

Jollibee
122-126 Kilburn High Road
London
NW6 4HY

**Plant Noise
Impact Assessment**

On behalf of



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For and on behalf of Noise Solutions Ltd				

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1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned by StuArt Consultancy Ltd to provide a Noise Impact Assessment for new plant serving a proposed Jollibee restaurant along Kilburn High Road in London.
- 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. The cumulative plant noise level has been predicted at the nearest noise-sensitive receptors and assessed against recognised standards.
- 1.4. A glossary of acoustic terminology is given 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 Jollibee premises are to be located within an existing building at Nos 122-126 Kilburn High Road in London.
- 2.2. New ventilation plant will be located within the building, with two catering condensing units at low level to the rear of the proposed restaurant. Ventilation plant will comprise a supply AHU and a kitchen extract fan.
- 2.3. The existing air conditioning unit will be replaced on a like for like basis and installed within the existing acoustic enclosure.
- 2.4. The refrigeration plant will run constantly. All other plant will run only during the daytime period 07:00 hours to 23:00 hours.

3.0 Nearest noise sensitive receptors

- 3.1. The nearest noise sensitive properties are the residential dwellings (Reference R1) located on the first floor above the restaurant, approximately 10m from the nearest plant.
- 3.2. [Appendix B](#) contains aerial photographs showing the site and surrounding area, including the locations of the potential receptors identified above.

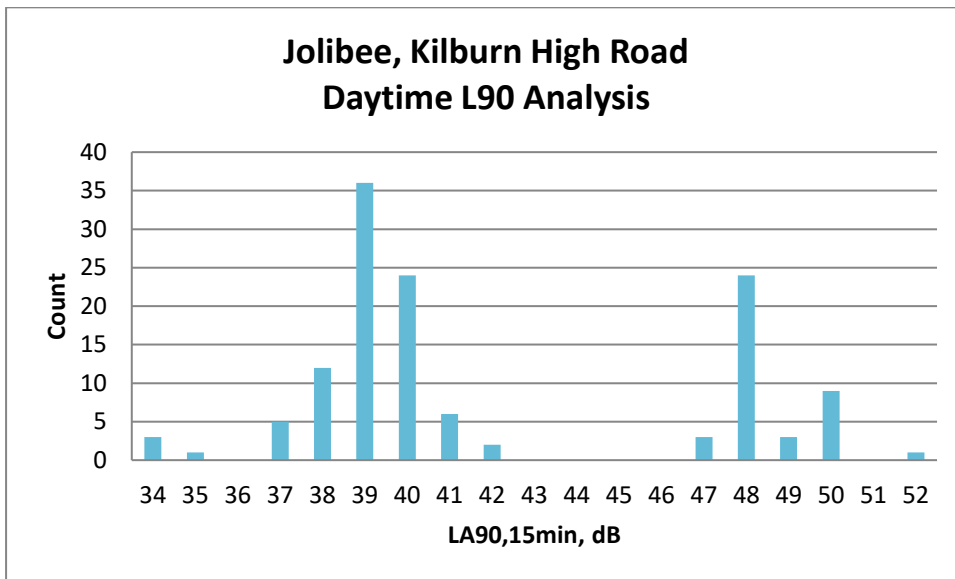
4.0 Existing noise climate

- 4.1. It should be noted that this assessment was undertaken in July 2020, at a time when the coronavirus pandemic was causing a disruption to working patterns and other activity.
- 4.2. Since Government advice at this time is to avoid any unnecessary travel, traffic noise levels are currently likely to be much lower than normal - and certainly not higher. Many potentially noise generating commercial premises in the area may also be closed. It is likely that any noise survey at the site would therefore measure lower background sound levels than would usually prevail, and give more onerous limits on plant noise than is necessary.
- 4.3. The Chief Planner at the Ministry of Housing Communities and Local Government wrote to all planning authorities in March 2020 encouraging them to be pragmatic in their approach during these abnormal times. It is therefore proposed to provide a noise impact assessment using historic noise survey data for the area (e.g. from the NSL database and previous planning submissions) and include commentary on the robustness of the survey data and the potential impact of any uncertainties within the methodology and results.
- 4.4. An environmental noise survey was undertaken for a previous planning application at this site (Reference 2016/6163/P) by Noico Limited and detailed within the report "*122-126 Kilburn High Road London NW6 4HY Environmental Noise Survey Report*" reference 661052-1 dated 7th November 2020.
- 4.5. 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 within the Noico Limited report.

Table 1 Summary of survey results

Measurement period	Range of recorded sound pressure levels (dB)	
	L _{Aeq} (15mins)	L _{A90} (15mins)
Daytime period (07.00 – 23.00 hours)	40-84	34-52
Night-time period (00.70 – 23.00 hours)	33-51	33-51

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



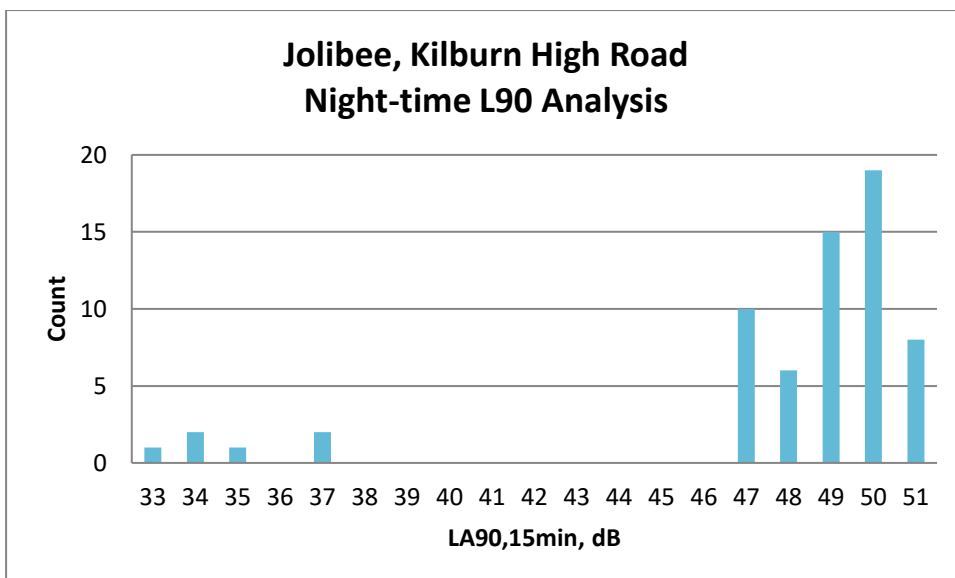
4.6. Further statistical analysis has been carried out on the data, and the mean and median values are shown in table 2 below.

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

dB, L_{A90} daytime period	
Mean	42
Mode	39
Median	40

4.7. From the histogram analysis, 39dB has been selected to be a robust representation of the background noise level during the daytime period, at the survey location.

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



- 4.8. Further statistical analysis has been carried out on the data and the mean 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	48
Mode	50
Median	49

- 4.9. Again, from the histogram analysis, 37dB has been chosen to be representative of the background sound level at the survey location, during the night-time period.
- 4.10. The following values are considered representative of the existing background sound pressure levels at nearby noise sensitive premises:
- 39dB L_{A90} during the daytime period; and
 - 37dB L_{A90} during the night-time period.

5.0 Plant noise design criteria

National Planning Policy Framework

- 5.1. A new edition of NPPF was published in February 2019 and came into effect immediately. The original National Planning Policy Framework (NPPF¹) was published in March 2012, with a revision in July 2018 - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The 2019 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 February 2019 edition.
- 5.2. Paragraph 170 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 180:
- "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;*

¹ National Planning Policy Framework, DCLG, March 2012

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 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 117 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"*.

London Borough of Camden

- 5.8. Section 6 of the Camden Planning Guidance Amenity, published March 2018, gives guidance on noise and vibration.
- 5.9. Clause 6.8 refers noise thresholds within Appendix 3 of the Local Plan and to refers to the principles of No observed effect level (NOEL), Lowest observable adverse effect level (LOAEL) and Significant observed adverse effect level (SOAEL) and defines their meanings. Specifically, in the context of this report, LOAEL is defined as:

The level above which changes in behaviour (e.g. closing windows for periods of the day) and adverse effects on health (e.g. sleep disturbance) and quality of life can be detected.

- 5.10. SOAEL is defined as:

² Noise Policy Statement for England, DEFRA, March 2010

The level above which adverse effects on health and quality of life occur. This could include psychological stress, regular sleep deprivation and loss of appetite.

5.11. Clause 6.27 states that:

Developments proposing plant, ventilation, air extraction or conditioning equipment and flues will need to provide the system's technical specifications to the council accompanying any acoustic report. "BS4142 Method for rating Industrial and Commercial Sound" contains guidance and standards which should also be considered within the acoustic report.

5.12. Appendix 3 within the Camden Local Plan published 2017 states:

"A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion)."

5.13. Table C of the appendix states the criteria at which development related noise levels will be acceptable:

Table C: Noise levels applicable to proposed industrial and commercial development (including plant and machinery)

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dB _{L_{Amax}}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB _{L_{Amax}}	'Rating level' greater than 5dB above background and/or events exceeding 88dB _{L_{Amax}}

**10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed*

development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.

***levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.*

- 5.14. The plant noise data available indicates that the noise from the units is not tonal. It is therefore considered appropriate to exclude the 5dB additional penalty described in the notes to Table C.

BS 4142:2014 Methods for rating and assessing industrial and commercial sound

- 5.15. BS 4142:2014 is intended to be used to assess the likely effects of sound on people residing in nearby dwellings. The scope of BS 4142:2014 includes *"sound from fixed plant installations which comprise mechanical and electrical plant and equipment"*.
- 5.16. The procedure contained in BS 4142:2014 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.
- 5.17. 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.
- 5.18. 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."*
- 5.19. 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."*
- 5.20. 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.*
- 5.21. 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."*
- 5.22. 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."*
- 5.23. 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."*
- 5.24. BS 4142:2014 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.

Proposed criteria

- 5.25. In accordance with the London Borough of Camden Council's usual requirements it is proposed that the plant rating noise level should be at least 10dB below the existing representative background sound level at the nearest noise sensitive receptor in order to be rated 'Green', or between 9dB below the existing background and 5dB above the existing background in order to be 'Amber'. Table 4 below presents the proposed plant noise rating levels at the nearest residences:

Table 4 Proposed plant noise emissions level limits at noise sensitive residential receptor

Receptor	Period	Cumulative plant rating level Green dB(A)	Cumulative plant rating level Amber dB(A)
Residential	Daytime (07.00 – 23.00 hours)	29	44
	Night-time (23.00 – 07.00 hours)	27	42

6.0 Plant noise assessment

- 6.1. The cumulative plant noise level at the most affected noise sensitive receptors has been predicted. The assessment has taken into consideration distance attenuation and directivity corrections. Predictions are inclusive of the following atmospheric-side attenuators fitted to the ventilation systems.

Table 5 Proposed atmospheric side attenuators to ventilation system

Attenuator	Insertion losses dB, at octave band centre frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
Kitchen Extract (EF1)	6	11	21	30	36	32	26	18
Supply (AHU1)	6	11	21	34	41	41	38	31

- 6.2. It should be noted that the proposed plant, with the exception of the refrigeration plant, will operate during daytime 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.
- 6.3. The predictions are inclusive of 11dB sound reduction from the various buildings between the residential receptor R1 and the proposed refrigeration plant within the yard.
- 6.4. Table 6, below, summarises the results of the assessment at the nearest receptors. All other receptors benefit from increased distance/screening to the plant. The full set of calculations can be found in [Appendix E](#). The predictions between 07.00 and 23.00 hours have been based on the proposed plant operating simultaneously at full capacity. The predictions between 23.00 and 07.00 hours have been based on the catering condensers only operating at full capacity.
- 6.5. It should be noted that there is an existing plant installation on site (which is to remain, albeit being replaced with a new like-for-like unit). There is therefore a precedent for mechanical services and the proposals do not represent the introduction of a new plant noise source in an otherwise quiet area.

Table 4 Assessment of predicted noise levels at nearest receptors

Receptor	Period	Predicted noise level at receptor, L_{Aeq} (dB)	Proposed design criterion (amber) (dB)	Difference (dB)
R1	Daytime hours (07.00 – 23.00 hours)	32	44	-12
	Night-time (23.00 – 07.00 hours)	28	42	-14

6.6. The above assessment demonstrates that noise from the proposed plant will result in noise levels significantly below the proposed Amber limits and also lower than 5dB below the existing L_{A90} background.

6.7. The Green level is exceeded by only 3dB during the daytime period and by only 1dB at night.

Context and uncertainties

6.8. As BS 4142:2014 advises, the impact must be considered within the context of the site and the surrounding acoustic environment. The following must, therefore, also be taken into consideration when determining the potential impact that may be experienced:

- The assessment is undertaken at the nearest residential windows. The impact on all other nearby residential windows will be lower due to screening and distance attenuation.
- It is to be appreciated that the BS 4142:2014 assessment relates to external noise levels only.
- The air conditioning unit is the single loudest plant item. This will be a direct replacement for existing plant and installed within the existing acoustic enclosure according to Planning Application reference 2016/6163/P and 2017/2868/P.
- The time history graph in [Appendix C](#) shows that the existing background is largely dominated by existing plant at neighbouring properties.

6.9. Where possible uncertainty in the above assessments has been minimised by taking the following steps:

- Uncertainty in the calculated impacts has been reduced by the use of well-established calculation methods.

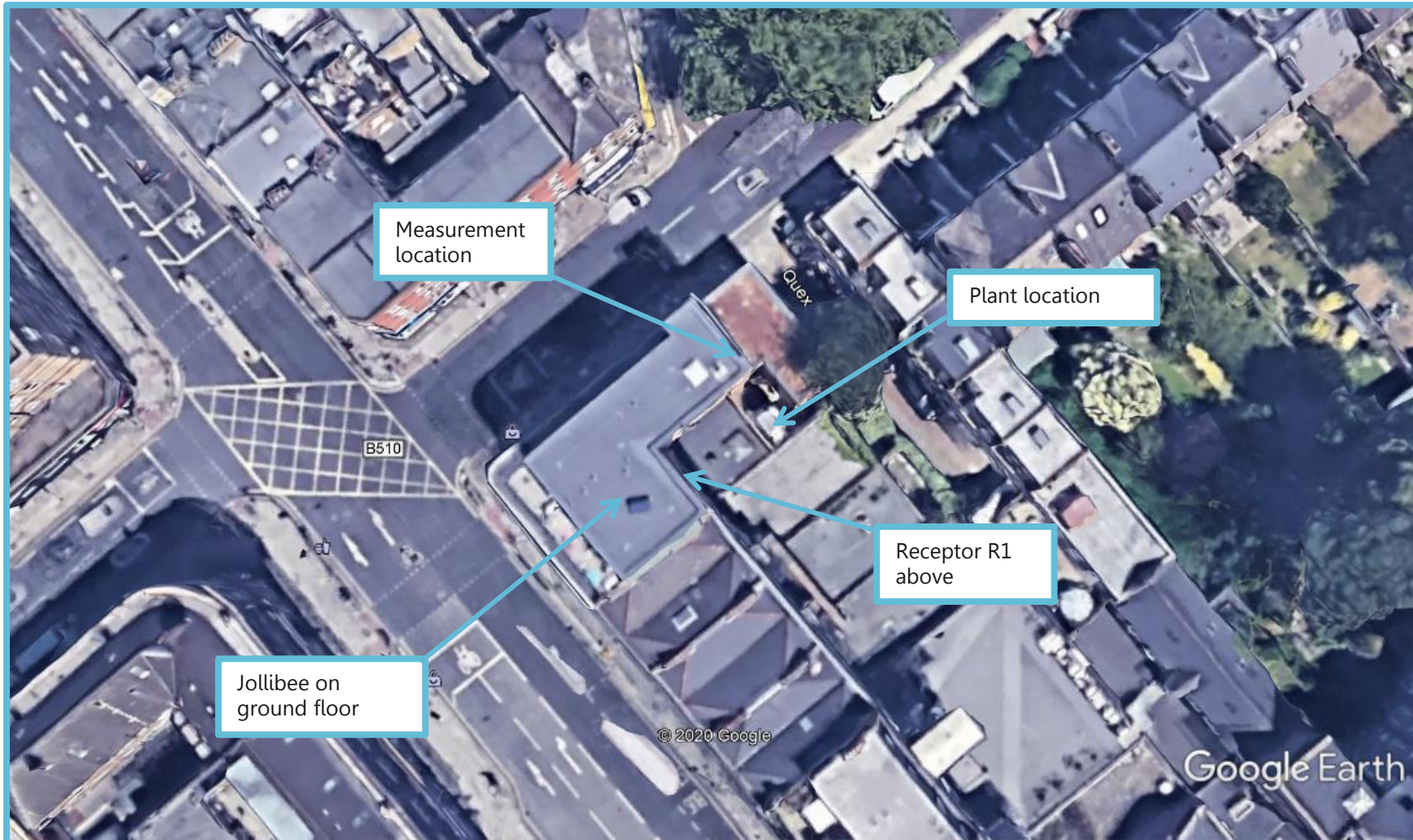
7.0 Summary

- 7.1. Noise Solutions Ltd (NSL) has been commissioned by StuArt Consultancy Ltd to provide a Noise Impact Assessment for new plant serving a proposed Jollibee restaurant along Kilburn High Road in London.
- 7.2. An environmental noise survey has been previously undertaken by Noico Limited to establish the existing prevailing noise levels at a location representative of the noise climate outside the nearest noise sensitive receptors to the proposed plant area.
- 7.3. The predictions are inclusive of suitable atmospheric side attenuation to the ventilation fans and a minimum 11dB sound reduction from the various buildings between the proposed refrigeration plant and the residential receptor along Kilburn High Road.
- 7.4. The air conditioning unit is the single loudest plant item. This will be a direct replacement for existing plant and installed within the existing acoustic enclosure.
- 7.5. The results of this assessment demonstrate that noise emissions from proposed plant, at the nearest noise-sensitive premises, will meet the typical London Borough of Camden Council requirements.

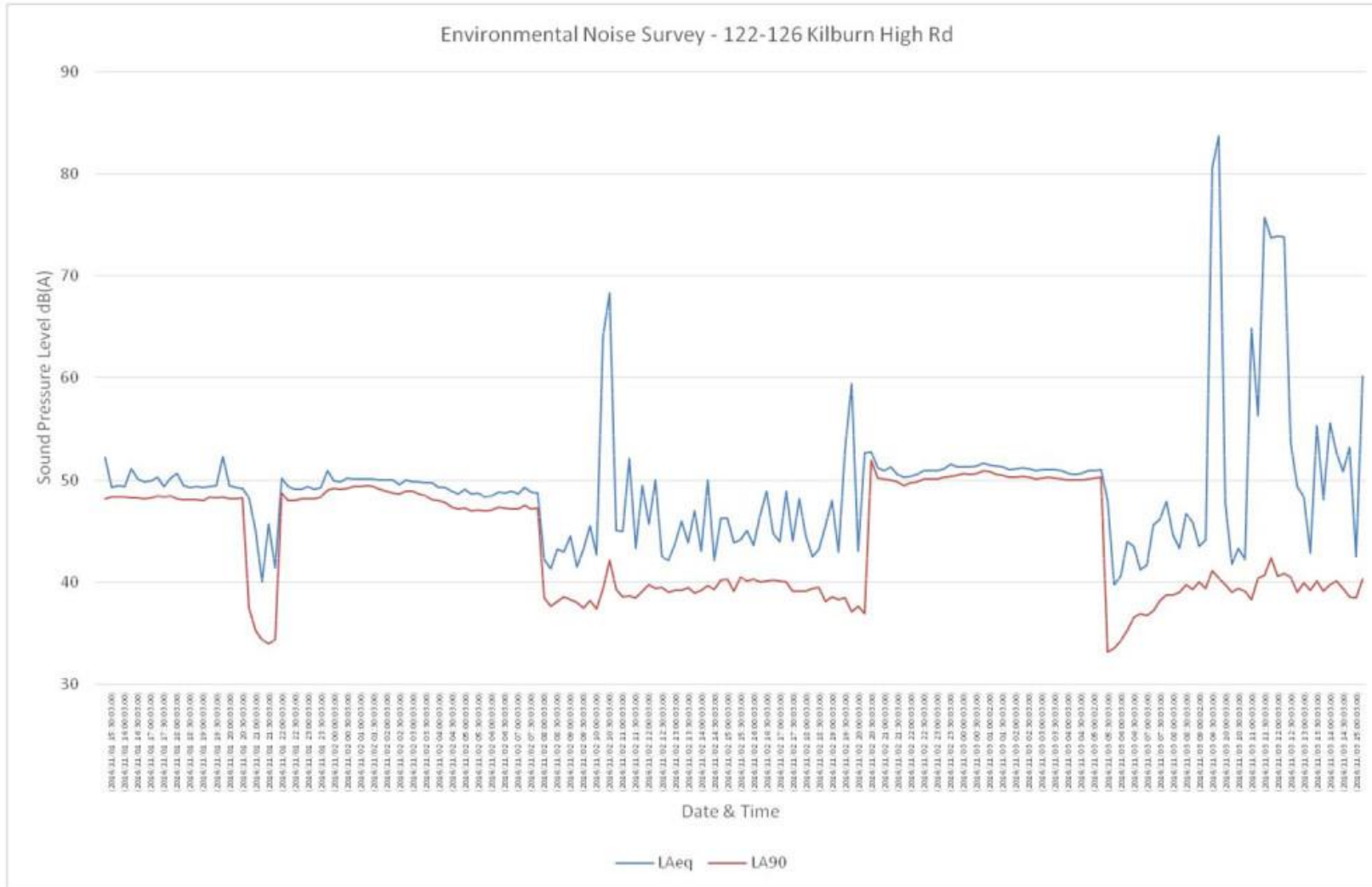
Appendix A Acoustic terminology

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 that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

Appendix B Aerial photograph of site showing areas of interest



Appendix C Environmental sound survey



Appendix D Equipment Manufacturer's Noise Data

Reference	Make / Model	No. units	Notes	Sound levels, dB, at octave band frequencies (Hz)								
				63	125	250	500	1K	2K	4K	8K	L _{Aeq} (dB)
AHU1	FläktWoods / ESTOC Powerbox 102-710-3	1	Case breakout L _w	67	73	64	50	45	39	33	29	60
			Discharge L _w	83	80	76	71	70	68	66	62	76
			Inlet L _w	77	74	70	66	63	62	61	52	70
EF1	FläktWoods / ESTOC Powerbox 102-710-3	1	Case breakout L _w	67	73	64	50	45	39	33	29	60
			Discharge L _w	83	80	76	71	70	68	66	62	76
			Inlet L _w	77	74	70	66	63	62	61	52	70
CC1-CC2	Storer	2	L _p at 10m									33 at 10 m
AC	Same as existing											

Appendix E Predicted Noise Levels Calculation

Receptor R1

Plant	Maximum plant sound pressure level at source		DISTANCE		Directivity (dB)	Screening (dB)	BS4142 Feature correction (dB)	Plant sound pressure level at receptor (dBA)
	Lp (dBA)	Distance (m)	Distance (m)	Correction (dB)				
Catering Condenser (CC1)	33	10	10	0	3	-11	0	25
Catering Condenser (CC2)	33	10	10	0	3	-11	0	25
Kitchen extract (EF1)	See calculation below							13
AHU	See calculation below							17
AC	See calculation in Noico report							29
Cumulative sound pressure level (day)								32
Cumulative sound pressure level (night)								28

Description	Notes	L _{eq} (dB)								L _{Aeq} (dB)
		63	125	250	500	1K	2K	4K	8K	
Kitchen Extract										
Source noise level	In-duct L _w	83	80	76	71	70	68	66	62	76
System losses		-16	-12	-5	-4	-6	-8	-8	-8	
Atmospheric-side attenuator	I.L.	-6	-11	-21	-30	-36	-32	-26	-18	
Directivity	135°	0	0	0	-2	-2	-4	-4	-4	
Distance correction (m)	16	-32	-32	-32	-32	-32	-32	-32	-32	
Screening correction	0	0	0	0	0	0	0	0	0	
BS4142 correction	0	0	0	0	0	0	0	0	0	
Resultant at receptor	L _p	29	25	18	3	-6	-8	-4	0	13
AHU										
Source noise level	In-duct L _w	77	74	70	66	63	62	61	52	70
System losses		-4	-1	0	0	0	0	0	0	
Atmospheric-side attenuator	0	-6	-11	-21	-34	-41	-41	-38	-31	
Directivity	0°,135°	-1	-3	-6	-9	-8	-8	-8	-8	
Distance correction (m)	10	-28	-28	-28	-28	-28	-28	-28	-28	
Screening correction	0	0	0	0	0	0	0	0	0	
BS4142 correction	0	0	0	0	0	0	0	0	0	
Resultant at receptor	L _p	38	31	15	-5	-14	-15	-13	-15	17

Appendix F Plant drawings

