

The Co-operative
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**Plant Noise
Impact Assessment Report**

On behalf of



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1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned by CDS to provide a noise impact assessment for replacement plant serving an existing Co-operative store located along The High Street in Shoreham-by-Sea.
- 1.2. An environmental sound survey has been undertaken to establish the prevailing background sound pressure levels at a location representative of the sound levels outside the nearest noise sensitive receptors to the site.
- 1.3. Plant noise levels have been predicted at the nearest noise-sensitive premises and assessed against the local authority's usual requirements.
- 1.4. To assist with the understanding of this report a glossary of acoustic terms can be found in [Appendix A](#). An in-depth glossary of acoustic terms can be viewed online at www.acoustic-glossary.co.uk.

2.0 Details of development proposals

- 2.1. The Co-operative store occupies a dedicated building fronting onto The High Street in Shoreham-by-Sea.
- 2.2. New refrigeration and air conditioning (AC) plant will be installed externally on the roof of the store. The AC will operate only when the store is open, the refrigeration plant will operate 24 hours but generally at a reduced duty at night when cooling demands are lower.
- 2.3. A site plan showing the site and surrounding area and the noise monitoring location used in this assessment is presented in [Appendix B](#).

3.0 Nearest noise-sensitive receptors

- 3.1. The area surrounding the site is mixed residential and commercial in nature.
- 3.2. The nearest noise sensitive receptor is the residential flat above No 5 Church Street (Reference R1) at a distance of approximately 5 metres from the nearest proposed plant. The house opposite at No 10 Church Street (Reference R2) has direct line of site exposure to the proposed plant from the upper floor window.

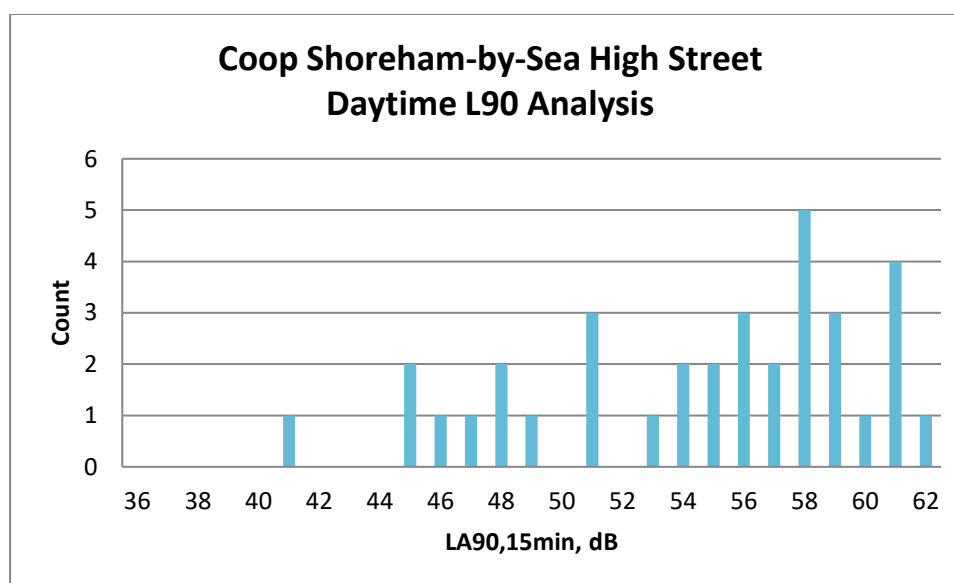
4.0 Existing noise climate

- 4.1. An environmental noise survey was undertaken to establish the typical background sound levels at a location representative of the noise climate outside the façades of the nearest noise sensitive receptors to the proposed plant area during the quietest times at which the plant will operate.
- 4.2. The results of the environmental sound survey are summarised in Table 1 below. The full set of measurement results and details of the survey methodology are presented in [Appendix C](#).

Table 1 Summary of survey results

Measurement period	Range of recorded sound pressure levels (dB)			
	L _{Aeq} (15mins)	L _{Amax} (15mins)	L _{A10} (15mins)	L _{A90} (15mins)
Daytime (07.00 – 23.00 hours)	64-71	77-96	68-74	41-62
Night-time (23.00 – 07.00 hours)	51-70	73-86	48-74	36-56

Figure 1 Histogram of daytime L_{A90} background sound pressure levels



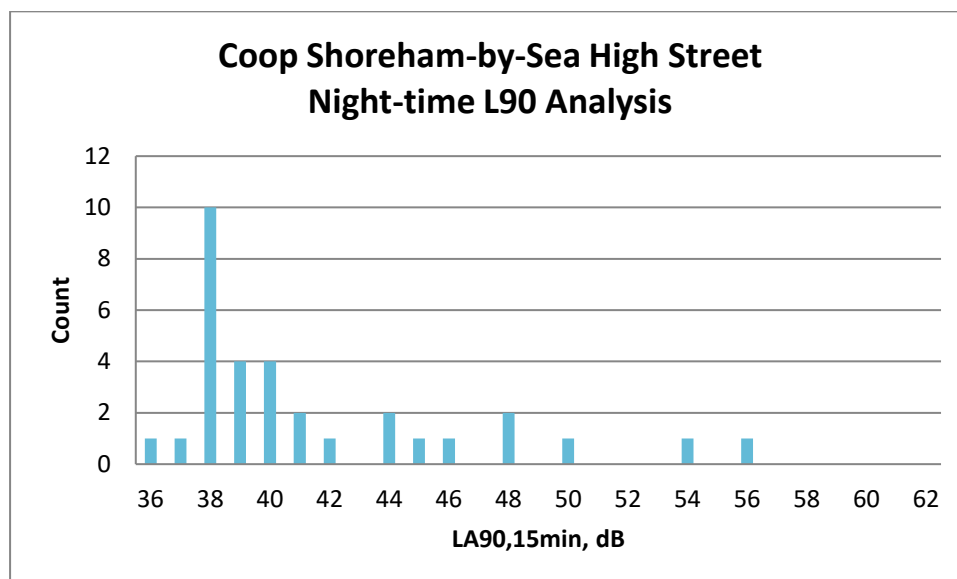
- 4.3. Further statistical analysis has been carried out on the data; the mean, modal and median values are shown in Table 2 below.

Table 2 Statistical analysis of L_{A90,15min} levels during the daytime period

dB, L _{A90} daytime period	
mean	54
modal	58
median	56

- 4.4. From the histogram analysis, 45dB has been selected to be a robust representation of the background noise level during the daytime period.

Figure 2 Histogram of night-time L_{A90} background sound pressure levels



- 4.5. Further statistical analysis has been carried out on the data; the mean, modal and median values are shown in Table 3 below.

Table 3 Statistical analysis of $L_{A90,15min}$ levels during the night-time period

dB, L_{A90} night-time period	
mean	41
modal	38
median	40

- 4.6. Again, from the histogram analysis, 38dB has been selected to be a robust representation of the background sound level during the night-time period.
- 4.7. Therefore, the following values are considered to be the representative existing background sound pressure levels at nearby noise sensitive premises:
- 45dB L_{A90} during the daytime period; and
 - 38dB L_{A90} during the night-time period.

5.0 Plant noise design criteria

National Planning Policy Framework

- 5.1. A new edition of the NPPF was published in December 2024 updated February 2025 and came into effect immediately. The original National Planning Policy Framework (NPPF¹) was published in March 2012, with subsequent revisions made periodically - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The December 2024 revised edition contains no new directions or guidance with respect to noise. The paragraph references quoted below relate to the December 2024 edition.
- 5.2. Paragraph 187 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst others) *"preventing new and existing development from contributing to being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability."*
- 5.3. The NPPF goes on to state in Paragraph 198:
- "planning policies and decisions should ...*
- a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development, - and avoid noise giving rise to significant adverse impacts on health and quality of life;*
 - b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason ...*
- 5.4. The NPPF document does not refer to any other documents or British Standards regarding noise other than the Noise Policy Statement for England (NPSE²).
- 5.5. Paragraph 2 of the NPPF states that *"planning law requires that applications for planning permission be determined in accordance with the development plan unless material considerations indicate otherwise."*
- 5.6. Paragraph 12 of the NPPF states that *"The presumption in favour of sustainable development does not change the statutory status of the development plan as the starting point for decision making. Where a planning application conflicts with an up-to-date development plan (including any neighbourhood plans that form part of the development plan), permission should not usually be granted. Local planning authorities may take decisions that depart from an up-to-date development plan, but only if material considerations in a particular case indicate that the plan should not be followed"*.

¹ National Planning Policy Framework, DCLG, March 2012

² Noise Policy Statement for England, DEFRA, March 2010

- 5.7. Paragraph 124 states that *"Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out a clear strategy for accommodating objectively assessed needs, in a way that makes as much use as possible of previously-developed or 'brownfield' land"*.

Adur District Council

- 5.8. Policy 34 *Pollution and Contamination* in the Adur Local Plan 2017 (adopted December 2017) states that "where appropriate ... noise assessments will be required in conjunction with development proposals". Reference is also made to the Planning Noise Advice Document: Sussex, July 2015.
- 5.9. The *Planning Noise Advice Document for Sussex* contains the following paragraph in relation to Industrial and Commercial Noise Sources.

The starting point for designing any industrial/ commercial development should be to minimise noise "as far as reasonably practicable". The rating level of the plant/process, when measured in accordance with BS4142:2014, should, where practicable, be no greater than the existing background levels when measured in accordance with BS4142:2014. There may be instances, for specific sites, where a rating level below background is deemed appropriate. This can be determined through prior discussion with the Local Planning Authority or Local Environmental Health Department. For example, a rating level of 10 dBA below background may be required in certain instances if there are specific concerns such as the potential for noise creep. It is considered that meeting these criteria would avoid adverse noise impacts, in the interests of ensuring a good standard of amenity and protecting human health. Where these criteria are not attainable, the noise report should explain why, and how best practicable means will be implemented to control noise in order to satisfy the LPA that the development is acceptable.

- 5.10. Since the proposed plant is replacing similar existing plant it is considered that there is a negligible risk of noise creep and therefore meeting the normal criteria will be acceptable.

BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

- 5.11. BS 4142:2014+A1:2019 is intended to be used to assess the likely effects of sound on people residing in nearby dwellings. The scope of BS 4142:2014+A1:2019 includes *"sound from fixed plant installations which comprise mechanical and electrical plant and equipment"*.

- 5.12. The procedure contained in BS 4142:2014+A1:2019 is to quantify the “*specific sound level*”, which is the measured or predicted level of sound from the source in question over a one hour period for the daytime and a 15 minute period for the night-time. Daytime is defined in the standard as 07:00 to 23:00 hours, and night-time as 23:00 to 07:00 hours.
- 5.13. The specific sound level is converted to a rating level by adding penalties on a sliding scale to account for either potentially tonal or impulsive elements. The standard sets out objective methods for determining the presence of tones or impulsive elements, but notes that it is acceptable to subjectively determine these effects.
- 5.14. The penalty for tonal elements is between 0dB and 6dB, and the standard notes: “*Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.*”
- 5.15. The penalty for impulsive elements is between 0dB and 9dB, and the standard notes: “*Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.*”
- 5.16. The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:
- *Typically, the greater this difference, the greater the magnitude of the impact.*
 - *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
 - *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;*
 - *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*
- 5.17. The standard does state 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.*”
- 5.18. The standard goes on to note that: “*Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.*”

- 5.19. In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014 edition places emphasis upon an appreciation of the context, as follows:

"An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context."

- 5.20. BS 4142:2014+A1:2019 requires uncertainties in the assessment to be considered, and where the uncertainty is likely to affect the outcome of the assessment, steps should be taken to reduce the uncertainty.

Summary of criteria

- 5.21. Based on the typical requirements from Adur District Council, it is considered appropriate for the plant noise level to be at level that is no higher than the representative L_{A90} background level at the nearest residential property.
- 5.22. The proposed plant limits are therefore as shown in Table 4:

Table 4 Proposed plant sound level limits at nearest residential receptors

Receptor	Period	Plant rating level (dB)
Residential	Daytime (07.00 – 23.00 hours)	45
	Night-time (23.00 – 07.00 hours)	38

6.0 Plant noise impact assessment

- 6.1. The cumulative plant sound level at the most affected noise sensitive receptors has been predicted. The assessment has taken into consideration distance attenuation and directivity corrections.
- 6.2. It should be noted that the proposed plant will operate during operational hours only and is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. All proposed external plant will be inverter driven and, therefore, will gently ramp up and down depending on the demands on the various systems. To provide a robust assessment, a 3dB acoustic feature correction as described in BS 4142:2014+A1:2019 for the possible presence of *"...characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment..."*.

- 6.3. Table 5 summarises the results of the assessment outside the nearest noise-sensitive dwellings. All other nearby receptors benefit from increased distance/screening to the plant such that resulting noise levels will be lower than at the receptors considered. The full calculations are presented in **Appendix E** :

Table 5 Assessment of plant rating levels

Receptor	Period	Predicted plant rating level at receptor, L_{Aeq} (dB)	Proposed design criterion (dB)	Difference (dB)
R1	Daytime (07.00 – 23.00 hours)	45	45	0
	Night-time (23.00 – 07.00 hours)	27	38	-1
R2	Daytime (07.00 – 23.00 hours)	34	45	-11
	Night-time (23.00 – 07.00 hours)	17	38	-21

Assessment of uncertainties

- 6.4. Where possible uncertainty in this assessment has been minimised by taking the following steps:
- The measurement of the background sound levels was undertaken over a period including the quietest times of the day and night.
 - The sound level meter and calibrator used have a traceable laboratory calibration and the meter was field calibrated before and after the measurements.
 - Uncertainty in the calculated impact has been reduced by the use of a well-established calculation method.
 - Care was taken to ensure that the measurement position was representative of the noise climate outside the nearby residential dwellings and not at a position where higher noise levels are present.

7.0 Summary

- 7.1. Noise Solutions Ltd (NSL) has been commissioned by CDS to provide a noise impact assessment for replacement plant serving an existing Co-operative store located along The High Street in Shoreham-by-Sea.
- 7.2. An environmental noise survey has been undertaken to establish the existing prevailing noise levels at a location representative of the noise climate outside the nearest noise sensitive receptors to the proposed site.

- 7.3. The cumulative rating levels for the proposed plant have been predicted at the most affected noise sensitive receptor locations and assessed taking into consideration the typical requirements of Adur District Council and other recognised standards. Therefore, sound from the plant proposals should not be a reason for refusal of planning permission.

Appendix A Acoustic terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, 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.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A-weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. Generally used to describe background noise level.

Appendix B Photograph of site showing areas of interest



Appendix C Environmental sound survey

Details of environmental sound survey

- C.1 Measurements of the existing environmental sound levels were undertaken between 18.00 hours on Tuesday 4th March and 10.45 hours on Wednesday 5th March 2025.
- C.2 The sound level meter was programmed to record the A-weighted L_{eq} , L_{90} , L_{10} and L_{max} noise indices for consecutive fifteen-minute sample periods for the duration of the survey.

Measurement position

- C.3 The representative measurement position was located on a lamp post along the High Street. This location is approximately representative of the levels of road traffic noise at the closest receptor. The approximate location of the microphone is indicated on the plan in [Appendix B](#).
- C.4 In accordance with BS 7445-2:1991 '*Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use*', the measurements were undertaken under free-field conditions.

Equipment

- C.5 Details of the equipment used during the survey are provided in the table below. The sound level meter was calibrated before and after the survey; no significant change (± 0.2 dB) in the calibration level was noted.

Environmental noise survey

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Svantek 977/ 97446	16/01/2025	1511004-1
Condenser microphone	Microtech MK255 / 20194		
Preamplifier	Microtech MK255 / 20194		
Calibrator	Svantek SV 30A / 10847	04/06/2024	1508883-2

Weather conditions

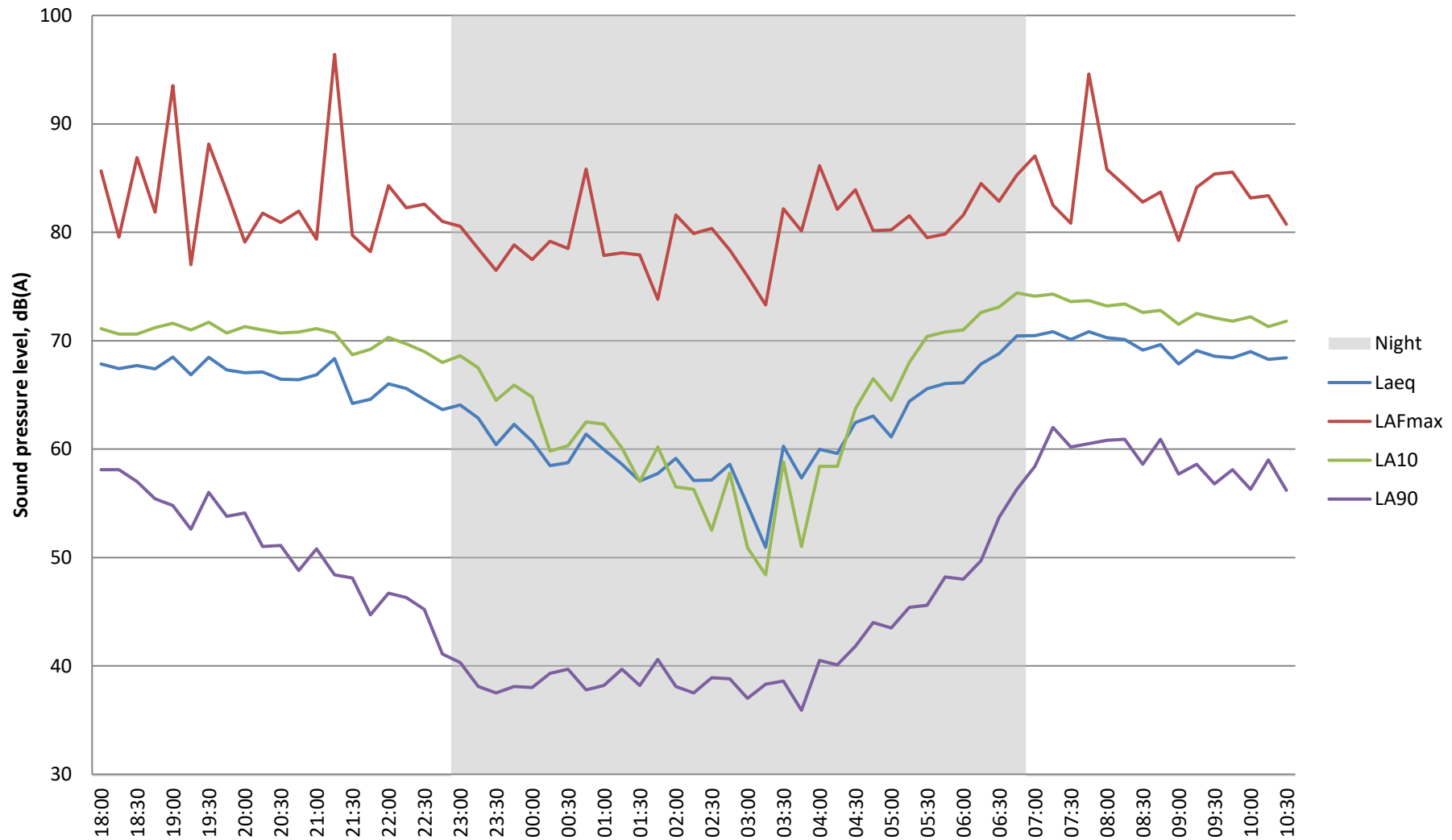
- C.6 Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the beginning and end of the survey.

Weather Conditions				
Measurement Location	Date/Time	Description	Beginning of Survey	End of Survey
As indicated on Appendix B	18.00 4/3/25 - 10.45 5/3/25	Temperature (°C)	8	6
Cloud Cover Symbol Scale in oktas (eighths) 0 Sky completely clear 1 2 3 4 Sky half cloudy 5 6 7 8 Sky completely cloudy (9) Sky obstructed from view		Precipitation:	No	No
		Cloud cover (oktas - see guide)	9	9
		Presence of fog/snow/ice	No	Fog
		Presence of damp roads/wet ground	No	Yes
		Wind Speed (m/s)	2	0
		Wind Direction	Westerly	-
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

Results

- C.7 The results of the environmental survey are considered to be representative of the background sound pressure levels at the façades of the nearest noise sensitive receptors during the quietest times at which the plant will operate. The predominant noise source affecting the area was local traffic. The results of the survey are presented in a time history graph overleaf.

Coop Shoreham-by-Sea High Street Tuesday 04 - Wednesday 05 Mar 2025



Appendix D Manufacturer's Noise Data

Plant	Unit/Model	No. of units	Description	Level (dBA)
Gas cooler	Coolers and Condensers/GFHA1.2-123AMg-EC63.H3-375	1	Sound pressure level at 1m	20
Pack	Space Engineering/ SE-2A-2M-E-LN	1	Sound pressure level at 10m	20
ACU-01	Mitsubishi/PUZ-ZM140YKA2	1	Sound pressure level at 1m	52
ACU-02	Mitsubishi/PUZ-M140VKA2	1	Sound pressure level at 1m	57
ACU-03	Mitsubishi/PUZ-ZM100YDA	1	Sound pressure level at 1m	48

Appendix E Sound level predictions

Receptor R1 – Daytime

Plant	PLANT NOISE LEVEL AT SOURCE		DISTANCE		Directivity	Screening	BS4142 FEATURE	Rating Level at Receptor (dB)
	Noise level (dBA)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	Correction (dB)	
Gas Cooler	20	10	8	2	0	0	3	25
Pack	20	10	9	1	0	0	3	24
AC1	52	1	7	-17	0	0	3	43
AC2	57	1	6	-16	0	0	3	39
AC3	48	1	5	-14	0	0	3	37
Combined rating level at receptor								45

Receptor R1 – Night-time

Plant	PLANT NOISE LEVEL AT SOURCE		DISTANCE		Directivity	Screening	BS4142 FEATURE	Rating Level at Receptor (dB)
	Noise level (dBA)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	Correction (dB)	
Gas Cooler	20	10	8	2	0	0	3	25
Pack	20	10	9	1	0	0	3	24
Combined rating level at receptor								27

Receptor R2 – Daytime

Plant	PLANT NOISE LEVEL AT SOURCE		DISTANCE		Directivity	Screening	BS4142 FEATURE	Rating Level at Receptor (dB)
	Noise level (dBA)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	Correction (dB)	
Gas Cooler	20	10	22	-7	0	0	0	13
Pack	20	10	18	-5	0	0	0	15
AC1	52	1	20	-26	0	0	0	31
AC2	57	1	20	-26	0	0	3	29
AC3	48	1	20	-26	0	0	3	25
Combined rating level at receptor								34

Receptor R2 – Night-time

Plant	PLANT NOISE LEVEL AT SOURCE		DISTANCE		Directivity	Screening	BS4142 FEATURE	Rating Level at Receptor (dB)
	Noise level (dBA)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	Correction (dB)	
Gas Cooler	20	10	22	-7	0	0	0	13
Pack	20	10	18	-5	0	0	0	15
Combined rating level at receptor								17