Architecture for London

Design and Access Statement for the proposed addition of roof level plant at 3 Gainsborough Gardens NW3 1BJ

May 2023

1.0 Introduction

This Design and Access Statement has been prepared for a full planning application and listed building consent, for the location of a an AC condenser unit with an acoustic enclosure on the flat roof to the side annex at no.3 Gainsborough Gardens. The purpose of this report is to provide evidence that by locating the plant on the flat roof there is no detrimental harm caused to the immediate environment, the listed building or character of the local area

The accompany acoustic report in Appendix I further highlights that the noise emissions from the plant would not have an adverse impact on the nearest residential receivers.

2.0 Site

3 Gainsborough Gardens is a Grade II listed semi-detached house within the Hampstead Conservation Area. Built-in 1884 by renowned architect EJ May, the pair of houses at no.s 3 and 4 Gainsborough Gardens are built in the Arts and Crafts style that is typical of architects EJ May and Norman Shaw.

The property listing reads as follows:

CAMDEN

TQ2686SE GAINSBOROUGH GARDENS 798-1/17/544 (Northside) No.s.3 AND 4

II

Pair of semi-detached houses forming part of a small estate. 1884. By EJ May. For HB Timewell. Red brick with stucco dressings and 1st floor band. No.3 has a tiled roof and tile-hung gable and second floor; No.4 has a tiled roof with slate-hung gable and second floor. Tall brick chimney-stacks and white bargeboards, No.4 with dormer. Irregular fenestration, the second floor and attics with sash windows, the lower floors have principal windows with mullion and transom glazing whose upper panes have small lights. No.3 with round-arched, brick and stucco banded porch entrance with enriched keystone and recessed part-glazed door with sidelights. First floor projecting transom and mullion bay window, to right, on large bracket supports. To left, a 2-storey canted oriel, partly tile-hung. No.4 has similar entrance with similar oriel on angle to right and a keyed oculus. INTERIORS: not inspected. HISTORICAL NOTE: drawings for the houses were exhibited at the Royal Academy in 1884. EJ May worked extensively on the Bedford Park Estate, the first major development in the Queen Anne style in London; this has some Queen Anne details but is more monumental in scale. Mr Timewell, a London tailor, lived in No.4 and let No.3. (The Building News: 19 December 1884)..

External view of front elevation at 3 Gainsborough Gardens

No. 3 Gainsborough Gardens has been significantly altered over the years. The property has seen the construction of a rear and side extension and the internal spaces on the ground floor have been notably rearranged. However, the street-facing facade is largely unchanged (save the new side garage) and the external materials, proportions and scale contribute to the context and reinforce the character of the gardens.

The houses in Gainsborough Gardens share a common architectural language, with features such as gabled roof forms. They also share several materials and finishes (primarily brick, stucco and tile). Most of the houses are semi-detached (or link-detached) pairs.

3.0 Planning history

Apr 2023 - 2023/0987/L
Listed Building application for a like a for like roof lantern replacement
Application Permitted

Sept 2022 - 2022/3636/L/
Listed Building application for internal rearrangements to the upper parts.
Application Permitted

Sept 2015 - 2015/4372/P/
Alterations to the front garden to include new boundary walls and railings with new landscaping
Application Permitted

Sept 2015 - 2015/4586/L
Listed Building application for proposed new works to front gates, walls with new landscaping
Application Permitted

April 2015 - 2015/2305/NEW
Alterations to the front garden, boundary wall, access stairs, driveway, bin store and associated hard landscaping
Application Withdrawn

Oct 2008 - 2008/4801/T
Notification of Emergency works to dead /dangerous tree
Application Permitted

Aug 1999 - LW9902097
LB Consent for Replacement of side extension by new side extension with roof light, erection of rear conservatory and internal alterations.
Application Permitted

Aug 1999 - PW9802112
PA for Replacement of side extension by new side extension with roof light, erection of rear conservatory and internal alterations.
Application Permitted

Aerial view showing Gainsborough Gardens

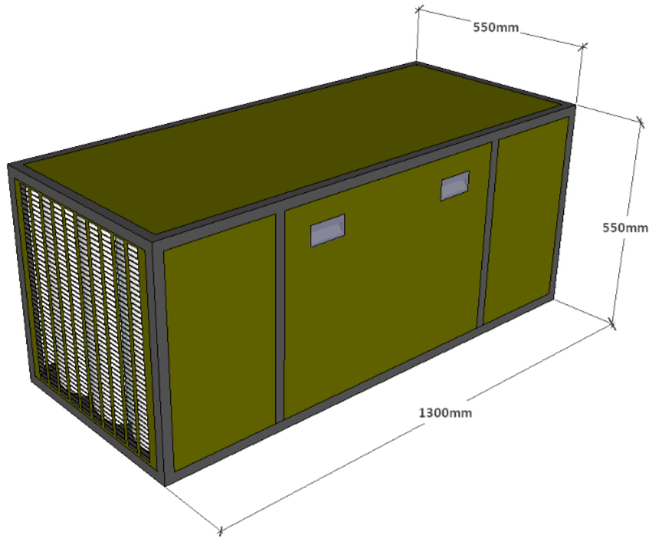
4.0 Client brief

The client wishes to install a cooling unit that services a cold store food and drink area. The cold storage comes with a internal refrigeration unit and an external condenser unit. The condenser unit has been positioned on the flat roof and above the store room. The store sits within the side annex extension to the main building constructed in 2002.

5.0 Design Summary

The annex to the building is a modern extension with a flat roof that stretches along the length of the main house. The acoustic report commissioned highlights certain restrictions that will need to be followed through including anti-vibration mounts and advice on where to place the unit. The window to the side of the house under which the unit will be placed is non opening with obscure coloured glass panes. Additionally the client intends to use the flat roof for potted plants in order to create a verdant outlook from the terrace above the garage.

The condenser unit has been designed to have an acoustic enclosure so the sound emitted will be contained. The nearest neighbours are at Well Walk with the house set back from the boundary wall by 6.1m. The wall and fence between the two properties is heavily planted with a row of further planted vegetation on the neighbour's side.

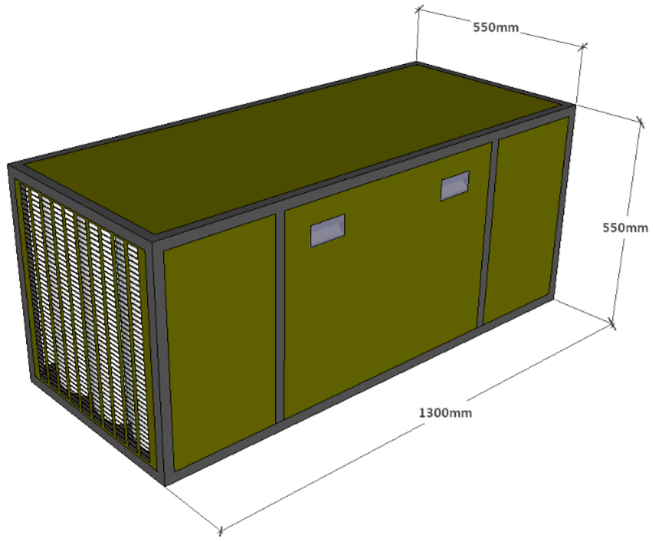


Acoustic enclosure and dimensions of plant

Photos of flat roof above contemporary side extension. Condenser unit to be located under window sill

Condenser unit sits below sill to window on LHS in this image. Note the vegetation on boundary

View from rear garden looking to front - window sill not visible and hidden behind parapet



Acoustic enclosure and dimensions of plant

Internal view of fixed frame windows. Condenser unit sits under sill of window to the RHS in this image

7.0 APPENDIX I: Acoustic Report by KP Acoustics.

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3 Gainsborough Gardens
London

Planning Compliance Report
Report 26389.PCR.01

Architecture for London
3-5 Bleeding Heart Yard
London
EC1N 8SJ

Report 26389.PCR.01 Revision History			
First Issue Date: 18/04/2023			
A	18/04/2023 - Amendment to address of the neighbouring property.	D	
B		E	
C		F	

Written by:	Checked by:	Approved by:
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KP acoustics

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List of Attachments

1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by Architecture for London, 3-5 Bleeding Heart Yard, London, EC1N 8SJ, to undertake a noise impact assessment of a proposed plant unit installation serving the building at 3 Gainsborough Gardens, Hampstead Heath, London, NW3 1BJ.

A 24-hour environmental noise survey has been undertaken on site in order to prepare a noise impact assessment in accordance with BS4142:2014 *'Method for rating and assessing industrial and commercial sound'* as part of the planning requirements of the London Borough of Camden.

This report presents the methodology and results from the environmental survey, followed by calculations in accordance with BS4142 to provide an indication as to the likelihood of the noise emissions from the proposed plant unit installation having an adverse impact on the closest noise sensitive receiver. Mitigation measures will be outlined as appropriate.

2.0 SITE SURVEYS

2.1 Site Description

As shown in Figure 2.1, the site is surrounded by residential properties, with the nearest properties located nearby at the north and west facades. Being a gated community, the south and east facades are bounded by further residential properties however located further away.

Figure 2.1 Site Location Plan (Image Source: Google Maps)

Initial inspection of the site revealed that the background noise profile at the monitoring location was atypical of an urban cityscape environment. Gainsborough Gardens is a gated community, with all properties circling around a central garden area. A result of this being houses located within Gainsborough Gardens provide good shielding from the noise emitted from the surrounding roads e.g. E Health Road.

2.2 Environmental Noise Survey Procedure

Continuous automated monitoring was undertaken for the duration of the noise survey between 10:30 on 30/03/2023 and 10:30 on 31/03/2023.

The environmental noise measurement position, proposed plant installation locations, and the closest noise sensitive receiver relative to the plant installations are described within Table 2.1 and shown within Figure 2.2.

Icon	Descriptor	Location Description
	Noise Measurement Position	The microphone was installed on a tripod approximately 1.5m from ground level, in the rear garden of the property as shown in Figure 2.2. The microphone was positioned within free-field conditions at approximately 1.5 metres from the nearest surface.
	Closest Noise Sensitive Receiver	Rear façade of Wellside property. 1st Floor window.
	Proposed Plant Installation Location	Proposed plant installations are outlined in Section 5.1.

Table 2.1 Measurement position and description

Figure 2.2 Site measurement position, identified receiver and proposed plant unit installation (Image Source: Google Maps)

The choice of the position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receiver relative to the proposed plant installation.

Weather conditions were generally dry with light winds and therefore suitable for the measurement of environmental noise. The measurement procedure complied with ISO 1996-2:2017 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels*'.

2.3 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used is described within Table 2.2.

Measurement instrumentation		Serial no.	Date	Cert no.
Noise Kit 32	NTI Audio XL2 Class 1 Sound Level Meter	A2A-21098-E0	04/08/2022	UK-22-078
	Free-field microphone NTI Acoustics MC230A	A23535		
	Preamp NTI Acoustics MA220	11029		
	NTI Audio External Weatherproof Shroud	-	-	-
B&K Type 4231 Class 1 Calibrator		2147411	24/05/2022	UCRT22/1581

Table 2.2 Measurement instrumentation

3.0 RESULTS

The $L_{Aeq:\,5min}$, $L_{Amax:\,5min}$, $L_{A10:\,5min}$ and $L_{A90:\,5min}$ acoustic parameters were measured throughout the duration of the survey. Measured levels are shown as a time history in Figure 26389.TH1.

Representative background noise levels are shown in Table 3.1 for daytime and night-time.

It should be noted that the representative background noise level has been derived from the most commonly occurring $L_{A90,5\ min}$ levels measured during the environmental noise survey undertaken on site, as shown in 26389.Daytime L90.TH1 and 26389.Daytime L90.TH1 attached.

Time Period	Representative background noise level L_{A90} dB(A)
Daytime (07:00-23:00)	42
Night-time (23:00-07:00)	41

Table 3.1 Representative background noise levels

4.0 NOISE ASSESSMENT GUIDANCE

4.1 BS4142: 2014 *'Methods for rating and assessing industrial and commercial sound'*

British Standard BS4142:2014 *'Methods for rating and assessing industrial and commercial sound'* describes a method for rating and assessing sound of an industrial and/or commercial nature, which includes:

- Sound from industrial and manufacturing processes
- Sound from fixed installations which comprise mechanical and electrical plant and equipment

- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises, and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes.

This Standard compares the Rating Level due to the noise source/s under assessment for a one-hour period during the daytime (07:00 – 23:00 hours) and a fifteen-minute period during the night-time (23:00 – 07:00 hours) with the existing background noise level in terms of an L_{A90} when the noise source is not operating.

It should be noted that the Rating Level is the Specific Sound Level in question ($L_{Aeq,\ Tr}$), including any relevant acoustic feature corrections, as follows:

- **Tonality** – '*For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible*'
- **Impulsivity** – '*A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible*'
- **Intermittency** – '*If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied*'
- **Other sound characteristics** – '*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 3dB can be applied*'

Once the Rating Level has been obtained, the representative background sound level is subtracted from the Rating Level to obtain an initial estimate of the impact, as follows:

- 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 could be an indication of an adverse impact, de pending on the context

- The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact or significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context

NOTE: Adverse impacts may include but not be limited to annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

The initial estimate of the impact may then be modified by taking consideration of the context in which the sound occurs.

4.2 Local Authority Guidance

The guidance provided by The London Borough of Camden for noise emissions of new plant in this instance is as follows:

The noise criteria, as per the Local Plan 2017 of London Borough of Camden, British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' should be considered as the main reference document for the assessment. The resultant 'Rating Level' would be considered as follows:

Period	Assessment Location	Rating Level Acceptability Range		
		Green: noise is considered to be at an acceptable level	**Amber:** noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development	**Red:** noise is observed to have a significant adverse effect.
Daytime (7:00-23:00)	Garden used for main amenity (free field) and Outside living or dining or Bedroom window (façade)	10dB below background	9 dB below and 5dB above background	5dB above background
Night-time (23:00-7:00)	Outside bedroom window (façade)	10dB below background and no events exceeding 57dB L_{Amax}	9db below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	5dB above background and/or events exceeding 88dB L_{Amax}

Table 4.1 Camden noise criteria for plant and machinery

Emergency equipment such as generators which are only to be used for short periods of time will be required to meet the noise criteria of no more than 10dB above the background level ($L_{90,\ 15\ min}$). During standby periods, emergency equipment will be required to meet the usual criteria for plant and machinery. Conditions to this effect may be imposed in instances where emergency equipment forms part of the application.

5.0 NOISE IMPACT ASSESSMENT

5.1 Proposed Plant Installations

It is understood that the proposed plant installation is comprised of the following units:

- 1 No. Danfoss OP-UCGC018 Condenser Unit

The proposed installation location for the Danfoss Condenser Unit will be on the first floor, positioned directly above the wine room located on the ground floor, as shown in Figure 2.2 above.

The noise emission level as provided by the manufacturer for the unit is shown in Table 5.1.

Unit	Descriptor	Octave Frequency Band (Hz)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
Danfoss OP-UCGC018 Condenser	SPL@1m (dB)	Individual octave band data not available.								49

Table 5.1 Plant Units Noise Emission Levels as provided by the manufacturer

The closest noise sensitive receiver to the proposed installation location has been identified as being a residential window of the neighbouring property, Wellside, located approximately 6 metres from the proposed plant installation location, as shown in Figure 2.2.

5.2 Calculations

Taking all acoustic corrections into consideration, the noise level contribution expected at the closest residential window from the proposed condenser unit would be as shown in Table 5.2. Detailed calculations are shown in Appendix B.

A correction of 2dB has been added due to tonality of the condenser unit.

Receiver	Criterion	Noise Rating Level at 1m From the Closest Noise Sensitive Window
First Floor Window of 2 Gainsborough Gardens	31dB(A)	31dB(A)

Table 5.2 Predicted noise level and criterion at nearest noise sensitive location

As shown in Appendix B and Table 5.2, transmission of noise to the nearest sensitive windows due to the effects of the proposed condenser unit installation satisfies the emissions criterion of London Borough of Camden, providing that the mitigation measures outlined in Section 6 are implemented.

6.0 NOISE CONTROL MEASURES

In order to achieve the specific sound level and subsequent rating level shown in the assessment above, the following noise control strategy should be adopted.

6.1 Condenser Units Installed

In order to control the noise emissions from the 1 No. Danfoss OP-UCGC018 condenser unit installed, we would recommend that an enclosure is installed which should reduce the overall noise emissions from the condenser unit by at least 7dB.

Unit	Insertion Loss Levels (dB) in each Octave Frequency Band							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Louvres of acoustic enclosure	Overall noise reduction of 7dB.							

Table 6.1 Insertion loss figures to be provided by acoustic enclosure

6.2 Suitable Suppliers

We would recommend the following suppliers of the aforementioned enclosure:

- Environmental Equipment Corporation
- IAC
- Noico Ltd
- Waterloo Acoustics
- Allaway Acoustics
- Wakefield Acoustics
- Caice
- Environ

6.3 Anti-Vibration Mounting Strategy

In the case of all plant units, appropriate anti-vibration mounts should be installed in order to ensure that vibrations do not give rise to structure-borne noise. Appendix C outlines detailed advice in order to ensure that the system installer selects the appropriate anti-vibration mount for the installation.

It is the supplier's responsibility to ensure that all mountings offered are suitable for the loads, operating and environmental conditions which will prevail.

7.0 CONCLUSION

An environmental noise survey has been undertaken at 3 Gainsborough Gardens, Hampstead Heath, London, NW3 1BJ, by KP Acoustics Ltd between 10:30 on 30/03/2023 and 10:30 on 30/03/2023. The results of the survey have enabled criteria to be set for noise emissions.

Manufacturer's noise data of proposed plant units has been used to obtain Specific and Rated Noise Level at the nearest noise sensitive receiver in accordance with British Standard BS4142:2014 for compliance with the London Borough of Camden requirements.

The rating level was compared with the representative background noise level to assess the likelihood of impact considering the environmental noise context of the area as per the requirements of BS4142:2014.

It has been concluded that noise emissions from the proposed plant units would not have an adverse impact on the nearest residential receivers provided that the noise control strategy presented in Section 6 is followed.

3 Gainsborough Gardens - Position 1
Environmental Time History
30/03/2023 to 31/03/2023

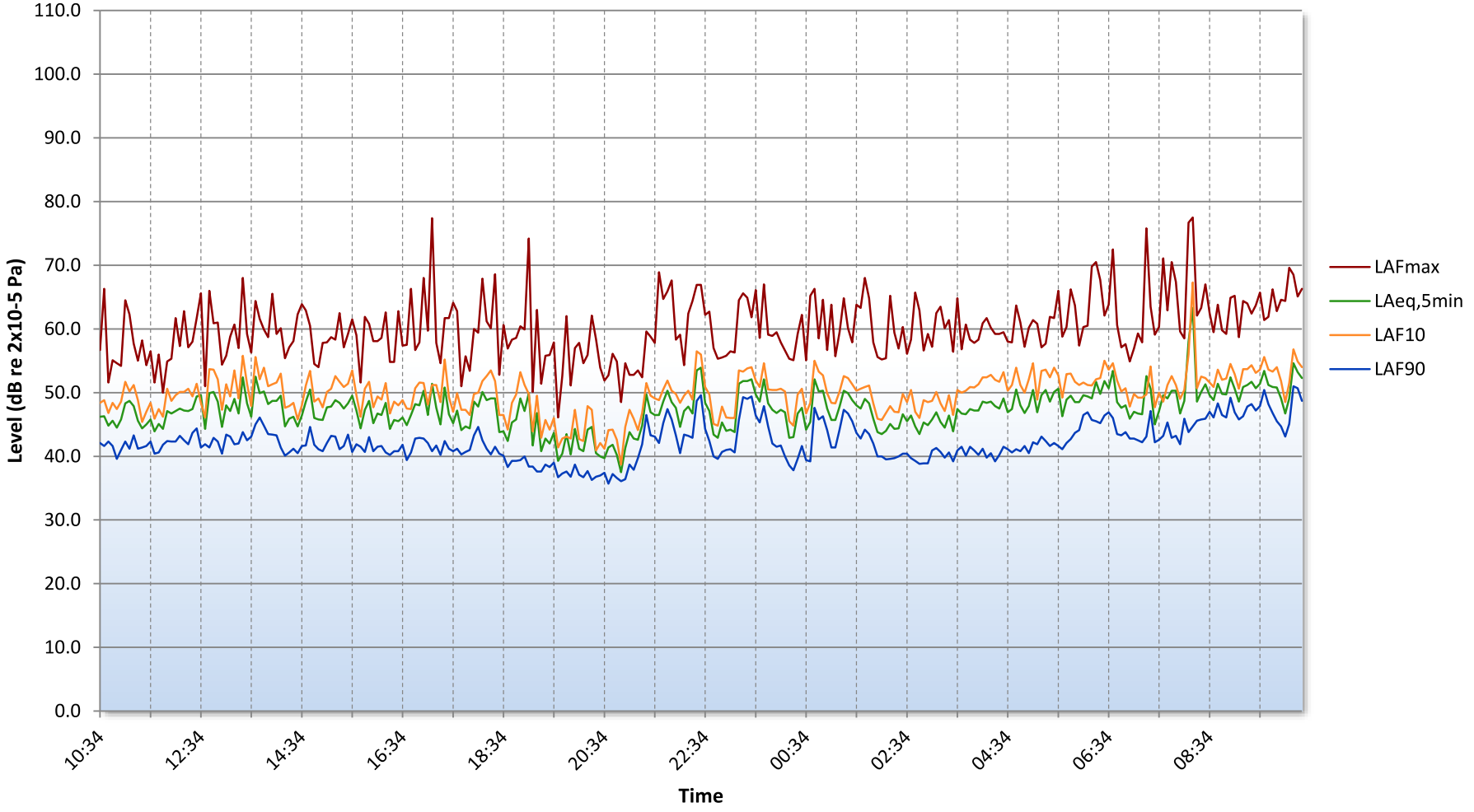

Figure 26389.TH1

3 Gainsborough Gardens - Position 1
Representative Daytime Background Noise Level
30/03/2023 to 31/03/2023

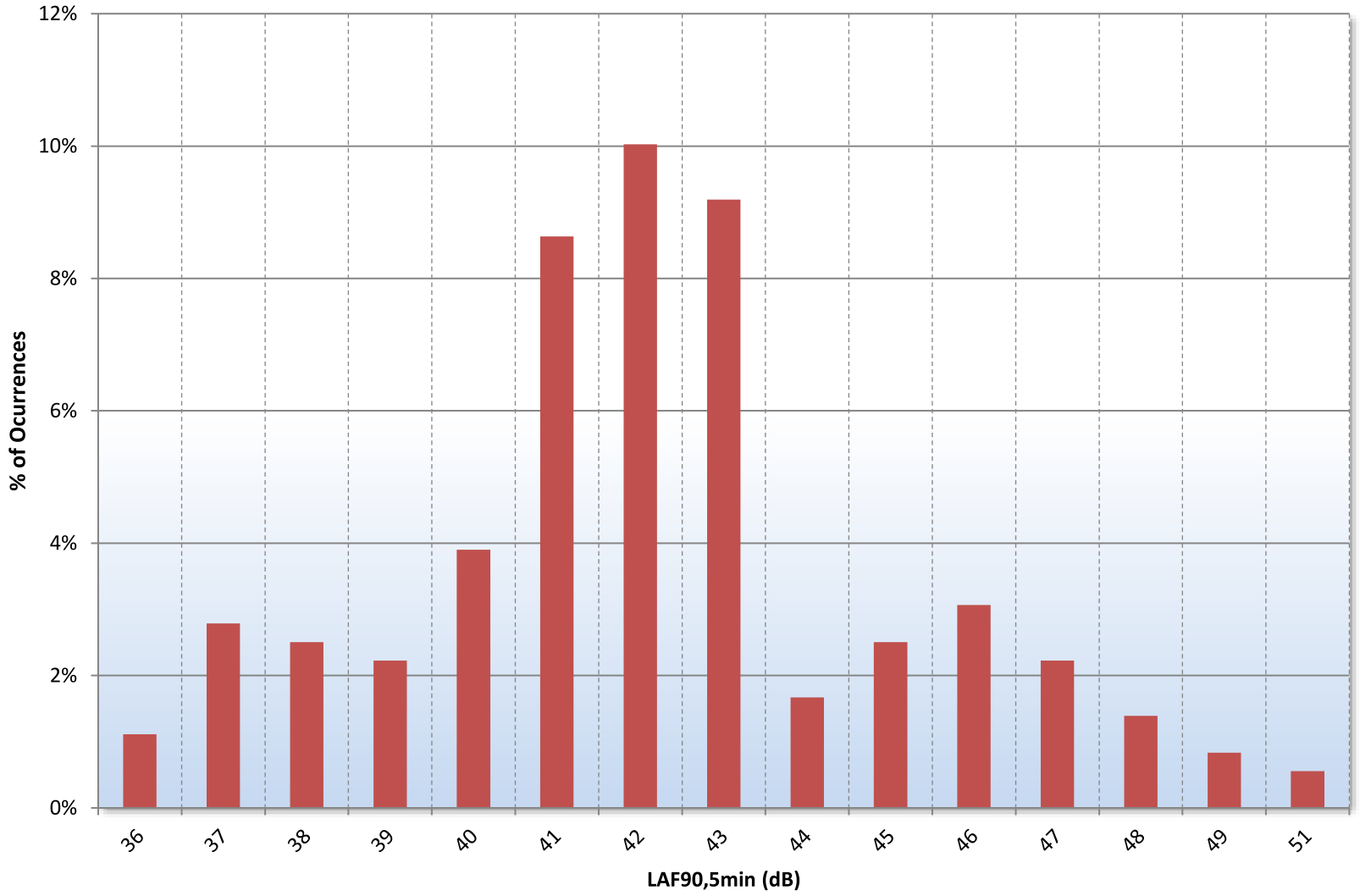

Figure 26389.Daytime L90.TH1

3 Gainsborough Gardens - Position 1
Representative Night-time Background Noise Level
30/03/2023 to 31/03/2023

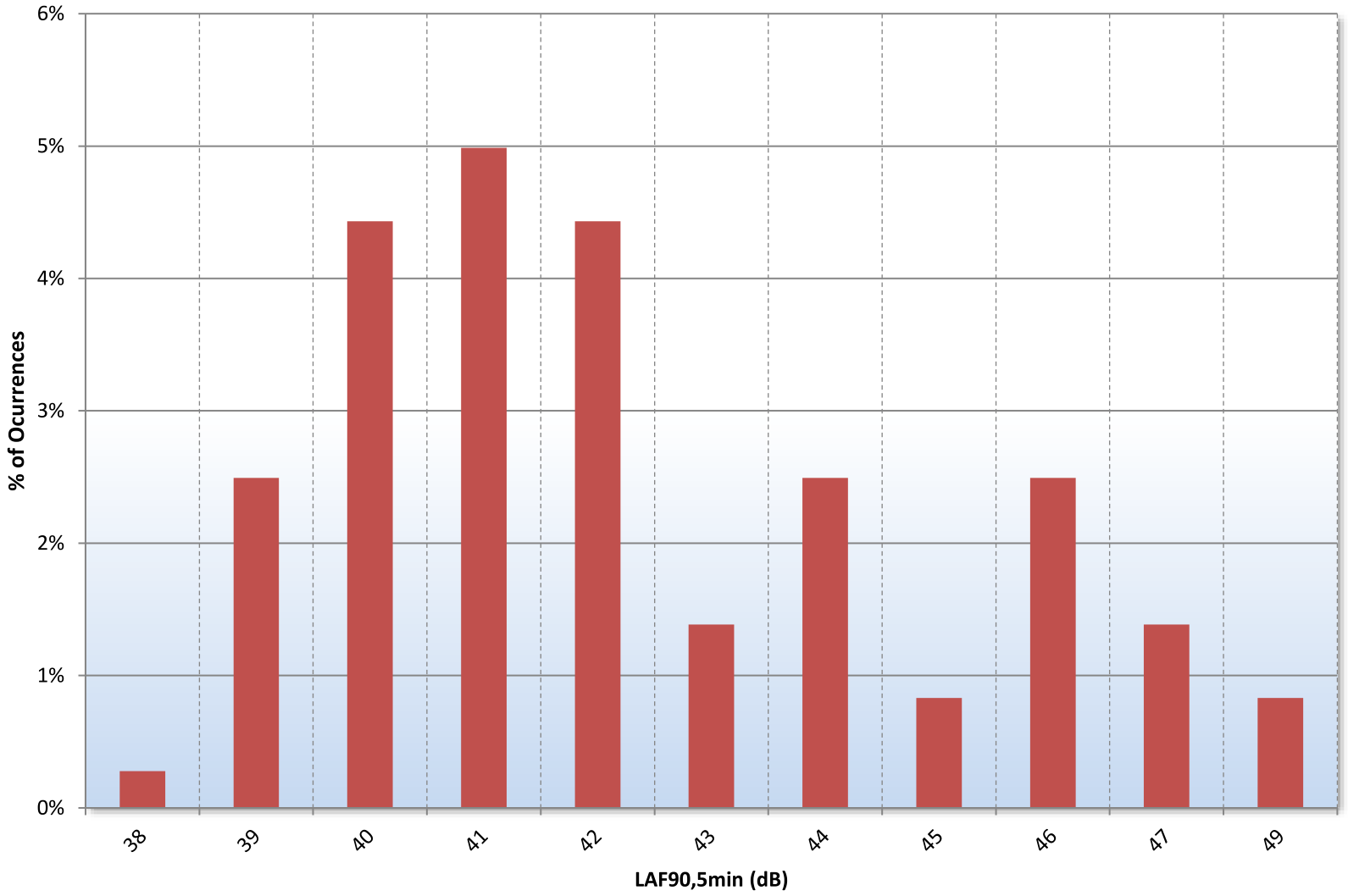

Figure 26389.Night-time L90.TH1

APPENDIX A

GENERAL ACOUSTIC TERMINOLOGY

Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of 10^{13} units, that only a logarithmic scale is the sensible solution for displaying such a range.

Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

L_{90}

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

APPENDIX A

APPLIED ACOUSTIC TERMINOLOGY

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud

Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.

APPENDIX B

3 Gainsborough Gardens, London, NW3 1BJ

PLANT NOISE EMISSIONS CALCULATIONS

Source: 3 Gainsborough Gardens **Receiver: Wellside, Wellwalk**	***Frequency, Hz***								***dB(A)***
	63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	
Danfoss OP-UCGC018 (Sound Pressure Level @1m)									49
Correction due to surface reflections (1), dB									3
Minimum attenuation provided by distance (6m), dB									-16
Minimum attenuation required from proposed silencer, dB									-7
Correction due to tonality	2	2	2	2	2	2	2	2	2
Sound Pressure Level at Receiver due to All Units, dB									**31**

Design Criterion	**31**

APPENDIX C

ANTI-VIBRATION MOUNTING SPECIFICATION REFERENCE DOCUMENT

1.0 General

1.1 All mountings shall provide the static deflection, under the equipment weight, shown in the schedules. Mounting selection should allow for any eccentric load distribution or torque reaction, so that the design deflection is achieved on all mountings under the equipment, under operating conditions.

1.2 It is the supplier's responsibility to ensure that all mountings offered are suitable for the loads, operating and environmental conditions which will prevail. Particular attention should be paid to mountings which will be exposed to atmospheric conditions to prevent corrosion.

1.3 All mountings shall be colour coded, or otherwise marked, to indicate their load capacity, to facilitate identification during installation.

Where use of resilient supports allows omission of pipe flexible connections for vibration/noise isolation, it shall be the Mechanical Service Consultant's or Contractor's responsibility to decide whether such devices are required to compensate for misalignment or thermal strain.

2.1 Type A Mounting (Caged Spring Type)

2.1.1 Each mounting shall consist of cast or fabricated telescopic top and bottom housings enclosing one or more helical steel springs as the principle isolation elements, and shall incorporate a built-in levelling device. The housing should be designed to permit visual inspection of the springs after installation, i.e. the spring must not be totally enclosed.

2.1.2 The springs shall have an outside diameter of not less than 75% of the operating height, and be selected to have at least 50% overload capacity before becoming coil-bound.

2.1.3 The bottom plate of each mounting shall have bonded to it a rubber/neoprene pad designed to attenuate any high frequency energy transmitted by the springs.

2.1.4 Mountings incorporating snubbers or restraining devices shall be designed so that the snubbing, damping or restraining mechanism is capable of being adjusted to have no significant effect during the normal running of the isolated machine.

2.1.5 All nuts, bolts or other elements used for adjustment of a mounting shall incorporate locking mechanisms to prevent the isolator going out of adjustment as a result of vibration or accidental or unauthorised tampering.

2.2 Type B Mounting (Open Spring Type)

2.2.1 Each mounting shall consist of one or more helical steel springs as the principal isolation elements, and shall incorporate a built-in levelling device.

2.2.2 The springs shall be fixed or otherwise securely located to cast or fabricated top and bottom plates, shall have an outside diameter of not less than 75% of the operating height, and shall be selected to have at least 50% overload capacity before becoming coil-bound.

2.2.3 The bottom plate shall have bonded to it a rubber/ neoprene pad designed to attenuate any high frequency energy transmitted by the springs.

APPENDIX C

2.3 Type C Mounting (Rubber/Neoprene Type)

Each mounting shall consist of a steel top plate and base plate completely embedded in oil resistant rubber/neoprene. Each mounting shall be capable of being fitted with a levelling device, and should have bolt holes in the base plate and a threaded metal insert in the top plate so that they can be bolted to the floor and equipment where required.

3.0 Plant Bases

3.1 **Type A Bases (A.V. Rails)**

An A.V. Rail shall comprise a steel beam with two or more height-saving brackets. The steel sections must be sufficiently rigid to prevent undue strain in the equipment and if necessary should be checked by the Structural Engineer.

3.2 **Type B Bases (Steel Plant Bases)**

Steel plant bases shall comprise an all-welded steel framework of sufficient rigidity to provide adequate support for the equipment, and fitted with isolator height saving brackets. The frame depth shall be approximately 1/10 of the longest dimension of the equipment with a minimum of 150 mm. This form of base may be used as a composite A.V. rail system.

3.3 **Type C Bases (Concrete Inertia Base: for use with steel springs)**

These shall consist of an all-welded steel pouring frame-work with height saving brackets, and a frame depth of approximately 1/12 of the longest dimension of the equipment, with a minimum of 100 mm. The bottom of the pouring frame should be blanked off, and concrete (2300 kg/m^3) poured in over steel reinforcing rods positioned 35 mm above the bottom. The inertia base should be sufficiently large to provide support for all parts of the equipment, including any components which over-hang the equipment base, such as suction and discharge elbows on centrifugal pumps.

Architecture For London

We are award-winning London architects and designers, dedicated to the creation of sustainable buildings and places. Our residential projects include new homes, house extensions and refurbishments at all scales. We work toward Passivhaus and EnerPHit standards of comfort and low energy, creating sustainable homes that bring joy.

Our work includes both new build houses and alterations to existing homes, from house extensions and basements to lofts and garden rooms. Each provides inspiring, light filled spaces for living and entertaining.

We have extensive experience with heritage properties, where there is often a need to balance sensitive refurbishment with carefully considered contemporary extensions. Projects are designed holistically with architecture, landscape, joinery, and interiors each interlocking to form a coherent whole.

Recognition

Selected: RIBA Practice of the Month
Finalist: London Construction Awards
Finalist: Blueprint Awards Best Residential
Finalist: BD Young Architect of the Year Award
Finalist: Dezeen Awards
Winner: RIBA Journal Rising Stars Cohort
Finalist: BD Housing Architect of the Year Award
Finalist: AJ Small Projects Award
Finalist: Architizer A+ Awards
Finalist: AJ Retrofit Award
Finalist: NLA Don’t Move Improve Award

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