

Construction Noise and Vibration Monthly Report – January 2024

London Borough of Camden

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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 Camden during the month of January 2024.

Within this period monitoring was undertaken at the following worksites:

- Noise monitoring was undertaken in the vicinity of The Adelaide Road Ventilation Shaft (ref.: ARVS) where fencing and safety barrier installation, scaffold modification, staircase installation, site hoarding repairs and adjustments, excavation works, pile trimming, sheet pile prop installation, base slab waterproofing, steel fixing and concrete pouring were underway.
- Noise monitoring was undertaken in the vicinity of the Vehicle Holding Area worksite (ref.: VHA), where deliveries, site maintenance, surveys, haul road and drainage maintenance were underway.
- Noise monitoring was undertaken in the vicinity of the Mornington Street Bridge worksite (ref.: MSB), where no works were undertaken.
- Noise monitoring was undertaken in the vicinity of the Park Village East worksite (ref.: PVE), where deliveries, site maintenance, surveys, haul road and drainage maintenance, excavation works, steel fixing, formwork installation and concrete pouring were underway.
- Noise monitoring was undertaken in the vicinity of Euston Scissor Box worksite (ref.: ESB) where deliveries, site maintenance, surveys, haul road and drainage maintenance, installation and extraction of piles, excavation works, pile capping, scaffold installation, building of reinforcement cages, steel fixing and concrete pumping and pouring were underway.
- Noise monitoring was undertaken in the vicinity of Euston Throat Retained Cut worksite (ref.: ETRC) where deliveries, site maintenance, surveys, haul road and drainage maintenance, excavation works, pile capping, concrete treatment works, and steel fixing were underway.
- Noise monitoring was undertaken in the vicinity of Granby Terrace Bridge worksite (ref.: GTB) where deliveries, site maintenance, surveys, haul road and drainage maintenance, bridge structure formwork and concrete pouring were underway.
- Noise and vibration monitoring were undertaken in the vicinity of the Hampstead Road Bridge worksite (ref.: HRB) where deliveries, site maintenance, surveys and haul road, drainage and hoarding maintenance were underway.

- Noise and vibration monitoring were undertaken in the vicinity of the Euston Cavern worksite (ref.: ECAV) where deliveries, site maintenance, surveys, haul road and drainage maintenance, formwork installation and concrete pouring were underway.
- Noise monitoring was undertaken in the vicinity of On-Network worksites (ref.: B, C, D, E, F, G and H), where work activities included:
 - Monitoring and surveys, excavation works, material movements, concrete pouring, drainage works, concrete formwork, concrete levelling and materials delivery and removal. (worksite E).
 - Steelworks and station upgrade works including maintenance (worksite H and G).
 - No HS2 works were undertaken at worksites B, C, D and F.
- Noise monitoring was undertaken in the vicinity of the Former National Temperance Hospital - North worksite (ref.: NTH-N) where no works were undertaken.
- Noise monitoring was undertaken in the vicinity of the Former National Temperance Hospital - Euston North worksite (ref.: NTH-EN) where no works were undertaken.
- Noise monitoring was undertaken in the vicinity of Maria Fidelis worksite (ref.: MF) where internal fitout works, asbestos removal, scaffold installation and non-structural elements removal were underway.
- Noise monitoring was undertaken in the vicinity of the Euston Towers Demolition worksite (ref.: ETD), where no works were undertaken.
- Noise monitoring was undertaken in the vicinity of the Traction Substation worksite (ref.: TSS) where internal fitout works were underway.
- Noise monitoring was undertaken in the vicinity of the Interim Taxi Rank worksite (ref.: ITR) where utility works, drilling and roadworks were underway.

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

- Gloucester Avenue where water utility works were underway.

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>) were exceeded eighteen (18) times during the reporting period.

Trigger levels as defined in section 61 consents was exceeded once (1) during the reporting period.

One (1) complaint was 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 +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 Camden (LBC) for the period 1st to 31st January 2024.

1.1.2 Active construction sites in the local authority area where monitoring was undertaken during this period include:

- The Adelaide Road ventilation shaft ref.: ARVS, (see plan 2 in Appendix A), where work activities included:
 - Fencing and safety barrier installation.
 - Scaffold modification.
 - Staircase installation.
 - Site hoarding repairs and adjustments.
 - Excavation works.
 - Pile trimming.
 - Sheet pile prop installation.
 - Base slab waterproofing.
 - Steel fixing.
 - Concrete pouring.

- Vehicle Holding Area worksite ref.: VHA (see plan 1 in Appendix A), where work activities included:
 - Deliveries.
 - Site maintenance.
 - Surveys.
 - Haul road and drainage maintenance.
- Mornington Street Bridge worksite ref.: MSB (see plan 2 in Appendix A), where no works were undertaken.
- Park Village East worksite ref.: PVE (see plan 2 in Appendix A), where work activities included:
 - Deliveries.
 - Site maintenance.
 - Surveys.
 - Haul road and drainage maintenance.
 - Excavation works.
 - Steel fixing and formwork installation.
 - Concrete pouring.
- Euston Scissor Box worksite ref.: ESB (see plan 2 in Appendix A), where work activities included:
 - Deliveries.
 - Site maintenance.
 - Surveys.
 - Haul road and drainage maintenance.
 - Installation and extraction of sheet piles.
 - Excavation works.
 - Pile capping.
 - Scaffold installation.
 - Building of reinforcement cages and steel fixing.
 - Concrete pumping and pouring.
- Euston Throat Retained Cut worksite ref.: ETRC (see plan 2 in Appendix A), where work activities included:
 - Deliveries.
 - Site maintenance.

- Surveys.
- Haul road and drainage maintenance.
- Excavation works.
- Pile capping.
- Concrete scabbling.
- Steel fixing.
- Granby Terrace Bridge worksite ref.: GTB (see plan 2 in Appendix A), where work activities included:
 - Deliveries.
 - Site maintenance.
 - Surveys.
 - Haul road and drainage maintenance.
 - Bridge structure formwork.
 - Concrete pouring.
- Hampstead Road Bridge worksite ref.: HRB (see plan 3 in Appendix A), where work activities included:
 - Deliveries.
 - Site maintenance.
 - Surveys.
 - Haul road and drainage maintenance.
 - Hoarding maintenance.
- Euston Cavern worksite ref.: ECAV (see plan 3 in Appendix A), where work activities included:
 - Deliveries.
 - Site maintenance.
 - Surveys.
 - Haul road and drainage maintenance.
 - Formwork installation.
 - Concrete pouring.

- On-Network worksites ref.: B, C, D, E, F, G and H (see plan 3 in Appendix A), where work activities included:
 - Monitoring and surveys, excavation works, material movements, concrete pouring, drainage works, concrete formwork, concrete levelling and materials delivery and removal. (worksite E).
 - Steelworks and station upgrade works including maintenance (worksite G and H).
 - No HS2 works were undertaken at worksites B, C, D and F.
- Former National Temperance Hospital – North worksite ref.: NTH-N (see plan 4 in Appendix A), where no works were undertaken.
- Former National Temperance Hospital – Euston North worksite ref.: NTH-EN (see plan 4 in Appendix A), where no works were undertaken activities included:
- Maria Fidelis worksite ref.: MF (see plan 4 in Appendix A), where work activities included:
 - Internal fitout works (including mechanical electrical and plumbing installation, drylining works, floor laying, scaffold works and doors installation).
 - Asbestos removal.
 - Scaffold installation.
 - Removal of non-structural elements.
- Euston Towers Demolition worksite ref.: ETD (see plan 4 in Appendix A), where no works were undertaken.
- Traction Substation worksite ref.: TSS (see plan 4 in Appendix A), where work activities included:
 - Internal fitout works (including riser platform installation, floor finishing, firestopping installation, access hatch installation, handrail installation and mechanical, electrical and plumbing installation)
- Interim Taxi Rank worksite ref.: ITR (see plan 4 in Appendix A), where work activities included:
 - Utility works.
 - Drilling.
 - Roadworks including traffic management.

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

- Gloucester Avenue where water utility works were underway.

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

1.2 Measurement Locations

- 1.2.1 Thirty-four (34) noise and eleven (11) vibration monitoring installations were active across eighteen worksites in January in the LBC area. Table 2 summarises the position of noise and vibration monitoring installations within the LBC area in January 2024.
- 1.2.2 Noise monitor ref.: N051 was temporarily removed from site for testing and repair and therefore did not measure any data throughout the month.
- 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 |
|--------------------|-----------------------|--|
| ARVS | N051 | Outside 70 Adelaide Road |
| | N051a | Outside 70 Adelaide Road |
| | N052 | Adelaide Road-Beaumont Walk |
| | V059 | Outside 68 Adelaide Road |
| | ARBW-V1 | Adelaide Road-Beaumont Walk |
| B | JC | Juniper Crescent |
| MSB & ECAV, PVE, C | N024 | Lamppost outside Park Village Studios, Park Village East |
| | N047 | Lamppost #3 on corner of Park Village East and Mornington Street Bridge |
| | PVS-N001 | Park Village Studios |
| | PVS-V1 | Park Village Studios |
| | N022 | Lamppost #34 on Mornington Terrace, between Mornington Street Bridge and Edinboro Castle pub |
| | N046 | Lamppost on Mornington Terrace, between Mornington Street Bridge and Delancey Street, near Edinboro Castle pub |
| ESB & GTB, PVE, E | N001 | Park Village East Lamppost #1 Outside Cubitt Court |
| | N002 | Park Village East Lamppost #2 Outside Richmond House |

| Worksite Reference | Measurement Reference | Address |
|--------------------|-----------------------|---|
| ESB & GTB, PVE, D | N003 | Park Village East Lamppost #15 Outside Silsoe House |
| | SH-V1 | Basement of Silsoe House |
| | N004 | Mornington Terrace Lamppost #7 Junction of Mornington Terrace, Mornington Place & Clarkson Row |
| ESB & GTB, PVE, E | N005 | Euston Approaches – Xavier House site office external staircase |
| | CR | Lamppost #2 on Clarkson Row |
| ETRC & HRB, F | N023 | Lamppost #21 on Hampstead Road - opposite Xavier House site office |
| ETRC & HRB | N020 | Lamppost on corner of Mackworth Street and Harrington Street |
| | N021 | Lamppost on Stanhope Street, west of Stephenson House site office |
| | N044 | Euston Approaches site hoarding – between Stephenson House site office and Langdale, Regent's Park Estate |
| | N045 | Euston Approaches site hoarding – east of Coniston, Regent's Park Estate |
| | V039 | Euston Approaches site – east of Coniston, Regent's Park Estate |
| | V043 | Euston Approaches site – Cartmel House, Regents Park Estate |
| HRB & ETRC, NTH-N | N019 | Euston Approaches site hoarding – north facing façade of Cartmel House |
| | N026a | Euston Approaches site hoarding – east facing façade of Cartmel House |
| G, H | HH | Euston Station Parcel Deck, Barnby Street |
| G | BS | Roof of Stockbeck House, Barnby Street |
| ETD, TSS | N006 | Royal College of General Practitioners roof level |
| TSS | N008 | Stephenson's Way lamppost (external to RCGP) |
| | N010 | Wesley Hotel |
| | N011 | Euston Street, lamppost #4 (external to 82 Euston Street) |
| | V002 | Royal College of General Practitioners basement boiler room by Stephenson Way |
| | V037 | Magic Circle, basement |
| | V038 | Wesley Hotel, basement lightwell, Euston Street |
| ETD, ITR | N007 | Royal College of General Practitioners, Melton Street |
| | V003 | Royal College of General Practitioners basement vaults under Melton St |
| VHA | N025 | Lamppost #3 on Prince Albert Road opposite the Vehicle Holding Area (VHA) site |
| NTH-EN, TSS | N012 | Drummond Street, lamppost #14 (opposite to 92-94 Drummond Street) |
| NTH-EN, MF | N014 | Starcross Street lamppost (external to Exmouth Arms) |
| | N016 | Margaret Centre roof |
| | V021 | 42-44 Cobourg Street |
| NTH-EN | N017 | Hampstead Road, lamppost #48 |

| Worksite Reference | Measurement Reference | Address |
|----------------------|-----------------------|---|
| ETRC & HRB, NTH-N | N018 | Outside replacement housing, Hampstead Road |

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 L_{Aeq} Data over the Monitoring Period

| Worksite Reference | Measurement Reference | Site Address | Free-Field or Façade Measurement | Weekday Average L _{Aeq,T} (Highest Day L _{Aeq,T}) | | | | | Saturday Average L _{Aeq,T} (Highest Day L _{Aeq,T}) | | | | | Sunday / Public Holiday Average L _{Aeq,T} (Highest Day L _{Aeq,T}) | |
|--------------------|-----------------------|---|----------------------------------|--|----------------|----------------|----------------|----------------|---|----------------|----------------|----------------|----------------|--|----------------|
| | | | | 0700 - 0800 | 0800 - 1800 | 1800 - 1900 | 1900 - 2200 | 2200 - 0700 | 0700 - 0800 | 0800 - 1300 | 1300 - 1400 | 1400 - 2200 | 2200 - 0700 | 0700 - 2200 | 2200 - 0700 |
| ARVS | N051a | Outside 70 Adelaide Road | Free-field | 66.9 (74.8) | 71.7 (85.1) | 67.8 (76.7) | 66.6 (75.8) | 63.9 (72.3) | 63.6 (64.7) | 69.8 (71.3) | 67.7 (70.6) | 67.2 (72.7) | 64.0 (68.6) | 66.5 (72.3) | 63.7 (70.0) |
| | N052 | Adelaide Road-Beaumont Walk | Free-field | 67.6 (74.2) | 68.7 (70.8) | 68.3 (74.0) | 67.1 (75.2) | 65.4 (70.6) | 65.0 (65.6) | 68.8 (69.5) | 68.3 (72.0) | 67.9 (73.1) | 65.6 (70.3) | 67.5 (75.0) | 65.0 (78.2) |
| B | JC | Juniper Crescent | Free-field | 56.1 (58.4) | 57.9 (61.6) | 57.4 (60.0) | 58.1 (62.3) | 54.8 (59.9) | 56.1 (57.1) | 56.7 (57.0) | 57.2 (57.3) | 56.2 (60.5) | 51.2 (56.0) | 55.1 (59.6) | 53.3 (63.7) |
| MSB & ECAV, PVE, C | N024 | Lamppost outside Park Village Studios, Park Village East | Free-field | 58.8 (66.6) | 60.8 (71.4) | 60.4 (65.9) | 59.2 (67.1) | 55.5 (65.3) | 55.2 (56.3) | 57.5 (58.2) | 58.0 (58.9) | 57.9 (60.3) | 58.0 (73.7) | 60.1 (75.2) | 56.4 (68.5) |
| | N047 | Lamppost #3 on corner of Park Village East and Mornington Street Bridge | Free-field | 57.0 (64.1) | 59.4 (62.3) | 58.3 (59.0) | 57.7 (71.0) | 53.5 (58.4) | 54.9 (55.5) | 57.5 (58.5) | 56.8 (57.6) | 57.6 (61.2) | 53.6 (61.7) | 58.4 (73.2) | 54.6 (69.8) |
| | PVS-N001 | Park Village Studios | Façade | 61.2 (62.8) | 64.9 (68.2) | 61.8 (62.8) | 61.1 (62.7) | 56.5 (66.2) | 60.7 (61.9) | 61.1 (62.0) | 60.2 (61.0) | 60.1 (62.2) | 53.5 (65.1) | 59.2 (62.2) | 55.7 (69.7) |
| | N022 | Lamppost #34 on Mornington Terrace | Free-field | 58.4 (60.4) | 61.9 (69.9) | 59.2 (63.8) | 58.0 (62.0) | 53.9 (64.8) | 57.5 (58.7) | 59.6 (62.2) | 58.3 (58.9) | 57.4 (59.9) | 52.0 (58.1) | 58.6 (72.5) | 53.5 (68.3) |

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| Worksite Reference | Measurement Reference | Site Address | Free-Field or Façade Measurement | Weekday Average L _{Aeq,T} (Highest Day L _{Aeq,T}) | | | | | Saturday Average L _{Aeq,T} (Highest Day L _{Aeq,T}) | | | | | Sunday / Public Holiday Average L _{Aeq,T} (Highest Day L _{Aeq,T}) | |
|--------------------|-----------------------|--|----------------------------------|--|----------------|----------------|----------------|----------------|---|----------------|----------------|----------------|----------------|--|----------------|
| | | | | 0700 - 0800 | 0800 - 1800 | 1800 - 1900 | 1900 - 2200 | 2200 - 0700 | 0700 - 0800 | 0800 - 1300 | 1300 - 1400 | 1400 - 2200 | 2200 - 0700 | 0700 - 2200 | 2200 - 0700 |
| | N046 | Lamppost on Mornington Terrace, between Mornington Street Bridge and Delancey Street | Free-field | 62.2 (63.9) | 64.7 (72.9) | 62.6 (64.6) | 61.7 (63.0) | 58.0 (65.9) | 61.6 (62.4) | 61.9 (62.2) | 60.9 (61.8) | 61.0 (63.4) | 55.8 (66.3) | 61.2 (73.3) | 56.9 (70.4) |
| ESB & GTB, PVE, E | N001 | Park Village East Lamppost #1 | Free-field | 56.7 (65.9) | 60.9 (64.0) | 57.5 (59.1) | 56.7 (66.9) | 52.5 (60.5) | 55.1 (59.6) | 56.3 (56.7) | 56.0 (56.9) | 56.7 (60.4) | 52.5 (56.0) | 56.1 (59.3) | 52.9 (67.1) |
| | N002 | Park Village East Lamppost #2 | Free-field | 56.8 (66.3) | 60.9 (66.2) | 58.8 (60.1) | 57.7 (66.3) | 53.1 (57.7) | 55.4 (56.3) | 57.1 (57.4) | 57.2 (58.4) | 57.9 (59.8) | 53.7 (60.6) | 57.3 (62.4) | 55.0 (71.3) |
| ESB & GTB, PVE, D | N003 | Park Village East Lamppost #15 Outside Silsoe House | Façade | 56.2 (64.9) | 59.0 (61.5) | 58.3 (59.3) | 57.2 (68.7) | 52.7 (58.3) | 53.9 (54.8) | 56.6 (56.9) | 56.8 (58.2) | 57.4 (61.3) | 53.5 (60.7) | 57.3 (61.5) | 54.0 (67.9) |
| | N004 | Mornington Terrace Lamppost #7 | Free-field | 62.2 (63.8) | 64.6 (68.2) | 62.8 (66.0) | 62.3 (67.6) | 58.6 (67.4) | 61.5 (61.8) | 62.5 (63.0) | 61.3 (62.2) | 61.0 (63.5) | 55.5 (63.6) | 60.8 (66.9) | 57.0 (66.8) |
| ESB & GTB, PVE, E | N005 | Euston Approaches – Xavier House site office external staircase | Free-field | 63.6 (66.8) | 65.1 (71.1) | 64.2 (66.7) | 63.5 (68.1) | 60.8 (67.8) | 61.9 (62.6) | 63.2 (63.5) | 63.2 (64.4) | 63.0 (65.6) | 60.6 (65.5) | 62.6 (67.3) | 60.0 (70.4) |
| | CR | Lamppost #2 on Clarkson | Free-field | 63.1 (66.3) | 68.7 (75.1) | 65.5 (69.4) | 64.7 (68.9) | 59.9 (66.8) | 61.1 (61.3) | 64.2 (64.9) | 64.5 (65.2) | 64.0 (68.2) | 57.8 (61.9) | 64.2 (74.8) | 58.7 (66.5) |

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| Worksite Reference | Measurement Reference | Site Address | Free-Field or Façade Measurement | Weekday Average L _{Aeq,T} (Highest Day L _{Aeq,T}) | | | | | Saturday Average L _{Aeq,T} (Highest Day L _{Aeq,T}) | | | | | Sunday / Public Holiday Average L _{Aeq,T} (Highest Day L _{Aeq,T}) | |
|--------------------|-----------------------|--|----------------------------------|--|----------------|----------------|----------------|----------------|---|----------------|----------------|----------------|----------------|--|----------------|
| | | | | 0700 - 0800 | 0800 - 1800 | 1800 - 1900 | 1900 - 2200 | 2200 - 0700 | 0700 - 0800 | 0800 - 1300 | 1300 - 1400 | 1400 - 2200 | 2200 - 0700 | 0700 - 2200 | 2200 - 0700 |
| ETRC & HRB, F | N023 | Lamppost #21 on Hampstead Road | Free-field | 68.4 (74.5) | 68.3 (73.2) | 67.8 (71.2) | 67.5 (74.4) | 65.9 (74.2) | 65.9 (67.4) | 67.3 (67.8) | 68.0 (69.6) | 68.0 (70.7) | 66.4 (70.0) | 67.7 (71.0) | 65.5 (71.2) |
| ETRC & HRB | N020 | Lamppost on corner of Mackworth Street and Harrington Street | Free-field | 52.4 (63.9) | 57.2 (61.3) | 50.5 (53.8) | 49.3 (55.2) | 46.2 (52.4) | 48.1 (49.8) | 49.6 (50.0) | 48.8 (49.9) | 49.1 (50.4) | 46.5 (50.5) | 50.4 (55.1) | 46.7 (64.8) |
| | N021 | Lamppost on Stanhope Street, west of Stephenson House site office | Free-field | 55.5 (66.7) | 59.0 (70.5) | 56.8 (63.4) | 56.0 (67.0) | 52.5 (68.4) | 53.1 (55.4) | 56.2 (57.2) | 57.1 (59.1) | 56.8 (60.2) | 53.5 (61.0) | 57.8 (71.7) | 54.5 (71.1) |
| | N044 | Regents Park Estate west, near Langdale | Free-field | 55.2 (63.0) | 59.9 (64.5) | 53.1 (56.3) | 52.3 (55.7) | 50.0 (58.0) | 50.9 (52.0) | 52.1 (53.1) | 51.7 (52.9) | 52.0 (54.1) | 50.1 (53.7) | 52.6 (57.2) | 50.2 (64.7) |
| | N045 | Euston Approaches site hoarding – east of Coniston, Regent's Park Estate | Free-field | 53.8 (56.8) | 73.4 (84.2) | 54.5 (61.8) | 53.6 (61.1) | 52.0 (61.2) | 51.7 (52.4) | 52.7 (53.2) | 52.6 (52.8) | 54.3 (61.5) | 52.6 (56.4) | 57.6 (77.8) | 51.1 (63.5) |
| ETRC & HRB, NTH-N | N019 | Euston Approaches site hoarding – north facing façade of Cartmel House | Façade | 55.8 (58.4) | 71.4 (80.7) | 55.6 (59.5) | 55.5 (60.5) | 54.1 (60.6) | 53.8 (54.4) | 54.6 (55.2) | 54.6 (56.6) | 56.5 (66.2) | 54.3 (59.8) | 56.2 (63.9) | 54.0 (63.8) |
| | N026a | Euston Approaches site hoarding – east facing façade of Cartmel House | Façade | 60.3 (62.0) | 69.4 (75.6) | 60.3 (63.0) | 60.2 (66.5) | 58.9 (64.6) | 58.3 (58.9) | 59.7 (60.4) | 59.8 (60.7) | 61.5 (70.2) | 59.5 (64.2) | 60.2 (63.8) | 58.4 (64.4) |

OFFICIAL

| 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 |
| G, H | HH | Euston Station Parcel Deck, Barnby Street | Free-field | 56.6 (61.3) | 61.5 (66.3) | 59.5 (65.4) | 58.9 (67.4) | 55.8 (68.0) | 54.4 (54.8) | 58.0 (60.9) | 57.5 (59.8) | 59.2 (64.4) | 56.6 (66.6) | 56.5 (63.8) | 53.4 (68.7) |
| G | BS | Roof of Stockbeck House, Barnby Street | Free-field | 56.7 (59.0) | 58.5 (64.7) | 57.0 (60.2) | 56.3 (59.1) | 54.2 (61.5) | 56.0 (56.5) | 56.5 (57.1) | 56.0 (56.3) | 55.9 (59.1) | 53.6 (56.0) | 56.0 (61.7) | 54.0 (67.9) |
| ETD, TSS | N006 | Royal College of General Practitioners roof level | Free-field | 53.3 (57.7) | 66.5 (76.9) | 52.3 (57.7) | 51.0 (53.0) | 50.1 (54.5) | 51.2 (51.6) | 60.8 (67.3) | 52.8 (59.1) | 50.9 (53.1) | 49.3 (51.2) | 54.0 (69.6) | 50.0 (64.9) |
| TSS | N008 | Stephenson's Way lamppost (external to RCGP) | Façade | 63.9 (70.4) | 63.9 (70.5) | 58.7 (69.9) | 57.8 (71.1) | 57.2 (68.8) | 57.4 (61.6) | 58.6 (62.5) | 56.7 (58.2) | 56.4 (60.4) | 55.1 (56.1) | 57.4 (65.2) | 57.6 (69.2) |
| | N010 | Wesley Hotel | Façade | 62.9 (67.1) | 66.9 (78.4) | 62.6 (65.0) | 62.2 (65.7) | 58.2 (65.2) | 62.0 (63.4) | 62.7 (64.0) | 62.1 (63.5) | 61.9 (63.5) | 57.5 (61.8) | 60.7 (68.4) | 58.2 (64.0) |
| | N011 | Outside 82 Euston Street | Free-field | 56.6 (65.4) | 59.2 (63.5) | 54.1 (56.9) | 53.2 (57.0) | 52.0 (68.9) | 52.5 (56.2) | 53.7 (54.6) | 54.9 (57.6) | 53.4 (57.0) | 50.5 (54.7) | 53.9 (60.9) | 51.8 (62.4) |
| ETD, ITR | N007 | Royal College of General Practitioners, Melton Street | Free-field | 64.3 (68.4) | 66.7 (68.9) | 63.4 (65.5) | 63.1 (65.9) | 61.4 (66.6) | 61.7 (62.2) | 64.4 (67.6) | 62.3 (63.0) | 63.2 (65.2) | 61.7 (65.4) | 62.6 (67.5) | 60.8 (65.5) |
| VHA | N025 | Lamppost #3 on Prince Albert Road | Free-field | 65.3 (68.4) | 67.2 (74.1) | 67.2 (73.0) | 65.6 (68.7) | 63.6 (70.4) | 63.5 (64.1) | 65.6 (66.9) | 65.4 (66.2) | 65.9 (69.3) | 64.3 (67.4) | 66.3 (72.3) | 63.8 (72.7) |

OFFICIAL

| 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 |
| NTH-EN, TSS | N012 | Opposite 92-94 Drummond Street | Free-field | 54.7 (58.6) | 59.8 (62.6) | 56.0 (57.7) | 55.0 (61.8) | 51.5 (59.9) | 51.8 (52.9) | 54.2 (54.7) | 55.5 (58.0) | 55.7 (61.0) | 50.7 (54.1) | 55.4 (60.2) | 52.5 (62.9) |
| NTH-EN, MF | N014 | Starcross Street lamppost (external to Exmouth Arms) | Free-field | 53.9 (67.9) | 55.9 (63.1) | 52.8 (63.0) | 51.8 (61.8) | 47.9 (56.6) | 48.5 (52.2) | 51.0 (52.5) | 51.7 (55.2) | 50.7 (56.3) | 46.5 (49.6) | 50.6 (58.7) | 48.9 (62.2) |
| | N016 | Margaret Centre roof | Free-field | 54.1 (57.8) | 58.5 (62.9) | 53.6 (56.4) | 53.2 (62.0) | 51.8 (60.5) | 51.7 (52.4) | 54.7 (58.9) | 53.8 (54.6) | 53.0 (57.3) | 51.4 (55.7) | 53.3 (58.8) | 51.5 (65.6) |
| NTH-EN | N017 | Hampstead Road, lamppost #48 | Free-field | 69.0 (71.0) | 70.4 (72.2) | 69.4 (71.9) | 69.3 (78.7) | 68.0 (75.1) | 66.8 (68.4) | 68.8 (69.2) | 69.3 (71.1) | 69.5 (76.4) | 68.5 (75.6) | 69.4 (73.2) | 67.3 (72.7) |
| ETRC & HRB, NTH-N | N018 | Outside replacement housing, Hampstead Road | Free-field | 68.7 (71.3) | 69.9 (71.8) | 69.4 (75.8) | 69.2 (78.6) | 67.9 (75.3) | 66.4 (67.5) | 68.8 (69.9) | 69.0 (69.5) | 70.5 (80.0) | 68.4 (71.7) | 69.4 (75.7) | 67.4 (72.4) |

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 |
|--------------------|-----------------------|---|--|
| ARVS | V059 | Outside 68 Adelaide Road | 2.53 (Z-axis) |
| | ARBW-V1 | Adelaide Road – Beaumont Walk | 2.99 (Y-axis) |
| MSB & ECAV, PVE, C | PVS-V1 | Park Village Studios | 1.80 (Y-axis) |
| ESB & GTB, PVE, D | SH-V1 | Basement of Silsoe House | 0.55 (Y-axis) |
| ETRC & HRB | V039 | Euston Approaches site – east of Coniston, Regent's Park Estate | 1.63 (X-axis) |
| | V043 | Euston Approaches site – Cartmel House, Regents Park Estate | 0.74 (Y-axis) |
| ETD, ITR | V003 | RCGP basement vaults, 305 Euston Road | 0.57 (Y-axis) |
| TSS | V002 | RCGP basement boiler room, 305 Euston Road | 1.02 (Z-axis) |
| | V037 | Magic Circle, basement | 0.75 (Z-axis) |
| | V038 | Wesley Hotel, basement lightwell, Euston Street | 0.81 (Z-axis) |
| NTH-EN, MF | V021 | 42-44 Cobourgh Street (floor) | 0.97 (Z-axis) |

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

<https://data.gov.uk/dataset/24542ae7-dd44-444f-b259-871c4cc43b5e/environmental-monitoring-data>.

2.2 Exceedances of the 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 reported construction noise levels exceed the SOAEL at nearby receptors, relevant periods will be identified. Summary statistics to evaluate ongoing qualification for noise insulation and temporary rehousing are also presented where relevant.

2.2.4 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 SOAEL

| Worksite Reference | Measurement Reference | Site Address | Day (Weekday, Saturday, Sunday, Night) | Time period | Number of exceedances of SOAEL |
|--------------------|-----------------------|--|--|-------------|--------------------------------|
| ARVS | N051a | Outside 70 Adelaide Road | All days | All periods | No exceedance |
| | N052 | Adelaide Road, Beaumont Walk | All days | All periods | No exceedance |
| B | JC | Juniper Crescent | All days | All periods | No exceedance |
| MSB & ECAV, PVE, C | N024 | Lamppost outside Park Village Studios, Park Village East | All days | All periods | No exceedance |
| | N047 | Lamppost #3 on corner of Park Village East and Mornington Street Bridge | All days | All periods | No exceedance |
| | PVS-N001 | Park Village Studios | All days | All periods | No exceedance |
| | N022 | Lamppost #34 on Mornington Terrace | All days | All periods | No exceedance |
| | N046 | Lamppost on Mornington Terrace, between Mornington Street Bridge and Delancey Street | All days | All periods | No exceedance* |

| Worksite Reference | Measurement Reference | Site Address | Day (Weekday, Saturday, Sunday, Night) | Time period | Number of exceedances of SOAEL |
|--------------------|-----------------------|--|--|-------------------------------------|--------------------------------|
| ESB & GTB, PVE, E | N001 | Park Village East Lamppost #1 | All days | All periods | No exceedance |
| | N002 | Park Village East Lamppost #2 | All days | All periods | No exceedance |
| ESB & GTB, PVE, D | N003 | Park Village East Lamppost #15 Outside Silsoe House | All days | All periods | No exceedance |
| | N004 | Mornington Terrace Lamppost #7 | All days | All periods | No exceedance |
| ESB & GTB, E, PVE | N005 | Euston Approaches – Xavier House site office external staircase | All days | All periods | No exceedance |
| | CR | Lamppost #2 on Clarkson Row | All days | All periods | No exceedance |
| ETRC & GTB, F | N023 | Lamppost #21 on Hampstead Road | All days | All periods | No exceedance* |
| ETRC & HRB | N020 | Lamppost on corner of Mackworth Street and Harrington Street | All days | All periods | No exceedance |
| | N021 | Stanhope Street, lamppost #2 | All days | All periods | No exceedance |
| | N044 | Regents Park Estate west, near Langdale | All days | All periods | No exceedance* |
| | N045 | Euston Approaches site hoarding – east of Coniston, Regent's Park Estate | Weekday Sunday Night | 0800-1800 0700-2200 2200-0700 | 11 3 5 |

| Worksite Reference | Measurement Reference | Site Address | Day (Weekday, Saturday, Sunday, Night) | Time period | Number of exceedances of SOAEL |
|--------------------|-----------------------|--|--|-------------|--------------------------------|
| HRB & ETRC, NTH-N | N019 | Euston Approaches site hoarding – north facing façade of Cartmel House | Weekday | 0800-1800 | 6 |
| | N026a | Euston Approaches site hoarding – east facing façade of Cartmel House | All days | All periods | No exceedance |
| G, H | HH | Euston Station Parcel Deck, Barnby Street | All days | All periods | No exceedance |
| G | BS | Roof of Stockbeck House, Barnby Street | All days | All periods | No exceedance |
| ETD, TSS | N006 | RCGP Roof level | All days | All periods | Not applicable* |
| TSS | N008 | Stephenson's Way lamppost (external to RCGP) | All days | All periods | Not applicable* |
| | N010 | Wesley Hotel | All days | All periods | Not applicable* |
| | N011 | Outside 82 Euston Street | All days | All periods | No exceedance |
| ETD, ITR | N007 | RCGP, Melton Street | All days | All periods | No exceedance |
| VHA | N025 | Lamppost #3 on Prince Albert Road | All days | All periods | No exceedance |
| NTH-EN, TSS | N012 | Opposite 92-94 Drummond Street | All days | All periods | No exceedance |
| NTH-EN, MF | N014 | Starcross Street lamppost (external to Exmouth Arms) | All days | All periods | No exceedance |

| Worksite Reference | Measurement Reference | Site Address | Day (Weekday, Saturday, Sunday, Night) | Time period | Number of exceedances of SOAEL |
|--------------------|-----------------------|---|--|-------------|--------------------------------|
| | N016 | Margarete Centre roof | All days | All periods | No exceedance |
| NTH-EN | N017 | Hampstead Road, lamppost #48 | All days | All periods | No exceedance |
| ETRC & HRB, NTH-N | N018 | Outside replacement housing, Hampstead Road | All days | All periods | No exceedance |

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

2.2.5 Exceedances of the SOAEL were recorded at two (2) noise monitors. The SOAEL exceedances were recorded during weekday daytime, Sunday, and night periods.

2.2.6 For the purpose of assessing eligibility for noise insulation or temporary rehousing, multiple exceedances of the SOAEL in a 24-hour period would be counted as a single exceedance during that day. Over the reporting period, the overall number of SOAEL exceedances at each measurement location is shown in Table 6 and may be lower than the total sum of individual exceedances reported in Table 5 for each location.

Table 6: Summary of Total Exceedances of SOAEL

| Worksite Reference | Measurement Reference | Monitor Address | Total of SOAEL exceedances in the month |
|--------------------|-----------------------|--|---|
| MSB & ECAV, PVE, C | N045 | Euston Approaches site hoarding – east of Coniston, Regent's Park Estate | 12 |
| ESB & GTB, E, PVE | N019 | Euston Approaches site hoarding – north facing façade of Cartmel House | 6 |

2.2.7 Eighteen (18) 24-hour periods that experienced an exceedance of the SOAEL were recorded due to HS2 construction works during January 2024.

2.3 Exceedances of Trigger Level

2.3.1 Table 7 provides a summary of exceedances of the S61 trigger noise levels determined to be due to HS2 related construction noise measured during the reporting period, along with the findings of any investigation.

Table 7: Summary of Exceedances of Trigger Levels

| Complaint Reference Number (if applicable) | Worksite Reference | Date and Time Period | Identified Source | Results of Investigation (including noise monitoring results) | Actions Taken |
|--|--------------------|---------------------------|----------------------------|--|--|
| - | ETRC | 14/01/2024 11:00-14:00 | Jet washer and compressor. | Unconsented use of a jet washer and compressor for water management activities. Breach of Section 61 consent. | Local Authority EHO advised of exceedance. Site supervisors and engineers briefed. |

2.4 Complaints

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

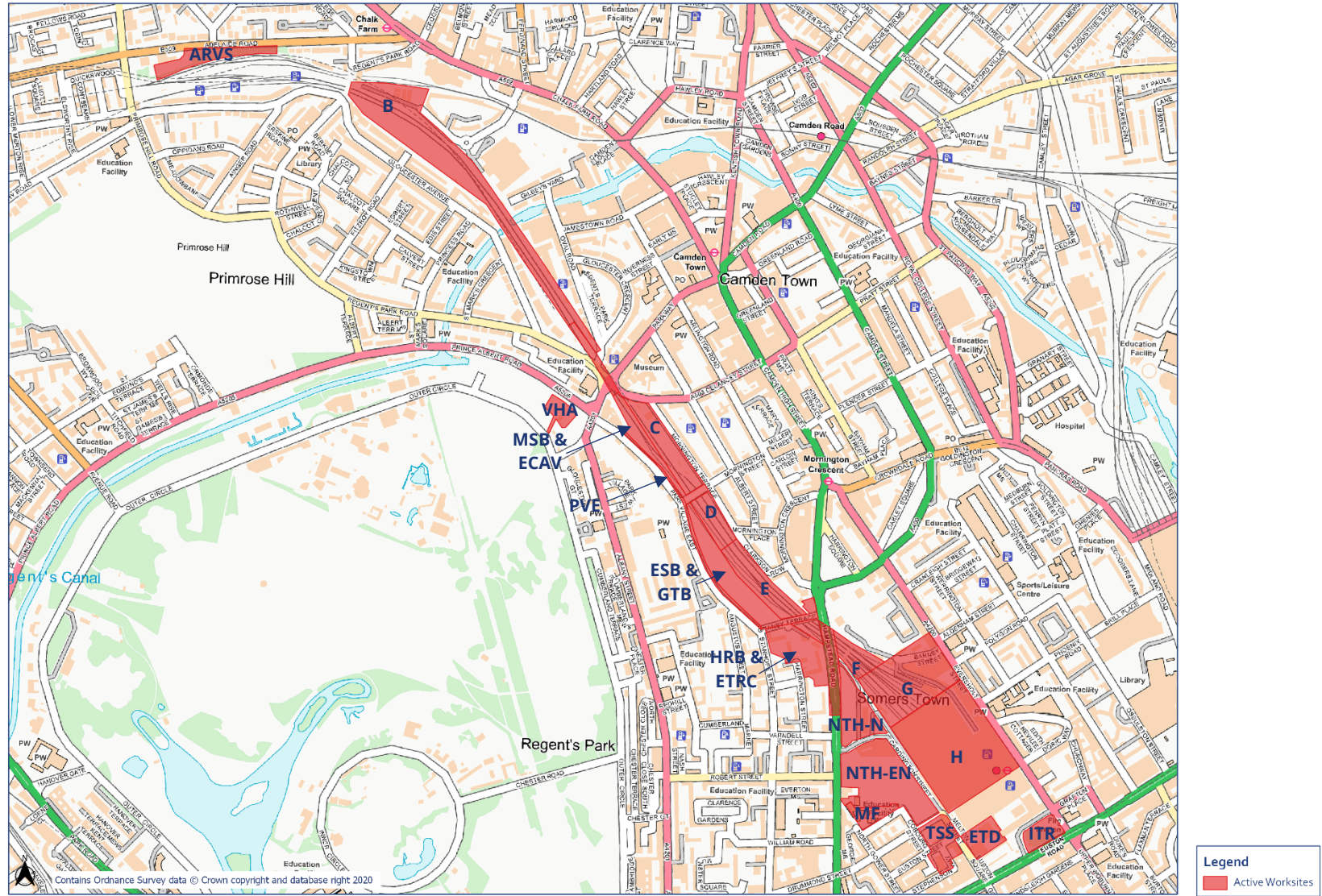
Table 8: Summary of Complaints

| Complaint Reference Number | Worksite Reference | Description of Complaint | Results of Investigation | Actions Taken |
|----------------------------|--------------------|--------------------------|---|--|
| HS2-24-45159-C | ARVS | Noise issues in area. | Noise and dust due to concrete pours which occur every fortnight, dust mitigation in place. Monitoring data demonstrates compliance with Section 61 requirements. | The stakeholder was provided with information confirming the results of investigation. |

Appendix A Site Locations

HS2

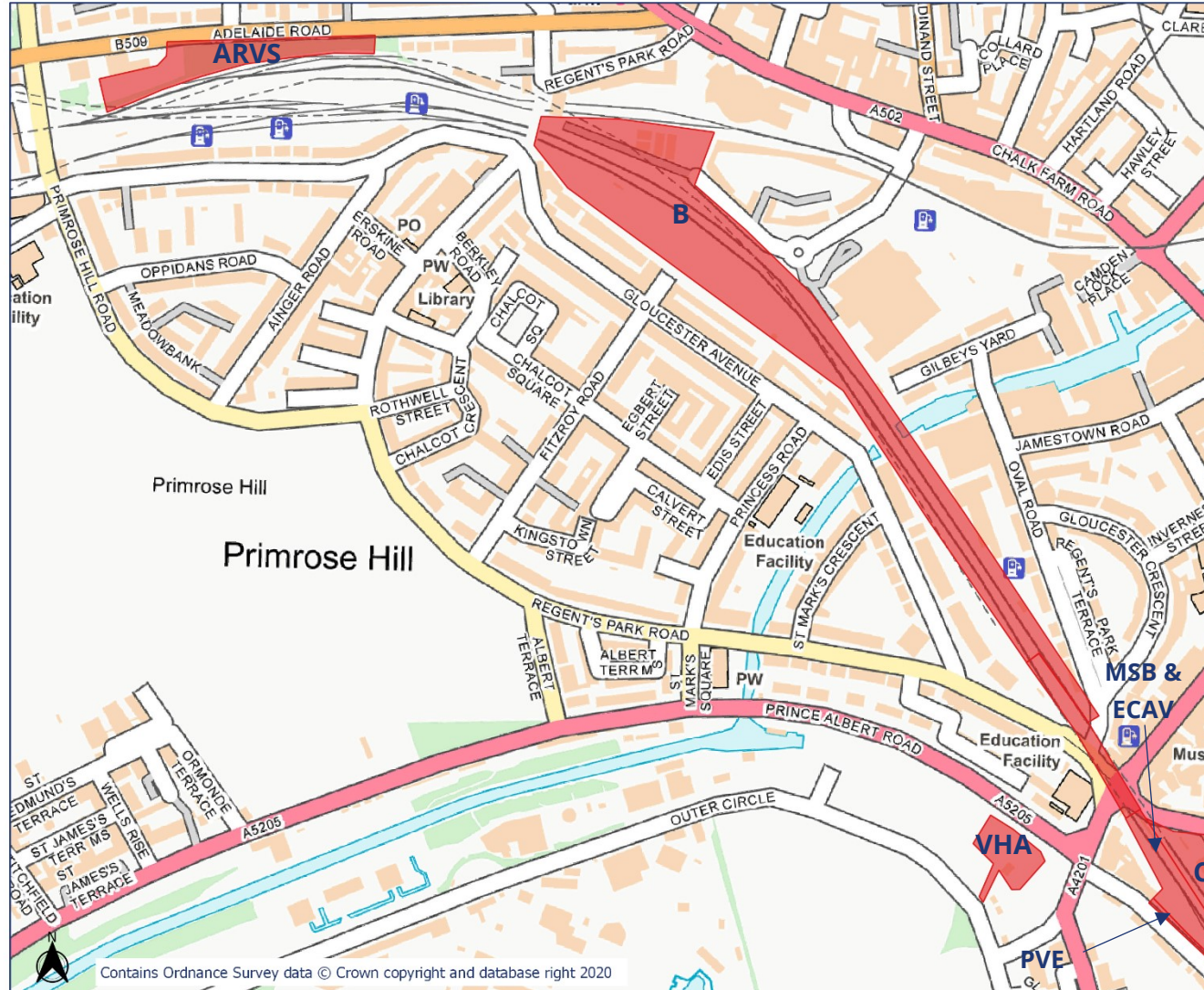
Worksite Identification Plan - Overview



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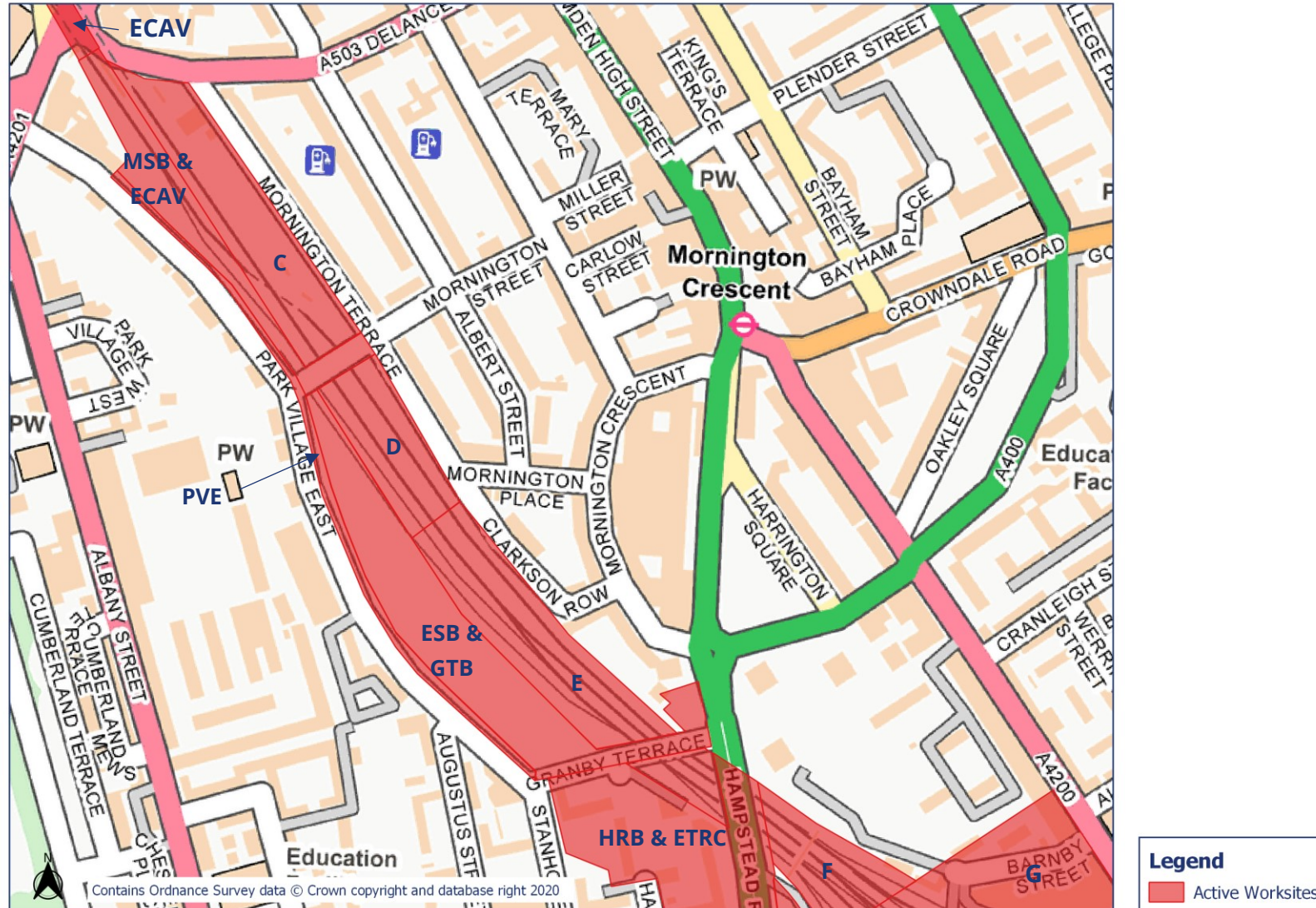
HS2

Worksite Identification Plan - 1



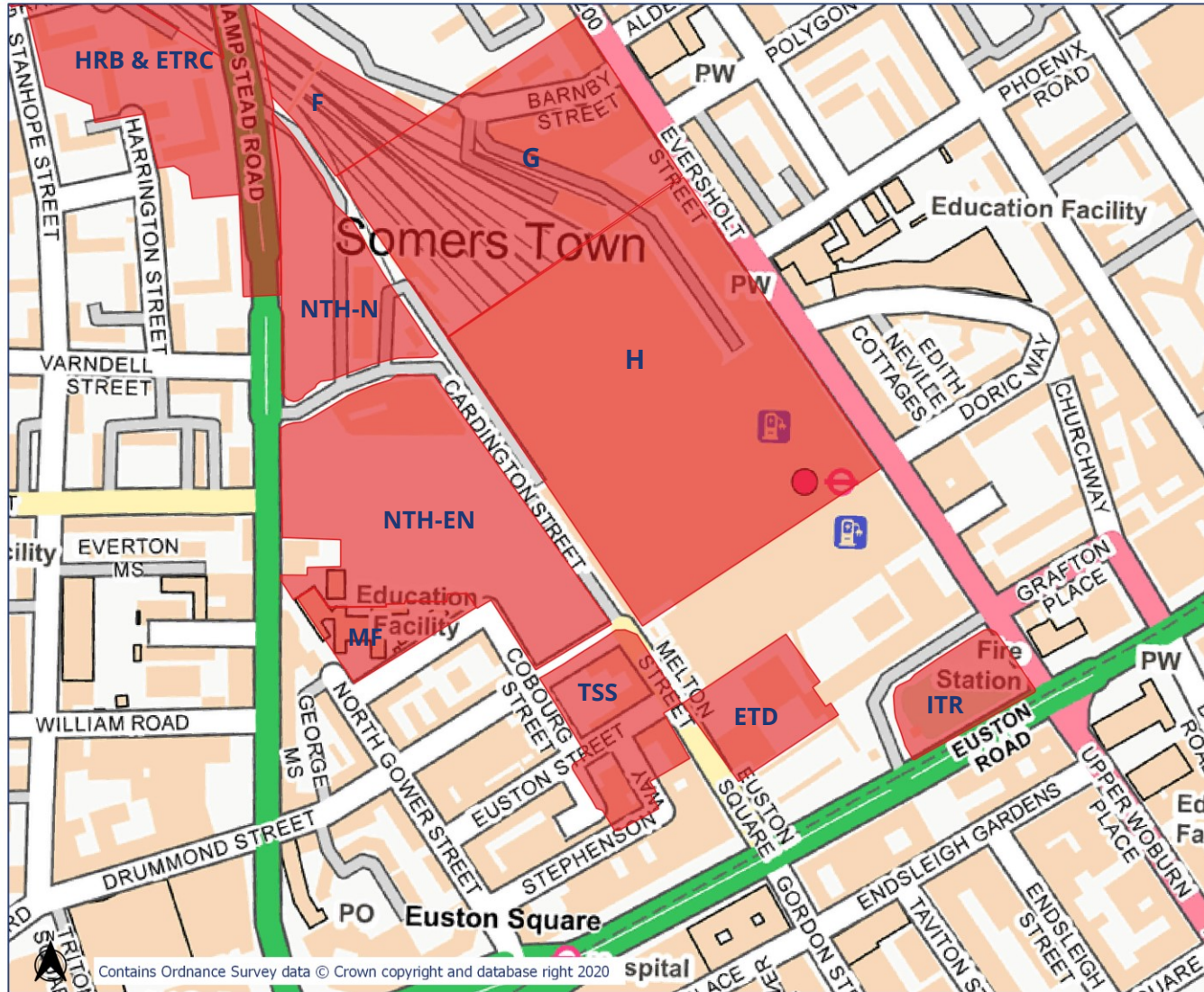
HS2

Worksite Identification Plan - 2



HS2

Worksite Identification Plan - 3



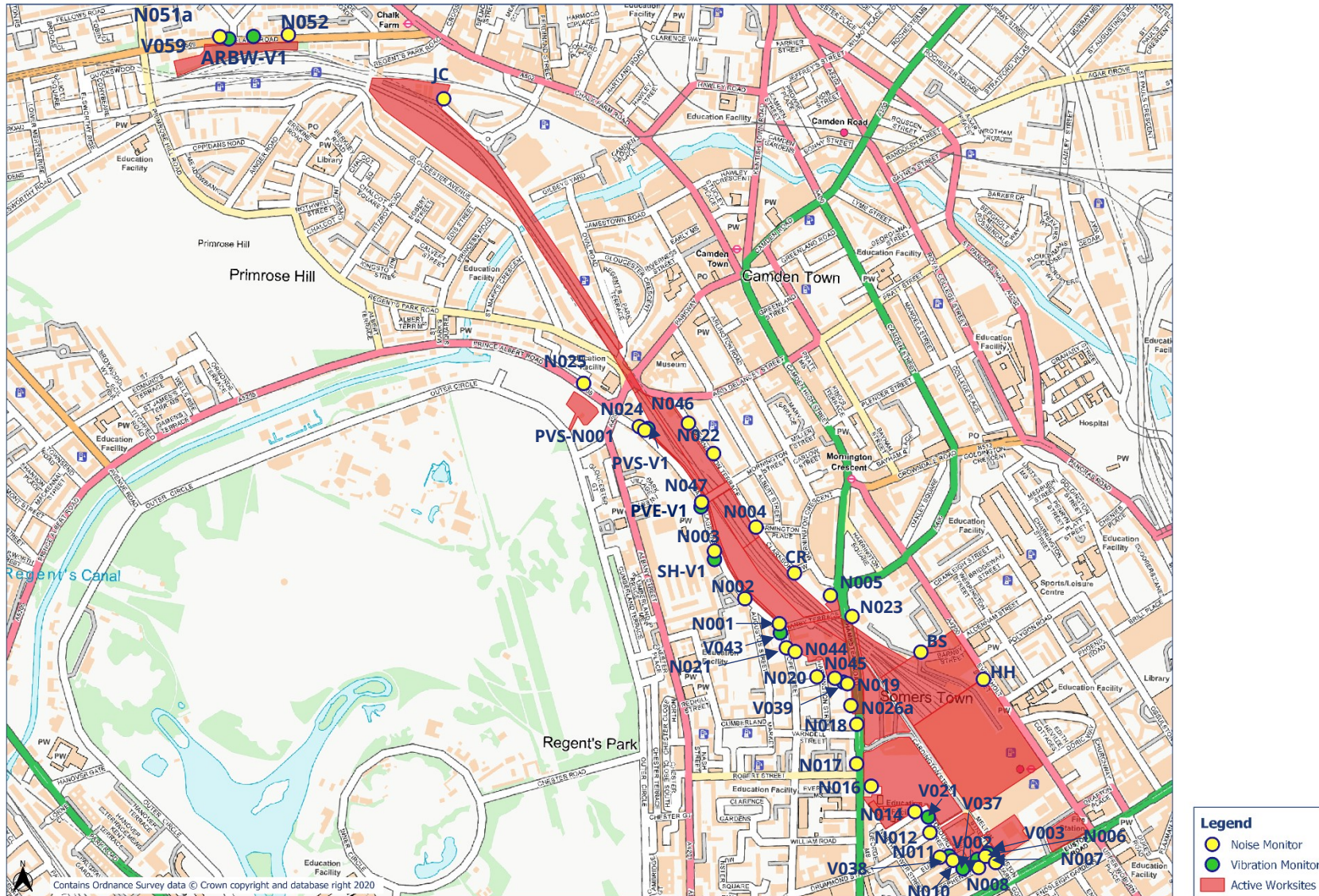
Legend

- Active Worksites

Appendix B Monitoring Locations

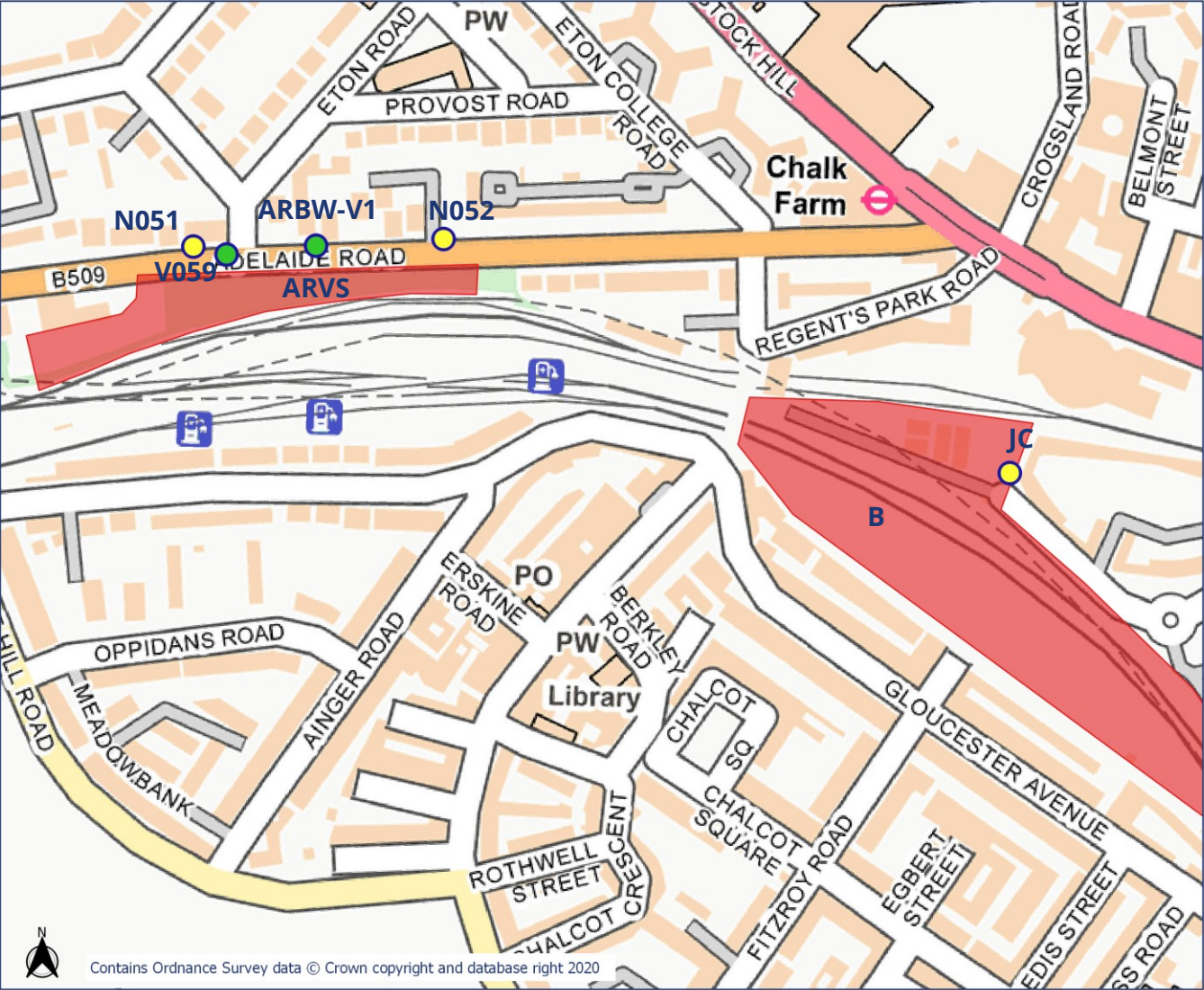
HS2

Noise and Vibration Monitoring Plan - Overview



HS2

Noise and Vibration Monitoring Plan - 1



Legend

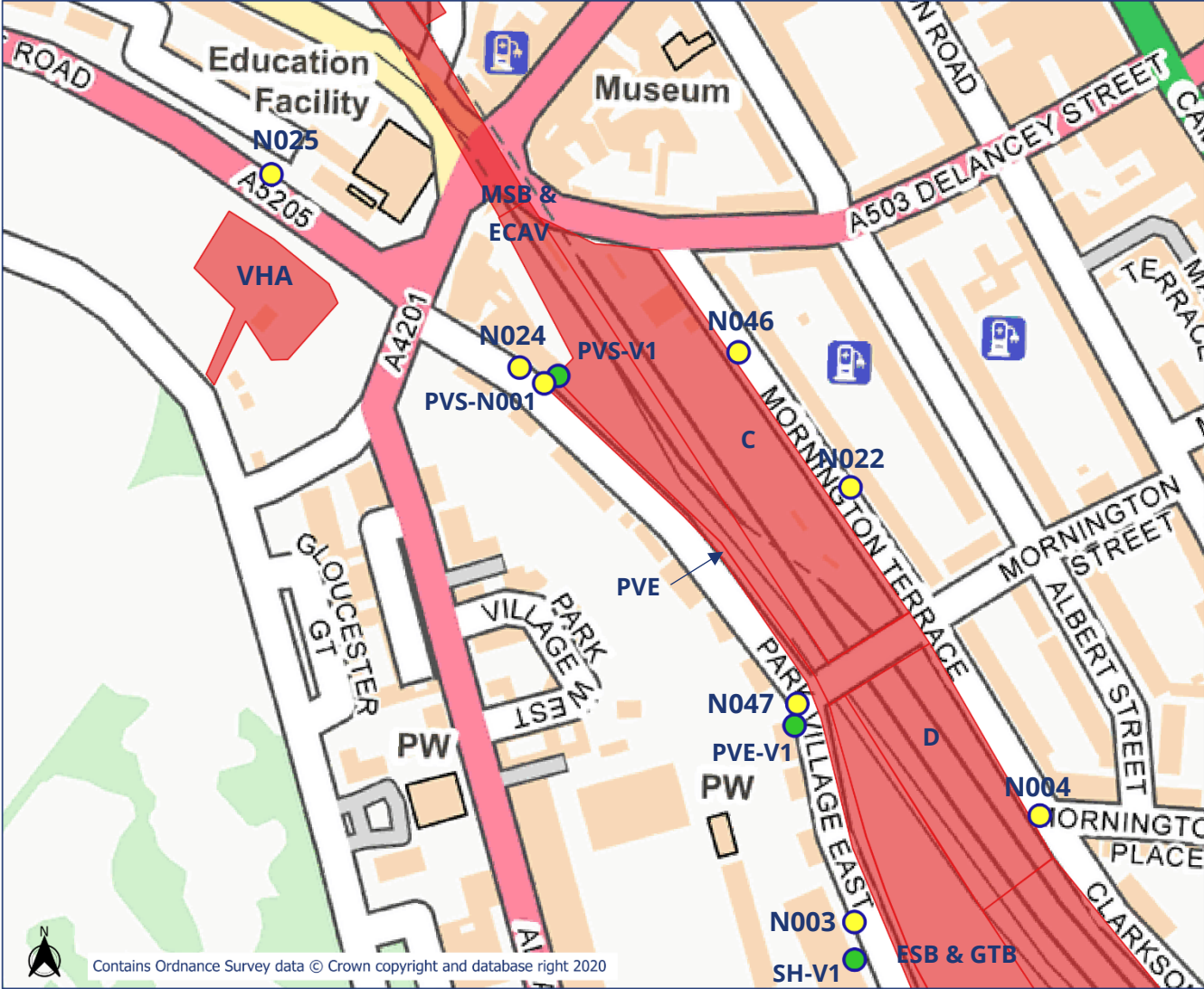
- Noise Monitor
- Vibration Monitor
- Active Worksites



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HS2

Noise and Vibration Monitoring Plan - 2



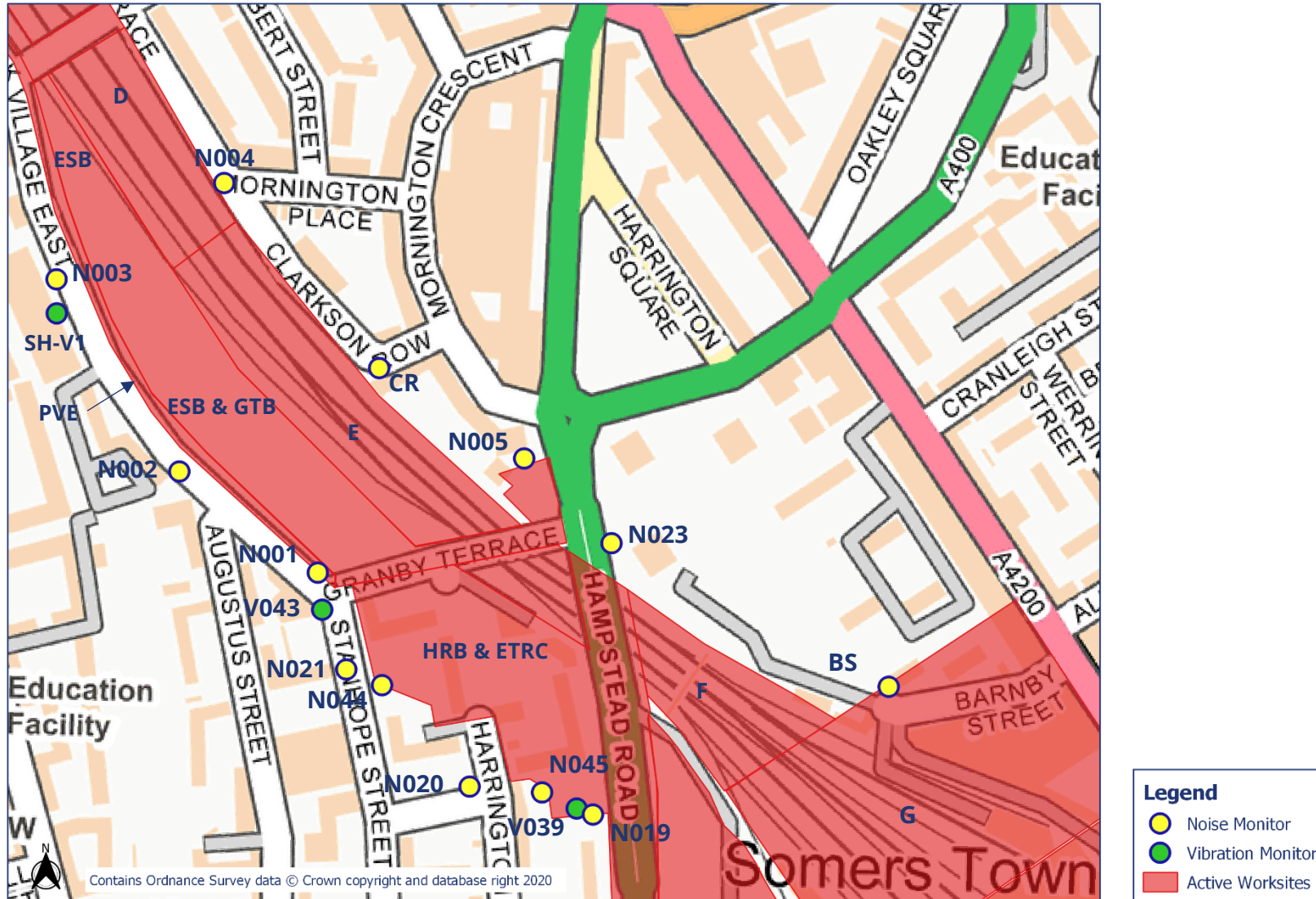
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Legend

- Noise Monitor
- Vibration Monitor
- Active Worksites

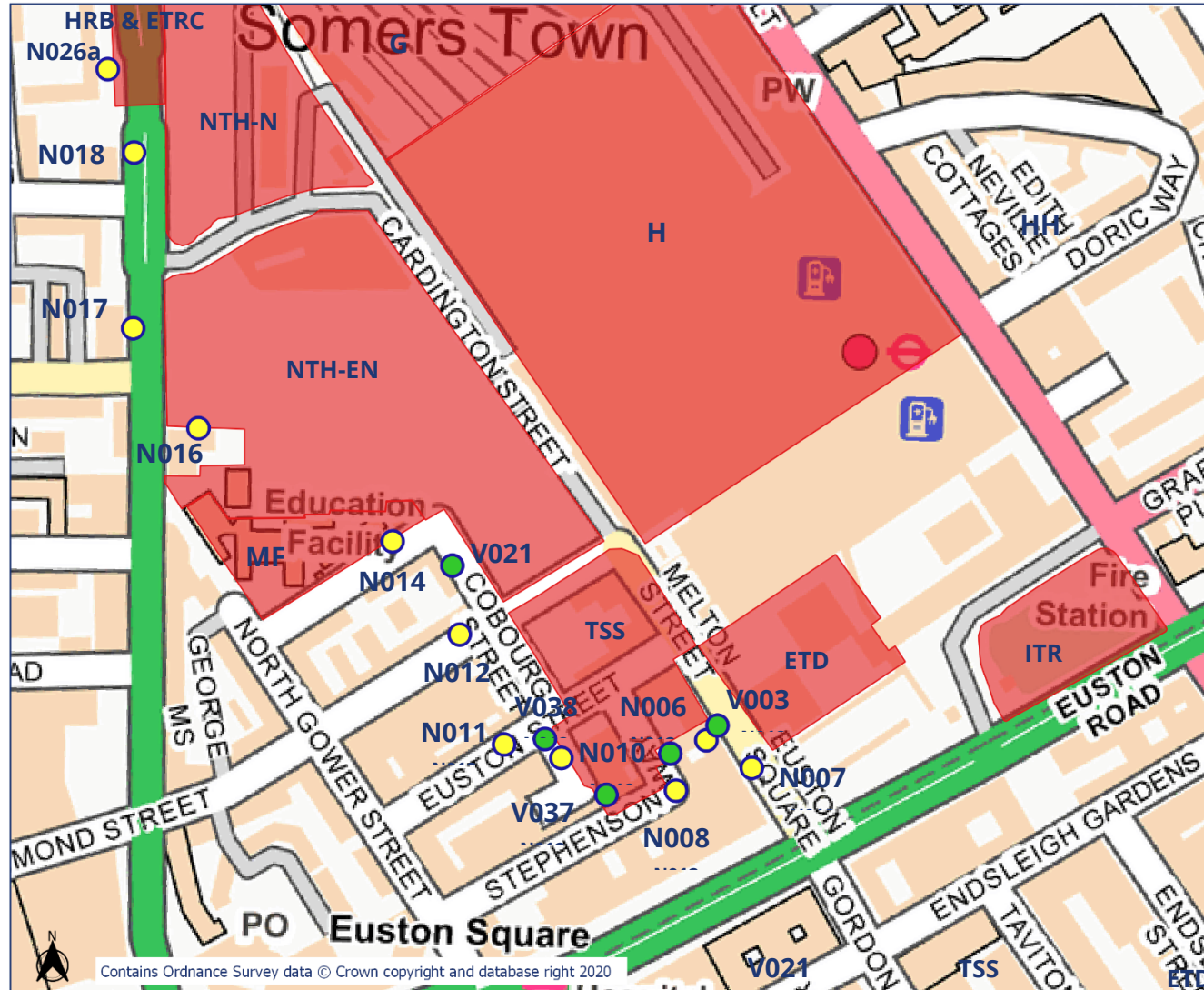
HS2

Noise and Vibration Monitoring Plan - 3



HS2

Noise and Vibration Monitoring Plan - 4



Legend

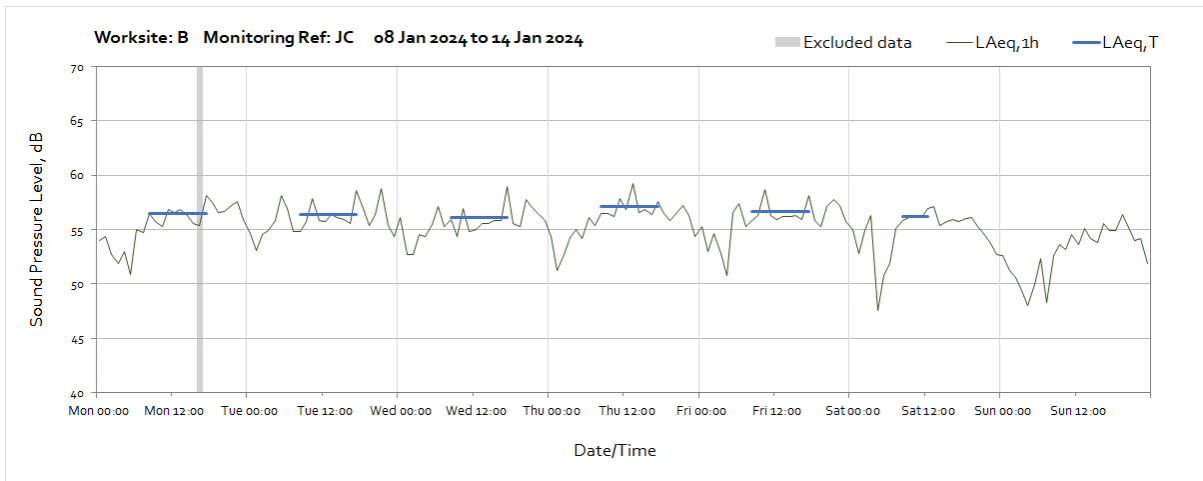
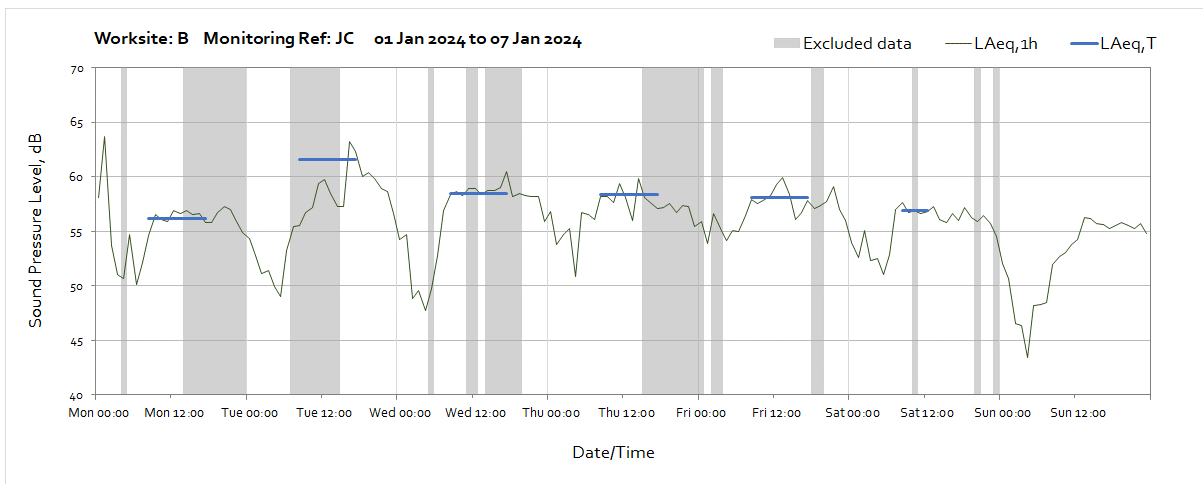
- Noise Monitor
- Vibration Monitor
- Active Worksites

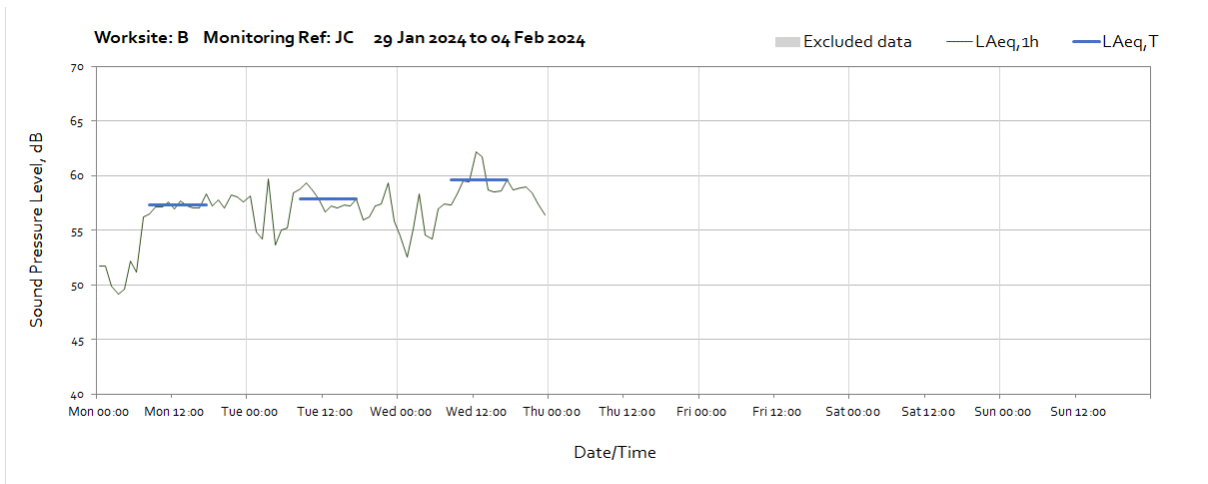
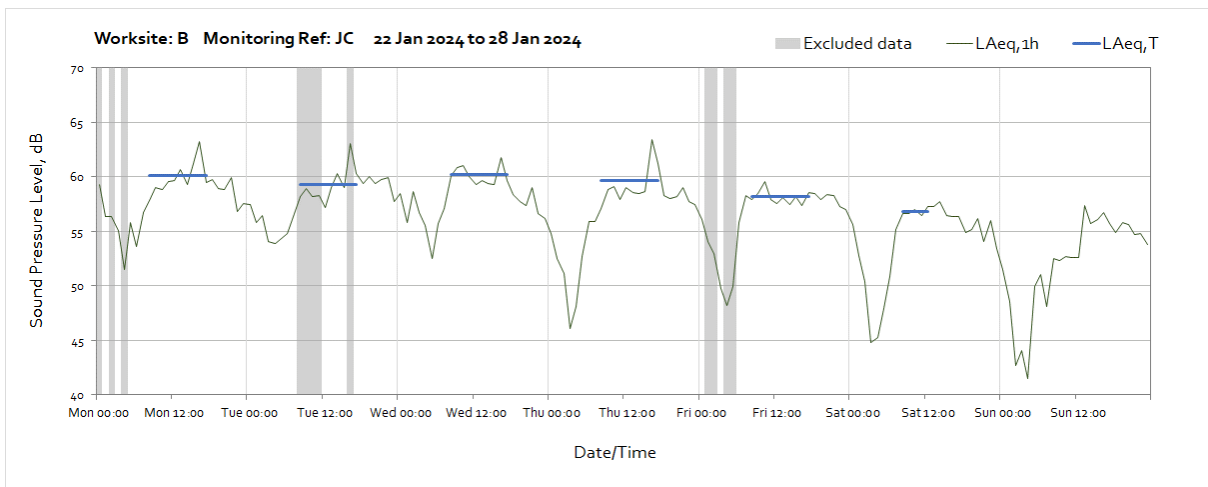
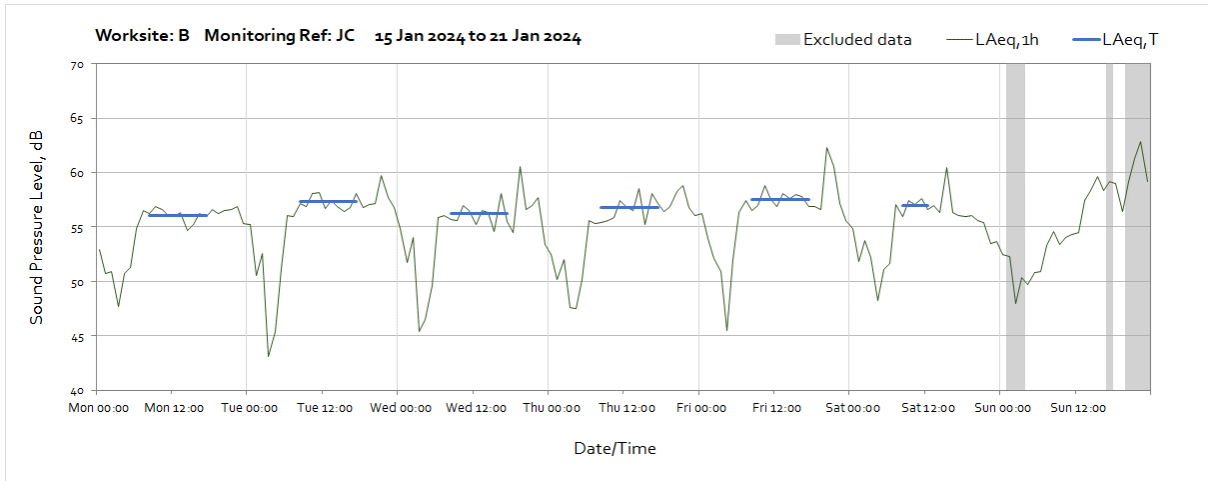
Appendix C Data

Noise

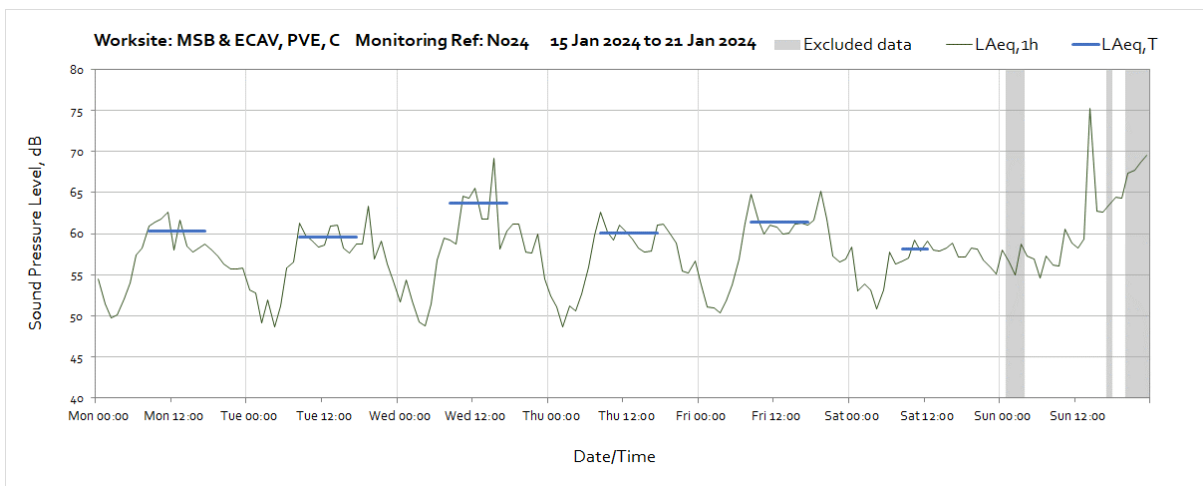
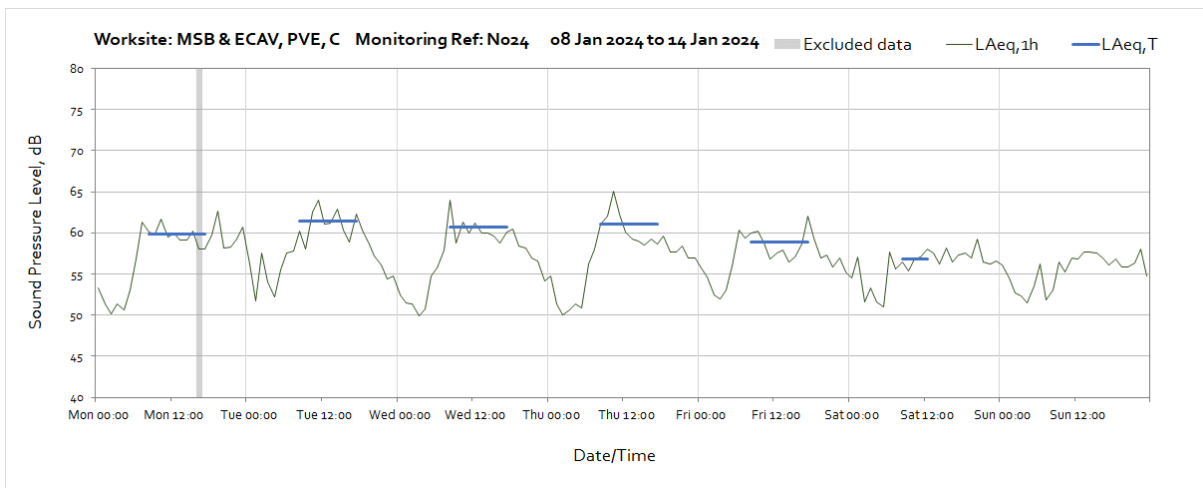
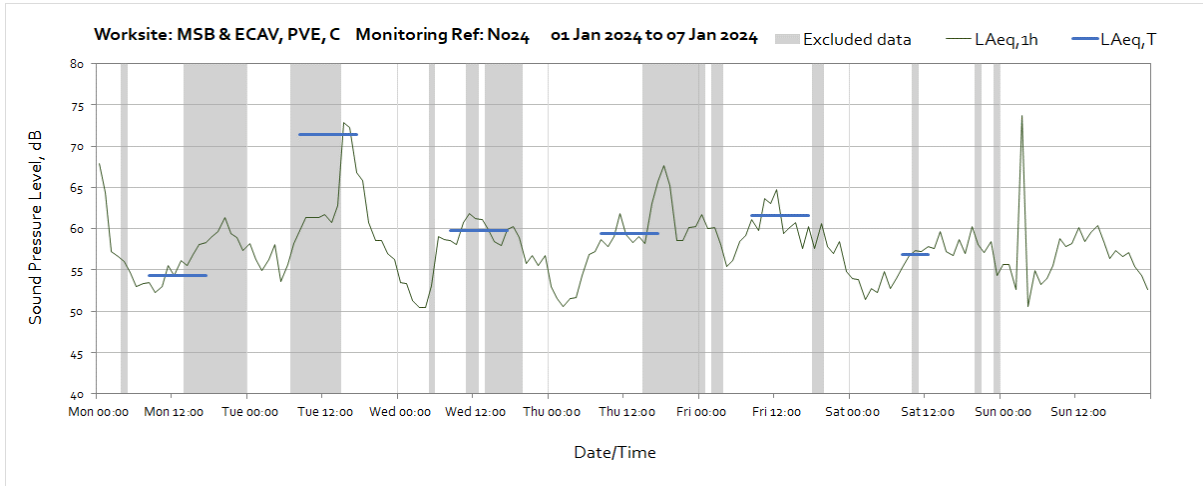
The following graphs show the hourly measured ambient noise level $L_{Aeq,1h}$ and, where relevant, the averaged noise level $L_{Aeq,T}$ values, where the time period T is as specified in Table 1 of HS2 Information Paper E23. Periods where noise levels are adversely affected by weather or only measured for part of the period, which are not representative of HS2 construction works, have been greyed out and excluded from the calculation of the $L_{Aeq,T}$ values in in Table 3 of the main report.

Worksite: B - Monitoring Ref: JC

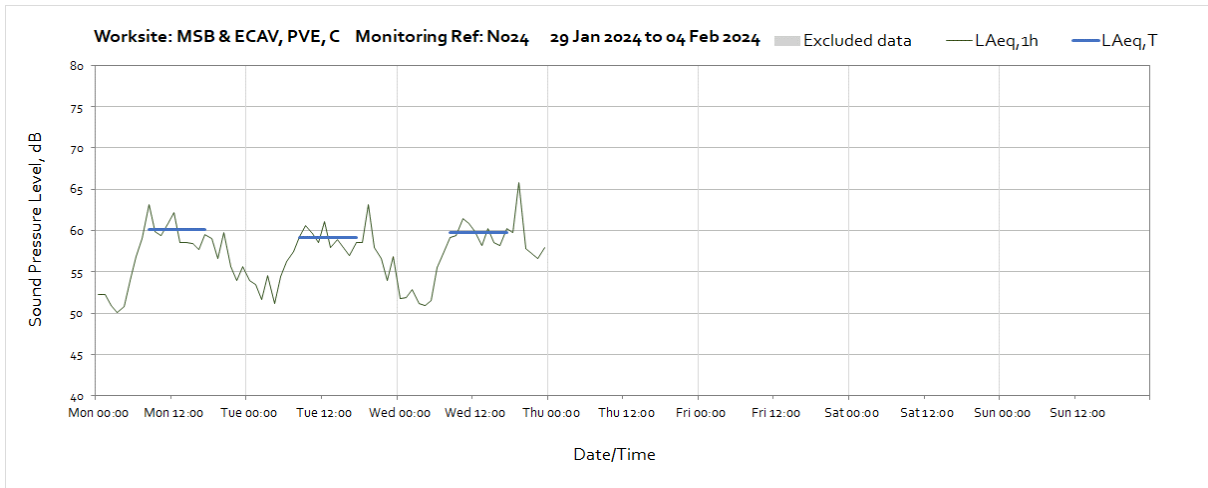
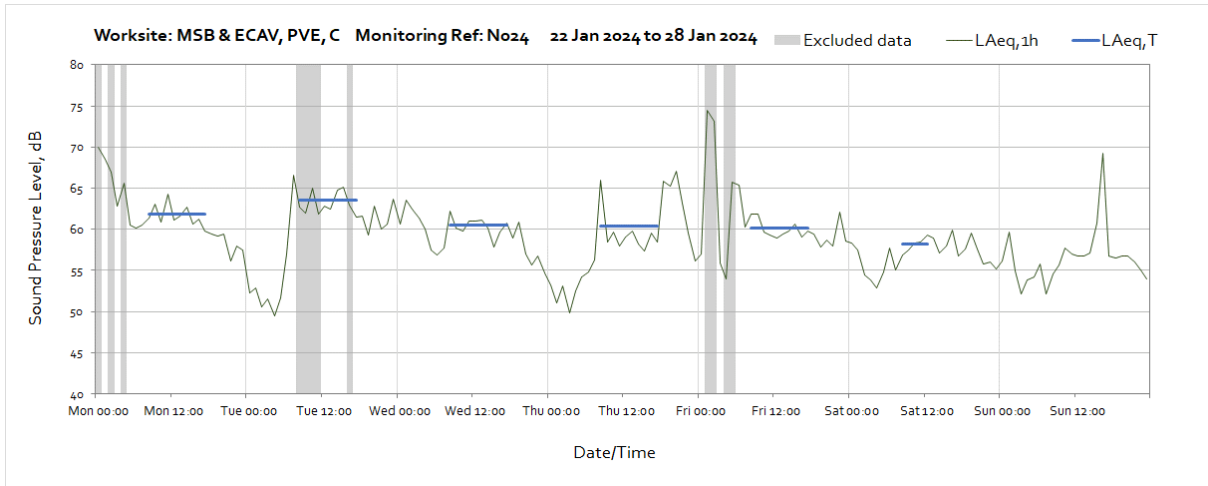




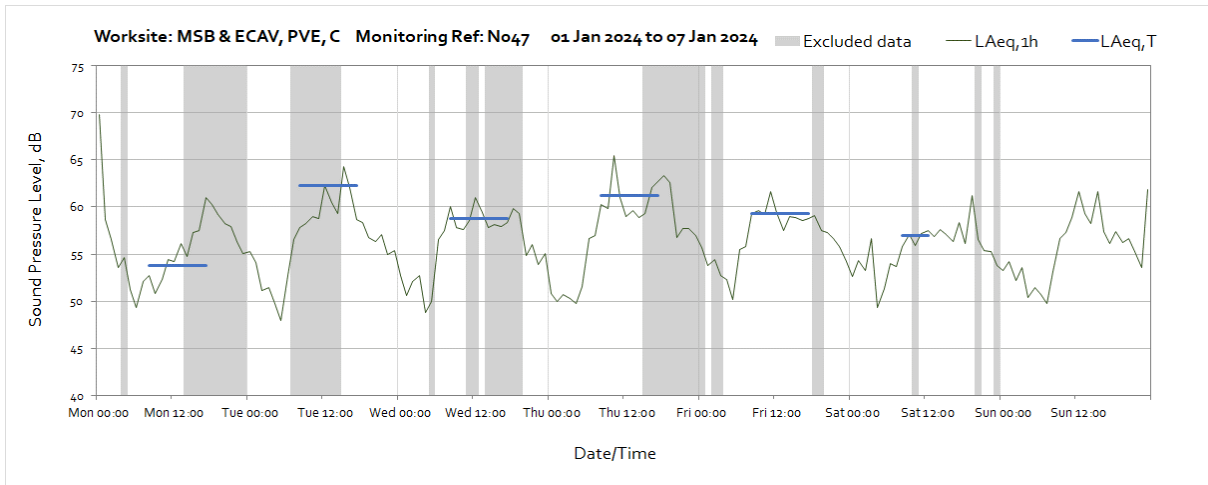
Worksite: MSB & ECAV, PVE, C - Monitoring Ref: N024

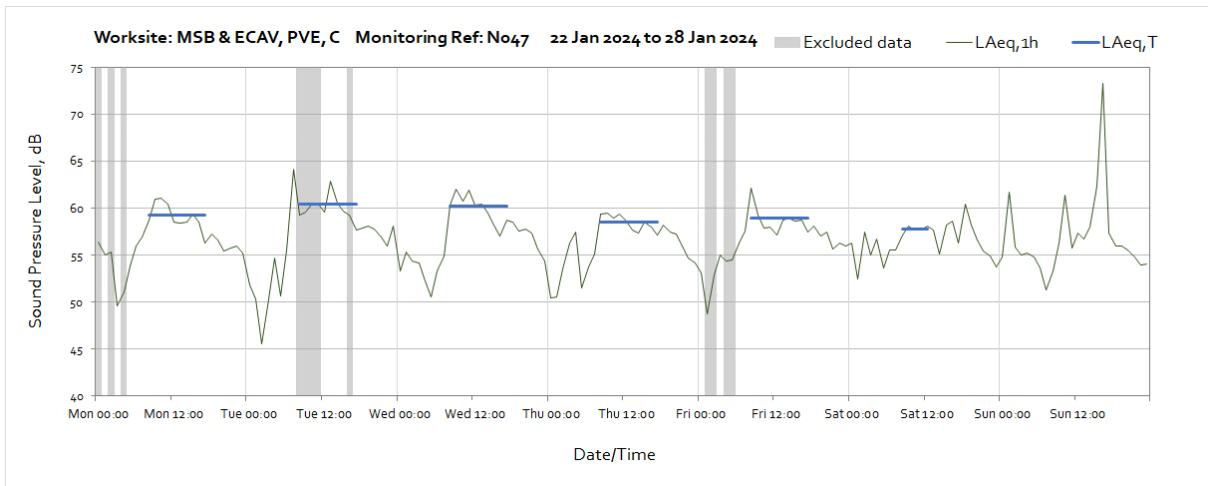
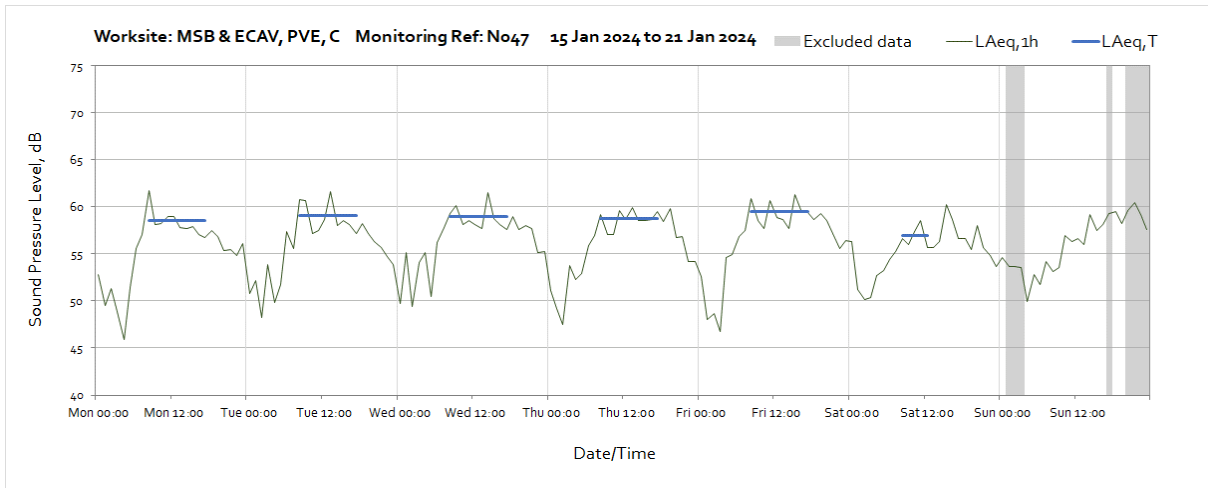
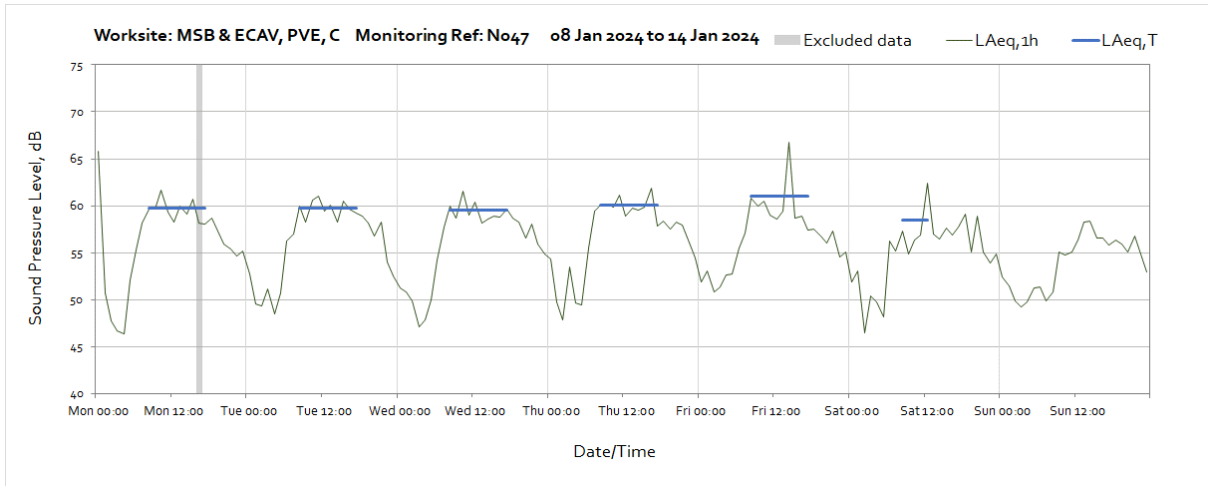


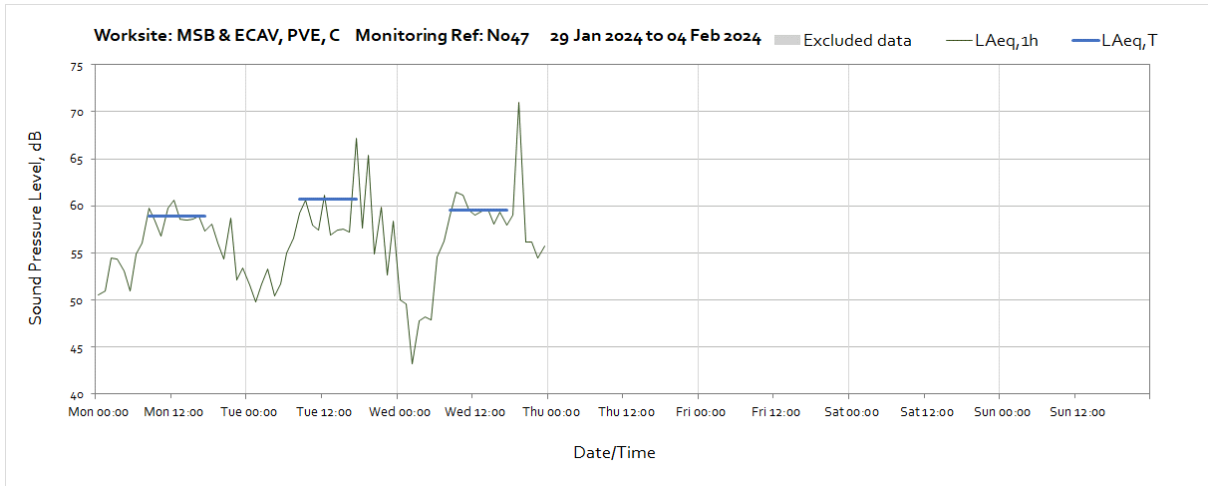
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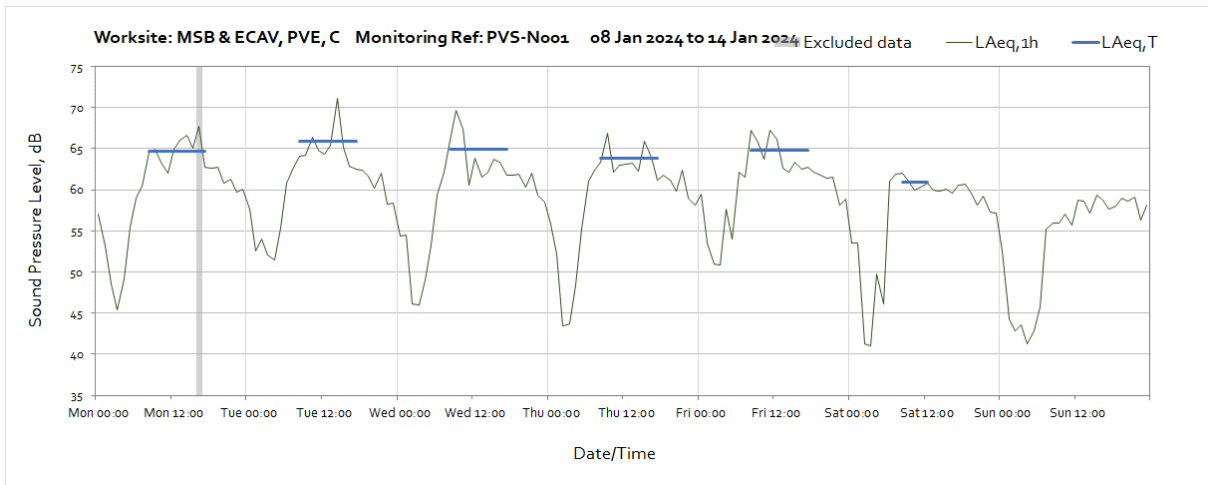
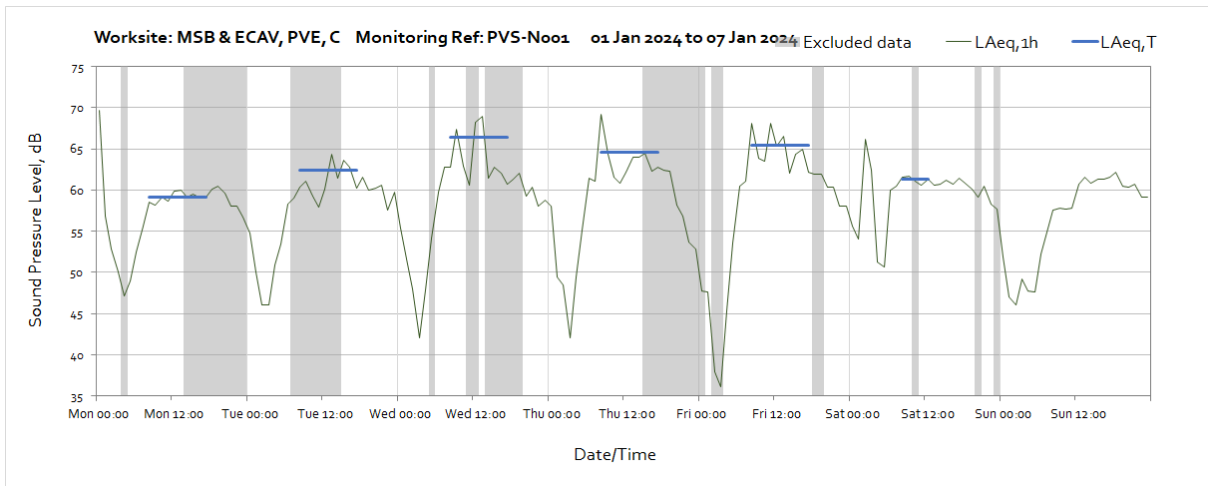
Worksite: MSB & ECAV, PVE, C – Monitoring Ref: N047

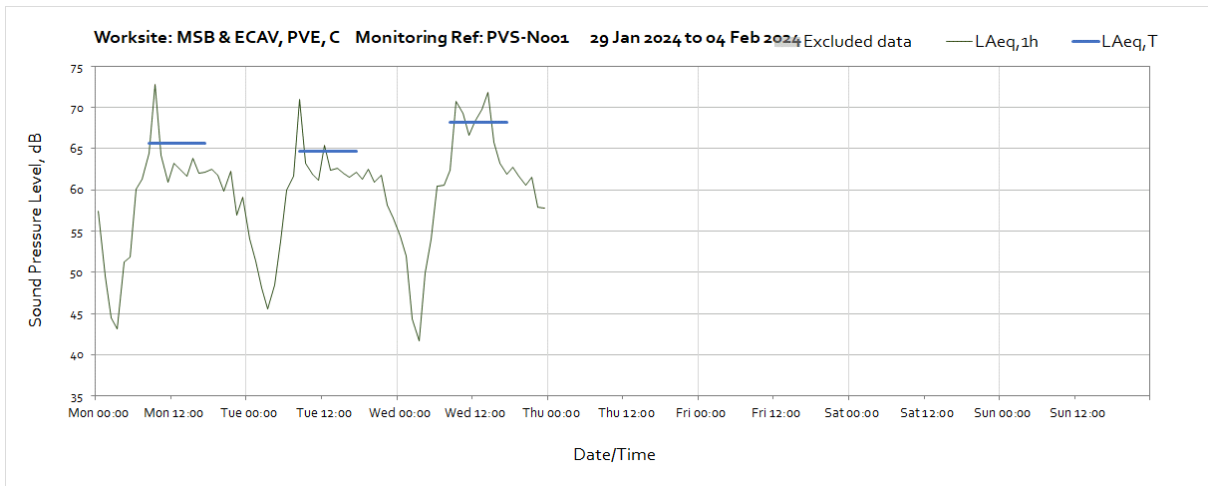
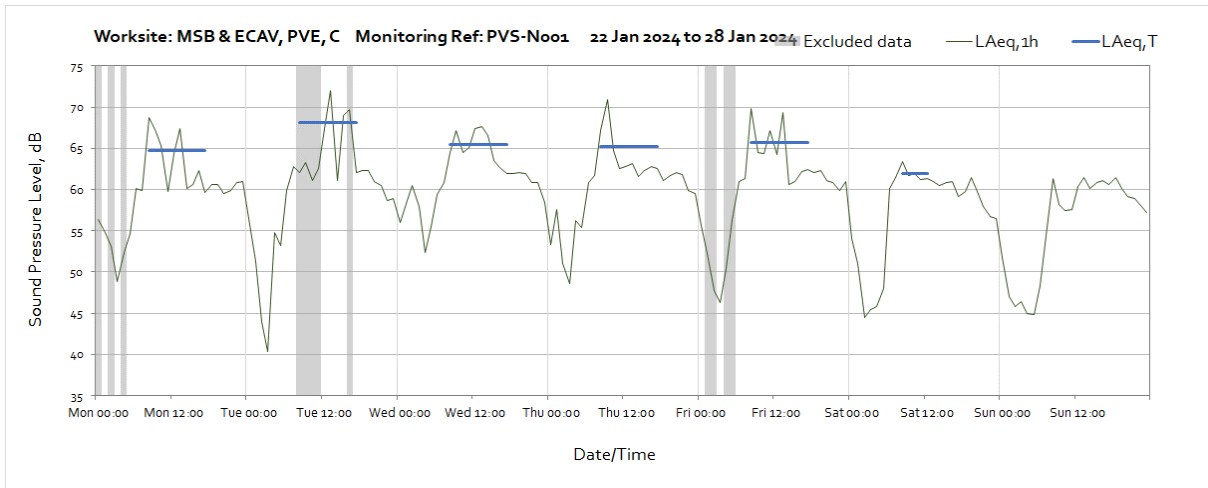
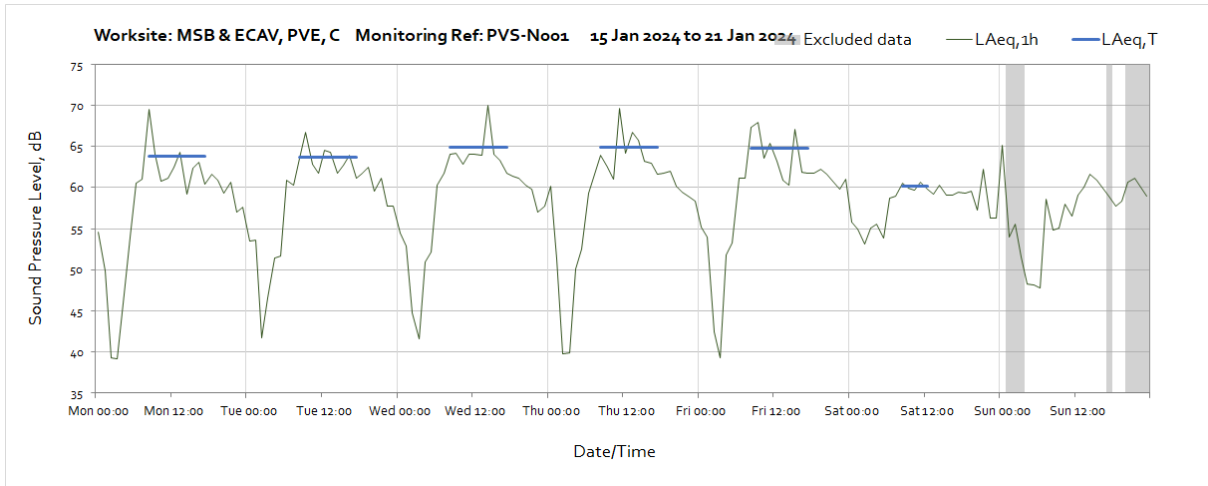




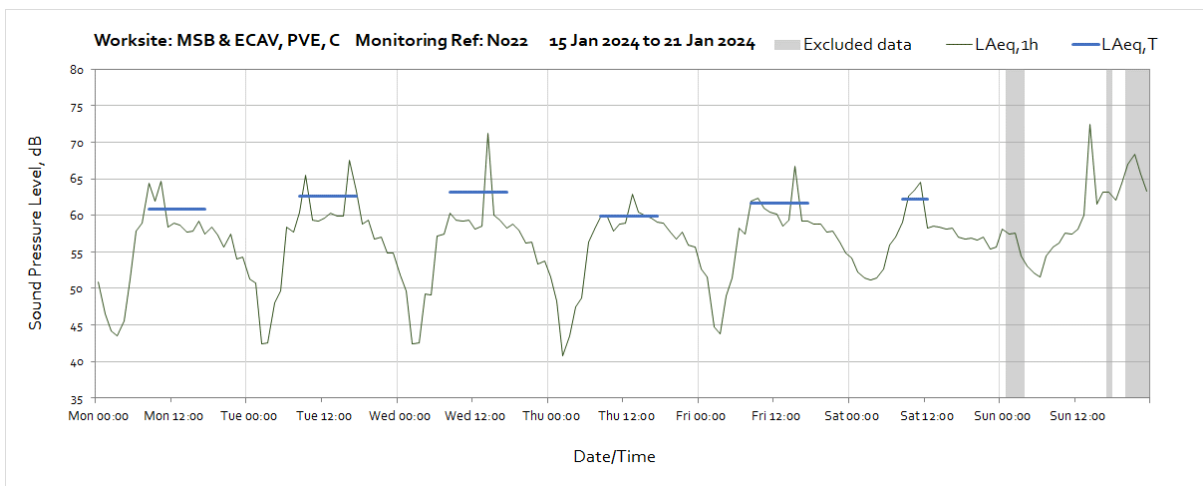
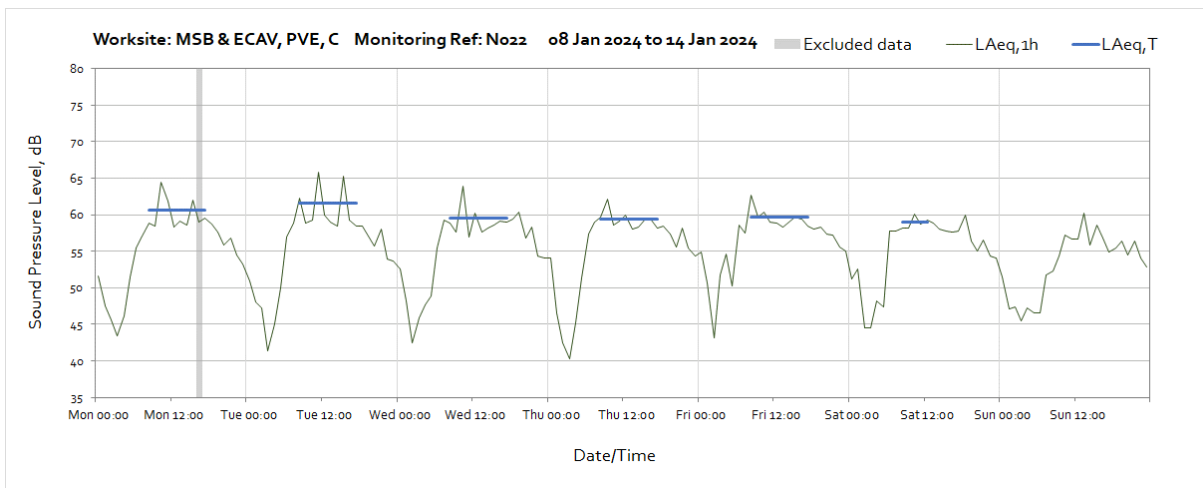
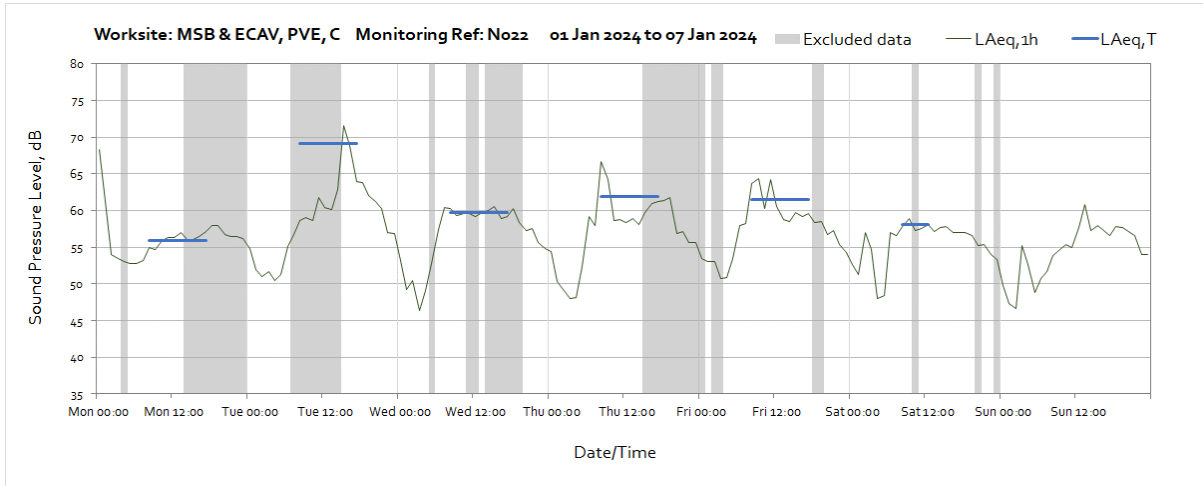


Worksite: MSB & ECAV, PVE, C - Monitoring Ref: PVS-N001

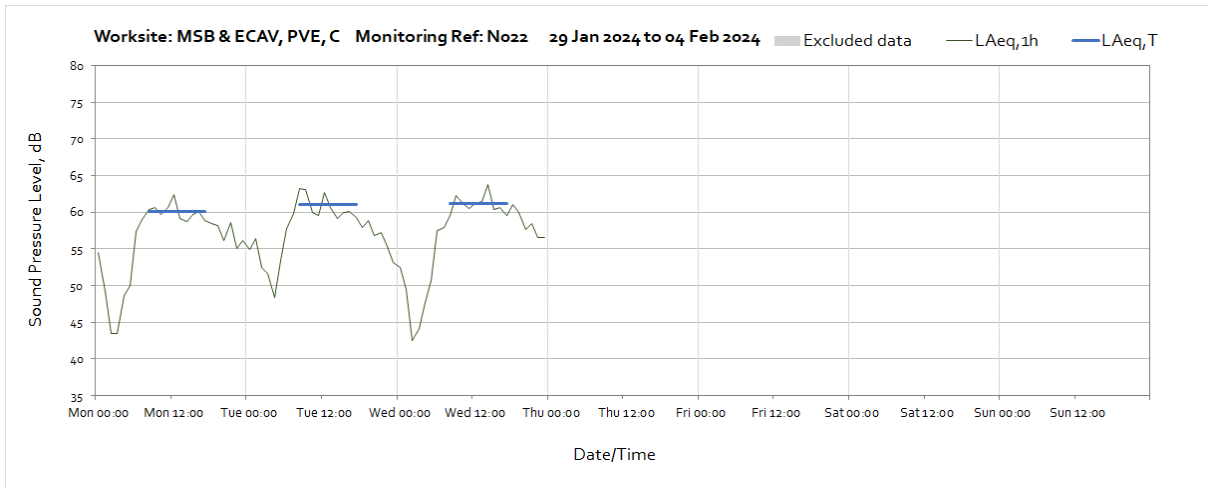
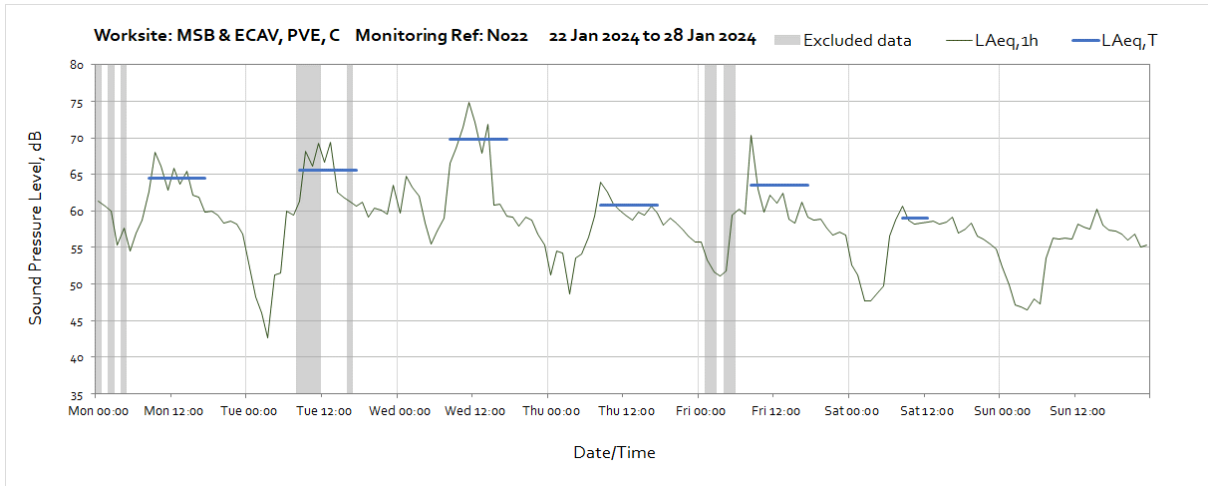




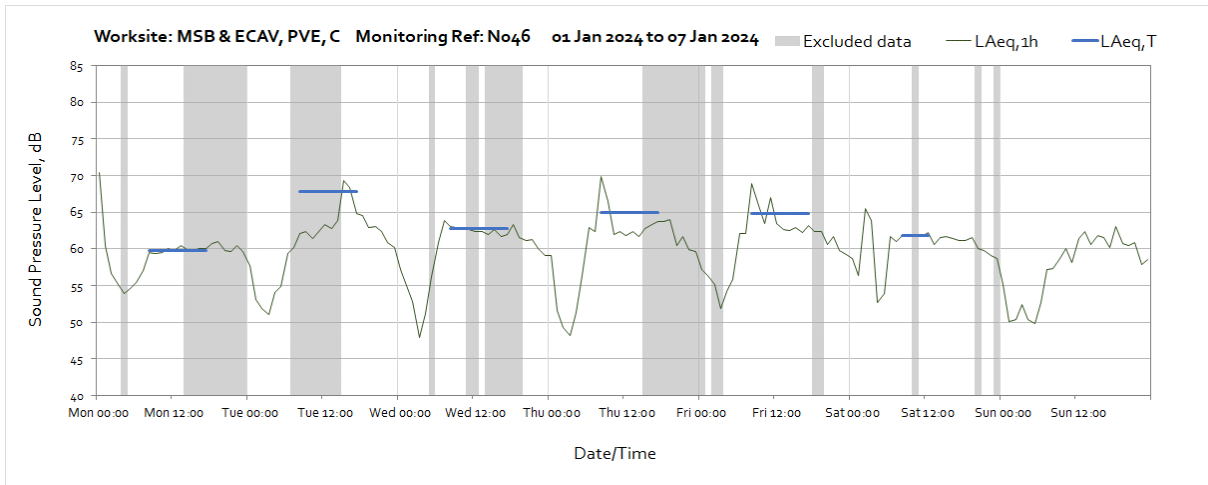
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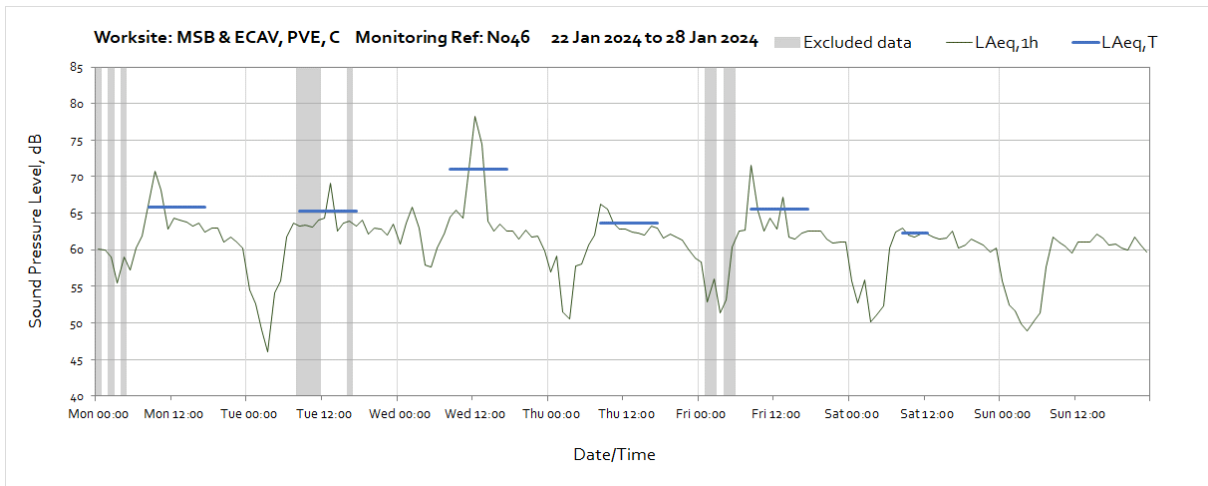
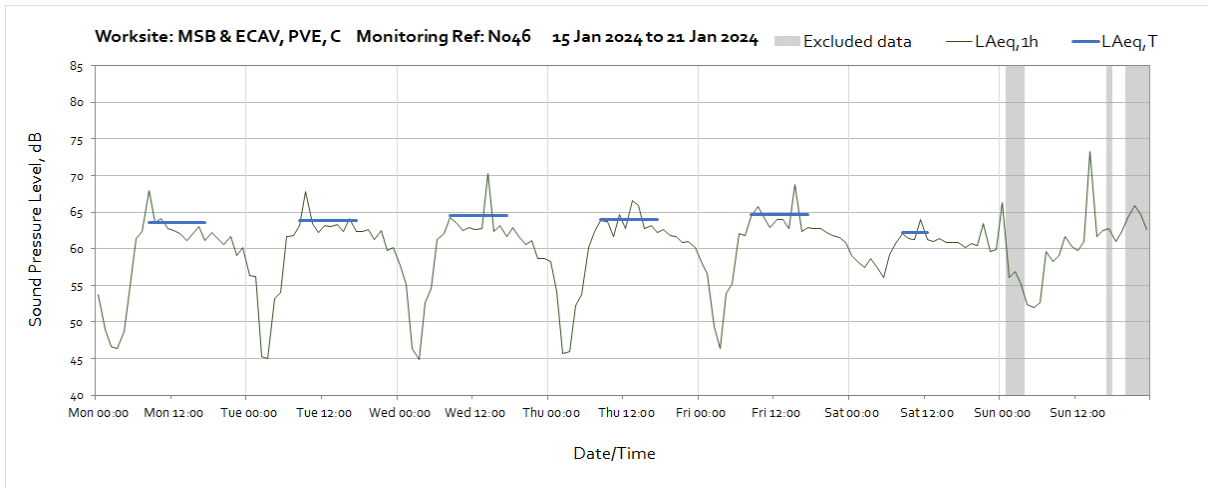
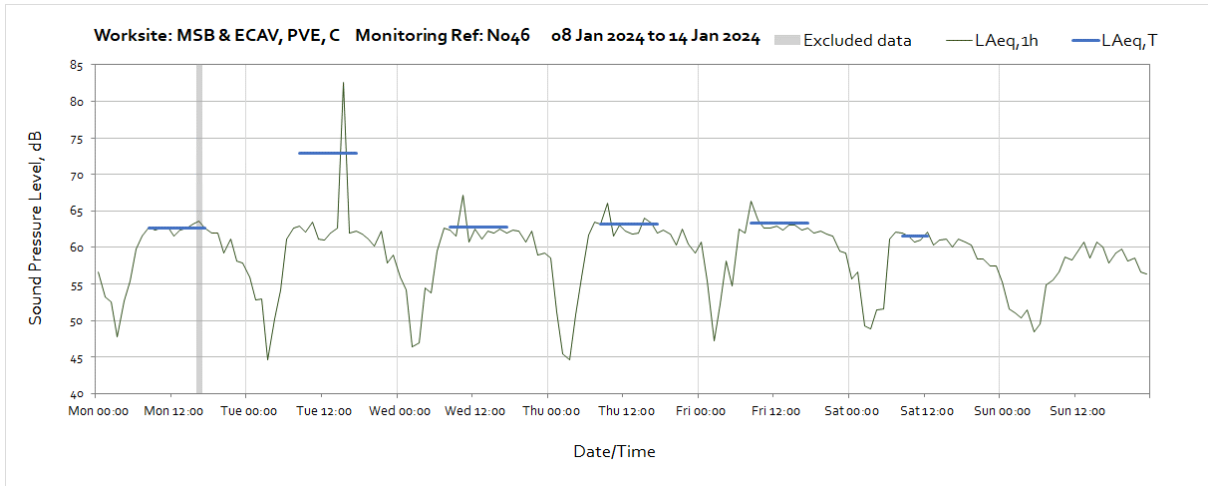


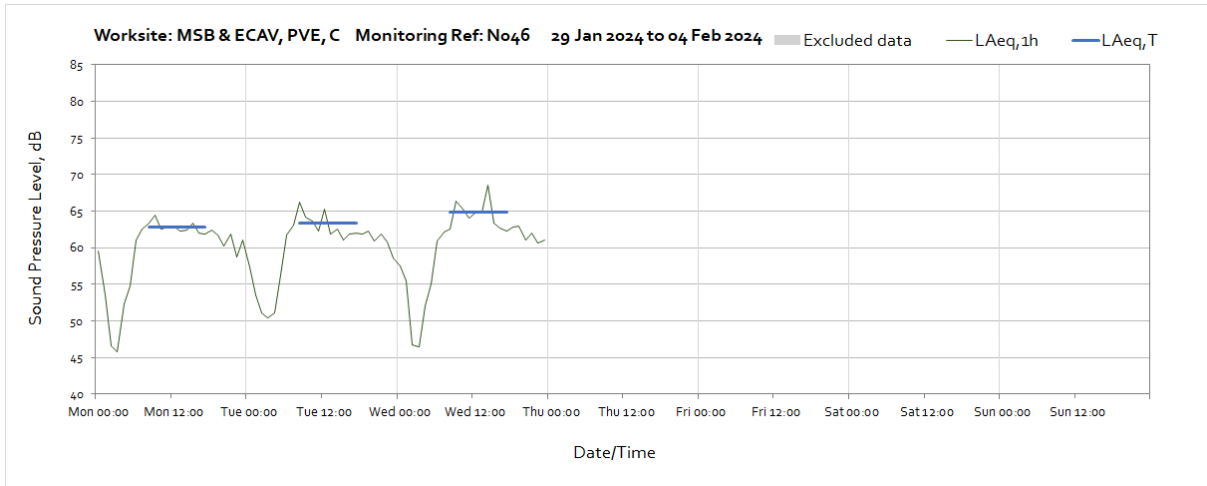
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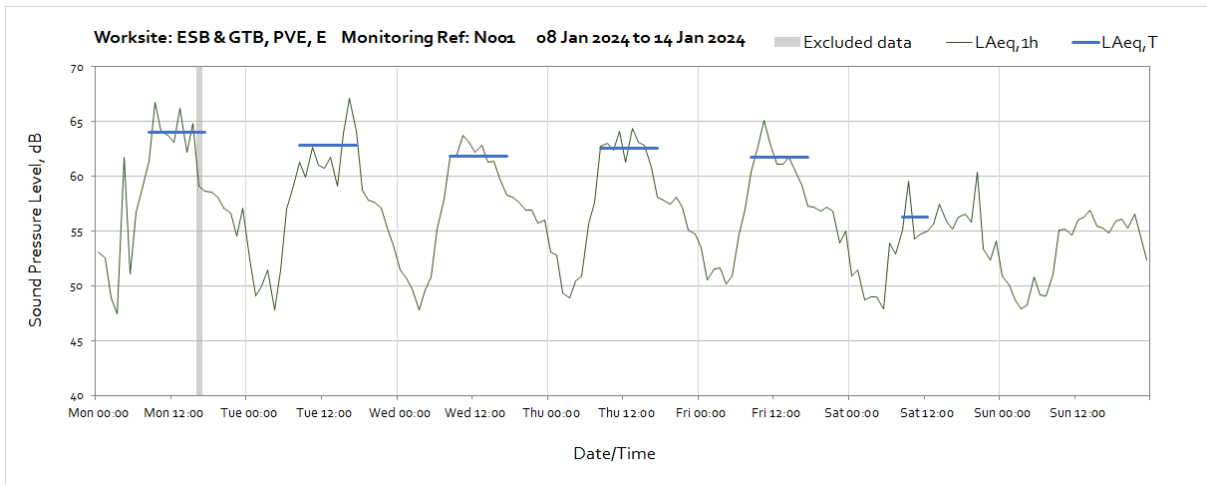
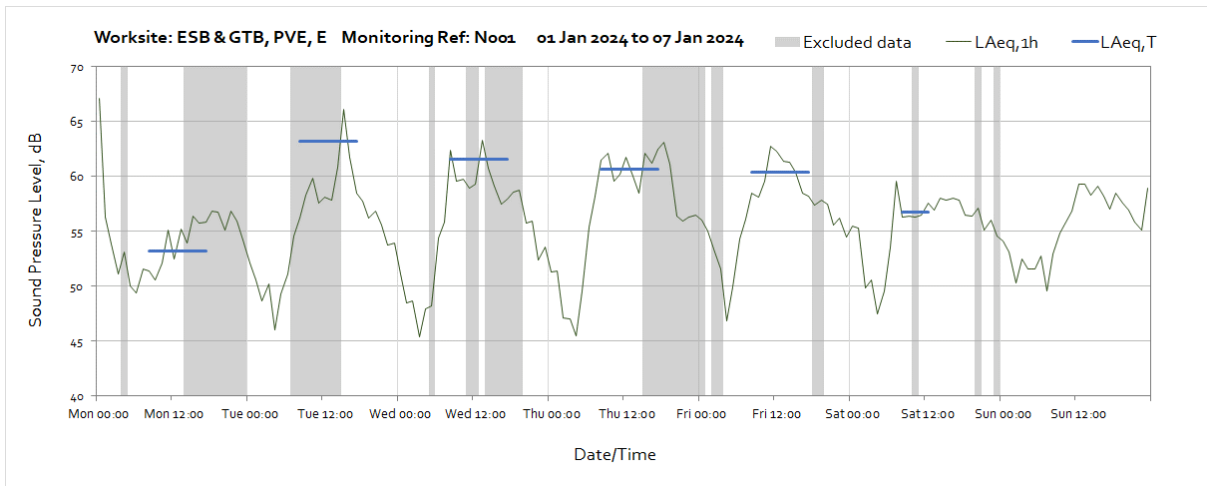
Worksite: MSB & ECAV, PVE, C – Monitoring Ref: N046

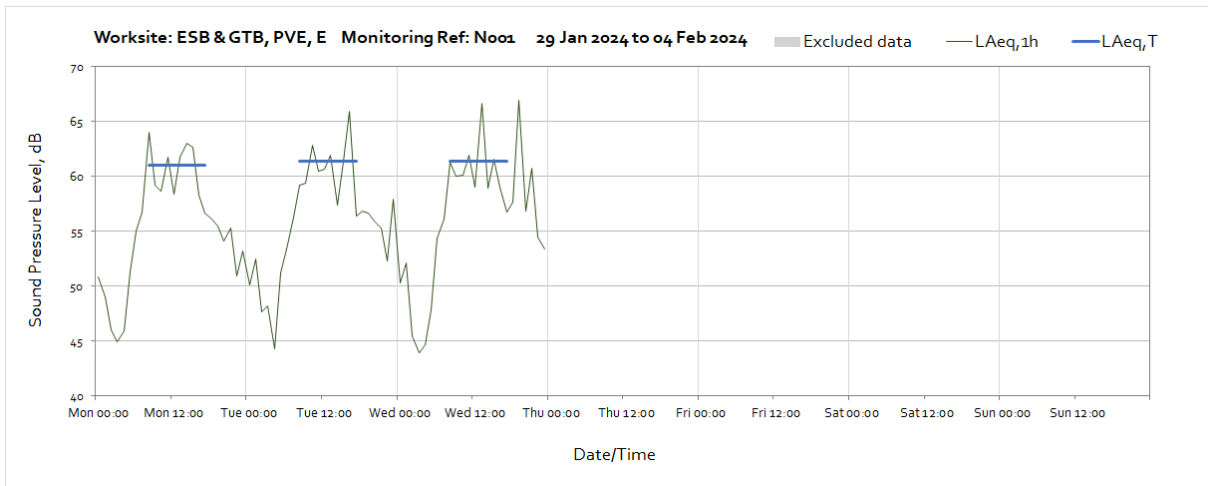
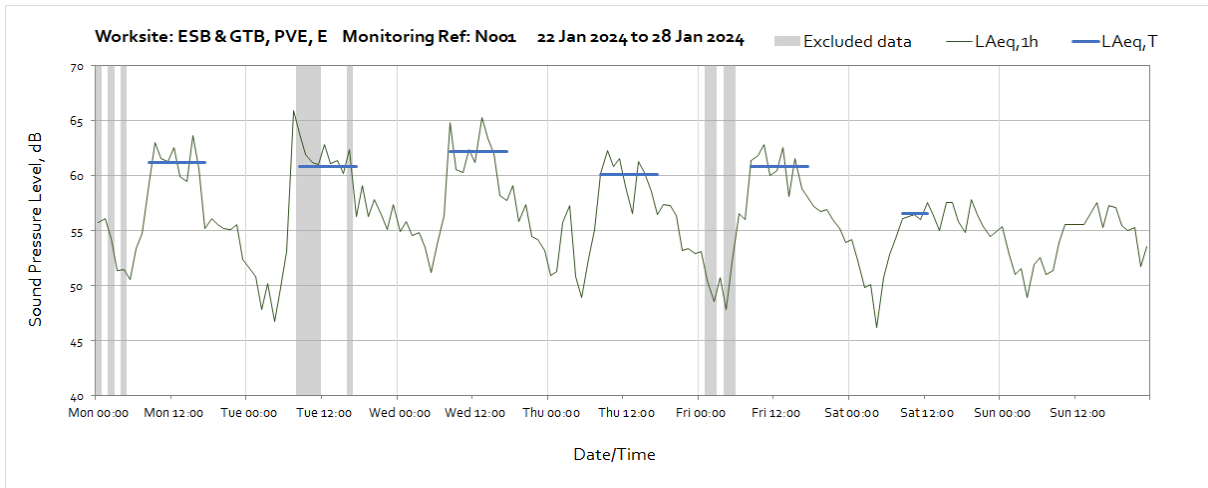
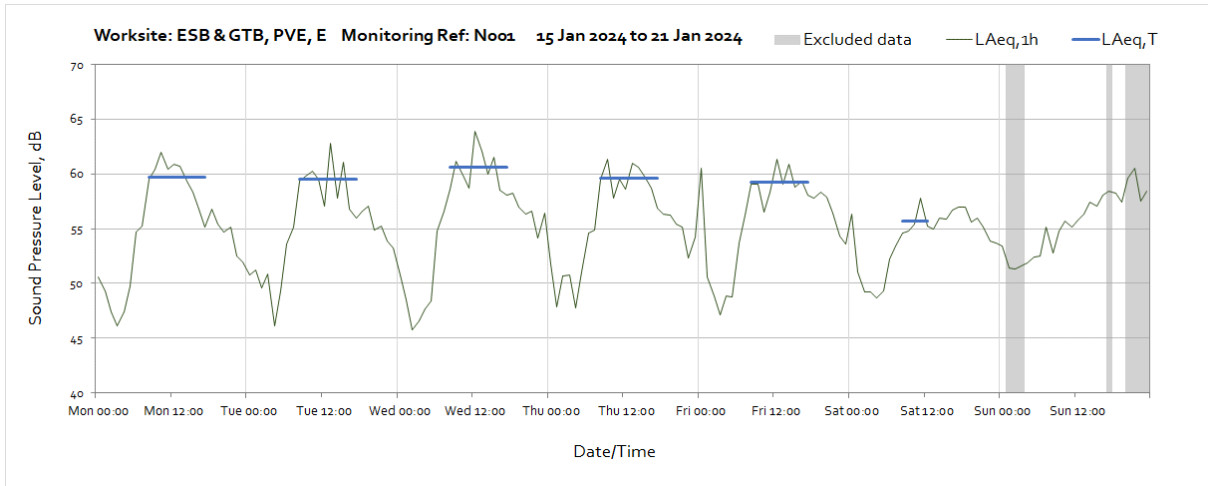




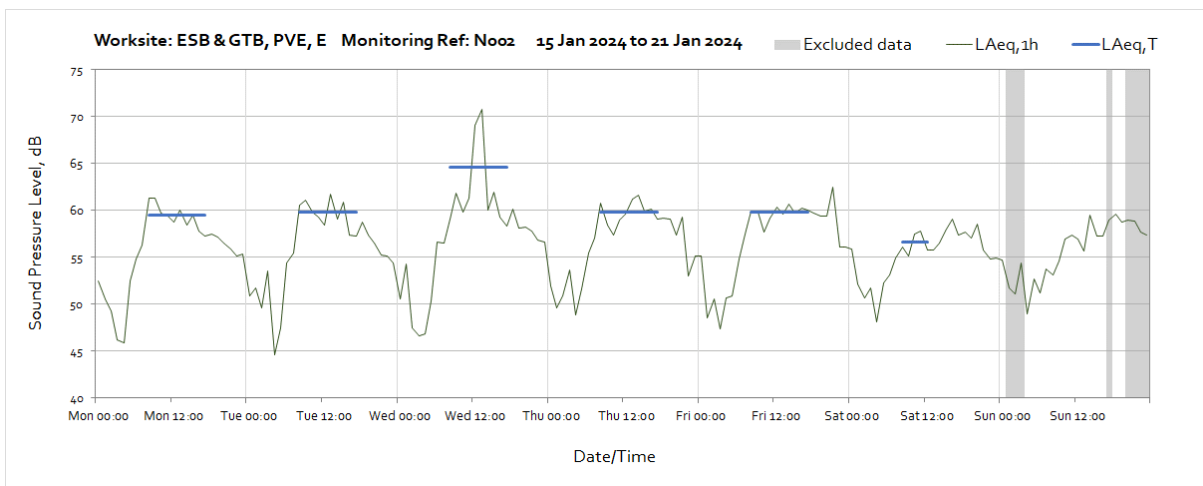
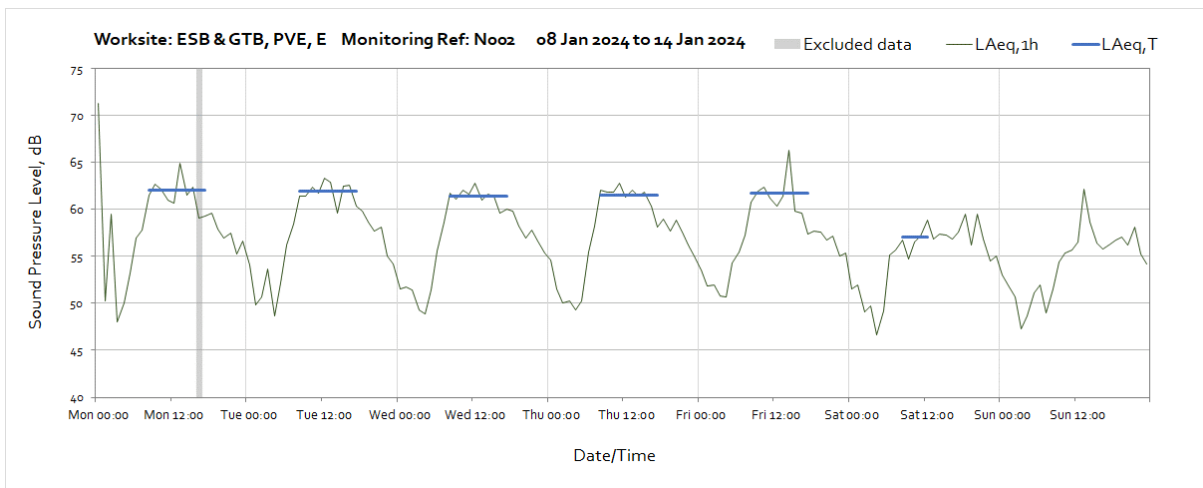
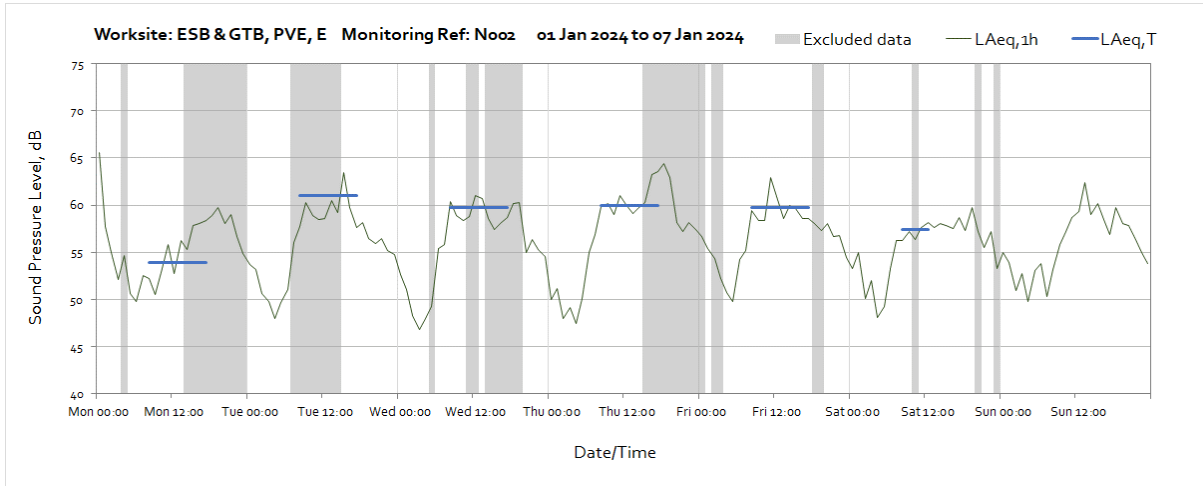


Worksite: ESB & GTB, PVE, E - Monitoring Ref: N001

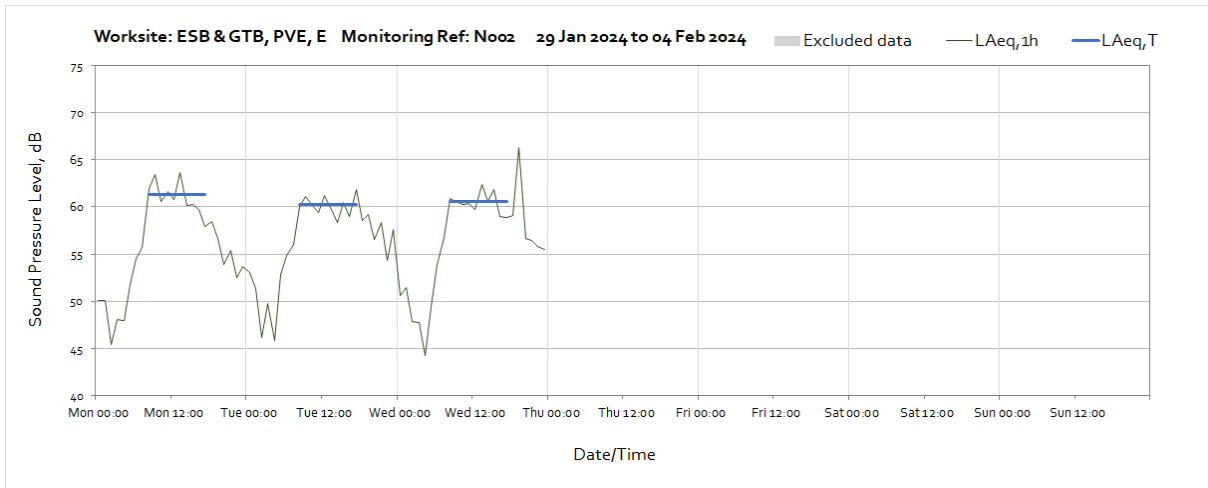
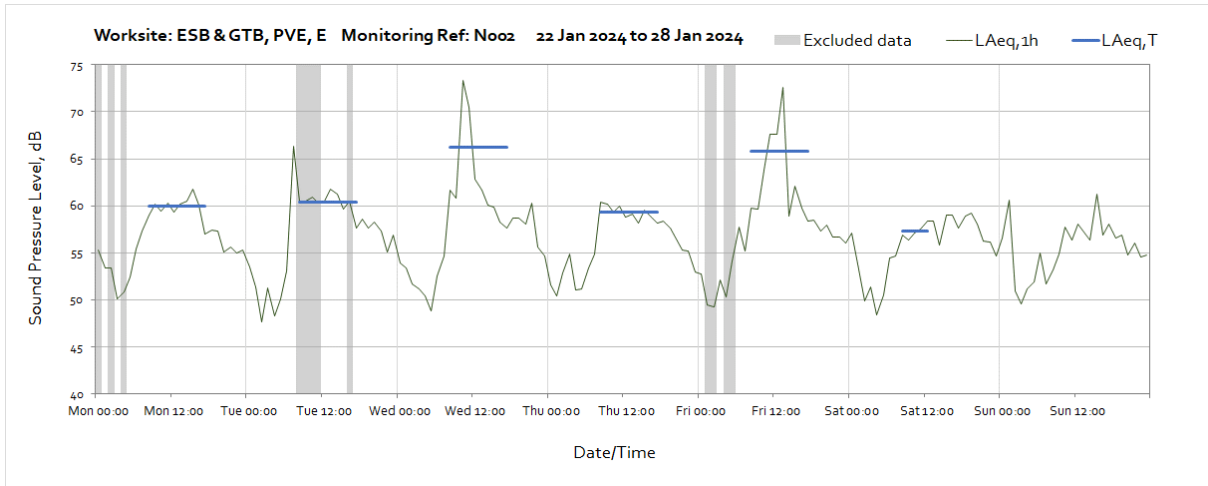




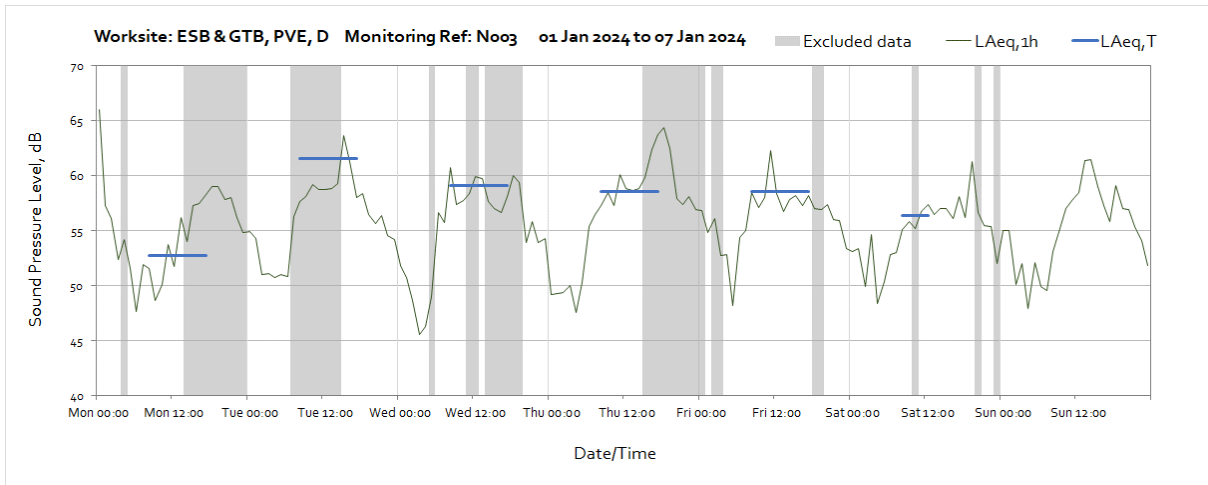
Worksite: ESB & GTB, PVE, E – Monitoring Ref: N002

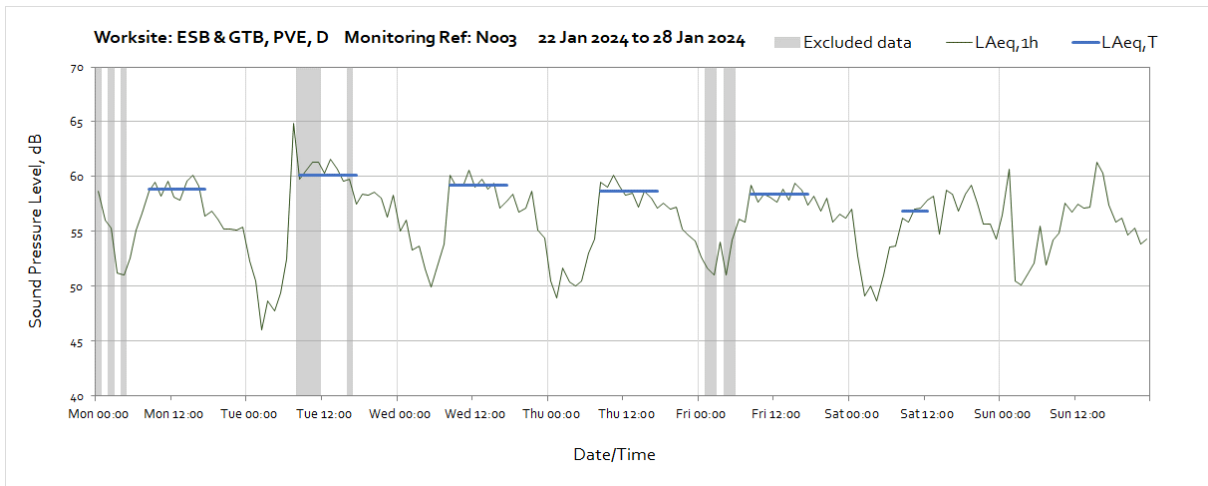
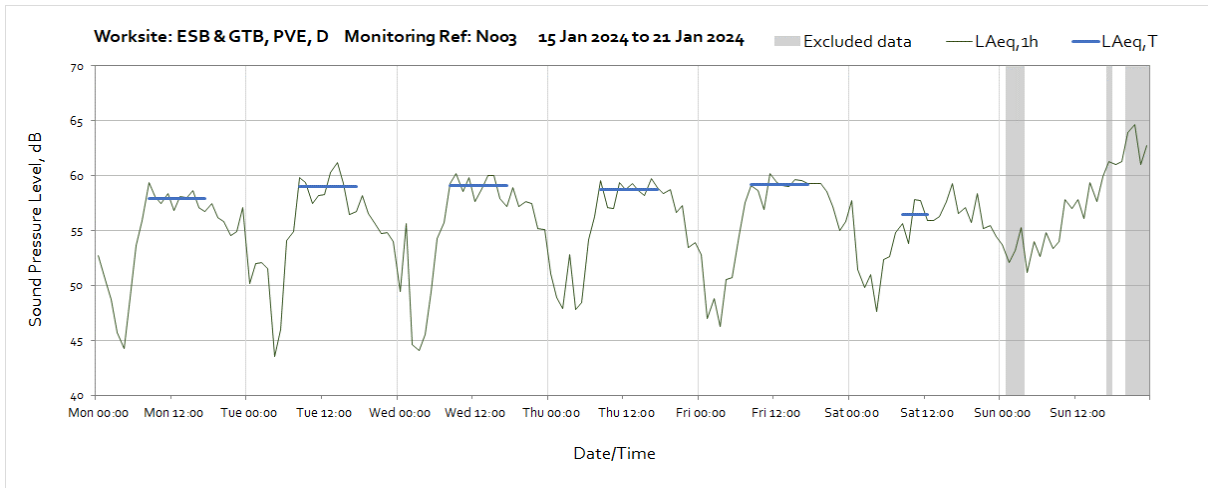
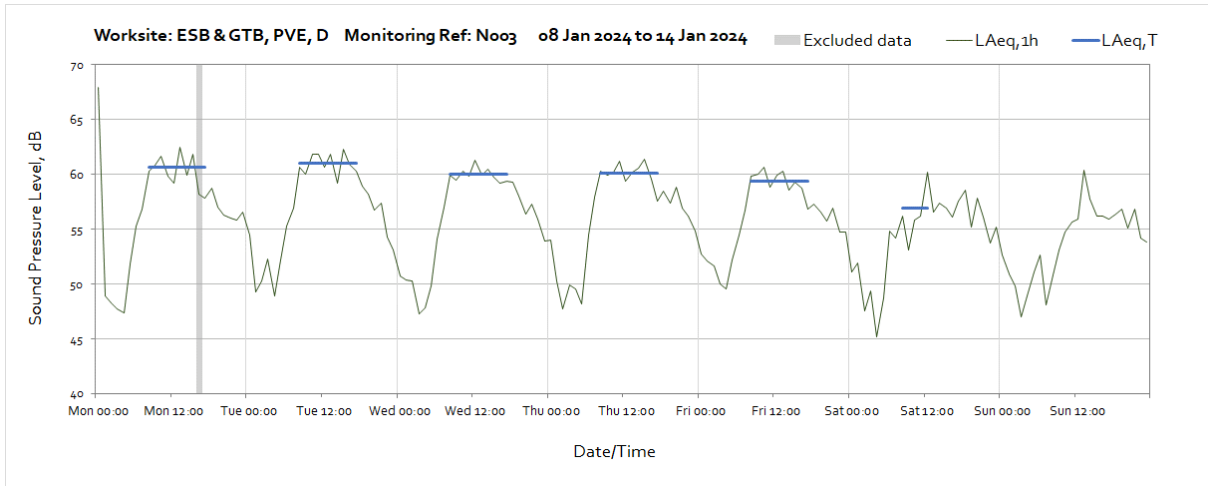


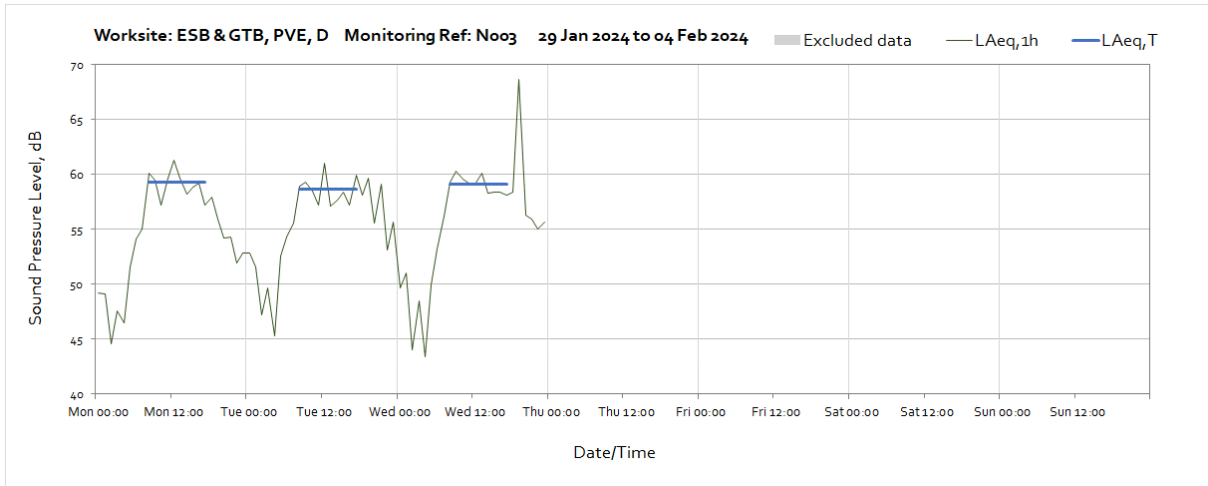
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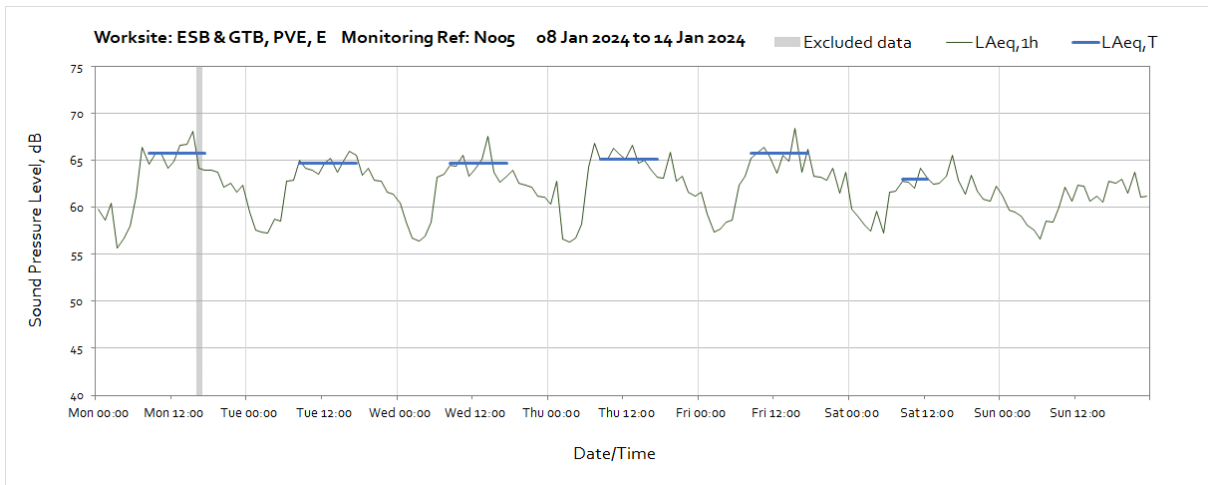
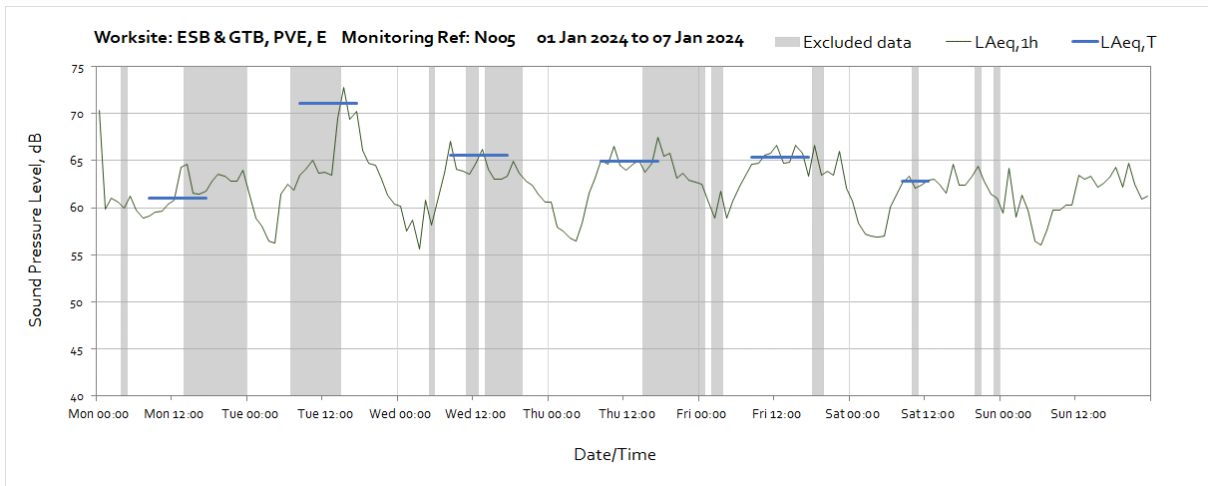
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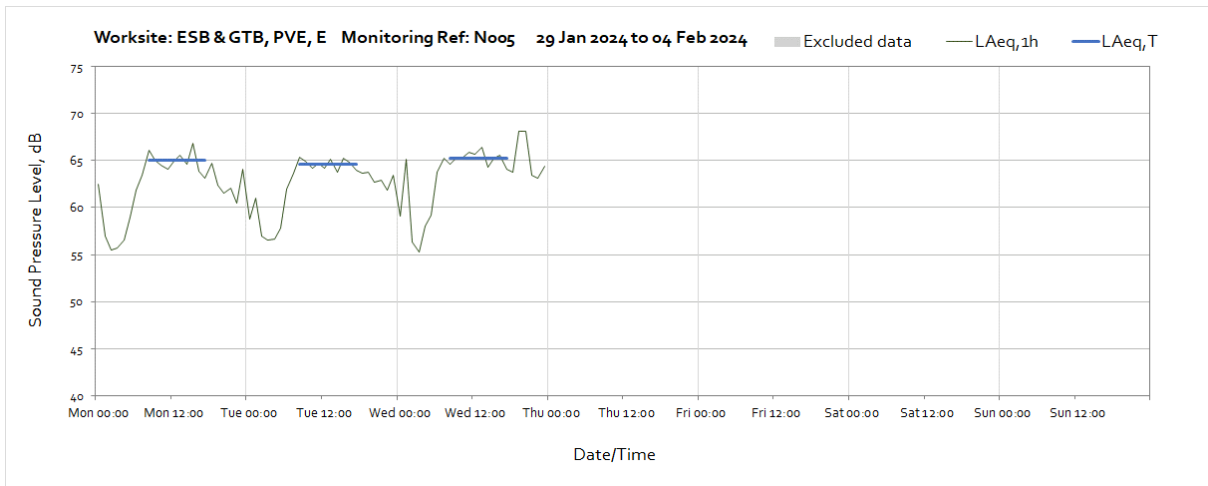
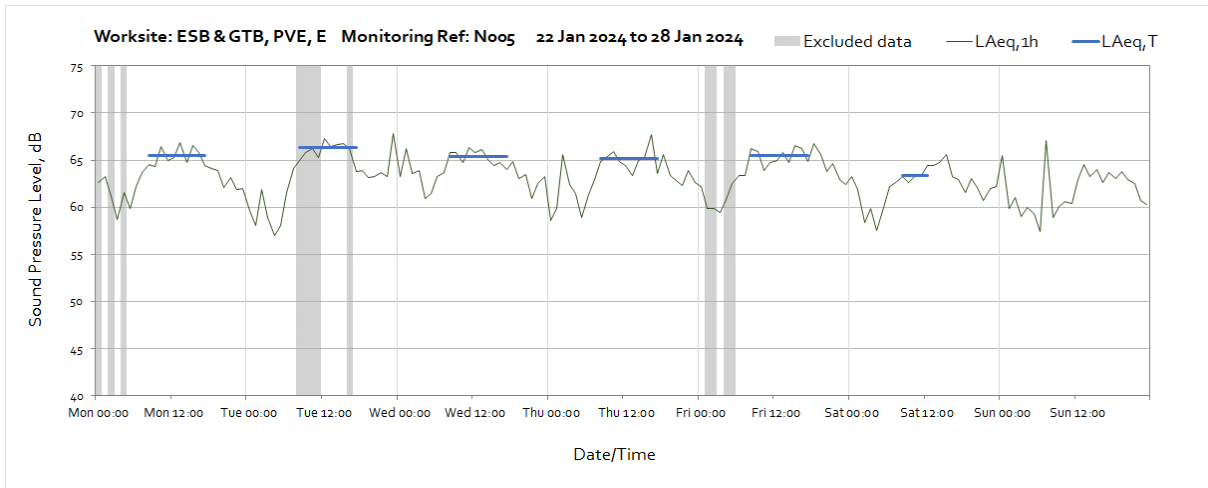
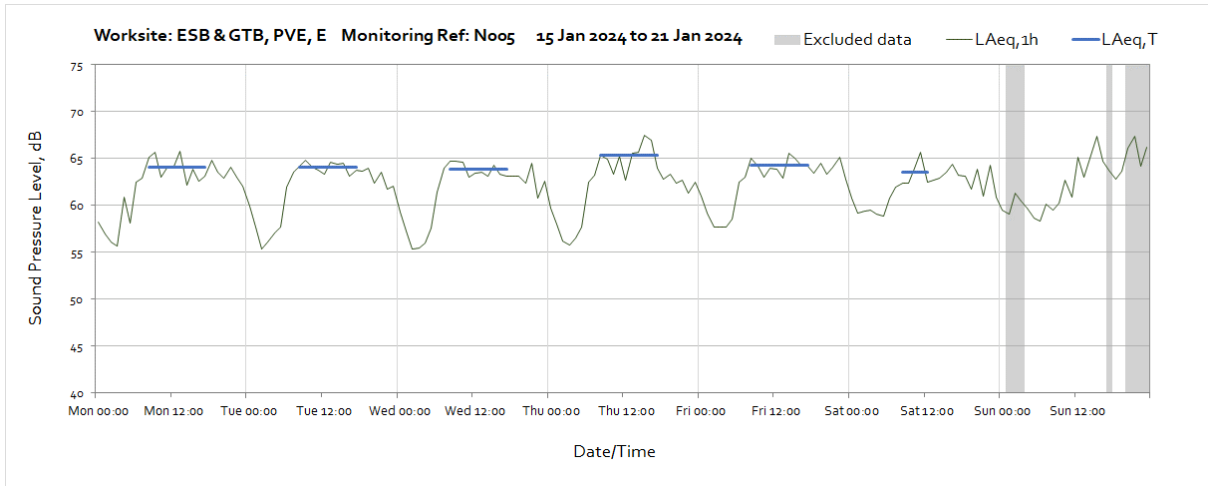




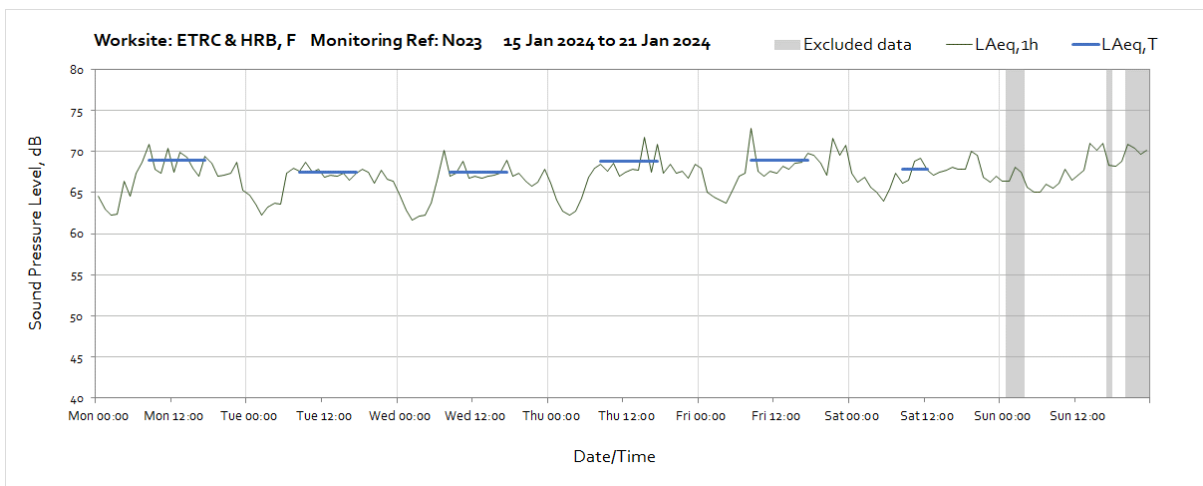
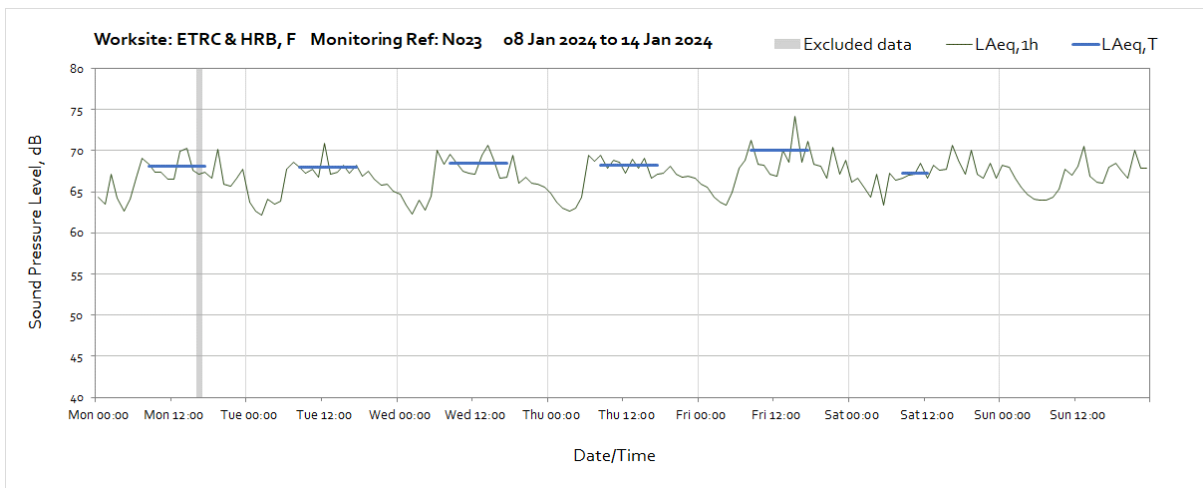
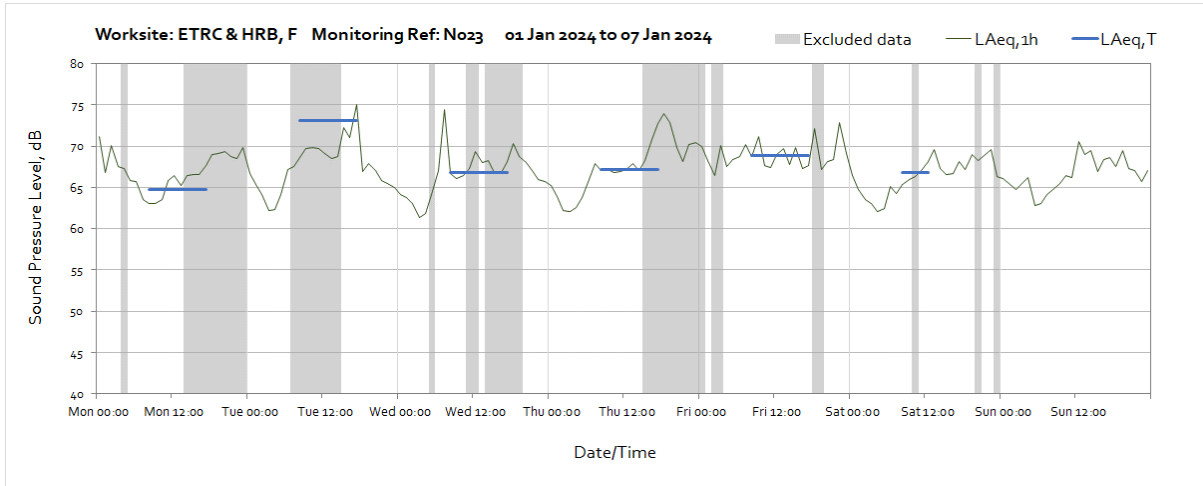


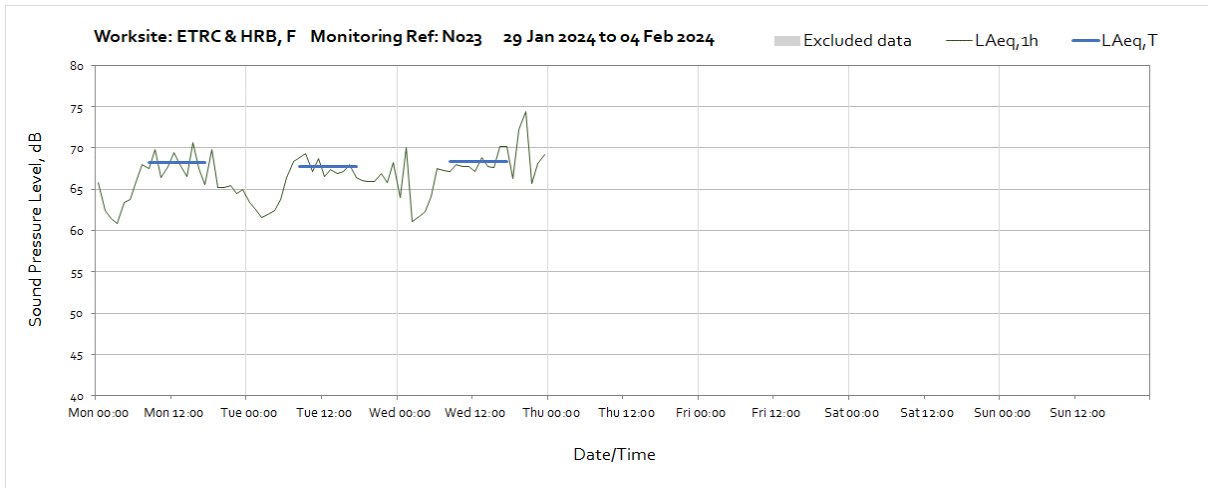
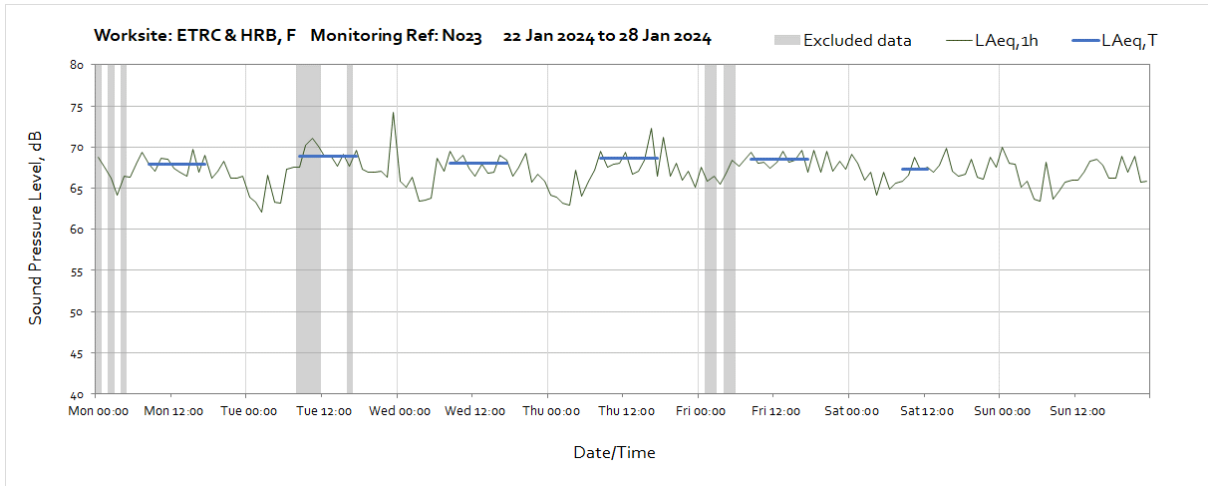
Worksite: ESB & GTB, PVE, E – Monitoring Ref: N005



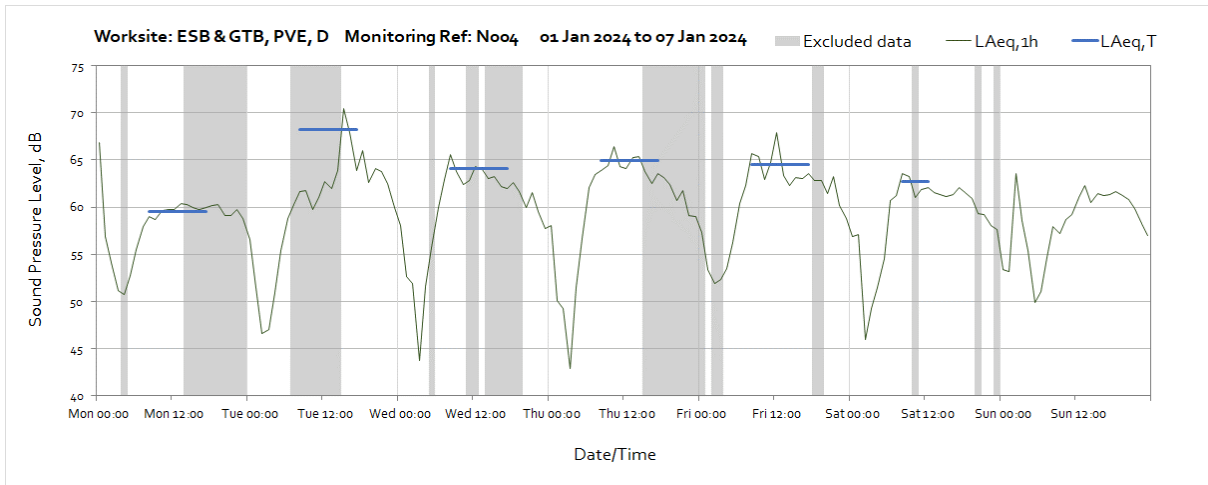


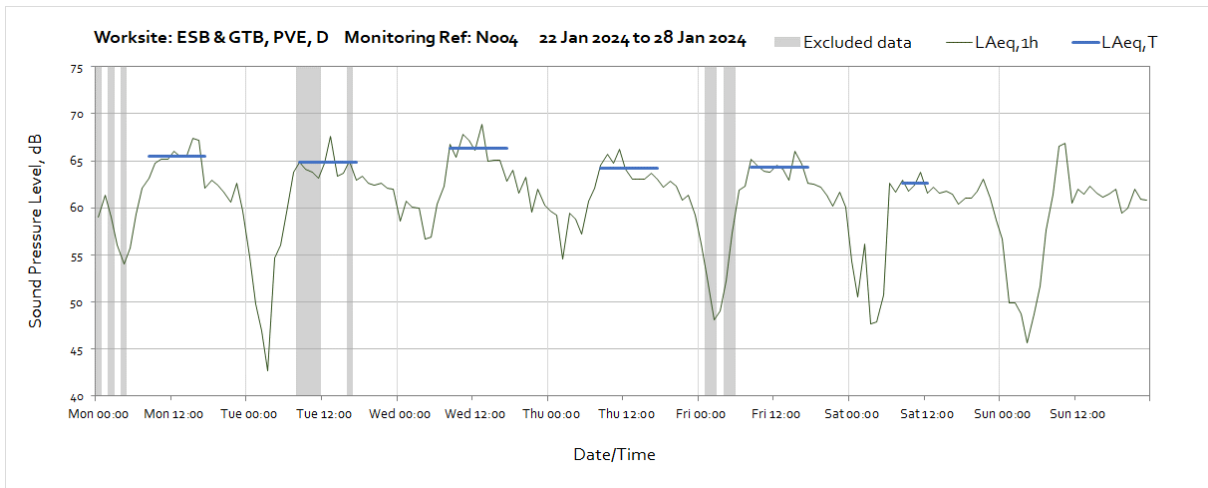
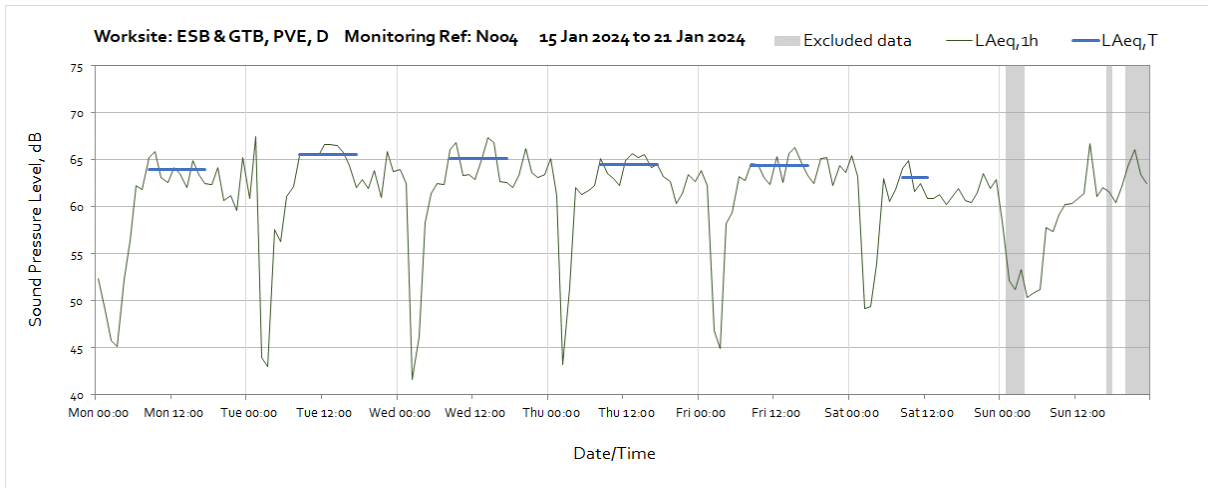
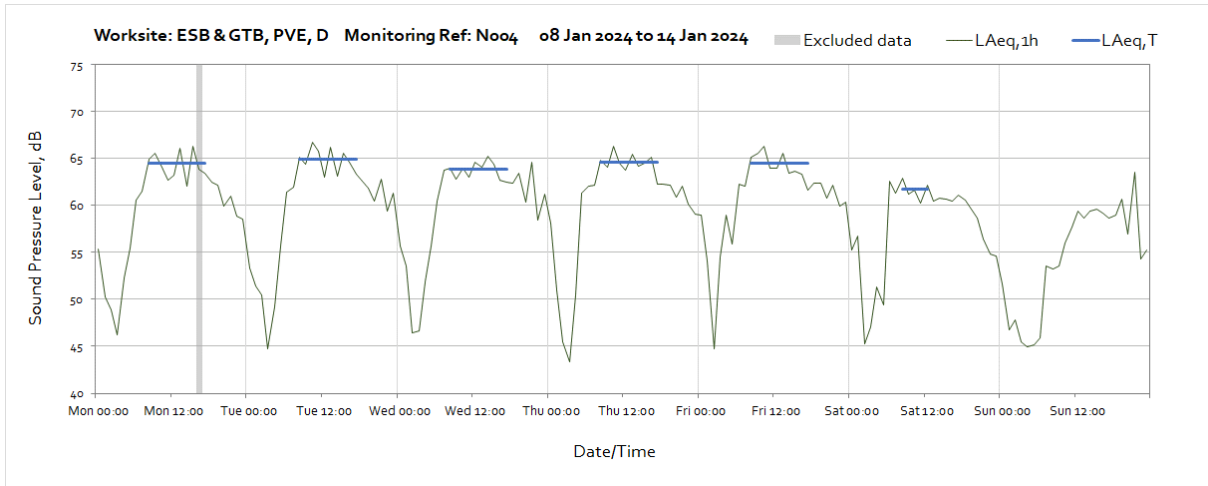
Worksite: ETRC & HRB, F - Monitoring Ref: N023

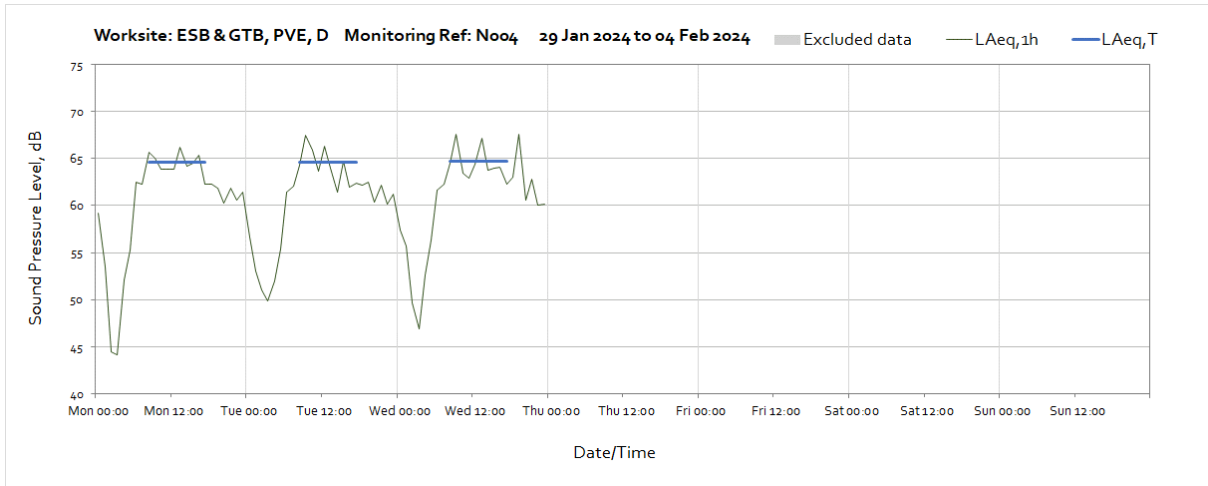




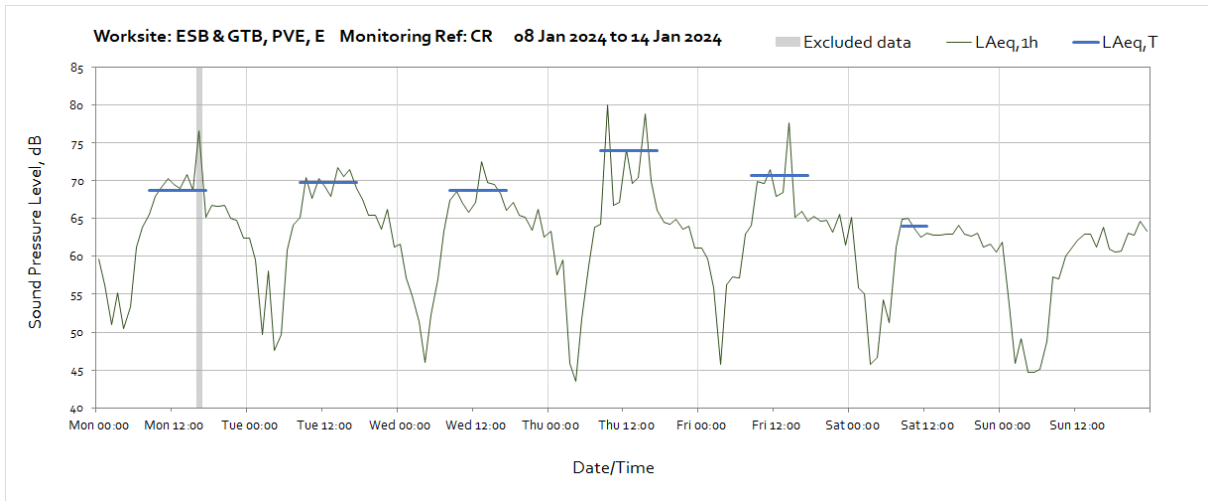
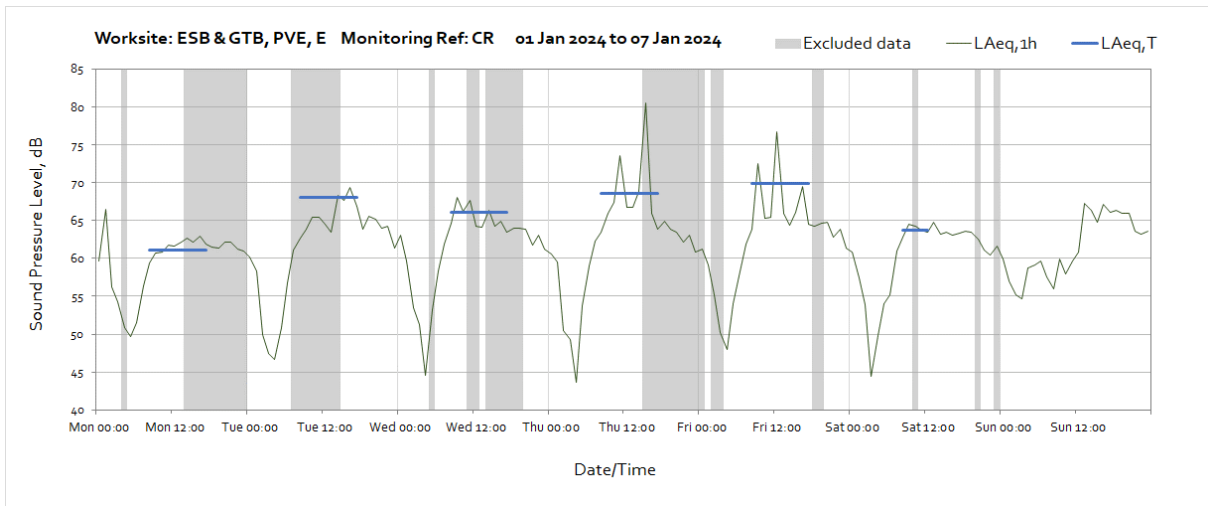
Worksite: ESB & GTB, PVE, D - Monitoring Ref: N004

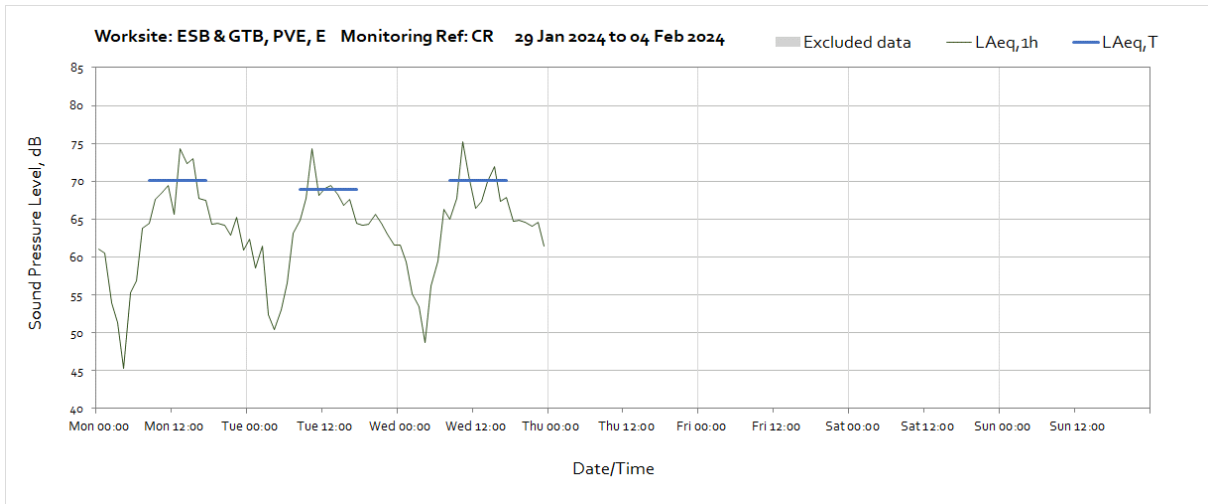
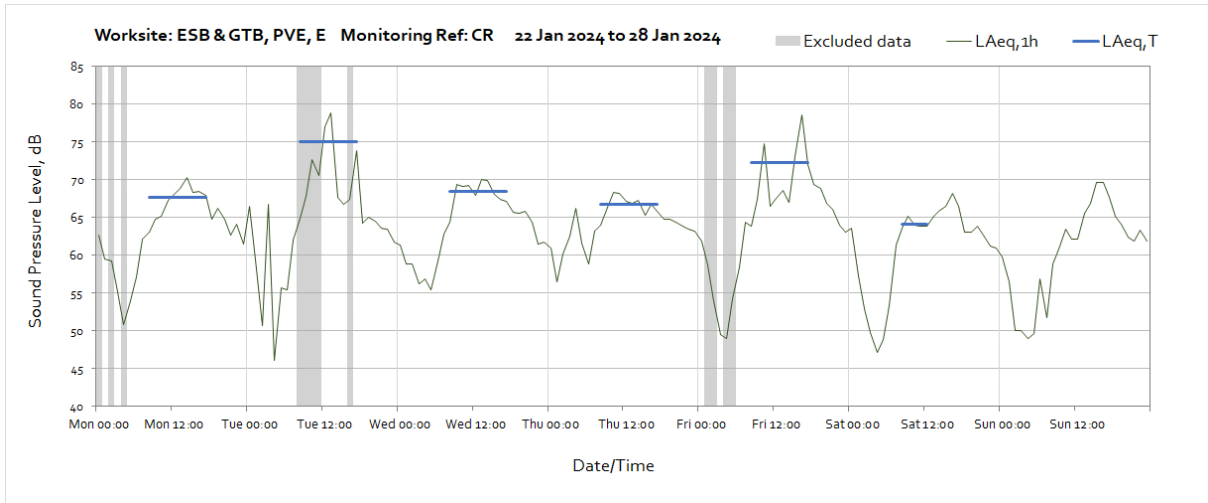
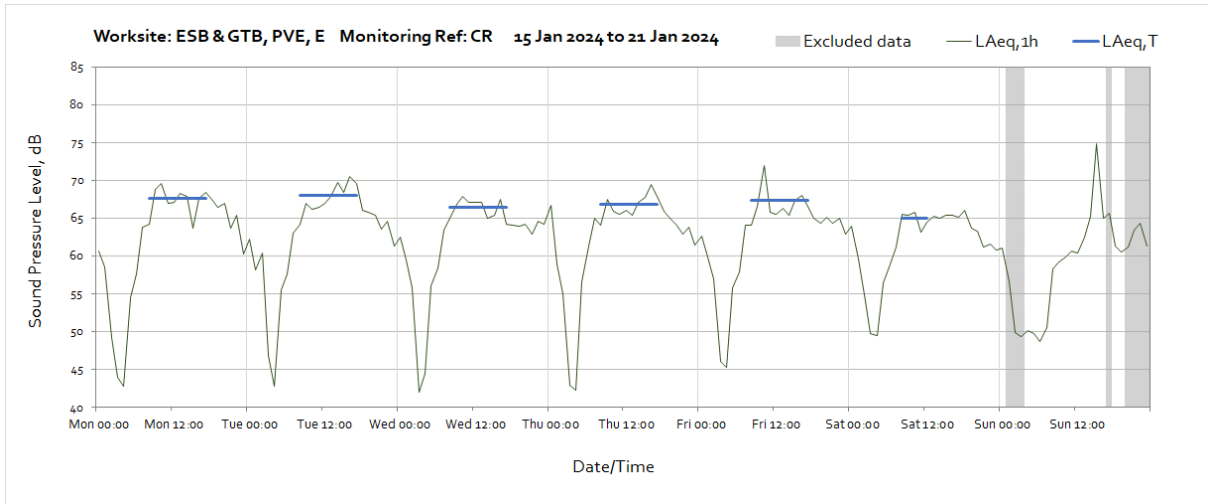




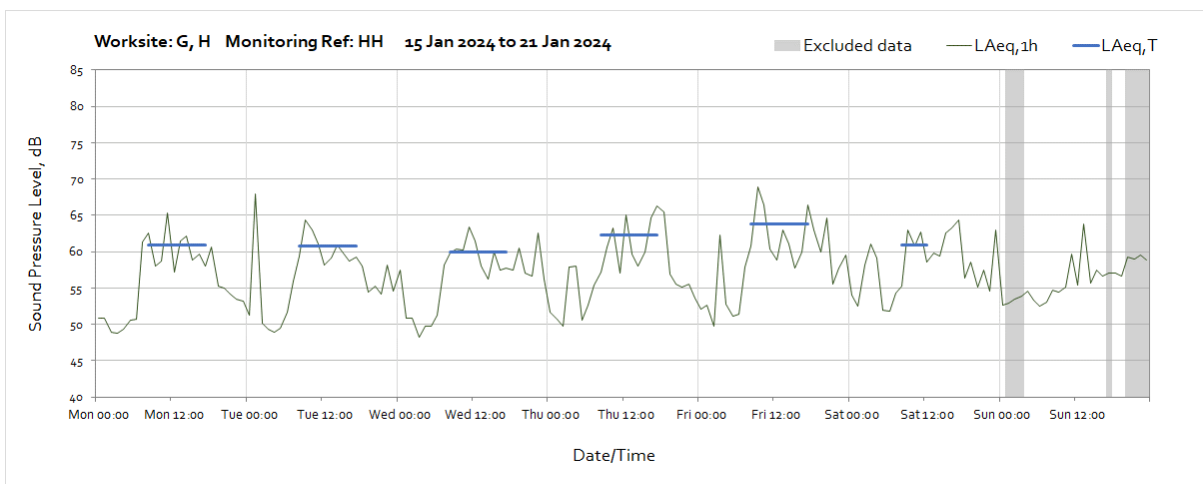
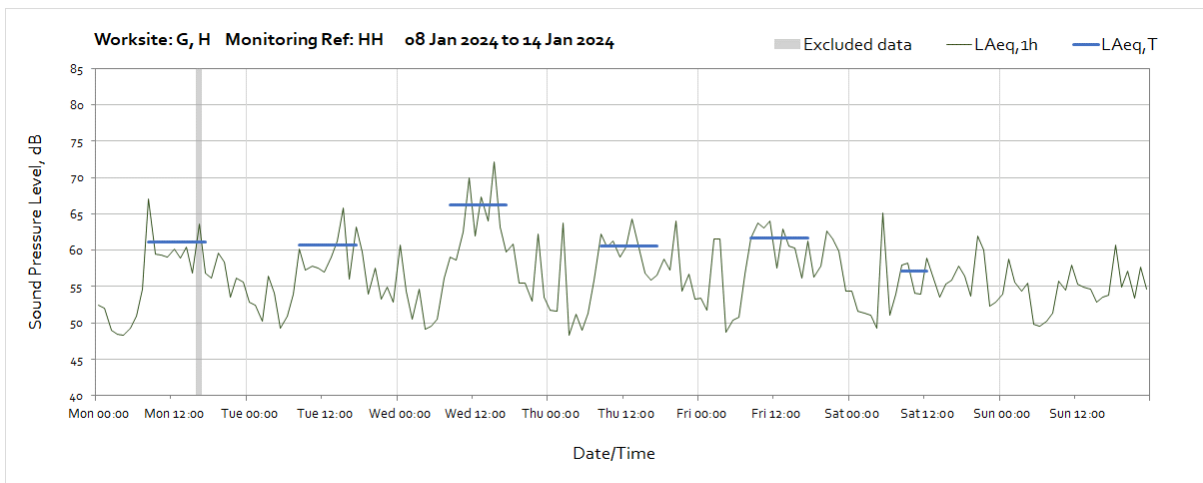
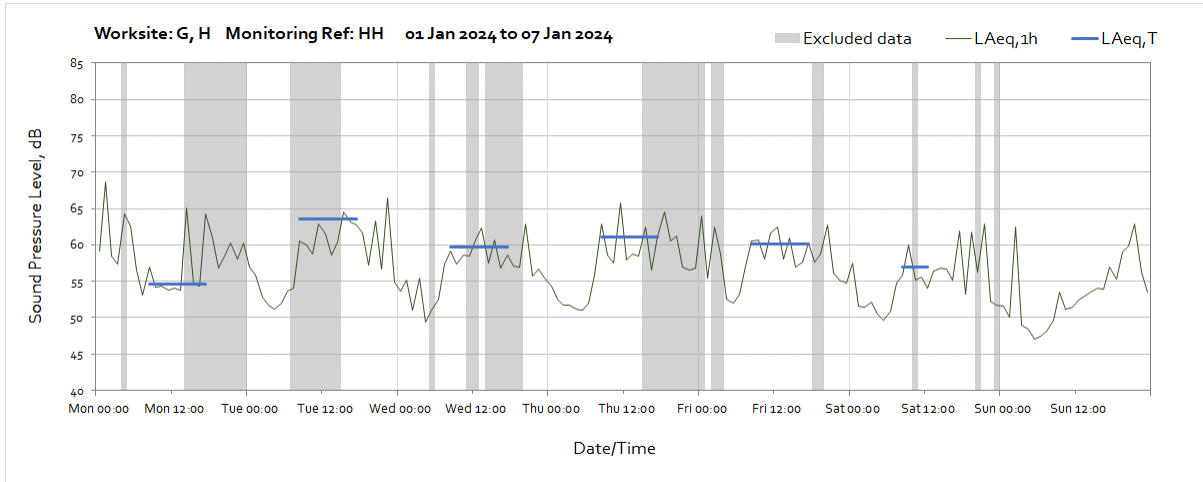


Worksite: ESB & GTB, PVE, E – Monitoring Ref: CR

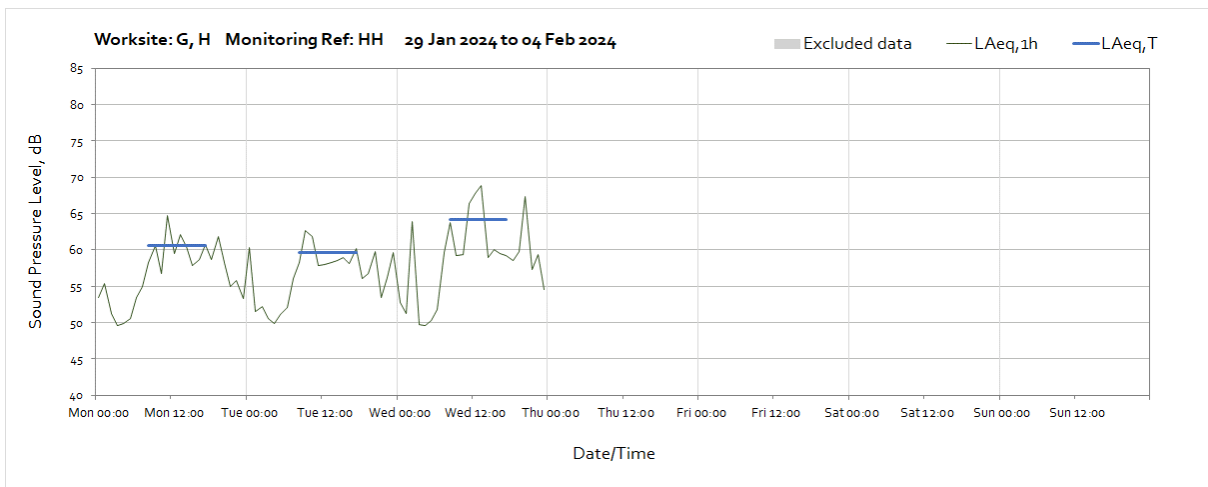
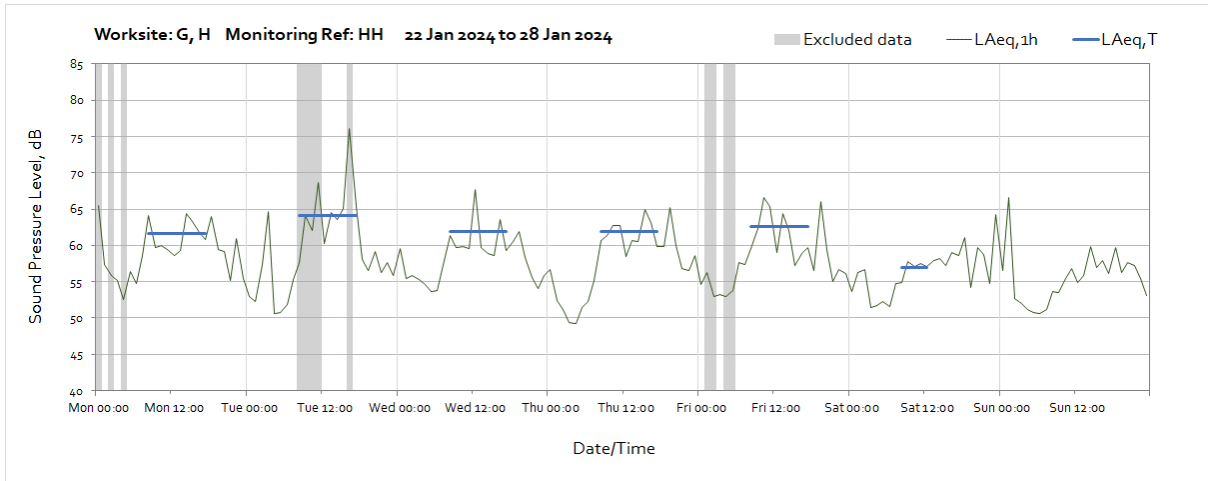




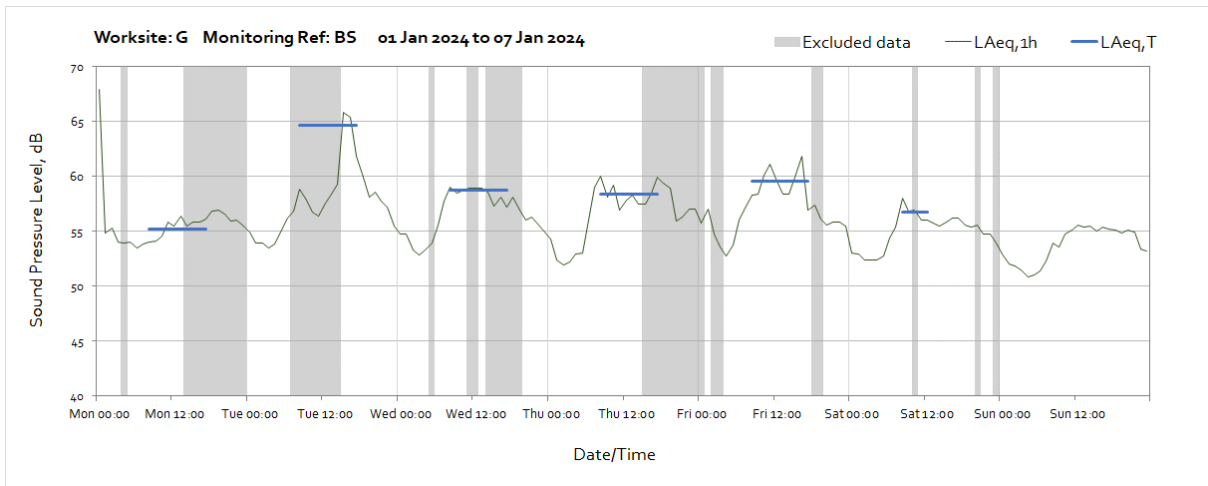
Worksite: G, H – Monitoring Ref: HH

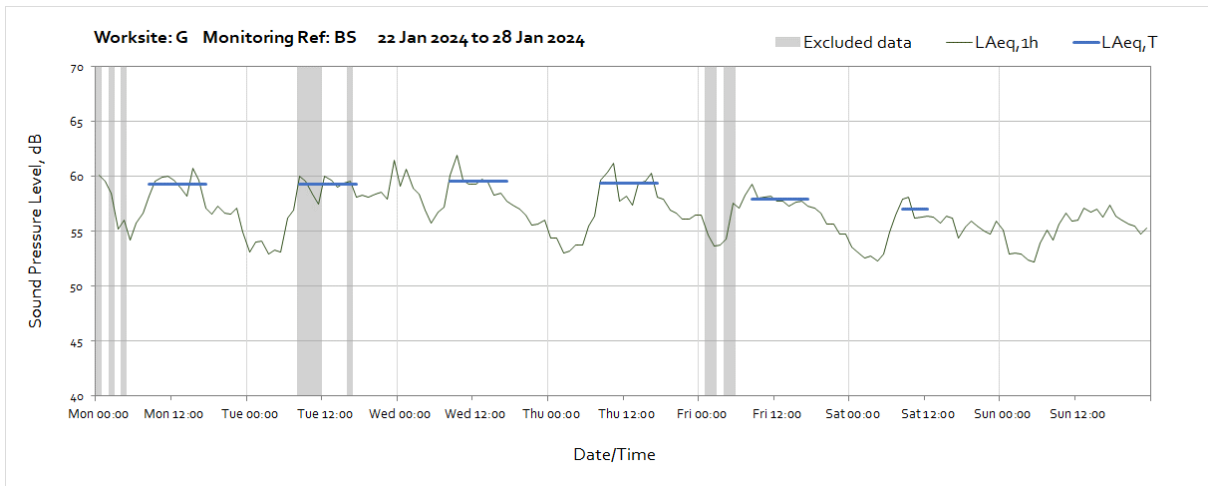
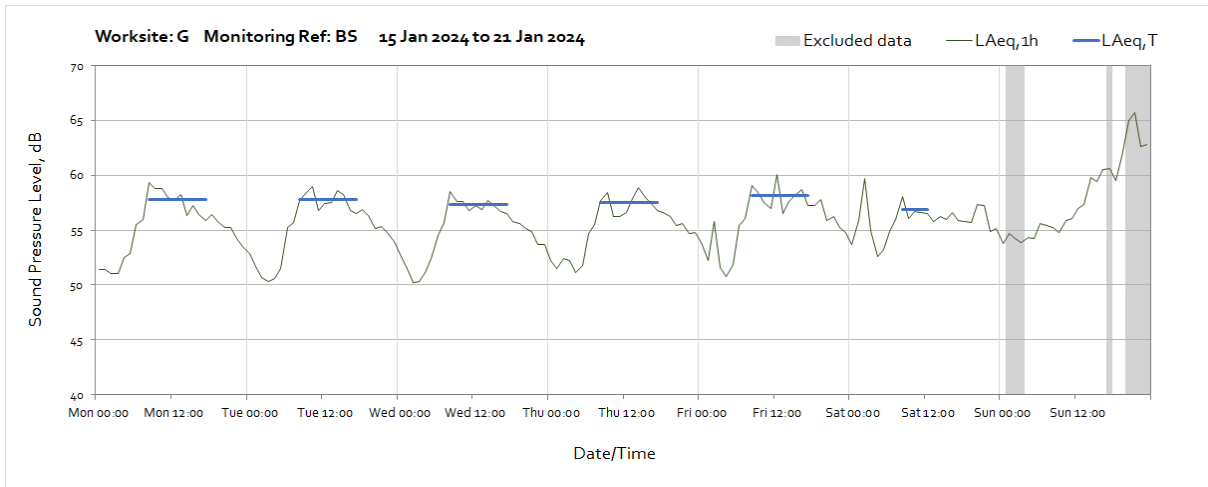
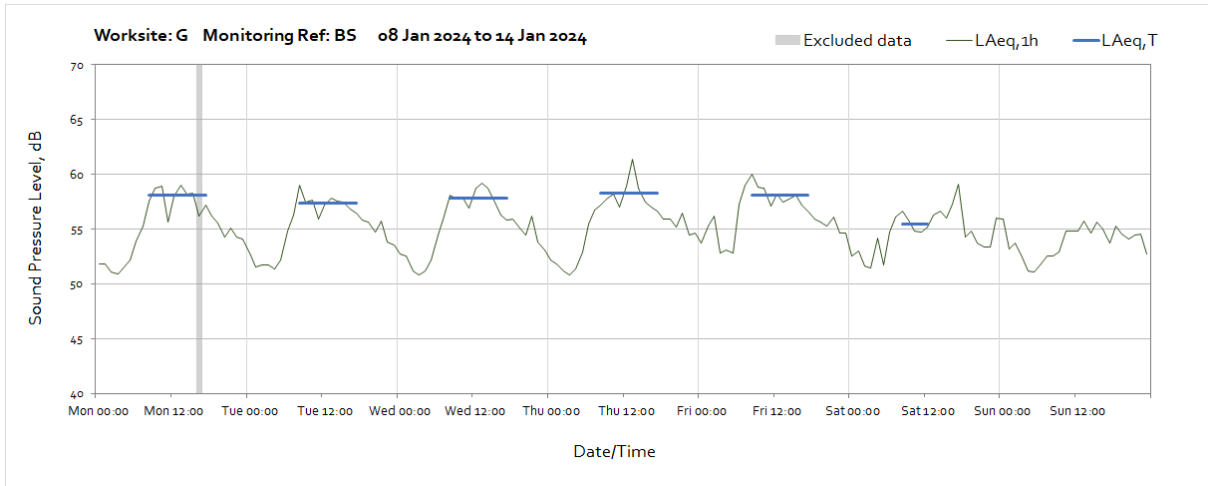


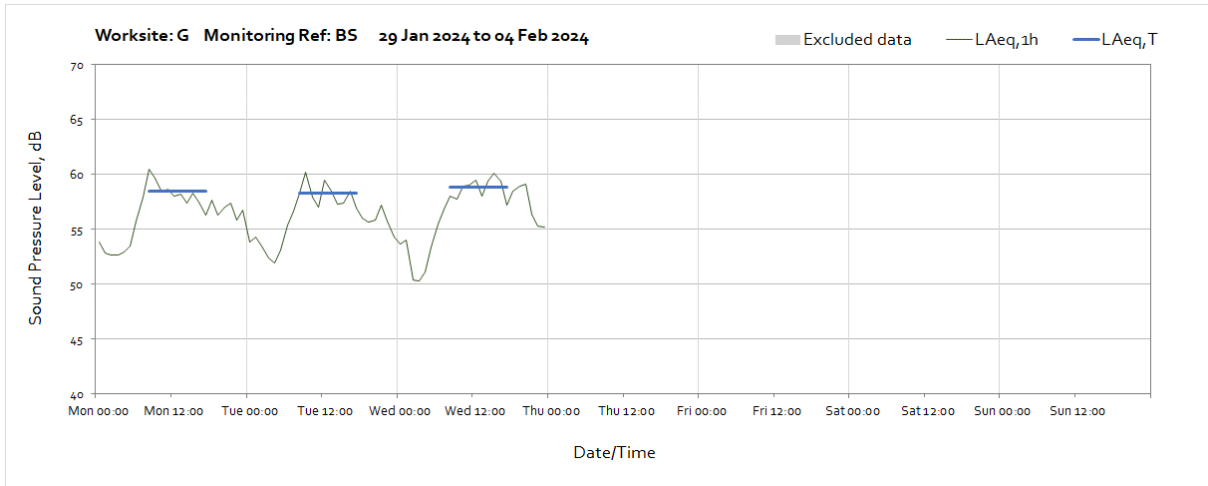
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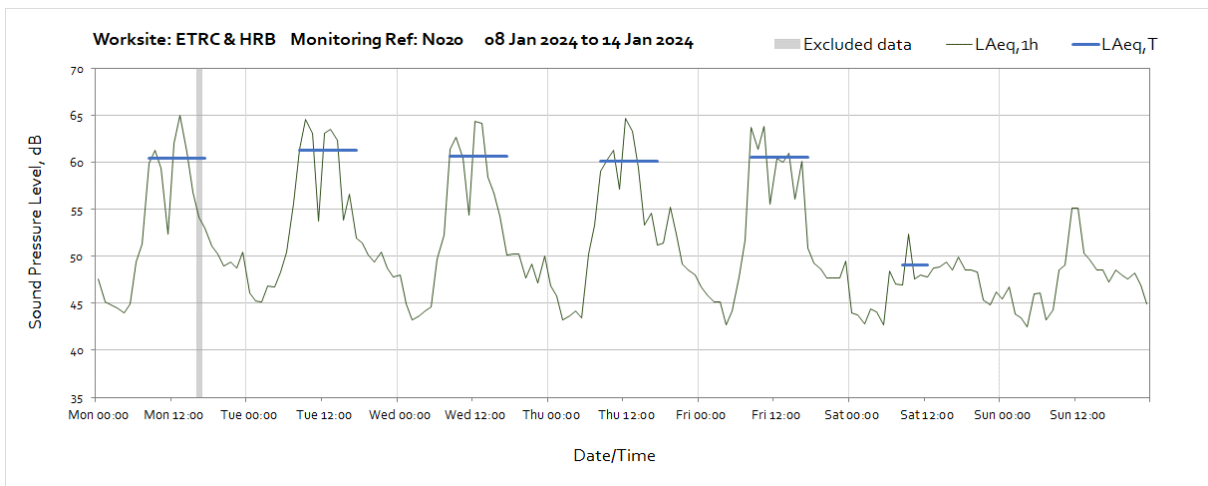
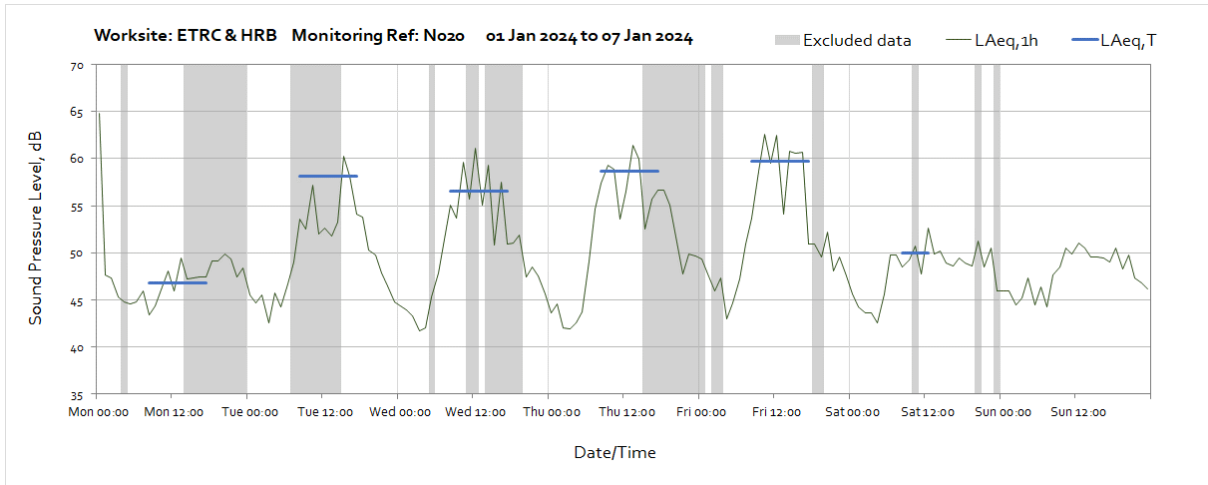
Worksite: G - Monitoring Ref: BS

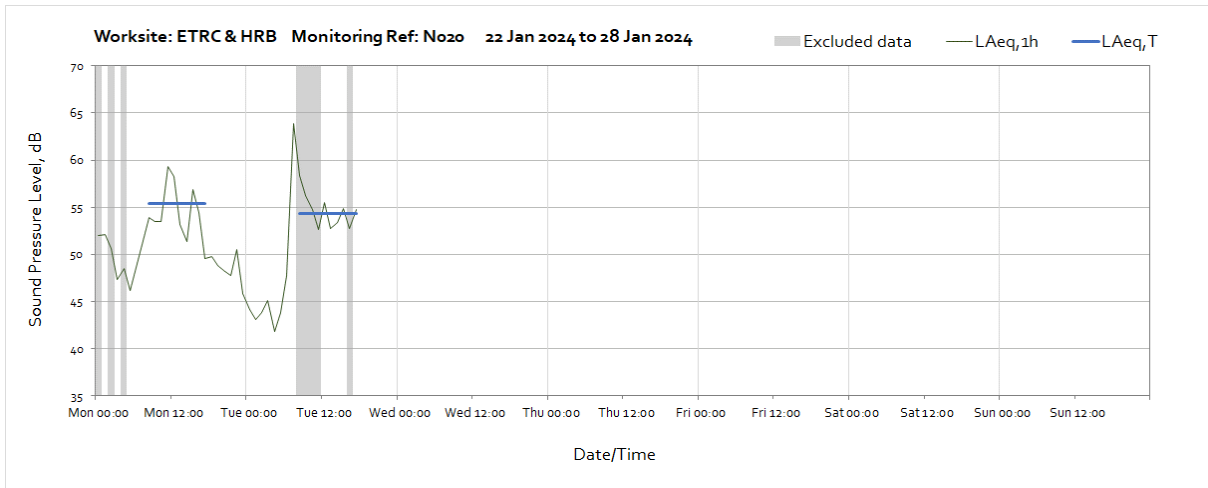
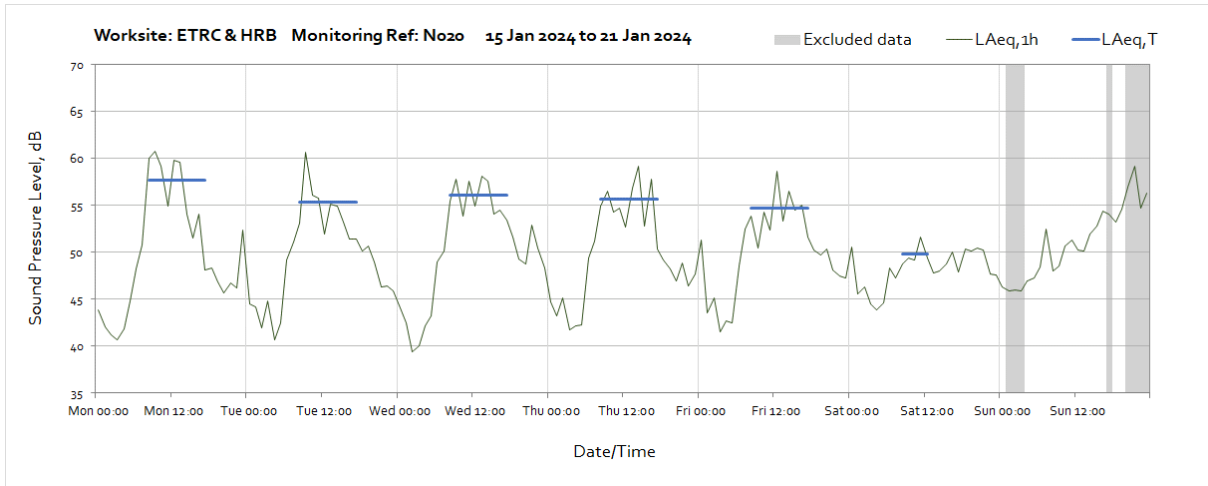






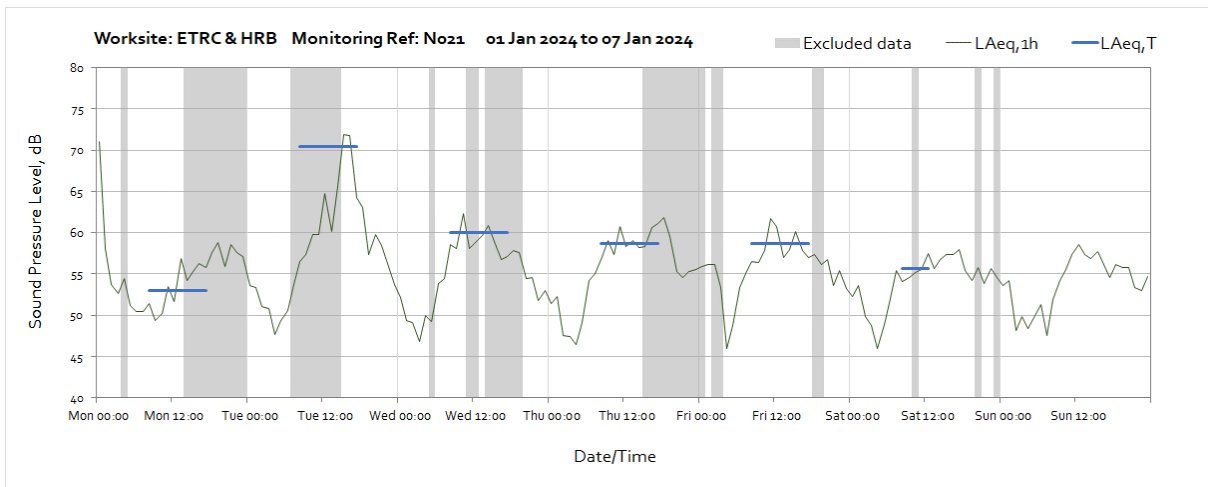
Worksite: ETRC & HRB - Monitoring Ref: N020

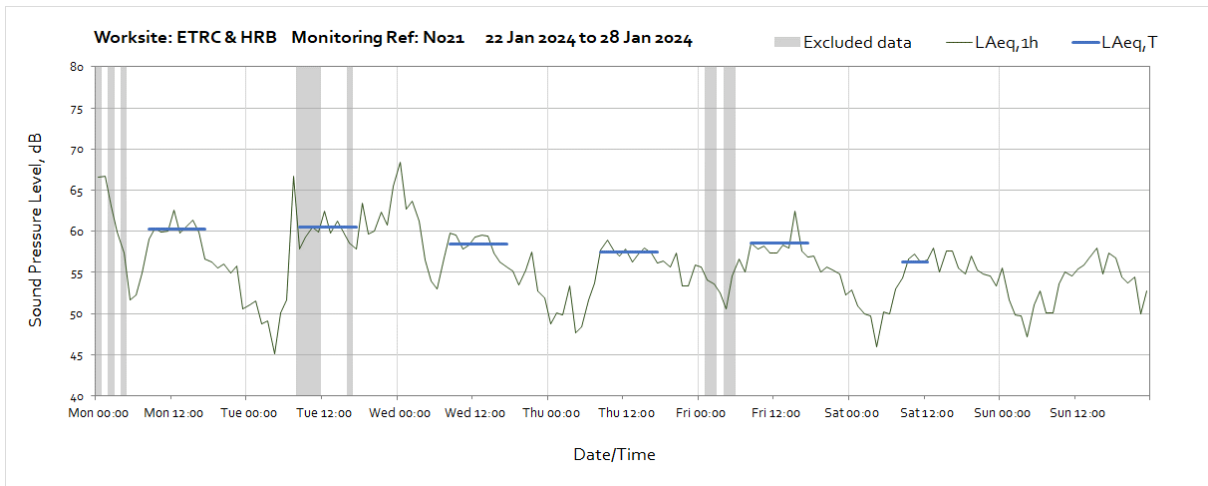
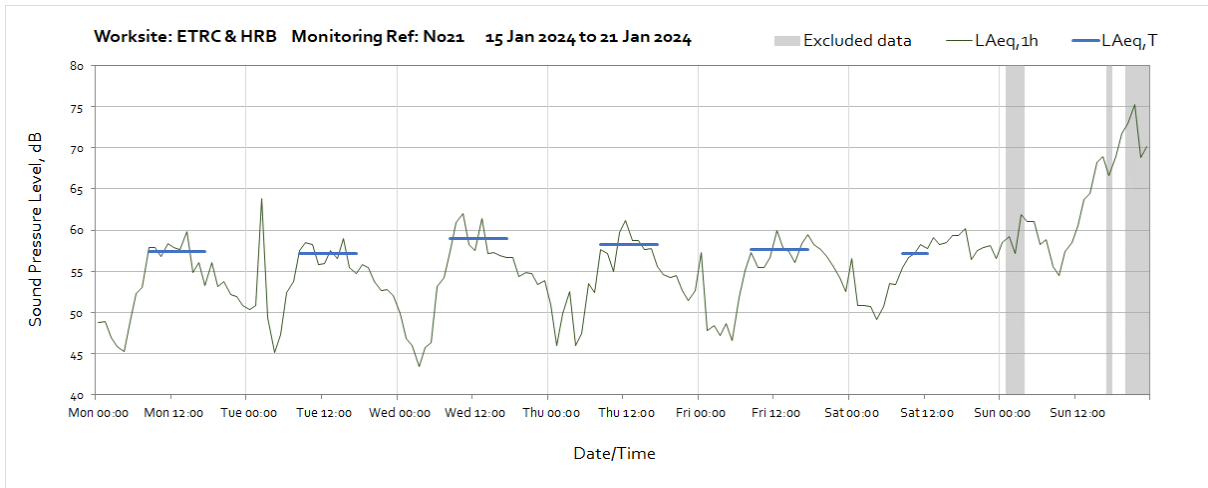
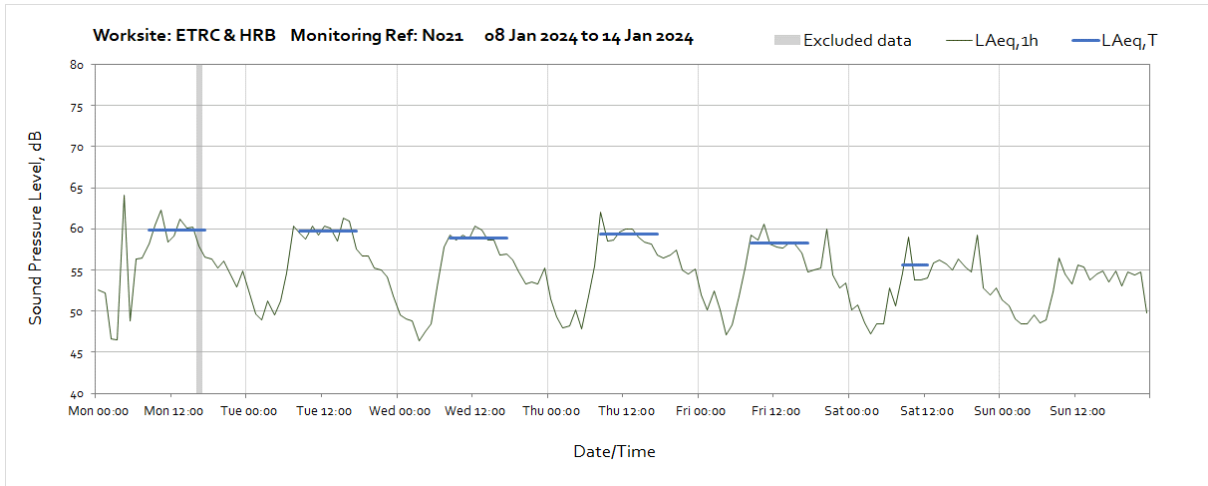


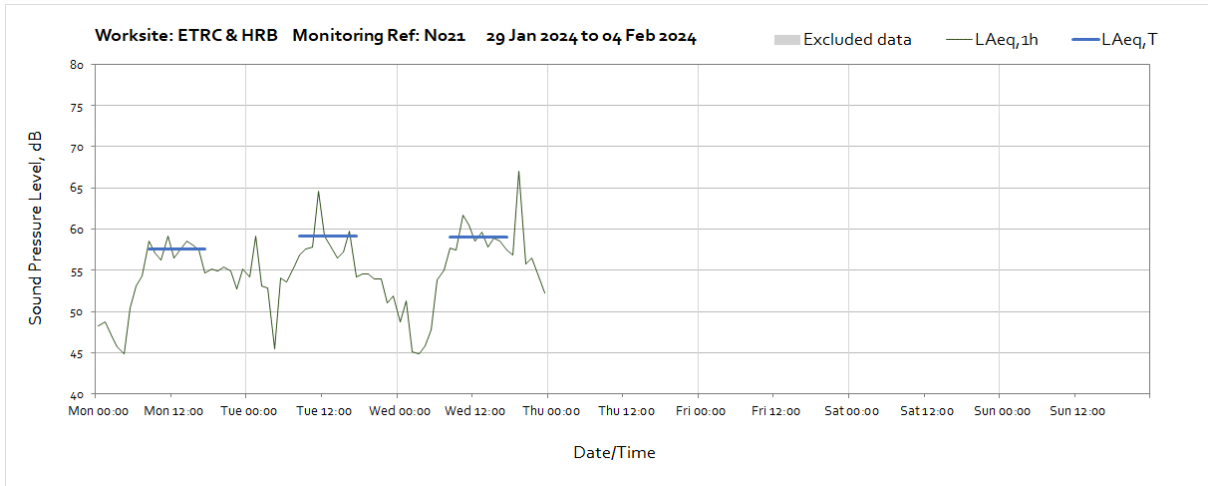


Note: Missing data from 23rd of January at 18:00 until the end of the month was due to memory card failure.

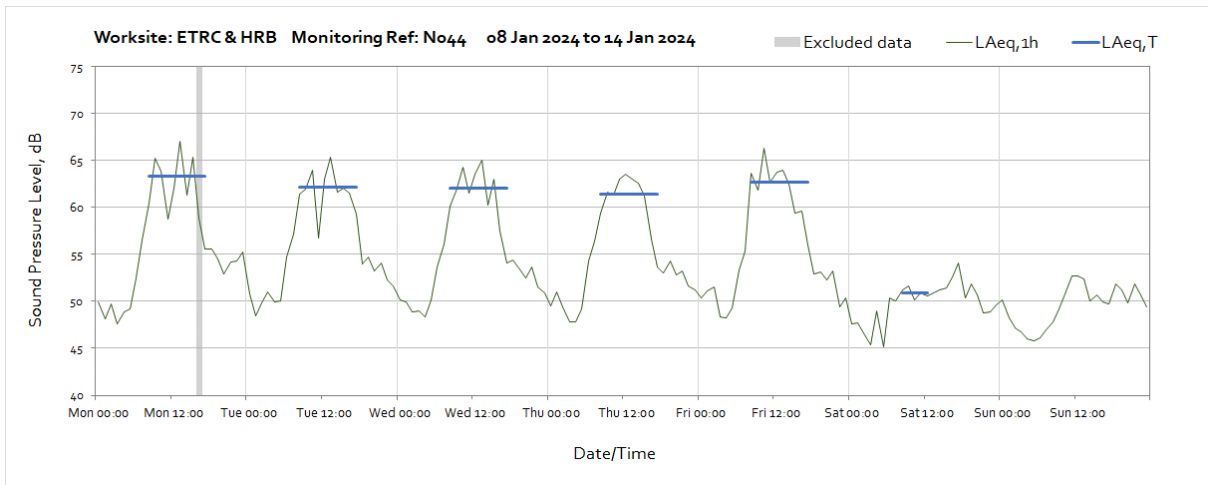
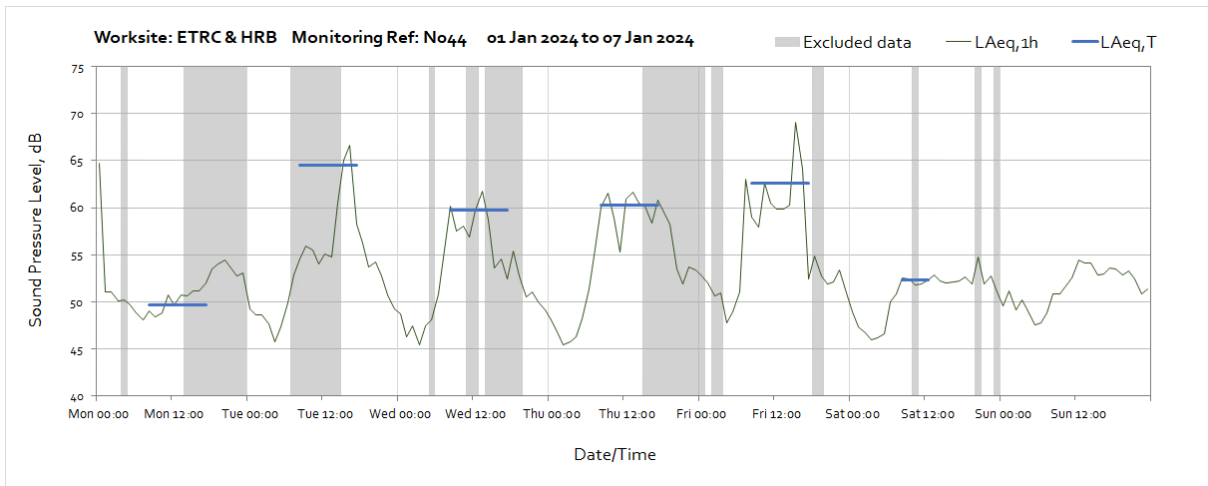
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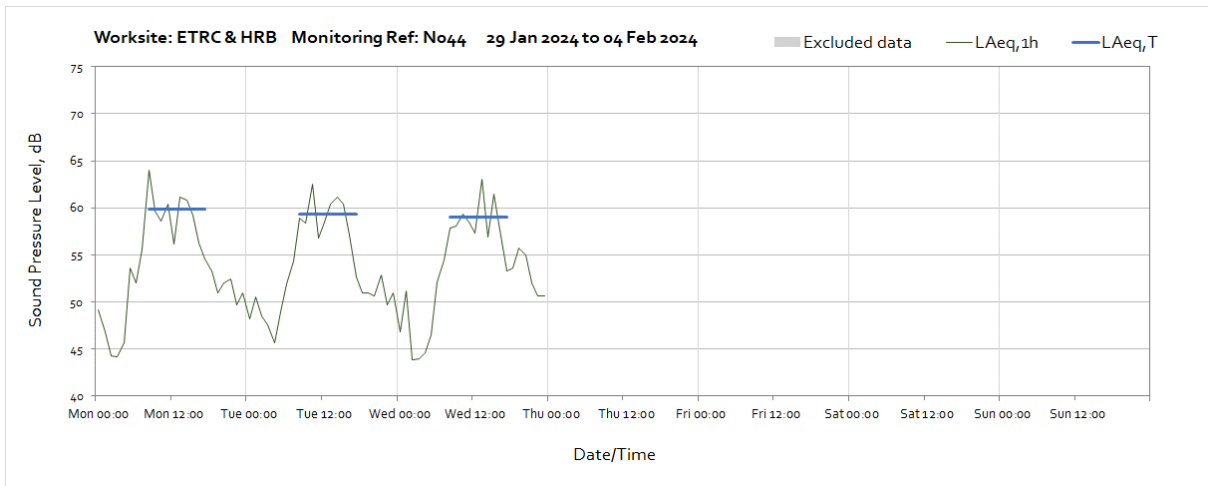
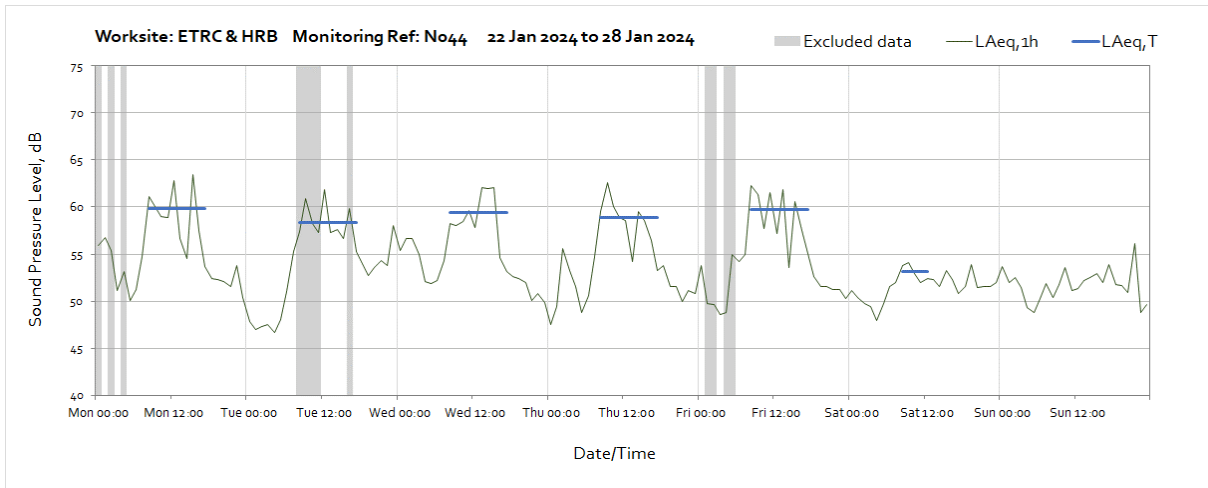
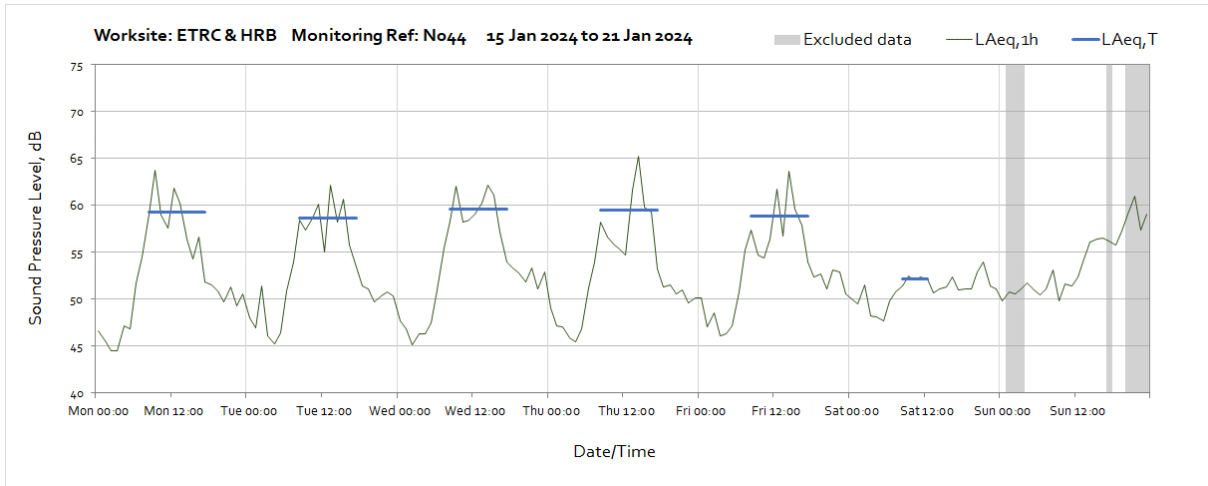




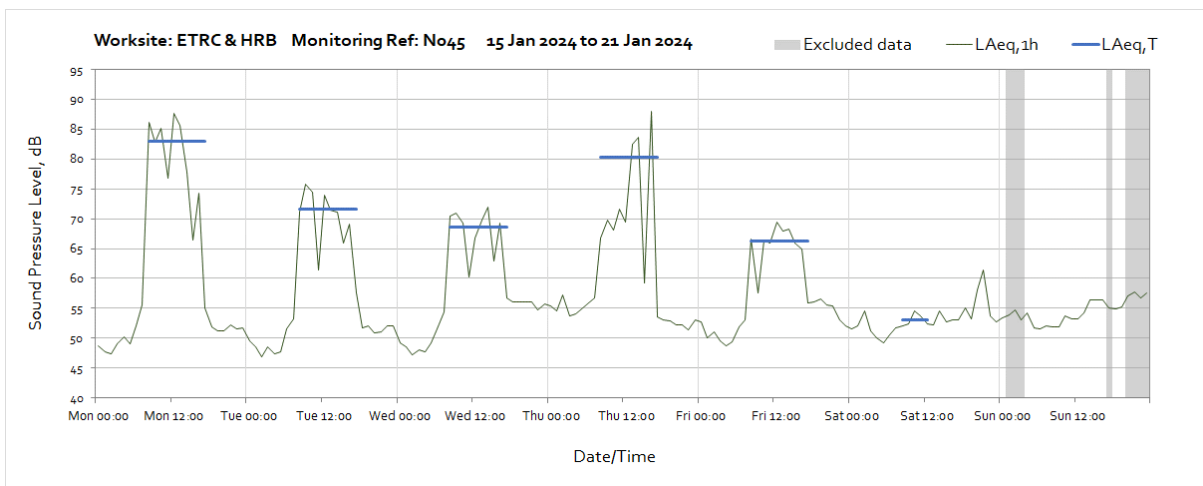
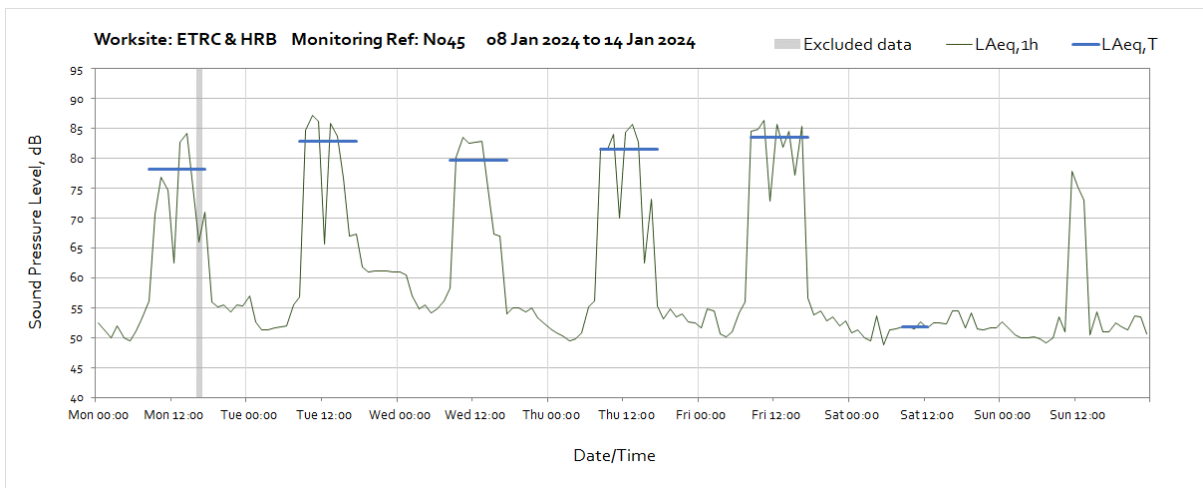
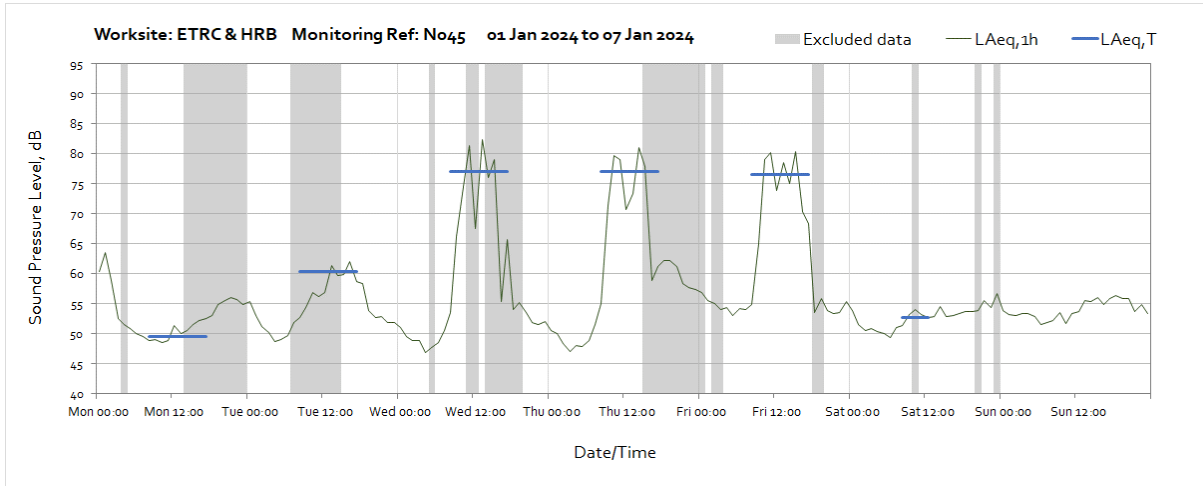


Worksite: ETRC & HRB - Monitoring Ref: N044

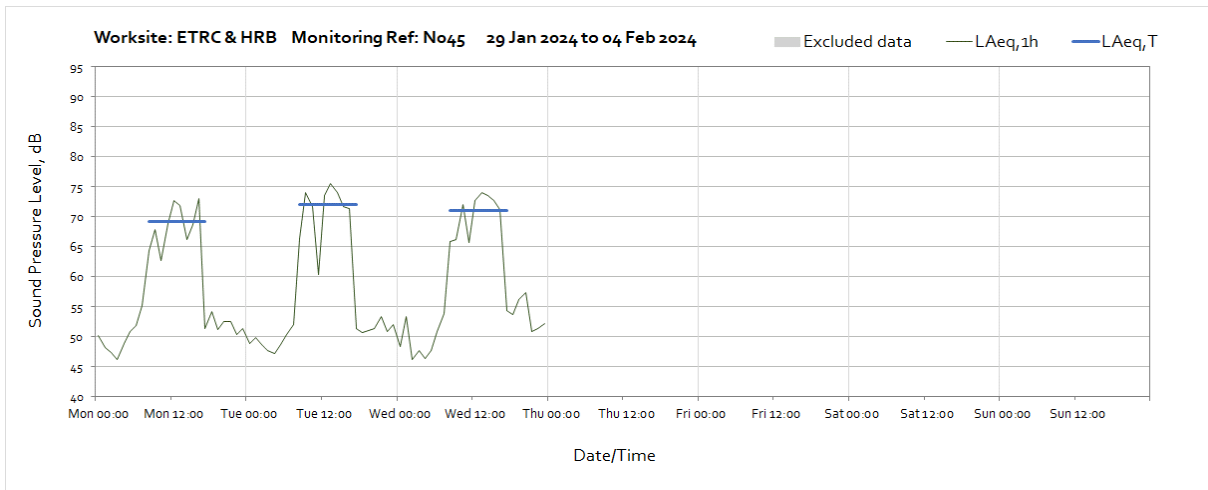
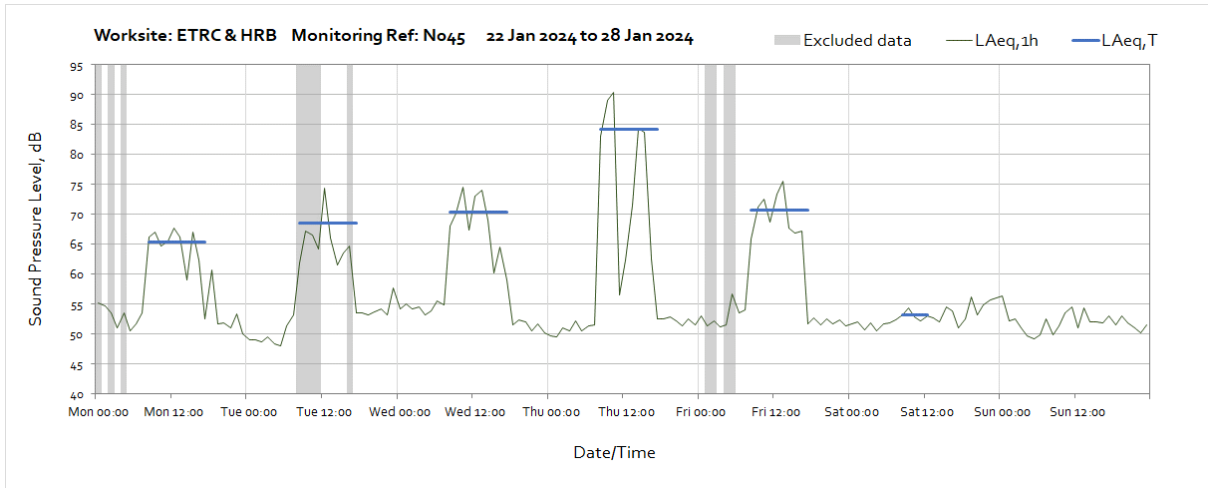




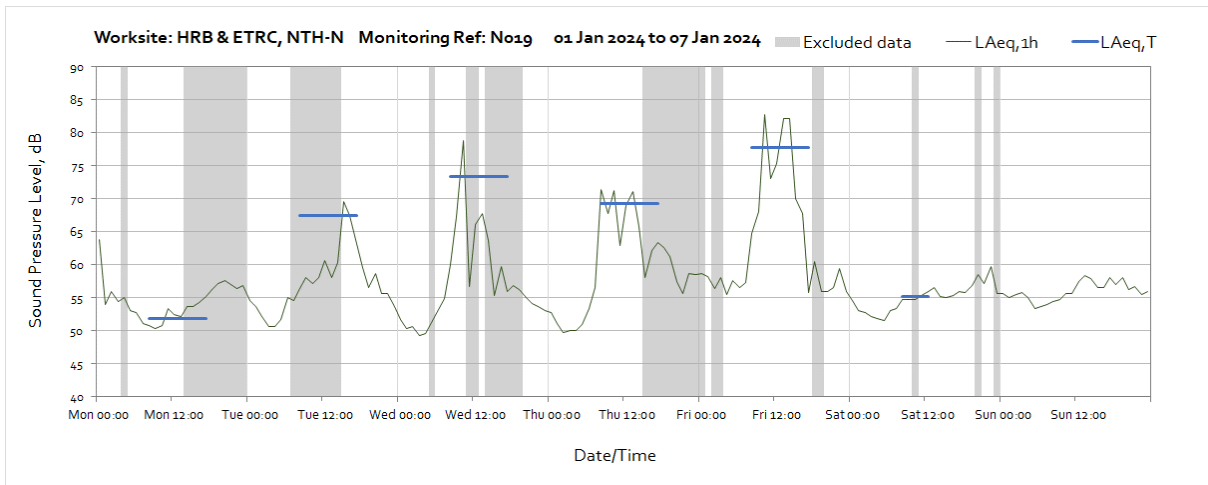
Worksite: ETRC & HRB – Monitoring Ref: N045

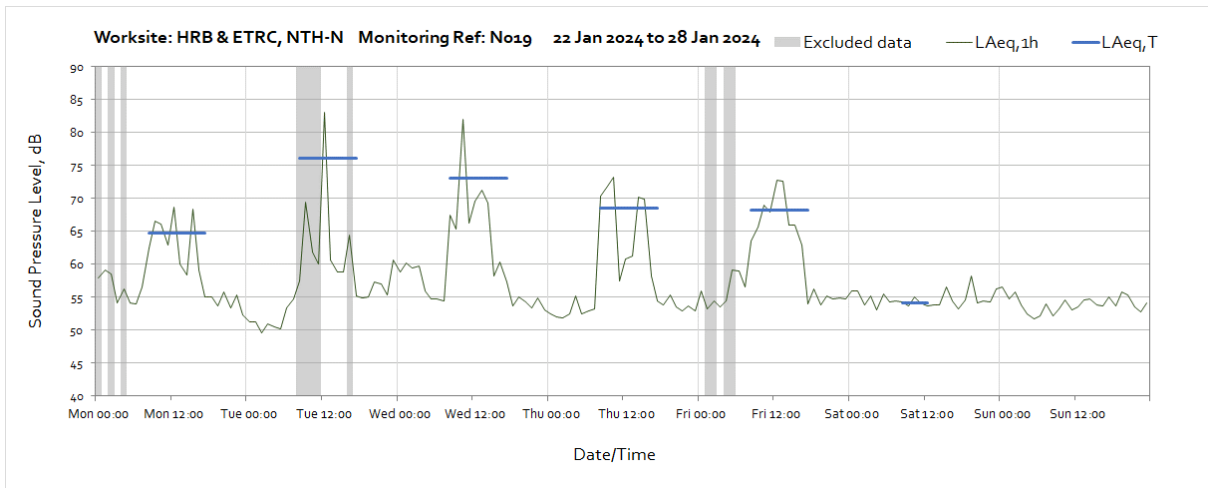
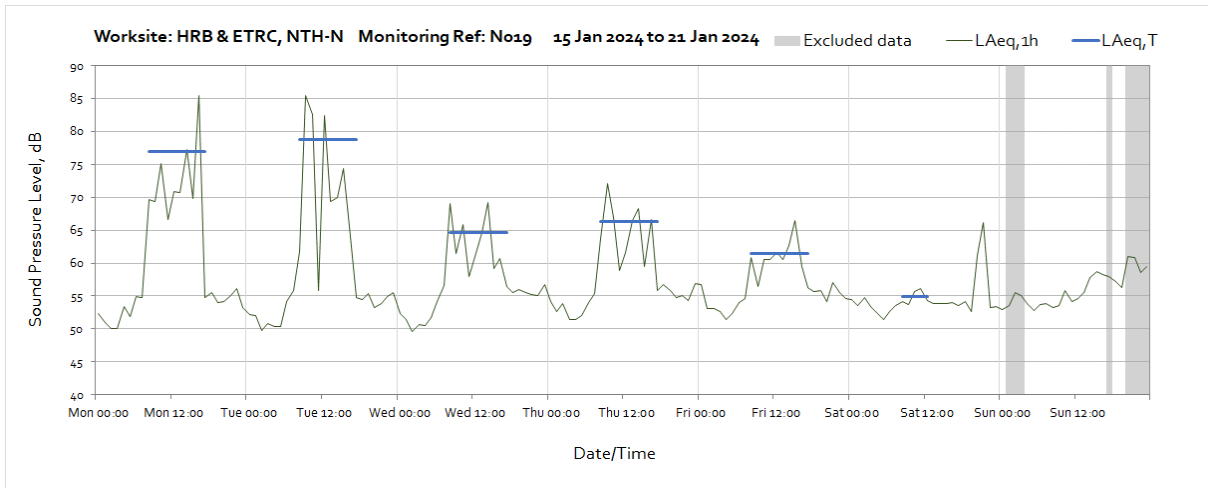
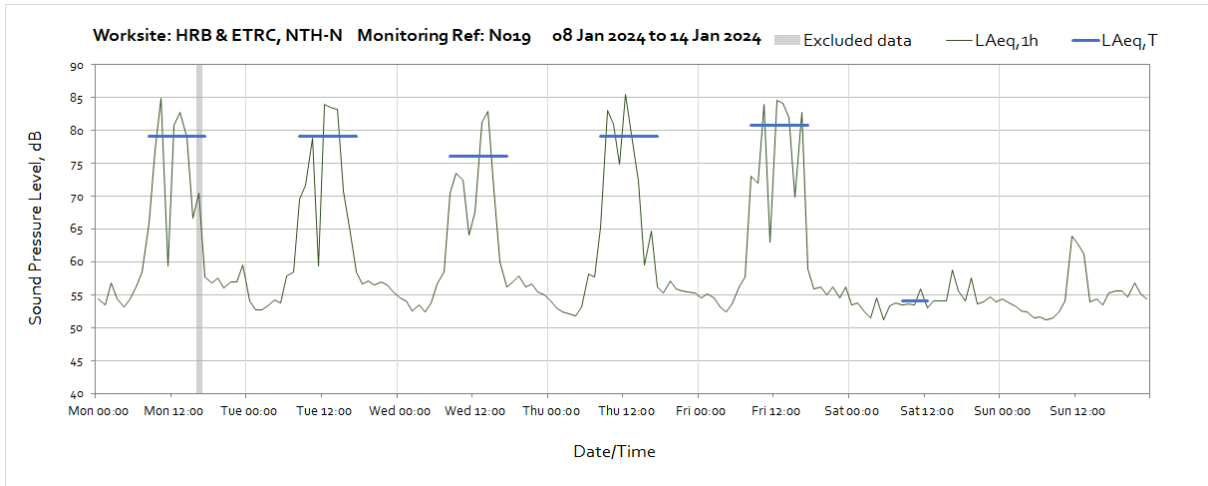


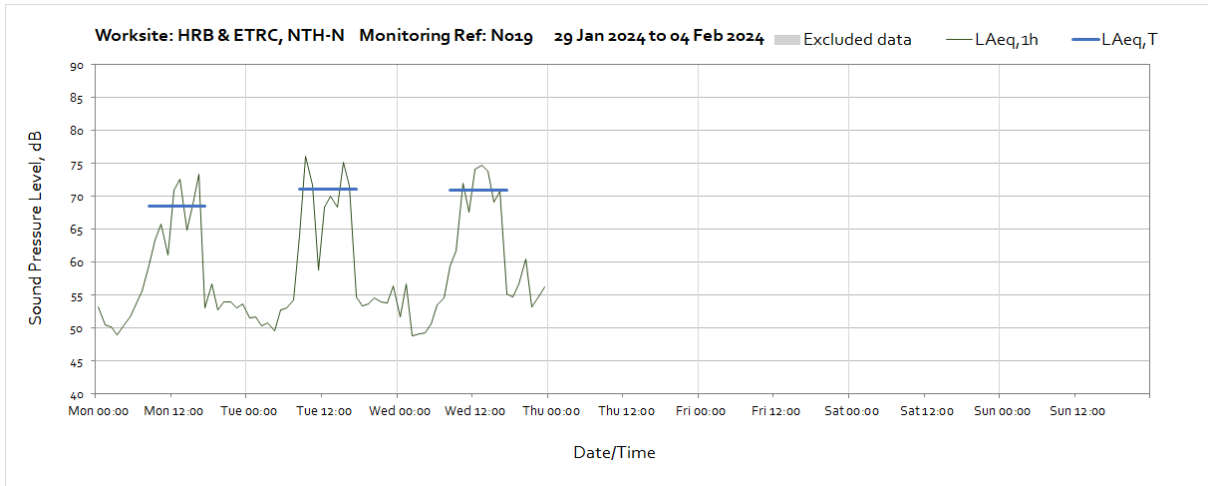
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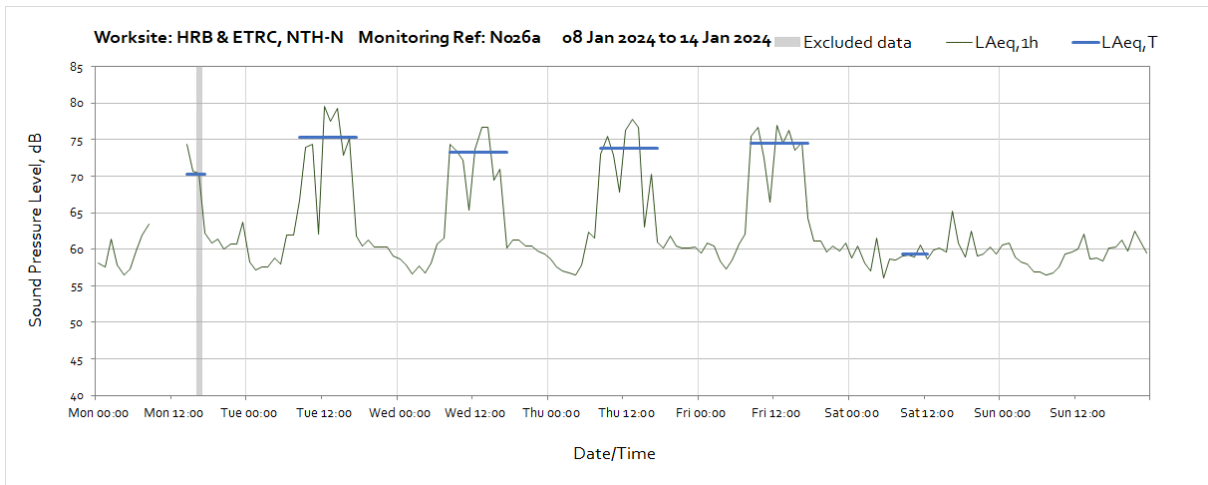
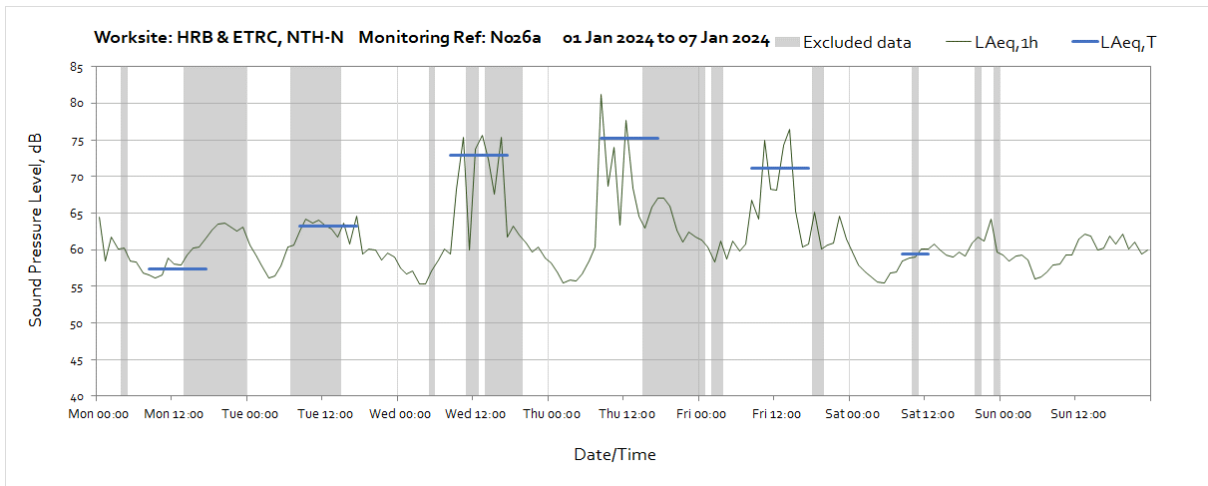
Worksite: HRB & ETRC, NTH-N - Monitoring Ref: N019





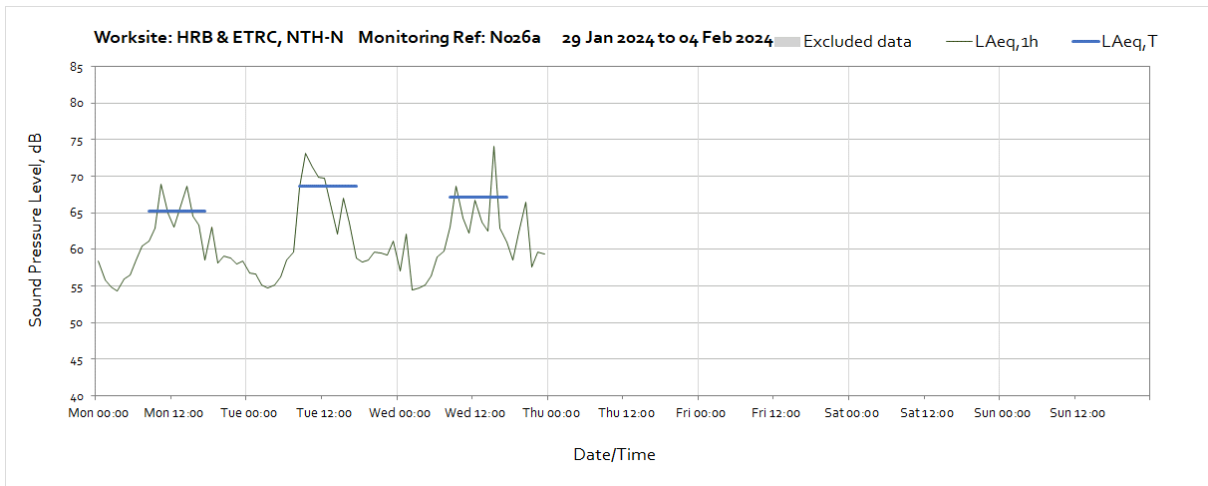
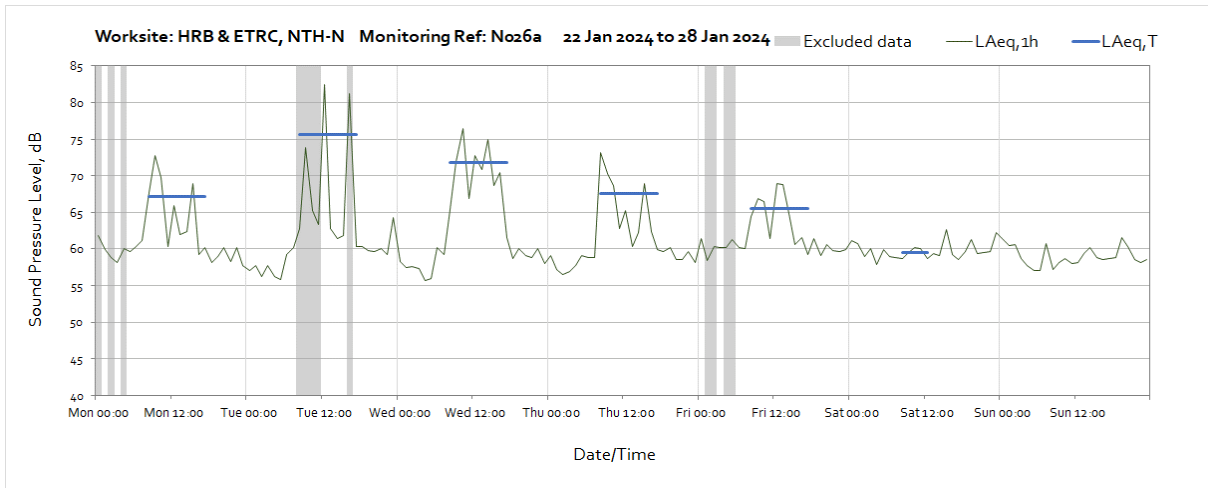
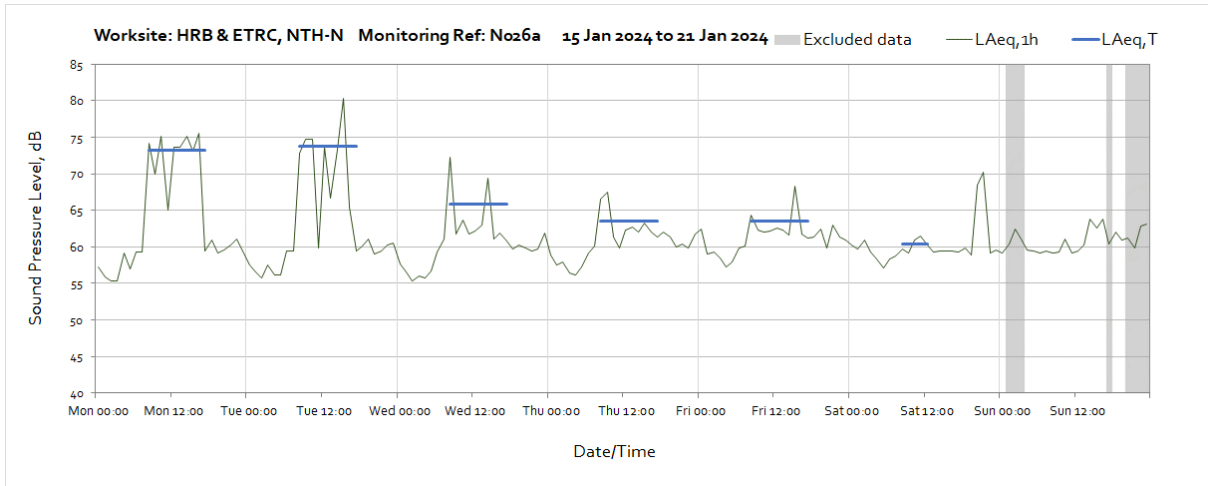


Worksite: HRB & ETRC, NTH-N – Monitoring Ref: N026a

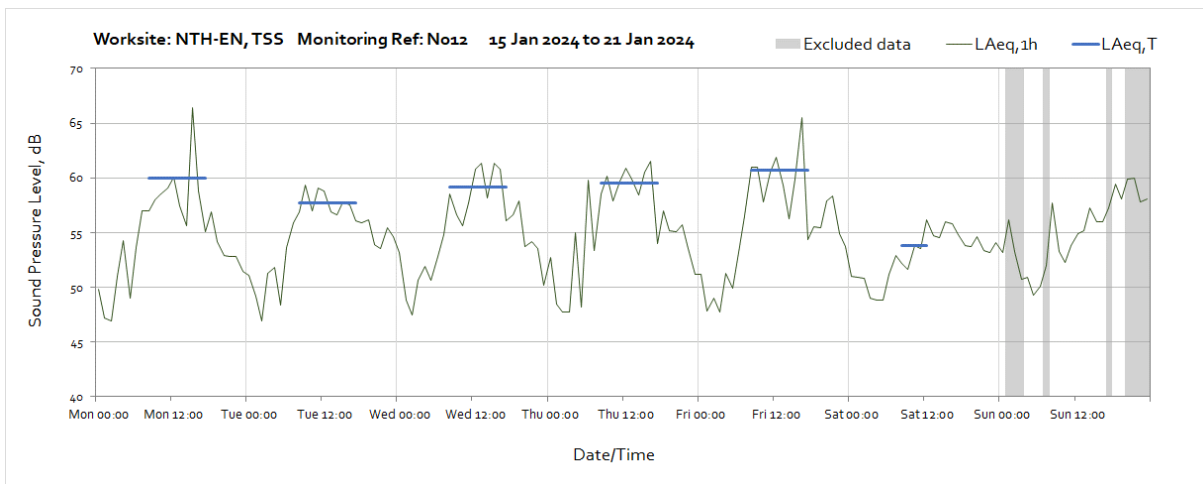
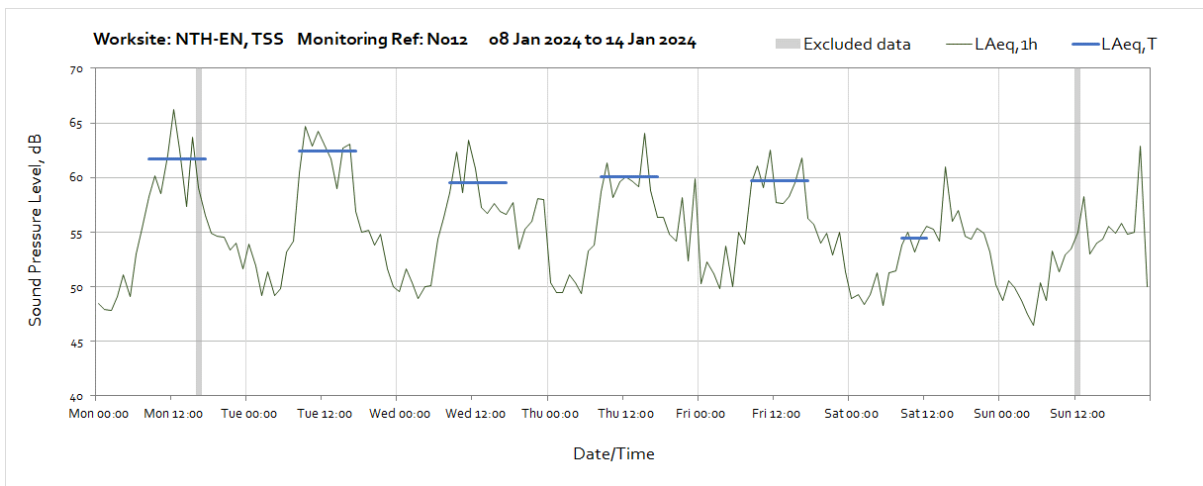
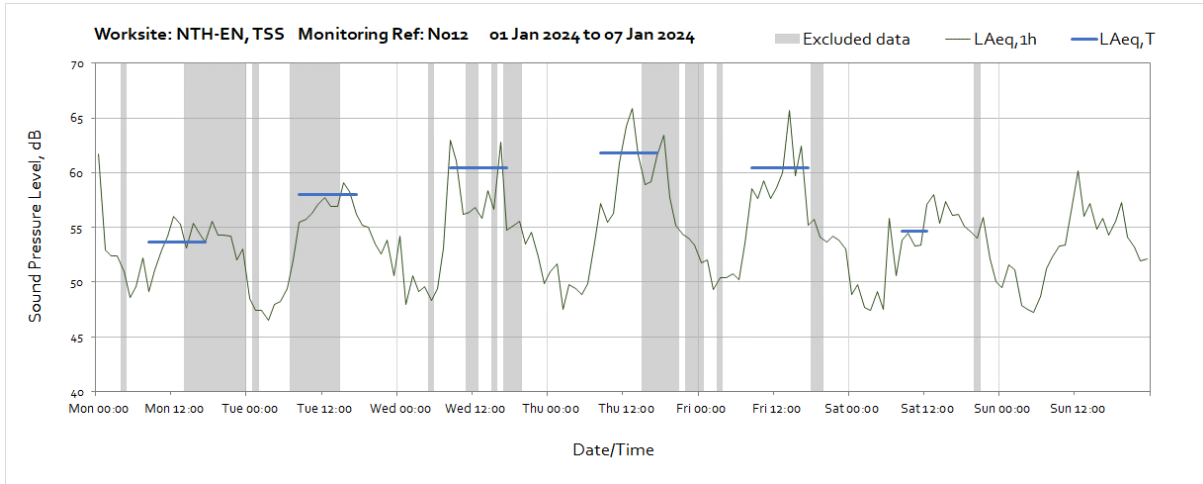


Note: Missing data on 08th of January from 09:00 until 13:00 was due to loss of power at monitoring station.

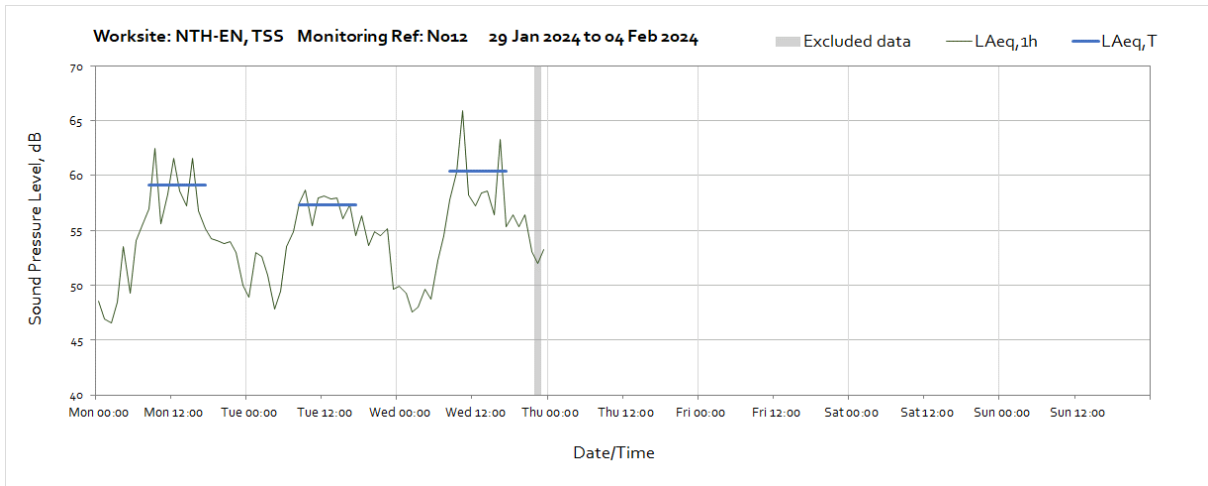
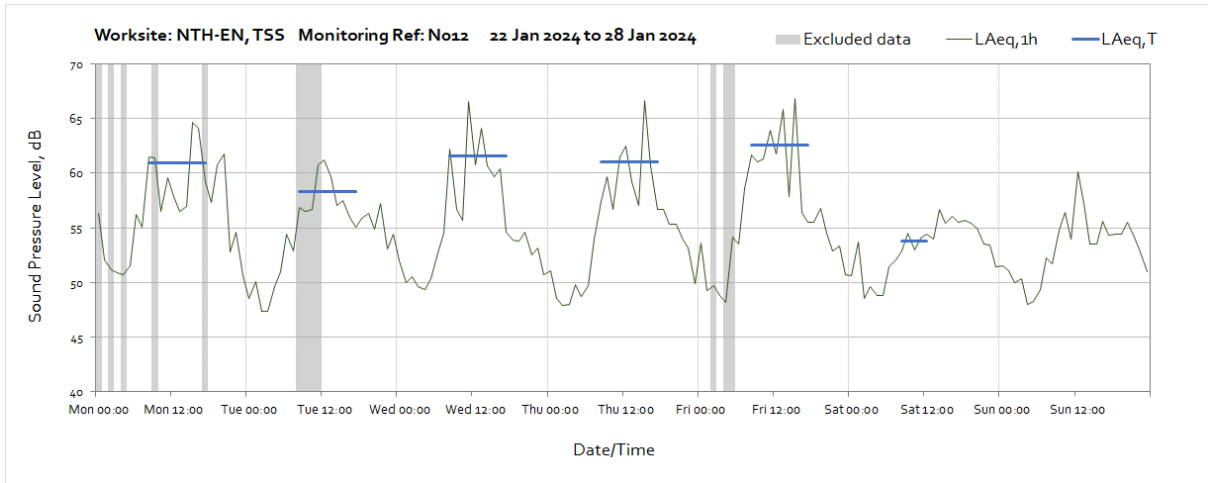
OFFICIAL



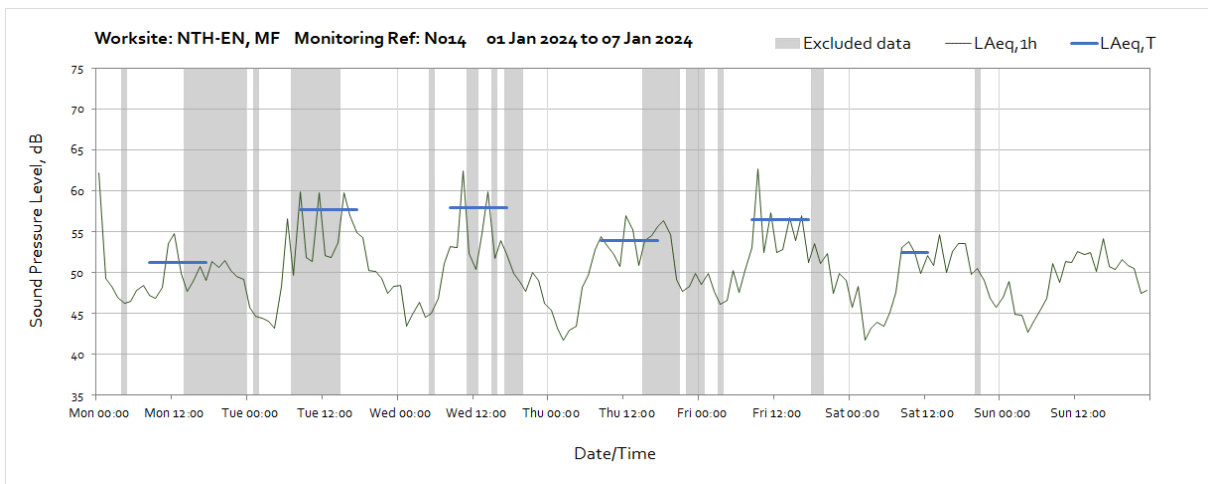
Worksite: NTH-EN, TSS - Monitoring Ref: N012

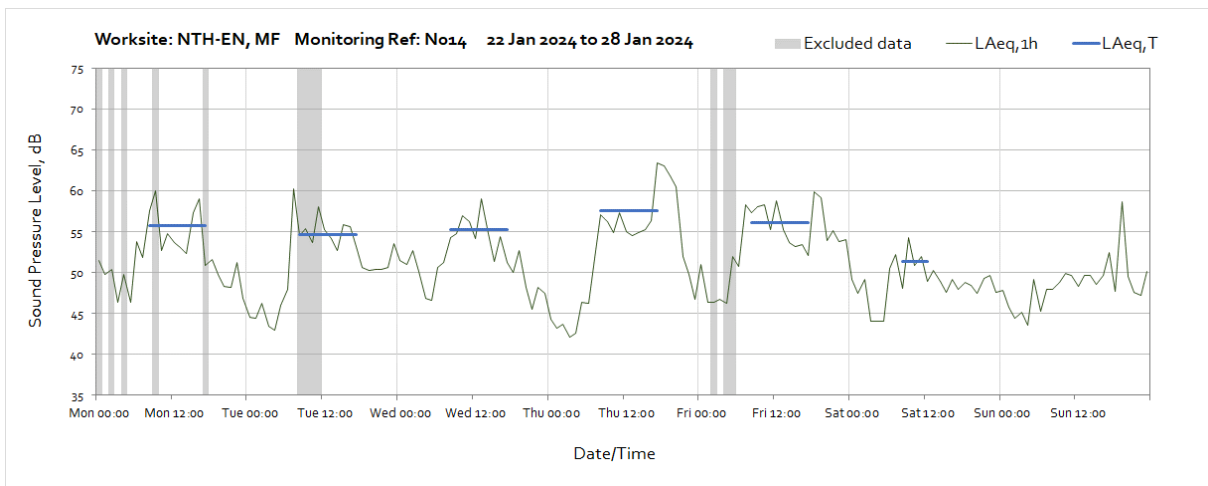
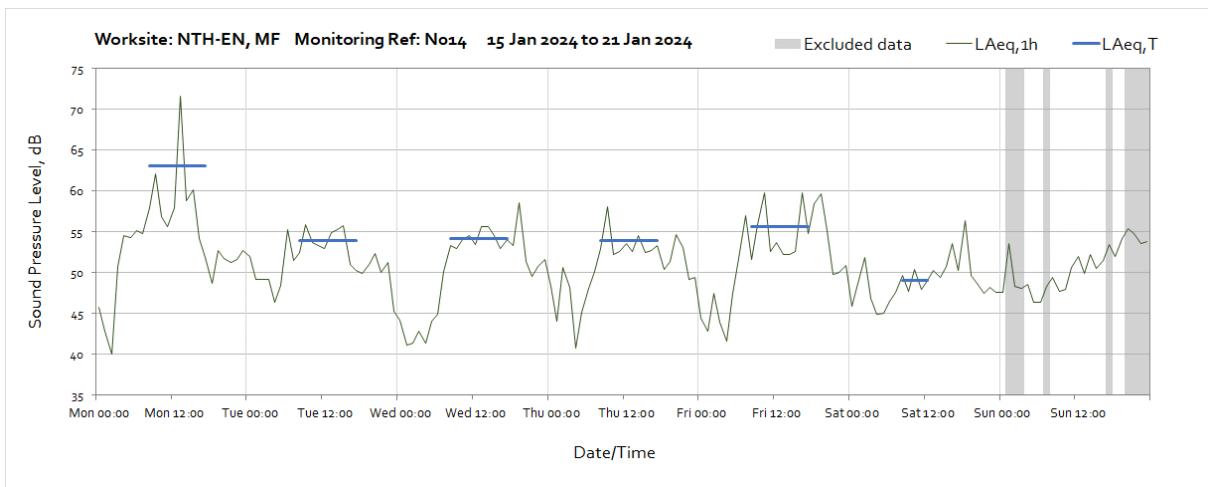
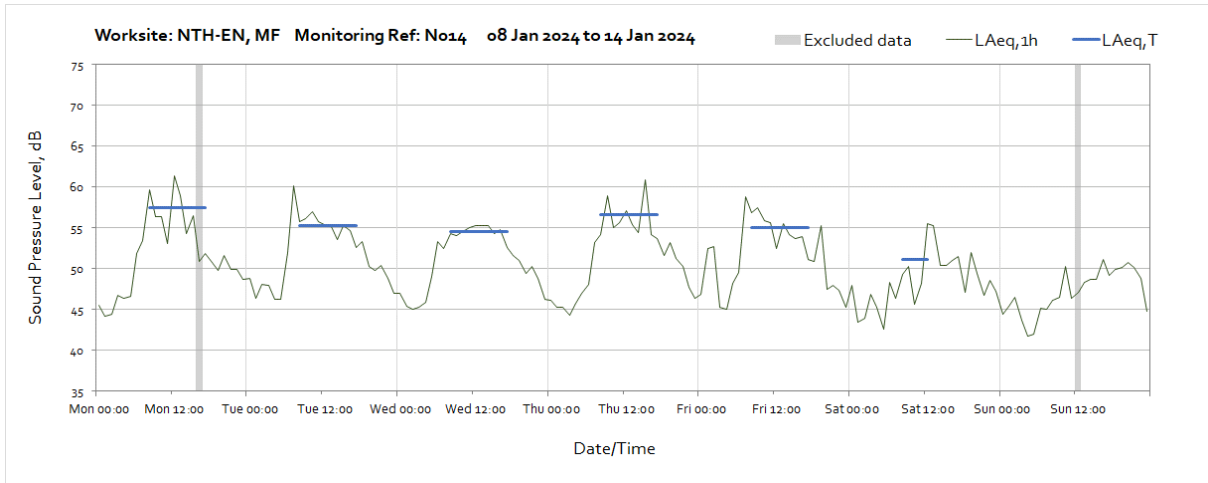


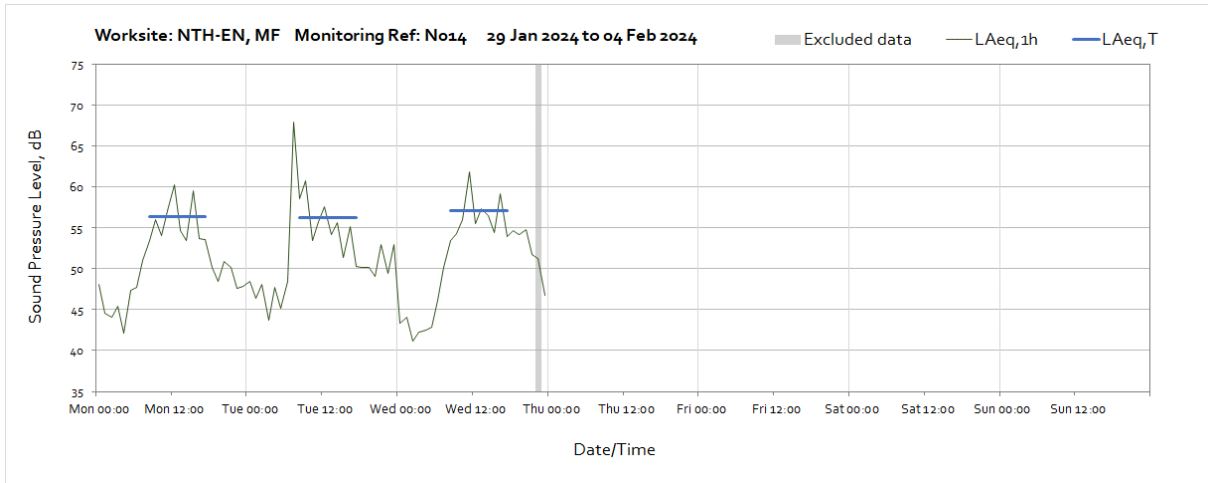
OFFICIAL



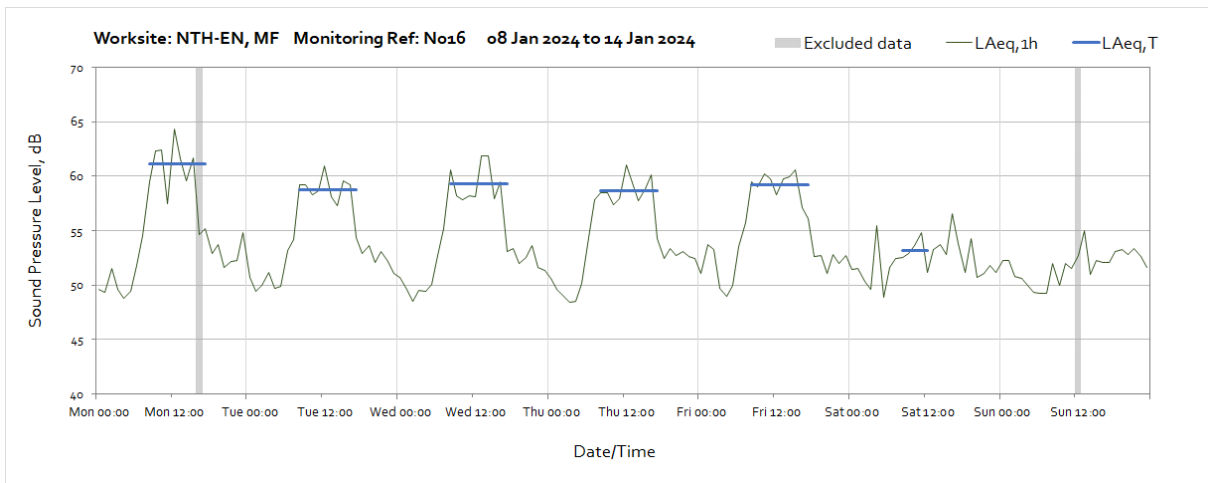
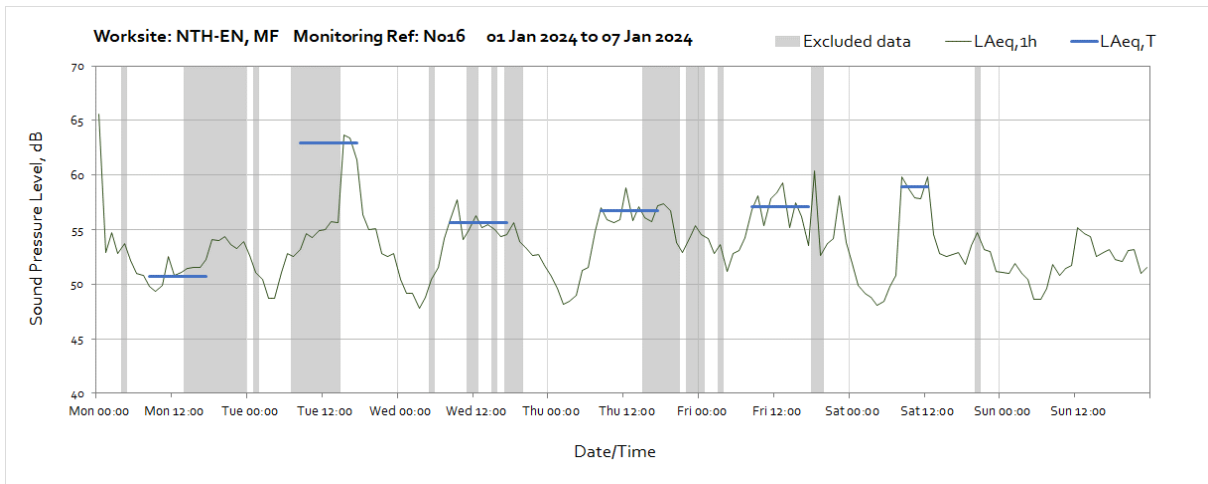
Worksite: NTH-EN, MF - Monitoring Ref: N014

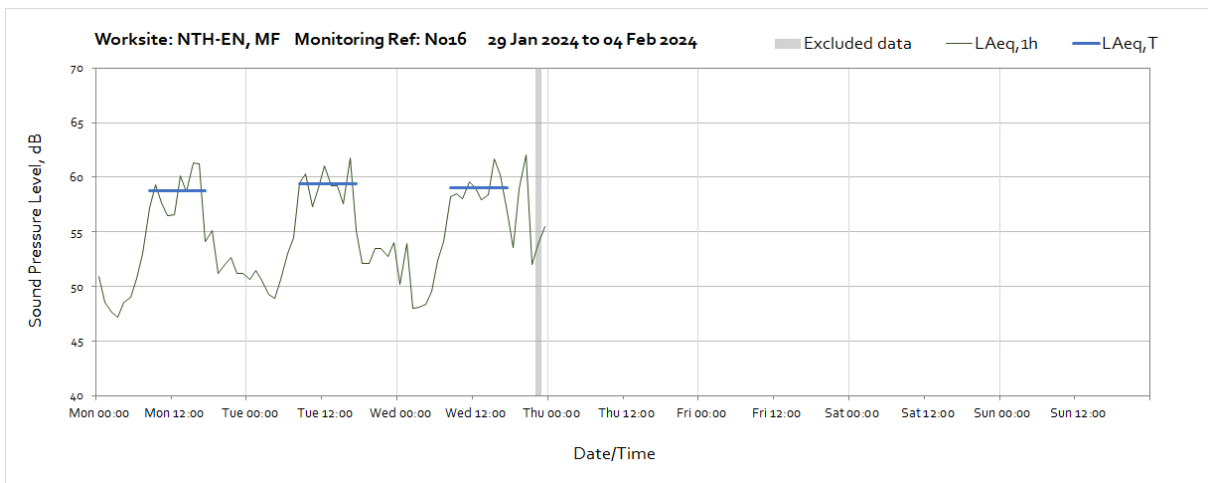
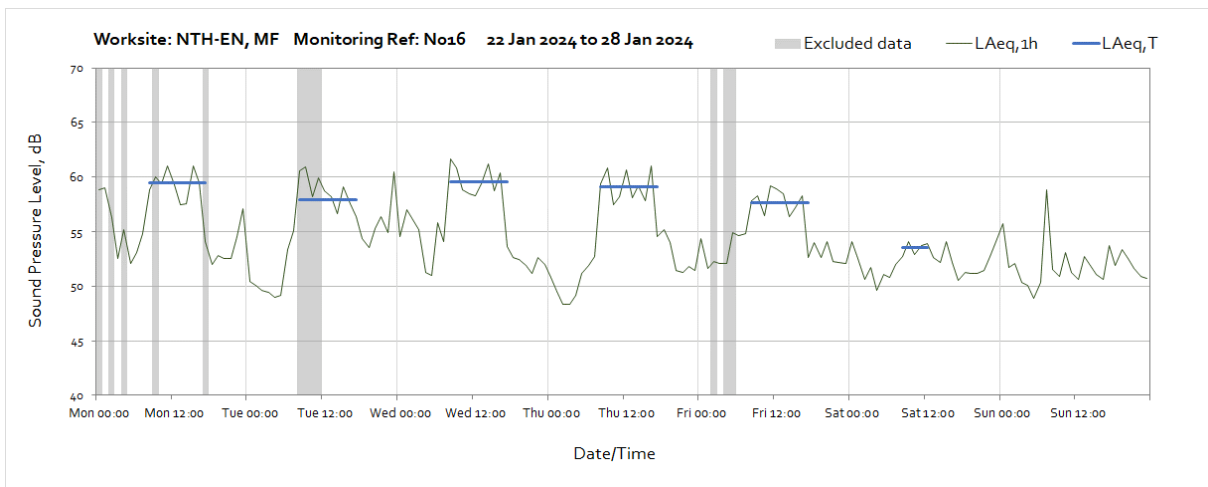
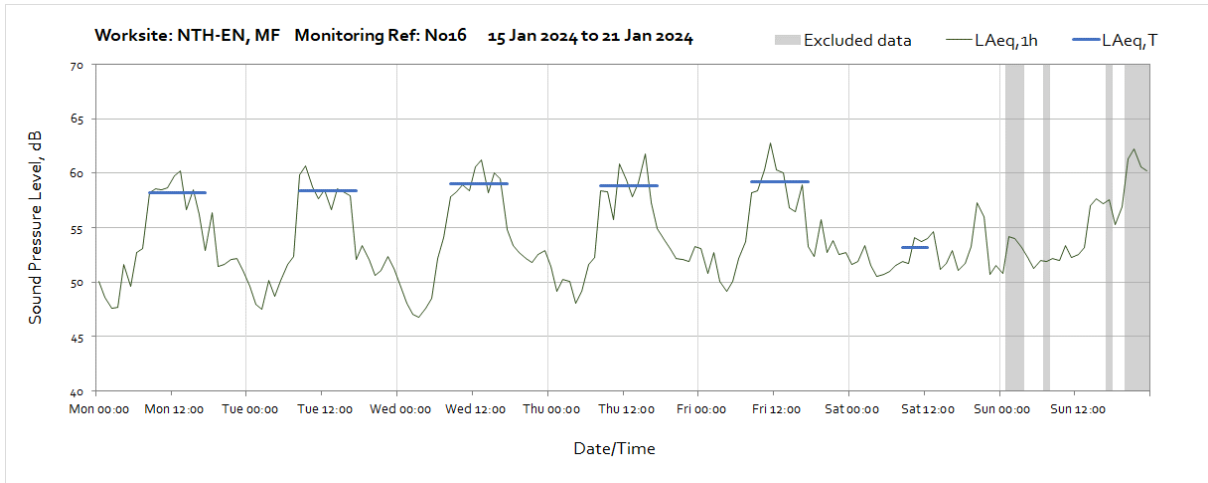




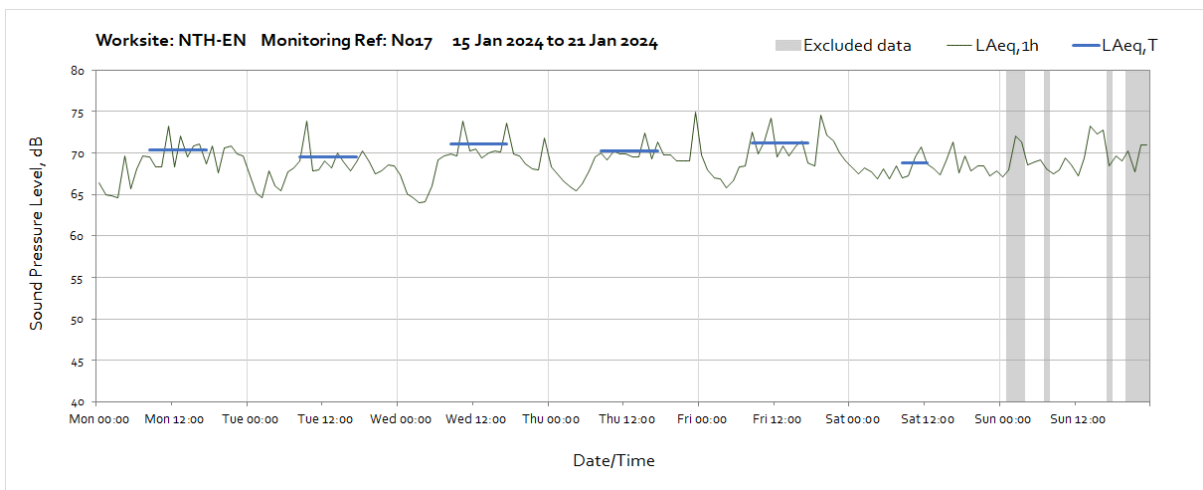
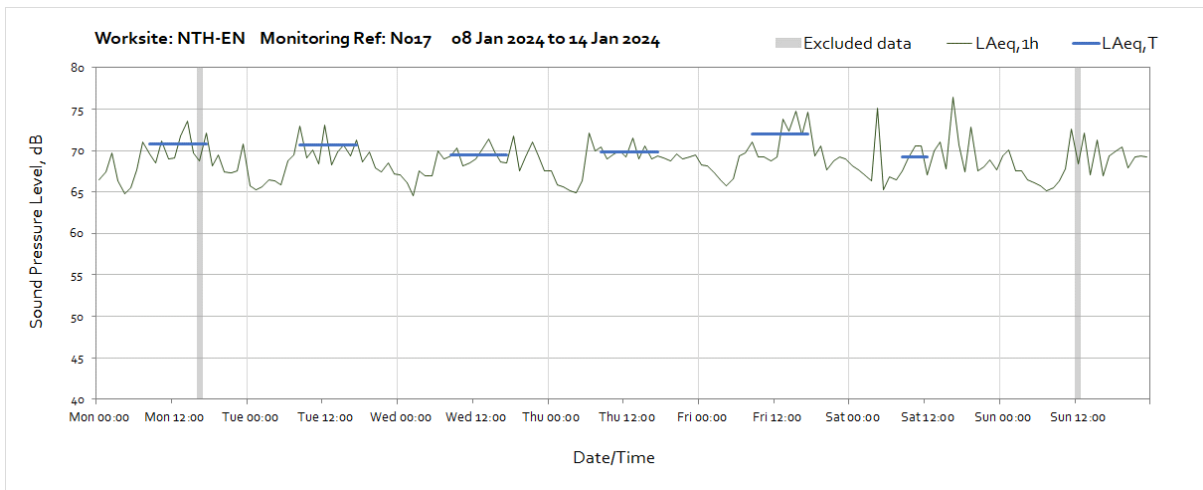
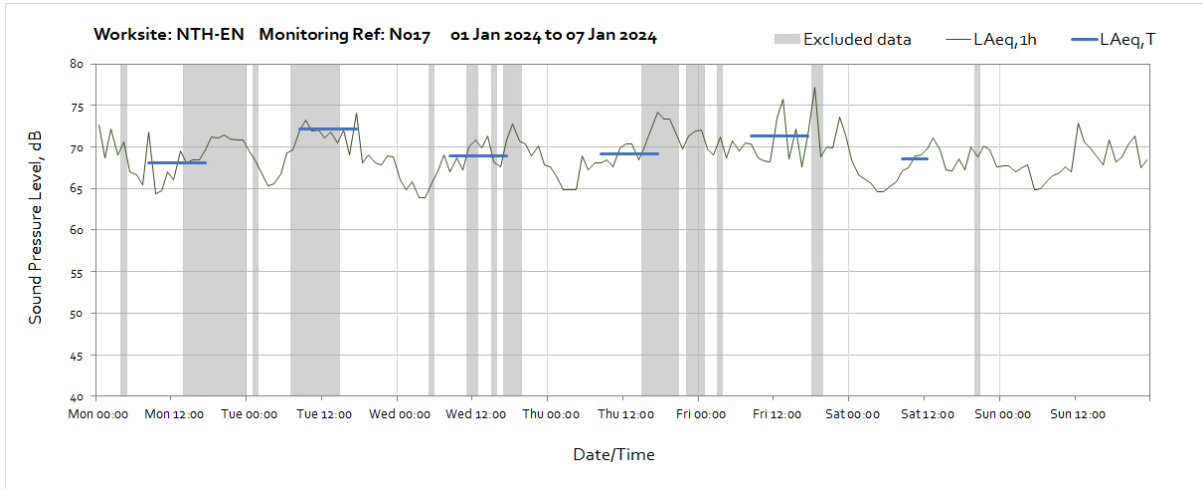


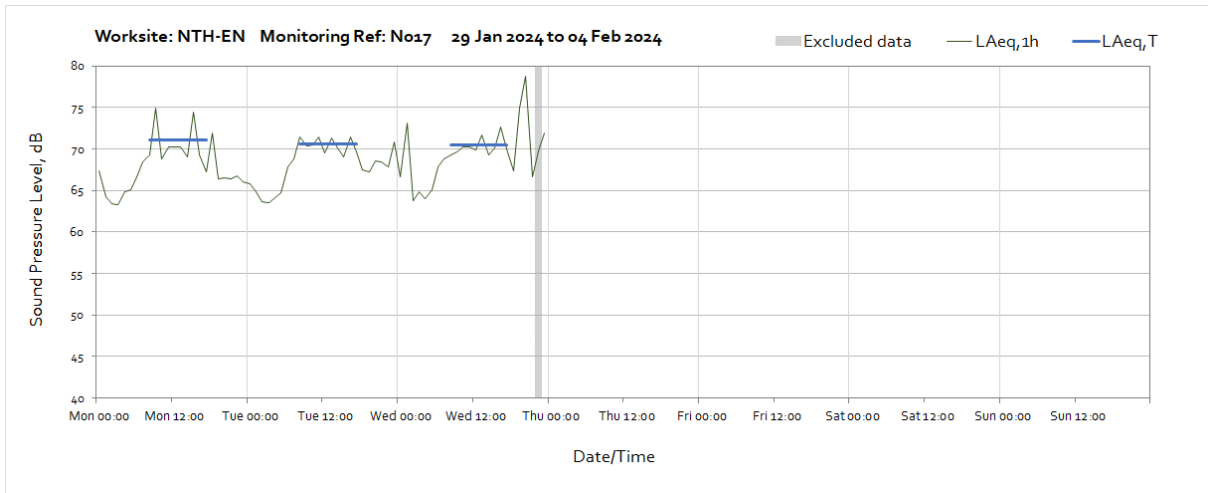
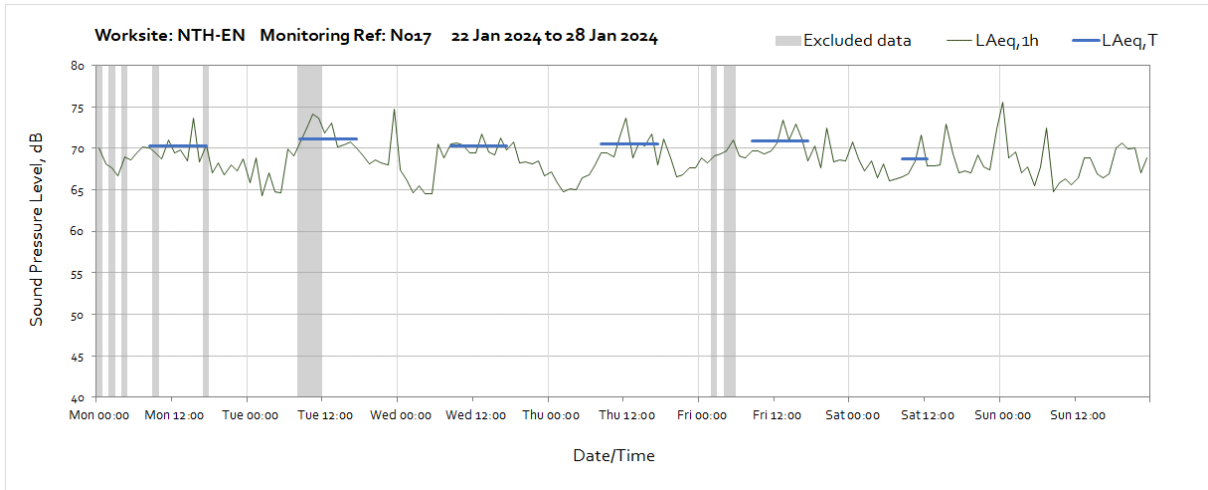
Worksite: NTH-EN, MF – Monitoring Ref: N016



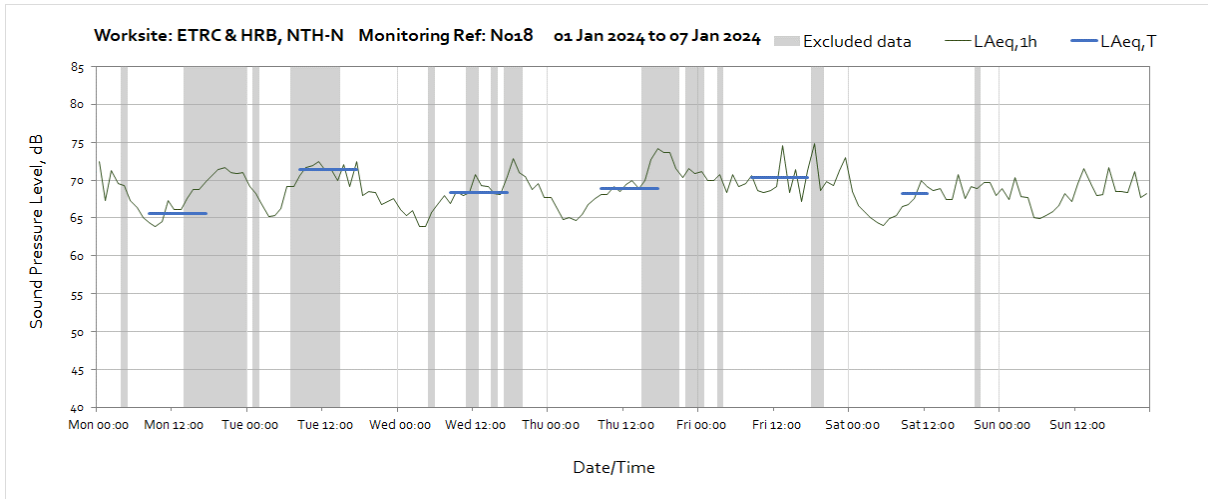


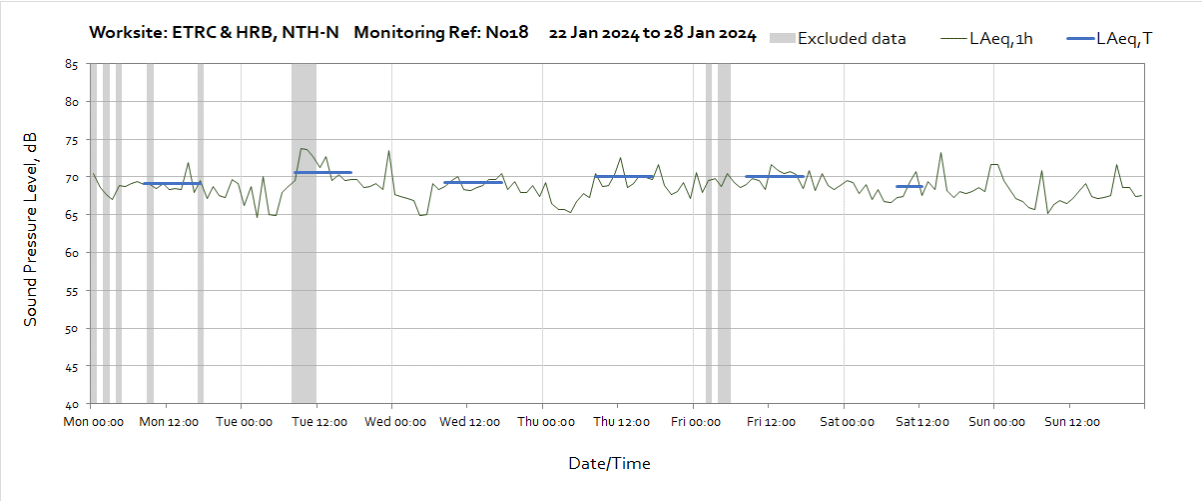
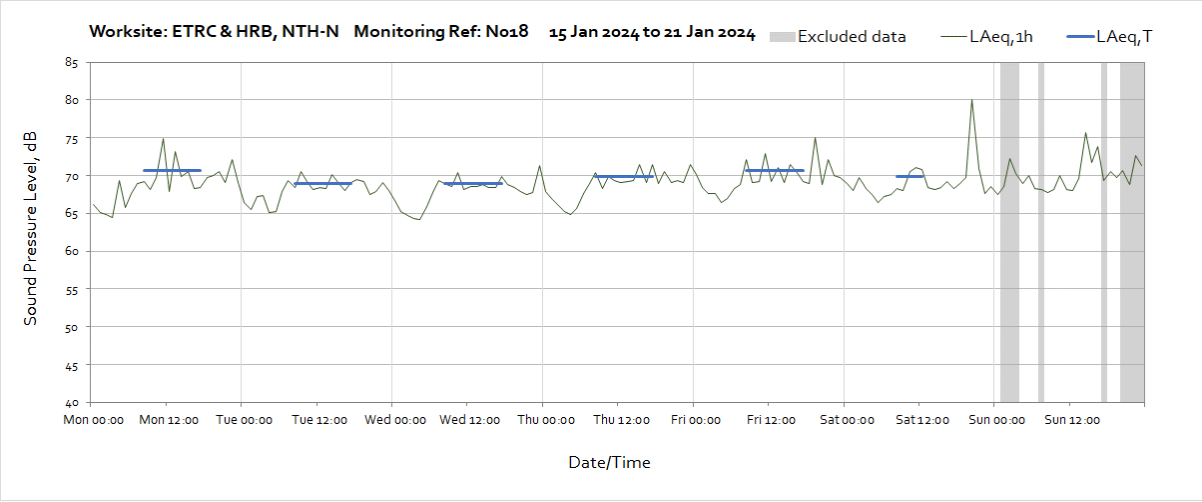
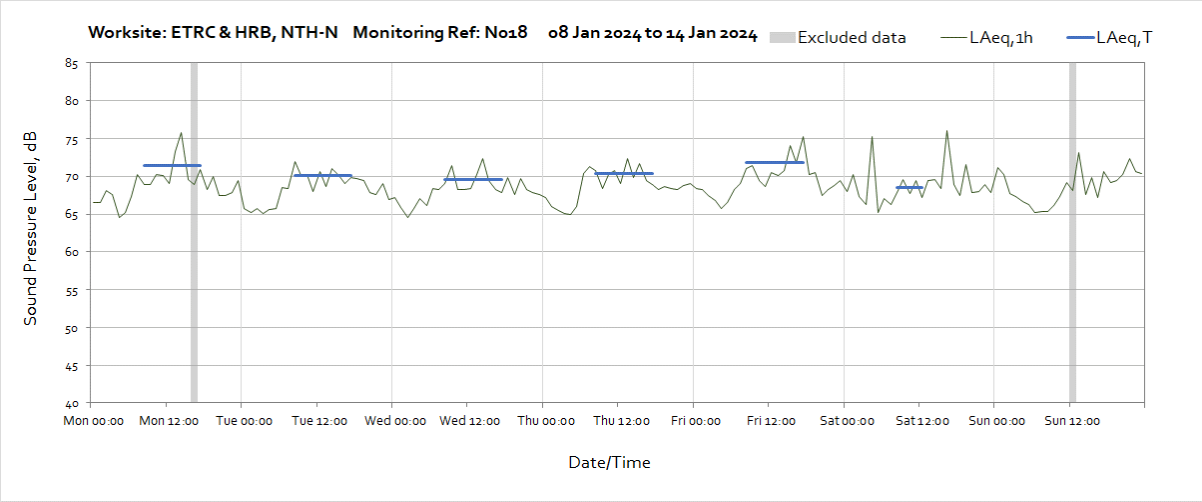
Worksite: NTH-EN - Monitoring Ref: N017

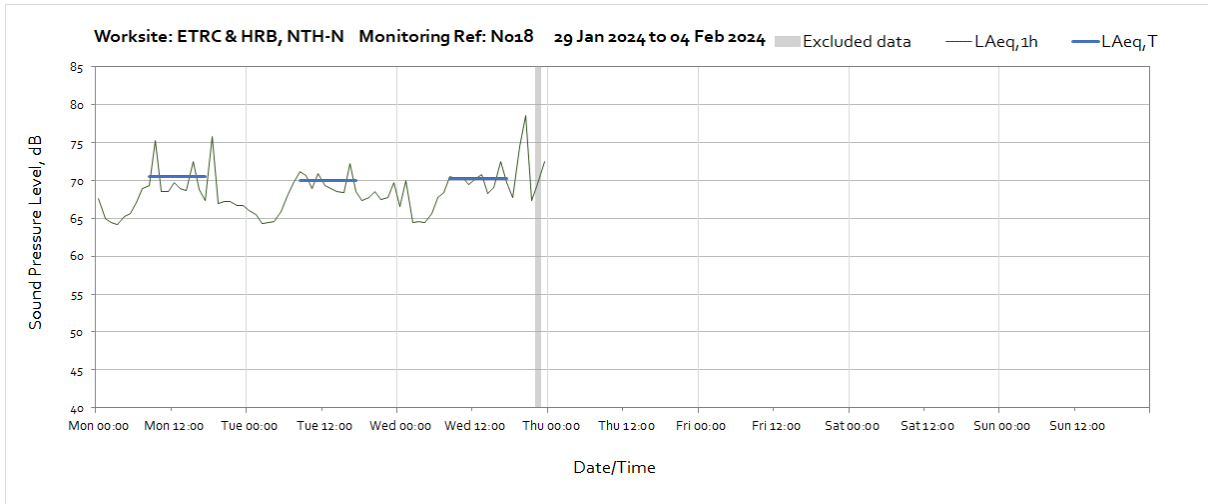




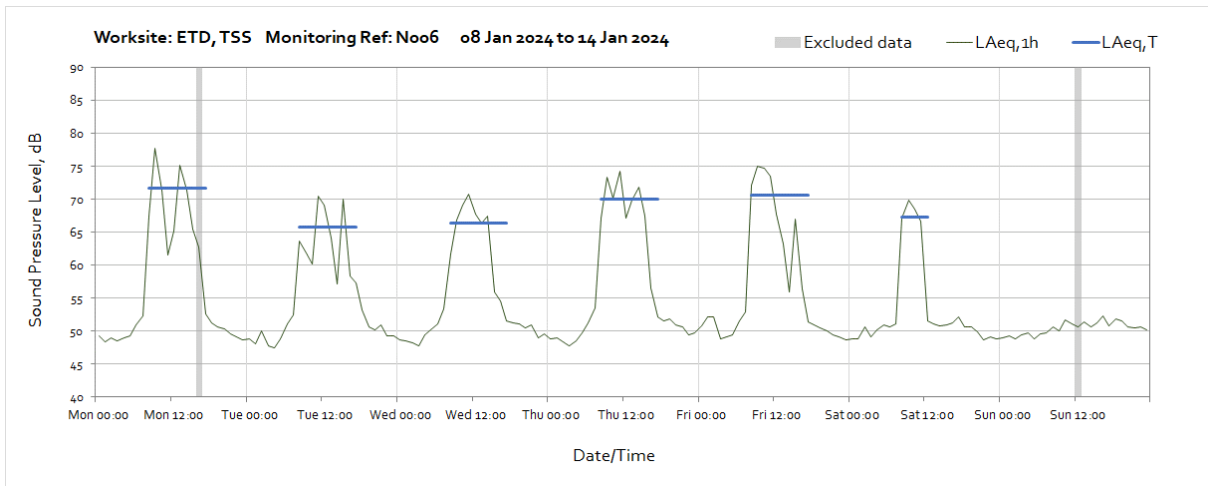
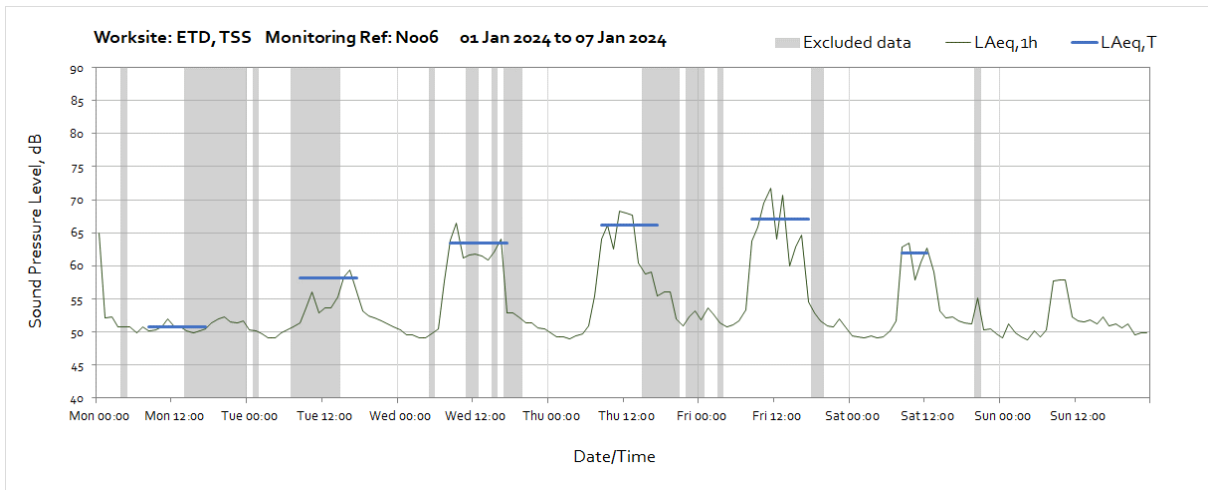
Worksite: ETRC & HRB, NTH-N – Monitoring Ref: N018

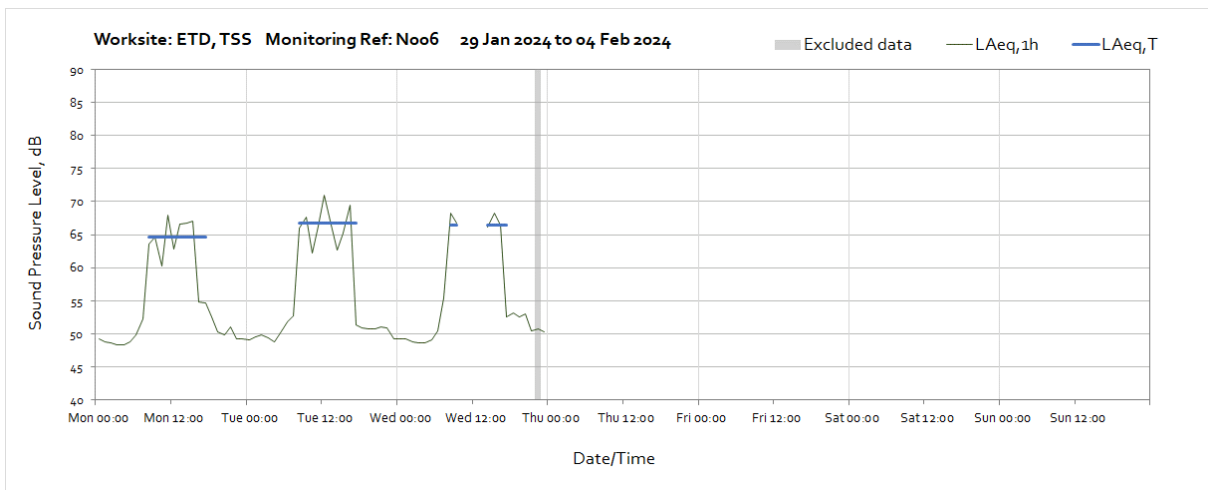
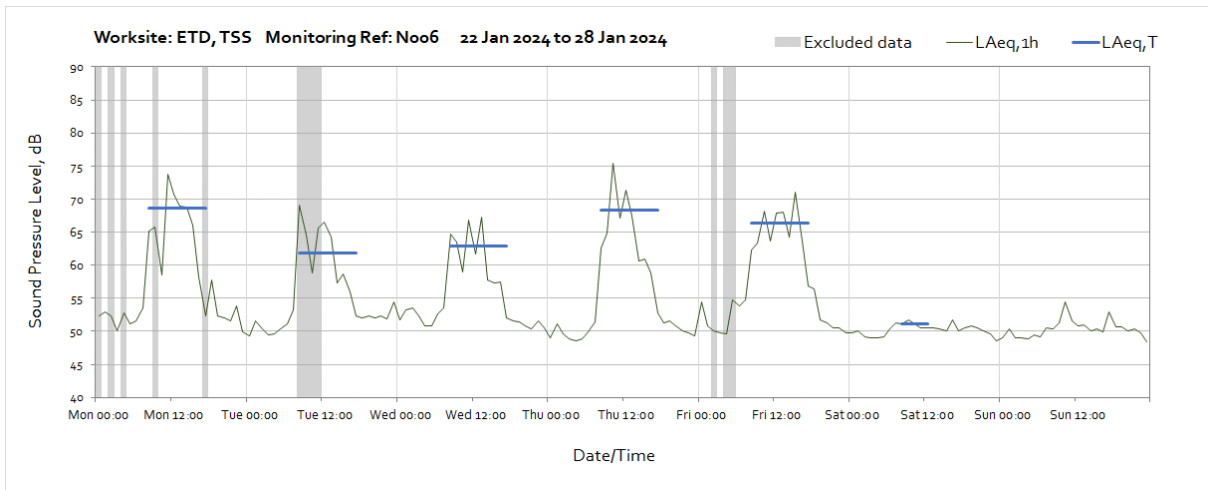
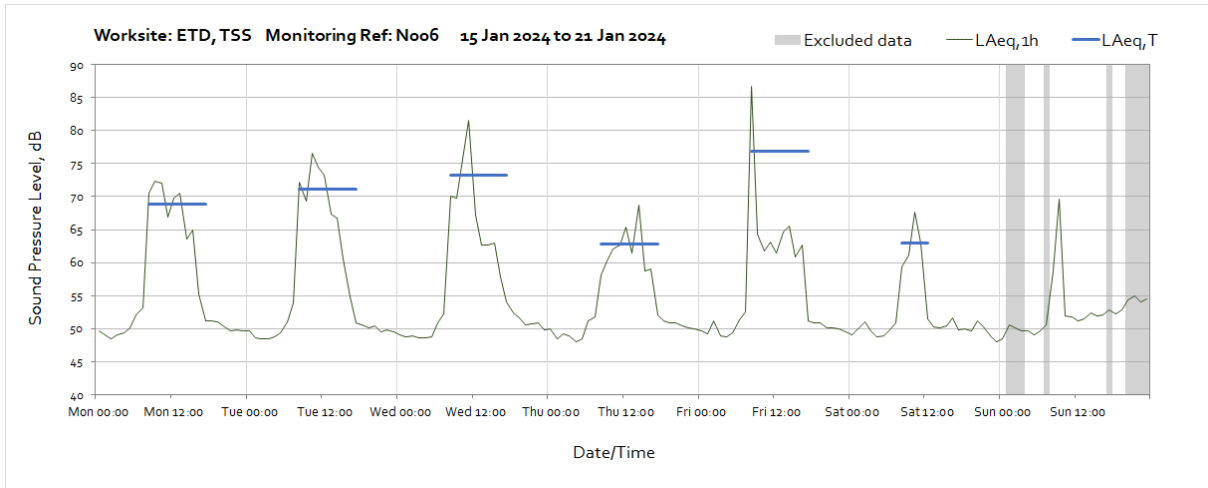






Worksite: ETD, TSS - Monitoring Ref: N006

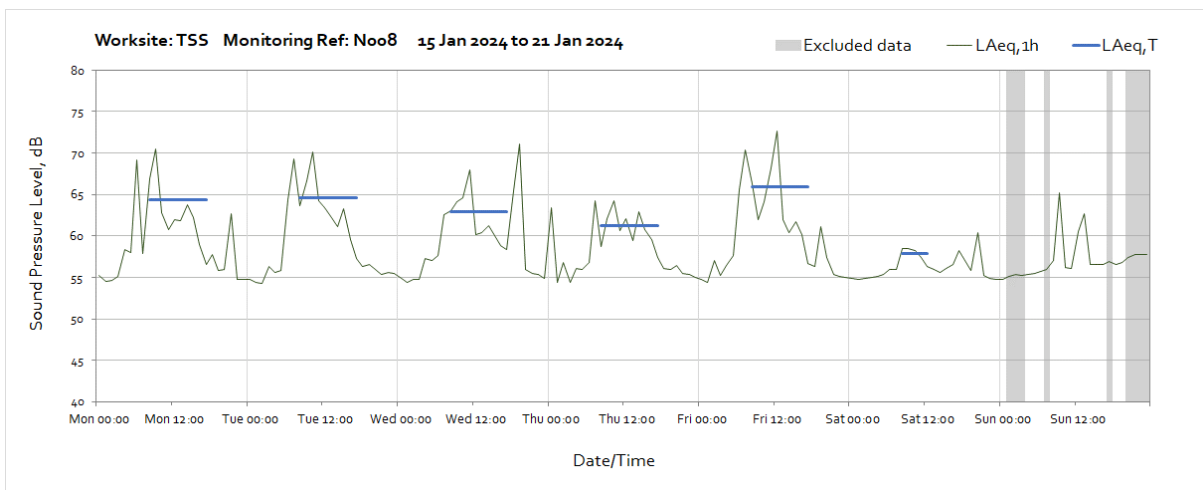
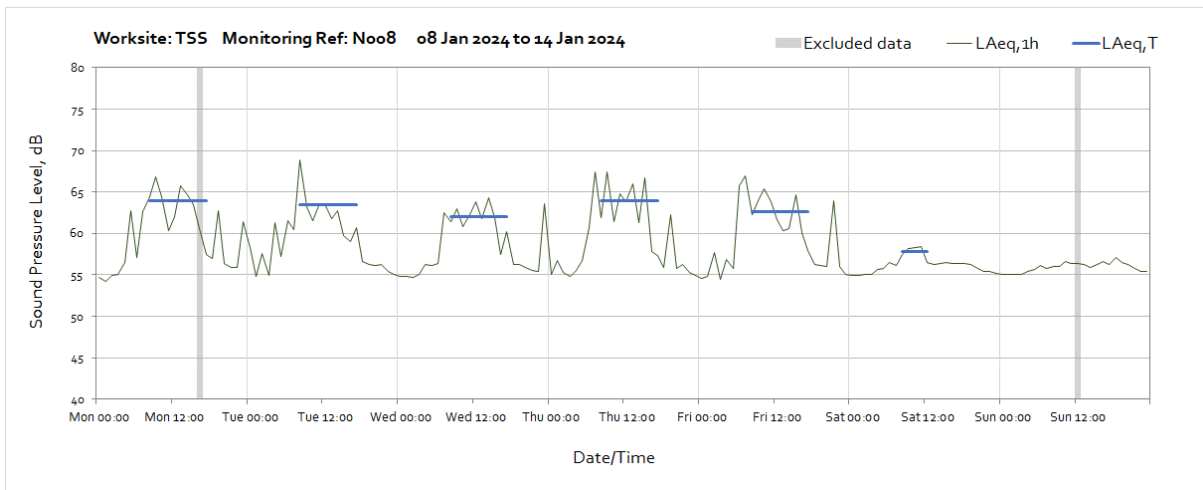
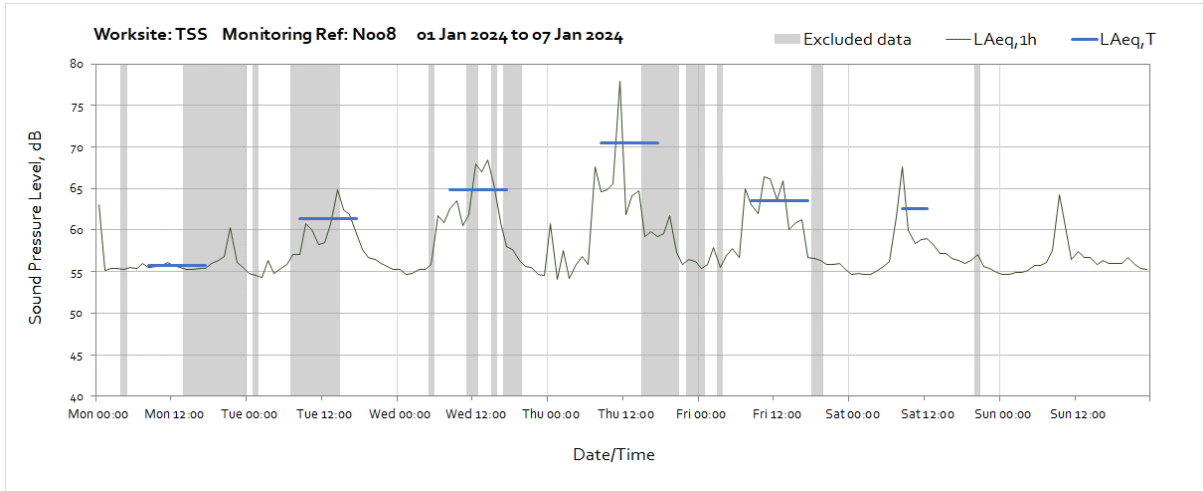




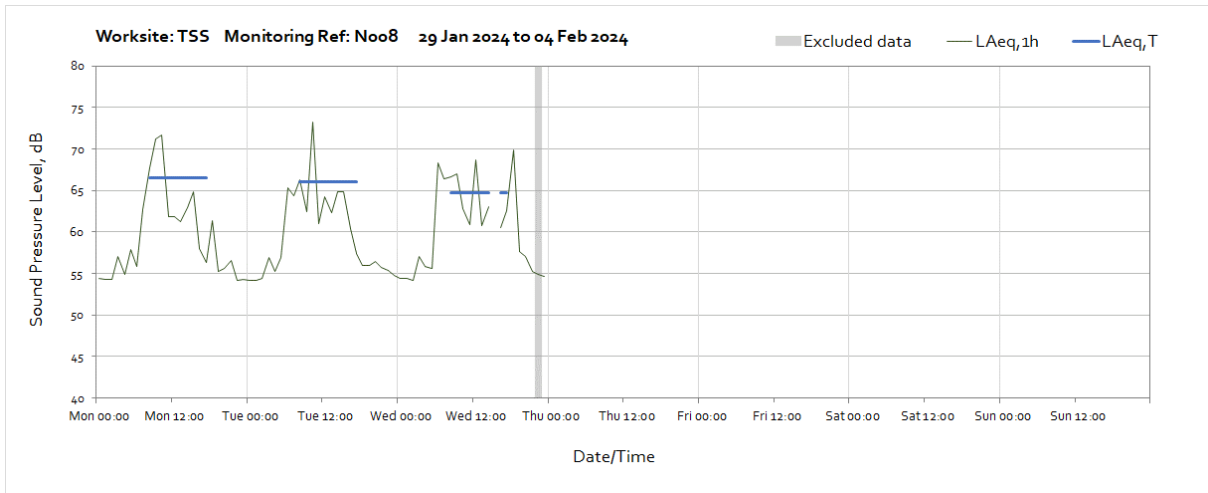
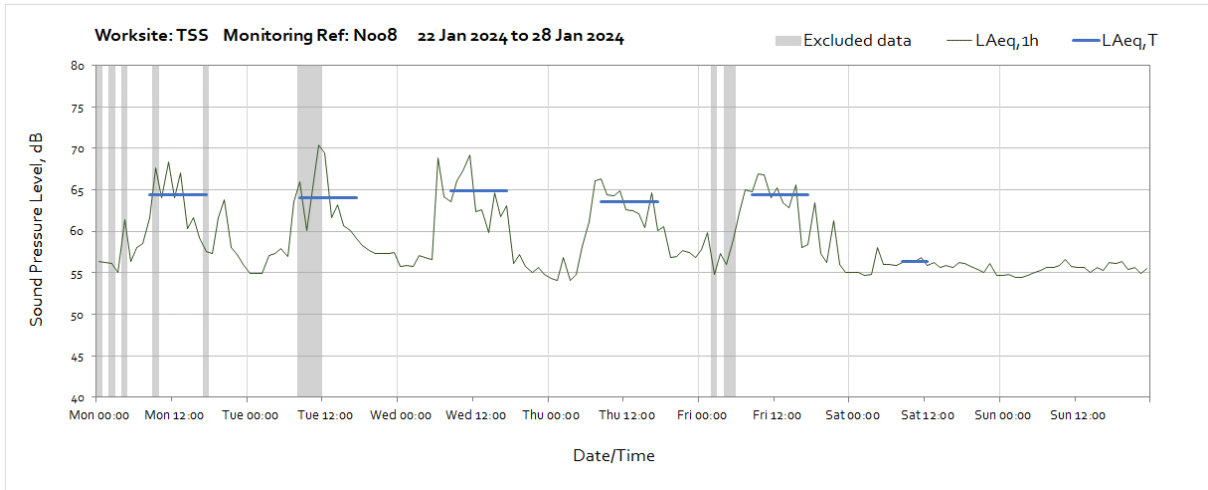
Note: Missing data on 31st of January from 10:00 until 13:00 was due to monitoring station error.

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Worksite: TSS – Monitoring Ref: N008

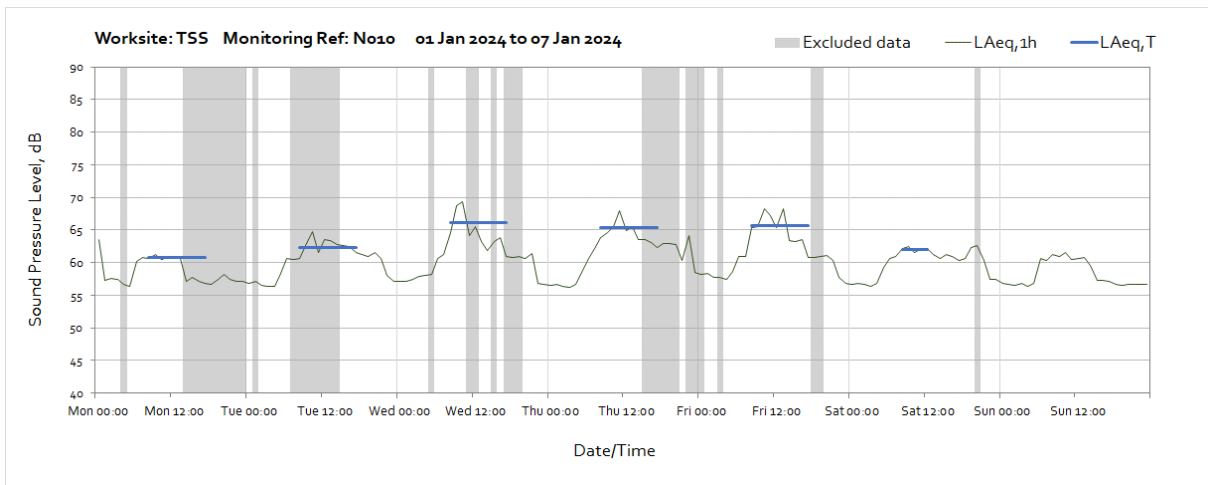


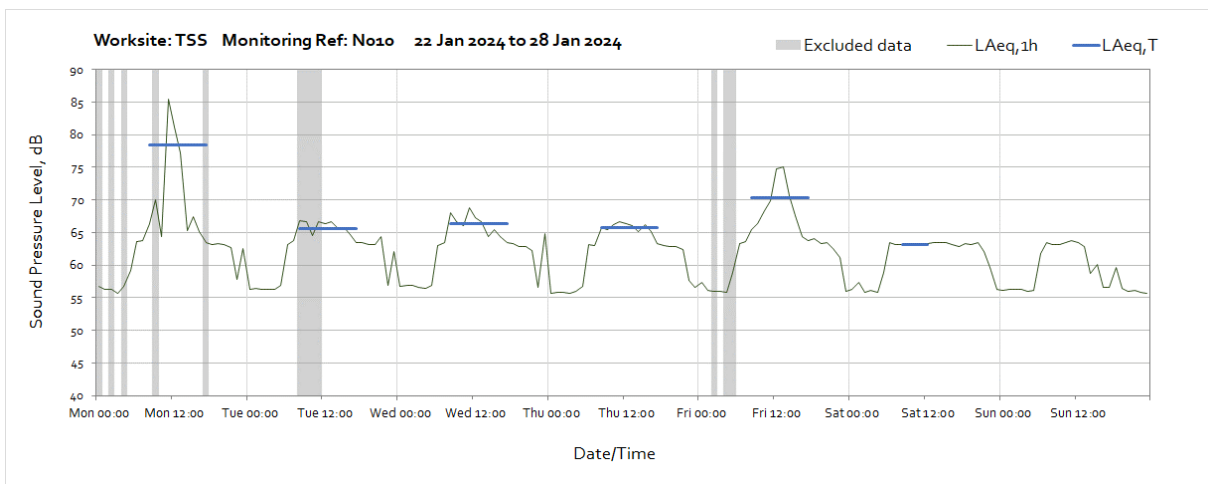
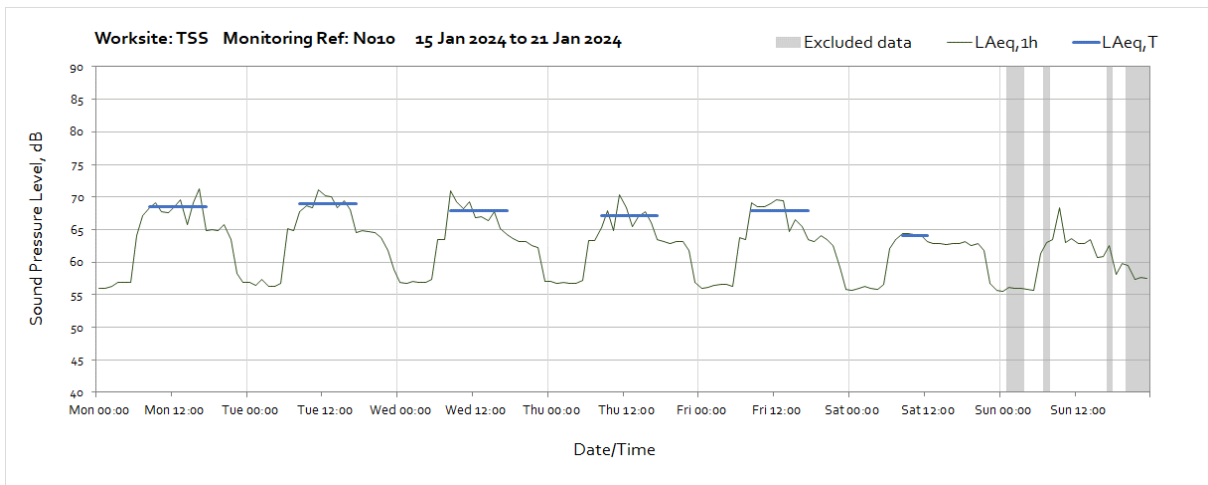
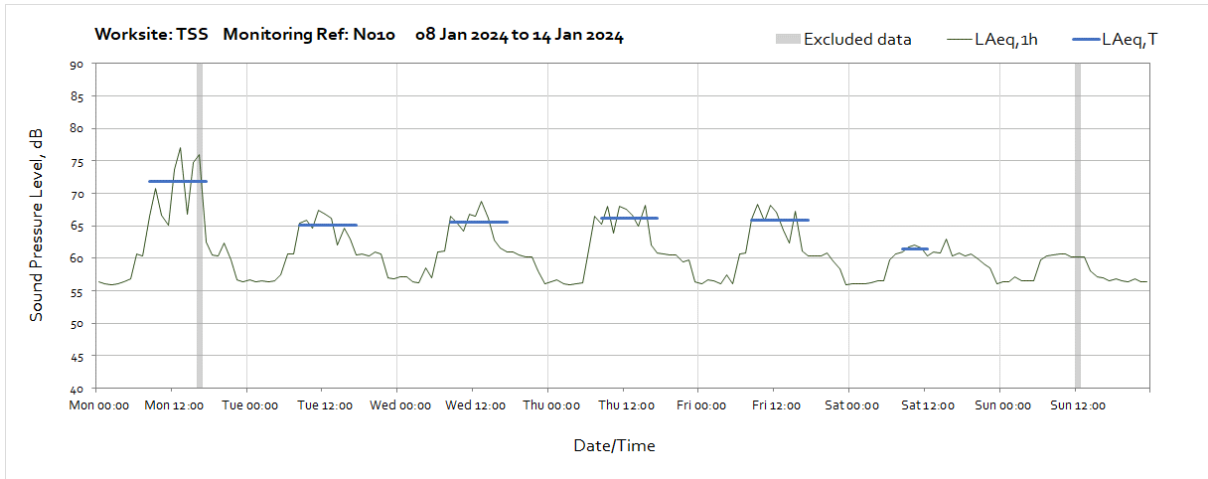
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Note: Missing data on 31st of January at 15:00 was due to monitoring station error.

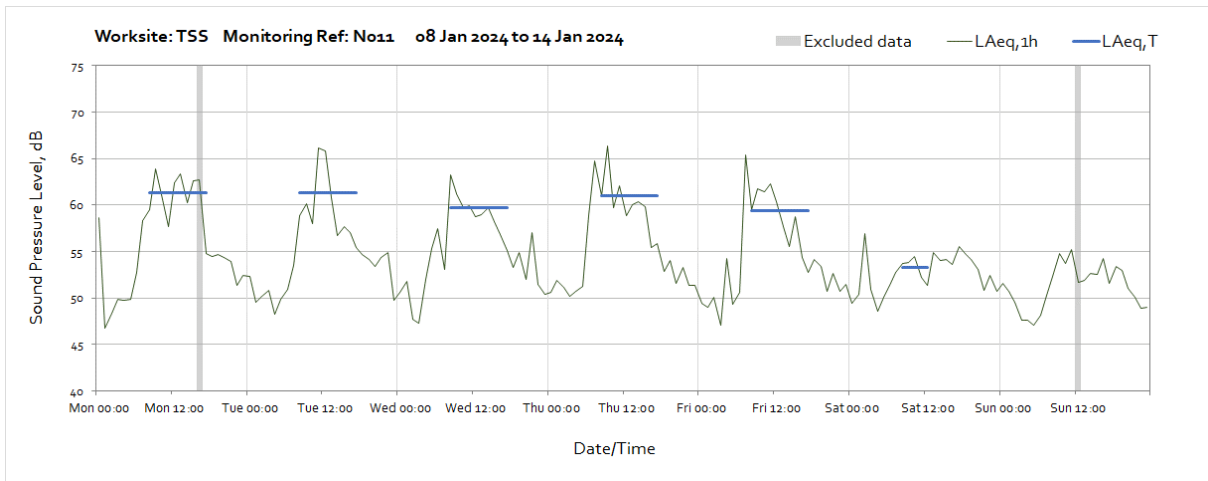
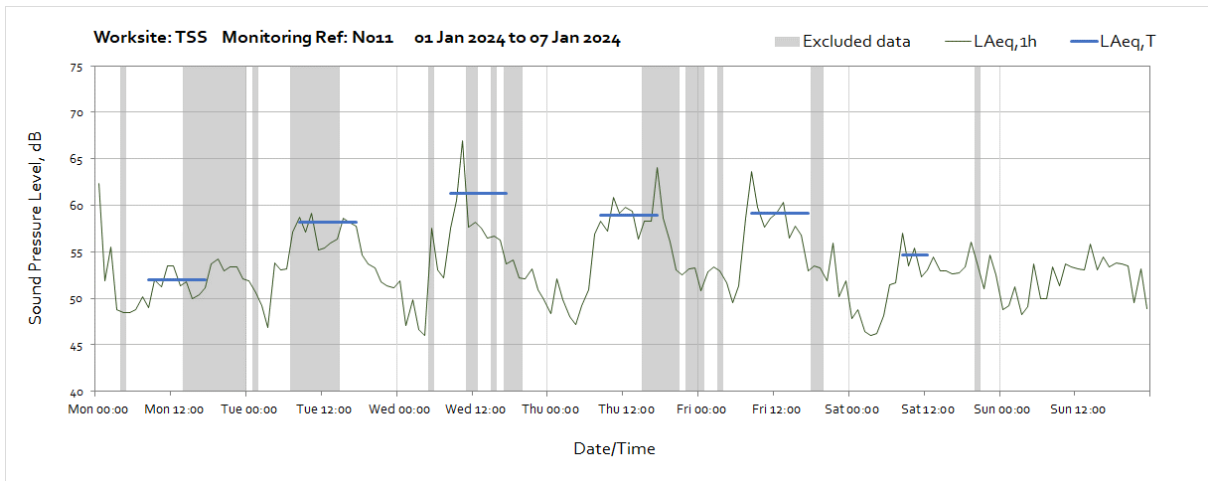
Worksite: TSS - Monitoring Ref: N010

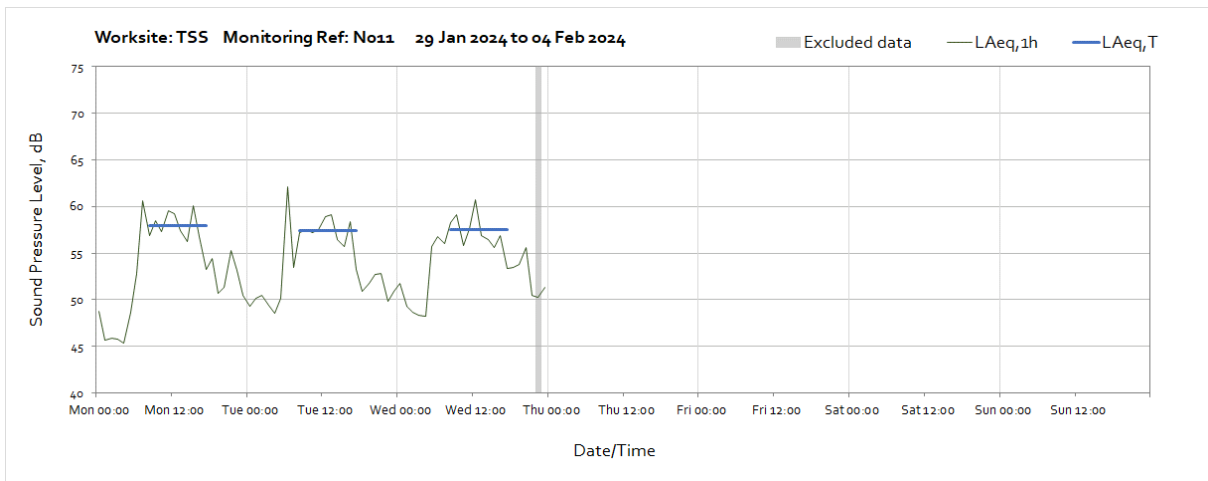
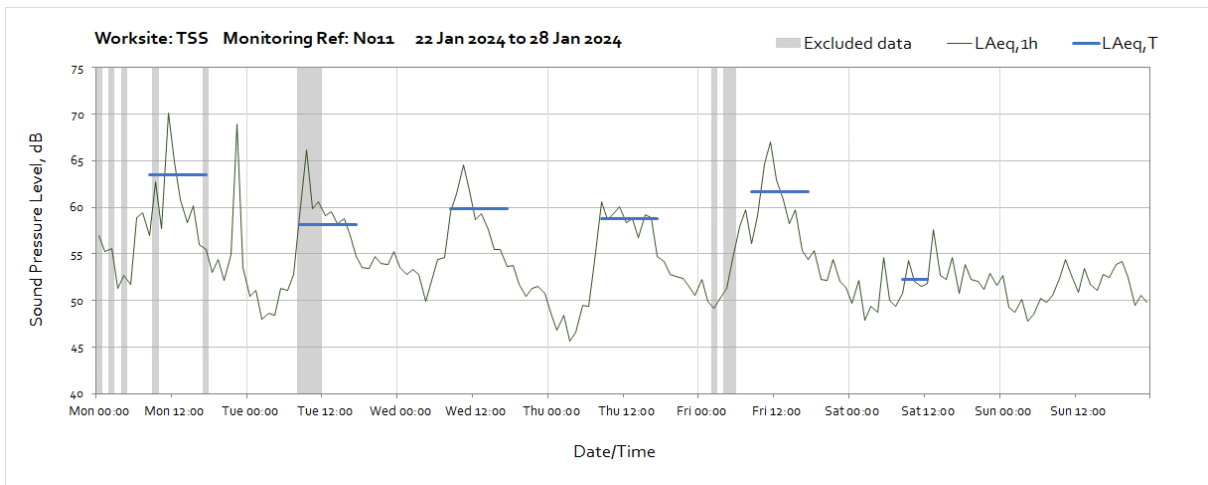
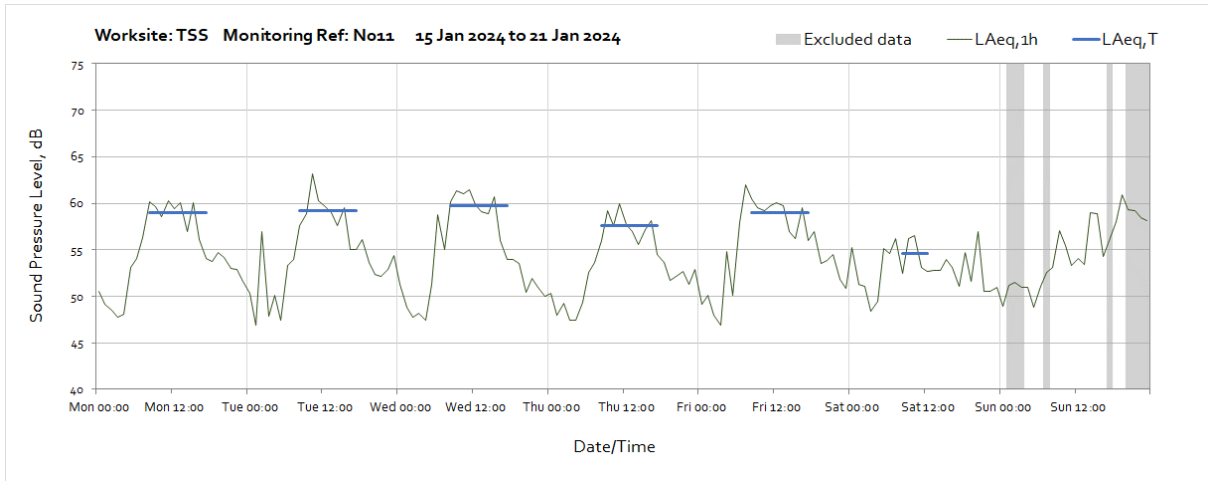




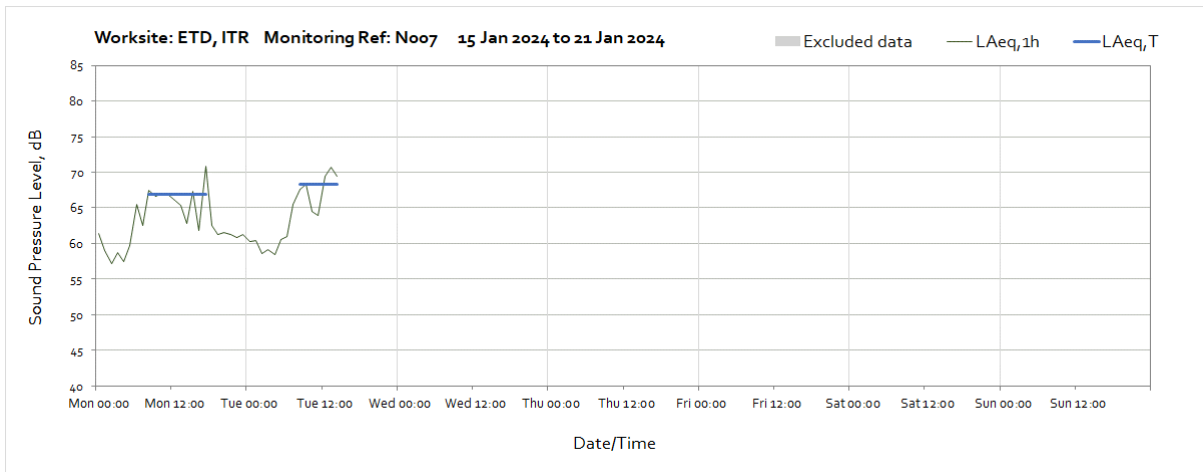
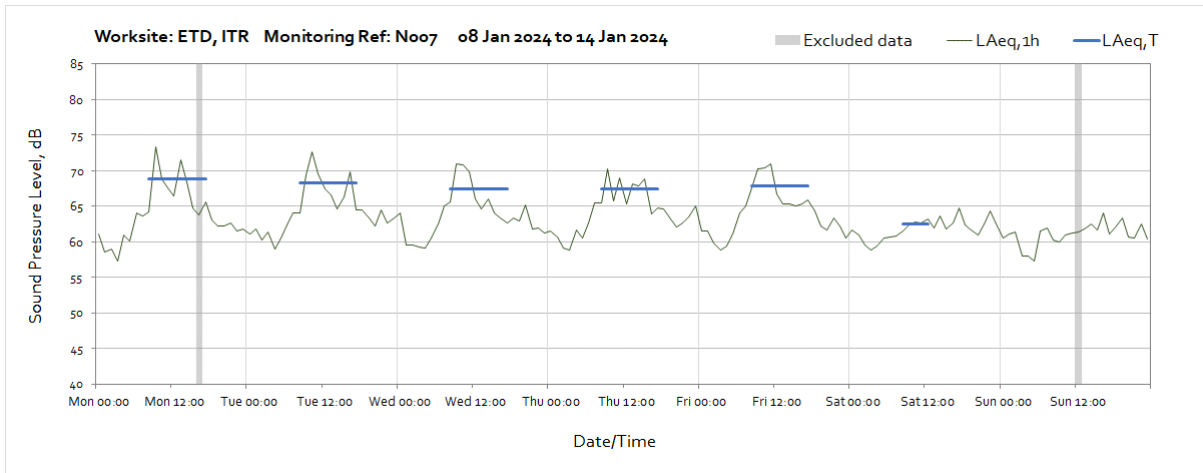
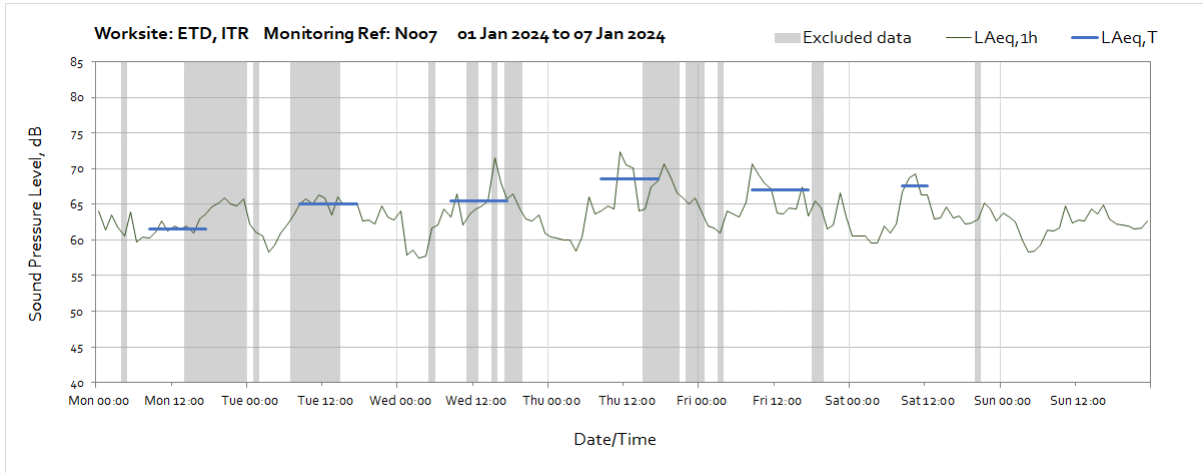


Worksite: TSS - Monitoring Ref: N011



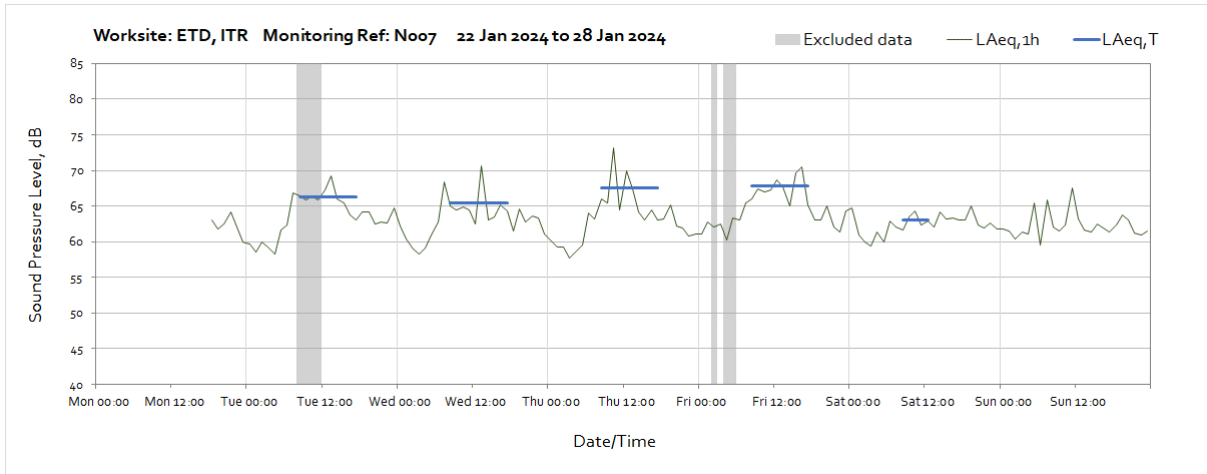


Worksite: ETD, ITR – Monitoring Ref: N007

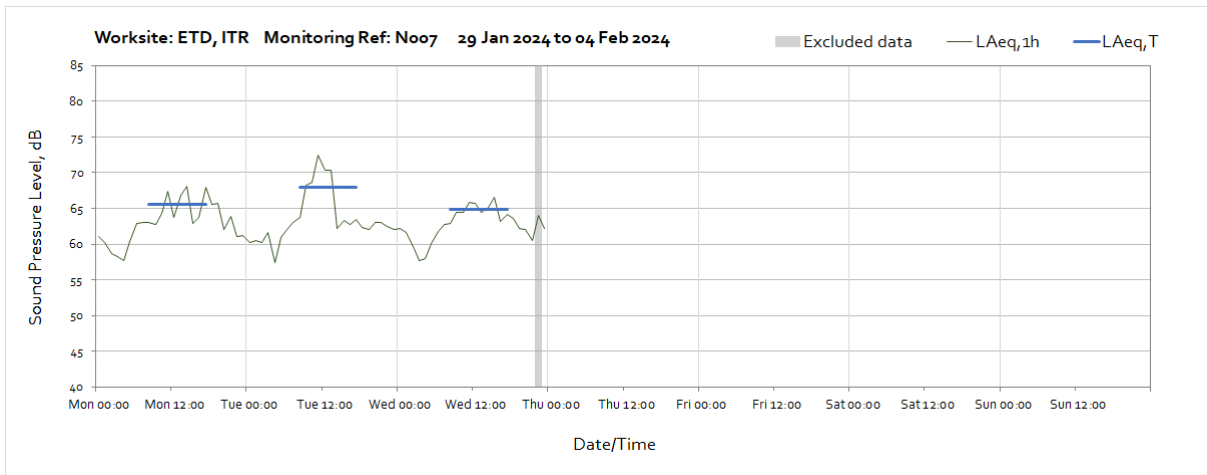


Note: Missing data from 16th of January at 15:00 until 21st of January at 23:00 was due to monitoring station error.

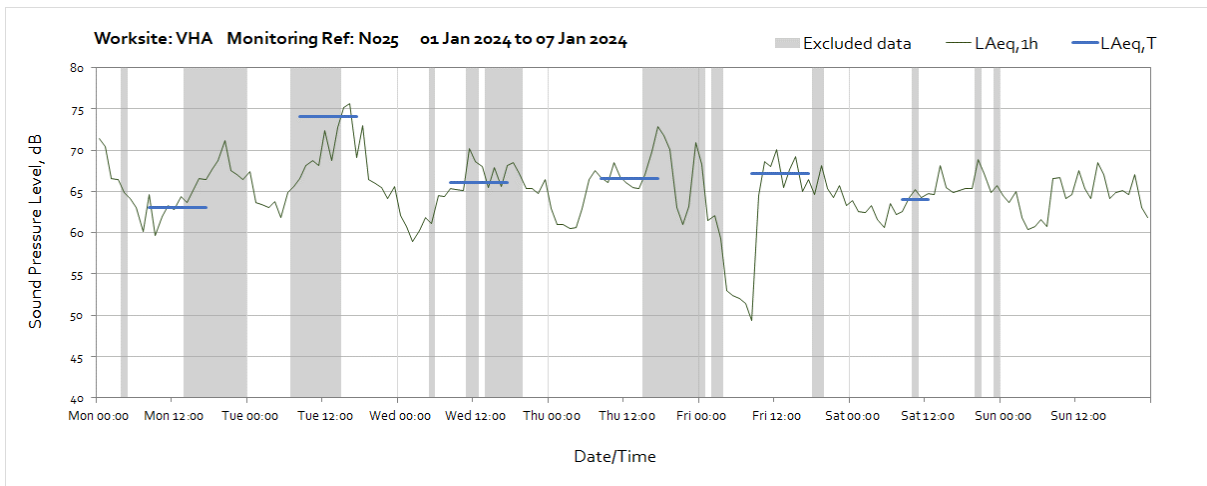
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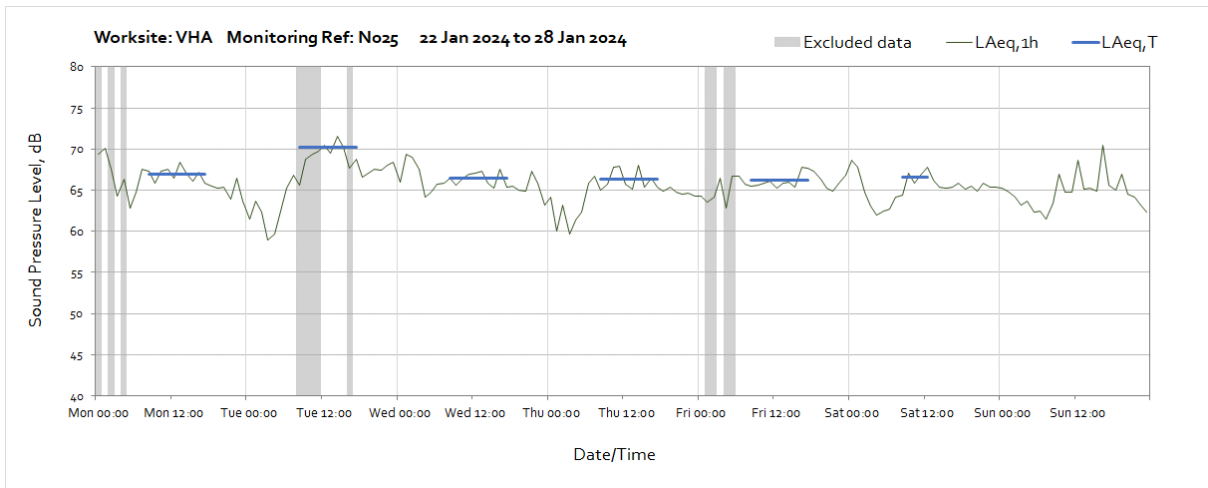
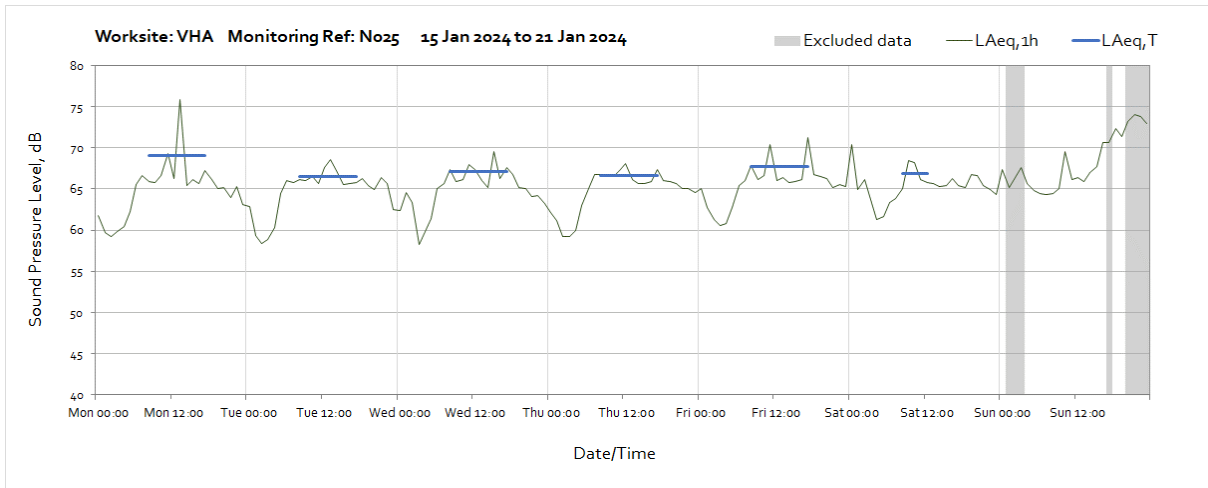
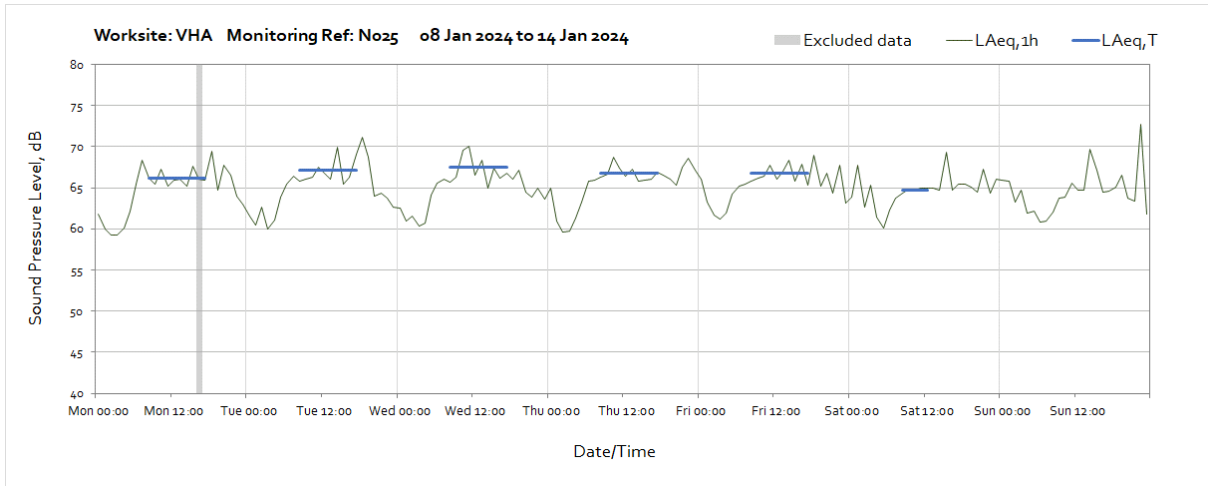


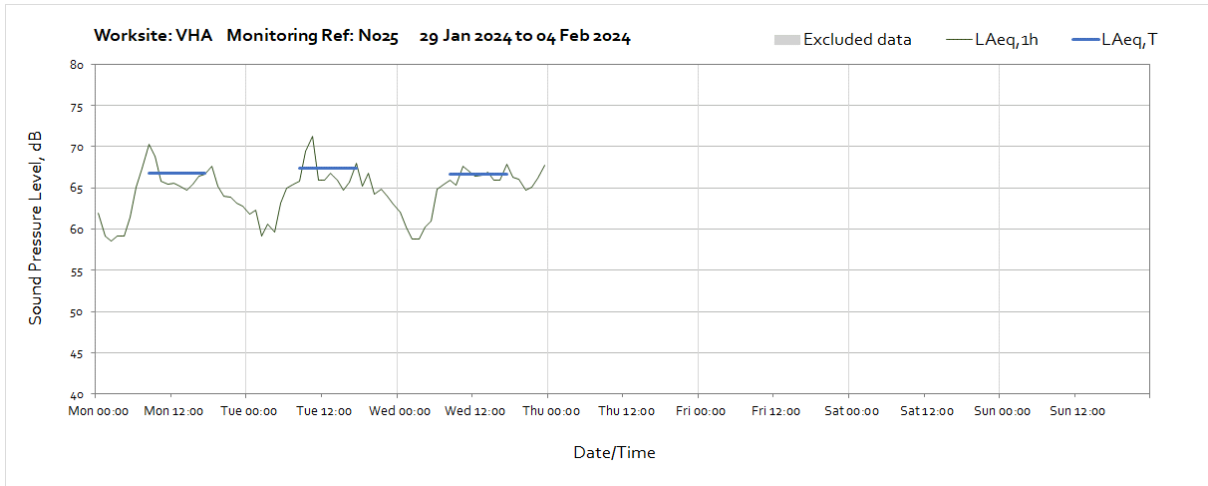
Note: Missing data from 22nd of January at 00:00 until 17:00 was due to monitoring station error.



Vehicle Holding Area (VHA) – Monitoring Ref: N025



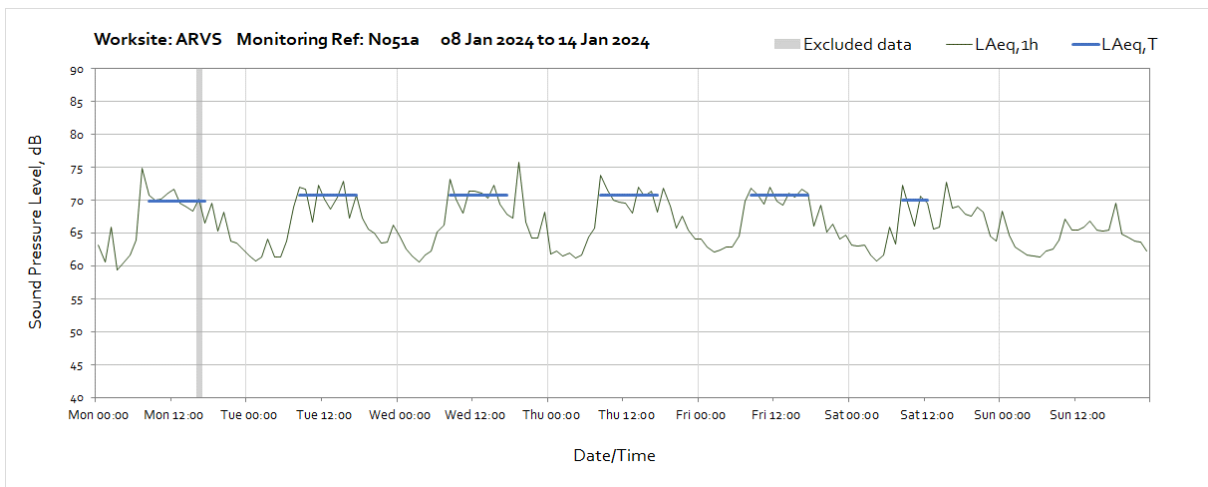
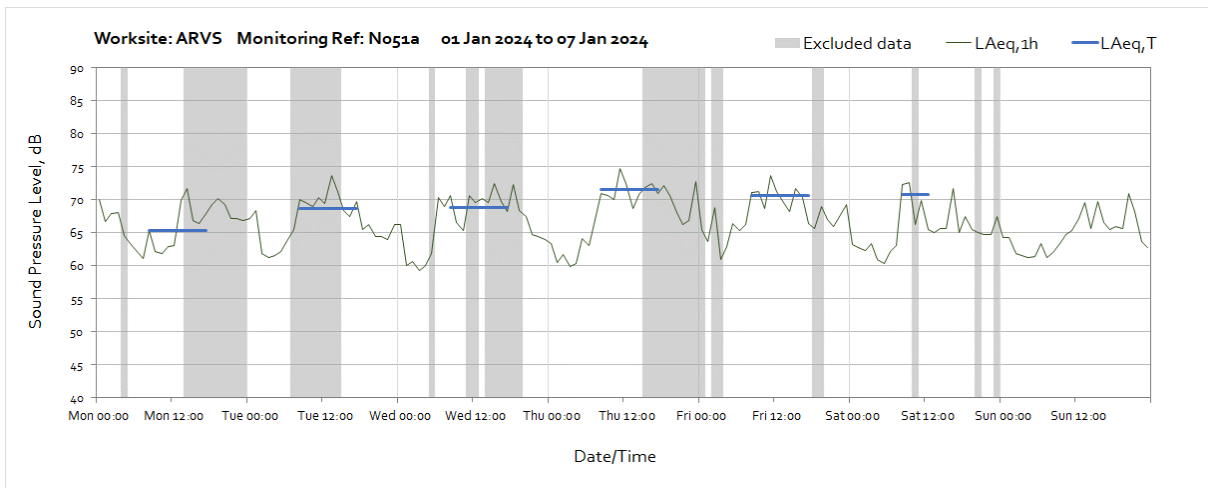


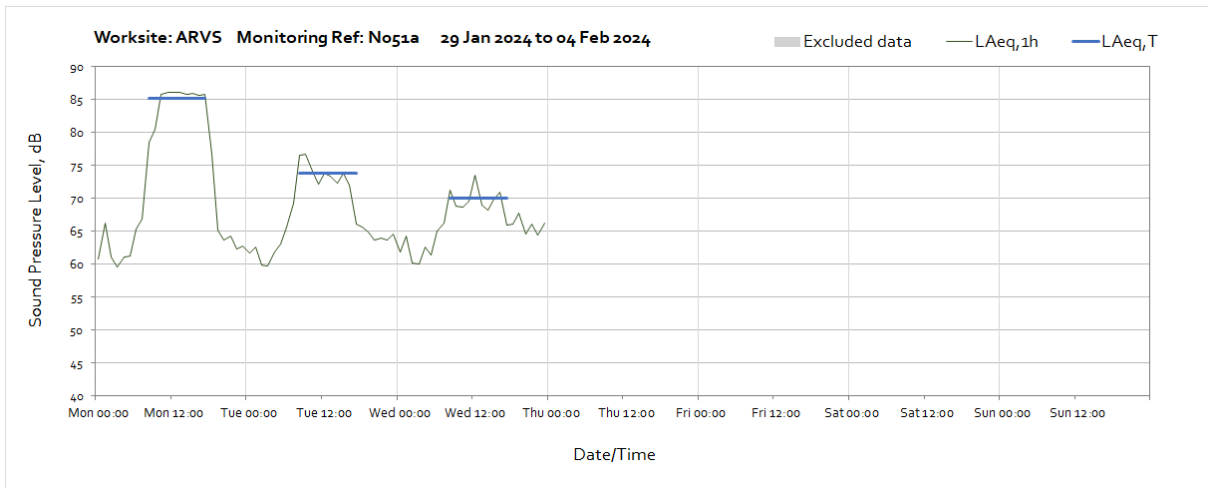
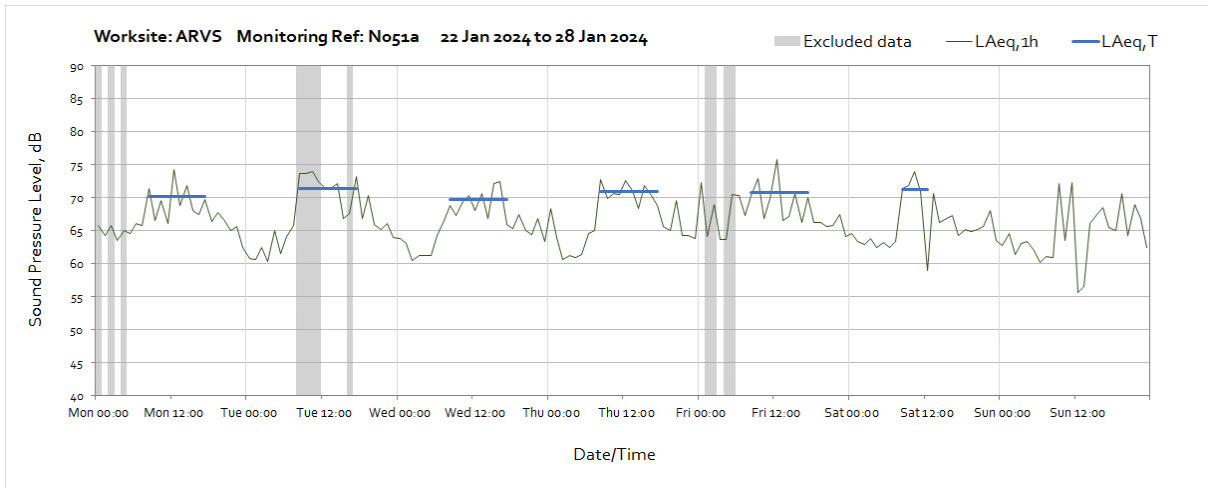
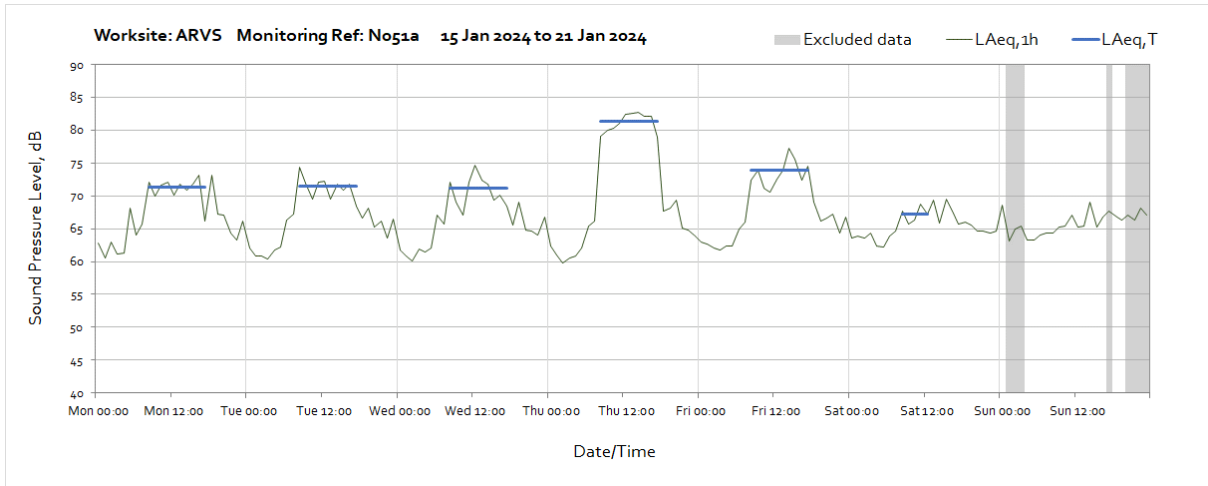


Adelaide Road Ventilation Shaft (ARVS) – Monitoring Ref: N051

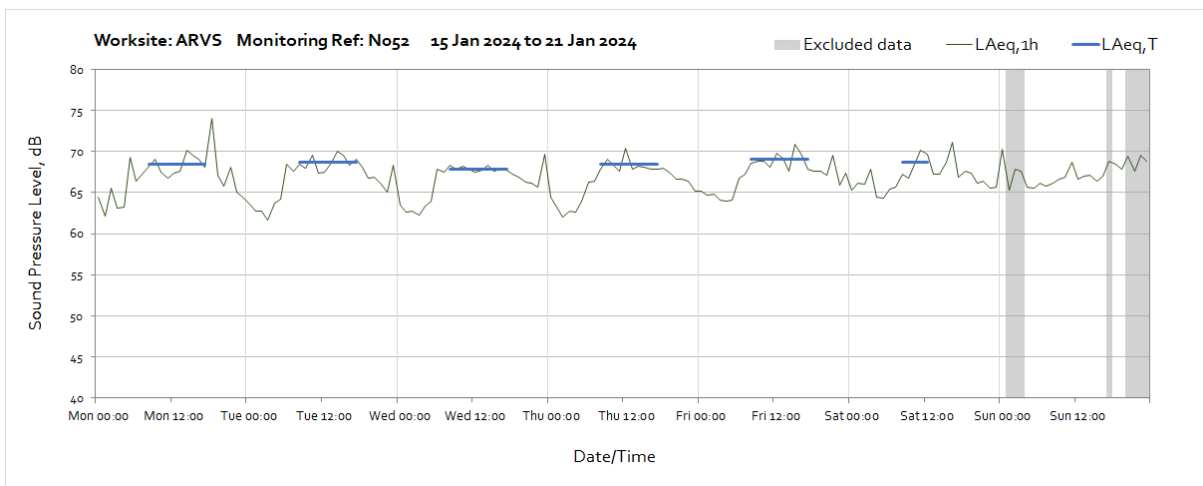
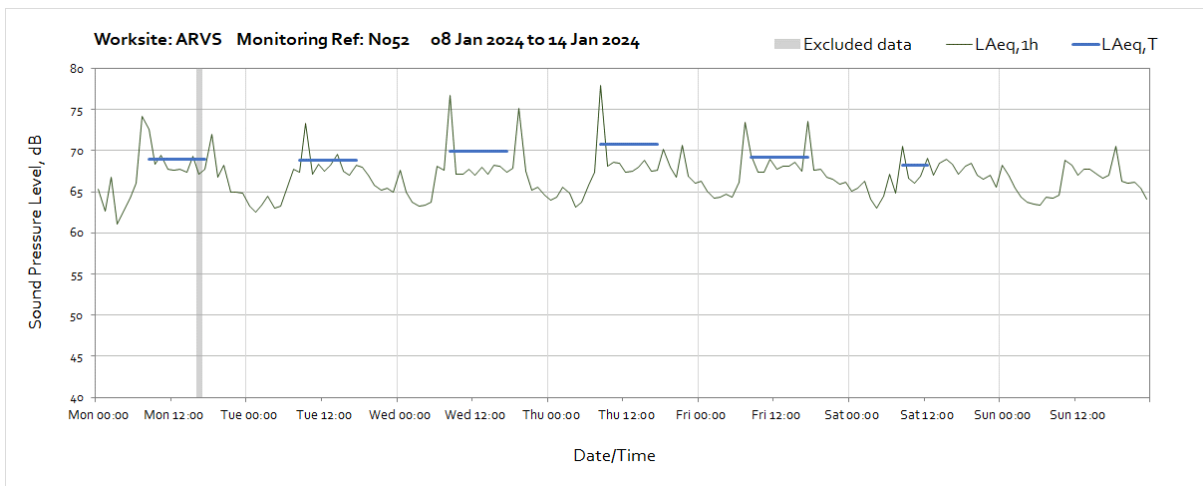
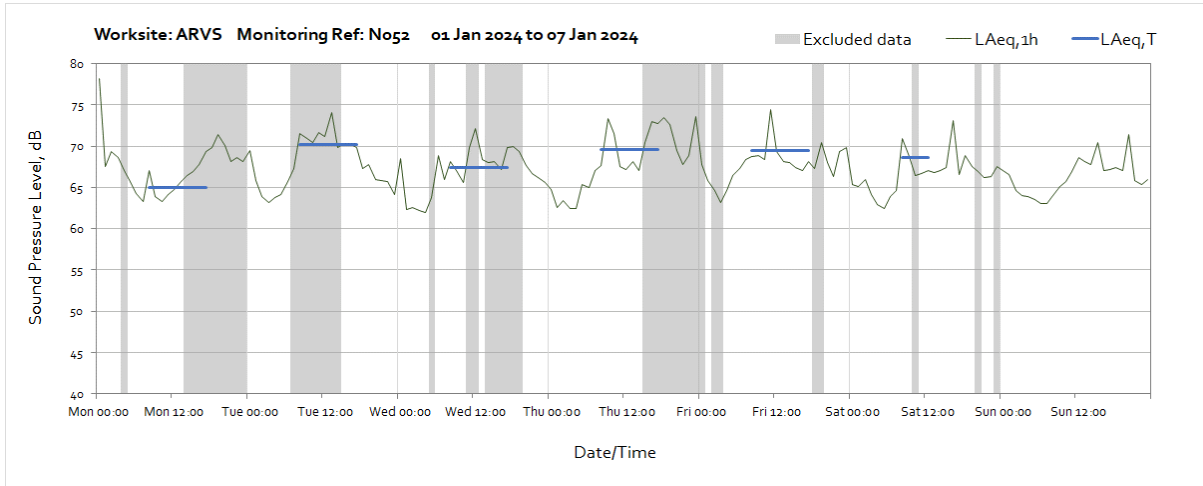
Note: No data measured throughout the month due to monitor being temporarily retrieved for testing.

Adelaide Road Ventilation Shaft (ARVS) – Monitoring Ref: N051a

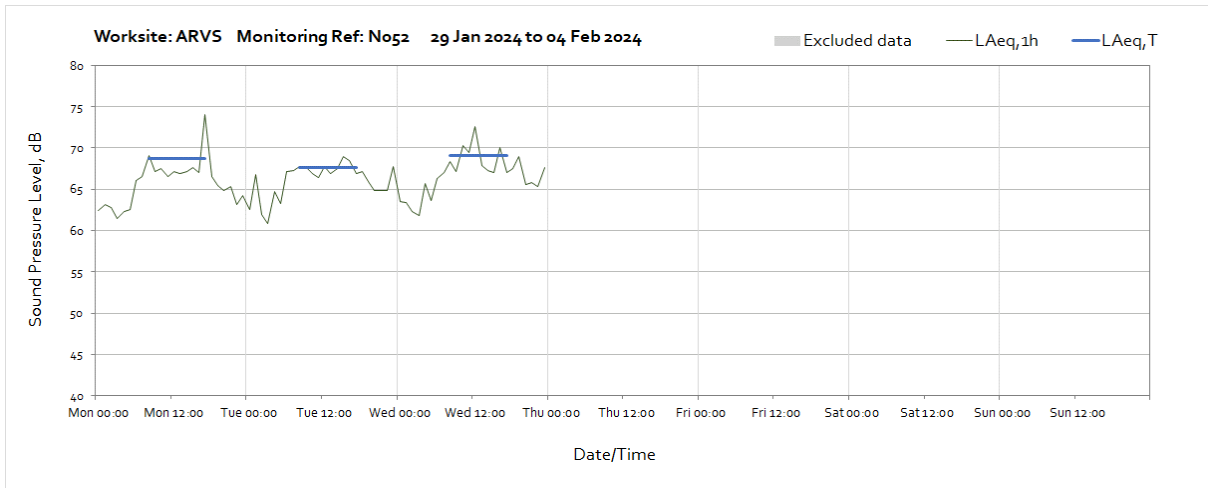
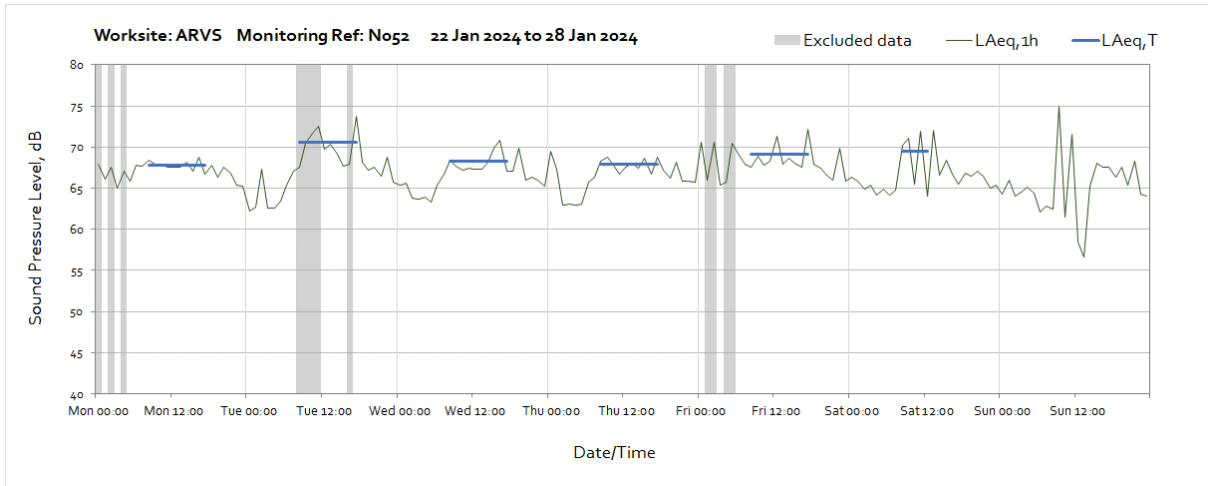




Adelaide Road Ventilation Shaft (ARVS) – Monitoring Ref: N052



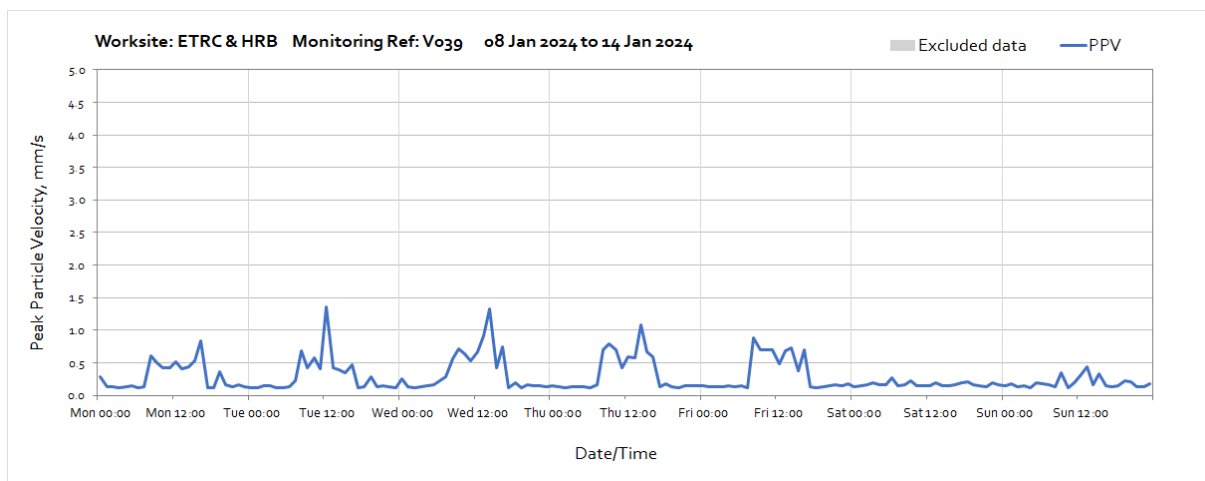
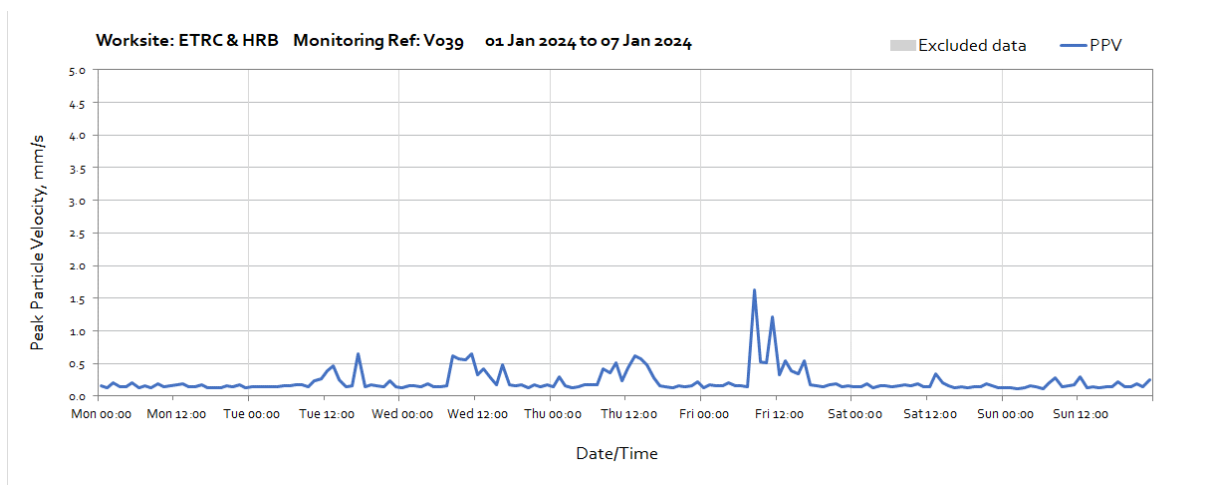
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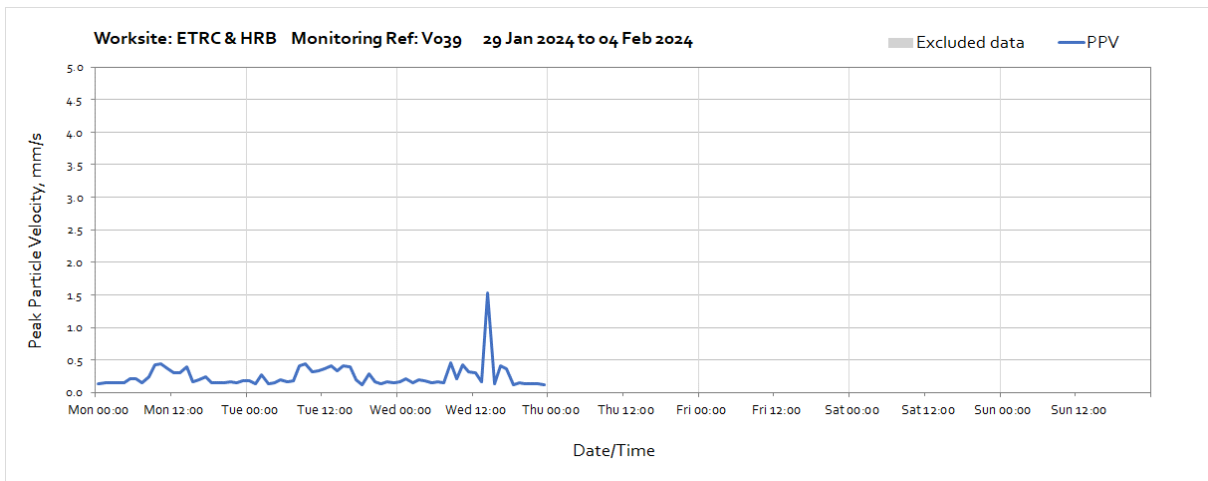
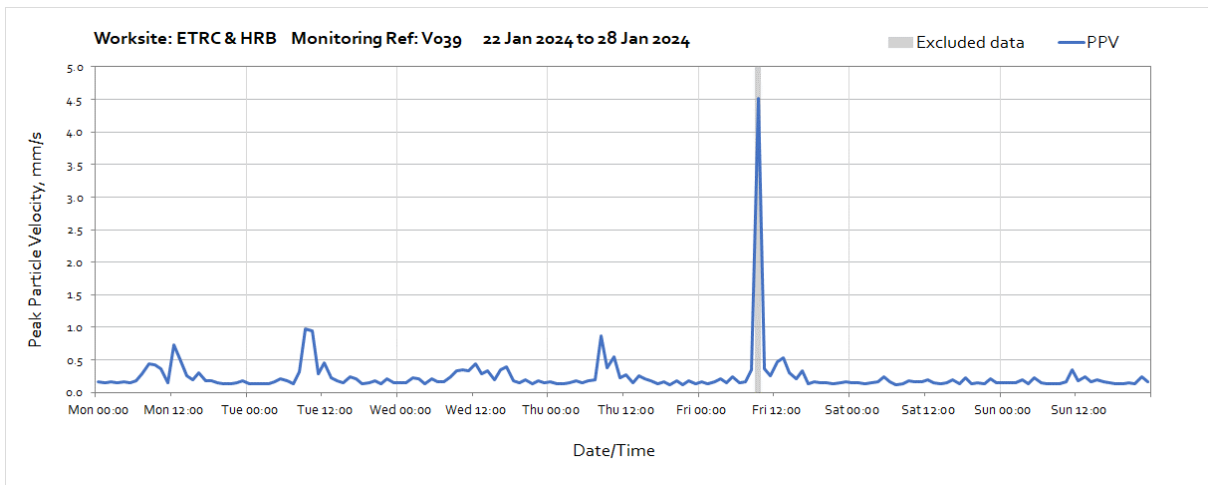
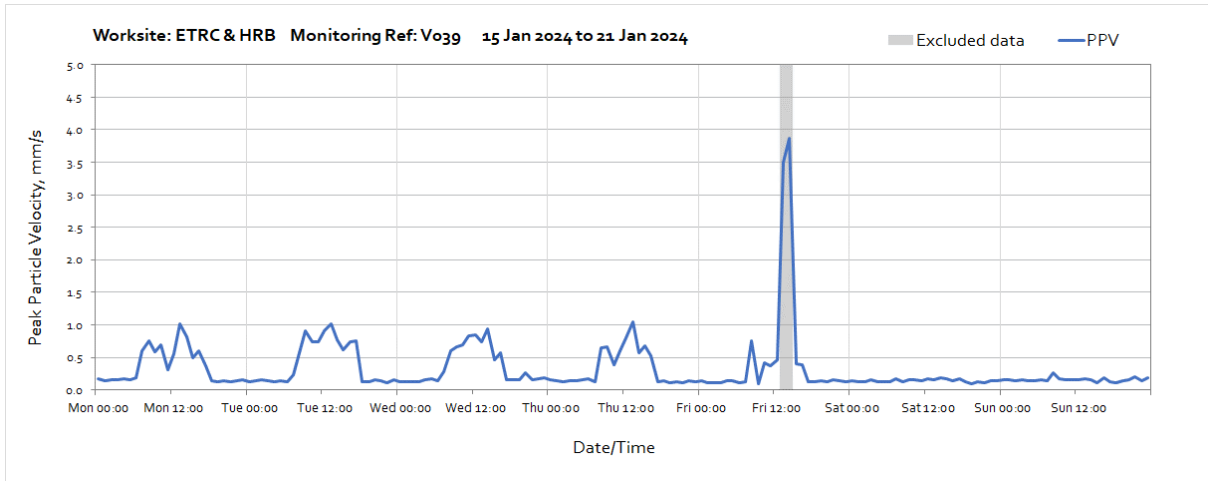


Vibration

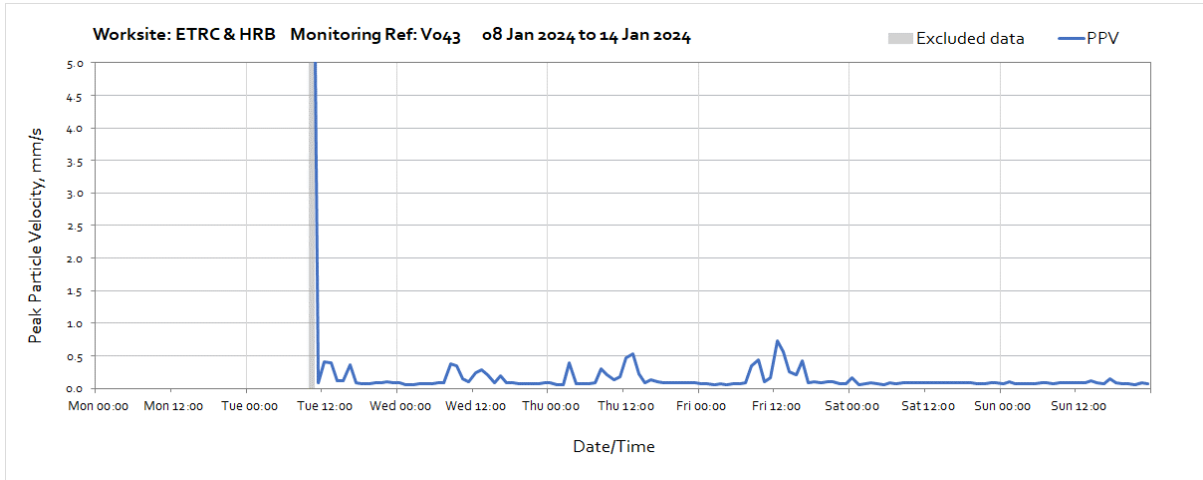
The following graphs show the hourly measured peak particle velocity PPV recorded during the monitoring period. The graphs show the highest PPV of the three orthogonal axes x, y and z . Periods where PPV values have been affected by local interference with the vibration monitor or only measured for part of the period, which are not representative of HS2 construction works , have been greyed out and excluded when calculating values in Table 4 of the main report.

Worksite: ETRC & HRB – Monitoring Ref: V039

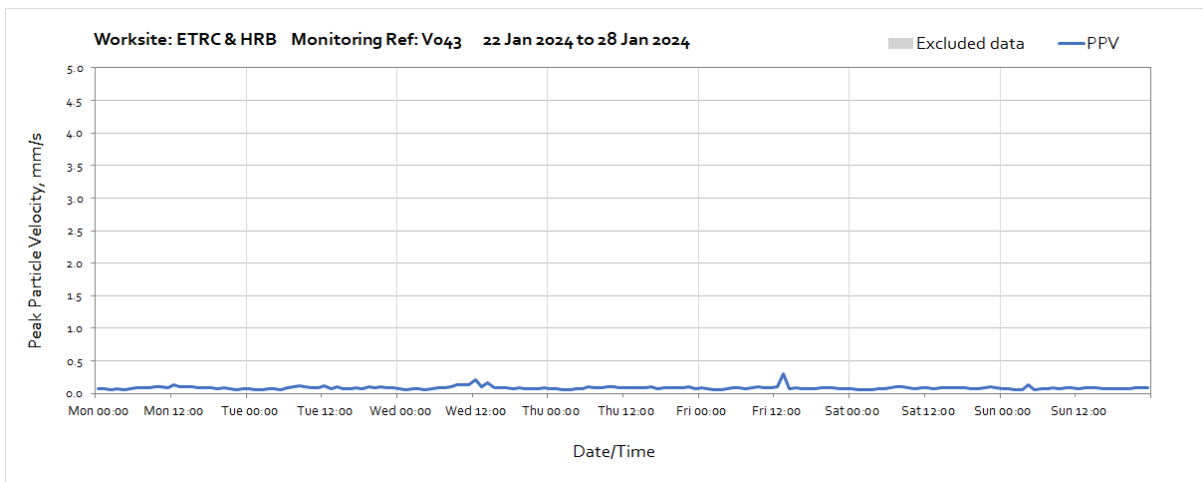
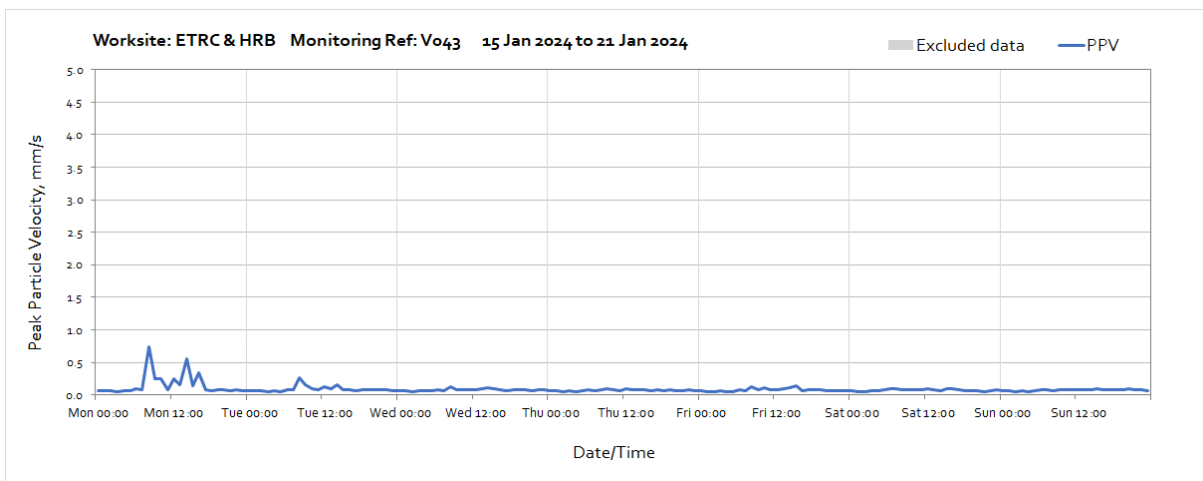


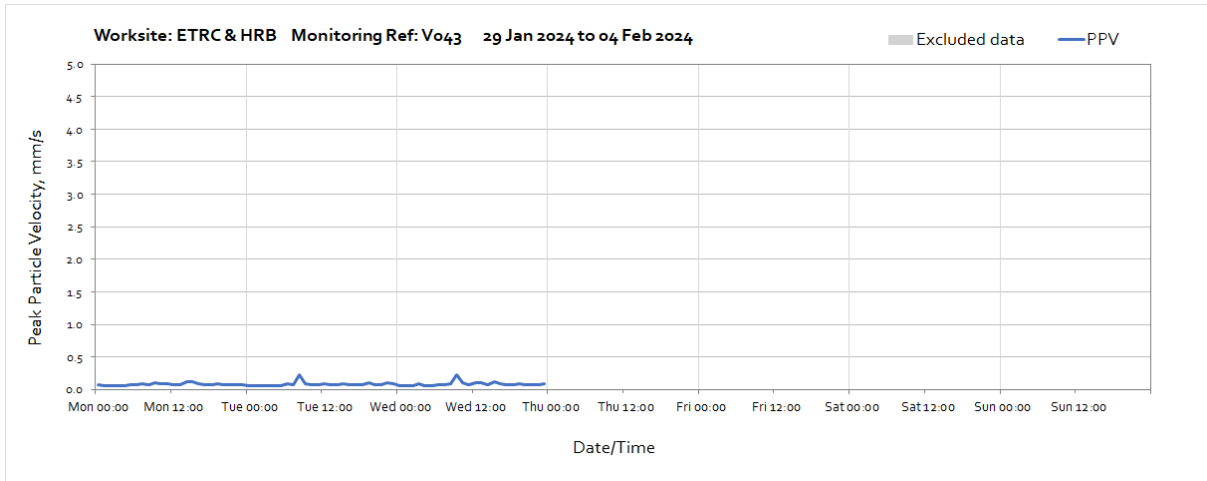


Worksite: ETRC & HRB – Monitoring Ref: V043

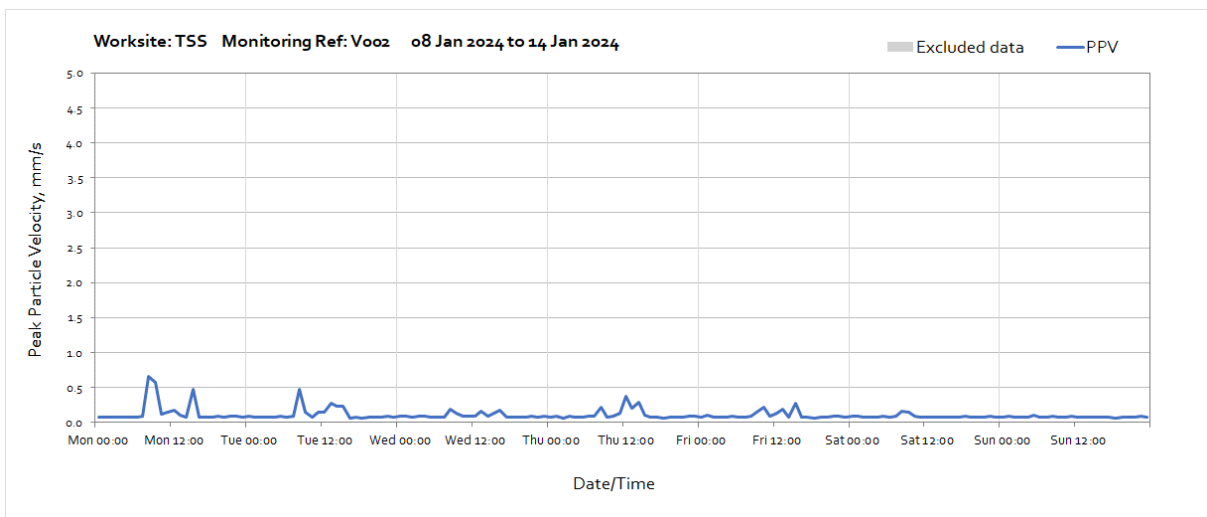
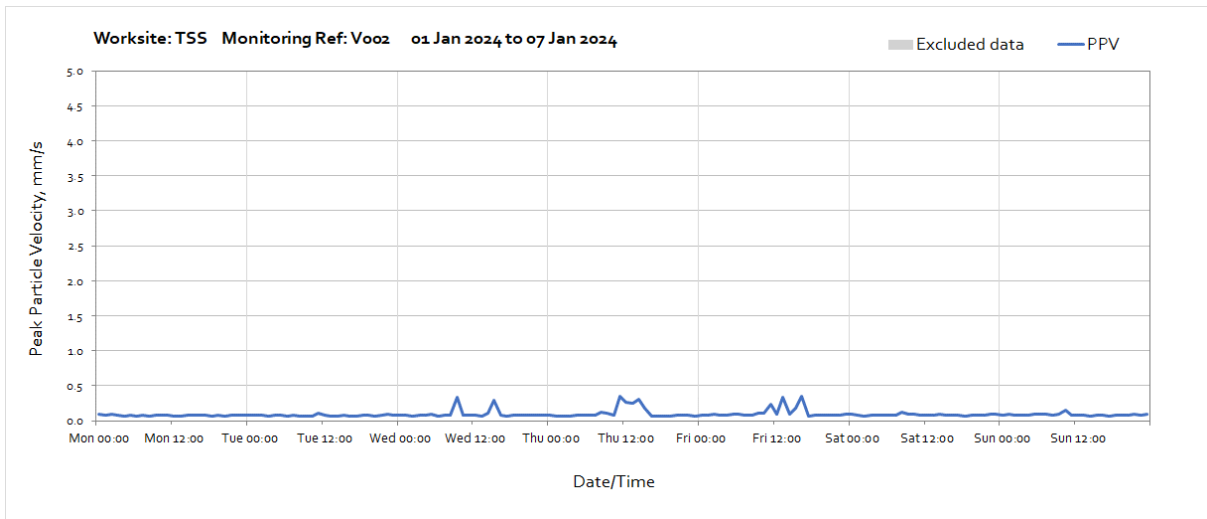


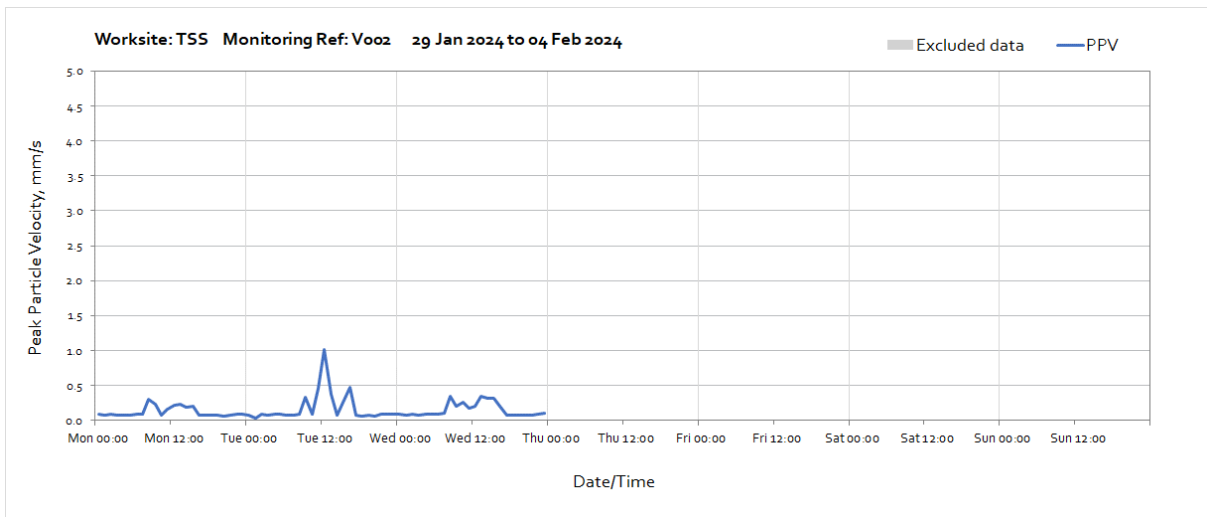
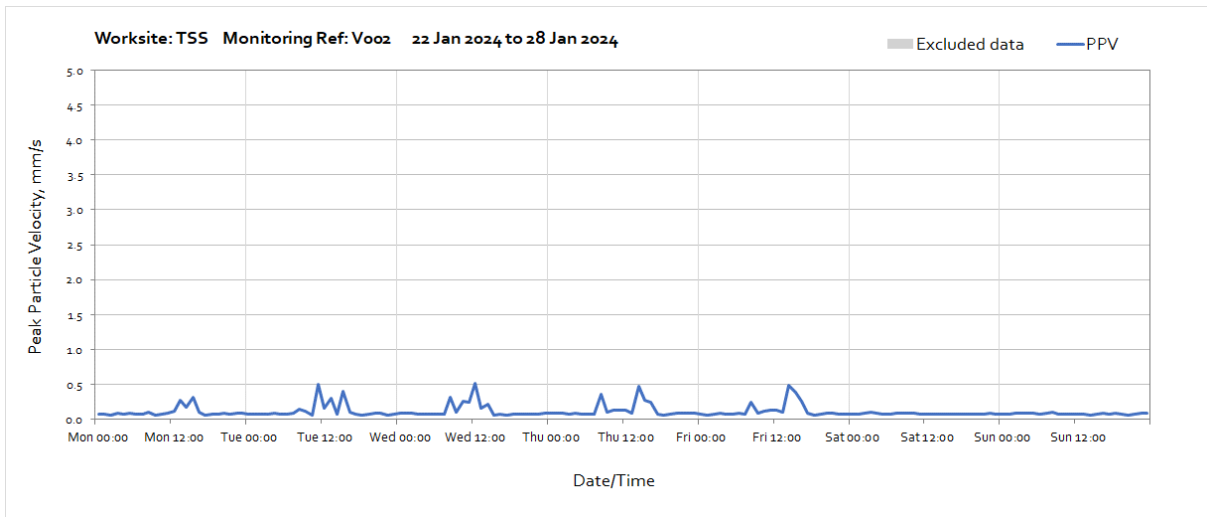
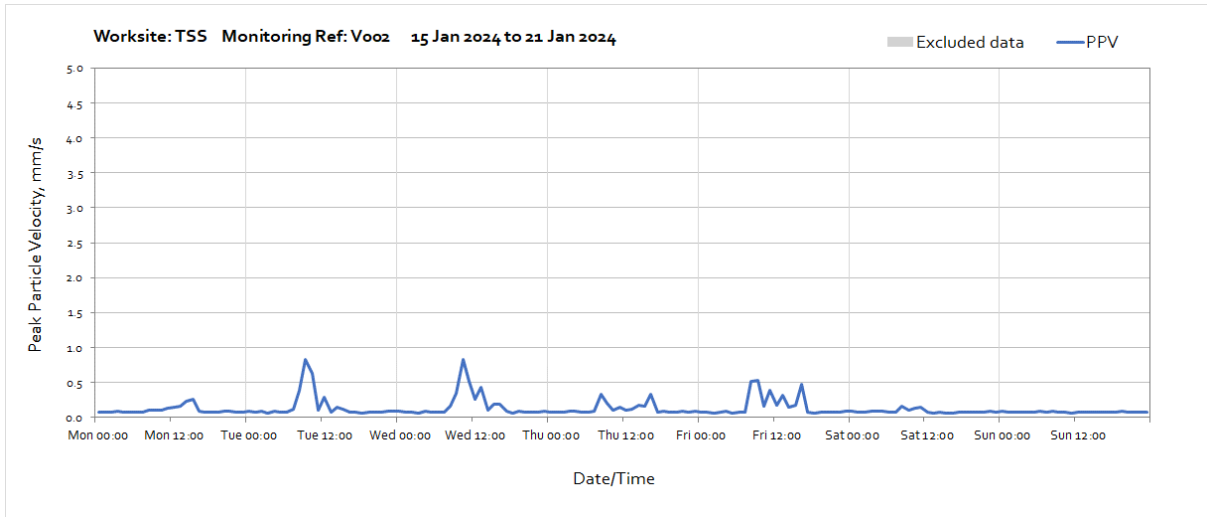
Note: Missing data from the start of the month until 9th of January at 09:00 was due to monitoring station error.



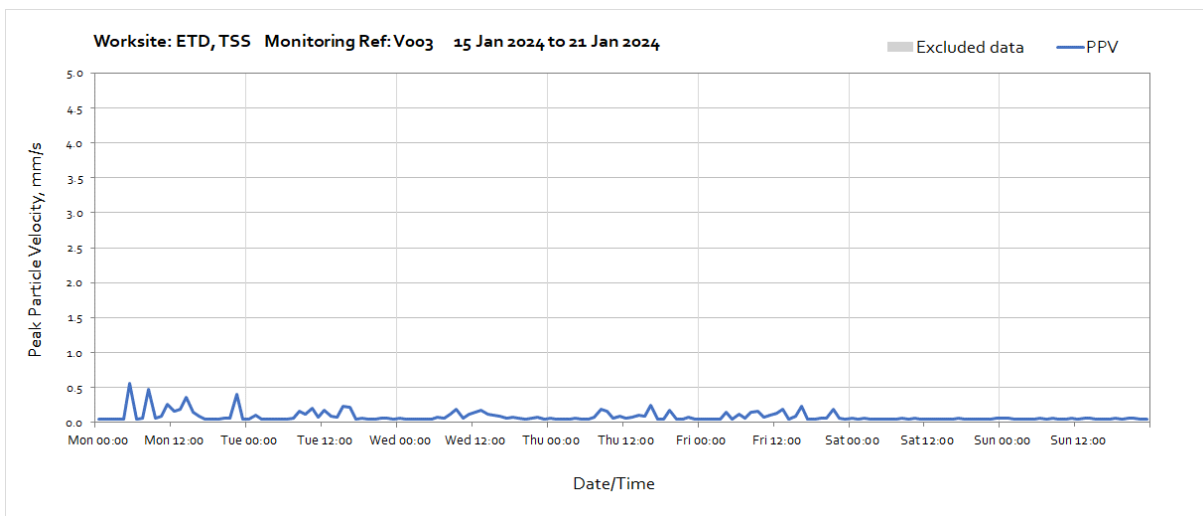
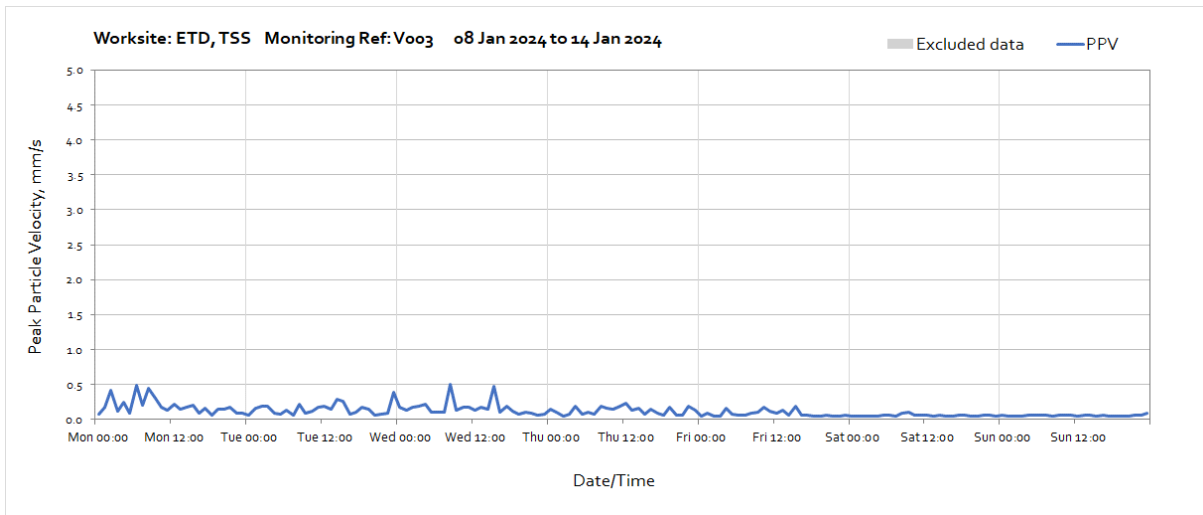
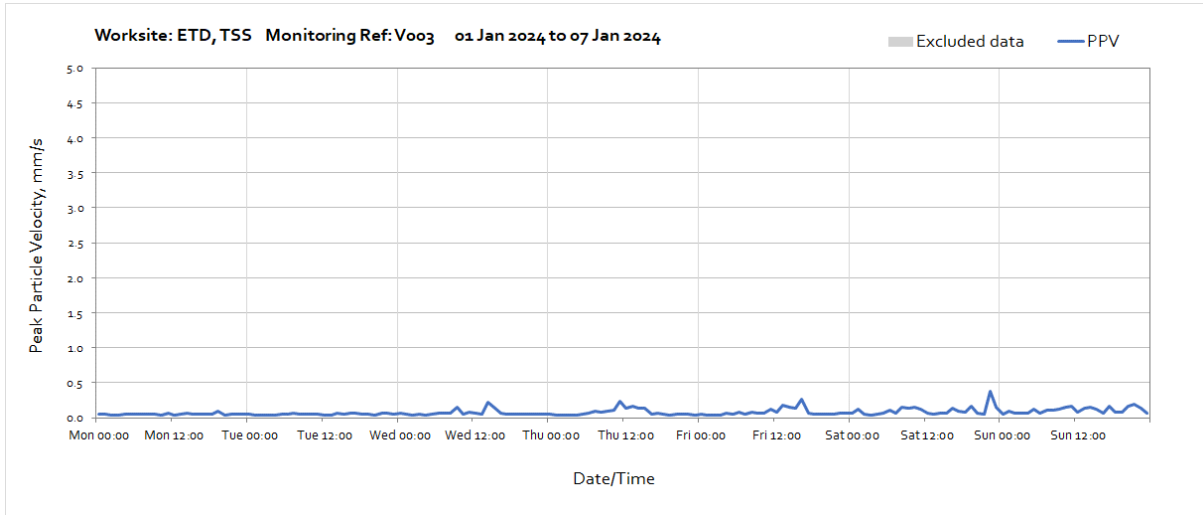


Worksite: TSS - Monitoring Ref: V002

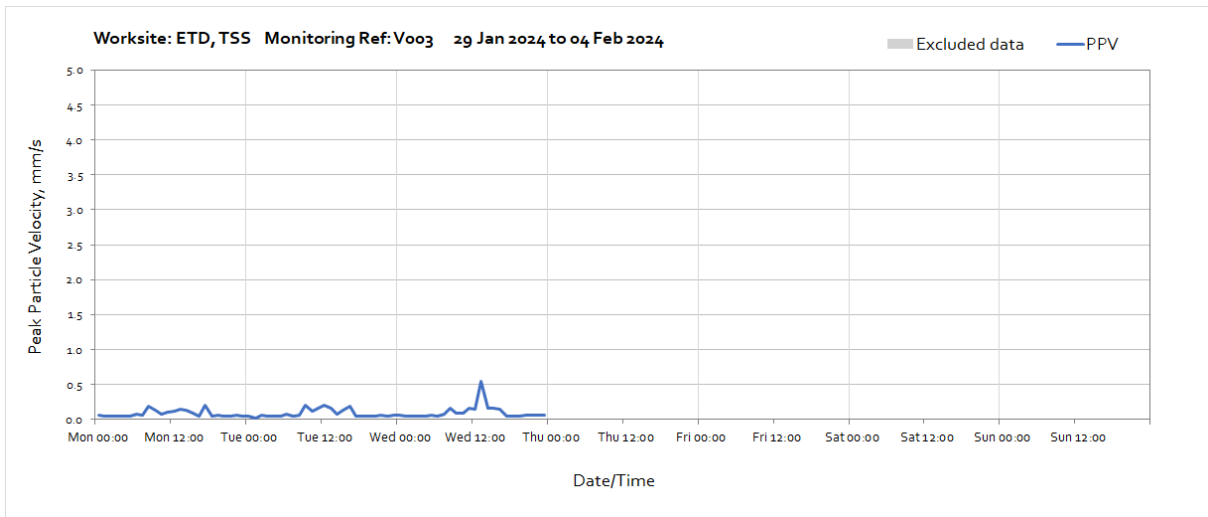
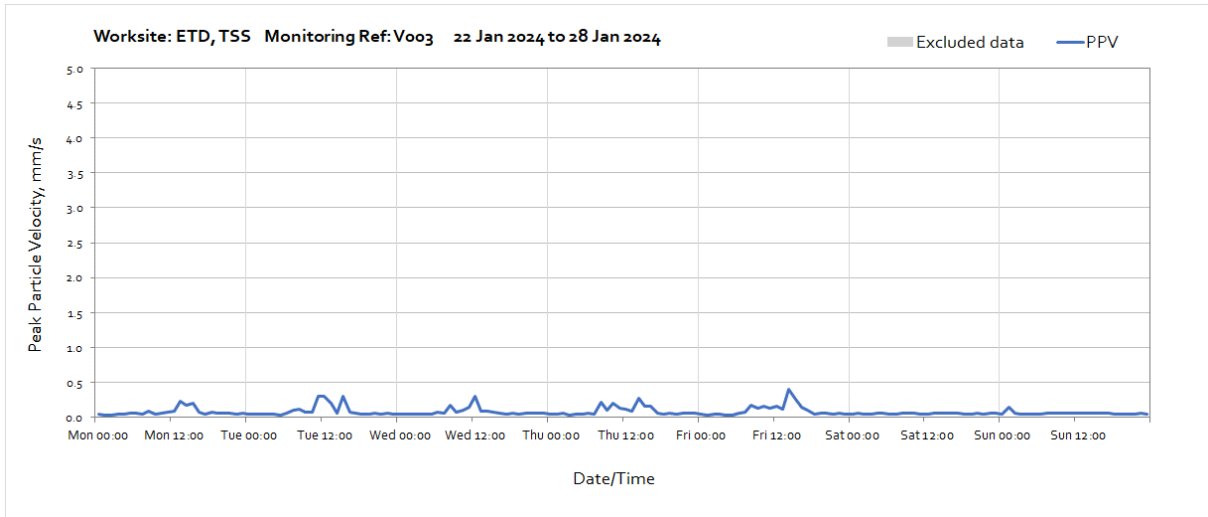




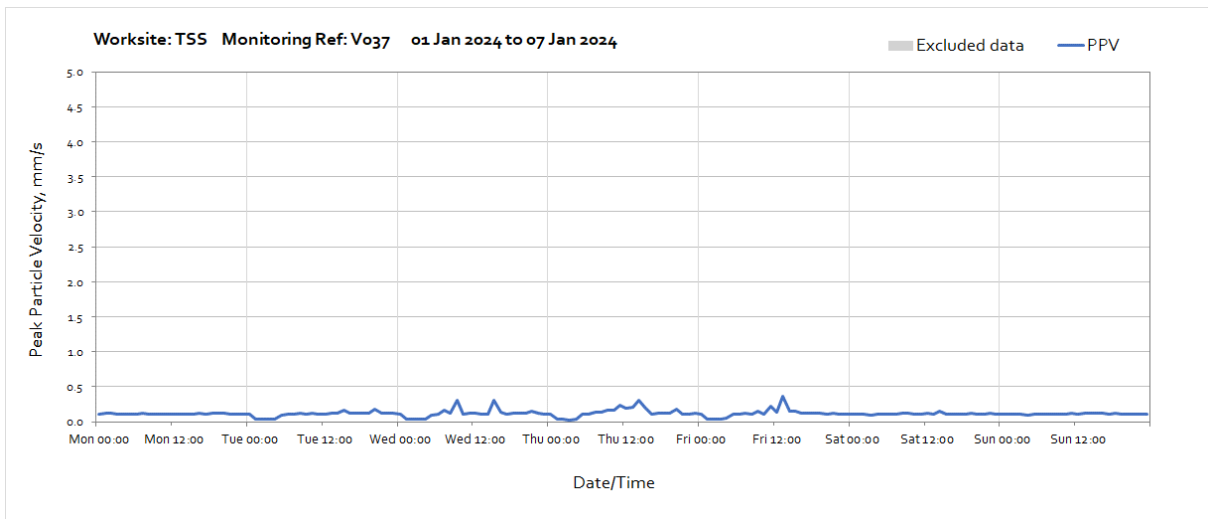
Worksite: ETD, TSS - Monitoring Ref: V003

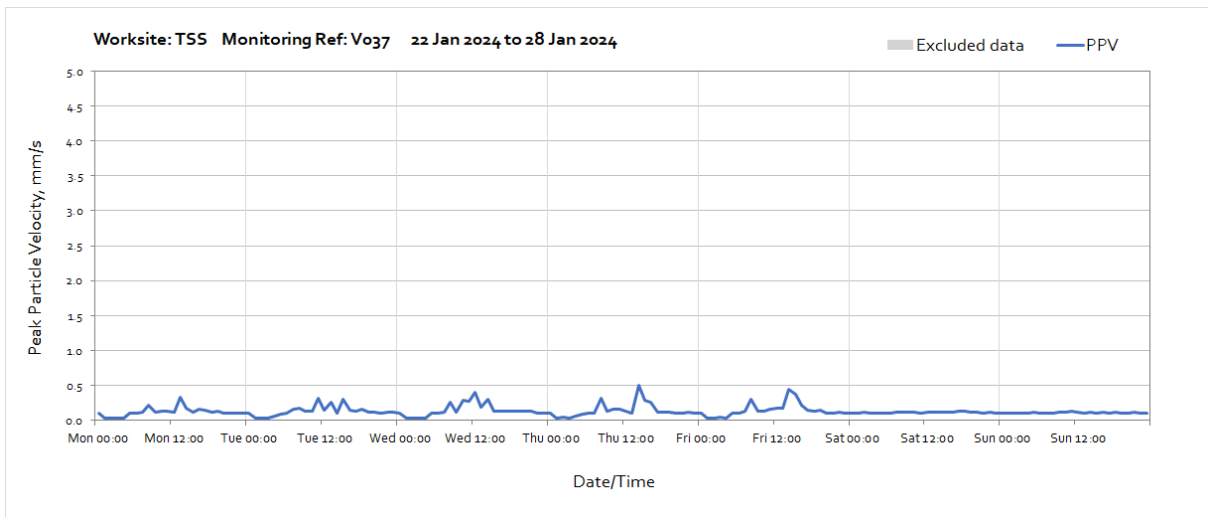
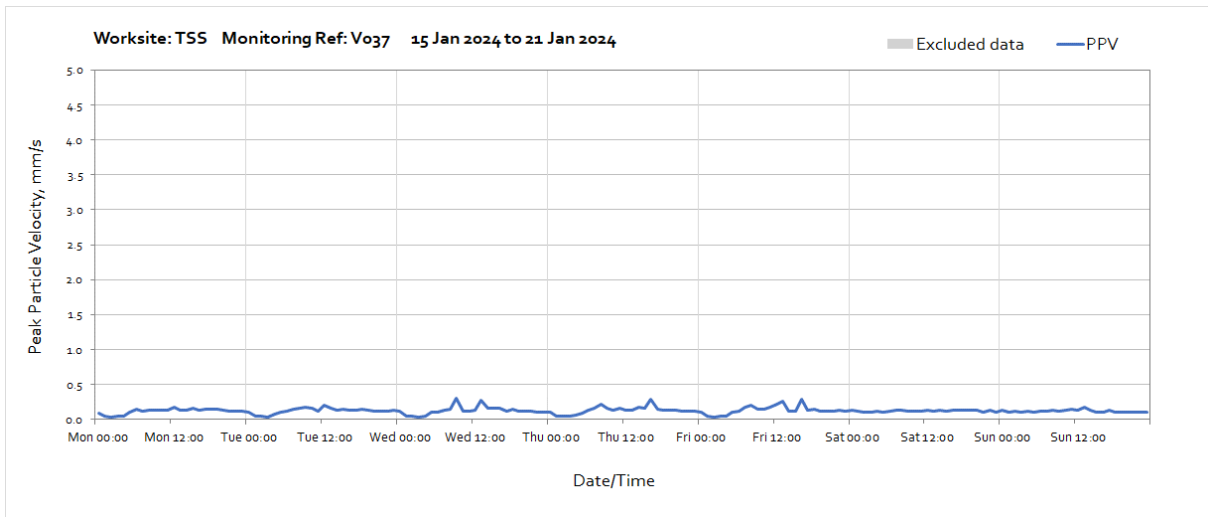
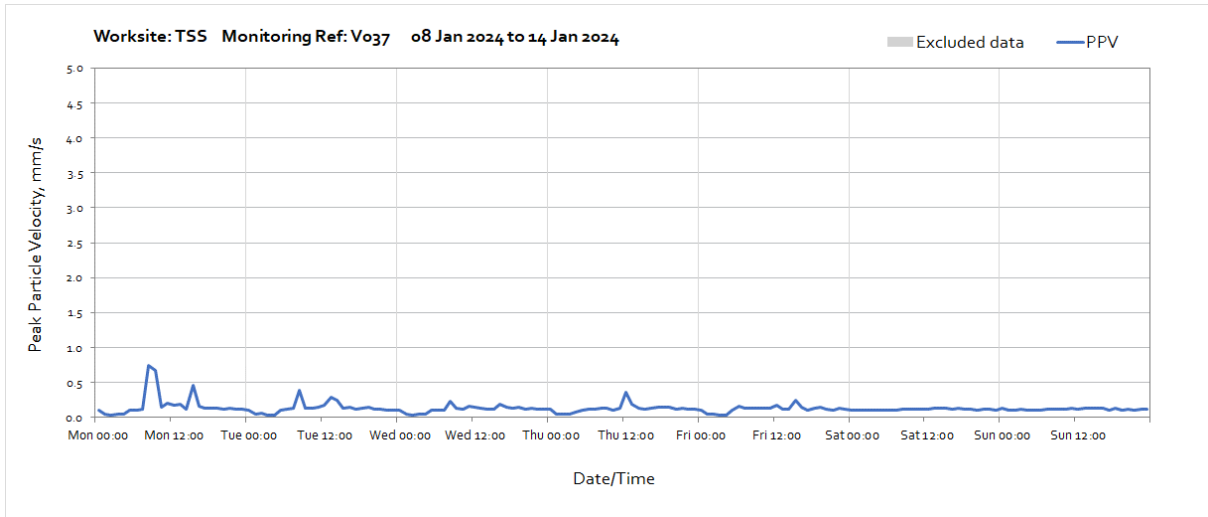


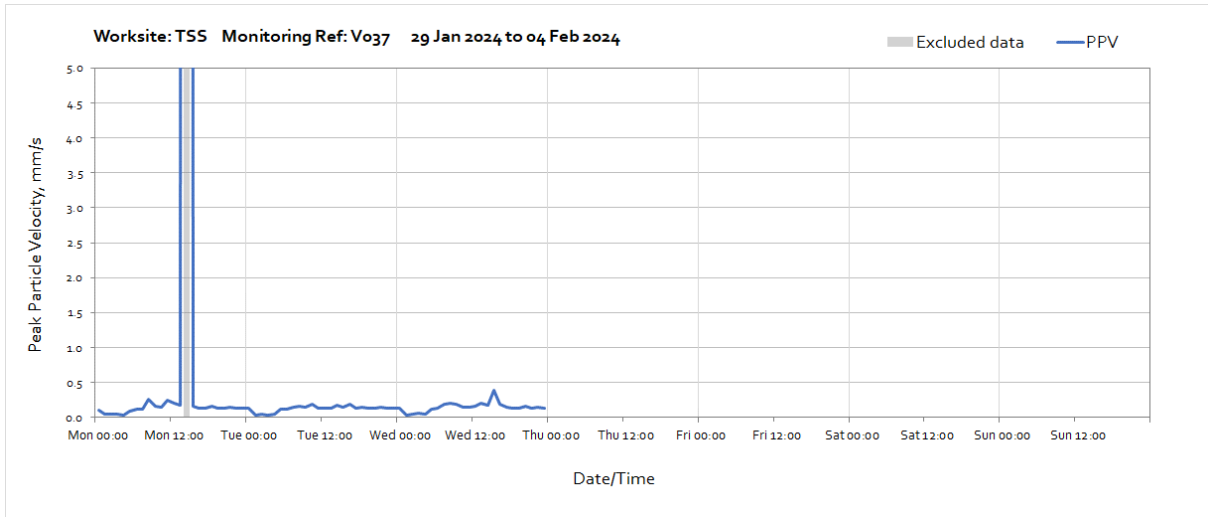
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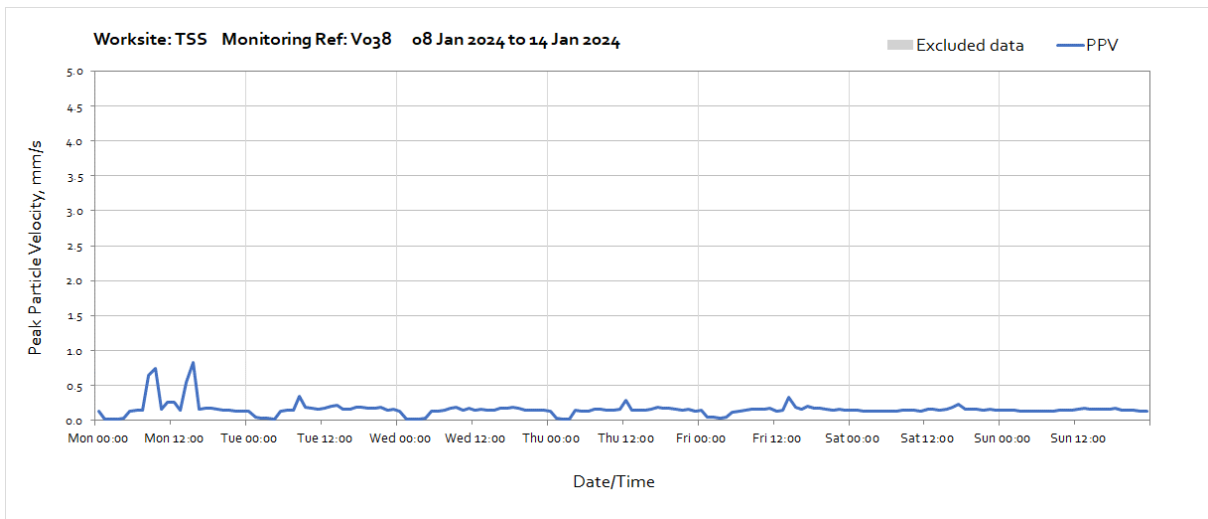
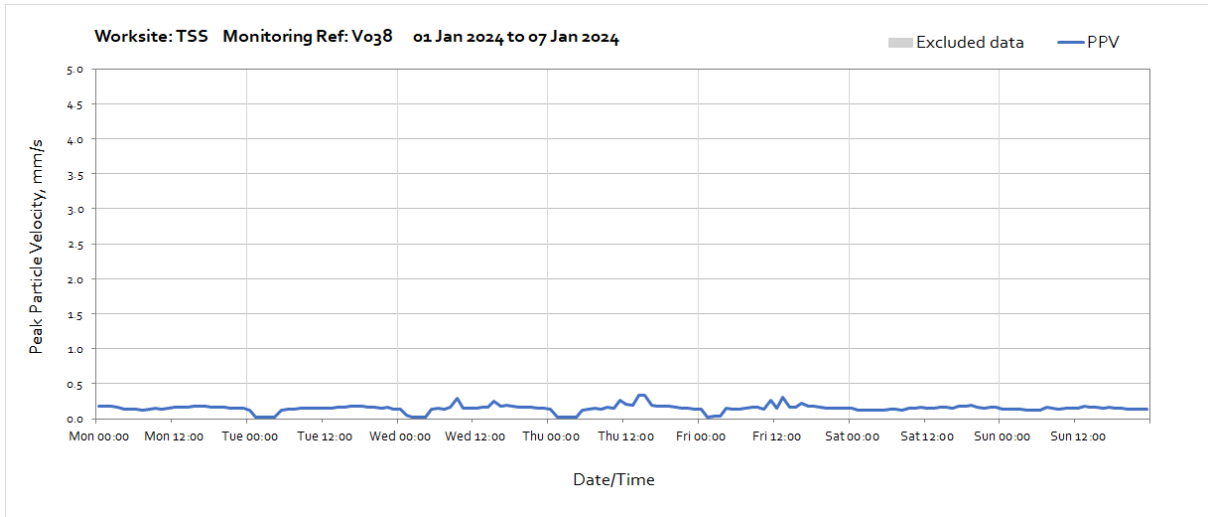
Worksite: TSS - Monitoring Ref: V037

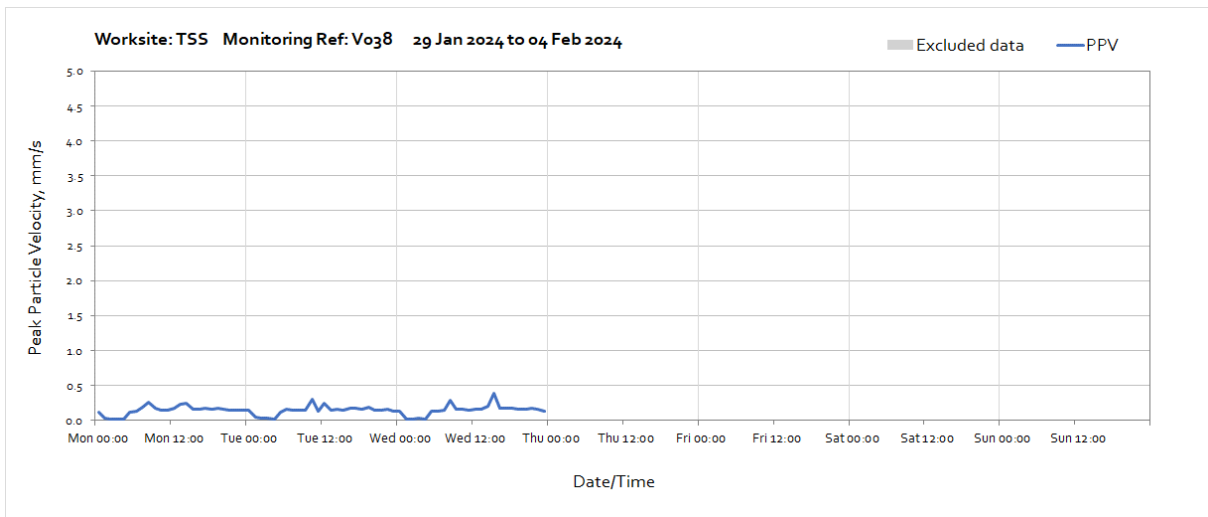
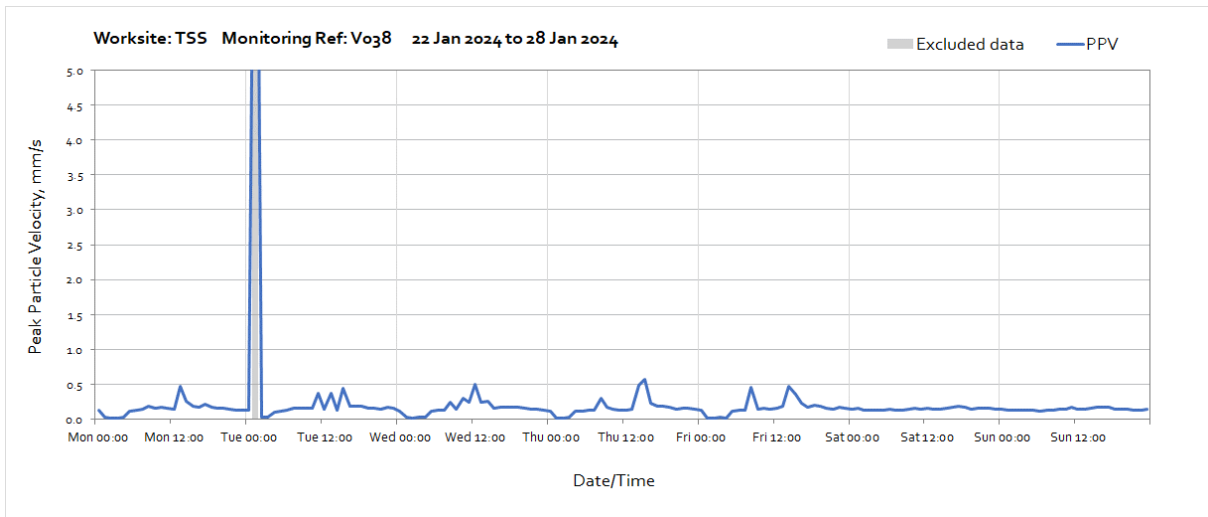
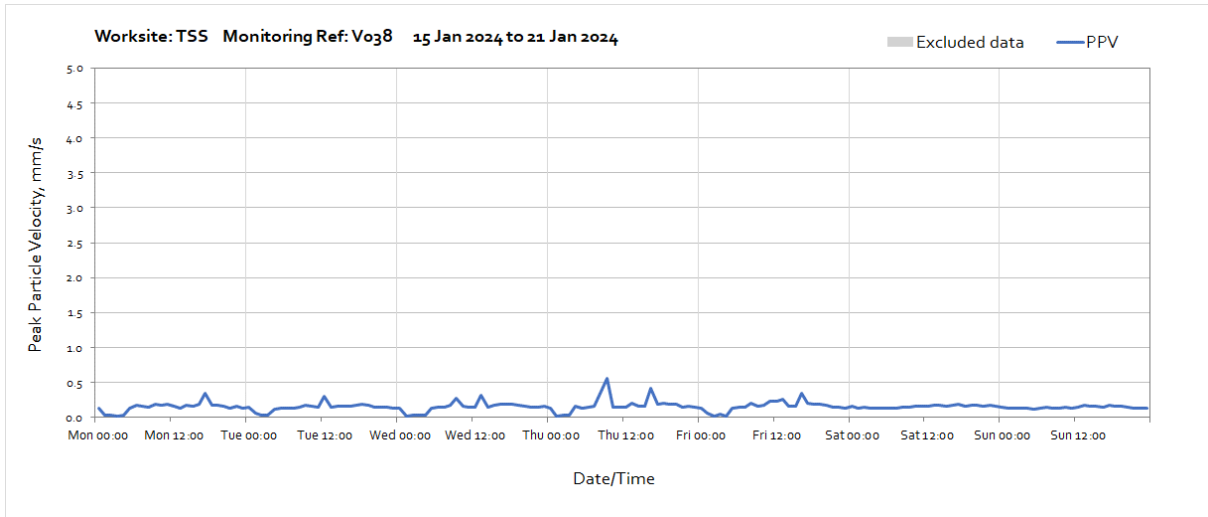




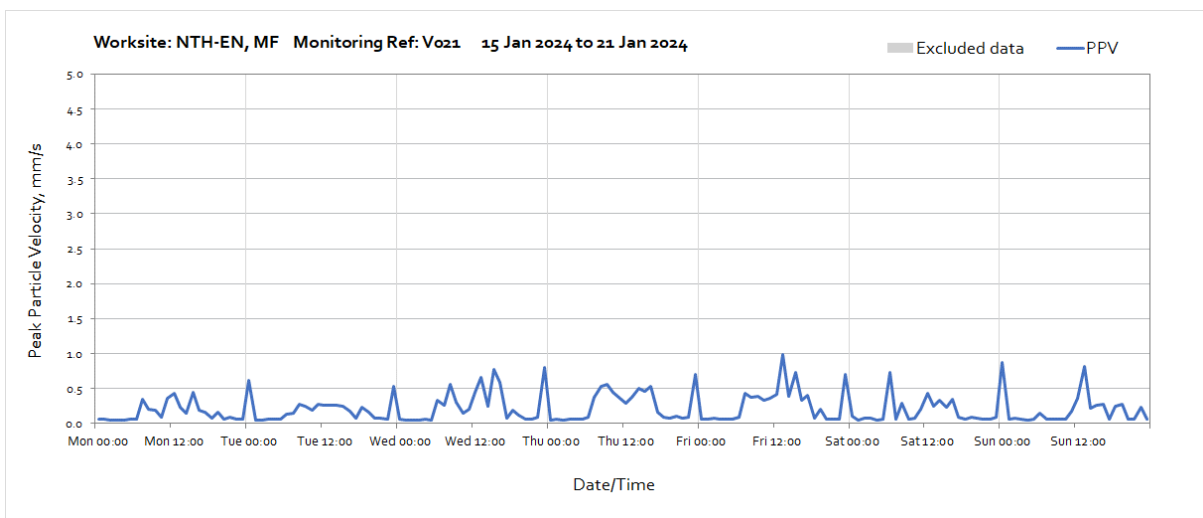
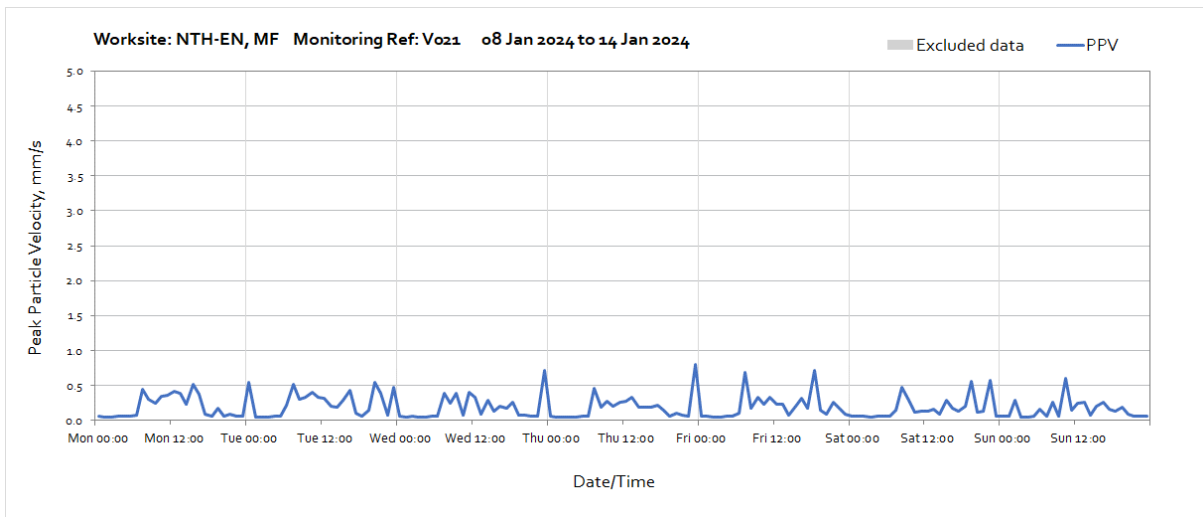
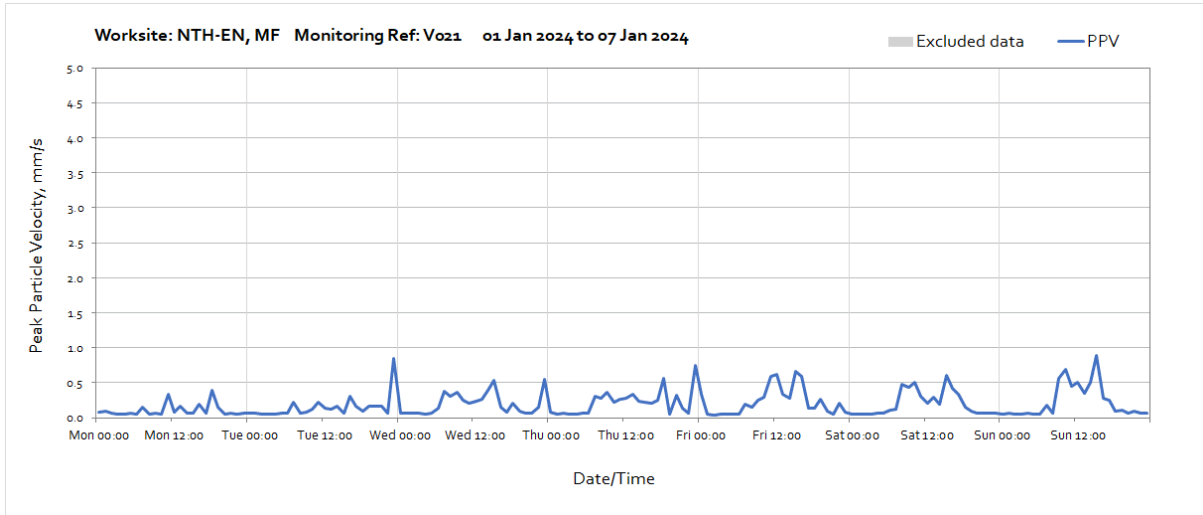


Worksite: TSS - Monitoring Ref: V038

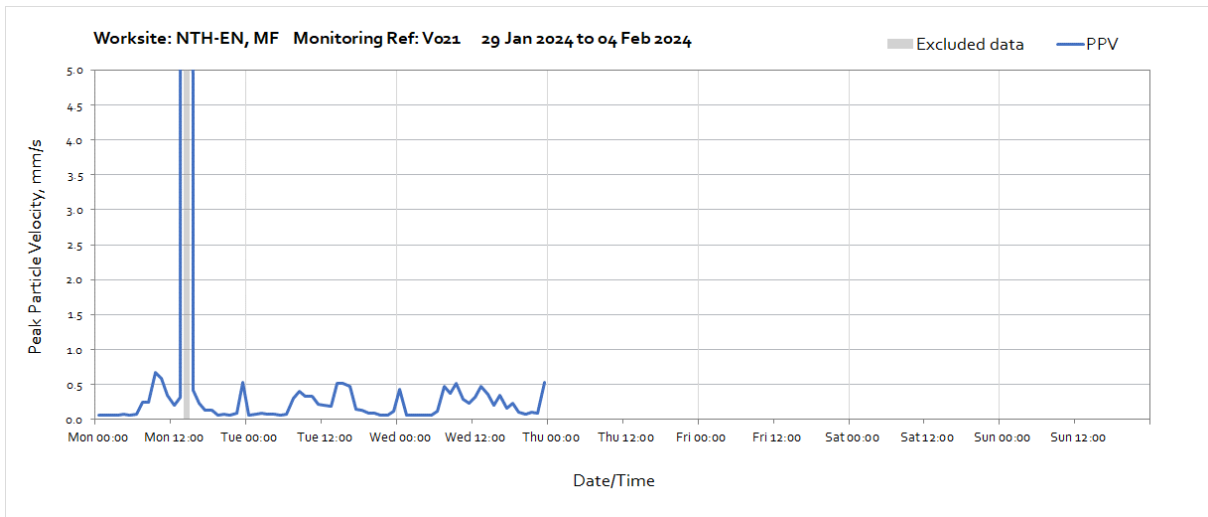
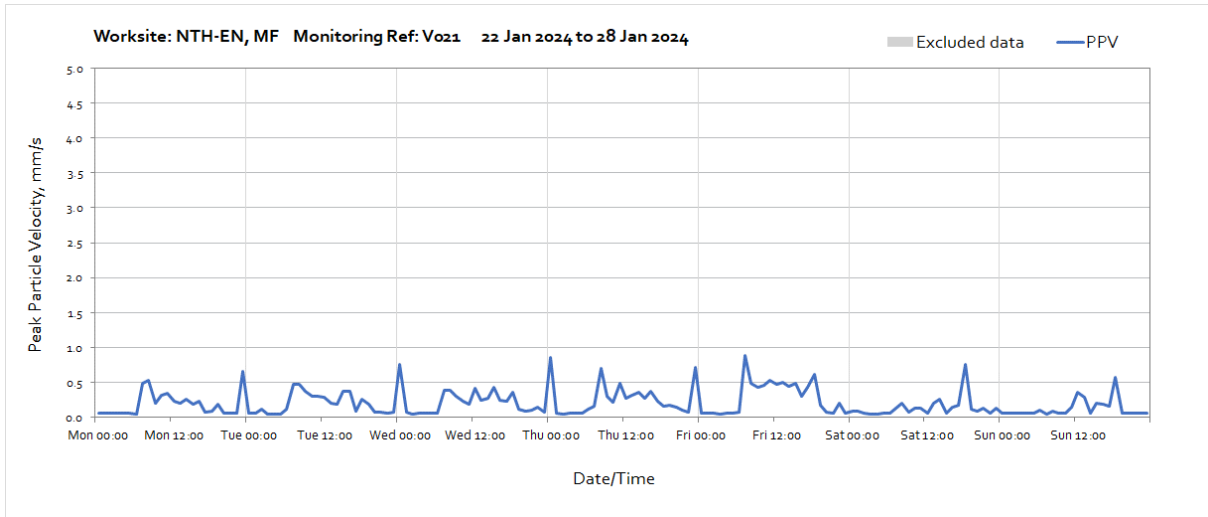




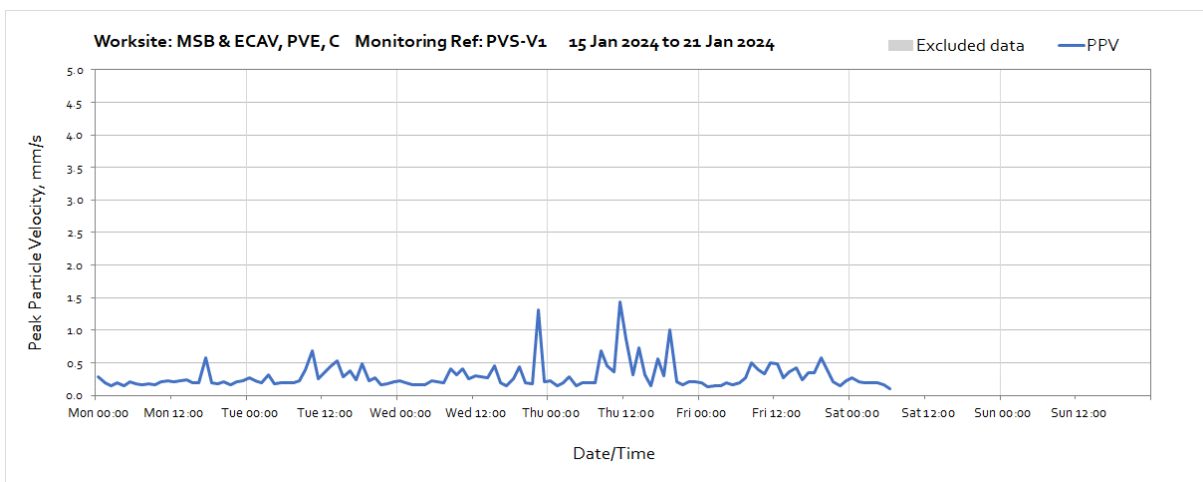
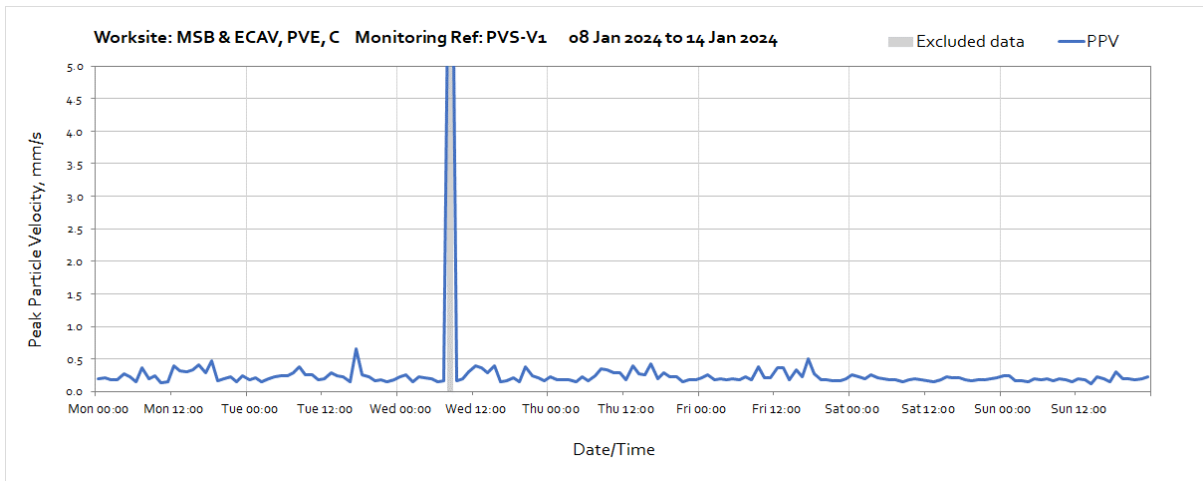
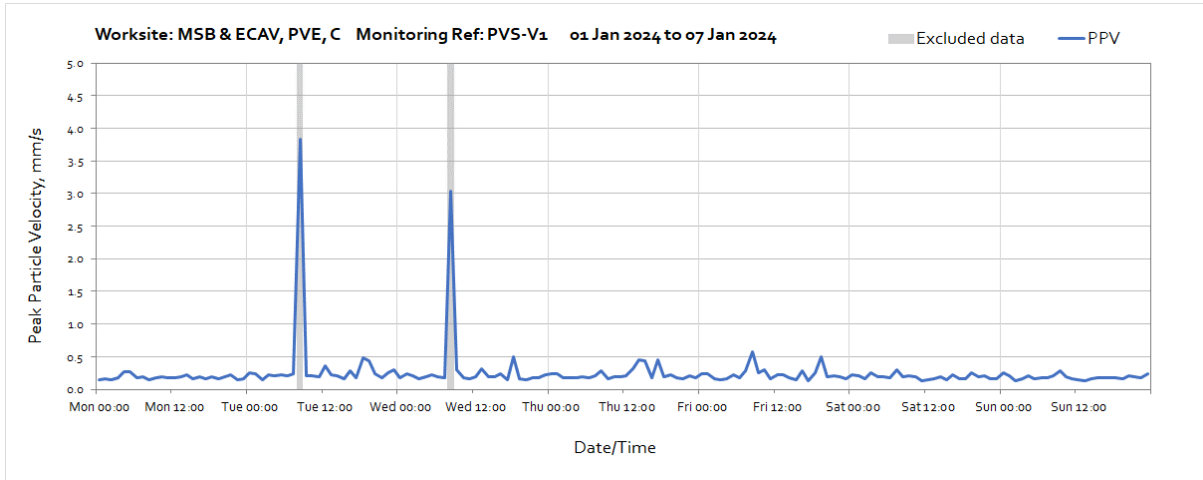
Worksite: NTH-EN, MF - Monitoring Ref: V021



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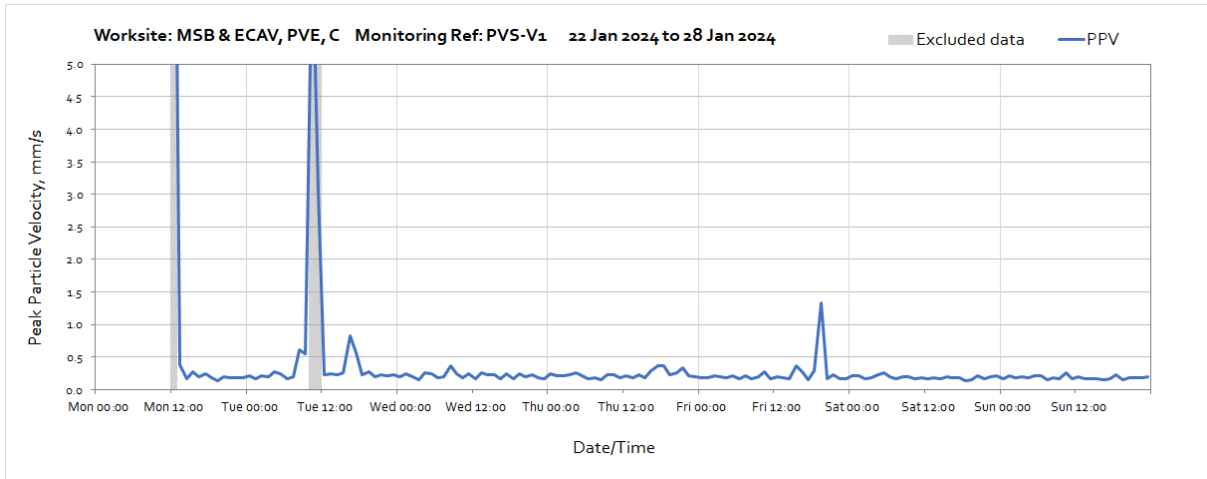


Worksite: MSB & ECAV, PVE, C - Monitoring Ref: PVS-V1

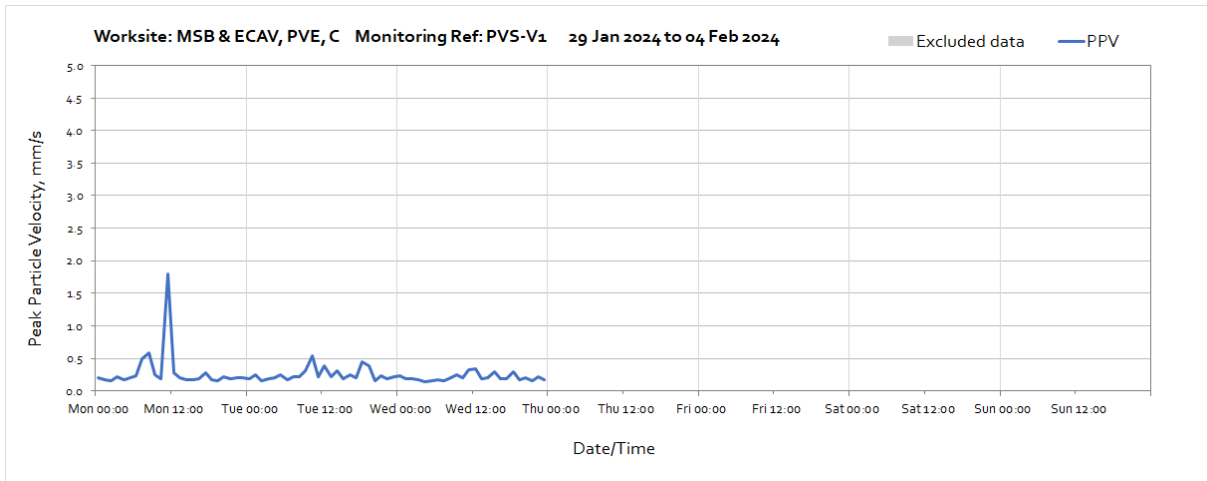


Note: Missing data from 20th of January at 07:00 until 23:00 was due to loss of power at the monitoring station.

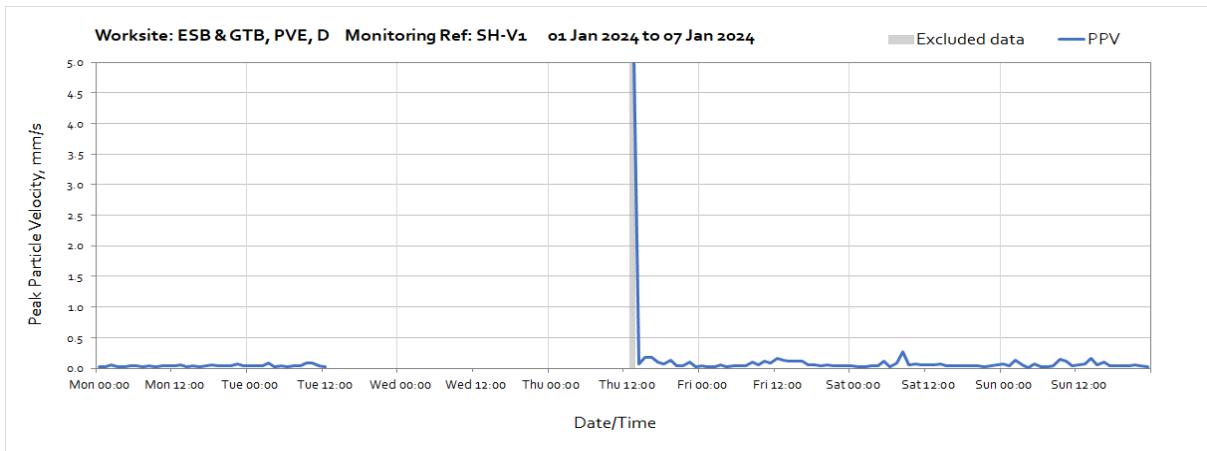
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Note: Missing data from 21st of January at 00:00 until 22nd of January at 11:00 was due to loss of power at monitoring station.

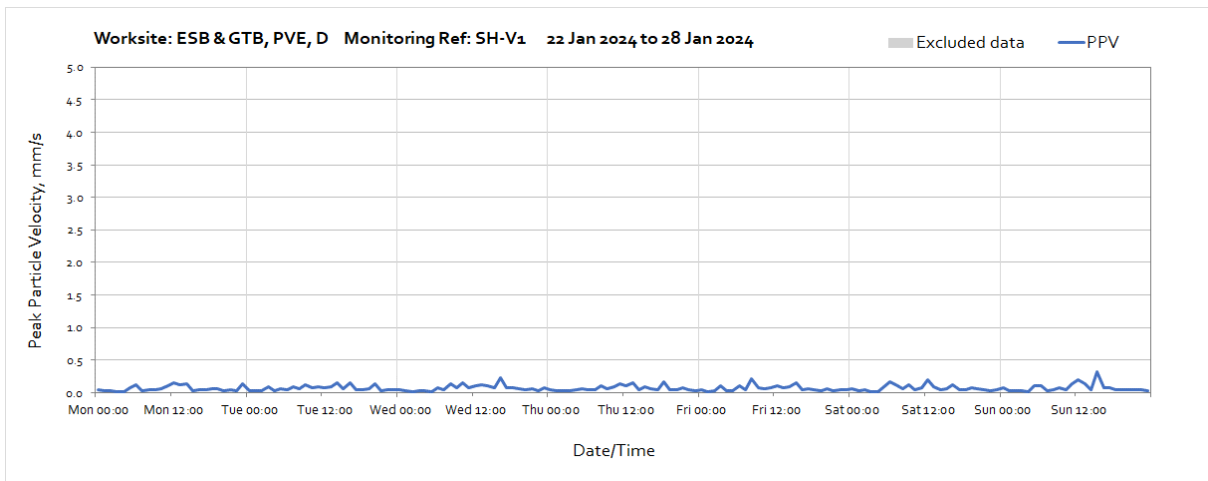
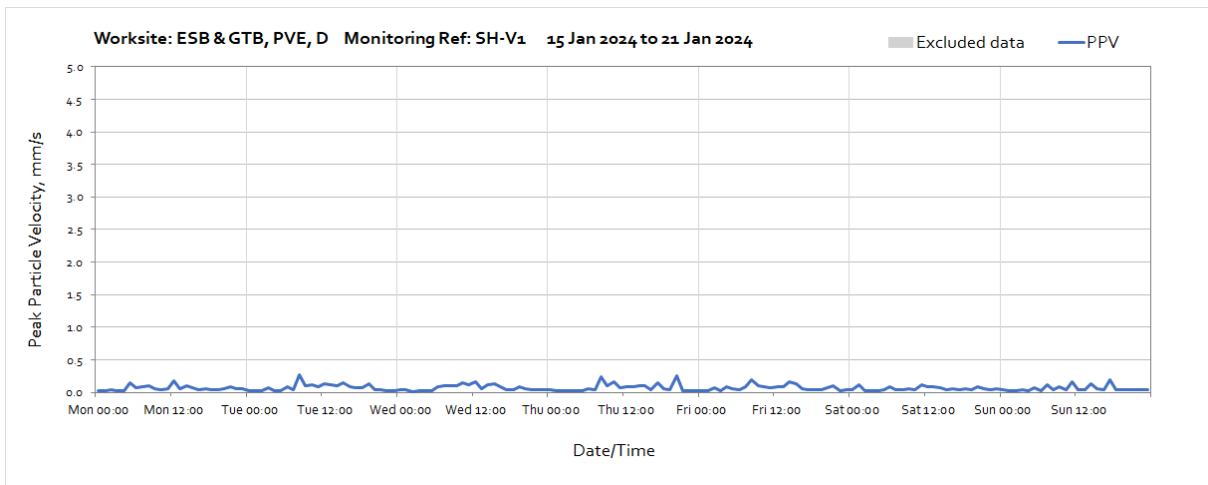
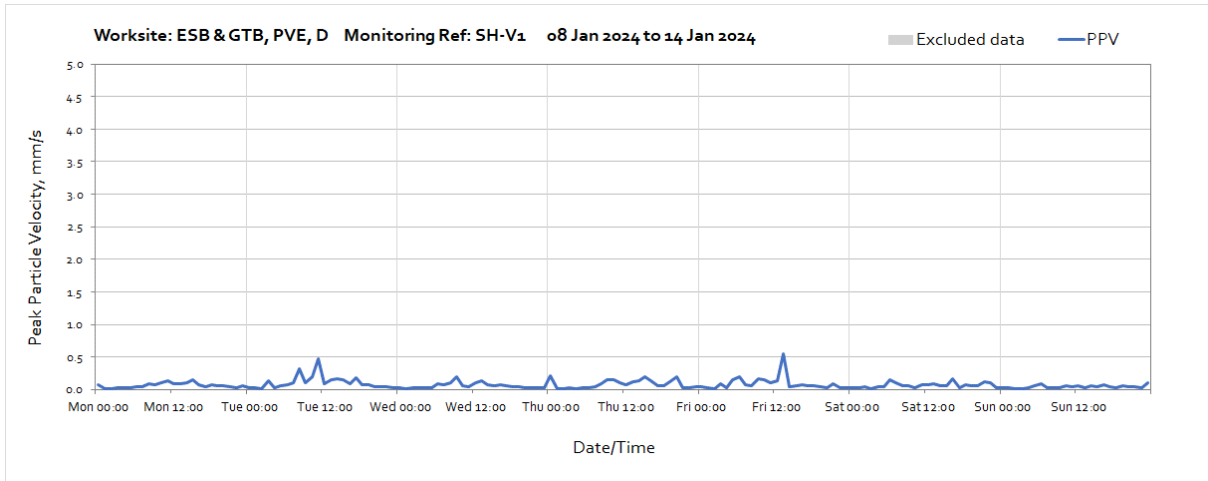


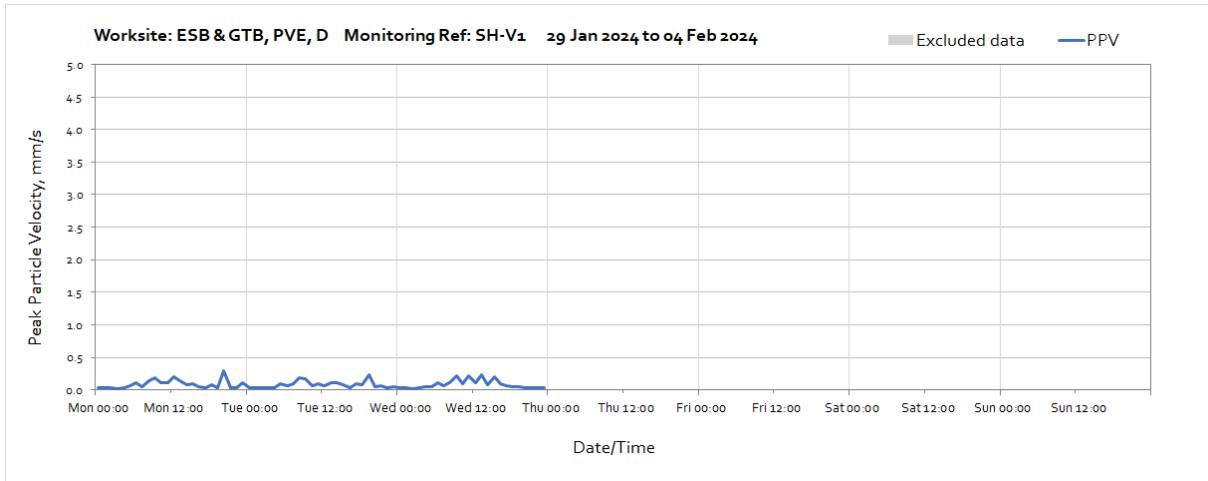
Worksite: ESB & GTB, PVE, D – Monitoring Ref: SH-V1



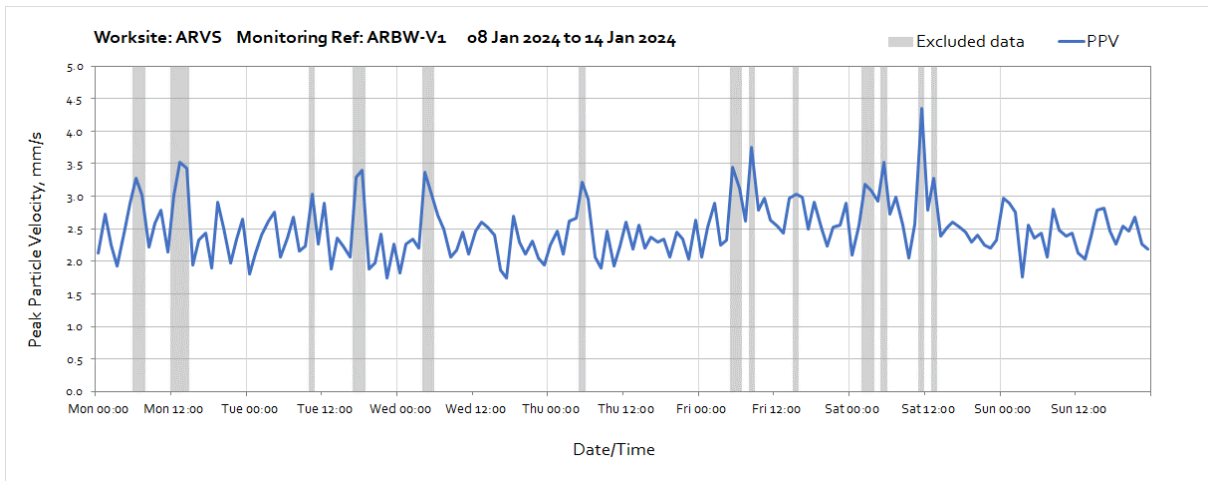
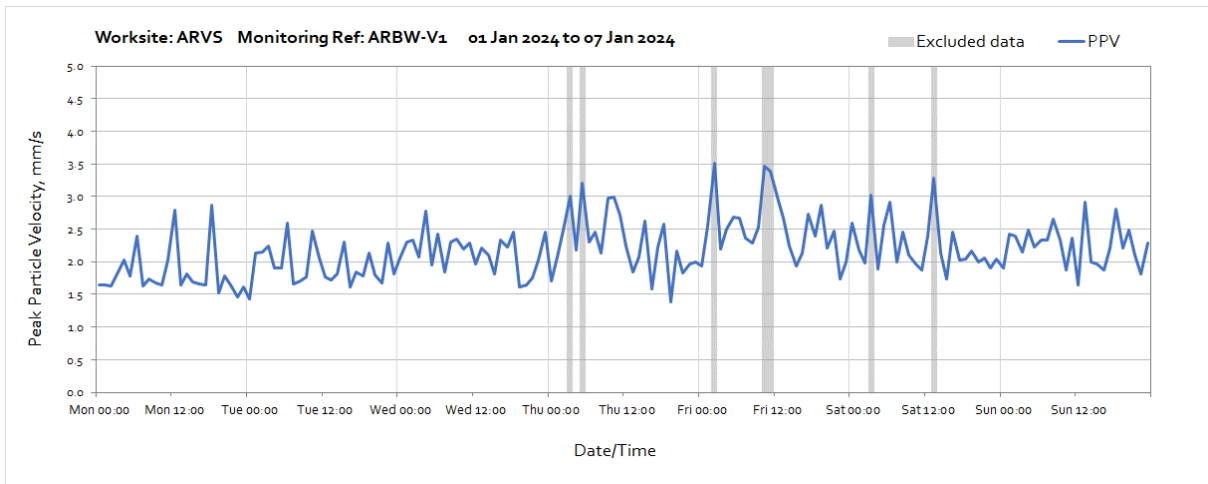
Note: Missing data from 2nd of January at 13:00 until 04th of January at 12:00 was due to loss of power at monitoring station.

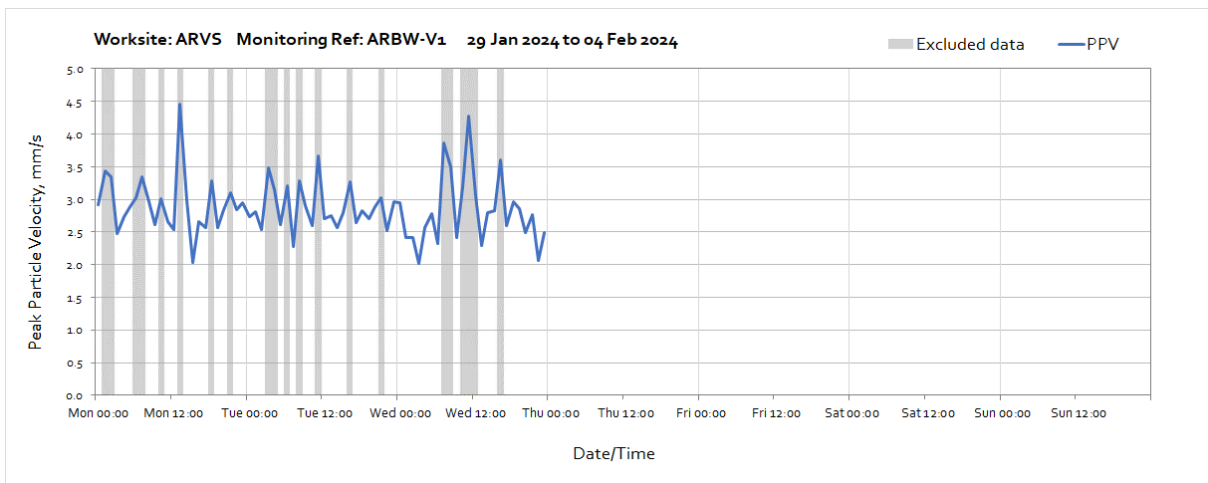
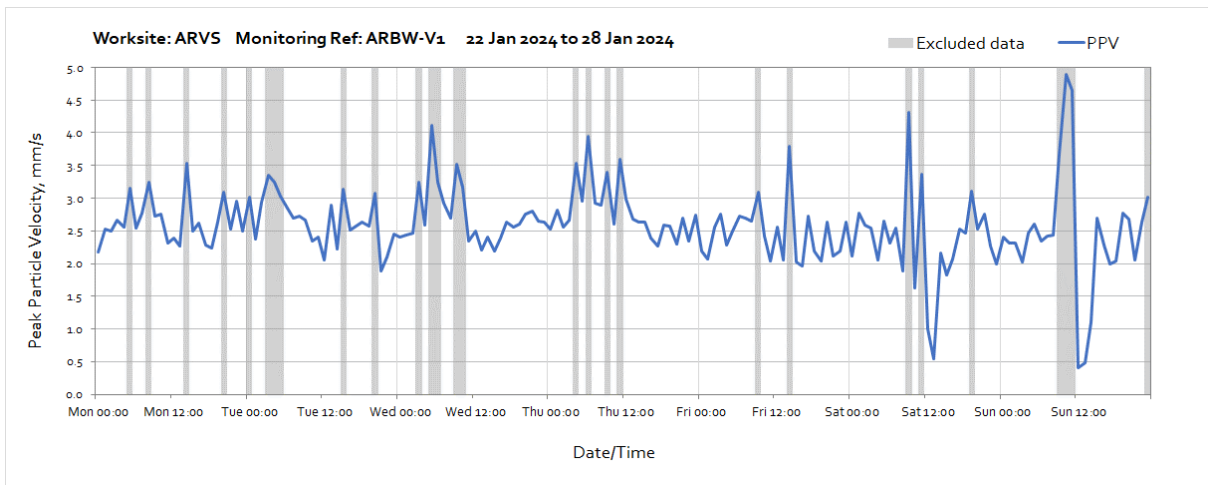
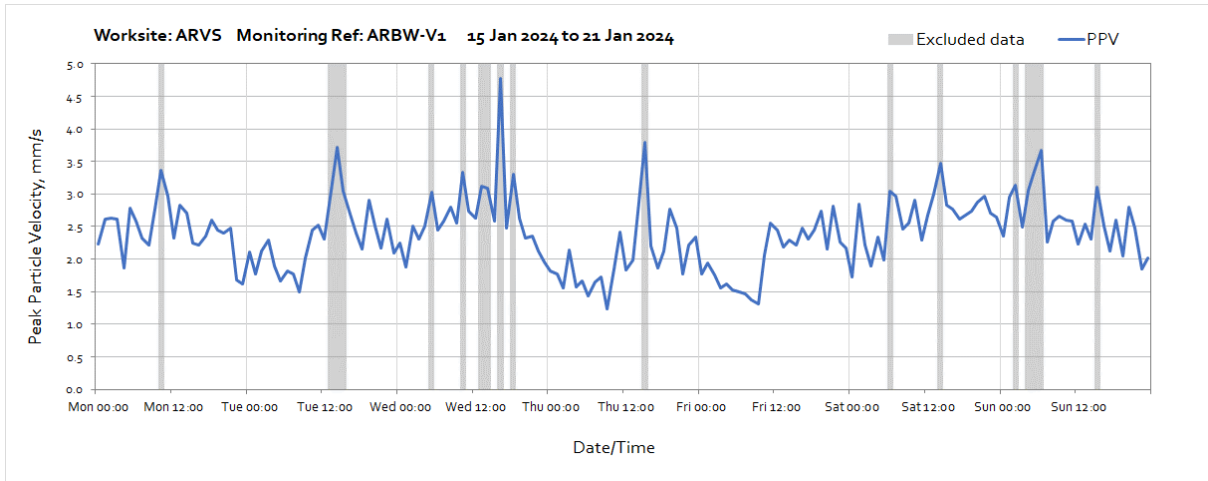
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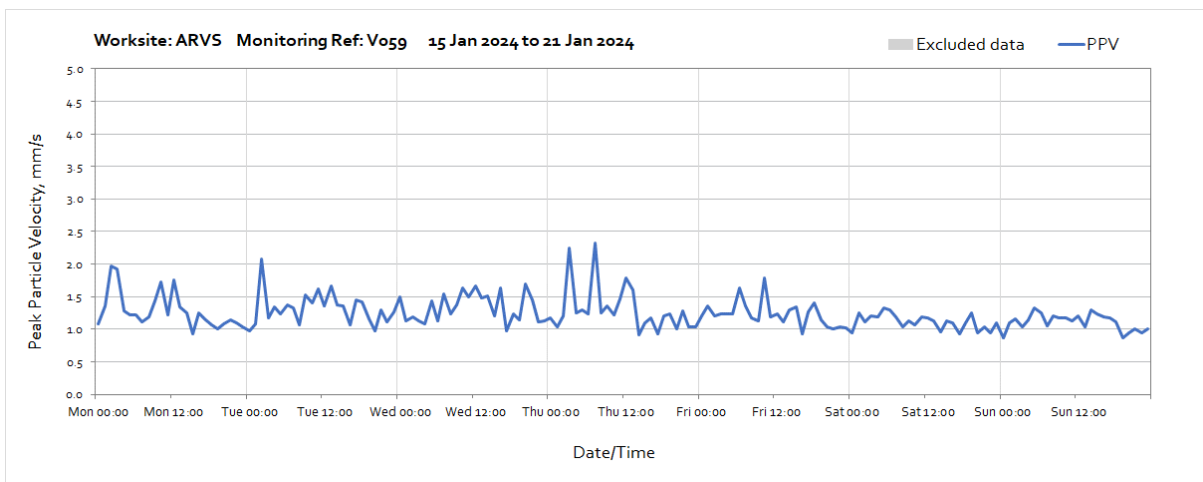
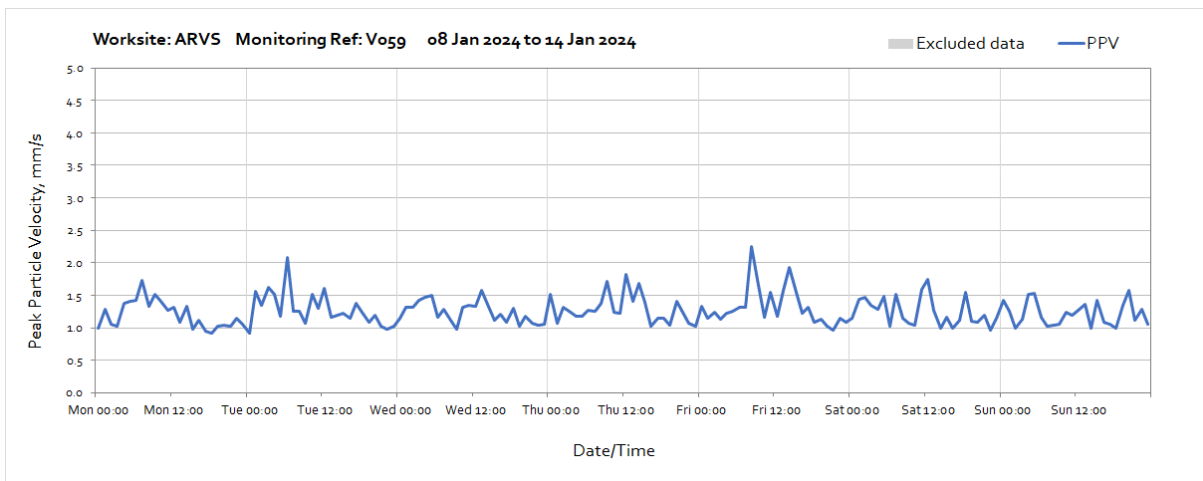
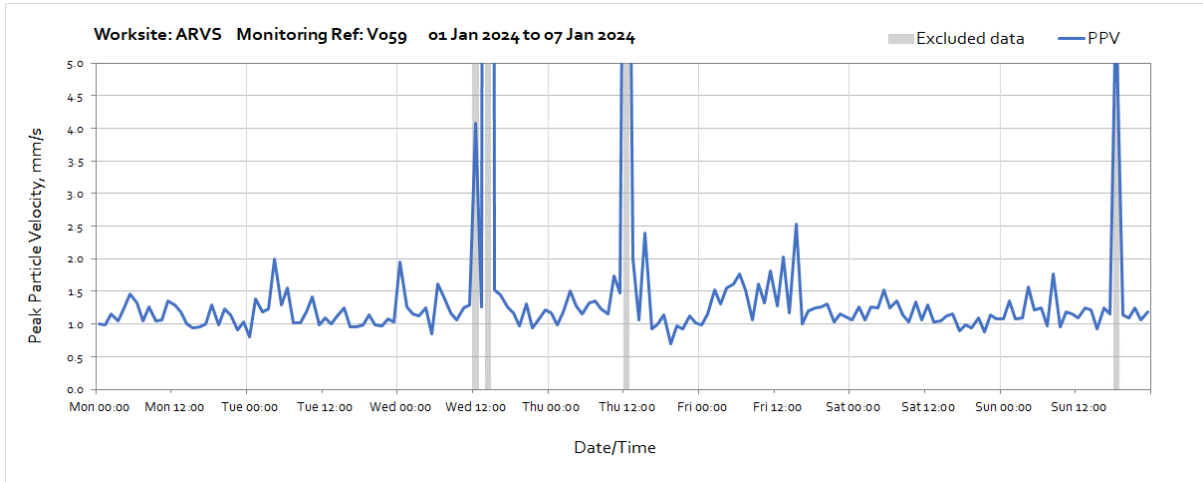


Worksite: ARVS – Monitoring Ref: ABRW-V1





Worksite: ARVS – Monitoring Ref: V059



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