REPORT TITLE:

Parker House, Sidcup – Baseline Noise Survey, Building Envelope Advice & Plant Noise Limits

CLIENT DETAILS:

Beechwood Property Ltd

DATE:

28/06/19

REPORT REFERENCE:

PC-19-0143-RP1

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Contents

1. Executive Summary

1.1. The noise levels at Parker House, Sidcup have been measured over a typical weekday and weekend period to help assess the impact of the existing noise sources on the proposed development.

1.2. The main noise sources affecting the site are industrial noise from the adjacent commercial & industrial units, and traffic noise from the nearby A20. Noise monitoring was completed which captured the effect of these sources on the proposed development.

1.3. Noise break in calculations have been completed using the assumed construction of the façade (based upon details noted when on site), and assumed typical residential room dimensions.

1.4. Maximum night-time noise levels require the highest noise reductions to achieve the internal ambient noise criteria (as set out in section 3). The sound reduction required by the façade elements has been confirmed along with sample calculations indicating the performance achieved.

1.5. Passive Ventilation through the façade of the building is possible; provided that appropriate glazing is fitted, and acoustically rated trickle ventilators installed.

1.6. Cumulative Plant Noise limits at the nearest sensitive receptors have been confirmed.

2. Introduction

2.1. Pace Consult has been commissioned by Beechwood Property Ltd to complete an assessment of the impact of external noise levels associated with the proposed development of Parker House, Sidcup; and to provide noise limiting criteria for new items of mechanical plant.

2.1.1. There is a potential for road traffic and industrial noise to have an impact on the proposed development. Therefore, the impact of the noise levels existing at the proposed site has been considered in assessing the site's suitability for the proposed residential development.

2.2. Our noise break in assessment was completed following the guidance of BS 8233: 2014: *'Sound Insulation and Noise Reduction for Buildings'* and the World Health Organisation *'Guidelines for Community Noise'.*

2.3. These documents provide a typical method of assessing noise impact on residential dwellings, and should ensure that the intentions of the *'Noise Policy Statement England'*, and in turn the *'National Planning policy Framework'*, are fulfilled.

2.4. This approached was confirmed by Richard Angerson (Environmental Health Officer for London Borough of Bexley), by e-mail 14/06/19, as the typical method expected to be used for residential planning applications in the Borough.

2.5. Therefore, a baseline environmental noise survey has been completed by Pace Consult to confirm the existing ambient noise conditions present at the proposed site. The findings of the Pace Survey for the site are presented in Section 5 of this report.

2.6. Confirmation of the Sound Insulation Performance required from the façade elements of the building is included within section 6.

2.7. Confirmation of the Plant Noise limits for the site are provided in section 7 of this report

3. Criteria

3.1. National Planning Policy Framework and the Noise Policy Statement for England

3.1.1. The National Planning Policy Framework (NPPF) 2018 sets out the general requirements for gaining planning permission. Comments regarding noise found within the document are as follows.

S15. Para 170

Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

S15. Para 180

180. 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.

See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010).

3.2. The NPPF references the Noise Policy Statement for England (NPSE) which intern references two concepts used by the World Health Organisation (WHO) which can be used to ascertain relevant noise levels for individual sites. The concepts are LOAEL (Lowest Observed Adverse Effect Level) and SOAEL (Significant Observed Adverse Effect Level). The NPPF then gives three aims to adhere to:

Aim 1 – Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

Aim 2 – Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy of sustainable development.

Aim 3 – Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

3.3. To avoid 'significant adverse impacts on health and quality of life' we will refer to both BS8233 : 2014 – 'Guidance on sound insulation and noise reduction for buildings' and the World Health Organisation (WHO) 'Guidelines for Community Noise', by creating a situation

where the impact of noise lies below the SOAEL. Both documents provide good criteria for internal noise levels for residential buildings.

3.4. In the context of assessing noise impact from the site, acceptable amenity levels for gardens are discussed within WHO Guidelines for Community noise, these criteria are also taken up by BS 8233: 2014 'Guidance on sound insulation and noise reduction for buildings'.

3.5. British Standard BS8233:2014 – Guidance on Sound Insulation and Noise Reduction for Buildings

3.5.1. The scope of BS8233 is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.

3.5.2. BS8233 suggests suitable internal noise levels within different types of buildings, including residential dwellings. It suggests an internal noise level of 35 dB $L_{Aeq,T}$ during day time, and 30 dB $L_{Aeq,T}$ during night time within bedrooms. In the daytime, the standard recommends 35 dB $L_{Aeq,T}$ in living rooms and 40 dB $L_{Aeq,T}$ in dining rooms. The values in table 1 below show these criteria.

Table 1: Table 4 values from BS 8233.

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

3.6. World Health Organisation (WHO) 'Guidelines for Community Noise'

3.6.1. This document states that, in dwellings, the critical effects of noise are on sleep, annoyance and speech interference.

3.6.2. According to this document, to protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB L_{Aeq}.

3.6.3. To avoid any possibility of sleep disturbance, indoor guideline values for bedrooms are 30 dB L_{Aeq} for continuous noise and 45 dB L_{Amax} for single sound events. These indoor noise levels correspond to sound pressure levels at the outside façades of the living spaces of 45 dB L_{Aeq} and 60 dB L_{Amax}. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 dB.

3.7. BS4142:2014 Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas

3.7.1. BS 4142 provides a means of assessing the significance of building plant noise. A key aspect of the BS 4142 assessment procedure is a comparison between the background noise level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

3.7.2. Background Sound Level, $L_{A90,T}$, defined in the Standard as the 'A-weighted sound pressure level that is exceeded by the residual sound for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels'; •

3.7.3. Specific Sound Level, $L_{Aeq,Tr}$, the 'equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr'; and •

3.7.4. Rating Level, $L_{Ar,Tr}$, the specific sound level plus any adjustment made for the characteristic features of the sound'.

3.7.5. BS 4142 allows for, as an absolute worst case, a cumulative +15 dB correction to be applied to the specific sound level based upon the presence or expected presence of the following:

3.7.6. Tonality – up to +6 dB penalty;

3.7.7. Impulsivity – up to +9 dB penalty (this can be summed with tonality penalty); and

3.7.8. Other sound characteristics (neither tonal nor impulsive but still distinctive) – +3 dB penalty.

3.7.9. BS 4142 provides guidance as to the likely response from sensitive residential receptors to new fixed noise sources (e.g. building plant or services) through comparison of the rating level of the new noise source with the existing background level. The higher the rating noise level in comparison to the background noise level, the greater the likelihood of complaints arising. BS 4142 requires separate analysis for day and night time periods.

3.7.10. The criteria for determining the significance of changes in noise levels from building services plant, based on guidance within BS 4142, and the potential effect on noise sensitive receptors are presented in below.

Difference Between Rating Level[1] and Background Level[2]	*Magnitude of Effect*
10 dB(A) below	Very Low (LOAEL)
No difference	Low
Low +5 dB(A)	Medium (SOEAL)
+10 dB(A) or more	High

1 - The Rating Level is the noise level attributable to the new source(s), plus penalties if the new source has tonal or intermittent characteristics;

2 - The Background Level is taken as the L_{A90}; this is the ambient noise level in the absence of the source which is exceeded for 90% of the time.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

3.7.11. For this project, Richard Angerson (Environmental Health Officer for London Borough of Bexley), has confirmed by e-mail 14/06/19, that a BS4142 Rating level of -10 Db is typically sought i.e. Plant Noise emitted from the development should not have a rating any higher than 10 dB below the prevailing Background Noise Level L_{A90} at all sensitive receptors.

3.7.12. Plant Noise at this level would have a Low Impact of nearby receptors.

4. Site Location and Description

4.1. The site is located on Powerscroft Road, Sidcup, DA14 5DT. The site is bounded on all sides by existing industrial and commercial nits. These include adjoined offices, building materials supplier, kitchen fitters and a car spray shop. Beyond these are a Coca Cola bottling plant to the North, and the A20 & local road network to the south and east.

4.2. The proposed new development consists of the conversion of the existing three story office block in to residential accommodation.

4.3. Figure 1, below, shows the location of the site relative to the surrounding area. Survey locations are indicated, as well as the main noise sources and sensitive receptors described in paragraph 4.1 (above).

Figure 1. Ariel View of the Proposed Development Location

4.4. Figures 2 to 4 below indicate the existing layout of the floors of the building. No drawings are available at this stage to indicate the proposed layout of rooms within the proposed dwellings.

Figure 2 – Ground Floor Plan

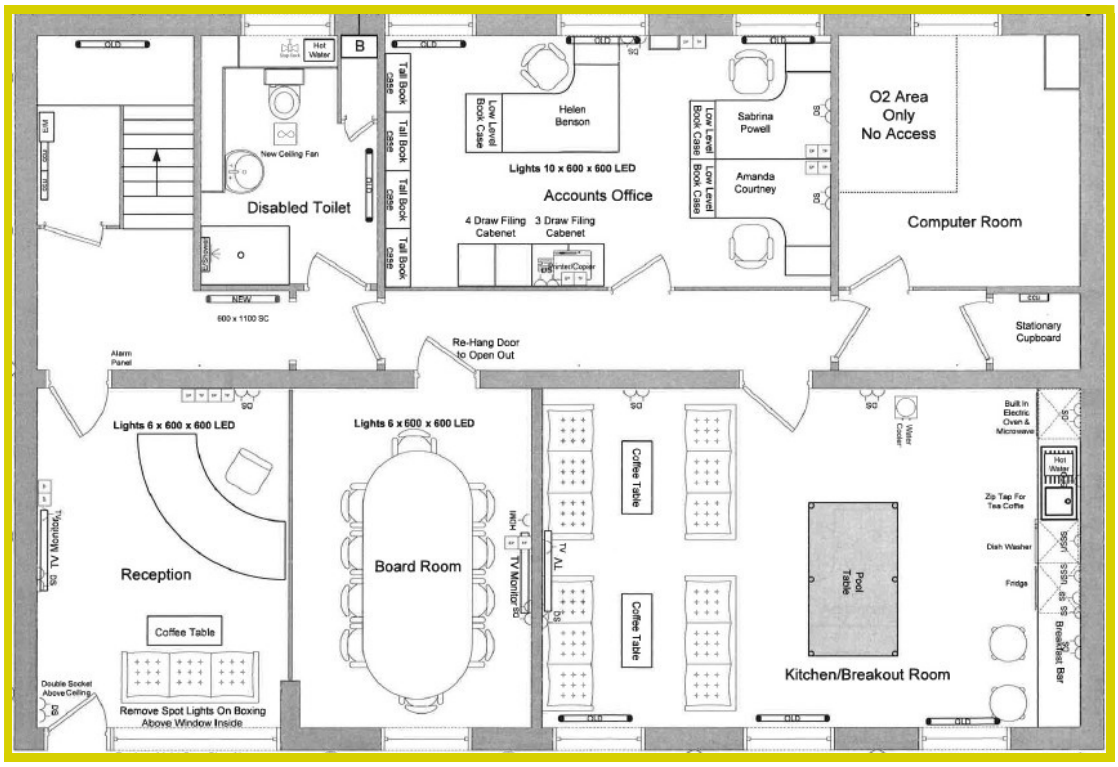


Figure 3 – Level 01 Floor Plan

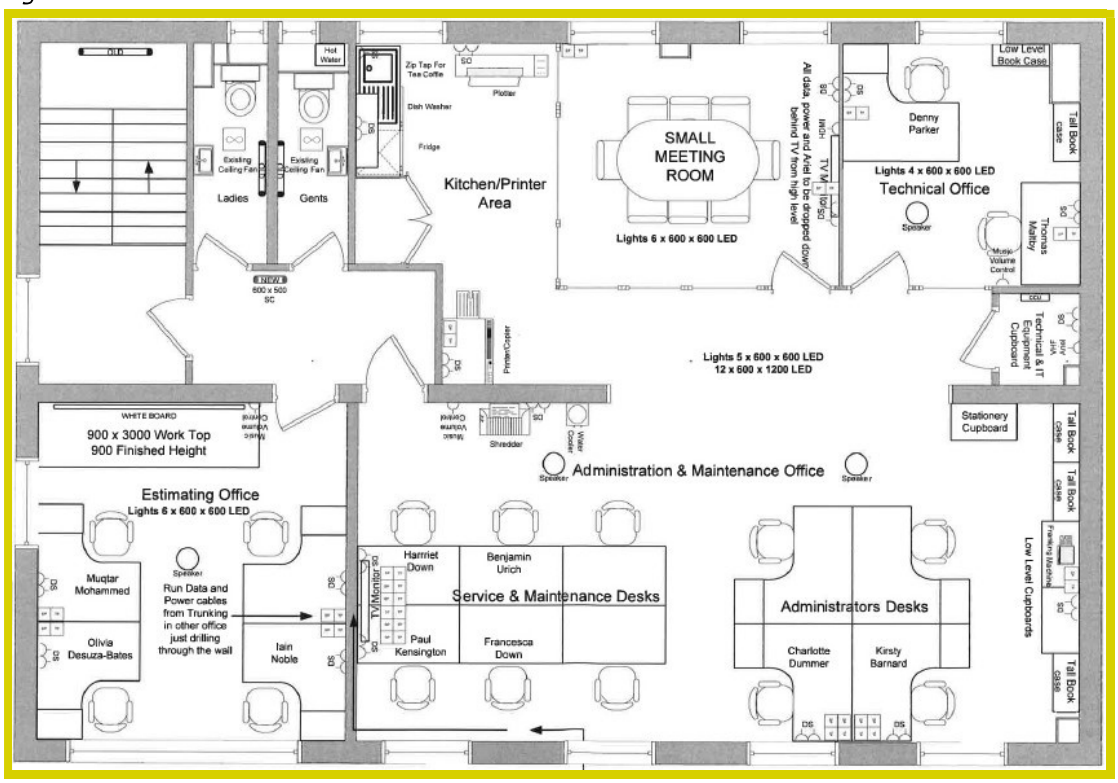
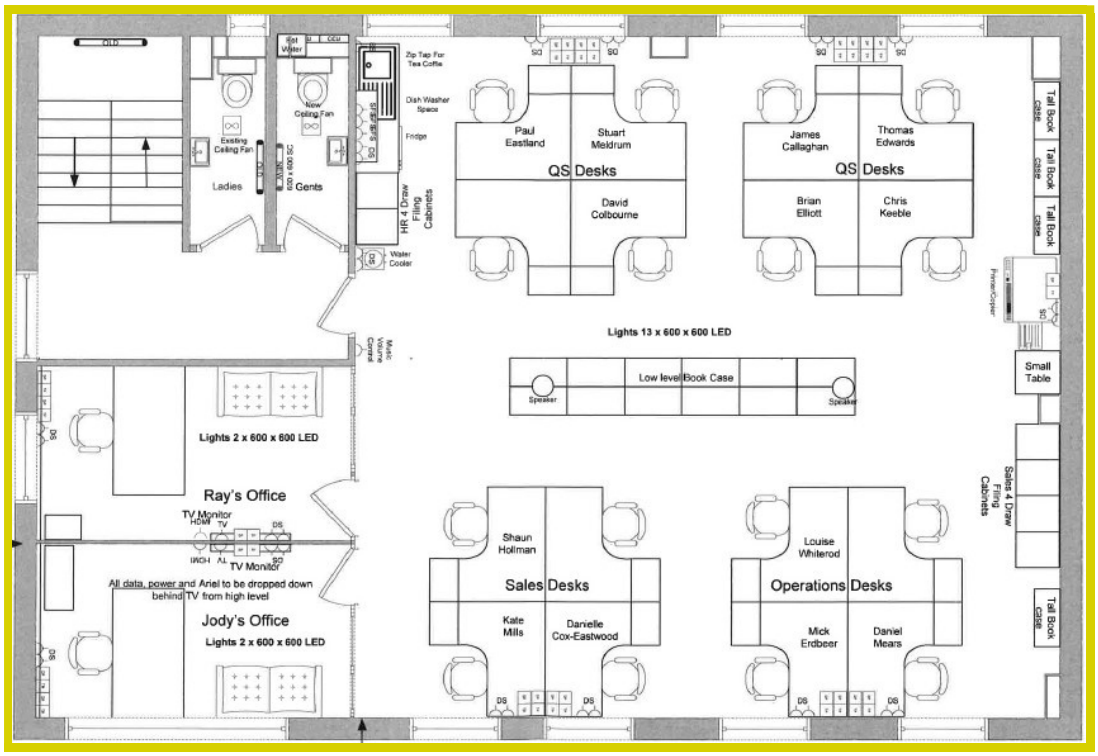


Figure 4: 2nd Floor Plan



5. Survey Method and Equipment

5.1. The noise survey was carried out between Friday 14th & Tuesday 18th June 2019, to measure representative noise levels at the site of the proposed development during typical weekday and weekend periods.

5.2. The noise survey consisted of a single unattended long-term monitoring location, combined with several attended short-term monitoring positions. These are described in detail below.

5.3. Measurement Position 1 (MP1) was located south facing façade of the site. The sound level meter was positioned 2m from the building façade, on the grassed area. Unattended continuous monitoring position recorded the noise levels from the nearby mixed commercial and industrial sources, and traffic noise from the A20 and local roads. The sound level meter was tripod mounted at a height of approximately 1.5m.

5.4. Noise measurements were made with a calibrated precision grade sound level meter which achieves the requirements of BS EN 61672:2003.

5.5. The survey was carried out in accordance with the principles of BS 7445-1:2003 'Description and measurement of environmental noise - Guide to quantities and procedures', BS 7445-2:1991 'Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use', BS 7445-3:1991 'Description and measurement of environmental noise. Guide to application to noise limits' & BS 4142: 2014 *'Methods for rating and assessing industrial and commercial sound'*.

5.6. Equipment

Svantek 971 Serial no. 34927 class 1 sound level meter (MP1)

Svantek 971 Serial no. 34937 class 1 sound level meter (ST2)

Norsonic Nor140 Serial no. 1403395 class 1 sound level meter (ST1)

Norsonic Nor1251 calibrator

Environmental wind shields

The sound level meters were calibrated before and after the survey. No significant drift was noted between the two reference checks.

5.7. Climactic conditions were warm and overcast for the majority of the survey period. Some instances of wind speeds in excess of 5m/s were noted. These were considered when selecting the appropriate noise level and spectrum shapes to complete noise break in calculations. Generally were these were noted, a similar measurement period also existed with lower wind speeds, and no significant variation was noted.

5.8. An enhanced view of the survey positions is shown in figure 5, below.

Figure 5: Environmental noise survey positions

6. Survey Results

6.1. Subjective impressions on site noted that the ambient noise conditions at the site were dominated by traffic noise from the A20, and industrial noise from the vehicle spray shop (immediately to the west of the site).

6.2. No significant noise was noted to emanate from the Coca Cola bottling plant at the site of the proposed development. There is no vehicle access to the Coca Cola bottling plant through Powerscroft road.

Table 3 – Summary of measured Noise Data for MP1

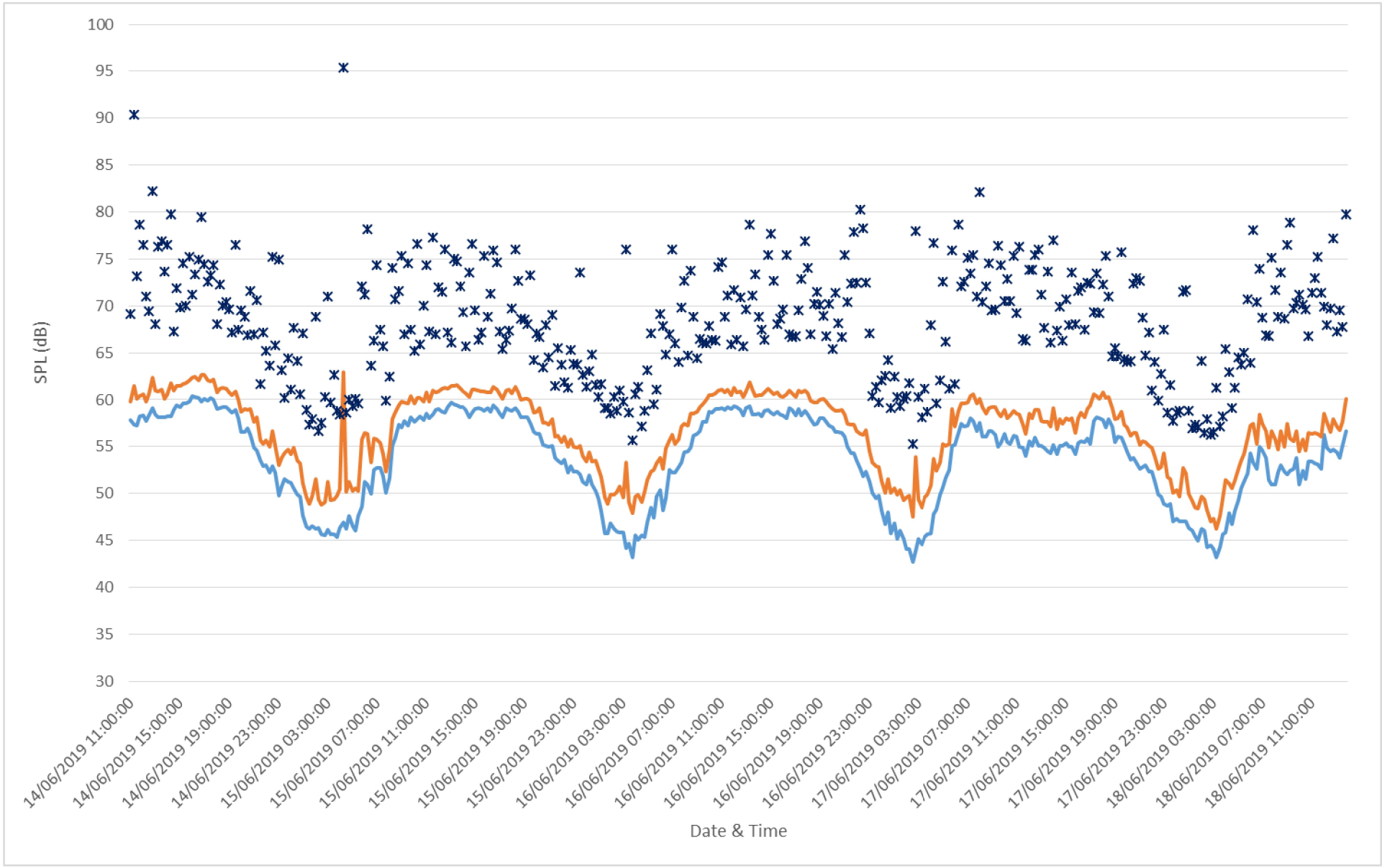
Measurement Position	L_{Aeq}	$L_{AFmax\ (typical)}$	$L_{A90\ (15\ min)}$
Friday (10:00 – 23:00) Day	61	-	52
Friday (23:00 – 07:00) Night	53	72	45
Saturday (07:00 – 23:00) Day	60	-	50
Saturday (23:00 – 07:00) Night	53	68	43
Sunday (07:00 – 23:00) Day	60	-	52
Sunday (23:00 – 07:00) Night	54	74	43
Monday (07:00 – 23:00) Day	58	-	50
Monday (23:00 – 07:00) Night	53	73	43
Tuesday (07:00 – 14:00) Day	57	-	51

6.3. Significant noise was not noted to originate from the commercial units immediately to the north & to the east. These are a kitchen manufacturer, and office block respectively. The kitchen manufacturers unit present a rear brick façade with no openings, while the office block is adjoined to the proposed development.

6.4. The daytime noise levels measured at the two short term monitoring positions (ST1 & ST2) are summarized in table 5 below. Noise levels measured at ST2 did not differ significantly from MP1; noise levels at ST1 (rear of the building) were slightly quieter than at MP1.

	$L_{Aeq\ (1\ hr)}$	$L_{A90\ (15\ min)}$
ST1 (Site Rear)	55	52
ST2	58	55

Figure 6. Overall Noise Survey Data MP1 for L_{Aeq}, L_{Amax}, L_{A90}



7. Achieving the Internal Ambient Noise Criteria

7.1. External noise levels have been measured at positions indicative of the façades of the proposed refurbishment development.

7.2. As no drawings showing the internal room layouts for the proposed building are available at this stage, our assessment is based upon typical residential room dimensions.

7.3. To achieve internal noise conditions that meet the criteria set out in section 2.0 of this report the following reductions in external noise levels at the front façade will be required.

Table 7 - Sound Reduction required to achieve the noise criteria. (MP1)

Accommodation	Internal Noise Criteria	External Noise Level	Sound Reduction required
Living Rooms	35 dB L_{Aeq}	59 dB L_{Aeq}	24 dB(A)
Bedrooms	30 dB L_{Aeq}	59 dB L_{Aeq}	24 dB(A)
Bedrooms	45 dB L_{Amax}	71 dB L_{Amax}	26 dB(A)

7.4. Table 7 above indicates that the maximum noise levels incident on bedrooms require the greatest reduction, to achieve the internal noise criteria, and to provide suitable internal conditions for sleep inside the building.

7.5. To achieve the internal ambient noise requirements in the bedrooms the glazing & frames installed in the building must have a minimum sound insulation value (including both glazing & frame) as indicated in table 8 below.

Table 8: Octave band SRI of glazing a frame

Parameter	Octave Band Centre Frequency (Hz)							Overall SRI (R_w)
	63	125	250	500	1k	2k	4k	
SRI (dB)	11	16	19	24	31	32	18	29

7.6. The glazed façade sound insulation values detailed in the table 6 above should be suitable to meet all the break-in requirements throughout all accommodation in the buildings.

7.7. It will also be necessary to use acoustic trickle ventilators in order to allow passive ventilation through the façade. The acoustic trickle ventilators must have a minimum sound insulation value as indicated in table 9 below. Please note that the performance of trickle ventilators uses a different specification to glazing. The values are a $D_{ne,w}$.

Table 9: Octave band Dne,w of acoustic trickle ventilator

Parameter	Octave Band Centre Frequency (Hz)							Overall $D_{ne,w}$
	63	125	250	500	1k	2k	4k	
D_{ne} (dB)	34	37	35	36	41	42	51	40

7.8. Noise Break-in calculations completed for the most onerous noise criteria are included within appendix A of the report. The calculations indicate that the most onerous noise criteria can be achieved if the building façade provide the sound insulation performances stated in tables 8 & 9.

7.9. The acoustic performance of both glazing and trickle ventilators is not particularly onerous. Standard thermal double glazing should achieve the performance set out in table 8 (above). Although (as stated ion paragraph 6.4, above) noise levels at the rear of the site were slightly quitter than at MP1, as this is not a high specification the same glazing and trickle ventilators are recommended for all facades.

8. Plant Noise Limits

8.1. The lowest background noise levels typically measured during the daytime and night-time at MP1:

Daytime (07:00-23:00) 50 dB $L_{A90,15mins}$

Night-time (23:00-07:00) 43 dB $L_{A90,15mins}$

8.2. It should be noted that the nearest noise sensitive receives are quite distant, and that several commercial and industrial premises are located between the proposed site and these receivers. Minimal plant is expected to be introduced as part of the new development, and any noise from the intervening industrial sites is likely to dominate the receptors. The noise levels measured at MP1 are therefore considered suitable for setting noise limits for new items of mechanical plant.

8.3. The plant noise criteria required by the local authority is set out in section 3.3. The limiting plant noise criteria at the nearest sensitive receptors is proposed as follows:

Table 10: Proposed Noise Limiting Criteria

Noise Limit at nearest noise sensitive receptor (+1.5m above ground level) or nearest sensitive window	Cumulative Noise Rating Level*
Daytime (07:00-19:00)	40 dB $L_{Ar,Tr}$
Night-time (23:00-07:00)	33 dB $L_{Ar,Tr}$

** Denotes this must include all applicable acoustic feature corrections as well as specific plant noise levels.*

8.4. Noise levels generated by mechanical plant and experienced by local receptors will depend upon a number of variables, the most significant of which are considered to be as follows.

- Noise generated by plant or equipment used to service the building, generally expressed as sound power levels (SWL)
- Distance between the noise source and the receptor
- Attenuation due to ground absorption, atmospheric and barrier effects
- Periods of operation of the plant on the site, known as its "on-time"

9. Conclusions

9.1. Baseline environmental noise levels at the proposed Parker House, Sidcup development have been measured over a typical weekday and weekend period.

9.2. The measured noise levels have been assessed against the requirements of BS 8233: 2014: *'Sound Insulation and Noise Reduction for Buildings'* and the World Health Organisation *'Guidelines for Community Noise',* based upon the assumed façade constructions and room layouts. Recommended specifications for glazing and acoustic trickle ventilators have been made.

9.3. Cumulative noise rating limits for new items of mechanical plant have been specified, at the closest sensitive receiver.

10. Appendix A – Façade Sound Insulation Calculation

Noise Break In - Point Source

Print

Job Details

Project	**Parker House, Sidcup**
Client	**Beechwood Property Ltd**
Contract	**N/A**

Quality Assurance

Consultant	Date
Checked	Date

Measurement Location			Enter Facade Correction (dB)
Enter Facade Correction	0	dB	0 - if measured in free field
Element			3 - if measured at facade
Area 1 - Glazing	1.2	m²	Optimised
Area 2 - Non Glazed	7	m²	275mm cavity brick, plastered both sides
Area 3 - Non Glazed		m²	
Number of Vents	2		Titon V50 Stndard Canopy
Area of Each Vent	2500	mm²	
Angle of incidence	0	degs	0 degrees is normal to element

Comments:-

Receiving Room	**Description**		
Height of room	2.8	m	
Width of room	2.5	m	
Length of room	4	m	Volume can be manually overwritten if required
Volume of room	**28**	m³	Use Volume Recalc button after overwriting to restore Autocalc

Vol Recalc

Frequency Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**
Reverberation time (sec)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Absorption (sabines)	9	9	9	9	9	9	9

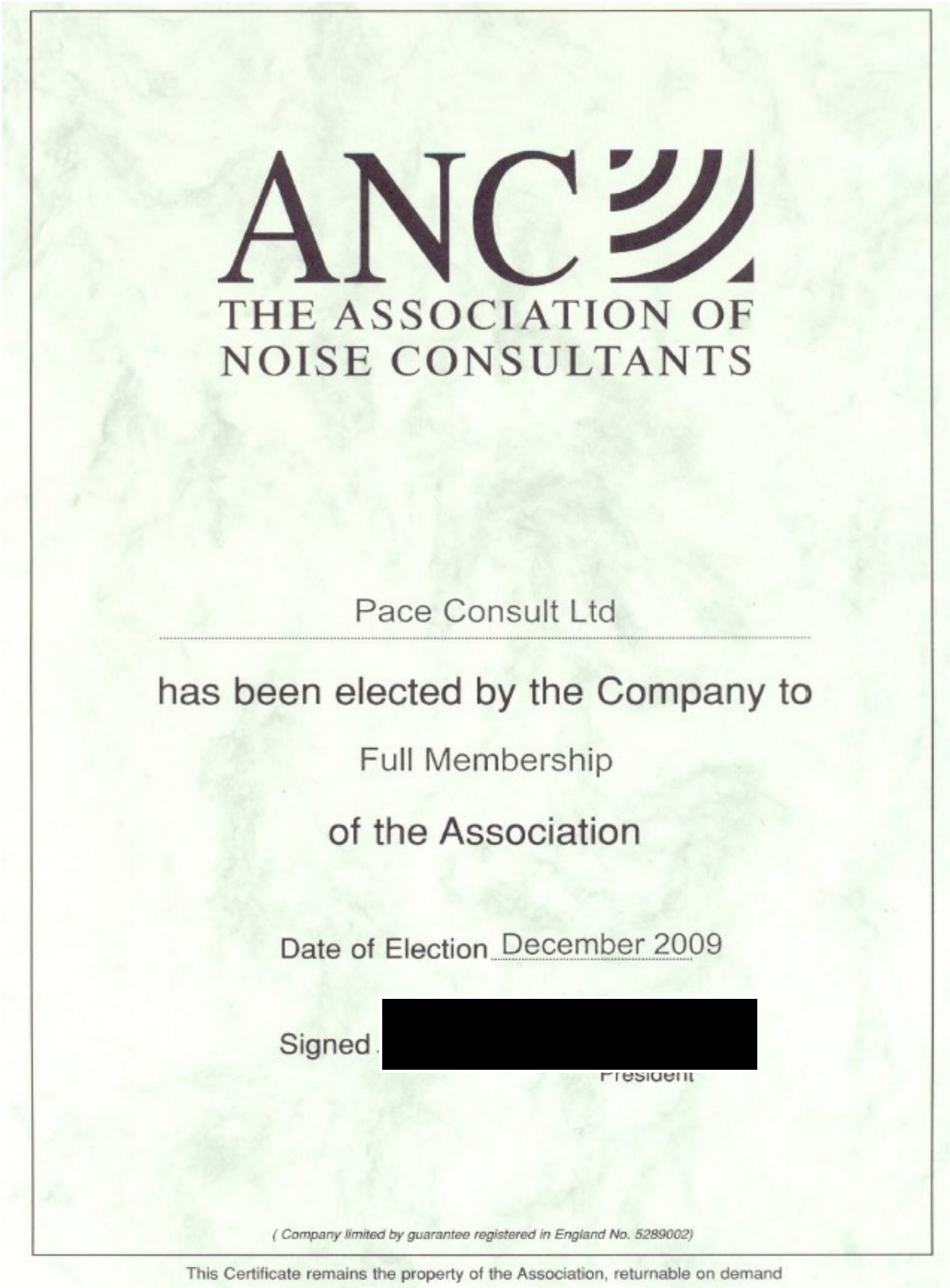
Frequency Hz	**Index**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**dB(A)**
External dB		75.5	73.4	70.2	68.4	66.6	62.0	57.0	71
External Freefield									
External Freefield dB		75	73	70	68	67	62	57	71
Additional Correction		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	Comment here why
10log(cos(angle))		0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Enter SRI/Dne Ref. No.	Area							
1	1.2	11	16	19	24	31	32	18	**Optimised**
275mm cavity brick, plastered both sides	7	33	38	42	51	59	63	63	Optimise SRI
0	0	20	23	27	31	37	38	40	Pre-Optimised
103	0.005	34	37	35	36	41	42	51	**Titon V50 Stndard Canopy**
Combined SRI		**19**	**24**	**26**	**29**	**35**	**36**	**26**	
10logS(tot) S =	8.2	9.1	9.1	9.1	9.1	9.1	9.1	9.1	
10log(4T/0.161V)		-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	
Internal dB		**58**	**51**	**46**	**41**	**33**	**27**	**32**	**43**
Internal dBA		33	36	38	38	33	29	33	
Criterion NR0 (at 1kHz)		35	22	12	5	0	-4	-6	
Additional SRI Required		23	29	34	36	33	31	38	To meet NR0

Free NR Restore NR

Contributions	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**dB(A)**
Glazed - Area 1	58	51	44	38	29	23	32	**42**
Non Glazed - Area 2	43	36	29	18	9	0	-5	**25**
Non Glazed - Area 3	-	-	-	-	-	-	-	**-**
Non Glazed - Area 4	47	42	41	38	31	25	11	**38**

11. Appendix B – ANC Accreditation



ANC

THE ASSOCIATION OF NOISE CONSULTANTS

Pace Consult Ltd

has been elected by the Company to

Full Membership

of the Association

Date of Election December 2009

Signed [redacted]

President

(Company limited by guarantee registered in England No. 5289002)

This Certificate remains the property of the Association, returnable on demand