

SHARPS REDMORE

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Report

**Deliveroo Editions, Crouch
End, Hornsey, N8 9DJ**

Fixed plant noise assessment

Prepared by

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Contents

- 1.0 Introduction
- 2.0 Assessment methodology and criteria
- 3.0 Baseline noise environment
- 4.0 Fixed plant noise assessment
- 5.0 Assessment conclusions

Appendices

- A. NSL Noise assessment report, reference 87161, dated 21st November 2017
- B. NoysPlot plant noise predictions
- C. Acoustic terminology

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1.0 Introduction

- 1.1 Sharps Redmore (SR) has been instructed to undertake a noise assessment of a Deliveroo Editions site at Unit 21, Cranford Way, Hornsey. The site is located within an industrial/commercial area with noise sensitive premises to the west of the site, as shown in Figure 1 below.

FIGURE 1: Site location plan



- 1.2 Deliveroo Editions has been operational at the Cranford Way site since 2018. Planning permission (reference HGY/2017/3207) was granted subject to a number of planning conditions, of which planning condition 1 permitted the use of the site for a temporary 5 year period. This noise assessment report is produced to accompany a planning application which seeks the continued use of the site post December 2022.
- 1.3 The original 2017 planning application was accompanied by a technical noise report prepared by NSL, that considered noise associated with fixed plant equipment and the use of scooters to collect and deliver the food to customers. The NSL report is reproduced at Appendix A of this report. In terms of noise associated with delivery scooter movements SR is not aware of any material changes from the positions assessed by NSL, as such this assessment does not seek to assess this noise source.
- 1.4 The Deliveroo Editions site comprises of up to ten kitchen 'pods' with associated ventilation and refrigeration plant equipment. This assessment is based on the plant equipment witnessed on site during a site visit in July 2022. Whilst materially the ventilation plant equipment assessed by NSL in 2017 is no different to the present situation, this report

provides an updated plant assessment to consider additional items of equipment now on site.

- 1.5 The available methods of assessment and assessment criteria are presented at section 2.
- 1.6 The baseline noise environment in the vicinity of the site is discussed in section 3. Predicted Deliveroo plant noise levels are considered in section 4 and assessment conclusions in section 5. A guide to the acoustic terminology used in this report is shown in Appendix C.

2.0 Assessment methodology and criteria

National planning policy

- 2.1 The National Planning Policy Framework (NPPF), July 2021, sets out the Government's planning policies for England and "these policies articulate the Government's vision of sustainable development." In respect of noise, Paragraph 185 of the NPPF states the following:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they 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 the 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; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation".*

- 2.2 Guidance on the interpretation of the policy aims contained within the NPPF is contained within National Planning Policy Guidance (NPPG). The NPPG introduces the concept of a noise exposure hierarchy based on likely average response. The guidance contained in the NPPG is summarised in the table below:

TABLE 1: Noise Exposure Hierarchy

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

- 2.3 The NPPF and NPPG reinforces the March 2010 DEFRA publication, “Noise Policy Statement for England” (NPSE), which states three policy aims, as follows:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.”*

- 2.4 Together, the first two aims require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

“... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur.”

- 2.5 Taking an overview of national policy aims and guidance it is clear that when considering the impact of noise, the fact noise can be heard and causes impact, is not a reason to refuse an application as consideration should also be given to the significance of the impact and the mitigation measures available.

- 2.6 It is normal and good practice to apply objective standards to the assessment of noise and the effect produced by the introduction of a certain noise source may be determined by several methods, as follows:

- i) The effect may be determined by reference to guideline noise values, such as those contained in the World Health Organisation (WHO) “*Guidelines for Community Noise*”.
- ii) Alternatively, the impact may be determined by considering the change in noise level that would result from the proposal, in an appropriate noise index for the characteristic of the noise in question. There are various criteria linking change in noise level to effect. This is the method that is suited to, for example, the assessment of noise from road traffic because it is capable of displaying impact to all properties adjacent to a road link irrespective of their distance from the road.
- iii) Another method is described within BS 4142:2014+A1:2019 which focuses on determining the significance of sound impact from sources of industrial and/or commercial nature. The sources that the newly revised standard is intended to assess are sound from industrial and manufacturing processes, sound from fixed plant installations, sound from loading and unloading of goods at industrial and/or commercial premises and the sound from mobile plant and vehicles, such as forklift, train or ship movements.

BS 4142:2014+A1:2019

- 2.7 The assessment of fixed plant noise is principally undertaken in accordance with the methodology in BS 4142:2014. The scope of this standard states that it is suitable for the assessment of:

- “a) sound from industrial and manufacturing processes;*
- b) sound from fixed installations which comprise mechanical and electrical plant and equipment;*
- c) sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and*
- d) 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.”*

2.8 The significance of sound impact is to be determined according, in summary, to the following process:

- i) Determine the typical background sound levels, in terms of the index L_{A90} , at the receptor locations of interest.
- ii) Determine the specific sound level of the source being assessed, in terms of its L_{AeqT} level (T = 1 hour for day or 15 minutes for night), at the receptor location of interest.
- iii) Apply a rating level acoustic feature correction if the source sound has tonal, impulsive, intermittent, or other characteristics which attract attention.
- iv) Compare the rating sound level with the background sound level; the greater the difference between the two, the higher the likelihood of adverse impact.
- v) A difference (rating – background) of around +10 dB is an indication of significant adverse impact, depending on the context; a difference of +5 dB is an indication of an adverse impact, depending on the context. 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 upon context.

2.9 Paragraph 5.18 of the NSL report indicates Haringey Borough Council’s position with regard to setting plant noise limits:

London Borough of Haringey Council

5.18. Derek Pearce from the local council advised the following in relation to plant noise:

“We would expect plant to be designed 10dB below the representative measured background noise level.”

3.0 Baseline noise environment

- 3.1 The planning application, which this report accompanies, is for the continuation of a temporary planning consent. Therefore, the present noise climate in the vicinity of the site would be inclusive of noise associated with Deliveroo operations.
- 3.2 The baseline noise survey undertaken by NSL in 2017 established a typical daytime background noise climate of 55 dB L_{A90} and 54 dB L_{A90} during the night time. NSL report noted that the noise climate was dominated by noise from the substation, hence the consistency of the background noise climate across a 24 hour period.
- 3.3 A noise report by 24 Acoustics (reference R9390-1 Rev 0, dated January 2022) that accompanied a planning application for a proposed kitchen unit on an adjacent site (planning application reference HGY/2022/0696) presents details of a noise survey undertaken in the vicinity of the Deliveroo site.
- 3.4 The 24 Acoustics noise report indicates noise levels in the vicinity of the Deliveroo site of typically 55 dB L_{A90} throughout a 4-day noise survey between 7th and 11th January 2022. This indicates that the baseline noise levels established in 2017 in the NSL report are still representative of the current noise climate.
- 3.5 Both the baseline noise level surveys (with and without the Deliveroo Editions site operating) indicate that noise associated with the Deliveroo site is not contributing to the existing noise climate.

TABLE 2: Typical background noise levels/plant noise limits

Period	Typical background noise levels dB L_{A90}	Harringay plant noise level limit dB *
Daytime (0700 to 2300 hours)	55	45
Night time (2300 to 0700 hours)	54	44

*Based on plant noise levels being 10 dB below the background noise climate

4.0 Plant noise assessment

- 4.1 The objective assessment of plant sound sources in commercial premises is typically undertaken in accordance with British Standard 4142:2014+A1:2019. This Standard enables the resultant sound levels from new plant equipment to be compared against the existing typical background sound level (L_{A90}) of an area to establish the significance of the sound impact.
- 4.2 Table 2 of this report explains that appropriate plant noise limits, based on the local authority assessment approach, are 45 dB daytime and 44 dB at night.
- 4.3 In terms of seeking to set appropriate plant rating sound limits for residential receptors, the advice in BS 4142:2014 is that *“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 of having a low impact, depending on the context”* (clause 11, note ‘d’).
- 4.4 The following table summarises the mechanical services plant equipment source noise levels.

TABLE 3: Deliveroo plant equipment source noise levels

Description	Octave band (Hz) sound power levels dB L_w							
	63	125	250	500	1K	2K	4K	8K
20x Kitchen extract fans (L _w per fan)	76	76	64	63	58	60	54	47
20x Kitchen supply fans (L _w per fan)	75	75	66	61	58	60	53	46
3x Kitchen condenser fans (per unit)								
8x Kitchen A/C Units (per unit)	52 dBA @ 1m L _p							
2x Large kitchen extracts (per fan)	89	86	78	75	70	66	60	56

- 4.5 All of the plant equipment would operate during the daytime, with only the refrigeration condenser units operating throughout the day and night time. The ventilation equipment would operate during the daytime when the kitchens are in use.

Noise modelling

- 4.6 SR uses an environmental noise modelling software package called ‘NoysPlot’. This software enables coordinates to be entered for the relative positions of noise sources, receivers and barriers to calculate a resultant noise level at a given noise receptor. The software carries out ‘text book’ atmospheric side calculations with regard to distance and screening attenuation by referencing relative source and receiver positions.
- 4.7 The schedule of source noise data produced by the noise model is presented in Appendix B1.1.

- 4.8 The height coordinates ('z') used in the 'NoysPlot' model have been taken from the LBF Architects drawings and from site observations. The horizontal coordinates are referenced from an arbitrary 'x', 'y' position on a grid system.
- 4.9 NoysPlot uses operating time information to calculate noise levels for daytime and night time operation. The time period that the equipment is assumed to be operating is denoted by 'D' to indicate daytime only operation; 'N' to denote night time usage and 'A' to indicate that the equipment runs all the time. As explained, all of the plant equipment would operate during the daytime; with only the refrigeration condenser units operating throughout the day and night time. None of the ventilation or refrigeration equipment is considered to attract a BS 4142 rating level correction for noticeable acoustic characteristic when considered at the receptor locations.
- 4.10 NoysPlot has the capability to accept input noise data in a number of formats. Where available, the ventilation plant manufacturer's sound power level data (designated by the letter W in the L_p/L_w column of the input schedule) is used. Where the sound power level data is not available the manufacturer's un-weighted octave band sound pressure levels at a stated distance are used (designated P but with an N in the dBA column of the schedule to indicate un-weighted). Alternatively, measured or manufacturer's A-weighted, single figure, averaged level at the stated distance is used (designated 'P' with 'Y' in the dBA column of the schedule). For this assessment, single figure A-weighted noise level data and octave band sound power levels have been used.
- 4.11 The surface directivity is also assessed for all cases – this depends on the number of adjacent reflective surfaces – the number can be seen in the column headed Q in the input schedule.
- 4.12 Summaries of the atmospheric noise calculations for daytime and night time are displayed in Appendices B3 and B4. Calculations for each source to receiver can be made available upon request. These calculations take into account the attenuation afforded by distance, outlet reflection, angular and surface directivity and acoustic screening. The software maintains a logarithmic summation for each receiver position and ranks the individual noise sources in order of contribution to the overall noise level (highest at the top of the list). This assists with the identification of those noise sources requiring additional noise control.
- 4.13 The input data defining the locations of the noise sources, the receivers and screening are shown in Appendix B2. The NoysPlot noise model principally considers two noise barrier types; the barrier descriptor 'R' is used in the schedule to denote a ring type whereby only noise transmitted over the top of the barrier is considered; whilst noise barriers denoted 'F' for finite consider noise transmitted over the top and around the ends of the barrier. Both ring and finite barriers have been used to represent screening afforded by the site boundary wall and Deliveroo pods.

- 4.14 The NoysPlot calculations (see Appendices B3 and B4) show the following resultant plant noise levels:

TABLE 3: Summary of predicted plant rating noise levels

Noise sensitive receptor	Predicted plant rating noise level dB(A)	
	Daytime	Night time
9 Rathcoole Avenue	37	31
21 Rathcoole Avenue	37	31

- 4.15 The predicted plant rating noise levels in Table 3 above are well below the London Borough of Haringay Council plant noise limits of 45 dB daytime and 44 dB at night. The plant rating noise levels associated with the operation of the Deliveroo Editions site at Unit 21, Cranford Way, Hornsey are demonstrated to be indicative of low impact, in accordance with the guidance in BS 4142:2014+A1:2019.

5.0 Assessment conclusions

- 5.1 This assessment considers noise associated with the current fixed plant equipment installation at the Deliveroo Editions site at Unit 21, Cranford Way, Hornsey.
- 5.2 The plant noise assessment, undertaken in accordance with the methodology in BS 4142:2014+A1:2019, demonstrates that the predicted noise levels from the operation of the Deliveroo fixed plant equipment (at the closest residential properties) is significantly below the lowest background noise levels during the day and night time periods.
- 5.3 This assessment objectively demonstrates that predicted noise levels from the current Deliveroo Editions plant equipment is complying with the requirements of the NPPF to avoid significant adverse impact.

APPENDIX A

**NSL NOISE ASSESSMENT REPORT, REFERENCE 87161, DATED 21ST
NOVEMBER 2017**

Deliveroo

Tottenham Lane
Crouch End
Hornsey
N8 9DJ

Noise Impact Assessment

On behalf of



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Contents

1.0	Introduction	1
2.0	Details of development proposals	1
3.0	Nearest noise sensitive receptors	1
4.0	Existing noise climate	2
5.0	Noise design criteria	3
	Noise Policy Statement for England	3
	National Planning Policy Framework	4
	Planning Practice Guidance – Noise	5
	London Borough of Haringey Council	7
	BS 4142:2014	7
	BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings	8
	Guidelines for Community Noise, 1999 World Health Organisation, (WHO)	8
6.0	Plant Noise assessment	9
7.0	Delivery scooter noise assessment	11
	Sound pressure levels of activities associated with deliveries	11
	Predicted impact	11
	BS 4142:2014 Assessment	12
	BS 8233:2014 and WHO assessment	13
	L_{Aeq} assessment	13
8.0	Summary	14

Appendices

Appendix A	Acoustic Terminology
Appendix B	Aerial Photograph of site showing areas of interest
Appendix C	Environmental Sound Survey
Appendix D	Manufacturer plant noise data
Appendix E	Plant noise level predictions at receptor
Appendix F	Proposed plant layout

1.0 Introduction

- 1.1. Ten Deliveroo kitchen pod units are to be located on a brownfield site off Tottenham Lane in Hornsey. Noise Solutions Ltd (NSL) has been commissioned to undertake a noise impact assessment in relation to the plant noise emissions from the building services plant serving the proposed kitchens, and noise from scooters arriving at and leaving the site.
- 1.2. Noise emission levels for the proposed plant have been predicted at the nearest noise sensitive receptors to the site and assessed against the relevant local and national guidance.
- 1.3. An assessment of noise impact from scooters has been made and assessed against relevant local and national guidance.
- 1.4. [Appendix A](#) contains a guide to common acoustic terminology.

2.0 Details of development proposals

- 2.1. A Deliveroo kitchen will be located on the vacant land north of the Eastern Electricity Hornsey Grid and west of Cranford Way Industrial Estate, on the south side of Tottenham Lane in Hornsey, London. The location is shown in [Appendix B](#).
- 2.2. The proposals include for the installation of 44 kitchen extract fans across nine portacabin style kitchens. Kitchen 6 is proposed to contain a naturally ventilated pizza oven flue with no extract fans. In each case, wall-mounted 350mm diameter plate fans will penetrate through the side of the individual pod. Each pod will have either four or eight fans, depending on the length of cabin.
- 2.3. Meals from the proposed kitchen will be delivered to customers using a mix of pedal cycles and motor scooters. All vehicles will enter and leave the yard at the eastern side of the site and enter Tottenham Lane. This road is one way only from east to west.
- 2.4. The proposed plant will operate only between 11.00 and 23.00 hours daily. [Appendix D](#) contains the noise output data for the proposed plant.

3.0 Nearest noise sensitive receptors

- 3.1. The area surrounding the site is a mix of residential and commercial in nature. The nearest residential dwellings to the plant are the houses along Rathcoole Avenue (Receptor R1) at a distance of approximately 62m from the closest proposed ventilation grille.
- 3.2. The nearest residential dwellings to the scooter delivery path are the properties from 54 – 70 Tottenham Lane (Receptor 2).

- 3.3. Hornsey railway station is located less than 200m away from the site. To the south of the site is the ABS Transport depot, which is approximately 200m long.
- 3.4. [Appendix B](#) contains an aerial photograph showing the site and surrounding area.

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} (15min)	L _{Amax} (15min)	L _{A10} (15min)	L _{A90} (15min)
Daytime (07.00 - 23.00 hours)	55-78	66-96	60-88	54-65
Operating Hours (11.00 – 23.00 hours)	55-78	68-95	60-88	55-65
Night-time (23.00 - 07.00 hours)	54-60	59-84	56-71	53-57

- 4.3. Statistical analysis of the measurement levels (see histograms below) shows that the representative L_{A90} background sound pressure level may be considered to be 55dB during the daytime period and 54dB during the night-time period.

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

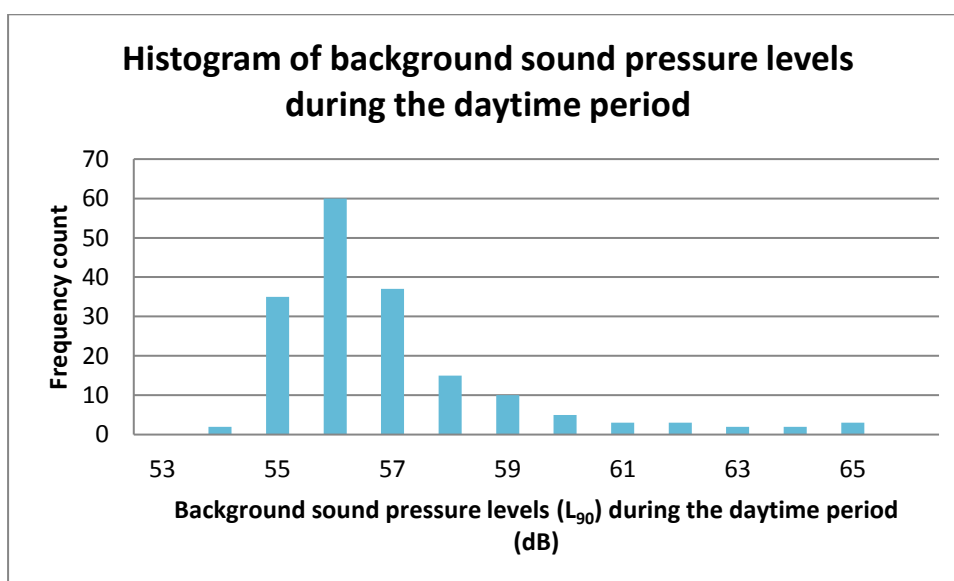
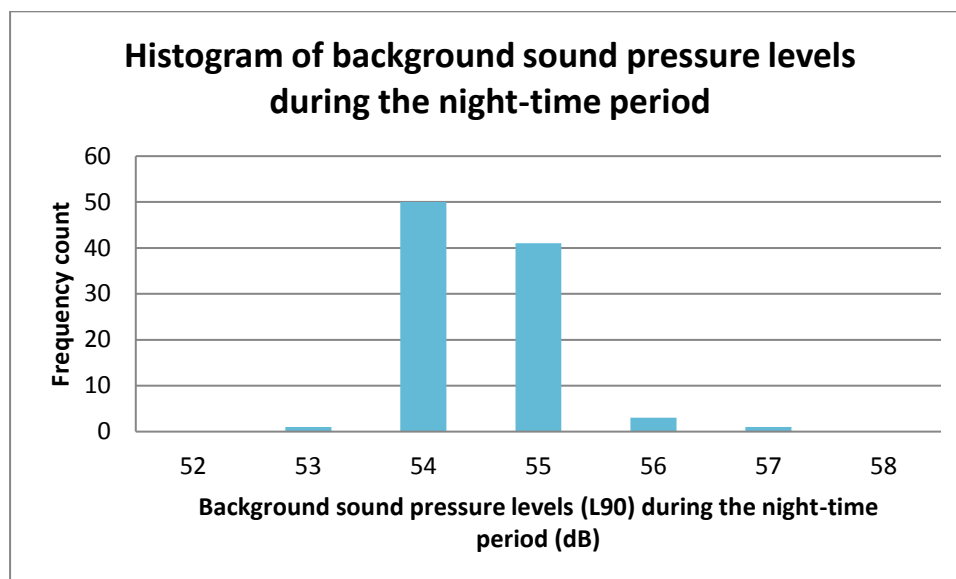


Figure 2 Histogram of night-time L_{A90} background sound pressure levels



5.0 Noise design criteria

Noise Policy Statement for England

- 5.1. The Noise Policy Statement for England (NPSE), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy aims, as presented in this document, are: *"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*
- avoid significant adverse effects on health and quality of life;
 - mitigate and minimise adverse effects on health and quality of life; and
 - where possible, contribute to the improvement of health and quality of life."
- 5.2. The NPSE makes reference to the concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as used in toxicology but applied to noise impacts. It also introduces the concept of SOAEL (Significant Observed Adverse Effect Level) which is described as the level above which significant adverse effects on health and quality of life occur.
- 5.3. The first aim of the NPSE is to avoid significant adverse effects, taking into account the guiding principles of sustainable development (as referenced in Section 1.8 of the NPSE). The second aim seeks to provide guidance on the situation that exists when the potential noise impact falls between the LOAEL and the SOAEL, in which case: *"...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development."*

- 5.4. Importantly, the NPSE goes on to state: "This does not mean that such adverse effects cannot occur."
- 5.5. The NPSE does not provide a noise-based measure to define SOAEL, acknowledging that the SOAEL is likely to vary depending on the noise source, the receptor and the time in question. NPSE advises that: *"Not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*
- 5.6. It is therefore likely that other guidance will need to be referenced when applying objective standards for the assessment of noise, particularly in reference to the SOAEL, whilst also taking into account the specific circumstances of a proposed development.

National Planning Policy Framework

- 5.7. The National Planning Policy Framework (NPPF) was introduced in March 2012. The document sets out the Government's planning policies for England and how these are expected to be applied.
- 5.8. *Paragraph 123 of the NPPF states that planning policies and decisions should aim to:*
- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
 - *mitigate and reduce to a minimum other adverse impacts on quality of life arising from noise from new development, including through the use of conditions;*
 - *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established [subject to the provisions of the Environmental Protection Act 1990 and other relevant law]; and*
 - *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*
- 5.9. Furthermore the NPPF gives weight to the requirements of the local authority as it states the following:

11. Planning law requires that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise.

12. This National Planning Policy Framework does not change the statutory status of the development plan as the starting point for decision making. Proposed development that

accords with an up-to-date Local Plan should be approved, and proposed development that conflicts should be refused unless other material considerations indicate otherwise. It is highly desirable that local planning authorities should have an up-to-date plan in place.

13. The National Planning Policy Framework constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications.

Planning Practice Guidance – Noise

- 5.10. As of March 2014, a Planning Practice Guidance (PPG) for noise was issued which provides additional guidance and elaboration on the aims of Paragraph 123 in the NPPF. The PPG advises that when plan-making and decision-taking, the Local Planning Authority should consider the acoustic environment in relation to:
- Whether or not a significant adverse effect is occurring or likely to occur;
 - Whether or not an adverse effect is occurring or likely to occur; and
 - Whether or not a good standard of amenity can be achieved.
- 5.11. This guidance introduced the concepts of NOAEL (No Observed Adverse Effect Level), and UAEL (Unacceptable Adverse Effect Level). NOAEL differs from NOEL in that it represents a situation where the acoustic character of an area can be slightly affected (but not such that there is a perceived change in the quality of life). UAEL represents a situation where noise is 'noticeable', 'very disruptive' and should be 'prevented' (as opposed to SOAEL, which represents a situation where noise is 'noticeable' and 'disruptive', and should be 'avoided').
- 5.12. As exposure increases above the LOAEL, the noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.
- 5.13. The LOAEL is described in PPG as the level above which "noise starts to cause small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life."
- 5.14. PPG identifies the SOAEL as the level above which "noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise.

Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area."

5.15. In line with the Explanatory Note of the NPSE, the PPG goes on to reference the LOAEL and SOAEL in relation to the noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that: *"...the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation."*

5.16. The relevant guidance in the PPG in relation to the adverse effect levels is summarized below:

Perception	Examples of Outcomes	Increasing Level	Effect	Action
Not Noticeable	No Effect	No Observed Effect		No specific measures required
Noticeable and not Intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect		No specific measures required
Lowest Observed Adverse Effect Level				
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Effect	Adverse	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level				
Noticeable and Disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect		Avoid
Noticeable and very Disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect		Prevent

5.17. This assessment will assess the impact of scooter deliveries from the kitchen in line with the NPPF. As the NPPF does not provide explicit objective assessment methodologies, various guidance documents and standards will be taken into account as summarized in the following section.

London Borough of Haringey Council

- 5.18. Derek Pearce from the local council advised the following in relation to plant noise:

"We would expect plant to be designed 10dB below the representative measured background noise level."

BS 4142:2014

- 5.19. BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' 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". The standard has been referenced as appropriate for the assessment of noise from plant.
- 5.20. The procedure contained in BS 4142:2014 provides the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains "a tone, impulse or other characteristic" then various corrections can be added to the specific (source) noise level to obtain the "rating level". Specifically "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 3 dB can be applied."
- 5.21. The likely effects of sound on people are assessed by subtracting the background noise level from the rating level. BS 4142:2014 states the following:
- *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.*

BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.

- 5.22. This Standard provides recommended guideline values for internal noise levels within dwellings which are similar in scope to the guideline values contained within the World Health Organisation (WHO) document, Guidelines for Community Noise (1999). These guideline noise levels are shown in Table 2, below.

Table 2 BS8233 Desirable Internal Ambient Noise Levels for Dwellings

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

- 5.23. BS 8233:2014 advises that: "regular individual noise events...can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values."

Guidelines for Community Noise, 1999 World Health Organisation, (WHO)

- 5.24. The (WHO) 1999 Guidelines for Community Noise also sets out guidance on suitable internal and external noise levels in and around residential properties. The following internal noise levels are recommended by the WHO in Table 4.1 (of the WHO document):

- 35 dB $L_{Aeq,T}$ in living rooms over a 16 hour day; and
- 30 dB $L_{Aeq,T}$ in bedrooms during the 8 hour night.

- 5.25. With respect to the night-time maximum noise levels, the WHO guidelines in Section 3.4 state:

"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night."

- 5.26. The guidelines refer to community noise which is also called environmental noise, residential noise or domestic noise. WHO states that this noise encompasses all sources except noise at the industrial workplace. Main sources of community noise include road, rail and air traffic, industries, construction and public work, and the neighbourhood. The main indoor sources of noise are ventilation systems, office machines, home appliances and neighbours. Typical neighbourhood noise comes from premises and installations related to the catering trade (restaurant, cafeterias, discotheques, etc.); from live or recorded music; sport events including motor sports; playgrounds; car parks; and domestic animals such as barking dogs.

6.0 Plant Noise assessment

- 6.1. Based on the guidance above and in order to demonstrate compliance with London Borough of Haringey Council's typical requirements, it is recommended that the cumulative noise level for the proposed plant should not exceed a level 10dB below the representative L_{A90} background level, at the nearest noise sensitive receptors. The following noise limits apply:

Table 3 Plant noise emissions limits at nearest receptors

Period	Cumulative plant noise level, dB(A)
Daytime (07.00 – 23.00 hours)	45
Night-time (23.00 – 07.00 hours)	44

- 6.2. Cumulative noise emissions from the proposed plant have been predicted at the nearest properties to the site, based on the manufacturer noise data presented in [Appendix D](#). A number of properties along Rathcoole Avenue have been assessed in order to identify the most affected receptor: it was found that 25 - 33 Rathcoole Avenue are subject to the highest plant noise levels.
- 6.3. Noise levels for the proposed extract systems have been predicted taking into account directivity of sound propagation, distance attenuation and screening from the cabin envelope.
- 6.4. The proposed fans are high-quality systems which will run continuously between 11.00 and 23.00 hours. The fans will not emit any impulsive characteristics provided they are well maintained. Although the manufacturer's do not provide 1/3 octave band frequency data to enable a full tonal analysis in accordance with the methodology detailed in BS 4142:2014, a review of the 1/1 octave band data does not suggest the presence of any tonal peaks.
- 6.5. Predicted noise levels during the daytime period (specifically between 11.00 and 23.00 hours when the plant will be in operation) are based upon all plant operating simultaneously at maximum capacity. All the plant will be switched off between 23.00 and 11.00 hours when the kitchens are closed. Therefore, an assessment of plant noise emissions during the night-time period is not required.
- 6.6. Table 4, below, summarises the assessment of predicted noise levels. The full set of calculations are presented in [Appendix E](#).

Table 4 Assessment of predicted noise levels at the nearest noise sensitive receptor

Receptor	Period	Predicted noise level at receptor, L_{Aeq} (dB)	Design criterion (dB)	Difference (dB)
Receptor R1	All plant operating (11.00 - 23.00 hours)	35	45	-10

- 6.7. The plant noise impact assessment has demonstrated that cumulative noise emissions from the proposed plant will comply with the local council's typical design criteria (as established in Table 3) at the most affected residential premises, without the need for mitigation measures.
- 6.8. Cumulative plant noise levels have been predicted to be 10dB below the otherwise prevailing background noise level outside the nearest noise sensitive receptors. In accordance with BS 4142:2014, plant noise levels will be comfortably below the threshold for *'low impact, depending on context'*.
- 6.9. 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.
 - The site is located within a busy city centre location with various commercial and industrial uses located within the vicinity. Many of these premises will have existing building services plant and, therefore, noise emitted from the Deliveroo site will be in keeping with the existing noise climate.
- 6.10. Where possible uncertainty in this assessment has been minimised by taking the following steps:
- The measurement of the background sound levels was undertaken at a representative location close to the site entrance.
 - The meter and calibrator used have a traceable laboratory calibration and 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.

7.0 Delivery scooter noise assessment

Sound pressure levels of activities associated with deliveries

- 7.1. The sound pressure levels associated with delivery scooter pass-bys were established by measurement of scooters at a similar Deliveroo kitchen already in operation. The sound pressure levels were normalised to a distance of 10m from the receptor position and have been converted to Sound Exposure Levels (SEL) for ease of comparison/calculation.
- 7.2. Traffic projections for the proposed Deliveroo kitchen have been provided by i-Transport. The busiest 1 hour period will have a total of 60 deliveries. Each delivery will consist of two pass by journeys (one in, one out) and 85% of the deliveries will be by scooter with the remainder by pedal cycle. Over the whole working day (11.00 to 23.00), the average delivery rate may be half the peak hourly rate.
- 7.3. Table 5, below, details typical source noise levels, used within the assessment, with the data presented in terms of SEL.

Table 5 Reference noise data for delivery activities (at 10m)

Noise Source	SEL, dB(A)
Scooter pass-by	57

Predicted impact

- 7.4. The information contained in Table 5 was used to 'build-up' a source noise level based on the number of activity events over the required assessment period using the following equation:

7.5.
$$L_{Aeq,T} = SEL + 10 \cdot \log\left(\frac{1}{T}\right) + 10 \cdot \log(N) \quad (\text{Equation 1})$$

Where:

SEL is the L_{Aeq} over a one second period, and represents the noise energy from an event (e.g. scooter pass-by) compressed into one second;

T is the reference time period in seconds; and

N is the number of movements in the time period, T.

- 7.6. The delivery path is located approximately 5m from the most affected noise sensitive receptor R2. Table 7 presents the calculated cumulative L_{Aeq} noise levels at the residential window.

Table 6 Predicted delivery noise levels

Period	Predicted noise levels at ground floor window of most affected residential dwelling
Daytime	48 $L_{Aeq,1hr}$ (dB)

BS 4142:2014 Assessment

- 7.7. Table 7 below presents the initial assessment of the likely impact during the daytime period in accordance with the BS 4142:2014 methodology.

Table 7 Assessment of predicted external delivery noise levels using BS 4142:2014 during the daytime

Results		Relevant Clauses of BS4142:2014	Commentary
Background Sound level	$L_{A90} = 55\text{dB}$	8.1, 8.2	Representative typical background sound level determined from a range of measurements
Assessment made during the daytime, so the reference interval is one hour		7.2	
Specific Sound Level	$L_{Aeq,T} = 48\text{dB}$	7.3.6	Calculations presented above
Acoustic Feature Correction	3dB	9.2	Scooters will pass intermittently
Rating Level	$(48+3) \text{ dB} = 51\text{dB}$		
Excess of Rating Level over background sound level	$(51-55) \text{ dB} = -4\text{dB}$		
Assessment of impact: low impact depending on context		11	

- 7.8. In addition to the context discussed in the section 6 - Plant Noise Assessment above, the context of this assessment may be explored by considering the absolute sound pressure levels. The existing ambient sound pressure levels and predicted sound pressure levels are examined within the BS 8233:2014 assessment below.
- 7.9. The uncertainties related to the assessment are mainly concentrated on the assumptions in relation to the number of scooter movements and the prevailing background noise levels. As the assessment errs on the side of caution, the uncertainties related to the assessment should have a positive impact on the end result i.e. smaller noise impact compared to that predicted.

BS 8233:2014 and WHO assessment

- 7.10. A BS 4142:2014 assessment considers only external noise levels at the location of sensitive receptors and does not consider the attenuation offered by the building envelope.

L_{Aeq} assessment

- 7.11. Based on the methodology detailed in Section 7.4, worst case noise levels from the delivery scooter activities within Receptor R2 have been predicted and summarised in Table 8 below. The predicted sound pressure levels are internal and inclusive of a 15dB sound reduction for partially opened windows (as per guidance within BS 8233:2014).
- 7.12. The predictions for the daytime period from 07:00 to 23:00 hours are based on the total scooter traffic projections for the busiest day. This results in an external noise level, due to scooters alone, of 43 dB $L_{Aeq,16hours}$. The equivalent continuous level measured during our survey, due to existing noise sources alone, was 64 dB $L_{Aeq,16hour}$.

Table 8 Summary of internal predicted noise levels with relevant guidance given in WHO documents and BS 8233:2014 for living rooms and bedrooms at Receptor R2

Typical Situation	Existing environmental only $L_{Aeq, T}$ (dB)	Predicted internal noise level		Target level $L_{Aeq, T}$ (dB)	Existing total difference (dB)	Existing & scooter total difference (dB)
		Scooters only $L_{Aeq, T}$ (dB)	Total environmental and scooter noise $L_{Aeq, T}$ (dB)			
Living rooms (daytime 07.00 – 23.00 hours)	49	28	49	35	+14	+14

- 7.13. The results from the environmental sound pressure level survey indicate that, with no delivery scooters, the measured $L_{Aeq, T}$ ambient noise levels exceed internal ambient noise targets as stated in BS 8233:2014 and WHO Guidelines for Community Noise, 1999 during the daytime period, assuming partially opened windows.
- 7.14. The predicted $L_{Aeq, T}$ noise emissions due to the delivery scooters will not increase the ambient noise levels since the predicted scooter noise emission levels are significantly lower than the existing ambient noise level.

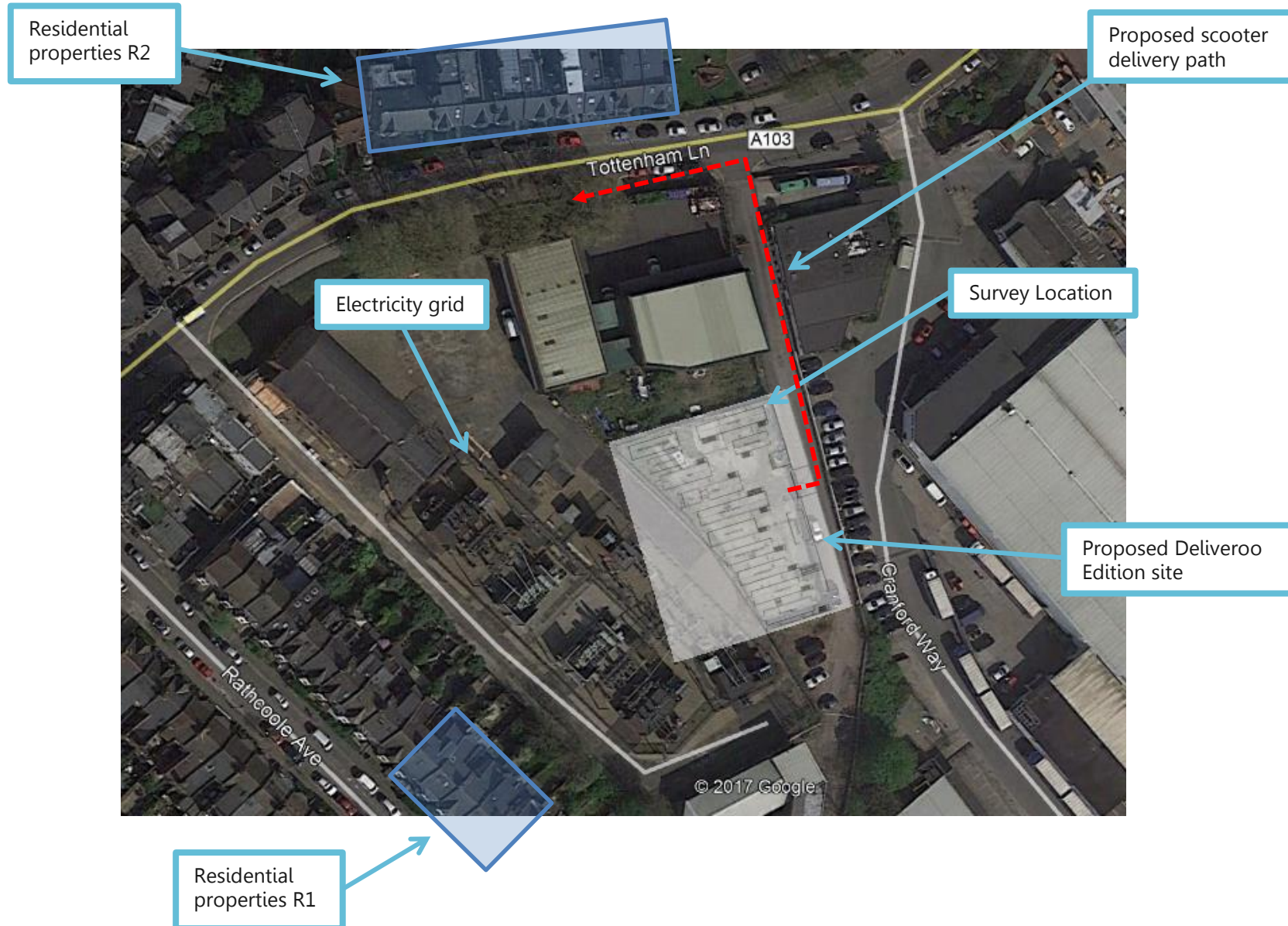
8.0 Summary

- 8.1. Noise Solutions Ltd (NSL) has been commissioned by Deliveroo to undertake a noise assessment for new plant at a proposed Deliveroo kitchen off of Tottenham Lane in Hornsey, London.
- 8.2. The noise impact from the proposed plant has been predicted at the nearest noise sensitive receptors to the site and assessed against the typical requirements of the London Borough of Haringey.
- 8.3. The predictions demonstrate that cumulative noise from the proposed plant should be acceptable to the London Borough of Haringey Council at all nearby receptors and at all times, without the need of mitigation measures.
- 8.4. Predicted noise from the delivery scooters are 'low impact' according to BS 4142:2014 and will not increase the internal noise levels within the nearest dwelling.
- 8.5. Therefore, noise from the 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 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

Details of environmental sound survey

- C.1 Measurements of the existing background sound levels were undertaken from 15:30 hours on Friday 27th October to 12:00 hours on Monday 30th October 2017.
- 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 15-minute sample periods for the duration of the survey.

Measurement position

- C.3 The sound level meter was positioned above a corner fence within the Deliveroo yard as shown in [Appendix B](#). The microphone was positioned in free-field at a height of approximately 3.5m above ground level.
- C.4 The adopted position is considered to be representative of the noise climate affecting the nearest noise sensitive premises to the site.

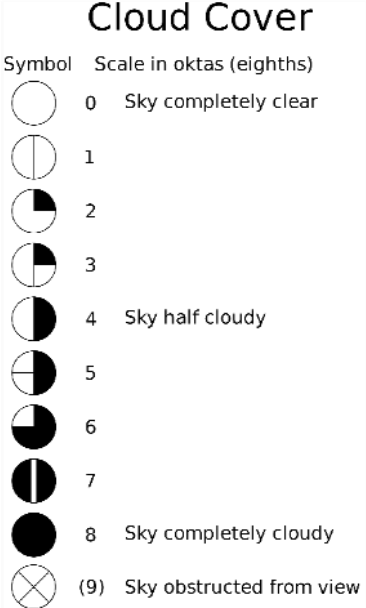
Equipment

- 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.

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Rion NL-52 / 00876023	03/10/2017	CONF101703
Condenser microphone	Rion UC-59 /11669		
Preamplifier	Rion NH-25 / 76140		
Calibrator	Rion NC-74 /34535932	21/09/2015	14746

Weather Conditions

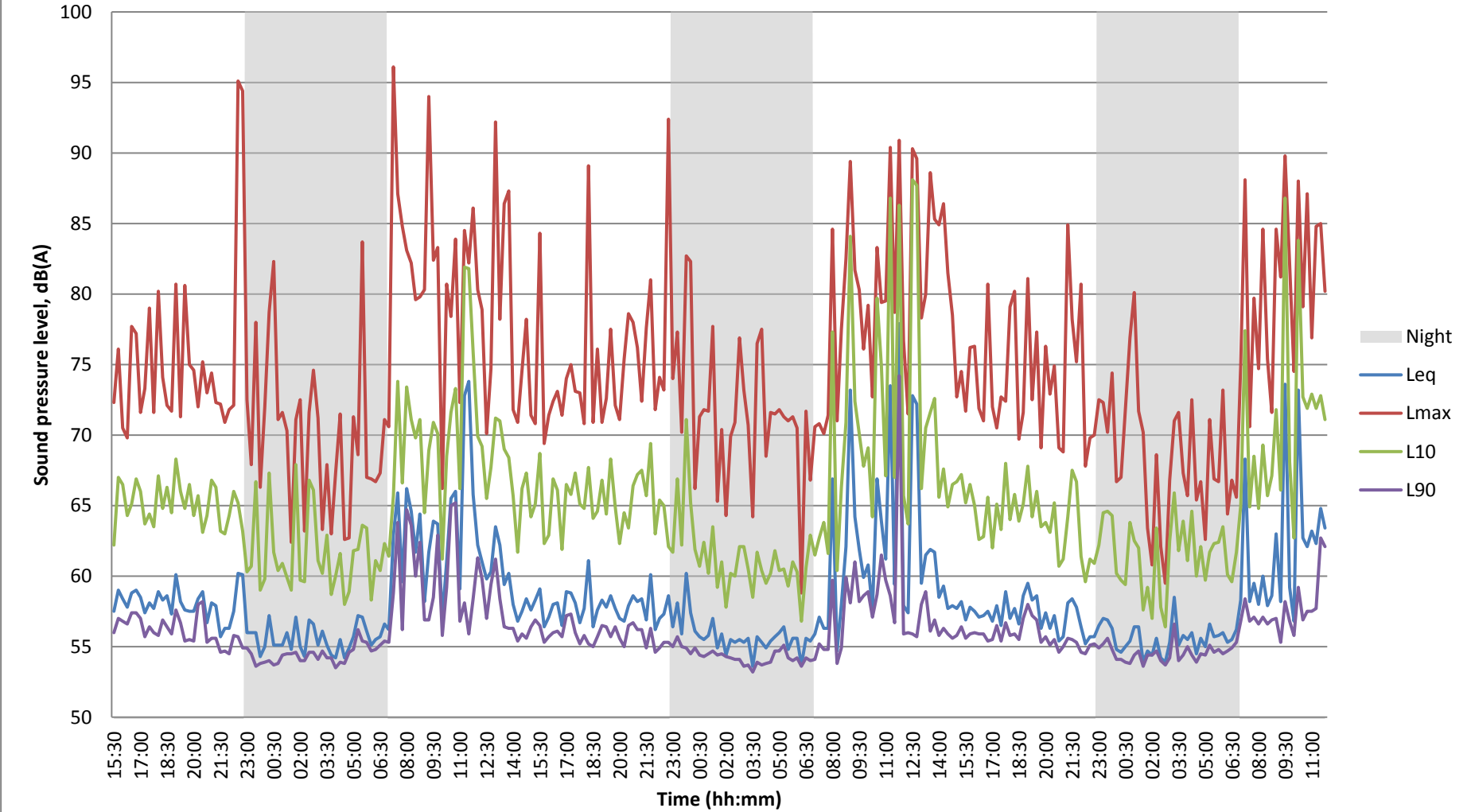
- C.6 Weather conditions were determined both at the start and on completion of the surveys. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the beginning and end of the survey.

Weather Conditions				
Measurement Location	Date/Time	Description	Beginning of Survey	End of Survey
As indicated on Appendix B	15:30 27/10/2017- 12:00 30/10/2017	Temperature (°C)	10	8
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)	1	7
		Presence of fog/snow/ice	No	No
		Presence of damp roads/wet ground	No	No
		Wind Speed (m/s)	3	-
		Wind Direction	N	-
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

Results

- C.7 The results of the survey are considered to be representative of background sound pressure levels at the façades of the nearest noise sensitive receptors to the proposed plant area during the quietest times at which the plant will operate. The noise climate during the survey period was dominated by the electrical sub-station, local road traffic movements and aeroplanes overhead. The results of the survey are presented in a time history graph overleaf.

Deliveroo, Hornsey
Sound pressure levels recorded from Friday 27th - Monday 30th Oct 2017



Appendix D Manufacturer plant noise data

Description	Model / Model	Quantity	Notes.	Sound power level(dB) at octave band centre frequencies (Hz)								Sound Pressure Level at 1m L _{PA} (dB)
				63	125	250	500	1k	2k	4k	8k	
Kitchen Extract	Systemair / AW 350E4 Sileo Axial Fan+	44	In-duct L _w Outlet	40	54	53	60	58	61	55	46	57
			In-duct L _w Inlet	39	53	55	58	58	61	54	45	57

Appendix E Plant noise level predictions at receptor

Receptor R1, 25-33 Rathcoole Avenue– Daytime

Kitchen	Maximum plant noise level at source		Distance		Directivity	Screening	Resultant at receptor (dB)
	Sound pressure level (dBA)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	
1 (Busaba)	57	1	74	-37	0	-5	15
	57	1	74	-37	0	-5	15
	57	1	77	-38	0	-5	14
	57	1	77	-38	0	-5	14
	57	1	81	-38	0	-5	14
	57	1	81	-38	0	-5	14
	57	1	82	-38	0	-5	14
	57	1	82	-38	0	-5	14
2 (Texas Joe)	57	1	76	-38	0	-5	14
	57	1	76	-38	0	-5	14
	57	1	79	-38	0	-5	14
	57	1	79	-38	0	-5	14
3 (GBK)	57	1	62	-36	0	-5	16
	57	1	62	-36	0	-5	16
	57	1	66	-36	0	-5	16
	57	1	66	-36	0	-5	16
4 (Pho)	57	1	66	-36	0	-5	16
	57	1	66	-36	0	-5	16
	57	1	69	-37	0	-5	15
	57	1	69	-37	0	-5	15
5 (White Rabbit)	57	1	62	-36	0	0	21
	57	1	62	-36	0	0	21

	57	1	66	-36	0	0	21
	57	1	66	-36	0	0	21
	57	1	69	-37	0	0	20
	57	1	69	-37	0	0	20
	57	1	71	-37	0	0	20
	57	1	71	-37	0	0	20
7 (Mother Clucker)	57	1	62	-36	0	0	21
	57	1	62	-36	0	0	21
	57	1	66	-36	0	0	21
	57	1	66	-36	0	0	21
8	57	1	62	-36	0	0	21
	57	1	62	-36	0	0	21
	57	1	67	-37	0	0	20
	57	1	67	-37	0	0	20
9	57	1	63	-36	0	0	21
	57	1	63	-36	0	0	21
	57	1	67	-37	0	0	20
	57	1	67	-37	0	0	20
10	57	1	64	-36	0	-5	16
	57	1	64	-36	0	-5	16
	57	1	68	-37	0	-5	15
	57	1	68	-37	0	-5	15
					Cumulative (dB)		35

Appendix F Proposed plant layout



APPENDIX B

NOYSPLOT PLANT NOISE PREDICTIONS

Client: Deliveroo Editions				Appendix B1.1								Page: 1 of 3	
Project: Deliveroo Crouch End				Project no: 2221305									
Consultant: K J Metcalfe				Date: 08 July 2022									
Sound power levels (Lw) & sound pressure levels (Lp) for fans & other equipment													
Equipment name/reference	Lw/ Lp	Dist. (m)	On time D/N/A	Mid-frequency Octave Bands (Hz)									
				63	125	250	500	1k	2k	4k	8k		
Kitchen 10 A/C Unit	Lp	1	D	52	dBA								
Kitchen 8 A/C Unit	Lp	1	D	52	dBA								
Kitchen 7 A/C Unit	Lp	1	D	52	dBA								
Kitchen 6 A/C Unit	Lp	1	D	52	dBA								
Kitchen 5 A/C Unit	Lp	1	D	52	dBA								
Kitchen 4 A/C Unit	Lp	1	D	52	dBA								
Kitchen 3 Fridge Unit	Lp	1	A	68	66	69	69	66	61	56	49		
Kitchen 2 A/C Unit	Lp	1	D	52	dBA								
Kitchen 1 A/C Unit	Lp	1	D	52	dBA								
Kitchen 1 Fridge Unit	Lp	1	A	68	66	69	69	66	61	56	49		
Motorcycle Space Fridge Unit	Lp	1	A	68	66	69	69	66	61	56	49		
Kitchen 10 Supply 1	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 10 Extract 1	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 10 Supply 2	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 10 Extract 2	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 9 Supply 1	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 9 Extract 1	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 9 Supply 2	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 9 Extract 2	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 8 Supply 1	Lw		D	76	76	64	63	58	60	54	47		
Notes: 1. Lw/Lp Lw means sound power level (dB) Lp means sound pressure level at the stated distance (dB@m) 2. On times (On.time D/N/A): D (Day) means that the fan/equipment could operate at any time between 0700 and 2300 hours N (Night) means that the fan/equipment could operate at any time between 2300 and 0700 hours A (All) means that the fan/equipment could operate at any time during the day and night													

Client: Deliveroo Editions				Appendix B1.1								Page: 2 of 3	
Project: Deliveroo Crouch End				Project no: 2221305									
Consultant: K J Metcalfe				Date: 08 July 2022									
Sound power levels (Lw) & sound pressure levels (Lp) for fans & other equipment													
Equipment name/reference	Lw/ Lp	Dist. (m)	On time D/N/A	Mid-frequency Octave Bands (Hz)									
				63	125	250	500	1k	2k	4k	8k		
Kitchen 8 Extract 1	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 8 Supply 2	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 8 Extract 2	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 7 Supply 1	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 7 Extract 1	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 7 Supply 2	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 7 Extract 2	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 5 Supply 1	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 5 Extract 1	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 5 Supply 2	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 5 Extract 2	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 5 Supply 3	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 5 Extract 3	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 5 Supply 4	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 5 Extract 4	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 4 Supply 1	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 4 Extract 1	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 4 Supply 2	Lw		D	76	76	64	63	58	60	54	47		
Kitchen 4 Extract 2	Lw		D	75	75	66	61	58	60	53	46		
Kitchen 3 Supply 1	Lw		D	76	76	64	63	58	60	54	47		
Notes:													
1. Lw/Lp Lw means sound power level (dB) Lp means sound pressure level at the stated distance (dB@m)													
2. On times (On.time D/N/A): D (Day) means that the fan/equipment could operate at any time between 0700 and 2300 hours N (Night) means that the fan/equipment could operate at any time between 2300 and 0700 hours A (All) means that the fan/equipment could operate at any time during the day and night													

Client: Deliveroo Editions			Appendix B1.1									Page: 3 of 3		
Project: Deliveroo Crouch End			Project no: 2221305											
Consultant: K J Metcalfe			Date: 08 July 2022											
Sound power levels (Lw) & sound pressure levels (Lp) for fans & other equipment														
Equipment name/reference	Lw/	Dist.	On time	Mid-frequency Octave Bands (Hz)										
	Lp	(m)		D/N/A	63	125	250	500	1k	2k	4k	8k		
Kitchen 3 Extract 1	Lw		D	75	75	66	61	58	60	53	46			
Kitchen 3 Supply 2	Lw		D	76	76	64	63	58	60	54	47			
Kitchen 3 Extract 2	Lw		D	75	75	66	61	58	60	53	46			
Kitchen 2 Supply 1	Lw		D	76	76	64	63	58	60	54	47			
Kitchen 2 Extract 1	Lw		D	75	75	66	61	58	60	53	46			
Kitchen 2 Supply 2	Lw		D	76	76	64	63	58	60	54	47			
Kitchen 2 Extract 2	Lw		D	75	75	66	61	58	60	53	46			
Kitchen 1 Supply 1	Lw		D	76	76	64	63	58	60	54	47			
Kitchen 1 Extract 1	Lw		D	75	75	66	61	58	60	53	46			
Kitchen 1 Supply 2	Lw		D	76	76	64	63	58	60	54	47			
Kitchen 1 Extract 2	Lw		D	75	75	66	61	58	60	53	46			
Kitchen 1 Supply 3	Lw		D	76	76	64	63	58	60	54	47			
Kitchen 1 Extract 3	Lw		D	75	75	66	61	58	60	53	46			
Kitchen 1 Supply 4	Lw		D	76	76	64	63	58	60	54	47			
Kitchen 1 Extract 4	Lw		D	75	75	66	61	58	60	53	46			
Large Extract Kitchen 8 (Roobox 4)	Lw		D	89	86	78	75	70	66	60	56			
Large Extract Kitchen 8 (Roobox 4)	Lw		D	89	86	78	75	70	66	60	56			

Notes:

1. Lw/Lp
Lw means sound power level (dB)
Lp means sound pressure level at the stated distance (dB@m)

2. On times (On.time D/N/A):
D (Day) means that the fan/equipment could operate at any time between 0700 and 2300 hours
N (Night) means that the fan/equipment could operate at any time between 2300 and 0700 hours
A (All) means that the fan/equipment could operate at any time during the day and night

Appendix B2: NoysPlot input data, source, receptor and barrier data

Sharps Redmore Partnership
The White House, London Road, Copdock, Ipswich, IP8 3JH

Filename: p:\22 - Projects\2221305 Deliveroo Crouch End Hornsea-KJM\NoysPlot\Crouch END FULL (MOT and AJM)\Deliveroo Crouch End Hornsey
Date: 08 July 2022
Entries by: K J Metcalfe
Project no: 2221305
Project title: Deliveroo Crouch End
Client's name: Deliveroo Editions

Map/plot details: Length: 3200
Width: 3200
Height: 250

Source data - description, co-ordinates, outlet size, percentage to atmosphere, directivity, sound levels and running period

Source description	Co-ordinates			Outlet details			%	Q	Run d/n/a	Lp/ Lw	dBA Y/N	Dist (m)	Noise level - Octave band centre frequency Hz							
	X m	Y m	Z m	Amm	Bmm	Ang.							63	125	250	500	1k	2k	4k	8k
Kitchen 10 A/C Unit	489.0	503.2	0.6	0	0	0	100	2	D	P	Y	1.0	52 dBA							
Kitchen 8 A/C Unit	494.0	512.8	0.6	0	0	0	100	2	D	P	Y	1.0	52 dBA							
Kitchen 7 A/C Unit	485.4	513.6	0.6	0	0	0	100	2	D	P	Y	1.0	52 dBA							
Kitchen 6 A/C Unit	484.0	518.0	0.6	0	0	0	100	2	D	P	Y	1.0	52 dBA							
Kitchen 5 A/C Unit	485.0	522.3	0.6	0	0	0	100	2	D	P	Y	1.0	52 dBA							
Kitchen 4 A/C Unit	486.0	526.8	0.6	0	0	0	100	2	D	P	Y	1.0	52 dBA							
Kitchen 3 Fridge Unit	478.0	533.0	0.6	0	0	0	100	2	A	P	N	1.0	68	66	69	69	66	61	56	49
Kitchen 2 A/C Unit	493.2	533.1	0.6	0	0	0	100	2	D	P	Y	1.0	52 dBA							
Kitchen 1 A/C Unit	492.0	541.6	0.6	0	0	0	100	2	D	P	Y	1.0	52 dBA							
Kitchen 1 Fridge Unit	498.8	540.0	0.6	0	0	0	100	2	A	P	N	1.0	68	66	69	69	66	61	56	49
Motorcycle Space Fridge Unit	499.6	530.0	0.6	0	0	0	100	2	A	P	N	1.0	68	66	69	69	66	61	56	49
Kitchen 10 Supply 1	491.6	500.6	1.8	400	400	180	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 10 Extract 1	493.6	500.6	1.8	400	400	180	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 10 Supply 2	495.6	500.6	1.8	400	400	180	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 10 Extract 2	497.6	500.6	1.8	400	400	180	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 9 Supply 1	489.4	508.2	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 9 Extract 1	491.4	508.2	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 9 Supply 2	493.4	508.2	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 9 Extract 2	495.4	508.2	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 8 Supply 1	488.0	512.6	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 8 Extract 1	490.0	512.6	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 8 Supply 2	492.0	512.6	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 8 Extract 2	494.0	512.6	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 7 Supply 1	487.0	517.0	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 7 Extract 1	489.0	517.0	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 7 Supply 2	491.0	517.0	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 7 Extract 2	493.0	517.0	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 5 Supply 1	484.1	525.7	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 5 Extract 1	485.6	525.7	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 5 Supply 2	487.1	525.7	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 5 Extract 2	488.6	525.7	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 5 Supply 3	490.1	525.7	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 5 Extract 3	491.6	525.7	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 5 Supply 4	493.1	525.7	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 5 Extract 4	494.3	525.7	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 4 Supply 1	485.2	530.2	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 4 Extract 1	486.7	530.2	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 4 Supply 2	488.2	530.2	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 4 Extract 2	489.7	530.2	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 3 Supply 1	480.6	534.2	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 3 Extract 1	482.6	534.2	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 3 Supply 2	484.6	534.2	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 3 Extract 2	486.6	534.2	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 2 Supply 1	491.7	536.5	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 2 Extract 1	493.7	536.5	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 2 Supply 2	495.7	536.5	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 2 Extract 2	497.7	536.5	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 1 Supply 1	486.8	541.5	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 1 Extract 1	488.3	541.5	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 1 Supply 2	489.8	541.5	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 1 Extract 2	491.3	541.5	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 1 Supply 3	492.8	541.5	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 1 Extract 3	494.3	541.5	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Kitchen 1 Supply 4	495.8	541.5	1.8	400	400	0	100	2	D	W	N	0.0	76	76	64	63	58	60	54	47
Kitchen 1 Extract 4	497.3	541.5	1.8	400	400	0	100	2	D	W	N	0.0	75	75	66	61	58	60	53	46
Large Extract Kitchen 8 (Roobo	487.0	512.6	2.0	400	400	270	100	1	D	W	N	0.0	89	86	78	75	70	66	60	56
Large Extract Kitchen 8 (Roobo	487.8	512.6	2.0	400	400	90	100	1	D	W	N	0.0	89	86	78	75	70	66	60	56

Receptor data - description and co-ordinates

Receptor description	Co-ordinates			DNA
	X m	Y m	Z m	
21 Rathcoole Avenue	424.0	498.0	7.5	A
9 Rathcoole Avenue	405.0	528.0	7.5	A

Barrier data - description and co-ordinates

Barrier description	Co-ordinates					
	Start			End		
	X m	Y m	Z m	X m	Y m	Z m
Finite barrier	500.0	500.0	1.5	486.0	500.0	1.5
Finite barrier	486.0	500.0	1.5	480.0	525.0	1.5
Finite barrier	480.0	525.0	1.5	472.0	542.0	1.5
Finite barrier	472.0	542.0	1.5	500.0	542.0	1.5
Finite barrier	500.0	542.0	1.5	500.0	528.0	1.5
Finite barrier	500.0	522.0	1.5	500.0	500.0	1.5
Ring barrier	497.8	500.8	2.2	489.6	500.8	2.2
Ring barrier	489.6	500.8	2.2	489.6	503.8	2.2
Ring barrier	489.6	503.8	2.2	497.8	503.8	2.2
Ring barrier	497.8	503.8	2.2	497.8	500.8	2.2
Ring barrier	495.6	505.0	2.2	487.4	505.0	2.2
Ring barrier	487.4	505.0	2.2	487.4	508.0	2.2
Ring barrier	487.4	508.0	2.2	495.6	508.0	2.2
Ring barrier	495.6	508.0	2.2	495.6	505.0	2.2
Ring barrier	494.5	509.4	2.2	486.0	509.4	2.2
Ring barrier	486.0	509.4	2.2	486.0	512.4	2.2
Ring barrier	486.0	512.4	2.2	494.5	512.4	2.2
Ring barrier	494.5	512.4	2.2	494.5	509.4	2.2
Ring barrier	493.2	513.8	2.2	485.0	513.8	2.2
Ring barrier	485.0	513.8	2.2	485.0	516.8	2.2
Ring barrier	485.0	516.8	2.2	493.2	516.8	2.2
Ring barrier	493.2	516.8	2.2	493.2	513.8	2.2
Ring barrier	491.5	518.2	2.2	483.2	518.2	2.2
Ring barrier	483.2	518.2	2.2	483.2	521.2	2.2
Ring barrier	483.2	521.2	2.2	491.5	521.2	2.2
Ring barrier	491.5	521.2	2.2	491.5	518.2	2.2
Ring barrier	494.5	522.5	2.2	482.6	522.5	2.2
Ring barrier	482.6	522.5	2.2	482.6	525.5	2.2
Ring barrier	482.6	525.5	2.2	494.5	525.5	2.2
Ring barrier	494.5	525.5	2.2	494.5	522.5	2.2
Ring barrier	491.0	527.0	2.2	485.0	527.0	2.2
Ring barrier	485.0	527.0	2.2	485.0	527.5	2.2
Ring barrier	485.0	527.5	2.2	484.0	527.5	2.2
Ring barrier	484.0	527.5	2.2	484.0	527.0	2.2
Ring barrier	484.0	527.0	2.2	480.5	527.0	2.2
Ring barrier	480.5	527.0	2.2	480.5	530.0	2.2
Ring barrier	480.5	530.0	2.2	484.0	530.0	2.2
Ring barrier	484.0	530.0	2.2	484.0	529.5	2.2
Ring barrier	484.0	529.5	2.2	485.0	529.5	2.2
Ring barrier	485.0	529.5	2.2	485.0	530.0	2.2
Ring barrier	485.0	530.0	2.2	491.0	530.0	2.2
Ring barrier	491.0	530.0	2.2	491.0	527.0	2.2
Ring barrier	486.9	531.0	2.2	478.6	531.0	2.2
Ring barrier	478.6	531.0	2.2	478.6	534.0	2.2
Ring barrier	478.6	534.0	2.2	486.9	534.0	2.2
Ring barrier	486.9	534.0	2.2	486.9	531.0	2.2
Ring barrier	497.7	533.3	2.2	489.7	533.3	2.2
Ring barrier	489.7	533.3	2.2	489.7	536.3	2.2
Ring barrier	489.7	536.3	2.2	497.7	536.3	2.2
Ring barrier	497.7	536.3	2.2	497.7	533.3	2.2
Ring barrier	498.6	538.3	2.2	486.6	538.3	2.2
Ring barrier	486.6	538.3	2.2	486.6	541.3	2.2
Ring barrier	486.6	541.3	2.2	498.6	541.3	2.2
Ring barrier	498.6	541.3	2.2	498.6	538.3	2.2
Ring barrier	483.0	534.8	2.2	477.0	534.8	2.2
Ring barrier	477.0	534.8	2.2	477.0	537.8	2.2
Ring barrier	477.0	537.8	2.2	483.0	537.8	2.2
Ring barrier	483.0	537.8	2.2	483.0	534.8	2.2
Ring barrier	483.0	538.3	2.2	475.0	538.3	2.2
Ring barrier	475.0	538.3	2.2	475.0	541.3	2.2
Ring barrier	475.0	541.3	2.2	483.0	541.3	2.2
Ring barrier	483.0	541.3	2.2	483.0	538.3	2.2
Ring barrier	499.6	514.0	2.2	496.6	514.0	2.2
Ring barrier	496.6	514.0	2.2	496.6	520.0	2.2
Ring barrier	496.6	520.0	2.2	499.6	520.0	2.2
Ring barrier	499.6	520.0	2.2	499.6	514.0	2.2

Appendix B3: Predicted daytime noise levels

Overall receptor listings

Period: Day time

Overall daytime plant noise levels (dB)	Mid frequency octave bands (Hz)								
	63	125	250	500	1k	2k	4k	8k	dBA
9 Rathcoole Avenue	44	43	37	36	31	28	21	16	37
21 Rathcoole Avenue	45	44	37	36	31	26	20	14	37

Source noise levels at receiver: 21 Rathcoole Avenue

Period: Day time

Plant item	Mid frequency octave bands (Hz)								
	63	125	250	500	1k	2k	4k	8k	dBA
Large Extract Kitchen 8 (Roobox 4)	33	35	33	33	29	24	19	14	34
Motorcycle Space Fridge Unit	31	28	30	29	25	18	11	1	30
Kitchen 3 Fridge Unit	29	26	27	25	20	12	4	0	26
Large Extract Kitchen 8 (Roobox 4)	38	36	27	22	14	9	0	0	25
Kitchen 1 Fridge Unit	26	22	22	19	13	5	0	0	19
Kitchen 10 Supply 2	25	27	17	15	7	9	0	0	17
Kitchen 10 Supply 1	25	27	16	15	7	9	0	0	17
Kitchen 10 Extract 2	24	26	19	13	7	9	0	0	17
Kitchen 9 Supply 1	28	29	16	13	4	6	0	0	17
Kitchen 10 Extract 1	24	26	18	13	7	9	0	0	16
Kitchen 8 Supply 1	28	29	15	12	3	3	0	0	16
Kitchen 9 Supply 2	27	28	14	11	1	2	0	0	15
Kitchen 7 Supply 1	28	28	14	11	1	1	0	0	15
Kitchen 1 Supply 1	26	27	14	12	3	4	0	0	15
Kitchen 5 Supply 1	27	28	14	10	0	0	0	0	14
Kitchen 9 Extract 1	26	27	16	9	2	2	0	0	14
Kitchen 9 Extract 2	26	27	16	9	1	1	0	0	14
Kitchen 8 Supply 2	27	27	13	9	0	0	0	0	13
Kitchen 4 A/C Unit	32	22	14	7	3	1	0	0	13
Kitchen 8 Extract 1	26	26	15	8	0	0	0	0	13
Kitchen 8 Extract 2	26	26	15	7	0	0	0	0	12
Kitchen 4 Supply 1	26	26	12	9	0	0	0	0	12
Kitchen 7 Extract 1	25	26	14	7	0	0	0	0	12
Kitchen 7 Supply 2	26	26	12	8	0	0	0	0	12
Kitchen 3 Supply 1	26	26	11	7	0	0	0	0	12
Kitchen 7 Extract 2	25	25	14	6	0	0	0	0	11
Kitchen 5 A/C Unit	31	21	13	7	2	0	0	0	11
Kitchen 10 A/C Unit	31	21	13	6	1	0	0	0	11
Kitchen 5 Extract 1	25	25	13	5	0	0	0	0	11
Kitchen 5 Supply 2	26	25	11	7	0	0	0	0	11
Kitchen 5 Supply 4	25	25	10	6	0	0	0	0	11
Kitchen 2 Supply 1	25	25	10	6	0	0	0	0	11
Kitchen 4 Supply 2	25	25	10	6	0	0	0	0	11
Kitchen 5 Supply 3	25	25	10	6	0	0	0	0	11
Kitchen 5 Extract 2	24	24	13	4	0	0	0	0	10
Kitchen 8 A/C Unit	32	20	12	4	0	0	0	0	10
Kitchen 3 Extract 1	24	24	12	4	0	0	0	0	10
Kitchen 4 Extract 2	24	24	12	4	0	0	0	0	10
Kitchen 3 Supply 2	25	24	10	6	0	0	0	0	10
Kitchen 3 Extract 2	24	24	12	4	0	0	0	0	10
Kitchen 4 Extract 1	24	24	12	4	0	0	0	0	10
Kitchen 5 Extract 3	24	24	12	4	0	0	0	0	10
Kitchen 1 Extract 1	24	24	12	4	0	0	0	0	10
Kitchen 7 A/C Unit	31	20	12	4	0	0	0	0	10
Kitchen 2 A/C Unit	31	20	11	4	0	0	0	0	10
Kitchen 1 Supply 2	24	24	9	5	0	0	0	0	9
Kitchen 2 Supply 2	24	24	9	5	0	0	0	0	9
Kitchen 6 A/C Unit	30	20	11	4	0	0	0	0	9
Kitchen 5 Extract 4	23	23	11	3	0	0	0	0	9
Kitchen 2 Extract 2	23	23	11	3	0	0	0	0	9
Kitchen 2 Extract 1	23	23	11	3	0	0	0	0	9
Kitchen 1 Supply 3	24	23	8	4	0	0	0	0	9
Kitchen 1 Extract 2	23	22	11	2	0	0	0	0	8
Kitchen 1 Extract 3	22	22	10	2	0	0	0	0	8
Kitchen 1 Supply 4	22	22	7	3	0	0	0	0	7
Kitchen 1 Extract 4	21	21	9	1	0	0	0	0	6
Kitchen 1 A/C Unit	27	15	6	0	0	0	0	0	4
Total Free field Lp and dBA	45	44	37	36	31	26	20	14	37

Source noise levels at receiver: 9 Rathcoole Avenue

Period: Day time

Plant item	Mid frequency octave bands (Hz)								
	63	125	250	500	1k	2k	4k	8k	dBA
Large Extract Kitchen 8 (Roobox 4)	29	32	33	33	29	25	20	16	34
Motorcycle Space Fridge Unit	30	27	30	29	25	19	12	4	30
Kitchen 3 Fridge Unit	28	25	26	24	19	11	3	0	25
Large Extract Kitchen 8 (Roobox 4)	33	32	26	22	14	10	1	0	23
Kitchen 1 Fridge Unit	25	20	21	18	12	4	0	0	18
Kitchen 4 Supply 1	24	26	14	14	6	8	0	0	16
Kitchen 3 Supply 1	24	25	14	14	6	8	0	0	16
Kitchen 7 Supply 1	24	25	14	14	6	8	0	0	16
Kitchen 5 Supply 2	24	25	14	14	6	8	0	0	16
Kitchen 5 Supply 1	24	25	14	14	6	8	0	0	16
Kitchen 4 Extract 1	23	25	17	12	6	8	0	0	15
Kitchen 5 Extract 2	23	25	16	12	6	8	0	0	15
Kitchen 4 Supply 2	26	27	14	12	4	6	0	0	15
Kitchen 5 Extract 1	23	24	16	12	6	8	0	0	15
Kitchen 5 Supply 4	23	25	14	13	5	7	0	0	15
Kitchen 5 Supply 3	23	25	14	13	5	7	0	0	15
Kitchen 7 Supply 2	23	25	13	13	5	7	0	0	15
Kitchen 3 Supply 2	26	27	14	12	3	4	0	0	15
Kitchen 8 Supply 1	23	24	13	13	5	7	0	0	15
Kitchen 9 Supply 1	23	24	13	13	5	7	0	0	15
Kitchen 7 Extract 2	22	24	16	11	5	7	0	0	14
Kitchen 5 Extract 3	22	24	16	11	5	7	0	0	14
Kitchen 5 Extract 4	22	24	16	11	5	7	0	0	14
Kitchen 2 Supply 1	26	27	13	11	2	4	0	0	14
Kitchen 3 Extract 1	25	26	16	10	3	5	0	0	14
Kitchen 8 Supply 2	25	26	13	11	3	5	0	0	14
Kitchen 7 Extract 1	22	23	15	11	5	7	0	0	14
Kitchen 8 Extract 1	22	23	15	11	5	7	0	0	14
Kitchen 1 Supply 1	26	27	13	10	2	3	0	0	14
Kitchen 3 Extract 2	25	26	16	9	3	4	0	0	14
Kitchen 9 Supply 2	25	26	13	11	2	4	0	0	14
Kitchen 4 Extract 2	24	25	15	9	3	5	0	0	14
Kitchen 9 Extract 1	24	25	15	9	3	5	0	0	14
Kitchen 8 Extract 2	24	25	15	9	3	4	0	0	13
Kitchen 2 Supply 2	25	26	13	10	1	2	0	0	13
Kitchen 2 Extract 1	24	25	15	8	2	3	0	0	13
Kitchen 9 Extract 2	24	25	15	8	2	3	0	0	13
Kitchen 1 Extract 1	24	25	15	8	1	3	0	0	13
Kitchen 1 Supply 2	25	26	12	10	0	1	0	0	13
Kitchen 2 Extract 2	24	25	15	8	1	1	0	0	13
Kitchen 1 Supply 3	25	25	12	9	0	0	0	0	12
Kitchen 1 Extract 2	24	25	14	7	0	0	0	0	12
Kitchen 1 Supply 4	25	25	11	8	0	0	0	0	11
Kitchen 1 Extract 3	24	24	14	6	0	0	0	0	11
Kitchen 8 A/C Unit	31	20	13	6	1	0	0	0	11
Kitchen 1 A/C Unit	32	21	13	5	0	0	0	0	11
Kitchen 1 Extract 4	24	24	13	6	0	0	0	0	11
Kitchen 2 A/C Unit	32	21	12	4	0	0	0	0	11
Kitchen 4 A/C Unit	29	19	12	6	2	0	0	0	10
Kitchen 5 A/C Unit	29	19	11	4	0	0	0	0	9
Kitchen 10 Supply 1	22	22	8	4	0	0	0	0	8
Kitchen 7 A/C Unit	29	18	10	2	0	0	0	0	8
Kitchen 10 A/C Unit	28	18	10	3	0	0	0	0	7
Kitchen 10 Extract 1	21	21	10	2	0	0	0	0	7
Kitchen 6 A/C Unit	28	18	9	2	0	0	0	0	6
Kitchen 10 Supply 2	21	21	7	3	0	0	0	0	6
Kitchen 10 Extract 2	20	20	9	1	0	0	0	0	5
Total Free field Lp and dBA	44	43	37	36	31	28	21	16	37

Appendix B4: Predicted night time noise levels

Overall receptor listings

Period: Night-time

Overall night time plant noise levels (dB)	Mid frequency octave bands (Hz)								
	63	125	250	500	1k	2k	4k	8k	dBA
21 Rathcoole Avenue	34	31	32	31	26	19	12	1	31
9 Rathcoole Avenue	33	30	32	30	26	20	13	4	31

Source noise levels at receiver: 21 Rathcoole Avenue

Period: Night-time

Plant item	Mid frequency octave bands (Hz)								
	63	125	250	500	1k	2k	4k	8k	dBA
Motorcycle Space Fridge Unit	31	28	30	29	25	18	11	1	30
Kitchen 3 Fridge Unit	29	26	27	25	20	12	4	0	26
Kitchen 1 Fridge Unit	26	22	22	19	13	5	0	0	19
Total Free field Lp and dBA	34	31	32	31	26	19	12	1	31

Source noise levels at receiver: 9 Rathcoole Avenue

Period: Night-time

Plant item	Mid frequency octave bands (Hz)								
	63	125	250	500	1k	2k	4k	8k	dBA
Motorcycle Space Fridge Unit	30	27	30	29	25	19	12	4	30
Kitchen 3 Fridge Unit	28	25	26	24	19	11	3	0	25
Kitchen 1 Fridge Unit	25	20	21	18	12	4	0	0	18
Total Free field Lp and dBA	33	30	32	30	26	20	13	4	31

APPENDIX C

ACOUSTIC TERMINOLOGY

Acoustic Terminology

- C1 Noise, defined as unwanted sound, is measured in units of decibels, dB. The range of audible sounds is from 0 dB to 140 dB. Two equal sources of sound, if added together will result in an increase in level of 3 dB, i.e. 50 dB + 50 dB = 53 dB. Increases in continuous sound are perceived in the following manner:
- 1 dB increase - barely perceptible.
 - 3 dB increase - just noticeable.
 - 10 dB increase - perceived as twice as loud.
- C2 Frequency (or pitch) of sound is measured in units of Hertz. 1 Hertz (Hz) = 1 cycle/second. The range of frequencies audible to the human ear is around 20Hz to 18000Hz (or 18kHz). The capability of a person to hear higher frequencies will reduce with age. The ear is more sensitive to medium frequency than high or low frequencies.
- C3 To take account of the varying sensitivity of people to different frequencies a weighting scale has been universally adopted called "A-weighting". The measuring equipment has the ability automatically to weight (or filter) a sound to this A scale so that the sound level it measures best correlates to the subjective response of a person. The unit of measurement thus becomes dBA (decibel, A-weighted).
- C4 The second important characteristic of sound is amplitude or level. Two units are used to express level, a) sound power level - L_w and b) sound pressure level - L_p . Sound power level is an inherent property of a source whilst sound pressure level is dependent on surroundings/distance/directivity, etc. The sound level that is measured on a meter is the sound pressure level, L_p .
- C5 External sound levels are rarely steady but rise or fall in response to the activity in the area - cars, voices, planes, birdsong, etc. A person's subjective response to different noises has been found to vary dependent on the type and temporal distribution of a particular type of noise. A set of statistical indices have been developed for the subjective response to these different noise sources.
- C6 The main noise indices in use in the UK are:
- L_{A90} : The sound level (in dBA) exceeded for 90% of the time. This level gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the "background sound level" of an area.
 - L_{Aeq} : The equivalent continuous sound level in dBA. This unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the intermittent noise". In other

words, the energy average level. This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as aircraft and trains.

L_{A10}: The sound level (in dBA) exceeded for 10% of the time. This level gives an indication of the sound level during the noisier periods of time in any given sample. It has been used over many years to measure and assess road traffic noise.

L_{AMAX}: The maximum level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.

- C7** The sound energy of a transient event may be described by a term SEL - Sound Exposure Level. This is the L_{Aeq} level normalised to one second. That is the constant level in dBA which lasting for one second has the same amount of acoustic energy as a given A weighted noise event lasting for a period of time. The use of this unit allows the prediction of the L_{Aeq} level over any period and for any number of events using the equation;

$$L_{AeqT} = SEL + 10 \log n - 10 \log T \text{ dB.}$$

Where

n = Number of events in time period T.

T = Total sample period in seconds.

- C8** In the open, known as free field, sound attenuates at a rate of 6 dB per each doubling of distance. This is known as geometric spreading or sometimes referred to as the Inverse Square Law. As noise is measured on a Logarithmic scale, this attenuation in distance = 20 Log (ratio of distances), e.g. for a noise level of 60 dB at ten metres, the corresponding level at 160 metres is:

$$60 - 20 \log \frac{160}{10} = 60 - 24 = 36 \text{ dB.}$$