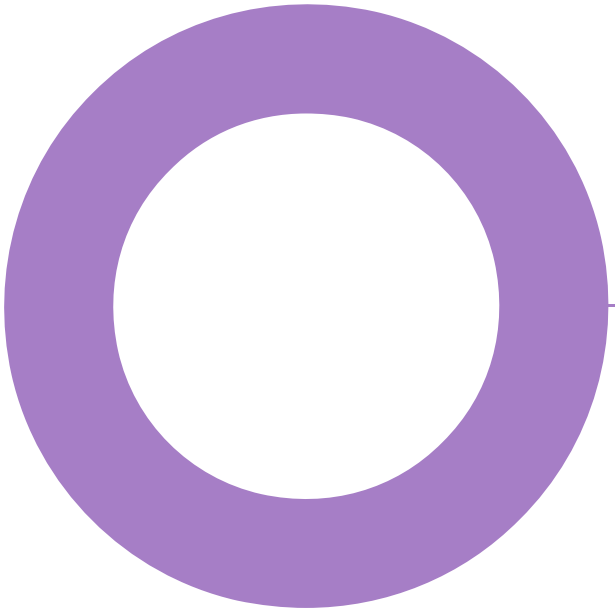
Flint-Coleshill Hydrogen Gen.
Coleshill, Flint.
HYRO ENERGY LIMITED

ACOUSTICS
BASELINE NOISE SURVEY REPORT
HOARE LEA
REVISION 2 – 18 APRIL 2023



Audit sheet

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
1	21/02/2023	First version	SG	MMC	MMC
2	18/04/2023	Updated calibration details	SG	MMC	MMC

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Contents

1. Introduction

Hoare Lea LLP have been appointed to undertake a background noise survey in relation to the development of a proposed co-located hydrogen generation facility on land owned by Kimberley Clark Coleshill Paper Mill in Flint.

This report sets out the existing noise climate and summarises the background survey undertaken at the proposed site. The methodology within BS 4142:2014 has been considered in the survey, to assist with determining prevailing background noise levels at the closest noise sensitive receptors.

2. Site Context

The site is located in the north-west extents of Flint, on a green field site sited to the south-west of the existing Kimberley Clark Mill. There are existing industrial and commercial uses to the east of site, residential dwellings to the south, and green fields to the west.

Figure 1 below illustrates the red line boundary of the proposed development overlaid onto the existing area.

Figure 1: Site context showing the red line boundary (red line) for the proposed development site.

3. Relevant guidance

3.1 British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

Current Government advice to Local Planning Authorities in both England and Wales makes reference to BS 4142 as being the appropriate guidance for assessing commercial operations and fixed building services plant noise. The British Standard provides an objective method for rating the significance of impact from industrial and commercial operations. It describes a means of determining sound levels from fixed plant installations and determining the background sound levels that prevail on a site.

The assessment of the impacts is based on comparison of the rating level ($L_{Ar,Tr}$) from the proposed operations with the pre-existing background sound level (L_{A90}).

The standard does not give a definitive method for determining the background sound level but instead, as a commentary, states that *"the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods"*.

Clause 8.1.4, which discusses the monitoring duration, states *"there is no "single" background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed."* As a note to this clause the following commentary is given on obtaining a representative backgrounds sound level:

"To obtain a representative background sound level a series of either sequential or disaggregated measurements ought to be carried out for the period(s) of interest, possibly on more than one occasion. A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value."

This method is only applicable for external noise levels. The scope of the method for assessing industrial and commercial sound is clearly defined in Section 1 of the Standard; music, entertainment and people are included in the list of noise sources not intended to be assessed by the method.

The rating level is defined objectively as the specific source noise level in question (either measured or predicted) with graduated corrections for tonality (up to +6 dB), impulsivity (up to +9 dB), intermittency (+3 dB) and other sound characteristics (+3 dB) which may be determined either subjectively or objectively, if necessary.

The background sound level is subtracted from the rating level and the difference used to assess the impact of the specific noise source:

- A difference of around +10 dB 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
- A difference of +0 dB or less is an indication of the specific sound source having a low impact, depending on the context.

The "context" in the above statements refers to a fundamental requirement of BS 4142: this requires consideration not only of the difference between rated levels of background but also of several contextual factors.

3.2 Consultation

Consultation was made with the Environmental Health Team at Flintshire County Council (FCC) on 31st January 2023, outlining the proposed assessment methodology. A response was received via email on 31st January from dealing officer Dave Jones, showing agreement with the proposed methodology.

Relevant requirements of FCC at this stage include carrying out the assessment in accordance with *BS 4142:2014+A1:2019* to determine the existing noise level in the area and at any nearby properties likely to be affected by the noise.

4. Acoustic survey

Acoustic survey measurements have been undertaken at the site to quantify the existing background noise climate in the area. The location of the acoustic survey measurements is shown in Figure 2.

4.1 Methodology

The acoustic survey included one long-term unattended measurements in the rear garden of No.24 Royal Drive, a nearby noise sensitive residential receptor deemed to be representative of the nearest receptors to the proposed development, which are the properties along Royal Drive. The survey measurements were undertaken from Friday 3rd February to Tuesday 7th February 2023.

The noise logger used was setup to measure A-weighted broadband levels. Measurements were made with the environmental logger at a distance of approximately 2 metres from the garden fence and located further away from the main façade of the property and therefore unlikely to be significantly affected by reflections. The chosen location was therefore considered representative of the main amenity area of the property and more generally of the background noise levels experienced in the area.

A rain gauge was also installed on site with the long-term logger, measuring rainfall each 15-minute period for the duration of the measurements. Weather conditions were considered suitable for the purpose of the measurements with calm and dry conditions for the duration of the survey.

The main source of noise during setup and collection was occasional road traffic noise from passage along Royal Drive and distant low level traffic noise from the surrounding local road network. Birdsong was also observed, as well as occasional noise from neighbourhood activity in the immediate area. Overall, the levels of noise observed were consistent with the nature of the site.

All survey equipment was field calibrated at the start and end of each set of measurements with no discernible drift in level observed. The measurement instrumentation used is listed in Appendix A attached.

4.2 Results

Time history plot of the long-term unattended measurements taken at LT1 for the measured broadband levels can be found in Appendix B attached.

Figure 2: Acoustic survey measurement position (LT1)

4.3 Background sound levels

In line with the requirements of BS 4142, in order to "*quantify what is typical during particular time periods*", a statistical analysis of the measured background sound levels has been undertaken. The periods of interest have been taken as daytime (07:00 to 23:00) and night-time (23:00 to 07:00).

Assessment durations of 15-minutes are used for both day and night-time periods. A single $L_{A90,1h}$ measurement would always be higher than the lowest of the four 15-minute duration background sound levels it comprises. Therefore, this represents a conservative case.

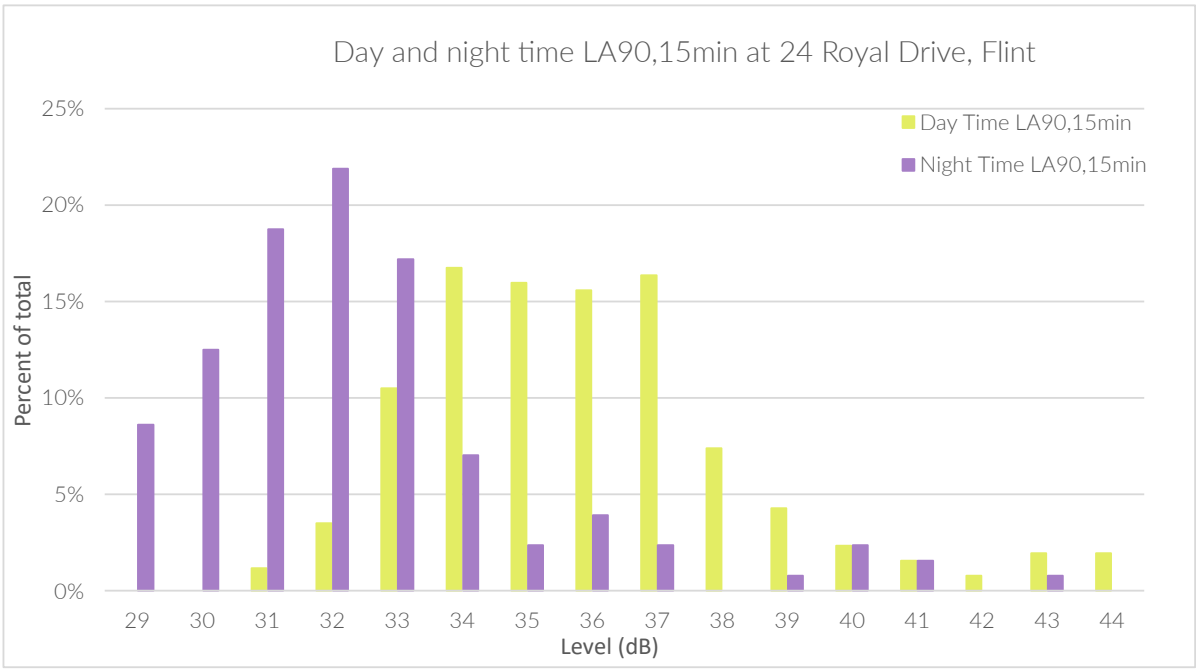


Figure 3: Statistical analysis of measured background noise levels at LT1 - 24 Royal Drive.

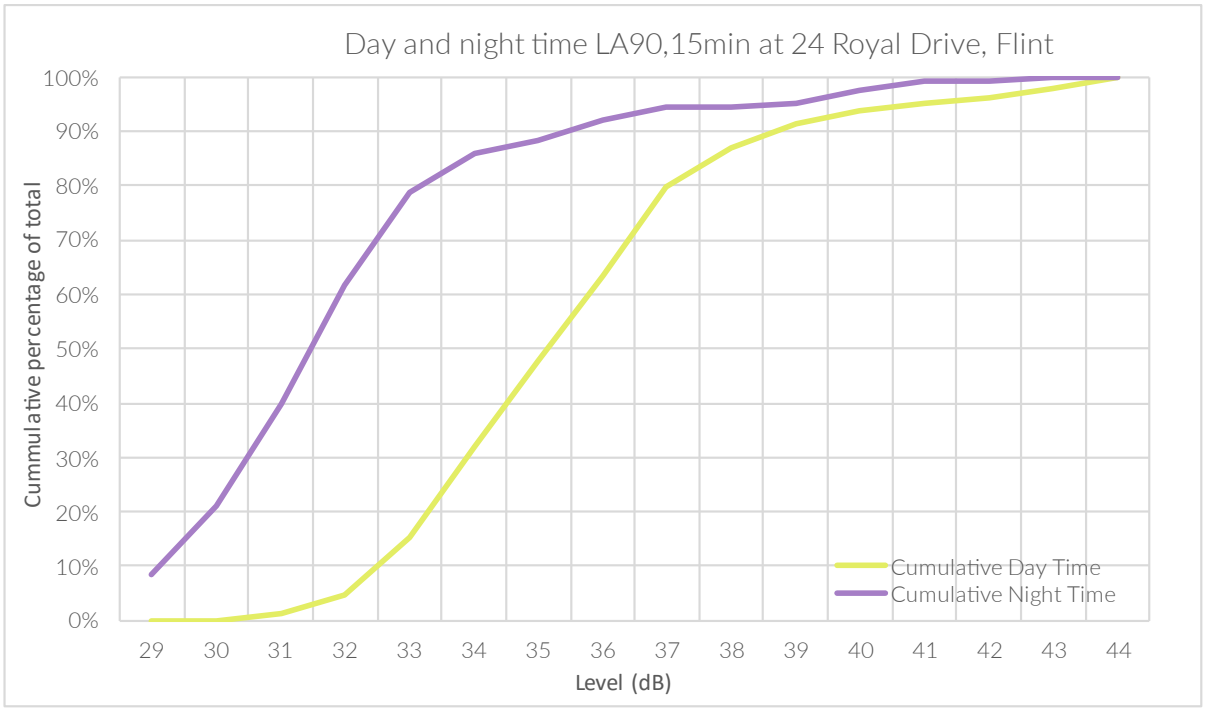


Figure 4: Cumulative distribution of measured background noise levels at LT1 - 24 Royal Drive.

The distributions of the measured noise levels are set out in Figure 3 above. Using the above statistical analysis charts together with the time history chart included in Appendix B, given the context of the site, representative (typical lowest) background sound levels have been determined to represent each of the periods of interest. Results of this analysis are set out in Table 1 below.

Monitoring Location	Weighting	$L_{90,T}$ background noise level (dB) measurement period (T) result	
		Day	Night
LT1 – 24 Royal Drive	Broadband, A-weighted	34	31

Table 1 - Representative L_{90} background noise levels at LT1

5. Summary and conclusion

Hoare Lea LLP have been appointed to undertake a background noise survey in relation to the proposed development of a Hydrogen Generation project on land owned by Kimberley Clark Coleshill Paper Mill in Flint, in line with the methodology of BS 4142:2014.

Typical lowest background noise levels for the unattended measurement position were determined for the day and night-time periods.

Appendix A: Acoustic survey equipment & Photos

Equipment	Type	Serial Number	Last Calibrated
Sound Level Meter	Rion NL-52	00331819	11/01/2022
Pre-amplifier	Rion NH-25	21770	11/01/2022
Microphone	Rion UC-59	10813	11/01/2022

Table B1 - Sound level meter 1 – Long Term Logger position

A field calibration was carried out at the start and end of the measurements, using:

Equipment	Type	Serial Number	Last Calibrated
Calibrator	Rion NC-74	34172706	12/07/2022

Table B2 - Calibrator

A rain gauge was installed on site to gather rain data:

Equipment	Type	Serial Number
Rain Gauge	Campbell Scientific CR200 Datalogger	10465
	Davis Instruments 0.2 mm Tipping Bucket Rain Gauge: 7852	HLA 07

Table B3 – Rain Gauge

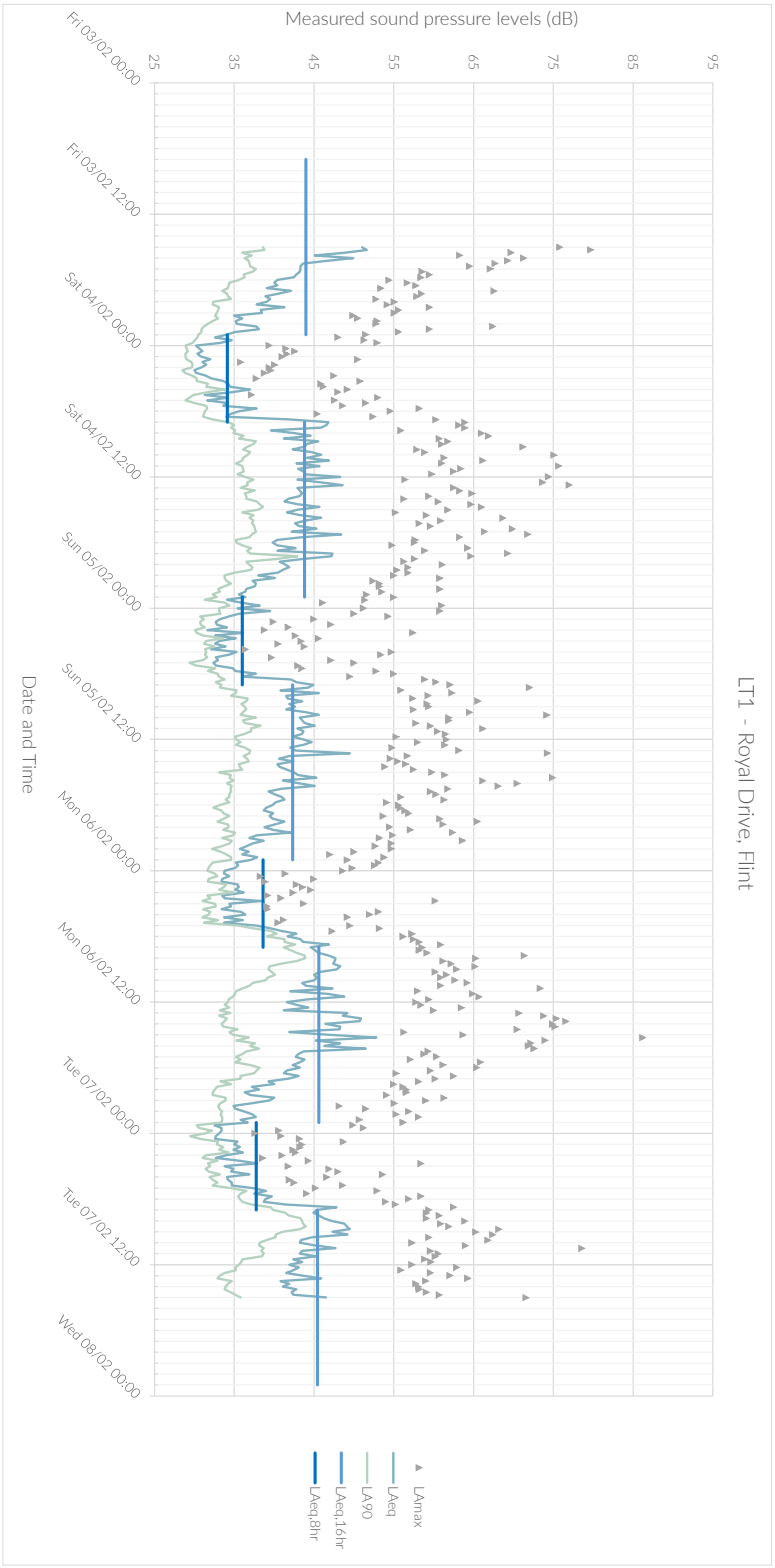
Figure B 1- Measurement Position LT1 (1 of 3) – facing west

Figure B 2- Measurement Position LT1 (2 of 3) – facing north (in the direction of site)

Figure B 3- Measurement Position LT1 (3 of 3) – facing east

Appendix B: Time history chart

B.1 Measurement position LT1



HOARE LEA

SARAH GILSTON
SENIOR ACOUSTICS ENGINEER

+441616727103
sarahgilston@hoarelea.com

HOARELEA.COM

Royal Exchange
Manchester
M2 7FL
England