Cory Environmental Holdings Limited

CORY DECARBONISATION PROJECT

Noise Impact Assessment

SEPTEMBER 2025

PUBLIC

Cory Environmental Holdings Limited

CORY DECARBONISATION PROJECT

Noise Impact Assessment

ACOUSTICS REPORT PUBLIC

DATE: SEPTEMBER 2025

WSP

WSP House
70 Chancery Lane
London
WC2A 1AF

Phone: +44 20 7314 5000

WSP.com

QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Final
Remarks	Draft	First Draft	Second Draft	Final
Date	08/09/2025	24/09/2025	25/09/2025	30/09/2025
Prepared by	Najwa Adnan-Smith	Najwa Adnan-Smith	Najwa Adnan-Smith	Najwa Adnan-Smith
Signature				
Checked by	Esteban Olmos	Esteban Olmos	Esteban Olmos	Esteban Olmos
Signature	Esteban.Olmos@wsp.com Digitally signed by Esteban.Olmos@wsp.com DN: cn=Esteban.Olmos@wsp.com Date: 2025.09.29 13:49:49 +01'00'	Esteban.Olmos@wsp.com Digitally signed by Esteban.Olmos@wsp.com DN: cn=Esteban.Olmos@wsp.com Date: 2025.09.29 13:50:16 +01'00'	Esteban.Olmos@wsp.com Digitally signed by Esteban.Olmos@wsp.com DN: cn=Esteban.Olmos@wsp.com Date: 2025.09.29 13:50:29 +01'00'	Esteban.Olmos@wsp.com Digitally signed by Esteban.Olmos@wsp.com DN: cn=Esteban.Olmos@wsp.com Date: 2025.09.29 13:50:40 +01'00'
Authorised by	Esteban Olmos/ Jenny Warhurst	Esteban Olmos/ Jenny Warhurst	Esteban Olmos/ Jenny Warhurst	Esteban Olmos/ Jenny Warhurst
Signature	Esteban.Olmos@wsp.com Digitally signed by Esteban.Olmos@wsp.com DN: cn=Esteban.Olmos@wsp.com Date: 2025.09.29 17:06:37 +01'00'	Esteban.Olmos@wsp.com Digitally signed by Esteban.Olmos@wsp.com DN: cn=Esteban.Olmos@wsp.com Date: 2025.09.29 17:06:54 +01'00'	Esteban.Olmos@wsp.com Digitally signed by Esteban.Olmos@wsp.com DN: cn=Esteban.Olmos@wsp.com Date: 2025.09.29 17:07:07 +01'00'	Esteban.Olmos@wsp.com Digitally signed by Esteban.Olmos@wsp.com DN: cn=Esteban.Olmos@wsp.com Date: 2025.09.29 17:07:19 +01'00'
File Reference	UK0042614.2444 Noise Impact Assessment Stage 3	UK0042614.2444 Noise Impact Assessment Stage 3	UK0042614.2444 Noise Impact Assessment Stage 3	UK0042614.2444 Noise Impact Assessment Stage 3
Report number	001	002	003	004

CONTENTS

TABLES

FIGURES

APPENDICES

APPENDIX A

LIMITATIONS OF REPORT

APPENDIX B

NOISE MONITORING FORMS

APPENDIX C

NOISE MONITORING GRAPHS

APPENDIX D

CERTIFICATION OF CALIBRATION

EXECUTIVE SUMMARY

A noise impact assessment has been undertaken in accordance with BS 4142:2014+A1:2019 to determine the likely noise impact arising from the operation of the Carbon Capture Facility. Considering the results of the initial impact estimation, contextual evaluation and the additional mitigation measures to be implemented, it is concluded that the operation of the Carbon Capture Facility will not lead to a significant adverse noise impact or noise 'pollution' at receptors.

1 INTRODUCTION

Cory Environmental Holdings Limited (hereafter referred to as 'Cory') has instructed WSP to produce a Noise Impact Assessment (NIA) to accompany the application to the Environment Agency (EA) under The Environmental Permitting (England and Wales) Regulations 2016 (Environmental Permitting Regulations) for an Environmental Permit (EP) to operate a Carbon Capture Facility (CCF) (the Proposed Scheme) in relation to the Cory Decarbonisation Project. The aim of the NIA is to assess the potential noise impact from the CCF on the nearest sensitive receptors.

This NIA is based on information from the Environmental Statement (the ES) accompanying the application for a Development Consent Order (DCO) for the Cory Decarbonisation Project. Additional information has also been included to account for any changes in the assessment methodology since the submission of the ES.

Noise modelling files and spreadsheets with the raw noise survey data and noise sources used in the assessment are also submitted with the application.

1.1 SITE DESCRIPTION

The location of the Proposed Scheme (the Site) is within the London Borough of Bexley, within the Belvedere Industrial Area, a Strategic Industrial Location, as shown in **Figure 1-1**. The Belvedere Industrial Area includes a number of industrial estates, including:

- Hailey Road Industrial Estate, approximately 60m south of the Site Boundary;
- Fishers Way Industrial Estate, approximately 80m east of the Site Boundary;
- Waldrist Way Industrial Estate, approximately 330m southwest of the Site Boundary;
- Crabtree Manorway North, approximately 600m east of the Site Boundary; and
- River Wharf Business Park, approximately 600m east of the Site Boundary.

The Crossness Sewage Treatment Works is located approximately 230m to the west of the Site Boundary, comprises a disused sludge incinerator and the Crossness Pumping Station.

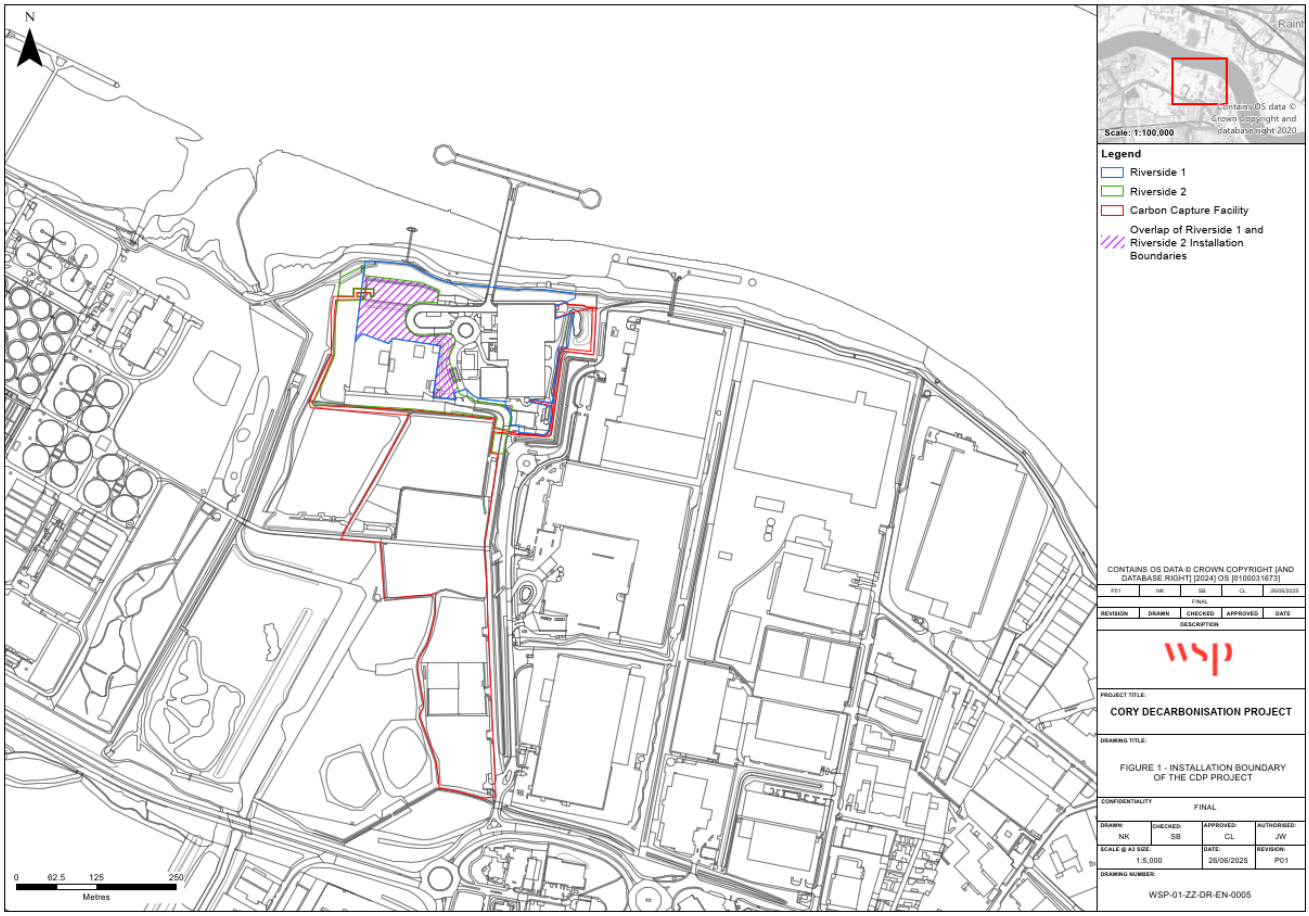
The closest residential properties located in Clydesdale Way are approximately 120m to the southeast of the Site at its closest point. Community facilities lie within 120m of the Site Boundary including the Morgan Public House, approximately 95m south (on the A2016 Picardy Manorway) and Travelodge London Belvedere approximately 110m south.

The Site is split into the following zones:

- Riverside 1 and Riverside 2;
- Carbon Capture Facility; and
- Biodiversity Mitigation and Enhancement Area.

Of these zones, the Proposed Scheme includes fixed plant or pipework within the Riverside 1 and Riverside 2 zone and within the CCF. These two zones are therefore relevant to the NIA.

Figure 1-1: Site boundary location plan



1.2 PROJECT DESCRIPTION

The CCF will be constructed on land immediately adjacent to Cory's existing Riverside Resource Recovery Facility (Riverside 1) and the soon to be operational Riverside Energy Park (Riverside 2), within the London Borough of Bexley and would serve the operation of both Riverside 1 and Riverside 2.

The CCF will comprise the following:

- Carbon Capture Plant(s), each comprising:
  - Flue Gas Pre-Treatment;
  - Absorber Column(s) and Stack(s);
  - Back Pressure Turbine and Generator;
  - Solvent Regeneration System;
  - Rich Solvent/Lean Solvent Heat Exchanger; and
  - Solvent Storage.
- CO_2 Processing Plant, each comprising:
  - Compression;
  - Dehydration;
  - Liquefaction; and

- CO_2 Vents.

- LCO_2 Buffer Storage Area comprising:
  - Temporary Storage; and
  - Boil Off Gas Processing.
- LCO_2 Pipelines;
- Flue gas Supply Ductwork;
- Supporting Plant, comprising:
  - Cooling System;
  - Chemical Storage and Distribution Handling Facilities; and
  - Effluent Treatment Plant.
- Amenities and other, comprising:
  - Gatehouse;
  - Control Room;
  - Welfare Facilities; and
  - Stores and Workshop.

This assessment considers two lines from Riverside 1 and Riverside 2 to be combined into a single Stack at the Carbon Capture Facility.

1.3 PREVIOUS ASSESSMENT

The ES submitted to accompany the DCO application for the Proposed Scheme outlined the mitigation measures which would ensure that the operational noise rating levels from the Proposed Scheme do not exceed the typical background sound levels as predicted at 1m from the façade of the nearest sensitive receptors (as a free-field noise level), with the exception of plant operating in an emergency. These mitigation measures are described in **Section 7** of this report.

The noise calculations for the ES were undertaken using CadnaA noise prediction software. At the time of the assessment, the software utilised the now superseded guidance ISO 9613-2:1996[1] for the calculations of noise. An updated version of the guidance ISO 9613-2:2024[2] was published in 2024. This guidance was consequently used to update the calculation methodology within the noise modelling software and as such, there are variations to the results presented in the ES compared to the updated results. This NIA presents both sets of results for comparison and determination of impact at the nearest sensitive receptors.

[1] International Organization for Standardization. (1996). ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. Switzerland.
[2] International Organization for Standardization. (2024). ISO 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors. Switzerland.

2 ASSESSMENT LOCATION

2.1 SENSITIVE RECEPTORS

The nearest noise sensitive receptors (NSRs) within 600m of the Site have been considered. An assessment of noise effects has been carried out at a selection of the closest NSRs, in order to produce a robust assessment.

The following NSRs have been considered. They are shown in **Figure 2-1**:

- Residential properties on Clydesdale Way (approximately 120m southeast of the Site Boundary);
- Hospitality facilities: Travelodge London Belvedere (approximately 110m south of the Site Boundary).

Given the industrial nature of the area, the other non-residential receptors surrounding the Site are not considered noise sensitive.

A number of footpaths and public rights of way are situated within the vicinity of the Site. However, as their use is transitory, they are considered to have a low sensitivity to noise and noise affecting users of these routes would not be considered significant pollution. Therefore, they have not been considered further.

2.2 BASELINE NOISE SURVEY

A baseline noise survey was undertaken for the ES to quantify the existing baseline noise levels at the nearest NSRs, as identified above. Noise monitoring was carried out at three measurement positions between 16th March to the 21st March 2023. Continuous noise measurements were taken at three locations considered representative of the NSRs. A summary of the monitoring locations is presented below.

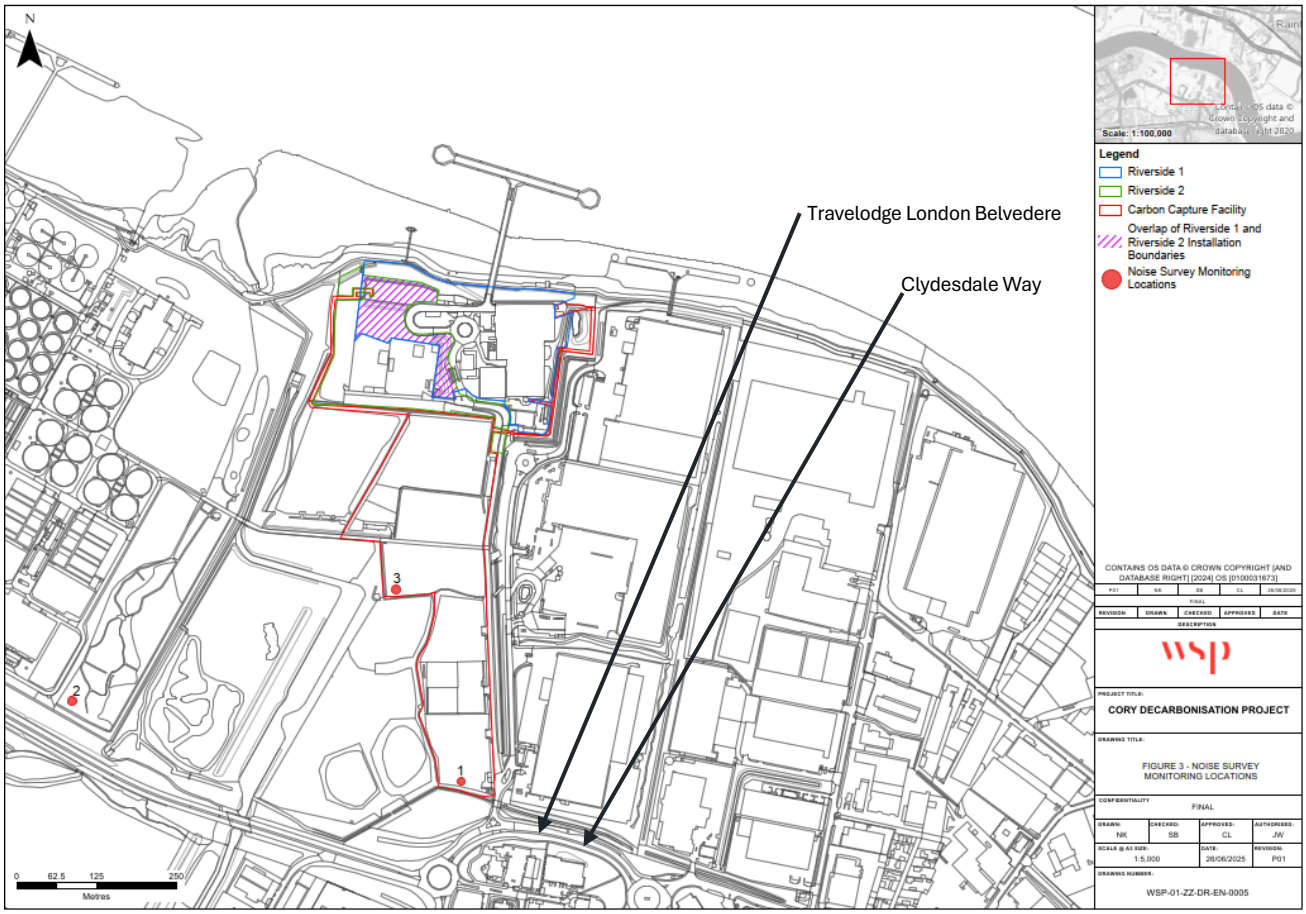
Table 2-1: Noise monitoring position description

Measurement Position	Description	Photo
MP1	Microphone installed on a pole at a height of 4m on southern boundary fence of Gannon parcel. Measurements taken between 11:00 on Thursday 16th March until 11:00 on Tuesday 21st March 2023. Location is considered representative of the ambient noise levels incident upon the London Belvedere Travelodge, and other residential dwellings located to the southeast on the opposing side of the A2016.	

Measurement Position	Description	Photo
MP2	Microphone installed on a tripod at a height of 1.5m to the southwest of the Site, within the Crossness Sewage Treatment Works site, and overlooking Crossness LNR to the east. Measurements taken between 14:00 on Thursday 16th March until 11:00 on Monday 20th March 2023. Location is considered representative of the ambient noise levels close to the A2016 Eastern Way.	
MP3	Microphone installed on fence at a height of 2.5m. Measurements taken between 10:00 on Thursday 16th March until 10:00 on Tuesday 21st March 2023. Location is considered representative of the ambient noise levels at the Crossness LNR.	

The future baseline noise climate at the nearest sensitive receptors may be influenced by changes in road traffic noise or due to the industrial and commercial uses in the area. Whilst the potential for future development in the area could give rise to higher ambient noise levels, there is unlikely to be a significant change to the background sound levels. Furthermore, any future developments would only give rise to an increase in noise levels, and therefore the use of existing noise levels is considered to be a conservative approach.

Figure 2-1: NSRs and noise monitoring locations



3 EQUIPMENT AND METEOROLOGY

3.1 SURVEY METHODOLOGY

Measurements were taken in accordance with BS 7445-1:2003[3] and BS 4142:2014+A1:2019[4]. Meteorological conditions were conducive to obtaining accurate and reliable noise data.

All measurements were made using Class 1 sound monitoring equipment. All sound level meters had been calibrated to traceable standards within the previous 24 months, and the calibrator within the previous 12 months. All the sound level meters were calibrated onsite at the beginning and end of the monitoring periods. Any drifts in calibration level were within accepted tolerances.

A summary of the results obtained from these measurements is presented in **Section 5** of this report.

Table 3-1 presents details of the equipment used whilst undertaking the noise monitoring surveys. Certification of calibration is presented in **Appendix D**.

Table 3-1: Noise monitoring equipment details

Measurement Location	Equipment Description	Manufacturer & Type No.	Serial No.	Calibration Due Date
MP1	Sound Level Meter	01dB-Stell Duo 'Datalogging Integrating Sound Level Meter'	10594	16 May 2024
	Pre-amplifier	01dB-Stell PRE 22 Preamplifier	1507076	
	Microphone	G.R.A.S Type 40CD Condenser Microphone	224313	
	Calibrator	01dB Cal 21	34924020	
MP2	Sound Level Meter	01dB-METRAVIB Blue Solo 'Datalogging Integrating Sound Level Meter'	61331	22 October 2023
	Pre-amplifier	01dB-METRAVIB PRE 21 S	14575	
	Microphone	01dB Mereavib MCE 212 Microphone	92344	
	Calibrator	Norsonic type 1251 Sound Calibrator	31460	26 September 2023

[3] British Standards Institute (BSI). (2003). BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures. United Kingdom.
[4] British Standards Institute (BSI). (2014). BS 4142:2014+A1:2019 Method for Rating Industrial and Commercial Sound. United Kingdom.

Measurement Location	Equipment Description	Manufacturer & Type No.	Serial No.	Calibration Due Date
MP3	Sound Level Meter	01dB-Stell Duo 'Datalogging Integrating Sound Level Meter'	10616	1 June 2023[1]
	Pre-amplifier	01dB-Stell PRE 22 Preamplifier	10180	
	Microphone	G.R.A.S Type 40CD Condenser Microphone	154423	
	Calibrator	01dB Cal 21	34924053	13 May 2023

[1]Calibration due date at time of survey, equipment has since been calibrated prior to the issue of this report.

4 METHODOLOGY

4.1 NOISE AND VIBRATION MANAGEMENT: ENVIRONMENTAL PERMITS (ENVIRONMENT AGENCY, 2022)

This guidance[5] provides advice on how the EA will assess noise from industrial activities, legal considerations in the management of noise and vibration, how to carry out a noise impact assessment and what operators should include in a noise management plan.

The EA have produced this guidance to help holders and potential holders of permits to apply for, vary, and comply with their permits. Environmental permits have conditions that require operators to control pollution – this includes controlling noise and vibration.

Required competencies and standards are specified whereby assessments should be carried out by competent personnel, for example members of the Institute of Acoustics (IOA). British Standard BS 4142:2014+A1:2019 should be used to quantify the environmental noise impact from industrial processes.

The guidance provides the effect levels at sensitive receptors in relation to the closest corresponding BS 4142 criteria for each defined level. A description of the level and the actions required dependant on the level is also included. These are reproduced in **Table 4-1**.

Table 4-1: Noise impact description and required actions for environmental permits

Description of impact		BS 4142 descriptor
Unacceptable level of audible or detectable noise	This level of noise means that significant pollution is being, or is likely to be, caused at a receptor (regardless of whether you are taking appropriate measures). You must take further action, or you may have to reduce or stop operations. The environment agencies will not issue a permit if you are likely to be operating at this level.	The closest corresponding BS 4142 descriptor is 'significant adverse impact' (following consideration of the context).
Audible or detectable noise	This level of noise means that noise pollution is being (or is likely to be) caused at a receptor. Your duty is to use appropriate measures to prevent or, where that is not practicable, minimise noise. You are not in breach if you are using appropriate measures. But you will need to rigorously demonstrate that you are using appropriate measures.	The closest corresponding BS 4142 descriptor is 'adverse impact' (following consideration of the context).

[5] Environment Agency. (2022). Noise and vibration management: environmental permits. United Kingdom. [Available at: Noise and vibration management: environmental permits - GOV.UK]

Description of impact		BS 4142 descriptor
No noise, or barely audible or detectable noise	This level of noise means that no action is needed beyond basic appropriate measures or best available techniques (BAT).	The closest corresponding BS 4142 descriptor is 'low impact or no impact' (following consideration of context). Low impact does not mean there is no pollution. However, if you have correctly assessed it as low impact under BS 4142, the environment agencies may decide that taking action to minimise noise is a low priority. Note that BS 4142 is unlikely to be the appropriate methodology on its own to assess low frequency noise.

4.2 METHOD IMPLEMENTATION DOCUMENT (MID) FOR BS4142

This guidance[6], produced by the EA, Natural Resources Wales and Northern Ireland Environment Agency, provides additional guidance on how BS 4142 should be implemented in the assessment of noise from permitted processes.

Important points set out in the MID include:

a) The importance of soundscape in the contextual assessment;

b) The importance of field calibration testing;

c) The need to ensure that wind speed and direction is suitably measured and recorded; and

d) The priority of subjective character evaluation (at the assessment location) over objective assessment methods.

[6] Environment Agency. (2023). Method implementation document (MID) for BS 4142. United Kingdom. [Available at: Method implementation document (MID) for BS 4142 - GOV.UK]

4.3 BS 4142:2014+A1:2019: METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND (BRITISH STANDARDS INSTITUTE, 2014)

BS 4142 primarily provides a method by which to determine the significance of sound of an industrial nature (e.g., the 'specific sound' from proposed new plant units) at nearby noise sensitive receptors.

The specific sound level may then be corrected for acoustic characteristics using the penalties below, if appropriate:

a) Tonality up to 6 dB;

b) Impulsivity up to 9 dB;

c) Intermittency up to 3 dB; and

d) Other sound characteristics 3 dB.

This resultant level is then termed the 'rating level' (denoted as $L_{Ar,Tr}$), whether or not a penalty is applied.

An initial estimate of the impact is obtained by subtracting the background sound level from the derived rating level. Typically, the greater the difference, the greater its magnitude is. In the context of the Standard, adverse impacts include, but are not limited to, annoyance and sleep disturbance. It also recommends the following assessment scale:

- *"Typically, the greater this difference, the greater the magnitude of impact.*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on context;*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on context; and*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

Using the results of the baseline noise survey, noise emission targets for the Proposed Scheme have been derived in accordance with BS 4142: 2014+A1:2019.

4.4 ISO 9613-2:2024 ACOUSTICS - ATTENUATION OF SOUND DURING PROPAGATION OUTDOORS – PART 2: ENGINEERING METHOD FOR THE PREDICTION OF SOUND PRESSURE LEVELS OUTDOORS (INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, 2024)

This Standard specifies methods of calculating the attenuation of sound propagating outdoors in order to predict the level of environmental noise at distant locations from various sound sources. Part 2 specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources.

4.5 BS 7445-1:2003 DESCRIPTION AND MEASUREMENT OF ENVIRONMENTAL NOISE – PART 1: GUIDE TO QUANTITIES AND PROCEDURES (BRITISH STANDARDS INSTITUTE, 2003)

BS 7445-1:2003 defines and prescribes best practice during recording and reporting of environmental noise. It is inherently applied in all instances when making environmental noise measurements and is applicable to the baseline noise measurements taken to inform this chapter. The document advises that the information to be reported should include:

a) Measurement technique;

b) Conditions prevailing during measurements;

c) Qualitative data; and

d) Connotation of the sound.

5 NOISE MONITORING DATA AND PREDICTIONS

5.1 BASELINE NOISE SURVEY RESULTS

A summary of the results obtained from the continuous noise measurements is presented in **Table 5-1**. The raw survey results are included on a separate document for reference and noise monitoring forms are presented in **Appendix B**.

Table 5-1: Summary of noise monitoring data

Measurement position	Daytime Noise Level (07:00 – 23:00) dB $L_{Aeq,16hours}$	Night-time Noise Level (23:00 – 07:00) dB $L_{Aeq,8hours}$	Typical Daytime Background Sound Level (07:00 – 23:00) dB $L_{A90,15minutes}$	Typical Night-time Background Sound Level (23:00 – 07:00) dB $L_{A90,15minutes}$
MP1	60	55	54	49
MP2	62	56	58	46
MP3	57	51	50	49

The ambient noise levels have been derived for the typical 16-hour day (07:00 – 23:00), and 8-hour night (23:00 – 07:00). The two periods have been used to provide context for the operation noise assessment.

Histograms showing the frequency of occurrence of background sound levels at each measurement position are presented in **Appendix C** of this report. These have been used to determine the typical background sound level, based on the most commonly occurring measured $L_{A90,15mins}$ value. The typical background sound levels were then used to inform the operation phase noise assessment.

5.2 OPERATIONAL NOISE MODELLING

A computerised noise model of the site and the surrounding area was created using CadnaA noise prediction software, which implements calculations to predict the effects on noise propagation of geometric spreading, topography, screening, meteorological conditions, based on information provided by the user regarding the sources of noise. Calculations were carried out in accordance with ISO 9613-2:2024 which assumes a moderate downwind condition in all calculations, as recommended in Section 5 of the same standard. The results from the ES which were calculated using the superseded ISO:9613-2:1996 and they are also presented for comparison purposes.

5.2.1 ASSUMPTIONS

The following assumptions have been adopted in the noise model:

- Ground absorption has been set at 1 to approximate ground cover between the noise sources and the facades of the proposed residential properties where the ground is predominantly acoustically absorbent. Areas with significant levels of hard ground have been modelled with a ground absorption of 0;
- The order of reflections is set within the model at 3;

- Ground topography based on 1m Digital Terrain Model (DTM) data;
- The base mapping has been established using Ordnance Survey (OS) OpenMap;
- The heights of existing buildings located near to the Proposed Scheme have been approximated individually using online mapping software;
- Heights of the residential properties have been determined using online mapping software; and
- Noise levels have been predicted at the facades of the residential properties on Clydesdale Way at a height of 7m above ground level for the first-floor apartments and increasing by 3m for each subsequent floor. Noise levels at the Travelodge London Belvedere have been predicted at a height of 5m.

Table 5-2 identifies the assumptions made for sound power levels and heights of each noise source that has been modelled for the operation phase of the Proposed Scheme, based on the evolving design.

Table 5-2: Operation noise source assumptions

Noise Source	Sound Power Level L_{wA} dB	Height (m)	Information Source
Stack(s)	103	60[7]	Sound power level equivalent to the stack for Riverside 2, excludes the Absorber Column(s). Height of the Absorber Column(s) and Stack(s) is 113m.
Flue Gas Fan	85	9.8	Based on similar development (professional judgement).
Pumps	104	1	WKC Group Pump Noise Calculator, 450kW rich solution pump, assumed worst-case speed range.
Pumps associated with solvent/waste tanks	96	1	WKC Group Pump Noise Calculator, 100kW pump, assumed 1500rpm speed range.
Back Pressure turbines	85	6	Based on similar development (professional judgement).
33/11kV Transformers	78	6	Based on NEMA TR1[8] and the Institute of Electrical and Electronics Engineers (IEEE) standards for specifying sound pressure and converting to sound power.
132/33kV Transformers	86	6	Based on NEMA TR1 and the IEEE standards for specifying sound pressure and converting to sound power.

[7] A precautionary height of 60m was used for the Stack(s) to represent a worst-case assessment in terms of noise propagation from this component to the nearest noise sensitive receptors.
[8] National Electrical Manufacturers Association (NEMA). (2019). NEMA Standards Publication TR 1-2013 (R2019) Transformers, Step Voltage Regulators and Reactors. United States of America.

Noise Source	Sound Power Level L_{wA} dB	Height (m)	Information Source
CO_2 Vents	110	11.6	Based on similar development (professional judgement).
CO_2 Compressors	90	11	The CO_2 compressors are a part of the Compression Plant.
Refrigeration Package	98	1	Based on similar development (professional judgement).
Cooling Solution	93	15	Assumed as part of design based on similar developments.
Backup ASHP Fans	98	7.75	Assumed as part of design based on similar developments, height assumed to be 2.5m above the roof of building as a worst case.

It has been assumed that all plant would be running constantly for the entire assessment period during both the daytime and night-time as a worst-case with the exception of the CO_2 vents.

For the CO_2 vents, the sound power level presented above is derived from a 3-minute duration. Due to the nature of its operation, the sound power level has been assumed to only occur for 3 minutes within the time period of 1 hour during the daytime and 15 minutes during the night-time.

There are emergency pressure relief valves associated with the onsite LCO_2 temporary storage. These valves will release LCO_2 should pressure within the temporary storage become too great, to avoid damage. As the valves will only be used in emergency situations and are not considered part of typical activities, they have not been included within this assessment.

5.2.2 NOISE MODELLING RESULTS

The results of the noise modelling based on the above assumptions are presented in **Table 5-3**. These results are calculated based on the updated ISO 9613-2:2024. The results presented in the ES and based on the superseded ISO 9613-2:1996 are also included for comparison purposes.

Table 5-3: Predicted specific sound levels from the Proposed Scheme at receptors

Receptor	ISO 9613-2:1996 (from the ES)		ISO 9613-2:2024 (updated results)	
	Daytime	Night-time	Daytime	Night-time
Clydesdale Way	50	50	52	53
Travelodge London Belvedere	51	51	53	53

The predicted specific sound levels are below the measured ambient noise levels of 60 dB $L_{Aeq,16h}$ during the daytime and 55 dB $L_{Aeq,8h}$ during the night-time.

6 NOISE IMPACT ASSESSMENT

The assessment to determine the noise impact associated with the operation phase are set out below.

The background sound level has been determined at Travelodge London Belvedere and the residential receptors at Clydesdale Way from the data captured at MP1 as identified previously in **Table 5-1**.

An acoustic feature correction of +3 dB has been applied based on the assumption the cooling fans at the Heat Transfer Station will have a tonal component. This is considered to be a precautionary approach as full, one-third octave band data for the plant is not available at this time.

Table 6-1 presents the initial estimate for operational noise from the Proposed Scheme at the receptors. This is an update of the results presented in the ES and the results taken from the ES is indicated within brackets in italics.

Table 6-1: Operational noise impact assessment

Receptor	Time Period	Background sound level dB $L_{A90,\,T}$	Specific sound level at nearest noise sensitive receptor dB $L_{Aeq,T}$	Acoustic feature correction	Rating sound level dB $L_{Ar,Tr}$	Excess of rating sound level over background sound level
Clydesdale Way	Daytime	54	52 *(50)*	+3	55 *(53)*	+1 *(-1)*
	Night-time	49	53 *(50)*	+3	56 *(53)*	+7 *(+4)*
Travelodge London Belvedere	Daytime	54	53 *(51)*	+3	56 *(54)*	+2 *(0)*
	Night-time	49	53 *(51)*	+3	56 *(54)*	+7 *(+5)*

In accordance with BS 4142, a difference of around +5 dB is likely to be an indication of an adverse impact, depending on context, and a difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on context. The results above show that a significant adverse impact from the Proposed Scheme is unlikely to occur at the receptors as the rating levels are predicted to exceed the background levels by no more than +7 dB without any additional mitigation measures in place.

A noise impact assessment should consider all pertinent contextual factors, in line with the guidance in BS 4142, before modifying the initial impact estimation accordingly. In this case the key contextual considerations are:

- **Frequency of exposure**: The back-up Air Source Heat Pump (ASHP) fans associated with the Heat Transfer Station of the Proposed Scheme are the greatest source of noise at both sensitive receptors. The ASHP will only be in use when thermal capacity cannot be provided by Riverside 1 or Riverside 2. The ASHP will be active for approximately 1,500 hours per year, which is

approximately 17% of the time. This would support a downward modification to any estimated impact magnitude.

- **The established use of the Site**: The Proposed Scheme is located within an existing large commercial/industrial area and therefore will not be out of character with the existing noise climate. This would support a downward modification to any estimated impact magnitude.
- **The sensitivity of the receptor**: The exposed facades of the residential development on Clydesdale Way and the Travelodge London Belvedere are orientated towards a busy A-road (A2016 Picardy Manorway) and consequently are designed with acoustic façade mitigation to minimise any potential noise impact. Furthermore, the Travelodge London Belvedere includes air conditioning minimising the need to open windows during periods of hot weather. This would support a downward modification of the initial impact estimation.
- **The character of the residual sound compared to the character of the specific sound**: The characteristics of the sound, being industrial in nature, are similar to that of the prevailing noise environment which is dominated by existing industrial/commercial noise and road traffic noise. This would support a downward modification of the initial impact estimation.
- **The level of the residual sound compared to the level of the specific sound**: The level of the ambient sound (60 dB $L_{Aeq,16h}$ during the day and 55 dB $L_{Aeq,8h}$ during the night), is higher than the predicted specific sound level (53 dB $L_{Aeq,T}$) generated by the operation of the Proposed Scheme at the receptors on Clydesdale Way and the Travelodge London Belvedere. This would support a downward modification to any estimated impact magnitude.

Additional mitigation measures are also considered and described in **Section 7** of this report which targets the reduction of noise from the ASHP fans associated with the Heat Transfer Station heating facility of the Proposed Scheme in order to minimise adverse impacts.

On balance, considering the results of the initial impact estimation, contextual evaluation and the additional mitigation measures to be implemented, it is concluded that the operation of the Proposed Scheme will not lead to a significant noise adverse impact or noise ‘pollution’ at receptors.

7 NOISE CONTROL

The ES submitted to accompany the DCO application for the Proposed Scheme outlined the mitigation measures which would ensure that the operational noise rating levels from the Proposed Scheme do not exceed the typical background sound levels as predicted at 1m from the façade of the nearest sensitive receptors (as a free-field noise level). This requirement is included in the Draft DCO as Requirement 20 Control of Noise During Operation in the form of 'Operational Noise Limit' at the identified receptors except for plant operating in an emergency. The operational noise limits are reproduced below.

Table 7-1: Draft DCO operational noise requirement

(1) Location	(2) Day-time Operational Noise Limit $L_{Ar,Tr}$ dB	(3) Night-time Operational Noise Limit $L_{Ar,Tr}$ dB
Clydesdale Way	54	49
Travelodge London Belvedere Hotel	54	49

The results from the ES showed that without any additional mitigation measures, the operational noise rating levels would exceed the operational noise limits by up to +5 dB. However, the results obtained from the updated calculations using ISO 9613-2:2024 showed that the rating levels would exceed the noise limits by up to +7 dB in the same scenario.

The back-up ASHP fans of the Proposed Scheme are the greatest source of noise at Clydesdale Way and the Travelodge London Belvedere. As such, while the ASHP will only be in operation when thermal capacity from Riverside 1 or 2 is unavailable, the following potential mitigation measures have been reviewed.

Any one measure would provide the attenuation required to result in a reduction in noise levels such that the operational noise rating levels do not exceed the operational noise limits above.

- locating the ASHP fans further away and behind the Heat Transfer Station, such that the building acts as a barrier to the noise from the fans; or
- selecting quieter ASHP fans; or
- erecting an acoustic barrier around the ASHP fans.

Although the details of the final mitigation measures are not yet available, through the DCO, a Noise Mitigation Plan to detail the final mitigation measures and demonstrate that the CCF will be able to be operated in compliance with the operational noise limits will be prepared and submitted to and approved by the London Borough of Bexley in writing prior to the operation of the Proposed Scheme. Compliance with this plan (and thus the noise limits) is therefore secured through the DCO.

8 CUMULATIVE NOISE IN COMBINATION WITH THE RIVERSIDE 1 AND THE RIVERSIDE 2 FACILITIES

During a pre-application meeting, the EA expressed a wish to understand combined noise impacts arising from Proposed Scheme in combination with the existing Riverside 1 facility and the planned operation of the Riverside 2 facility (currently under construction), which are both situated nearby, on the southern bank of the River Thames.

In support of this, predicted noise from Riverside 1 and Riverside 2 have been considered below. In addition, information regarding measured background sound levels carried out for the Riverside 1 and Riverside 2 planning applications have been sourced and compared with the background sound levels measured for the NIA carried out for the ES.

The Riverside 1 planning application noise impact assessment predicted a specific sound level of 34 dB from the development at receptors on North Road. North Road lies approximately 290 m to the south of the Clydesdale Way and the Travelodge London Belvedere. Correcting for distance, this results in a predicted specific sound level of 35.5 dB at these NSRs. No corrections were applied for acoustic features, so the predicted specific sound level equals the rating level.

Predicted noise levels from Riverside 2 have been taken from the results of modelling carried out for and reported in the document Control of Operational Noise, in accordance with Requirement 19, Schedule 2, of the DCO. Noise from this development was predicted at the Hackney House apartments. This receptor is the same as the receptor in the ES NIA referred to as Clydesdale Way. Given the large separation distance between the Riverside 2 development and both receptors, Clydesdale Way and the Travelodge London Belvedere, and the close proximity between them, the predicted noise level at the Travelodge London Belvedere is not expected to be significantly different to the predicted noise level at Clydesdale Way. The predicted specific sound level arising from the operation of Riverside 2 at these receptors is 39.4 dB. No corrections were applied for acoustic features, so the predicted specific sound level equals the rating level.

Requirement 20 of the Draft DCO secures a night-time rating noise level, $L_{Ar,Tr}$ of 49 dB from the Proposed Scheme (equal to the background sound level), for receptors on Clydesdale Way and the Travelodge London Belvedere. Taking a cautious approach, it is assumed that an acoustic feature correction of +3 dB is required, so that a specific sound level of 46 dB would need to be achieved.

Logarithmically summing the predicted specific sound levels from Riverside 1, Riverside 2 and from the noise limit in DCO Requirement 20 for the Proposed Scheme results in a cumulative predicted specific sound level of 47 dB. A rating level is calculated assuming the same acoustic feature correction of +3 dB would be applied to the cumulative specific sound level, resulting in a rating level, $L_{Ar,Tr}$ of 50 dB.

Table 8-1 presents an initial estimate of cumulative noise for Riverside 1 and Riverside 2 plus the noise limit for the Proposed Scheme in accordance with BS 4142 based on the noise monitoring carried out for the ES NIA.

Table 8-1: Calculated cumulative noise level with the inclusion of predicted noise levels from Riverside 1 and Riverside 2

Receptor	Time Period	Background sound level dB $L_{A90, T}$	Specific sound level dB $L_{Aeq,T}$	Acoustic feature correction	Rating sound level, dB $L_{Ar,Tr}$	Excess of rating sound level over background sound level, dB
Travelodge London Belvedere	Daytime	54	47	+3	50	-4
	Night-time	49	47	+3	50	+1

The initial estimate indicates a low impact (barely audible or detectable noise) during the daytime and at night.

The contextual factors described in **Section 6** relevant to noise from the Proposed Scheme in isolation would also be relevant to the cumulative noise level. As all of the contextual factors would support a downward modification of the initial estimate of the impact this indicates that the noise from the Proposed Scheme would be barely audible or detectable at the nearest NSRs.

Table 8-2 compares baseline measurements carried out for the Riverside 1 and Riverside 2 planning applications with those carried out for the ES.

Table 8-2: Comparison of Baseline Noise Levels

Noise Monitoring Location	Baseline noise levels adopted in the planning application noise assessments			
	L_{Aeq}, dB		L_{A90}, dB	
	Daytime	Night-time	Daytime	Night-time
Riverside 1				
North Road	52	48	48	44
Riverside 2				
Hackney House Apartments	60	54	54	45
Proposed Scheme				
MP1 (Representative of the nearest NSRs to the south of the Site)	60	55	54	49

Baseline noise levels have increased gradually over the period between when noise monitoring was carried out for the Riverside 1 planning application, the Riverside 2 planning application and the Proposed Scheme planning application. It is likely that over this period, road traffic noise has contributed to an increase in baseline noise levels.

It is considered unlikely that noise from the existing Riverside 1 development contributes significantly to the baseline noise level at MP1 as the predicted noise level of 36 dB (when adjusted for distance to the Travelodge, as described above), is more than 10 dB below the current measured baseline noise level.

8.1.1 The level of the ambient sound measured at Clydesdale Way and the Travelodge London Belvedere (60 dB $L_{Aeq,16h}$ during the day and 55 dB $L_{Aeq,8h}$ during the night), is higher than the predicted cumulative noise level, including the operation of Riverside 1, Riverside 2 and the Proposed Development, of 51 dB L_S. This supports a downward modification of the initial impact estimation indicating that the noise from the Proposed Scheme would be barely audible or detectable at the nearest NSRs.

8.1.2 The operation of the Proposed Scheme would not affect the operational noise levels arising from Riverside 1 and Riverside 2.

9 UNCERTAINTY

Uncertainties in all aspects of this noise assessment have been minimised as far as possible. **Table 9-1** below identifies the process WSP has undertaken to reduce uncertainty in the BS 4142 assessment for the Proposed Scheme.

Table 9-1: WSP uncertainty assessment matrix

Uncertainty Control Measures	Applicable?	Adopted? /Comments
Measurement		
Only use in calibration Type/Class 1 equipment and check (and record) calibration level before and after measurements.	✓	Yes
Take measurements using the time and frequency weighting specified by the relevant standard.	✓	Yes
Make detailed notes, including details of the equipment, weather, survey positions (including approximate distances), contributing noise sources, presence of screening etc.	✓	Yes
Take photographs and record survey locations.	✓	Yes
Avoid standing waves/interference – listen for effects, take spatial average from several locations or conduct a sweep.	✓	External measurements only.
Take measurements at different distances to establish propagation.	✓	Measurements taken in multiple locations.
Take measurements at different heights where relevant.	×	N/A
Don't just measure at the "noisiest" parts of site, but establish how "quiet" it is, too, where relevant to the assessment.	×	N/A
Measure under different operating conditions relevant to your assessment / adopt worst case if known.	×	N/A
Measure more than one cycle/ event (ideally at least three).	×	N/A
Determine state of repair of any associated source, where relevant.	×	N/A
Use a windshield and avoid windy conditions (i.e., gusts regularly exceeding 5 m/s).	✓	Windshield was utilised, exposure to high wind speed was minimised as far as practicable.
Avoid wet conditions (particularly in terms of rain on the windshield/mic and on neighbouring surfaces).	✓	Yes
Avoid electrical and electromagnetic interference (such as from power cables and radio transmitters).	×	N/A

Uncertainty Control Measures	Applicable?	Adopted? /Comments
Avoid extreme temperatures – traffic conditions can be different in freezing conditions, whilst meters can overheat and fail in a case when in direct sunlight during the summer.	✓	Yes
Make measurements during different weather conditions (particularly relevant in terms of wind direction for sites affected by aircraft movements, but also for sites affected by other distant, but significant, sources of noise, in different directions).	×	N/A
Where only one source is dominant (such as a main road), as a minimum, measure during conditions favourable to propagation (i.e., when wind direction is within +/-45° of the line between the source and receiver or during temperature inversion, such as on clear calm nights).	×	N/A
Avoid tree/leaf (movement) sound where possible – ideally take measurements at comparable distance to receptor locations.	✓	Yes
Avoid dawn chorus sound where possible – ideally take measurements the same distance from trees and bushes as any receptors of interest.	×	N/A
Measure outside the receptor in question where possible; however, it is worst case typically to measure under free-field conditions and apply +3 dB correction to convert to "façade" where applicable – for most planning (new residential development) assessments, free-field is preferable.	×	N/A
Where it is not possible to install a meter outside the receptor in question, install a meter elsewhere and undertake additional attended measurements, either outside the receptor or at a representative location (when not adequately covered by the installed meter).	✓	Yes
Avoid atypical traffic conditions (such as during school holidays and road works – road traffic incidents can significantly affect flows, but which can't be predicted, and their occurrence can't always be established after the survey – check the data for anomalies).	✓	Yes
Avoid presence of you and/or the microphone resulting in atypical conditions.	✓	Yes
Data Handling		
Download data immediately after survey and process promptly whilst details are fresh in your head.	✓	Yes
Use digital transfer methods and double check data read-off manually.	✓	Yes
Look at the time-history (in as fine a resolution as possible) for any unexpected events – preferably with active spectral data (i.e., in dBTRAIT).	✓	Yes

Uncertainty Control Measures	Applicable?	Adopted? /Comments
If removing any data (due to an atypical event, for example), 'save as' a new file and provide a note to the data.	✓	Yes
Prediction		
Use measurement data at different distances to verify propagation.	✓	Yes
Different height measurements to verify screening effects, if relevant.	×	N/A
Use propagation calculation procedure relevant to source and distance.	✓	Yes
Use detailed traffic flow data applicable to the methodology.	×	N/A
Use detailed sound source data (including octave-bands levels), accounting for size, height and directivity, where known.	✓	Yes
Use detailed topographical data and base mapping.	✓	Yes
Identify different ground types.	✓	Yes
Apply an order of reflections of at least one.	✓	Yes
Use 3D view feature to check model accuracy of the model.	✓	Yes
Produce contour plots as a further means of identifying any abnormalities or errors in the model.	×	N/A

10 CONCLUSIONS

Cory Environmental Holdings Limited has instructed WSP to produce a Noise Impact Assessment to accompany the application for an Environmental Permit to operate a Carbon Capture Facility (CCF) in relation to the Cory Decarbonisation Project. The aim of this assessment is to assess the potential noise impact from the CCF on the nearest sensitive receptors.

This assessment is based on the information from the ES accompanying the application for a DCO for the Cory Decarbonisation Project.

A baseline noise survey was undertaken for the ES to quantify the existing baseline noise levels at the nearest noise sensitive receptors. Noise monitoring was carried out between 16th March to the 21st March 2023. Continuous noise measurements were taken at three locations considered representative of the nearest noise sensitive receptors. The monitoring location MP1 is considered representative of the receptors identified and assessed within this report.

The draft DCO includes a requirement with respect to the operational noise. Requirement 20 Control of Noise During Operation requires that the operational noise rating levels from the Proposed Scheme do not exceed the 'Operational Noise Limit' at the identified receptors which are derived from the typical background sound levels measured except for plant operating in an emergency.

The assessment results showed that without any additional mitigation measures, the operational noise rating levels would exceed the operational noise limits by up to +7 dB. This outcome is largely due to the back-up ASHP fans of the Proposed Scheme on those occasions when thermal capacity from R1 and R2 was unavailable. As such, options for mitigation measures have been considered which would provide the attenuation required to result in a reduction in noise levels such that the operational noise rating levels do not exceed the operational noise limits above.

Although the details of the final mitigation measures are not yet available, through the DCO, a Noise Mitigation Plan to detail the final mitigation measures and demonstrate compliance with the operational noise limits will be prepared and submitted to and approved by the relevant planning authority in writing prior to the operation of the CCF.

10.1.1 The combined noise levels from the Proposed Scheme, Riverside 1 facility and the Riverside 2 facility (currently under construction) were also predicted based on the specific sound levels presented in the noise assessment for their respective planning applications. The initial estimate indicates a low combined impact (barely audible or detectable noise) during the daytime and at night. The operation of the Proposed Scheme would not affect the operational noise levels arising from Riverside 1 and Riverside 2.

Considering the results of the initial impact estimation for the Proposed Scheme as well as the Proposed Scheme in combination with the existing Riverside 1 facility and the Riverside 2 facility combined, contextual evaluation and the additional mitigation measures to be implemented, it is concluded that the operation of the Proposed Scheme will not lead to a significant noise adverse impact or noise 'pollution' at receptors.

Appendix A

LIMITATIONS OF REPORT

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorisation of WSP UK Limited. WSP UK Limited accept no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/or WSP UK Limited and agree to indemnify WSP UK Limited for any and all loss or damage resulting therefrom. WSP UK Limited accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned.

The findings and opinions expressed are relevant to the dates of the site works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations WSP UK Limited reserve the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

Appendix B

NOISE MONITORING FORMS

Figure B-1: MP1 noise monitoring form

Noise Monitoring Form

Project Name:	Cory CCU		**Project No:**	70090329
Location:	MP1		**Engineer:**	Will Sterlini
Equipment:	01dB Duo	[serial no 10594]	**Weather:**	Moderate wind, 100% cloud cover, temperature range between 7°C and 14°C over measurement period
Pre-Calibration Level:	93.9			
Post-Calibration Level:	94.0			
Additional Comments:				

Measurement Period			**Description of Audible Noise**
Date	**Start / Stop Time**	**Measurement Intervals**	Dominated by road noise from the A2016. Bird song, occassional noise from recycling vans and overhead aircraft movements. Noise from ind turbine on Crossness site audible during lulls in the traffic.
16/03/2023	11:00	1 hour	
21/03/2023	11:00		

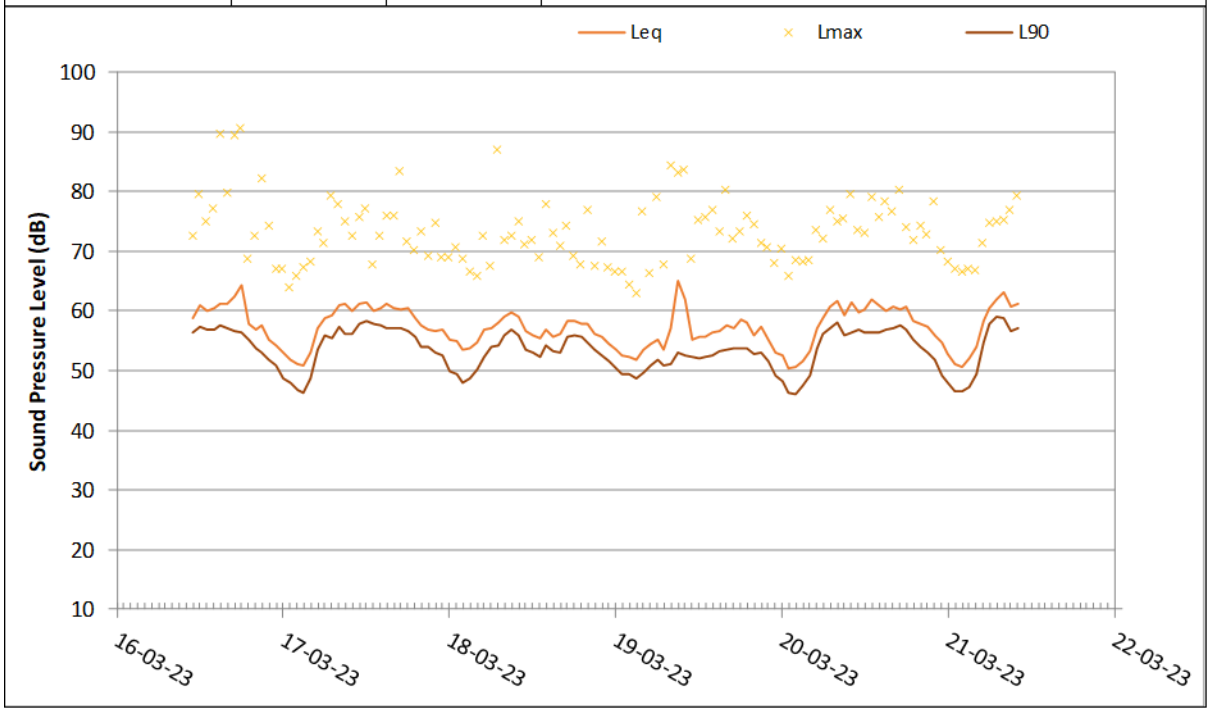


Figure B-2: MP2 noise monitoring form

Noise Monitoring Form

Project Name:	CORY CCUS		**Project No:**	70090329
Location:	MP2		**Engineer:**	Will Sterlini
Equipment:	01dB Solo	[serial no 61331]	**Weather:**	Moderate wind, 100% cloud cover, temperature range between 7°C and 14°C over measurement period
Pre-Calibration Level:	113.9			
Post-Calibration Level:	114.0			
Additional Comments:				

Measurement Period			**Description of Audible Noise**
Date	**Start / Stop Time**	**Measurement Intervals**	Dominated by road noise from the A2016. Bird song, very occassional vehicle movement on access road to sewege treatment works
16/03/2023 20/03/2023	14:00 23:00	1 hour	

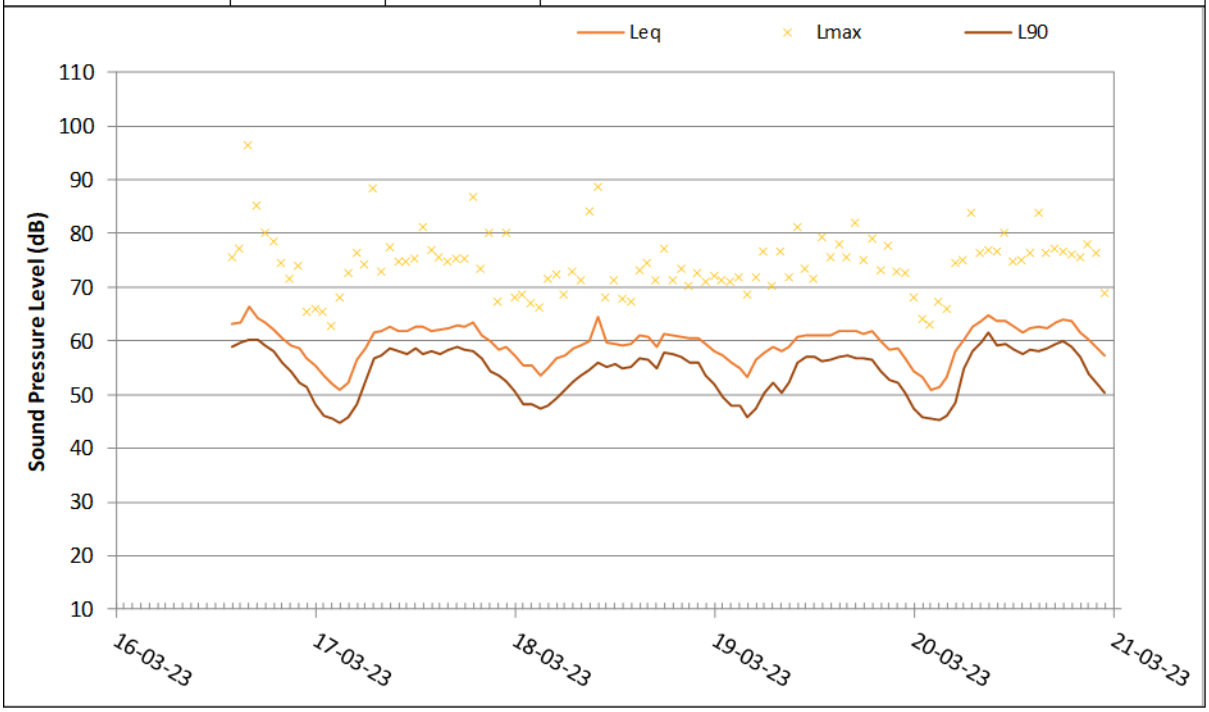
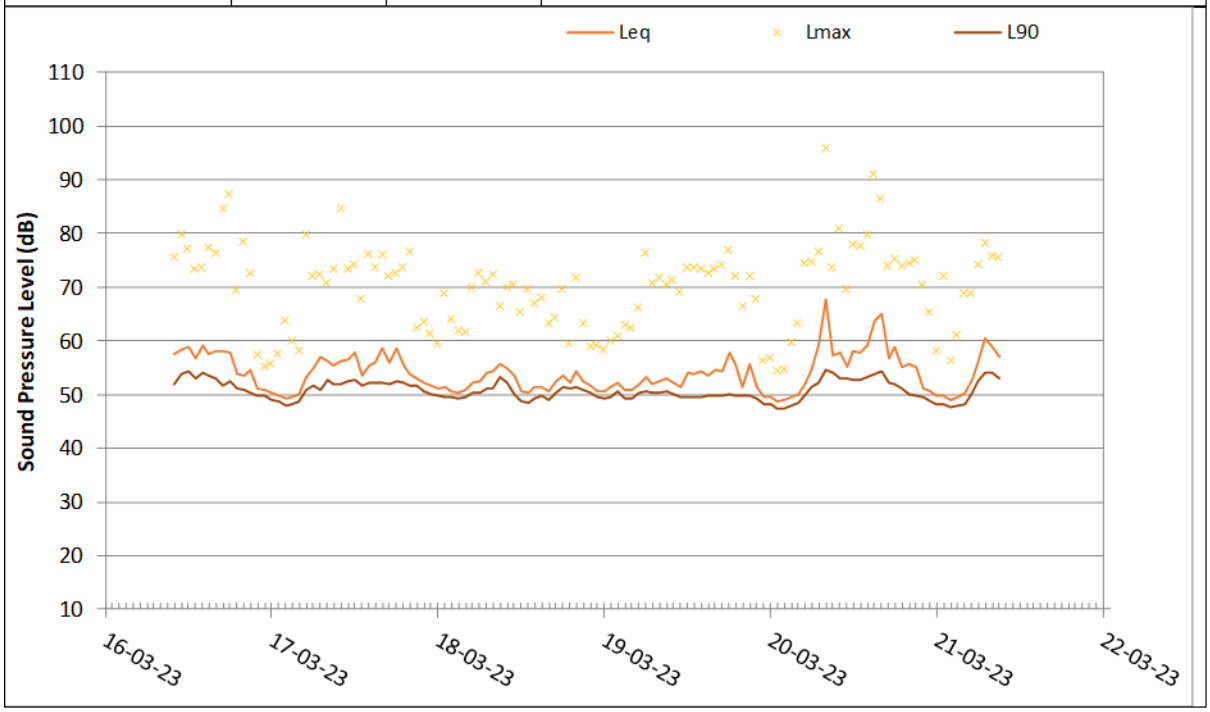


Figure B-3: MP3 noise monitoring form

Noise Monitoring Form

Project Name:	CORY CCUS		**Project No:**	70090329
Location:	MP3		**Engineer:**	Will Sterlini
Equipment:	01dB Duo	[serial no 10616]	**Weather:**	Moderate wind, 100% cloud cover, temperature range between 7°C and 14°C over measurement period
Pre-Calibration Level:	113.9			
Post-Calibration Level:	114.0			
Additional Comments:				

Measurement Period			**Description of Audible Noise**
Date	**Start / Stop Time**	**Measurement Intervals**	Noise from vehicle movements on local road to the east of measurement positon, road noise from A2016. Construction noise from site located to the east of measurment position also present. Noise from large fans located on Cory site, birdsong and occassional overhead aircraft passby
16/03/2023	10:00	1 hour	
21/03/2023	10:00		



Appendix C

NOISE MONITORING GRAPHS

Figure C-1: MP1 daytime typical background sound levels

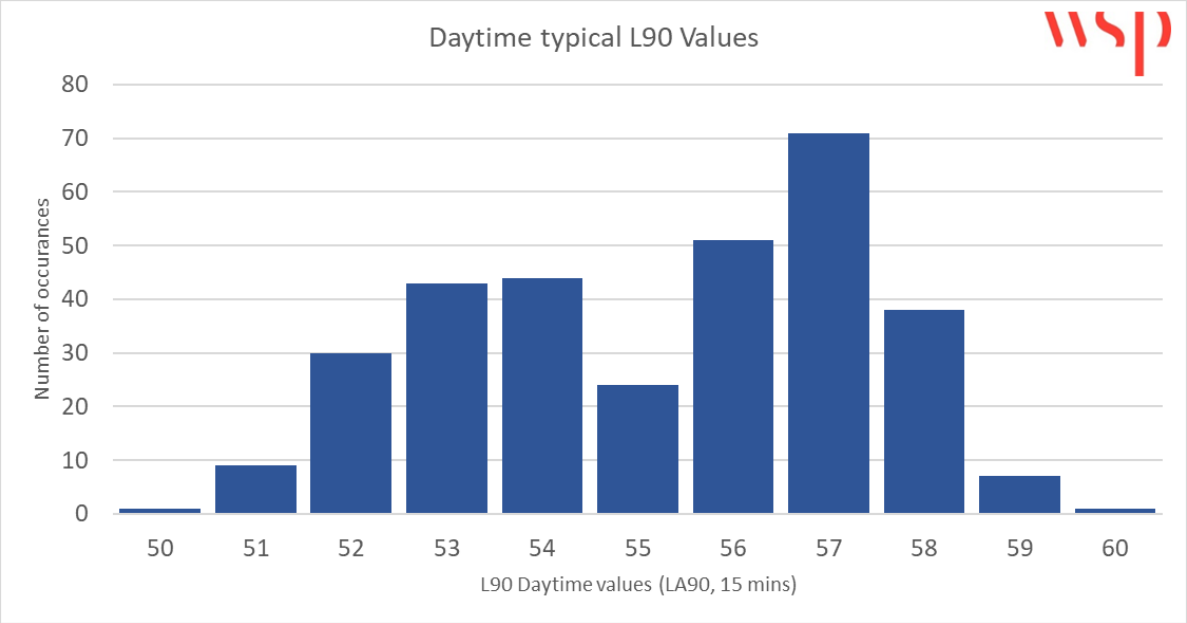


Figure C-2: MP1 night-time typical background sound levels

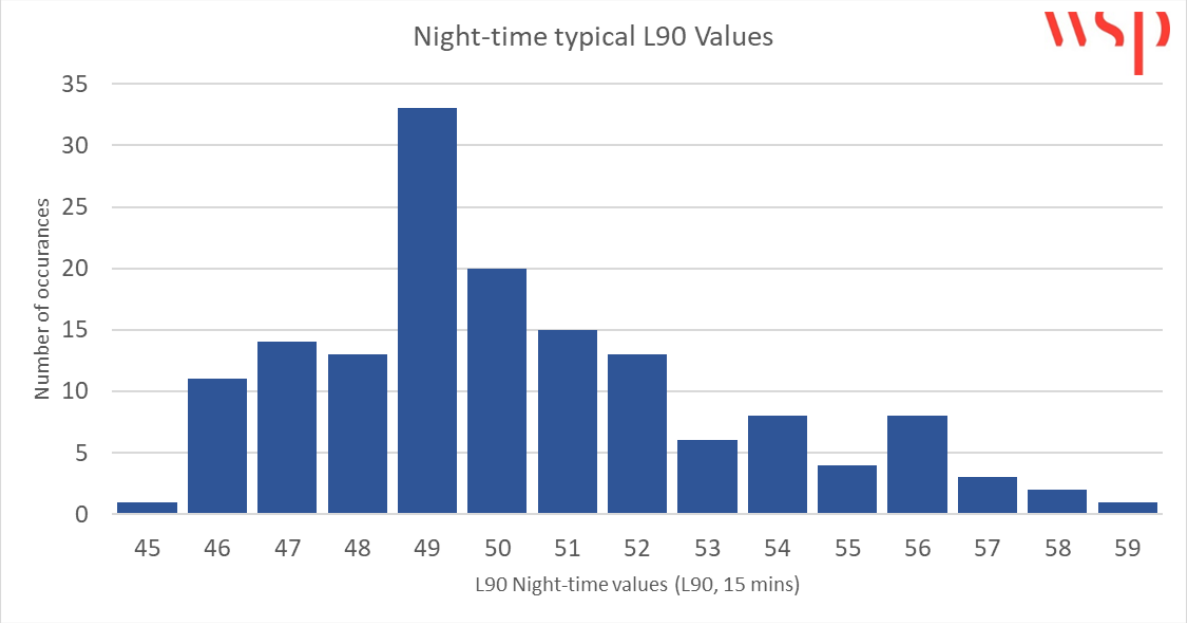


Figure C-3: MP2 daytime typical background sound levels

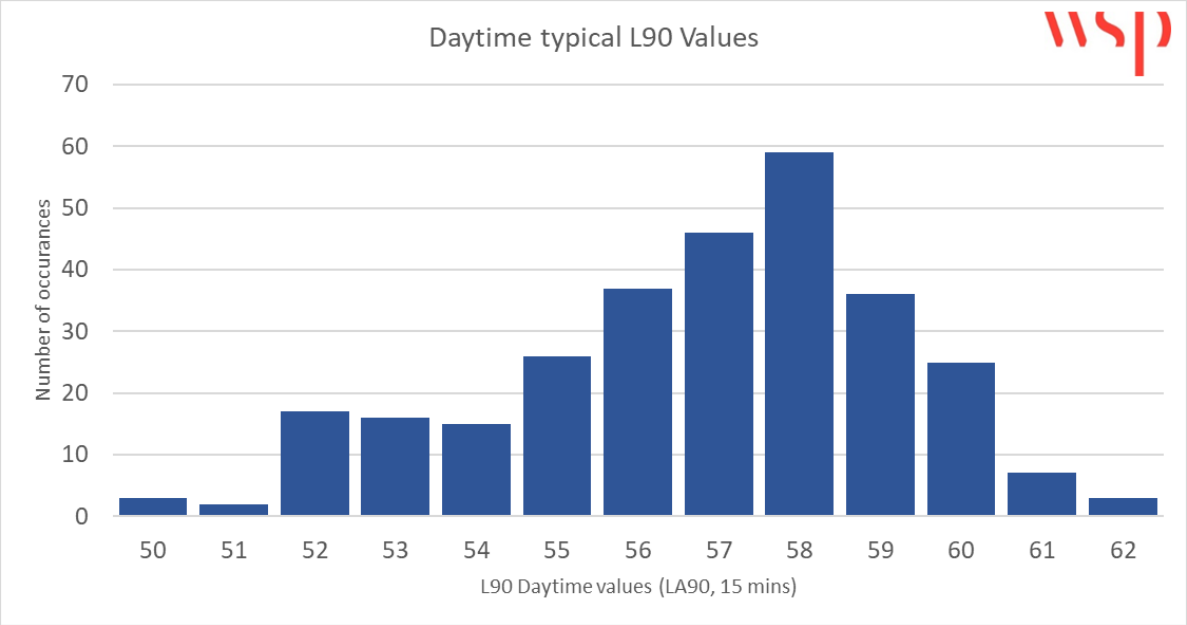


Figure C-4: MP2 night-time typical background sound levels

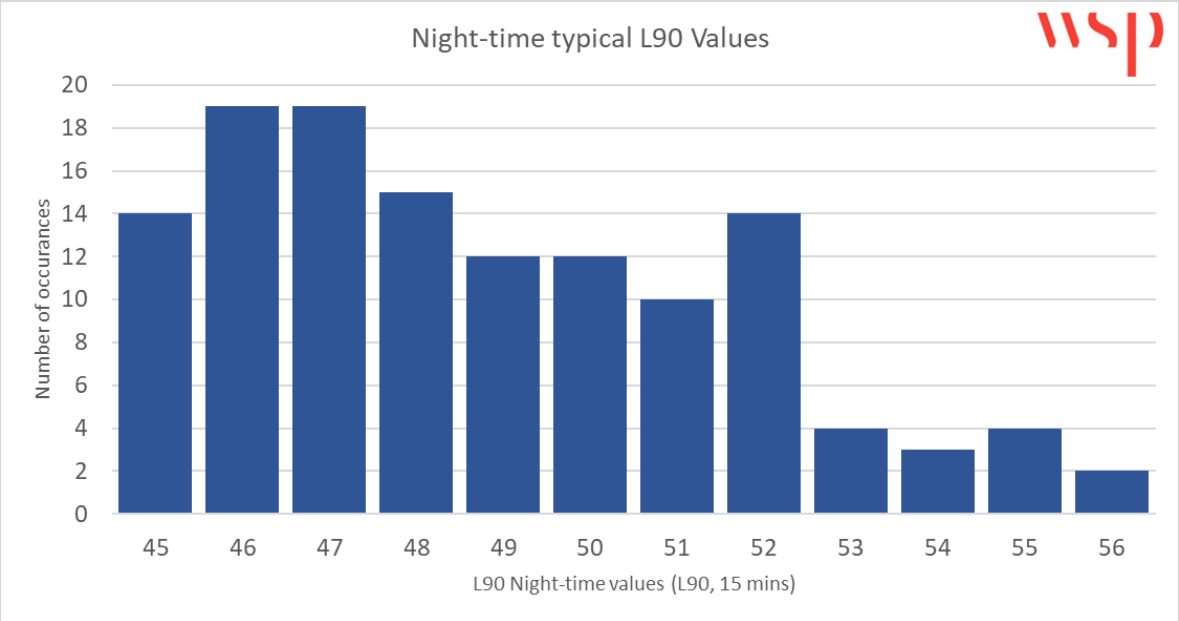


Figure C-5: MP3 daytime typical background sound levels

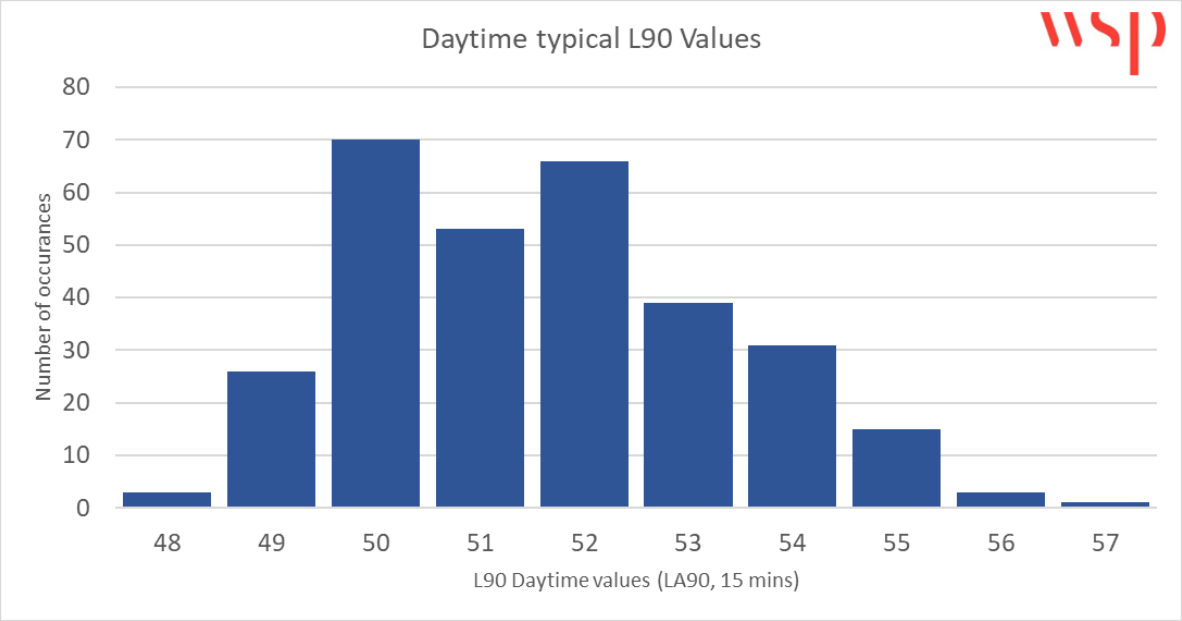
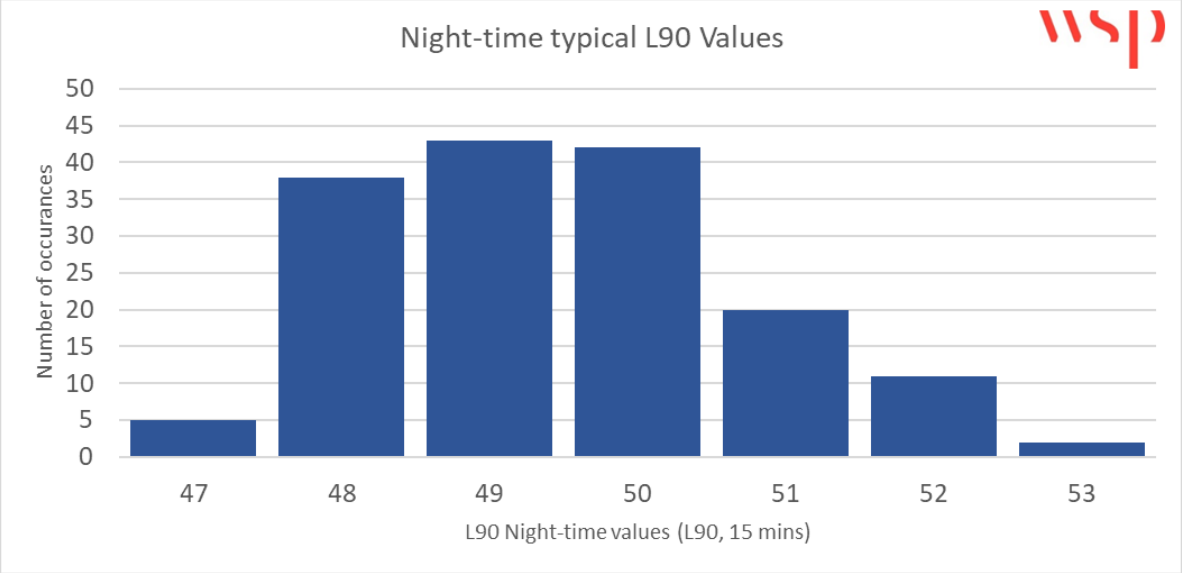


Figure C-6: MP3 daytime typical background sound levels



Appendix D

CERTIFICATION OF CALIBRATION

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 01 June 2021 **Certificate Number: UCRT21/1686**

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

K. Mistry

CUSTOMER	WSP UK Ltd WSP House 70 Chancery Lane London WC2A 1AF
ORDER No	20126865
Job No	UKAS21/05355
DATE OF RECEIPT	27 May 2021
PROCEDURE	Calibration Engineer's Handbook, section 25: periodic testing of sound level meters to IEC 61672-3:2006 (BS EN 61672-3:2006) as modified by UKAS TPS 49 Edition 2:June 2009
IDENTIFICATION	Sound level meter 01dB type DUO serial No 10616 connected via an extension lead type RAL135-10M and preamplifier type PRE 22 serial No 10180 to a half-inch microphone type GRAS 40CD serial No 154423 fitted with a 'DMK01' weatherproof outdoor windshield including nosecone type RA 0208. Associated calibrator 01dB type CAL21 serial No 34924053(2012) with a one-inch housing and adapter type BAC21 for half-inch microphone.
CALIBRATED ON	01 June 2021
PREVIOUS CALIBRATION	Calibrated on 21 January 2019, Certificate No. UCRT19/1095 issued by this laboratory.

The sound level meter was set up using the type CAL21 sound calibrator supplied; it was set to frequency weighting A, and initially read 94.1 dB. It was then adjusted to read 93.9 dB (corresponding to 93.9 dB at standard atmospheric pressure). This reading was derived from Calibration Certificate no. UCRT21/1679 supplied by this laboratory and manufacturers' information on the free-field response of the sound level meter when fitted with the windshield. The calibration check frequency was 1kHz.

Procedures from IEC 61672-3:2006 (BS EN 61672-3:2006) as modified by UKAS TPS 49 Edition 2:June 2009 were used to perform the periodic tests.

RESULTS

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

The self-generated noise recorded with the microphone replaced by the electrical input device was:

12.1 dB (A) 13.1 dB (C) 18.1 dB (Z)

The environmental conditions recorded at the start and end of testing were:

Start: 23 to 24 ºC, 39 to 49 %RH and 101.2 to 101.3 kPa
End: 23 to 24 ºC, 39 to 49 %RH and 101.2 to 101.3 kPa

Technical information including adjustment data specified in the manufacturers' User Manual DOC1112 - May 2015 H with further clarification from 01dB has been used to carry out this verification. These data include manufacturer-specified uncertainties for case reflections and windshield, but NOT for the microphone response.

Publicly-available evidence has been found that this configuration of the 01dB DUO sound level meter design has successfully undergone pattern evaluation in accordance with IEC 61672-2:2002 (BS EN 61672-2:2003) by Physikalisch-Technische Bundesanstalt (PTB), an independent testing organisation responsible for pattern approvals.

All measurement data are held at ANV Measurement Systems for a period of at least six years.

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.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate No UCRT21/1686

NOTES

Any opinions or interpretations which may be expressed in the following notes are not UKAS Accredited.

1 The high pass filter was set to 10 Hz, the mic correction to 90° and the nosecone usage to "Yes".

2 No suitable microphone frequency response information was supplied with the instrument. It was therefore measured by this laboratory using the electrostatic actuator method. This response in isolation is not UKAS accredited.

3 The instrument was running application firmware version 2.34 and metrology firmware version 2.10 on hardware version 3F2D3D

4 These periodic tests are valid ONLY for the instrument configuration shown on page 1 of this certificate and for 90° incidence of sound on the microphone.

5 When set up to read correctly in response to the sound calibrator, the sound level meter stored a calibration correction of 0.1 dB and a microphone sensitivity of 49.4 mV/Pa

6 The case reflection factors have been taken as zero, since an extension lead has been used for this verification.

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

END

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 13 May 2022

Certificate Number: UCRT22/1648

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

K. Mistry

CUSTOMER	WSP UK Ltd WSP House 70 Chancery Lane London WC2A 1AF
ORDER No	20144671
Job No	UKAS22/05326
DATE OF RECEIPT	12 May 2022
PROCEDURE	Procedure TP 1 Calibration of Sound Calibrators
IDENTIFICATION	Sound Calibrator 01dB type CAL21 serial number 34924053(2012) with one-inch housing and adapter type BAC21 for half-inch microphone
CALIBRATED ON	13 May 2022
PREVIOUS CALIBRATION	Calibrated on 27 May 2021, Certificate No. UCRT21/1679 issued by this laboratory.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate No UCRT22/1648

MEASUREMENTS

The sound pressure level generated by the Sound Calibrator in its half-inch configuration was measured using a B&K type 4134 microphone with the protective grid in position. The microphone sensitivity was traceable to National Standards.

RESULTS

The mean level of the calibrator output, corrected to the standard atmospheric pressure of 101.3 kPa using manufacturers' data, was

94.12 ± 0.10 dB rel 20 µPa

The fundamental frequency of the sound output was 1001.99 ± 0.12 Hz,
and its total distortion was (1.70 ± 0.11) %.

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.

During the measurements the laboratory environmental conditions were:

Temperature: 23 to 24 ºC
Atmospheric pressure: 100.8 to 100.9 kPa
Relative humidity: 37 to 47 %

The tests carried out were based on Annex B of BS EN 60942:2003, but with five determinations of sound pressure level, and limited to the above level(s) & freq(s). This is a subset of the tests specified in Annex B of BS EN 60942:1998. The mean level, frequency and total distortion of the sound output as measured meet the Class 1 requirements of BS EN 60942:1998 for the environmental conditions under which the tests were performed. This does not imply that the sound calibrator meets this standard under any other conditions. However it has successfully undergone pattern evaluation to the earlier Standard IEC 942:1988

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

Calibrator adjusted No END R 2

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 13 April 2021 **Certificate Number: UCRT21/1488**

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

K. Mistry

CUSTOMER	WSP UK Ltd 4th Floor 6 Devonshire Square London EC2M 4YE
ORDER No	20215800
Job No	UKAS21/04241
DATE OF RECEIPT	12 April 2021
PROCEDURE	Calibration Engineer's Handbook, section 25: periodic testing of sound level meters to IEC 61672-3:2006 (BS EN 61672-3:2006) as modified by UKAS TPS 49 Edition 2:June 2009
IDENTIFICATION	Sound level meter 01dB type DUO serial No 10594 connected via an extension lead type RAL135-10M and preamplifier type PRE 22 serial No 1507076 to a half-inch microphone type GRAS 40CD serial No 224313 fitted with a 'DMK01' weatherproof outdoor windshield including nosecone type RA 0208. Associated calibrator 01dB type CAL21 serial No 34924020(2012) with a one-inch housing and adapter type BAC21 for half-inch microphone.
CALIBRATED ON	13 April 2021
PREVIOUS CALIBRATION	Calibrated on 01 March 2019, Certificate No. UCRT19/1268 issued by this laboratory.

The sound level meter was set up using the type CAL21 sound calibrator supplied; it was set to frequency weighting A, and initially read 93.8 dB. It was then adjusted to read 93.9 dB (corresponding to 93.9 dB at standard atmospheric pressure). This reading was derived from Calibration Certificate no. UCRT20/1981 supplied by this laboratory and manufacturers' information on the free-field response of the sound level meter when fitted with the windshield. The calibration check frequency was 1kHz.

Procedures from IEC 61672-3:2006 (BS EN 61672-3:2006) as modified by UKAS TPS 49 Edition 2:June 2009 were used to perform the periodic tests.

RESULTS

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

The self-generated noise recorded with the microphone replaced by the electrical input device was:

15.1 dB (A) 16.9 dB (C) 20.9 dB (Z)

The environmental conditions recorded at the start and end of testing were:

Start: 23 to 24 ºC, 27 to 37 %RH and 102.1 to 102.2 kPa
End: 23 to 24 ºC, 25 to 35 %RH and 102.0 to 102.1 kPa

Technical information including adjustment data specified in the manufacturers' User Manual DOC1112 - May 2015 H with further clarification from 01dB has been used to carry out this verification. These data include manufacturer-specified uncertainties for case reflections and windshield, but NOT for the microphone response.

Publicly-available evidence has been found that this configuration of the 01dB DUO sound level meter design has successfully undergone pattern evaluation in accordance with IEC 61672-2:2002 (BS EN 61672-2:2003) by Physikalisch-Technische Bundesanstalt (PTB), an independent testing organisation responsible for pattern approvals.

All measurement data are held at ANV Measurement Systems for a period of at least six years.

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.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate No UCRT21/1488

NOTES

Any opinions or interpretations which may be expressed in the following notes are not UKAS Accredited.

1 The high pass filter was set to 10 Hz, the mic correction to 90° and the nosecone usage to "Yes".

2 No suitable microphone frequency response information was supplied with the instrument. It was therefore measured by this laboratory using the electrostatic actuator method. This response in isolation is not UKAS accredited.

3 The instrument was running application firmware version 2.49 and metrology firmware version 2.12 on hardware version LIS1005G

4 These periodic tests are valid ONLY for the instrument configuration shown on page 1 of this certificate and for 90° incidence of sound on the microphone.

5 When set up to read correctly in response to the sound calibrator, the sound level meter stored a calibration correction of 0.51 dB and a microphone sensitivity of 48.92 mV/Pa

6 Typical case reflection factors (for the DMK01 unit) specified by the manufacturer have been used for this verification.

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

END

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 25 October 2022 **Certificate Number: UCRT22/2269**

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

K. Mistry

CUSTOMER	WSP UK Ltd WSP House 70 Chancery Lane London WC2A 1AF
ORDER No	20151294
Job No	UKAS22/10667
DATE OF RECEIPT	21 October 2022
PROCEDURE	Procedure TP 1 Calibration of Sound Calibrators
IDENTIFICATION	Sound Calibrator 01dB type CAL21 serial number 34254632(2015) with one-inch housing and adapter type BAC21 for half-inch microphone
CALIBRATED ON	25 October 2022
PREVIOUS CALIBRATION	Calibrated on 21 October 2021, Certificate No. UCRT21/2295 issued by this laboratory.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate No UCRT22/2269

MEASUREMENTS

The sound pressure level generated by the Sound Calibrator in its half-inch configuration was measured using a B&K type 4134 microphone with the protective grid in position. The microphone sensitivity was traceable to National Standards.

RESULTS

The mean level of the calibrator output, corrected to the standard atmospheric pressure of 101.3 kPa using manufacturers' data, was

94.04 ± 0.10 dB rel 20 µPa

The fundamental frequency of the sound output was 1001.35 ± 0.12 Hz,
and its total distortion was (1.17 ± 0.08) %.

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.

During the measurements the laboratory environmental conditions were:

Temperature: 24 to 25 ºC
Atmospheric pressure: 100.0 to 100.1 kPa
Relative humidity: 47 to 59 %

The tests carried out were based on Annex B of BS EN 60942:2003, but with five determinations of sound pressure level, and limited to the above level(s) & freq(s). This is a subset of the tests specified in Annex B of BS EN 60942:1998. The mean level, frequency and total distortion of the sound output as measured meet the Class 1 requirements of BS EN 60942:1998 for the environmental conditions under which the tests were performed. This does not imply that the sound calibrator meets this standard under any other conditions. However it has successfully undergone pattern evaluation to the earlier Standard IEC 942:1988

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

Calibrator adjusted No END R 2

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 21 October 2021 **Certificate Number: UCRT21/2301**

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

K. Mistry

CUSTOMER	WSP UK Ltd WSP House 70 Chancery Lane London WC2A 1AF
ORDER No	20134892
Job No	UKAS21/10684
DATE OF RECEIPT	18 October 2021
PROCEDURE	Calibration Engineer's Handbook, section 25: periodic testing of sound level meters to IEC 61672-3:2006 (BS EN 61672-3:2006) as modified by UKAS TPS 49 Edition 2:June 2009
IDENTIFICATION	Sound level meter 01dB type FUSION serial No 10796 connected via an extension lead type RAL135-10M and preamplifier type PRE 22 serial No 10882 to a half-inch microphone type GRAS 40CE serial No 207588 fitted with a 'DMK01' weatherproof outdoor windshield including nosecone type RA 0208. Associated calibrator 01dB type CAL21 serial No 34254632(2015) with a one-inch housing and adapter type BAC21 for half-inch microphone.
CALIBRATED ON	21 October 2021
PREVIOUS CALIBRATION	Calibrated on 29 August 2019, Certificate No. UCRT19/1943 issued by this laboratory.

The sound level meter was set up using the type CAL21 sound calibrator supplied; it was set to frequency weighting A, and initially read 94.0 dB. It was then adjusted to read 93.8 dB (corresponding to 93.8 dB at standard atmospheric pressure). This reading was derived from Calibration Certificate no. UCRT21/2295 supplied by this laboratory and manufacturers' information on the free-field response of the sound level meter when fitted with the windshield. The calibration check frequency was 1kHz.

Procedures from IEC 61672-3:2006 (BS EN 61672-3:2006) as modified by UKAS TPS 49 Edition 2:June 2009 were used to perform the periodic tests.

RESULTS

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

The self-generated noise recorded with the microphone replaced by the electrical input device was:

14.5 dB (A) 15.2 dB (C) 18.1 dB (Z)

The environmental conditions recorded at the start and end of testing were:

Start: 22 to 23 ºC, 31 to 41 %RH and 100.1 to 100.2 kPa
End: 24 to 25 ºC, 38 to 48 %RH and 100.1 to 100.2 kPa

Technical information including adjustment data specified in the manufacturers' User Manual DOC1131 - Feb 2017 J with further clarification from 01dB has been used to carry out this verification. These data include manufacturer-specified uncertainties for case reflections and windshield, but NOT for the microphone response.

Publicly-available evidence has been found that this configuration of the 01dB FUSION sound level meter design has successfully undergone pattern evaluation in accordance with IEC 61672-2:2002 (BS EN 61672-2:2003) by Physikalisch-Technische Bundesanstalt (PTB), an independent testing organisation responsible for pattern approvals.

All measurement data are held at ANV Measurement Systems for a period of at least six years.

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.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate No UCRT21/2301

NOTES

Any opinions or interpretations which may be expressed in the following notes are not UKAS Accredited.

1 The high pass filter was set to 10 Hz, the mic correction to 90° and the nosecone usage to "Yes".

2 No suitable microphone frequency response information was supplied with the instrument. It was therefore measured by this laboratory using the electrostatic actuator method. This response in isolation is not UKAS accredited.

3 The instrument was running application firmware version 2.34 and metrology firmware version 2.10 on hardware version LIS006E

4 These periodic tests are valid ONLY for the instrument configuration shown on page 1 of this certificate and for 90° incidence of sound on the microphone.

5 When set up to read correctly in response to the sound calibrator, the sound level meter stored a calibration correction of 0.32 dB and a microphone sensitivity of 37.5 mV/Pa

6 Typical case reflection factors (for the DMK01 unit) specified by the manufacturer have been used for this verification.

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

END

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 25 October 2022 **Certificate Number: UCRT22/2270**

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

K. Mistry

CUSTOMER	WSP UK Ltd WSP House 70 Chancery Lane London WC2A 1AF
ORDER No	20151294
Job No	UKAS22/10667
DATE OF RECEIPT	21 October 2022
PROCEDURE	Procedure TP 1 Calibration of Sound Calibrators
IDENTIFICATION	Sound Calibrator 01dB type CAL21 serial number 34924020(2012) with one-inch housing and adapter type BAC21 for half-inch microphone
CALIBRATED ON	25 October 2022
PREVIOUS CALIBRATION	Calibrated on 21 October 2021, Certificate No. UCRT21/2297 issued by this laboratory.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate No UCRT22/2270

MEASUREMENTS

The sound pressure level generated by the Sound Calibrator in its half-inch configuration was measured using a B&K type 4134 microphone with the protective grid in position. The microphone sensitivity was traceable to National Standards.

RESULTS

The mean level of the calibrator output, corrected to the standard atmospheric pressure of 101.3 kPa using manufacturers' data, was

94.06 ± 0.10 dB rel 20 µPa

The fundamental frequency of the sound output was 1002.33 ± 0.12 Hz,
and its total distortion was (1.36 ± 0.10) %.

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.

During the measurements the laboratory environmental conditions were:

Temperature: 24 to 25 ºC
Atmospheric pressure: 100.0 to 100.1 kPa
Relative humidity: 50 to 61 %

The tests carried out were based on Annex B of BS EN 60942:2003, but with five determinations of sound pressure level, and limited to the above level(s) & freq(s). This is a subset of the tests specified in Annex B of BS EN 60942:1998. The mean level, frequency and total distortion of the sound output as measured meet the Class 1 requirements of BS EN 60942:1998 for the environmental conditions under which the tests were performed. This does not imply that the sound calibrator meets this standard under any other conditions. However it has successfully undergone pattern evaluation to the earlier Standard IEC 942:1988

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

Calibrator adjusted No END R 1

WSP House
70 Chancery Lane
London
WC2A 1AF

wsp.com

PUBLIC