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UNIT 19
BAKERS PARK
BRISTOL

NOISE ASSESSMENT

Technical Report: R10530-1 Rev 1

Date: 5th March 2025

For: MTS Environmental Ltd
Filwood Green Business Park
1 Filwood Park Lane
Bristol
BS4 1ET

24 Acoustics Document Control Sheet

Project Title: Unit 19, Bakers Park, Bristol –Noise Assessment

Report Ref: R10530-1 Rev 1

Date: 5th March 2025

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For and on behalf of 24 Acoustics Ltd				

Document Status and Approval Schedule

Revision	Description	Prepared By	Reviewed By	Approved By
0	Approved for issue	Kiel Edwards	Reuben Peckham	Reuben Peckham
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1.0 INTRODUCTION

1.1 24 Acoustics Ltd has been instructed by MTS Environmental Ltd, on behalf of PH Waste Management Ltd, to undertake an assessment of noise from renovations of an existing waste processing facility at Unit 19, Bakers Park, Bristol.

1.2 This report presents the results of the assessment, following site visits, investigations and background noise surveys undertaken between the 7th and 12th March 2024.

1.3 All noise levels in this report are presented in dB relative to 20µPa.

2.0 SITE DESCRIPTION AND PROPOSALS

2.1 The processing facility site is located to the south of Bristol in Bakers Park, an industrial site with mixed use. Neighbouring uses include a scrap yard/car dealership, auto repair/recovery centre and storage warehouse.

2.2 Unit 19 is on the northern boundary of Barkers Park with neighbouring industrial uses to the south, east and west. The existing building on the site comprises a standard panel design with large shutter door openings to the south of the building.

2.3 The site overlooks allotments to the north with residential properties located further north, northeast and northwest on Headley Lane. The nearest residential properties are described below and identified in Figure 1.

- Receptor 1: 30 Headley Road, approximately 95m northwest of the site.
- Receptor 2: 249 Headley Road, approximately 120m northeast of the site.
- Receptor 3: 252 to 284 Headley Road, approximately 100m north of the site.

2.4 The site is currently used for the processing of mixed waste, specifically persistent organic pollutants (POPs). The proposed permit variation will allow material to be processed by a shredder. The material will then be processed through an eddy current separator to remove ferrous materials. Processed material will be held in storage bays for later transport off site.

2.5 Following the installation of the new plant, a new building will be constructed around the existing building to house the shredding and processing operations. The site will operate for a period of time within the existing building only, having one of the shredders located outside the main building, within an enclosure. Therefore, this assessment considers noise from operations within the current building and the future building, as detailed in following sections.

2.6 A permanent 4m high solid fence is located to the site's eastern boundary. Further 2m high barriers are proposed to the western and northern boundaries.

2.7 The proposed hours of operation at the site are 07:00 to 23:00 Monday to Friday with no processing operations on weekends.

2.8 Figure 1 shows the site location and surrounding area. Figure 2 shows the proposed site layout.

3.0 CRITERIA

3.1 The following represents current relevant guidance in relation to the proposed operations.

Environment Agency Guidance

3.2 EA guidance "Noise and vibration management: environmental permits" [Reference 1] provides guidance on how the agency will assess noise, how to manage noise and in particular how to carry out a noise impact assessment in the context of an environmental permit.

3.3 The guidance refers to BS 4142 to assess noise from industrial processes. It describes how the level of impact relates to BS 4142 descriptors and this is summarised below.

- *Unacceptable level of audible or detectable noise – this level of noise means that significant pollution is being or is likely to be caused at a receptor and you must take further action to reduce or stop operations. The closest corresponding BS 4142 descriptor is 'significant adverse impact'.*

- *Audible or detectable noise – this level of noise means that noise pollution is being (or is likely to be) caused at a receptor – your duty is to use appropriate measures to prevent or minimise noise. You are not in breach if you are using appropriate measures. The closest corresponding BS 4142 descriptor is 'adverse impact'.*

- *No noise, or barely audible or detectable noise – this level of noise means that no action is needed beyond basic appropriate measures. The closest corresponding BS 4142 descriptor is 'low impact or no impact' following consideration of context. The agency may decide that taking action to minimise noise is a low priority.*

BS 4142:2014+A1:2019 - Methods for Rating Industrial and Commercial Sound

3.4 BS 4142:2014+A1:2019 [Reference 2] provides a method for rating the effects of industrial and commercial sound on residential areas.

3.5 The standard advocates a comparison between the representative measured L_{A90} background noise level and L_{Aeq} noise level from the source being considered. For rating purposes if the noise source is tonal, intermittent or otherwise distinctive in character, a rating correction should be applied.

3.6 The standard states that a difference between the rating level and the background level of around +10 dBA is an indication of a significant adverse impact, depending on the context and a difference of around +5 dBA is likely to be an indication of an adverse impact, also depending on the context. Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact (depending upon the context).

4.0 ASSESSMENT METHODOLOGY

4.1 The following assessment methodology has been used:

i. A background noise survey has been undertaken to determine existing levels of background noise at locations representative of the nearest residential properties to the site;

ii. An acoustic model of the proposed operations has been developed. This has predicted the operational noise level at the nearest residential properties;

iii. An assessment of the likely noise impact associated with the proposals has been undertaken, in accordance with BS 4142:2014+A1:2019.

5.0 ENVIRONMENTAL NOISE MEASUREMENTS

Methodology

5.1 Background noise surveys were undertaken between the 7th to 11th March 2023. Long term measurements were undertaken to the northern boundary of the site, as described below:

- Location 1: To the north of the site, overlooking the allotments, at a height of 2.5m above local ground level in free-field conditions (OSBG Ref: ST 57424 68770);

5.2 Due to access and security restrictions, further attended measurements were undertaken at the nearest receptor location's boundary, described below:

- Location 2: To the northwest of the site, adjacent to 30 Headley Road's rear garden, at a height of 2m above local ground level in free-field conditions (OSBG Ref: ST 57352 68737);

5.3 Background noise measurements and observations at Location 2 were undertaken during daytime hours on the 11th March 2024 for a minimum of three hours.

5.4 The instrumentation was setup to monitor background noise levels and store data in 5-minute intervals of the overall A-weighted L_{eq}, L_{max} and L_{90} using fast time weighting. The equipment was configured to record octave band data to assist in identification of noise sources throughout the survey. The following instrumentation was used:

- 2 x Rion NL52 Type 1 sound level meter;
- Rion NC74 acoustic calibrator;
- Norsonic 1251 acoustic calibrator.

5.5 Calibration of the equipment was checked before and on completion of the measurements and no drift was recorded. Noise measurements were made in accordance with BS 7445: 1991 'Description and measurement of environmental noise Part 2 – Acquisition of data pertinent to land use' [Reference 3].

5.6 A Logic Energy weather station was time-synchronised with all noise monitors and installed to the site's western boundary (OSBG Ref: ST 57425 68742) as shown in Figure 1. The weather station was active for the duration of the surveys to record and log wind speed, direction and precipitation. All periods with weather unsuitable for background noise monitoring (average wind speeds above 5 m/s and/or precipitation) were removed from the analysis. The recorded meteorological data is shown in Appendix B.

Results

5.7 The measured background noise levels are summarised in Tables 1 and 2 and shown graphically in Appendix C. The site was closed down during the measurements and, therefore, measurements were not affected by noise from existing site operations. From on-site investigations and analysis of spectral and audio data, industrial/commercial operations were taking place, associated with the surrounding industrial and commercial units, and included HGV movements, loading operations and plant movement.

Measurement Location 1 (Northern site boundary)		
Date (March 2024)	**Daytime Typical Background Noise Level (07:00 to 19:00 hours) dB $L_{A90\ 1\ hour}$**	**Evening Typical Background Noise Level (19:00 to 23:00 hours) dB $L_{A90\ 1\ hour}$**
Thursday 7th	42	38
Friday 8th	42	38
Saturday 9th	40	37
Sunday 10th	40	37
Monday 11th	43	-

Table 1 - Location 1 - Measured Background Noise Levels

Measurement Location 2 – 11th March 2024 (Adjacent to Receptor 1 – 30 Headley Road)	
Time	**Typical Background Noise Level dB $L_{A90\ 1\ hour}$**
13:00 – 14:00	45
14:00 – 15:00	46
15:00 – 16:00	46

Table 2 - Location 2 - Measured Background Noise Levels

5.8 Following detailed analysis of the concurrent measurement results at locations 1 and 2, a background noise level difference between the locations of 2 dB between has been derived. This difference has been applied to the overall long-term measurement results to account for the setback position of measurement location 1 (relative to surrounding sources) compared to the nearest receptor locations. Therefore, a daytime background noise level of 43 dB $L_{A90\ 1\ hour}$ and evening background noise level of 39 dB $L_{A90\ 1\ hour}$ is considered representative of the nearest receptor locations.

5.9 24 Acoustics determines the typical to be the average minus one standard deviation.

Source-term Noise Data

5.10 The makes and models of the proposed plant are described below:

Item	Make	Model
External Shredder	Pronar	MRW 2.1010
Internal Shredder	Polaris	2800
Drum Feeder	Eriez	OBM
Eddy Current Separator	Eriez	Rev-X-E

Table 3 - Manufacturer's Details

5.11 Manufacturer's noise data for the proposed Pronar MRW 2.1010 shredder states a sound power level of 120 dBA. Manufacturer's noise data for the proposed Polaris 2800 shredder states an average sound pressure level of 96.8 dBA at 1m. Full manufacturer's noise data is shown in Appendix D.

5.12 Manufacturer's documentation for the Eriez plant states that the units have been designed to *"reduce noise to levels which are safe and without risk to the health of a normally fit operator"*. The documentation further states that "*It is, however, possible that a noise level in excess of 80dBA may occur in the vicinity of the equipment*". Therefore, 24 Acoustics in house database has been referred to provide an eddy current sound power level of 101 dBA and drum feeder sound power level of 96 dBA.

5.13 Noise data for the proposed wheeled loading shovels has been sourced from measurements of similar existing operations at ETM Recycling's site in Ashton Vale, comprising a single Liebherr 566 loader moving product, providing a sound power level of 101 dBA.

5.14 For the calculation of noise from HGV movements to the receptor locations from the site's access road, a source noise level of 72 dB $L_{Aeq\,T}$ at 4m for a slow-moving HGV has been used, with reference to 24 Acoustics' library database from measurements on similar sites.

5.15 Single octave band data for the above noise sources is shown in Appendix D.

6.0 NOISE ASSESSMENT

Proposed Operations

6.1 The proposed operations will include the processing of mixed waste, including POPs, requiring the use of shredders and a wheeled loading shovel.

6.2 The operations will be active under two scenarios, as described below:

- Scenario 1: Operations within the existing building, with a single external shredder within an enclosure.
- Scenario 2: Operations within a new building, enclosing all shredding and material processing.

6.3 The enclosure proposed in scenario 1 will comprise blockwork walls and a raised roof for access.

6.4 To provide a worst case analysis of the proposals, a scenario comprising full operation of the shredding plant in operation for a 1-hour period, has been used in the assessment. Based on observations of other similar sites, a loading procedure on-time of 30 mins per hourly period has been used for the wheeled loading shovel. Additionally, it is assumed that all shutter doors will be open at all times.

6.5 It is understood that up to 20 HGVs will access the site in a single day. HGV's will deliver to the site during daytime hours only (07:00 to 23:00 hours) providing an average of 1.25 HGVs per hour. HGVs will utilise the existing access road to the south of the site, as shown in Figure 1.

Acoustic Model

6.6 The source-term noise data and proposed operations described above have been used to populate an acoustic model of the site. IMMI 24 noise mapping software has been used following the methodology of ISO 9613 [Reference 5] to determine the noise levels from each relevant source at the receptor locations, taking into account the effects of geometric divergence, screening and ground/atmospheric absorption. The model factors an ambient air temperature of 10 Celsius with 70% relative humidity and a G=0.5 for ground absorption at account for the mixture of soft and hard ground in the area. The model assumes that all shutter doors will be open at all times.

6.7 The sound insulation performance of the existing building is based on a typical warehouse panel performance. Any damaged panels or gaps/holes in the existing building's construction should be made good and, if required, panels should be replaced like for like.

6.8 Initial calculations demonstrate that the following sound insulation performances for the wall and roof panels will be suitable to control noise break-out from the proposed new building and has been included in the noise model.

Item	Proposed New Building - Recommended Single Octave Band (Hz) Sound Insulation Performance (dB)							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	R_w
Wall	18	24	37	48	53	55	63	48
Roof	17	27	39	44	49	57	67	48

Table 4 - Proposed New Building, Recommended Sound Insulation Performance

6.9 For guidance, the above performances can be achieved by the Kingspan KS1000 range of panels, subject to configuration.

6.10 Resultant cumulative noise levels from all proposed plant at the receptor locations under both scenarios are shown in Table 5.

Receptor Location	Scenario 1 - Cumulative Plant Noise Level dB $L_{Aeq\ 1\ hour}$	Scenario 2 - Cumulative Plant Noise Level dB $L_{Aeq\ 1\ hour}$
1	45	44
2	45	44
3	42	43

Table 5 - Noise Modelling Results – Receptor Location Cumulative Plant Noise Levels

Assessment

6.11 A comparison of the predicted rating noise levels, relative to the representative background noise level at each receptor location has been carried out in accordance with BS 4142 with the results are shown for each scenario in Tables 6, 7 and 8.

6.12 Due to the existing and recommended buildings' sound insulation performance, significant screening and distances involved between the site and receptor locations, unfavourable noise characteristics from the proposed operations are considered unlikely to be perceptible at the receptor locations, hence a rating correction is not applicable.

	Receptor 1 - 30 Headley Road			
	Scenario 1		Scenario 2	
	Daytime (07:00 to 19:00)	Evening (19:00 to 23:00)	Daytime (07:00 to 19:00)	Evening (19:00 to 23:00)
Specific Source Noise Level	45 dB $L_{Aeq\ 1\ hour}$	45 dB $L_{Aeq\ 1\ hour}$	44 dB $L_{Aeq\ 1\ hour}$	44 dB $L_{Aeq\ 1\ hour}$
Rating Level	45 dB	45 dB	44 dB	44 dB
Background Sound Level	43 dB $L_{A90\ 1\ hour}$	39 dB $L_{A90\ 1\ hour}$	43 dB $L_{A90\ 1\ hour}$	39 dB $L_{A90\ 1\ hour}$
Difference	+ 2	+6	+ 1	+5

Table 6 - Noise Modelling Results – Receptor Location 1 Plant Noise Levels

	Receptor 2 - 249 Headley Road			
	Scenario 1		Scenario 2	
	Daytime (07:00 to 19:00)	Evening (19:00 to 23:00)	Daytime (07:00 to 19:00)	Evening (19:00 to 23:00)
Specific Source Noise Level	45 dB $L_{Aeq\ 1\ hour}$	45 dB $L_{Aeq\ 1\ hour}$	44 dB $L_{Aeq\ 1\ hour}$	44 dB $L_{Aeq\ 1\ hour}$
Rating Level	45 dB	45 dB	44 dB	44 dB
Background Sound Level	43 dB $L_{A90\ 1\ hour}$	39 dB $L_{A90\ 1\ hour}$	43 dB $L_{A90\ 1\ hour}$	39 dB $L_{A90\ 1\ hour}$
Difference	+ 2	+ 6	+ 1	+5

Table 7 - Noise Modelling Results – Receptor Location 2 Plant Noise Levels

	Receptor 3 - 252 to 284 Headley Road			
	Scenario 1		Scenario 2	
	Daytime (07:00 to 19:00)	Evening (19:00 to 23:00)	Daytime (07:00 to 19:00)	Evening (19:00 to 23:00)
Specific Source Noise Level	42 dB $L_{Aeq\ 1\ hour}$	42 dB $L_{Aeq\ 1\ hour}$	43 dB $L_{Aeq\ 1\ hour}$	43 dB $L_{Aeq\ 1\ hour}$
Rating Level	42 dB	42 dB	43 dB	43 dB
Background Sound Level	43 dB $L_{A90\ 1\ hour}$	39 dB $L_{A90\ 1\ hour}$	43 dB $L_{A90\ 1\ hour}$	39 dB $L_{A90\ 1\ hour}$
Difference	- 1	+ 3	0	+ 4

Table 8 - Noise Modelling Results – Receptor Location 3 Plant Noise Levels

6.13 The assessment outcomes at all receptor locations are indicative of an adverse impact during evening hours (19:00 to 23:00), depending on context (see below).

Context

6.14 Under BS 4142, consideration must be given to the context of the site and proposals.

6.15 In this instance, noise arising from the proposals will be similar in character to both the existing use of the site and surrounding industrial/commercial premises.

6.16 Additionally, the daytime only operations reduce the risk of noise disturbance.

6.17 Based on the above and the recommended mitigation, it is considered that the proposals employ reasonable and practicable measures to limit noise and will not be out of character for the area.

Uncertainty

6.18 All reasonable measures have been undertaken to ensure minimal uncertainty in the measurement procedures and assessment. This includes:

- Representative background noise levels determined during periods of suitable weather conditions;
- Measurement equipment fully calibrated to national standards and traceable with on-site calibration checks undertaken before and after the measurement exercises;
- Calculations undertaken using proprietary software including the calculation methodology of ISO 9613;
- One metre resolution topographical data utilised in the acoustic model to ensure accurate topography of the site and surrounding area.

6.19 Based on the above, uncertainty associated with the assessment has been reduced to a minimum.

7.0 CONCLUSIONS

7.1 24 Acoustics has been instructed by MTS Environmental Ltd, on behalf of PH Waste Management Ltd, to undertake a noise assessment in relation to a proposed permit variation at Unit 19, Bakers Park, Bristol.

7.2 The assessment has been carried out following background noise measurements undertaken at the site and, following the production of an acoustic model of the proposed operations.

7.3 Results are indicative of an adverse impact. However, when assessed in accordance with BS 4142 and considering the context of the site and proposals, noise arising from the proposed operations will employ reasonable and practicable measures to reduce noise to a minimum and will not be out of character for the area.

REFERENCES

1. Environment Agency Guidance "Noise and Vibration Management: Environmental Permits", updated Jan 2022

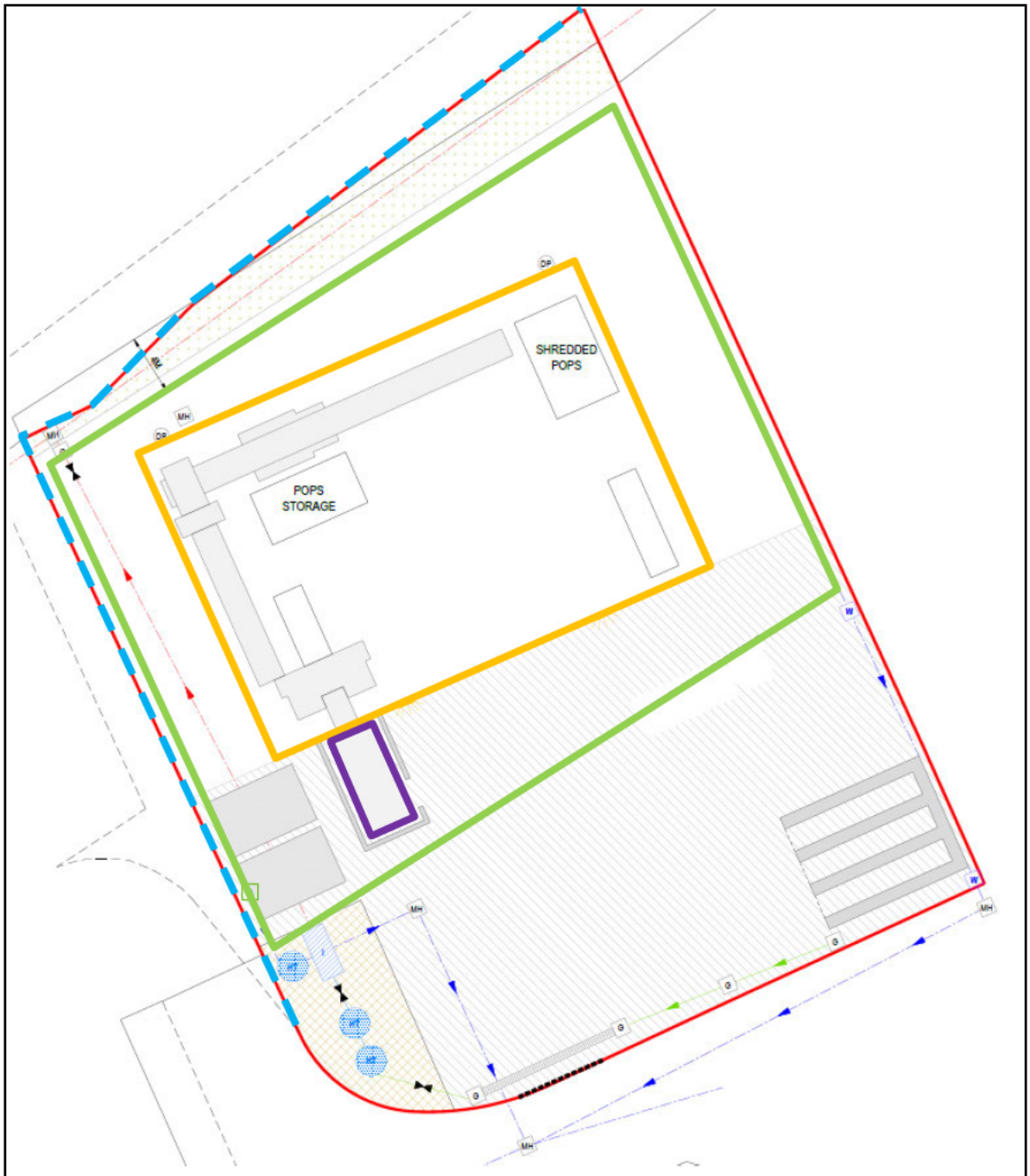
2. British Standards Institution. British Standard 4142:2014+A1:2019. Methods for Rating and Assessing Industrial and Commercial Sound, 2014.

3. British Standards Institution. BS 7445: 'Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use' 1991.

4. International Standards Organisation. ISO 9613. Acoustics - Propagation of Environmental Noise, 2024.

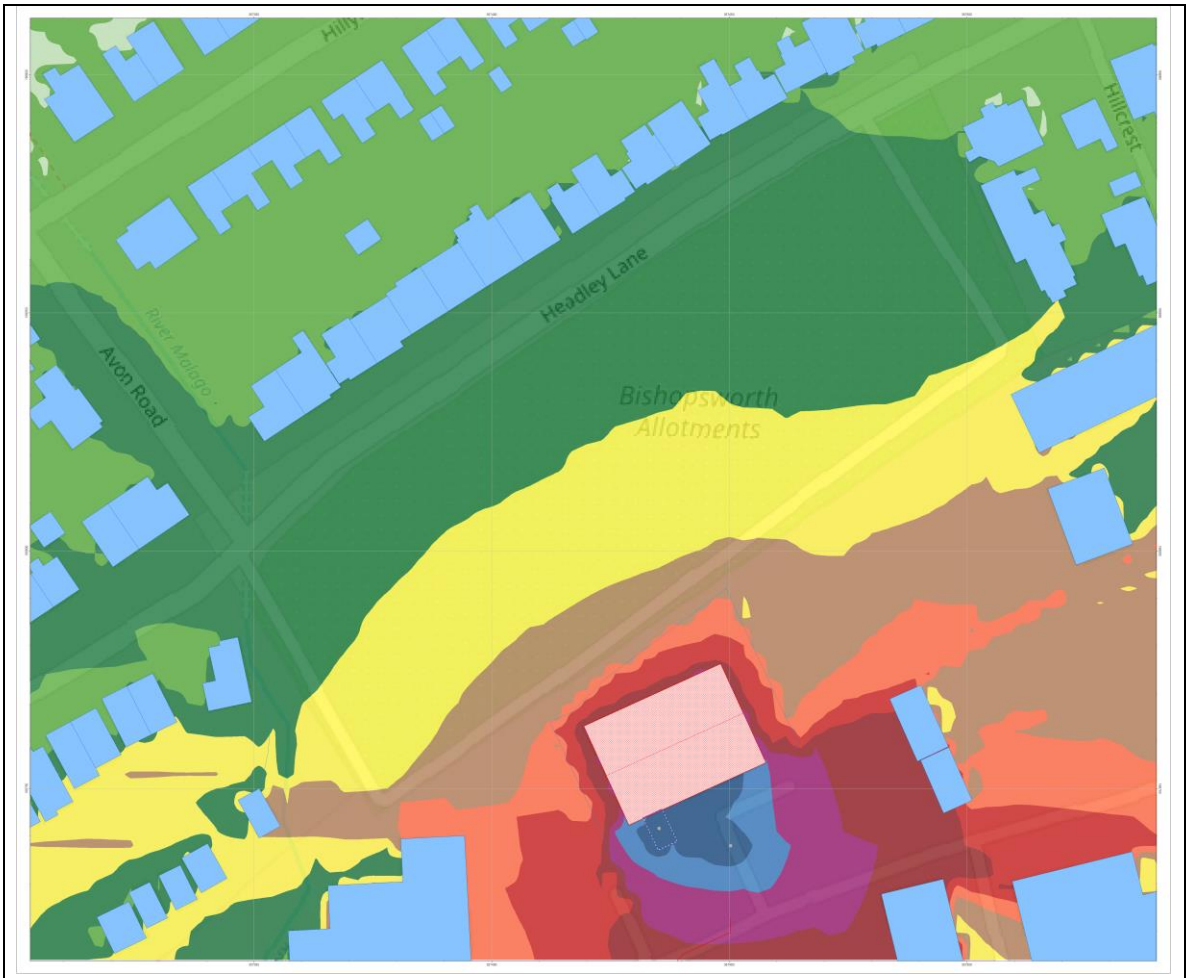
Measurement Location 1	
Measurement Location 2	
Weather Station Location	
1	Receptor Location 1 (30 Headley Road)
2	Receptor Location 2 (249 Headley Road)
3	Receptor Location 3 (252 to 284 Headley Road)
Site Access Road	
Site Location	

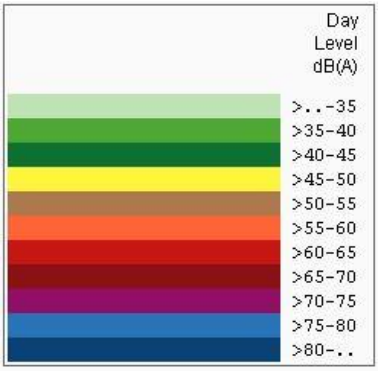
Project: Bakers Park, Bristol	**Title:** Site, Receptor and measurement Locations	
DWG No: Figure 1	**Scale:** N.T.S.	**Rev: -**
Date: May 2024	**Drawn By:** KE	**Job No:** 10530



Existing Building
Proposed Building
Scenario 1 external shredder in enclosure
Proposed 2m high barrier

Project: Bakers Park, Bristol	**Title:** Site plan	
DWG No: Figure 2	**Scale:** N.T.S.	**Rev: -**
Date: May 2024	**Drawn By:** KE	**Job No:** 10530





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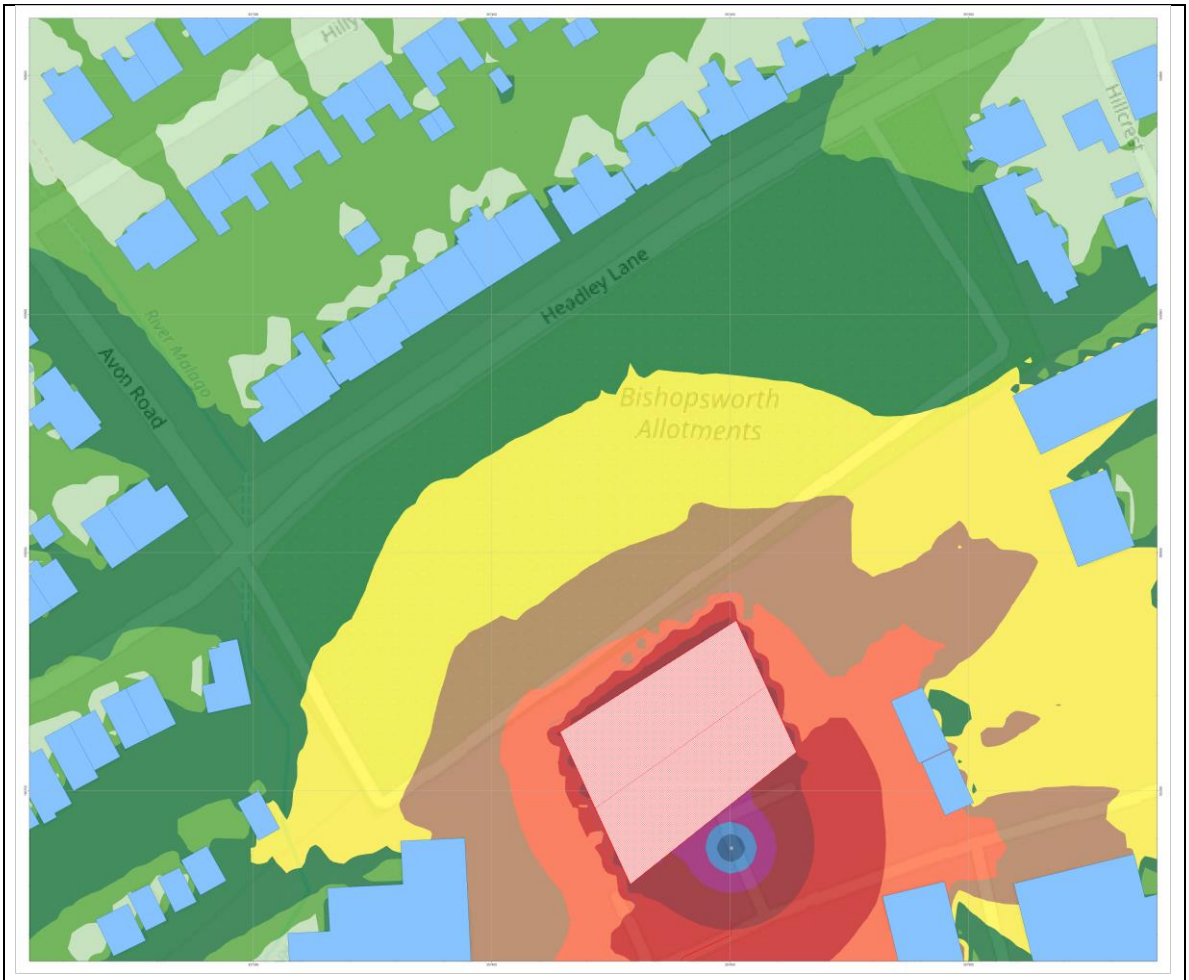
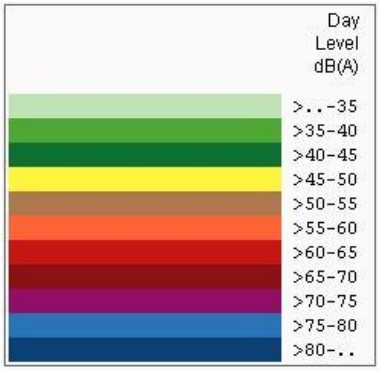
DWG No: Figure 3	**Scale:** N.T.S.	**Rev: -**
Date: March 2025	**Drawn By:** KE	**Job No:** 10530





Project: Bakers Park, Bristol	**Title:** Proposed Building, Site Noise Contours, 1.5m, dB $L_{Aeq\ 1\ hour}$. Daytime Operation.		24Acoustics
DWG No: Figure 4	**Scale:** N.T.S.	**Rev: -**	
Date: March 2025	**Drawn By:** KE	**Job No:** 10530	

APPENDIX A – SOUND INSULATION TERMINOLOGY

The Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and, as such, it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed (0.0002Pa to 20Pa) to a more manageable range of numbers. The threshold of hearing occurs at approximately 0dB and the threshold of pain is around 120dB.

Airborne Sound Insulation

Voices, hi-fi systems, television and radio sound and musical instruments are all sources of airborne sound. They excite the air around them and the vibration in the air is transmitted to surrounding surfaces, such as walls, ceilings and floors. This sets these constructions into vibration and this vibration is re-radiated in neighbouring rooms as sound. Energy is lost in the transmission path and this is referred to as transmission loss or more generally, airborne sound insulation. The most simple measure of sound insulation between two rooms is the sound level difference, D, which is the arithmetic difference between the sound level, in dB, in the source room and the sound level in the receiving room.

Other measures of sound insulation include the sound reduction index (R, obtained by laboratory test), the apparent sound reduction index (R', obtained in field tests) and the standardised level difference (D_{nT}, used mainly in the sound insulation of rooms in dwellings and other cellular rooms). The relevant test procedures are laid down in BS EN ISO 140. The results are obtained over a range of frequencies. A single-figure "weighted" result can be obtained from one-third octave band results measured over the frequency range 100 - 3150Hz by using a curve-fitting procedure laid down in BS EN ISO 717. The subscript "w" is added to the descriptors above, for example; $D_{nT,w}$. The C_{tr} value is a correction factor (normally negative) which takes additional account of low frequency performance of the structure tested.

Impact Sound Isolation

In the case of impact sound, the building construction is caused to vibrate as a result of a physical impact. Footsteps on floors are the most obvious example. The vibration is radiated as sound in neighbouring rooms. Impact insulation is measured using a standard tapping machine, which drops weights cyclically onto a floor. The sound pressure level is measured in the receiving room below and the result is known as the impact level, L_i. This test is used in the evaluation of domestic separating floors. As with airborne sound, the test procedures are set out in BS EN ISO 140 and the single-figure weighting of the results is described in BS EN ISO 717. The descriptor for the final result of a field test is $L'_{nT,w}$.

Reverberation time

The reverberation time is a measure of the rate of decay of sound in a room and this influences the sound pressure level of noise in that room. It is defined as the time taken, in seconds, for the level of sound in a room to decrease by 60 dB (a millionth of its original energy value) after the discontinuation of a sound. A reverberation time of 0.5s is used to standardise sound insulation test results in dwellings. Reverberation time is measured in accordance with the requirements of BS EN ISO 140.

APPENDIX B – METEOROLOGICAL DATA

MET 5 - Bristol	Wind speed(m/s)	Wind direction(degrees)	Rain gauge(mm)	Temperature(°C)
07/03/2024 13:20	0.3	5	0.0	11.2
07/03/2024 13:30	0.9	121	0.2	10.8
07/03/2024 13:40	2.8	203	0.2	9.7
07/03/2024 13:50	3.4	198	0.0	9.8
07/03/2024 14:00	2.4	199	0.0	9.8
07/03/2024 14:10	2.5	199	0.0	9.8
07/03/2024 14:20	1.3	206	0.0	9.8
07/03/2024 14:30	2.1	202	0.0	9.6
07/03/2024 14:40	2.6	203	0.0	9.9
07/03/2024 14:50	2.7	201	0.0	10.3
07/03/2024 15:00	2.3	203	0.0	10.0
07/03/2024 15:10	2.9	198	0.0	9.8
07/03/2024 15:20	2.4	200	0.0	9.9
07/03/2024 15:30	2.7	200	0.0	9.6
07/03/2024 15:40	3.0	200	0.0	9.5
07/03/2024 15:50	1.8	204	0.0	9.6
07/03/2024 16:00	1.7	200	0.0	9.7
07/03/2024 16:10	2.5	201	0.0	9.8
07/03/2024 16:20	2.4	204	0.0	9.6
07/03/2024 16:30	2.7	201	0.0	9.6
07/03/2024 16:40	3.3	200	0.0	9.7
07/03/2024 16:50	2.4	200	0.0	9.7
07/03/2024 17:00	2.3	202	0.0	9.6
07/03/2024 17:10	1.5	198	0.0	9.4
07/03/2024 17:20	2.6	199	0.0	9.3
07/03/2024 17:30	2.4	196	0.0	9.2
07/03/2024 17:40	2.1	199	0.0	9.1
07/03/2024 17:50	2.5	199	0.0	9.0
07/03/2024 18:00	2.9	195	0.0	9.0
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07/03/2024 18:30	1.6	201	0.0	8.4
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07/03/2024 18:50	1.9	197	0.0	8.0
07/03/2024 19:00	1.8	199	0.0	7.7
07/03/2024 19:10	2.0	196	0.0	7.5
07/03/2024 19:20	2.3	197	0.0	7.5
07/03/2024 19:30	2.6	197	0.0	7.3
07/03/2024 19:40	2.2	199	0.0	7.2
07/03/2024 19:50	2.0	202	0.0	7.0
07/03/2024 20:00	2.8	199	0.0	6.9
07/03/2024 20:10	3.9	197	0.0	6.9
07/03/2024 20:20	3.1	199	0.0	6.7
07/03/2024 20:30	3.2	198	0.0	6.6
07/03/2024 20:40	3.6	199	0.0	6.4
07/03/2024 20:50	3.4	200	0.0	6.3
07/03/2024 21:00	3.5	197	0.0	6.2

07/03/2024 21:10	3.0	201	0.0	6.0
07/03/2024 21:20	3.1	201	0.0	5.8
07/03/2024 21:30	3.6	201	0.0	5.7
07/03/2024 21:40	2.4	202	0.0	5.5
07/03/2024 21:50	2.7	199	0.0	5.4
07/03/2024 22:00	2.0	201	0.0	5.2
07/03/2024 22:10	2.3	198	0.0	5.1
07/03/2024 22:20	1.8	203	0.0	5.0
07/03/2024 22:30	1.0	197	0.0	4.9
07/03/2024 22:40	1.0	198	0.0	4.8
07/03/2024 22:50	1.0	198	0.0	4.7
07/03/2024 23:00	1.7	197	0.0	4.7
07/03/2024 23:10	1.4	197	0.0	4.7
07/03/2024 23:20	0.9	195	0.0	4.4
07/03/2024 23:30	1.1	201	0.0	4.4
07/03/2024 23:40	1.1	196	0.0	4.2
07/03/2024 23:50	1.0	199	0.0	4.0
08/03/2024 00:00	1.6	199	0.0	4.0
08/03/2024 00:10	1.2	198	0.0	4.0
08/03/2024 00:20	1.0	193	0.0	3.9
08/03/2024 00:30	1.0	197	0.0	4.0
08/03/2024 00:40	0.8	195	0.0	4.1
08/03/2024 00:50	1.0	196	0.0	4.2
08/03/2024 01:00	1.1	197	0.0	4.1
08/03/2024 01:10	1.3	192	0.0	4.1
08/03/2024 01:20	0.6	195	0.0	3.9
08/03/2024 01:30	0.8	196	0.0	3.8
08/03/2024 01:40	0.7	197	0.0	3.8
08/03/2024 01:50	0.7	190	0.0	3.7
08/03/2024 02:00	0.6	196	0.0	3.6
08/03/2024 02:10	0.8	198	0.0	3.5
08/03/2024 02:20	0.6	196	0.0	3.4
08/03/2024 02:30	0.8	195	0.0	3.3
08/03/2024 02:40	0.8	200	0.0	3.3
08/03/2024 02:50	0.9	201	0.0	3.3
08/03/2024 03:00	1.0	196	0.0	3.3
08/03/2024 03:10	0.8	199	0.0	3.3
08/03/2024 03:20	0.8	204	0.0	3.4
08/03/2024 03:30	0.8	191	0.0	3.5
08/03/2024 03:40	0.8	201	0.0	3.6
08/03/2024 03:50	1.0	195	0.0	3.7
08/03/2024 04:00	1.1	194	0.0	3.8
08/03/2024 04:10	1.3	201	0.0	3.9
08/03/2024 04:20	0.9	196	0.0	3.9
08/03/2024 04:30	0.9	199	0.0	4.1
08/03/2024 04:40	1.7	195	0.0	4.2
08/03/2024 04:50	1.3	200	0.0	4.3
08/03/2024 05:00	1.9	201	0.0	4.4

08/03/2024 05:10	1.7	201	0.0	4.4
08/03/2024 05:20	1.8	203	0.0	4.4
08/03/2024 05:30	2.2	199	0.0	4.4
08/03/2024 05:40	1.9	198	0.0	4.4
08/03/2024 05:50	1.5	196	0.0	4.4
08/03/2024 06:00	1.0	204	0.0	4.4
08/03/2024 06:10	1.4	201	0.0	4.3
08/03/2024 06:20	1.4	196	0.0	4.3
08/03/2024 06:30	1.4	198	0.0	4.2
08/03/2024 06:40	1.2	203	0.0	4.1
08/03/2024 06:50	1.9	200	0.0	4.0
08/03/2024 07:00	2.5	194	0.0	4.0
08/03/2024 07:10	1.8	199	0.0	4.0
08/03/2024 07:20	1.5	199	0.0	3.9
08/03/2024 07:30	1.9	198	0.0	3.9
08/03/2024 07:40	1.3	200	0.0	4.0
08/03/2024 07:50	2.8	202	0.0	4.1
08/03/2024 08:00	2.9	203	0.0	4.4
08/03/2024 08:10	2.3	205	0.0	4.6
08/03/2024 08:20	2.3	199	0.0	4.9
08/03/2024 08:30	3.3	199	0.0	5.2
08/03/2024 08:40	3.0	202	0.0	5.1
08/03/2024 08:50	3.2	198	0.0	5.1
08/03/2024 09:00	2.6	200	0.0	5.3
08/03/2024 09:10	3.1	203	0.0	5.5
08/03/2024 09:20	3.3	201	0.0	5.7
08/03/2024 09:30	2.5	203	0.0	6.2
08/03/2024 09:40	3.7	200	0.0	6.2
08/03/2024 09:50	4.0	201	0.0	6.3
08/03/2024 10:00	3.2	204	0.0	6.7
08/03/2024 10:10	3.8	202	0.0	6.9
08/03/2024 10:20	4.2	199	0.0	7.2
08/03/2024 10:30	3.7	202	0.0	7.6
08/03/2024 10:40	3.5	202	0.0	7.6
08/03/2024 10:50	2.5	208	0.0	8.3
08/03/2024 11:00	3.6	199	0.0	8.0
08/03/2024 11:10	3.3	199	0.0	8.1
08/03/2024 11:20	3.0	197	0.0	8.2
08/03/2024 11:30	3.0	208	0.0	8.4
08/03/2024 11:40	2.3	203	0.0	8.8
08/03/2024 11:50	2.9	206	0.0	9.0
08/03/2024 12:00	3.2	206	0.0	9.0
08/03/2024 12:10	3.0	209	0.0	9.0
08/03/2024 12:20	3.7	198	0.0	9.5
08/03/2024 12:30	4.0	199	0.0	9.5
08/03/2024 12:40	3.8	198	0.0	9.8
08/03/2024 12:50	4.7	198	0.0	9.9
08/03/2024 13:00	4.0	199	0.0	10.2

08/03/2024 13:10	3.3	199	0.0	10.3
08/03/2024 13:20	3.4	199	0.0	10.7
08/03/2024 13:30	3.8	201	0.0	10.6
08/03/2024 13:40	3.0	199	0.0	10.7
08/03/2024 13:50	3.3	200	0.0	10.4
08/03/2024 14:00	3.1	202	0.0	10.3
08/03/2024 14:10	2.7	205	0.0	10.8
08/03/2024 14:20	3.8	201	0.0	10.6
08/03/2024 14:30	3.7	200	0.0	10.7
08/03/2024 14:40	3.2	204	0.0	10.9
08/03/2024 14:50	3.5	200	0.0	10.7
08/03/2024 15:00	2.8	205	0.0	10.6
08/03/2024 15:10	3.1	201	0.0	10.4
08/03/2024 15:20	3.1	202	0.0	10.5
08/03/2024 15:30	2.4	204	0.0	10.3
08/03/2024 15:40	3.4	206	0.0	10.6
08/03/2024 15:50	3.5	203	0.0	10.6
08/03/2024 16:00	3.9	199	0.0	10.5
08/03/2024 16:10	3.6	199	0.0	10.4
08/03/2024 16:20	3.6	199	0.0	10.2
08/03/2024 16:30	2.7	203	0.0	10.0
08/03/2024 16:40	1.9	201	0.0	10.0
08/03/2024 16:50	1.6	209	0.0	9.8
08/03/2024 17:00	2.2	203	0.0	9.5
08/03/2024 17:10	2.4	204	0.0	9.2
08/03/2024 17:20	2.6	203	0.0	9.0
08/03/2024 17:30	2.3	207	0.0	8.8
08/03/2024 17:40	1.5	201	0.0	8.6
08/03/2024 17:50	1.8	199	0.0	8.4
08/03/2024 18:00	2.3	203	0.0	8.2
08/03/2024 18:10	2.3	201	0.0	8.0
08/03/2024 18:20	2.3	198	0.0	7.7
08/03/2024 18:30	2.8	202	0.0	7.6
08/03/2024 18:40	2.1	196	0.0	7.4
08/03/2024 18:50	2.7	198	0.0	7.2
08/03/2024 19:00	3.0	199	0.0	7.1
08/03/2024 19:10	3.3	199	0.0	6.9
08/03/2024 19:20	3.5	200	0.0	6.7
08/03/2024 19:30	3.7	200	0.0	6.5
08/03/2024 19:40	3.0	198	0.0	6.2
08/03/2024 19:50	2.8	199	0.0	6.0
08/03/2024 20:00	1.9	202	0.0	6.0
08/03/2024 20:10	2.8	203	0.0	5.9
08/03/2024 20:20	2.2	200	0.0	5.8
08/03/2024 20:30	2.5	204	0.0	5.6
08/03/2024 20:40	2.3	200	0.0	5.6
08/03/2024 20:50	3.3	199	0.0	5.6
08/03/2024 21:00	2.7	196	0.0	5.7

08/03/2024 21:10	2.4	197	0.0	5.7
08/03/2024 21:20	1.3	198	0.0	5.8
08/03/2024 21:30	1.4	193	0.0	5.7
08/03/2024 21:40	1.7	198	0.0	5.6
08/03/2024 21:50	1.8	198	0.0	5.6
08/03/2024 22:00	1.9	197	0.0	5.6
08/03/2024 22:10	1.8	201	0.0	5.5
08/03/2024 22:20	1.6	205	0.0	5.5
08/03/2024 22:30	1.7	201	0.0	5.5
08/03/2024 22:40	2.1	200	0.0	5.5
08/03/2024 22:50	2.2	198	0.0	5.4
08/03/2024 23:00	1.7	206	0.0	5.4
08/03/2024 23:10	1.8	198	0.0	5.3
08/03/2024 23:20	1.5	199	0.0	5.3
08/03/2024 23:30	2.2	203	0.0	5.3
08/03/2024 23:40	2.4	195	0.0	5.3
08/03/2024 23:50	1.6	205	0.0	5.2
09/03/2024 00:00	2.0	197	0.0	5.1
09/03/2024 00:10	1.5	198	0.0	5.0
09/03/2024 00:20	1.8	202	0.0	5.0
09/03/2024 00:30	1.6	199	0.0	4.9
09/03/2024 00:40	1.5	198	0.0	5.1
09/03/2024 00:50	1.1	203	0.0	5.1
09/03/2024 01:00	1.3	200	0.0	5.2
09/03/2024 01:10	1.9	196	0.0	5.1
09/03/2024 01:20	1.4	196	0.0	5.0
09/03/2024 01:30	1.2	197	0.0	4.8
09/03/2024 01:40	1.1	197	0.0	4.8
09/03/2024 01:50	1.1	196	0.0	4.8
09/03/2024 02:00	1.2	198	0.0	4.8
09/03/2024 02:10	0.8	201	0.0	4.8
09/03/2024 02:20	0.7	204	0.0	4.7
09/03/2024 02:30	1.1	195	0.0	4.7
09/03/2024 02:40	0.6	196	0.0	4.6
09/03/2024 02:50	0.8	197	0.0	4.6
09/03/2024 03:00	1.5	194	0.0	4.8
09/03/2024 03:10	1.1	198	0.0	4.8
09/03/2024 03:20	0.7	204	0.0	4.8
09/03/2024 03:30	2.1	197	0.0	4.8
09/03/2024 03:40	1.3	198	0.0	4.8
09/03/2024 03:50	1.1	196	0.0	4.8
09/03/2024 04:00	0.9	189	0.0	4.8
09/03/2024 04:10	0.9	189	0.0	4.8
09/03/2024 04:20	0.7	198	0.0	4.8
09/03/2024 04:30	0.5	201	0.0	4.8
09/03/2024 04:40	0.6	179	0.0	4.8
09/03/2024 04:50	0.5	190	0.0	4.8
09/03/2024 05:00	0.3	201	0.0	4.8

09/03/2024 05:10	0.4	243	0.0	4.8
09/03/2024 05:20	0.5	199	0.0	4.8
09/03/2024 05:30	0.4	194	0.0	4.8
09/03/2024 05:40	0.4	191	0.0	4.8
09/03/2024 05:50	0.4	239	0.0	4.8
09/03/2024 06:00	0.5	195	0.0	4.7
09/03/2024 06:10	0.8	191	0.0	4.7
09/03/2024 06:20	0.9	193	0.0	4.8
09/03/2024 06:30	0.8	197	0.0	4.8
09/03/2024 06:40	0.7	184	0.0	4.8
09/03/2024 06:50	0.5	191	0.0	4.8
09/03/2024 07:00	1.5	199	0.0	4.9
09/03/2024 07:10	1.7	200	0.0	5.0
09/03/2024 07:20	2.3	196	0.0	5.1
09/03/2024 07:30	2.3	198	0.0	5.2
09/03/2024 07:40	1.9	197	0.0	5.3
09/03/2024 07:50	1.6	196	0.0	5.3
09/03/2024 08:00	2.8	198	0.0	5.6
09/03/2024 08:10	2.6	198	0.0	5.9
09/03/2024 08:20	1.7	198	0.0	6.0
09/03/2024 08:30	1.3	193	0.0	6.1
09/03/2024 08:40	1.1	196	0.0	6.4
09/03/2024 08:50	2.5	196	0.0	6.9
09/03/2024 09:00	2.4	196	0.0	7.4
09/03/2024 09:10	2.7	197	0.0	7.0
09/03/2024 09:20	2.2	198	0.0	7.2
09/03/2024 09:30	3.0	199	0.0	7.4
09/03/2024 09:40	3.3	195	0.0	7.6
09/03/2024 09:50	4.0	197	0.0	7.8
09/03/2024 10:00	3.6	196	0.0	8.0
09/03/2024 10:10	3.8	198	0.0	8.2
09/03/2024 10:20	4.1	196	0.0	8.3
09/03/2024 10:30	4.5	196	0.0	8.5
09/03/2024 10:40	3.4	202	0.0	8.6
09/03/2024 10:50	3.6	199	0.0	8.9
09/03/2024 11:00	4.1	197	0.0	8.9
09/03/2024 11:10	4.0	198	0.0	9.0
09/03/2024 11:20	4.0	199	0.0	9.0
09/03/2024 11:30	3.6	196	0.0	9.2
09/03/2024 11:40	2.9	200	0.0	9.7
09/03/2024 11:50	3.6	196	0.0	10.1
09/03/2024 12:00	3.7	198	0.0	10.2
09/03/2024 12:10	3.6	195	0.0	10.2
09/03/2024 12:20	4.3	199	0.0	10.2
09/03/2024 12:30	3.7	200	0.0	10.4
09/03/2024 12:40	3.1	202	0.0	10.9
09/03/2024 12:50	3.5	200	0.0	10.8
09/03/2024 13:00	3.7	199	0.0	10.9

09/03/2024 13:10	3.8	196	0.0	11.3
09/03/2024 13:20	4.0	200	0.0	11.5
09/03/2024 13:30	3.0	197	0.0	11.6
09/03/2024 13:40	3.2	196	0.0	11.5
09/03/2024 13:50	3.3	198	0.0	11.4
09/03/2024 14:00	2.7	198	0.0	11.5
09/03/2024 14:10	3.3	202	0.0	11.2
09/03/2024 14:20	3.1	198	0.0	11.0
09/03/2024 14:30	3.6	199	0.0	11.0
09/03/2024 14:40	4.2	199	0.0	10.9
09/03/2024 14:50	3.7	200	0.0	11.0
09/03/2024 15:00	3.4	197	0.0	11.0
09/03/2024 15:10	2.4	201	0.0	11.0
09/03/2024 15:20	2.4	198	0.0	10.9
09/03/2024 15:30	2.2	198	0.0	11.0
09/03/2024 15:40	2.1	200	0.0	11.1
09/03/2024 15:50	2.6	197	0.0	11.2
09/03/2024 16:00	2.3	199	0.0	11.2
09/03/2024 16:10	1.9	198	0.0	11.3
09/03/2024 16:20	1.9	197	0.0	11.3
09/03/2024 16:30	1.6	199	0.0	11.3
09/03/2024 16:40	1.8	200	0.0	11.3
09/03/2024 16:50	2.3	196	0.0	11.3
09/03/2024 17:00	1.7	196	0.0	11.2
09/03/2024 17:10	1.9	196	0.0	11.2
09/03/2024 17:20	1.7	199	0.0	11.2
09/03/2024 17:30	1.8	199	0.0	11.0
09/03/2024 17:40	1.9	197	0.0	10.9
09/03/2024 17:50	1.5	201	0.0	10.7
09/03/2024 18:00	2.4	200	0.0	10.6
09/03/2024 18:10	2.2	202	0.0	10.5
09/03/2024 18:20	2.2	205	0.0	10.4
09/03/2024 18:30	2.9	200	0.0	10.3
09/03/2024 18:40	3.3	201	0.0	10.3
09/03/2024 18:50	3.2	200	0.0	10.3
09/03/2024 19:00	2.9	199	0.0	10.3
09/03/2024 19:10	2.9	196	0.0	10.1
09/03/2024 19:20	1.7	200	0.0	10.0
09/03/2024 19:30	1.2	196	0.0	9.8
09/03/2024 19:40	1.5	199	0.0	9.7
09/03/2024 19:50	1.6	197	0.0	9.6
09/03/2024 20:00	1.5	201	0.0	9.5
09/03/2024 20:10	1.6	206	0.0	9.4
09/03/2024 20:20	1.3	197	0.0	9.4
09/03/2024 20:30	1.5	203	0.0	9.2
09/03/2024 20:40	1.3	198	0.0	9.1
09/03/2024 20:50	1.6	198	0.0	9.1
09/03/2024 21:00	1.3	196	0.0	9.0

09/03/2024 21:10	1.1	194	0.0	8.8
09/03/2024 21:20	1.7	198	0.0	8.6
09/03/2024 21:30	1.9	202	0.2	8.4
09/03/2024 21:40	1.7	202	0.0	8.2
09/03/2024 21:50	1.3	195	0.2	8.0
09/03/2024 22:00	1.3	193	0.0	7.9
09/03/2024 22:10	1.3	204	0.0	7.8
09/03/2024 22:20	1.4	192	0.0	7.8
09/03/2024 22:30	1.6	198	0.0	7.8
09/03/2024 22:40	1.7	196	0.0	7.8
09/03/2024 22:50	1.4	201	0.0	7.8
09/03/2024 23:00	1.6	193	0.0	7.8
09/03/2024 23:10	1.0	197	0.0	7.8
09/03/2024 23:20	1.1	190	0.0	7.8
09/03/2024 23:30	0.6	204	0.0	7.6
09/03/2024 23:40	0.6	194	0.0	7.6
09/03/2024 23:50	0.5	193	0.0	7.5
10/03/2024 00:00	0.6	196	0.2	7.5
10/03/2024 00:10	0.7	195	0.0	7.4
10/03/2024 00:20	0.6	195	0.2	7.3
10/03/2024 00:30	0.6	188	0.0	7.3
10/03/2024 00:40	0.9	194	0.4	7.3
10/03/2024 00:50	0.9	195	0.4	7.3
10/03/2024 01:00	0.8	196	0.4	7.2
10/03/2024 01:10	0.7	187	0.4	7.2
10/03/2024 01:20	0.8	193	0.4	7.1
10/03/2024 01:30	0.5	196	0.2	7.0
10/03/2024 01:40	0.5	198	0.2	7.0
10/03/2024 01:50	0.4	190	0.0	6.9
10/03/2024 02:00	0.3	198	0.0	6.8
10/03/2024 02:10	0.3	199	0.0	6.8
10/03/2024 02:20	0.3	223	0.0	6.7
10/03/2024 02:30	0.5	197	0.0	6.8
10/03/2024 02:40	0.4	193	0.0	6.8
10/03/2024 02:50	0.4	196	0.0	6.8
10/03/2024 03:00	0.3	196	0.0	6.8
10/03/2024 03:10	0.3	196	0.0	6.8
10/03/2024 03:20	0.3	196	0.0	6.8
10/03/2024 03:30	0.3	196	0.0	6.8
10/03/2024 03:40	0.3	195	0.0	6.8
10/03/2024 03:50	0.3	195	0.0	6.7
10/03/2024 04:00	0.3	195	0.0	6.6
10/03/2024 04:10	0.3	195	0.0	6.5
10/03/2024 04:20	0.3	195	0.0	6.3
10/03/2024 04:30	0.3	195	0.0	6.3
10/03/2024 04:40	0.3	195	0.0	6.3
10/03/2024 04:50	0.3	195	0.0	6.3
10/03/2024 05:00	0.4	195	0.0	6.4

10/03/2024 05:10	0.4	195	0.0	6.6
10/03/2024 05:20	0.4	189	0.0	6.7
10/03/2024 05:30	0.3	189	0.0	6.7
10/03/2024 05:40	0.3	189	0.0	6.7
10/03/2024 05:50	0.3	189	0.0	6.6
10/03/2024 06:00	0.3	181	0.0	6.6
10/03/2024 06:10	0.4	177	0.0	6.6
10/03/2024 06:20	0.4	182	0.0	6.6
10/03/2024 06:30	0.4	193	0.0	6.7
10/03/2024 06:40	0.3	208	0.0	6.6
10/03/2024 06:50	0.3	207	0.0	6.6
10/03/2024 07:00	0.3	206	0.0	6.6
10/03/2024 07:10	0.3	206	0.0	6.6
10/03/2024 07:20	0.3	206	0.0	6.6
10/03/2024 07:30	0.3	206	0.0	6.6
10/03/2024 07:40	0.3	206	0.0	6.7
10/03/2024 07:50	0.3	206	0.0	6.8
10/03/2024 08:00	0.3	206	0.0	6.9
10/03/2024 08:10	0.3	206	0.0	7.0
10/03/2024 08:20	0.3	206	0.0	7.0
10/03/2024 08:30	0.7	190	0.0	7.2
10/03/2024 08:40	0.7	198	0.0	7.3
10/03/2024 08:50	0.4	178	0.0	7.6
10/03/2024 09:00	0.4	197	0.0	7.7
10/03/2024 09:10	0.4	198	0.0	7.8
10/03/2024 09:20	0.4	188	0.0	8.0
10/03/2024 09:30	0.9	192	0.0	8.0
10/03/2024 09:40	0.9	193	0.0	8.0
10/03/2024 09:50	0.6	188	0.0	8.1
10/03/2024 10:00	0.7	188	0.0	8.1
10/03/2024 10:10	0.6	198	0.0	8.3
10/03/2024 10:20	1.0	194	0.0	8.5
10/03/2024 10:30	1.0	191	0.0	8.8
10/03/2024 10:40	1.5	196	0.0	9.0
10/03/2024 10:50	1.7	195	0.0	9.2
10/03/2024 11:00	1.1	196	0.0	9.6
10/03/2024 11:10	1.3	191	0.0	9.8
10/03/2024 11:20	2.0	199	0.0	9.8
10/03/2024 11:30	1.4	192	0.0	9.7
10/03/2024 11:40	1.0	193	0.0	9.7
10/03/2024 11:50	1.3	194	0.0	9.6
10/03/2024 12:00	1.4	196	0.0	9.8
10/03/2024 12:10	0.9	202	0.0	10.1
10/03/2024 12:20	1.0	196	0.0	10.3
10/03/2024 12:30	1.1	200	0.0	10.4
10/03/2024 12:40	0.6	194	0.0	10.3
10/03/2024 12:50	0.4	196	0.0	10.7
10/03/2024 13:00	0.8	201	0.0	10.7

10/03/2024 13:10	0.5	200	0.0	11.2
10/03/2024 13:20	0.4	197	0.0	11.3
10/03/2024 13:30	0.4	194	0.0	11.4
10/03/2024 13:40	0.6	191	0.0	11.2
10/03/2024 13:50	0.7	198	0.0	11.2
10/03/2024 14:00	0.4	197	0.0	11.8
10/03/2024 14:10	0.5	190	0.0	11.9
10/03/2024 14:20	0.4	201	0.0	11.6
10/03/2024 14:30	0.3	202	0.0	11.3
10/03/2024 14:40	0.3	202	0.0	11.6
10/03/2024 14:50	0.5	199	0.0	11.5
10/03/2024 15:00	0.4	198	0.0	11.3
10/03/2024 15:10	0.3	198	0.0	11.5
10/03/2024 15:20	0.3	200	0.0	11.5
10/03/2024 15:30	0.3	237	0.0	11.5
10/03/2024 15:40	0.3	200	0.0	11.4
10/03/2024 15:50	0.3	218	0.0	11.4
10/03/2024 16:00	0.3	226	0.0	11.2
10/03/2024 16:10	0.4	337	0.0	10.9
10/03/2024 16:20	0.4	9	0.2	10.6
10/03/2024 16:30	0.4	186	0.2	10.3
10/03/2024 16:40	0.3	240	0.6	9.9
10/03/2024 16:50	0.3	342	0.2	9.4
10/03/2024 17:00	0.3	351	0.4	9.1
10/03/2024 17:10	0.3	13	0.4	8.9
10/03/2024 17:20	0.3	309	0.2	8.7
10/03/2024 17:30	0.3	236	0.8	8.6
10/03/2024 17:40	0.3	245	0.2	8.4
10/03/2024 17:50	0.3	255	0.2	8.3
10/03/2024 18:00	0.4	200	0.0	8.3
10/03/2024 18:10	0.3	202	0.2	8.2
10/03/2024 18:20	0.3	202	0.0	8.1
10/03/2024 18:30	0.3	203	0.0	8.1
10/03/2024 18:40	0.3	203	0.0	8.1
10/03/2024 18:50	0.3	203	0.0	8.0
10/03/2024 19:00	0.3	203	0.0	7.9
10/03/2024 19:10	0.3	203	0.0	7.9
10/03/2024 19:20	0.3	203	0.0	7.9
10/03/2024 19:30	0.3	203	0.0	7.8
10/03/2024 19:40	0.3	203	0.0	7.8
10/03/2024 19:50	0.3	202	0.0	7.9
10/03/2024 20:00	0.3	41	0.0	7.8
10/03/2024 20:10	0.3	41	0.0	7.8
10/03/2024 20:20	0.3	41	0.0	7.8
10/03/2024 20:30	0.3	41	0.0	7.9
10/03/2024 20:40	0.3	41	0.0	7.9
10/03/2024 20:50	0.3	41	0.0	7.9
10/03/2024 21:00	0.3	41	0.0	7.8

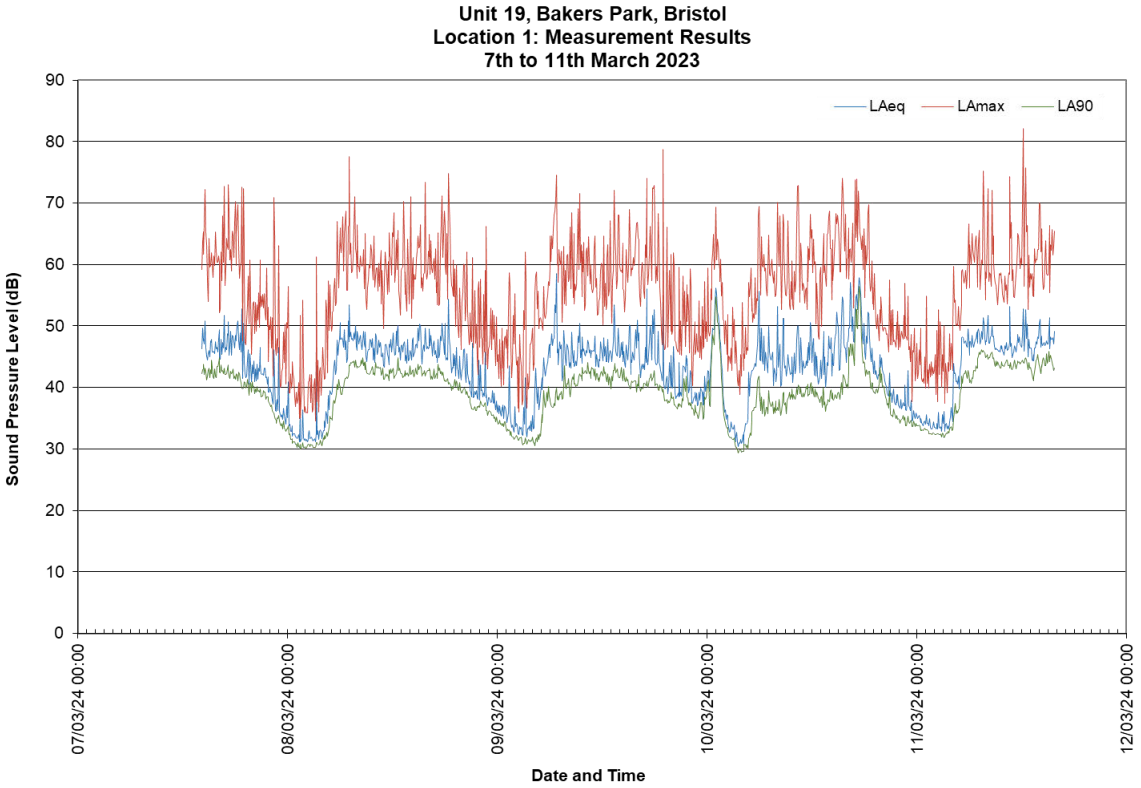
10/03/2024 21:10	0.3	209	0.0	7.8
10/03/2024 21:20	0.3	211	0.0	7.8
10/03/2024 21:30	0.3	211	0.0	7.7
10/03/2024 21:40	0.3	211	0.0	7.7
10/03/2024 21:50	0.3	211	0.0	7.6
10/03/2024 22:00	0.3	211	0.0	7.6
10/03/2024 22:10	0.3	211	0.0	7.5
10/03/2024 22:20	0.3	211	0.0	7.4
10/03/2024 22:30	0.3	211	0.0	7.3
10/03/2024 22:40	0.3	211	0.0	7.2
10/03/2024 22:50	0.3	211	0.0	7.3
10/03/2024 23:00	0.3	211	0.0	7.3
10/03/2024 23:10	0.3	211	0.0	7.3
10/03/2024 23:20	0.3	211	0.0	7.3
10/03/2024 23:30	0.3	211	0.0	7.2
10/03/2024 23:40	0.3	211	0.0	7.2
10/03/2024 23:50	0.3	211	0.0	7.2
11/03/2024 00:00	0.3	3	0.0	7.2
11/03/2024 00:10	0.3	23	0.0	7.1
11/03/2024 00:20	0.3	23	0.0	7.1
11/03/2024 00:30	0.3	19	0.0	7.0
11/03/2024 00:40	0.4	12	0.0	7.0
11/03/2024 00:50	0.3	41	0.0	6.9
11/03/2024 01:00	0.4	16	0.0	6.9
11/03/2024 01:10	0.3	2	0.0	6.9
11/03/2024 01:20	0.4	10	0.0	6.8
11/03/2024 01:30	0.3	11	0.0	6.8
11/03/2024 01:40	0.3	6	0.0	6.7
11/03/2024 01:50	0.3	4	0.0	6.7
11/03/2024 02:00	0.3	356	0.0	6.7
11/03/2024 02:10	0.4	4	0.0	6.7
11/03/2024 02:20	0.4	17	0.0	6.6
11/03/2024 02:30	0.4	340	0.0	6.7
11/03/2024 02:40	0.3	2	0.0	6.7
11/03/2024 02:50	0.3	4	0.0	6.7
11/03/2024 03:00	0.3	344	0.0	6.7
11/03/2024 03:10	0.4	2	0.0	6.6
11/03/2024 03:20	0.3	7	0.0	6.6
11/03/2024 03:30	0.3	8	0.0	6.6
11/03/2024 03:40	0.3	10	0.0	6.6
11/03/2024 03:50	0.3	10	0.0	6.6
11/03/2024 04:00	0.3	26	0.0	6.6
11/03/2024 04:10	0.4	20	0.0	6.6
11/03/2024 04:20	0.4	45	0.0	6.6
11/03/2024 04:30	0.4	46	0.0	6.6
11/03/2024 04:40	0.3	334	0.0	6.5
11/03/2024 04:50	0.4	14	0.0	6.4
11/03/2024 05:00	0.4	212	0.0	6.4

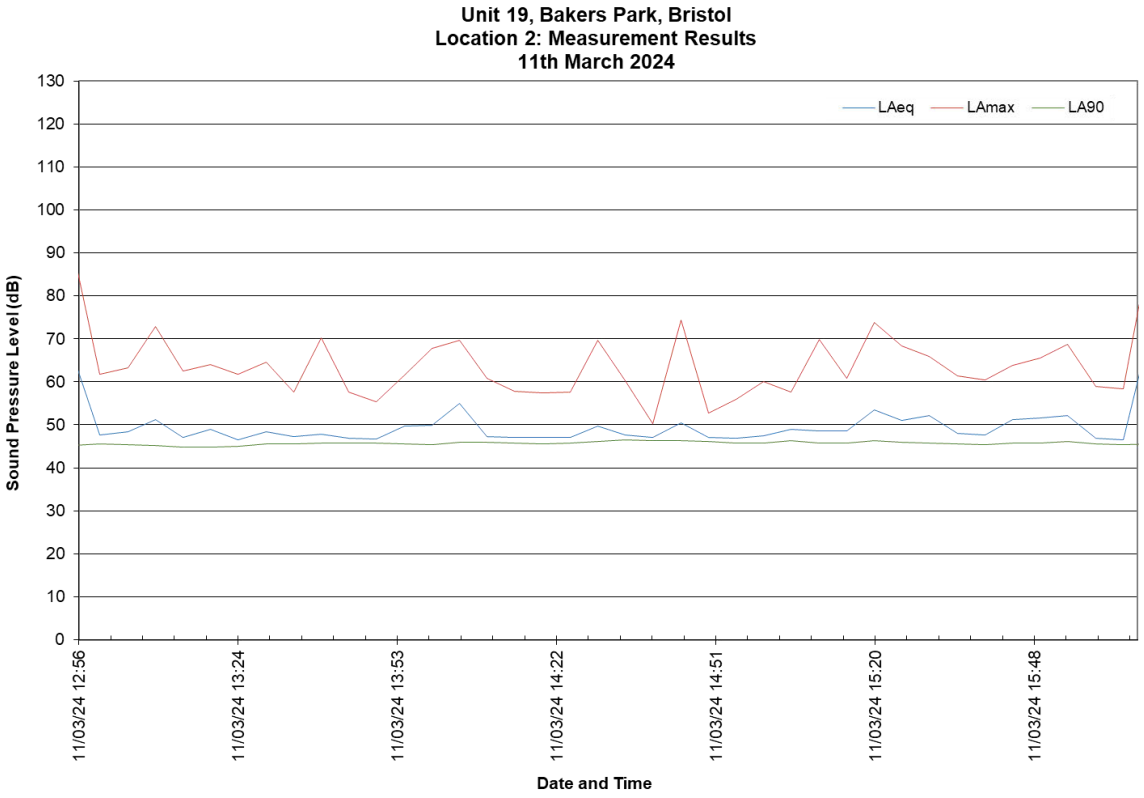
11/03/2024 05:10	0.4	2	0.0	6.3
11/03/2024 05:20	0.4	7	0.0	6.2
11/03/2024 05:30	0.5	18	0.0	6.2
11/03/2024 05:40	0.4	12	0.0	6.2
11/03/2024 05:50	0.3	7	0.0	6.1
11/03/2024 06:00	0.3	6	0.0	6.1
11/03/2024 06:10	0.4	0	0.0	6.1
11/03/2024 06:20	0.3	0	0.0	6.1
11/03/2024 06:30	0.4	5	0.0	6.1
11/03/2024 06:40	0.4	7	0.0	6.1
11/03/2024 06:50	0.4	10	0.0	6.0
11/03/2024 07:00	0.3	360	0.0	6.0
11/03/2024 07:10	0.3	353	0.0	5.9
11/03/2024 07:20	0.3	3	0.0	6.0
11/03/2024 07:30	0.3	0	0.0	6.0
11/03/2024 07:40	0.3	32	0.0	6.0
11/03/2024 07:50	0.3	20	0.0	6.0
11/03/2024 08:00	0.3	32	0.0	6.0
11/03/2024 08:10	0.4	12	0.0	6.1
11/03/2024 08:20	0.3	20	0.0	6.1
11/03/2024 08:30	0.3	37	0.0	6.2
11/03/2024 08:40	0.4	40	0.0	6.2
11/03/2024 08:50	0.4	7	0.0	6.4
11/03/2024 09:00	0.4	11	0.0	6.5
11/03/2024 09:10	0.4	21	0.0	6.5
11/03/2024 09:20	0.4	17	0.0	6.6
11/03/2024 09:30	0.4	10	0.0	6.7
11/03/2024 09:40	0.4	18	0.0	6.7
11/03/2024 09:50	0.4	37	0.0	6.7
11/03/2024 10:00	0.4	34	0.0	6.7
11/03/2024 10:10	0.5	33	0.0	6.7
11/03/2024 10:20	0.4	39	0.0	6.8
11/03/2024 10:30	0.3	31	0.0	6.8
11/03/2024 10:40	0.3	29	0.0	6.8
11/03/2024 10:50	0.3	34	0.0	6.8
11/03/2024 11:00	0.3	26	0.0	6.8
11/03/2024 11:10	0.3	8	0.0	6.9
11/03/2024 11:20	0.3	14	0.0	7.0
11/03/2024 11:30	0.4	19	0.0	7.1
11/03/2024 11:40	0.4	26	0.0	7.1
11/03/2024 11:50	0.4	27	0.0	7.2
11/03/2024 12:00	0.4	65	0.0	7.4
11/03/2024 12:10	0.4	30	0.0	7.5
11/03/2024 12:20	0.4	32	0.0	7.7
11/03/2024 12:30	0.4	33	0.0	8.0
11/03/2024 12:40	0.5	32	0.0	8.2
11/03/2024 12:50	0.4	31	0.0	8.4
11/03/2024 13:00	0.4	22	0.0	8.5

11/03/2024 13:10	0.4	22	0.0	8.6
11/03/2024 13:20	0.5	27	0.0	9.3
11/03/2024 13:30	0.4	6	0.0	9.6
11/03/2024 13:40	0.4	3	0.0	9.5
11/03/2024 13:50	0.4	26	0.0	9.3
11/03/2024 14:00	0.6	30	0.0	9.3
11/03/2024 14:10	0.4	6	0.0	10.0
11/03/2024 14:20	0.4	15	0.0	10.1
11/03/2024 14:30	0.4	18	0.0	9.8
11/03/2024 14:40	0.4	36	0.0	9.5
11/03/2024 14:50	0.4	27	0.0	9.2
11/03/2024 15:00	0.4	29	0.0	9.2
11/03/2024 15:10	0.4	26	0.0	9.0
11/03/2024 15:20	0.4	15	0.0	8.9
11/03/2024 15:30	0.4	30	0.0	8.7

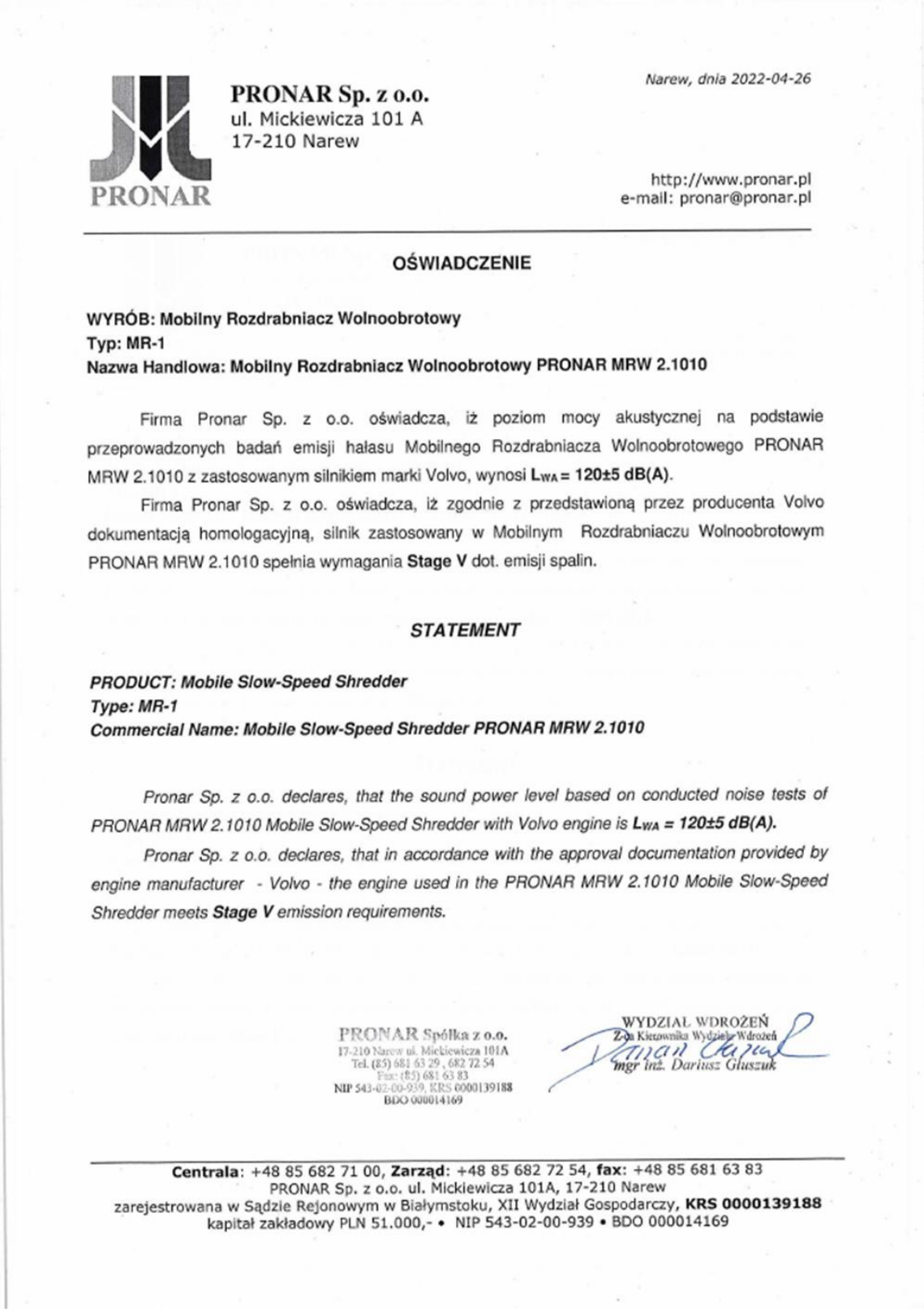
Figure B2: Meteorological Record During Long Term Measurements – 7th to 11th March 2024

APPENDIX C – MEASUREMENT RESULTS





APPENDIX D – SOURCE-TERM NOISE DATA



PRONAR Sp. z o.o.
ul. Mickiewicza 101 A
17-210 Narew

Narew, dnia 2022-04-26

http://www.pronar.pl
e-mail: pronar@pronar.pl

OŚWIADCZENIE

WYRÓB: Mobilny Rozdrabniacz Wolnoobrotowy
Typ: MR-1
Nazwa Handlowa: Mobilny Rozdrabniacz Wolnoobrotowy PRONAR MRW 2.1010

Firma Pronar Sp. z o.o. oświadcza, iż poziom mocy akustycznej na podstawie przeprowadzonych badań emisji hałasu Mobilnego Rozdrabniacza Wolnoobrotowego PRONAR MRW 2.1010 z zastosowanym silnikiem marki Volvo, wynosi L_{WA} = **120±5 dB(A)**.

Firma Pronar Sp. z o.o. oświadcza, iż zgodnie z przedstawioną przez producenta Volvo dokumentacją homologacyjną, silnik zastosowany w Mobilnym Rozdrabniaczu Wolnoobrotowym PRONAR MRW 2.1010 spełnia wymagania **Stage V** dot. emisji spalin.

STATEMENT

PRODUCT: Mobile Slow-Speed Shredder
Type: MR-1
Commercial Name: Mobile Slow-Speed Shredder PRONAR MRW 2.1010

Pronar Sp. z o.o. declares, that the sound power level based on conducted noise tests of PRONAR MRW 2.1010 Mobile Slow-Speed Shredder with Volvo engine is L_{WA} = ***120±5 dB(A).***

Pronar Sp. z o.o. declares, that in accordance with the approval documentation provided by engine manufacturer - Volvo - the engine used in the PRONAR MRW 2.1010 Mobile Slow-Speed Shredder meets ***Stage V*** *emission requirements.*

PRONAR Spółka z o.o.
17-210 Narew ul. Mickiewicza 101A
Tel. (85) 681 63 29, 682 72 54
Fax: (85) 681 63 83
NIP 543-02-00-939, KRS 0000139188
BDO 000014169

WYDZIAŁ WDROŻEŃ
Z-ca Kierownika Wydziału Wdrożeń
mgr inż. Dariusz Gluszuk

Centrala: +48 85 682 71 00, **Zarząd**: +48 85 682 72 54, **fax**: +48 85 681 63 83
PRONAR Sp. z o.o. ul. Mickiewicza 101A, 17-210 Narew
zarejestrowana w Sądzie Rejonowym w Białymstoku, XII Wydział Gospodarczy, **KRS 0000139188**
kapitał zakładowy PLN 51.000,- • NIP 543-02-00-939 • BDO 000014169

Figure D1: Pronar MRW 2.1010 Manufacturer's Noise Data

LINDNER

Noise level measurement

Machine:

Type: POLARIS 2800
Series:
Machine No.: 6269

Power(HM1) [kW]:	250(FC)	Screen:	SK100mm
Power(HM2) [kW]:		Cutting system:	172R5
Frequency [Hz]:	50	Rotor speed test [rpm]:	112rpm

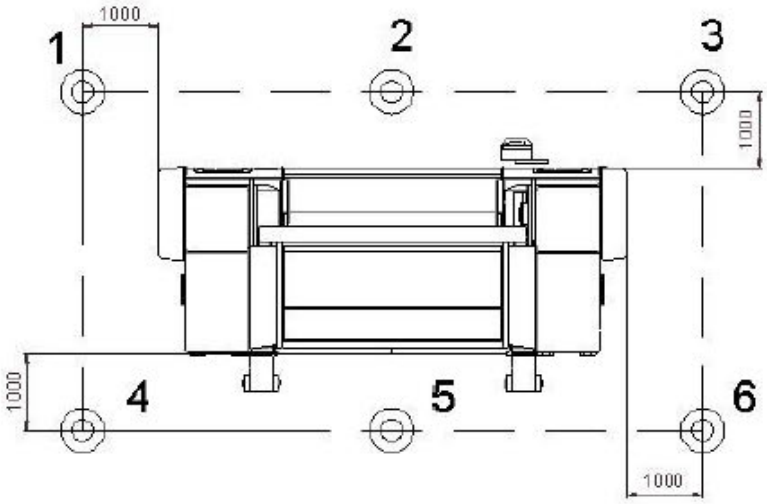
Material:

Industry: Energy
Material: Commercial & Industrial Waste (C&I)

Measurement:

Measuring point1, LpA:	91.8 [dB]	Measuring point4, LpA:	96.8 [dB]
Measuring point2, LpA:	99.1 [dB]	Measuring point5, LpA:	100.7 [dB]
Measuring point3, LpA:	91.3 [dB]	Measuring point6, LpA:	89.7 [dB]

Remarks: Site => Hall



Info:

The values given are indicative and not warranties. Also measured values can fluctuate due to various influences (environment, location, material,...!

Class II measuring device according to IEC 651

Figure D1: Polaris Shredder Manufacturer's Noise Data

Proposed Plant - Single Octave Band (Hz) Sound Power Levels (dB)										
Plant Item	**31.5 Hz**	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8 kHz**	**dBA**
Wheeled Loader	99	107	102	100	97	95	93	86	82	101
Shredder	113	114	114	113	109	101	96	90	84	110
Drum Feeder	98	98	95	89	90	93	89	85	78	96
Eddy Current Seperator	100	99	97	93	93	92	94	97	92	101

Figure D2: Plant Single Octave Band Sound Power Levels

Slow Moving HGV - Single Octave Band (Hz) Sound Power Levels (dB)									dBA
31.5 Hz	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8 kHz**	
99	107	102	100	97	95	93	86	82	101

Figure D3: HGV Single Octave Band Sound Power Levels