ENVIRONMENTAL NOISE AND IMPACT ASSESSMENT

Cecil Sharp House

Produced by XCO2 for Cecil Sharp House

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EXECUTIVE SUMMARY

An environmental noise survey has been undertaken at Cecil Sharp House, London, to determine the representative background sound level at the nearest noise-sensitive premises.

The maximum noise levels from the proposed new plant located at roof level towards the north of the site, adjacent to the lift overrun have been calculated at various noise sensitive receptors and compared with the requirements of the London Borough of Camden's Local Plan Policy.

NOISE IMPACT ASSESSMENT

Four residential windows near to Cecil Sharp House have been identified as the nearest sensitive receptors with regard to noise impact from potential plant.

Background noise level has been measured at a representative location, close to the nearest sensitive receptor. The representative background sound level during the proposed hours of plant operation (08.00 to 23.00 hours), is considered to be 51 dB L_{A90}. The measurement has been taken for 24 hours between 2nd October 2019 and 3rd October 2019.

Attenuation is required as follows:

- 5dB(A) attenuation to AHU fresh air intake
- 15dB(A) attenuation to kitchen extract exhaust
- Acoustic screening to ASHP
- Attenuation to ASHP providing 6dB(A) overall noise reduction (in addition to the screen); alternatively, a unit 6dBA quieter may be selected during detailed design

With the above attenuation, the rating noise level of the proposed plant, assessed using the methodology described in BS 4142:2014, will be at least 10dB below the existing background sound levels and would therefore comply with London Borough of Camden's usual requirements.

INTRODUCTION

Cecil Sharp House in London is the Grade II listed Headquarters for the English Folk Dance and Song Society, built in 1929-30. The building was partly rebuilt in 1949-1951 after damage received from the war. The Society are currently requesting funding to complete the first phase of a long-term plan which aims to upgrade facilities at the Cecil Sharp House; this is by improving the quality and scope of the venues to hire and making the existing mechanical and electrical infrastructure more efficient, thus improving the revenue streams. The first phase of works looks to: upgrade inefficient mechanical and electrical installations to save on energy consumption and free-up space, consolidate the bar and café into one area making it more space efficient and appealing, bringing in more revenue and finally, expand and improve venues available for hire increasing revenue.

SITE LOCATION

The site is located at Cecil Sharp House, within the London Borough of Camden (See Figure 1 below).

Figure 1: Site location map

PLANNING POLICIES

A great deal of change has occurred in recent years in the assessment of noise impacts and their relationship with planning decisions. The following sections introduce the applicable policies, either national or local, which ought to be considered to support the planning application. It should be highlighted that the assessment is mainly addressed to the local planning authority.

NOISE POLICY STATEMENT FOR ENGLAND

The Noise Policy Statement for England (NPSE[1]), 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."*

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.

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."*

Importantly, the NPSE goes on to state that: " *This does not mean that such adverse effects cannot occur."*

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."*

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.

[1] Noise Policy Statement for England, Defra, March 2010

NATIONAL PLANNING POLICY FRAMEWORK

A new edition of The National Planning Policy Framework (NPPF[2]) was published in February 2019 and came into effect immediately. The original NPPF 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.

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."*

The NPPF goes on to state in Paragraph 180 "*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 health and quality of life arising from noise from new development, including thorough 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 use since they were established, and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value."*

The NPPF document does not refer to any other documents or British Standards regarding noise other than the NPSE.

Paragraph 11 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."*

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"*.

Paragraph 13 of the NPPF states that *"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."*

Therefore, if a development/local plan does not align closely with the NPPF, planning decisions should be based on assessments which align with the NPPF. So for instance if a development is refused permission due to conflicts with the local plan, this decision can be overturned (i.e. via the appeal process) if the local plan did not closely align with the aims in the NPPF.

[2] National Planning Policy Framework, DCLG, February 2019

Paragraph 17 of the NPPF states that one of the 12 principles of planning is that it should "*not simply be about scrutiny, but instead be a creative exercise in finding ways to enhance and improve the places in which people live their lives.*"

Paragraph 117 states that *"Planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value. To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account."*

PLANNING PRACTICE GUIDANCE – NOISE

As of March 2014, a Planning Practice Guidance (PPG[3]) for noise was issued which provides additional guidance and elaboration on the NPPF. It 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.

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').

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.

The LOAEL is described in PPG[4] 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."*

PPG identifies the SOAEL[5] 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."*

In line with the Explanatory Note of the NPSE, the PPG goes on to reference the LOAEL and SOAEL in relation to 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

[3] Planning Practice Guidance – Noise, http://planningguidance.planningportal.gov.uk/blog/guidance/noise/, 06 March 2014
[4] Paragraph: 005 Reference ID: 30-005-20140306

levels are provided for LOAEL or SOAEL although the PPG[5] 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."*

The relevant guidance in the PPG in relation to the adverse effect levels is summarized in Table 1.

Table 1. PPG guidance on adverse effect levels

Perception	Examples of Outcomes	Increasing Effect Level	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 Adverse Effect	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

The Planning Practice Guidance[6] states the following in relation to mitigation measures:

> *"For noise sensitive developments mitigation measures can include avoiding noisy locations; designing the development to reduce the impact of noise from the local environment; including noise barriers; and, optimising the sound insulation provided by the building envelope. Care should be taken when considering mitigation to ensure the envisaged measures do not make for an unsatisfactory development."*

[5] Paragraph: 006 Reference ID: 30-006-20141224
[6] Paragraph: 008 Reference ID: 30-008-20140306

In addition[7]:

"consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations".

LOCAL PLAN POLICY

The Camden Local Plan sets out the Council's planning policies and replaces the Core Strategy and Development Policies planning documents (adopted in 2017). It ensures that Camden continues to have robust, effective and up to date planning policies that respond to changing circumstances and the borough's unique characteristics and contribute to delivering the Camden Plan and other local priorities.

Two Planning Policies linked to Noise requirements are Policy A1 and A4 with further guidance provided in the Camden Planning Guidance Amenity March 2018 document.

POLICY A1 MANAGING THE IMPACT OF DEVELOPMENT

The Council will seek to protect the quality of life of occupiers and neighbours. We will grant permission for development unless this causes unacceptable harm to amenity.
We will:
a. seek to ensure that the amenity of communities, occupiers and neighbours is protected;
b. seek to ensure development contributes towards strong and successful communities by balancing the needs of development with the needs and characteristics of local areas and communities;
c. resist development that fails to adequately assess and address transport impacts affecting communities, occupiers, neighbours and the existing transport network; and
d. require mitigation measures where necessary.
The factors we will consider include:
e. visual privacy, outlook;
f. sunlight, daylight and overshadowing;
g. artificial lighting levels;
h. transport impacts, including the use of Transport Assessments, Travel Plans and Delivery and Servicing Management Plans;
i. impacts of the construction phase, including the use of Construction Management Plans;
j. noise and vibration levels;
k. odour, fumes and dust;
l. microclimate;
m. contaminated land; and
n. impact upon water and wastewater infrastructure.

[7] Paragraph: 006 Reference ID: 30-006-20141224

POLICY A4 NOISE AND VIBRATION

The Council will seek to ensure that noise and vibration is controlled and managed.
Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:
a. development likely to generate unacceptable noise and vibration impacts; or
b. development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.
We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development.

CAMDEN PLANNING GUIDANCE: AMENITY (MARCH 2018)

NOISE AND VIBRATION THRESHOLDS

6.8 When assessing acoustic reports, the Council will consider the reported measurements against the noise thresholds set out in Appendix 3 of the Local Plan. The thresholds are expressed as 'effect levels', which sets out a hierarchy of expected changes in behaviour and impact on health and wellbeing in response to increasing noise levels (measured in decibels - dB). The 'effect levels' are summarised below and explained in detail in National Planning Practice Guidance (NPPG). The table detailing each 'effect level' from NPPG is also set out in Appendix 1 to this guidance for ease of reference.

- *No observed effect level (NOEL) – the level below which no effect can be detected on health and quality of life.*
- *Lowest observable adverse effect level (LOAEL) – 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.*
- *Significant observed adverse effect level (SOAEL) – 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.*

6.9 Where appropriate, the Council will also consider the cumulative impact of numerous individual noise sources where noise is known to be an issue. Camden's town centres for example are known to have a proliferation of air conditioning machinery and contain numerous food, drink, leisure and entertainment uses which all contribute to creating noisy environments.

PLANT AND OTHER NOISE GENERATING EQUIPMENT

6.27 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.
6.28 There are however likely to be instances where the Council will consider that a BS4142 assessment alone is not sufficient to provide all the information necessary. Plant such as electrical substations for example, may meet BS4142 standards, but are also known to emit low frequency noise, which also needs to be considered. Developers are therefore encouraged to discuss proposals of this nature with the Council's Noise team before preparing their acoustic report - Email: RegulatoryServices@camden.gov.uk.
6.29 Plant, ventilation, air extraction or conditioning equipment and flues can cause disturbance to residential properties. The Council would therefore welcome the use of long-term maintenance agreements to ensure that equipment maintains acceptable noise levels over its lifetime and the use of timers to limit any unnecessary operation of the equipment.

MEASUREMENT OF NOISE LEVELS

The following section describes the methodology undertaken to establish the environmental noise levels around the site.

DETAILS OF ENVIRONMENTAL SOUND SURVEY

Continuous measurements of the incident sound pressure levels at the site were undertaken from 15:30 on Wednesday 2nd October 2019 to 15:30 on Thursday 3rd October 2019. The sound level meter was programmed to record the A-weighted L_{eq}, L_{90}, L_{10} and L_{max} noise indices and corresponding octave band frequency information (for L_{eq}) for consecutive five-minute sample periods for the duration of the survey.

MEASUREMENT POSITIONS

The measurements of incident sound levels were undertaken within the north car-park area. The approximate location of the sound level meter is indicated in the aerial photograph below along with the approximate location of nearest noise sensitive receptors Figure 2.

1 SOUND MEASUREMENT LOCATION

1 RECEPTOR LOCATION

Figure 2: On site sound pressure level measurement positions

The microphone was located approximately 1.5m above the ground. In accordance with BS 7445-2:21991 'Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use', the measurements were undertaken under free-field conditions.

EQUIPMENT

Details of the equipment used during the survey are provided in Table 2 below. The sound level meters were calibrated before and after the survey; no significant change (+/-0.2 dB) in the calibration level was noted.

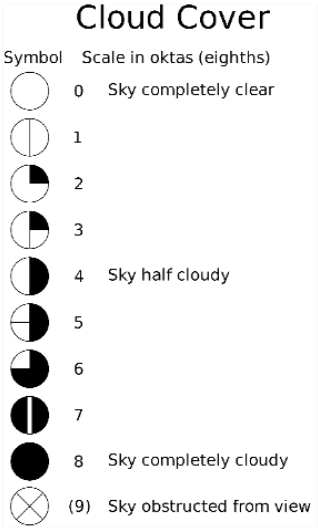
Table 2. On site instrumentation

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Nor-140 1404090	15/11/2018	U30095 / U30096
Condenser microphone	GRAS-41 AL/S.21091	17/01/2018	27490
Calibrator	Nor-1251.30796	05/03/2019	U31152

WEATHER CONDITIONS

Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. Table 3 presents the weather conditions recorded on site at the beginning and end of the survey.

Table 3. Weather Conditions

Date/Time	Description	Beginning of Survey	End of Survey
02 October 2019 – 03 October 2019	Temperature (°C)	12	14
	Precipitation:	No	No
	Cloud cover (oktas - see guide)	2	6
	Presence of fog/snow/ice	No	No
	Presence of damp roads/wet ground	Yes	No
	Wind Speed (m/s)	0.5	0.7
	Wind Direction	N	SW
	Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

*no influence in the conclusions of the assessment

RESULTS

The noise measurements are representative of the noise climate of the façades of the neighbouring houses. The predominant noise source was observed to be local road traffic, passing trains to the north, with aircraft and other transient sources of noise (such as cars parking & internal noise from music in Cecil Sharp House itself) intermittently audible.

EXTERIOR NOISE LEVELS

The single figure free field noise indices recorded are presented in tabular format within Appendix B. The relevant results of the survey have been summarised in Table 4 overleaf.

Table 4. Summary of survey results (free field levels)

Measurement period	Range of recorded sound pressure levels (dB)			
	LAmax, T	LAeq, T	LA_{10}, T	LA_{90}, T
Daytime (07.00 – 23.00 hours)	53-90	45-71	42-55	46-68
Night-time (23.00 – 07.00 hours)	49-83	43-59	41-46	44-61
Proposed plant operating hours (08.00 – 23.00 hours)	46-71	53-90	44-55	48-68

A histogram of the background sound levels during proposed operational hours is shown in Figure 3.

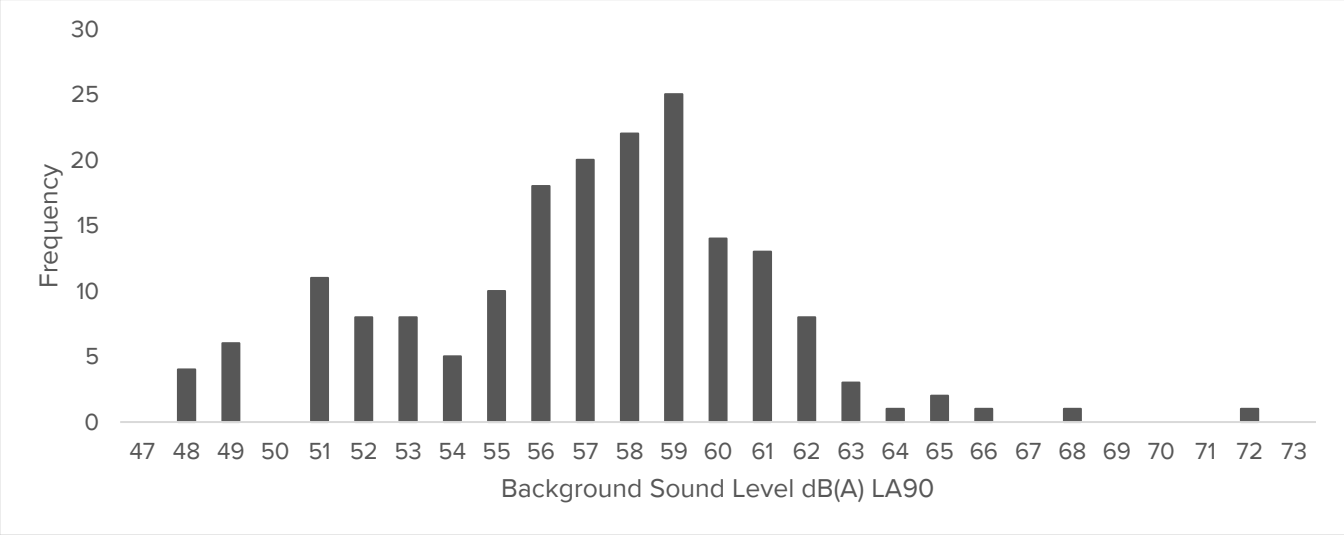


Figure 3: Background sound levels (08.00 - 23.00 hours)

From the above histogram, the representative background sound level during plant operating hours is considered to be 51dB L_{A90}.

ASSESSMENT OF AIR CONDITIONING PLANT

Cumulative noise emissions from the new proposed plant have been predicted at the nearest noise sensitive properties to the site and compared with the criteria in Local and London Plan Policy.

PLANT LOCATIONS

The location of the new plant equipment (including; ASHP, extract fan and AHU) is proposed to the north of the site at roof level, adjacent to the lift overrun. For this assessment the minimum noise ratings for the equipment will be assumed to inform the Building Services engineer's kit selection.

Plant Location

N

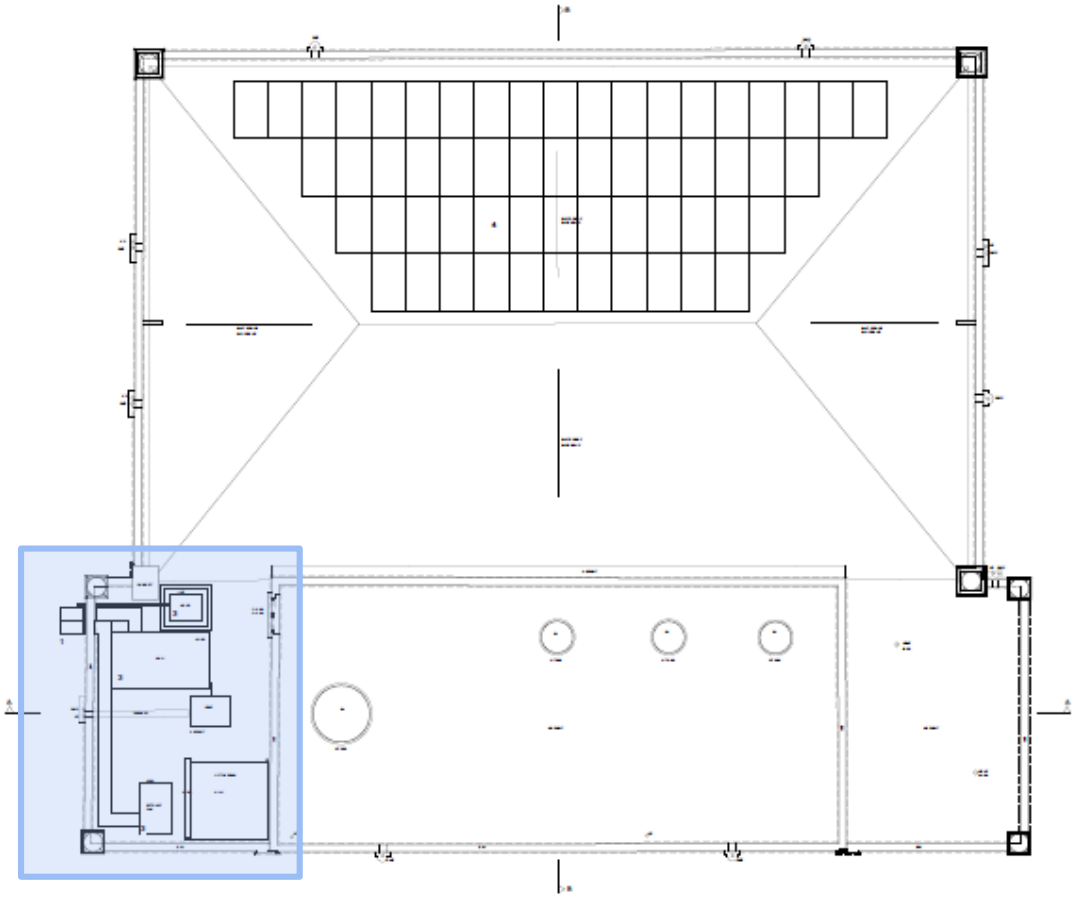


Figure 4: Location of external plant

NEAREST NOISE-SENSITIVE RECEPTORS

The noise-sensitive receptors closest to the proposed plant location are:

- **Receptor R1:** Rear of houses to the west of the site, on Regent's Park Road. The nearest windows are located to the rear of 4 Regent's Park Road approximately 32m from the proposed plant location.
- **Receptor R2:** Rear of houses to the north west of the site, on Gloucester Avenue. The nearest windows are located to the rear of 39 Gloucester Avenue approximately 10m from the proposed plant location.
- **Receptor R3:** Front of Darwin Court The nearest windows are located approximately 33m from the proposed plant location.
- **Receptor R4:** Front of houses to the south of the site, on Regent's Park Road. The nearest windows are located to the front of 3 Regent's Park Road approximately 60m from the proposed plant location.

PLANT NOISE LEVELS

Manufacturer's noise levels for the proposed plant are shown in Table 5. With the exception of the kitchen condenser, which is located at ground level, all plant is to be installed on the roof as shown in Figure 4.

Table 5: Manufacturer's plant noise data

Description	Model Ref	Quantity	Operating period	Manufacturer noise level, dBA
AHU Intake	Systemair Geniox 18 - Outdoor air	1	Day and night	66 Sound power level
AHU Casing	Systemair Geniox 18 - Breakout	1	Day and night	61 Sound power level
ASHP	Daikin REYQ10U	1	Day and night	79 Sound power level
Extract fan	Systemair Geniox 18 - Exhaust	1	Day and night	79 Sound power level
Kitchen condenser		1	Day and night	30 at 10m

ASSESSMENT AGAINST LONDON BOROUGH OF CAMDEN REQUIREMENTS

London Borough of Camden noise guidance typically requires the rating noise level of new plant to be at least 10dB(A) below the otherwise prevailing background sound level. The background noise survey was carried out for Gloucester Avenue only which on inspection by the surveyor was deemed quieter than Regent's Park Road. Background sound levels have been predicted at the front of Cecil Sharp House (Regent's Park Road) by assuming the same background noise levels exist. However, it is likely that background noise levels will be higher.

It should be noted that the proposed plant is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. All proposed plant will be inverter driven and, therefore, will gently ramp up and down depending on the demands on the various systems. However, a penalty of 3dB as described in BS 4142:2014 has been applied for the possible presence of "...characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment...".

It should be noted that the noise limits resulting from London Borough of Camden typical criteria are significantly below the levels at which, according to BS 4142:2014, a "low impact" would be expected.

The proposed AHU, ASHP and extract fan will be located at roof level adjacent to the lift overrun to the north of the site. The horizontal distances of the nearest receptors to the proposed plant locations are 32m, 10m, 33m and 60m for receptors 1, 2, 3 and 4, respectively. Receptors 1, 2 and 4 also benefit from acoustic screening provided by the

building envelope. The kitchen condenser is a similar distance from the receptors, but is screened from receptors 1 and 4 by the building.

Plant noise levels have been predicted at the at the identified receptors taking into consideration distance losses, surface acoustic reflections and, where applicable, screening provided by the building. Full calculations are given in Appendix C. The assessment of the predicted plant noise levels against the local authority's criteria is shown in Table 6. The assessment also includes the following attenuation:

- 5dB(A) attenuation to AHU fresh air intake. Dimensions to be confirmed during detailed design, but likely to be approximately 900mm long
- 15dB(A) attenuation to kitchen extract exhaust. Dimensions to be confirmed during detailed design, but likely to be approximately 1200mm long
- Acoustic screening to ASHP as shown in Figure 5 and accompanying notes
- Attenuation to ASHP providing 6dB(A) overall noise reduction (in addition to the screen); alternatively, a unit 6dBA quieter may be selected during detailed design

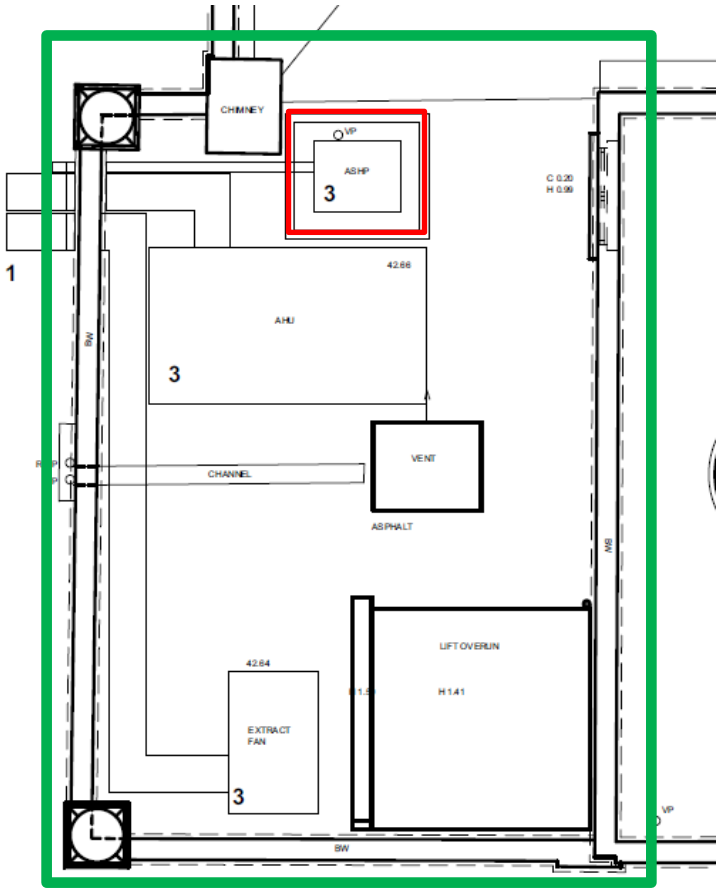


Figure 5 Preliminary extent of acoustic screen (shown red) to ASHP

The ASHP screen should be solid screen with no holes, a mass of at least 7kg/m^2, and at least 300mm higher than the top of the ASHP. Footprint of screen to be confirmed by ASHP supplier during detailed design to maintain airflow to base of the unit. Acoustically absorptive lining to be applied to control reflections.

Please note that the assessment assumes that all plant may run at night. If this is not the case, cumulative plant noise levels will be lower than shown in the table.

Table 6: Plant noise assessment (operational hours)

Receptor	Predicted plant rating level (dB $L_{Ar,Tr}$)	Background sound level (dB L_{A90})	Difference (dB)
R1	31	51	-20
R2	41	51	-10
R3	36	51	-15
R4	19	51	-32

It can be seen that at all receptors the plant rating noise level is 10dB or more below the representative background sound level, and therefore complies with London Borough of Camden's usual requirements.

The local authority may permit noise levels from the emergency generator to exceed their normal requirements; this should be discussed with them as the design proposals are developed.

ADDITIONAL CONSIDERATIONS

All plant should be fitted with suitable vibration isolators, to prevent vibration from entering the structure and re-radiating in the apartments. Mounts should be specified and designed to provide at least 95% isolation efficiency.

Airborne noise transmission from the plant through the roof deck into the teaching and performance spaces must also be considered as part of the acoustic design of the building structure.

CONCLUSION

An environmental noise survey has been undertaken at Cecil Sharp House, London, to determine the representative background sound level at the nearest noise-sensitive premises.

The maximum noise levels from the proposed new plant located at roof level towards the north of the site, adjacent to the lift overrun has been has been calculated at various noise sensitive receptors and compared with the requirements of the London Borough of Camden's Local Plan Policy.

NOISE IMPACT ASSESSMENT

Four residential windows near to Cecil Sharp House have been identified as the nearest sensitive receptors with regard to noise impact from potential plant.

Background noise level has been measured at a representative location, close to the nearest sensitive receptor. The representative background sound level during the proposed hours of plant operation (08.00 to 23.00 hours), is considered to be 51 dB L_{A90}. The measurement has been taken between for 24 hours between 2nd October 2019, through to 3rd October 2019.

The assessment shows that, with the attenuation outlined in this report, noise from the proposed plant will meet London Borough of Camden's usual requirements, being at least 10dB below the background noise levels.

APPENDIX A

Table 7. 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 (LAeq,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 s1 and s2 is given by 20 log10 (s1/s2). 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 20μPa. 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), LAx	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.
LAeq,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.
Lmax,T	A noise level index defined as the maximum noise level recorded during a noise event with a period T. Lmax is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L10,T	A noise level index. The noise level exceeded for 10% of the time over the period T. L10 can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. LA10,18h is the A –weighted arithmetic average of the 18 hourly LA10,1h values from 06:00-24:00.

APPENDIX B

Table 8. Results of environmental noise measurements

Date & time	L_{Aeq} [dB]	L_{AFmax} [dB]	L_{A10} [dB]	L_{A90} [dB]
02/10/2019				
15:30	63	80	51	68
15:35	58	75	49	59
15:40	56	75	48	56
15:45	57	72	48	61
15:50	53	71	47	55
15:55	59	77	47	59
16:00	57	74	47	61
16:05	57	76	48	56
16:10	56	73	48	57
16:15	56	72	47	56
16:20	56	71	48	58
16:25	58	72	48	61
16:30	55	69	47	58
16:35	57	73	47	57
16:40	56	73	48	59
16:45	55	74	47	53
16:50	58	77	49	59
16:55	55	71	48	55
17:00	62	90	48	59
17:05	63	87	48	56
17:10	57	72	48	58
17:15	56	72	47	59
17:20	57	69	49	60
17:25	53	69	48	53
17:30	56	73	46	60
17:35	55	73	46	57
17:40	56	78	47	57
17:45	52	67	47	55
17:50	56	70	49	59
17:55	57	72	48	59

Date & time	L_{Aeq} [dB]	L_{AFmax} [dB]	L_{A10} [dB]	L_{A90} [dB]
18:00	55	78	47	56
18:05	50	67	47	51
18:10	59	80	48	59
18:15	54	70	47	56
18:20	58	75	47	62
18:25	59	79	47	55
18:30	54	69	47	57
18:35	58	74	48	60
18:40	52	68	47	53
18:45	54	76	47	54
18:50	55	69	47	56
18:55	55	74	48	55
19:00	52	66	47	54
19:05	56	75	48	56
19:10	58	77	48	60
19:15	57	75	47	58
19:20	54	75	47	53
19:25	57	69	49	61
19:30	52	67	47	52
19:35	57	77	47	55
19:40	56	71	53	58
19:45	60	77	55	62
19:50	58	70	55	59
19:55	62	78	48	64
20:00	59	78	47	61
20:05	60	82	48	60
20:10	56	71	47	58
20:15	54	68	47	55
20:20	57	72	47	59
20:25	57	76	48	56
20:30	61	80	47	63
20:35	58	77	47	58
20:40	57	76	47	58
20:45	59	74	47	62

Date & time	L_{Aeq} [dB]	L_{AFmax} [dB]	L_{A10} [dB]	L_{A90} [dB]
20:50	57	73	47	58
20:55	56	70	46	58
21:00	56	72	47	58
21:05	55	69	46	58
21:10	60	72	48	65
21:15	56	71	47	60
21:20	71	90	46	66
21:25	57	74	46	60
21:30	56	76	45	57
21:35	56	71	46	59
21:40	54	72	45	56
21:45	56	75	46	57
21:50	62	78	48	65
21:55	54	69	46	56
22:00	53	70	45	52
22:05	55	69	46	56
22:10	57	81	44	58
22:15	51	71	45	51
22:20	57	76	45	56
22:25	57	76	45	53
22:30	59	80	46	60
22:35	52	72	45	51
22:40	59	77	45	62
22:45	56	70	46	59
22:50	56	78	44	51
22:55	50	66	45	51
23:00	54	70	45	53
23:05	52	68	45	51
23:10	54	73	44	52
23:15	54	67	46	57
23:20	57	77	46	57
23:25	50	66	44	50
23:30	47	66	44	49
23:35	55	71	45	56

Date & time	L_{Aeq} [dB]	L_{AFmax} [dB]	L_{A10} [dB]	L_{A90} [dB]
23:40	49	65	45	51
23:45	56	71	46	56
23:50	58	75	45	61
23:55	52	68	44	52
03/10/2019				
00:00	54	72	44	54
00:05	52	72	44	50
00:10	50	66	44	49
00:15	57	77	45	52
00:20	51	67	44	50
00:25	53	69	44	52
00:30	55	72	44	53
00:35	55	73	44	56
00:40	53	70	43	52
00:45	57	80	43	56
00:50	57	79	43	52
00:55	57	74	44	57
01:00	48	64	43	48
01:05	51	68	43	51
01:10	51	68	43	51
01:15	49	68	42	49
01:20	53	67	43	54
01:25	54	74	43	51
01:30	56	74	43	57
01:35	53	68	43	56
01:40	57	78	44	58
01:45	46	56	43	48
01:50	57	73	43	60
01:55	44	54	42	46
02:00	44	55	41	46
02:05	43	50	42	45
02:10	51	66	42	52
02:15	44	54	42	45
02:20	49	69	42	46

Date & time	L_{Aeq} [dB]	L_{AFmax} [dB]	L_{A10} [dB]	L_{A90} [dB]
02:25	43	54	42	44
02:30	48	67	42	45
02:35	47	64	42	46
02:40	44	51	42	45
02:45	56	78	42	45
02:50	50	69	42	48
02:55	53	72	42	49
03:00	44	51	42	45
03:05	44	56	43	45
03:10	45	57	42	47
03:15	50	66	43	51
03:20	51	70	42	46
03:25	49	59	43	53
03:30	49	67	43	47
03:35	50	69	43	48
03:40	51	71	42	47
03:45	45	57	43	48
03:50	45	64	43	45
03:55	59	83	43	48
04:00	45	55	43	46
04:05	44	53	42	46
04:10	46	56	43	47
04:15	45	55	43	47
04:20	55	73	43	48
04:25	49	69	43	46
04:30	44	60	42	44
04:35	45	57	42	46
04:40	45	60	41	44
04:45	51	70	42	52
04:50	51	69	42	47
04:55	45	63	42	46
05:00	44	60	42	44
05:05	43	51	42	44
05:10	44	51	42	45

Date & time	L_{Aeq} [dB]	L_{AFmax} [dB]	L_{A10} [dB]	L_{A90} [dB]
05:15	44	58	42	45
05:20	50	67	42	46
05:25	47	64	42	45
05:30	44	51	42	45
05:35	50	67	43	47
05:40	49	64	43	52
05:45	48	64	43	48
05:50	44	54	42	44
05:55	44	53	43	45
06:00	50	69	43	45
06:05	44	49	43	45
06:10	50	63	44	52
06:15	50	66	44	47
06:20	56	76	45	48
06:25	51	67	45	50
06:30	53	70	44	53
06:35	49	65	44	49
06:40	47	61	44	47
06:45	53	70	43	48
06:50	50	66	44	49
06:55	46	57	44	48
07:00	48	65	44	48
07:05	51	68	44	48
07:10	47	56	44	48
07:15	51	66	43	55
07:20	56	77	44	54
07:25	46	61	44	48
07:30	46	62	44	47
07:35	52	72	43	49
07:40	45	60	43	47
07:45	51	68	42	51
07:50	45	55	43	46
07:55	53	74	43	48
08:00	46	55	44	48

Date & time	L_{Aeq} [dB]	L_{AFmax} [dB]	L_{A10} [dB]	L_{A90} [dB]
08:05	46	53	44	48
08:10	48	60	45	48
08:15	47	57	44	49
08:20	47	55	45	48
08:25	47	55	45	49
08:30	48	64	46	49
08:35	49	63	46	51
08:40	48	56	46	49
08:45	48	56	46	49
08:50	47	60	45	49
08:55	52	68	46	52
09:00	56	76	46	52
09:05	57	78	46	55
09:10	54	69	47	53
09:15	55	75	45	51
09:20	49	60	45	51
09:25	50	70	46	52
09:30	53	70	46	51
09:35	50	65	45	51
09:40	51	65	45	53
09:45	54	73	45	55
09:50	52	70	45	51
09:55	54	70	45	57
10:00	56	72	46	58
10:05	55	70	46	57
10:10	56	69	46	59
10:15	53	69	46	57
10:20	56	73	44	54
10:25	57	75	45	57
10:30	53	65	44	56
10:35	52	70	44	52
10:40	57	71	44	62
10:45	56	69	47	59
10:50	58	76	47	60

Date & time	L_{Aeq} [dB]	L_{AFmax} [dB]	L_{A10} [dB]	L_{A90} [dB]
10:55	51	70	44	52
11:00	55	73	44	59
11:05	58	74	45	61
11:10	54	66	44	57
11:15	52	64	45	57
11:20	53	68	44	57
11:25	53	73	44	52
11:30	56	74	45	58
11:35	55	71	47	56
11:40	56	72	46	59
11:45	56	70	46	61
11:50	57	77	45	56
11:55	57	72	45	59
12:00	58	75	46	58
12:05	59	76	47	61
12:10	55	69	46	57
12:15	54	72	47	57
12:20	56	71	48	58
12:25	54	69	45	56
12:30	56	72	45	58
12:35	57	80	46	58
12:40	55	73	45	54
12:45	60	76	45	63
12:50	57	72	46	61
12:55	55	73	47	56
13:00	58	71	48	61
13:05	54	74	46	57
13:10	59	78	46	59
13:15	58	78	47	59
13:20	56	74	46	59
13:25	58	75	46	60
13:30	55	73	47	57
13:35	56	70	48	58
13:40	57	73	47	59

Date & time	L_{Aeq} [dB]	L_{AFmax} [dB]	L_{A10} [dB]	L_{A90} [dB]
13:45	59	76	50	61
13:50	59	73	49	63
13:55	56	71	47	58
14:00	58	75	46	61
14:05	57	77	46	54
14:10	55	73	46	55
14:15	58	72	48	60
14:20	59	77	49	62
14:25	55	75	48	57
14:30	56	75	48	57
14:35	58	73	48	60
14:40	54	70	46	53
14:45	59	75	49	62
14:50	58	73	49	60
14:55	56	73	48	59
15:00	58	74	48	59
15:05	59	73	49	61
15:10	59	76	49	62
15:15	57	74	48	59
15:20	56	70	47	60
15:25	57	74	47	58

APPENDIX C

Plant noise calculations

Table 9: Receptor R1

Plant	Plant noise level		Distance		Directivity dB	Screening dB	Attenuation dB	Sound pressure level at receptor (dBA)
	dB(A)		m					
AHU Intake	66	L_w	32	-38	0	-8	-5	15
AHU Casing	61	L_w	32	-38	0	-8	0	15
ASHP	79	L_w	32	-38	0	-8	-6	27
Extract fan	79	L_w	32	-38	0	-8	-15	18
Kitchen condenser	30	L_p at 10m	32	-10	6	-15	0	11
							Specific sound pressure level	28
							BS 4142 feature	3
							Rating level	31

Table 10: Receptor R2

Plant	Plant noise level		Distance		Directivity dB	Screening dB	Attenuation dB	Sound pressure level at receptor (dBA)
	dB(A)		m	dB				
AHU Intake	66	L_w	10	-28	0	-5	-5	28
AHU Casing	61	L_w	10	-28	0	-5	0	28
ASHP	79	L_w	10	-28	0	-10	-6	35
Extract fan	79	L_w	10	-28	0	-5	-15	31
Kitchen condenser	30	L_p at 10m	10	0	6	-5	0	31
							Specific sound pressure level	38
							BS 4142 feature	3
							Rating level	41

Table 11: Receptor R3

Plant	Plant noise level		Distance		Directivity dB	Screening dB	Attenuation dB	Sound pressure level at receptor (dBA)
	dB(A)		m	dB				
AHU Intake	66	L_w	33	-38	0	0	-5	23
AHU Casing	61	L_w	33	-38	0	0	0	23
ASHP	79	L_w	33	-38	0	-5	-6	30
Extract fan	79	L_w	33	-38	0	0	-15	26
Kitchen condenser	30	L_p at 10m	33	-10	6	0	0	26
							Specific sound pressure level	33
							BS 4142 feature	3
							Rating level	36

Table 12: Receptor R4

Plant	Plant noise level		Distance		Directivity dB	Screening dB	Attenuation dB	Sound pressure level at receptor (dBA)
	dB(A)		m	dB				
AHU Intake	66	L_w	60	-44	0	-15	-5	2
AHU Casing	61	L_w	60	-44	0	-15	0	2
ASHP	79	L_w	60	-44	0	-15	-6	14
Extract fan	79	L_w	60	-44	0	-15	-15	5
Kitchen condenser	30	L_p at 10m	60	-16	6	-15	0	5
							Specific sound pressure level	16
							BS 4142 feature	3
							Rating level	13

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