

Uniper UK Limited

Environmental Permit Variation and Partial Low Risk Surrender Application North Killingholme Power Project

Appendix G - Noise Impact Assessment

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Ove Arup & Partners Limited
12 Wellington Place
Leeds
LS1 4AP
United Kingdom
arup.com

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		Signature			
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		Name	Marios Filippoupolitis	Fiona Rogerson	David Hiller
		Signature			

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D.1 Uniper Technologies Ltd

D.2 Arup

List of Abbreviations

CCGT	Combined Cycle Gas Turbine
EIA	Environmental Impact Assessment
ES	Environmental Statement
NIA	Noise Impact Assessment
DCO	Development Consent Order
HVAC	Heating, ventilation and air conditioning
NIA	Noise Impact Assessment
NSR	Noise Sensitive Receptor
SLM	Sound Level Meter
HRSG	Heat Recovery Steam Generator
HVAC	Heating Ventilation & Air Conditioning
PCC	Power Control Centre
SSSI	Site of Special Scientific Interest
LIDAR	Light Detection and Ranging

1. Synopsis

This Appendix has been prepared in support of the Environmental Permit variation application for the North Killingholme Power Project (the Installation) to be located in Killingholme, North Lincolnshire.

The Installation is already permitted to enable the operation of a Combined Cycle Gas Turbine (CCGT) with a net output of 470MWe, however, the CCGT has not yet been constructed. Uniper are now looking to construct the CCGT, which would have a grid connection capacity of a net output of 540MWe and therefore will be larger than the currently permitted plant. As such, a new Noise Impact Assessment (NIA) has been carried out to support the Environmental Permit variation application that is being submitted to increase the capacity of the CCGT plant.

The environmental baseline sound levels have been established from a number of recent surveys which have been undertaken in the area, including baseline sound surveys conducted by Uniper Technologies Ltd between 13 October and 14 November 2023 and between 28 October and 27 November 2024, as part of the Environmental Impact Assessment (EIA) for Humber H₂ub® (Green) Project (Technical Appendix 10.3¹). A baseline sound survey has also been undertaken by Arup between 27 June and 4 July 2025 for the Killingholme Low Carbon Power project (which would be the subject of a further Environmental Permit variation application). Details of these surveys are provided in Annex A and Annex B and a combined results analysis is provided in Annex C.

To assess the noise impacts from the operation of the Installation, a three-dimensional noise model has been developed by Uniper using proprietary software and based on detailed plant sound emission data from the plant supplier. Mitigation measures have been developed and incorporated into the three-dimensional model.

Mitigation measures include:

- the selection of equipment with lowest practicable noise emission;
- design of building envelopes with appropriate sound insulation performance;
- provision of acoustic louvres for the building openings which face the closest receptors; and
- acoustic enclosures.

The assessment was undertaken following Environment Agency (EA) Guidance – Noise and vibration management: environmental permits and other best practice guidance². It is concluded that the noise impact at the closest Noise Sensitive Receptors (NSR) would be low.

The Installation would be in an existing and former industrial area and so there would be no change to the soundscape character as a result of its operation.

¹ Humber H₂ub® (Green) Environmental Statement. Uniper Hydrogen UK, 2025 [<https://apps.northlincs.gov.uk/application/pa-2025-1146> - last accessed 07/11/2025]. Environmental Statement Volume III Technical Appendices, Appendix 10.3 Baseline Sound Survey.

² <https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits/noise-and-vibration-management-environmental-permits>

2. Introduction

This Noise Impact Assessment (NIA) is part of a suite of documents submitted to the Environmental Agency (EA) in support of an application by Uniper UK Limited (Uniper) to vary the existing Environmental Permit for the North Killingholme Power Project (the Installation), reference EPR/FP3838EB.

The operation of the Installation would be regulated in accordance with the Control of Pollution Act 1974, Environmental Protection Act 1990 and the Environmental Permitting (England and Wales) Regulations 2016 (as amended).

The Installation is a Combined Cycle Gas Turbine (CCGT) electricity generating station with an electrical output of up to 540MWe, designed to run on natural gas. The Site is located to the north-west of Immingham Docks, on land adjacent to C.RO Ports Killingholme Ltd (CPK) (see Figure 3-1).

The CCGT includes gas and steam turbines; electricity generators and transformers; a Heat Recovery Steam Generator (HRSG), including stack; a gas reception area; an auxiliary boiler; an emergency diesel generator; water treatment plants; cooling towers; raw and fire water storage tank; and material storage facility.

The Installation is planned to operate 24 hours per day, seven days per week. The traffic on-site will be principally limited to operational staff arriving and departing from site, together with intermittent deliveries likely to be spread throughout the day. The noise associated with vehicle movements during the operation of the Installation is considered to be negligible due to the anticipated low traffic volumes.

3. Assessment Locations

The Installation is located wholly within the administrative boundary of North Lincolnshire Council and the parishes of North Killingholme and East Halton. The Site is centred at Ordnance Survey National Grid Reference TA 1578 1963.

The Installation lies approximately 6 km north of the A180(T) dual carriageway. The A160(T), to the south of the Site, runs east - west to provide a link with the A180(T), which in turn links with the M180 motorway (at Junction 5) and, thereby, with the wider motorway network. To the south-west of the Installation is the existing Uniper Killingholme B Power Station.

The nearest residential settlements to the Installation, are:

- East Halton (approximately 1.2 km to the west)
- North Killingholme (approximately 2 km to the south-west)
- South Killingholme (approximately 3 km to the south-west)

In addition, there are isolated residential receptors and ecological receptors as detailed in Table 3-1.

The ground between the Site and the receptors consists of mainly pastoral land with some industrial areas.

The soundscape around the Installation is primarily influenced by road traffic, mainly from Chase Hill Road, East Halton Road and A160(T) (Humber Road), and industrial noise (see Annex A and Annex B for further description).

The assessment locations selected for this NIA are consistent with those used for the previous permit application which were agreed with the local authority for use in the Environmental Statement (ES) for the original Development Consent Order (DCO) application for the development, submitted in 2013 (“2013 DCO Application”). The assessment locations are presented in Figure 3-1 and described in Table 3-1. Minor changes have been made to the co-ordinates of the prediction points for receptors at Swinster Lane, Scrub Lane, Brick Lane and North Killingholme Haven Pits ecological receptor to better reflect the closest/ most exposed parts

of these receptors. An additional receptor has been included at Chase Hill Road (assessment location 10 in Figure 3-1). These assessment locations are representative of the closest noise sensitive receptors (NSR). Photographs of the locations and details of the environmental sound level surveys are presented in Annex A and Annex B. Note that alternative assessment location position numbers were used in the Uniper report for the Humber H2ub® (Green) Project and additional positions were included in the Arup survey which were relevant for assessing construction noise for the proposed Killingholme Low Carbon Power project.

The Installation boundary is shown in green in Figure 3-1. All Installation noise sources within this area have been modelled. The red boundary shows an additional area which has been included in the site boundary in the model (this is relevant to the assignment of hard reflective ground as described in Section 5).



Figure 3-1: Noise sensitive receptor assessment locations and site boundaries (see text for description)

Table 3-1: Description of assessment locations

Assessment location number	Description	Coordinates	
		British National Grid	
		Easting	Northing
Location 1	Marsh Lane	515569	421413
Location 2	Skitter Road	514072	420626
Location 3	Station Road	513944	420230
Location 4	Kettlebridge Lane	514114	419679
Location 5	Swinster Lane ¹	514323	419316
Location 6	Scrub Lane ¹	514270	419050
Location 7	Brick Lane ¹	514641	418828
Location 9	North Killingholme Haven Pits (Ecological) ¹	516237	419713
Location 10	Old Vicarage (Chase Hill Road) ²	514426	418206

Note 1 – slightly amended receptor locations from previous permit application.

Note 2 – additional NSR

4. Equipment and Meteorology

The environmental sound level survey conducted by Uniper was undertaken by Kevin Brown MIOA from 13 October to 14 November 2023 and from 28 October to 27 November 2024.

The environmental sound level survey conducted by Arup was undertaken by Gina Mackworth AMIOA, Josh Heenan AMIOA and Marios Filippopolitis MIET from 27 June to 4 July 2025.

Both surveys were conducted in line with BS 7445-1:2003 *Description and measurement of environmental noise - Guide to quantities and procedures* and according to the principles of BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*. The Sound Level Meters (SLMs) were all positioned in free-field conditions, approximately 1.2-1.5m above the local ground. Full details of the environmental sound level surveys are presented in Annex A and Annex B.

The SLMs, microphones and sound pressure level calibrators used were Class 1 instruments, conforming to BS EN 61672-1:2013 *Electroacoustics. Sound level meters - Specifications*. The instrumentation have traceable calibration to national and international standards, undertaken by an accredited calibration laboratory. Calibration certificates are provided within each baseline survey report in Annexes A and B respectively.

The SLMs and related noise monitoring instrumentation used to undertake the Uniper survey are described in Table 4-1.

Table 4-1: Equipment used for the Uniper environmental sound survey

Description	Serial number	Item type	Calibration certificate date of issue
Sound Level Meter	0120529	Rion NL-52	January 2024
Sound Level Meter	0810301	Rion NL-52	N/A
Sound Level Meter	1087404	Rion NL-52	March 2024

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Description	Serial number	Item type	Calibration certificate date of issue
Sound Level Meter	0620872	Rion NL-52	January 2024
Sound Level Meter	2717740	Bruel & Kjaer 2250	March 2025
Calibrator	1883787	Bruel & Kjaer 4231	March 2025
Calibrator	34835125	Rion NC-75	October 2023
Weather Station	N/A	Davis Vantage Vue	N/A

The SLMs and related noise monitoring instrumentation used to undertake the Arup survey are described in Table 4-2.

Table 4-2: Equipment used for the Arup environmental sound survey

Description	Serial number	Item type	Calibration certificate date of issue
Sound Level Meter	00301365	Rion NA-28	10 April 2025
Pre-amp	91399	Rion NH-23	10 April 2025
Calibrator	34334830	Rion NC-75	10 April 2025
Microphone	01963	Rion UC-59	10 April 2025
Sound Level Meter	00264533	RION NL-52	07 September 2023
Pre-amp	64658	RION NH-25	07 September 2023
Calibrator	34467730	RION NC-74	09 December 2024
Microphone	09681	RION UC-59	07 September 2023
Weather Station	230.0924.0701.251	Luft WS600	N/A

The calibration of the SLMs was checked before and after each series of measurements. No significant drift was recorded when performing calibration checks in the field.

A weather station was set up by Uniper to monitor meteorological conditions during the measurements. Parameters recorded included wind speed and wet/dry weather period (see Annex A).

A weather station was set up by Arup at the unattended logger location to record meteorological conditions during the measurement period. Parameters recorded included wind speed, wind direction, temperature, humidity and precipitation. Measurements were logged at 15 minutes interval and were synchronised with the unattended SLM. The wind direction was mainly from the south-west (see Annex B).

The raw data from the SLMs used in Uniper baseline sound survey were exported and processed using B&K BZ5503, SAS V9.4 and Microsoft Excel to calculate appropriate background sound levels for analysis. Measurement periods during which the weather was not suitable for environmental sound measurements (i.e. when wind speed was greater than 4 m/s and during precipitation or wet conditions) has been excluded from subsequent analysis.

The raw data from the SLMs used in Arup baseline sound survey was exported and processed using Microsoft Excel to calculate appropriate background sound levels for analysis.

The data from the unattended monitoring at Brick Lane, during the 2024 Uniper survey and the Arup survey, have been combined and are presented in Annex C.

5. Methodology

The assessment of potential noise impacts associated with operation of the Installation has been undertaken in line with BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.

A three-dimensional model has been developed by Uniper, using IMMI acoustic modelling software, to assess the current layout options for the Installation. IMMI implements the sound attenuation method ISO 9613-2: 2024 *Acoustics - Attenuation of sound during propagation outdoors*, which has been used to calculate sound levels at surrounding NSRs due to operations at the site. The noise impact assessment is based on the results of this prediction model.

The Installation will operate continuously as a base load plant and therefore fluctuations in noise emissions are not anticipated and it is this scenario that has been modelled.

The sources of data used in the noise model are:

- Sound power level emission spectra from potential CCGT equipment supplier (Siemens), supplemented by data from a similar CCGT site;
- Installation layout plans; and
- Building structure heights (for nearby industrial buildings only) estimated by reference to Government terrain and surface LIDAR dataset.

The model has been developed with the following configurations and assumptions:

- The receptors were modelled at a height of 4.0 m above ground to represent first floor window level;
- The ground type was assumed hard and reflective ($G=0$) within the site boundary (shown by the red and green boundaries in Figure 3-1). Soft ground cover ($G=1$) was assumed across the intervening ground between the site boundary and the NSRs, except for the industrial facilities where hard and reflective ground ($G=0$) was also assumed. Ground is assumed to be flat and terrain barrier features are not considered.
- The sound emitted by large building envelopes has been calculated based on the total sound power level for the building, distributed according to the surface area of the façade/roof;
- The sound emitted by small buildings was assumed to radiate uniformly from roof area sources;
- The sound emitted by Hybrid Cooling Towers was assumed to radiate uniformly from the two long-sides (inlets) and roof (outlet);
- No directivities were assumed;
- All pumps and smaller sources have been modelled as point sources;
- An atmospheric temperature of 10°C and relative humidity of 70% were assumed in the model, as they are representative of typical average UK conditions;
- A moderate downwind propagation from the source to the receptor was assumed as a worst-case calculation;
- Non-industrial building structures such as dwellings were not included within Uniper's model and subsequent predictions;
- Some existing industrial buildings have been included in the model to account for screening (Orsted Substation and Uniper Killingholme B Power Station);
- Some structures within the Installation that do not emit sound have been included, based on an interpretation of plot-plan and professional judgement; and

The specific sound level may be adjusted for any characteristic features of the sound (such as tonality, impulsivity, intermittency, or otherwise distinctive character) to give the rating level ($L_{Ar,Tr}$).

The background sound level is subtracted from the rating level and the difference used to inform the impact assessment.

An initial estimate of the impact of the specific sound is conducted by subtracting the measured background sound level from the rating level and consider the following:

- Typically, the greater this difference, the greater the magnitude of the impact;
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the 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 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.

BS 4142 also states that “*The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs*”.

The significance of effect has been determined based on the methodology described above and other factors, including the acoustic context of the area, magnitude of exceedance, changes in soundscape, predicted absolute noise levels, time of the day where impact occurs and professional judgement.

6. Noise Monitoring Data and Predictions

6.1 Noise Monitoring

Table 6-1 presents representative L_{A90} sound levels, for each of the human receptor assessment locations, derived from the recent survey data collected by Uniper and Arup together with a justification for each. Ecological receptor results, based on the L_{Aeq} sound levels, are presented in Section 7.2. The Installation will operate 24-hours per day and therefore the assessment takes into account the most sensitive periods. It should be noted that in this location, due to the continuous nature of existing industrial noise sources, and the distance to other environmental sound sources (road/ rail), there are generally small differences between the lowest daytime (including evening) and night-time background sound levels. At some of the more distant NSRs no recent night-time background sound level surveys have been undertaken and hence a daytime or evening measurement has been used instead. This is considered to have minimal influence on the resulting assessment due to these not being the most critical receptors (due to distance from the Installation).

Full details for both surveys, including analyses of continuous monitoring data and calibration certificates are presented in Annexes A to C. The credentials of those who performed the surveys are presented in Annex D.

Table 6-1: Summary of representative background sound levels (L_{A90}) relevant to BS 4142 assessment (day and night)

Location	Sound Pressure Level, dB(A) (re 20 μ Pa)	
	Representative background L_{A90}	Origin and justification
Location 1	32	2013 DCO Application/ previous permit application night-time value (daytime levels similar to Arup daytime survey lowest level of 36 dB L_{A90})

Location	Sound Pressure Level, dB(A) (re 20 µPa)	
	Representative background L _{A90}	Origin and justification
Location 2	33	Arup value at Station Road as closest alternative location. 2013 DCO Application / previous permit application value was also 33 dB L _{A90} night
Location 3	31	Arup median of five samples undertaken in day/ evening (the environmental report, and associated survey, prepared for the DCO amendment in 2019 also determined a level of 33 dB L _{A90} night)
Location 4	36	Assumed level at Swinster Lane as nearest recent measurement location (2013 DCO Application / previous permit application value was 41 dB L _{A90} daytime)
Location 5	36	Level derived from Uniper baseline sound survey as set out in Annex A
Location 6	36	Level derived from Uniper baseline sound survey as set out in Annex A
Location 7	40	Level derived from combined Arup and Uniper data in Annex C.
Location 10	39	Level derived from Uniper baseline sound survey as set out in Annex A

6.2 Embedded Mitigation

Table 6-2 summarises the embedded noise control mitigation incorporated into the Installation design which forms the basis of the noise model prediction.

Table 6-2: Embedded noise mitigation

Main Noise Sources ¹	Noise mitigation measures
Transformer, incl. MBJ	Low noise design for the transformer, implemented by supplier's design
HRSG (UHA), incl. Stack	Facades of building with sound reduction index R _w 49 dB (C-Cassette construction) High insulating doors and access doors Low noise design for Heating, Ventilation and Air Conditioning (HVAC) System Silencer for HRSG Stack
Feedwater Pumps (ULA)	Installed inside sound enclosure (sound reduction index R _w 35 dB)
Filter house (MBL)	Air Inlet equipped with a silencer
Diffusor (MBR)	Installed inside sound enclosure (sound reduction index R _w 35 dB)
Gas & Steam Turbine Building (UMC)	Facades of building with sound reduction index R _w 49 dB (C-Cassette construction) High insulating doors and access doors Low noise design for HVAC System
PCCs (UBA)	Low noise design for HVAC system/ air conditioning units
Gas preheating, metering & filtering station (UEN)	Sound insulation for piping and valves, local sound enclosures for individual piping and valve as required
Steampipes (UMY)	Steampipes outside building footprint to be installed inside sound enclosure (sound reduction index R _w 35 dB)

Main Noise Sources ¹	Noise mitigation measures
Hybrid Cooling Tower	Low noise fans Splash attenuators inside water chamber Silencer for air inlets and air outlets
Fuel Gas Reducing Station (UEN)	Sound insulation for piping and valves, local sound enclosures for individual piping and valve as required
Electrical Auxiliary Boiler	Low noise design as per supplier
HRSR Sampling Container (UHX) and Ammonia Dosing Container (USX)	Low noise design for HVAC System implemented by supplier's design
Control Room and Administration Building (UCA)	Low noise design for HVAC System implemented by supplier's design
Workshop and Storage Building (UST)	Low noise design for HVAC System implemented by supplier's design
Combined Cooling Tower Circulating Water Pump Structure (UGJ) and Regeneration Plant (ULX)	Facades of building with sound reduction index R_w 35 dB high insulating doors and gates Low noise design for HVAC System implemented by supplier's design
Water Treatment Plant Container (UGD)	Low noise design for HVAC System implemented by supplier's design
Cooling Tower Treatment Plant (URD)	Sound enclosure for cooling tower pumps
Space Heating System (USB)	Sound enclosure for the system or installed within building structure

6.3 Plant Sound Power Levels

The A-weighted sound power levels of the proposed sound sources with embedded mitigation are presented in Table 6-3.

Table 6-3: Sound power level of plant items with embedded mitigation

Building ¹	L_{wA} dB(A)	Sound Power Level, L_{wA} (dB(A))								
		Octave band centre frequency, Hz								
		31.5	63	125	250	500	1k	2k	4k	8k
Transformer, incl. MBJ	99	65	88	95	92	93	84	80	76	71
HSRG (UHA), incl. Stack	98	79	87	87	87	88	90	93	84	82
Feedwater Pumps (ULA)	92	73	78	84	84	85	86	84	81	72
Filterhouse (MBL)	95	83	88	82	87	89	89	84	76	79
Diffusor (MBR)	89	66	73	76	78	77	77	87	80	73
Gas and Steam Turbine Building (UMC)	88	75	81	82	78	78	74	76	77	72
PCCs (UBA)	88	57	69	75	82	84	81	76	70	60
Gas Preheating, Metering and Filtering station (UEN)	83	44	60	74	75	74	74	75	78	66

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Building ¹	L _{WA} dB(A)	Sound Power Level, L _{WA} (dB(A))								
		Octave band centre frequency, Hz								
		31.5	63	125	250	500	1k	2k	4k	8k
Steampipes (UMY)	82	67	75	71	75	74	74	71	67	58
Hybrid Cooling Tower (URA)	102	77	88	95	94	88	89	93	96	96
Fuel Gas Reducing Station (UEN)	97	67	79	85	92	92	91	86	85	77
HRSG Sampling Container (UHX) and Ammonia Dosing Container (USX)	88	42	58	74	77	82	84	79	76	72
Control Room and Administration Building (UCA)	88	66	71	76	80	84	83	78	72	65
Workshop and Storage Building (UST)	87	56	63	71	79	82	82	79	75	67
Combined Cooling Tower Circulating Water Pump Structure (UGJ) and Regeneration Plant (ULX)	86	61	74	77	80	80	77	73	67	62
Water Treatment Plant Container (UGD)	86	50	60	71	81	79	80	78	72	67
Cooling Tower Treatment Plant (URD)	86	58	69	81	81	79	72	57	43	22
Space Heating System (USB)	75	59	72	71	64	61	56	47	42	42

Note 1 - The acronyms correspond to the identifiers in Figure 5-1

6.4 Predicted noise levels

Figure 6-1 presents the predicted specific noise levels resulting from the operation of Installation, based on the assumptions above, at a height of 4m above ground level.

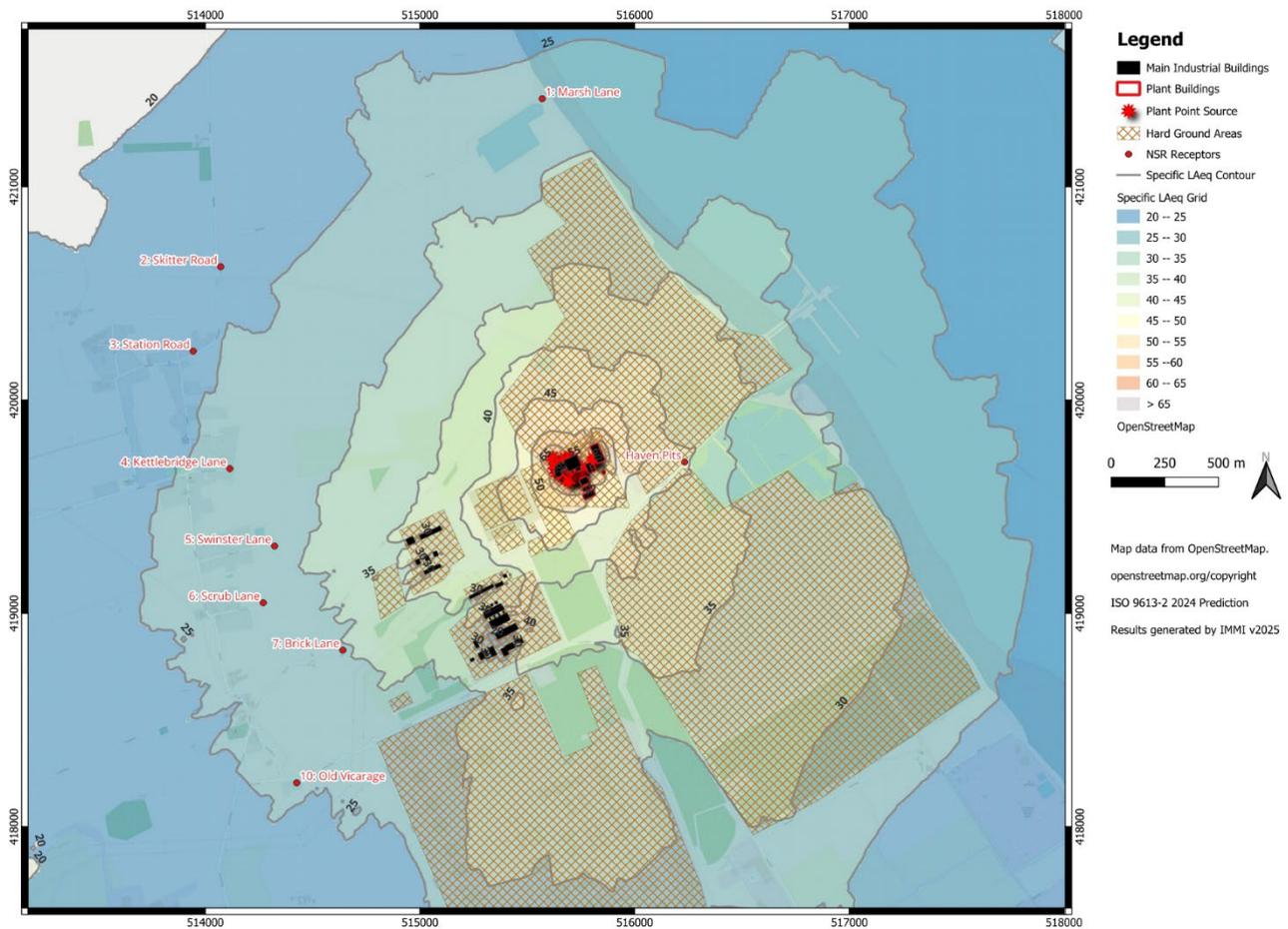


Figure 6-1 Noise contour map showing the predicted noise levels from the operation of the Installation and NSRs

6.5 Character Correction

Given that the existing soundscape at the NSRs includes a component of industrial noise, and taking into account the low absolute predicted noise levels from the Installation at the NSRs (see Figure 6-1), it is unlikely that noise from the Installation will be readily distinguishable at any of the NSRs and hence no character correction has been applied.

7. Noise Impact Assessment

7.1 Human Receptors

Table 7-1 sets out the noise impact assessment undertaken following the methodology and guidance of BS 4142.

Table 7-1: BS 4142 assessment for including most sensitive periods, with embedded mitigation and receptors at 4.0m distance from ground.

Receptor	NSR 1 Marsh Lane	NSR 2 Skitter Road	NSR 3 Station Road	NSR 4 Kettlebridge Lane	NSR 5 Swinster Lane	NSR 6 Scrub Lane	NSR 7 Brick Lane	NSR 10 Chase Hill Road
<i>Specific sound level</i> $L_s (L_{Acq,Tr})$, dB	26	23	24	27	29	27	30	26
Acoustic feature correction, dB	0	0	0	0	0	0	0	0
<i>Rating level</i> ($L_{Ar,Tr}$), dB	26	23	24	27	29	27	30	26
<i>Representative background sound level</i> ($L_{A90,T}$), dB	32	33	31	36	36	36	40	39
<i>Excess of rating level over background sound level</i> ($L_{Ar,Tr} - L_{A90,T}$), dB	-6	-10	-7	-9	-7	-9	-10	-13
BS 4142:2014 impact category	Low	Low	Low	Low	Low	Low	Low	Low

The predicted noise levels (rating levels) from the Installation at the nearest noise sensitive receptors do not exceed the background sound levels during the most sensitive periods and therefore this is assessed, in terms of BS 4142, as having a ‘low impact’ dependent on context.

The NSR all currently experience, and have historically experienced, a degree of industrial noise throughout the day and night, seven days a week and therefore the new noise source will not be out of context with the existing soundscape. The predicted absolute noise levels are low, such that with windows open the internal noise levels from this source (or combined with underlying prevailing background sound levels) would be below 30 dB L_{Aeq} . It is therefore considered that taking into account contextual factors, the residual impact remains low.

7.2 Ecological Receptors

In preparation for environmental assessment for the 2013 DCO Application, C.GEN undertook consultation with Natural England to determine suitable thresholds of significance for the assessment of potential noise impacts on ecological receptors. The conclusion was that an increase of 3dB above baseline conditions (L_{Aeq}) was acceptable.

The noise level from the Installation has been predicted at the closest point on the North Killingholme Haven Pits Site of Special Scientific Interest (SSSI) (NSR9) at a height of 1m above the ground to represent the approximate head height of waterfowl, such as geese and swans, which inhabit the area. Although limited data was collected at this location in the recent Arup survey, past data collected for the ES for the 2013 DCO Application (also as set out in the previous permit application) and the 2019 DCO amendment, support a range of baseline sound levels between 41 dB and 56 dB $L_{Aeq,T}$ in the vicinity of the SSSI.

The predicted noise level at NSR 9 is 2 dB below the lower of the Arup measured ambient sound levels and is 14 dB below the higher measured sound level.

Table 7-2: Noise impact assessment at the ecological receptor

Receptor	Specific sound level ($L_{Aeq,Tr}$), dB	Ambient sound levels recorded during Arup survey ($L_{Aeq,15minute}$), dB
NSR 9 Haven Pits SSSI	40	42 (evening), 54 (day)

The existing sound environment in this area, which it may be assumed that the waterfowl are habituated to, consists of steady industrial noise, along with intermittent and impulsive noise sources from the road and port activity.

Noise from the Installation could give rise to an approximate 2dB increase in the lowest ambient L_{Aeq} sound levels at the closest point on the SSSI and would have no influence on the higher ambient sound levels. At more distant locations, across the SSSI noise from the Installation would be lower. It is therefore considered that noise from the Installation would result in a low impact at the nearest sensitive ecological receptors at North Killingholme Haven Pits SSSI.

8. Uncertainty

Given the industrial nature of the area, the underlying sound levels differ from day to day, and over the longer term, based on the operating characteristics of the surrounding plant. The level of uncertainty for this assessment has been minimized by collecting baseline sound level data at two NSRs closest to the Installation, over several weeks, during different periods, coupled with sample data at other NSRs. There is a degree of uncertainty for the night-time sound levels at receptors where placement of logging equipment was not feasible but recent evening/night-time measurement data has been obtained for the closest receptors. Furthermore, where continuous monitoring has been undertaken it has shown evidence of small differences between typical evening and night-time sound levels.

The detail included in the prediction model is proportionate to the likely impact of the Installation given the distances to the nearest noise sensitive receptors and the existing soundscape. As noted, there is some uncertainty in the form and dimensions of buildings in the model but the sound emission from the larger buildings has been derived based on the total internal sound power, the proposed façade or roof sound insulation and the dimensions of each building. The resulting total sound power has been assigned proportionally to each façade/ roof. This is likely to have little influence on the resulting predicted noise levels, when considering the large separation between the Installation and the NSRs.

Sound power levels are considered to be realistic having been based on sound power level emission spectra from a potential supplier of the CCGT equipment (Siemens) and data from another similar CCGT site.

Provided that the selected plant and building items are consistent with the assumptions outlined in this report, the NIA outcomes should be achieved.

In terms of propagation, a moderate downwind condition has been factored into the modelling although most receptors are upwind or in a neutral position compared with the prevailing south-westerly wind direction. Consequently, the estimated specific levels used in the assessment are considered to be worst-case for the nearest noise sensitive receptors in East Halton village.

9. Conclusions

A NIA has been undertaken to assess the potential impacts associated with the operation of the proposed North Killingholme Power Project (the 'Installation') upon the nearest NSRs.

A three-dimensional model has been constructed by Uniper based on plant supplier's detailed data to predict noise from the Installation. An assessment of the likely noise impact has been undertaken at the nearest noise sensitive human and ecological receptors in line with the EA Guidance and British Standard BS 4142.

Recent baseline environmental sound level surveys, undertaken for other recent or forthcoming planning applications, have been used to establish the representative background sound levels at the nearest NSR.

With incorporation of the embedded mitigation, the predicted rating levels due to the Installation, do not exceed the background sound levels ($L_{A90,T}$) at the nearest residential receptors. As noted in BS 4142, where the rating level does not exceed background sound levels, this is an indication of the specific sound source having a low impact dependent on context. Given that the predicted absolute noise levels are low and that the existing sound environment at the noise sensitive receptors includes an element of industrial noise, no adjustment has been made for context, and it is concluded that the Installation would result in a low impact at the nearest residential receptors.

The predicted impact at the nearest ecological receptor, North Killingholme Haven Pits SSSI, has been found to be low. Noise from the Installation would be below the lowest measured baseline ($L_{Aeq,T}$) sound levels at this location and well below the highest measured baseline sound levels. It is therefore concluded that the Installation would not cause a new impact on sensitive ecological receptors.

A low level of impact indicates that no further action is needed beyond the mitigation measures specified and embedded in the design.

Annex A

Baseline sound survey (Uniper Technologies Ltd)

This annex includes the environmental baseline sound survey that was conducted by Uniper Technologies Ltd as part of the Environmental Impact Assessment (EIA) for Humber H2ub® (Green) Project.

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1 Baseline Sound Survey

- 1.1.1 Surveys have been undertaken to determine baseline sound levels at residential locations close to the Proposed Development. Monitoring over two separate long-term periods in 2023 and 2024 has taken place at two locations representative of residential noise sensitive receptors - NSR 2 and NSR 3, as detailed in Table 1-1. Additional short-term monitoring at NSR 1 and NSR 4 was conducted during the 2024 survey period, details as follows:

2023 Survey

- 1.1.2 Unattended long-term continuous monitoring took place at NSR 2 Scrub Lane and NSR 3 Brick Lane (5 min interval) in the period 13 October 2023 to 14 November 2023. At the time of deployment, the daytime ambient sound at NSR 2 and NSR 3 comprised of contributions from industrial sites to the south and west of the site, distant traffic noise plus some domestic activities.

2024 Survey

- 1.1.3 Unattended long-term continuous monitoring took place at NSR 2 Scrub Lane and NSR 3 Brick Lane (15 min interval) in the period 28 October 2024 to 27 November 2024. At the time of deployment, the daytime ambient sound at NSR 2 comprised of contributions from industrial sites to the west, distant traffic, industrial sites to the south plus domestic activity. The ambient sound at NSR 3 had a similar composition, but with increased contributions from industrial facilities and traffic on Chase Hill Road to the south.
- 1.1.4 Attended Monitoring at NSR 1 Swinster Lane and NSR 4 Chase Hill Road, plus additional measurements at Hazel Dene, Marsh Lane took place in the period 26 November 2024 22:15 to 27 November 2024 01:20. Table 1-1 provides details of the measurement locations used during each survey. Calibration details of equipment used on each survey are given in Table 1-2 and traceable calibration certificates are shown in Figure 1-1. (Note –certificates for calibrated hire equipment are not shown). A photograph showing the position of the site perimeter weather station is given in Figure 1-2 and Figure 1-3 provides photographs of the continuous monitoring locations.

Table 1-1 Details of long- and short-term survey locations

Receptor	Eastings & Northings (Approx)	Description	Survey
NSR 1	514237,419320	On roadside verge, Representative of properties at end of Swinster Lane whilst avoiding disturbance/intrusion	Attended 2024
NSR 2	514284,419049	On field boundary adjoining garden of last property on Scrub Lane (Roselea)	Continuous 2023 & 2024
NSR 3	514658,418851	Within field just behind Fairfield property (Last property on Brick Lane)	Continuous 2023 & 2024

Receptor	Eastings & Northings (Approx)	Description	Survey
NSR 4	514466,418232	On verge/field access area off Chase Hill Road , Representative of Old Vicarage property whilst avoiding disturbance/intrusion	Attended 2024
Hazel Dene, Marsh Lane	517298,417319	On verge of Marsh Lane, Representative of Hazel Dene property whilst avoiding disturbance/intrusion	Attended 2024

All measurements were made between approximately 1.2 and 1.5 m above ground level, and in accordance with the requirements of British Standard BS 7445 [1] .

- All sound level meters were positioned at least 3.5 m from any reflecting surface, other than the ground (i.e. free-field). Details of sound in the area were noted during visits to the monitoring locations to set up and collect the measurement equipment.
- All sound level meters (SLMs) used were Class 1 precision instruments. Each has been programmed to log a range of sound indicators including $L_{Aeq,T}$ and $L_{A90,T}$, in contiguous intervals.
- The calibration levels were checked prior to and following all measurements. No significant drift, more than 0.2 dB occurred.

Table 1-2 Details of Instruments used in long- and short-term surveys

Equipment	Details	Serial Number	Calibration Date	Use
Sound Level Meter	RION NL52	0120529	Jan-2024	Scrub Lane, 2023, NSR 2
Sound Level Meter	RION NL52 (hire meter)	0810301	Not noted	Brick Lane, 2023, NSR 3
Sound Level Meter	RION NL52 (hire meter)	1087404	Mar-2024	Scrub Lane, 2024, NSR 2
Sound Level Meter	RION NL52 (hire meter)	0620872	Jan-2024	Brick Lane, 2024, NSR 3
Sound Level Meter	Bruel & Kjaer 2250	2717740	Mar-2025	Attended Survey Nov 2024
Acoustic Calibrator	Bruel & Kjaer 4231	1883787	Mar-2025	Continuous and Attended Surveys
Acoustic Calibrator	RION NC-75	34835125	Oct-2023	Continuous and Attended Surveys
Weather Station	Davis Vantage Vue	Site Perimeter monitoring during 2023 & 2024 continuous monitoring and 2024 attended surveys		

- 1.1.5 A weather station was set up to monitor meteorological conditions during the measurements. Measurement periods during which the weather was not suitable for environmental sound measurements (i.e. when wind speeds >4 m/s and during precipitation or wet conditions) have been excluded from subsequent analysis. Wind speed and wet/dry weather period are provided in time series in Figure 1-4. Weather conditions during the short term attended measurements were all within suitable limits for environmental sound measurements.

1.1.6 The long-term continuous monitoring surveys in 2023 and 2024 each extended for approximately one month. Details of other companies' industrial plant operational states are not known, but for Uniper's KPS-B the 2023 and 2024 surveys contained periods of normal operation and maintenance shutdown. Due to the duration of the surveys, it is considered that the NSR 2 and NSR 3 results are a representative indication of the long-term baseline sound that arose at these East Halton residential locations.

Table 1-3 Base-line results from attended survey locations 26-27 November 2024

NSR	Start Time	Elapsed Time	L _{Aeq} dB	L _{A90} dB	Comment/Observation
NSR1 Swinster Lane	22:59	00:10:00	37.2	34.4	Distant refinery is dominant L _{A90} source. Some low frequency characteristic - but minor. Wildlife noises plus distant traffic in East Halton
	00:01	00:10:00	38.8	36.1	Distant refinery noise dominant L _{A90} source. Noise from nearby industry to the east not discernible.
	01:20	00:10:00	38.1	36.7	Distant refinery plant is dominant L _{A90} source. Perceptible contribution from industry located east of East Halton.
NSR 4 Chase Hill Road	22:12	00:10:00	66.3	44.7	Traffic on nearby road. Industry complex to south dominant background L _{A90} source. Various sources spread across the site are also intermittent. More minor contribution from distant traffic in East Halton and further afield.
	23:17	00:09:46	43.3	39.3	Refinery steady noise dominant. Minor contribution from industry to north. Distant traffic on East Halton Road. No local traffic movements.
	00:34	00:10:00	47.3	45.8	Refinery steady noise dominant, both in terms of L _{A90} and L _{Aeq} . Minor contribution from distant traffic on East Halton village road. No local vehicle movements.
Extra Receptor Hazel Dene, Marsh Lane	22:32	00:10:00	55.2	53.8	Nearest industrial plant dominates, various steam discharge and pipework noises. Gas flaring occurring - but no discernible contribution. Some traffic on Rosper Road, but not discernible due to process noise. Very steady noise levels overall.
	23:37	00:10:00	54.2	51.7	Nearest industrial plant noises dominate - variety of contributions from pumps/steam/pipes/valves. Rosper Road traffic indiscernible.
	00:57	00:10:00	49.9	48.9	Nearest industrial plant noises dominate - various contributions.

Note: The duration of each measurement was approximately 10 minute – to enable multiple sets samples to be taken around the various locations during the night period. It is considered that the resultant L_{A90,10min} levels are representative of the underlying background sound level that occurred throughout the night.

Acoustic calibrator Bruel & Kjaer 4231 1883787 94.0dB, Calibration Response Before: 93.9 dB Calibration After: 93.9 dB.

1.1.7 In response the NLC Scoping Opinion, for completeness, the attended November 2024 survey scope was extended to include measurement of baseline L_{Aeq} and L_{A90} levels near Hazel Dene on Marsh Lane. The survey results and observations indicate that overnight levels are dominated by contributions from various local industry sources, with lowest measurements of 49.9 dB L_{Aeq} and 48.9 L_{A90} levels. These are comparable with representative background sound levels of 51 dB L_{A90} (Night) and 50 dB L_{A90} (Day) identified in VPI and P66 Carbon Capture projects [2] & [3] projects. On the basis this existing

baseline and its distance from the Proposed Development (more than 2km), this location has been screened out from further detailed assessment.

- 1.1.8 Timeseries of the $L_{Aeq,T}$ and $L_{A90,T}$ measured at NSR2 and NSR3 during 2023 and 2024 survey (filtered to exclude windy/wet periods) are shown in Figure 1-5. A summary of the baseline arithmetic mean L_{Aeq} and L_{A90} levels recorded during daytime and night-time periods are shown in Table 1-4 (Day period: 07:00 to 23:00 and Night Period: 23:00 to 07:00). Representative background sound levels have been identified through consideration of the mean and commonly occurring ranges of L_{A90} levels from the level distribution graphs given in Figure 1-6.

Table 1-4 Summary of Mean and Representative Baseline Level Results from 2023 and 2024 long-term monitoring

Survey	NSR2 Scrub Lane		NSR3 Brick Lane					
	Day		Night		Day		Night	
	L_{Aeq} dB	L_{A90} dB	L_{Aeq} dB	L_{A90} dB	L_{Aeq} dB	L_{A90} dB	L_{Aeq} dB	L_{A90} dB
2023	43.1	38.6	38.9	36.9	44.6	41.7	42.8	41.2
2024	41.1	35.7	36.1	33.2	43	39.8	40.9	38.9
All	42.5	37.7	38.1	35.8	44.1	41.2	42.3	40.6
Assumed Representative Background Sound Level L_{A90}		38		36		41		40

- 1.1.9 For NSR 1 and NSR 4 where attended surveys were completed, the night-time minimum L_{A90} level minimum is taken to be representative of the baseline background. The night-time BS4142 assessment is based on 36 dB L_{A90} at NSR 1 and 39 dB L_{A90} at NSR 4. This is considered to be a precautionary approach, particularly at NSR 4 which is less remote from the road network and southern industrial facilities.

- 1.1.10 For the daytime period assessment, a similarly precautionary approach has been taken for identifying representative daytime L_{A90s} at NSR 1 and NSR 2. Due to the widespread influence of various industrial and road traffic noise sources on properties in East Halton, daytime L_{A90} levels from the continuous monitoring surveys are considered a robust indicator of likely background levels at nearby NSR 1 and NSR 4. For the assessment of potential impacts during daytime, Chapter 10 Table 10-15 shows 38 dB L_{A90} applying to NSR 1/NSR 2 and 41 dB L_{A90} applying to NSR 3/NSR 4.



Figure 1-2 Photograph showing location of weather monitoring equipment near westerly site perimeter (2023 & 2024 surveys)



Figure 1-3 Photographs showing continuous monitoring locations at NSR2: Scrub Lane and NSR3: Brick Lane (2023 and 2024 surveys)

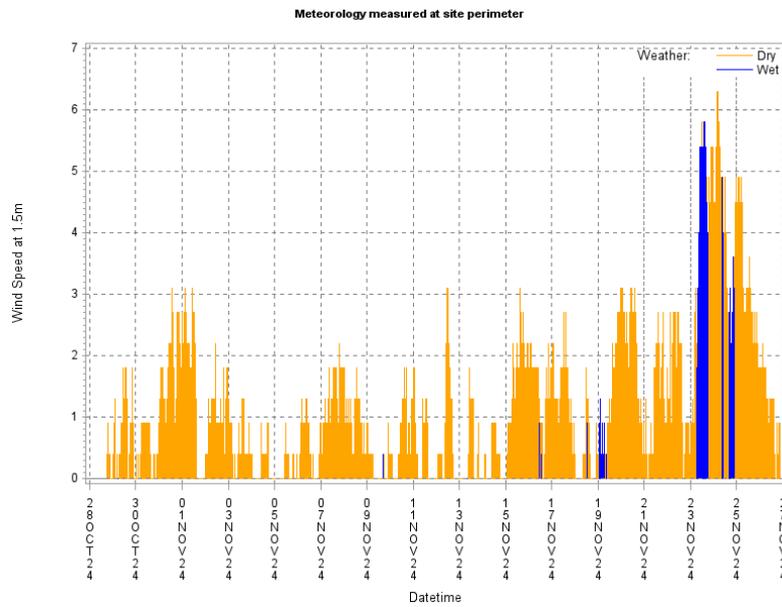
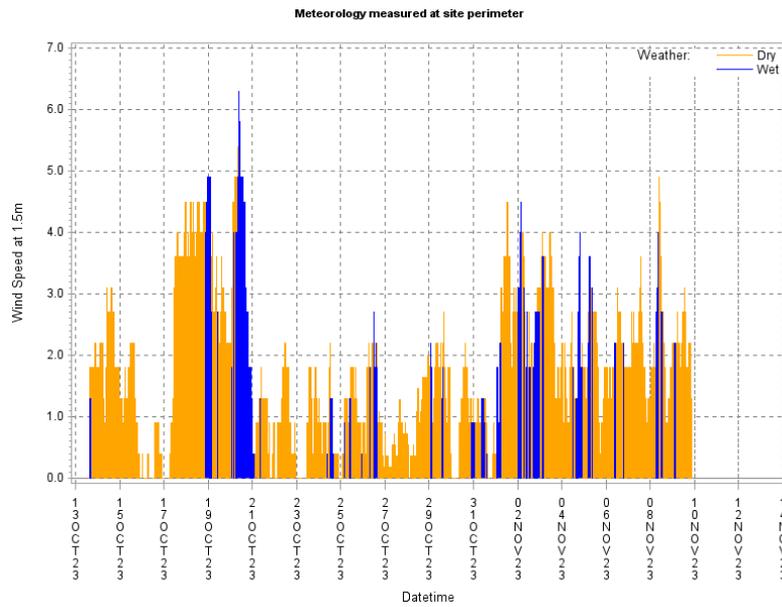


Figure 1-4 Graphs of wind speed and weather state at site perimeter during 2023 and 2024 surveys

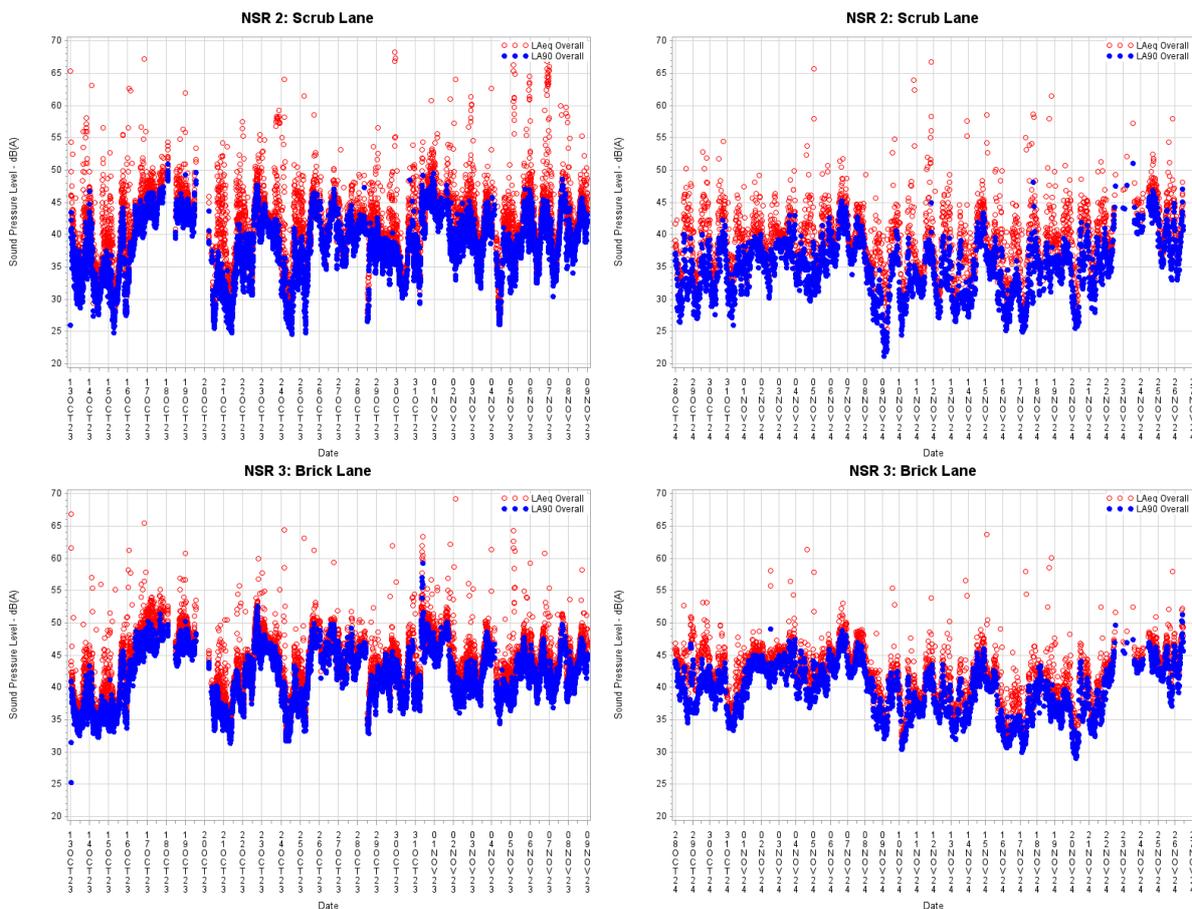


Figure 1-5 Timeseries of $L_{Aeq,T}$ & $L_{A90,T}$ at NSR2: Scrub Lane and NSR3: Brick Lane locations during 2023 and 2024 survey (excluding windy/wet periods)

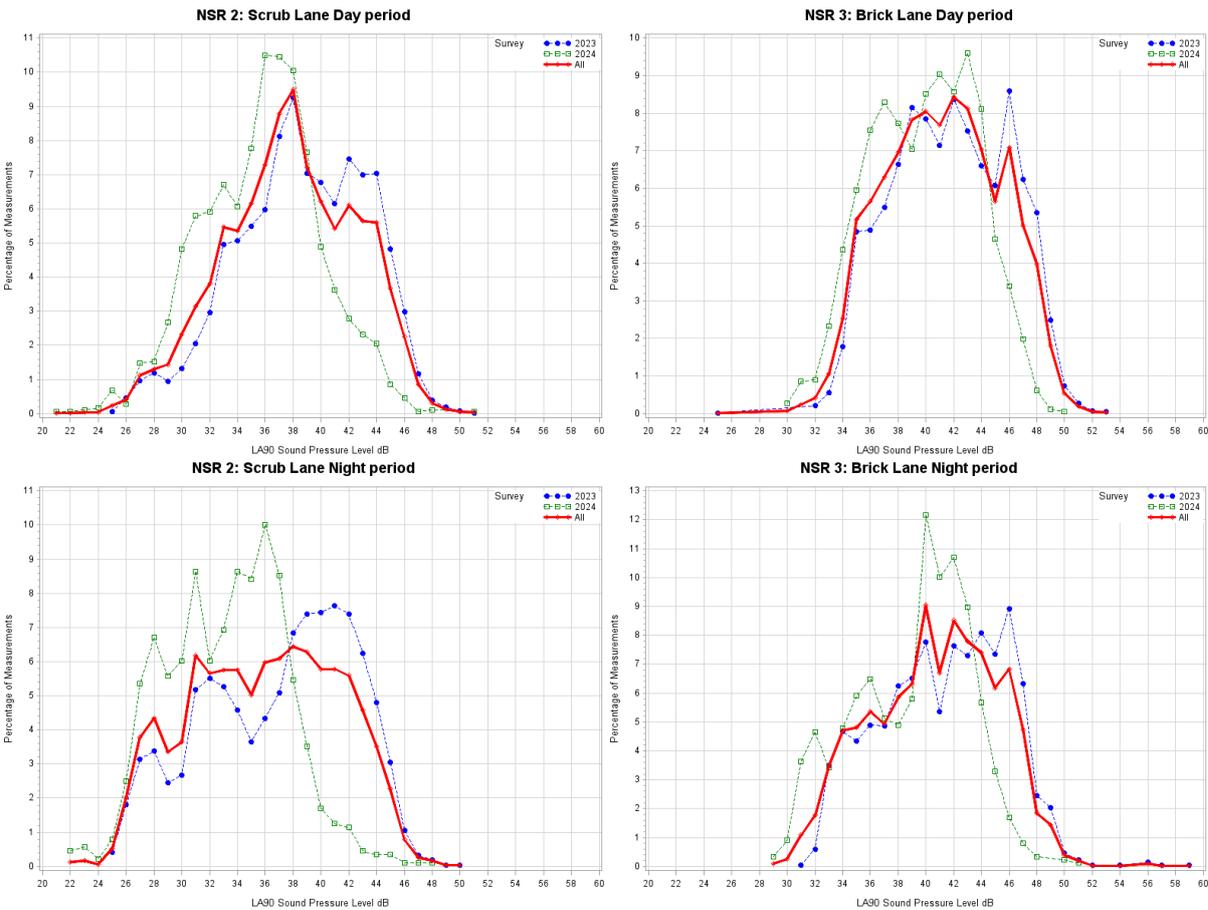


Figure 1-6 Day and Night period frequency distribution of LA90 measurements during 2023 and 2024 surveys at NSR 2 Scrub Lane and NSR 3 Brick Lane.

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Annex B

Baseline sound survey (Arup)

This annex includes the environmental baseline sound survey conducted by Arup between 27 June and 4 July 2025 for the forthcoming planning application for the Killingholme Low Carbon Power project.

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B.1 Introduction

An environmental baseline sound level survey has been undertaken to determine the existing sound climate and character at the noise sensitive receptors located around the North Killingholme Uniper site.

The findings in this report include:

- Results from the attended and unattended sound level surveys carried out by Arup between 27 June and 4 July 2025.

The findings presented are intended to inform the assessment of potential noise impacts associated with the proposed development.

B.2 Arup's survey details

B.2.1 Site description and monitoring locations

The site is located in North Killingholme, North Lincolnshire, within a heavily developed industrial estate with C. Ro Ports Killingholme to the east and Killingholme Power Station to the southwest. The red line boundary of the proposed development and the monitoring locations, which were chosen to represent the closest noise sensitive receptors, are shown in Figure 1. The numbering of these locations has been applied in accordance with the 2013 DCO application for the Combined Cycle Gas Turbine (CCGT) to ensure consistency. Monitoring was focussed on gaining additional data to supplement past noise measurement surveys, particularly around the proposed pipeline options.



Figure 1: Red line boundary and monitoring locations (Maps Data: Google, Imagery ©2025 Airbus, CNES / Airbus, Landsat / Copernicus, Maxar Technologies)

Unattended sound level logging was conducted over a one-week period at Location 7 on Brick Lane, to the west of the main site (indicated by the orange dot). Additionally, attended measurements were carried out at multiple locations around the proposed development, shown by the blue dots.

The general sound environment is primarily influenced by road traffic, mainly from Chase Hill Road, East Halton Road and Humber Road, and industrial noise from the existing industrial estate in the area. Occasional aircraft and helicopter overflights were observed during attended measurements.

B.2.2 Instrumentation

The sound level meters (SLMs), microphones and sound pressure level calibrators used by Arup are Class 1 instruments, conforming to BS EN 61672-1:2013¹. All Arup instrumentation is calibrated regularly in line with the recommendations in BS 4142:2014+A1:2019² and has full traceable calibration to national and international standards, which are undertaken by an accredited calibration laboratory. Calibration certificates are provided in Section B.5.

¹ BS EN 61672-1:2013 Electroacoustics. Sound level meters - Specifications. (published 31/12/2013)

² BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound. (published 30/06/2019)

The SLM was checked for correct calibration level before and after each series of measurements.

The equipment used to undertake the survey is described in Table 1 below.

Description	Serial number	Item type
Sound level meter	00301365	Rion NA-28
Pre-amp	91399	Rion NH-23
Calibrator	34334830	Rion NC-75
Microphone	01963	Rion UC-59
Sound level meter	00264533	RION NL-52
Pre-amp	64658	RION NH-25
Calibrator	34467730	RION NC-74
Microphone	09681	RION UC-59
Weather station	230.0924.0701.251	Luft WS600

Table 1: Measurement instrumentation

B.2.3 Measurement methodology

The survey was conducted following the guidance in BS 7445-1:2003³. At each measurement location, the SLM was mounted on a tripod with the microphone set between 1.2m to 1.5m above local ground level. All measurements were taken under acoustically free-field conditions, except where otherwise stated. The appropriate windshield for the SLM was fitted to the microphone throughout to minimise wind-induced noise.

Unattended continuous measurements were taken at one location over one week period with 15-minute intervals, capturing sound levels representative of the weekdays and weekend.

Attended measurements were undertaken at seven locations, through a series of 15-minute measurements at each location. Some measurements on the second day of surveying had to be abandoned due to increasing wind speeds.

A weather station was set up at the unattended logger location to record meteorological conditions during the measurement period. Parameters recorded included wind speed, wind direction, temperature, humidity and precipitation. Measurements were logged at 15 minutes interval and were synchronised with the unattended sound level meter.

³ BS 7445-1:2003 Description and measurement of environmental noise - Guide to quantities and procedures (published 12/12/2003)

B.2.4 Measurement results

B.2.4.1 Attended measurements

The summary tables for each measurement location provide values of each time 15-minute period for L_{A90} , L_{A10} and L_{Aeq} .

B.2.4.1.1 Location 1

Location description:

The measurement location is representative of Winters Farm located at the eastern end of Marsh Lane. The location is surrounded by fields, with a reservoir to the east.

Measurement duration:

Refer to time periods in Table 2.

Environment and observations:

Distant road traffic noise from Skitter Road (approximately 1.2 km to the west) and operational sounds from industrial units located to the south-west were clearly audible. The noise from these industrial units resembled activities such as drilling and digging, although the specific sources could not be identified. Occasional aircraft pass-bys were also noted.

Weather conditions:

Wind speed and direction: See Table 2 for individual wind conditions for each measurement.

Summary: Dry and sunny

Strong winds developing on Friday 4 July, reaching up to 7.2 m/s gusts so further measurements were abandoned.



Figure 2: Measurement Location 1

Personnel:

Gina Mackworth, Marios Filippoupolitis

Date	Time		Sound Pressure Level, dB(A) (re 20 μ Pa)			Wind Conditions	Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L_{90}	L_{eq}	L_{10}		
Day							
03/07/2025	13:32	00:15:00	36	45	46	Wind speed typically 2.5 m/s with gusts of 4 to 5 m/s from the west.	Industrial plant from existing estate to the south-west was clearly audible. Occasional aircraft pass-bys and rustling in trees was also present.
04/07/2025	12:24	00:15:00	44	47	54	Occasional gusts of wind 7.2 m/s but were typically around 4 m/s, from south-west.	Industrial plant from existing estate to the south-west was clearly audible. Rustling in trees was noticeably louder.
Evening							
03/07/2025	18:42	00:15:00	50	59	61	Wind speed typically 2.5 m/s with gusts of 4 to 5 m/s, from the west.	Industrial noise from south-west and road traffic from Skitter Road to the west was clearly audible. Geese sounds also present.

Table 2: Measured sound pressure levels at Location 1

B.2.4.1.2 Location 3

Location description:

Station Road, north-west of the existing industrial estate. The location is approximately 25 m east from the nearest residential property on Station Road.

Measurement duration:

Refer to time periods in Table 3

Environment and observations:

The sound environment included distant road traffic on Townside Road to the west and occasional pass-bys on Station Road. Generally, a rural sound environment with nature sounds present.

Weather conditions:

Wind speed and direction: See Table 3 for individual wind conditions for each measurement.

Summary: Dry and sunny. Wind speed was greater than 5m/s on Friday 4 July leading to further measurements being abandoned.

Personnel:

Gina Mackworth, Marios Filippoupolitis



Figure 3: Sound level meter at location 3

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)			Wind Conditions	Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀		
Day							
03/07/2025	14:00	00:15:00	31	34	40	Location is sheltered by trees. Typically wind speed of 0 m/s with occasional gusts of 2 m/s from the west.	Distant road traffic noise from Townside Road. Occasional aircraft pass-bys
04/07/2025	12:49	00:15:00	38	52	49	Typically wind speed of 2.6 m/s from the south. Gusts of up to 4 m/s.	Distant road traffic from Townside Road. Some noise from livestock. Occasional pass-bys on Station Road.
04/07/2025	16:27	00:15:00	41	45	53	Typically wind speed of 3.8 m/s from the south. Gusts of up to 4 m/s.	Dominant road traffic noise from Townside Road. Wind speed of 4.6 m/s average causing some rustling of leaves
Evening							
03/07/2025	19:04	00:15:00	29	55	52	Typically wind speed of 0 m/s with occasional gusts of 2 m/s from the west.	Distant road traffic from Townside Road. Some noise from livestock. Occasional pass-bys on Station Road. Noise from resident driving past and pulling up to speak to survey team towards end of measurement.
03/07/2025	20:48	00:15:00	28	33	44	Same as previous measurement.	Three close car pass-bys on Station Road. Some sounds from livestock.

Table 3: Measured sound pressure levels at Location 3

B.2.4.1.3 Location 9

Location description:

Measurement taken to the north-east of the existing industrial estate, at a layby on Haven Road.

Measurement duration:

Refer to time periods in Table 4.

Environment and observations:

Road traffic on Haven Road was the dominant source of noise, especially HGV movements. Additionally, industrial activity associated with the adjacent port entrance also contributed to the sound climate.

Weather conditions:

See Table 4 for individual wind conditions for each measurement. Summary: Dry and sunny.

Personnel:

Gina Mackworth, Marios Filippoupolitis



Figure 4: Sound level meter at location 9

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)			Wind Conditions	Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀		
Day							
03/07/2025	16:54	00:15:00	50	54	61	Wind speed typically 3 m/s from the west. Occasional gusts of 4 m/s.	Dominant road traffic on Haven Road and movement in the adjacent car park. Intermittent car horns were heard during the measurement period.
Evening							
03/07/2025	20:23	00:15:00	37	42	53	Wind speed typically 1.9 m/s from the west. Occasional gusts of 3 m/s.	Dominant noise from port activity, such as HGV movement, loading/unloading, drilling and banging sounds.

Table 4: Measured sound pressure levels at Location 9

B.2.4.1.4 Location 11

Location description:

Measurement taken to the west of the existing industrial estate, at the north end of a track off Church Lane. The monitoring location is approximately 200m from the red line boundary and considered representative of residential properties on St Crispins Close.

Measurement duration:

Refer to time periods in Table 5.

Environment and observations:

Road traffic noise from East Halton Road was the dominant source of noise. Industrial activities associated the existing industrial estate and the port to the east was also found to contribute to the existing sound climate.

Weather conditions:

Wind speed and direction: See Table 5 for individual wind conditions for each measurement.
Summary: Dry and sunny.



Figure 5: Sound level meter at location 11

Personnel:

Gina Mackworth, Marios Filippoupolitis

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)			Wind Conditions	Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀		
Day							
03/07/2025	15:35	00:15:00	40	42	46	Wind speed typically 2.3 m/s from the west. No significant gusts.	Dominant road traffic noise from East Halton Road was clearly audible. Industrial activities associated with the existing industrial estate was also present.
Evening							
03/07/2025	21:13	00:15:00	38	38	43	Typically wind speed of 0 m/s with occasional gusts of 1.5 m/s from the west.	Dominant plant noise from industrial estate to the east.

Table 5: Measured sound pressure levels at Location 11

B.2.4.1.5 Location 12

Location description:

Measurement taken at the residential property, Hazeldene, on Marsh Lane.

Measurement duration:

Refer to time periods in Table 6.

Environment and observations:

Industrial activities associated with the existing industrial estate located to the north-west was clearly audible. Road traffic from Rosper Road to the west and Manby Road to the south was also found to contribute to the existing sound climate.

Weather conditions:

See Table 6 for individual wind conditions for each measurement.
Summary: Dry and sunny.



Figure 6: Sound level meter at location 12

Personnel:

Gina Mackworth, Marios Filippoupolitis

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)			Wind Conditions	Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀		
Day							
03/07/2025	16:00	00:15:00	50	51	54	Wind speed typically 1.6 m/s from the north-west. Occasional gusts of 2.3 m/s.	Industrial activities associated with the existing industrial estate was the dominant source of noise. Occasional aircraft pass-bys.
04/07/2025	11:30	00:15:00	52	53	56	Wind speed typically 3.5 m/s from the south-west. Occasional gusts of 4.5 m/s.	Combination of industrial activities associated with the existing industrial estate and road traffic from Manby Road was the dominant source of noise. Occasional aircraft pass-bys noticed.
04/07/2025	15:30	00:15:00	53	54	58	Wind speed typically 4.6 m/s from the south-west.	Industrial activities associated with the existing industrial estate was the dominant source of noise.
Evening							
03/07/2025	19:32	00:15:00	50	51	57	Wind speed typically 1.6 m/s from the north-west. Occasional gusts of 2.3 m/s.	Road traffic noise was noticeably reduced compared to previous measurements. However, industrial activities associated with the existing industrial estate remained consistently noticeable through the monitoring period.

Table 6: Measured sound pressure levels at Location 12

B.2.4.1.6 Location 13

Location description:

Measurements were taken at a location to the east of the existing industrial estate. The monitoring location is approximately 120m from the residential property.

Measurement duration:

Refer to time periods in Table 7.

Environment and observations:

Industrial activities associated with the existing industrial estate and road traffic on Rosper Road were found to be dominant source of noise contributing to the existing sound climate.

Weather conditions:

See Table 7 for individual wind conditions for each measurement.

Summary: Dry and sunny.

Personnel:

Gina Mackworth, Marios Filippoupolitis

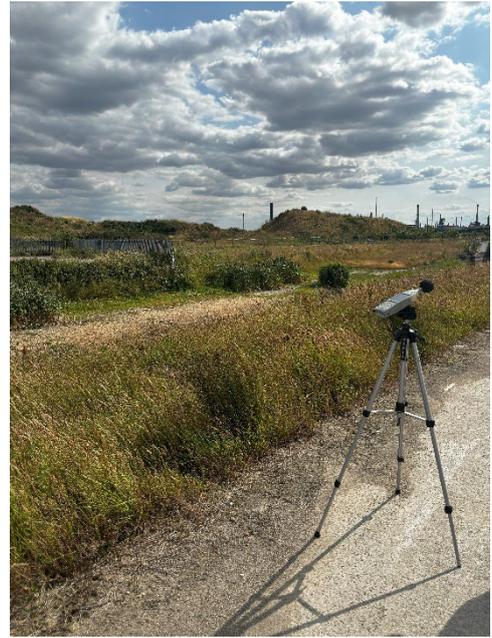


Figure 7: Sound level meter at location 13

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)			Wind Conditions	Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀		
Day							
04/07/2025	11:03	00:15:00	47	46	54	Typically, 4 m/s from the west. Gust of over 5 m/s but results have been reported as the levels are still lower than previous measurement.	Road traffic noise from Rosper Road which is approximately 800m to the west was clearly audible. Industrial noise from the existing estate to the west was also found to contribute to the existing noise climate.
Evening							
03/07/2025	20:00	00:15:00	42	42	49	Wind speed typically 4 m/s from the west. No significant gusts.	Road traffic noise from Rosper Road was observed to be noticeably reduced compared to previous measurements. However, industrial activities associated with the existing industrial estate remained consistently noticeable through the monitoring period.

Table 7: Measured sound pressure levels at Location 13

B.2.4.2 Unattended measurement

B.2.4.2.1 *Logger Location 7*

Location description:

Located in a field to the west of the existing industrial estate, at the eastern end of Brick Lane. The Humber Sea Terminal is located to the east and East Halton Road to the west. The microphone was positioned approximately 25 m to the east of the residential property.

Measurement duration:

Fri 27/06/2025 14:30

to

Fri 05/07/2025 14:45

Environment and observations:

During the period when the location was attended, the industrial activities associated with the existing industrial estate to the east, were the dominant noise source. Distant road traffic from East Halton Road was also found to contribute to the existing sound climate.

Logging interval:

15 minutes

Weather conditions:

Meteorological conditions during the monitoring period were generally dry, with only one short period of drizzle, which was not long or significant enough to affect measurement conditions. Wind speeds were generally below 3 m/s, peaking up to 3.5 m/s on Monday 30 June. Prevailing wind direction was from the south-west. The data from the weather station are presented in Figure 12 and Figure 13.



Figure 8: Logger and weather station at the logger location

Figure 9 and Figure 10 show the frequency distribution of $L_{A90, 15\text{minute}}$ levels, in 1dB intervals, during daytime and night-time periods, respectively. A summary of the data obtained from the unattended logger location is presented in Table 9. The representative L_{A90} , has been determined taking into account the most frequently occurring value and the cumulative distribution of L_{A90} levels. The L_{Aeq} is the logarithmic

average of the dataset for each period (day/night). A time history of the measurement data is shown in Figure 11.

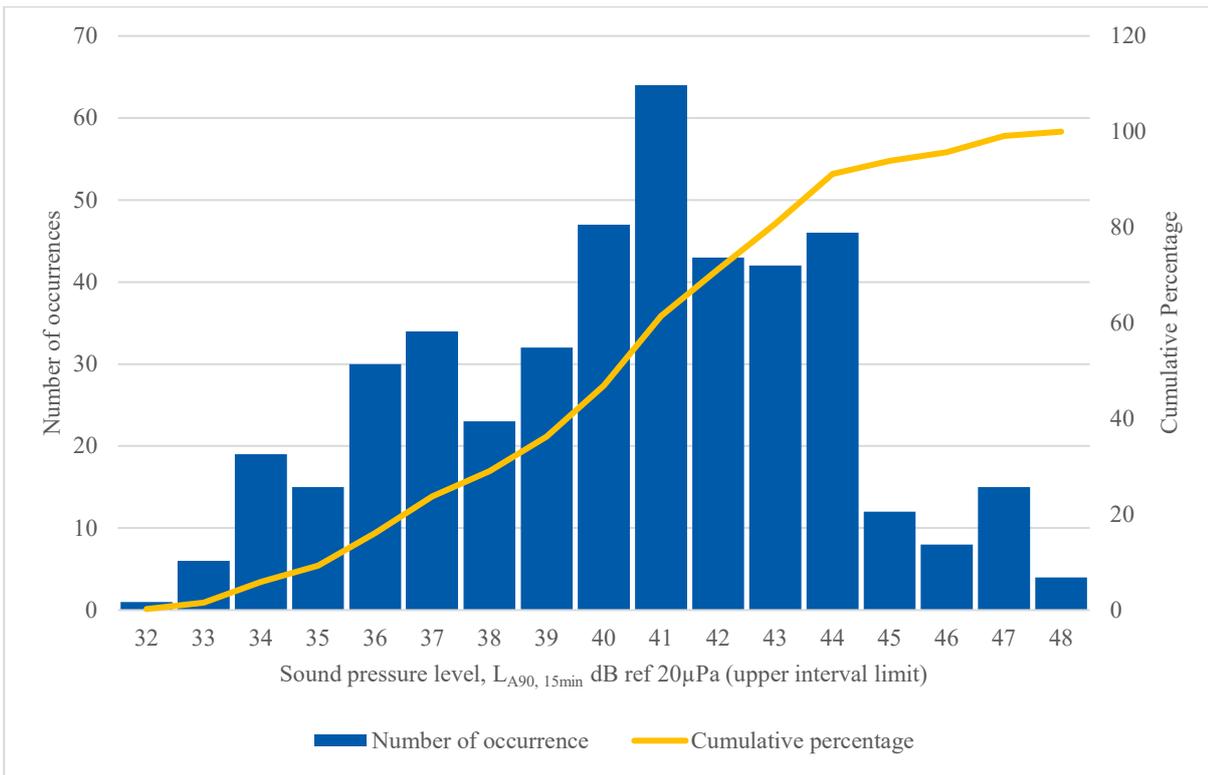


Figure 9: Histogram of daytime LA90,15min levels with the frequency of occurrence

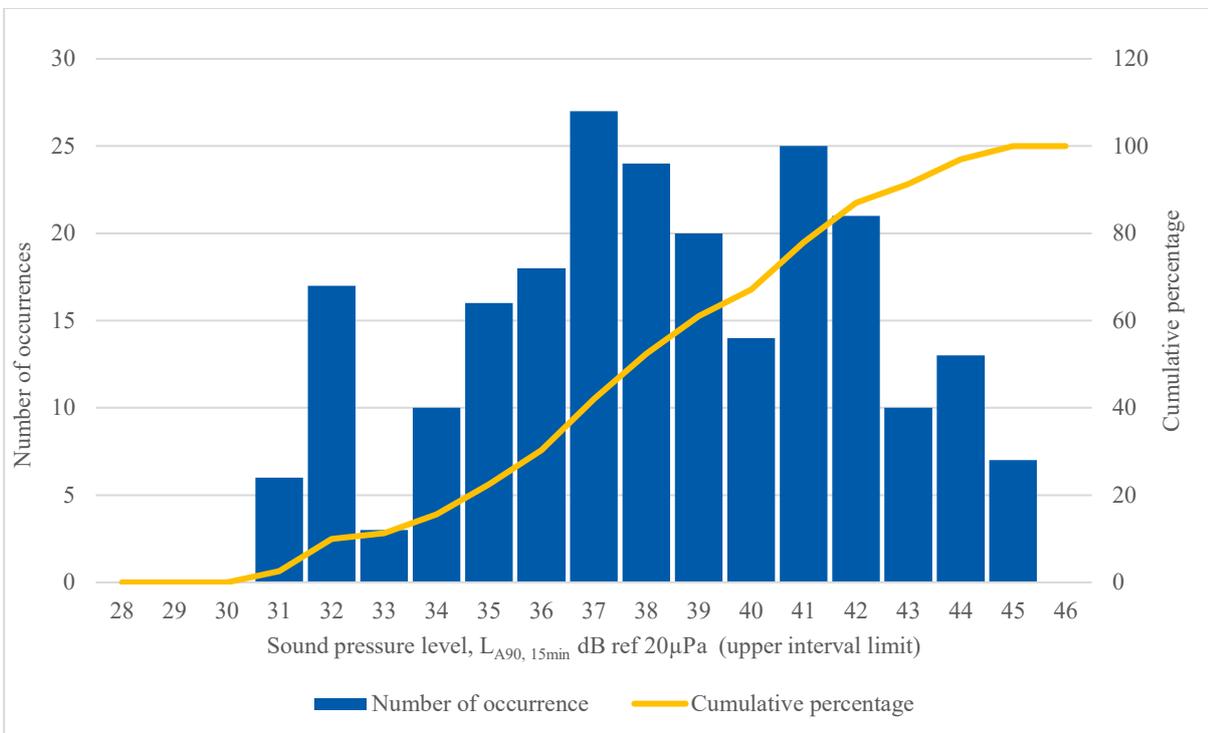


Figure 10: Histogram of night-time LA90,15min levels with frequency of occurrence

Period	Sound Pressure Level, dB(A) (re 20 µPa)	
	L ₉₀	L _{eq}
Day (07:00 – 23:00)	40	45
Night (23:00 – 07:00)	37	43

Table 8: Summary of sound pressure levels at logger location 7

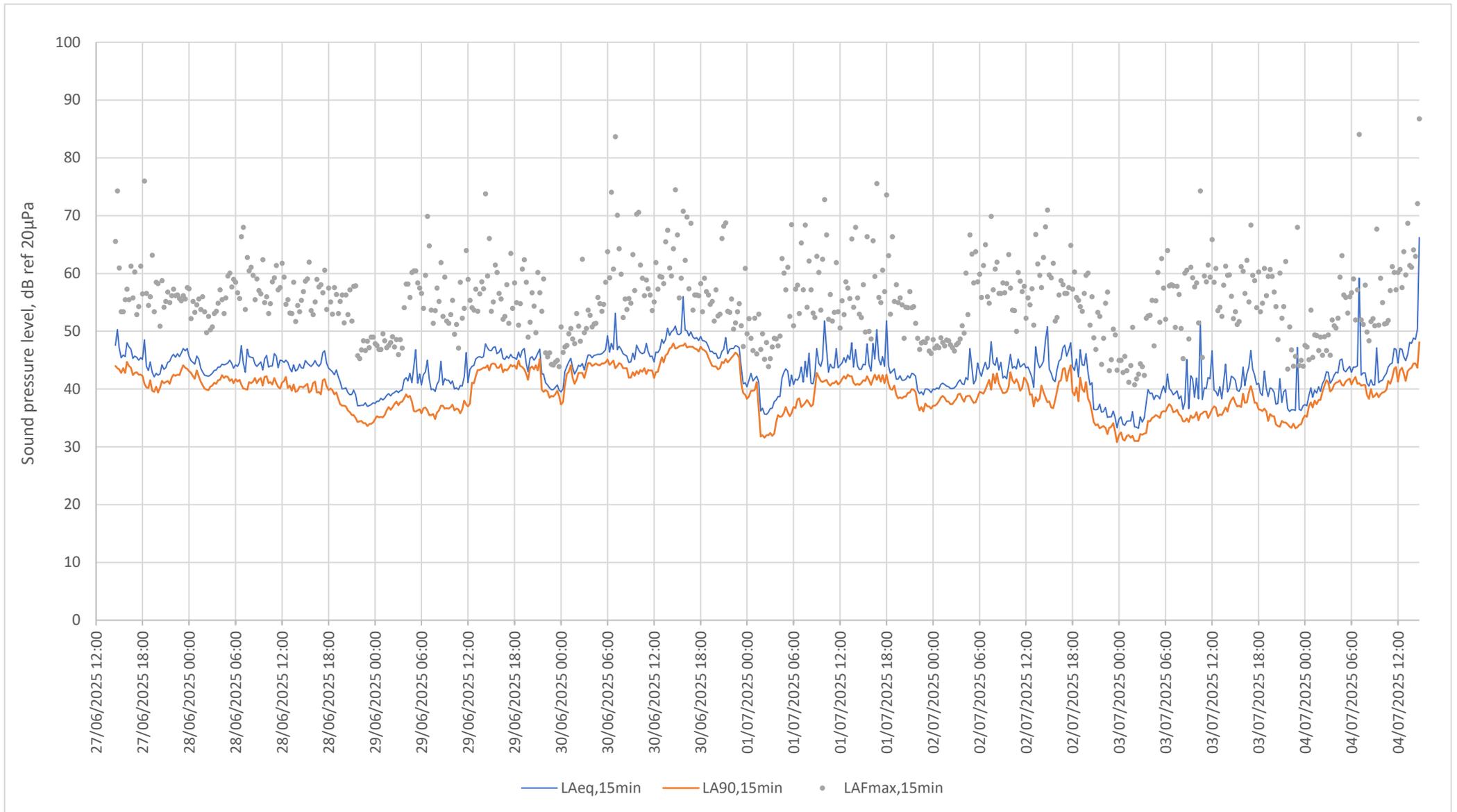


Figure 11: Time history of measurements for full measurement period

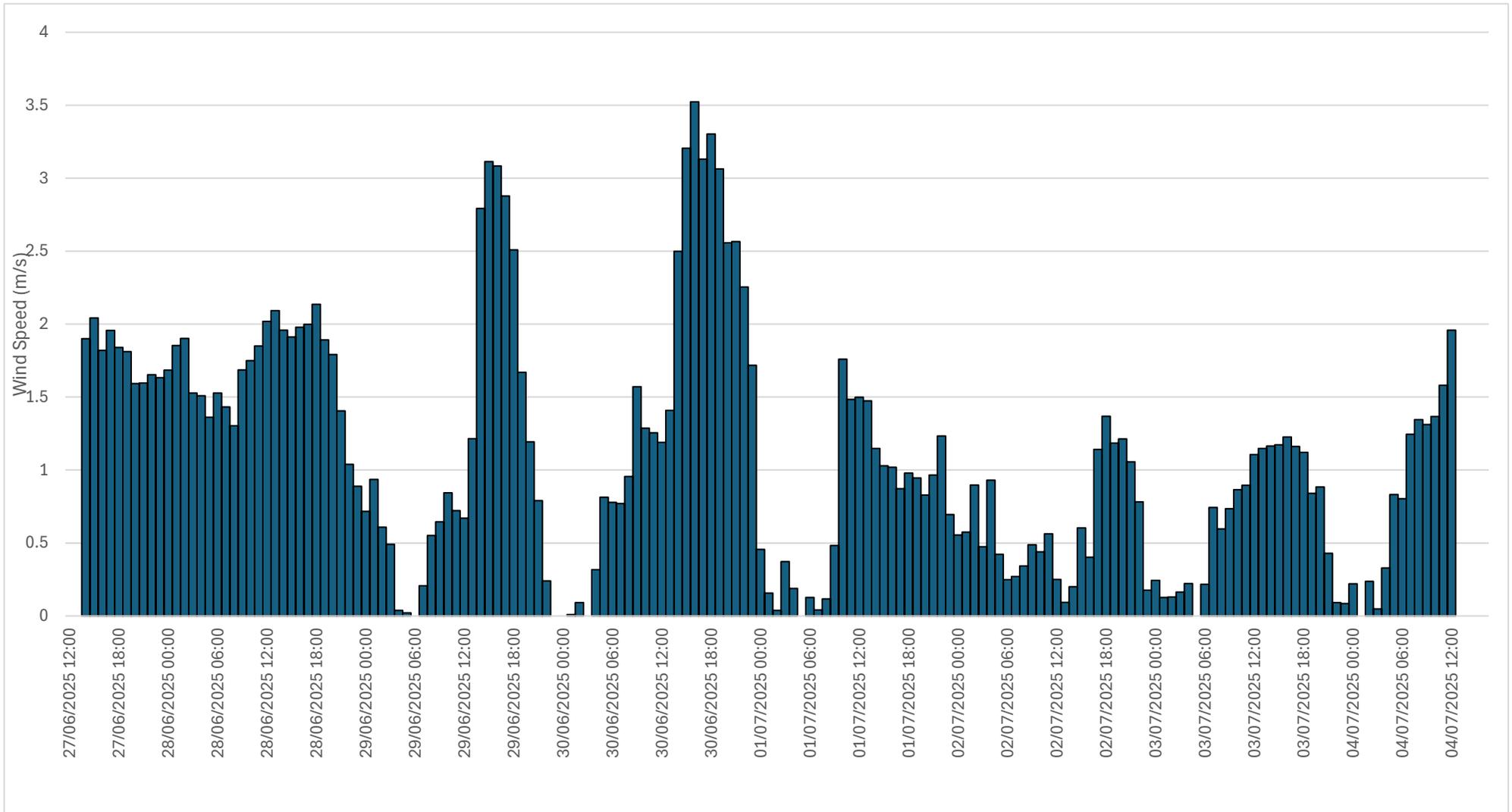


Figure 12: Wind speed from weather station for full measurement period

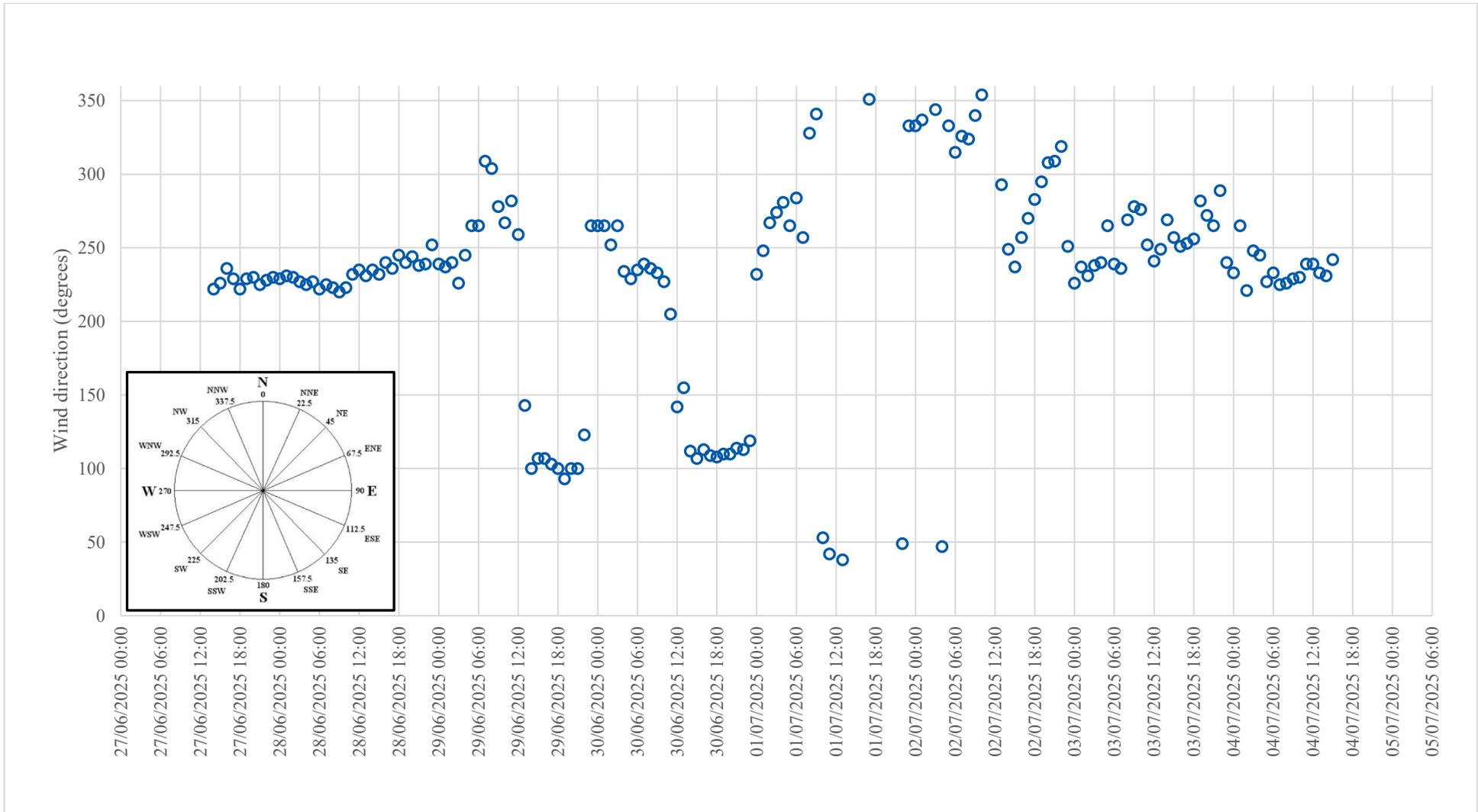


Figure 13: Wind direction from weather station

B.3 Calibration certificates

This section includes the calibration certificates for the equipment used for the baseline noise survey conducted by Arup.



CERTIFICATE OF CALIBRATION



0653

Date of Issue: 10 April 2025

Certificate Number: UCRT25/1578

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

Acoustic Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages
Approved Signatory

K. Mistry

Customer Ove Arup & Partners International Ltd
Parkin House
8 St. Thomas Street
Winchester
SO23 9HE

Order No. UK_PRPO 303

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

Identification	Manufacturer	Instrument	Type	Serial No. / Version
	Rion	Sound Level Meter	NA-28	00301365
	Rion	Firmware		1.9
	Rion	Pre Amplifier	NH-23	91399
	Rion	Microphone	UC-59	01963
	Rion	Callibrator	NC-75	34334830
		Callibrator adaptor type if applicable		NC-75-022

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 21.21/07.01

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2002

Date Received 07 April 2025

ANV Job No.

UKAS25/04292

Date Calibrated 10 April 2025

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 61672-2:2002, 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
	20 March 2023	TCRT23/1244	ANV Measurement Systems

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CERTIFICATE OF CALIBRATION	Certificate Number UCRT25/1578
	Page 2 of 2 Pages

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	NA-28		
SLM instruction manual ref / issue	06-11	Source	Rion	
Date provided or internet download date	N/A			
	Case Corrections	Wind Shield Corrections	Mic Pressure to Free Field Corrections	
Uncertainties provided	Yes	Yes	Yes	
Total expanded uncertainties within the requirements of IEC 61672-1:2002				YES
Specified or equivalent Calibrator	Specified			
Customer or Lab Calibrator	Lab Calibrator			
Calibrator adaptor type if applicable	NC-75-022			
Calibrator cal. date	17 March 2025			
Calibrator cert. number	UCRT25/1429			
Calibrator cal cert issued by Lab	0653			
Calibrator SPL @ STP	93.99	dB	Calibration reference sound pressure level	
Calibrator frequency	1000.00	Hz	Calibration check frequency	
Reference level range	20 - 120	dB		
Accessories used or corrected for during calibration - Wind Shield WS-10				

Environmental conditions during tests	Start	End	
Temperature	22.61	22.27	± 0.30 °C
Humidity	39.7	40.0	± 3.00 %RH
Ambient Pressure	102.16	102.11	± 0.03 kPa

Indication at the Calibration Check Frequency			
Initial indicated level	93.6	dB	Adjusted indicated level 94.0 dB
Uncertainty of calibrator used for indication at the Calibration Check Frequency ±			0.10 dB
Self Generated Noise			

Microphone installed - This test is currently not performed by this Lab.

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

Weighting	A	C	Z
	9.0 dB UR	13.7 dB UR	20.6 dB UR
Uncertainty of the electrical self generated noise ±			0.12 dB

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.

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

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

None

..... END
 Calibrated by: K. Zablocki R 1

CALIBRATION CERTIFICATE

Issued By AcSoft Limited Calibration Laboratory

Date Of Issue: 09-12-2024

Certificate No: 1510779-1

Calibrated By: W. Jay

Approved By: W. Jay



CUSTOMER

ARUP
Level 3 Asta House,
55-65 Whitfield Street,
W1T 4BQ
United Kingdom

INSTRUMENT DETAILS

Manufacturer: RION
Model: NC-74
Serial No.: 34467730
Description: Acoustic Calibrator accuracy class 1 with nominal level of 94 dB, and nominal frequency of 1000 Hz

P/O NUMBER

AAcW 3811

DATE RECEIVED

06-12-2024

DATE CALIBRATED

09-12-2024

ENVIRONMENTAL CONDITIONS

Temperature:	20.3	°C
Humidity:	43.7	%rh
Pressure:	102.1	kPa

CALIBRATION RESULTS

The calibrator submitted for testing has successfully completed the Periodic tests of IEC 60942:2003 (BS EN 60942:2003) (Annex B), for class 1 sound calibrators, for the environmental conditions under which the tests were performed.

REPORTED RESULTS

The results contained in this Certificate refer only to the measurements made at the time of test for the instrument detailed above. These results do not reflect the instrument's ability to maintain calibration.

MEASUREMENT TRACEABILITY

The instrument under test was calibrated using the following equipment:
Svantek SV30A Acoustic Calibrator, ACS023, Certificate No. 06397/1
GRAS 40AG Reference Microphone, ACS009, Certificate No. 06448/2
LAB-EL LB-706B Thermo-Barometer, ACS029, Certificate No. 1148624

Page 1 of 2

This calibration was performed by AcSoft Ltd, 11 Abbey Court, Fraser Road,
Priory Business Park, Bedford, MK44 3WH
T: 01234 639550 W: www.acsoft.co.uk E: sales@acsoft.co.uk

(AP 17/05/2024 Issue No. 4)

CALIBRATION CERTIFICATE

Issued By AcSoft Limited Calibration Laboratory

Date Of Issue: 09-12-2024

Certificate No: 1510779-1



NOTES

1. The information appearing on this certificate has been compiled specifically for this instrument. This calibration certificate is produced with traceable and advanced equipment which permit comprehensive quality assurance verification of all data supplied herein.
2. The measurements in this document are traceable to GUM (Central Office of Measures), Poland
3. This calibration certificate shall not be reproduced except in full, without written permission from AcSoft Ltd.

CALIBRATION RESULTS ARE AS FOLLOWS:

SPL

Measured Level	Deviation From Nominal	Uncertainty	Tolerance (dB)	
			class 1	class 2
dB	dB	dB		
94.02	0.02	0.15	±0.25	±0.4

Frequency

Measured Frequency	Deviation From Nominal	Uncertainty	Tolerance (%)	
			class 1	class 2
Hz	Hz	Hz		
1001.55	155	0.1	±0.7 (±7Hz)	±1.7 (±17Hz)

THD•N

Measured Distortion	Uncertainty	Tolerance (%)	
		class 1	class 2
%	%		
2.03	0.1	2.5	3.0

Page 2 of 2

This calibration was performed by AcSoft Ltd, 11 Abbey Court, Fraser Road,
Priory Business Park, Bedford, MK44 3WH
T: 01234 639550 W: www.acsoft.co.uk E: sales@acsoft.co.uk

0AP 17/05/2024 Issue No. 4)



CERTIFICATE OF CALIBRATION



0653

Date of Issue: 07 September 2023

Certificate Number: UCRT23/2147

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

Page 1 of 2 Pages

Approved Signatory

K. Mistry

Customer Ove Arup & Partners International Ltd
Parkin House
8 St. Thomas Street
Winchester
SO23 9HE

Order No. AAoW3636

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

Identification	Manufacturer	Instrument	Type	Serial No. / Version
	Rion	Sound Level Meter	NL-52	00264533
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	64658
	Rion	Microphone	UC-59	09681
	Rion	Callibrator	NC-74	34467730
		Callibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 10. SLM 61672-3:2013

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

Type Approved to IEC 61672-1:2013 Yes

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

Date Received 06 September 2023

ANV Job No. UKAS23/09610

Date Calibrated 07 September 2023

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

Previous Certificate	Dated	Certificate No.	Laboratory
	27 August 2021	UCRT21/2053	0653

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CERTIFICATE OF CALIBRATION

Certificate Number

UCRT23/2147

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 NL-52/NL-42 Description for IEC 61672-1			
SLM instruction manual ref / issue No. 56034 21-03		Source Rion	
Date provided or internet download date 19 March 2021			
	Case Corrections	Wind Shield Corrections	Mic Pressure to Free Field Corrections
Uncertainties provided	Yes	Yes	Yes
Total expanded uncertainties within the requirements of IEC 61672-1:2013			YES
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Customers Calibrator	
Calibrator adaptor type if applicable		NC-74-002	
Calibrator cal. date		07 September 2023	
Calibrator cert. number		UCRT23/2143	
Calibrator cal cert issued by Lab		0653	
Calibrator SPL @ STP	94.03	dB	Calibration reference sound pressure level
Calibrator frequency	1001.55	Hz	Calibration check frequency
Reference level range	Single	dB	
Accessories used or corrected for during calibration - None			

Environmental conditions during tests	Start	End	
Temperature	23.97	23.75	± 0.30 °C
Humidity	41.5	40.4	± 3.00 %RH
Ambient Pressure	100.65	100.63	± 0.03 kPa

Indication at the Calibration Check Frequency			
Initial indicated level	94.2	dB	Adjusted indicated level 94.0 dB
Uncertainty of calibrator used for indication at the Calibration Check Frequency ±			0.10 dB

Self Generated Noise			
Microphone installed -	Less Than	19.0	dB A Weighting
Microphone replaced with electrical input device -		UR - Under Range Indicated	
Weighting	A	C	Z
	10.8	14.7	19.8
	dB UR	dB UR	dB UR

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

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

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

None

END

Calibrated by: K. Zablocki

R 1

Annex C

Combined baseline survey data collected by Uniper Technologies Ltd and Arup

This annex includes the combination and analysis of the baseline survey data collected by Arup and Uniper Technologies Ltd at Brick Lane.

C.1 Combined baseline data

The baseline survey data collected by Arup and Uniper have been combined and analysed.

A representative combined background L_{A90} sound level at the Brick Lane has been determined taking into account the most frequently occurring values and the cumulative distribution. The result is shown in Table 1.

Period	Representative background L_{A90} dB(A) from combined survey data
Day (07:00 – 23:00)	40
Night (23:00 – 07:00)	40

Table 1: Summary of representative of background sound levels at logger location

Figure 1 and Figure 2 show the frequency distribution of $L_{A90, 15\text{minute}}$ levels, in 1dB intervals, during the daytime and night-time periods, respectively.

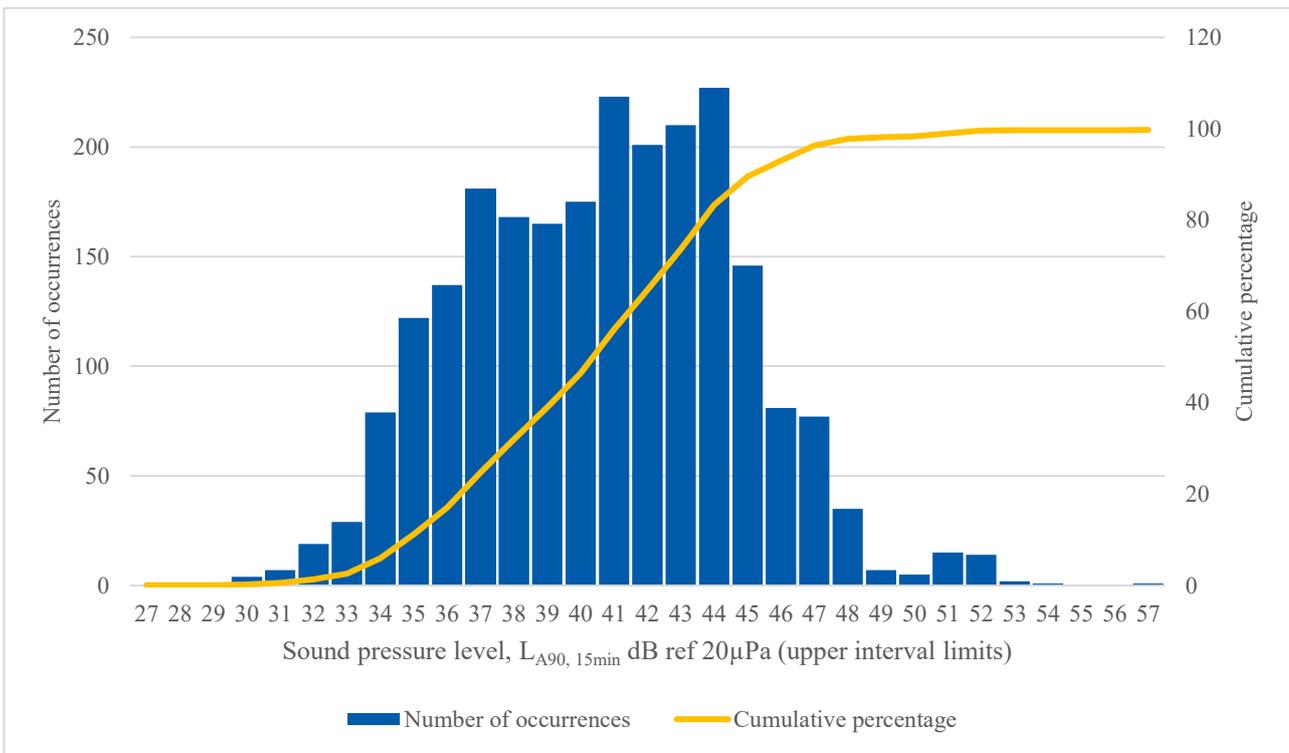


Figure 1: Histogram of daytime $L_{A90,15\text{min}}$ levels and cumulative frequency of occurrence

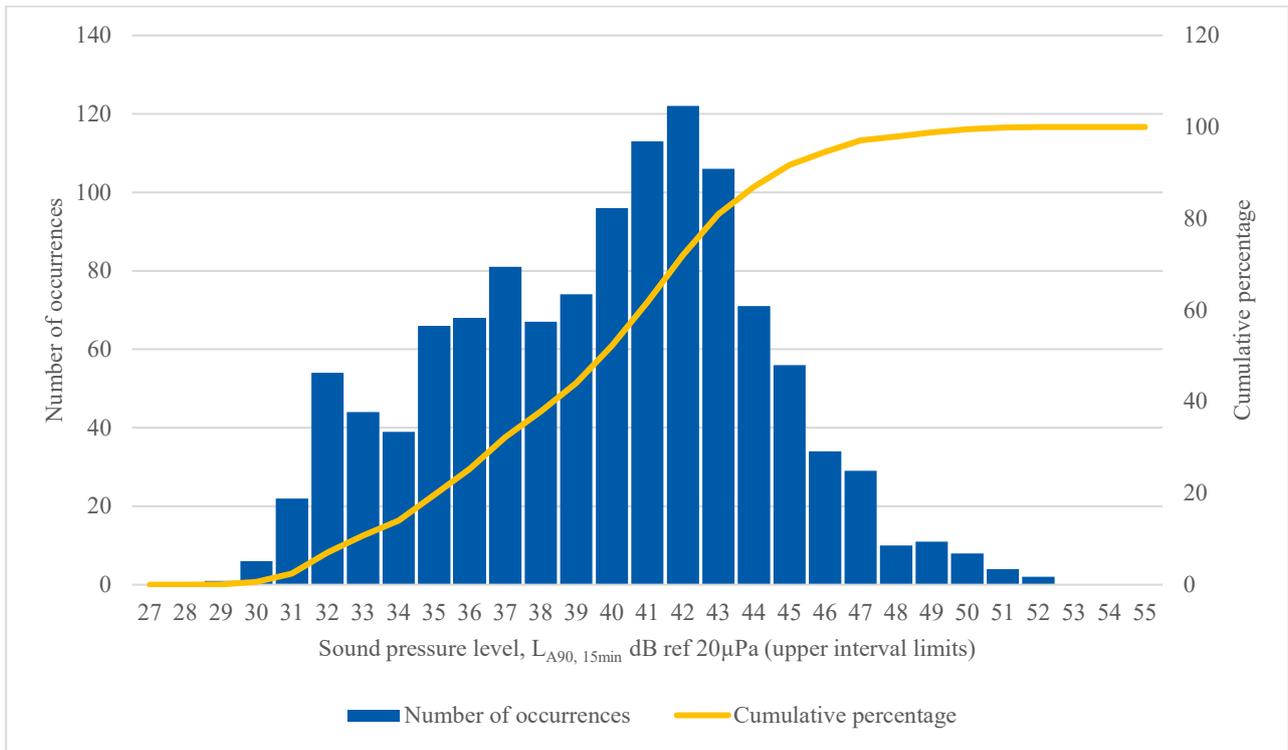


Figure 2: Histogram of night-time $L_{A90,15min}$ levels and cumulative frequency of occurrence

Annex D

Credentials of Survey, Modelling and Reporting Personnel

D.1 Uniper Technologies Ltd

Kevin Brown MIOA

D.2 Arup

Survey Personnel

Marios Filippoupolitis MEng MSc MPhil PhD MIET

Gina Mackworth BEng AMIOA

Josh Heenan BA AMIOA

Modelling Personnel

Holly Cowperthwaite BEng AMIOA

Marios Filippoupolitis MEng MSc MPhil PhD MIET

Reporting Personnel

Young Youn BEng MSc MIOA

Fiona Rogerson BEng MIOA

David Hiller, BSc MSc PhD CEng MIOA MIMMM FGS