Noise Impact Assessment

Wrexham Breakfast Cereals

Kellogg Company of Great Britain Limited

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Basis of Report

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1.0 Introduction

Kellanova has appointed SLR Consulting Ltd (SLR) to undertake a noise assessment for proposed changes to emission points to air associated with proposed changes to existing production processes at their production facility at Wrexham, Bryn Lane, Wrexham, LL13 9UT. The assessment is to be submitted in support of a full planning application seeking consent for the following:

> *"Installation of plant, machinery, ducting, extracts and flues on the main building and the expansion of the effluent treatment plant"*

Due to the potential for the new plant to increase noise levels in the area a Noise Impact Assessment has been undertaken to present the results of:

- A Baseline Survey.
- A BS4142 Assessment of existing permitted operations.
- A BS4142 Assessment of cumulative (permitted and proposed) operations.

The Noise Impact Assessment for the application is presented in this Report.

1.1 Report Structure

This Report presents:

- A description of the Site.
- A description of applicable guidance.
- The results of a baseline background sound survey at locations representative of the nearest noise-sensitive receptors to the proposed new plant.
- The results of an operational noise survey of all existing noise sources operating at the Site.
- An assessment of existing and cumulative operations undertaken in accordance with British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* as required by the Environment Agency (EA) Guidance *Noise and vibration management: environmental permits* as referred to by NRW in its How to carry out a risk assessment for an Environmental Permit guidance.

Whilst reasonable effort has been made to ensure that this report is easy to understand, it is technical in nature; to assist the reader, a glossary of terminology is included in Appendix A.

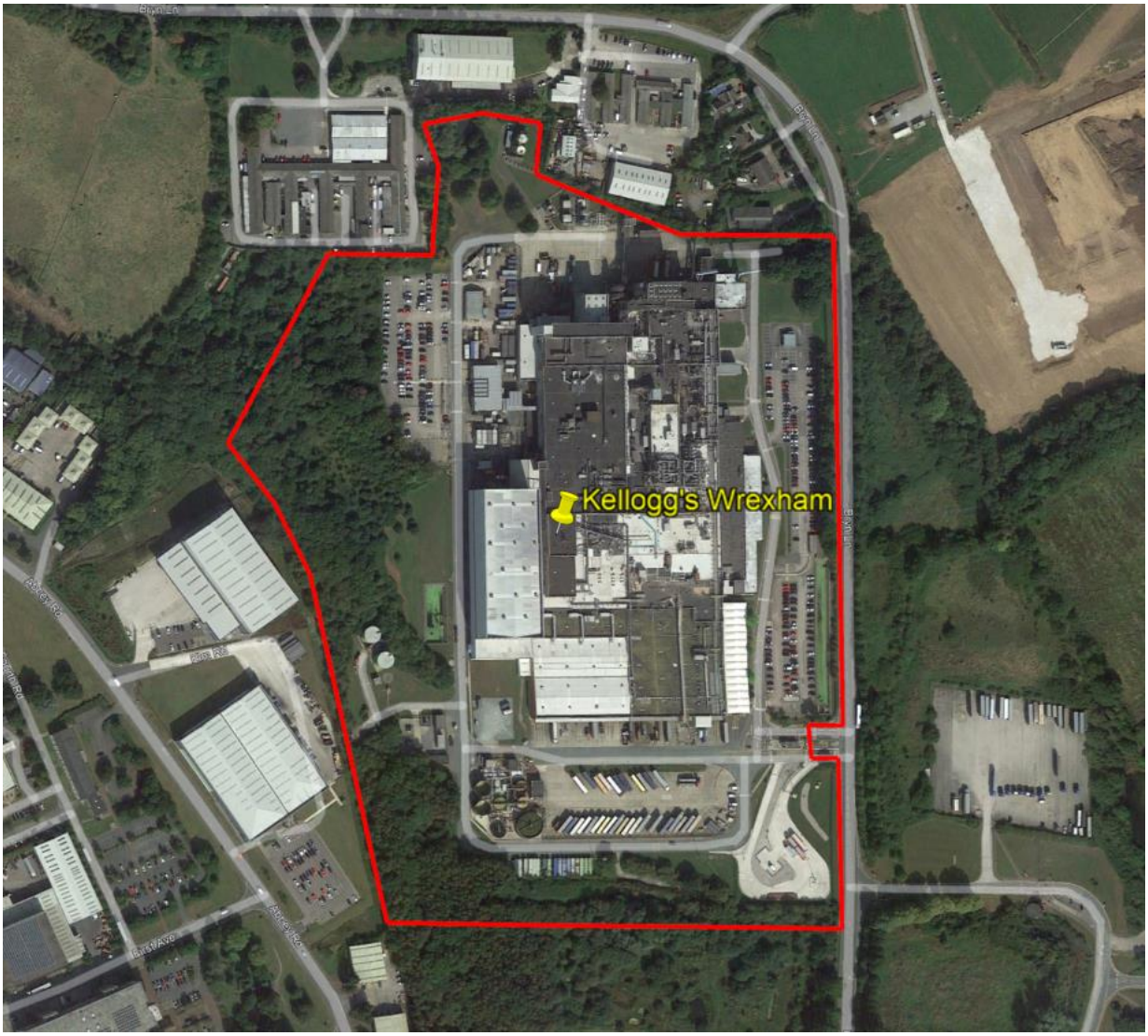
2.0 Site Description

2.1 Existing Site

The site is located at Bryn Lane, Wrexham, LL13 9UT.

The position of The Site in the context of the surrounding area can be seen in Figure 2-1.

Figure 2-1 Site Location



3.0 Proposal Description

Kellogg's are applying for full planning permission in order to install new plant and related equipment. For further information, please refer to the Non-Technical Summary.

4.0 Scope and Guidance

A summary of the requirements outlined in the EA Guidance document, and the assessment methodology outlined in BS4142:2014+A1:2019 are provided below.

4.1 Noise and vibration management: environmental permits

The Environment Agency (EA) released the guidance document *Noise and vibration management: environmental permits* (NVM) in July 2021, replacing the previous guidance presented in *Horizontal Guidance for Noise (H3) parts 1 and 2*. The NVM details when a noise assessment is required, the competency required to undertake an assessment and how to carry out a noise impact assessment.

The NVM references BS4142:2014+A1:2019 as the appropriate assessment methodology.

The NVM outlines how context should be taken into account in the assessment and notes that *"Whilst context allows you to interpret impact thresholds (to a degree), there are practical limits to the extent of the interpretation. It is unlikely you could adjust the assessment outcome beyond the next band (for example, modifying a BS 4142 outcome of more than 10dB to be less than an 'adverse impact')."*

Determining the outcome of the assessment the following should be considered:

- weekdays rather than weekends.
- what the sound 'means' – meaningful sound is one that conveys an unpleasant meaning beyond its mere acoustic content, for example noise from an abattoir.
- time of day.
- the absolute sound level.
- where the sound occurs.
- new industry or new residences.
- intrinsic links between the source and receptor, for example the source is the resident's place of work.
- local attitudes.
- the residual acoustic environment.
- the land use at the receptor (for example, gardens rather than yards).
- the exceedance (traditional BS 4142).
- whatever else might be particular to that individual situation.

Based on the results of the BS4142:2014+A1:2019 assessment the NVM has three distinct requirements as detailed in Table 4-1.

Table 4-1 NVM Assessment

NVM Result	BS4142 Descriptor	Next Stage
Unacceptable level of audible or detectable noise	The closest corresponding BS 4142 descriptor is 'significant adverse impact'	You must take further action or you may have to reduce or stop operations. The environment agencies will not issue a permit if you are likely to be operating at this level.
Audible or detectable noise	The closest corresponding BS 4142 descriptor is 'adverse impact'	Your duty is to use appropriate measures to prevent or, where that is not practicable, minimise noise. You are not in breach if you are using appropriate measures. But you will need to rigorously demonstrate that you are using appropriate measures.
No noise, or barely audible or detectable noise	The closest corresponding BS 4142 descriptor is 'low impact or no impact'	Low impact does not mean there is no pollution. However, if you have correctly assessed it as low impact under BS 4142, the environment agencies may decide that taking action to minimise noise is a low priority.

4.2 British Standard 4142:2014+A1:2019

British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* is intended to be used to assess the potential adverse impact of sound, of an industrial and/or commercial nature, at nearby noise-sensitive receptor locations within the context of the existing sound environment.

Where the specific sound contains tonality, impulsivity and/or other sound characteristics, penalties should be applied depending on the perceptibility. For tonality, a correction of either 0, 2, 4 or 6dB should be added and for impulsivity, a correction of either 0, 3, 6 or 9dB should be added. If the sound contains specific sound features which are neither tonal nor impulsive, a penalty of 3dB should be added.

In addition, if the sound contains identifiable operational and non-operational periods, that are readily distinguishable against the existing sound environment, a further penalty of 3dB may be applied.

The assessment of impact contained in BS4142:2014+A1:2019 is undertaken by comparing the sound rating level, i.e. the specific sound level of the source plus any penalties, to the measured representative background sound level immediately outside the noise-sensitive receptor location. Consideration is then given to the context of the existing sound environment at the noise-sensitive receptor location to assess the potential impact.

Once an initial estimate of the impact is determined, by subtracting the measured background sound level from the rating sound level, BS4142:2014+A1:2019 states that the following should be considered:

- typically, the greater the difference, the greater the magnitude of the impact;
- a difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- a difference of around +5dB 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 impact or a significant adverse impact. It is an indication that the specific sound source has a low impact, depending on the context.

BS4142:2014+A1:2019 notes that:

"Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

To account for the acoustic character of proposed sound sources, BS4142:2014+A1:2019 provides the following with respect to the application of penalties to account for *"the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention".*

- **Tonality** – "For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible;
- **Impulsivity** – A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible;
- **Intermittency** – When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied; and
- **Other Sound Characteristics** – Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied."

Finally, BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact, including consideration of the existing residual sound levels, location and/or absolute sound levels.

4.3 ISO 9613-2:1996

The levels of sound generated by the operation of the proposed Plant has been predicted in accordance with the prediction framework within ISO 9613-2:1996 *Acoustics – Attenuation of Sound during Propagation Outdoors– Part 2: General Method of Calculation*. This method of calculation takes into account the distance between the sound sources and the closest receptors, and the amount of attenuation due to atmospheric absorption. The methodology

also assumes downwind propagation, i.e. a wind direction that assists the propagation of sound from the source to the receiver.

5.0 Baseline Sound Survey

5.1 Survey Date

To determine baseline sound levels in the vicinity of the Site, a noise survey was undertaken between Thursday 16th November to Monday 20th November 2023.

5.2 Weather Conditions

A weather station was set up at Location 1 so that any extraneous data could be removed. During the survey, weather conditions were generally suitable for noise monitoring. There was some rainfall recorded during Thursday 16th, Saturday 18th, and Sunday 19th November whilst high wind speeds were recorded on Saturday 18th November from 12:00 – 04:30. A full summary of the weather conditions for the duration of the noise survey during daytime and night-time periods can be seen in Appendix C.

5.3 Equipment

The noise survey equipment used during the survey is detailed in Table 5-1. All measurement instrumentation was calibrated before and after the measurements. No significant drift was observed. The calibration chain is traceable via the United Kingdom Accreditation Service to National Standards held at the National Physical Laboratory.

Table 5-1 Survey Equipment

Location	Equipment	Serial Number
Location 1 (337746, 350671)	Cirrus CR:171B Class 1 Sound Level Meter	G0302667
	Cirrus CR:515 Acoustic Calibrator	94806
Location 2 (339919, 348818)	Rion NL-52 Class 1 Sound Level Meter	00331823
	Rion NC-74 Acoustic Calibrator	34336013
Location 3 (338557, 349554)	Cirrus CR:171B Class 1 Sound Level Meter	G300561
	Cirrus CR:515 Acoustic Calibrator	87922

5.4 Survey Locations

Sound levels were measured at three locations, representative of the nearest residential receptors to the site, and at positions the Site was not audible, as follows:

- Location 1: Representative of Receptors on Bryn Lane to north of Site (Receptor 6 and 7).
- Location 2: Representative of Receptors on the B5130 (Receptors 1, 2, 3, and 4).
- Location 3: Representative of Receptor Bryn Lane to south of Site (Receptor 5).

The Receptors identified were consistent with previous assessments at the Site. A seventh Receptor location has since been identified. Location 1 is considered representative of Receptor 7.

5.5 Soundscape

5.5.1 Location 1

- Road traffic noise – cars and HGV's travelling at approximately 20-30mph.
- Impulsive and metallic scraping noise in warehouse opposite.
- Bird song.

5.5.2 Location 2

- Road Traffic Noise- cars travelling at approximately 40mph.
- Some impulsive noise from farm to north in distance.
- Birdsong.
- Area generally peaceful.

5.5.3 Location 3

- Road noise dominant. Cars and HGV's going by 30-40mph.
- Noise from industrial buildings nearby.

At all positions the Kellonova site was not observed to be audible. With sources in the immediate vicinity dominant.

The survey locations (in yellow) (and the nearest sensitive receptor locations in green) are shown in Figure 5-1 Monitoring and Sensitive Receptor Locations.

Figure 5-1 Monitoring and Sensitive Receptor Locations



At the survey locations, the microphone was placed 1.5m above the local ground level in free-field conditions, i.e. at least 3.5m from the nearest vertical, reflecting surface. The following noise level indices were recorded:

- $L_{Aeq,T}$: The A-weighted equivalent continuous noise level over the measurement period.
- L_{A90}: The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe background noise.
- L_{A10}: The A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe road traffic noise.
- L_{AFmax}: The maximum A-weighted noise level during the measurement period.

5.6 Baseline Sound Level Results

A summary of the survey results at Location One is shown in Table 5-2. The full survey results are available in Appendix D.

Table 5-2 Location 1 - Summary of Measured Sound Levels, free-field, dB

Date	Period	$L_{Aeq,T}$	L_{Amax}	Median L_{A10}	Median L_{A90}
16/11/23	Daytime	68	87	73	52
	Night-Time	65	87	58	46
17/11/23	Daytime	69	98	73	54
	Night-Time	63	87	61	48
18/11/23	Daytime	66	88	70	47
	Night-Time	59	85	54	44
19/11/23	Daytime	65	89	68	46
	Night-Time	64	88	58	44
20/11/23	Daytime	70	93	74	55
	Night-Time	-	-	-	-

A summary of the survey results at Location Two is shown in Table 5-3. The full survey results are available in Appendix D.

Table 5-3 Location 2 - Summary of Measured Sound Levels, free-field, dB

Date	Period	$L_{Aeq,T}$	L_{Amax}	Median L_{A10}	Median L_{A90}
16/11/23	Daytime	57	82	56	40
	Night-Time	51	81	43	39
17/11/23	Daytime	58	83	56	41
	Night-Time	51	78	42	32
18/11/23	Daytime	57	96	54	37
	Night-Time	50	84	40	35
19/11/23	Daytime	56	83	54	39
	Night-Time	50	80	39	32
20/11/23	Daytime	59	94	60	44
	Night-Time	-	-	-	-

- A summary of the survey results at Location Two is shown in Table 5-4. The full survey results are available in Appendix D.

Table 5-4 Location 3 - Summary of Measured Sound Levels, free-field, dB

Date	Period	$L_{Aeq,T}$	L_{Amax}	Median L_{A10}	Median L_{A90}
16/11/23	Daytime	55	87	57	49
	Night-Time	54	75	54	49
17/11/23	Daytime	56	83	59	48
	Night-Time	49	74	46	41
18/11/23	Daytime	52	92	53	44
	Night-Time	50	72	51	46
19/11/23	Daytime	53	75	55	48
	Night-Time	51	76	48	44
20/11/23	Daytime	56	79	58	51
	Night-Time	-	-	-	-

5.7 Baseline Background Sound Levels

Histograms of the daytime and night-time baseline background sound levels at all locations can be seen in **Appendix E.**

From a review of the data, the following baseline background sound levels presented in Table 5-5 may be considered representative for any future BS 4142:2014+A1:2019 assessment required for the Site.

Table 5-5 Baseline Background Sound Levels for Future Assessment

Monitoring Location	Noise Sensitive Receptor	Period	L_{A90} Range, dB	L_{A90} Selected, dB
1	6 and 7	Daytime	41 - 62	46
		Night-time	42 - 59	44
2	1, 2, 3 and 4	Daytime	28 - 55	37
		Night-time	29 - 54	32
3	5	Daytime	40 – 56	48
		Night-time	38 - 53	45

5.7.1 Location 1

During the daytime, the background noise levels were in the range of 41 – 62 dB(A), with 40% of levels occupying the 45 – 48 dB(A) range. 46 dB(A) is therefore considered a robust representative value within the range. At night-time background levels ranged between 42-59 dB(A). 44 dB(A) is considered a robust value as it represented 23% of levels.

5.7.2 Location 2

During the daytime, background levels ranged from 20 – 55 dB(A). 37 dB(A) is considered a robust value, providing a balanced representation of noise levels. During the night-time, levels ranged between 29 and 54 dB(A). Over 50% of levels occupied the 30 – 35 dB(A) range and so 32 dB(A) is considered a robust representative value.

5.7.3 Location 3

During the daytime, background levels were in the range of 40 – 56 dB(A). Over 50% of levels occupied the 47 – 51 dB(A) range and so 48 dB(A) has been considered a representative value. During the night-time, levels ranged from 38 – 53 dB(A). Around 50% of levels were in the region of 45 – 49 dB(A) and so 45 dB(A) is considered a robust representative value.

5.8 Uncertainty

In accordance with BS4142:2014+A1:2019 assessment the uncertainty associated with measured baseline sound levels requires discussion. Baseline sound level measurement uncertainty was minimised using the following steps:

- Measurement locations were representative of the nearest noise-sensitive receptors to the site;
- Measurements were undertaken using a suitable logging period considered to provide representative background sound levels;
- The sound measurements included an extended period;
- Measurements were rounded to the nearest one decimal place before the final calculations; and
- Instrumentation was appropriate and in accordance with Section 5 of BS4142:2014+A1:2019.

6.0 Existing Site BS4142 Assessment

A BS4142 assessment for the existing Site operations was completed by INVC in 2023 (Report: R10137A). This was further updated in Report R10137B dated 2024.

6.1 Baseline Background Sound Survey

As part of the assessment presented in Report R10137A baseline background sound level were obtained at the three locations identified on Figure 6-1. At each location noise from the Site was not audible.

Figure 6-1: INVC Baseline Background Survey Locations



The survey methodology is presented in the INVC Report. The results of the four-hour night-time noise survey are presented in Table 5-1.

Table 6-1: Night-Time Baseline Sound Survey Results

Location	Night-Time L_{Aeq}	Night-Time L_{A90}
B1	37	35
B2	32	27
B3	46	45

6.2 Noise Sensitive Receptors

The baseline sound survey results were considered representative of the Noise Sensitive Receptors identified on Figure 6-2.

Baseline sound surveys were not completed at the NSR locations as at each position noise from the Site was audible.

Figure 6-2: Noise Sensitive Receptor Locations



The baseline sound levels measured at locations B1, B2, and B3 were considered representative of the following NSR locations:

- B1 = NSR 6 and NSR 7.
- B2 = NSRs 1, 2, 3 and 4.
- B3 = NSR 5.

6.3 Assessment

6.3.1 Character Correction

Within the INVC Report (R10137A) at Section 10 a review of applicable character corrections is completed. It was noted that a Receiver Locations 1, 2, 3, 4, and 6 the Site was audible with the following sound characteristics:

- Broadband mid/high frequency noise; similar to venting/air flow noise.
- Audible tonal noise.

Following the analysis presented in Section 10[1] of the INVC Report (R10137A) the character corrections presented in Table 6-2 were applied in the assessment.

Table 6-2: BS4142 Character Corrections

Receptor Location	Sound Characteristics	Correction
1	Tonal noise from Site is clearly audible	+4
2	Tonal noise from Site is clearly audible	+4
3	Tonal noise from Site is clearly audible	+4
4	Tonal noise from Site is clearly audible	+4
5	Site is not audible above extraneous background levels	0
6	Tonal noise from Site is clearly audible	+4
7	SLR assumed same as NSR 6	+4

6.3.2 Assessment Results

Specific sound levels from the Site are presented in two INVC Reports, Report R10137A and Report R10137B. In addition, SLR has been provided with a noise model of the Site from INVC. The noise input data to the model can be seen in Appendix F.

Table 6-3 below presents a summary of the specific sound levels at receptor locations 1 to 6 measured/calculated by INVC. The log averaged levels may be used as a representative specific sound level of the Existing Site at NSR locations 1 to 6.

Table 6-3: Summary of Specific Sound Level Results, dBA

Location	INVC Report			INVC Model
	R10137A	R10137B May	R10137B October	
1	36.0	40.2	40.2	39.9
2	36.0	38.1	37.2	37.6
3	40.0	39.9	39.8	39.8
4	37.0	34.7	34.1	33.9
5	43.0	40.9	40.6	40.9

[1] INVC Report Table 33

Location	INVC Report			INVC Model
	R10137A	R10137B May	R10137B October	
6	44.0	44.1	44.8	44.8
7	-	-	-	51.9[2]

Within INVC Report R10137A a BS4142 Assessment is completed for the night-time period only with the following justification provided:

"As the site operates 24 hours a day, the critical period is during the night-time (23:00 to 07:00). To account for this, the main focus of the assessment was on the night-time period. It is likely that the impact of the site will be greatest during this period due to the lower levels of extraneous background noise".

The INVC Assessment has been updated by SLR at Table 6-4 using the INVC modelled specific sound levels (see Table 6-3).

Table 6-4: INVC Existing Site BS412 Assessment Results

NSR Location	Specific Sound Level	Rating Level[3]	Background Sound Level	Difference
1	40	44	27	+17
2	38	42	27	+15
3	40	44	27	+17
4	34	38	27	+11
5	41	41	45	-4
6	45	49	35	+14
7	52	56	35	+21

[2] Added to model by SLR

[3] INVC Report Table 33

7.0 Permit Variation BS4142 Assessment

7.1 Noise Sources Removed

It is understood that as part of the permit variation, it is proposed for some plant to be removed. The plant listed in Table 7-1 will be removed from the site. Not all the plant was included in the INVC model that informed Table 6-4 due to being redundant / not in use and hence why it is now proposed for removal.

Table 7-1: Plant that is to be removed from Site

Plant Number	Plant Item	Named by INVC
4	SILO EXHAUST RECEIVER	Not in model as redundant
17	RDX RICE SCALE 1 EXHAUST	PV67_S17
46	RDX SSB K-RAY	Not in model as redundant
47	RDX SSB RETURN	Not in model as redundant
48	HOT AIR LIFT RECEIVER	Not in model as redundant
49	RDX MORTON MIXER PULSAIR	Not in model as redundant
50	ALL BRAN DRYER BLEED 1	No1 2 3 Dryer Bleed S51
51	ALL BRAN DRYER BLEED 2	No1 2 3 Dryer Bleed S51
52	ALL BRAN COOLER BLEED	No1 2 3 Dryer Bleed S51
53	RDX SURGE BIN RECEIVER	Not in model as redundant
54a	RDX PELLET MILL 1+12	Not in model as redundant
54b	RDX PELLET MILL 3+4	Not in model as redundant
54c	RDX PELLET MILL 4+5	Not in model as redundant
54d	RDX PELLET MILL 6+7	Not in model as redundant
54e	RDX PELLET MILL 8+9	Not in model as redundant
54f	RDX PELLET MILL 10+11	Not in model as redundant
61	RDX FM 1-7 DUST COLLECTION	Not in model as redundant
62	RDX FM 8-14 DUST COLLECTION	Not in model as redundant
70	RECOOK RECEIVER	Not in model as redundant
71	RECOOK RECEIVER	Not in model as redundant
74	MUESLI DUST EXTRACTION,	Not in model as redundant
76	NUTRI-GRAIN OVEN EXTRACT	S76 Nutrigrain oven extract
77	NUTRI-GRAIN OVEN EXTRACT	S76 Nutrigrain oven extract
78	NUTRI-GRAIN OVEN ZONE 4	S77 Nutrigrain oven zone5
79	NUTRI-GRAIN OVEN ZONE 4	S78 nutri grain oven zone 4
80	NUTRI-GRAIN OVEN ZONE 4	S79 nutri grain oven zone 3
81	NUTRI-GRAIN OVEN ZONE 4	S80 nutri grain oven zone2
84	LINES 9 + 10 WET SCRUBBER	S84 4th Process L9 + L10 wet scrubber
101	BUHLER FLOUR RETURNS EXHAUST	Not in model as redundant
103	FLOUR SUCTION EXHAUSTER	Not in model as redundant
111	4TH PROCESS DRYER BLEED	Not in model as redundant
112	4TH PROCESS DUST EXTRACT	S95 4th Process FM dust extract

7.2 Noise Sources to be Mitigated

In response to Improvement Condition 11 of the Site's environmental permit, the following mitigation measures have been implemented or are due to be implemented during the 2024 Christmas shutdown to reduce existing noise levels from named plant at the Site. These mitigation measures have been included in the noise model that informed Table 6-4.

Table 7-2: Noise Mitigation for Existing Plant

Plant Item	Plant Name in CadnaA	Mitigation	Existing Sound Data (dBA)[4]	Target Sound Reduction (dBA)	Attenuation used in CadnaA (dBA)
SID13 ANIMAL RECEIVER	S10 to 13 (S13)	Replacement Silencer.	85	3 - 7	5
SID 50-52 All Bran Bleed	Branflakes Jetzone Bleed (S56)	Plant will not be used.	79	Plant to be turned off	
LEV 23 Fan and Jetzone Feed: Tank Blower	LEV23_Jetzone feed tank blower (S66)	Replacement Silencer.	82	2 - 6	4
SID 120 Extrusion LEV111	LEV111 Dry filter extract fan_120 (S120)	Replacement Silencer and Jet Cowl.	97.1	To be confirmed no attenuation applied.	
Bran Feed Blower	Tank Floor Bran Feed Blower (S65A)	Replacement Silencer.	87	2 - 5	3.5
4th Process Plant Room Vent	4th Process plant room vent (S87)	Further Assessment Required.	78	No mitigation agreed.	
4th Process Bran Suction	4th Process Bran suction exhauster (S104)	Outlet has been lagged with acoustic barrier.	83 - 93	3 - 5	4
SID8 Dust Receiver Exhaust	Dust receiver exhaust S8	Outlet above acoustic housing has been lagged.	84	No mitigation agreed.	
SID122 Extrusion	Rotoclone_122 (S122)	Could fit a revised jet cowl to move emission point.	81	No mitigation agreed.	
Canopy Vent	Vent Under Canopy	Further Assessment Required.	73	5 - 8	6.5
4th Process Dust Dryer	4th Process Dryer area dust collection (S9699)	Plate on the floor has been secured and lagged.	86	2 - 7	4

[4] See Report R10137B dated Jan 2024 for sound pressure at stated distance.

7.3 New Noise Sources

Supplied noise data for the plant to be added is shown in Table 7-3.

Table 7-3: Noise Source Data

Number or ID	Plant (device) name	Height	Sound power
N-01	Process 5 – New AHU Process	10m from ground floor level (will be placed on the platform on the roof)	Sound Power level for Supply fan: - casing: 61,8 [dB(A)] - intake: 83,2 [dB(A)] - outlet: 85,8 [dB(A)] Log Add = 87.7[dB(A)] Sound Power level for Return fan: - casing: 59,8 [dB(A)] - intake: 78,7 [dB(A)] - outlet: 88,6 [dB(A)] Log Add = 89.0[dB(A)]
N-02	Process 5 – New AHU Packing	10m from ground floor level (will be placed on the platform on the roof)	Sound Power level for Supply fan: - casing: 59,8 [dB(A)] - intake: 81,2 [dB(A)] - outlet: 83,8 [dB(A)] Log Add = 85.7[dB(A)] Sound Power level for Return fan: - casing: 59,8 [dB(A)] - intake: 78,2 [dB(A)] - outlet: 88,6 [dB(A)] Log Add = 89.0[dB(A)]
N-03	Process 5 – New AHU Locker area	10m from ground floor level (will be placed on the platform on the roof)	Sound Power level for Supply fan: - casing: 59,3 [dB(A)] - intake: 81,3 [dB(A)] - outlet: 84.0 [dB(A)] Log Add = 85.8[dB(A)] Sound Power level for Return fan: - casing: 56,3 [dB(A)] - intake: 75,6 [dB(A)] - outlet: 85,8 [dB(A)] Log Add = 86.2[dB(A)]
N-04	Process 5 – New AHU Coating Dryer	10m from ground floor level (will be placed on the platform on the roof)	Sound Power level for Supply fan: - casing: 59,3 [dB(A)] - intake: 81,3 [dB(A)] - outlet: 84.0 [dB(A)] Log Add = 85.9[dB(A)] Sound Power level for Return fan: - casing: 56,3 [dB(A)] - intake: 75,6 [dB(A)] - outlet: 85,8 [dB(A)] Log Add = 86.2[dB(A)]



Number or ID	Plant (device) name	Height	Sound power
N-05	Process 3 – New AHU Coating Dryer	13m from ground floor level (will be placed on the platform on the roof)	Sound Power level for Supply fan: - casing: 59,3 [dB(A)] - intake: 81,3 [dB(A)] - outlet: 84.0 [dB(A)] Log Add = 85.9[dB(A)] Sound Power level for Return fan: - casing: 56,3 [dB(A)] - intake: 75,6 [dB(A)] - outlet: 85,8 [dB(A)] Log Add = 86.2[dB(A)]
EP125	Process 5 – Wet dust collection system serving process & packing	10.5 m above ground level Diameter (0.8m)	92 dB
EP126	Process 3 – Wet dust collection system serving extruders	10.5 m above ground level Diameter (0.9m)	<95dB(A)
EP127	Process 3 – Wet dust collection system serving coating dryer	10.5 m above ground level Diameter (1.1m)	<95dB(A)
EP128	Process 3 – Wet dust collection system serving transfer lines	10.5 m above ground level Diameter (0.5m)	<95dB(A)
EP129	Process 3 – Dry dust collector serving big bag area	8 m above ground level Diameter (0.3m)	+/-72dB(A)
EP130	Process 3 – Dry dust collector serving flour transport	8 m above ground level Diameter (0.2m)	+/-72dB(A)
EP131	Process 3 – Dry dust collector serving salt and flour receivers	15 m above ground level Diameter (0.25m)	+/-72dB(A)
EP132	Process 3 – Cyclone serving toaster cooler	16 m above ground level Diameter (0.75m)	+/-96-101 dB(A)

7.4 Vehicle Movements

On-Site HGV movements have been modelled as follows. These reflect no increase compared to current vehicle movements on site.

- Height 1m.
- Moving point source.
- Speed 10mph.

- Daytime 1-hour movements = 20.
- Night-Time 15-minute movements = 2.5.
- Sound Power 93dB(A)[5].

7.5 Noise Model Assumptions

The sound predictions in this assessment have been undertaken using a proprietary software-based noise model, CadnaA, which implements the full range of UK noise-based calculation methods. The calculation algorithms set out in ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation have been used and the model assumptions are the same as Section 5-1 of the INVC Report R10137B. These are copied below.

- data was obtained by INVC and accurately represents the dominant noise sources.
- the assessable receiver locations are 1.5 m above ground.
- buildings and solid boundary walls are reflective and provide acoustic shielding.
- the ground surface between the sources and receivers is ‘soft ground type’.
- CadnaA prediction method assumes ‘worst case’ meteorological conditions. This includes 3 m/s wind from source to receiver (in all directions)
- SLR will assess at 4m above ground during the nighttime.

7.6 Sound Character Corrections

The character of each noise source and the sound correction that will be applied in the BS4142:2014+A1:2019 are consistent with the character corrections applied for the existing Site with the addition of a 3dB(A) character correction at Receptor Location 5.

This has been added for the permit variation as the proposals have the potential to impact Location 5 and the Site may be audible above the residual sound level. This approach is considered reasonable. The character corrections are therefore as follows:

- NSR 1 = +4dB(A).
- NSR 2= +4dB(A).
- NSR 3= +4dB(A).
- NSR 4= +4dB(A).
- NSR 5= +3dB(A).
- NSR 6= +4dB(A).
- NSR 7 = +4dB(A).

7.7 Results

The BS4142 assessment is presented in Table 7-4. The daytime and night-time CADNA output images can be seen in Figures 7-1 and 7-2.

For this assessment the 2023 baseline background sound level data has been used in the place of the 2020 data.

[5] Sound Power level of HGV at 15mph measured by SLR in Runcorn.

The 2020 data was of very short duration and may not be considered representative.

The 2023 data was completed over four days and during a period of suitable weather conditions.

Table 7-4: Permit Variation BS4142 Assessment

Receptor	Assessment Period	Predicted Variation Specific Sound Level, $L_{Aeq,T}$	Predicted Variation Rating Level, $L_{Ar,Tr}$	Referenced Proxy 2023 Background Sound Level $L_{A90,T}$	Difference
1	Daytime	40	44	37	+ 7
	Night-Time	40	44	32	+ 12
2	Daytime	38	42	37	+ 5
	Night-Time	38	42	32	+ 10
3	Daytime	39	43	37	6
	Night-Time	40	44	32	+ 12
4	Daytime	33	37	37	0
	Night-Time	34	38	32	+ 6
5	Daytime	40	43	48	- 5
	Night-Time	41	44	45	- 1
6	Daytime	42	46	46	0
	Night-Time	43	47	44	+3
7	Daytime	52	56	46	+10
	Night-Time	52	56	44	+12

In discussion discuss initial assessment compared with this one

Figure 7-1: Daytime BS4142 Assessment

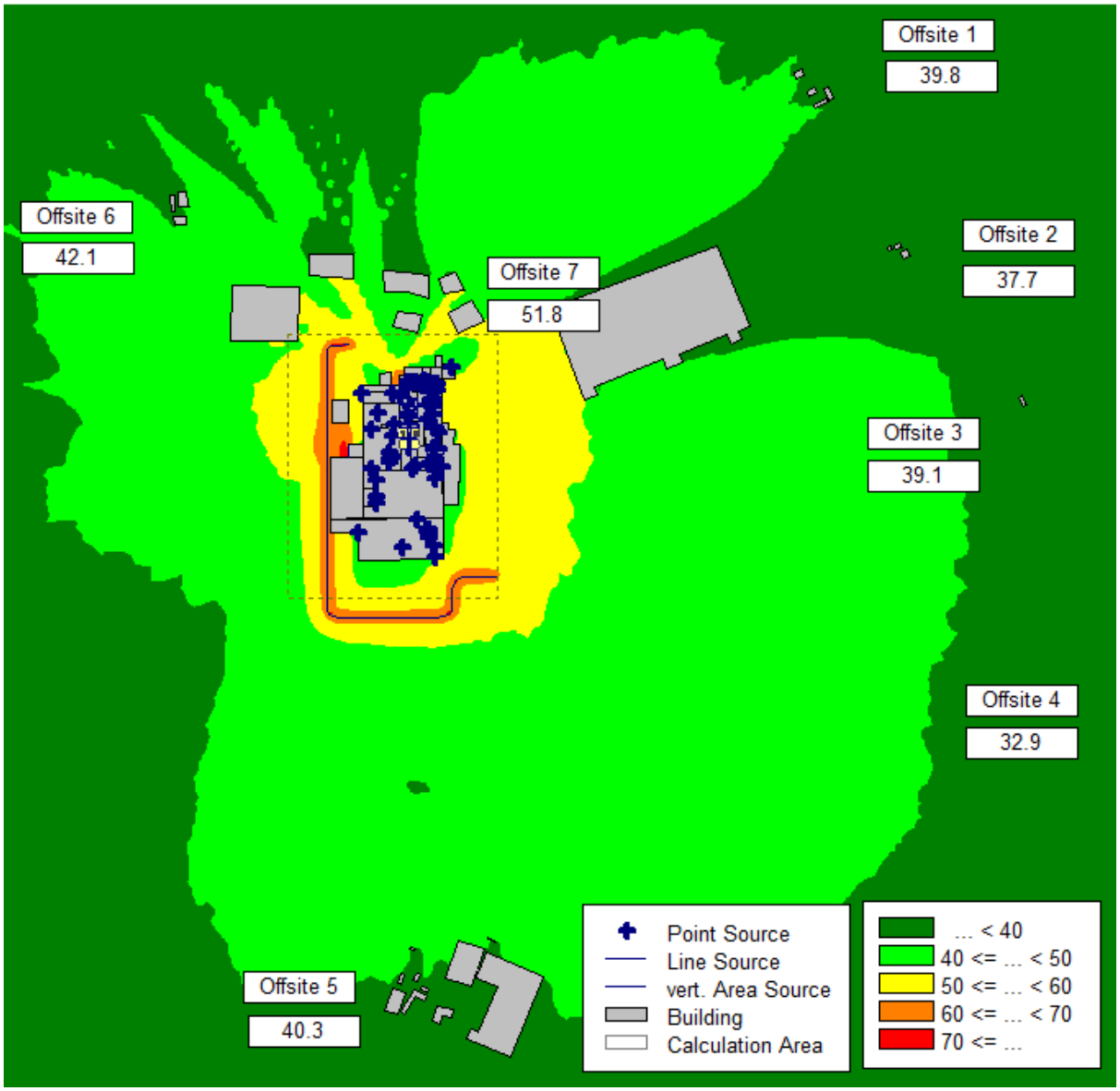
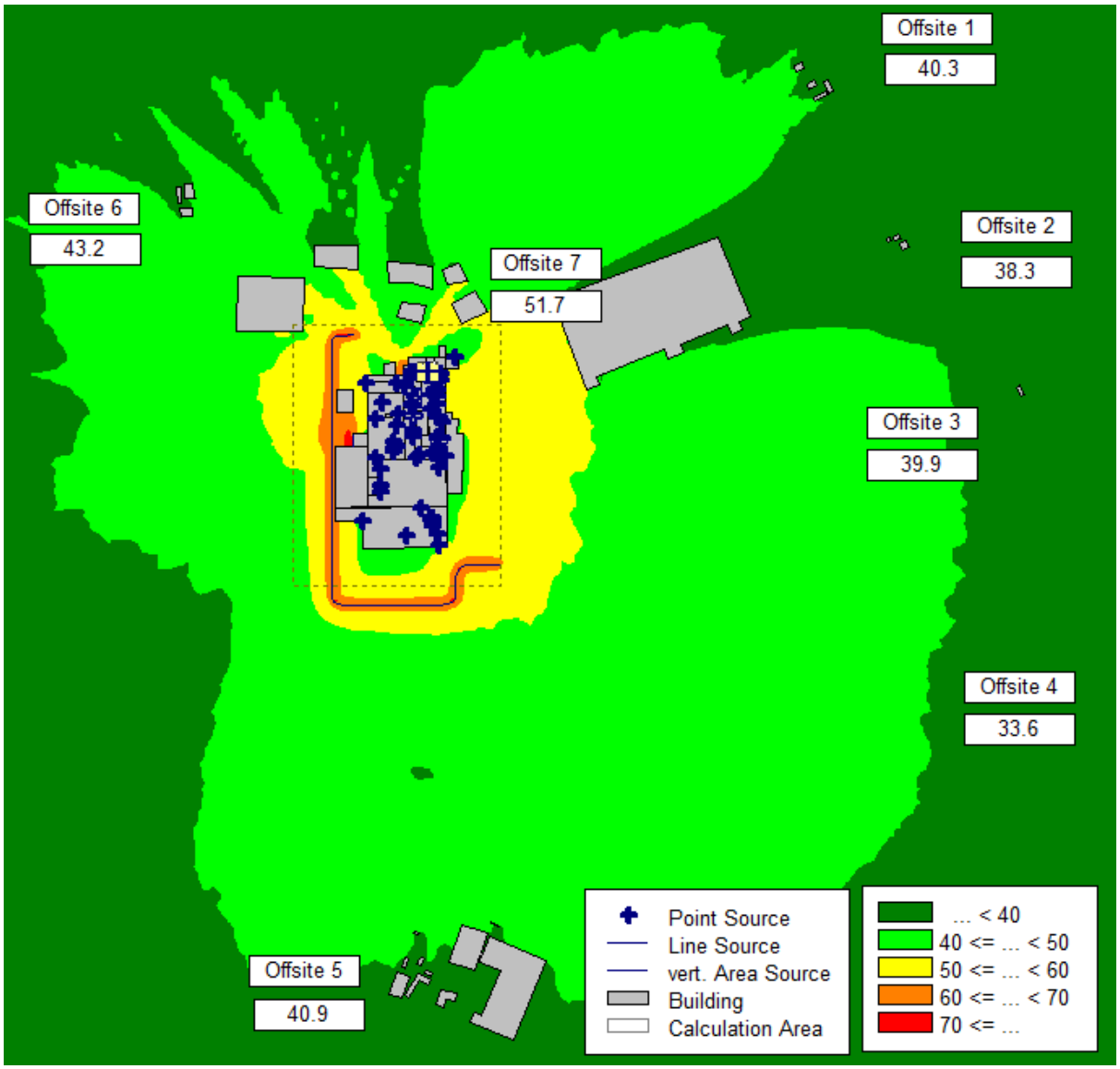


Figure 7-2: Night-Time BS4142 Assessment



7.8 Discussion

Table 7-5 presents the predicted specific sound level at each noise sensitive receptor of the existing site, compared with the proposed permit variation.

Table 7-5: Specific Sound Level Comparison

Receptor	Assessment Period	Predicted Specific Sound Level, dB $L_{Aeq,T}$		Difference (dB)
		Existing (see Table 6-4)	Proposed (see Table 7-4)	
1	Daytime	40	40	0
	Night-Time	40	40	0
2	Daytime	38	38	0
	Night-Time	38	38	0
3	Daytime	40	39	-1
	Night-Time	40	40	0
4	Daytime	34	33	-1
	Night-Time	34	34	0
5	Daytime	41	40	-1
	Night-Time	41	41	0
6	Daytime	45	42	-3
	Night-Time	45	43	-2
7	Daytime	52	52	0
	Night-Time	52	52	0

The proposed changes include the removal of several plant items (see Table 7-1), the addition of attenuation on several plant items (see Table 7-2) and the addition of the proposed plant (see Table 7-3).

As shown in Table 7-4, the predicted variation rating level is above the referenced proxy 2023 background sound level at the majority of receptors during both the daytime and the night time periods. However, as shown in Table 7-5, the specific sound level of the Site with the proposed changes is predicted to be equal to or lower than the existing Site at every receptor.

Therefore, as the noise level from the existing Site is already above the baseline background sound level, and future noise levels are predicted to be equal to or lower than currently occurs, it is considered unlikely that the proposed variation will cause a noise impact on the nearest noise sensitive receptors.

8.0 Conclusion

Kellogg's has appointed SLR Consulting Ltd (SLR) to undertake a noise assessment for proposed changes to emission points to air associated with proposed changes to existing production processes at their production facility at Wrexham, Bryn Lane, Wrexham, LL13 9UT. The assessment is to be submitted in support of a full planning application seeking consent for the following:

> *"Installation of plant, machinery, ducting, extracts and flues on the main building and the expansion of the effluent treatment plant"*

Due to the potential for the new plant to increase noise levels a Noise Impact Assessment has been undertaken to present the results of:

- A Baseline Survey.
- A BS4142 Assessment of existing permitted operations.
- A BS4142 Assessment of cumulative (permitted and proposed) operations.

The proposed changes include the removal of several plant items, the addition of attenuation on several plant items and the addition of plant.

This assessment concludes that while the proposed changes may result in rating levels above the 2023 baseline background sound levels, they are not anticipated to worsen the existing noise impact. This is because the predicted noise levels at all receptors are either equal to or lower than the current noise levels. Therefore, it is considered unlikely that the proposed variation will cause a noise impact on the nearest noise sensitive receptors.

Appendix A Glossary of Terminology

Noise Impact Assessment

Wrexham Breakfast Cereals

Kellogg Company of Great Britain Limited

SLR Project No.: 416.065647.00001

4 November 2024

A.1 Glossary of Terminology

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A-1: Sound Levels Commonly Found in the Environment

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of Pain

A.2 Acoustic Terminology

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (of 20 µPa).

dB(A) A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

$L_{Aeq, T}$ $L_{Aeq, T}$ is defined as the notional steady sound level which, over a stated period T, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

$L_{A10, T}$ & L_{A90} If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence LA10 is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, LA90 is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the LA10 index to describe traffic noise.

$L_{Amax(F)}$ $L_{Amax(F)}$ is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.

Appendix B Survey Photos

Noise Impact Assessment

Wrexham Breakfast Cereals

Kellogg Company of Great Britain Limited

SLR Project No.: 416.065647.00001

4 November 2024

Figure B-1: Location 1



Figure B-2: Location 2



Figure B-4: Location 3



Appendix C Weather Data

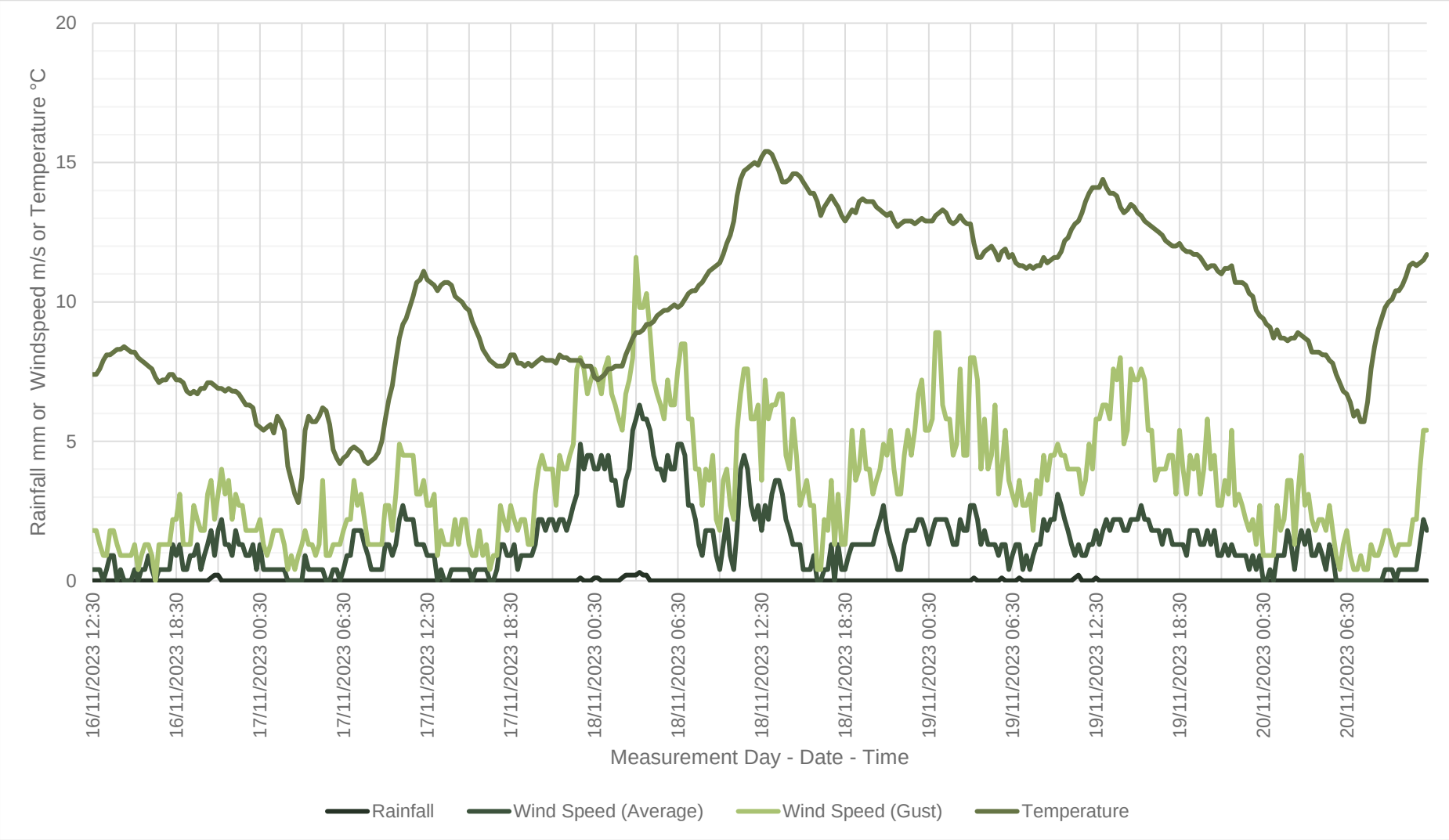
Noise Impact Assessment

Kellogg Company of Great Britain Limited

SLR Project No.: 416.065647.00001

4 November 2024

Figure C-1: Weather Overview



Appendix D Noise Survey Results

Noise Impact Assessment

Wrexham Breakfast Cereals

Kellogg Company of Great Britain Limited

SLR Project No.: 416.065647.00001

4 November 2024

Table D-1 Measured Sound Levels at Location 1, free-field, dB

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
16/11/2023 12:15	68.6	86.6	72.9	52
16/11/2023 12:30	68.8	82.9	73.5	52.3
16/11/2023 12:45	69.6	85.5	74.2	51.4
16/11/2023 13:00	68.7	83.4	73	53
16/11/2023 13:15	69.5	83.1	73.7	55.7
16/11/2023 13:30	70	83.6	74.4	54.3
16/11/2023 13:45	69.2	82.8	73.5	52.1
16/11/2023 14:00	67.6	86.9	71.6	53.6
16/11/2023 14:15	66.8	80	71.5	51.4
16/11/2023 14:30	67.3	82.8	71.6	54.4
16/11/2023 14:45	69.3	84.6	73.6	55.7
16/11/2023 15:00	70.6	82.9	74.8	56.2
16/11/2023 15:15	69.4	82.1	74.1	54
16/11/2023 15:30	69.9	83.9	74.5	53.7
16/11/2023 15:45	70.2	82.7	74.7	54.8
16/11/2023 16:00	71.1	83.2	74.9	57.7
16/11/2023 16:15	70.7	82.6	74.9	56.8
16/11/2023 16:30	70	82.1	74	54.7
16/11/2023 16:45	69.9	80.6	74	54.9
16/11/2023 17:00	69.8	82.4	74	55.6
16/11/2023 17:15	68.9	86.8	73.4	53.1
16/11/2023 17:30	68.8	85.7	73.4	53.2
16/11/2023 17:45	68.8	82.9	73.5	51.5
16/11/2023 18:00	69.4	79.8	73.9	50.2
16/11/2023 18:15	67	82.5	72	48.6
16/11/2023 18:30	64.9	85.1	67.6	47.3
16/11/2023 18:45	66.4	84.8	70.2	47.3
16/11/2023 19:00	66.8	83.1	71.5	46.5
16/11/2023 19:15	65.4	80.9	70	46.5
16/11/2023 19:30	66	85.5	70.2	46.9
16/11/2023 19:45	65.2	84.3	66.8	47.6
16/11/2023 20:00	63	80	65.7	49.9
16/11/2023 20:15	64.1	80.7	66.9	47.1
16/11/2023 20:30	65.2	80	68.6	47.9
16/11/2023 20:45	62.8	78.2	64.8	47.6
16/11/2023 21:45	65.2	84.1	67.5	47.9
16/11/2023 22:00	64.7	83.2	67.2	46.2
16/11/2023 22:15	61.1	82.2	60.1	45.2
16/11/2023 22:30	61	81.6	60.9	45
16/11/2023 22:45	59.7	79.3	58.4	44.7

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
16/11/2023 23:00	59.2	81.9	54.4	46.2
16/11/2023 23:15	60.4	84.3	56.5	46
16/11/2023 23:30	58.3	82.3	49.6	45.3
16/11/2023 23:45	58.8	86.7	47.6	44.9
17/11/2023 00:00	60.6	81.6	61.1	46.4
17/11/2023 00:15	59.7	83	55.2	47.4
17/11/2023 00:30	58.2	80.8	53.8	46.8
17/11/2023 00:45	58.4	79.4	57.2	46.6
17/11/2023 01:00	61	81.2	55	45.5
17/11/2023 01:15	60.2	84	53.4	44.9
17/11/2023 01:30	61.4	82.3	57	44.9
17/11/2023 01:45	56.4	79.5	50.1	44.6
17/11/2023 02:00	58.7	81.2	51	45.8
17/11/2023 02:15	58.6	80.3	54.3	47.1
17/11/2023 02:30	60.6	84.3	57.1	47.1
17/11/2023 02:45	61.6	82.4	59.1	46.9
17/11/2023 03:00	63.6	86	61.9	47.9
17/11/2023 03:15	59.7	81.6	57.1	44.3
17/11/2023 03:30	64.1	87.2	63.5	44.1
17/11/2023 03:45	63.7	84.2	62.7	43.3
17/11/2023 04:00	63.4	83.2	63.2	45.2
17/11/2023 04:15	61.4	81.3	60.3	44.3
17/11/2023 04:30	60.9	82.1	57.2	45.5
17/11/2023 04:45	63.3	81.2	65.1	46.2
17/11/2023 05:00	64.3	81.1	66.5	45.3
17/11/2023 05:15	66.4	85.3	70.2	47.4
17/11/2023 05:30	70	85.4	74.8	52.9
17/11/2023 05:45	68.8	82.4	73.9	54.2
17/11/2023 06:00	68.8	82.6	73.9	52.5
17/11/2023 06:15	68.7	82.6	73.7	52.8
17/11/2023 06:30	70	87.3	74.8	56.8
17/11/2023 06:45	70.5	80.8	75.2	58.6
17/11/2023 07:00	67.9	81.2	73.1	54.1
17/11/2023 07:15	70.9	83.7	75.4	58
17/11/2023 07:30	72.2	82.6	76.1	62.1
17/11/2023 07:45	70.2	81.8	74.1	59.7
17/11/2023 08:00	71.1	82.6	75	60.7
17/11/2023 08:15	70.2	84.4	74.3	58.6
17/11/2023 08:30	71.2	83	75.7	56.9
17/11/2023 08:45	70.5	84.1	75	56.9
17/11/2023 09:00	67.7	81.3	71.8	56.3

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
17/11/2023 09:15	67	85	71.1	57.3
17/11/2023 09:30	66	79.1	70.4	54.5
17/11/2023 09:45	67.8	83.1	71.6	57.5
17/11/2023 10:00	68.2	82.4	72.8	51.8
17/11/2023 10:15	70.1	85.4	74.7	55.5
17/11/2023 10:30	68.9	82.2	73.6	52.5
17/11/2023 10:45	69	87.6	73.6	54.3
17/11/2023 11:00	69.4	85	73.8	56
17/11/2023 11:15	69.1	83.1	73.9	52.8
17/11/2023 11:30	68.7	81.6	73.6	51.9
17/11/2023 11:45	68.2	80.9	72.7	54.2
17/11/2023 12:00	68.3	82	72.8	53.2
17/11/2023 12:15	72.8	97.8	74.5	56.6
17/11/2023 12:30	68.9	83.6	73.4	53.4
17/11/2023 12:45	69.1	85.1	73.7	54.1
17/11/2023 13:00	66.3	80.5	70.2	55.8
17/11/2023 13:15	67.4	80.8	72	56.1
17/11/2023 13:30	67.9	88.8	72.2	54.2
17/11/2023 13:45	69	84.4	72.7	59.4
17/11/2023 14:00	68.8	81.4	72.6	57.6
17/11/2023 14:15	69.3	84.4	73.6	56.5
17/11/2023 14:30	70.9	81.6	75	60.3
17/11/2023 14:45	69.5	84.6	73.8	54.1
17/11/2023 15:00	70.3	84.3	74.5	54.3
17/11/2023 15:15	70.5	85.9	74.3	54.8
17/11/2023 15:30	77.4	90	82.6	58.8
17/11/2023 15:45	70.1	86.7	73.8	57.1
17/11/2023 16:00	70.2	81.9	74.5	56.9
17/11/2023 16:15	69.8	87.9	74.1	55.6
17/11/2023 16:30	69.7	80.9	74.4	52.9
17/11/2023 16:45	69.4	82.2	74	54.2
17/11/2023 17:00	70	88.2	74.6	51.8
17/11/2023 17:15	69.3	84.9	73.9	54.6
17/11/2023 17:30	69.8	88.8	74.4	52
17/11/2023 17:45	68	85.6	73	49.5
17/11/2023 18:00	68.4	81.6	73.3	48.7
17/11/2023 18:15	65.9	81.5	71	47.3
17/11/2023 18:30	65.9	83.3	69.8	47.1
17/11/2023 18:45	63.9	82.3	66.1	46.7
17/11/2023 19:00	64.9	83	67.8	45.7
17/11/2023 19:15	64.7	81.6	66.5	45.3



Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
17/11/2023 19:30	62.3	81.8	63.2	45.6
17/11/2023 19:45	65.9	84.3	69.6	46.7
17/11/2023 20:00	63.4	83.2	64.3	46.5
17/11/2023 20:15	64.2	83.1	66.4	46.6
17/11/2023 20:30	64.2	82.7	66.6	46.5
17/11/2023 20:45	62.1	80	62.7	46
17/11/2023 21:00	63.7	83	64.5	46.3
17/11/2023 21:15	59.8	80.3	58.5	46
17/11/2023 21:30	62.9	80.6	64	45.7
17/11/2023 21:45	63.8	85.9	64.9	46.6
17/11/2023 22:00	61.9	84.5	62.4	46.6
17/11/2023 22:15	61.2	84.8	60.6	46.1
17/11/2023 22:30	58.1	79.5	51.3	46
17/11/2023 22:45	58.3	82.4	56.1	45.5
17/11/2023 23:00	60.6	84	58.1	45.3
17/11/2023 23:15	62.2	83.4	60.8	47.4
18/11/2023 01:00	62.1	86.6	57.3	47.4
18/11/2023 01:15	61.9	81.3	60.9	47.6
18/11/2023 01:30	60.8	80.2	58	47.5
18/11/2023 01:45	62.9	83.3	57.6	46.9
18/11/2023 02:00	57.5	79.7	52.3	45.9
18/11/2023 02:15	60.1	83.7	56.7	45.8
18/11/2023 04:45	56.2	77.5	55	46.7
18/11/2023 05:00	58.1	77.8	55.5	46.7
18/11/2023 05:15	63.1	83.3	63.3	47.8
18/11/2023 05:30	65.8	84.3	69.5	49.7
18/11/2023 05:45	67	83.7	70.8	50.3
18/11/2023 06:00	66	81	70	50.6
18/11/2023 06:15	63.8	81.9	64.7	47.7
18/11/2023 06:30	65.8	84.3	69.3	49
18/11/2023 06:45	65.3	83.1	68.5	48.5
18/11/2023 07:00	66.9	83	71.2	48.4
18/11/2023 07:15	64.1	81.8	65.8	47.4
18/11/2023 07:30	65.9	82.8	70.3	47.8
18/11/2023 07:45	68	83.2	73	48.1
18/11/2023 08:00	68.2	82.6	73.1	50.7
18/11/2023 08:15	67.7	85	72.5	50.7
18/11/2023 08:30	66.6	82.8	71.4	51.1
18/11/2023 08:45	66.5	83.2	71.1	50.4
18/11/2023 09:00	67.8	87.4	72.6	48.4
18/11/2023 09:15	66.9	85.1	71.2	50.3

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
18/11/2023 09:30	67.1	81	72	48.8
18/11/2023 09:45	67.7	87.7	72	49.6
18/11/2023 10:00	67.3	84.8	72.4	48.7
18/11/2023 10:15	68	80	73.1	50.2
18/11/2023 10:30	66.2	81.2	71.3	48.6
18/11/2023 10:45	67	84.7	71.9	51.8
18/11/2023 11:00	67.3	82.2	72.4	49.7
18/11/2023 11:15	66.9	80.6	71.9	50.8
18/11/2023 11:30	67.2	81.2	72.2	49.8
18/11/2023 11:45	67.7	79.8	73	51.4
18/11/2023 12:00	68.9	82.9	73.7	51.8
18/11/2023 12:15	67.2	79.4	72.5	49.2
18/11/2023 12:30	67.2	82.9	72	47.6
18/11/2023 12:45	67.6	82.8	72.5	48.9
18/11/2023 13:00	66.6	79.2	71.8	50.8
18/11/2023 13:15	67.8	83.5	72.3	49.3
18/11/2023 13:30	66.8	81	71.8	48.4
18/11/2023 13:45	65.8	80.1	70.4	49.5
18/11/2023 14:00	65.7	81.2	70.3	46.6
18/11/2023 14:15	65.1	82.8	68.8	45.6
18/11/2023 14:30	64.6	81.9	68.4	45.3
18/11/2023 14:45	65.3	85.1	69.3	45.5
18/11/2023 15:00	66.5	85.3	71	46.5
18/11/2023 15:15	66.1	84.9	70.4	47
18/11/2023 15:30	67.8	80	73	50.7
18/11/2023 15:45	65.8	84.2	70.3	45.9
18/11/2023 16:00	64.1	81.5	66.6	45.6
18/11/2023 16:15	64.6	81.9	67.9	45.7
18/11/2023 16:30	65	83.6	69.5	45.5
18/11/2023 16:45	65.2	81.9	69.9	44.7
18/11/2023 17:00	66.6	79.9	72.1	45.8
18/11/2023 17:15	65.6	80.1	70.8	44.8
18/11/2023 17:30	66.8	81.5	72.1	47.1
18/11/2023 17:45	65.5	79.6	70.4	45.7
18/11/2023 18:00	66.6	80.3	71.6	47.6
18/11/2023 18:15	63.4	81.3	66.3	44.9
18/11/2023 18:30	62.4	78.5	64.9	44.3
18/11/2023 18:45	62.9	81.2	63.6	44.8
18/11/2023 19:00	62.9	79.7	64.6	45
18/11/2023 19:15	61.9	79.9	62.8	45.4
18/11/2023 19:30	59.4	82.2	56.1	44.3

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
18/11/2023 19:45	62	79.9	62.8	44.4
18/11/2023 20:00	63.7	87.8	65.6	44.2
18/11/2023 20:15	60.3	81	59.4	44.2
18/11/2023 20:30	61.5	78.9	61.8	44.8
18/11/2023 20:45	59.9	85.6	56.5	44.7
18/11/2023 21:00	61.7	83	62	44.5
18/11/2023 21:15	57	80.4	55.8	44.4
18/11/2023 21:30	60.5	79.7	60	44.2
18/11/2023 21:45	57.2	79	53.6	41.9
18/11/2023 22:00	60.1	85	57.6	41.3
18/11/2023 22:15	60.7	81	60.4	43.3
18/11/2023 22:30	59.3	81.8	58.8	43.8
18/11/2023 22:45	59.9	81.6	59	44
18/11/2023 23:00	56.4	77.3	54.3	44.1
18/11/2023 23:15	56.5	79.7	52.7	44.4
18/11/2023 23:30	60.3	79.3	58.8	45.5
18/11/2023 23:45	59.4	80.1	57.9	45.2
19/11/2023 00:00	57.6	80.9	54.2	42.9
19/11/2023 00:15	55.8	79.3	52.1	43.2
19/11/2023 00:30	57.6	83.2	52.9	43.7
19/11/2023 00:45	52.9	76.2	52.4	44.4
19/11/2023 01:00	54.6	79.2	52.2	44.5
19/11/2023 01:15	59	80.4	54.9	44.1
19/11/2023 01:30	53.8	77.5	51.9	44.8
19/11/2023 01:45	59.8	82.9	53.3	44.3
19/11/2023 02:00	54.7	76.5	49.6	43.3
19/11/2023 02:15	50.2	72.1	48	42.8
19/11/2023 02:30	59.6	84.5	55.9	45
19/11/2023 02:45	56.9	84.8	52	43.3
19/11/2023 03:00	52.1	76.9	51.3	44.1
19/11/2023 03:15	59.5	80.8	56.3	46
19/11/2023 03:30	56.8	79.7	56.9	48.2
19/11/2023 04:00	56.9	77.3	52.9	43.6
19/11/2023 04:15	51.1	76.7	48.1	43.5
19/11/2023 04:30	54.7	79.4	46.2	42.9
19/11/2023 04:45	56.2	81.4	48.7	43.6
19/11/2023 05:00	55.8	77.2	54.1	42.6
19/11/2023 05:15	58.7	78.8	58.4	43.5
19/11/2023 05:30	62.9	82.2	64	44.9
19/11/2023 06:00	65.2	80.9	69.2	44.2
19/11/2023 06:15	61.6	80.8	62	43

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
19/11/2023 06:30	62.9	83.5	64.3	44.3
19/11/2023 06:45	64.9	80.9	68.6	46
19/11/2023 07:15	65.3	88.8	66.8	44.8
19/11/2023 07:30	63.5	82.4	64.3	43.4
19/11/2023 07:45	63.6	80.8	65.1	44.9
19/11/2023 08:00	65.3	84.3	69.1	45.9
19/11/2023 08:15	65.8	80.5	69.5	44.8
19/11/2023 08:30	64.8	80.3	67.4	44.6
19/11/2023 08:45	64.8	81.3	68	45.6
19/11/2023 09:00	60.3	77.8	60.8	45.6
19/11/2023 09:15	65	83.5	66.7	46.5
19/11/2023 09:30	66.1	86	67.9	46.9
19/11/2023 09:45	65.7	87	68.1	46.4
19/11/2023 10:00	64.3	80.3	67.3	46.3
19/11/2023 10:15	68	83.7	72.8	48.6
19/11/2023 10:30	66.9	83.8	71.2	46.8
19/11/2023 10:45	64.7	79.7	68.2	45.6
19/11/2023 12:45	65.8	82.8	70.1	47.5
19/11/2023 13:00	66.7	83.2	71.6	46.9
19/11/2023 13:15	66.4	83.3	71.6	48.2
19/11/2023 13:30	66.4	79.7	71.6	48.7
19/11/2023 13:45	66.9	79.4	72.4	48.5
19/11/2023 14:00	65.6	82.4	70.4	47.6
19/11/2023 14:15	64.2	81.3	67.9	46.8
19/11/2023 14:30	64.8	82	68.5	47.2
19/11/2023 14:45	65.1	82.3	68.6	48.9
19/11/2023 15:00	65.1	80.3	69.8	50.4
19/11/2023 15:15	65.8	80.2	71	48.4
19/11/2023 15:30	67.1	82.9	72.3	51.3
19/11/2023 15:45	65.9	80.9	70.6	48.3
19/11/2023 16:00	65.8	80.6	69.9	49.6
19/11/2023 16:15	65.8	83	70.1	47.1
19/11/2023 16:30	65	82.2	68.9	47.2
19/11/2023 16:45	63.6	78	68.3	46.1
19/11/2023 17:00	65.3	79.3	70.1	47.6
19/11/2023 17:15	66.5	85	71.4	47.3
19/11/2023 17:30	65.8	80.9	70.6	47.7
19/11/2023 17:45	64.9	83.7	69.2	45.4
19/11/2023 18:00	66	82.7	70.3	45.9
19/11/2023 18:15	59.4	78.4	58.9	45.1
19/11/2023 18:30	62	80.7	63.9	44.8

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
19/11/2023 18:45	63.2	81.4	64.6	44.3
19/11/2023 19:00	61.6	84.3	61.1	45.8
19/11/2023 19:15	62.8	82	64.7	46
19/11/2023 19:30	59	82.1	57.9	44.9
19/11/2023 19:45	62.2	80.4	63	43.3
19/11/2023 20:00	61.9	79.3	62.6	44.5
19/11/2023 20:15	62.9	83.5	64.1	44.8
19/11/2023 20:30	63.3	83.4	65.1	43.3
19/11/2023 20:45	60.8	82.1	60	43.5
19/11/2023 21:00	62	83.7	61.8	42.2
19/11/2023 21:15	61	83.4	59.9	43.4
19/11/2023 21:30	60.1	82.2	58.2	42.7
19/11/2023 21:45	61.1	80.4	61.1	42.5
19/11/2023 22:00	60.4	79	60.8	43.7
19/11/2023 22:15	57.1	80.9	50.7	42.4
19/11/2023 22:30	57.7	84.2	47.5	42.4
19/11/2023 22:45	57.1	79.7	48	42.1
19/11/2023 23:00	53.7	77.6	46.7	42
19/11/2023 23:15	55.8	78.1	48.5	42
19/11/2023 23:30	58.3	79.4	52.8	43
19/11/2023 23:45	57	82.1	44.7	42.6
20/11/2023 00:00	57.8	80.7	48.2	42.8
20/11/2023 00:15	56.5	82.1	48.8	42.3
20/11/2023 00:30	55.5	79.3	50.8	43.4
20/11/2023 00:45	58.3	81.4	54.3	44.3
20/11/2023 01:00	58	81.1	50.4	43.8
20/11/2023 01:15	50.5	76.8	45.1	42.9
20/11/2023 01:30	60.7	80.9	59.9	44
20/11/2023 01:45	59.7	82.5	55.6	43.7
20/11/2023 02:00	59.4	82.2	53.6	44.7
20/11/2023 02:15	60.2	79.7	59.1	44.1
20/11/2023 02:30	56.6	80.2	49.9	42.9
20/11/2023 02:45	59.5	79.2	55.5	42.3
20/11/2023 03:00	57.3	80	52.2	42.9
20/11/2023 03:15	61.2	83	60.3	42.8
20/11/2023 03:30	59.5	80.4	58.8	43.8
20/11/2023 03:45	61.7	85	60.5	44.6
20/11/2023 04:00	59.3	81.2	57.9	44.1
20/11/2023 04:15	62.2	82.5	61.9	44
20/11/2023 04:30	63.3	82.2	64	44.1
20/11/2023 04:45	64.3	82.4	65.7	45.9

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
20/11/2023 05:00	64.2	80.2	66.3	45.5
20/11/2023 05:15	66.5	84.5	71.2	46.5
20/11/2023 05:30	68.7	81.8	73.6	50.5
20/11/2023 05:45	69.3	87.5	74.1	54.2
20/11/2023 06:00	68.5	83.5	73.5	53.5
20/11/2023 06:15	69.7	86.2	74.7	54.6
20/11/2023 06:30	68.8	86.4	74.1	53.1
20/11/2023 06:45	70.7	84.4	75.3	59
20/11/2023 07:00	70	86	74.7	56.9
20/11/2023 07:15	70.8	82.4	75.2	57.5
20/11/2023 07:30	71.1	81.9	74.9	60
20/11/2023 07:45	69.4	82.5	73	60.8
20/11/2023 08:00	69.3	93.1	72.7	58.8
20/11/2023 08:15	70.1	84.4	74.2	57.6
20/11/2023 08:30	71.2	84.6	75.3	59.3
20/11/2023 08:45	70.9	85.4	75.2	58.3
20/11/2023 09:00	69.9	82.2	74.6	55.3
20/11/2023 09:15	69.8	87.1	74.3	53.7
20/11/2023 09:30	69.5	82.9	74.2	54.5
20/11/2023 09:45	67.4	82.8	71.8	50.8
20/11/2023 10:00	67.8	86.7	72.6	49.2
20/11/2023 10:15	70	85.8	74.5	52.2
20/11/2023 10:30	68.2	82.4	73.1	49.9
20/11/2023 10:45	69	83.1	73.9	51
20/11/2023 11:00	68.6	82.7	73.2	53.3
20/11/2023 11:15	69.3	86.8	73.7	54.6
20/11/2023 11:30	69.7	84.5	74.4	53.5
20/11/2023 11:45	68.6	81.4	73.7	51.7
20/11/2023 12:00	69.9	85.1	74.4	55.1
20/11/2023 12:15	69.9	81.6	74.3	55
20/11/2023 12:30	69.4	83.1	74	55.5
20/11/2023 12:45	70.3	85.2	74.6	56.5
20/11/2023 13:00	70.5	83.6	74.9	57.1

Table D-2 Measured Sound Levels at Location 2, free-field, dB

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
16/11/2023 13:30	57	79.1	52.4	35.4
16/11/2023 13:45	55.2	75.7	52.5	35
16/11/2023 14:00	57.8	77.2	58.3	37.3

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
16/11/2023 14:15	56.4	76.4	55.4	39.5
16/11/2023 14:30	55.5	77.6	55.2	40.2
16/11/2023 14:45	57.7	76.8	59.1	39.9
16/11/2023 15:00	57.1	80.5	58.1	40.2
16/11/2023 15:15	59.5	80.6	61.2	41.6
16/11/2023 15:30	58.2	78.5	58	41.2
16/11/2023 15:45	58.1	79	56.8	43.2
16/11/2023 16:00	60.9	79.4	62.9	46.3
16/11/2023 16:15	61.1	80.4	63.5	47.1
16/11/2023 16:30	59.4	79.5	58.9	46.8
16/11/2023 16:45	57.3	79.1	57.1	46.1
16/11/2023 17:00	57.5	77.5	56.9	46.4
16/11/2023 17:15	60.8	77.9	61.4	52.7
16/11/2023 17:30	59.8	78	60.3	53.2
16/11/2023 17:45	60	79	60.1	53.3
16/11/2023 18:00	59.1	79.7	58.1	53.7
16/11/2023 18:15	59.1	80.7	57.7	53.6
16/11/2023 18:30	58.3	78.3	57.2	53.4
16/11/2023 18:45	53.8	77	49.8	43.8
16/11/2023 19:00	53.8	80.8	46.7	43.1
16/11/2023 19:15	54.5	78	48.6	40.1
16/11/2023 19:30	52.9	76.2	47.9	42.5
16/11/2023 19:45	53.8	81.8	45.7	39.3
16/11/2023 20:00	43.4	70	41.7	33.8
16/11/2023 20:15	53.8	79.9	52.2	31.7
16/11/2023 20:30	53.2	77	55.9	33.1
16/11/2023 20:45	53.3	75.1	46.3	37.8
16/11/2023 21:45	37.5	51.8	40.8	31.6
16/11/2023 22:00	51.3	74.9	43.3	30.9
16/11/2023 22:15	49.1	76.5	37.5	28.2
16/11/2023 22:30	45.1	69.4	35.3	28.6
16/11/2023 22:45	30.6	43.6	32	27.9
16/11/2023 23:00	49.3	76.4	38.1	32.1
16/11/2023 23:15	35.6	51.2	37.5	32
16/11/2023 23:30	34.8	54	37.1	31.1
16/11/2023 23:45	35.6	47.1	37.9	32.7
17/11/2023 00:00	36.8	50.5	38.6	34.1
17/11/2023 00:15	49.8	75.8	44.9	40.6
17/11/2023 00:30	42.3	52.8	43.9	39.3
17/11/2023 00:45	40	50.8	41.6	38.2
17/11/2023 01:00	41.4	48.5	43.4	38



Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
17/11/2023 01:15	39.9	44.9	41.5	38.4
17/11/2023 01:30	43.1	52.9	45.2	39.9
17/11/2023 01:45	49	77.7	40.4	37.4
17/11/2023 02:00	37.6	43.1	39.8	35.7
17/11/2023 02:15	37.8	42.8	39.1	36.4
17/11/2023 02:30	37.8	41.8	39	36.7
17/11/2023 02:45	36.8	43.2	38.4	35
17/11/2023 03:00	38.6	43.9	39.9	37
17/11/2023 03:15	39.2	46.4	40.9	36.7
17/11/2023 03:30	41.8	52.2	43	39.3
17/11/2023 03:45	40.8	46.2	42	39.4
17/11/2023 04:00	41.6	55	42.8	38.5
17/11/2023 04:15	42.6	54.5	43.9	39.9
17/11/2023 04:30	53.7	80.5	48.4	41.6
17/11/2023 04:45	50.6	74.2	48	41
17/11/2023 05:00	47.2	70.2	45.3	39.8
17/11/2023 05:15	43.4	53.1	45.6	39.4
17/11/2023 05:30	52.2	79.4	53.7	41.7
17/11/2023 05:45	55.9	59.3	57.4	53.6
17/11/2023 06:00	56.7	69.6	57.9	54.1
17/11/2023 06:15	56.6	68.6	58.1	54.4
17/11/2023 06:30	59.6	80.3	61.5	54
17/11/2023 06:45	59.4	78.6	58.5	54.2
17/11/2023 07:00	59.5	78.9	58.1	54.7
17/11/2023 07:15	59.5	76.7	59.4	54.7
17/11/2023 07:30	61	79	62.8	48.4
17/11/2023 07:45	59	76.9	58.6	46.9
17/11/2023 08:00	60.8	80	63.1	46
17/11/2023 08:15	59.7	77.1	61.9	46.6
17/11/2023 08:30	62.7	82.6	63.7	46.5
17/11/2023 08:45	60.8	80.5	62.4	47.2
17/11/2023 09:00	61.8	82.3	63.2	45.3
17/11/2023 09:15	59.1	80.5	60.3	44
17/11/2023 09:30	60.2	79	61	44
17/11/2023 09:45	57.1	77.5	53.5	41.9
17/11/2023 10:00	57.5	77.6	55.9	39.6
17/11/2023 10:15	56.3	77	51.1	38.1
17/11/2023 10:30	60.6	81.5	63.2	40.4
17/11/2023 10:45	57.4	78	56.1	42.7
17/11/2023 11:00	56.4	76.8	56.1	41
17/11/2023 11:15	56.2	79.9	55.6	41

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
17/11/2023 11:30	58.3	79.6	56.8	39.8
17/11/2023 11:45	54.9	79.5	51.9	36.8
17/11/2023 12:00	56	78.8	55.6	38.2
17/11/2023 12:15	54.2	75.9	50.6	35.8
17/11/2023 12:30	55	76	52.6	33.7
17/11/2023 12:45	58.8	77.3	62.5	42.4
17/11/2023 13:00	57.5	78.5	55.1	40.9
17/11/2023 13:15	57.3	75.7	56.6	41.5
17/11/2023 13:30	57.6	78.4	56	41.8
17/11/2023 13:45	56.5	77.6	54.5	40.5
17/11/2023 14:00	56.8	78.8	57.8	40.2
17/11/2023 14:15	56.8	77.2	56.8	42
17/11/2023 14:30	58.1	78.5	59.5	42.4
17/11/2023 14:45	58.1	76.7	60.3	42.7
17/11/2023 15:00	58.2	76.7	59.4	41.6
17/11/2023 15:15	60.2	78.7	62.3	35.2
17/11/2023 15:30	58.7	80.3	59.1	38.5
17/11/2023 15:45	60.3	82.5	61.2	39.8
17/11/2023 16:00	59.4	79	61.6	40.8
17/11/2023 16:15	59.5	79.1	60.3	41
17/11/2023 16:30	58.8	78.7	61.2	42.3
17/11/2023 16:45	59.9	80.1	60.1	52.3
17/11/2023 17:00	60.1	81.8	58.4	52.9
17/11/2023 17:15	60.6	81.9	60.6	52.6
17/11/2023 17:30	58.8	78.1	56.6	52.9
17/11/2023 17:45	58.7	76.8	57	52.7
17/11/2023 18:00	58.6	82.8	55.7	52.8
17/11/2023 18:15	59.5	81.1	55.8	52.6
17/11/2023 18:30	54.8	78.9	48.1	32.3
17/11/2023 18:45	54.3	78.3	46.3	32.5
17/11/2023 19:00	50.6	80.6	40.2	31.1
17/11/2023 19:15	55	80.5	43.5	32.2
17/11/2023 19:30	49.2	74.1	41.5	30.2
17/11/2023 19:45	54.2	81.2	39.6	30.1
17/11/2023 20:00	55.2	75.7	51.4	30.5
17/11/2023 20:15	50	70.2	54.8	28.9
17/11/2023 20:30	53.7	75.4	43.2	28.9
17/11/2023 20:45	51.2	77.3	41.6	30.5
17/11/2023 21:00	44.2	71.8	37.4	30
17/11/2023 21:15	50.2	76.8	40.1	30.2
17/11/2023 21:30	43.1	71.8	36.5	29.1

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
17/11/2023 21:45	52.4	83.1	37.4	28.7
17/11/2023 22:00	48.2	72.5	39.5	30.8
17/11/2023 22:15	52.1	77.1	42.9	30.9
17/11/2023 22:30	47.5	73.3	38.9	30.7
17/11/2023 22:45	49.1	77.6	35.6	29.6
17/11/2023 23:00	52.8	77.3	41	30
18/11/2023 00:00	50.1	76	43.6	33.9
18/11/2023 00:15	47.1	76.5	43.2	31.4
18/11/2023 01:00	44.5	70.9	42.7	34.7
18/11/2023 01:15	39.1	53.3	41.7	34.6
18/11/2023 01:30	37.2	49.8	40.6	32.7
18/11/2023 01:45	35.5	46.1	38.4	31.9
18/11/2023 02:00	34.6	48.8	36.3	30.8
18/11/2023 02:15	34.3	45.8	36.2	31.3
18/11/2023 04:45	40.8	67.3	37.2	29.8
18/11/2023 05:00	33.3	44.6	35	30.7
18/11/2023 05:15	31.4	42.3	32.8	29.7
18/11/2023 05:30	44.8	72.8	41.5	30
18/11/2023 05:45	53.4	62.2	55.6	36.6
18/11/2023 06:00	55	75.7	56.1	52.3
18/11/2023 06:15	55.2	59	56.7	53.1
18/11/2023 06:30	57.6	77.9	59	53.2
18/11/2023 06:45	55.3	71.8	56.3	53
18/11/2023 07:00	55.4	76.4	56.1	53
18/11/2023 07:15	55.9	74.3	56.9	53.2
18/11/2023 07:30	56.7	78.5	56.8	36.4
18/11/2023 07:45	53.2	79.7	45.3	34.1
18/11/2023 08:00	55.4	80.8	49.9	35.3
18/11/2023 08:15	57.9	78.7	55.3	37.1
18/11/2023 08:30	56.5	78.9	54.1	43.5
18/11/2023 08:45	55.8	80.2	54.2	36.5
18/11/2023 09:00	54.7	75.6	52.5	37.1
18/11/2023 09:15	56.1	77.1	53.1	37.5
18/11/2023 09:30	59.7	79.7	59.4	38.9
18/11/2023 09:45	54.5	77.1	50.1	38.4
18/11/2023 10:00	54.7	76.3	47.2	36.6
18/11/2023 10:15	60.5	81.5	60.7	37.4
18/11/2023 10:30	57.3	74.1	59.2	37.3
18/11/2023 10:45	56.4	79.7	54.2	37.3
18/11/2023 11:00	59.6	79.3	62.1	40.8
18/11/2023 11:15	57.1	76.6	54.7	38.7

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
18/11/2023 11:30	57.5	77.8	59	37.5
18/11/2023 11:45	57.8	81.3	53.7	38.3
18/11/2023 12:00	57.2	76.9	55.1	37.1
18/11/2023 12:15	59	80.5	58.3	36.8
18/11/2023 12:30	57	77.7	54.4	36.8
18/11/2023 12:45	56.3	77.3	53.7	37.4
18/11/2023 13:00	56.1	78.4	53.1	36.4
18/11/2023 13:15	57.9	77.7	59.4	37.9
18/11/2023 13:30	56.9	77.7	56.9	38.7
18/11/2023 13:45	58.1	78.4	56.2	40.2
18/11/2023 14:00	58.2	77.5	57.8	36.4
18/11/2023 14:15	56.7	78.3	53.9	42
18/11/2023 14:30	54.2	74	50.9	40
18/11/2023 14:45	55.9	79.5	51.2	37.4
18/11/2023 15:00	57	77.5	53.9	37.3
18/11/2023 15:15	56.5	77.6	53.1	35.6
18/11/2023 15:30	56.7	78.5	54.3	35.1
18/11/2023 15:45	54.6	78.6	48.4	35.4
18/11/2023 16:00	56.8	78.3	54.8	35.2
18/11/2023 16:15	55.4	77.6	51.7	34.2
18/11/2023 16:30	57.2	77.7	56.4	51.3
18/11/2023 16:45	57.5	76.4	56.2	52
18/11/2023 17:00	58.4	81.1	57.4	52
18/11/2023 17:15	58	78.3	56.1	52.1
18/11/2023 17:30	57.1	76.5	55	52.6
18/11/2023 17:45	57.4	76.9	55	52.3
18/11/2023 18:00	55.6	75.1	54.8	32.3
18/11/2023 18:15	51.3	72.7	44.1	31.8
18/11/2023 18:30	57.7	83.2	49.1	35.2
18/11/2023 18:45	56.8	81.2	54.2	34.6
18/11/2023 19:00	56	77.1	50.7	33.5
18/11/2023 19:15	56.5	79.1	51.2	35.8
18/11/2023 19:30	54.5	81.6	47.7	35.2
18/11/2023 19:45	50.2	77.5	42.3	34.3
18/11/2023 20:00	52.4	74.3	53.9	33.3
18/11/2023 20:15	66.5	95.9	51.3	34.7
18/11/2023 20:30	53.1	77	43.6	30.9
18/11/2023 20:45	35.6	52.3	37.6	30.2
18/11/2023 21:00	50.6	75.3	43	32.9
18/11/2023 21:15	51.2	79.9	41.7	32.2
18/11/2023 21:30	51.3	77.1	43.7	32.4



Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
18/11/2023 21:45	50.3	75.8	39.3	32.6
18/11/2023 22:00	52	78.7	43.2	28.8
18/11/2023 22:15	48.5	76.3	38.7	30.9
18/11/2023 22:30	52.1	76.6	44.9	34.1
18/11/2023 22:45	46.3	70.9	39.5	31.6
18/11/2023 23:00	57	83.3	42.8	33.7
18/11/2023 23:15	49.9	75.6	42.9	35.2
18/11/2023 23:30	44.3	70.4	38.7	34.4
18/11/2023 23:45	43.9	72	36.1	31.5
19/11/2023 00:00	38.8	48.2	41.6	32.1
19/11/2023 00:15	48.4	78.7	39.9	34.5
19/11/2023 00:30	45.2	69.7	43.5	36.5
19/11/2023 00:45	54	83.7	41.1	32.4
19/11/2023 01:00	36.5	49.1	38.3	33.6
19/11/2023 01:15	37	45.3	38.6	34.9
19/11/2023 01:30	37.1	49.7	39.4	33.9
19/11/2023 01:45	37.5	55.3	38.7	34.8
19/11/2023 02:00	47.2	76	38.7	34.3
19/11/2023 02:15	45.9	75.6	37	33.5
19/11/2023 02:30	37.7	50.4	39.1	34.7
19/11/2023 02:45	39	51.9	41.8	34.8
19/11/2023 03:00	38.2	47.1	40.4	35.4
19/11/2023 03:15	39.9	48.2	42.5	36.7
19/11/2023 03:30	46.6	56.5	49	43
19/11/2023 04:15	37.1	43.2	38.7	35
19/11/2023 04:30	36	45.8	37.9	33.2
19/11/2023 04:45	49.3	77.5	40.9	32.2
19/11/2023 05:00	36.4	46.7	38.7	32.5
19/11/2023 05:15	37.7	45.5	39.7	35
19/11/2023 05:30	40.6	53.9	42.7	36.4
19/11/2023 06:00	55.8	64.9	56.3	52.4
19/11/2023 06:15	55.6	75.1	55.8	52.1
19/11/2023 06:30	54.7	71.7	56	52.6
19/11/2023 06:45	54.1	73.7	55.2	52.4
19/11/2023 07:15	55	75.6	56.4	52.9
19/11/2023 07:30	53.6	76.9	53.6	34.9
19/11/2023 07:45	49.8	75.6	48.9	32.7
19/11/2023 08:00	44.8	71.8	43.2	32.1
19/11/2023 08:15	54.7	77.4	49.7	32.8
19/11/2023 08:30	54.8	80	47.2	32.7
19/11/2023 08:45	41	61.6	43.6	33.7

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
19/11/2023 09:00	51.1	74.6	49	34.2
19/11/2023 09:15	57.2	80.1	53.2	36
19/11/2023 09:30	55.3	77.2	51	36.3
19/11/2023 09:45	53.1	78.3	50.5	37
19/11/2023 10:00	55.5	78	51.1	38.5
19/11/2023 10:15	59.3	79.8	62.5	36.5
19/11/2023 10:30	55.4	78.1	53.5	37.4
19/11/2023 10:45	56.6	76	55.3	37.7
19/11/2023 11:30	56.9	77	53.5	41.2
19/11/2023 11:45	57.4	79.3	55.2	37.1
19/11/2023 12:00	56	77.1	53.6	38.5
19/11/2023 12:15	56.9	75.2	55.6	40.4
19/11/2023 12:45	59.6	78.6	61	40.3
19/11/2023 13:00	59.1	77.4	59.3	42.8
19/11/2023 13:15	54	75.1	53.9	43.9
19/11/2023 13:30	57.2	79.4	55.1	40
19/11/2023 13:45	56.8	80.1	53.5	41.6
19/11/2023 14:00	56.4	76.3	56.1	42.2
19/11/2023 14:15	57.6	78.9	57.6	42
19/11/2023 14:30	57.1	78.1	56	43.8
19/11/2023 14:45	57.6	78	56.4	45.3
19/11/2023 15:00	58.1	83.4	57.7	44.1
19/11/2023 15:15	56.2	77	55.3	46.3
19/11/2023 15:30	59	78.4	58.3	48.2
19/11/2023 15:45	57	76.6	56.9	47.2
19/11/2023 16:00	56.8	77.3	56.2	44.9
19/11/2023 16:15	58.4	76.8	58.4	50.7
19/11/2023 16:30	57	77.1	56.7	51.9
19/11/2023 16:45	58.7	77.2	58.5	52.7
19/11/2023 17:00	58	78.3	56.7	52
19/11/2023 17:15	55.6	79.3	54.6	52
19/11/2023 17:30	56.5	76.8	55.9	52.5
19/11/2023 17:45	57.5	80.8	55.9	53.2
19/11/2023 18:00	57.4	76.7	56.3	42.3
19/11/2023 18:15	55	77.7	51	40.2
19/11/2023 18:30	51.2	73.9	51.1	38.8
19/11/2023 18:45	55.6	78.5	52.5	38.5
19/11/2023 19:00	52.1	77.4	46.6	38.8
19/11/2023 19:15	52.9	76.9	49.1	39
19/11/2023 19:30	40.7	53.6	42.7	37.8
19/11/2023 19:45	53.8	77.8	47.2	37.8

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
19/11/2023 20:00	53.7	79.4	52.9	36.8
19/11/2023 20:15	53.1	76.1	54.4	37.6
19/11/2023 20:30	51.8	78.3	43.1	37.5
19/11/2023 20:45	43.9	67.8	43.7	37.6
19/11/2023 21:00	47.4	72.9	44.4	36.4
19/11/2023 21:15	51.4	81	40.3	36.4
19/11/2023 21:30	44.7	70.7	40.6	35.6
19/11/2023 21:45	48	75.4	42.1	34.2
19/11/2023 22:00	37.9	51.4	39.4	34.5
19/11/2023 22:15	54.4	81.7	42.9	35.4
19/11/2023 22:30	44.7	72.7	38.9	35.5
19/11/2023 22:45	47.6	76	38.2	34.3
19/11/2023 23:00	38.9	58.2	38.9	35.2
19/11/2023 23:15	36	40.4	37.2	34.6
19/11/2023 23:30	45.4	73.6	37.2	34.4
19/11/2023 23:45	45	71.2	42.3	36
20/11/2023 00:00	38	46.2	39.5	36.4
20/11/2023 00:15	37.6	45	38.9	36.2
20/11/2023 00:30	38.1	49.6	39.3	34.4
20/11/2023 00:45	32.2	47.3	31.8	28.7
20/11/2023 01:00	30.9	38.3	31.8	29.9
20/11/2023 01:15	32.2	45.8	33.2	29.9
20/11/2023 01:30	37.7	47.5	40.1	31.7
20/11/2023 01:45	36.5	52.7	38.3	31.1
20/11/2023 02:00	38	52	39.8	33.9
20/11/2023 02:15	31.1	37.3	33.4	29.4
20/11/2023 02:30	30.1	38.9	30.8	29.4
20/11/2023 02:45	30.6	44.2	31.4	29.6
20/11/2023 03:00	30.7	49.1	31.7	29.6
20/11/2023 03:15	30.6	41.2	31.5	29.5
20/11/2023 03:30	30.6	37	31.4	29.7
20/11/2023 03:45	35.7	49.9	38.4	30.4
20/11/2023 04:00	31.3	41.4	32.8	29.7
20/11/2023 04:15	33.5	46.2	35.2	30.8
20/11/2023 04:30	51.4	78.6	41	32
20/11/2023 04:45	52.3	77.2	48.1	31.1
20/11/2023 05:00	50.6	77.5	40	30.9
20/11/2023 05:15	36.6	49.7	38.6	33.4
20/11/2023 05:30	51	77.1	47.5	33.9
20/11/2023 05:45	55.9	77.2	56.8	40.7
20/11/2023 06:00	56.4	76.4	56.6	52.8

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
20/11/2023 06:15	57	75.2	58.2	53.4
20/11/2023 06:30	57.9	77.6	57.2	53.5
20/11/2023 06:45	59.2	79.6	57.7	51.7
20/11/2023 07:00	60.5	80.2	60.7	53.6
20/11/2023 07:15	58.1	78.2	57.2	53.3
20/11/2023 07:30	59.2	76.5	59.1	52.9
20/11/2023 07:45	59.1	77.1	60.2	48.2
20/11/2023 08:00	58.9	78.5	59.6	46.8
20/11/2023 08:15	61.7	78.6	65.1	48.4
20/11/2023 08:30	60.3	82.7	60.8	45.4
20/11/2023 08:45	64.9	94.3	65.3	47.2
20/11/2023 09:00	60.4	78.4	62	44.3
20/11/2023 09:15	56.3	78.5	55.3	42.2
20/11/2023 09:30	56.7	76.9	55.4	43.7
20/11/2023 09:45	58.2	77.5	56.4	43
20/11/2023 10:00	60.9	83.3	63.2	43.4
20/11/2023 10:15	55.9	76.4	56.3	43.6
20/11/2023 10:30	56.8	81.2	55.4	43.2
20/11/2023 10:45	57.7	76.8	58.4	43.1
20/11/2023 11:00	59.8	77.9	60.9	43
20/11/2023 11:15	57.1	75	59.7	43.5
20/11/2023 11:30	58.4	77.6	58.5	43.5
20/11/2023 11:45	57.5	77.4	58.6	42.6
20/11/2023 12:00	58.4	78.6	58.7	43.8
20/11/2023 12:15	58	78.4	58.2	40.7
20/11/2023 12:30	58.9	78.8	61.5	43.4
20/11/2023 12:45	60	78.8	63	43.5
20/11/2023 13:00	57.4	75.8	59.5	43.2
20/11/2023 13:15	57.2	77.2	57.7	42.3
20/11/2023 13:30	60.7	79.5	62.5	43.4
20/11/2023 13:45	61	78.9	63.4	45.8

Table D-3 Measured Sound Levels at Location 3, free-field, dB

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
16/11/2023 13:00	53.7	68.7	57	48.3
16/11/2023 13:15	53.4	68.6	56.2	48.4
16/11/2023 13:30	54.3	68.5	57.2	50.1
16/11/2023 13:45	54.7	70.6	57.4	50.4
16/11/2023 14:00	54.3	68	57.5	48.7
16/11/2023 14:15	53.6	68.1	57	48.1

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
16/11/2023 14:30	53.4	66.1	57	47
16/11/2023 14:45	52.2	64.9	55.5	46.6
16/11/2023 15:00	54.1	65.8	57.7	47.8
16/11/2023 15:15	55	71.9	58.2	49.3
16/11/2023 15:30	54.7	68	57.5	50.4
16/11/2023 15:45	54.6	69	57.5	50.8
16/11/2023 16:00	56.3	70.5	59.7	51.1
16/11/2023 16:15	55.9	69	59	50.9
16/11/2023 16:30	55.8	67.7	59.3	50
16/11/2023 16:45	55.4	69.7	58.8	50.2
16/11/2023 17:00	61	87.3	62.8	51.7
16/11/2023 17:15	57.1	72.2	59.8	51.4
16/11/2023 17:30	56.7	71.6	59.4	51.1
16/11/2023 17:45	56.4	71.9	58.2	50.3
16/11/2023 18:00	54.9	71.6	56.9	48.7
16/11/2023 18:15	53.7	72.2	54.6	48.3
16/11/2023 18:30	54.5	72.9	56.3	49.7
16/11/2023 18:45	55.1	70.6	57.3	48
16/11/2023 19:00	53.2	73.5	54	47.7
16/11/2023 19:15	53.7	70.8	54	48.5
16/11/2023 19:30	51.9	67.9	53	48.4
16/11/2023 19:45	53.5	71	54.7	49.3
16/11/2023 20:00	51.9	69.1	52.5	49
16/11/2023 20:15	52.4	71.9	51.7	48.3
16/11/2023 20:30	49.8	70.3	49.8	45.7
16/11/2023 20:45	51.3	71.6	51.3	46.5
16/11/2023 21:45	50.4	70.4	50.8	43.6
16/11/2023 22:00	51.8	70.9	51.2	45.9
16/11/2023 22:15	49.6	71.2	49.6	45.6
16/11/2023 22:30	52.2	75.3	50.6	45.5
16/11/2023 22:45	50.6	68.5	51.3	47.4
16/11/2023 23:00	51.3	69.7	51.8	47.6
16/11/2023 23:15	50.5	69.7	51.3	47.7
16/11/2023 23:30	48.9	63	50.7	45.9
16/11/2023 23:45	47.6	53	49.1	45.5
17/11/2023 00:00	47	63.7	48	44.8
17/11/2023 00:15	51.4	73.1	50.3	47.4
17/11/2023 00:30	50.2	68.9	50.5	48
17/11/2023 00:45	50.2	53.8	51.7	47.7
17/11/2023 01:00	51.2	56	52.4	49.5
17/11/2023 01:15	52.3	56.5	53.8	50.4

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
17/11/2023 01:30	50.8	65.1	52.3	48.4
17/11/2023 01:45	52.3	72.2	52.3	48.5
17/11/2023 02:00	50.7	65.1	51.7	48.8
17/11/2023 02:15	51.3	63.5	52.5	49.2
17/11/2023 02:30	54	74.6	54	49.6
17/11/2023 02:45	53.6	69.3	54.3	51
17/11/2023 03:00	54.1	71.7	55.2	51.1
17/11/2023 03:15	53.3	57.6	54.7	51.4
17/11/2023 03:30	54	65.9	55.3	52
17/11/2023 03:45	53.9	67.6	55.1	51.8
17/11/2023 04:00	53.9	74.7	53.8	50.6
17/11/2023 04:15	51.2	68.5	52.4	48.7
17/11/2023 04:30	51.6	72.7	50.6	47.6
17/11/2023 04:45	53.3	70.3	54.8	48.4
17/11/2023 05:00	55.5	69.4	56.3	53.3
17/11/2023 05:15	55.7	70.2	57.9	48.9
17/11/2023 05:30	56.5	72.6	59.6	48.4
17/11/2023 05:45	56.2	73.4	58.6	49.7
17/11/2023 06:00	55.5	72	57.5	49.6
17/11/2023 06:15	56.5	71.5	59	49
17/11/2023 06:30	57.6	73.4	60.7	50.8
17/11/2023 06:45	57.8	71.6	61.2	50.6
17/11/2023 07:00	57	73.2	59.7	49.5
17/11/2023 07:15	57.2	72.4	60.8	50
17/11/2023 07:30	58.8	73.2	62.5	51.7
17/11/2023 07:45	59.1	71.7	63.1	51.8
17/11/2023 08:00	57.2	70.9	60.5	50.5
17/11/2023 08:15	58.5	75.6	62.1	51.7
17/11/2023 08:30	57.5	73.3	60.6	50
17/11/2023 08:45	57.2	72.6	61	49.9
17/11/2023 09:00	55.5	72.2	58.1	48.1
17/11/2023 09:15	54.9	76.4	56.7	47.9
17/11/2023 09:30	56.3	74.5	59.2	46.8
17/11/2023 09:45	57.2	74.1	60.8	48.7
17/11/2023 10:00	57.2	70.6	61	48.6
17/11/2023 10:15	56.4	70	60.6	48.1
17/11/2023 10:30	55.1	72.3	57.8	47.4
17/11/2023 10:45	56	74.5	59.4	47.4
17/11/2023 11:00	56.7	74.8	59.8	46.8
17/11/2023 11:15	56.7	71.6	60.5	47.3
17/11/2023 11:30	56.6	72.3	60.1	48.6



Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
17/11/2023 11:45	56.5	71.3	59.9	47.7
17/11/2023 12:00	55.8	71	59.6	46.4
17/11/2023 12:15	56	72.1	59.8	46.8
17/11/2023 12:30	56.1	71.9	59.5	47.4
17/11/2023 12:45	57.5	76.1	61.4	49.2
17/11/2023 13:00	57.4	71.2	61.4	48.5
17/11/2023 13:15	57.1	70.5	61.1	49.1
17/11/2023 13:30	57.2	73.9	60.6	50
17/11/2023 13:45	56.9	70.4	60.5	50
17/11/2023 14:00	57.2	71.7	61	50.4
17/11/2023 14:15	56.3	73.7	59.6	50.1
17/11/2023 14:30	56.8	73.4	60.3	50.1
17/11/2023 14:45	57	74	60	50.8
17/11/2023 15:00	55.9	73.3	59.4	47.5
17/11/2023 15:15	54.6	70.4	58.6	46.8
17/11/2023 15:30	55.6	68.5	59.3	48.2
17/11/2023 15:45	55.9	75.6	58.7	48.9
17/11/2023 16:00	57.6	71.9	61.4	50.4
17/11/2023 16:15	58	82.9	60.1	48.2
17/11/2023 16:30	56.1	74.7	58.6	49
17/11/2023 16:45	56	74.5	59	48.5
17/11/2023 17:00	59	83.3	62.3	49.9
17/11/2023 17:15	55.5	72.9	57.6	47.6
17/11/2023 17:30	56.4	75.1	59.3	48.4
17/11/2023 17:45	54.4	71.6	56	48.1
17/11/2023 18:00	53.4	73.5	53.6	47.2
17/11/2023 18:15	52.6	68.4	53.3	46.4
17/11/2023 18:30	54.8	79.1	54.8	46.1
17/11/2023 18:45	54.5	71.7	57.1	46.9
17/11/2023 19:00	53.5	73.2	54.2	47.8
17/11/2023 19:15	49.4	69	50.1	44.4
17/11/2023 19:30	49.1	69.4	48.2	43.1
17/11/2023 19:45	51.2	73.4	50.8	44.3
17/11/2023 20:00	46.7	62.9	48.5	43
17/11/2023 20:15	50.5	70.9	51.4	44.3
17/11/2023 20:30	48.8	69.4	48.5	43.4
17/11/2023 20:45	49.3	71.6	49.3	43.6
17/11/2023 21:00	47.7	67.1	48.4	43.7
17/11/2023 21:15	48.7	68.1	49.1	42.3
17/11/2023 21:30	50.8	72.3	50	43.8
17/11/2023 21:45	47.8	69.6	46.2	41.9

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
17/11/2023 22:00	49.3	69.2	48.7	42.1
17/11/2023 22:15	48.1	70.7	45.4	42
17/11/2023 22:30	48.1	72.6	45.4	41.6
17/11/2023 22:45	45.2	66.4	44	40
17/11/2023 23:00	45.8	68.6	45.1	40.8
17/11/2023 23:15	44.5	63.7	44.7	40.6
18/11/2023 01:00	44.6	66.5	43.1	39.6
18/11/2023 01:15	47.1	69.7	46.2	41
18/11/2023 01:30	52.7	73.7	50.1	41.9
18/11/2023 01:45	48.5	73.8	45.5	40.3
18/11/2023 02:00	49.1	69.6	47.1	40.2
18/11/2023 02:15	44.1	55.2	46.6	41.1
18/11/2023 05:00	47.8	73.1	45.2	40.8
18/11/2023 05:15	48.4	68.4	48	40.5
18/11/2023 05:30	50.7	73	50.1	40.2
18/11/2023 05:45	50.1	67	50.8	40.4
18/11/2023 06:00	43.8	63.5	44.6	40.7
18/11/2023 06:15	52.8	73	54.5	41.8
18/11/2023 07:00	51.1	71.2	50.8	44
18/11/2023 07:15	48.9	67.3	49.2	43.3
18/11/2023 07:30	49.3	73.1	49.2	42.3
18/11/2023 07:45	50.2	71.5	50.1	42.7
18/11/2023 08:00	50.5	69.1	51.8	43.6
18/11/2023 08:15	49.6	68.5	50.2	43.6
18/11/2023 08:30	52.3	71.1	53.8	43.7
18/11/2023 08:45	52.2	72.5	52.9	43.4
18/11/2023 09:00	53.4	73.3	54.7	44.2
18/11/2023 09:15	53.2	72.4	54	44.8
18/11/2023 09:30	52.9	70.8	54.6	44.4
18/11/2023 09:45	54.6	70.6	57	44
18/11/2023 10:00	53.2	70.3	55.6	43.4
18/11/2023 10:15	52.4	70.2	54.6	43.6
18/11/2023 10:30	52.7	73.2	54.8	43
18/11/2023 10:45	51.8	73.4	53.8	43.1
18/11/2023 11:00	52.4	67.7	54.9	44.3
18/11/2023 11:15	54.6	71.3	57.9	44.8
18/11/2023 11:30	54	73.2	56.8	44.3
18/11/2023 11:45	53.8	69.2	56.5	46
18/11/2023 12:00	53.2	72	55.8	44.4
18/11/2023 12:15	54.2	68.6	57	44.8
18/11/2023 12:30	53.6	69.2	56.3	45



Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
18/11/2023 12:45	53.2	71.2	55.4	44.9
18/11/2023 13:00	53.3	68.6	56.3	43.9
18/11/2023 13:15	54.2	71.4	57.2	43.5
18/11/2023 13:30	53.7	71.7	56.1	45
18/11/2023 13:45	55.3	70.2	58.8	46.4
18/11/2023 14:00	53.3	72	55.5	45.2
18/11/2023 14:15	51.9	70.9	54	42.7
18/11/2023 14:30	53.9	71.6	56.6	43.9
18/11/2023 14:45	58	91.6	57.1	44.8
18/11/2023 15:00	53.2	74.3	54.6	44.4
18/11/2023 15:15	54	70	57.1	45.2
18/11/2023 15:30	52.2	67.4	54.6	44.8
18/11/2023 15:45	51.1	68.6	52.2	44.4
18/11/2023 16:00	52.8	68.2	55.3	44.3
18/11/2023 16:15	52.2	72.4	53.5	43.6
18/11/2023 16:30	50	68.1	50.8	43.7
18/11/2023 16:45	51.7	70.8	53.5	45.3
18/11/2023 17:00	51.7	70.8	52.3	46.3
18/11/2023 17:15	51	68.4	51.7	46.1
18/11/2023 17:30	50.6	67.5	51.2	45.6
18/11/2023 17:45	50.4	71.4	50.7	42.9
18/11/2023 18:00	50.9	71.6	51.7	42
18/11/2023 18:15	50.3	71.8	51.6	42.4
18/11/2023 18:30	50.2	71.4	50.2	42.2
18/11/2023 18:45	50	72.6	49.7	42.3
18/11/2023 19:00	49.5	69.8	49.3	44.6
18/11/2023 19:15	50.9	71.9	51.7	47
18/11/2023 19:30	48.8	55.3	50.4	46.6
18/11/2023 19:45	49.3	65.2	51	46.2
18/11/2023 20:00	47.3	54	49	44.8
18/11/2023 20:15	49.2	69.2	50.1	44.8
18/11/2023 20:30	45.4	68.3	45.7	41.6
18/11/2023 20:45	47	68.2	46.5	41.9
18/11/2023 21:00	47.3	64.3	48	43.9
18/11/2023 21:15	47.9	70.6	46.9	42.7
18/11/2023 21:30	46.5	61.1	49	42.5
18/11/2023 21:45	50.3	65.1	52.2	46.6
18/11/2023 22:00	46.8	52.7	48.4	44.8
18/11/2023 22:15	46.9	67.3	47.9	44.2
18/11/2023 22:30	48.4	64.5	50.4	45.2
18/11/2023 22:45	47.4	54.5	49.3	44.7

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
18/11/2023 23:00	47.7	53.5	49.6	45.1
18/11/2023 23:15	49	56.5	50.7	46.6
18/11/2023 23:30	49.2	60.8	51.1	46.4
18/11/2023 23:45	45.5	53.1	48.2	42.5
19/11/2023 00:00	44.1	53.7	45.5	41.9
19/11/2023 00:15	47	63.9	48.2	44.2
19/11/2023 00:30	47.8	55.3	49.7	45.4
19/11/2023 00:45	49.2	56.9	51.4	45
19/11/2023 01:00	46.8	53.4	49	43.8
19/11/2023 01:15	49	56	51	46.1
19/11/2023 01:30	48.8	56.5	50.7	45.9
19/11/2023 01:45	49	58.4	50.7	46.7
19/11/2023 02:00	48.8	62.8	50.5	45.8
19/11/2023 02:15	49.2	60.6	51.1	46.4
19/11/2023 02:30	50	58.7	52.2	46.9
19/11/2023 02:45	50.5	58	52.5	47.9
19/11/2023 03:00	50	57	52.3	47.2
19/11/2023 03:15	49.9	66	51.9	47
19/11/2023 03:30	51	66.5	52.6	48.6
19/11/2023 04:00	49.1	56.9	50.7	46.9
19/11/2023 04:15	50.5	59.2	52.7	47.5
19/11/2023 04:30	50.8	59.5	53.4	47.1
19/11/2023 04:45	48.9	56.5	51.2	45.4
19/11/2023 05:00	50.3	66.4	52.4	46.6
19/11/2023 05:15	49.9	67.4	51.4	46.3
19/11/2023 05:30	52.2	70.6	54	47.1
19/11/2023 06:00	49.5	68	49.5	44.9
19/11/2023 06:15	51.5	70.3	53.1	46.2
19/11/2023 06:30	53.9	70.6	56.4	44.7
19/11/2023 06:45	51.5	72.4	52.3	43.4
19/11/2023 07:15	47.9	67.7	48.8	42.9
19/11/2023 07:30	49.9	75.1	47.1	40.1
19/11/2023 07:45	47.7	66.7	48.7	42.6
19/11/2023 08:00	45.8	67.3	45.3	41.5
19/11/2023 08:15	48	69.2	46.9	42
19/11/2023 08:30	50.2	72.1	49.2	42.9
19/11/2023 08:45	51	72.8	50.5	41.1
19/11/2023 09:00	48.9	66.9	49.9	41.5
19/11/2023 09:15	49.5	67.6	51.3	42.1
19/11/2023 09:30	48.7	69.4	48.5	43.6
19/11/2023 09:45	50.9	69.6	52.3	42.9

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
19/11/2023 10:00	50.6	70	50.8	42.3
19/11/2023 10:15	52.7	69.2	54.7	42.7
19/11/2023 10:30	51.8	69.3	53.6	42.6
19/11/2023 10:45	53.1	70.7	55.3	42.2
19/11/2023 11:30	52.7	69.9	55.1	44.4
19/11/2023 11:45	51.7	68.9	53.6	44.3
19/11/2023 12:00	54.4	68.9	57.1	47.6
19/11/2023 12:15	54.2	71.9	56.9	46.8
19/11/2023 12:45	55.3	72	58.1	48.4
19/11/2023 13:00	55.5	72	58.2	49.3
19/11/2023 13:15	56.3	71.4	59.3	49.4
19/11/2023 13:30	55.3	73.2	57.8	48.1
19/11/2023 13:45	54.4	67.9	57.1	47.9
19/11/2023 14:00	54.7	68.2	57.5	47.8
19/11/2023 14:15	55	72.5	57.3	49.4
19/11/2023 14:30	55.3	71.1	57.3	48.6
19/11/2023 14:45	55	70	57.9	47.9
19/11/2023 15:00	55.2	70.1	57.9	49.3
19/11/2023 15:15	55	70.6	57.5	49.2
19/11/2023 15:30	55.5	72.3	57.6	50.3
19/11/2023 15:45	55	69.3	56.5	50.5
19/11/2023 16:00	55.2	70.8	57	51
19/11/2023 16:15	53.9	68.6	55.3	50.3
19/11/2023 16:30	55.2	74.9	56.4	50
19/11/2023 16:45	54.2	70.3	55.5	50
19/11/2023 17:00	53.8	71.7	54.9	49.5
19/11/2023 17:15	54.4	72.7	55.7	50.5
19/11/2023 17:30	53.5	69.2	54.9	49.8
19/11/2023 17:45	54	72.7	55.2	49.4
19/11/2023 18:00	52.5	68.1	53.8	49.2
19/11/2023 18:15	53.6	69.4	55.4	49.1
19/11/2023 18:30	53.2	70.1	54.1	49.3
19/11/2023 18:45	55.2	69.9	57.2	49.6
19/11/2023 19:00	51.7	63	53.3	48.8
19/11/2023 19:15	51.3	68.1	52.8	47.4
19/11/2023 19:30	53.2	70.2	53.9	49.3
19/11/2023 19:45	51.8	69.2	53.4	48.5
19/11/2023 20:00	53.2	73.1	53.6	48
19/11/2023 20:15	52.5	69.1	54.4	48.3
19/11/2023 20:30	53.2	69.7	55.1	49.4
19/11/2023 20:45	52.7	68.2	54.6	48.7

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
19/11/2023 21:00	53.5	72.5	55	49.2
19/11/2023 21:15	52.3	69.9	54	48
19/11/2023 21:30	52.1	67.2	54.3	48.5
19/11/2023 21:45	51.4	72.1	53.3	47.6
19/11/2023 22:00	52.3	71.8	53.8	47.2
19/11/2023 22:15	52.3	71.9	54.1	48.3
19/11/2023 22:30	50.1	56.9	52.2	47
19/11/2023 22:45	50.8	70.3	52.1	47.4
19/11/2023 23:00	52.2	71.6	53.4	48
19/11/2023 23:15	48.3	66	49	45.1
19/11/2023 23:30	48.5	69.4	48.4	45.2
19/11/2023 23:45	50.1	69	49.8	43.8
20/11/2023 00:00	46.8	55	48.2	45.1
20/11/2023 00:15	46.8	51	48.1	45
20/11/2023 00:30	48	68.9	48	44.9
20/11/2023 00:45	42.3	51.5	45	39.2
20/11/2023 01:00	42.9	67.9	40.5	37.7
20/11/2023 01:15	47.5	73.6	42.2	39.8
20/11/2023 01:30	44.6	66	42.2	37.7
20/11/2023 01:45	46.8	68.4	45.4	38
20/11/2023 02:00	44.7	70.8	41.7	38.6
20/11/2023 02:15	46.9	71.7	43.2	38.9
20/11/2023 02:30	44.9	68.5	42.4	38.8
20/11/2023 02:45	40.7	46.7	42.1	38.6
20/11/2023 03:00	44.8	69	42.2	39
20/11/2023 03:15	43	65.1	42.6	40.5
20/11/2023 03:30	45.8	67.5	43.1	39.3
20/11/2023 03:45	51	75.7	48.9	41.1
20/11/2023 04:00	44.2	51	45.1	42.7
20/11/2023 04:15	51.5	73.5	47.9	43.2
20/11/2023 04:30	49	71.3	48.7	43.7
20/11/2023 04:45	49.5	69.7	50.1	44.8
20/11/2023 05:00	48.5	68.1	48.2	44.6
20/11/2023 05:15	50.7	70.7	51.4	44.2
20/11/2023 05:30	53.4	69.6	55.7	45.5
20/11/2023 05:45	55.8	70.6	58.5	48.5
20/11/2023 06:00	54.1	71.1	55.3	49
20/11/2023 06:15	55.6	69.5	57.6	50.9
20/11/2023 06:30	57.3	71.3	60	52.2
20/11/2023 06:45	58.9	73.2	62.5	52.9
20/11/2023 07:00	56.2	78.7	58.3	50.4

Date and Time	$L_{Aeq,1min}$	L_{Amax}	L_{A10}	L_{A90}
20/11/2023 07:15	57.5	71	60.3	51.6
20/11/2023 07:30	59.6	72.8	62.9	54.7
20/11/2023 07:45	59.4	70.5	62.1	55.8
20/11/2023 08:00	58.7	74.8	61.6	53.6
20/11/2023 08:15	57.9	73.4	61.4	52
20/11/2023 08:30	56.8	71.2	60	51.3
20/11/2023 08:45	57	70.8	60.9	50.6
20/11/2023 09:00	56.3	72.3	58.8	50.4
20/11/2023 09:15	54.7	70.8	57.5	49.3
20/11/2023 09:30	54.8	71.2	57.2	49.6
20/11/2023 09:45	56	73.6	58.6	49.7
20/11/2023 10:00	55.6	72	58	48.8
20/11/2023 10:15	56.3	73.2	59.2	49.5
20/11/2023 10:30	55.5	70.7	58.7	48.8
20/11/2023 10:45	53.9	70.2	55.7	48
20/11/2023 11:00	55.1	70.2	58.2	49.2
20/11/2023 11:15	55.2	68.9	57.4	50.6
20/11/2023 11:30	56	68.5	58.5	51.1
20/11/2023 11:45	55.5	68.7	57.7	50.8
20/11/2023 12:00	55.4	69.3	58	50.5
20/11/2023 12:15	53.7	64.1	56.6	49.4
20/11/2023 12:30	55.7	69.8	57.7	52.3
20/11/2023 12:45	55.4	67.6	58.1	51.3
20/11/2023 13:00	55.6	68.3	58.6	50.7
20/11/2023 13:15	55.7	69.8	58.2	51.3

Appendix E Statistical Histogram Analysis

Noise Impact Assessment

Wrexham Breakfast Cereals

Kellogg Company of Great Britain Limited

SLR Project No.: 416.065647.00001

4 November 2024

Figure E-1 Location 1 Histogram, daytime and night-time, L90

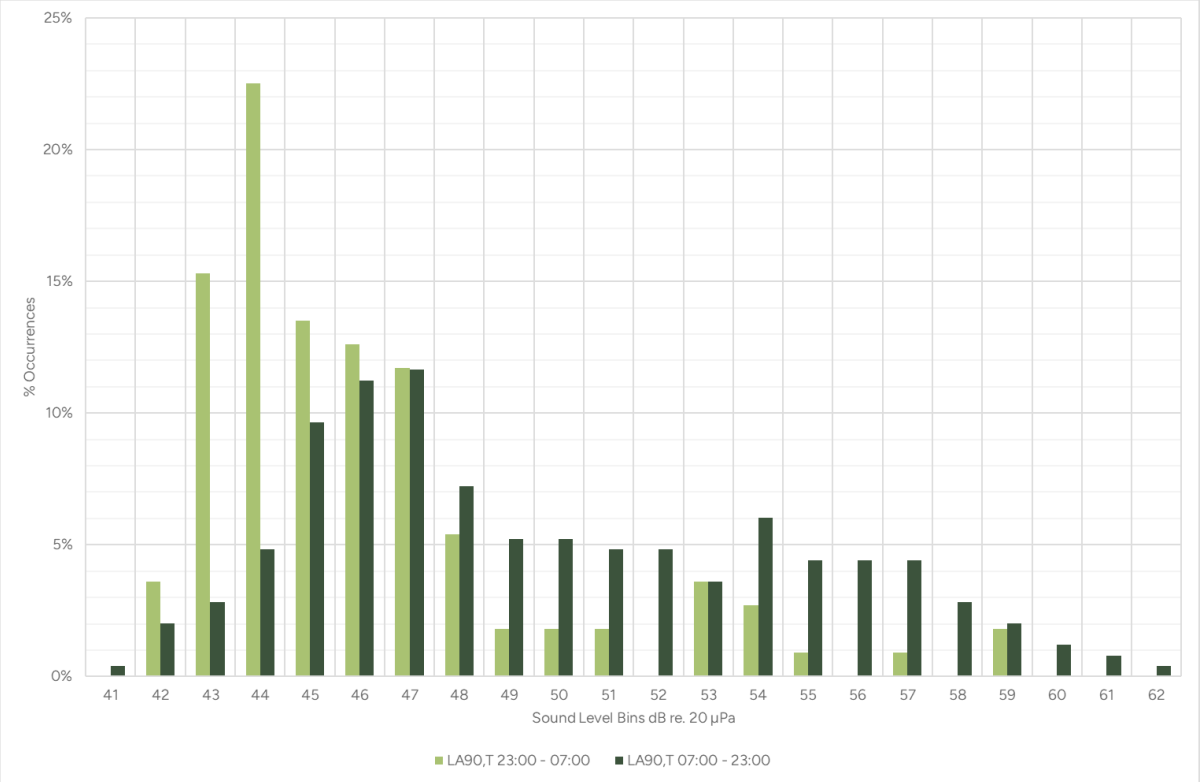


Figure E-2 Location 2 Histogram, daytime and night-time, L90

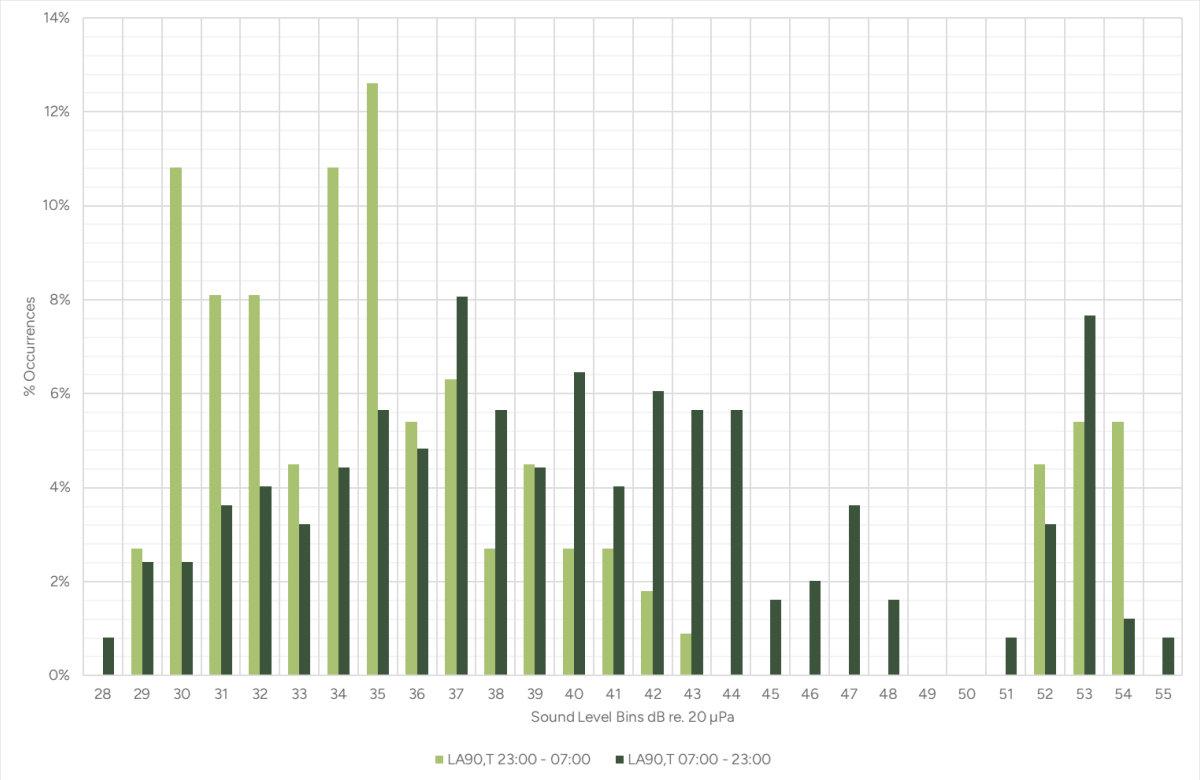
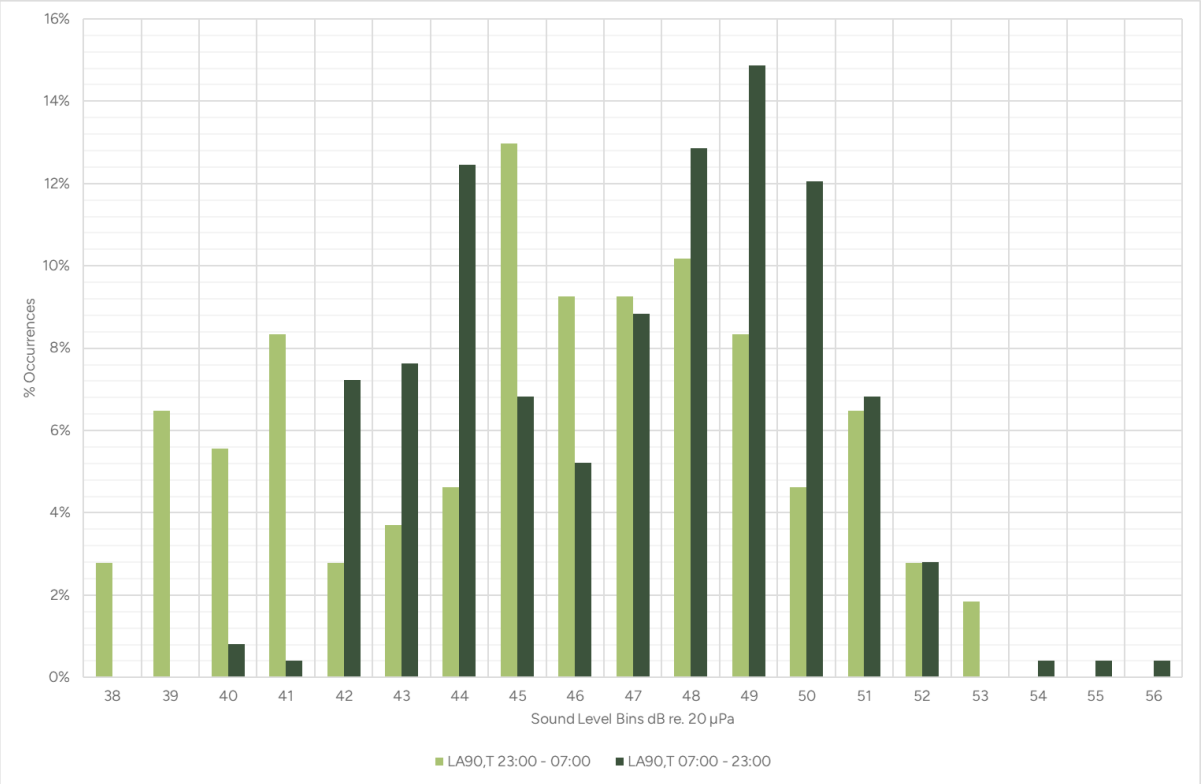


Figure E-3 Location 3 Histogram, daytime and night-time, L90



Appendix F INVC Model Input

Noise Impact Assessment

Wrexham Breakfast Cereals

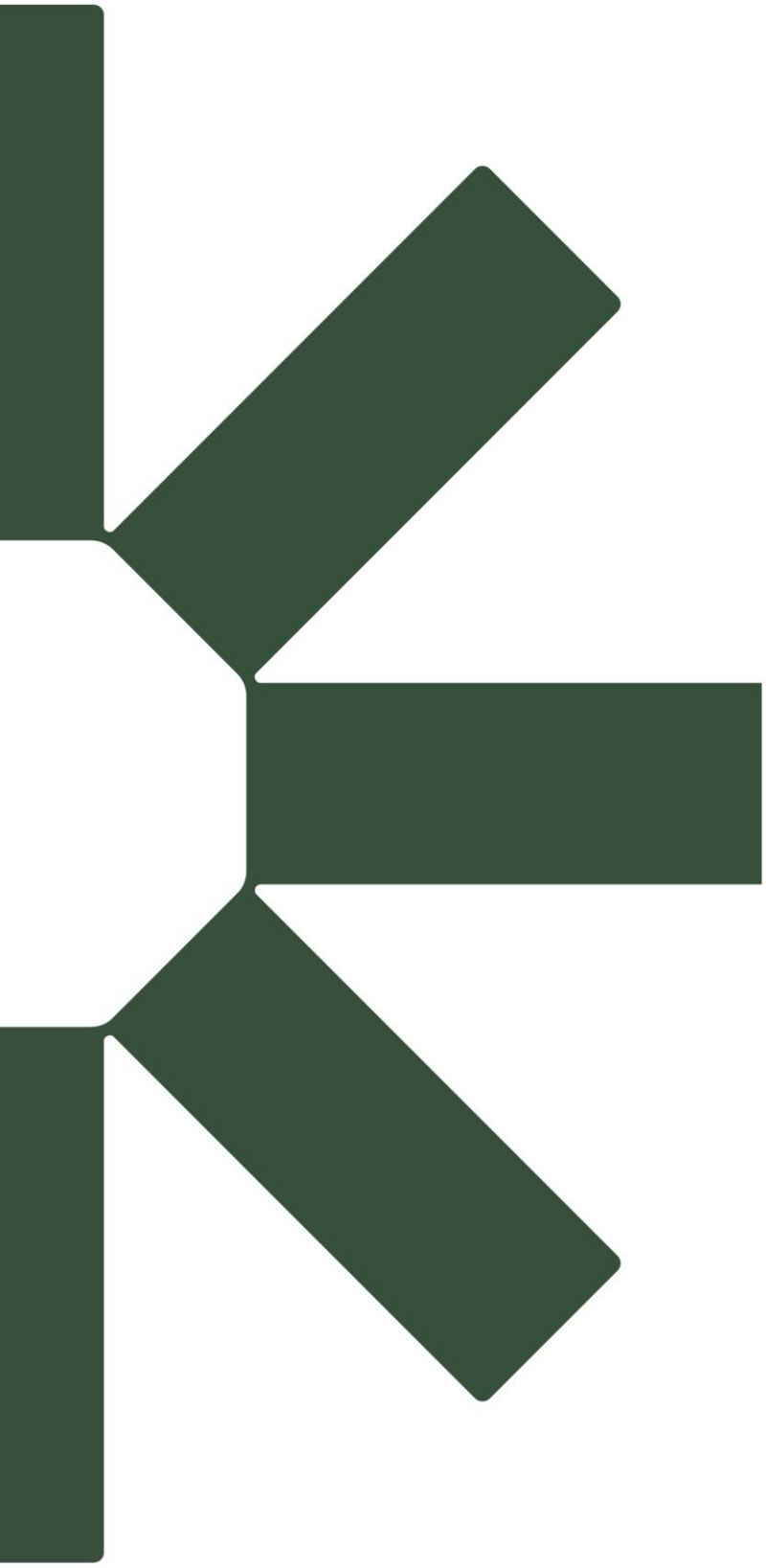
Kellogg Company of Great Britain Limited

SLR Project No.: 416.065647.00001

4 November 2024

Name	Sound Power Level (dBA)	Height (m)	Coordinates	
			x	y
LEV83	95.8	1.0	338870.8	350497.1
LEV23_Jetzone feed tank blower	104.0	1.0	338841.6	350517.8
Blower feed system	85.6	1.0	338860.3	350520.3
LEV20 All bran dust collection fan	98.3	1.5	338868.1	350520.4
Rotocyclone_121	86.1	2.5	338870.2	350528.2
No1_2_3 dryer bleed fans	106.1	1.5	338856.4	350551.2
Rotoclone_122	97.6	1.5	338869.5	350573.6
LEV111 Dry filter extract fan_120	97.1	1.5	338868.6	350595.1
AB shredder fan	88.5	1.0	338857.7	350587.3
Rotary valves_33 to 38	98.0	1.0	338829	350594.8
Seven sisters_124	83.1	1.0	338832.8	350578.1
AB hot air lift and BF apron feeder	85.7	1.0	338867.9	350607.8
Roof extract vent 1	91.5	0.7	338875.3	350567.2
Roof extract vent 2	91.0	0.7	338875.9	350542.4
Roof extract vent 3	90.3	0.7	338879.6	350515.4
PV102 Flavour mixing exhasut fan	94.5	1.5	338827.9	350643.7
High yield wort extract vent	97.8	1.5	338833.2	350644.2
S10 to 13	109.3	1.0	338839.8	350645.5
PV67_S17	91.8	1.0	338852.7	350646.7
All bran suction fan_S20	95.5	1.0	338859.1	350645.8
RDX pleunum fan	95.7	1.5	338865.2	350640.8
Cooker roof extract 1	94.4	0.7	338864.2	350642.7
Cooker roof extract 2	95.0	0.7	338867.9	350642.8
Cooker roof extract 3	90.5	0.7	338872.2	350642.9
Cooker roof extract 4	95.1	0.7	338864.6	350633.6
Cooker roof extract 5	91.2	0.7	338868.2	350633.5
Cooker roof extract 6	85.1	0.7	338872.3	350633.5
Cooker roof extract 7	96.0	0.7	338865.5	350629.9
Cooker roof extract 8	96.8	0.7	338868.2	350629.8
Cooker roof air coolers 2	97.8	1.5	338868	350617.3
Cooker roof air coolers1	97.8	1.5	338863.7	350617.2
Branflakes jetzone extract	100.4	2.0	338869	350542.8
Branflakes jetzone bleed	99.1	2.0	338869.6	350538.3
Branflakes jetzone extract outlet	86.1	10.0	338868.9	350544.5
Branflakes jetzone bleed outlet	92.4	10.0	338869.4	350537.4
Tank Floor Bran Feed Blower	103.3	1.0	338834.9	350513.3
Nutrigrain oven extract	82.7	1.5	338866.4	350433.2
Nutrigrain oven zone5	82.5	1.5	338866.8	350425.2
nutri grain oven zone 4	85.5	1.5	338867	350418.4
nutri grain oven zone 3	81.6	1.5	338867	350411.2
nutri grain oven zone1	76.4	1.5	338866.9	350395.6

Name	Sound Power Level (dBA)	Height (m)	Coordinates	
			x	y
nutri grain oven zone2	75.1	1.5	338867.1	350404
elevenses rear vent	88.7	1.0	338819.4	350392.9
elevenses centre vent	81.8	1.5	338841.9	350435.7
4th Process dust collection	87.5	1.5	338799.4	350522.4
4th jetzone bleed1	86.8	1.5	338799.4	350527.3
4th jetzone bleed2	83.9	1.5	338799.4	350536.3
4th process glass vent	96.0	1.5	338804.3	350529.5
4th process vent in wall	84.3	1.5	338771.5	350511.9
4th Process Dryer area dust collection	100.2	1.5	338804.3	350563
4th Process Process wet scrubber	87.4	1.5	338809	350579.4
4th Process Lennox	89.8	2.5	338783.8	350597.8
4th Process Aqua cooler	92.9	1.5	338773.2	350572.1
4th Process Bran suction exhauster	104.8	1.5	338805	350627.7
4th Process FM dust extract	82.0	1.5	338798.8	350562.5
4th Process L9+L10 wet scrubber	97.9	4.5	338772	350494.1
4th Process plant room vent	103.9	3.0	338781.2	350495.6
4th Process plant louvre 1	98.0	2.5	338780.7	350469.1
4th Process plant louvre 2	72.9	2.5	338780.7	350460.1
Rotoclone 122 outlet	100.8	5.0	338866.9	350573.7
Rotoclone 120 outlet	103.2	5.0	338866.3	350595.1
S8	108.2	2.5	338827.7	350638.7
Small fan	96.2	1.2	338817.4	350622.7
S123 Bran Rotoclone	96.3	2.5	338861.2	350609
Potable foods building vents	92.4	15.0	338758.5	350626.5



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