

Sainsbury's
Islington Wharf
Salford
M4 6EE

Noise Impact Assessment

On behalf of

Sainsbury's

Project Reference: 89840 | Revision: 00 | Date: 4th April 2023

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1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned by Sainsbury's to undertake a noise impact assessment in relation to proposed external plant to be installed at a Sainsbury's store at Islington Wharf, Great Ancoats Street, Salford M4 6EE.
- 1.2. A detailed, fully automated environmental noise survey has been undertaken to establish the prevailing background and ambient sound pressure levels at a location representative of the sound levels outside the nearest noise sensitive receptors to the site.
- 1.3. Cumulative plant noise emission levels for the proposed plant have been predicted at the most affected noise sensitive receptors 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 proposed Sainsburys store is located on the ground floor of a 16-storey building.
- 2.2. 1No Gas cooler and 1No VRF unit are proposed to be installed externally on the roof of the proposed development while a housed compressor pack will be installed internally. An acoustic shroud is proposed to be installed to the discharge of the VRF.
- 2.3. The area immediately around the site is mostly residential properties. No screening/barriers around the plant area are assumed to exist.
- 2.4. A figure 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 closest residential receptor is the window on the west side of the residential property below the proposed plant area on the south-west façade, designated (R1), approximately 6m from the nearest plant item. This receptor is screened from the plant by the roof edge.
- 3.2. The closest windows with an unobstructed view of the plant are on the east elevation of the neighbouring residential property west of the plant (Receptor R2), approximately 42m from the nearest plant item.

- 3.3. The location is indicated in [Appendix B](#). All other dwellings are at greater distances or benefit from greater screening.

4.0 Existing noise climate

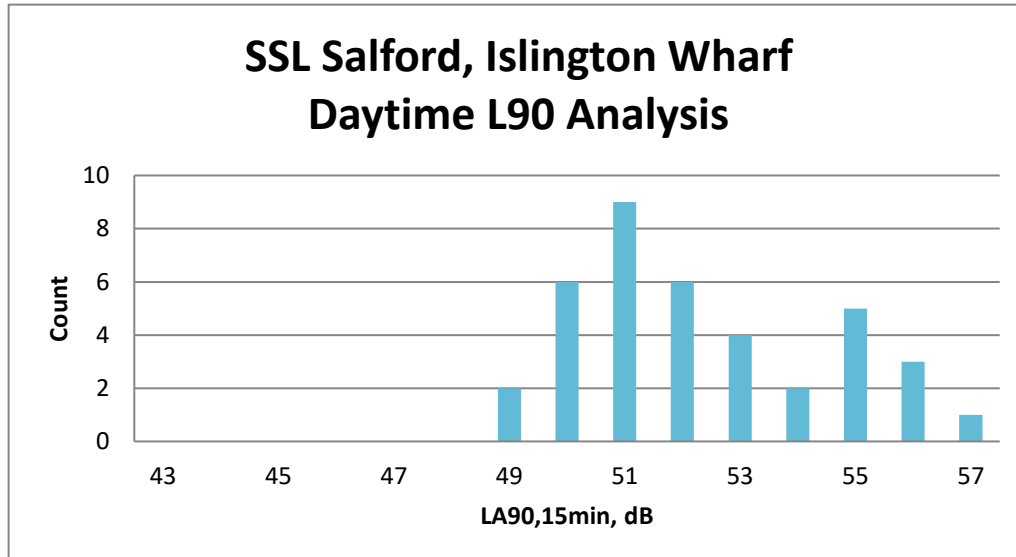
- 4.1. An environmental noise survey was undertaken close to the proposed site and the nearest noise sensitive receptors considered here.
- 4.2. The results of the noise survey have been summarised in Table 1 below. The full set of measurement results and details of the survey methodology can be found in [Appendix C](#).

Table 1 Summary of noise survey results

Measurement period	Range of noise levels over measurement period (dB)			
	L _{Aeq} (15mins)	L _{Amax} (15mins)	L _{A10} (15mins)	L _{A90} (15mins)
Daytime (07.00 - 23.00 hours)	52-77	59-98	54-82	49-57
Night-time (23.00 - 07.00 hours)	46-54	55-74	49-56	43-52

- 4.3. The following figure presents the distribution of daytime background sound pressure levels.

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



- 4.4. Additional statistical analysis has been undertaken. As shown in Table 2, the mean, median, and modal values have been calculated:

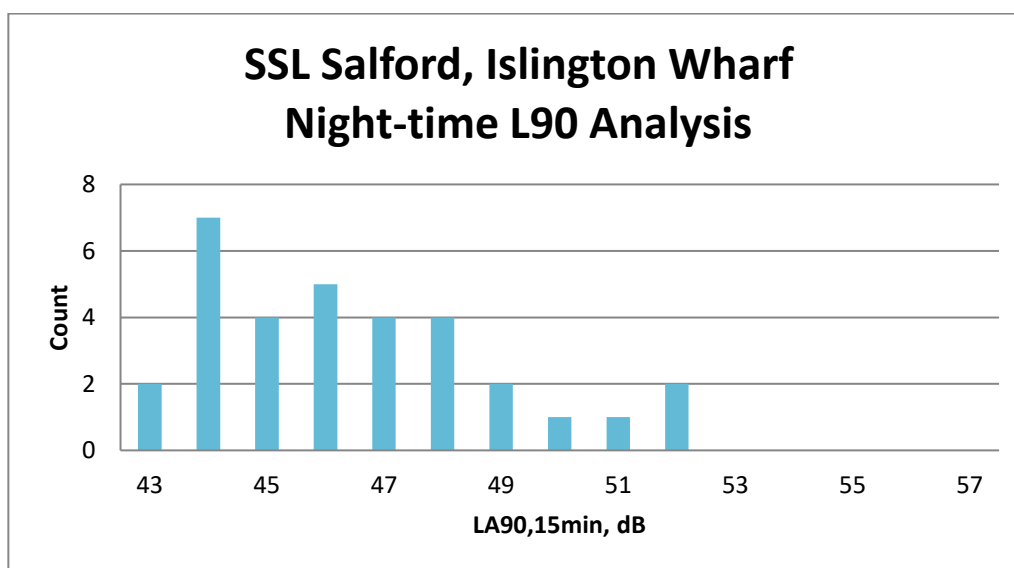
Table 2 Statistical analysis of $L_{A90,15min}$ levels during the daytime period

dB, L_{A90} daytime period	
Mean	52
Mode	51
Median	52

4.5. From reviewing the above histogram and statistics, 50 dBA has been selected to be robustly representative of the daytime background sound level in this area.

4.6. The following figure presents the distribution of night-time background sound pressure levels.

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



4.7. Additional statistical analysis has been undertaken. As shown in Table 3, the mean, median, and modal values have been calculated:

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

dB, L_{A90} night-time period	
Mean	46
Mode	44
Median	46

4.8. From reviewing the above histogram, 44 dBA has been selected to be robustly representative of the night-time background sound level in this area.

4.9. Therefore, the following values are considered to be robustly representative of the existing background sound pressure levels at nearby noise sensitive receptors:

- 50 dBA L₉₀ during the daytime period; and
- 44 dBA L₉₀ during the night-time period.

5.0 Plant noise design criteria and guidance

National Planning Policy Framework

- 5.1. A new edition of NPPF was published in July 2021 and came into effect immediately. The original National Planning Policy Framework (NPPF¹) was published in March 2012, with revisions in July 2018 and February 2019 - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The 2021 revised edition contains no new directions or guidance with respect to noise, and hence, all previous references remain extant. The paragraph references quoted below relate to the July 2021 edition.
- 5.2. Paragraph 174 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by (amongst others) *"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, water or noise pollution or land stability."*
- 5.3. The NPPF goes on to state in Paragraph 185:
- "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 must 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

¹ National Planning Policy Framework, DCLG, March 2012

² Noise Policy Statement for England, DEFRA, March 2010

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”.

- 5.7. Paragraph 119 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”.

BS 4142:2014 ‘Methods for Rating and Measuring Industrial and Commercial Sound’

- 5.8. British Standard (BS) 4142:2014 describes a method for rating and assessing sound of an industrial or commercial nature, which includes:
- Sound from industrial and manufacturing processes;
 - Sound from fixed installations which comprise mechanical and electrical plant and equipment;
 - Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
 - Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.
- 5.9. The industrial or commercial sound is assessed outside a dwelling or premises used for residential purposes, upon which sound is incident.
- 5.10. The procedure contained in BS 4142 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.
- 5.11. 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.

- 5.12. 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."
- 5.13. 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."
- 5.14. The background sound level should be established in terms of the L_{A90} noise index. The standard states that the background sound level should be measured over a period of sufficient length to obtain a representative value. This should not normally be less than 15-minute intervals. The standard states that: *"A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value."*
- 5.15. The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:
- a) Typically, the greater this difference, the greater the magnitude of the impact.*
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- d) 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.*
- 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."*
- 5.16. 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."
- 5.17. 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."

- 5.18. BS 4142 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.

Manchester City Council

- 5.19. Condition 12 of the planning approval for the site relates to plant noise and states the following;

12) (a) Prior to the first occupation of the residential element of the development, details of any externally mounted ancillary plant, equipment and servicing shall be submitted for approval in writing by the City Council, as Local Planning Authority. For the avoidance of doubt, externally mounted plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5 db (L_{aeq}) below the typical background (L_{a90}) level at the nearest noise sensitive location.

(b) Prior to the first occupation of the residential element of the development, a verification report will be required to validate that the work undertaken conforms to the recommendations and requirements approved as part of part (a) of this planning condition. The verification report shall include post completion testing to confirm the noise criteria has been met. In instances of non-conformity, these shall be detailed along with mitigation measures required to ensure compliance with the noise criteria. Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority, and thereafter retained and maintained in situ.

Reason - To minimise the impact of plant on the occupants of the development pursuant to policies SP1 and DM1 of the Manchester Core Strategy (2012) and saved policy DC26 of the Unitary Development Plan for the City of Manchester (1995).

Summary of criteria

- 5.20. It is proposed that the BS 4142:2014 rating level due to the new plant, at the nearest residential windows, is at least 5dBA below the representative background sound level during the day and night. The proposed plant limits are therefore as shown in Table 4.

Table 4 Proposed plant noise emissions level limits at nearest residential receptors

Period	Plant rating level (dB L _{A,r,Tr})
Daytime (07.00 – 23.00 hours)	45
Night-time (23.00 – 07.00 hours)	39

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 is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. All proposed plant will be inverter driven and, therefore, will gently ramp up and down depending on the demands on the various systems. However, a penalty of 3dB as described in BS 4142:2014 has been applied 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 at the most affected receptor. All other nearby receptors benefit from increased distance/screening to the plant. The full set of calculations can be found in [Appendix F](#).

Table 5 Assessment of predicted noise levels at nearest receptor

Receptor	Period	Predicted rating level at receptor, $L_{A,r,Tr}$ (dB)	Proposed design criterion (dB)	Difference (dB)
R1, residential	Daytime (07.00 – 23.00 hours)	43	45	-2
	Night-time (23:00 – 07:00 hours)	37	39	-2
R2, residential	Daytime (07.00 – 23.00 hours)	44	45	-1
	Night-time (23:00 – 07:00 hours)	36	39	-3

- 6.4. The above assessment demonstrates that the proposed plant will comply with the local authority's usual requirements inclusive of the proposed acoustic shroud to the VRF unit.
- 6.5. Where possible uncertainty in the above assessments has been minimised by taking the following steps:
- The meter and calibrator used have a traceable laboratory calibration and the meter was field calibrated before and after the measurements.
 - Uncertainty in the calculated impacts has been reduced by the use of a well-established calculation method.

- Care was taken to ensure that the measurement positions were representative of the noise climate outside the nearby residential dwellings and not in positions where higher noise levels were present.

7.0 Summary

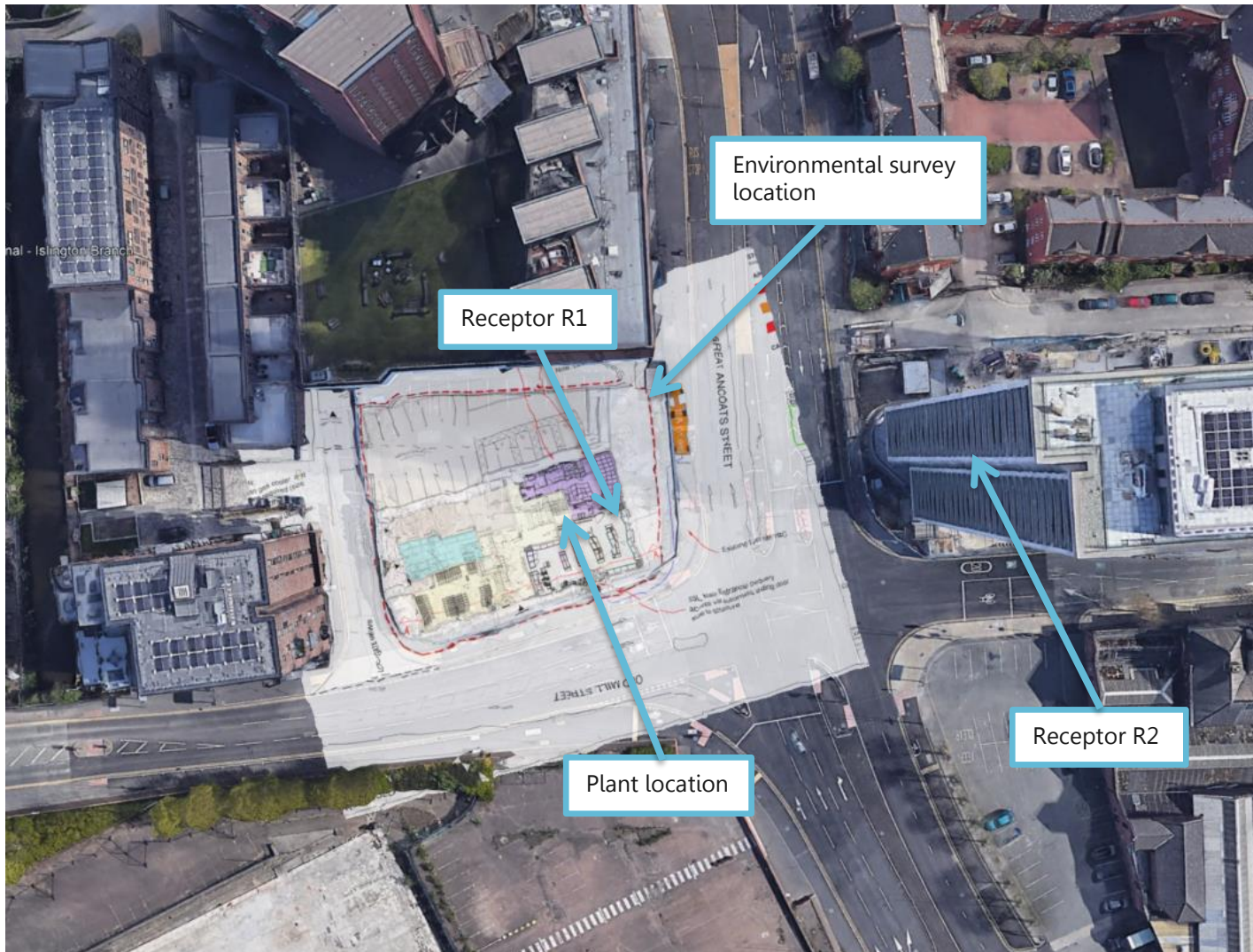
- 7.1. Noise Solutions Ltd (NSL) has been commissioned by Sainsbury's to undertake a noise impact assessment in relation to proposed external plant to serve a Sainsbury's store at Islington Wharf, Great Ancoats Street, Salford, M8 6EE.
- 7.2. An environmental sound survey was undertaken at the site in order to establish typical background sound levels at the closest noise sensitive receptor.
- 7.3. Cumulative plant noise emission levels for the proposed plant have been predicted at the most affected noise sensitive receptors and assessed against the local authority's usual requirements, inclusive of the proposed acoustic shroud to the VRF unit.
- 7.4. The assessment of predicted noise levels demonstrates compliance with Part a) of Condition 12 of the planning approval for the site.

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

Layout of existing site showing areas of interest



Appendix C Environmental sound survey

Details of environmental sound survey

- C.1 Measurements of the existing background sound levels were undertaken between 17.30 hours on Monday 3rd April and 11.00 hours on Tuesday 4th April 2023.
- 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 sound level meter was positioned on site as indicated in Appendix B, representative of the closest receptors. 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

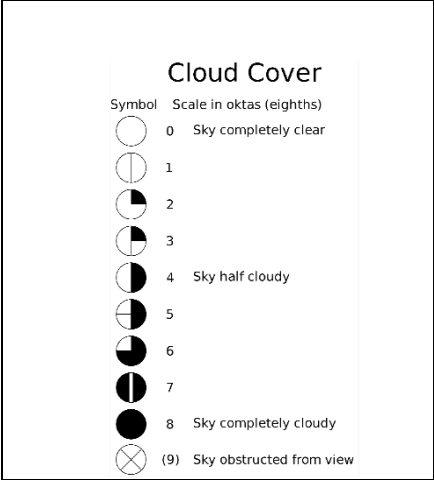
- C.5 Details of the equipment used during the survey are provided in the table below. The sound level meter was calibrated before and after the survey; no significant change (± 0.2 dB) in the calibration level was noted.

Environmental noise survey instrumentation

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Svantek 971 / 111625	18/06/2021	Factory conformation certificate
Condenser microphone	ACO Pacific 7052E / 80034		
Preamplifier	Svantek SV18 / 112630		
Calibrator	Rion NC-74 / 35094453	06/09/2022	1503192-1

Weather conditions

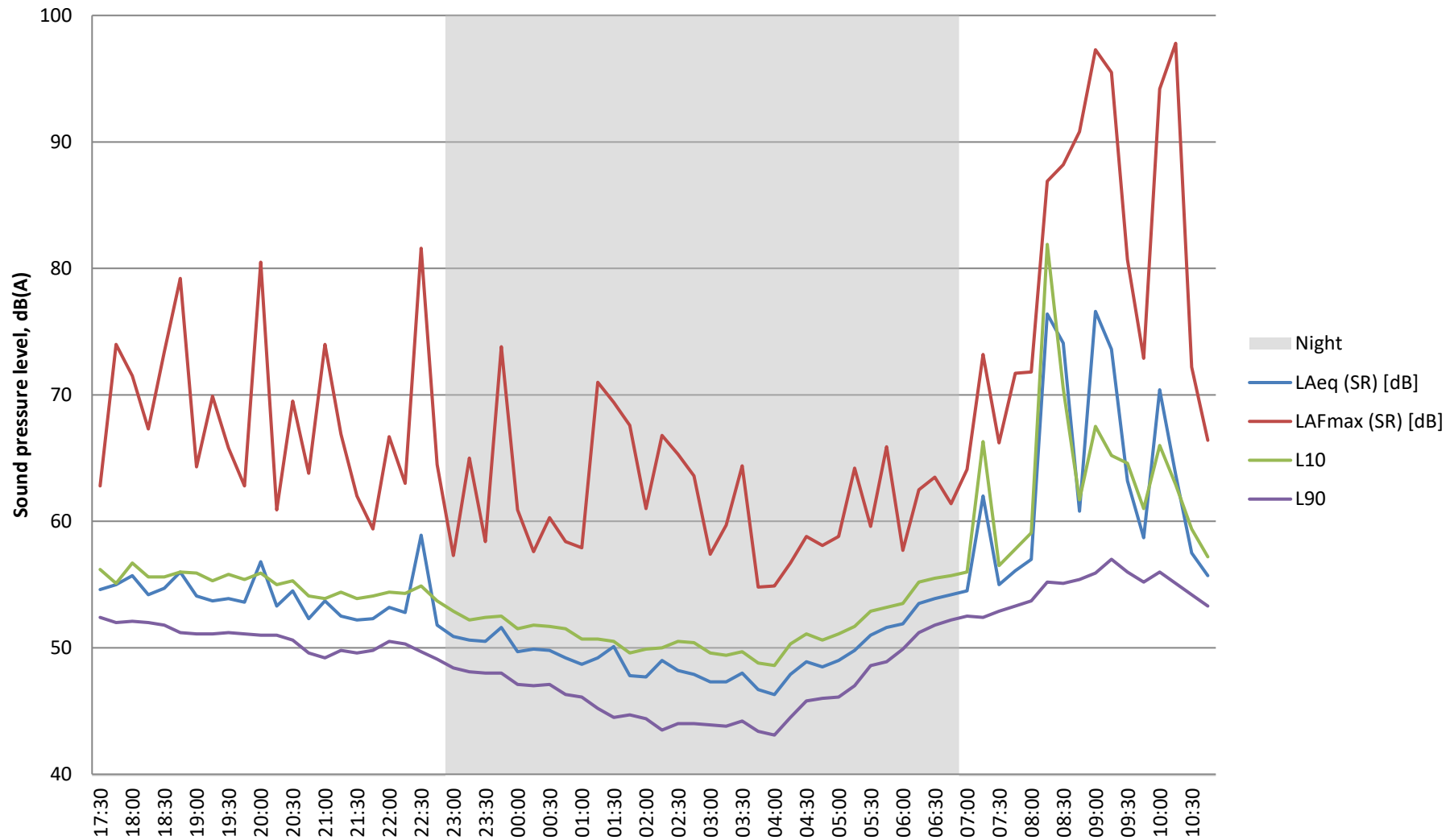
- C.6 Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the beginning and end of the survey.

Weather Conditions				
Measurement Location	Date/Time	Description	Beginning of Survey	End of Survey
As indicated in Appendix B	17.30 3/4/23 – 11.00 4/4/23	Temperature (°C)	12.5	8.5
 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)	2	1
		Presence of fog/snow/ice	No	No
		Presence of damp roads/wet ground	No	Yes
		Wind Speed (m/s)	1	5
		Wind Direction	SW	W
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

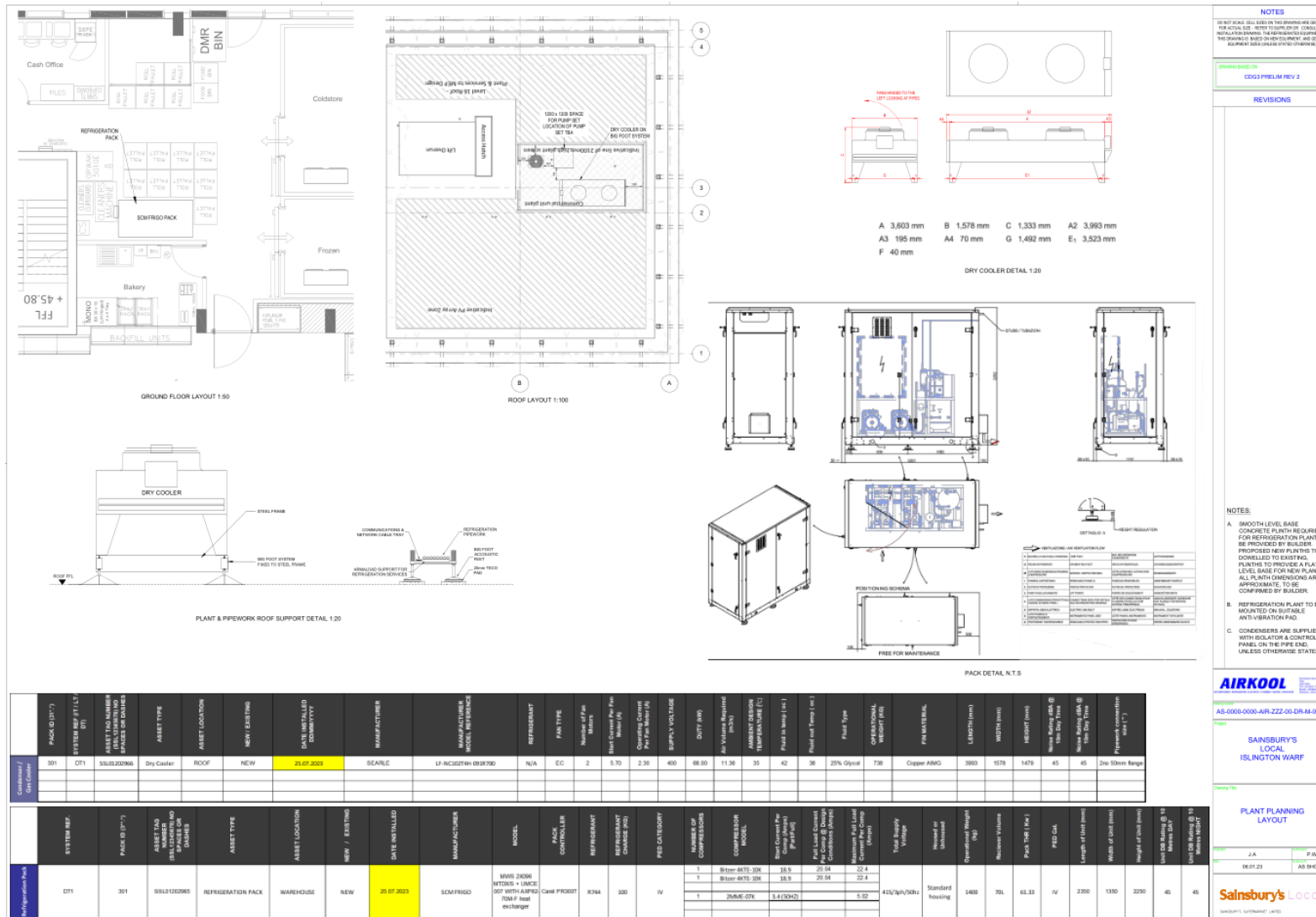
Results

- 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. Notable dominant noise sources include local and distant road traffic.
- C.8 The results of the survey are presented in a time history graph overleaf.

SSL Salford, Islington Wharf Monday 03 - Tuesday 04 Apr 2023



Appendix D Proposed plant layout



Appendix E Proposed plant noise data

Plant Item	Make/Model	Quantity	Sound pressure level (dBA)	
			Day	Night
Refrigeration gas cooler	Searle/LF-NC102T4H-091R700	1	45 at 10m	45 at 10m
VRF	Mitsubishi/PURY-M300YNW	1	86.5 Lw	-

Appendix F Plant noise calculations

Receptor R1

Plant	Source sound pressure level		Distance (m)	Correction (dB)	Directivity (dB)	Screening (building edge) (dB)	Attenuation (shroud) (dB)	BS4142 Feature (dB)	Rating level at receptor
	dBA	at (m)							
Gas Cooler	45	10	6	4	0	-15	0	3	37
VRF	86.5	Lw	9	-27	0	-16	-5	3	42
Rating level (daytime – all plant running)									43
Rating level (night – heating plant off)									37

Receptor R2

Plant	Source sound pressure level		Distance (m)	Correction (dB)	Directivity (dB)	Screening (building edge) (dB)	Attenuation (shroud) (dB)	BS4142 Feature (dB)	Rating level at receptor
	dBA	at (m)							
Gas Cooler	45	10	42	-12	0	0	0	3	36
VRF	86.5	Lw	44	-41	0	0	-5	3	44
Rating level (daytime – all plant running)									44
Rating level (night – heating plant off)									36