BRIEF FOR CONSULTANCY:

To conduct a noise impact assessment for the proposed variation to an Environmental Agency permit to increase the quantity of 'treatment of waste' from the existing 25,000 tonnes per annum.

50 RMP Est. 1969
acoustics energy vibration

Unit 1, 7Hills Business Park
37 Bankhead Crossway South
Edinburgh
EH11 4EP

T: 0345 062 0000
E: rmp@napier.ac.uk
www.rmp.biz

Noise Impact Assessment
Enterprise Skip Hire
Wendover Rd
Stoke Mandeville
Aylesbury
HP22 5GX

Report No. R-10081-DJC-RGM
12th September 2024

PREPARED FOR:

Enterprise Skip Hire
C/o AA Environmental Ltd
Units 4 to 8
Cholswell Court
Shippon
Abingdon
OX13 6HX

For the attention of Ed Brown

Edinburgh Napier UNIVERSITY

Contents

1.0 Introduction

1.1 RMP was instructed by AA Environmental Ltd, on behalf of Enterprise Skip Hire Ltd, to undertake a noise impact assessment on the nearest existing noise-sensitive receptor(s), as part of a variation of their Environmental Permit (#DB3904US) to increase the quantity of "treatment of waste" from <25,000 tonnes to ≤125,000 tonnes per annum; at the existing Enterprise Skip Hire facility, Land Adjacent To Chiltern View Nursery, Wendover Rd, Stoke Mandeville, Aylesbury HP22 5GX.

1.2 The site comprises an area of land bounded by a railway line to the west/southwest. The A413 Wendover Road is located approximately 250m northeast from the centre of the site, with Chiltern View Garden Centre and other commercial/industrial units to the east and southeast.

1.3 The nearest noise sensitive receivers (NSRs) to the site are considered to be residential dwelling houses on the northern end of the A413/Wendover Road, at an approximate worst-case distance of 275 m from the centre of site and as indicated in the Google Earth satellite imagery in Figure 1.

Figure 1. Site location and nearest NSR

1.4 The site is surrounded by ~3 m high concrete panelling walls to the northwest of the site (*C&D Processing and Aggregate Storage*) and ~6 m high solid enclosure to the *Main Yard Area*. The A413/ Wendover Road is circa 1 m higher than the land on the site-ward side, as it rises sharply up to the edge of the road, the land from site to the increased elevation of the road however remains flat; see Figures 2 and 3 respectively for the concrete panelling and A413 banking (Figure 9, page 16 shows the enclosures for the *Main Yard Area*).

Figure 2. ~3m concrete panelling surrounding site

Figure 3. Bank along A413/Wendover Road looking NW (NSRs to the right)

1.5 Other noise sensitive receptors that occur further away from the worst-case NSR would be expected to be impacted by noise equally, or to a lesser extent, due to inherent further distances and/or natural barrier losses from the intervening topography.

2.0 Guidance

POLICY AND PLANNING

2.1 In terms of Planning and noise the site has been operating as currently by Enterprise Skip Hire Ltd since 2012 and seeks only to increase the amount of waste processing throughput/outputs.

ENVIRONMENT AGENCY – NOISE IMPACT ASSESSMENTS INVOLVING CALCULATIONS AND MODELLING

2.2 The EA's guidance on Noise Impact Assessments involving calculations or modelling was published on 23 October 2018 and was updated on 18th August 2022. Guidance is provided on the information to be presented as part of a noise impact assessment. Within the EA guidance, reference is made to the use of British Standard 4142: 2014+A1 2019: "*Methods for Rating and assessing industrial and commercial sound"*. Additional guidance on noise and vibration is included in the joint EA/SEPA document (*Guidance - Noise and vibration management: environmental permits*) dated July 2021.

2.3 In accordance with EA requirements and their associated July 2021 guidance document, the author of this document, David Chapman has an honours degree in engineering from the University of Hertfordshire, has over seventeen years' experience in acoustics and acoustic consultancy work and is a full member of the Institute of Acoustics (MIOA).

2.4 David is therefore recognised as a Suitably Qualified Acoustician (SQA). Please refer to the RMP website www.rmp.biz for any further information which may be required.

BS 4142: 2014+A1 2019

2.5 Conducting an assessment in accordance with BS 4142 involves measuring the existing background noise level at a position representative of the proposed residential development during the normal times of

operation of the industrial premises. This value is then compared with the rating level; which is the specific noise level generated by the source, corrected if appropriate to allow for the character of the noise. The difference between the two is calculated so as to give an assessment level, which is used to indicate the likelihood of adverse impact, depending on the context.

2.6 BS 4142 suggests that, in general, a difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context. A difference of around + 10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference around 0 dB is an indication that adverse impact is unlikely.

2.7 Where the initial estimate of the impact needs to be modified due to the context, consideration should be given to the following factors:

- The absolute level of sound, with consideration to background level, rating level and the residual sound level in the acoustic environment;
- The character and level of the residual sound compared to the character and level of the specific sound;
- The sensitivity of the receptor and whether dwellings will already incorporate design measures that provide good internal and/or outdoor acoustic conditions, such as façade insulation, ventilation and/or cooling that will reduce the need to have windows open for rapid ventilation, and acoustic screening.

2.8 Context is further defined within BS 12913 – 1 (2014): *Acoustics – Soundscape*, which provides a framework for considering context (see Figure 4 overleaf). Factors include;

- Sensation; meteorological conditions, hearing impairments.
- Interpretation; attitudes to source and producer, experience and expectations, visual and odour.

- Responses to environment; time of day, lighting, weather; emotional state, ability to deal with the situation and exposure.

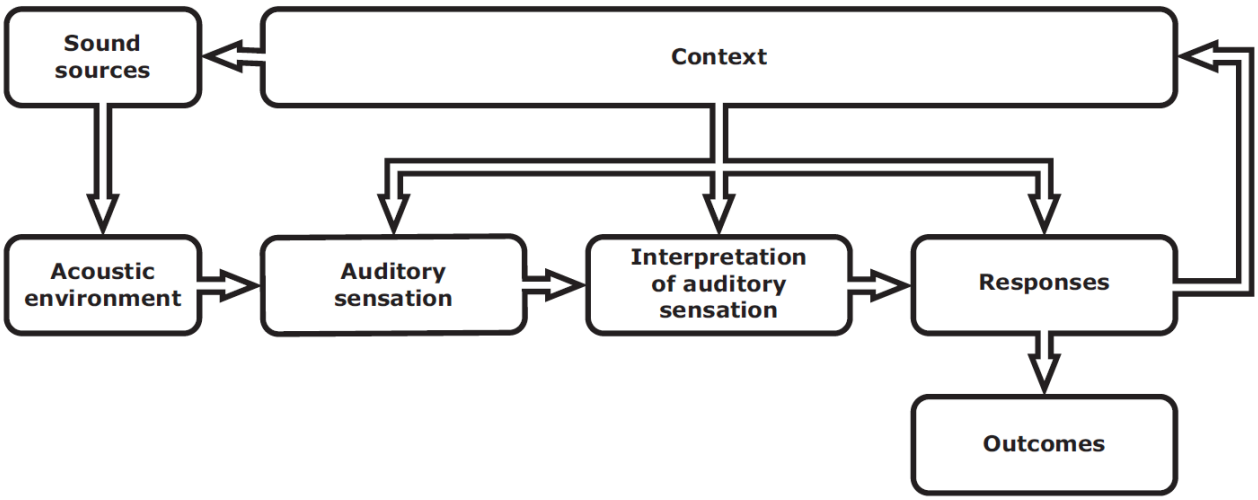


Figure 4: BS12913-1 *"Elements in the perceptual construct of soundscape"*

Best Practicable Means

2.9 The use of 'best practicable means' (BPM) to control noise emissions from a site constitutes a ground of defence against charges that a nuisance is being caused under Section 72 of the '*Control of Pollution Act 1974*'. The term practicable is defined as 'reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications'.

3.0 Proposed Operation and Noise Sources

3.1 The existing layout and boundaries are shown in *Noise Monitoring* plans by AAe in Appendix A.

3.2 The importing/exporting of processed 'skip' waste are proposed to be undertaken between 0700 to 1700 hours Monday to Friday and 0700-1300 on Saturdays. No activities will take place outside these hours, inclusive of Sundays and bank holidays. This is no change of operating hours to the existing permit.

3.3 In relation to noise sources, the only difference to current worst-case operations will be an increase of trucks and/or HGVs importing and exporting waste. There is to be an increase from 50 to 100 HGVs (50x coming and 50 going) per day, or a maximum of 10x per hour (vs the current circa 5 per hour).

3.4 Over the year the increase in processing from ≤25,000 to 125,000 tonnes will result in more days active and more hours that are at full activity. However, there are currently frequent hours that the plant/site activities are operating at full capacity and therefore in terms of a BS4142 assessment, in any given one-hour daytime period (time period required by a BS4142 assessment for daytime hours) waste sorting/stockpiling is identical over that one-hour period, whether processing 25,000 or 125,000 tonnes across a year.

3.5 Noise level measurements of activities from Enterprise Skip Hire Ltd were undertaken to inform the BS4142 noise impact assessment.

4.0 Noise Measurements

4.1 In order to inform a BS 4142:2014 assessment, AAe undertook both short term manned and a week-long unmanned measurements of the existing background noise at a secure location, as shown in AAe's marked up drawings in Appendix A.

4.2 Due to the busy main road along the A413, it was not possible to ensure a secure location of the long-term meter equipment nearer to the NSRs. However, the measurement location undertaken to the southwest (see Appendix A) provides background noise levels that can be adjusted, as this was distant from the A413 (and entirely shielded from Enterprise Skip Hire activities). The short-term measurements adjacent to the NSRs (locations ST5 and ST6 in Appendix A) also provide a means to correlate the noise levels with the long-term measurement position.

4.3 Measurements were setup and collected by Kristian Wood MSc BSc (Hons). He holds a certificate of competency by the Institute of Acoustics (IoA) to undertake environmental noise measurements. Long term measurements were undertaken between approximately 2pm on Friday 23rd August and 12pm on Friday 30th August 2024.

4.4 The long-term unmanned microphone set-up at the measurement location is shown in Figure 5 overleaf with the view looking southeast towards the concrete panelling wall of Enterprise Skip Hire Ltd. Within the same photos in the foreground was the short-term sound level meter (SLM).

Figure 5. Measurement position setup long-term SLM in background (view facing southeast)

4.5 The measurements were carried out as far as practicable in accordance with BS 7445-1:2003 *Description and measurement of environmental noise, Part 1: Guide to quantities and procedures*.

4.6 The equipment used for the noise measurements were a Norsonic 131 SLM for the short-term attended measurements and a Rion NL52 SLM for the long-term measurements. Full calibration certificates for the equipment are shown in Appendix B.

4.7 The Rion NL52 SLM was calibrated before and after the measurements, with a negligible (comfortably within acceptable tolerances) 113.4 dB before and 113.3 dB at the end of the long-term survey. No deviation from the calibration level of 114 dB re 2 x 10^{-5} Pa at 1000 Hz was recorded for the Norsonic 131 SLM.

4.8 The microphone positions were situated approximately 1.5 m above local ground level, in free-field conditions (albeit in proximity to localised plants) and fitted with a windshield.

4.9 AAe does not possess a weather station and it is understood that a rental one was unavailable the week of the survey, due to the constrained timescales provided by EA on this scheme. Consequently, localised weather data has been purchased and is shown in Appendix C. The meteorological conditions during the site measurements have been reviewed. Where winds speeds or gusts over 5 m/s occurred, this has been discounted from the survey results. Equally periods of rain have been ignored. These are all highlighted in red within the table in Appendix C.

4.10 During the daytime measurement periods, AAe have confirmed that the noise environment throughout the survey comprised intermittent train passbys, distant road traffic noise from the A413 and muffled (due to the intervening concrete panel wall) Enterprise Skips activities. AAe also confirmed that the long-term SLM was positioned on a dried pond bed, attached to a fallen tree and that although there were trees surrounding the pond, none were close enough to have a noticeable effect on the sound pressure levels and little leaf rustling occurred as the trees were on the whole, evergreen.

4.11 A chart depicting the seven-day measured A-weighted background (dB $L_{A90,1hr}$), ambient (dB $L_{Aeq,1hr}$) and maximum (dB $L_{AFmax,1hr}$) noise levels are given in Figure 6. The chart depicts the 1-hour daytime only periods of 07:00-17:00 weekdays and 07:00-13:00 for Saturday operations, as per BS4142 requirements and the operational hours of the site.

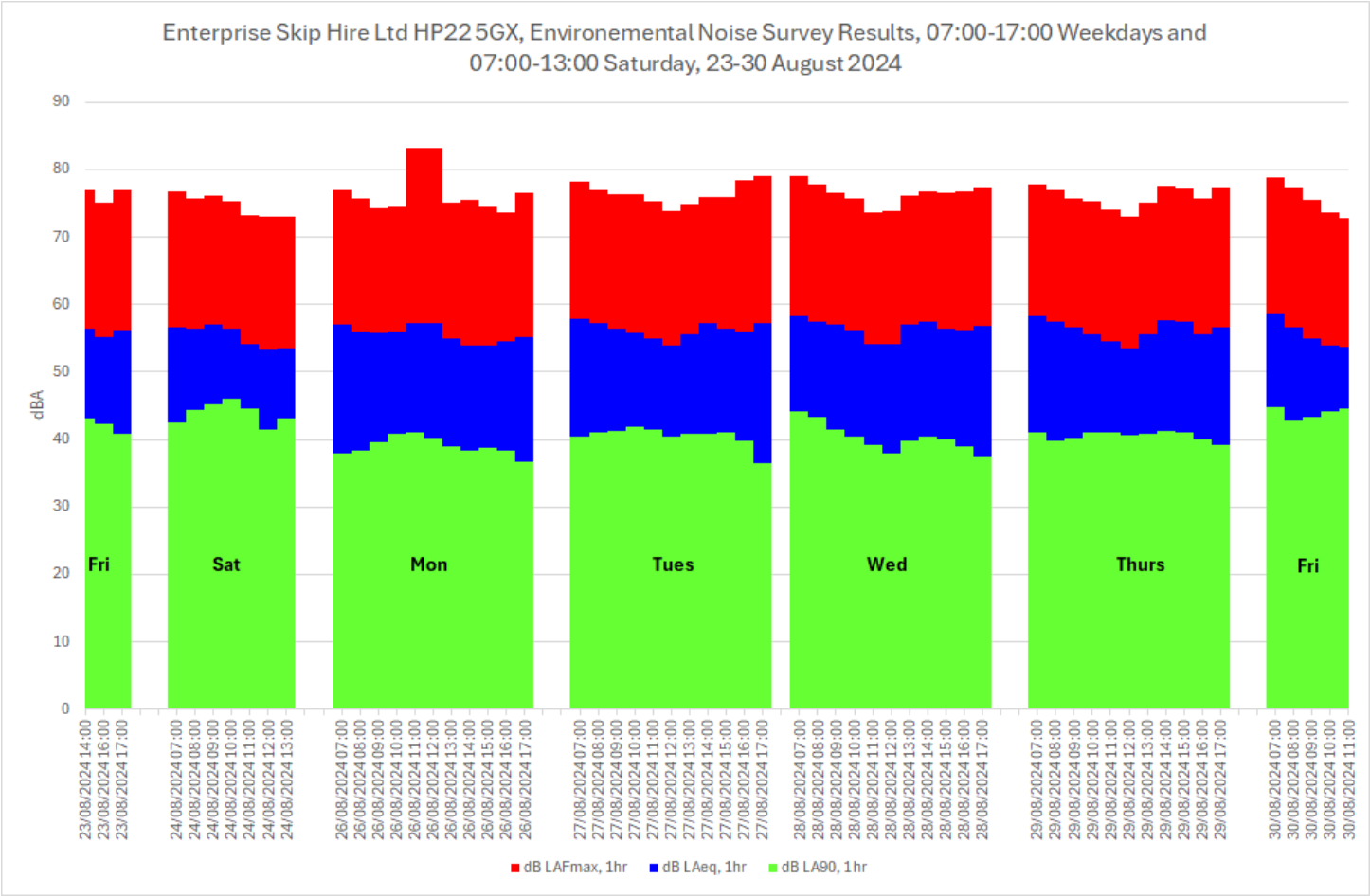


Figure 6: Daytime 1-hour measurement results

Background noise measurements

4.12 The Table in Appendix D provides the raw background noise data from Figure 6 for each 1-hour measurement period. The results from Appendix D show that the lowest typical background noise levels at the measurement position (without adjacent site activities) would be selected as 38 dB $L_{A90,1hr}$ Monday to Friday and 41 dB $L_{A90,1hr}$ on Saturdays; although a conservative approach would be to apply the same background noise on a Saturday, to that of a weekday. This level is however not considered similar to what would be experienced at the NSRs, which are far closer to the relatively busy A413.

4.13 Background (dB L_{A90}) noise levels at the NSRs were measured for the manned positions ST5 and ST6 (15-mins) occurring within the same one-hour period as the long term LT1 position, the results of which are shown in Table 1.

Table 1 - Long-term measurement noise levels vs short term at NSRs

Measurement Position	Start Time	dB L_{AFmax}	dB L_{Aeq}	dB L_{A90}
LT1 (1hr)	30/08/2024 11:00	73	54	45
ST5 (15min)	30/08/2024 11:28	83	69	59
ST6 (15min)	30/08/2024 11:56	83	72	61

4.14 From Table 1, noise levels during the same time period on 30th August 2024 are approximately 14-16 dB louder for the background noise levels (15-18 dB louder for the ambient levels and ~10 dBA louder for the maximum levels), due to road traffic noise affecting the measurement positions ST5 and ST6, i.e. the NSRs.

4.15 Consequently, the worst-case background noise levels used for the BS4142 assessment, Monday to Saturday is 52 dB $L_{A90,1hr}$ at the NSRs (38 dB at LT1 + 14 dB level difference at ST5). This level is also akin to other residential dwelling sites/façades measured by RMP throughout the UK next to similar A-roads.

Source Activity Noise Measurements

4.16 Short term measurements ST2-ST4 were undertaken on the 23rd August 2024 within the Enterprise Skip Hire site and of the noisiest/worst case activities from the *Trommel*, *Picking Station* and *Main Yard* activities (ST2-ST4 respectively – see Appendix A), which also included measurements of moving plant and deliveries/tipping etc. The results of the maximum, ambient and background noise levels associated with these activities (at 5m from each/main source) are shown in Table 2 overleaf.

Table 2 – Short Term Site/Source Measurement Results (levels @ 5 m)				
Measurement Position	**Start Time**	**dB L_{AFmax}**	**dB L_{Aeq}**	**dB L_{A90}**
ST2 (5min)	23/08/2024 14:13	91	83	80
ST3 (5min)	23/08/2024 14:20	97	81	78
ST4 (15min)	23/08/2024 14:36	90	75	71

4.17 Photos of the short-term source measurement positions are shown in Figures 7-9.

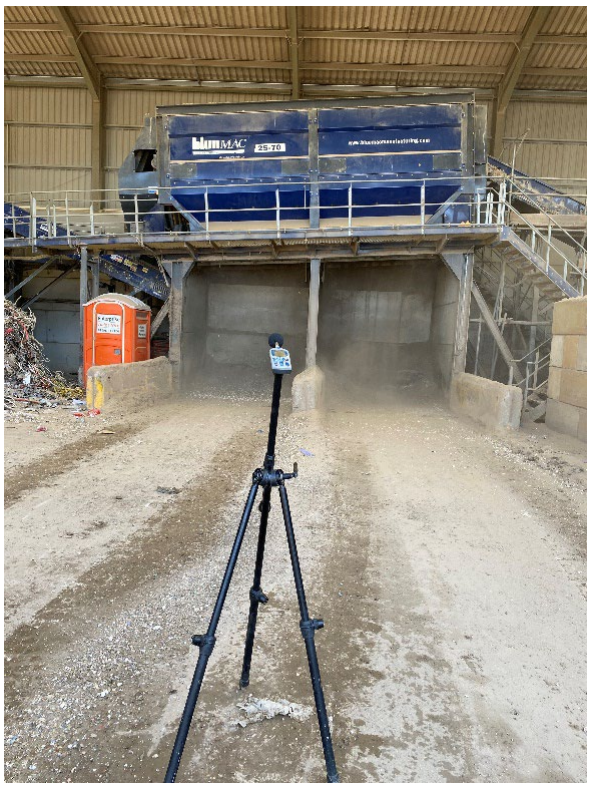


Figure 7: ST2 Position – *Trommel*

Figure 8: ST3 Position – *Picking Station*

Figure 9: ST4 Position – *Main Yard*

5.0 Noise prediction and assessment

5.1 The BS 4142:2014 assessment is undertaken by comparing the background noise levels within paragraph 4.15, with source levels.

5.2 The source levels require to be corrected for distance and the character of the noise to establish the Rating Level to be used in the assessment.

5.3 Additional character penalties (from BS4142:2014), can be applied in relation to tonality/impulsivity/intermittency from plant; the meanings of which are replicated below. However, these penalties are only applicable in terms of the effects at the sensitive receiver (not the source).

Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and

then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Assessment – Waste Processing and Site Activities – Current Baseline

5.4 The source levels require to be corrected for distance and the character of the noise to establish the Rating Level to be used in the assessment.

5.5 Worst-case measurements were undertaken by AAe for the *Main Yard Area* (ST2-ST4/Table 2, page 15). However, for the *C&D Processing & Aggregate Storage* to the northwest, this was not operational on both days of AAe's attendance at site on 23rd and 30th August and therefore unmeasurable. However, AAe have provided us with noise levels of the rock crusher unit and associated loading/unloading of this/adjacent stockpiles from this site (taken directly from the previous Planning Application in 2018 for Enterprise Skip Hire Limited), the noise levels of which were measured by another consultancy to be 88 dB L_{Aeq} @ 3 m over a minimum 10-minute period. From other waste processing sites that RMP have attended historically, this relatively loud noise level (88 dBA) is typical of this sized machinery/processing.

5.6 As the specific noise will operate over a 1-hr daytime period, no on-time corrections have been included.

5.7 The distance correction for the noise from the external activities incident on the nearest residential properties (NSRs) is calculated using point source attenuation (20* log d1/d2, where d1 is the source to measurement position distance and d2 is the distance from source to NSR.

5.8 In relation to barriers to the northwest (*C&D Processing and Aggregate Storage*), these are surrounded by 3m high concrete panelled walls. For the noisiest activities around the *Main Yard Area*, these are surrounded by 6 m high enclosures (inclusive of 'awnings/returns) which can be clearly defined in Figure 9 (page 16) and indicated in the site layout in Appendix A. The losses

from the intervening barrier(s) have been calculated using STRUTT (latest "Swift Parrot" version) and the Maekawa empirical calculation methodology. The results of which are shown in Table 3 overleaf. For the NSRs, the centre of the worst-case windows are all situated approximately 1.5 m above local ground level (all worst-case houses only have single storey windows facing the A413), themselves approximately 2.5 m above the Enterprise Skip Hire site.

Table 3 - Barrier Loss Calculations using Strutt

	Input				Octave Band Centre Frequency, Hz								
Zone	Item / Description	Barrier Height	Source to Barrier Distance	Barrier to NSR distance	63	125	250	500	1k	2k	4k	8k	**Overall dB Loss**
Main Yard Area	Barrier Attenuation - Theory: Maekawa, Source Height: 2 m, Receiver Height: 2.5 m	6.0 m	22.0 m	253.0 m	-7	-9	-11	-14	-17	-20	-23	-25	**-15**
C&D Processing & Aggregate Storage	Barrier Attenuation - Theory: Maekawa, Source Height: 1.7 m, Receiver Height: 2.5 m	3.0 m	6.0 m	269.0 m	-6	-7	-8	-10	-12	-15	-18	-21	**-12**

5.9 The results of Table 3 demonstrate that the losses associated with 'barriers' are -15 dB and -12 dB for the *Main Yard Area* and the *C&D Processing and Aggregate Storage* zones respectively, at the worst-case NSRs.

5.10 The site operational noise can be impulsive and may contain tonal characteristics at source. However, given that the existing activity was found to be inaudible at the NSRs (due to road traffic noise masking operations, as well as relatively large distances and the aforementioned barrier losses), no character corrections are considered applicable in the context of the NSRs. No intermittency correction is also required as a worst-case assessment for the one-hour BS4142 assessment assumes continuous operations throughout that entire one-hour period.

5.11 The predicted daytime Monday to Friday and Saturday daytime rating level of the loading/unloading and worst-case site noise impact at the NSRs, taking into account the aforementioned corrections where required, are given in

Table 4 for the Main Yard Area and Table 5 for the *C&D Processing & Aggregate Storage* zone.

Table 4. BS 4142 assessment of Enterprise Skip Hire Operations at NSRs – *Main Yard Area* (dB re 2 x 10^{-5} Pa)		
Description	Daytime (07:00-17:00) Mon-Fri	Daytime (07:00-17:00) Saturday
Worst-Case Source Noise @ 5m	83	83
Distance Loss (20*log(5m/275m)	-35	-35
Barrier Loss (Table 3)	-15	-15
Rating level, $L_{Ar,Tr}$	33	33
Background noise level, L_{A90} (para. 4.15)	52	52
Difference	-19	-19
BS 4142 Assessment	**No Adverse Impact (inaudible)**	**No Adverse Impact (inaudible)**

Table 5. BS 4142 assessment of Enterprise Skip Hire Operations at NSRs – *C&D Processing & Aggregate Storage* (dB re 2 x 10^{-5} Pa)		
Description	Daytime (07:00-17:00) Mon-Fri	Daytime (07:00-17:00) Saturday
Worst-Case Source Noise @ 3m	88	88
Distance Loss (20*log(3m/275m)	-39	-39
Barrier Loss (Table 3)	-12	-12
Rating level, $L_{Ar,Tr}$	37	37
Background noise level, L_{A90}	52	52
Difference	-15	-15
BS 4142 Assessment	**No Adverse Impact (inaudible)**	**No Adverse Impact (inaudible)**

Assessment – Waste Processing and Site Activities – Proposed Increase in Processing to 125,000 tonnes

5.12 The processing/activity noise that is to be undertaken over a worst-case one-hour period is no different whether processing 25,000 or 125,000 tonnes. Therefore Tables 6 and 7 demonstrate the individual areas overall noise levels, with Table 8 demonstrating the overall impact from all site activities.

Table 6. BS 4142 assessment of Enterprise Skip Hire Operations at NSRs – *Main Yard Area* (dB re 2 x 10^{-5} Pa)

Description	Daytime (07:00-17:00) Mon-Fri	Daytime (07:00-17:00) Saturday
Worst-Case Source Noise @ 5m	83	83
Distance Loss (20*log(5m/275m)	-35	-35
Barrier Loss (Table 3)	-15	-15
Rating level, $L_{Ar,Tr}$	33	33

Table 7. BS 4142 assessment of Enterprise Skip Hire Operations at NSRs – *C&D Processing & Aggregate Storage* (dB re 2 x 10^{-5} Pa)

Description	Daytime (07:00-17:00) Mon-Fri	Daytime (07:00-17:00) Saturday
Worst-Case Source Noise @ 3m	88	88
Distance Loss (20*log(3m/275m)	-39	-39
Barrier Loss (Table 3)	-12	-12
Rating level, $L_{Ar,Tr}$	37	37

Table 8. BS 4142 assessment of Enterprise Skip Hire Operations at NSRs – All Site Activities (dB re 2 x 10^{-5} Pa)		
Description	Daytime (07:00-17:00) Mon-Fri	Daytime (07:00-17:00) Saturday
Main Yard Rating level, $L_{Ar,Tr}$	33	33
C&D Processing Rating level, $L_{Ar,Tr}$	37	37
Total Combined Rating level, $L_{Ar,Tr}$	38	38
Background noise level, L_{A90}	52	52
Difference	-14	-14
BS 4142 Assessment	**No Adverse Impact (inaudible)**	**No Adverse Impact (inaudible)**

5.13 In terms of context, whilst the noise will occur more frequently with the proposed development, subjectively the source noise was inaudible at the receiver and therefore the context of the increased waste processing would not change the BS 4142 assessment/outcomes.

Assessment – HGV traffic impact onto NSR

5.14 The noise levels associated with moving heavy goods vehicles (HGVs) on the access into and out of the site has been predicted using the equation outlined in BS:5228 (*Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*) section F2.5.2 is reproduced as follows:

F.2.5.2 Method

For mobile items of plant that pass at intervals (such as earth-moving machinery passing along a haul road), it is possible to predict an equivalent continuous sound level using the following method.

a) *Stage 1*. The general expression for predicting the L_{Aeq} alongside a haul road used by single engined items of mobile plant is:

$$L_{Aeq} = L_{WA} - 33 + 10\log_{10}Q - 10\log_{10}V - 10\log_{10}d \quad \text{(F.6)}$$

where:

L_{WA} is the sound power level of the plant, in decibels (dB);

Q is the number of vehicles per hour;

V is the average vehicle speed, in kilometres per hour (km/h);

d is the distance of receiving position from the centre of haul road, in metres (m).

5.15 The worst case (closest to the NSRs) movements taking place within the proposed site have been considered in the assessment, which is at worst-case/minimum 230 m southwest of the NSRs (main entrance to the site).

5.16 AAe have confirmed that a maximum of 10 HGVs coming in and out per hour during the aforementioned operational daytime hours.

5.17 The maximum vehicle speed entering and leaving site will be 20 km/h.

5.18 As aforementioned, this is not a new source being introduced into the area, but simply an increase in numbers. As a worst-case assessment, an increase of +5 HGVs proposed and should therefore be compared directly with the existing level (i.e. how much more noise having 10 HGVs in an hour vs the existing ~5 HGVs an hour).

5.19 No penalties have been applied to the BS4142 rating/calculations, as tonality/impulsivity/intermittency from HGV movements is not considered a factor at the NSR.

5.20 Calculations for the average noise level associated with HGV movements per hour at the NSRs are shown in Table 9.

Table 9. Prediction of worst-case noise level generated by moving HGVs entering/leaving the site @ NSR (dB re 2 x 10-5 Pa)								
Equipment	**BS5228 Lwa (dB)**	**Average speed (km/h)**	**-10 log V**	**Distance to haul road d (m)**	**-10 Log d1/d2**	**No. Sources per hour Q**	**Multiple Source Correction (dB)**	**Overall Noise Level, L_{Aeq} (dB)**
Lorry entering/exiting site (Table C.11, ref 5 + 28dB) -Existing	111	20	-13	230	-24	5	7	**48**
Lorry entering/exiting site (Table C.11, ref 5 + 28dB) - Increased processing	111	20	-13	230	-24	10	10	**51**

5.21 Comparing the levels in Table 8 with BS 4142, yields the impact prediction in Table 10.

Table 10. Predicted BS 4142 assessment of HGVs at the NSR, Daytime (1-hr) (dB re 2 x 10^{-5} Pa)		
	Existing	Proposed (+5 HGVs)
Calculated external noise level at NSRs dB L_{Aeq}	48	51
Background level, $L_{A90,1hr}$	52	52
Assessment difference	-4	-1
BS 4142:2014 Assessment	No adverse impact	Low Impact

5.22 Table 9 demonstrates that adverse impact from HGV movements across the site upon the NSR is low/unlikely. The difference in noise levels between existing and proposed will be a marginal +3 dBA, which would only just be a perceptible increase.

5.23 If one were to logarithmically add the noise levels from Table 10 onto the overall noise levels from site (Table 8), the final predicted BS4142 rated impact noise onto the NSRs would be as given in Table 11.

Table 11. BS 4142 assessment of Enterprise Skip Hire Operations at NSRs – Total Noise of Site + HGVs (dB re 2 x 10^{-5} Pa)		
Description	Daytime (07:00-17:00) Mon-Fri	Daytime (07:00-17:00) Saturday
Rating level, $L_{Ar,Tr}$ - All Site activity Table 8	38	38
Rating level, $L_{Ar,Tr}$ - HGVs Table 10	51	51
Total Rating level, $L_{Ar,Tr}$	51	51
Background noise level, L_{A90} (para. 4.15)	52	52
Difference	-1	-1
BS 4142 Assessment	**Low Impact**	**Low Impact**

5.24 Table 11 demonstrates an overall 'low impact' prediction from proposed increased processing at Enterprise Skip Hire Limited activities and are therefore considered acoustically acceptable.

6.0 Uncertainty

6.1 In undertaking the assessment, RMP have considered the following uncertainty as follows:

- Class 1 sound level meters calibrated in accordance with the manufacturers' guidelines were used to minimise uncertainty of measured sound level.
- Background, ambient, and residual measurements were undertaken over an extended period rather than short term measurements to take into account variation of the noise environment and resulting uncertainty. The measurements have been supported by meteorological results, to ensure that adverse weather conditions have not adversely affected noise levels. Where weather conditions have adversely affected the survey, these have been highlighted and omitted from any acoustic impact assessment.
- The assessment has not considered ground absorption, and therefore further positive (reduction) effects on the noise impacts for the NSR(s) are likely.
- The surrogate position for the NSR may have different background noise levels, i.e. being located further away (quieter) to the main A413/NSRs. However, a conservative approach has been taken to calculate the noise impact in accordance with BS4142 and this therefore provides confidence that a low impact is predicted from increased waste processing operations on site.

7.0 Conclusions

7.1 RMP was instructed by AA Environmental Ltd, on behalf of Enterprise Skip Hire Ltd, to undertake a noise impact assessment on the nearest existing noise-sensitive receptor(s), as part of a variation of their Environmental Permit (#DB3904US) to increase the quantity of "treatment of waste" from <25,000 tonnes to ≤125,000 tonnes per annum; at the existing Enterprise Skip Hire facility, Land Adjacent To Chiltern View Nursery, Wendover Rd, Stoke Mandeville, Aylesbury HP22 5GX.

7.2 A 7-day survey of the existing background daytime noise environment at a surrogate/secure location for the worst-case noise sensitive receptors have been conducted.

7.3 In relation to noise sources, the only difference to current operations will be an increase of trucks and/or HGVs importing and exporting waste/soil. There is to be an increase from 50 to 100 HGVs per day, or a maximum of 10x per hour (vs the current circa 5 per hour).

7.4 Over the year the increase in processing from 25,000 to 125,000 tonnes will result in more days active and more hours that are at full activity. However, there are currently frequent hours that the plant is operating at full activity and therefore in terms of a BS4142 assessment, in any given one-hour daytime period (time period required by a BS4142 assessment for daytime hours) rock crushing/waste sorting/stockpiling is identical over that one-hour period, whether processing 25,000 or 125,000 tonnes across a year.

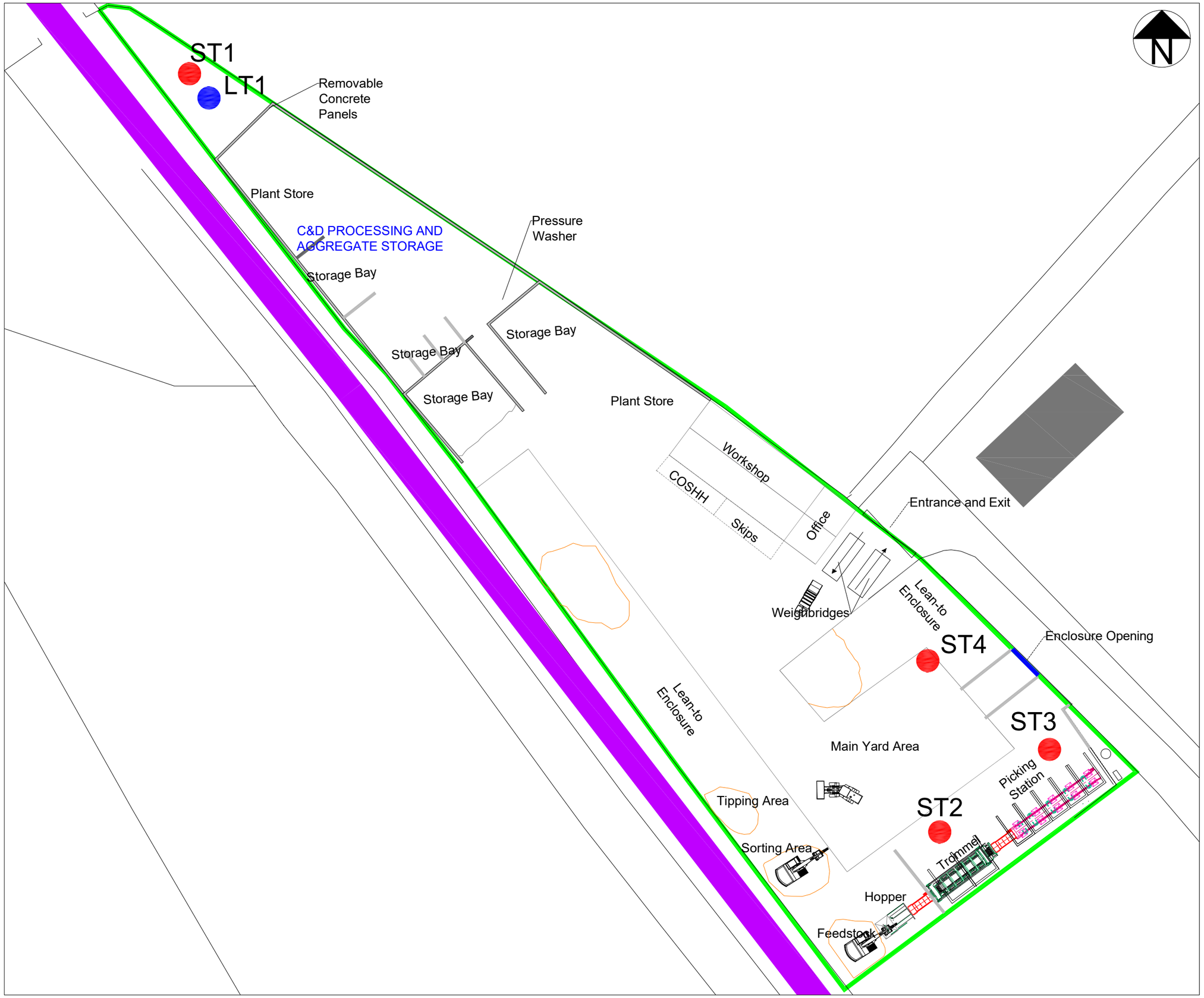
7.5 A BS4142:2014 assessment of all combined site activities and HGV noise has been undertaken for the worst-case nearest noise-sensitive receptors.

7.6 The findings of the worst-case BS4142 assessment, are that the proposed increase in output of waste processing is predicted to have a low impact on the NSR. The difference in noise levels at the NSR's from HGVs between existing and proposed will be a marginal +3 dBA, which would only just be a perceptible increase, however the overall impact relative to BS4142 demonstrates a 1 dB below background noise levels and is thereby deemed acoustically acceptable.

Prepared by:	Approved by:
David Chapman BEng(Hons), MIOA	Richard Mackenzie BSc, PGDip, MIOA

Appendix A

AAe's Site Layout Plan and Measurement Positions



KEY

- Permit Boundary
- Short-term Monitoring Location
- Long-term monitoring Location
- Railway

Notes:

1. Site is fully concreted.

Rev.	Details	Drawn / Chkd.	Date

Project

233036
Enterprise Skip Hire Limited
Stoke Mandeville

Title

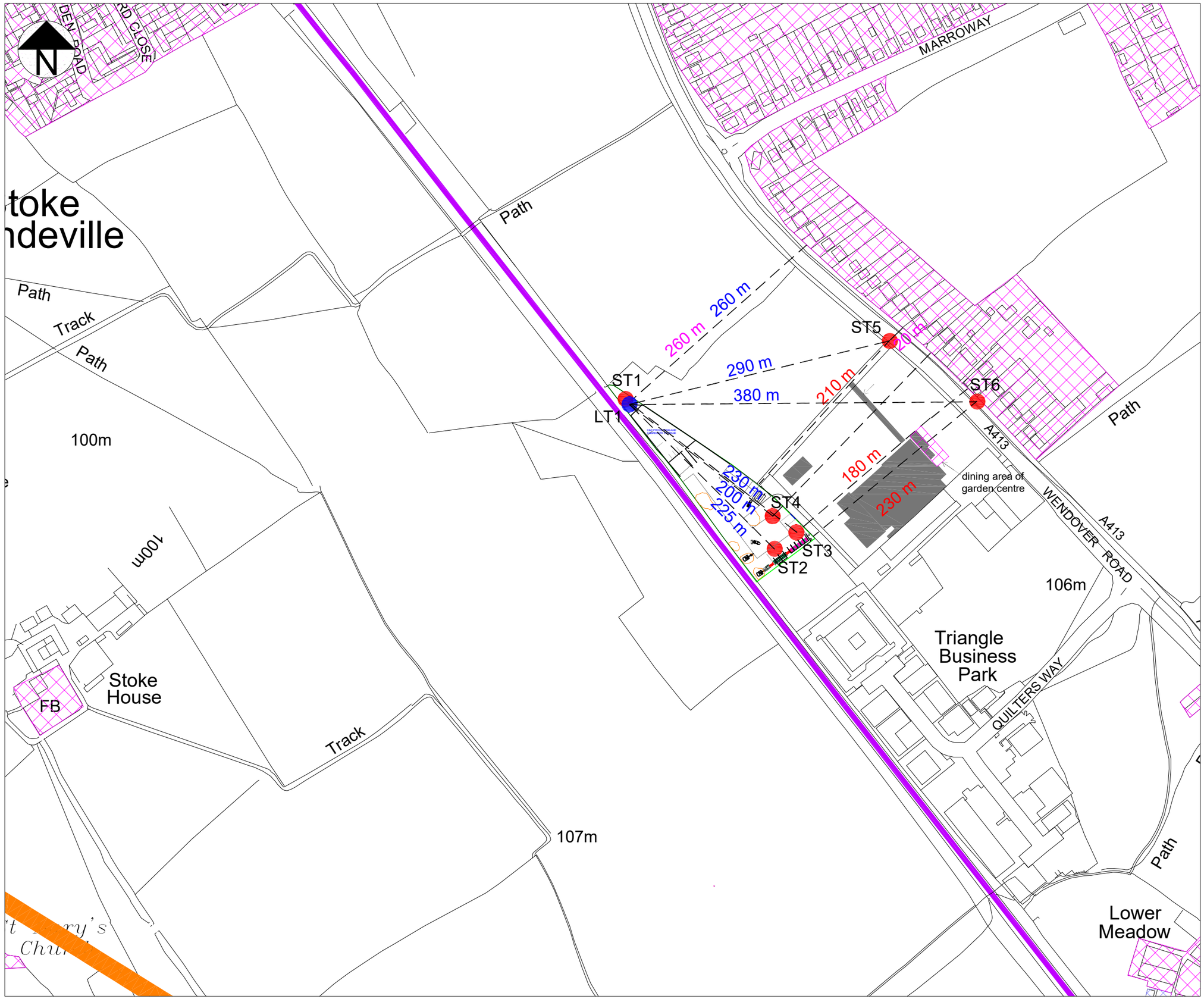
Noise Monitoring Plan

AA Environmental Ltd
Units 4-8
Cholswell Court
Shippon Abingdon
Oxon OX13 6HX

T:(01235) 536042
F:(01235) 523849
info@aae-ltd.co.uk
www.aae-ltd.co.uk

AAe
Environmental Consultants

Scale	Date	Drg. No.	Rev.
1:800@A3	Aug'24	233036/NM/D/001	
	Drawn: KW / Chkd.: EB		



KEY

- Permit Boundary
- Short-term Monitoring Location
- Long-term monitoring Location
- Receptors
- Railway
- HS2 Alignment

Notes:
1. Site is fully concreted.

Rev.	Details	Drawn / Chkd.	Date

Project
233036
Enterprise Skip Hire Limited
Stoke Mandeville

Title
Noise Monitoring Plan

AA Environmental Ltd
Units 4-8
Cholswell Court
Shippon Abingdon
Oxon OX13 6HX

T: (01235) 536042
F: (01235) 523849
info@aae-ltd.co.uk
www.aae-ltd.co.uk

Environmental Consultants

Scale	Date	Drg. No.	Rev.
1:4000@A3	Aug'24	233036/NM/D/002	
	Drawn: KW / Chkd.: EB		

Appendix B

Calibration Certificates for Sound Level Meters used for the Surveys

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

Certificate of Calibration

Certificate number: **U48224**

Test Object: **Sound Level Meter, BS EN IEC 61672-1:2003 Class 1**

Producer:	**Norsonic AS.**
Type:	**131**
Serial number:	**1312759**
Customer:	**AA Environmental Limited**
Address:	**Units 4 - 8, Cholswell Court, Shippon, Abingdon, Oxon. OX13 6HX.**
Contact Person:	**Stephen Lewis**
Order No:	**TBC**

Introduction:
Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	*Producer*	*Type*	*Serial No*	*Certificate No*
Microphone	Norsonic	1228	00120	48223
Calibrator*	Norsonic	1251	33765	U48222
Preamplifier	Norsonic	1207	12185	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield	Norsonic	Nor1451 (ø 60mm)
Attenuator	N/A	
Extension cable	N/A	

These items have been taken into account wherever appropriate.

Instruction Manual: Im131_1Ed3R0En Firmware Version: v3.0.1866 The test object is a single channel instrument.

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	101.00 ±0.01	22.40 ±0.25	51.60 ±2.3

Calibration Dates:

Received date:	27/06/2024	Reviewed date:	01/07/2024
Calibration date:	28/06/2024	Issued date:	01/07/2024

Technicians: (Electronic certificate)

Calibrated by: *Palaniwel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Jenny Crawford*

Certificate of Calibration

Continuation of Certificate number: **U48224**

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	**BS EN IEC 61672-1:2003**
Periodic Tests:	**BS EN IEC 61672-3:2006**
Pattern Evaluation:	**Not Applicable**

Conformance:
From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - IEC61672-3 Ed.1 #9	Passed
Self-generated noise - IEC 61672-3 Ed.1 #10.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 #11	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 #12	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 #13	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.1 #14	Passed
Toneburst response - IEC 61672-3 Ed.1 #16	Passed
Peak C sound level - IEC 61672-3 Ed.1 #17	Passed
Overload indication - IEC 61672-3 Ed.1 #18	Passed

Comments
Correct level with associated calibrator is 114.0dB(A).

Statement of Conformance
The sound level meter submitted for testing has successfully completed the periodic tests for the environmental conditions under which the tests were performed. However, no general statement of conclusion can be made about conformance of the sound level meter to the full requirements of the manufactured standard because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in the manufacturer's standard and because the periodic tests completed cover only a limited subset of the specifications in the relevant standard

Observations
No information on the uncertainty of measurement, required by the listed standard, for the correction data was made available in the instruction manual / data sheets from the equipment manufacturer / supplier for the test object. The uncertainty of measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the test object may not conform to the requirements of the listed standards.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

Decision Rule
Basic Meter Function - The decision rules will be applied in accordance with the procedure as described in BS EN 61672-3:2006.

Certificate of Calibration

Continuation of Certificate number: U48224

This certificate relates only to the items tested above.

** End of Certificate **

Measurement Results:

Indication at the calibration check frequency - IEC61672-3 Ed.1 Clause 9

```
Reference level: 114.0 dB
Reference Range: 130 dB FS
Reference Frequency: 1000 Hz
Reference Calibrator: WSC5 - Nor1251-31824
Reference calibrator level: 113.96
Before calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.81
Calibrator level before adjustment: 113.8
After calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.81
Reference calibrator level after calibration: 113.8
Associated Calibrator: Norsonic - 1251 - 33765
Associated calibrator level: 114.16
Initial level check:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 114.01
Indicated level: 114.0
Final level statement:
Environmental corrections after calibration: 0.00
Other corrections: -0.15
Notional level: 114.01
Calibrator level after adjustment: 114.0
This value shall be used for adjusting the sound level meter in the future.
Test Passed
```

Self-generated noise - IEC 61672-3 Ed.1 Clause 10.2

Network	Level (dB)	Comment
A	16.9	Microphone installed
A	13.4	Equivalent capacity
C	15.2	Equivalent capacity
Z	19.2	Equivalent capacity

Test Passed

Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 Clause 11

C-Weighted results

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
125 Hz	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.3	+-1.5	0.0	P
1 kHz	0.0	0.2	0.1	0.0	-0.1	0.1	0.1	0.1	0.3	+-1.1	0.0	P
4 kHz	-0.9	0.2	1.0	0.0	-0.1	0.2	0.7	0.1	0.3	+-1.6	0.6	P
8 kHz	-3.8	0.2	2.9	0.0	0.0	0.2	0.1	0.2	0.4	+2.1/-3.1	-1.0	P

The level obtained at 1 kHz was used as reference for the calculations.
This level was: 95.33 dB.
The overall frequency response of the sound level meter, nominal case reflections, typical wind screen response and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
Frequency response test using electrostatic actuator.
Sources for correction data:

Microphone field corrections and uncertainty:	Norsonic
Case reflections and uncertainty:	Norsonic AS. Certificate CAL022-2005
Wind screen corrections and uncertainty:	Norsonic NTQ-L-T-007 04/01/2010

Test Passed

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

A-Weighted results:

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.16	+-1.5	0.0	P
125 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.16	+-1.5	0.0	P
250 Hz	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.19	+-1.4	0.0	P
500 Hz	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.19	+-1.4	0.1	P
1 kHz	0.0	0.1	0.1	0.0	-0.1	0.1	0.1	0.1	0.19	+-1.1	0.1	P
2 kHz	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.1	0.19	+-1.6	0.5	P
4 kHz	-0.1	0.1	0.2	0.0	-0.1	0.2	0.7	0.1	0.25	+-1.6	0.7	P
8 kHz	0.0	0.1	-0.8	0.0	0.0	0.2	0.1	0.2	0.31	2.1/3.1	-0.8	P
16 kHz	0.0	0.1	-3.6	0.0	-0.1	0.3	-0.5	0.3	0.44	3.5/17	-4.2	P

C-Weighted results:

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.16	+-1.5	0.0	P
125 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.16	+-1.5	0.0	P
250 Hz	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.19	+-1.4	0.0	P
500 Hz	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.19	+-1.4	0.2	P
1 kHz	0.0	0.1	0.1	0.0	-0.1	0.1	0.1	0.1	0.19	+-1.1	0.1	P
2 kHz	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.1	0.19	+-1.6	0.5	P
4 kHz	-0.1	0.1	0.2	0.0	-0.1	0.2	0.7	0.1	0.25	+-1.6	0.7	P
8 kHz	0.0	0.1	-0.8	0.0	0.0	0.2	0.1	0.2	0.31	2.1/3.1	-0.8	P
16 kHz	0.0	0.1	-3.6	0.0	-0.1	0.3	-0.5	0.3	0.44	3.5/17	-4.2	P

Z-Weighted results:

Frequency	SLM Meas	SLM U	Microphone Corr	Microphone U	Case Refl. Corr	Case Refl. U	Wind Screen Corr	Wind Screen U	Uncert	Lim	Result
	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	
63 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.16	+-1.5	0.0	P
125 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.16	+-1.5	0.0	P
250 Hz	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.19	+-1.4	0.0	P
500 Hz	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.19	+-1.4	0.1	P
1 kHz	0.0	0.1	0.1	0.0	-0.1	0.1	0.1	0.1	0.19	+-1.1	0.1	P
2 kHz	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.1	0.19	+-1.6	0.5	P
4 kHz	0.0	0.1	0.2	0.0	-0.1	0.2	0.7	0.1	0.25	+-1.6	0.8	P
8 kHz	0.0	0.1	-0.8	0.0	0.0	0.2	0.1	0.2	0.31	2.1/3.1	-0.8	P
16 kHz	0.0	0.1	-3.6	0.0	-0.1	0.3	-0.5	0.3	0.44	3.5/17	-4.2	P

The actual frequency response of Norsonic / 1228 00120 has been used for the calculations.
The overall frequency response of the sound level meter, nominal case reflections, typical wind screen response and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
The calculated uncertainties are checked against the requirements in the standard.
Sources for correction data:

Microphone response and uncertainty:	Measured response / Settings file
Case reflections and uncertainty:	Norsonic AS. Certificate CAL022-2005
Wind screen corrections and uncertainty:	Norsonic NTQ-L-T-007 04/01/2010

Test Passed

Frequency weightings: A Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	92.0	0.12	0.0
125.9	92.0	92.0	0.12	0.0
251.2	92.0	92.0	0.12	0.0
501.2	92.0	92.0	0.12	0.0
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	92.0	0.12	0.0
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency weightings: C Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	92.0	0.12	0.0
125.9	92.0	92.0	0.12	0.0
251.2	92.0	92.0	0.12	0.0
501.2	92.0	92.1	0.12	0.1
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	92.0	0.12	0.0
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency weightings: Z Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	92.0	0.12	0.0
125.9	92.0	92.0	0.12	0.0
251.2	92.0	92.0	0.12	0.0
501.2	92.0	92.0	0.12	0.0
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	92.0	0.12	0.0
3981.1	92.0	92.0	0.12	0.0
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 Clause 13

Weightings Time	Netw	Ref. (dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Fast	A	114.0	114.0	0.4	-0.4	0.12	0.0	P
Fast	C	114.0	114.0	0.4	-0.4	0.12	0.0	P
Fast	Z	114.0	114.0	0.4	-0.4	0.12	0.0	P
Slow	A	114.0	114.0	0.3	-0.3	0.12	0.0	P
Leq	A	114.0	114.0	0.3	-0.3	0.12	0.0	P
SEL	A	124.0	124.0	0.3	-0.3	0.12	0.0	P

Test Passed

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Measured at 8 kHz						
114.0	114.0	1.1	-1.1	0.12	0.0	P
119.0	119.0	1.1	-1.1	0.12	0.0	P
124.0	124.0	1.1	-1.1	0.12	0.0	P
129.0	129.0	1.1	-1.1	0.12	0.0	P
131.0	131.0	1.1	-1.1	0.12	0.0	P
132.0	132.0	1.1	-1.1	0.12	0.0	P
133.0	133.0	1.1	-1.1	0.12	0.0	P
134.0	134.0	1.1	-1.1	0.12	0.0	P
135.0	135.0	1.1	-1.1	0.12	0.0	P
136.0	136.0	1.1	-1.1	0.12	0.0	P
114.0	114.0	1.1	-1.1	0.12	0.0	P
109.0	109.0	1.1	-1.1	0.12	0.0	P
104.0	104.0	1.1	-1.1	0.12	0.0	P
99.0	99.1	1.1	-1.1	0.12	0.1	P
94.0	94.1	1.1	-1.1	0.12	0.1	P
89.0	89.1	1.1	-1.1	0.12	0.1	P
84.0	84.1	1.1	-1.1	0.12	0.1	P
79.0	79.1	1.1	-1.1	0.12	0.1	P
74.0	74.1	1.1	-1.1	0.12	0.1	P
69.0	69.1	1.1	-1.1	0.12	0.1	P
64.0	64.1	1.1	-1.1	0.12	0.1	P

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
59.0	59.1	1.1	-1.1	0.12	0.1	P
54.0	54.1	1.1	-1.1	0.12	0.1	P
49.0	49.1	1.1	-1.1	0.12	0.1	P
44.0	44.1	1.1	-1.1	0.12	0.1	P
39.0	39.1	1.1	-1.1	0.12	0.1	P
34.0	34.1	1.1	-1.1	0.12	0.1	P
30.0	30.2	1.1	-1.1	0.12	0.2	P
29.0	29.2	1.1	-1.1	0.12	0.2	P
28.0	28.2	1.1	-1.1	0.12	0.2	P
27.0	27.2	1.1	-1.1	0.12	0.2	P
26.0	26.3	1.1	-1.1	0.12	0.3	P
25.0	25.4	1.1	-1.1	0.12	0.4	P
24.0	24.4	1.1	-1.1	0.12	0.4	P

Test Passed

Toneburst response - IEC 61672-3 Ed.1 Clause 16

Burst type	Ref. (dB)	Measured (dB)	Lim. (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
Fast 200 mSec	134.0	133.9	0.8	-0.8	0.16	-0.1	P
Fast 2.0 mSec	117.0	116.8	1.3	-1.8	0.16	-0.2	P
Fast 0.25 mSec	108.0	107.3	1.3	-3.3	0.16	-0.7	P
Slow 200 mSec	127.6	127.5	0.8	-0.8	0.16	-0.1	P
Slow 2.0 mSec	108.0	107.9	1.3	-3.3	0.16	-0.1	P
SEL 200 mSec	128.0	127.9	0.8	-0.8	0.16	-0.1	P
SEL 2.0 mSec	108.0	107.9	1.3	-1.8	0.16	-0.1	P
SEL 0.25 mSec	99.0	98.7	1.3	-3.3	0.16	-0.3	P

Test Passed

Peak C sound level - IEC 61672-3 Ed.1 Clause 17

Pulse Type	Pulse Freq. (Hz)	Ref. RMS (dB)	Ref. Peak (dB)	Measured Value (dB)	Lim. (+/-dB)	Uncert. (dB)	Dev. (dB)	Result
1 cycle	8k	126.0	129.4	128.7	2.4	0.2	-0.7	P
Pos 1/2 cycle	500	129.0	131.4	131.3	1.4	0.2	-0.1	P
Neg 1/2 cycle	500	129.0	131.4	131.3	1.4	0.2	-0.1	P

Test Passed

Overload indication - IEC 61672-3 Ed.1 Clause 18

	Measured (dB)	Lim. (+/-dB)	Uncert. (dB)	Result
Level difference of positive and negative pulses:	0.2	1.8	0.16	P

Positive 1/2 cycle 4 kHz. Overload occurred at: 143.5
Negative 1/2 cycle 4 kHz. Overload occurred at: 143.7
Test Passed

*** End of results ***

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

Certificate of Calibration

Certificate number: **48223**

Test Object: **Measurement Microphone**

Producer: **Norsonic AS.**
Type: **1228**
Serial number: **00120**
Customer: **AA Environmental Limited**
Address: **Units 4 - 8, Cholswell Court, Shippon, Abingdon, Oxon. OX13 6HX.**
Contact Person: **Stephen Lewis**
Order No: **TBC**

Measurement Results	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)	Capacitance (pF)
Measurement 1	*-27.84*	*40.55*	*16.23*
Measurement 2	*-27.84*	*40.55*	*16.24*
Measurement 3	*-27.83*	*40.58*	*16.24*
Result (Average):	***-27.84***	***40.56***	***16.24***
Expanded Uncertainty:	0.10		2.00
Degree of Freedom:	>100		>100
Coverage Factor:	2		2

The stated sensitivity is the pressure sensitivity at 250Hz, S_{250}, and is valid at reference conditions. The following correction factors have been applied during the measurement:
Pressure:-0.004 dB/kPa Temperature:-0.005 dB/°C Humidity:-0.003 dB/%RH

Conditions	*Pressure kPa*	*Temperature °C*	*Humidty %RH*
Reference conditions	101.325	23	50
Measurement conditions	100.99 ± 0.040	22.1 ± 0.1	51.7 ± 0.7

The calibration test report shown on the next page gives details of the response at other frequencies relative to this 250 Hz reference sensitivity. Results ≥100 Hz are obtained using an electrostatic actuator as described in BS EN 61094-6 and those below 100 Hz are obtained in a reference pressure chamber. Detailed results are available from the calibration laboratory upon request.

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a coverage probability of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level.

Calibration Dates:

Received date:	27/06/2024	Reviewed date:	01/07/2024
Calibration date:	28/06/2024	Issued date:	01/07/2024

Technicians: (Electronic certificate)

Calibrated by: *Palaniwel Marappan B.Eng (Hons), M.Sc*
Reviewed by: *Jenny Crawford*

Certificate of Calibration

Continuation of Certificate number: 48223

Reference Calibrator: WSC9 (C) - Nor-1253.21816
Measurement Record: K:\C A\Calibration\Nor-1504\Nor-1017 MicCal\NOR1228_00120_M1.nmf

Preconditioning
The equipment was preconditioned for more than 12 hours at the specified calibration temperature and humidity.

Instruments and Program
A complete list of instruments, hardware and software that have been used for this calibration is available from the calibration laboratory

Traceability
The measured values for sound pressure, frequency, voltage, capacitance, temperature, humidity and ambient pressure are traceable to an accredited national physical laboratory.

Observations
The differences between the two results at 100 Hz are within normal limits bearing in mind the different test methods and are taken into account in arriving at the uncertainties of measurement.

Method of Calibration
The open circuit sensitivity of the microphone has been determined at 250 Hz against a reference laboratory standard measurement microphone by insert voltage techniques using a laboratory standard sound calibrator as a transfer standard. The electrostatic actuator frequency response was then obtained for frequencies above 100 Hz as described in BS EN IEC 61094-6. In addition, where requested the optional free field frequency response over the range 2 – 100 Hz has been obtained using a pressure chamber; in this case the reference frequency is 100 Hz. All of these results and their associated uncertainties are detailed in the table on page 3 of this certificate. See the observations field below for details of any discrepancies between the 100 Hz results obtained via the electrostatic actuator and pressure chamber.

The overall uncertainty at any frequency Combined,Fn may be obtained by combining the uncertainty of the open circuit sensitivity S250 with the uncertainty of the actuator / or LF pressure response at any other frequency Act,Fn where Fn is the uncertainty at the frequency of interest using the relationship:

$$\text{Combined,Fn} = 2\sqrt{(2S250 + 2\text{ActFn}}\ )$$

Appendix to this certificate
Where data is available from the microphone manufacturer to correct the actuator / pressure frequency response to obtain the random incidence and / or free field response it is shown in the appendix to this certificate. The uncertainty information relating to these corrections is the responsibility of the microphone manufacturer and when it is available the total uncertainty for the corrected frequency response at each point may then be obtained by including the correction uncertainty in the root-sum-square formula given above. These responses are outside the UKAS accredited scope, but are provided for information.

Observations

Continuation of Certificate number: **48223**

Numerical Results for Relative Frequency Response

Actuator Results					
Freq	Actuator	Uncert.	Freq	Actuator	Uncert.
Hz	dB re 250 Hz	dB	Hz	dB re 250 Hz	dB
100.0	0.04	0.21	5,010.70	-1.32	0.24
112.2	0.04	0.21	5,622.00	-1.71	0.24
125.9	0.03	0.21	6,307.90	-2.23	0.24
141.3	0.03	0.21	7,077.50	-2.85	0.24
158.5	0.03	0.21	7,940.90	-3.69	0.24
177.9	0.03	0.21	8,909.70	-4.51	0.48
199.6	0.03	0.21	9,996.70	-5.51	0.48
223.9	0.02	0.21	11,216	-6.61	0.48
251.2	Ref	0.21	12,585	-7.84	0.48
281.9	0.02	0.21	14,120	-9.45	0.48
316.3	0.02	0.21	15,843	-11.30	0.48
354.9	0.01	0.21	17,775	-13.09	0.70
398.2	0.01	0.21	19,944	-15.03	0.70
446.7	0.01	0.21	22377		0.90
501.2	0.00	0.21	25107		0.90
562.4	0.00	0.21	28170		0.90
631.0	-0.01	0.21	31607		0.90
708.0	-0.01	0.21	35463		0.90
794.4	-0.02	0.21	39790		0.90
891.3	-0.03	0.21	44644		0.90
1000.0	-0.03	0.21	50091		0.90
1122.0	-0.05	0.21	56202		1.20
1258.9	-0.06	0.21	63058		1.20
1412.5	-0.08	0.21	70752		1.20
1584.8	-0.11	0.21	79383		1.20
1778.1	-0.14	0.21	89068		1.20
1995.1	-0.18	0.21	99934		1.20
2238.5	-0.23	0.21	112126		-
2511.6	-0.29	0.21	125806		-
2818.0	-0.37	0.21	141154		-
3161.8	-0.47	0.21	158375		-
3547.5	-0.61	0.21	177696		-
3980.3	-0.80	0.21	199375		-
4465.9	-1.03	0.24	-		-

Low Frequency		
Freq	dB re 100 Hz	Uncert.
Hz		dB
2.0		0.7
2.2		0.7
2.5		0.7
2.8		0.7
3.2		0.7
3.6		0.7
4.0		0.7
4.5		0.7
5.0		0.7
5.6		0.7
6.3		0.7
7.1		0.7
8.0		0.7
8.9		0.7
10.0		0.7
11.2		0.7
12.6		0.7
14.1		0.7
15.9		0.7
17.8		0.7
20.0		0.7
22.4		0.7
25.1		0.7
28.2		0.7
31.6		0.7
35.5		0.7
39.8		0.7
44.7		0.7
50.1		0.7
56.3		0.7
63.1		0.7
70.8		0.7
79.5		0.7
89.2		0.7
100.0	Ref	0.7

Continuation of Certificate number: 48223

Appendix to certificate (not accredited). Random and Free Field Corrected Data

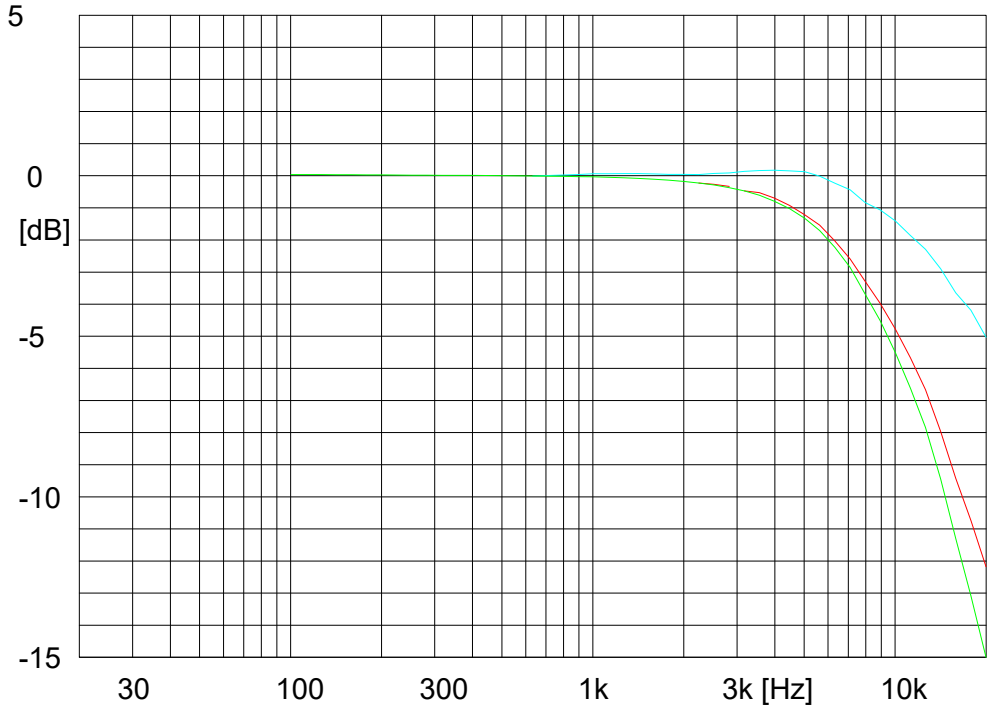
Corrected results, dB re 250 Hz					
Freq Hz	Random incidence corrected	Free field corrected	Freq Hz	Random incidence corrected	Free field corrected
100	0.04	0.04	5,010.70	-1.21	0.13
112.2	0.04	0.04	5,622.00	-1.54	-0.01
125.9	0.03	0.03	6,307.90	-2.03	-0.23
141.3	0.03	0.03	7,077.50	-2.59	-0.43
158.5	0.03	0.03	7,940.90	-3.29	-0.84
177.9	0.03	0.03	8,909.70	-3.97	-1.06
199.6	0.03	0.03	9,996.70	-4.78	-1.41
223.9	0.02	0.02	11,216	-5.67	-1.86
251.2	0.02	0.02	12,585	-6.66	-2.29
281.9	0.02	0.02	14,120	-7.97	-2.90
316.3	0.02	0.02	15,843	-9.43	-3.65
354.9	0.01	0.01	17,775	-10.74	-4.19
398.2	0.01	0.01	19,944	-12.18	-5.03
446.7	0.01	0.01	22,377		
501.2	0.00	0.00	25,107		
562.4	0.00	0.00	28,170		
631	-0.01	-0.01	31,607		
708	-0.01	0.00	35,463		
794.4	-0.02	0.02	39,790		
891.3	-0.03	0.03	44,644		
1,000.00	-0.03	0.06	50,091		
1,122.00	-0.05	0.07	56,202		
1,258.90	-0.06	0.07	63,058		
1,412.50	-0.08	0.07	70,752		
1,584.80	-0.11	0.06	79,383		
1,778.10	-0.14	0.04	89,068		
1,995.10	-0.18	0.04	99,934		
2,238.50	-0.23	0.04	112,126		
2,511.60	-0.27	0.07	125,806		
2,818.00	-0.33	0.09	141,154		
3,161.80	-0.47	0.13	158,375		
3,547.50	-0.53	0.16	177,696		
3,980.30	-0.70	0.17	199,375		
4,465.90	-0.93	0.15	-		

The corrections used to produce these random and free field responses are published by the manufacturer and they are responsible for the accuracy of the data and for the associated uncertainties to be applied. Campbell Associates Limited use their best endeavours to ensure the accuracy of this data but are not responsible for any errors, omissions or for ensuring that the data is of the current issue.

If the actuator response was not measured for any frequency, then the corresponding cell in the above table will be blank; similarly, if correction data is not available from the manufacturer the cell will also be blank.
Correction data for frequencies below 100 Hz are not required

** End of Table Section **

Microphone Calibration Certificate



Norsonic
Type: 1228

Serial no: 00120

Sensitivity: 40.56 mV/Pa
-27.84 ±0.10 dB re. 1 V/Pa
Capacitance: 16.2 ±2.0 pF
Date: 28/06/2024

Signature:

Measurement conditions:

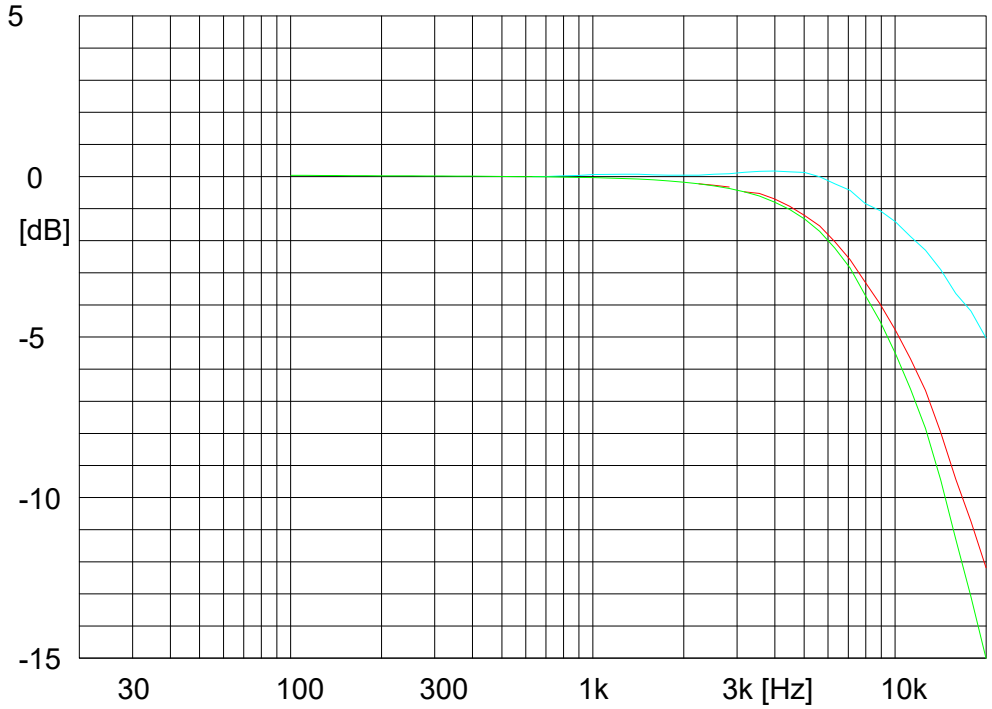
Polarisation voltage:	0.0 V
Pressure:	100.99 ±0.04 kPa
Temperature:	22.1 ±0.1 °C
Relative humidity:	51.7 ±0.7 %RH

Results are normalized to the reference conditions.

Free field response
Diffuse field response
Pressure (Actuator) response

Campbell Associates
www.campbell-associates.co.uk

Microphone Calibration Certificate



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Type: 1228

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Sensitivity: 40.56 mV/Pa
-27.84 ±0.10 dB re. 1 V/Pa
Capacitance: 16.2 ±2.0 pF
Date: 28/06/2024

Signature:

Measurement conditions:

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Pressure:	100.99 ±0.04 kPa
Temperature:	22.1 ±0.1 °C
Relative humidity:	51.7 ±0.7 %RH

Results are normalized to the reference conditions.

Free field response
Diffuse field response
Pressure (Actuator) response

Campbell Associates
www.campbell-associates.co.uk

Comment:

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

Certificate of Calibration

Certificate number: **U48222**

Test Object: **Sound Calibrator**

Producer: **Norsonic AS.**
Type: **1251**
Serial number: **33765**
Customer: **AA Environmental Limited**
Address: **Units 4 - 8, Cholswell Court, Shippon, Abingdon, Oxon. OX13 6HX.**
Contact Person: **Stephen Lewis**
Order No: **TBC**

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	114.15	0.05	1001.19	0.35
Measurement 2	114.16	0.05	1001.20	0.35
Measurement 3	114.16	0.04	1001.20	0.35
Result (Average):	**114.16**	**0.05**	**1001.20**	**0.35**
Expanded Uncertainty:	0.1	0.02	1	0.1
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

The stated level is relative to 20µPa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement
Pres:0.0005 dB/kPa Temp:0.003 dB/°C Humi:0 dB/%RH Load volume: 0.0003 dB/mm3

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	100.99 ±0.040	22.1 ±0.1	54.3 ±0.7

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\Current Year\NOR1251_33765_M1.nmf

Preconditioning
The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method
Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date:	27/06/2024	Reviewed date:	01/07/2024
Calibration date:	28/06/2024	Issued date:	01/07/2024

Technicians: (Electronic certificate)
Calibrated by: *Palaniwel Marappan B.Eng(Hons), M.Sc*
Reviewed by: *Jenny Crawford*

Certificate of Calibration

Continuation of Certificate number: U48222

Reference Microphone: WSM11 (C) - GRAS40AG-291442

Measurements

The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Instruments and Program

A complete list of instruments, hardware and software that have been used for this calibration is available from the calibration laboratory

Comments

Statement of Calibration

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in annex B of BS EN IEC 60942:2003 for the sound pressure levels and frequencies stated, for the environmental conditions under which the tests were performed. However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of sound calibrator conformed to the requirements for pattern evaluation described in annex A of BS EN IEC 60942:2003, no general statement of conclusion can be made about conformance of the sound calibrator to the requirements of BS EN IEC 60942:2003.

Notes:

The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in BOLD are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Observations:

Decision Rule:

The decision rules have been applied in accordance with the procedure as described in BS EN 60942:2003

This certificate relates only to the items tested above.

** End of Certificate **

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 14 October 2022 **Certificate Number: UCRT22/2232**

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

B. Bogdan

Customer	AA Environmental Ltd Unit 4 to 8 Cholswell Court Shippon Abingdon Oxfordshire OX13 6HX
Order No.	223006/EB
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	00164419
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	54552
Rion	Microphone	UC-59	09198
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 10. SLM 61672-3:2013

Procedures from IEC 61672-3:2013 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2013 Yes

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2013

Date Received 13 October 2022 ANV Job No. UKAS22/10647

Date Calibrated 14 October 2022

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	09 June 2021	UCRT21/1713	0653

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0653

Certificate Number
UCRT22/2232

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	NL-52/NL-42 Description for IEC 61672-1		
SLM instruction manual ref / issue	No. 56034 21-03	Source	Rion
Date provided or internet download date	19 March 2021		

	Case Corrections	Wind Shield Corrections	Mic Pressure to Free Field Corrections
Uncertainties provided	Yes	Yes	Yes

Total expanded uncertainties within the requirements of IEC 61672-1:2013	YES	
Specified or equivalent Calibrator	Specified	
Customer or Lab Calibrator	Lab Calibrator	
Calibrator adaptor type if applicable	NC-74-002	
Calibrator cal. date	07 October 2022	
Calibrator cert. number	UCRT22/2190	
Calibrator cal cert issued by Lab	0653	
Calibrator SPL @ STP	94.02 dB	Calibration reference sound pressure level
Calibrator frequency	1001.92 Hz	Calibration check frequency
Reference level range	Single dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - The Extension Cable was used between the SLM and the pre-amp for this calibration.

Environmental conditions during tests	Start	End	
Temperature	23.90	24.90	± 0.30 °C
Humidity	46.3	45.6	± 3.00 %RH
Ambient Pressure	100.00	99.96	± 0.03 kPa

Indication at the Calibration Check Frequency			
Initial indicated level	94.4 dB	Adjusted indicated level	94.0 dB
Uncertainty of calibrator used for Indication at the Calibration Check Frequency ±		0.10	dB

Self Generated Noise									
Microphone installed -	Less Than	18.6	dB	A Weighting					
Microphone replaced with electrical input device -				UR = Under Range indicated					

Weighting	A			C			Z		
	12.2	dB	UR	16.2	dB	UR	22.1	dB	UR

Self Generated Noise reported for information only and not used to assess conformance to a requirement

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor *k* =2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

…… END ……

Calibrated by: PB/BB

Appendix C

Purchased Weather Data

variable	Precipitation Total	Wind Speed	Wind Direction	variable	Precipitation Total	Wind Speed	Wind Direction
unit	mm	m/s	°	unit	mm	m/s	°
level	sfc	10 m	10 m	level	sfc	10 m	10 m
resolution	hourly	hourly	hourly	resolution	hourly	hourly	hourly
timestamp				timestamp			
2024-08-23T11:00:00	0	10	279	2024-08-27T00:00:00	0	4	211
2024-08-23T12:00:00	0	9	281	2024-08-27T01:00:00	0	4	206
2024-08-23T13:00:00	0	8	273	2024-08-27T02:00:00	0	4	198
2024-08-23T14:00:00	0	8	267	2024-08-27T03:00:00	0	5	203
2024-08-23T15:00:00	0	8	266	2024-08-27T04:00:00	0	5	200
2024-08-23T16:00:00	0	8	265	2024-08-27T05:00:00	0	5	201
2024-08-23T17:00:00	0	8	266	2024-08-27T06:00:00	0	5	200
2024-08-23T18:00:00	0	6	270	2024-08-27T07:00:00	0	6	195
2024-08-23T19:00:00	0	4	274	2024-08-27T08:00:00	0	6	193
2024-08-23T20:00:00	0	4	267	2024-08-27T09:00:00	0	6	192
2024-08-23T21:00:00	0	3	237	2024-08-27T10:00:00	0	7	186
2024-08-23T22:00:00	0	4	240	2024-08-27T11:00:00	0	8	187
2024-08-23T23:00:00	0	5	230	2024-08-27T12:00:00	0	8	211
2024-08-24T00:00:00	0	5	230	2024-08-27T13:00:00	0	8	213
2024-08-24T01:00:00	0	5	227	2024-08-27T14:00:00	0	8	212
2024-08-24T02:00:00	0	5	224	2024-08-27T15:00:00	0	8	212
2024-08-24T03:00:00	0.4	5	221	2024-08-27T16:00:00	0	7	215
2024-08-24T04:00:00	0.6	4	221	2024-08-27T17:00:00	0	7	213
2024-08-24T05:00:00	0.5	4	204	2024-08-27T18:00:00	0	6	210
2024-08-24T06:00:00	2.3	4	185	2024-08-27T19:00:00	0	4	202
2024-08-24T07:00:00	2.8	5	191	2024-08-27T20:00:00	0	4	190
2024-08-24T08:00:00	3.4	5	191	2024-08-27T21:00:00	0	4	189
2024-08-24T09:00:00	3	4	176	2024-08-27T22:00:00	0	3	188
2024-08-24T10:00:00	4.8	3	167	2024-08-27T23:00:00	0	3	184
2024-08-24T11:00:00	0.6	3	196	2024-08-28T00:00:00	0	3	180
2024-08-24T12:00:00	0	4	256	2024-08-28T01:00:00	0	3	170
2024-08-24T13:00:00	0	4	250	2024-08-28T02:00:00	0	3	164
2024-08-24T14:00:00	1.4	5	274	2024-08-28T03:00:00	0	2	152
2024-08-24T15:00:00	0	5	292	2024-08-28T04:00:00	0	2	133
2024-08-24T16:00:00	0	5	280	2024-08-28T05:00:00	0	3	122
2024-08-24T17:00:00	0.1	5	280	2024-08-28T06:00:00	0	3	131
2024-08-24T18:00:00	0	6	288	2024-08-28T07:00:00	0	3	167
2024-08-24T19:00:00	0	6	293	2024-08-28T08:00:00	0	4	185
2024-08-24T20:00:00	0	6	297	2024-08-28T09:00:00	0	4	195
2024-08-24T21:00:00	0	5	297	2024-08-28T10:00:00	0	4	197
2024-08-24T22:00:00	0	5	285	2024-08-28T11:00:00	0	4	198
2024-08-24T23:00:00	0	4	273	2024-08-28T12:00:00	0	6	186
2024-08-25T00:00:00	0	4	260	2024-08-28T13:00:00	0	6	193
2024-08-25T01:00:00	0	4	252	2024-08-28T14:00:00	0	6	205
2024-08-25T02:00:00	0	4	248	2024-08-28T15:00:00	0	6	234
2024-08-25T03:00:00	0	4	250	2024-08-28T16:00:00	0	6	263
2024-08-25T04:00:00	0	4	248	2024-08-28T17:00:00	0	6	282
2024-08-25T05:00:00	0	4	243	2024-08-28T18:00:00	0	3	263
2024-08-25T06:00:00	0	4	243	2024-08-28T19:00:00	0	3	241
2024-08-25T07:00:00	0	5	253	2024-08-28T20:00:00	0	4	248
2024-08-25T08:00:00	0	6	261	2024-08-28T21:00:00	0	4	284
2024-08-25T09:00:00	0	7	247	2024-08-28T22:00:00	0	4	279
2024-08-25T10:00:00	0	8	247	2024-08-28T23:00:00	0	4	284
2024-08-25T11:00:00	0	8	247	2024-08-29T00:00:00	0	4	282
2024-08-25T12:00:00	0	9	246	2024-08-29T01:00:00	0	5	285
2024-08-25T13:00:00	0	10	245	2024-08-29T02:00:00	0	5	291
2024-08-25T14:00:00	0	9	253	2024-08-29T03:00:00	0	5	290
2024-08-25T15:00:00	0	9	248	2024-08-29T04:00:00	0	4	285
2024-08-25T16:00:00	0	9	245	2024-08-29T05:00:00	0	4	279
2024-08-25T17:00:00	0	9	243	2024-08-29T06:00:00	0	4	281
2024-08-25T18:00:00	0	8	245	2024-08-29T07:00:00	0	4	284
2024-08-25T19:00:00	0	7	242	2024-08-29T08:00:00	0	4	281
2024-08-25T20:00:00	0	7	238	2024-08-29T09:00:00	0	4	279
2024-08-25T21:00:00	0	7	237	2024-08-29T10:00:00	0	4	282
2024-08-25T22:00:00	0	7	234	2024-08-29T11:00:00	0	4	284
2024-08-25T23:00:00	0	6	233	2024-08-29T12:00:00	0	6	277
2024-08-26T00:00:00	0	6	231	2024-08-29T13:00:00	0	6	281
2024-08-26T01:00:00	0	6	230	2024-08-29T14:00:00	0	6	280
2024-08-26T02:00:00	0	6	235	2024-08-29T15:00:00	0	6	281
2024-08-26T03:00:00	0	6	238	2024-08-29T16:00:00	0	6	283
2024-08-26T04:00:00	0	6	238	2024-08-29T17:00:00	0	5	282
2024-08-26T05:00:00	0	6	238	2024-08-29T18:00:00	0	5	286
2024-08-26T06:00:00	0	6	240	2024-08-29T19:00:00	0	3	277
2024-08-26T07:00:00	0	6	244	2024-08-29T20:00:00	0	3	262
2024-08-26T08:00:00	0	6	247	2024-08-29T21:00:00	0	3	255
2024-08-26T09:00:00	0	6	250	2024-08-29T22:00:00	0	3	272
2024-08-26T10:00:00	0	7	255	2024-08-29T23:00:00	0	2	302
2024-08-26T11:00:00	0	7	256	2024-08-30T00:00:00	0	2	332
2024-08-26T12:00:00	0	7	257	2024-08-30T01:00:00	0	2	351
2024-08-26T13:00:00	0	6	256	2024-08-30T02:00:00	0	2	360
2024-08-26T14:00:00	0	7	259	2024-08-30T03:00:00	0	2	13
2024-08-26T15:00:00	0	6	263	2024-08-30T04:00:00	0	2	25
2024-08-26T16:00:00	0	5	262	2024-08-30T05:00:00	0	2	28
2024-08-26T17:00:00	0	5	257	2024-08-30T06:00:00	0	3	31
2024-08-26T18:00:00	0	4	256	2024-08-30T07:00:00	0	3	43
2024-08-26T19:00:00	0	3	254	2024-08-30T08:00:00	0	5	54
2024-08-26T20:00:00	0	3	227	2024-08-30T09:00:00	0	5	52
2024-08-26T21:00:00	0	4	220	2024-08-30T10:00:00	0	5	58
2024-08-26T22:00:00	0	4	217	2024-08-30T11:00:00	0	4	73
2024-08-26T23:00:00	0	4	215	2024-08-30T12:00:00	0	3	84

Appendix D

Raw background noise data (from Figure 6) for each 1-hour measurement period

Start Time	dB $L_{AFmax, 1hr}$	dB $L_{Aeq, 1hr}$	dB $L_{A90, 1hr}$
23/08/2024 14:00	77	56	43
23/08/2024 16:00	75	55	42
23/08/2024 17:00	77	56	41
24/08/2024 07:00	77	57	42
24/08/2024 08:00	76	56	44
24/08/2024 09:00	76	57	45
24/08/2024 10:00	75	56	46
24/08/2024 11:00	73	54	45
24/08/2024 12:00	73	53	41
24/08/2024 13:00	73	53	43
26/08/2024 07:00	77	57	38
26/08/2024 08:00	76	56	38
26/08/2024 09:00	74	56	40
26/08/2024 10:00	75	56	41
26/08/2024 11:00	83	57	41
26/08/2024 12:00	83	57	40
26/08/2024 13:00	75	55	39
26/08/2024 14:00	76	54	38
26/08/2024 15:00	74	54	39
26/08/2024 16:00	74	54	38
26/08/2024 17:00	77	55	37
27/08/2024 07:00	78	58	41
27/08/2024 08:00	77	57	41
27/08/2024 09:00	76	56	41
27/08/2024 10:00	76	56	42
27/08/2024 11:00	75	55	41
27/08/2024 12:00	74	54	40
27/08/2024 13:00	75	56	41
27/08/2024 14:00	76	57	41
27/08/2024 15:00	76	56	41
27/08/2024 16:00	79	56	40
27/08/2024 17:00	79	57	36
28/08/2024 07:00	79	58	44
28/08/2024 08:00	78	57	43

Start Time	dB $L_{AFmax, 1hr}$	dB $L_{Aeq, 1hr}$	dB $L_{A90, 1hr}$
28/08/2024 09:00	77	57	42
28/08/2024 10:00	76	56	40
28/08/2024 11:00	74	54	39
28/08/2024 12:00	74	54	38
28/08/2024 13:00	76	57	40
28/08/2024 14:00	77	58	40
28/08/2024 15:00	77	57	40
28/08/2024 16:00	77	56	39
28/08/2024 17:00	77	57	37
29/08/2024 07:00	78	58	41
29/08/2024 08:00	77	57	40
29/08/2024 09:00	76	57	40
29/08/2024 10:00	75	56	41
29/08/2024 11:00	74	55	41
29/08/2024 12:00	73	53	41
29/08/2024 13:00	75	55	41
29/08/2024 14:00	78	58	41
29/08/2024 15:00	77	57	41
29/08/2024 16:00	76	56	40
29/08/2024 17:00	77	57	39
30/08/2024 07:00	79	59	45
30/08/2024 08:00	77	57	43
30/08/2024 09:00	76	55	43
30/08/2024 10:00	74	54	44
30/08/2024 11:00	73	54	45

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OFFICES

Head Office Edinburgh
Unit 1, 7Hills Business Park
37 Bankhead Crossway South
Edinburgh
EH11 4EP
0345 062 0000

South West
17 Bishops Close
Torquay
Devon
TQ1 2PL
07908 144954

South East
The Officer's Mess
Royston Road
Duxford
Cambridge
CB22 4QH
07592 104564

rmp@napier.ac.uk

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