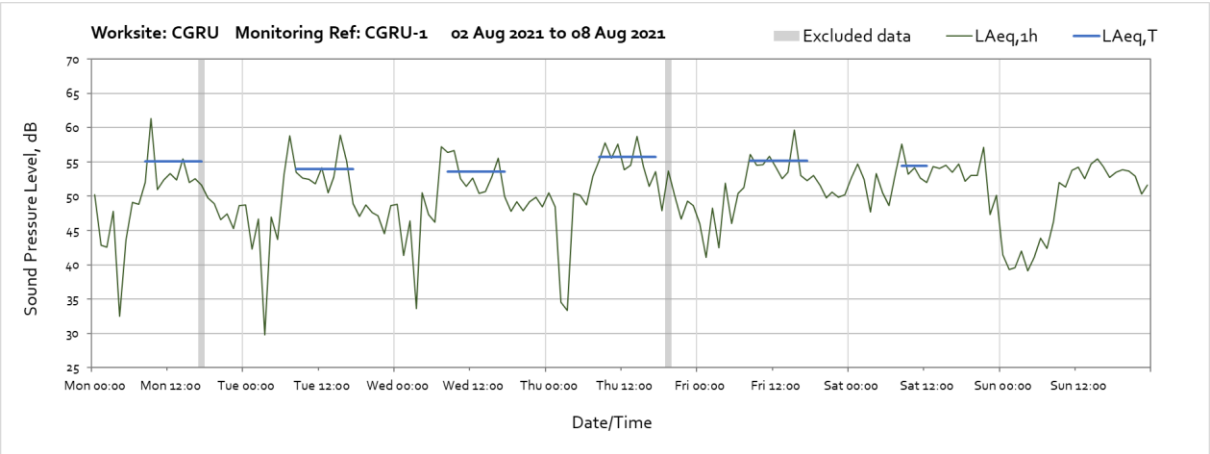
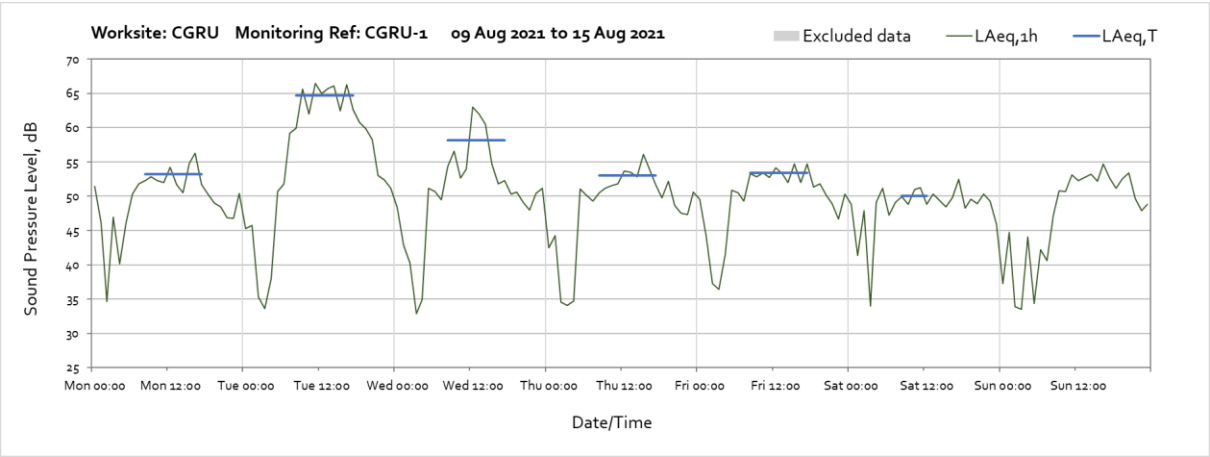


Worksite: Carol Green Rail Underbridge– Monitoring Ref: CGRU-1



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Excluded data
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Sound Pressure Level, dB
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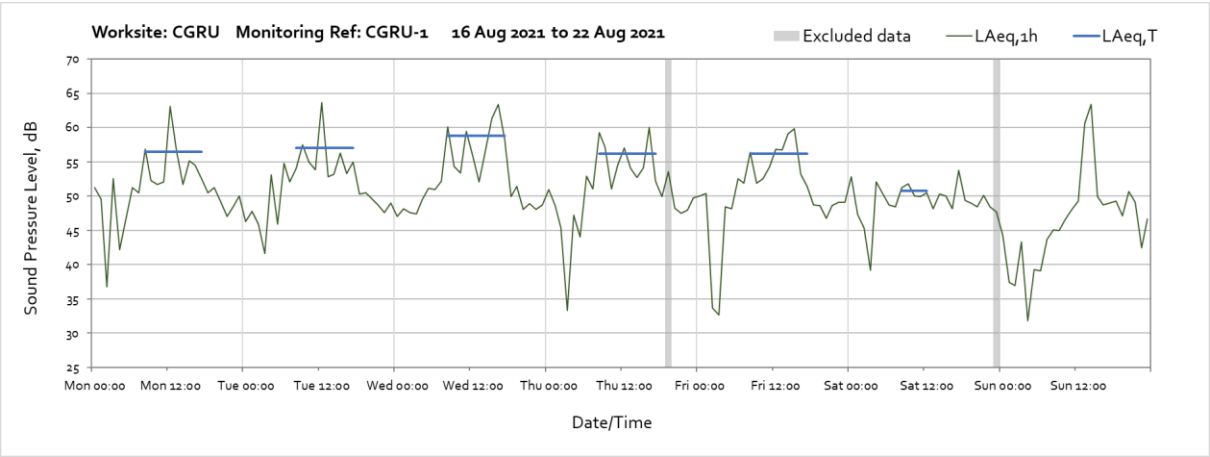
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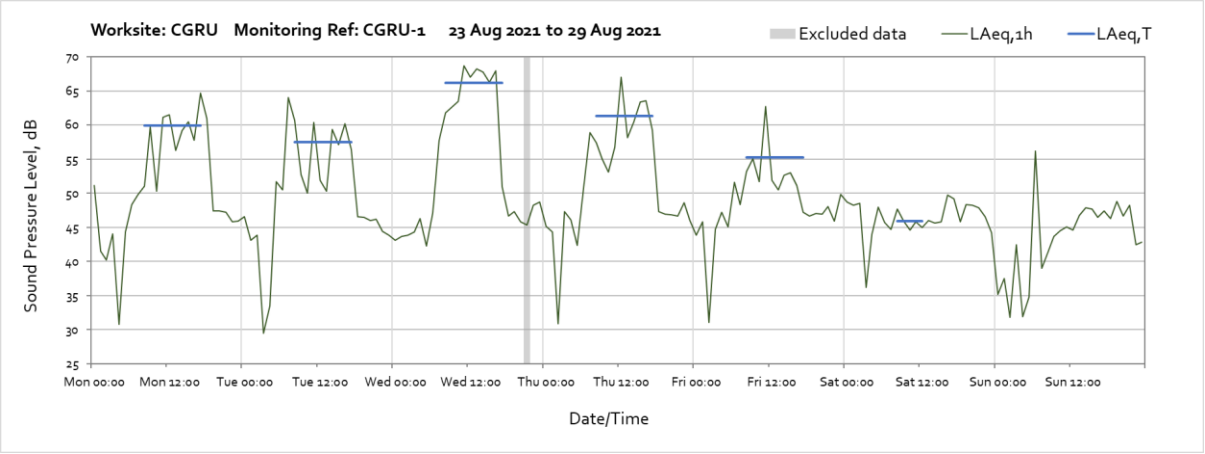
Worksite: CGRU Monitoring Ref: CGRU-1 23 Aug 2021 to 29 Aug 2021
Excluded data
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Sound Pressure Level, dB
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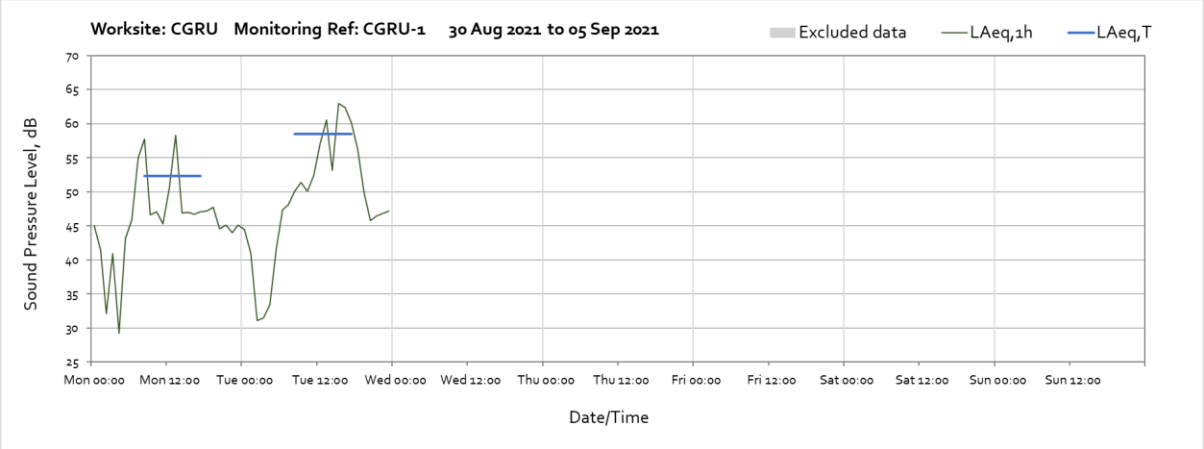
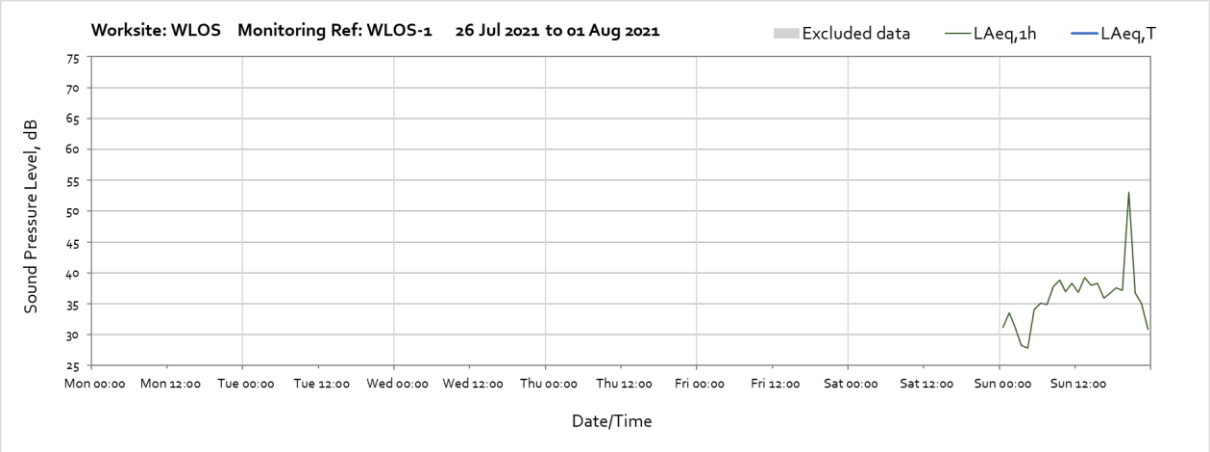
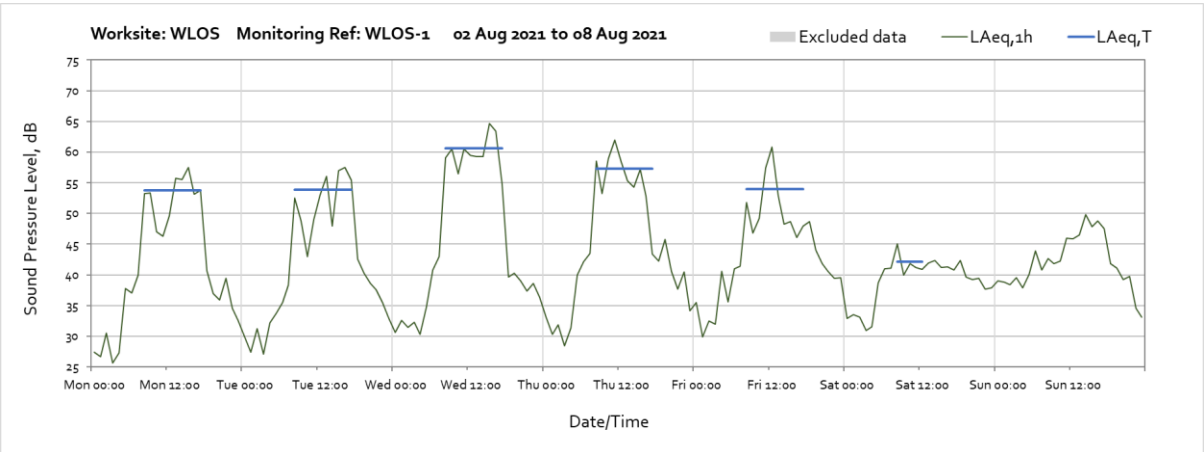
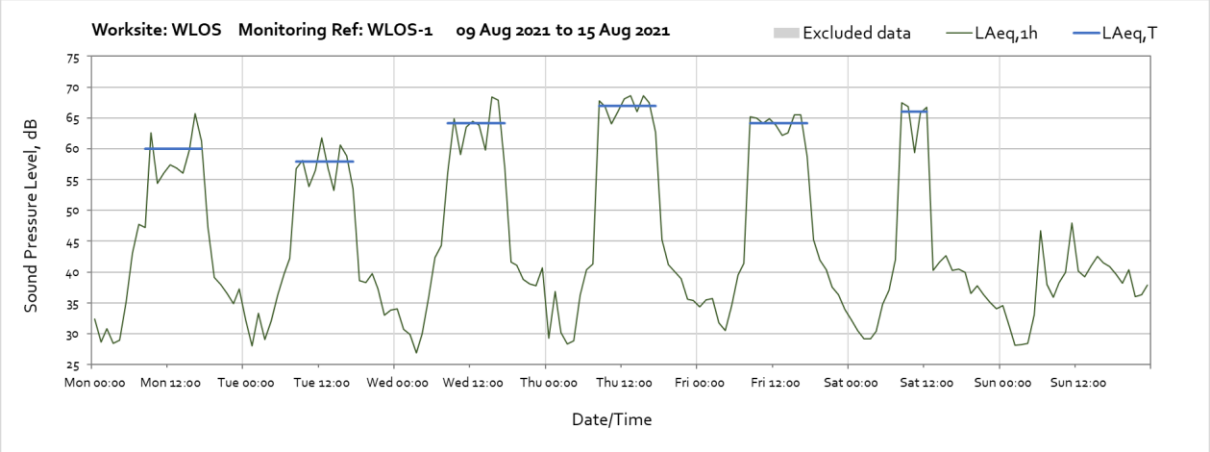
Date/Time



Worksite: Waste Lane Overbridge and Satellite – Monitoring Ref: WLOS-1






Worksite: WLOS Monitoring Ref: WLOS-1 09 Aug 2021 to 15 Aug 2021
Excluded data
LAeq,1h
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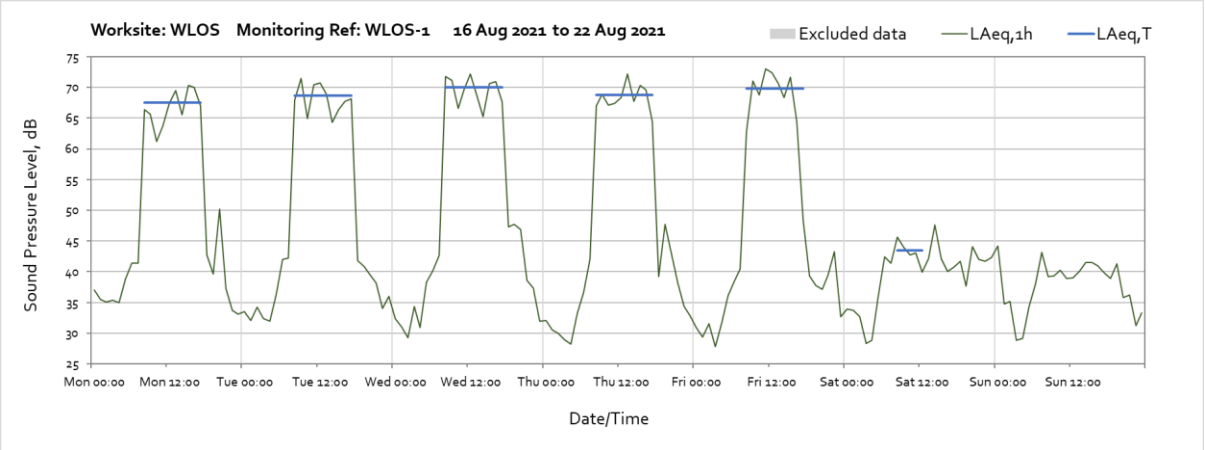
Worksite: WLOS Monitoring Ref: WLOS-1 16 Aug 2021 to 22 Aug 2021
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LAeq,T
Sound Pressure Level, dB
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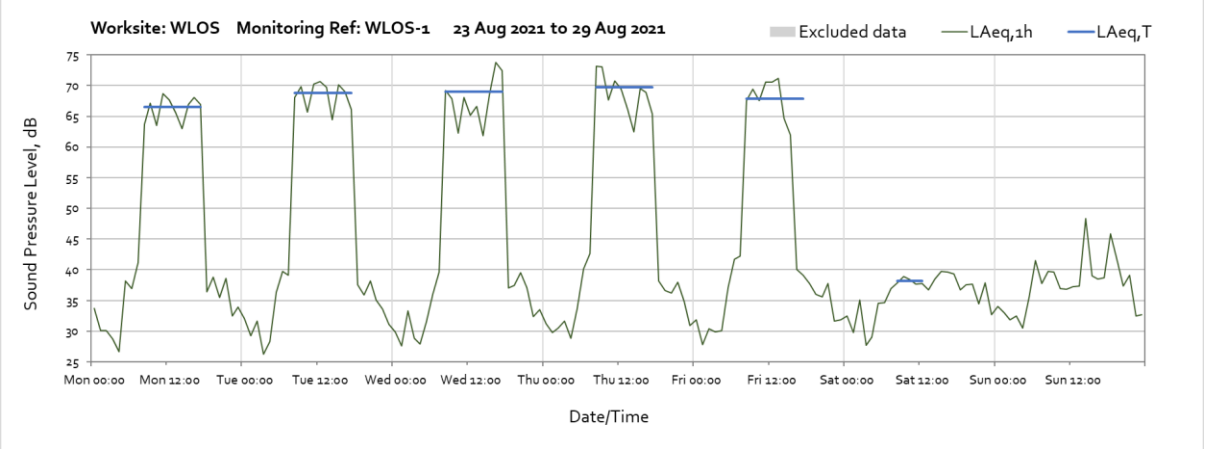
Date/Time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Sound Pressure Level, dB
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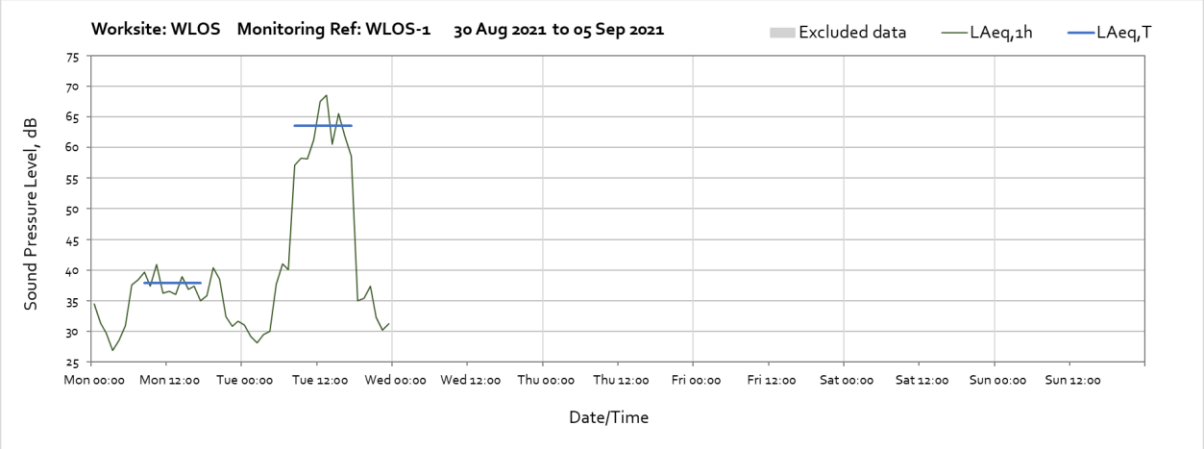
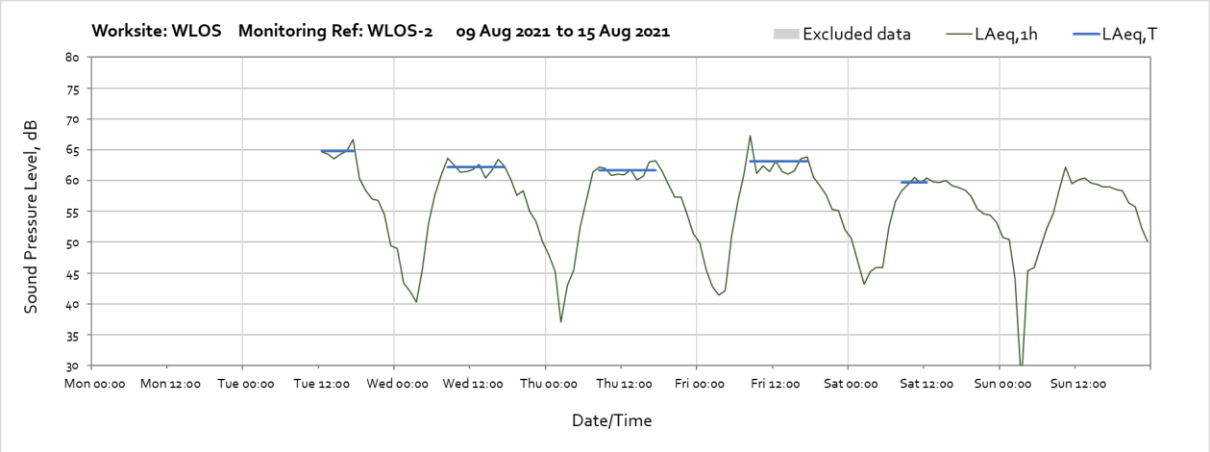
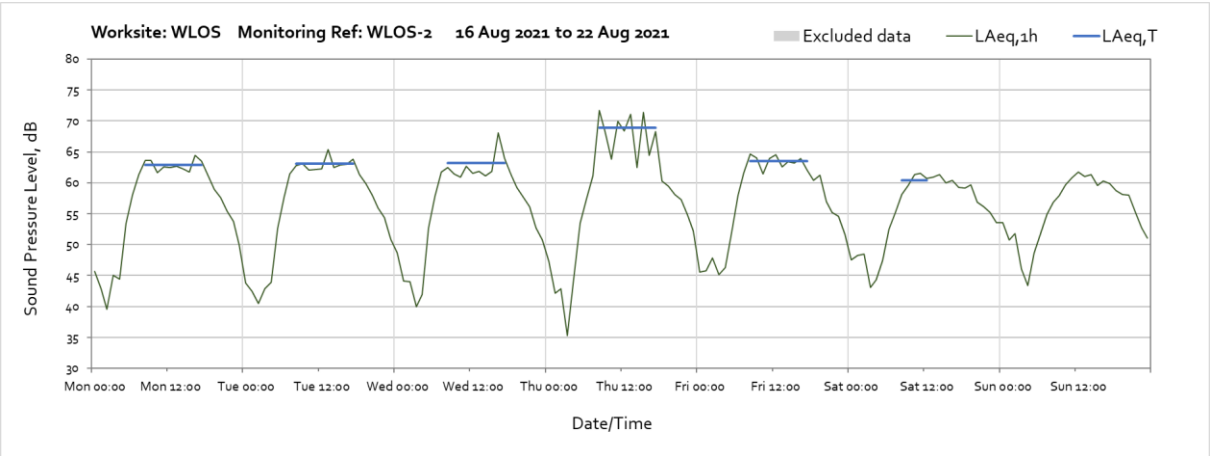
Date/Time

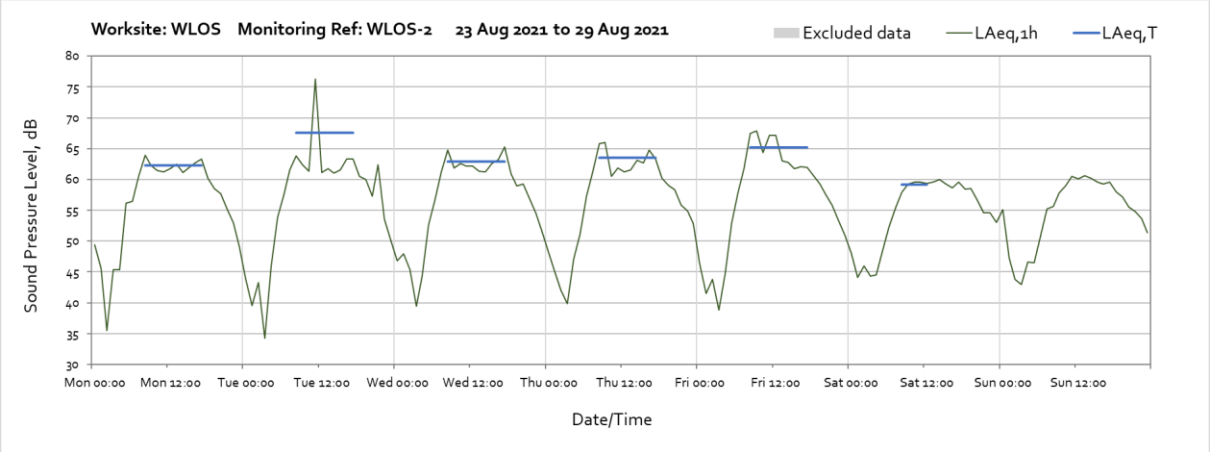


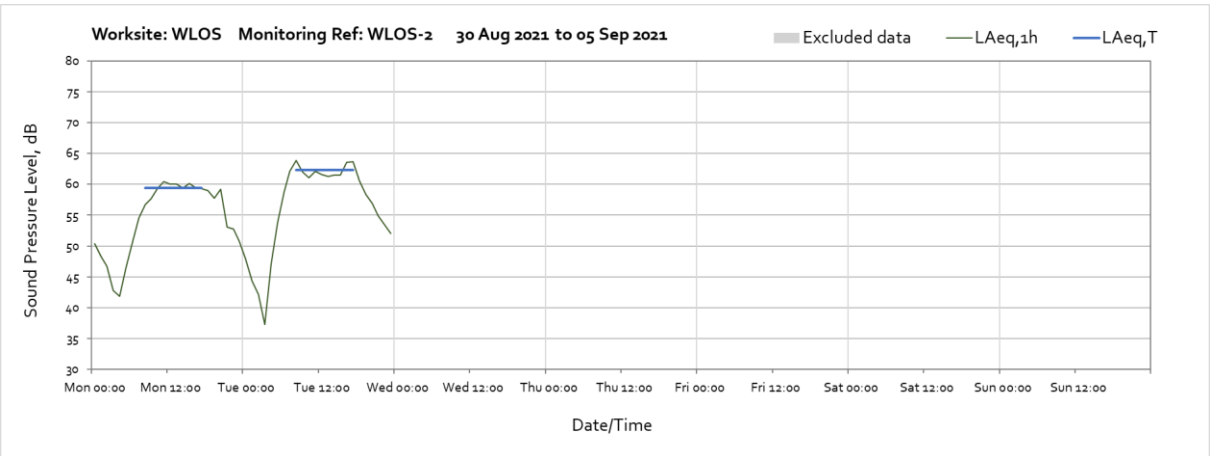
Worksite: Waste Lane Overbridge and Satellite – Monitoring Ref: WLOS-2



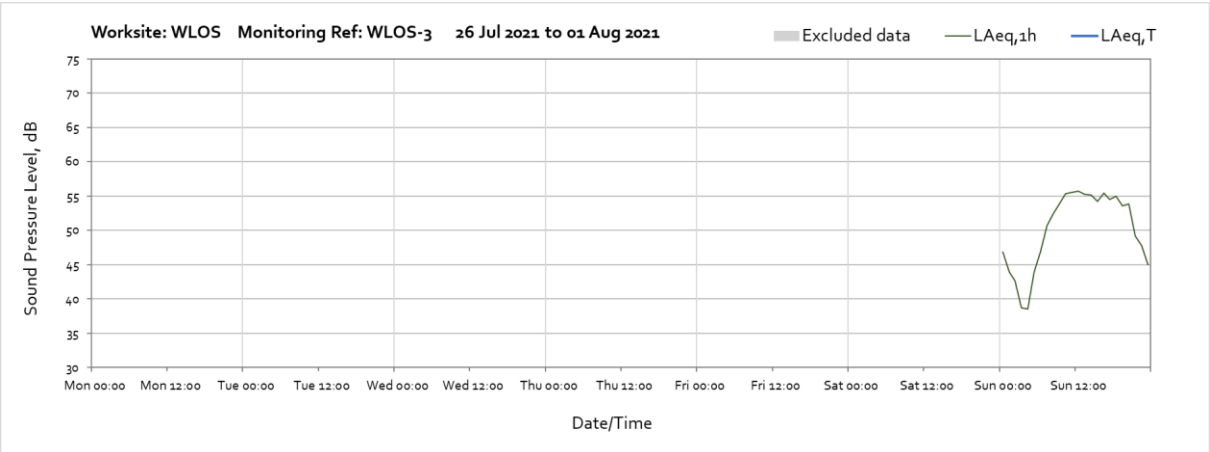
Note: The noise monitor was reinstated at site location on 10th August 2021 after it was removed in July due to a serious ant infestation causing damage to equipment.

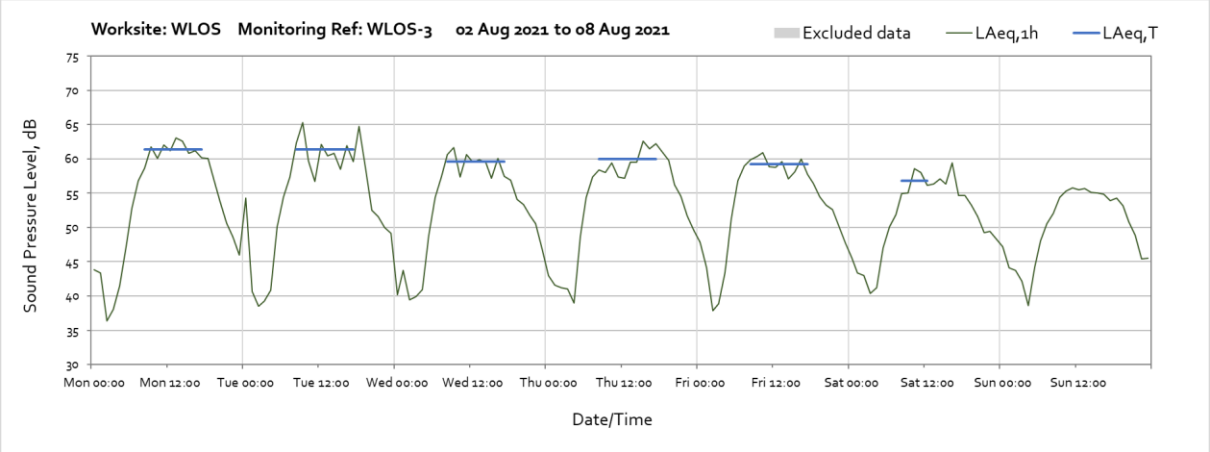






Worksite: Waste Lane Overbridge and Satellite – Monitoring Ref: WLOS-3




Worksite: WLOS Monitoring Ref: WLOS-3 02 Aug 2021 to 08 Aug 2021
Excluded data
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Sound Pressure Level, dB
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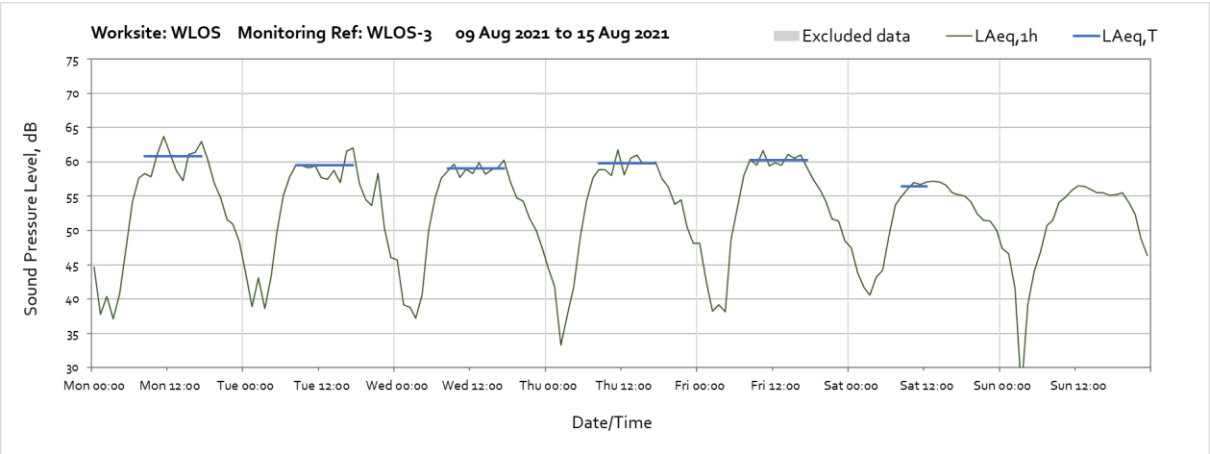
Date/Time


Worksite: WLOS Monitoring Ref: WLOS-3 09 Aug 2021 to 15 Aug 2021
Excluded data
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LAeq,T
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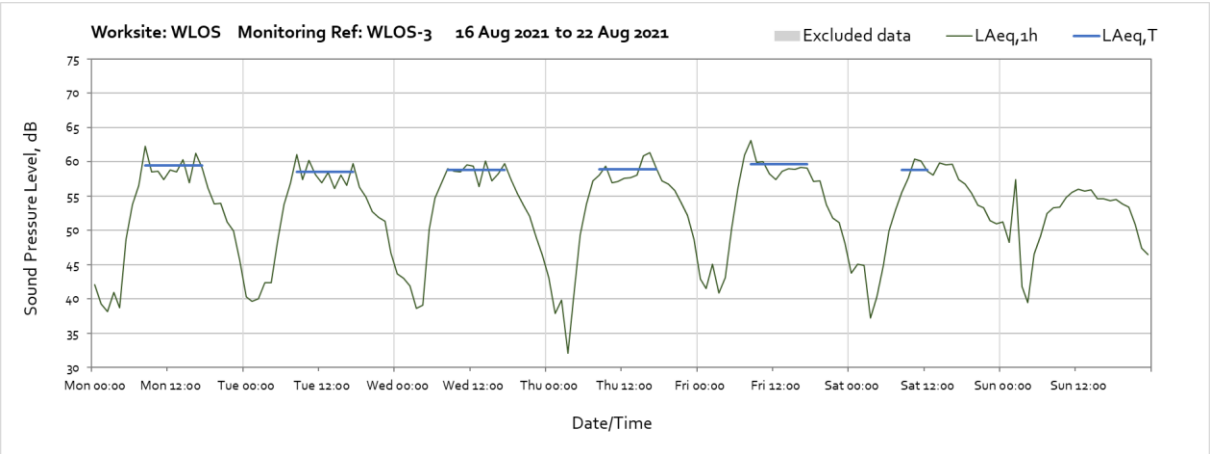
Worksite: WLOS Monitoring Ref: WLOS-3 16 Aug 2021 to 22 Aug 2021
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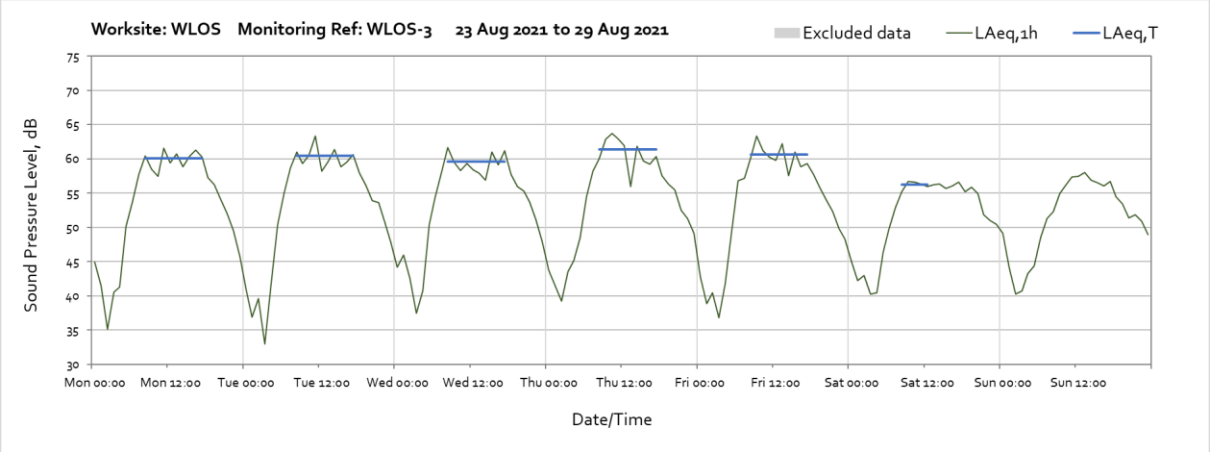
Worksite: WLOS Monitoring Ref: WLOS-3 23 Aug 2021 to 29 Aug 2021
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Sound Pressure Level, dB
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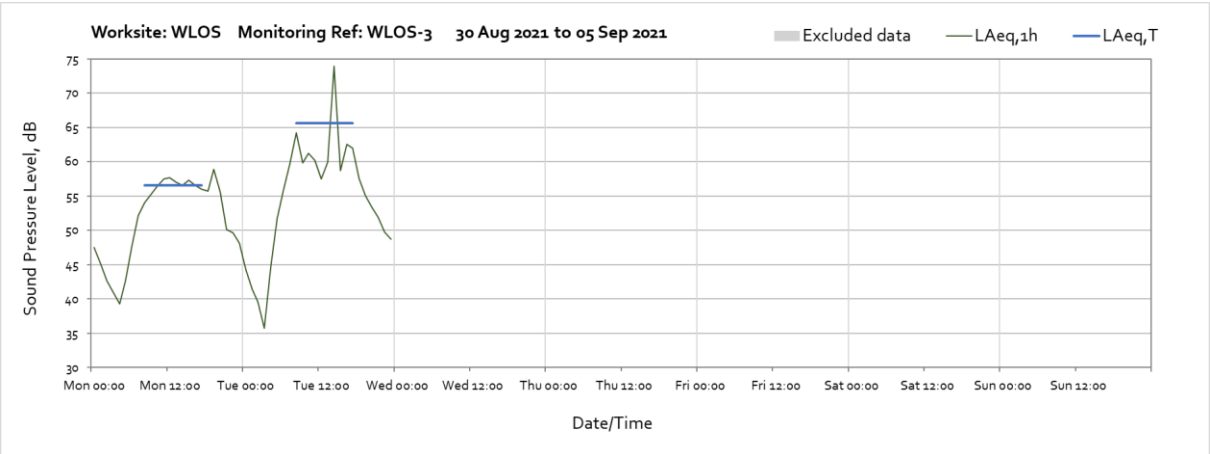
Date/Time


Worksite: WLOS Monitoring Ref: WLOS-3 30 Aug 2021 to 05 Sep 2021
Excluded data
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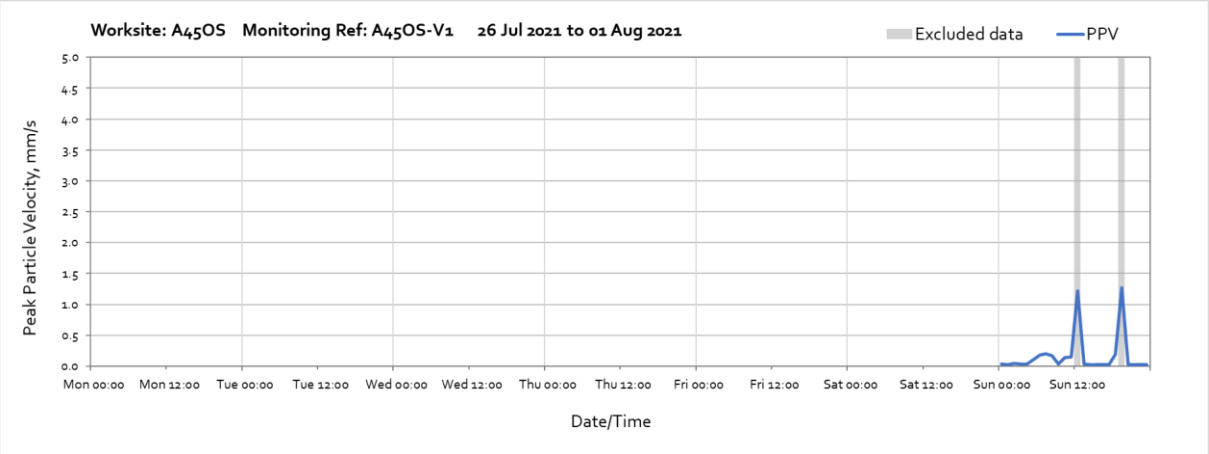
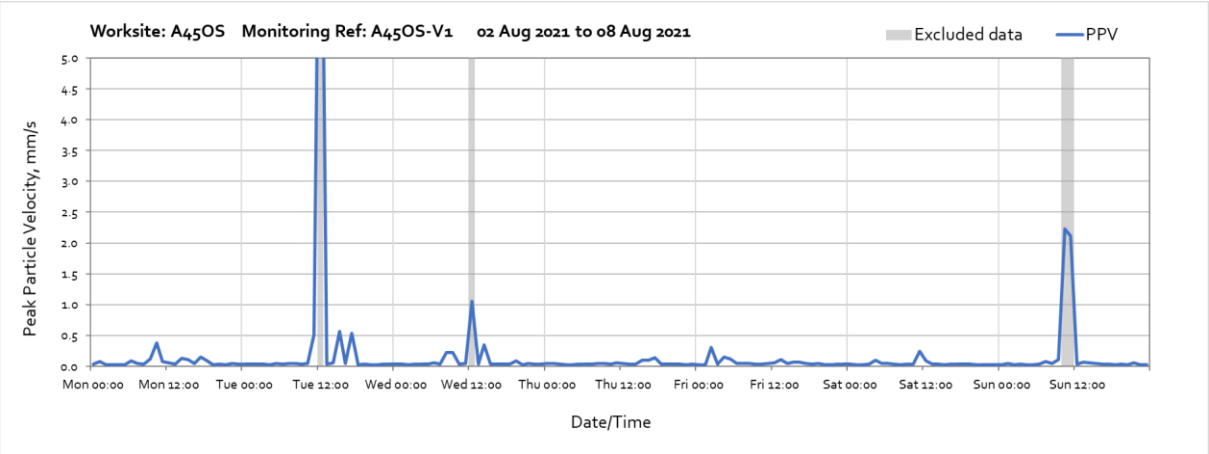
Vibration

The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the highest PPV of the three orthogonal axes x, y and z. Where high values of PPV were caused by local interference with the vibration monitor, which are not representative of HS2 construction works, these values have been greyed out in the following charts and have been excluded to calculate values in Table 4 of the main report.

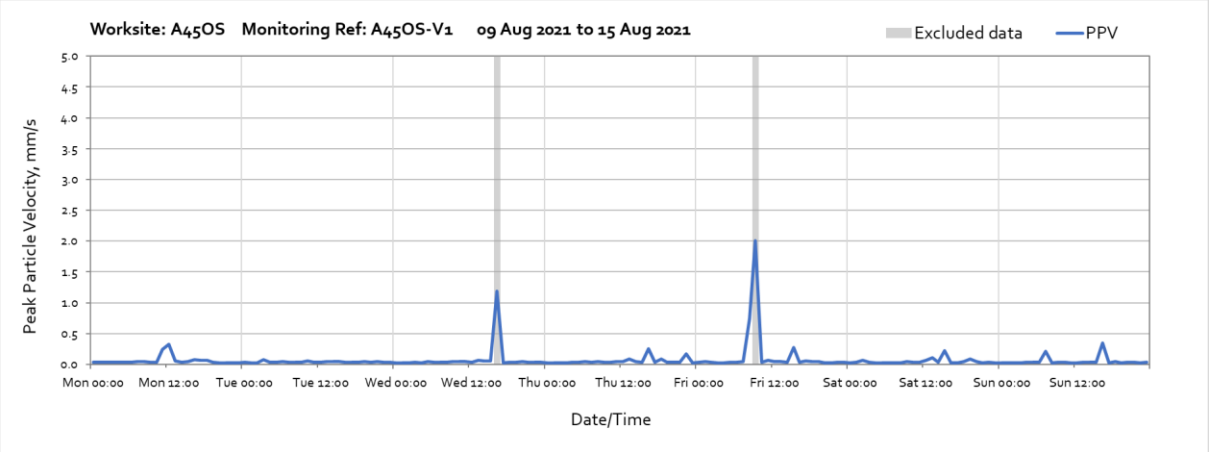
Worksite: A45OS – Monitoring Ref: A45OS-V1



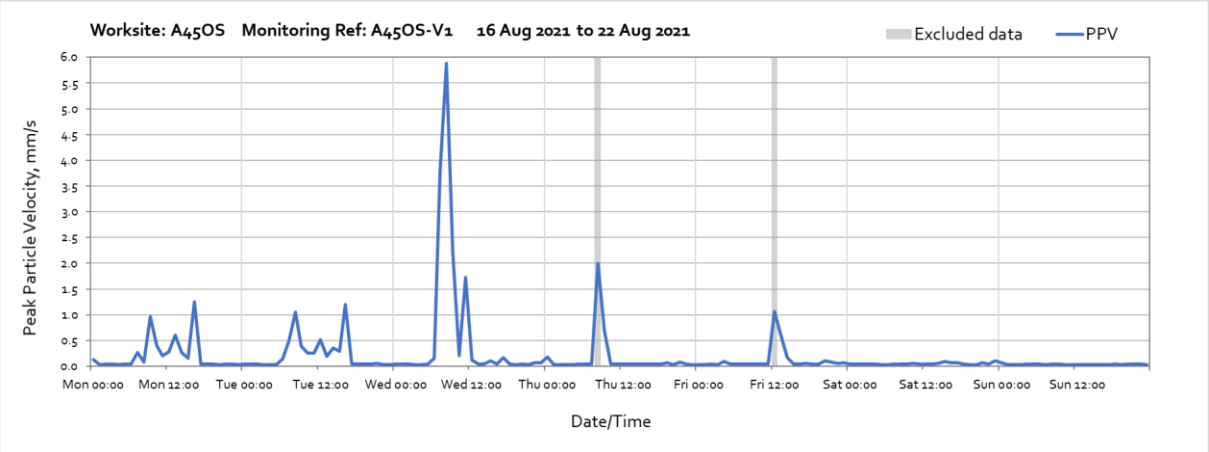
Note: High levels of vibration measured between 12:00 and 13:00 and between 19:00 and 20:00 on Sunday 1st August were due to local disturbance and are not representative of HS2 construction vibration levels.



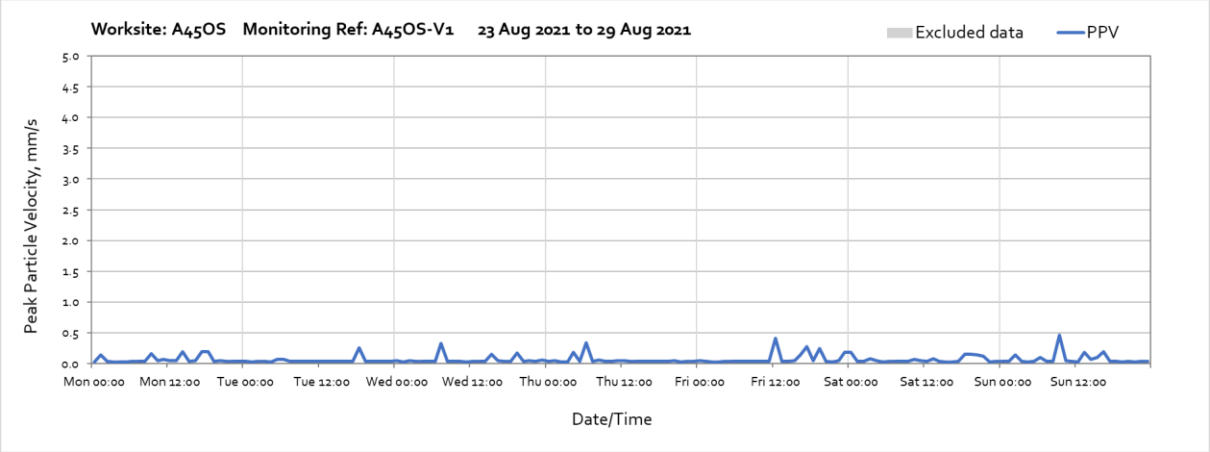
Note: High levels of vibration measured throughout the week were due to local disturbance and are not representative of HS2 construction vibration levels.

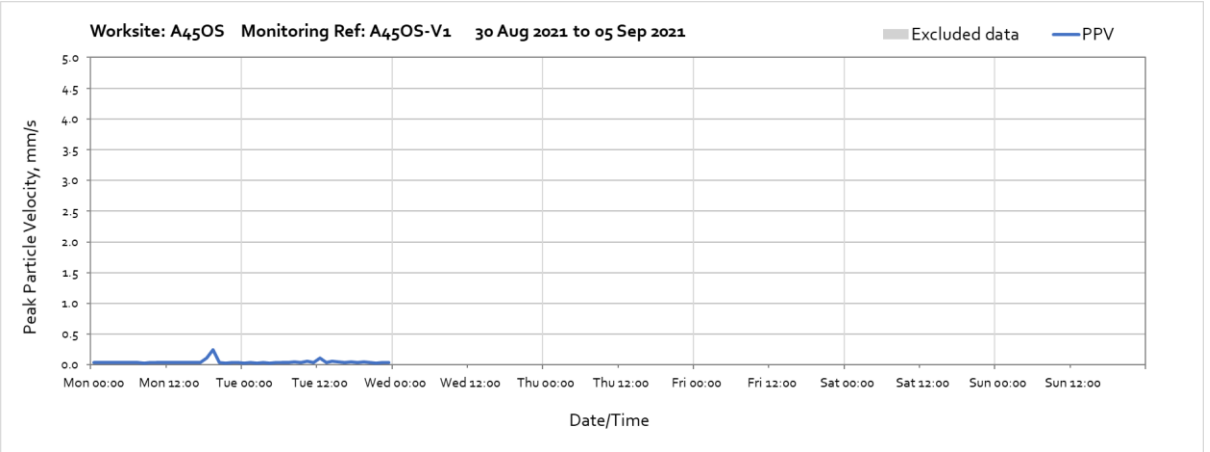


Note: High levels of vibration measured throughout the week were due to local disturbance and are not representative of HS2 construction vibration levels.

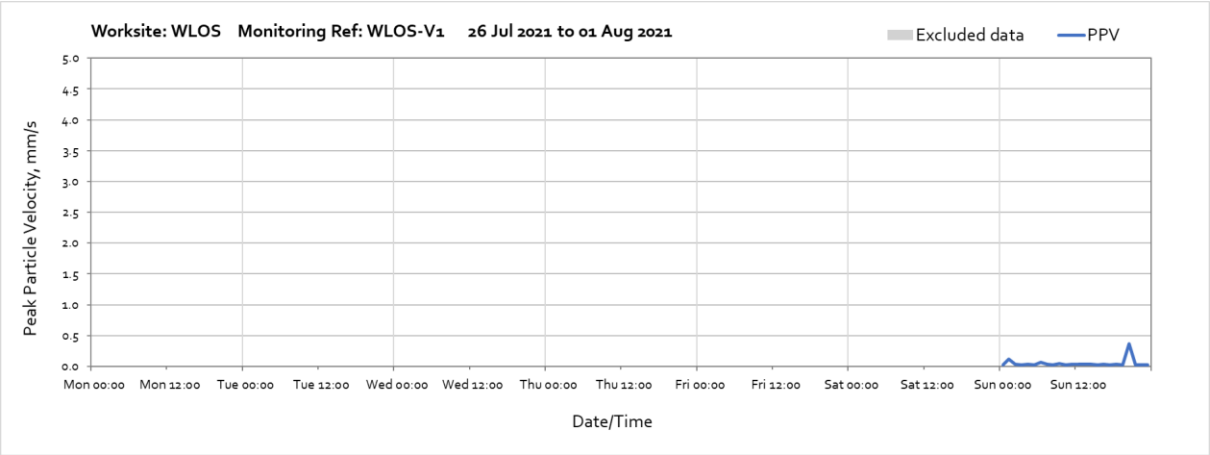


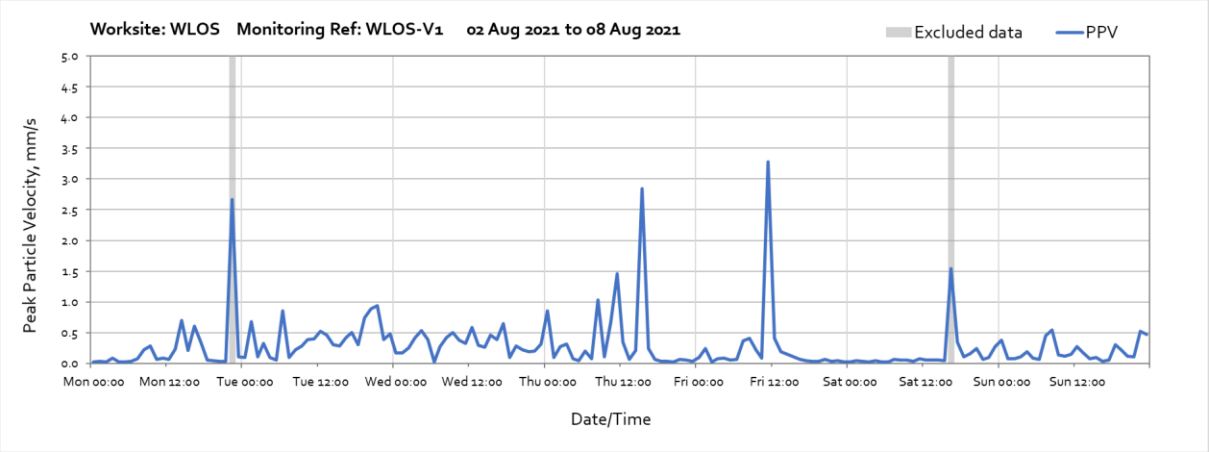
Note: High vibration levels on 16th to 18nd August were due to demolition and demobilization works carried out in proximity of the monitor. The nearest residential receptors are further from the works and vibration levels at the receptor will therefore be lower. High levels of vibration measured on 19th and 20th were due to local disturbance and are not representative of HS2 construction vibration levels.



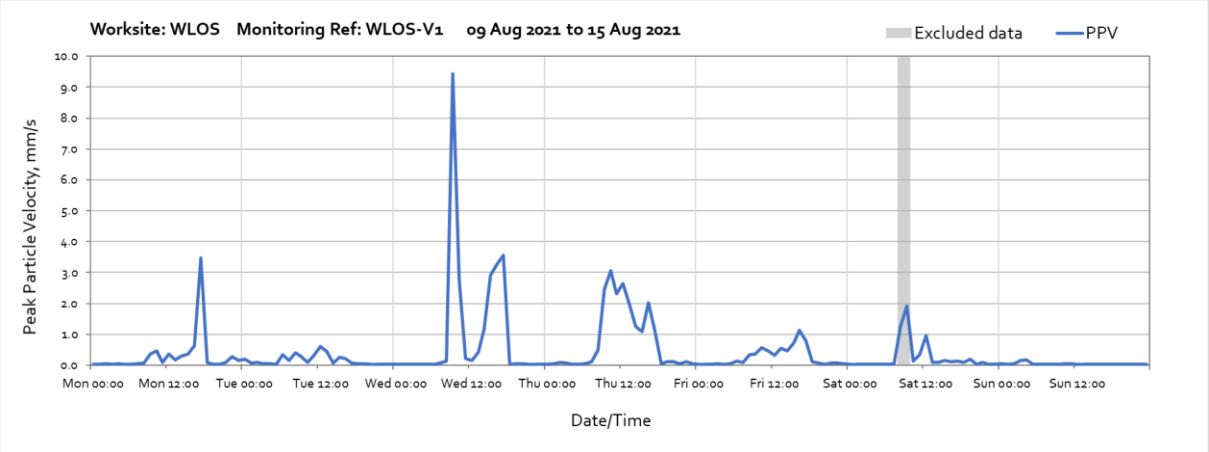


Worksite: WLOS – Monitoring Ref: WLOS-V1

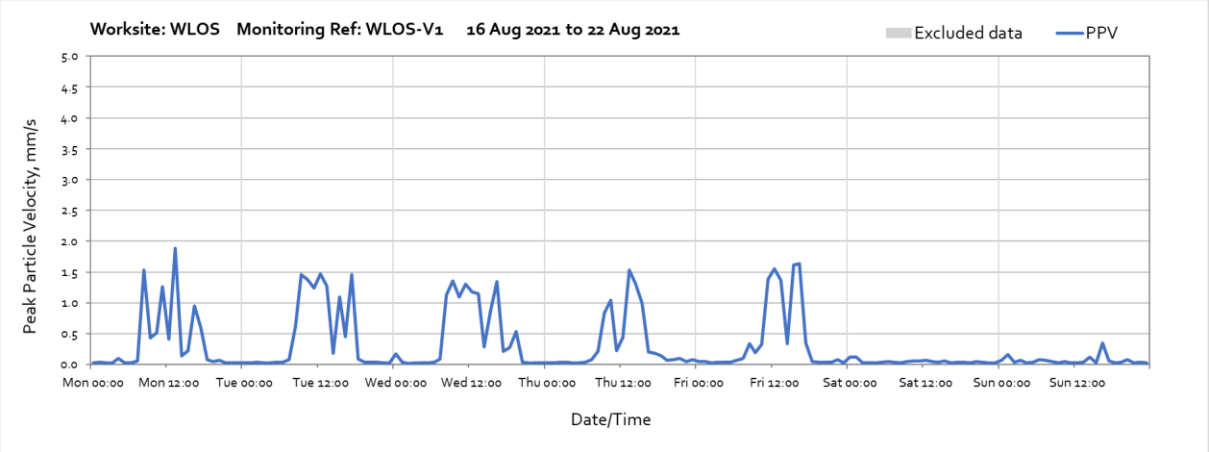




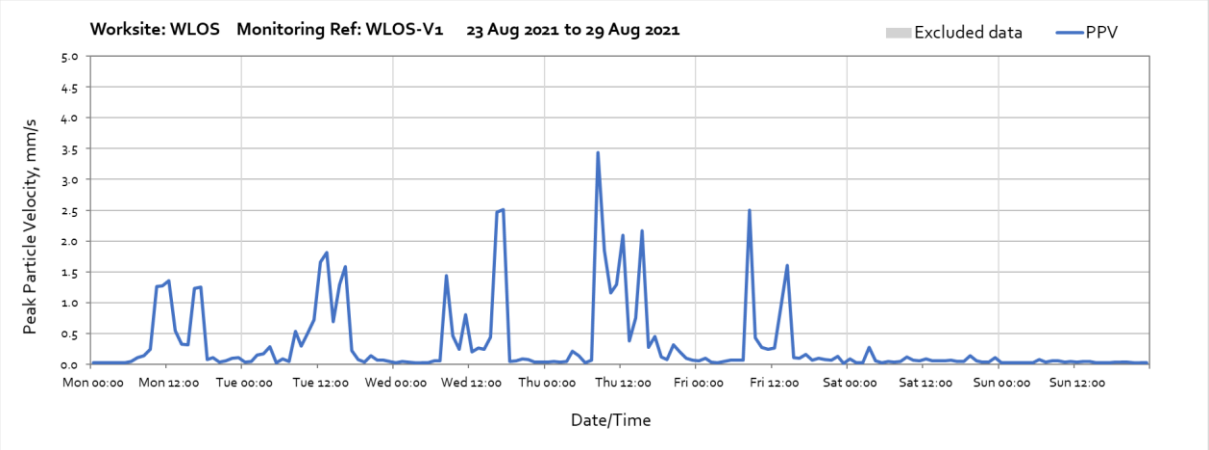
Note: High levels of vibration measured through out the week were due to bentonite slab constuction carried out in the vicinity of the monitor. The nearest residential receptors are further from the works and vibration levels at the receptor will therefore be lower. High levels of vibration measured between 22:00 and 23:00 on Monday 2nd August and between 16:00 and 17:00 on Saturday 7th August were due to local disturbance and are not representative of HS2 construction vibration levels.



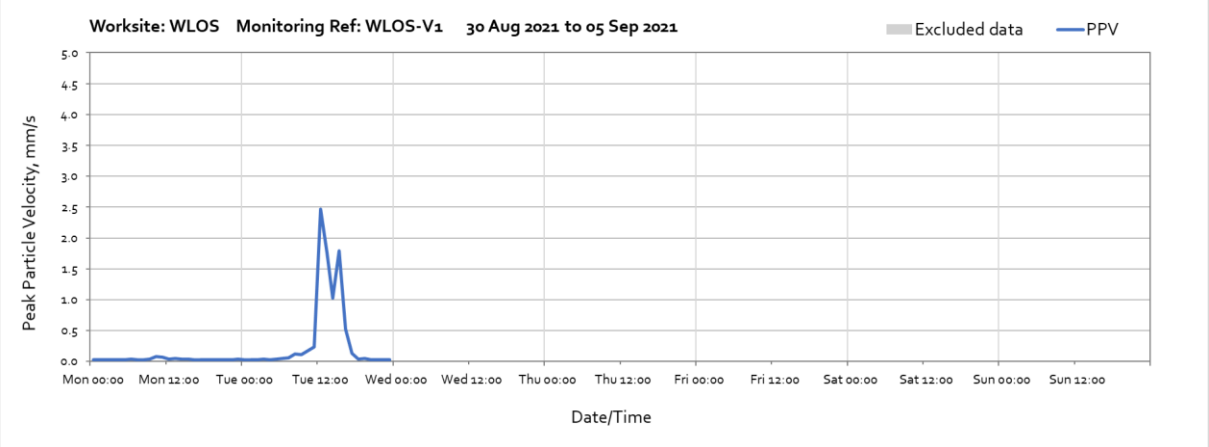
Note: High levels of vibration measured through out the week were due to earthworks and bentonite slab constuction carried out in the vicinity of the monitor. The nearest residential receptors are further from the works and vibration levels at the receptor will therefore be lower. High levels of vibration measured between 08:00 and 10:00 on Saturday 14th were due to local disturbance and are not representative of HS2 construction vibration levels.



Note: High levels of vibration measured through out the week were due to earthworks and bentonite slab constuction carried out in the vicinity of the monitor. The nearest residential receptors are further from the works and vibration levels at the receptor will therefore be lower.



Note: High levels of vibration measured through out the week were due to earthworks and bentonite slab constuction carried out in the vicinity of the monitor. The nearest residential receptors are further from the works and vibration levels at the receptor will therefore be lower.



Note: High levels of vibration measured through out the week were due to earthworks and bentonite slab constuction carried out in the vicinity of the monitor. The nearest residential receptors are further from the works and vibration levels at the receptor will therefore be lower.