Medworth Energy from Waste
Combined Heat and Power Facility

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Environmental Statement Technical Appendix

Appendix 7A: Baseline Noise Monitoring Report (Rev 2)

Regulation reference: The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 Regulation 5(2)(a)

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Glossary

Term	Description
ABC Method	Method provided in BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise* for determining thresholds of potential significance for construction noise affecting residential premises.
Ambient sound	Totally encompassing sound in a given situation, at a given time, usually composed of sound from many sources near and far.
ANC	Association of Noise Consultants
dB	Decibel
dBA	A-weighted decibel. A-weighting is a correction factor to represent how the human ear responds to sound, which is internationally accepted and found to correspond well with people's subjective reaction to sound.
DCO	Development Consent Order
DNO	(Electric) Distribution Network Operator
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
ES	Environmental Statement
FDC	Fenland District Council
Free Field	Signifies that a sound measurement has been undertaken in 'free field' conditions i.e. away from any reflecting facades, other than the ground, e.g. building facades, close boarded fence work etc.
HGV	Heavy Goods Vehicle. With regard to noise, heavy vehicles/ HGVs are any vehicle with an unladen weight in excess of 3.5 tonnes.
Interquartile range (IQR)	Inter quartile range, statistical index describing the range between the 25th percentile and 75th percentile of the dataset, equivalent to the range of the central 50% of the data.
IOA	Institute of Acoustics
KWLN	Borough Council of Kings Lynn and West Norfolk
$L_{Aeq, T}$	The equivalent continuous sound level. The sound level of a steady sound having the same energy as a fluctuating sound over the same period. Ambient and residual sound levels are described with this index. $L_{Aeq, T}$ is considered the best general-purpose index for environmental sound, as it is the index which generally best represents how sound levels are perceived.

Term	Description
$L_{An, T}$	This noise index represents the sound level exceeded for n% of the measurement period. The $L_{A90,T}$ is used to indicate quieter times during the measurement period. In BS 4142 assessments it is usually referred to as the background sound level and describes the quietest 10% of a measurement period.
L_{Amax}	The maximum recorded sound level during the measurement period.
LT	Long Term (monitoring location)
NSR	Noise Sensitive Receptor
Residual sound	When assessing industrial or commercial sound, the residual sound level is equal to the ambient sound level, in the absence of the specific sound (in the case of a proposed industrial or commercial activity, the residual sound level is equivalent to the existing ambient sound level prior to addition of the specific sound level to the acoustic environment).
SMP	Noise Survey and Monitoring Plan.
Specific sound	When assessing industrial or commercial sound, the specific sound is the sound of the (proposed or existing) industrial or commercial activity under assessment.
ST	Short Term (monitoring location)

Executive summary

Purpose of this report

The Applicant intends to make an application to the Secretary of State for a DCO for the Proposed Development on the industrial estate at Algores Way, Wisbech. The Proposed Development will recover useful energy in the form of electricity and steam from over half a million tonnes of non-recyclable (residual) Municipal, Commercial and Industrial waste each year.

To inform the noise assessments forming part of the EIA to be presented in the ES accompanying the DCO application, baseline noise surveys were undertaken. This Baseline Report presents the results of the baseline sound surveys that were conducted between Wednesday 10 November 2021 and Thursday 18 November 2021.

Baseline monitoring

All monitoring, and subsequent data processing, analysis and reporting was undertaken in accordance with the relevant British Standards and the agreed methodology, which is provided in **Appendix B**. Details of the monitoring are provided in **Section 2**. Monitoring results are presented in **Section 3** and analysis of the results is provided in **Section 4**.

The influence of Covid-19 on the measurement data is considered in **Section 4.1**, discussion of the results is provided in **Section 4.2** and corrections and validation are discussed in **Section 4.3**.

As outlined in **Section 4.1**, and based on comparisons of the 2019 and 2021 datasets, it is considered that any influence of Covid-19 on ambient sound conditions was negligible, and that the results of the monitoring were not unduly affected by any variations in local activity that may have occurred due to the pandemic.

The discussion in **Section 4.2** indicates that the measured sound levels are considered to be typical of the locations where the data were acquired, which tended to either be dominated by road noise or industrial/ commercial noise. Some other noise sources were noted (local activity, animal sounds, wind in trees, etc), however these did not confound the measurements, and any unrepresentative events/ data have been removed from the datasets (periods with wind gusts >5 ms^{-1}, noisy aircraft manoeuvres, etc).

Based on the above, the discussions presented in **Section 4.2**, and the validation presented in **Section 4.3**, the measured sound levels are considered representative of NSRs in proximity to each measurement location, and the representative sound levels to be used in the EIA are provided in **Section 4.4**.

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1. Introduction

1.1 Background

1.1.1 Wood Group UK Limited (Wood) has been commissioned by Medworth CHP Limited, (the 'Applicant'), to provide consenting and environmental consultancy support services for the Proposed Development. The Proposed Development centres around an Energy from Waste Combined Heat and Power Facility, hereafter referred to as 'the EfW CHP Facility' located on the industrial estate, currently accessed from Algores Way, Wisbech, Cambridgeshire. The Proposed Development will recover useful energy in the form of electricity and steam from over half a million tonnes of non-recyclable (residual), non-hazardous Municipal and Commercial and Industrial waste each year to generate over 50 megawatts (MW) of electricity per year.

1.2 Purpose of this report

1.2.1 The purpose of this Baseline Report is to present the results of the baseline sound level surveys that were conducted between Wednesday 10 November 2021 and Thursday 18 November 2021.

1.2.2 The purpose of the surveys was to determine robust and accurate baseline data to inform the noise assessments for the Environmental Impact Assessment (EIA) to be presented in the Environmental Statement (ES) accompanying the DCO application.

1.2.3 All personnel contributing to the baseline surveys, analysis of data and the preparation of this report were appropriately qualified. **Annex A** presents statements of competence for all personnel who contributed to the baseline surveys, analysis of data and preparation of this report.

2. Methodology

2.1 Agreed methodology

2.1.1 The methodology and monitoring locations were agreed with Environmental Health Officers (EHOs) from Fenland District Council (FDC) and the Borough Council of Kings Lynn and West Norfolk (KLWN), through the submission and review of a Noise Survey and Monitoring Plan (SMP) before any survey took place. The SMP is presented in **Annex B.** The SMP forms the agreed methodology to undertake and report the results of the baseline monitoring.

Identification of Receptor locations

2.1.2 Noise monitoring locations were selected to be representative of Noise Sensitive Receptors (NSRs) with the greatest potential to be affected by noise from the construction and operation of the Proposed Development. The NSRs and noise monitoring locations were identified using aerial imagery, OS mapping and local knowledge. Key NSR locations considered when determining appropriate measurement locations are identified in **Figure C1** – **Figure C4** in **Annex C**.

2.2 Details of the monitoring undertaken

Data collection methods

2.2.1 For the long-term monitoring locations, monitoring equipment was left to measure sound levels continuously for approximately eight days. The measurements were undertaken during local schools' term-time.

2.2.2 The long-term monitoring equipment was unattended for the majority of the survey period. Observations of the sound environment were made during equipment deployment and collection to contextualise the monitoring location.

2.2.3 At the short-term monitoring locations, measurements were attended and consisted of multiple 15-minute samples at different times of the day and night, with observations noted throughout. Where any unrepresentative, extraneous events occurred (such as emergency vehicle sirens, extended aircraft overflight, people taking near the measurement position, noisy vehicle passes, etc), these were excluded from the measurements.

2.2.4 Noise monitoring equipment was set to measure for intervals of 15-minutes in accordance with BS 4142:2014+A1:2019 *'Methods for rating and assessing industrial and commercial sound'* (BS 4142:2014), which states:

"8.1.3 Ensure that the measurement time interval is sufficient to obtain a representative value of the background sound level for the period of interest. This should comprise continuous measurements of normally not less than 15 min intervals, which can be continuous of disaggregated."

2.2.5 All sound level measurements were undertaken in accordance with BS 4142:2014+A1:2019 and BS 7445-1:2003 *'Description and measurement of environmental noise. Part 1: Basic quantities and procedures'*, i.e. with microphones mounted to a minimum height of 1.2 to 1.5 m above ground level and no less than 3.5 m from any reflecting surface other than the ground.

2.2.6 At each location, sound levels were measured using integrating averaging sound level meters (SLMs) conforming to Class 1 as defined by BS EN 61672-1:2013 *'Electroacoustics, Sound level meters, Specifications'*. The SLMs were field calibrated before and at the end of each survey period by applying an acoustic calibrator, conforming to BS EN 60942:2018 *'Electroacoustics – Sound calibrators'*, to the microphone to check the sensitivity of the measuring equipment. Any drift in calibration levels was noted at the end of the survey period, and no significant deviation was found.

2.2.7 All SLMs used during the monitoring had undergone laboratory calibration within a period not exceeding two years prior to use. All acoustic calibrators used had undergone laboratory calibration within a period not exceeding one year prior to use. See **Annex D** for a summary of laboratory calibrations and calibration certificates.

2.2.8 Meteorological measurement equipment was deployed to monitor local wind speeds and direction, precipitation, air temperature and relative humidity during the surveys. The logged meteorological data have been used in the analysis of the sound level data to ensure that only data collected during appropriate weather conditions has been used when determining representative sound levels to be used in the assessment.

Data collection locations

2.2.9 Sound monitoring was undertaken at eleven locations between Wednesday, 10 November 2021 and Thursday, 18 November 2021. This consisted of three long-term (reference prefix "LT") monitoring locations and eight short-term (reference prefix "ST") monitoring locations.

2.2.10 Monitoring was undertaken at various locations between the EfW CHP Facility Site and the Walsoken DNO Substation, the Point of Connection (POC). The Walpole POC no longer forms part of the Proposed development and as measurement locations ST7 to ST10 inclusive, were not used.

2.2.11 The monitoring locations and periods are identified in **Table 2.1 Summary of monitoring locations** below, and all locations are shown in **Figure C1** – **Figure C4** in **Annex C**.

Table 2.1 Summary of monitoring locations

Location Reference	Location description	Location Co-ordinates		Monitoring period
		Latitude	Longitude	
LT1c	Southern tip of the proposed EfW CHP Facility site,	52°38'53.55"	0° 8'53.18"	10/11/2021 – 18/11/2021

Location Reference	Location description	Location Co-ordinates		Monitoring period
		Latitude	Longitude	
	approximately 40 m east southeast of 9 New Bridge Lane.			
LT2	On a bridge over a drainage ditch, near to a residential Receptor adjacent to the A47 known as 'Potty Plants'.	52°38'45.33"	0° 9'10.88"	10/11/2021 – 17/11/2021
LT3	At 93 South Brink, approx. 5 m northwest of house and 5 m south east of edge of carriageway.	52°39'2.72"	0° 8'26.13"	10/11/2021 – 18/11/2021
ST-LT1	on New Bridge Lane approximately equidistant between LT1 (10 New Bridge Lane) and LT1a (9 New Bridge Lane)	52°38'52.54"	0° 8'53.38"	10/11/2021 – 11/11/2021 16/11/2021 – 17/11/2021
ST1 (Backup/Alternative)	On New Drove, approx. 500 m northeast of junction of New Bridge Lane & New Drove	52°38'56.87"	0° 9'28.40"	10/11/2021 – 11/11/2021 16/11/2021 – 17/11/2021
ST2	Northern turning circle at end of Victory Road.	52°39'32.51"	0° 9'22.30"	10/11/2021 – 12/11/2021 16/11/2021 – 17/11/2021
ST3	Near southwest corner of junction of Algores Way & Weasenham Lane.	52°39'14.92"	0° 9'32.05"	10/11/2021 – 12/11/2021 16/11/2021 – 17/11/2021
ST4	Near Cambian Wisbech School, Anglia Way.	52°39'1.19"	0° 9'15.92"	10/11/2021 – 12/11/2021 16/11/2021 – 17/11/2021
ST5 (Backup/Alternative)	Southeastern corner of Morrisons car park, approx. 30 m northwest of nearest building at Elme Hall Hotel.	52°38'56.58"	0°10'21.85"	10/11/2021 – 12/11/2021 16/11/2021 – 17/11/2021
ST6	On Meadowgate Lane, in lay by approximately 60 m south of A47.	52°38'57.92"	0°10'51.40"	11/11/2021 – 12/11/2021 17/11/2021 – 18/11/2021
ST11	At Broadend Road, approx. 15 m north of the dwelling at 56 Broadend Rd and 60 m west of the A47.	52°39'37.97"	0°11'37.11"	11/11/2021 – 12/11/2021 17/11/2021 – 18/11/2021

2.2.12 A data logging meteorological station was deployed approximately 100 m northwest of the sound monitoring equipment at LT1c, on top of an earth bund, approximately

3 m above local ground level. The meteorological station logged concurrently with the sound level surveys to allow adverse weather conditions to be identified and corresponding sound levels excluded from the data analysis. Meteorological conditions during the monitoring are discussed below under the heading 'Meteorological conditions'.

2.2.13 Specific details about the location of the monitoring equipment and observations made during deployment and collection of the long-term measurements and throughout the measurements at short term locations are detailed in **Annex E**.

Constraints

2.2.14 Constraints on preferred measurement locations required that some Backup/Alternative measurement locations were used in the monitoring. These are outlined below and details of any corrections and validation of monitoring results are provided in **Section 4.3**.

2.2.15 It was not possible to monitor at location LT1 and therefore to ensure that suitable levels were obtain for this position, backup location LT1c was used, with attended measurements at ST-LT1 also undertaken to determine any necessary attenuation corrections. Measurement data acquired at ST-LT1 has been used to validate and correct the measured sound level data from LT1c to be representative of ST-LT1 and nearby Receptors at 9 and 10 New Bridge Lane.

2.2.16 Due to being unable to monitor at location LT2, backup location LT2 was used. Measurement data acquired in 2019 at a location approximately 40 m north of LT2 was used for comparison and validation purposes.

2.2.17 An alternative location for ST1 was used during the survey. The ST1 Backup/Alternative was located further away from nearby road and industry sources than the preferred location at ST1. The results from ST1 Backup/Alternative have been compared to measurements undertaken at ST1 in 2019 and corrected to achieve sound levels representative of the nearby NSR known as 'The Chalet' on New Drove near to ST1.

2.2.18 Due to being unable to monitor at ST5, ST5 Backup/Alternative was used. There are no available data that would allow a comparison of sound levels at these locations. The alternative location is a greater distance from nearby transport sources than the preferred location. Therefore, measurement data acquired at ST5 Backup/Alternative will likely be subject to slightly lower sound levels than would be expected at the preferred measurement location, leading to a more conservative assessment for the Receptors represented by this monitoring position.

Meteorological conditions

2.2.19 With reference to the weather data presented in the time history charts in **Section 3**, meteorological conditions varied throughout the long-term surveys. It was noted that limited periods of rainfall were experienced on three days of the survey, with no average wind speeds greater than $5ms^{-1}$. Wind direction statistics based on analysis of the logged meteorological data are provided below in **Table 2.2 Wind direction as percentage of time over whole monitoring period.** Meteorological conditions

during short term measurements are detailed in **Annex F**. Wind speeds were always below 3 ms^{-1} and avoided rain.

2.2.20 The wind statistics in **Table 2.2 Wind direction as percentage of time over whole monitoring period** below indicate that the wind direction over the monitoring period is consistent with the prevailing wind direction, with winds from the west, southwest and south for around half of the monitoring period.

Table 2.2 Wind direction as percentage of time over whole monitoring period

Wind Direction	N	NW	W	SW	S	SE	E	NE	No direction recorded (speed to low)
% of monitoring period	4	5	18	27	4	15	6	14	7

2.2.21 The wind speeds reported in the time history charts in **Section 3** are averaged over each 15-minute period. However, maximum wind speeds were also logged. Review of the maximum wind speed data indicated that there were two periods when maximum wind speeds exceeded 5 ms^{-1}. The first occurred between 12/11/2021 12:15 hrs and 13/11/2021 16:30 hrs when, for the majority of the time, maximum wind speeds exceeded 5 ms^{-1}. The second period occurred 17/11/2021 between 10:30 and 14:30 hrs when maximum wind speeds exceeded 5 ms^{-1} approximately half of the time.

2.2.22 Review of the time histories presented in **Section 3** shows that at LT1c the $L_{Aeq,T}$ and $L_{A90,T}$ sound levels appear to have been affected by maximum wind speeds, with LT2 relatively unaffected and LT3 somewhat affected. Therefore, time periods where gusts above 5 ms^{-1} occurred were removed from the analysis. The limited number of periods where precipitation was logged were also excluded, to ensure adverse weather conditions had no influence on the analysis.

2.2.23 **Table 2.3 Time monitored at each long term monitoring location** shows the total time monitored at each long term location alongside the total time excluded from the data analysis.

Table 2.3 Time monitored at each long term monitoring location

Monitoring location	Total no. 15 minute samples	Total duration of dataset	No. samples excluded due to meteorological conditions	Duration of dataset, with exclusions
LT1c	758	7 days, 21 hours, 30 minutes	76	7 days, 2 hours, 30 minutes
LT2	669	6 days, 23 hours, 15 minutes	76	6 days, 4 hours, 15 minutes
LT3	753	7 days, 20 hours, 15 minutes	76	7 days, 1 hour, 15 minutes

3. Results

3.1 Long term measurements

3.1.1 Long term measurements were undertaken at three locations, as described in **Table 2.1 Summary of monitoring locations**, the results of which are provided below.

LT1c

3.1.2 The time history chart indicating the measured sound levels over the whole monitoring period at LT1c is presented in. **Graphic 3.1 Results of long term monitoring: LT1c - Time history**. Summaries of the results for weekdays, weekends and weekend periods, as specified by BS 5228-1:2009+A1:2014 (BS 5228-1), are presented in **Table 3.1**, **Table 3.2** and **Table 3.3**. Distribution charts are shown in **Graphic 3.2Results of long term monitoring: LT1c - Distribution of measured residual sound levels, all days** and **Graphic 3.3 Results of long term monitoring: LT1c - Distribution of measured background sound levels, all days**. It should be noted that the monitoring results presented within these tables and figures are uncorrected. To yield representative sound levels for the assessment, a correction has been applied to the monitoring results at LT1c, as set out in **Section 4.3**.

Graphic 3.1 Results of long term monitoring: LT1c - Time history

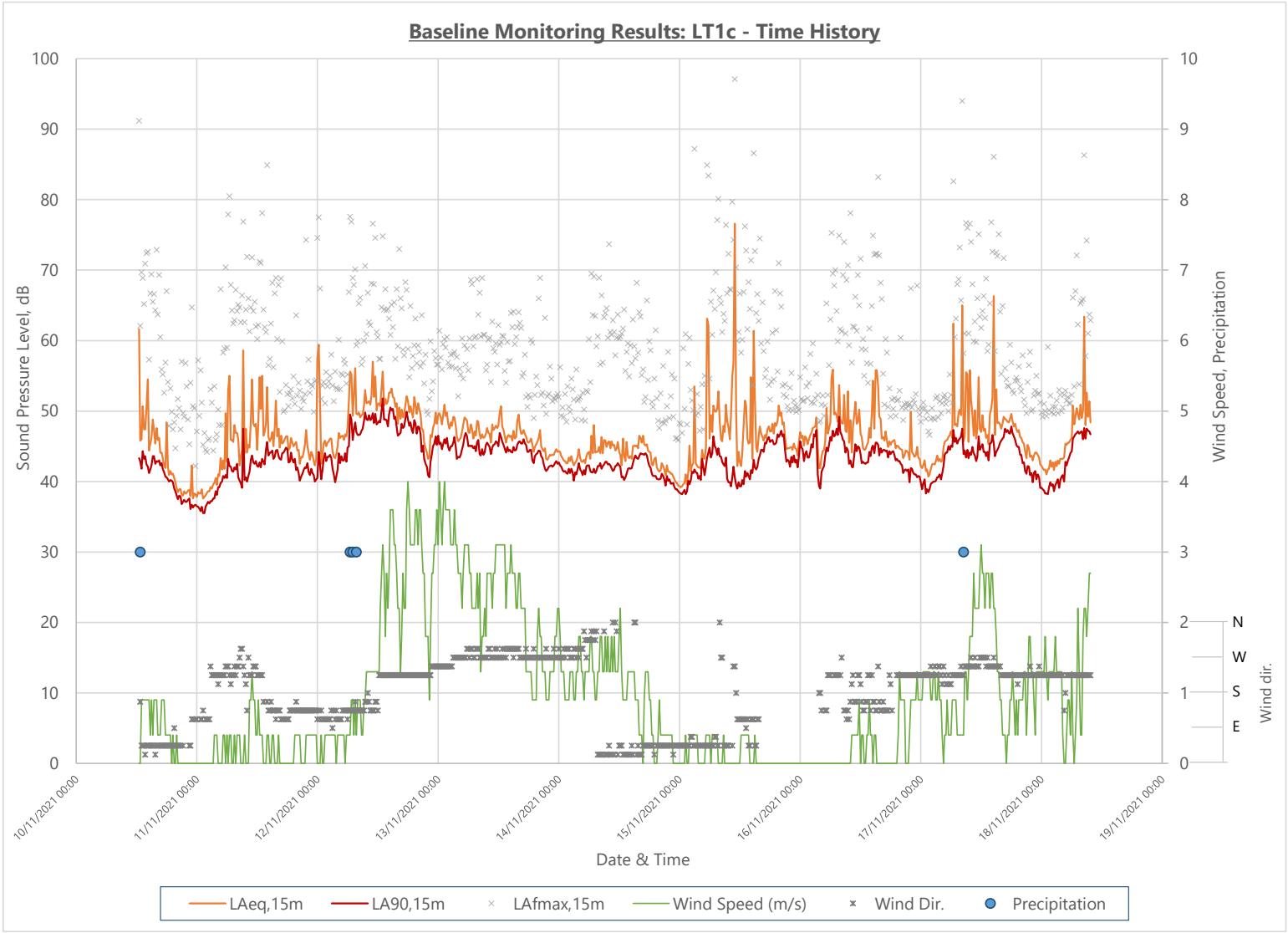


Table 3.1 Summary of measured sound levels at LT1c: weekdays

	Background sound level, dB $L_{A90,T}$			Residual sound level, dB $L_{Aeq,T}$			Maximum sound level, dB $L_{AFmax,T}$		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Range	39 - 50	36 - 47	36 - 49	41 - 77	38 - 51	38 - 63	48 - 97	45 - 74	42 - 87
25th %ile	43	41	39	46	43	42	59	50	50
Median	44	42	41	48	45	44	64	52	52
75th %ile	46	43	44	50	45	46	69	55	55
Arithmetic average	44	42	41	49	44	44	64	54	55
Logarithmic average	-	-	-	55	45	49	-	-	-

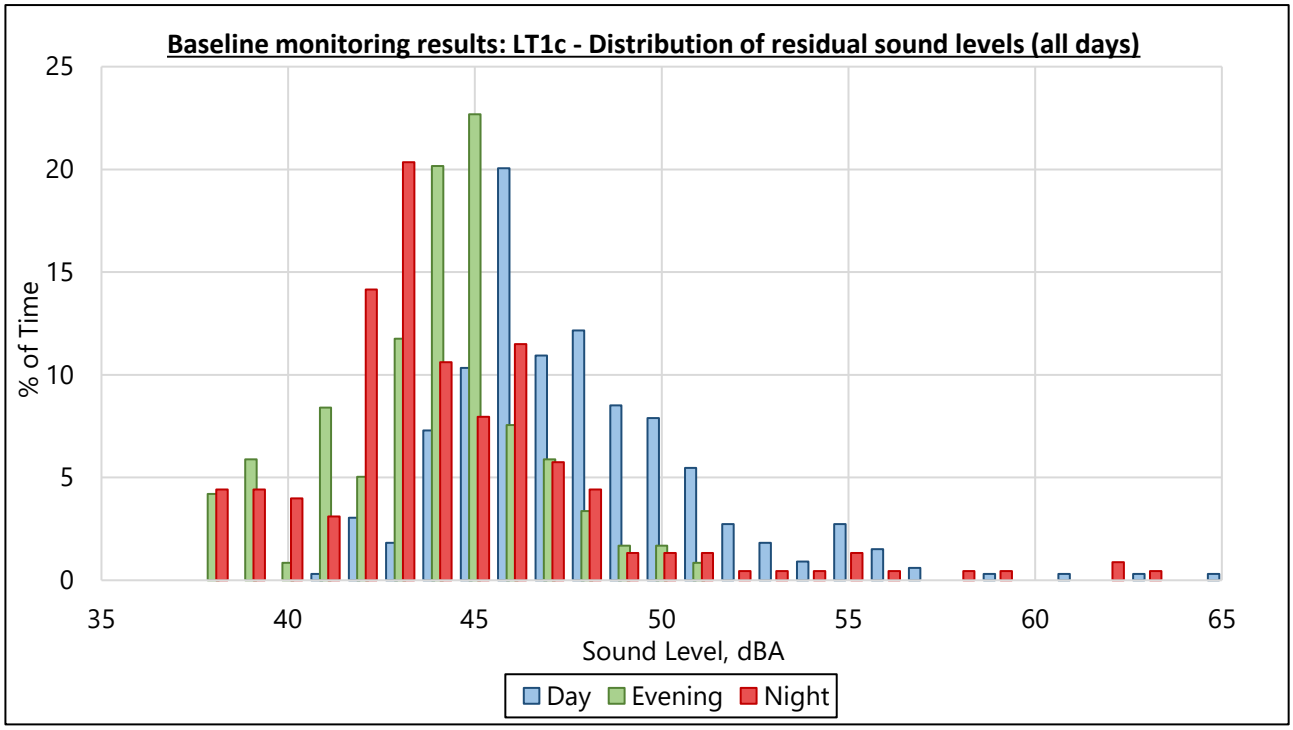
Table 3.2 Summary of measured sound levels at LT1c: weekends

	Background sound level, dB $L_{A90,T}$			Residual sound level, dB $L_{Aeq,T}$			Maximum sound level, dB $L_{AFmax,T}$		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Range	40 - 46	39 - 44	39 - 45	42 - 50	41 - 47	39 - 48	51 - 74	48 - 69	46 - 70
25th %ile	42	40	41	45	42	43	57	50	50
Median	44	41	42	46	43	43	60	52	52
75th %ile	45	43	42	47	44	44	63	55	54
Arithmetic average	43	42	42	46	43	43	60	54	53
Logarithmic average	-	-	-	46	44	44	-	-	-

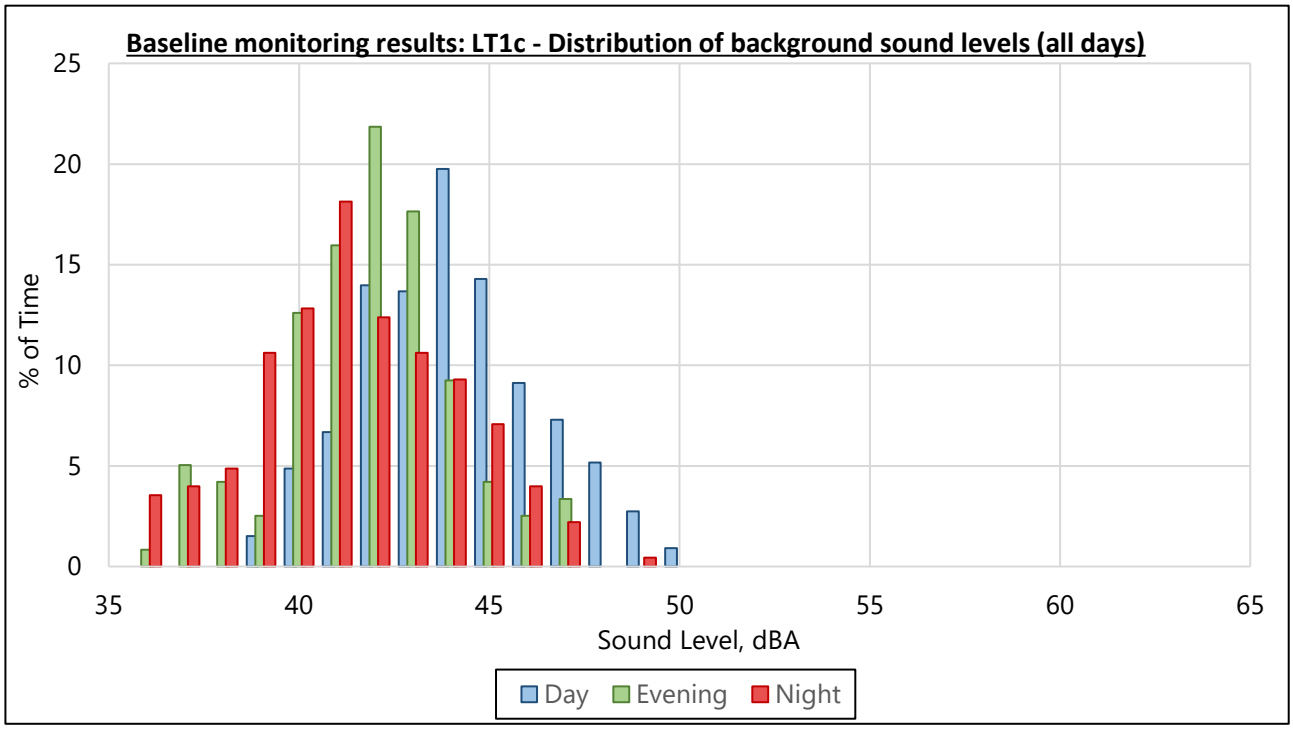
Table 3.3 Summary of measured sound levels at LT1c: weekend BS 5228-1 periods

	Background sound level, dB $L_{A90,T}$			Residual sound level, dB $L_{Aeq,T}$			Maximum sound level, dB $L_{AFmax,T}$		
	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs
Range	44 - 46	44 - 45	39 - 44	46 - 49	46 - 47	41 - 48	54 - 69	54 - 64	48 - 74
25th %ile	44	44	41	46	46	43	59	60	55
Median	45	44	42	47	46	44	61	61	59
75th %ile	45	45	43	48	47	45	62	62	62
Arithmetic average	45	45	42	47	46	44	61	60	58
Logarithmic average	-	-	-	47	47	44	-	-	-

Graphic 3.2 Results of long term monitoring: LT1c - Distribution of measured residual sound levels, all days



Graphic 3.3 Results of long term monitoring: LT1c - Distribution of measured background sound levels, all days



LT2

3.1.3 The time history chart indicating the measured sound levels over the whole monitoring period at LT2 is presented in **Graphic 3.4 Results of long term monitoring: LT2 - Time history.** Summaries of the results for weekdays, weekends and weekend BS 5228-1 periods, respectively, are presented in **Table 3.4, Table 3.5** and **Table 3.6**. Distribution charts are shown in **Graphic 3.5 Results of long term monitoring: LT2 - Distribution of measured residual sound levels, all days** and **Graphic 3.6 Results of long term monitoring: LT2 - Distribution of measured background sound levels, all days.**

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Graphic 3.4 Results of long term monitoring: LT2 - Time history

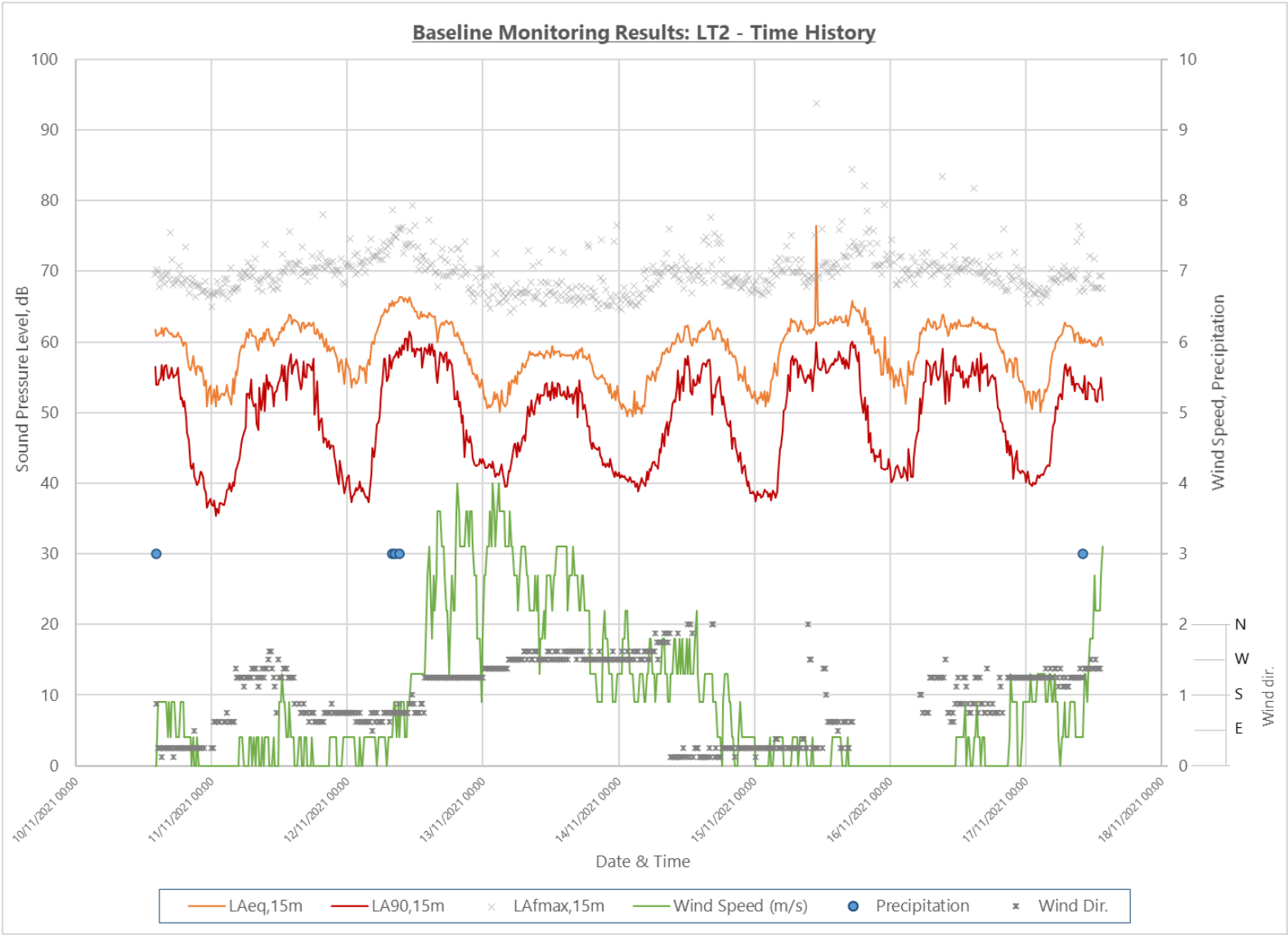


Table 3.4 Summary of measured sound levels at LT2, weekdays

	Background sound level, dB $L_{A90,T}$			Residual sound level, dB $L_{Aeq,T}$			Maximum sound level, dB $L_{AFmax,T}$		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Range	48 - 62	39 - 52	35 - 58	59 - 76	54 - 65	50 - 65	67 - 94	66 - 82	65 - 79
25th %ile	54	42	39	61	57	53	69	68	68
Median	56	45	41	62	58	55	70	70	70
75th %ile	57	47	46	63	60	59	72	72	71
Arithmetic average	56	45	43	62	58	56	71	71	70
Logarithmic average	-	-	-	63	59	58	-	-	-

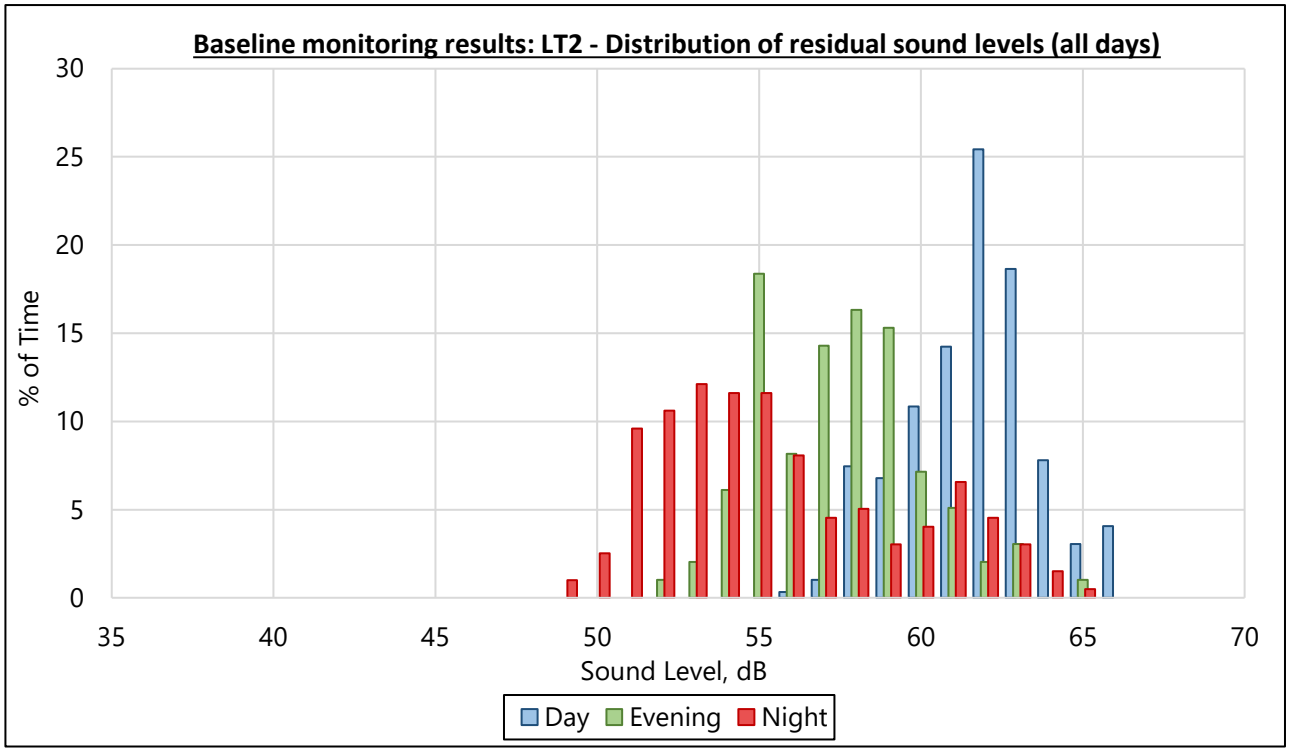
Table 3.5 Summary of measured sound levels at LT2, weekends

	Background sound level, dB $L_{A90,T}$			Residual sound level, dB $L_{Aeq,T}$			Maximum sound level, dB $L_{AFmax,T}$		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Range	42 - 58	40 - 49	39 - 46	56 - 63	52 - 60	49 - 56	65 - 78	65 - 75	65 - 77
25th %ile	51	43	40	58	55	51	68	66	66
Median	53	44	41	59	55	52	69	68	67
75th %ile	54	45	42	61	57	54	71	69	69
Arithmetic average	52	44	41	60	56	52	70	68	68
Logarithmic average	-	-	-	60	56	53	-	-	-

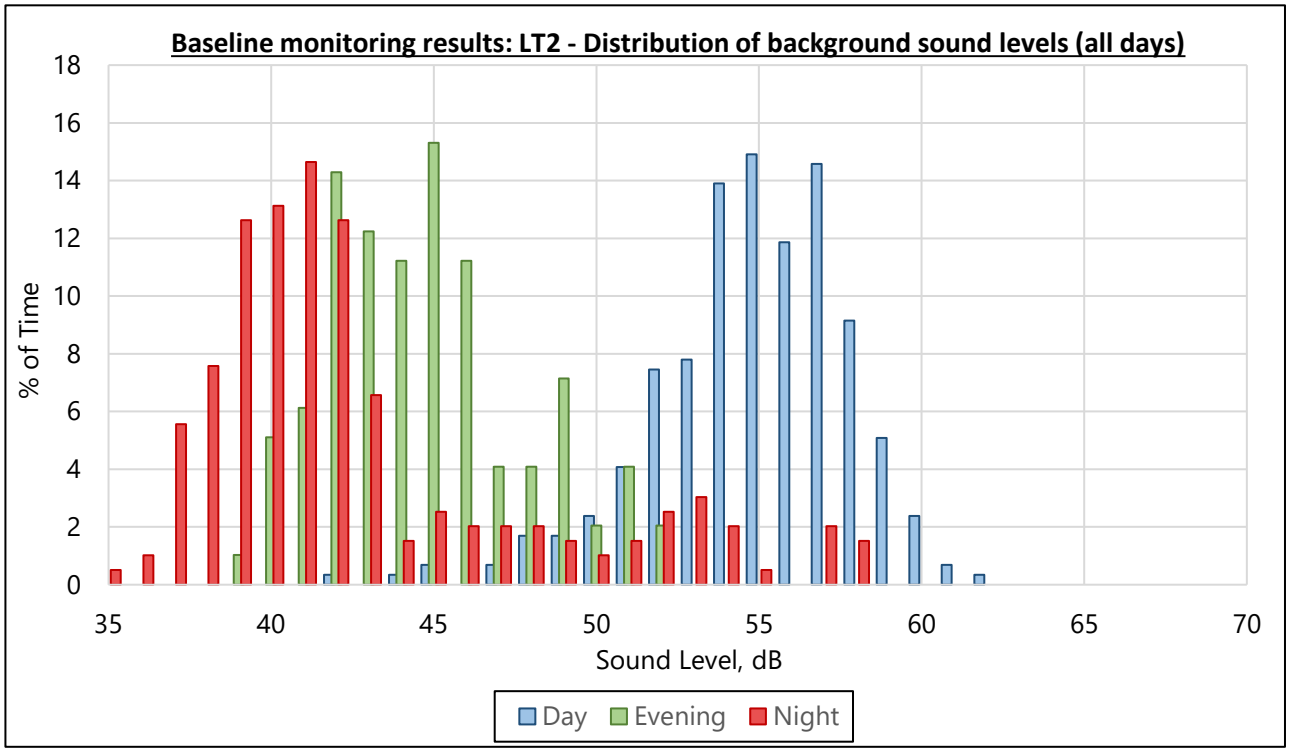
Table 3.6 Summary of measured sound levels at LT2, weekend BS 5228-1 periods

	Background sound level, dB $L_{A90,T}$			Residual sound level, dB $L_{Aeq,T}$			Maximum sound level, dB $L_{AFmax,T}$		
	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs
Range	49 - 54	52 - 54	40 - 58	57 - 59	58 - 58	53 - 63	65 - 73	66 - 68	67 - 78
25th %ile	51	53	47	58	58	58	67	66	69
Median	52	53	52	58	58	60	67	67	70
75th %ile	53	53	55	59	58	61	68	67	71
Arithmetic average	52	53	51	58	58	59	68	67	70
Logarithmic average	-	-	-	58	58	60	-	-	-

Graphic 3.5 Results of long term monitoring: LT2 - Distribution of measured residual sound levels, all days



Graphic 3.6 Results of long term monitoring: LT2 - Distribution of measured background sound levels, all days



LT3

3.1.4 The time history chart indicating the measured sound levels over the whole monitoring period at LT3 is presented in **Graphic 3.7 Results of long term monitoring: LT3 - Time history**. Summaries of the results for weekdays, weekends and weekend BS 52281-1 periods, respectively, are presented in **Table 3.7**, **Table 3.8** and **Table 3.9**. Distribution charts are provided in **Graphic 3.8 Results of long term monitoring: LT3 - Distribution of measured residual sound levels, all days** and **Graphic 3.9 Results of long term monitoring: LT3 - Distribution of measured background sound levels, all days**

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Graphic 3.7 Results of long term monitoring: LT3 - Time history

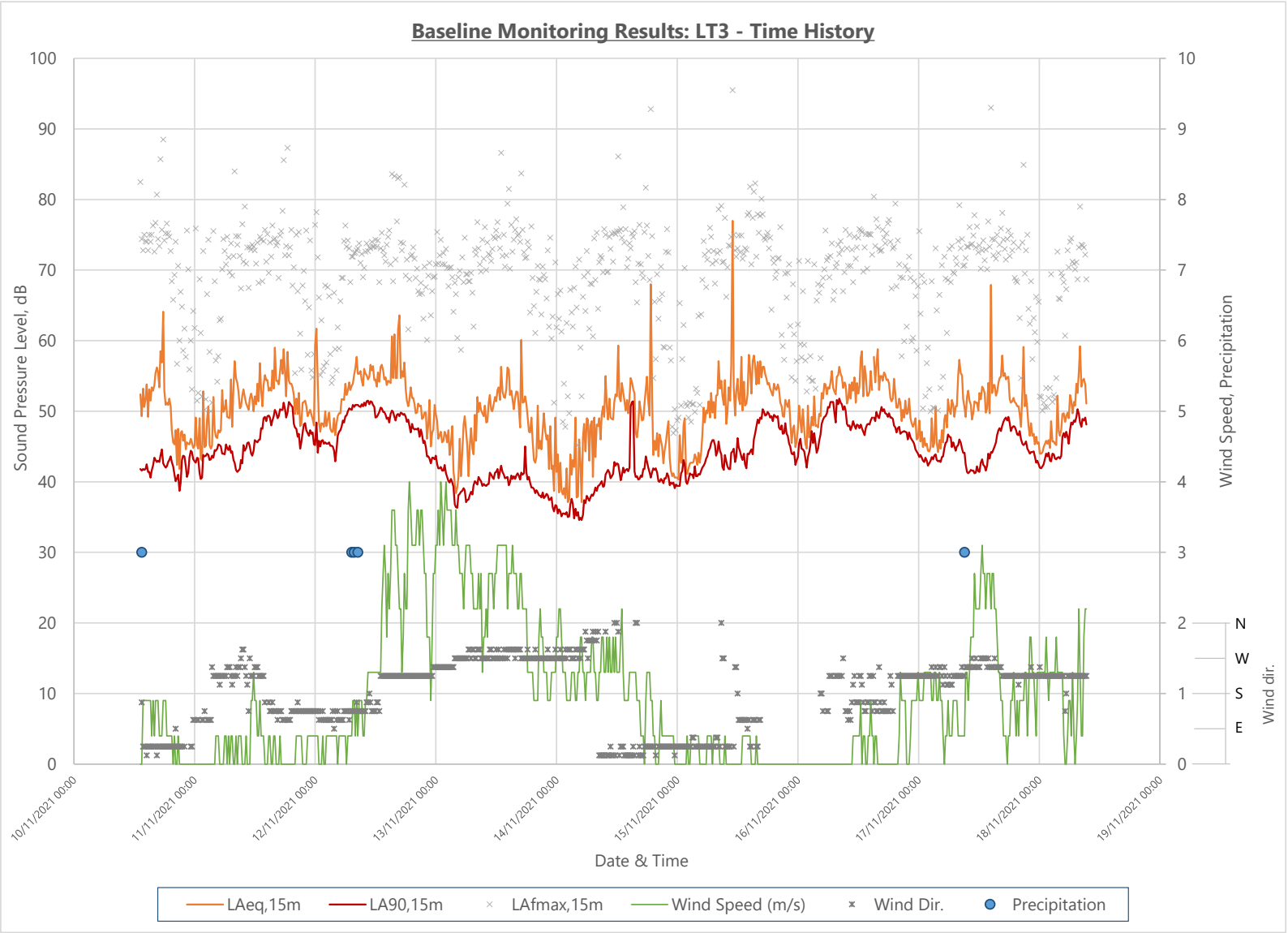


Table 3.7 Summary of measured sound levels at LT3, weekdays

	Background sound level, dB $L_{A90,T}$			Residual sound level, dB $L_{Aeq,T}$			Maximum sound level, dB $L_{AFmax,T}$		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Range	41 - 52	39 - 51	39 - 51	48 - 77	42 - 59	40 - 62	64 - 96	55 - 85	49 - 78
25th %ile	44	44	43	52	48	45	72	62	54
Median	48	47	44	54	50	48	74	69	64
75th %ile	49	47	46	55	52	50	75	72	70
Arithmetic average	47	46	44	54	50	48	74	67	63
Logarithmic average	-	-	-	57	51	49	-	-	-

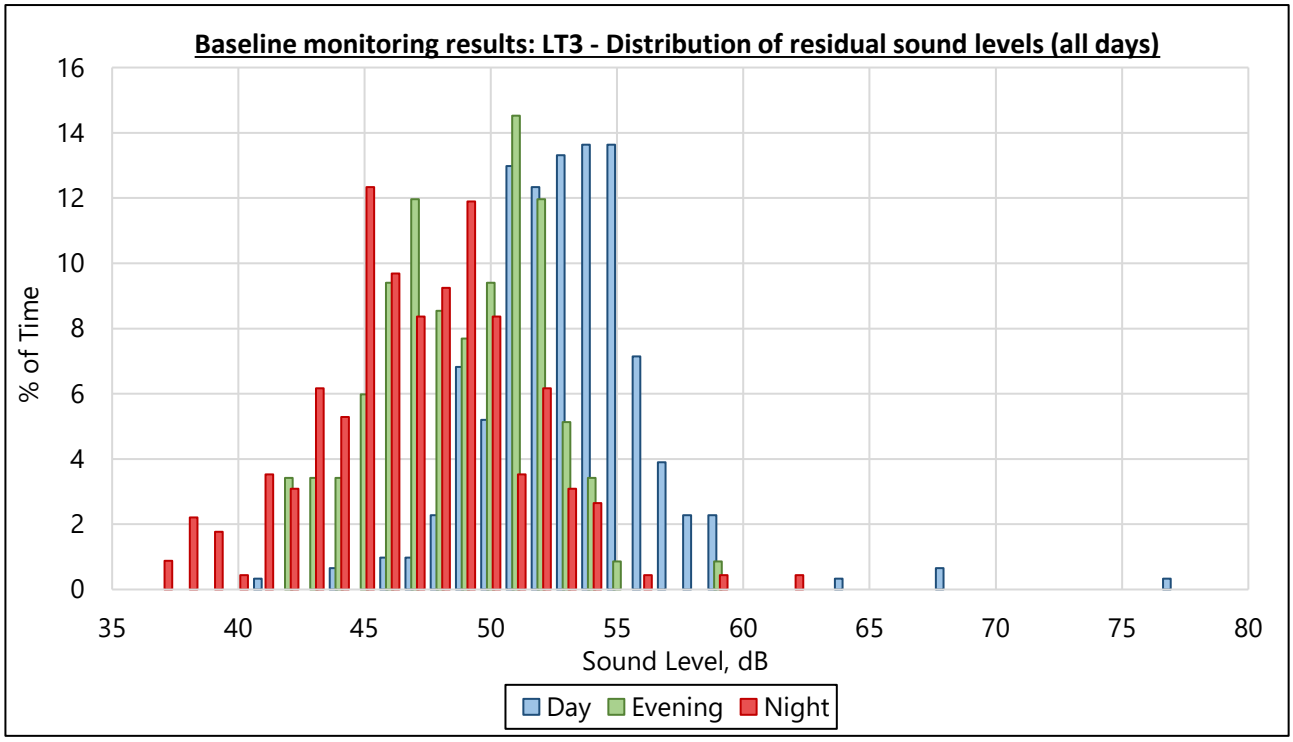
Table 3.8 Summary of measured sound levels at LT3, weekends

	Background sound level, dB $L_{A90,T}$			Residual sound level, dB $L_{Aeq,T}$			Maximum sound level, dB $L_{AFmax,T}$		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Range	38 - 51	37 - 42	35 - 40	41 - 68	42 - 52	37 - 49	61 - 93	55 - 76	45 - 73
25th %ile	40	38	35	49	44	39	71	63	52
Median	41	39	36	50	46	42	74	68	63
75th %ile	42	41	38	52	47	44	75	71	67
Arithmetic average	41	39	37	51	46	42	73	67	60
Logarithmic average	-	-	-	53	47	44	-	-	-

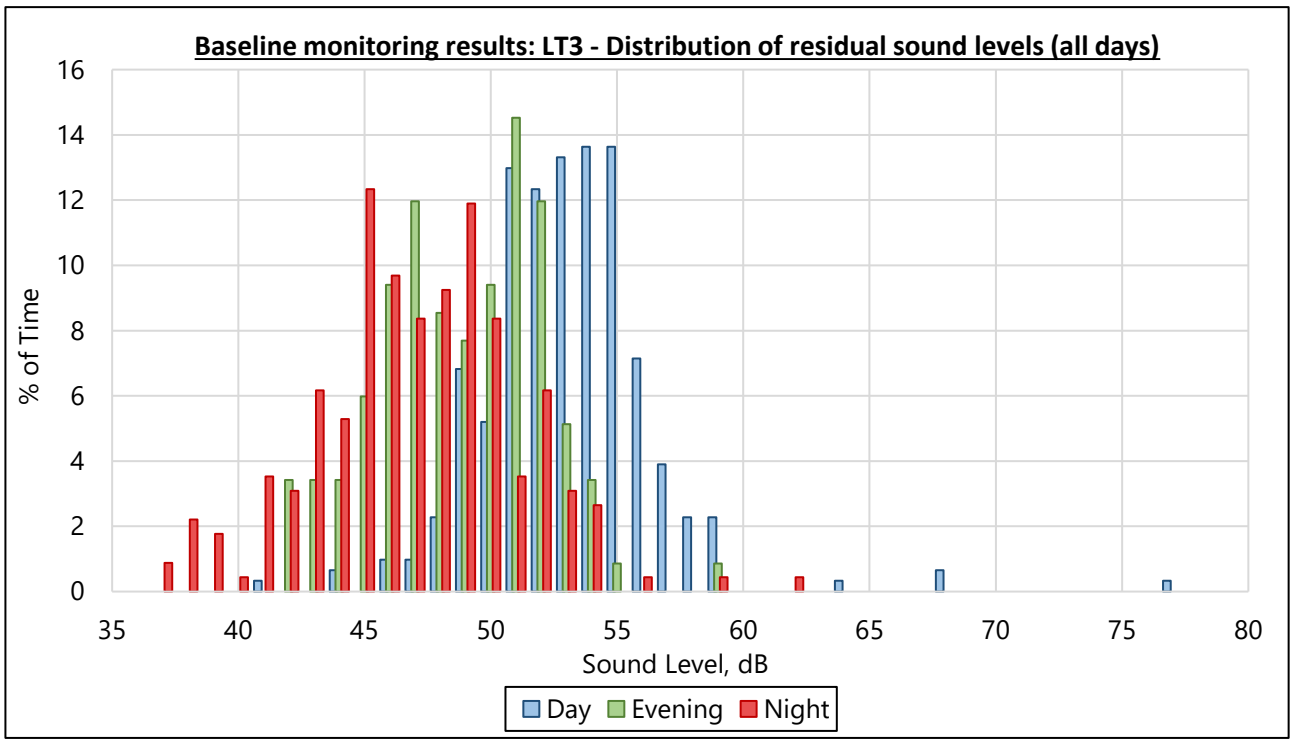
Table 3.9 Summary of measured sound levels at LT3, weekend BS 5228-1 periods

	Background sound level, dB $L_{A90,T}$			Residual sound level, dB $L_{Aeq,T}$			Maximum sound level, dB $L_{AFmax,T}$		
	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs
Range	39 - 41	41 - 41	38 - 51	46 - 52	50 - 56	41 - 68	70 - 77	74 - 79	55 - 93
25th %ile	40	41	40	49	52	47	72	76	69
Median	40	41	41	50	53	49	73	77	72
75th %ile	41	41	42	51	55	52	75	78	75
Arithmetic average	40	41	41	50	53	49	73	77	71
Logarithmic average	-	-	-	50	54	53	-	-	-

Graphic 3.8 Results of long term monitoring: LT3 - Distribution of measured residual sound levels, all days



Graphic 3.9 Results of long term monitoring: LT3 - Distribution of measured background sound levels, all days



3.2 Short term measurements

3.2.1 Short term measurements were undertaken at eight locations, as described in **Table 2.1 Summary of monitoring locations.**

3.2.2 The results of the short term monitoring are displayed in **Table 3.10** to **Table 3.17**, including the averages for each period (daytime, evening, and night-time). For each measurement location and period, $L_{Aeq,T}$ sound levels have been logarithmically averaged, statistical sound levels ($L_{An,T}$) have been arithmetically averaged, and the range of measured L_{Amax} levels has been reported.

Table 3.10 Short term measurement data collected at ST-LT1

Start date and time	Period	Sound pressure level, dB					Noise environment comments
		$L_{Aeq,T}$	L_{Amax}	$L_{A10,T}$	$L_{A50,T}$	$L_{A90,T}$	
17/11/2021 13:15	D	52	61	54	52	50	A low frequency whirring from a distant chiller, occasional HGVs and white noise beepers from nearby industrial sites dominate with distant road traffic noise and birdsong also audible.
11/11/2021 09:40	D	49	61	51	48	46	
11/11/2021 09:55	D	49	69	51	47	45	
11/11/2021 14:23	D	55	77	55	52	50	
11/11/2021 14:38	D	54	76	55	53	51	
10/11/2021 19:04	E	48	69	50	46	43	A low frequency whirring from a distant chiller, occasional HGVs from nearby industrial sites and road traffic noise dominant. Some distant alarms also audible.
10/11/2021 19:19	E	45	57	47	44	41	
16/11/2021 20:06	E	51	62	53	51	48	
16/11/2021 20:53	E	51	62	54	51	48	
10/11/2021 23:54	N	44	70	45	43	41	A low frequency whirring from a distant chiller and distant road traffic noise are just audible. There is also some occasional HGV movements from nearby industrial sites.
11/11/2021 00:09	N	45	63	47	42	41	
11/11/2021 01:47	N	45	73	46	43	41	
11/11/2021 02:02	N	46	69	48	43	41	
Daytime, all samples		52	61 - 77	53	50	48	
Evening, all samples		50	57 - 69	51	48	45	
Night-time, all samples		45	63 - 73	47	43	41	

Table 3.11 Short term measurement data collected at ST1 Alternative

Start date and time	Period	Sound pressure level, dB					Noise environment comments
		$L_{Aeq,T}$	L_{Amax}	$L_{A10,T}$	$L_{A50,T}$	$L_{A90,T}$	
11/11/2021 11:26	D	49	69	50	48	47	Distant continuous low frequency industrial plant noise from the east dominates, with the surrounding local road network traffic noise audible and dominating the background levels. An occasional distant reversing alarm was audible along with birdsong.
11/11/2021 11:45	D	49	59	51	49	48	
10/11/2021 14:30	D	46	66	47	45	44	
10/11/2021 14:45	D	45	62	46	45	44	
17/11/2021 13:41	D	51	63	52	51	49	
16/11/2021 20:32	E	49	62	50	49	46	Distant continuous low frequency industrial plant rumble from the east dominant, with the surrounding local road network traffic noise audible and dominating the background levels (however quieter than the daytime period). Occasional clangs from the industrial area were audible.
10/11/2021 20:24	E	45	65	46	45	44	
10/11/2021 20:41	E	45	54	46	44	43	
16/11/2021 21:23	E	50	60	52	49	48	
11/11/2021 00:38	N	46	51	47	45	44	Distant continuous low frequency industrial plant noise from the east dominates, with the surrounding local road network traffic noise also audible.
11/11/2021 00:53	N	47	54	48	46	45	
11/11/2021 01:08	N	47	52	48	46	44	
11/11/2021 01:23	N	47	56	48	47	45	
Daytime, all samples		48	59 - 69	49	47	46	
Evening, all samples		48	54 - 65	49	47	45	
Night-time, all samples		46	51 - 56	48	46	45	

Table 3.12 Short term measurement data collected at ST2

Start date and time	Period	Sound pressure level, dB					Noise environment comments
		$L_{Aeq,T}$	L_{Amax}	$L_{A10,T}$	$L_{A50,T}$	$L_{A90,T}$	
12/11/2021 09:36	D	50	63	51	50	48	Distant road traffic noise most dominant noise source, with some industrial chiller noise also audible. Occasional vehicles and reverse beeper alarms, along with some clangs from industrial sites, also audible.
12/11/2021 09:51	D	50	62	51	50	49	
11/11/2021 15:03	D	48	70	50	46	45	
11/11/2021 15:18	D	48	66	50	46	45	
17/11/2021 14:45	D	46	59	47	45	43	
10/11/2021 19:44	E	37	62	38	37	35	Distant road traffic noise and industrial chiller noise are equally audible and dominant. Birdsong also audible.
10/11/2021 19:59	E	37	52	37	35	34	
16/11/2021 21:45	E	46	57	47	45	44	
17/11/2021 00:40	N	42	56	44	41	40	Broadband industrial plant noise dominates, with some road traffic noise barely audible.
17/11/2021 00:55	N	42	60	43	41	40	
17/11/2021 01:27	N	42	54	43	42	40	
17/11/2021 01:42	N	41	56	43	41	40	
Daytime, all samples		49	59 - 70	50	47	46	
Evening, all samples		37	52 - 62	38	36	34	
Night-time, all samples		42	54 - 60	43	41	40	

Table 3.13 Short term measurement data collected at ST3

Start date and time	Period	Sound pressure level, dB					Noise environment comments
		$L_{Aeq,T}$	L_{Amax}	$L_{A10,T}$	$L_{A50,T}$	$L_{A90,T}$	
11/11/2021 09:43	D	71	87	75	67	60	Road traffic noise from Weasenham Lane was constant and dominant. Noise from an adjacent car mechanic (hydraulic sounds, workers voices) also audible. Birdsong and passing pedestrian noise also present during measurement. In moments of lull from the mechanic/Weasenham Lane, distant road traffic noise was dominant.
11/11/2021 09:57	D	72	88	76	67	58	
10/11/2021 16:15	D	75	101	75	67	60	
10/11/2021 16:30	D	72	92	75	69	61	
17/11/2021 14:19	D	71	89	75	67	58	
16/11/2021 21:18	E	64	83	66	50	47	Road traffic noise from Weasenham Lane constant and dominant. During periods of few car movements, industry including impulsive hammering and fan noise in the distance was audible.
10/11/2021 19:01	E	70	93	74	66	56	
10/11/2021 19:16	E	69	86	73	61	49	
16/11/2021 19:55	E	70	90	74	60	49	
17/11/2021 01:17	N	56	80	48	46	45	Continuous industrial plant (fans/chiller) noise dominates. Occasional traffic pass-bys were dominant when occurring, though this was infrequent.
17/11/2021 01:32	N	58	81	49	45	44	
12/11/2021 00:00	N	55	73	58	50	47	
12/11/2021 00:21	N	59	71	61	59	51	
Daytime, all samples		72	87 - 101	75	67	59	
Evening, all samples		69	83 - 93	72	59	50	
Night-time, all samples		57	71 - 81	54	50	47	

Table 3.14 Short term measurement data collected at ST4

Start date and time	Period	Sound pressure level, dB					Noise environment comments
		$L_{Aeq,T}$	L_{Amax}	$L_{A10,T}$	$L_{A50,T}$	$L_{A90,T}$	
11/11/2021 10:28	D	59	85	55	52	48	Industrial plant noise (chiller) dominates, along with local road traffic noise which is a significant source. Some light commercial and industrial noise from surrounding units (including hand tool type noise) also audible, along with the occasional vehicle reverse alarm.
11/11/2021 10:46	D	53	79	55	51	47	
11/11/2021 14:27	D	54	78	55	52	48	
11/11/2021 14:44	D	55	78	57	53	49	
17/11/2021 12:15	D	61	81	61	54	50	
10/11/2021 19:37	E	55	71	56	53	50	Local road traffic noise dominates the background with a high HGV ratio. Some industrial plant (chiller/generator/AHU) dominates, although intermittent in nature. Distant HGVs and reverse alarms also audible.
10/11/2021 19:52	E	54	65	57	52	45	
16/11/2021 20:22	E	54	60	57	53	49	
12/11/2021 00:41	N	56	71	61	50	48	Considerable HGV movements around industrial estate, along with plant movement including reverse alarms, hydraulic sounds, engine sounds, dominates. Road traffic noise from the surrounding local road network, along with multiple industrial sources, dominate the background levels.
12/11/2021 01:03	N	58	74	61	44	38	
Daytime, all samples		58	78 - 85	57	52	48	
Evening, all samples		54	60 - 71	57	53	48	
Night-time, all samples		57	71 - 74	61	47	43	

Table 3.15 Short term measurement data collected at ST5

Start date and time	Period	Sound pressure level, dB					Noise environment comments
		$L_{Aeq,T}$	L_{Amax}	$L_{A10,T}$	$L_{A50,T}$	$L_{A90,T}$	
11/11/2021 11:03	D	64	75	67	63	58	Road traffic noise from Elm High Road dominant.
11/11/2021 11:18	D	64	79	66	63	58	
10/11/2021 15:15	D	65	86	68	63	57	
10/11/2021 15:30	D	65	88	67	63	58	
17/11/2021 12:46	D	67	77	70	67	59	
16/11/2021 20:59	D	61	74	65	58	51	
16/11/2021 23:37	N	55	72	58	50	44	Less road traffic than during the daytime period, however road traffic noise from Elm High Road still dominates.
16/11/2021 23:52	N	54	72	57	48	44	
17/11/2021 00:07	N	55	72	58	47	43	
17/11/2021 00:22	N	56	77	55	47	44	
12/11/2021 01:18	N	55	77	53	44	40	
12/11/2021 01:39	N	46	64	48	38	35	
Daytime, all samples		65	74 - 88	67	63	57	
Night-time, all samples		54	64 - 77	55	46	41	

Table 3.16 Short term measurement data collected at ST6

Start date and time	Period	Sound pressure level, dB					Noise environment comments
		$L_{Aeq,T}$	L_{Amax}	$L_{A10,T}$	$L_{A50,T}$	$L_{A90,T}$	
17/11/2021 13:08	D	57	67	60	57	54	Continuous road traffic noise from A47 dominates. Some jet washing at a car wash and birdsong also audible.
11/11/2021 10:20	D	59	68	62	58	51	
11/11/2021 10:35	D	58	66	62	58	51	
11/11/2021 14:45	D	58	73	60	57	53	
17/11/2021 15:18	D	61	66	63	61	57	
18/11/2021 01:31	N	43	58	47	41	39	Road traffic noise from A47 and surrounding local road network dominant. When road traffic not present, industry noise from the west was clearly dominant. Some wind in trees also audible when present.
18/11/2021 01:46	N	46	58	49	44	41	
12/11/2021 01:39	N	46	64	48	38	35	
12/11/2021 01:54	N	48	66	52	42	36	
17/11/2021 00:44	N	50	64	54	42	38	
17/11/2021 00:59	N	45	64	44	40	38	
Daytime, all samples		59	66 - 73	61	58	53	
Night-time, all samples		47	58 - 66	49	41	38	

Table 3.17 Short term measurement data collected at ST11

Start date and time	Period	Sound pressure level, dB					Noise environment comments
		$L_{Aeq,T}$	L_{Amax}	$L_{A10,T}$	$L_{A50,T}$	$L_{A90,T}$	
17/11/2021 14:43	D	65	82	69	61	52	Road traffic noise from A47 dominant. Some birdsong along with wind in trees also audible when present.
12/11/2021 09:41	D	58	67	60	57	54	
12/11/2021 09:57	D	57	75	60	56	53	
11/11/2021 15:21	D	57	73	60	56	52	
11/11/2021 15:45	D	57	73	60	56	51	
17/11/2021 15:43	D	59	67	62	58	52	
18/11/2021 00:41	N	53	72	56	43	38	Road traffic noise from A47 dominant. Industry noise just audible during lulls in road traffic (faint hum from the direction of the substation).
18/11/2021 00:56	N	57	82	51	40	35	
18/11/2021 01:11	N	56	79	54	42	37	
17/11/2021 00:00	N	46	62	49	40	35	
17/11/2021 00:16	N	46	64	48	39	35	
Daytime, all samples		60	67 - 82	62	57	52	
Night-time, all samples		53	62 - 82	52	41	36	

4. Discussion

4.1 The influence of Covid-19 on ambient sound conditions

4.1.1 During the monitoring, there were no national or local lockdowns in place to control the spread of Covid-19. Comparisons provided in **Section 4.3** of monitoring data acquired prior to the start of the pandemic, and during the most recent monitoring (particularly at more comparable locations at LT1 and LT2) indicate negligible differences in measured sound levels.

4.1.2 In accordance with the IOA and ANC's *'Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments'* (Association of Noise Consultants and the Institute of Acoustics, 2020), where monitoring locations were within areas covered by the Strategic noise maps produced under the Environmental Noise (England) Regulations, 2006 (as amended), comparisons were made to determine the validity of the monitoring results. The results of the comparison are provided in **Table 4.1 Comparison of monitoring results with 2017 strategic noise mapping predicted road noise levels** below.

Table 4.1 Comparison of monitoring results with 2017 strategic noise mapping predicted road noise levels

Location	2021 Survey Results		2017 Strategic Noise Mapping Indicative Predicted Road Noise Level		Difference (2021 results minus 2017 predicted road noise levels)	
	Daytime, dB $L_{Aeq,T}$	Night-time, dB $L_{Aeq,T}$	Daytime, dB $L_{Aeq,16h}$	Night-time, dB L_{night}	Daytime, dB	Night-time, dB
ST5	65	54	65	60	0	-6
ST6	59	47	60	53	-1	-6
ST11	60	53	58	50	+2	+3

4.1.3 The differences in measured and predicted sound levels presented in **Table 4.1 Comparison of monitoring results with 2017 strategic noise mapping predicted road noise levels** tend to be equal to, or less than, ±3 dB. These differences are acceptable and indicate that the measured road noise levels were relatively unaffected by any influence of the Covid-19 pandemic and are, therefore, valid for the purposes of the assessment.

4.1.4 Reductions of 6 dB are observed at ST5 and ST6 in the night-time between 2017 and 2020. It would be expected that greater variability would be observed in the night-time road noise levels because the traffic flows and percentage of HGVs vary more throughout the night-time period and these variations will have a greater impact upon the measured levels. During the monitoring there were fewer samples

taken during the night-time, and, in any case, lower measured sound levels will yield a more robust assessment. The 6 dB differences are therefore considered acceptable and the measured night-time sound levels are considered valid for the purposes of the assessment.

4.1.5 On the basis of the above, and taking into account the validation presented below in **Section 4.3**, it is considered that the influence of Covid-19 on ambient sound conditions was negligible, and that the results of the monitoring were not unduly affected by any variations in local activity that may have occurred due to the pandemic.

4.2 Analysis of results

Long-term monitoring locations

4.2.1 For the purposes of determining representative sound levels for the operational noise assessment in accordance with BS 4142:2014, the discussion of monitoring results acquired at the long-term monitoring locations considers all results except those contained in the summary tables provided for the BS 5228-1 weekend periods.

4.2.2 Full summaries of the BS 5228-1 weekend periods are provided above for completeness. However, to provide representative sound levels for the assessment of construction noise, the measured logarithmic average sound levels will be used (with exclusions for adverse weather conditions, and corrections for location as set out in **Section 4.3**), in accordance with the ABC method provided in BS 5228-1.

LT1c

4.2.3 The time history provided in **Graphic 3.1 Results of long term monitoring: LT1c - Time** history shows a typical diurnal pattern of background and residual levels being higher during the daytime period than evening and night-time (with the exception of periods where high wind gusts were experienced, which have since been removed from the data analysis as explained in **Section 2.2**). The results in **Table 3.1 Summary of measured sound levels at LT1c: weekdays** and **Table 3.2 Summary of measured sound levels at LT1c: weekends** show that, during both weekdays and weekends, median evening and night-time sound levels are similar (1 dB difference in residual levels and background levels), with night-time sound levels slightly lower than during the evening.

4.2.4 The distribution of data indicated in **Graphic 3.2 Results of long term monitoring: LT1c - Distribution of measured residual sound levels, all days** and **Graphic 3.3 Results of long term monitoring: LT1c - Distribution of measured background sound levels, all days** also shows a typical diurnal pattern, with the most commonly occurring daytime sound levels higher than during the evening, and with lower most commonly occurring night-time sound levels. However, the spread of the most commonly occurring levels over the different periods is small, with less than 5 dB difference between the most common daytime residual and background sound levels and most common night-time residual and background levels. This low spread and small variation across the different time

periods is a strong indication that a continuous noise source/ sources are dominating the measured sound levels.

4.2.5 The subjective observations in **Annex E** indicate that noise emanating from the industrial area to the north dominates the background, with road traffic noise from the surrounding road network also a significant contributor. Plant activity at the site adjacent to the monitoring location was also audible during the set up and collection of the long term.

4.2.6 In consideration of the median residual sound levels and 25th percentile background sound levels, comparison of the results in **Table 3.1 Summary of measured sound levels at LT1c: weekdays** and **Table 3.2 Summary of measured sound levels at LT1c: weekends** show that there is little variation between weekday and weekend sound levels. The observed variances are between ±2 dB.

4.2.7 The difference between the 25th percentile and median of the background sound levels is 1 to 2 dB, with the 75th percentile only 1 to 2 dB greater than the median, yielding limited interquartile ranges (IQRs) of 2 to 3 dB. It is also noted that the IQRs for the different periods overlap. The small differences between the different periods, and the low variance between weekday and weekend sound levels, provide strong indications that a continuous noise source/ sources are dominating the measured sound levels and causing minimal variation in the sound levels throughout all days and times of day.

4.2.8 The subjective observations support the analysis provided above which indicates that the low variation of sound levels across different time periods are due to the dominance of continuous industrial noise sources, particularly during the evening and night-time.

4.2.9 Based on the above, the 25th percentile background sound levels are considered representative of sound levels that occur for the majority of the time. Therefore, using the 25th percentile background sound levels in the assessment will provide a robust approach.

4.2.10 In consideration of residual sound levels, the median is considered representative. As observed in the distribution charts, the median values occur for 20% of the daytime and night-time, and 23% of the evening. It is also noted that the median levels are lower than both the arithmetic and logarithmic averages and are only 1 to 2 dB higher than the 25th percentile. Therefore, the median sound levels are considered representative for the assessment and will yield a robust approach.

4.2.11 In consideration of extraneous noise events, it is observed that the time history chart presented in **Graphic 3.1 Results of long term monitoring: LT1c - Time** history indicates that measured $L_{Aeq,T}$ sound levels and, to a lesser extent, $L_{A90,T}$ sound levels were occasionally affected by events that caused elevated sound levels. This is most noticeable on Monday 15 November 2021 and Wednesday 17 November 2021. The 25th percentile background sound levels and median residual levels would not be significantly influenced by infrequently occurring elevated sound levels. The events would have to occur over a substantial proportion of the measurement duration before the 25th percentile or median values would be significantly shifted. Based on this, it is considered that extraneous/ unrepresentative events apparent in the dataset have not confounded the

determination of appropriate representative sound levels that will be used in the assessment.

LT2 Alternative

4.2.12 The time history provided in **Graphic 3.4 Results of long term monitoring: LT2 - Time** history shows a typical diurnal pattern of background and residual levels being higher during the daytime period than evening and night-time.

4.2.13 The subjective observations in **Annex E** indicate that the acoustic environment at this location is dominated by road traffic on A47, with some industrial fan type noise audible during lulls in traffic.

4.2.14 The distribution of data indicated in **Graphic 3.5** and **Graphic 3.6** also shows a typical diurnal pattern, with the most commonly occurring daytime sound levels higher than during the evening, and with lower most commonly occurring night-time sound levels. The spread of the most commonly occurring levels over the different periods is large, with 9 dB difference between the most common daytime and night-time residual sound levels and 14 dB difference between the most common daytime and night-time background sound levels. The significant differences between daytime and night-time sound levels indicates that the area may be dominated by noise from road traffic, which can give rise to a typical diurnal variation in sound levels.

4.2.15 In consideration of the median residual sound levels and 25th percentile background sound levels, comparison of the results in **Table 3.4** and **Table 3.5** show that there is some limited variation between weekday and weekend sound levels. Observed variances are between ±3 dB and indicate slightly lower sound levels during the weekend.

4.2.16 The difference between the 25th percentile and median background sound levels is 2 to 3 dB, with the 75th percentile 1 to 3 dB greater than the median. The IQRs of the background sound levels are 4 to 5 dB. It is noted that there is little overlap in the IQRs for the different periods. IQRs of residual sound levels are similarly limited, with a daytime IQR of 3 dB and a night-time IQR of 5 dB. The small range in IQR's is a strong indication that sound levels are quite consistent in each period. The variation between periods, indicating typical diurnal variation, suggest that road traffic noise is likely the dominant source affecting LT2 Alternative.

4.2.17 The subjective observations support the analysis provided above which concludes that the variation of sound levels across different time periods are likely due to the dominance of road traffic noise.

4.2.18 Based on the above, the 25th percentile background sound levels are considered representative of sound levels that occur for the majority of the time. Therefore, using the 25th percentile background sound levels in the assessment will provide a robust approach.

4.2.19 In consideration of residual sound levels, the median is considered representative. As shown in the distribution charts, the median values occur for 25% of the daytime, 18% of the evening and 12% of the night-time. It is noted that the median levels are the same or lower than both the arithmetic and logarithmic averages (with the exception of the evening arithmetic average being 1 dB lower than the median) and

are only 2 to 3 dB higher than the 25th percentile. Therefore, the median sound levels are considered representative for the assessment and will yield a robust approach.

4.2.20 In consideration of extraneous noise events, it is observed that the time history chart presented in **Graphic 3.4 Results of long term monitoring: LT2 - Time** history indicates a very consistent diurnal pattern with only one very limited period with elevated sound levels which may be unrepresentative, which occurred on Monday 15 November 2021. The 25th percentile background sound levels and median residual levels would not be significantly influenced by a single, short duration, even causing elevated sound levels. As such, extraneous events have not confounded the determination of appropriate representative sound levels to be used in the assessment.

LT3

4.2.21 The time history provided in **Graphic 3.7 Results of long term monitoring: LT3 - Time** history shows a typical diurnal pattern of background and residual levels being higher during the daytime period than evening and night-time (with the exception of periods where high wind gusts were experienced, which have since been removed from the data analysis as explained in **Section 2.2**). However, results in **Table 3.7 Summary of measured sound levels at LT3, weekdays** and **Table 3.8 Summary of measured sound levels at LT3, weekends** show that the 25th percentile background sound levels are identical during the daytime and evening on weekdays and only 2 dB lower during the evening on weekends. Residual sound levels show a similar pattern of variation with small differences between daytime, evening and night-time on weekdays and slightly greater differences between periods on weekends.

4.2.22 The subjective observations in **Annex E** indicate that the adjacent roads and local transport network dominated the background sound levels. Observations also note contributions from plant associated with the adjacent supermarket, idling HGVs and barking dogs.

4.2.23 The distribution of data indicated in **Graphic 3.8 Results of long term monitoring: LT3 - Distribution of measured residual sound levels, all days** and **Graphic 3.9Results of long term monitoring: LT3 - Distribution of measured background sound levels, all days** are also indicative of a typical diurnal pattern. However, the spread of the most commonly occurring levels over the different periods is limited, with the most commonly occurring daytime, evening and night-time residual sound levels within a 10 dB range, and the most commonly occurring daytime, evening and night-time background sound levels within a 6 dB range. The distribution charts indicate that nearby activity, at a fairly consistent sound level, is dominating the measured sound levels during the daytime and evening, with slightly reduced sound levels during the night-time.

4.2.24 In consideration of the median residual sound levels and 25th percentile background sound levels, comparison of the results in **Table 3.7 Summary of measured sound levels at LT3, weekdays** and **Table 3.8 Summary of measured sound levels at LT3, weekends** show that weekends have significantly lower sound levels than weekdays, with weekend sound levels between 3 to 8 dB lower than on weekdays.

4.2.25 The difference between the 25th percentile and median background sound levels is 2 to 4 dB, with the 75th percentile being 1 to 4 dB greater than the median. IQRs are between 3 to 7 dB, with the greatest range during the daytime and the lowest range during the night-time. The differences between the different periods indicate that nearby activity is dominating the measured sound levels during the daytime and evening with slightly reduced levels during the night-time.

4.2.26 The subjective observations support the analysis provided above which indicates that the variation of sound levels across different time periods are due to the activity on the local road network and the adjacent supermarket, particularly during the daytime with similar sound levels in the evening and reduced sound levels during the night-time.

4.2.27 Based on the above, the 25th percentile background sound levels are considered representative of sound levels that occur for the majority of the time. Therefore, using the 25th percentile background sound levels in the assessment will provide a robust approach.

4.2.28 In consideration of residual sound levels, the median is considered representative. As shown in the distribution charts, the median values occur for 13% of the daytime, 8% of the evening and 8% of the night-time. It is noted that the median levels are the same or lower than both the arithmetic and logarithmic averages. The 25th percentile and 75th percentile levels are within 2 to 3 dB of the Median. Therefore, the median sound levels are considered representative for the assessment and will yield a robust approach.

4.2.29 In consideration of extraneous noise events, it is observed that the time history chart presented in **Graphic 3.7 Results of long term monitoring: LT3 - Time** history indicates that measured $L_{Aeq,T}$ sound levels were occasionally affected by isolated events that caused elevated sound levels. These are noted to have occurred on Sunday 14 November 2021, Monday 15 November 2021 and Wednesday 17 November 2021. The events would have to occur over a substantial proportion of the measurement duration before the median values would be significantly shifted. Based on this, it is considered that extraneous/ unrepresentative events apparent in the dataset have not confounded the determination of appropriate representative sound levels that will be used in the assessment.

Short term monitoring locations

ST-LT1

4.2.30 The measurement data presented in **Table 3.10 Short term measurement data collected at ST-LT1** shows some variation in residual and background sound levels across the different time periods. There is some evidence of typical diurnal variation as the daytime and evening levels are higher than those measured during the night-time.

4.2.31 Individual daytime and evening residual sound levels are similar throughout, with minimal variation in the night-time. With reference to average sound levels, the residual sound levels are fairly consistent throughout the day and evening.

Background sound levels are also consistent, as they are similar during the daytime and evening and 4 dB lower during the night-time.

4.2.32 The variation in sound levels indicates that the sources influencing the measurement location are fairly consistent during the day and evening, and more so during the night-time, where the results indicate that continuous noise, likely emanating from the Kirk coachworks premises, is dominant during the night-time.

4.2.33 The subjective observations in **Annex F** concur with the above considerations, as they state that continuous industrial noise dominated the local sound environment at all times. It was also noted the monitoring location was influenced by distant road traffic which was audible during the day and evening, and just audible during the night.

4.2.34 Based on the above and in consideration of the location, which is approximately 50 m east of the industrial area around New Bridge Lane, the average sound levels in **Table 3.10 Short term measurement data collected at ST-LT1** are considered representative of nearby NSRs.

ST1 Alternative

4.2.35 The measurement data presented in **Table 3.11 Short term measurement data collected at ST1 Alternative** shows little variation in residual and background sound levels across the different time periods. There is some evidence of typical diurnal variation as the daytime and evening levels are higher than those measured during the night-time.

4.2.36 Individual daytime measurements show the most variation (6 dB in residual levels, 5 dB in background), whilst night-time measurements show the most consistency (1 dB variation in both residual and background levels). With reference to the average sound levels per period, it is observed that there is very little variation between all noise indices (1 to 2 dB), demonstrating that the sound environment tends to be consistent over a 24-hour period. The very low variation in sound levels indicate that a continuous noise source/ sources are dominant at this location, particularly during the night-time.

4.2.37 The subjective observations in **Annex F** concur with the above considerations, as they state that continuous low frequency industrial noise dominated the local sound environment at all times.

4.2.38 Based on the above and in consideration of the location, which is 375 m north of A47 and next to the industrial area, the average sound levels in **Table 3.11 Short term measurement data collected at ST1 Alternative** are considered representative of nearby NSRs.

ST2

4.2.39 The measurement data presented in **Table 3.12 Short term measurement data collected at ST2** shows variation in residual and background sound levels across the different time periods, providing some evidence of a diurnal variation as daytime levels are higher than night-time. However, measured evening sound levels do not follow a typical diurnal pattern as they are lower than those measured in both day and night-time periods.

4.2.40 Individual evening measurements show the most variation (9 dB in residual levels, 10 dB in background), whilst night-time measurements show the most consistency (1 dB in residual levels, 0 dB in background).

4.2.41 The variation in sound levels indicate a potential mixture of sources with greater variability during the day and evening with a more continuous noise source/ sources dominating during the night-time.

4.2.42 The subjective observations in **Annex F** concur with the above considerations, as they state that distant road noise was audible during the daytime and evening with industrial noise audible at all times, and industrial noise dominating in the night-time.

4.2.43 Based on the above and in consideration of the location, which is 250 m east of B198 and next to the industrial area, the average sound levels in **Table 3.12 Short term measurement data collected at ST2** are considered representative of nearby NSRs

ST3

4.2.44 The measurement data presented in **Table 3.13 Short term measurement data collected at ST3** shows variation in residual and background sound levels across the different time periods, providing evidence of a typical diurnal variation as the daytime and evening levels are higher than those measured during the night-time

4.2.45 Individual evening measurements show a high degree of variation (6 dB in residual levels, 9 dB in background), whilst daytime measurements show the most consistency (4 dB in residual levels, 3 dB in background).

4.2.46 The variation in sound levels are consistent with a location within an industrial area, which is primarily influenced by vehicle movements on the local road network, with continuous commercial/ industrial noise also contributing.

4.2.47 The subjective observations in **Annex F** concur with the above considerations, as they state that vehicle movements were dominant during the daytime and evening with industrial noise audible at all times.

4.2.48 Based on the above and in consideration of the location, which is adjacent to Weasenham Lane and near the boundary of the industrial area, the average sound levels in **Table 3.13 Short term measurement data collected at ST3** are considered representative of nearby NSRs.

ST4

4.2.49 The measurement data presented in **Table 3.14 Short term measurement data collected at ST4** shows little variation in residual and background sound levels across the different time periods. These levels provide no evidence of typical diurnal variation as the daytime, evening and night-time levels show no typical pattern.

4.2.50 Individual daytime, evening, and night-time residual and background sound levels vary throughout, though they tend to be of a similar level at all times.

4.2.51 With reference to the average sound levels the residual sound levels are fairly consistent throughout all periods of the day. Background sound levels are also

consistent, as they are the same during the daytime and evening and 5 dB lower during the night-time.

4.2.52 The measured sound levels are consistent with a location situated within an industrial area, with the acoustic environment mainly consisting of vehicle movements, continuous industrial and commercial sound with some impulsive noise throughout the day, evening and night.

4.2.53 The subjective observations in **Annex F** concur with the above considerations, as they state that vehicle movements were constant during the daytime and evening with a high percentage of HGV movements throughout and into the night-time. Industrial noise was audible at all times.

4.2.54 Based on the above, and consideration of the location, within the industrial area, the average sound levels in **Table 3.14 Short term measurement data collected at ST4** are considered representative of nearby NSRs.

ST5 Alternative

4.2.55 The measurement data presented in **Table 3.15 Short term measurement data collected at ST5** shows variation in residual and background sound levels across the different time periods, providing evidence of a typical diurnal variation as the daytime levels are higher than those measured during the night-time.

4.2.56 Individual night-time measurements show the most variation (10 dB in residual levels, 9 dB in background), whilst daytime measurements show the most consistency (6 dB variation in residual levels, 8 dB in background).

4.2.57 The sound levels are consistent with a location adjacent to an important road link.

4.2.58 The subjective observations in **Annex F** concur with the above considerations, as they state that vehicle movements were dominant throughout the daytime and night-time, but with reduced vehicle flows in the night.

4.2.59 Based on the above and in consideration of the location, which is adjacent to Elm High Road, the average sound levels in **Table 3.15 Short term measurement data collected at ST5** are considered representative of nearby NSRs

ST6

4.2.60 The measurement data presented in **Table 3.16 Short term measurement data collected at ST6** shows variation in residual and background sound levels across the different time periods, providing evidence of a typical diurnal variation as the daytime levels are higher than those measured during the night-time.

4.2.61 Individual night-time measurements show the most variation (7 dB in residual levels, 6 dB in background), whilst daytime measurements show the most consistency (4 dB variation in residual levels, 6 dB in background).

4.2.62 The variation in sound levels is consistent with a location which is primarily influenced by traffic on a busy road during the day and night-time, and which is less influenced by continuous industrial sources.

4.2.63 The subjective observations in **Annex F** concur with the above considerations, as they state that vehicle movements were dominant throughout the day and night, with industry noise also audible during the night.

4.2.64 Based on the above and in consideration of the location, which is approximately 70 m to the south of the A47 and approximately 1.3 km east of the industrial area the average sound levels in **Table 3.16 Short term measurement data collected at ST6** are considered representative of nearby NSRs

ST11

4.2.65 The measurement data presented in **Table 3.17 Short term measurement data collected at ST11** shows variation in residual and background sound levels across the different time periods, providing evidence of a typical diurnal variation as the daytime levels are higher than those measured during the night-time.

4.2.66 Residual sound levels varied greatly throughout the day and night, whereas background levels showed some consistency Individual night-time measurements show the most variation (11 dB in residual levels, 3 dB in background), compared with daytime measurements (8 dB in residual levels, 3 dB in background).

4.2.67 The variation in sound is consistent with a location which is primarily influenced by traffic on a busy road during the day and night-time, and which is less influenced by continuous industrial sources.

4.2.68 The subjective observations in **Annex F** concur with the above considerations, as they state that road traffic noise was consistent throughout the day and night, with industrial noise just audible during the night.

4.2.69 Based on the above and in consideration of the location, which is approximately 60 m to the west of the A47 and approximately 2.3 km east of the industrial area, the average sound levels in **Table 3.17 Short term measurement data collected at ST11** are considered representative of nearby NSRs

4.3 Corrections and comparisons with 2019 data

4.3.1 As described in **Section 2.2**, some constraints meant that monitoring in some preferred locations was not possible and Backup/Alternative locations were used instead, in accordance with the agreed methodology. Backup/Alternative monitoring locations were used instead of preferred locations at LT1, LT2, ST1 and ST5.

4.3.2 This section explains any corrections and comparisons made to the measurement data to ensure residual and background noise levels are representative of nearby NSRs.

4.3.3 Only locations LT1, LT2 and ST1 are considered here, as there is no data available to allow a comparison of preferred and backup locations at ST5. However, as outlined in **Section 2.2**, acquisition of baseline data at ST5 Backup/Alternative is considered to yield a more robust assessment. This is on the basis that ST5 Backup/Alternative was at a slightly greater distance to nearby transport sources than the preferred measurement location at ST5.

2019 Baseline Surveys

4.3.4 A series of short term attended measurements were undertaken in 2019 at locations selected to be representative of the nearest NSRs to the EfW CHP Facility. The monitoring was undertaken in accordance with BS 4142:2014+A1:2019 and BS 7445-1:2003. A summary of the monitoring methodology and monitoring results is provided in **Annex G**. The 2019 monitoring results have been compared to the 2021 monitoring data to validate and correct the 2021 measurement data, where appropriate, to achieve representative sound levels, as set out below.

LT1c and ST-LT1

4.3.5 It was established before the surveys were undertaken that long term monitoring at LT1 and LT1a would not be possible, and that long term monitoring would therefore be undertaken at LT1c. In the SMP, an additional survey location, ST-LT1, was added so that data could be gathered to validate, and if necessary, correct measurement data acquired at LT1c to be representative of Receptors at locations LT1 and LT1a, on New Bridge Lane.

4.3.6 Differences with the monitoring data acquired at LT1c and ST-LT1 were expected, as location LT1c was partially screened from nearby noise sources due to being located near the bottom of earth bunds. Conversely, ST-LT1, being approximately equidistant between NSRs at 9 and 10 New Bridge Lane, was expected to be representative of 9 and 10 New Bridge Lane. This is on the basis of the 2019 monitoring results, which showed that the differences between measured sound levels in close proximity to 9 and 10 New Bridge Lane were negligible.

4.3.7 Residual and background sound levels measured at ST-LT1 were compared with measurement data for the same periods at LT1c and the differences calculated. The comparison of the concurrent 15-minute samples is provided in **Table 4.2 Comparison of monitoring results at LT1c and ST-LT1 and calculation of corrections**, below. Corrections to be applied to measured data at LT1c to be representative of ST-LT1 are determined by arithmetically averaging the differences between concurrently measured sound levels at LT1c and ST-LT1 in each period.

Table 4.2 Comparison of monitoring results at LT1c and ST-LT1 and calculation of corrections

Start Date & Time	Period	Local Weather		Sound Pressure Level (ST-LT1), dB		Sound Pressure Level (LT1c), dB		Difference in sound levels, dB		Remarks
		Wind Speed, m/s	Wind Direction	$L_{Aeq,T}$	$L_{A90,T}$	$L_{Aeq,T}$	$L_{A90,T}$	$L_{Aeq,T}$	$L_{A90,T}$	
17/11/2021 13:15	D	1.3	W	52	50	47	44	+6	+6	
11/11/2021 09:40	D	0.4	SW	49	46	47	41	+1	+5	
11/11/2021 09:55	D	0	-	49	45	45	40	+4	+5	
11/11/2021 14:23	D	0.4	SE	55	50	46	44	+9	+7	
11/11/2021 14:38	D	0	-	54	51	46	44	+8	+7	
10/11/2021 19:04	E	0	-	48	43	41	40	+7	+3	
10/11/2021 19:19	E	0.4	NE	45	41	41	40	+3	+2	Exclude due to unrepresentative wind direction
16/11/2021 20:06	E	0.9	SW	51	48	48	43	+3	+6	
16/11/2021 20:53	E	0.9	SW	51	48	47	42	+4	+6	
10/11/2021 23:54	N	0	-	44	41	38	37	+6	+5	
11/11/2021 00:09	N	0	-	45	41	38	36	+7	+5	
11/11/2021 01:47	N	0	-	45	41	38	36	+7	+4	
11/11/2021 02:02	N	0	-	46	41	38	37	+8	+4	
Daytime - correction to LT1c data to be representative of ST-LT1								+6	+6	
Evening - correction to LT1c data to be representative of ST-LT1								+5	+5	
Night-time - correction to LT1c data to be representative of ST-LT1								+7	+4	

4.3.8 As detailed in **Section 4.2**, it is considered that the 25th percentile of the measured background sound levels and the median of the measured residual sound levels at LT1c would provide representative and robust sound levels to be used in the assessment. These levels were corrected based on the corrections presented at the bottom of **Table 4.2**, as shown in **Table 4.3**, below.

Table 4.3 Correction of monitoring results at LT1c

Period	2021 Survey Results (LT1c)		Correction (determined by comparison, as shown in Table 4.2)		2021 Survey Results (LT1c, corrected to be representative of ST-LT1)	
	Residual Sound Level, dB $L_{Aeq,T}$	Background Sound Level, dB $L_{A90,T}$	Residual Sound Level, dB $L_{Aeq,15m}$	Background Sound Level, dB $L_{A90,15m}$	Residual Sound Level, dB $L_{Aeq,15m}$	Background Sound Level, dB $L_{A90,15m}$
Daytime	47	43	+6	+6	53	49
Evening	44	41	+5	+5	49	46
Night-time	44	40	+7	+4	51	44

4.3.9 The corrected levels have been compared with the results of the 2019 monitoring, for validation purposes, in **Table 4.4 Comparison of corrected monitoring results at LT1c with 2019 monitoring results** below.

Table 4.4 Comparison of corrected monitoring results at LT1c with 2019 monitoring results

Period	2019 Survey Results (near 9 & 10 New Bridge Lane)		2021 Survey Results (LT1c, corrected to be representative of ST-LT1)		Difference (2021 results minus 2019 results)	
	Residual Sound Level, dB $L_{Aeq,T}$	Background Sound Level, dB $L_{A90,T}$	Residual Sound Level, dB $L_{Aeq,15m}$	Background Sound Level, dB $L_{A90,15m}$	Residual Sound Level, dB	Background Sound Level, dB
Daytime	54	50	53	49	-1	-1
Evening	50	48	49	46	-1	-2
Night-time	47	44	51	44	+4	0

4.3.10 The differences indicated in **Table 4.4 Comparison of corrected monitoring results at LT1c with 2019 monitoring results** show that the corrected sound levels are generally all within ±3 dB of the sound levels measured in 2019.

4.3.11 The only exception is the residual sound level during the night-time, where a +4 dB difference in the corrected levels is indicated. This is likely due to the differences in the times of day when the night-time measurements were undertaken. In the 2019 monitoring, night-time measurements were undertaken between 00:45 and

02:42 hrs, and the measured levels are therefore representative of the quietest parts of the night-time. The 2021 monitoring data from LT1c includes multiple whole night periods and is better representative of the whole night period. The whole night period includes periods of increased activity, particularly at the end of the night period from 06:00 to 07:00 hrs. As such, the greater difference in the corrected night-time residual sound levels is expected, and the corrected night-time residual sound levels at LT1c are considered valid for the purposes of the assessment.

LT2

4.3.12 Access arrangements could not be confirmed for LT2, therefore LT2 Backup/Alternative was used. The monitoring location at LT2 Backup/Alternative was approximately equidistant from the A47 as the NSR to the east known as 'Potty Plants'.

4.3.13 During the 2019 surveys, baseline data was collected at a location considered representative of 'Potty Plants', but at a greater distance from the A47. The 2019 survey location was approximately 80 m from the A47, and LT2 Backup/Alternative was approximately 40 m from the A47.

4.3.14 A comparison of the measurement data at the two locations described above was undertaken for validation purposes. As detailed in **Section 4.2**, it is considered that the 25th percentile of the measured background sound levels and the median of the measured residual sound levels at LT2 Backup/Alternative will provide representative and robust sound levels to be used in the assessment. These levels were used in the comparison which is provided in **Table 4.5 Comparison of monitoring results at LT2 Backup/Alternative with 2019 monitoring results** below.

Table 4.5 Comparison of monitoring results at LT2 Backup/Alternative with 2019 monitoring results

Period	2019 Survey Results (80 m from A47)		2021 Survey Results (LT2 Backup/Alternative, 40 m from A47)		Difference (2021 results minus 2019 results)	
	Residual Sound Level, dB $L_{Aeq,T}$	Background Sound Level, dB $L_{A90,T}$	Residual Sound Level, dB $L_{Aeq,15m}$	Background Sound Level, dB $L_{A90,15m}$	Residual Sound Level, dB	Background Sound Level, dB
Daytime	59	55	62	54	+3	-1
Evening	54	47	58	43	+4	-5
Night-time	49	42	54	40	+6	-3

4.3.15 The results in **Table 4.5 Comparison of monitoring results at LT2 Backup/Alternative with 2019 monitoring results** indicate that, at LT2 Backup/Alternative, residual sound levels are 3 to 6 dB greater than the residual

sound levels measured in 2019 and background sound levels are 2 to 5 dB lower than the background sound levels measured in 2019.

4.3.16 In consideration of the difference in residual sound levels, a +3 dB increase would be expected in the 2021 results due to the halving of distance between LT2 Backup/Alternative and the noise source dominating $L_{Aeq,T}$ sound levels – road traffic on the A47. Increases of 4 to 6 dB observed in the evening and night-time periods, respectively, are due to the limited sampling in the 2019 monitoring. The 2019 monitoring was focussed on determining likely worst-case levels at times with relatively reduced activity: measurements were undertaken around 21:30 hrs in the evening and between 01:24 and 03:00 hrs in the night-time.

4.3.17 In consideration of the difference in background sound levels, it is likely that the reason for the reduced $L_{A90,T}$ sound levels during all periods at LT2 Backup/Alternative is due to the increased distance from the Distribution Centre (DC) to the north. The DC was noted to be a significant source of industrial noise in the area (particularly at ST1 and ST1 Backup/Alternative). As such, sound from the DC may be dominating background sound levels in the vicinity of LT2 Backup/Alternative, which would explain why $L_{A90,T}$ sound levels at LT2 Backup/Alternative were reduced compared to the 2019 measurements which were in closer proximity to the DC. It is also noted that reduced background sound levels will yield a more robust assessment.

4.3.18 On the basis of the comparison, and the further considerations above, monitoring results acquired at LT2 Backup/Alternative are considered to be consistent with the 2019 monitoring results, and valid for the purposes of the assessment.

ST1 and ST1 Backup/Alternative

Correction for location

4.3.19 An alternative location for ST1 was used during the survey, ST1 Backup/Alternative, which was located further away from nearby road and industry sources than the location at ST1.

4.3.20 The results from ST1 Backup/Alternative have been compared to measurements undertaken at ST1 in 2019. The results of the comparison are provided in **Table 4.6 Comparison of monitoring results at ST1 Alternative/ Backup with 2019 monitoring results** below.

Table 4.6 Comparison of monitoring results at ST1 Alternative/ Backup with 2019 monitoring results

Period	2019 Survey Results (ST1)		2021 Survey Results (ST1 Backup/Alternative)		Difference (2021 results minus 2019 results)	
	Residual Sound Level, dB $L_{Aeq,T}$	Background Sound Level, dB $L_{A90,T}$	Residual Sound Level, dB $L_{Aeq,15m}$	Background Sound Level, dB $L_{A90,15m}$	Residual Sound Level, dB	Background Sound Level, dB
Daytime	58	54	48	46	-10	-8
Evening	53	51	48	45	-5	-6
Night-time	54	52	46	45	-8	-7

4.3.21 The results in **Table 4.6 Comparison of monitoring results at ST1 Alternative/ Backup with 2019 monitoring results** indicate that there is significant variation between the 2019 results acquired at ST1 and the 2021 results acquired at ST1 Backup/Alternative. The lower sound levels at ST1 Backup/Alternative are expected because this location was more than double the distance to the DC to the west and approximately one and a half times the distance to the A47 to the south.

4.3.22 Differences in the background sound levels are relatively consistent, with greater variation in the differences between residual sound levels. Due to the significant differences observed in the measured sound levels, it was considered appropriate to use the differences to calculate a correction to be applied to the 2021 monitoring results acquired at ST1 Backup/Alternative to be representative of ST1.

4.3.23 As there appears to be little consistency in the differences in measured sound levels, it was considered that an arithmetic average of the differences across all periods could provide a suitable basis for the correction. The average difference in the residual sound level across all periods was -8 dB. The average difference in the background sound level across all periods was -7 dB.

4.3.24 The average differences described above were used to correct the 2021 measurement data acquired at ST1 Backup/Alternative to be representative of ST1. For validation purposes, the corrected levels were compared against the 2019 measurement data acquired at ST1. The comparison is provided in **Table 4.7 Comparison of corrected monitoring results at ST1 Alternative/ Backup with 2019 monitoring results** below.

Table 4.7 Comparison of corrected monitoring results at ST1 Alternative/ Backup with 2019 monitoring results

Period	2019 Survey Results (ST1)		2021 Survey Results (ST1 Backup/Alternative, corrected to be representative of ST1)		Difference (2021 results minus 2019 results)	
	Residual Sound Level, dB $L_{Aeq,T}$	Background Sound Level, dB $L_{A90,T}$	Residual Sound Level, dB $L_{Aeq,15m}$	Background Sound Level, dB $L_{A90,15m}$	Residual Sound Level, dB	Background Sound Level, dB
Daytime	58	54	56	53	-2	-1
Evening	53	51	55	52	2	1
Night-time	54	52	54	52	0	0

4.3.25 The results of the comparison in **Table 4.7 Comparison of corrected monitoring results at ST1 Alternative/ Backup with 2019 monitoring results** indicate that the differences between the 2019 monitoring results at ST1 and the corrected monitoring results acquired in 2021 at ST1 Backup/Alternative are acceptable, as all are within ±3 dB and the average of the differences across all periods is 0 dB. The corrected 2021 data is therefore considered representative of ST1 and valid for the purposes of the assessment.

Correction to determine representative weekend sound levels

4.3.26 To determine representative weekend sound levels at ST1 and ST1 Backup/Alternative to inform the assessment of operational noise, a correction has been determined based on the monitoring results acquired at LT2. All these locations are affected by road noise from the A47, and from industrial and commercial sources at the south and south-eastern extents of the industrial area.

4.3.27 The correction is based on comparison of the representative weekday and weekend sound levels acquired at LT2 (25th percentile background sound levels and the median residual sound levels). The results of the comparison of the LT2 representative weekday and weekend sound levels are provided below in **Table 4.8 Comparison of weekday and weekend sound levels at LT2**.

Table 4.8 Comparison of weekday and weekend sound levels at LT2

	Difference in weekday and weekend sound levels at LT2 (weekends minus weekdays), dB					
	Background Sound Level, $L_{A90,T}$			Residual Sound Level, $L_{Aeq,T}$		
	Day	Eve	Night	Day	Eve	Night
25th %ile	-3	1	1	-	-	-
Median	-	-	-	-3	-3	-3

4.3.28 The results of the comparison of weekday and weekend sound levels at LT2 in **Table 4.8** indicates that, during weekends, background sound levels are similar in the evening and night-time, but are 3 dB lower during the daytime. Weekend residual sound levels are 3 dB lower during all periods.

4.3.29 Based on the above, corrections to apply to the measured sound levels at ST1 and ST1 Alternative/ Backup, to represent weekend baseline conditions are as follows:

- -3 dB to background sound levels during the daytime,
- 0 dB to background sound levels during the evening and night-time, and
- -3 dB to residual sound levels during all periods.

4.3.30 The weekend sound levels at ST1 and ST1 Alternative/ Backup, based on the corrections listed above, are shown in **Table 4.9 Corrected sound levels at ST1 and ST1 Alternative/ backup to be representative of weekends, based on comparison in Table 4.8** below.

Table 4.9 Corrected sound levels at ST1 and ST1 Alternative/ backup to be representative of weekends, based on comparison in Table 4.8

Location	Days of week	Daytime		Evening		Night-time	
		Residual Sound Level, dB $L_{Aeq,T}$	Background Sound Level, dB $L_{A90,T}$	Residual Sound Level, dB $L_{Aeq,T}$	Background Sound Level, dB $L_{A90,T}$	Residual Sound Level, dB $L_{Aeq,T}$	Background Sound Level, dB $L_{A90,T}$
ST1	Weekdays	56	53	55	52	54	52
ST1 backup	Weekdays	48	46	48	45	46	45
ST1	Weekends	53	50	52	52	51	52
ST1 backup	Weekends	45	43	45	45	43	45

4.4 Representative levels for the assessment

4.4.1 Based on the analysis in **Section 4.2**, and the corrections described above in **Section 4.3**, **Table 4.10** and **Table 4.11** provide the representative sound levels for weekdays and weekends respectively, alongside Receptor locations that these levels are considered representative of, that will be used in the assessment of operational noise.

4.4.2 As detailed in **Section 4.3**, representative levels for location ST-LT1 are the corrected levels measured at LT1c and the representative levels for location ST1 are the corrected levels measured at ST1 Backup/Alternative.

Representative weekday sound levels at ST4 are also considered to be representative of those that would be expected to occur at this location over a weekend as it is near the centre of the industrial area.

Table 4.10 Representative levels to be used in the assessment of operational noise – weekdays

Location	Representative of Receptor IDs	Daytime		Evening		Night-time	
		Residual sound level, dB $L_{Aeq,T}$	Background sound level, dB $L_{A90,T}$	Residual sound level, dB $L_{Aeq,T}$	Background sound level, dB $L_{A90,T}$	Residual sound level, dB $L_{Aeq,T}$	Background sound level, dB $L_{A90,T}$
Locations influenced by construction and operational noise (daytime 0700 – 1900 hours, evening 1900 – 2300 hours, night-time 2300 – 0700 hours)							
ST-LT1*	R2, R3	54	49	50	46	51	43
LT2 Alt.	R4, R5, R6	62	54	58	42	55	39
LT3	R1, R9, R10	54	44	50	44	48	43
ST1**	R7	56	53	55	52	54	52
ST1 Alt.	R8	48	46	48	45	46	45
ST4	R27	58	48	54	48	57	43

* - Representative levels based on measured sound levels from LT1c, corrected to ST-LT1.

** - Representative levels based on measured sound levels from ST1 Alternative, corrected to ST1.

Table 4.11 Representative levels to be used in the assessment of operational noise - weekends

Location	Representative of Receptor IDs	Daytime		Evening		Night-time	
		Residual sound level, dB $L_{Aeq,T}$	Background sound level, dB $L_{A90,T}$	Residual sound level, dB $L_{Aeq,T}$	Background sound level, dB $L_{A90,T}$	Residual sound level, dB $L_{Aeq,T}$	Background sound level, dB $L_{A90,T}$
Locations influenced by construction and operational noise (daytime 0700 – 1900 hours, evening 1900 – 2300 hours, night-time 2300 – 0700 hours)							
ST-LT1*	R2, R3	52	48	48	45	50	45
LT2 Alt.	R4, R5, R6	59	51	55	43	52	40
LT3	R1, R9, R10	50	40	46	38	42	35
ST1**	R7	53	50	52	52	51	52
ST1 Alt.	R8	45	43	45	45	43	45
ST4	R27	58	48	54	48	57	43

* - Representative levels based on measured sound levels from LT1c, corrected to ST-LT1.

** - Representative levels based on measured sound levels from ST1 Alternative, corrected to ST1.

Determination of BS 5228-1:2009+A1:2014 thresholds of significance

4.4.3 Based on the baseline monitoring results provided in **Section 3** and the corrections described in **Section 4.3**, BS 5228-1 threshold categories have been determined in accordance with the ABC method.

4.4.4 Receptors which are non-residential and where baseline data are available, are shown for completeness. However, the BS 5228-1 assessment method is only applicable to dwellings, therefore no threshold categories are provided for these Receptors.

4.4.5 Generally, where no weekend data are available, the lowest weekend threshold categories are assumed. However, for Receptors that are in close proximity to the A47 and Elm High Road, weekend threshold categories are assumed to be one category lower than the weekday daytime category. This is on the basis of measurement results at LT2, which was significantly influenced by road traffic noise on the A47, which indicate that logarithmic average ambient sound levels are 3 dB lower on weekend daytimes and evenings than on weekdays daytimes and evenings.

4.4.6 No construction works are planned for Sundays but determination of threshold categories are provided for Sundays, for information, or in case of emergency or exceptional circumstances requiring works on a Sunday.

4.4.7 Receptor R50 is located immediately adjacent to Cromwell Road and measurement results acquired at LT3 are considered representative, as LT3 was located within 200m of Cromwell Road and was significantly influenced by road traffic noise from Cromwell Road.

Table 4.12 Determination of BS 5228-1 threshold categories for assessment of construction noise

R. ID	Name of Receptor	Baseline dataset	Representative baseline ambient sound levels, dB $L_{Aeq,T}$						BS 5228-1 Threshold of significance Category			BS 5228-1 Threshold of significance Category		
			Weekdays			Weekends			Weekdays			Weekends		
			Day	Evening	Night	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs	Day	Evening	Night	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs
R01	2 New Bridge Lane	LT3	57	51	49	50	54	53	A	A	C	A	B	B
R02	9 New Bridge Lane	ST-LT1*	55	45	49	47	47	44	A	A	C	A	A	A
R03	10 New Bridge Lane	ST-LT1*	55	45	49	47	47	44	A	A	C	A	A	A
R04	Potty Plants	LT2 backup	63	59	58	58	58	60	B	C	C	A	C	C
R05	New Bridge Lane Travellers Site	LT2 backup	63	59	58	58	58	60	B	C	C	A	C	C
R06	Oakdale Place Park	LT2 backup	63	59	58	58	58	60	B	C	C	A	C	C
R07	The Chalet, New Drove	ST1**	56	55	54	-	-	-	A	B	C	A	A	A
R08	125 New Drove	ST1 backup	48	48	46	-	-	-	A	A	B	A	A	A
R09	93 South Brink	LT3	57	51	49	50	54	53	A	A	C	A	B	B
R10	97 South Brink	LT3	57	51	49	50	54	53	A	A	C	A	B	B
R26	TBAP Unity Academy	ST3	72	69	57	-	-	-	Non-residential, BS 5228-1 assessment not applicable.					
R27	Cambian EFLC, Anglia Way	ST4	58	54	57	-	-	-	Non- residential, BS 5228-1 assessment not applicable.					
R28	Thomas Clarkson Academy	ST3	72	69	57	-	-	-	Non- residential, BS 5228-1 assessment not applicable.					
R29	64 Weasenham Lane	ST3	72	69	57	-	-	-	C	B	C	B	B	B
R30	66 Weasenham Lane	ST3	72	69	57	-	-	-	C	B	C	B	B	B
R31	15 Hillburn Road	ST2	49	37	42	-	-	-	A	A	A	A	A	A
R32	16 Hillburn Road	ST2	49	37	42	-	-	-	A	A	A	A	A	A
R33	16a Hillburn Road	ST2	49	37	42	-	-	-	A	A	A	A	A	A
R34	24 Burdett Road	ST2	49	37	42	-	-	-	A	A	A	A	A	A
R35	5 Great Eastern Road	ST2	49	37	42	-	-	-	A	A	A	A	A	A
R36	1 Oldfield Lane	ST2	49	37	42	-	-	-	A	A	A	A	A	A
R37	3 Oldfield Lane	ST2	49	37	42	-	-	-	A	A	A	A	A	A
R38	25 Victory Road	ST2	49	37	42	-	-	-	A	A	A	A	A	A
R39	27 Victory Road	ST2	49	37	42	-	-	-	A	A	A	A	A	A

R. ID	Name of Receptor	Baseline dataset	Representative baseline ambient sound levels, dB $L_{Aeq,T}$						BS 5228-1 Threshold of significance Category					
			Weekdays			Weekends			Weekdays			Weekends		
			Day	Evening	Night	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs	Day	Evening	Night	Saturday 0800 - 1300 hrs	Saturday 1300 - 1600 hrs	Sunday 0700 - 2300 hrs
R44	52 Broadend Road	ST11	60	-	53	-	-	-	A	A	C	A	A	A
R45	56 Broadend Road	ST11	60	-	53	-	-	-	A	A	C	A	A	A
R46	Elme Hall Hotel	ST5	65	-	54	-	-	-	B	B	C	A	A	A
R47	85 Elm High Road	ST5	65	-	54	-	-	-	B	B	C	A	A	A
R48	36 Elmfield Drive	ST6	59	-	47	-	-	-	A	A	B	A	A	A
R49	Oxburgh Cott., Meadowgate Ln	ST6	59	-	47	-	-	-	A	A	B	A	A	A
R50	21 Cromwell Road	LT2 backup	63	59	58	58	58	60	B	C	C	A	C	C

* - Sound levels based on measured sound levels from LT1c, corrected to ST-LT1.

** - Sound levels based on measured sound levels from ST1 Alternative, corrected to ST1.

5. Summary & Conclusions

5.1.1 To inform the noise assessments forming part of the EIA to be presented in the ES accompanying the DCO application, baseline noise surveys were undertaken. This Baseline Report presents the results of the baseline sound surveys that were conducted between Wednesday 10 November 2021 and Thursday 18 November 2021.

5.1.2 All monitoring, and subsequent data processing, analysis and reporting was undertaken in accordance with the relevant British Standards and the agreed methodology.

5.1.3 Variation in local activity due to the influence of Covid-19, which could have given rise to changes in ambient sound levels, was investigated by comparison with sound level data acquired in 2019 and with strategic noise mapping data. The comparison indicated that there was minimal or no influence on ambient sound levels due to the influence of Covid-19, and the results of the monitoring are therefore valid for the purposes of the assessment.

5.1.4 The measured sound levels are considered to be typical of the locations where the data were acquired, which tended to either be dominated by road noise or industrial/ commercial noise. Some other noise sources were noted (local activity, animal sounds, wind in trees, etc), however these did not confound the measurements, and any unrepresentative events/ data have been removed from the datasets (periods with wind gusts >5 ms^{-1}, noisy aircraft manoeuvres, etc).

5.1.5 Based on the above, the measured sound levels are considered representative of NSRs in proximity to each measurement location, and the representative sound levels to be used in the EIA are provided in **Section 4.4**.

6. References

Association of Noise Consultants and the Institute of Acoustics (2020), Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments. ANC & IOA.

British Standards Institution (2019), BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound. BSI

British Standards Institution (2003), BS 7445-1:2003 Description and measurement of environmental noise – Guide to quantities and procedures. BSI

British Standards Institution (2013), BS EN 61672-1:2013 Electroacoustics. Sound level meters – Specifications. BSI

British Standards Institution (2018), BS EN IEC 60942:2018 Electroacoustics. Sound calibrators. BSI

British Standards Institution (2014), BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise. BSI

HMSO (2006), Statutory Instrument no. 2238, Environmental Noise (England) Regulations, 2006 (as amended). HMSO

Annex A
Statements of competence

Statements of competence for all personnel contributing to this report

Giles Hine

Giles is a Principal Consultant in Wood's Noise and Vibration Team with over 19 years' experience. Giles is a full corporate member of the Institute of Acoustics (MIOA).

He specialises in undertaking noise and vibration assessments, both as standalone projects and as part of larger projects such as EIA. As well as consultancy Giles has also worked as a pollution control officer for local authority (Fenland District Council).

His main areas of expertise include environmental impact assessments and assessments to support planning applications for a range of projects including energy, road and rail schemes, residential, commercial, schools, hospitals, and industrial applications. Giles' experience covers all of the process including consultations with planning authorities and other governing bodies; baseline noise and vibration monitoring and analysis; noise modelling and EIA reporting; he has also made representations at large scale public consultations. He has appeared as an expert for planning committees and hearings on behalf of both local authority and private sector clients.

Giles was responsible for reviewing the SMP, baseline data processing and baseline monitoring report.

Patrick Hoyle

Patrick is a Senior Consultant in Wood's Noise and Vibration Team with over 10 years' experience. Patrick is a full corporate member of the Institute of Acoustics (MIOA).

He has extensive experience in the hands-on aspects of acoustics including noise measurement, assessment; data processing, analysis and interpretation, predictive modelling for industrial, commercial, residential and transport schemes and technical authoring to support planning applications and to demonstrate compliance. He has experience in building acoustics and the prediction, measurement and assessment of vibration.

He has delivered stand-alone noise assessments, and inputs to EIA's, for numerous renewable and decentralised energy schemes across the UK including energy from waste, solar, gas fired peaking plant, and energy storage facilities.

Patrick was responsible for authoring the SMP, carrying out the acoustic monitoring, assisting with the data processing and analysis, and assisting with the preparation of the baseline monitoring report.

Josh Wilson

Josh is a Senior Consultant in Wood's Noise and Vibration Team with over 6 years' experience. Josh is a full corporate member of the Institute of Acoustics (MIOA).

Josh's experience is primarily focussed on environmental acoustics disciplines. He is notably experienced in industrial and commercial, energy and underwater acoustics projects, and has taken key roles in research projects that have informed guidance

documents for offshore industries. He has delivered numerous assessments to accompany planning applications and to discharge conditions.

Josh has extensive experience in undertaking noise and vibration measurements, noise impact assessments, data processing, data analysis, predictive noise modelling for projects in various sectors, and carrying out technical authoring.

Josh was responsible for carrying out the acoustic monitoring.

Jack Rostron

Jack is a Consultant in Wood's Noise and Vibration Team with over 5 years' experience. Jack is an Associate member of the Institute of Acoustics (AMIOA).

Jack's areas of expertise include environmental assessments of noise and vibration impacts, to inform planning applications and for the discharge of planning conditions. Jack's experience encompasses projects in the industrial, commercial, residential, educational and medical sectors. Jack specialises in building and architectural acoustics, including internal design to meet reverberation time criteria and building fabric design to address external noise break in.

He is experienced in noise propagation modelling and acoustic monitoring, including the provision of training in acoustic monitoring protocols to ensure best practice for undertaking accurate sound level measurements.

Jack was responsible for carrying out the acoustic monitoring, and assisting with the data analysis and reporting.

Heather Robinson

Heather is a Consultant in Wood's Noise and Vibration Team with over 3 years' experience. Heather is a full corporate member of the Institute of Acoustics (MIOA).

Her experience covers a variety of assessments, including residential, commercial, industrial and transport sectors, undertaken as stand-alone projects as well as larger scale Environmental Impact Assessments.

Heather has provided key input on a number of Nationally Significant Infrastructure Projects (NSIPs), undertaking and leading surveys, data analysis, modelling and reporting where required. This has involved contributing to several PEIR and ES chapters, as well as stand-alone reports. Heather is experienced with a number of different noise modelling software packages such as Lima, Predictor-Lima, CadnaA, SoundPLAN and Odeon.

Heather was responsible for assisting with and reviewing the data processing and analysis, and preparing the baseline monitoring report.

Zachary Simcox

Zachary is a Consultant in Wood's Noise and Vibration Team with over 4 years' experience. Zachary is an Associate member of the Institute of Acoustics (AMIOA).

Zachary specialises in noise impact assessments for industrial and commercial sites. He is competent in undertaking noise and vibration assessments, both as standalone projects and as part of larger projects such as EIA.

His main areas of expertise include environmental impact assessments and assessments to support planning applications for a range of projects including energy, road and rail schemes, residential, commercial, schools, hospitals, and industrial applications. Zachary's experience covers all of the process including consultations with planning authorities; baseline noise and vibration monitoring and analysis; noise modelling and EIA reporting.

Zachary was responsible for carrying out the acoustic monitoring.

Annex B
Survey and monitoring plan

Technical note: Medworth EfW Noise Survey and Monitoring Plan

1. Introduction

1.1 Background

1.1.1 Medworth CHP Limited (the 'Applicant') intends to make an application to the Secretary of State for a Development Consent Order (DCO) for an Energy from Waste (EfW) Combined Heat and Power (CHP) Facility (the 'Proposed Development') on the industrial estate, Algores Way, Wisbech (hereafter referred to as 'the Main Development Site').

1.1.2 The Applicant is part of the MVV Energie group of companies, providing sustainable and efficient solutions for waste-fired energy generation to publicly and privately-owned waste disposal companies as well as to Local Authorities. Every year in the UK MVV Energie group's EfW sites convert 527,000 tonnes of residual waste to electricity and heat.

1.1.3 The Proposed Development will recover useful energy in the form of electricity and steam from over half a million tonnes of non-recyclable (residual) Municipal and Commercial and Industrial waste each year. Generating over 50 megawatts, the renewable electricity will be first supplied to private wire customers, with the remainder exported to the grid. The EfW CHP Facility will also have the capability to export steam to users on the surrounding industrial estate.

1.1.4 The Proposed Development is a Nationally Significant Infrastructure Project (NSIP) under Part 3 Section 15 of the Planning Act 2008 (hereafter referred to as the '2008 Act')[1] by virtue of the fact that the generating station is located in England and has a generating capacity of over 50 megawatts. It therefore requires an application to be submitted for a DCO.

1.2 Purpose of the document

1.2.1 The purpose of this Survey and Monitoring Plan (SMP) is to present the relevant baseline characterisation for agreement with the host authorities. Such details include the methods to be employed and the spatial and temporal requirements for surveys/ monitoring to be undertaken for the Proposed Development for the assessment of noise and vibration.

[1] Planning Act 2008. Available online at: http://www.legislation.gov.uk/ukpga/2008/29/contents [Accessed 17 April 2020].

1.2.2 The preliminary purpose of these surveys are to determine robust and accurate baseline data to inform the Environmental Statement (ES) in support of the DCO application.

1.2.3 The SMP takes account of the comments received in the Secretary of State's EIA Scoping Opinion (January 2020)[2], and the teleconference held with the Applicant and the Environmental Health representatives from Cambridgeshire County Council, Fenland District Council and Kings Lynn and West Norfolk District Council on 2 April 2020. Norfolk County Council were also invited to the teleconference and provided with a copy of the minutes.

1.2.4 This version of the SMP takes into account amendments and refinements to a number of survey locations, discussed under paragraph 2.1.5, and sets out new proposals for the approach to be taken in the event that baseline surveys cannot be undertaken prior to the preparation and submission of the PEIR and ES, due to the influence of Covid-19.

1.2.5 This document has been prepared by appropriately qualified personnel. 'Appendix A – Statements of Competence' presents statements of competence for members of the team who have contributed to this SMP.

1.3 Consultation

1.3.1 This revision of the SMP has been amended to also take account of comments received on the draft versions from Fenland District Council (FDC) and the Borough Council of Kings Lynn and West Norfolk (KLWN).

1.3.2 FDC agreed that baseline vibration monitoring will not be required, and stated that 'Details of expected vibration levels, monitoring and mitigation should be provided where construction or operating techniques are proposed that are likely to give rise to levels that impact on nearby receptors in line BS 5228 – 1:2009 Part 2: Vibration.'. This accords with comments in the Scoping Opinion which indicate that assessment of likely worst case vibration emissions should be undertaken, and consideration provided of how any significant vibration effects will be mitigated, if any are identified.

1.3.3 KLWN requested confirmation of the methodologies and standards that will be used when presenting measurement data. This has been addressed in the final section of the SMP, under paragraph 2.3.2.

Background vibration monitoring – scoped out

1.3.1 Vibration effects are usually assessed against a fixed limit at a receptor location, irrespective of existing background vibration levels. The measurement of background vibration levels is therefore not normally carried out unless a significant source of vibration has been identified during a pre-monitoring site walkover or as a result of engagement. Therefore, it is not proposed to undertake background

[2] The Planning Inspectorate (on behalf of the Secretary of State, Scoping Opinion: Proposed Medworth Energy from Waste Combined Heat and Power Facility, January 2020. Available online at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010110/EN010110-000010-MEFW%20-%20Scoping%20Opinion.pdf [Accessed 30 April 2020].

vibration monitoring as part of the assessment of the Proposed Development. This does not preclude the need to measure vibration during the construction phase to ensure acceptable levels are maintained.

2. Survey Proposals

2.1 Construction and Operational Noise Surveys

Survey area

2.1.1 The baseline noise survey areas are defined by the proximity of the nearest noise sensitive receptors to the Main Development Site, CHP route, Grid Connection Corridor (GCC), temporary construction compound. The locations have been determined by the author and approver, whose competencies are detailed in Appendix A – Statement of competence, additionally the approver has significant knowledge of the local area having worked as an Environmental Protection Officer for Fenland District Council between 2002 and 2007. The initial search area for determining the baseline survey locations was approximated as a circle of 1km radius, centred on the centroid of the location of the Main Development Site, plus those receptors nearest the CHP connection and GCC.

2.1.2 With regard to the GCC, The SMP initially considered two cable route options for the connection of the EfW CHP Facility to the National Grid. Both cable route options included a common section, and then the route options split into a northbound route and an eastbound route, as shown in **Figure 2.** These options are described in more detail below, under the heading 'The Grid Connection'. Subsequent to the meeting with host authorities where both routes were presented, the Eastbound Route shall not be taken forward as one of the preferred options.

2.1.3 There are now two grid connection options to connect to one of two substations within the northbound route. Option 1 is connection at the substation at Walpole, approximately 400 m north of survey location ST10. Option 2 is connection at the substation at Walsoken, approximately 250 m west of survey location ST11. Survey locations are shown in **Figure 3**. Discussions are ongoing with UK Power Networks (UKPN) over the technical feasibility of the two options. Once discussions are concluded; should this identify Walsoken as the connection point (Option 2), then those monitoring locations north of survey location ST11 (survey locations ST7, ST8, ST9 and ST10 and associated backup locations) would no longer be necessary and would, therefore, be dropped from the noise survey.

Proposed noise surveys

2.1.4 Ambient and background noise measurements are required to inform the assessment of potential noise effects on human and ecological receptors caused by the construction and operation of the Proposed Development. The results of the ambient noise monitoring will be used to facilitate the assessment of potential construction noise emissions from the various elements of the construction

programme. The results of the background noise monitoring will be used to facilitate the assessment of commercial/industrial noise emissions.

2.1.5 A number of refinements to the proposed survey locations have been made as follows:

- Survey locations have been reviewed and identified as either being publicly accessible or requiring access arrangements with landowners.
- Proposed Long Term (LT) survey locations have been refined from areas to specific locations.
- Backup/ alternative locations have been identified for a number of monitoring locations, to be used in the event that there are problems making access arrangements with landowners.
- The location of Short Term (ST) monitoring location 4 has been modified to be representative of the Cambian Wisbech School on Anglia Way.
- The location of ST7 has been modified to be better representative of receptors nearest to the construction of the cable route.
- An additional survey location (ST8) has been added to be representative of residential receptors near to the proposed temporary Grid Connection Construction Compound.
- An additional survey location (ST-LT1) has been added as a potential survey location to gather data to validate and, if necessary, correct measurement data acquired at LT1b or LT1c, to be representative of receptors at LT1 and LT1a.

2.1.6 **Table 2.1:** Monitoring locations presents the proposed monitoring locations and back up locations (where applicable).

Table 2.1: Monitoring locations

ID	Long/ Short Term Monitoring	Address	Monitoring Location	Alternative Monitoring Site Address	Alternative Monitoring Location
LT1*	Long Term	10 New Bridge Lane, Wisbech, PE14 0SE	Southern Boundary	9 New Bridge Lane, Wisbech, PE14 0SE	North Eastern Boundary
LT2	Long Term	Potty Plants, New Bridge Lane, Wisbech, PE14 0SE	West of the main property within the garden	N/A	Publicly accessible land approx. 65 m East of Potty Plants
LT3	Long Term	93 South Brink, Wisbech, PE14 0RJ	Eastern Boundary	Residential receptor opposite 25 Cromwell Road	Southern Boundary

ID	Long/ Short Term Monitoring	Address	Monitoring Location	Alternative Monitoring Site Address	Alternative Monitoring Location
ST-LT1	Short Term	Approx. 70 m southeast of 9 New Bridge Lane	New Bridge Lane	N/A	N/A
ST1	Short Term	New Drove (Ln) Wisbech	Approx. 300 m north east of junction of New Bridge Lane & New Drove	New Drove (Ln) Wisbech	Approx. 500 m north east of junction of New Bridge Lane & New Drove
ST2	Short Term	Victory Road, Wisbech	Northern turning circle	N/A	N/A
ST3	Short Term	Weasenham Ln, Wisbech	Junction of Algores Way & Weasenham Ln	N/A	N/A
ST4	Short Term	Anglia Way, Wisbech	80 m south east of Algores Way	N/A	N/A
ST5	Short Term	Elme Hall Hotel, Elm High Rd, Wisbech	Near southern boundary of the car park	Morrisons, Elm High Rd	South Eastern Corner of Car Park
ST6	Short Term	Meadowgate Ln, Wisbech	Lay-by 60 m south of the A47	N/A	N/A
ST7	Short Term	Near northern boundary of Black Duck Farm, Fengate Road, Wisbech	Approx. 160 m north west of junction of Fengate Rd and Meer Dyke Ln.	Property south of Black Duck Farm, Biggs Road, Wisbech	East of farm buildings 75 m South of Fengate Rd
ST8	Short Term	Lynn Road, Wisbech	Agricultural land representative of Rosalie Farm, Colonial Cottage, and Willow Field Grange	Colonial Cottage, Wheatley Bank, Wisbech	Approx. 15 m east of the main property
ST9	Short Term	198 Salts Road, Wisbech	Northern Boundary	Salts Road, Wisbech	Private property, approx. 10 m north of the intersection of Dixon's Drove & Salts Rd

ID	Long/ Short Term Monitoring	Address	Monitoring Location	Alternative Monitoring Site Address	Alternative Monitoring Location
ST10	Short Term	Rose Hall Farms, Walpole Bank, Wisbech PE14 7JD	Northern Boundary of the yard	Wisbech Rd, Wisbech	Castoffs, on land opposite Bank House, approx. 15 m south of Wisbech Rd
ST11	Short Term	Broadend Road, Wisbech	Approx. 30 m north east of 56 Broadend Rd and 60 m west of A47	N/A	N/A

N/A: access to the original location has been granted/ is publicly accessible
* - Additional backup/ alternative monitoring locations for LT1 (LT1a, LT1b and LT1c) are described below under the heading 'The Main Development Site', and are shown in Figure 1.

Survey methods

2.1.7 Noise measurements will be undertaken at locations as agreed in advance in writing with the relevant Local Authorities, in order to determine the existing baseline ambient and background noise levels at these properties.

2.1.8 The ambient and background noise measurements undertaken in support of the construction and operational noise assessments will include measurements of the existing noise environment, in addition to gathering details of any dominant contributors to the noise climate. Noise levels from existing contributors to the noise environment will be measured in order that they can be quantified in the final assessment. Standalone weather stations will be installed at a representative sample of the locations for noise data collection over the survey period(s). This information would be used to filter out data collected during adverse weather conditions and thus ensure a robust dataset for assessments.

2.1.9 Surveys will be undertaken when conditions are considered most typical, i.e. outside of school holidays and when impacts from restrictions due to Covid-19 have diminished and are no longer a significant influence upon baseline conditions.

2.1.10 In the event that baseline conditions are not suitably representative for the baseline surveys to take place, it may be necessary to prepare the PEIR and ES without the baseline data that would have been acquired during the proposed surveying. The approach to the assessment in this case is set out in Section 2.4.

The Main Development Site

2.1.11 Noise monitoring locations have been selected to be representative of those properties likely to be worst affected by impacts from the construction and operation of the Proposed Development. The noise monitoring locations have been identified using aerial imagery and OS mapping. The proposed monitoring locations are listed below, and included as **Figure 1**:

- A residential receptor at 10 New Bridge Lane (LT1);
  - Backup/ alternative location at 9 New Bridge Lane (LT1a);

- Backup/ alternative location at the builder's merchant site immediately north east of 9 New Bridge Lane (LT1b);
- Backup/ alternative location on the southern tip of the proposed EfW CHP Facility site, approximately 40 m east south east of 9 New Bridge Lane (LT1c);
- If backup locations LT1b or LT1c are used, then long term monitoring data would be supplemented with short term measurements at location ST-LT1 on New Bridge Lane approximately equidistant between LT1 and LT1a. Short term measurement data would be used to validate daytime measurement data acquired at the long term monitoring location. Potentially, and if found to be necessary, a comparison of short term and long term measurement data may be used to determine an appropriate correction to be applied to the daytime long term measurement data from LT1c to be better representative of dwellings at 9 and 10 New Bridge Lane;

- A residential receptor close to the A47 known as 'Potty Plants' (LT2);
  - Backup location on publicly accessible land approximately 65 m east of Potty Plants (LT2 Backup/ Alternative);
- A residential receptor to the west of the Site at 93 South Brink (LT3);
  - Backup location at residential receptor opposite Smith's Farm Shop at 25 Cromwell Road (LT3 Backup/ Alternative);
- A residential receptor to the south east of the Site, at New Drove (ST1);
- A residential receptor close to the proposed CHP connection (ST2);
- The educational facility TBAP Unity Academy (ST3); and
- Cambian Wisbech School, Anglia Way (ST4).

2.1.12 The specific locations listed here may be refined based upon findings of the site walkover and visits to the area in the vicinity of the monitoring locations - as agreed on a site by site basis with the relevant host authorities.

2.1.13 Some specific properties are named in the scoping opinion where monitoring might not be necessary - if ambient / background levels are able to be reliably determined using monitoring data gathered from alternative locations nearby. The exclusion of such properties and use of alternative monitoring data will again be agreed on a site by site basis with the relevant host authorities.

2.1.14 The Eye Clinic was identified in the scoping opinion as a receptor which should be treated as highly sensitive to potential noise and vibration impacts. Whilst it is agreed that the Eye Clinic is highly sensitive to noise and vibration impacts, it is considered most unlikely that any significant adverse effects would occur at this location. This is on the basis that the Eye Clinic is approximately 400 m from the nearest point of the Main Development Site boundary and would therefore be most unlikely to experience significant levels of emissions from the Proposed Development during construction or operation. It is also considered most unlikely that increases in traffic movements, or works associated with the highway improvements potentially located approximately 170 m away from the Eye Clinic, at

the nearest point, would yield any significant impacts. With regard to noise, whilst it is considered that noise impacts at this location are most unlikely, potential noise impacts will be assessed using baseline data from LT3, which is considered to be representative of the Eye Clinic.

2.1.15 With regard to potential vibration impacts, it is likely that construction vibration monitoring may be located here, during the construction phase, subject to the assessment of predicted construction vibration impacts.

2.1.16 The assessment of potential impacts at the Eye Clinic will focus on absolute levels of noise and vibration, and as such, the acquisition of baseline data at this receptor is not essential for the assessment.

The Grid Connection

2.1.17 The SMP began by considering two options for the connection of the EfW CHP Facility to the National Grid: a 132kV connection or a 400kV connection. Starting at the Main Development Site, **Figure 2** shows that both options shared a common GCC running east of Wisbech. The corridor then split; the 132kV route continuing north to Walpole St. Peter **(Northbound route)**, and the 400kV connection continuing east to meet an existing 400 kV line beyond Emneth Hungate **(Eastbound route)**. Subsequent to the meeting with host authorities where both routes were presented, the Eastbound Route shall not be taken forward as one of the preferred options. Proposed monitoring locations for construction activity on the Northbound Route are as follows and can be seen in **Figure 3**:

- Elme Hall Hotel (ST5);
  - Backup location, approximately 100 m north of ST5, in supermarket car park, representative of Elme Hall Hotel (ST5 Backup/ Alternative);
- Location along Meadowgate Lane (ST6);
- Location near to the boundary of Black Duck Farm on Fengate Road (ST7);
  - Backup location, south west of farm buildings south of Black Duck Farm, Biggs Road, Wisbech (ST7 Backup/ Alternative);
- Location representative of residences at Rosalie Farm, Colonial Cottage and Willow Field Grange, which are near to the proposed temporary Grid Connection Construction Compound (ST8);
  - Backup location at Colonial Cottage (ST8 Backup/ Alternative);
- A residential receptor at 178 Salts Road, within the vicinity of the junction with Dixon's Drove (ST9); and
  - Backup location near residences, approximately 10 m north of the intersection of Dixon's Drove & Salts Rd (ST9 Backup/ Alternative);
- Location to the rear of Rose Hall Farm on Walpole Bank, approximately 400 m south west of the road entrance to the existing substation (ST10).
  - Backup location at Castoffs, on land opposite Bank House, approximately 15 m south of Wisbech Rd (ST10 Backup/ Alternative).

2.1.18 The proposed monitoring locations for the grid connection may be revised following refinements to the GCC, such as the definition of a route within the corridor.

2.2 Data Collection Methodology

2.2.1 Noise measurements will be undertaken on site by suitably qualified personnel. Suitably qualified shall mean the personnel undertaking measurements will be, as a minimum, an Associate Member of the Institute of Acoustics (AMIOA). Subsequent analysis of data and associated reporting shall be overseen and subject to peer review by a person who is a full corporate Member of Institute of Acoustics (MIOA), having demonstrated appropriate qualifications and experience to attain this level of membership.

2.2.2 Noise levels will be measured using an integrating averaging sound level meter (SLM) or equivalent system conforming to Class 1 or better as defined by BS EN 61672-1:2013 *Electroacoustics – Sound level meters – Part 1: Specifications*[3] to the microphone to check the sensitivity of the measuring equipment. Any drift in calibration levels will be noted.

2.2.3 For all noise surveys, the equipment would also have undergone laboratory calibration within a period not exceeding two years prior to use. Equipment to measure local wind speeds (for example a handheld anemometer) and air temperature would also be deployed on the day of each survey. Noise measurements will be undertaken in accordance with the relevant British Standards (including BS 4142:2014+A1:2019 *Methods of rating and assessing industrial and commercial sound*[4], BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*[5], and BS 7445 – *Description and Measurement of Environmental Noise*[5,6]).

2.2.4 Meteorological logging stations will be installed over the survey period at locations representative of the long-term monitoring sites which will log wind speed, wind direction and precipitation. This information will be used in the analysis of the noise data to ensure that only data collected under appropriate and representative weather conditions is included in any assessment

2.2.5 The proposed long-term unattended baseline monitoring, to be used within the construction and operational noise assessments, will be undertaken continuously for not less than 5 days (including a weekend), at relevant locations as agreed in advance in writing with the host Authorities.

2.2.6 Noise measurements at the proposed short-term measurement locations will consist of sample measurements, concurrent with long-term monitors. Where appropriate, a correction will be derived and applied based on comparison of results of long-term

[3] British Standards Institution. BS 61672-1:2013 Electroacoustics – Sound level meters – Part 1: Specifications. London, BSI, 2013.
[4] British Standards Institution. BS 4142:2014 + A1:2019 Methods for rating and assessing industrial and commercial sound. BSI, 2019.
[5] British Standards Institution. BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Basic quantities and procedures. BSI, 2003.
[6] British Standards Institution. BS 7445-2:1991 Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use. BSI, 1991.

monitoring to correct the results from long-term dataset to be representative of these locations. This will involve daytime and night-time sample measurements.

2.3 Data Presentation

2.3.1 The reporting of all data will be undertaken in accordance with the relevant technical guidance as identified throughout this document. The survey notes will include, as a minimum, the following information:

- The results of all noise measurements;
- Details of the instrumentation used, including calibration details;
- Details of any corrections made to the noise measurements;
- The type, frequency and duration of any events paused from the measurements;
- Details of extraneous noise events affecting the results; and
- Details of the meteorological conditions prevailing during the surveys.

2.3.2 The survey data acquired will be analysed to determine representative baseline sound levels to inform the assessments. Baseline sound levels will be determined and reported in accordance with the relevant standards, as follows:

- Baseline sound levels used for assessing construction noise impacts will be determined and reported in accordance with BS 5228-1:2009+A1:2014; and
- Baseline sound levels used for assessing operational noise impacts will be determined and reported in accordance with BS 4142:2014+A1:2019.

2.4 Approach to the Assessment without Baseline Surveys

2.4.1 The project schedule currently targets late autumn 2021 for submission of the DCO. As such, there is the possibility that national and/ or local lockdowns to control the spread of Covid-19 may result in conditions which are unrepresentative. In such a case, it would not be possible to gather representative baseline data.

2.4.2 In this case, the following approach is suggested:

- Assumed baseline sound levels will be used for the majority of receptor locations where no baseline data has been acquired. Baseline sound levels would be assumed to be low, to yield a conservative assessment. Where appropriate, predictive modelling would be used to inform the determination of assumed baseline sound levels. Assumed baseline sound levels would be agreed in writing with the host Authorities in advance.
- Some baseline sound level data was acquired outside of the EIA process in November 2019 at locations LT1, LT2 and ST1. The surveying was undertaken in accordance with the requirements of BS 4142:2014+A1:2019[4] and BS 7445-1:2003 *Description and measurement of environmental noise – Part 1: Basic quantities and procedures*[6] and consisted of attended short term

measurements during daytime, evening and night-time. This baseline data would be used for assessments required for those receptors closest to the Main Development Site at locations LT1, LT2 and ST1.

2.4.3 Following the approach set out above, every effort would be made to robustly determine the likelihood of significant adverse effects to ensure that there is sufficient detail in the assessments to appropriately inform the decision-making process.

2.4.4 In any case, potential construction noise and vibration effects would be controlled via DCO requirement (condition). Therefore, the need for acquisition of appropriate baseline data to inform the assessment and subsequent control of any adverse construction effects can be set out in such a requirement.

2.4.5 Similarly, potential operational noise and vibration effects would be controlled in accordance with the requirements of the Environmental Permitting Regulations[7].

Issued by	Approved by
.....	.....
Patrick Hoyle	Giles Hine

[7] Environmental Permitting Regulations 2016 (as amended), 2016. [Online]. Available: http://www.legislation.gov.uk/uksi/2016/1154/contents/made . [Accessed 7 January 2021].

Appendix A – Statements of Competence

Giles Hine

Giles is a Principal Consultant in Wood's Noise and Vibration Team with over 17 years' experience. Giles is a full corporate member of the Institute of Acoustics (MIOA).

He specialises in undertaking noise and vibration assessments, both as standalone projects and as part of larger projects such as EIA. As well as consultancy Giles has also worked as a pollution control officer for local authority.

His main areas of expertise include environmental impact assessments and assessments to support planning applications for a range of projects including energy, road and rail schemes, residential, commercial, schools, hospitals, and industrial applications. Giles' experience covers all of the process including consultations with planning authorities and other governing bodies; baseline noise and vibration monitoring and analysis; noise modelling and EIA reporting; he has also made representations at large scale public consultations. He has appeared as an expert for planning committees and hearings on behalf of both local authority and private sector clients.

Giles was responsible for reviewing and approving the SMP.

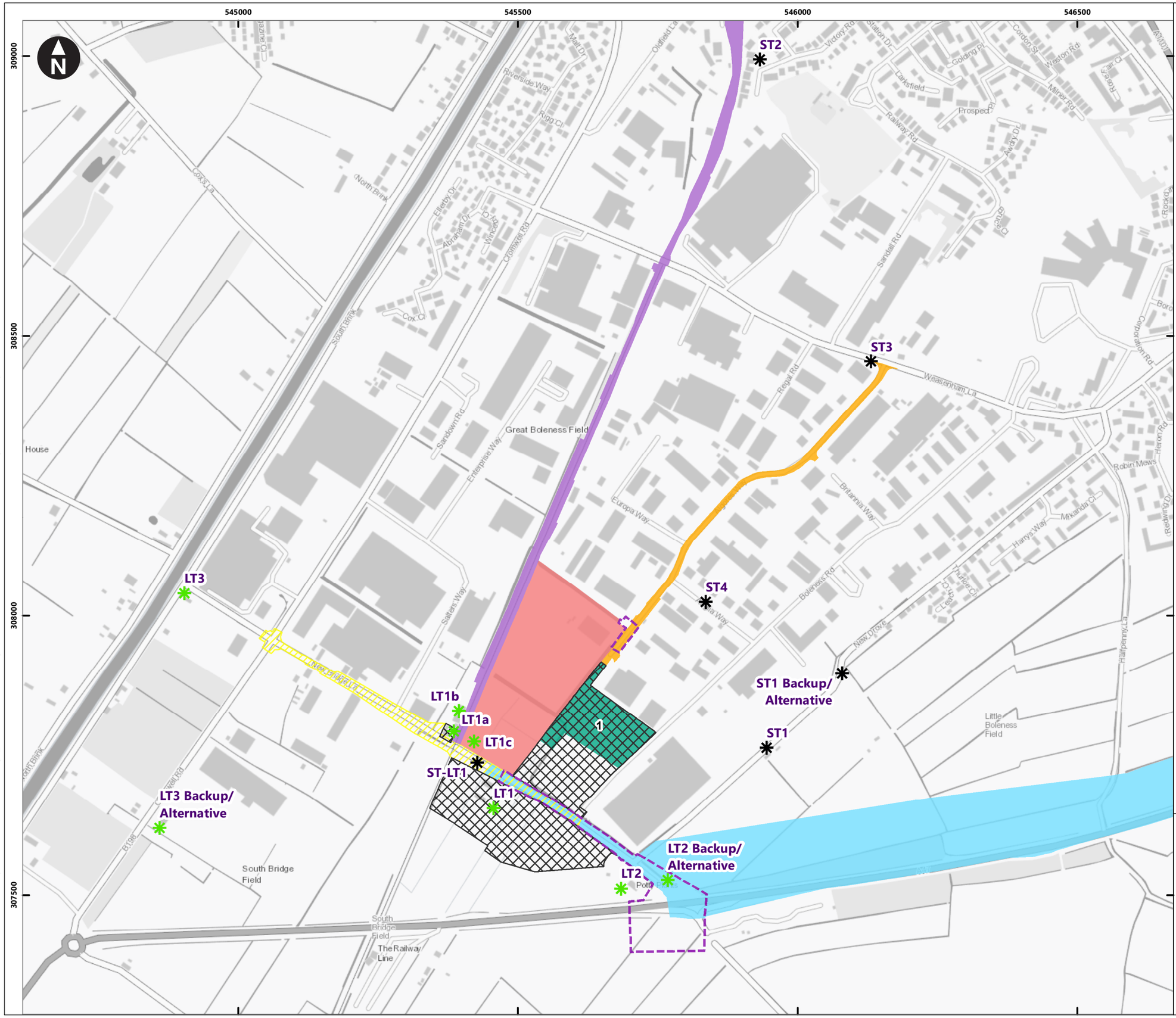
Patrick Hoyle

Patrick is a Senior Consultant in Wood's Noise and Vibration Team with over 10 years' experience. Patrick is a full corporate member of the Institute of Acoustics (MIOA).

He has extensive experience in the hands-on aspects of acoustics including noise measurement, assessment; data processing, analysis and interpretation, predictive modelling for industrial, commercial, residential and transport schemes and technical authoring to support planning applications and to demonstrate compliance. He has experience in building acoustics and the prediction, measurement and assessment of vibration.

He has delivered stand-alone noise assessments, and inputs to EIA's, for numerous renewable and decentralised energy schemes across the UK including energy from waste, solar, gas fired peaking plant, and energy storage facilities.

Patrick was responsible for authoring the SMP.



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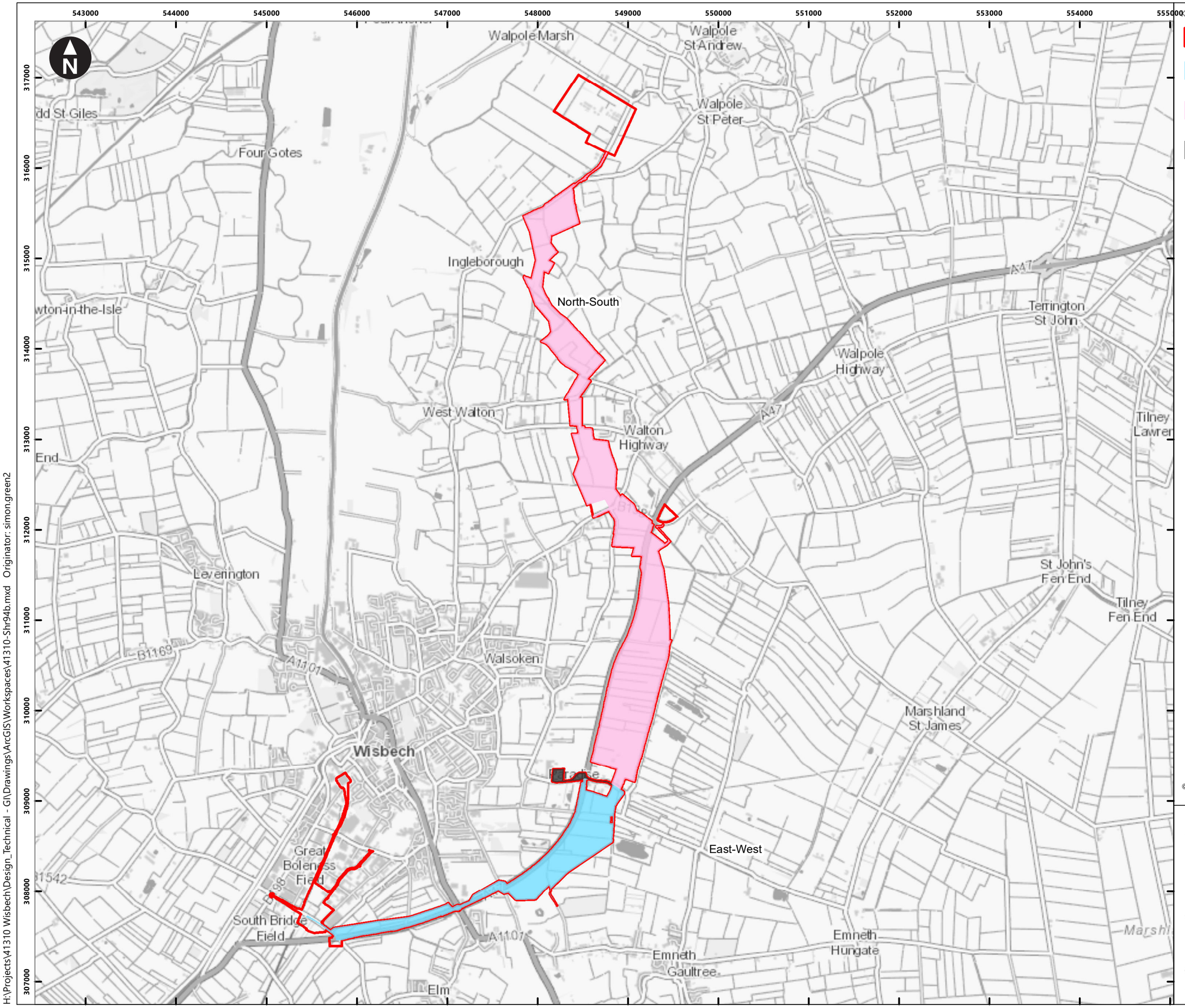
Medworth Energy from Waste Combined Heat and Power Facility
Noise Survey and Monitoring Plan

Figure 1
Monitoring location areas around the Site

December 2021

41310-Shr77e



Key

- Redline boundary
- Common Grid Connection (Options 1 and 2)
- Walpole Grid Connection (Option 1)
- Walsoken Grid Connection (Option 2)

0 500 1,000 1,500 2,000 m

Scale at A3: 1:40,000

Medworth Energy from Waste Combined Heat and Power Facility
Noise Survey and Monitoring Plan

Figure 2
Location of the Site and Grid Connection Corridor (GCC) options

October 2021

wood.

41310-Shr94b

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545000

550000

315000

310000

N

Walpole Substation

ST10 (Backup/ Alternative)

ST10

ST9 (Backup/ Alternative)

ST9

ST8

ST8 (Backup/ Alternative)

ST7

ST7 (Backup/ Alternative)

Walsoken Substation

ST11

ST5 (Backup/Alternative)

ST5

ST6

Key

- Redline boundary
- Monitoring location requiring access arrangements (locations to be dropped if connection to Walsoken Substation confirmed)
- Monitoring location requiring access arrangements
- Monitoring location which is publicly accessible
- Potential substations for grid connection
- LTx — Long term monitoring location
- STx — Short term monitoring location

0 500 1,000 1,500 2,000 m

Scale at A3: 1:40,000

Medworth Energy from Waste Combined Heat and Power Facility
Noise Survey and Monitoring Plan

Figure 3
ST monitoring locations for proposed grid connection

September 2021

wood.

41310-Shr78e

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Annex C
Noise Monitoring Locations and Noise Sensitive Receptor Locations

Key

- Order limits
- EfW CHP Facility Site
- Access Improvements
- Water Connection
- Noise sensitive receptor
- Long term monitoring location
- Short term monitoring location

0 100 200 300 m

Scale at A3: 1:5,000

Client

Medworth CHP Limited
Medworth Energy from Waste Combined Heat and Power Facility DCO
Environmental Statement
Appendix 7A Annex C– Baseline Noise Monitoring Report

Figure C1
Baseline Noise Monitoring Locations & Noise Sensitive Receptor Locations: EfW CHP Facility, Access Improvements and Water Connection

June 2022

wood.

41310-Shr307

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545600 545700 545800 545900 546000 546100 546200

309300 309200 309100 309000 308900 308800

N

R33 R32 R31 R36 R37 R34 R35 ST2 R39 R38 R13

Hillburn Rd Queens Rd King's Rd Burdett Rd Station Dr Great Eastern Rd Victory Rd Oldfield La Malt Dr Larksfield

Key

- Order limits
- CHP Connection
- Noise sensitive receptor
- Short term monitoring location

0 20 40 60 80 100 120 m

Scale at A3: 1:2,000

Client

Medworth CHP Limited
Medworth Energy from Waste Combined Heat and Power Facility DCO
Environmental Statement
Appendix 7A Annex C– Baseline Noise Monitoring Report

Figure C2
Baseline Noise Monitoring Locations & Noise Sensitive Receptor Locations: CHP Connection

June 2022

wood.

41310-Shr308

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Key

- Order limits
- Grid Connection
- A47 Traffic Management Area
- Noise sensitive receptors
- Short term monitoring location

0 50 100 150 200 m

Scale at A3: 1:4,000

Client

Medworth CHP Limited
Medworth Energy from Waste Combined Heat and Power Facility DCO
Environmental Statement
Appendix 7A Annex C– Baseline Noise Monitoring Report

Figure C3
Baseline Noise Monitoring Locations & Noise Sensitive Receptor Locations: Cable Route

June 2022

wood.

41310-Shr309

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548100 548200 548300 548400 548500 548600 548700

309400 309300 309200 309100 309000

N

Broad End Rd

Paradise

ST11

R44

R45

A47

Key

- Order limits
- Grid Connection
- Walsoken Substation
- A47 Traffic Management Area
- Noise sensitive receptor
- Short term monitoring location

0 20 40 60 80 100 120 m

Scale at A3: 1:2,000

Client

Medworth CHP Limited
Medworth Energy from Waste Combined Heat and Power Facility DCO
Environmental Statement
Appendix 7A Annex C– Baseline Noise Monitoring Report

Figure C4
Baseline Noise Monitoring Locations & Noise Sensitive Receptor Locations: Substation Connection

March 2022

wood.

41310-Shr310

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Annex D
Sound level meter details

Summary of Instrumentation Calibration

Table D.1 NL52 – Kit 28 calibration details

Manufacturer	Instrument	Type	Serial Number	Calibration Date
Rion	Sound Level Meter	NL – 52	00331828	29/03/2021
Rion	Pre Amplifier	NH – 25	21779	29/03/2021
Rion	Microphone	UC – 59	04895	29/03/2021

Table D.2 NL52 – Kit 29 calibration details

Manufacturer	Instrument	Type	Serial Number	Calibration Date
Rion	Sound Level Meter	NL – 52	00331829	29/03/2021
Rion	Pre Amplifier	NH – 25	21780	29/03/2021
Rion	Microphone	UC – 59	04896	29/03/2021

Table D.3 NL52 – Kit 32 calibration details

Manufacturer	Instrument	Type	Serial Number	Calibration Date
Rion	Sound Level Meter	NL – 52	1143532	29/03/2021
Rion	Pre Amplifier	NH – 25	43549	29/03/2021
Rion	Microphone	UC – 59	7392	29/03/2021

Table D.4 NL52 – Kit 33 calibration details

Manufacturer	Instrument	Type	Serial Number	Calibration Date
Rion	Sound Level Meter	NL – 52	1143533	29/03/2021
Rion	Pre Amplifier	NH – 25	43550	29/03/2021
Rion	Microphone	UC – 59	7393	29/03/2021

Table D.5 NL52 – Kit 35 calibration details

Manufacturer	Instrument	Type	Serial Number	Calibration Date
Rion	Sound Level Meter	NL – 52	1143535	30/03/2021
Rion	Pre Amplifier	NH – 25	43552	30/03/2021
Rion	Microphone	UC – 59	7396	30/03/2021

Table D.6 NL52 – Kit 94 calibration details

Manufacturer	Instrument	Type	Serial Number	Calibration Date
Rion	Sound Level Meter	NL – 52	01121394	29/03/2021
Rion	Pre Amplifier	NH – 25	21438	29/03/2021
Rion	Microphone	UC – 59	10448	29/03/2021

Table D.7 NL52 – Kit 95 calibration details

Manufacturer	Instrument	Type	Serial Number	Calibration Date
Rion	Sound Level Meter	NL – 52	01121395	29/03/2021
Rion	Pre Amplifier	NH – 25	21439	29/03/2021
Rion	Microphone	UC – 59	04412	29/03/2021

Table D.8 NC74 – C1 calibration details

Manufacturer	Instrument	Type	Serial Number	Calibration Date
Rion	Calibrator	NC – 74	34251550	26/03/2021

Table D.9 NC74 – C2 calibration details

Manufacturer	Instrument	Type	Serial Number	Calibration Date
Rion	Calibrator	NC – 74	34251551	29/03/2021

Table D.10 NC74 – C4 calibration details

Manufacturer	Instrument	Type	Serial Number	Calibration Date
Rion	Calibrator	NC – 74	34251553	27/05/2021

Table D.11 NC74 – C6 calibration details

Manufacturer	Instrument	Type	Serial Number	Calibration Date
Rion	Calibrator	NC – 74	34251556	26/03/2021

Calibration Certificates

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 30 March 2021

Certificate Number: UCRT21/1426

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 Signa [redacted]

K. Mistry

Customer
Wood Group UK Ltd
No 2 Booths Park
Chelford Road
Knutsford
WA16 8QZ

Order No. 26006559

Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	01143533
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	43550
Rion	Microphone	UC-59	07393
Rion	Calibrator	NC-74	34251551
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 26 March 2021 ANV Job No. UKAS21/03215

Date Calibrated 30 March 2021

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	18 December 2019	UCRT19/2371	0653

CERTIFICATE OF CALIBRATION

Certificate Number
UCRT21/1426

UKAS Accredited Calibration Laboratory No. 0653

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

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Customers Calibrator	
Calibrator adaptor type if applicable		NC-74-002	
Calibrator cal. date		29 March 2021	
Calibrator cert. number		UCRT21/1413	
Calibrator cal cert issued by		0653	
Calibrator SPL @ STP	94.04	dB	Calibration reference sound pressure level
Calibrator frequency	1004.01	Hz	Calibration check frequency
Reference level range	25 - 130	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End			
Temperature	24.21	24.22	±	0.30	°C
Humidity	40.5	40.5	±	3.00	%RH
Ambient Pressure	101.79	101.77	±	0.03	kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	12.8	dB	UR	17.0	dB	UR	23.5	dB	UR
Uncertainty of the electrical self generated noise ±						0.12		dB	

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.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: B. Bogdan R 2

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
None

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 30 March 2021

Certificate Number: UCRT21/1425

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 [redacted]

K. Mistry

Customer	Wood Group UK Ltd No 2 Booths Park Chelford Road Knutsford WA16 8QZ
Order No.	26006559
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	01143532
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	43549
Rion	Microphone	UC-59	07849
Rion	Calibrator	NC-74	34251551
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 26 March 2021 ANV Job No. UKAS21/03215

Date Calibrated 30 March 2021

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	09 January 2020	UCRT20/1031	0653

2

CERTIFICATE OF CALIBRATION

Certificate Number UCRT21/1425
UKAS Accredited Calibration Laboratory No. 0653 — Page 2 of 2 Pages

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

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Customers Calibrator	
Calibrator adaptor type if applicable		NC-74-002	
Calibrator cal. date		29 March 2021	
Calibrator cert. number		UCRT21/1413	
Calibrator cal cert issued by		0653	
Calibrator SPL @ STP		94.04 dB	Calibration reference sound pressure level
Calibrator frequency		1004.01 Hz	Calibration check frequency
Reference level range		25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	24.05	24.31	± 0.30 °C
Humidity	40.9	41.3	± 3.00 %RH
Ambient Pressure	101.79	101.78	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0 dB		Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	13.1	dB	UR	16.8	dB	UR	22.7	dB	UR
Uncertainty of the electrical self generated noise ±				0.12	dB				

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.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: B. Giles R 1

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
None

3

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 30 March 2021

Certificate Number: UCRT21/1428

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
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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 [redacted]

K. Mistry

Customer	Wood Group UK Ltd No 2 Booths Park Chelford Road Knutsford WA16 8QZ
Order No.	26006559
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	01121395
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	21439
Rion	Microphone	UC-59	04412
Rion	Calibrator	NC-74	34251551
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 26 March 2021 ANV Job No. UKAS21/03215

Date Calibrated 30 March 2021

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	18 December 2019	UCRT19/2375	0653

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0653	Certificate Number UCRT21/1428
	Page 2 of 2 Pages

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

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Customers Calibrator	
Calibrator adaptor type if applicable		NC-74-002	
Calibrator cal. date		29 March 2021	
Calibrator cert. number		UCRT21/1413	
Calibrator cal cert issued by		0653	
Calibrator SPL @ STP		94.04 dB	Calibration reference sound pressure level
Calibrator frequency		1004.01 Hz	Calibration check frequency
Reference level range		25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	24.26	24.55	± 0.30 °C
Humidity	40.3	41.9	± 3.00 %RH
Ambient Pressure	101.77	101.74	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0 dB		Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	12.4	dB	UR	16.7	dB	UR	23.7	dB	UR
Uncertainty of the electrical self generated noise ±						0.12		dB	

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.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: B. Bogdan R 2

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
None

5

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 30 March 2021

Certificate Number: UCRT21/1429

Calibrated at & Certificate issued by:
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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 [redacted]

K. Mistry

Customer	Wood Group UK Ltd No 2 Booths Park Chelford Road Knutsford WA16 8QZ
Order No.	26006559
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	00331828
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	21779
Rion	Microphone	UC-59	04895
Rion	Calibrator	NC-74	34251551
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 26 March 2021 ANV Job No. UKAS21/03215

Date Calibrated 30 March 2021

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	09 January 2020	UCRT20/1035	0653

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0653	**Certificate Number** UCRT21/1429
	Page 2 of 2 Pages

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

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Customers Calibrator	
Calibrator adaptor type if applicable		NC-74-002	
Calibrator cal. date		29 March 2021	
Calibrator cert. number		UCRT21/1413	
Calibrator cal cert issued by		0653	
Calibrator SPL @ STP		94.04 dB	Calibration reference sound pressure level
Calibrator frequency		1004.01 Hz	Calibration check frequency
Reference level range		25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	24.45	24.46	± 0.30 °C
Humidity	41.7	40.2	± 3.00 %RH
Ambient Pressure	101.75	101.74	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.1	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	10.9	dB	UR	15.5	dB	UR	20.3	dB	UR
Uncertainty of the electrical self generated noise ±						0.12		dB	

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.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: B. Giles R 1

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
None

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 30 March 2021

Certificate Number: UCRT21/1427

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
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Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signator [redacted]

K. Mistry

Customer	Wood Group UK Ltd No 2 Booths Park Chelford Road Knutsford WA16 8QZ
Order No.	26006559
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	01121394
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	21438
Rion	Microphone	UC-59	17214
Rion	Calibrator	NC-74	34251551
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 26 March 2021 ANV Job No. UKAS21/03215

Date Calibrated 30 March 2021

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	03 September 2020	UCRT20/1842	0653

CERTIFICATE OF CALIBRATION

Certificate Number UCRT21/1427
UKAS Accredited Calibration Laboratory No. 0653 — Page 2 of 2 Pages

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

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Customers Calibrator	
Calibrator adaptor type if applicable		NC-74-002	
Calibrator cal. date		29 March 2021	
Calibrator cert. number		UCRT21/1413	
Calibrator cal cert issued by		0653	
Calibrator SPL @ STP		94.04 dB	Calibration reference sound pressure level
Calibrator frequency		1004.01 Hz	Calibration check frequency
Reference level range		25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	24.34	24.40	± 0.30 °C
Humidity	41.3	41.5	± 3.00 %RH
Ambient Pressure	101.78	101.75	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise	This test is currently not performed by this Lab.		
Microphone installed (if requested by customer) = Less Than		N/A dB	A Weighting
Uncertainty of the microphone installed self generated noise ±		N/A dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	12.1	dB	UR	16.7	dB	UR	20.8	dB	UR
Uncertainty of the electrical self generated noise ±						0.12		dB	

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.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: C. Hirlav R 3

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
None

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 29 March 2021

Certificate Number: UCRT21/1413

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
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Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory [redacted]

K. Mistry

Customer	Wood Group UK Ltd No 2 Booths Park Chelford Road Knutsford WA16 8QZ
Order No.	26006559
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators
Description	Acoustic Calibrator

Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Rion	Calibrator	NC-74	34251551

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.	UKAS21/03215	
Date Received	26 March 2021	
Date Calibrated	29 March 2021	
Previous Certificate	*Dated*	18 December 2019
	Certificate No.	UCRT19/2369
	Laboratory	0653

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone	*Manufacturer*	*Type*
	Brüel & Kjær	4134

Results

The level of the calibrator output under the conditions outlined above was

94.04 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

The frequency of the sound produced was	1004.01 Hz	±	0.13 Hz
The total distortion was	1.40 %	±	6.6 % of Reading

During the measurements environmental conditions were

Temperature	23	to	24	°C
Relative Humidity	41	to	47	%
Barometric Pressure	101.4	to	101.5	kPa

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.

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

..... END .....

Note:

Calibrator adjusted prior to calibration?	NO	
Initial Level	N/A	dB
Initial Frequency	N/A	Hz

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

None

Calibrated by: B. Bogdan

R 2

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 30 March 2021

Certificate Number: UCRT21/1421

Calibrated at & Certificate issued by:
ANV Measurement Systems
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Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory [redacted]

K. Mistry

Customer	Wood Group UK Ltd No 2 Booths Park Chelford Road Knutsford WA16 8QZ
Order No.	26006559
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	01143535
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	43552
Rion	Microphone	UC-59	07396
Rion	Calibrator	NC-74	34251554
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 25 March 2021 ANV Job No. UKAS21/03211

Date Calibrated 30 March 2021

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	12 December 2019	UCRT19/2347	0653

CERTIFICATE OF CALIBRATION

Certificate Number
UCRT21/1421

UKAS Accredited Calibration Laboratory No. 0653

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

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52
SLM instruction manual ref / issue		11-03
SLM instruction manual source		Manufacturer
Internet download date if applicable		N/A
Case corrections available		Yes
Uncertainties of case corrections		Yes
Source of case data		Manufacturer
Wind screen corrections available		Yes
Uncertainties of wind screen corrections		Yes
Source of wind screen data		Manufacturer
Mic pressure to free field corrections		Yes
Uncertainties of Mic to F.F. corrections		Yes
Source of Mic to F.F. corrections		Manufacturer
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes
Specified or equivalent Calibrator		Specified
Customer or Lab Calibrator		Customers Calibrator
Calibrator adaptor type if applicable		NC-74-002
Calibrator cal. date		26 March 2021
Calibrator cert. number		UCRT21/1408
Calibrator cal cert issued by		0653
Calibrator SPL @ STP	94.03 dB	Calibration reference sound pressure level
Calibrator frequency	1001.00 Hz	Calibration check frequency
Reference level range	25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	23.55	23.40	± 0.30 °C
Humidity	36.5	39.9	± 3.00 %RH
Ambient Pressure	101.80	101.80	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.4	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	11.6	dB	UR	15.8	dB	UR	22.7	dB	UR
Uncertainty of the electrical self generated noise ±						0.12		dB	

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.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: B. Bogdan R 2

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
None

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 26 March 2021

Certificate Number: UCRT21/1407

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

[redacted]

K. Mistry

Customer	Wood Group UK Ltd No 2 Booths Park Chelford Road Knutsford WA16 8QZ
Order No.	26006559
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators
Description	Acoustic Calibrator

Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Rion	Calibrator	NC-74	34251550

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.	UKAS21/03211	
Date Received	25 March 2021	
Date Calibrated	26 March 2021	
Previous Certificate	*Dated*	24 August 2020
	Certificate No.	UCRT20/1804
	Laboratory	0653

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone	*Manufacturer*	*Type*
	Brüel & Kjær	4134

Results

The level of the calibrator output under the conditions outlined above was

93.96 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

The frequency of the sound produced was	1002.90 Hz	±	0.13 Hz
The total distortion was	1.17 %	±	6.8 % of Reading

During the measurements environmental conditions were

Temperature	23	to	24	°C
Relative Humidity	34	to	41	%
Barometric Pressure	99.6	to	99.7	kPa

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.

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

..... END .....

Note:

Calibrator adjusted prior to calibration?	NO	
Initial Level	N/A	dB
Initial Frequency	N/A	Hz

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

None

Calibrated by: B. Bogdan

R 2

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 26 March 2021

Certificate Number: UCRT21/1405

Calibrated at & Certificate issued by:
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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory [redacted]

K. Mistry

Customer	Wood Group UK Ltd No 2 Booths Park Chelford Road Knutsford WA16 8QZ
Order No.	26006559
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators
Description	Acoustic Calibrator

Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Rion	Calibrator	NC-74	34251556

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.	UKAS21/03211	
Date Received	25 March 2021	
Date Calibrated	26 March 2021	
Previous Certificate	*Dated*	17 July 2019
	Certificate No.	UCRT19/1805
	Laboratory	0653

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone	*Manufacturer*	*Type*
	Brüel & Kjær	4134

Results

The level of the calibrator output under the conditions outlined above was

94.00 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

The frequency of the sound produced was	1001.15 Hz	±	0.13 Hz
The total distortion was	1.16 %	±	6.8 % of Reading

During the measurements environmental conditions were

Temperature	23	to	24	°C
Relative Humidity	34	to	40	%
Barometric Pressure	99.6	to	99.7	kPa

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.

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

..... END .....

Note:

Calibrator adjusted prior to calibration?	NO	
Initial Level	N/A	dB
Initial Frequency	N/A	Hz

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

None

Calibrated by: B. Bogdan

R 2

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 29 March 2021

Certificate Number: UCRT21/1418

Calibrated at & Certificate issued by:
ANV Measurement Systems
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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory [redacted]

K. Mistry

Customer: Wood Group UK Ltd
No 2 Booths Park
Chelford Road
Knutsford
WA16 8QZ

Order No. 26006559

Description: Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	00331829
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	21780
Rion	Microphone	UC-59	04896
Rion	Calibrator	NC-74	34494241
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 25 March 2021 ANV Job No. UKAS21/03211

Date Calibrated 29 March 2021

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	12 December 2019	UCRT19/2346	0653

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0653

Certificate Number UCRT21/1418

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

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52
SLM instruction manual ref / issue		11-03
SLM instruction manual source		Manufacturer
Internet download date if applicable		N/A
Case corrections available		Yes
Uncertainties of case corrections		Yes
Source of case data		Manufacturer
Wind screen corrections available		Yes
Uncertainties of wind screen corrections		Yes
Source of wind screen data		Manufacturer
Mic pressure to free field corrections		Yes
Uncertainties of Mic to F.F. corrections		Yes
Source of Mic to F.F. corrections		Manufacturer
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes
Specified or equivalent Calibrator		Specified
Customer or Lab Calibrator		Customers Calibrator
Calibrator adaptor type if applicable		NC-74-002
Calibrator cal. date		26 March 2021
Calibrator cert. number		UCRT21/1406
Calibrator cal cert issued by		0653
Calibrator SPL @ STP	93.97 dB	Calibration reference sound pressure level
Calibrator frequency	1001.55 Hz	Calibration check frequency
Reference level range	25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15

Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	24.04	24.00	± 0.30 °C
Humidity	45.0	45.3	± 3.00 %RH
Ambient Pressure	101.60	101.60	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting	
Uncertainty of the microphone installed self generated noise ±	N/A	dB		

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	11.9	dB	UR	16.6	dB	UR	22.8	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

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.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: B. Bogdan R 2

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

None

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 27 May 2021

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
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Certificate Number: UCRT21/1682

Page	
Approved Signatory	[redacted]
K. Mistry	

Customer	Wood Group UK Ltd No 2 Booths Park Chelford Road Knutsford WA16 8QZ
Order No.	26006559
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators
Description	Acoustic Calibrator

Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Rion	Calibrator	NC-74	34251553

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.	UKAS21/05353	
Date Received	26 May 2021	
Date Calibrated	27 May 2021	
Previous Certificate	*Dated*	18 December 2019
	Certificate No.	UCRT19/2368
	Laboratory	0653

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0653

Certificate Number
UCRT21/1682

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone	*Manufacturer*	*Type*
	Brüel & Kjær	4134

Results

The level of the calibrator output under the conditions outlined above was

94.00 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

The frequency of the sound produced was	1002.82 Hz	±	0.13 Hz
The total distortion was	1.02 %	±	6.9 % of Reading

During the measurements environmental conditions were

Temperature	23	to	24	°C
Relative Humidity	38	to	45	%
Barometric Pressure	101.0	to	101.1	kPa

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.

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

..... END .....

Note:

Calibrator adjusted prior to calibration?	YES	
Initial Level	94.12	dB
Initial Frequency	1002.91	Hz

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

None

R 1

Calibrated by: B. Giles

Annex E
Measurement location details

Location (ID/ Address/ Coordinates)	LT1c			
Personnel (start/ end)	JW & JR [START] GH & ZS [END]	**Relevant Guidance/ BS / ISO Standard**	BS 7445 BS 4142	
Purpose of Monitoring	Baseline			
SLM ID	29	**Calibrator (start) (Cal. ID/ Cal. Level)**	C1	94.0
Filename	Auto_2901 Auto_2903	**Calibrator (end) (Cal. ID/ Cal. Level)**	C4	93.9
Start Date	10/11/2021	**End Date**	18/11/2021	
Start Time	11:30	**End Time**	10:00	
Microphone Height	**1.5 m**	**Façade/ Freefield**	Freefield	

Description of site (location of equipment, general surroundings, nature of ground between NSR and noise source (hard/ soft ground, topography, intervening features))

Kit located in the southern end of the site, approx. 3m from southern boundary, and at a central location between the eastern and wester perimeter bunds of the site. Bund that lines the perimeter of the site is approx. 3 m in height and is fairly steep. Surrounding ground gravel/dirt. Freefield.

Description of noise environment at start of survey (general observations on principal noise sources, including which sources are dominant)

Road traffic noise from surrounding road networking and general industrial murmur from the industrial area to the north dominating the background. Intermittent dominant site plant activity (collecting and dropping off skips / gravel stock). Birds tweeting. Slight flora movement due to light breeze.

Description of noise environment at end of survey (general observations on principal noise sources, including which sources are dominant)

Noise dominated by local road use and distant industrial noise. Industrial noise from Mick George group audible but screened from rubble piles. Birdsong and wind in trees also audible.

Photos of measurement location

Location (ID/ Address/ Coordinates)	LT2			
Personnel (start/ end)	JW & JR [START] GH & ZS [END]	**Relevant Guidance/ BS / ISO Standard**	BS 7445 BS 4142	
Purpose of Monitoring	Baseline			
SLM ID	28	**Calibrator (start) (Cal. ID/ Cal. Level)**	C1	94.0
Filename	Auto_2802 Auto_2803	**Calibrator (end) (Cal. ID/ Cal. Level)**	C4	93.9
Start Date	10/11/2021	**End Date**	17/11/2021	
Start Time	14:00	**End Time**	13:35	
Microphone Height	1.5 m	**Façade/ Freefield**	Freefield	

Description of site (location of equipment, general surroundings, nature of ground between NSR and noise source (hard/ soft ground, topography, intervening features))

Kit located 1.2 m above ground level at the pinned location (i.e. attached to the railing over the drainage ditch adjacent to the orchard field). The surrounding ground is generally soft. No major intervening features or notable changes in the topography.

Description of noise environment at start of survey (general observations on principal noise sources, including which sources are dominant)

Noise environment dominated by A47 road traffic and road traffic from the surrounding road network.

Description of noise environment at end of survey (general observations on principal noise sources, including which sources are dominant)

Noise dominated by road traffic on A47, industrial fans audible during during lulls in traffic.

Photos of measurement location

Location (ID/ Address/ Coordinates)	LT3			
Personnel (start/ end)	JW & JR [START] GH & ZS [END]	**Relevant Guidance/ BS / ISO Standard**	BS 7445 BS 4142	
Purpose of Monitoring	Baseline			
SLM ID	95	**Calibrator (start) (Cal. ID/ Cal. Level)**	C1	94.0
Filename	Auto_1010 Auto_1011	**Calibrator (end) (Cal. ID/ Cal. Level)**	C4	94.0
Start Date	10/11/2021	**End Date**	18/11/2021	
Start Time	13:15	**End Time**	09:37	
Microphone Height	1.2 m	**Façade/ Freefield**	Freefield	

Description of site (location of equipment, general surroundings, nature of ground between NSR and noise source (hard/ soft ground, topography, intervening features))

Kit located in the front (i.e. west facing) courtyard of the property at 1.2 m above ground level. The surrounding ground is generally hard (i.e. graveled courtyard and tarmaced road). Microphone in close proximity to a fairly low garden wall [to be discussed on whether a correction is appropriate].

Description of noise environment at start of survey (general observations on principal noise sources, including which sources are dominant)

Road traffic noise from adjacent roads dominant. Road traffic noise from the surrounding road network, and roof plant of adjacent tesco dominating the background. Dogs barking. Idle HGV.

Description of noise environment at end of survey (general observations on principal noise sources, including which sources are dominant)

Road traffic noise from surrounding roads dominant. Dog barking also audible.

Photos of measurement location

Location (ID/ Address/ Coordinates)	ST-LT1		
Personnel	PH, JR, ZS, GH, JW	**Relevant Guidance/ BS / ISO Standard**	BS 7445 BS 4142
Purpose of Monitoring	Baseline		
Microphone Height	1.2 m	**Façade/ Freefield**	Freefield

Description of site (location of equipment, general surroundings, nature of ground between NSR and noise source (hard/ soft ground, topography, intervening features))
On road adjacent to 56 Broadend Road. Ground near measurement location flat and mixed hard & soft. Ground from measurement location to nearby noise sources (industry & substation to west and road traffic on A47 to east) generally flat, soft ground. Some intervening trees and foliage to sources to west, some intervening foliage and buildings to road to the east.

Description of noise environment (general observations on principal noise sources, including which sources are dominant)	
Daytime	A low frequency whirring from a distant chiller, occasional HGVs and white noise beepers from nearby industrial sites dominate with distant road traffic noise and birdsong also audible.
Evening	A low frequency whirring from a distant chiller, occasional HGVs from nearby industrial sites and road traffic noise dominate. Some distant alarms also audible.
Night-time	A low frequency whirring from a distant chiller and distant road traffic noise are just audible. There is also some occasional HGV movements from nearby industrial sites.

Location (ID/ Address/ Coordinates)	ST1 Alternative		
Personnel	JW, PH, ZS, GH, JW, JR	**Relevant Guidance/ BS / ISO Standard**	BS 7445 BS 4142
Purpose of Monitoring	Baseline		
Microphone Height	1.2 m	**Façade/ Freefield**	Freefield

Description of site (location of equipment, general surroundings, nature of ground between NSR and noise source (hard/ soft ground, topography, intervening features))

On New Drove, at access to fields, approx. 500 m north east of junction off New Drove and New Bridge Lane. Ground near measurement location generally flat and mainly soft. Ground from measurement location to nearby noise sources (industry to west and road traffic on A47 to south) flat, soft ground with some intervening hedges, trees and foliage.

Description of noise environment (general observations on principal noise sources, including which sources are dominant, if baseline surveying for introduction of new source then consider the character of the existing sound environment compared to the character of the new source)

Daytime	Distant continuous low frequency industrial plant noise from the east dominates, with the surrounding local road network traffic noise audible and dominating the background levels. An occasional distant reversing alarm was aubile along with birdsong.
Evening	Distant continuous lowfrequency industrial plant rumble from the east dominant, with the surrounding local road network traffic noise audible and dominating the background levels (however quieter than the daytime period). Occasional clangs from the industrial area were audible.
Night-time	Distant continuous low frequency industrial plant noise from the east dominates, with the surrounding local road network traffic noise also audible.

Photos of measurement location

Location (ID/ Address/ Coordinates)	ST2		
Personnel	JR, PH, ZS, GH	**Relevant Guidance/ BS / ISO Standard**	BS 7445 BS 4142
Purpose of Monitoring	Baseline		
Microphone Height	1.2 m	**Façade/ Freefield**	Freefield
Description of site (location of equipment, general surroundings, nature of ground between NSR and noise source (hard/ soft ground, topography, intervening features))			
On pavement near 29 Victory Road. Ground near measurement location generally flat and hard. Ground from measurement location to nearby noise sources (industry to north and road traffic on B198 to west) mixed hard and soft ground with some intervening structures (bungalows and garden fences) and foliage.			
Description of noise environment (general observations on principal noise sources, including which sources are dominant)			
Daytime	Distant road traffic noise most dominant noise source, with some industrial chiller noise also audible. Occasional vehicles and reverse beeper alarms, along with some clangs from industrial sites, also audible.		
Evening	Distant road traffic noise and industrial chiller noise are equally audible and dominant. Birdsong also audible.		
Night-time	Broadband industrial plant noise dominates, with some road traffic noise barely audible.		

Location (ID/ Address/ Coordinates)	ST3		
Personnel	JW, PH, ZS, GH, JR	**Relevant Guidance/ BS / ISO Standard**	BS 7445 BS 4142
Purpose of Monitoring	Baseline		
Microphone Height	1.2 m	**Façade/ Freefield**	Freefield

Description of site (location of equipment, general surroundings, nature of ground between NSR and noise source (hard/ soft ground, topography, intervening features))

Approx. 2.5 m from southern kerb of Weasenham Lane, north of school. Ground near measurement location generally flat and hard. Ground from measurement location to nearby noise sources (industry to north and road traffic on B198 to west) mixed hard and soft ground with some intervening structures (bungalows and garden fences) and foliage.

Description of noise environment (general observations on principal noise sources, including which sources are dominant)

Daytime	Road traffic noise from Weasenham Lane was constant and dominant. Noise from an adjacent car mechanic (hydraulic sounds, workers voices) also audible. Birdsong and passing pedestrian noise also present during measurement. In moments of lull from the mechanic/Weasenham Lane, distant road traffic noise was dominant.
Evening	Road traffic noise from Weasenham Lane constant and dominant. During periods of few car movements, industry including impulsive hammering and fan noise in the distance was audible.
Night-time	Continuous industrial plant (fans/chiller) noise dominates. Occasional traffic passbys were dominant when occuring, though this was infrequent.

Photos of measurement location

Location (ID/ Address/ Coordinates)	ST4		
Personnel	JW, PH, JR	**Relevant Guidance/ BS / ISO Standard**	BS 7445 BS 4142
Purpose of Monitoring	Baseline		
Microphone Height	1.2 m	**Façade/ Freefield**	Freefield

Description of site (location of equipment, general surroundings, nature of ground between NSR and noise source (hard/ soft ground, topography, intervening features))

On pavement approx. 10 m west of vehicle access gate to unit occupied by Cambian Wisbech School. Ground near measurement location hard and flat. Ground from measurement location to nearby noise sources (primarily industry to south) flat and hard with intervening buildings.

Description of noise environment (general observations on principal noise sources, including which sources are dominant)

Daytime	Industrial plant noise (chiller) dominates, along with local road traffic noise which is a significant source. Some light commerical and industrial noise from surrounding units (including hand tool type noise) also audible, along with the occasional vehicle reverse alarm.
Evening	Local road traffic noise dominates the background with a high HGV ratio. Some industrial plant (chiller/generator/AHU) dominates, although intermittent in nature. Distant HGVs and reverse alarms also audible.
Night-time	Considerable HGV movements around industrial estate, along with plant movement including reverse alarms, hydraulic sounds, engine sounds, dominates. Road traffic noise from the surrounding local road network, along with multiple industrial sources, dominate the background levels.

Photos of measurement location

Location (ID/ Address/ Coordinates)	ST5		
Personnel	JR, PH, ZS, GH, JW	**Relevant Guidance/ BS / ISO Standard**	BS 7445 BS 4142
Purpose of Monitoring	Baseline		
Microphone Height	1.2 m	**Façade/ Freefield**	Freefield

Description of site (location of equipment, general surroundings, nature of ground between NSR and noise source (hard/ soft ground, topography, intervening features))

Near southern tip of car park, edge of parking bays, approx. 10 m from east kerbside of A1101 Elm High Road. Slight slope of mixed hard and soft ground to dominant noise source, road traffic on Elm High Road. Few sparse trees between measurement position and road.

Description of noise environment (general observations on principal noise sources, including which sources are dominant)

Daytime	Road traffic noise from Elm High Road dominant.
Night-time	Less road traffic than during the daytime period, however road traffic noise from Elm High Road still dominates.

Photos of measurement location

Location (ID/ Address/ Coordinates)	ST6		
Personnel	ZS, GH, JR, PH, JW	**Relevant Guidance/ BS / ISO Standard**	BS 7445 BS 4142
Purpose of Monitoring	Baseline		
Microphone Height	1.2 m	**Façade/ Freefield**	Freefield

Description of site (location of equipment, general surroundings, nature of ground between NSR and noise source (hard/ soft ground, topography, intervening features))

Approx. 65 m south east of carriageway edge of A47, approx. 20 m north west of property boundary of Oxburgh Cottage on Meadowgate Lane. Southern corner of parking/ turning place. Generally flat and soft ground to dominant noise source – road traffic on A47.

Description of noise environment (general observations on principal noise sources, including which sources are dominant)

Daytime	Continuous road traffic noise from A47 dominates. Some jetwashing at a car wash and birdsong also audible.
Night-time	Road traffic noise from A47 and surrounding local road network dominant. When road traffic not present, industry noise from the west was clearly dominant. Some wind in trees also audible when present.

Photos of measurement location

Location (ID/ Address/ Coordinates)	ST11		
Personnel	ZS, GH, JW, PH	**Relevant Guidance/ BS / ISO Standard**	BS 7445 BS 4142
Purpose of Monitoring	Baseline		
Microphone Height	1.2 m	**Façade/ Freefield**	Freefield

Description of site (location of equipment, general surroundings, nature of ground between NSR and noise source (hard/ soft ground, topography, intervening features))

On road adjacent to 56 Broadend Road. Ground near measurement location flat and mixed hard & soft. Ground from measurement location to nearby noise sources (industry & substation to west and road traffic on A47 to east) generally flat, soft ground. Some intervening trees and foliage to sources to west, some intervening foliage and buildings to road to the east.

Description of noise environment (general observations on principal noise sources, including which sources are dominant)

Daytime	Road traffic noise from A47 dominant. Some birdsong along with wind in trees also audible when present.
Night-time	Road traffic noise from A47 dominant. Industry noise just audible during lulls in road traffic (faint hum from the direction of the substation).

Photos of measurement location

Annex F
Detailed attended monitoring results

Location	Period	Surveyor	Measurement No (File Name/ ID)	Start Date & Time	Duration (mm:ss)	Local Weather					Subjective Audibility (0 - 4) 0: Inaudible, 1: Just Audible 2: Audible, 3: Significant source 4: Dominant				Sound Pressure Level, dB					No. of Pauses	Noise Environment Comments (Including reasons for pausing, audible noise sources etc.)
						Wind Speed, m/s	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Oktas	Industry	Wind in flora	Road	Other	$L_{Aeq,T}$	L_{Amax}	$L_{A10,T}$	$L_{A50,T}$	$L_{A90,T}$		
ST1 Alt	D	JW	1037 0017	11/11/2021 11:26	15:00	0.9	WSW	12.8	71	8	4	0	3	2	49	69	50	48	47	4	Distant low frequency continuous industrial plant noise coming from the east, could not pinpoint where, however this was fairly dominant. Surrounding road network dominating the background. Occasional passing pedestrian. Birds tweeting. Occasional distant reversing alarm.
ST1 Alt	D	JW	1037 0018	11/11/2021 11:45	15:00	0.4	WSW	13	72	8	4	0	3	2	49	59	51	49	48		Distant low frequency continuous industrial plant noise coming from the east, could not pinpoint where, however this was fairly dominant. Surrounding road network dominating the background. Occasional passing pedestrian. Birds tweeting. Occasional distant reversing alarm.
ST1 Alt	D	JW	1016	10/11/2021 14:30	15:00	0.9	NE	12.9	65	8	4	0	3	2	46	66	47	45	44		Distant low frequency continuous industrial plant noise coming from the east, could not pinpoint where, however this was fairly dominant. Surrounding road network dominating the background. Occasional passing pedestrian. Birds tweeting. Occasional distant reversing alarm.
ST1 Alt	D	JW	1016	10/11/2021 14:45	15:00	0.4	NE	12.9	65	8	4	0	3	2	45	62	46	45	44		Distant low frequency continuous industrial plant noise coming from the east, could not pinpoint where, however this was fairly dominant. Surrounding road network dominating the background. Occasional passing pedestrian. Birds tweeting. Occasional distant reversing alarm. Distant motorbikes.
ST1 Alt	D	PH	3201 0022	17/11/2021 13:41	15:00	0.9	WSW	8.6	74	0	4	2	2	0	51	63	52	51	49		Rumble from industry to west. Tonal movement alarm. Couple of vehicle pass bys.
ST1 Alt	E	ZS & GH	1502	16/11/2021 20:32	08:53	0.9	SW	8.8	74	8	3	0	3	0	49	62	50	49	46		Industry and roads equally audible, measurement shortened due to public prescence
ST1 Alt	E	JW & JR	1026	10/11/2021 20:24	15:00	0	-	11.2	67	8	4	0	2	0	45	65	46	45	44		Distant low frequency continuous industrial plant noise coming from the east, could not pinpoint where, but from the general industrial area. This is now more dominant that the background distant traffic noise had dropped off a little. No other sources.
ST1 Alt	E	JW & JR	1027	10/11/2021 20:41	15:00	0	-	11.2	67	8	4	0	2	0	45	54	46	44	43		Distant low frequency continuous industrial plant noise coming from the east, could not pinpoint where, but from the general industrial area. This is now more dominant that the background distant traffic noise had dropped off a little. No other sources.
ST1 Alt	E	PH	3201 0007	16/11/2021 21:23	15:00	0	-	8.1	74	6	4	0	3	0	50	60	52	49	48		Aeroplane. Industrial rumble dominant. Road noise also significant source. Clangs from industrial area.
ST1 Alt	N	JW & JR	3308	11/11/2021 00:38	15:00	0	-	10.4	68	8	2	0	1	0	46	51	47	45	44		Distant low frequency continuous industrial plant noise coming from the east, could not pinpoint where, but from the general industrial area. This is now more dominant that the background distant traffic noise had dropped off a little. No other sources.
ST1 Alt	N	JW & JR	3308	11/11/2021 00:53	15:00	0	-	10.4	68	8	2	0	1	0	47	54	48	46	45		Distant low frequency continuous industrial plant noise coming from the east, could not pinpoint where, but from the general industrial area. This is now more dominant that the background distant traffic noise had dropped off a little. No other sources.
ST1 Alt	N	JW & JR	3308	11/11/2021 01:08	15:00	0	-	10.4	68	8	2	0	1	0	47	52	48	46	44		Distant low frequency continuous industrial plant noise coming from the east, could not pinpoint where, but from the general industrial area. This is now more dominant that the background distant traffic noise had dropped off a little. No other sources.
ST1 Alt	N	JW & JR	3308	11/11/2021 01:23	15:00	0	-	10.4	68	8	2	0	1	0	47	56	48	47	45		Distant low frequency continuous industrial plant noise coming from the east, could not pinpoint where, but from the general industrial area. This is now more dominant that the background distant traffic noise had dropped off a little. No other sources.
ST2	D	JR	3319	12/11/2021 09:36	15:00	0.9	SSE	11.4	74	8	1	1	2	0	50	63	51	50	48		Quiet residential culdesac, distant road traffic most audble contributer to background - more audible than before, chiller noise appears to be partially masked by traffic noise
ST2	D	JR	3319	12/11/2021 09:51	15:00	1.3	SSE	11.7	74	8	1	1	2	0	50	62	51	50	49		Quiet residential culdesac, distant road traffic most audble contributer to background - more audble than before, chiller noise appears to be partially masked by traffic noise
ST2	D	JR	3316	11/11/2021 15:03	15:00	0.4	SE	12.9	59	8	1	0	1	0	48	70	50	46	45		Quiet residential culdesac, bird song, no wind, distant traffic noise, distant industrial noise - chiller noise, vechicles/reverse beepers
ST2	D	JR	3316	11/11/2021 15:18	15:00	0.4	SE	12.7	60	8	1	0	1	0	48	66	50	46	45		Quiet residential culdesac, bird song, no wind, distant traffic noise, distant industrial noise - chiller noise, vechicles/reverse beepers
ST2	D	PH	3201 0024	17/11/2021 14:45	10:37	0.4	WSW	8.3	74	6	2	0	2	0	46	59	47	45	43	1	Pause for loud aircraft. Whir and clangs from industry audible. Road noise audible. Dog barking. Aeroplane. Stopped measurement due to person talking.
ST2	E	JR	3305	10/11/2021 19:44	15:00	0	-	11.1	66	8	1	0	1	0	37	62	38	37	35		Quiet residential culdesac, bird song, no wind, distant traffic noise, distant industrial noise - chiller noise
ST2	E	JR	3305	10/11/2021 19:59	15:00	0	-	11.2	67	8	1	0	1	0	37	52	37	35	34		Quiet residential culdesac, bird song, no wind, distant traffic noise, distant industrial noise - chiller noise
ST2	E	PH	3201 0009	16/11/2021 21:45	15:00	0.9	SW	7.7	74	6	4	0	3	2	46	57	47	45	44		Mid high frequency tonal type sound from industry. Occasional power tool nearby.
ST2	N	ZS & GH	1506	17/11/2021 00:40	15:00	1.3	SW	8.6	75	7	4	0	0	0	42	56	44	41	40		Industry dominant (nestle purina)
ST2	N	ZS & GH	1506	17/11/2021 00:55	14:49	1.3	SW	8.7	75	7	4	0	0	0	42	60	43	41	40		Industry dominant (nestle purina)
ST2	N	PH	3201 0015	17/11/2021 01:27	15:00	0.9	SW	8.3	74	7	4	0	1	0	42	54	43	42	40		Broadband industrial noise. Road noise faintly audible.
ST2	N	PH	3201 0016	17/11/2021 01:42	15:00	1.3	SW	8.6	75	7	4	0	1	0	41	56	43	41	40		Broadband industrial noise. Road noise faintly audible.
ST3	D	JW	1031	11/11/2021 09:43	13:39	0.4	SW	11.7	70	8	0	0	4	2	71	87	75	67	60	1	Adjacent road (Weasenham Lane) traffic consistent and dominant. A little less consistent than afternoon measurement. Adjacent car mechanic light movement ie. hydraulic sounds for movement of ramps etc, and worker voices. Birds tweeting. Passing pedestrians. In moments of lull, distant road network dominant.
ST3	D	JW	1033	11/11/2021 09:57	15:00	0	-	11.8	71	8	0	0	4	2	72	88	76	67	58		Adjacent road (Weasenham Lane) traffic consistent and dominant. A little less consistent than afternoon measurement. Adjacent car mechanic light movement ie. hydraulic sounds for movement of ramps etc, and worker voices. Birds tweeting. Passing pedestrians. In moments of lull, distant road network dominant.
ST3	D	JW	1017	10/11/2021 16:15	15:00	0.4	NE	12.4	65	8	0	0	4	2	75	101	75	67	60		Adjacent road (Weasenham Lane) traffic consistent and dominant. Adjacent car mechanic light movement ie. hydraulic sounds for movement of ramps etc, and worker voices. Birds tweeting. Passing pedestrians. Max from 50cc bike.
ST3	D	JW	1017	10/11/2021 16:30	15:00	0.4	NE	12.3	65	8	0	0	4	2	72	92	75	69	61		Adjacent road (Weasenham Lane) traffic consistent and dominant. Adjacent car mechanic light movement ie. hydraulic sounds for movement of ramps etc, and worker voices. Birds tweeting. Passing pedestrians. Max from 50cc bike.
ST3	D	PH	3201 0023	17/11/2021 14:19	15:00	1.3	WSW	8.7	75	2	0	0	4	2	71	89	75	67	58	6	Pauses for loud aircraft, emergency sirens and shouting. Vehicles on Weasenham Lane dominant.
ST3	E	ZS & GH	1504	16/11/2021 21:18	15:00	0	-	8.1	74	7	2	0	3	0	64	83	66	50	47		Traffic on through road dominant, Industry including impulsive hammering dominant during lulls in traffic, high percentage HGV passes
ST3	E	JW	1018	10/11/2021 19:01	15:00	0	-	11.1	66	8	1	0	4	2	70	93	74	66	56		Adjacent road (Weasenham Lane) traffic consistent and dominant. In moments of lull, distant road network dominant and / or very distant continuous industrial plant murmur / generator type noise.
ST3	E	JW	1018	10/11/2021 19:16	15:00	0.4	NE	11.1	66	8	1	0	4	2	69	86	73	61	49		Adjacent road (Weasenham Lane) traffic consistent and dominant. In moments of lull, distant road network dominant and / or very distant continuous industrial plant murmur / generator type noise.
ST3	E	PH	3201 0004	16/11/2021 19:55	15:00	1.3	SW	8.8	75	8	1	0	4	0	70	90	74	60	49		Road noise dominant. Some industrial noise when no cars.
ST3	N	ZS & GH	1507	17/11/2021 01:17	15:00	1.3	SW	8.8	75	7	4	0	2	0	56	80	48	46	45		Industrial fans dominant, Passes on through road peak noise, but infrequent
ST3	N	ZS & GH	1507	17/11/2021 01:32	15:00	1.3	SW	8.8	75	7	4	0	2	0	58	81	49	45	44		Industrial fans dominant, Passes on through road peak noise, but infrequent

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						Wind Speed, m/s	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Oktas	Industry	Wind in flora	Road	Other	$L_{Aeq,T}$	L_{Amax}	$L_{A10,T}$	$L_{A50,T}$	$L_{A90,T}$		
ST3	N	JW & JR	2000 0023	12/11/2021 00:00	15:00	0	-	8.9	68	8	3	0	3	3	55	73	58	50	47	5-10	Road traffic from surrounding road network, and continuous chiller/generator noise dominating the background. The chiller/generator noise sounded like it was changing between different gears at various points throughout the measurement. Pedestrians passing. Distant police helicopter - seemed to be circling in a set location, hence the assumption of police helicopter.
ST3	N	JW & JR	2000 0024	12/11/2021 00:21	13:53	0	-	8.6	68	8	3	0	3	3	59	71	61	59	51	5-10	Road traffic from surrounding road network, and continuous chiller/generator noise dominating the background. The chiller/generator noise sounded like it was changing between different gears at various points throughout the measurement. Pedestrians passing. Police helicopter ended up circling closer and closer throughout measurement. Alarm at a nearby commercial unit went off during second half of measurement. Large group of youths approaching the measurement location so made the decision to end the measurement slightly early
ST4	D	JW	1037 0015	11/11/2021 10:28	15:00	0	-	12.3	71	8	4	0	3	2	59	85	55	52	48	10+	Road traffic on surround road network dominating background. Chiller from pork product unit still dominant and intermittent. Lots of pausing due to car passbys. Light commercial and industrial noise from surrounding units (incl. hand tool type noise). Passing pedestrians. General industrial murmur along with road traffic dominating background. Lots of road traffic on local roads
ST4	D	JW	1037 0016	11/11/2021 10:46	15:00	0.9	SW	12.4	71	8	4	0	3	2	53	79	55	51	47	10+	Road traffic on surround road network dominating background. Chiller from pork product unit still dominant and intermittent. Lots of pausing due to car passbys. Light commercial and industrial noise from surrounding units (incl. hand tool type noise). Passing pedestrians. General industrial murmur along with road traffic dominating background. Lots of road traffic on local roads. This measurement the local road traffic and number of pauses dropped off towards end of measurement hence the reduction in Leq.
ST4	D	JW	1037 0019	11/11/2021 14:27	15:00	0.4	SE	13.1	56	8	4	0	2	2	54	78	55	52	48	10+	Road traffic on surround road network dominating background. Chiller from pork product unit still dominant and intermittent. Lots of pausing due to car passbys. Light commercial and industrial noise from surrounding units (incl. hand tool type noise). Passing pedestrians. General industrial murmur along with road traffic dominating background. Lots of road traffic on local roads
ST4	D	JW	1037 0020	11/11/2021 14:44	15:00	0	-	13.1	57	8	4	0	3	2	55	78	57	53	49	10+	Road traffic on surround road network dominating background. Chiller from pork product unit still dominant and intermittent. Lots of pausing due to car passbys. Light commercial and industrial noise from surrounding units (incl. hand tool type noise). Passing pedestrians. General industrial murmur along with road traffic dominating background. Lots of road traffic on local roads. Gaggle of taxi drivers nearby. Slightly more movement on the roads.
ST4	D	PH	3201 0019	17/11/2021 12:15	15:00	1.3	W	8.8	75	0	4	2	3	2	61	81	61	54	50	6	Pauses for students arriving to school. Industrial noise. Vehicles on Anglia Way. Power tools in distance. Vehicle reverse alarm. Aeroplane.
ST4	E	JW	1019	10/11/2021 19:37	14:14	0	-	11.1	66	8	4	0	3	0	55	71	56	53	50	3	Road traffic on surrounding road network dominating background, high HGV ratio on local network active during this period. Dominant chiller/generator noise from an adjacent commercial unit associated with pork products? AHU type noise from similar location also dominant. Both these sources are intermittent in nature throughout measurement period. Distant HGV idling. Distant reversing alarms.
ST4	E	JW	1023	10/11/2021 19:52	19:55	0	-	11.2	67	8	4	0	3	0	54	65	57	52	45	2	Road traffic on surrounding road network dominating background, high HGV ratio on local network active during this period. Dominant chiller/generator noise from an adjacent commercial unit associated with pork products? AHU type noise from similar location also dominant. Both these sources are intermittent in nature throughout measurement period. Distant motorbikes. Distant reversing alarms.
ST4	E	PH	3201 0005	16/11/2021 20:22	15:00	2.7	SW	11.1	81	7	4	0	2	0	54	60	57	53	49		Generator in adjacent car park dominant. Some local vehicle movements. Distant road noise.
ST4	N	JW & JR	2000 0025	12/11/2021 00:41	15:00	0	-	8.4	68	8	4	0	2	0	56	71	61	50	48		Road traffic from surround road network, and multiple industrial noise sources dominating the background. Considerable HGV movement around local roads in industrial estate. Nearby plant movement taking place (reverse alarms, hydraulic type sounds, engine type sounds).
ST4	N	JW & JR	2000 0026	12/11/2021 01:03	15:00	0	-	7.8	67	8	4	0	2	0	58	74	61	44	38		Road traffic from surround road network, and multiple industrial noise sources dominating the background. Considerable HGV movement around local roads in industrial estate. Nearby plant movement taking place (reverse alarms, hydraulic type sounds, engine type sounds). Towards end of measurement, the adjacent pork chiller turned on and was intermittent in nature.
ST5	D	JR	3314	11/11/2021 11:03	15:00	1.3	SW	12.5	71	8	0	0	4	0	64	75	67	63	58		Traffic consistent and noise dominant on Elm High Road.
ST5	D	JR	3314	11/11/2021 11:18	15:00	0.9	WSW	12.8	71	8	0	0	4	0	64	79	66	63	58		Traffic consistent and noise dominant on Elm High Road.
ST5	D	JR	3302	10/11/2021 15:15	15:00	0.4	NE	12.7	65	8	0	2	4	0	65	86	68	63	57		Traffic consistent and noise dominant on Elm High Road. Siren at 15:21
ST5	D	JR	3302	10/11/2021 15:30	15:00	0.9	NE	12.6	65	8	0	2	4	0	65	88	67	63	58		Traffic consistent and noise dominant on Elm High Road.
ST5	D	PH	3201 0020	17/11/2021 12:46	15:00	2.2	W	11.4	81	0	0	0	4	0	67	77	70	67	59		Vehicles on Elm High Rd dominant.
ST5	E	ZS & GH	1503	16/11/2021 20:59	10:43	0.9	SW	8.6	74	7	0	0	4	0	61	74	65	58	51		Heavy traffic on Elm High Rd, speeding HGVs, High percentage HGVs
ST5	N	ZS & GH	1505	16/11/2021 23:37	15:00	0.9	SW	7.8	74	7	1	1	3	0	55	72	58	50	44		Noise climate as before, road dominant, much lower traffic on Elm High than evening period
ST5	N	ZS & GH	1505	16/11/2021 23:52	15:00	0.9	SW	7.6	74	7	1	1	3	0	54	72	57	48	44		Noise climate as before, road dominant, much lower traffic on Elm High than evening period
ST5	N	ZS & GH	1505	17/11/2021 00:07	15:00	0.9	SW	7.7	74	7	1	1	3	0	55	72	58	47	43		Noise climate as before, road dominant, much lower traffic on Elm High than evening period
ST5	N	ZS & GH	1505	17/11/2021 00:22	07:10	0.9	SW	8.3	74	7	1	1	3	0	56	77	55	47	44		Noise climate as before, road dominant, much lower traffic on Elm High than evening period
ST5	N	JW & JR	2000 0027	12/11/2021 01:18	15:00	0	-	7.9	67	8	2	0	3	0	55	77	53	44	40		Reduced traffic, however still main source of noise, mainly HGV passbys with occasional cars.
ST5	N	JW & JR	2000 0028	12/11/2021 01:39	15:00	0.4	ESE	7.8	67	8	2	0	3	0	46	64	48	38	35		Reduced traffic, however still main source of noise, mainly HGV passbys with occasional cars.
ST6	D	ZS & GH	1508	17/11/2021 13:08	15:00	2.7	WSW	11.4	81	0	1	0	4	0	57	67	60	57	54		Traffic on A road dominant, Dogs in garden audible when agitated , wind in fauna audible with gusts of wind (all predicted to be lower than 5ms)
ST6	D	JR	3313	11/11/2021 10:20	15:00	0	-	12.3	71	8	0	0	3	0	59	68	62	58	51		Bird song, consistent traffic noise from A47, 0 car pass bys on Meadowgate Lane
ST6	D	JR	3313	11/11/2021 10:35	15:00	0.9	SW	12.3	72	8	0	0	3	0	58	66	62	58	51		Bird song, consistent traffic noise from A47, 0 car pass bys on Meadowgate Lane
ST6	D	JR	3317	11/11/2021 14:45	15:00	0.4	NE	12.9	65	8	0	0	3	0	58	73	60	57	53		Bird song, consistent traffic noise from A47, 0 car pass bys on Meadowgate Lane
ST6	D	PH	3201 0026	17/11/2021 15:18	15:00	2.7	WSW	11.6	79	4	0	0	4	0	61	66	63	61	57	1	Pause for emergency vehicle siren. Vehicles on A47 dominant. Jet washing at car wash.
ST6	N	ZS & GH	1511	18/11/2021 01:31	15:00	1.3	SW	7.2	76	8	3	0	3	0	43	58	47	41	39		Road dominant when traffic present, southerly wind, industry clearly audible in lulls of traffic / could be dominant over a 15min period if no traffic
ST6	N	ZS & GH	1511	18/11/2021 01:46	15:00	1.3	SW	7.1	76	8	3	0	3	0	46	58	49	44	41		Road dominant when traffic present, southerly wind, industry clearly audible in lulls of traffic / could be dominant over a 15min period if no traffic
ST6	N	JW & JR	2000 0028	12/11/2021 01:39	15:00	0.4	ESE	7.8	67	8	0	2	4	0	46	64	48	38	35		Road traffic noise dominant at all times, mainly from A47, but also from surrounding road network. Slight flora movement due to light breeze.
ST6	N	JW & JR	2000 0029	12/11/2021 01:54	15:00	0.4	ESE	7.9	67	8	0	2	4	0	48	66	52	42	36		Road traffic noise dominant at all times, mainly from A47, but also from surrounding road network. Slight flora movement due to light breeze.
ST6	N	PH	3201 0013	17/11/2021 00:44	15:00	2.7	SW	11.7	77	7	2	1	3	0	50	64	54	42	38		Broadband industrial noise from west. Occasional vehicle on A47
ST6	N	PH	3201 0014	17/11/2021 00:59	15:00	2.7	SW	11.6	77	8	2	1	3	0	45	64	44	40	38		Broadband industrial noise from west. Occasional vehicle on A47
ST-LT1	D	PH	3201 0021	17/11/2021 13:15	15:00	1.3	W	8.9	74	0	3	2	3	0	52	61	54	52	50		Broadband movement alarm. Industrial noise from west. Vehicle horn.

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ST-LT1	D	JR	3312	11/11/2021 09:40	15:00	0.4	SW	11.7	70	8	2	0	1	0	49	61	51	48	46		Bird song, Distanct chiller noise -low freq whirring. Distant traffice noise. No wind in the flora/fauna. Occasional HGV noise from nearby industrial uses/white noise beepers. Generally quiet.
ST-LT1	D	JR	3312	11/11/2021 09:55	15:00	0	-	11.8	71	8	2	0	1	0	49	69	51	47	45		Bird song, Distanct chiller noise -low freq whirring. Distant traffice noise. No wind in the flora/fauna. Occasional HGV noise from nearby industrial uses/white noise beepers. Generally quiet.
ST-LT1	D	JR	3315	11/11/2021 14:23	15:00	0.4	SE	13.1	56	8	2	0	1	0	55	77	55	52	50		Bird song, Distanct chiller noise -low freq whirring. Distant traffice noise. No wind in the flora/fauna. Occasional HGV noise from nearby industrial uses/white noise beepers. Generally quiet. 14:45 moped drove passed.
ST-LT1	D	JR	3315	11/11/2021 14:38	15:00	0	-	13.1	57	8	2	0	1	0	54	76	55	53	51		Bird song, Distanct chiller noise -low freq whirring. Distant traffice noise. No wind in the flora/fauna. Occasional HGV noise from nearby industrial uses/white noise beepers. Generally quiet.
ST-LT1	E	JR	3304	10/11/2021 19:04	15:00	0	-	11.1	66	8	2	0	1	0	48	69	50	46	43		Bird song, Distanct chiller noise -low freq whirring. Distant traffice noise. No wind in the flora/fauna. Occasional HGV noise from nearby industrial uses
ST-LT1	E	JR	3304	10/11/2021 19:19	15:00	0.4	NE	11.1	66	8	2	0	1	0	45	57	47	44	41		Bird song, Distanct chiller noise -low freq whirring. Distant traffice noise. No wind in the flora/fauna. Occasional HGV noise from nearby industrial uses
ST-LT1	E	ZS & GH	1501	16/11/2021 20:06	15:00	0.9	SW	8.9	74	8	3	0	3	0	51	62	53	51	48		Fan noise from industrial source and road equaly audible / dominant, Alarms in distant *(industrial) just audible, Wind in fauna audible, Soft ground / 8/8 oktas / very humid but no rain, 2009 sirens in distance, 2016 HGV leaves indistral estate
ST-LT1	E	PH	3201 0006	16/11/2021 20:53	15:00	0.9	SW	8.9	74	7	3	2	3	0	51	62	54	51	48		Industrial 'whir' sound from west noticeable. Road likely dominant LAeq. Movement alarms in distance to west.
ST-LT1	N	JR/JW	3306	10/11/2021 23:54	15:00	0	-	10.3	68	8	1	0	1	0	44	70	45	43	41		Distanct chiller noise -low freq whirring. Distant traffic noise. No wind in the flora/fauna. Occasional HGV noise from nearby industrial uses
ST-LT1	N	JR/JW	3306	11/11/2021 00:09	15:00	0	-	10.4	68	8	1	0	1	0	45	63	47	42	41		Distanct chiller noise -low freq whirring. Distant traffic noise. No wind in the flora/fauna. Occasional HGV noise from nearby industrial uses
ST-LT1	N	JR/JW	3309	11/11/2021 01:47	15:00	0	-	10.6	68	8	1	0	1	0	45	73	46	43	41		Distanct chiller noise -low freq whirring. Distant traffic noise. No wind in the flora/fauna. Occasional HGV noise from nearby industrial uses
ST-LT1	N	JR/JW	3309	11/11/2021 02:02	15:00	0	-	10.6	68	8	1	0	1	0	46	69	48	43	41		Distanct chiller noise -low freq whirring. Distant traffic noise. No wind in the flora/fauna. Occasional HGV noise from nearby industrial uses
ST11	D	ZS & GH	1509	17/11/2021 14:43	15:00	2.2	W	11.7	77	0	0	0	4	0	65	82	69	61	52		A-road dominant, fairly frequent traffic on adjacent road, Dry, low wind, 4/8 oktas, soft ground other than roads between position and site
ST11	D	JW	2000 0030	12/11/2021 09:41	15:00	0.9	SSE	11.4	74	8	0	2	4	1	58	67	60	57	54		Road traffic noise dominant at all times. Birds tweeting. Slight flora movement due to light breeze.
ST11	D	JW	2000 0031	12/11/2021 09:57	15:00	1.3	SSE	11.7	74	8	0	2	4	1	57	75	60	56	53		Road traffic noise dominant at all times. Birds tweeting. Slight flora movement due to light breeze.
ST11	D	JW	1037 0021	11/11/2021 15:21	15:00	0.4	SE	12.7	60	8	0	0	4	2	57	73	60	56	52		Road traffic noise dominant at all times. Birds tweeting. Slight drizzle and water dripping off nearby flora.
ST11	D	JW	1037 0022	11/11/2021 15:45	15:00	0	-	12.4	61	8	0	0	4	2	57	73	60	56	51		Road traffic noise dominant at all times. Birds tweeting. Slight drizzle and water dripping off nearby flora.
ST11	D	PH	3201 0027	17/11/2021 15:43	15:00	2.2	WSW	11.6	80	3	0	0	4	0	59	67	62	58	52	1	Pause for person talking. A47 dominant. Bird song.
ST11	N	ZS & GH	1510	18/11/2021 00:41	15:00	1.3	SW	7.2	75	8	2	2	3	0	53	72	56	43	38		Noise climate as before / dominated by road noise, industry just audible in lulls in traffic
ST11	N	ZS & GH	1510	18/11/2021 00:56	15:00	1.8	SW	7.4	75	8	2	2	3	0	57	82	51	40	35		Noise climate as before / dominated by road noise, industry just audible in lulls in traffic
ST11	N	ZS & GH	1510	18/11/2021 01:11	12:15	1.3	SW	7.6	76	8	2	2	3	0	56	79	54	42	37		Noise climate as before / dominated by road noise, industry just audible in lulls in traffic
ST11	N	PH	3201 0011	17/11/2021 00:00	15:00	1.3	SW	10.9	77	5	2	1	3	0	46	62	49	40	35	1	Pause for vehicle alarm. Faint hum type sound from direction of substation. Distant road noise and occasional vehicle on A47.
ST11	N	PH	3201 0012	17/11/2021 00:16	15:00	1.3	SW	10.4	76	7	2	1	3	0	46	64	48	39	35	1	Pause for vehicle pass by. Faint hum type sound from direction of substation. Distant road noise and occasional vehicle on A47. Distant animal noises.

Annex G
2019 baseline monitoring

2019 Baseline Monitoring

Attended baseline noise monitoring was undertaken by suitably qualified personnel at four locations representative of the nearest residential NSRs to the proposed EfW CHP Facility as indicated in **Graphic G 1 Attended Baseline Monitoring Locations**, below.

Short term measurements were undertaken during daytime, evening and night-time periods on 12 November 2019 and 13 November 2019. Measurements consisted of two 15-minute samples during the daytime, one 15-minute sample during the evening and two 15-minute samples during the night-time. Measurements were undertaken with the aim of capturing worst-case (i.e. lowest representative) sound levels, by carrying out measurements during periods with reduced local activity by, where possible, avoiding rush hours, and avoiding the beginning and end of the night-time period.

All survey instrumentation used had undergone laboratory calibration within a period not exceeding two years prior to use (calibrators used are within a period not exceeding one year of calibration). Field calibration checks were performed before and after each measurement set and no significant deviation was found.

Graphic G 1 Attended Baseline Monitoring Locations

With reference to **Graphic G 1 Attended Baseline Monitoring Locations**, monitoring locations referred to as A, B, C and D (from west to east) are considered representative of adjacent Receptors at 9 New Bridge Lane, 10 New Bridge Lane, 'Potty Plants' and 'The Chalet', respectively. Monitoring Location A was approximately 15m west of the dwelling at 9 New Bridge Lane. Monitoring Location B was approximately 30m north of the dwelling at 10 New Bridge Lane. Monitoring Location C was approximately 30m north of the dwelling

known as Potty Plants. Monitoring Location D was approximately 20m west of The Chalet on New Drove.

All monitoring was conducted at a height of approximately 1.5m above local ground level, in free field conditions. Meteorological conditions during the surveying were acceptable with wind speeds tending to range from 0 – 3 m/s, and with some brief periods of very light precipitation. Gusts of wind peaked at around 5 m/s during the evening measurement at Location B. Meteorological conditions had an insignificant effect on the measurement results. The results are therefore considered valid as they were not unduly affected by the confounding influence of adverse weather conditions.

Monitoring Results

Monitoring results for each location are provided in **Table G1** – **Table G4** below.

Subjective observations indicate that the baseline environment at Locations A and B are dominated by road noise during the daytime and evening, and industrial sound during the night-time. At Location C the baseline environment is dominated by road noise with a contribution from industrial sound during the night-time. At Location D the baseline environment was noted to be dominated by industrial sound during all periods except the first daytime measurement in which road noise was dominant, with industrial sound contributing.

Table G1 Monitoring Results: Location A - 9 New Bridge Lane

Start Date & Time	Period	Residual Sound Level, dB $L_{Aeq,15m}$	Background Sound Level, dB $L_{A90,15m}$	Comments
13/11/2019 12:24	Day	63	49	Road dominant. Aeroplanes and activity in industry to W. HVAC whir in background. Fighter jet manoeuvres.
12/11/2019 16:09	Day	54	51	Road dominant. Some activity in industry. Bird calls. Excavator moving around in industrial unit to W. Movement alarm.
12/11/2019 20:50	Evening	50	47	HVAC whir noise seems dominant but continuous road noise still very significant and likely dominating.
13/11/2019 00:45	Night	47	44	Banging & movement alarms from site to NE. HVAC whir noise from roof mounted ventilation outlets of units to W.
13/11/2019 02:09	Night	47	44	Some impulsive sound from NE. HVAC whir from W. Distant movement alarms.

Table G2 Monitoring Results: Location B – 10 New Bridge Lane

Start Date & Time	Period	Residual Sound Level, dB $L_{Aeq,15m}$	Background Sound Level, dB $L_{A90,15m}$	Comments
13/11/2019 12:43	Day	69	49	2 x fighter jet. Road dominant. HVAC whir, horns and bangs in industry audible

Start Date & Time	Period	Residual Sound Level, dB $L_{Aeq,15m}$	Background Sound Level, dB $L_{A90,15m}$	Comments
12/11/2019 16:29	Day	54	52	Road dominant. Some activity in industry. Bird calls. Excavator in unit to NW, movement alarm. Sound of fixed plant - HVAC whir to NW. Bin lid shut around 10 m away.
12/11/2019 21:09	Evening	51	48	HVAC whir/ whine, road noise, wind in foliage
13/11/2019 01:04	Night	47	43	HVAC whir and low frequency from big Distribution Centre (DC) shed (Lineage Logistics Wisbech).
13/11/2019 02:27	Night	48	44	HVAC whir and low frequency from DC. Wind in foliage. Geese honking.

Table G3 Monitoring Results: Location C – Potty Plants

Start Date & Time	Period	Residual Sound Level, dB $L_{Aeq,15m}$	Background Sound Level, dB $L_{A90,15m}$	Comments
13/11/2019 13:06	Day	57	52	Road dominant. Faint rumble from DC just audible. Bird calls.
12/11/2019 16:48	Day	61	57	Road dominant. Wind picking up. Aeroplane.
12/11/2019 21:29	Evening	54	47	Road dominant. Contribution from wind noise and industrial noise from DC.
13/11/2019 01:24	Night	50	40	Low frequency & hum from DC. Wind in foliage. Distant movement alarms. Road dominant. Helicopter in distance.
13/11/2019 02:46	Night	49	43	Low frequency & hum from DC. Road dominant. Wind in foliage. Distant movement alarms. HVAC whir.

Table G4 Monitoring Results: Location D – The Chalet, New Drove

	Period	Comments

Start Date & Time		Residual Sound Level, dB $L_{Aeq,15m}$	Background Sound Level, dB $L_{A90,15m}$	
13/11/2019 13:27	Day	58	53	$L_{Aeq,T}$ = road and contribution from fighter jets, $L_{A90,T}$ = Industry. Engine rumble and vehicles at DC and fuel store to NE. Movement alarms.
12/11/2019 17:09	Day	58	54	Industry dominant, some low frequency rumble. Vehicles. Road significant contributor. Some dog barks.
12/11/2019 21:50	Evening	53	51	Industry dominant. Whir and movement alarms, materials being set down. Road noise significant contributor.
13/11/2019 01:44	Night	54	53	Rumble from DC. Distant movement alarm. Faint sound of forklift? Horns
13/11/2019 03:05	Night	54	52	Rumble from DC. Some bangs. Horns, engines and vehicle movements.

The monitoring results in **Table G1** and **Table G2** indicate that baseline conditions at 9 and 10 New Bridge Lane (The NSRs in closest proximity to the site) are very similar, with 0 – 1 dB difference in measured residual and background sound levels in all periods, except for the first daytime measurement at Location A which was influenced by the sound of fighter jet manoeuvres.

Residual sound levels at Potty Plants, shown in **Table G3**, are above those measured at 9 and 10 New Bridge Lane owing to sound arising from vehicle movements on the A47. Daytime background sound levels at Potty Plants are also above those measured at 9 & 10 New Bridge Lane, however, evening and night-time background sound levels are similar.

Monitoring results for The Chalet on New Drove, shown in **Table G4**, indicate that baseline sound levels at this location are generally higher than at the other NSR locations due to activity in the Distribution Centre (DC) and fuel store located west and northwest of The Chalet, respectively.

Overall, the measured sound levels are considered to be typical of an urban fringe area influenced by a mixture of transport, industrial and commercial sound sources.