CST Environmental &
Acoustic Consultants

Proposals for Installation of fixed plant

Planning Noise Assessment

White Wing
British Museum
WC 1B 3DG

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December 2019

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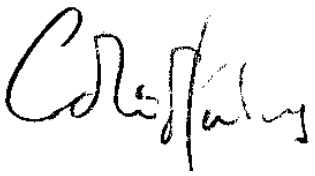


Report Prepared by:.....

Checked by:.....LDS

Date:.....20th December 2019

Version 1.0

1.0 Executive Summary

1.1 This report has been prepared for Frankham Consultancy Group Ltd. in support of a planning application for the installation of external chiller plant as part of an overall scheme of renovation of the British Museum White Wing.

1.2 It is proposed to locate new chiller plant at roof level within a light well, the effect of which will be site the plant well below the roof-line of the building. The proposed location can be identified from photographs at sections 3 and 8 as well as from an extract the Design and Access Statement.

1.3 A number of technical terms are referred to both in this summary and in the main report. A glossary of acoustic terms is to be found at section 10.

1.4 The nearest potentially sensitive residential receptor was identified as the rear facade of The Grange White Hall Hotel (2 -5 Montague Street) located 66 metres from the proposed installation.

1.5 The impact of the proposals have been informed from the results of the baseline survey undertaken to the rear of 1A Montague Street in 2017 which showed that the local sound environment is materially influenced by HVAC plant (chillers) which serve the Hirayama Studio. No new survey data have been obtained for this assessment, it is considered that our 2017 survey can still be considered as being within calibration and that it properly describes the local sound environment at the nearest residential receptors. For ease of reference details of the baseline survey are to be found at appendix 1.

1.6 The type of proposed external plant is listed below. Noise data have been taken from manufacturers' data sheets, extracts of which are to be found at section 7.

1.7 Schedule of Proposed External Plant

- White Wing – Air-Cooled Water- Chiller unit - 1Nr x Airedale DeltaChill model ref DCC014DX-04ADD0.

I.8 By reference to LBC's current local noise standards it is predicted that the proposals will fall within the green zone. No adverse implications for the local sound environment are indicated and no specific mitigation measures are required.

2.0 Objectives of Report

2.1 The objective of this report is:

- To assess the extent to which the proposed plant can comply with LB Camden local noise standards (with mitigation if required).

3.0 Description of Site

3.1 The site is to be found at approximate grid reference 530144(E): 181763(N). It is further identified by an extract of the location plan below:

3.2 The aerial photograph below shows the proposal location in relation to its surroundings. The nearest residential accommodation was identified as The Grange White Hall Hotel which is some 20 metres from the proposal location.

4.0 Assessment Framework & Policy Considerations

4.1 Local Plan Requirements

4.2 The 2017 Camden Local Plan contains the authority's planning policies in respect of Noise and Vibration. They are to be found at section A 4 of the local plan. An extract of policy A 4 is given below:

> **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.

4.3 Local policies are set within a framework of national guidance provided by the National Planning Policy Framework (NPPF). At the heart of the NPPF there is now a presumption in favour of sustainable development. However national planning guidance also advises that to prevent unacceptable risks from pollution, new development must be appropriate for its location and the effects of pollution on amenity mitigated to an acceptable level.

4.4 The local guidance on noise and vibration specifically draws on advice contained in government guidance contained in the Noise Policy Statement for England (NPSE).

4.5 The NPSE embraces three key concepts:

(i) No Observed Effect Level (NOEL) - This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

(ii) Lowest Observed Adverse Effect Level (LOAEL) - This is the level above which adverse effects on health and quality of life can be detected.

(iii) Significant Observed Adverse Effect Level (SOAEL) - This is the level above which significant adverse effects on health and quality of life occur.

4.6 Extracts from the local plan (below) sets out LB Camden's requirements for noise fixed plant. These reference the NPSE concepts outlined above.

Appendix 3: Noise thresholds

:

The significance of noise impact varies dependent on the different noise sources, receptors and times of operation presented for consideration within a planning application. Therefore, Camden's thresholds for noise and vibration evaluate noise impact in terms of various 'effect levels' described in the National Planning Policy Framework and Planning Practice Guidance:

- NOEL – No Observed Effect Level
- LOAEL – Lowest Observed Adverse Effect Level
- SOAEL – Significant Observed Adverse Effect Level

Three basic design criteria have been set for proposed developments, these being aimed at guiding applicants as to the degree of detailed consideration needed to be given to noise in any planning application. The design criteria outlined below are defined in the corresponding noise tables. The values will vary depending on the context, type of noise and sensitivity of the receptor:

- Green – where noise is considered to be at an acceptable level.
- Amber – where 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 – where noise is observed to have a significant adverse effect.

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

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

*10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.

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

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted Leq,5mins noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area.

4.7 Commercial Noise Sources. Appendix 3 is relevant to the proposals. It advises:

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

5.0 Calculations - BS 4142:2014 Assessment

5.1 Reference to the local plan policies identified above indicate that the local planning authority require the proposed plant to be assessed against a procedure described in BS 4142:2014. The BS describes a method for rating and assessing:

- 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, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

5.2 If appropriate, the specific sound level of the source (LAeq,T) is corrected, by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a 'rating' level (LAr,Tr).The Standard effectively compares and rates the difference between the rating level of the specific sound and the typical background sound level (LA90,T) in the absence of the specific sound.

5.3 The BS advises that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) the source in question operates or is proposed to operate in the future.

5.4 Comparing the rating level with the background sound level, BS 4142 states:

- Typically, the greater this difference, the greater the magnitude of impact.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.
- Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

5.5 This assessment considers the effects of the proposed unit operating at full power. In practice during the evening and night periods overall sound emission levels will reduce by software control.

5.6 The starting point for the calculation process is to identify the baseline background (L_{A90}) levels in the area. Table 1 below summarises the survey data in respect of the night and daytime periods now required by Appendix 3 of the LBC Local Plan.

Time	Measured L_{Aeq} 16/8 hr	Measured L_{A90} 16/8 hr
07:00 – 23:00 hrs	55	50
23:00 – 07:00 hrs	50	49

Table 1

5.7 Having established the baseline background noise environment it is possible to calculate the noise impact at specified distances from the proposed installation and compare these levels with the baseline L_{A90}. This process is set out in the following table (Table 2).

Receptor	Design Criteria & Calculations (Night)
1st Floor rear bedroom & G/F conservatory windows Rear of The Grange White Hall Hotel Notes: * Attenuation for a point source given by formula Attn = 20*log d1/d2 ** Reference see: BS 5228:2009 Part 1 Ref: F.2.2.2.1 Calculation for Sound Pressure Level = L_W - 20*LOG10 (distance) -11+6	Night Time Background Levels = 49.0dB$L_{A90(8hr)}$ Design Target for plant = 39dBLAeq(T) Proposed Plant (From Manufacturers' data) 1 Nr. DeltaChil DCC014DX-04ADD0 Sound Power Level = 82dBL_W(A) Distance to Receptor = 66.0 metres. Surface Directivity Factor Q = 4 Sound Pressure Level = 40.6dB Less shielding effect of building envelope 10dB(A)** Sound Pressure Level therefore at receptor = 30.6dB(A) **BS 4142:2014 Assessment - Night Time** Measured Ambient = 50 dB(A) Residual Sound (Measured) = 50 dB(A) Acoustic feature correction = 0dB(A) Rating Level = 30.6 dBL_{AeqTr} Background Sound Level (LA90) = 49dB(A) Excess of Rating over Background = **minus 18.4dB** **Result** – The proposals comply with LBC noise thresholds

Receptor	Design Criteria & Calculations (Day)
1st Floor rear bedroom & G/F conservatory windows Rear of The Grange White Hall Hotel Note: * Attenuation for a point source given by formula Attn = 20*log d1/d2 ** Reference see: BS 5228:2009 Part 1 Ref: F.2.2.2.1	Day Time Background Levels = 50.0dB$L_{A90(8hr)}$ Design Target for plant = 39dBLAeq(T) Proposed Plant (From Manufacturers' data) 1 Nr. DeltaChil DCC014DX-04ADD0 Sound Power Level = 82dBL_W(A) Distance to Receptor = 66.0 metres. Surface Directivity Factor Q = 4 Sound Pressure Level = 40.6dB Less shielding effect of building envelope 10dB(A)** Sound Pressure Level = 30.6dB(A) **BS 4142:2014 Assessment - Night Time** Measured Ambient = 55 dB(A) Residual Sound (Measured) = 55 dB(A) Acoustic feature correction = 0dB(A) Rating Level = 30.6 dBL_{AeqTr} Background Sound Level (LA90) = 50dB(A) Excess of Rating over Background = **minus 19.4dB** **Result** – The proposals comply with LBC noise thresholds

6.0 Conclusions

6.1 A baseline assessment of the local sound environment has been carried out.

6.2 The proposed plant are predicted to meet the LPA requirements contained in the LB Camden Local Plan (July 2017) without mitigation measures.

7.0 Manufacturer's Sound Data

Airedale
APPLIED THERMAL INNOVATION

DeltaChill Air Cooled
& Free Cool Chiller

100-510kW
R410A

Technical Manual

Technical

Technical Data **DCC011DX-04ACC0, DCC013DX-04ACD0, DCC014DX-04ADD0**

Ecodesign

	Notes:	Units	DCC011DX-04ACC0	DCC013DX-04ACD0	DCC014DX-04ADD0
SEPR	1,3,5		6.92	6.95	6.41
SEPR Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Annual Electricity Consumption		kWh/a	118906	130756	152782
Rated Refrigerant Capacity P_A	1,3,5	kW	111.1	122.6	132.2
Rated Power Input D_A		kW	32.7	36.4	40.1
Rated $EER_{C,A}$			3.4	3.37	3.3
Declared Refrigerant Capacity P_B	1,3,5	kW	123.8 / 61.6	137.1 / 62.8	148.1 / 73.8
Declared Power Input D_B		kW	26.7 / 13.6	29.8 / 13.6	32.9 / 16.7
Declared $EER_{C,B}$			4.64 / 4.54	4.61 / 4.62	4.50 / 4.41
Declared Refrigerant Capacity P_C	1,3,5	kW	134.2 / 66.9	149.1 / 68.2	161.3 / 80.4
Declared Power Input D_C		kW	21.0 / 10.7	23.8 / 10.7	26.7 / 13.6
Declared $EER_{C,C}$			6.39 / 6.22	6.26 / 6.36	6.03 / 5.89
Declared Refrigerant Capacity P_D	1,3,5	kW	143.4 / 71.5	159.4 / 73.0	172.3 / 85.9
Declared Power Input D_D		kW	15.2 / 7.9	17.9 / 7.8	20.8 / 10.7
Declared $EER_{C,D}$			9.42 / 9.09	8.90 / 9.36	8.30 / 8.06
SSCEE	2,3,5	%	169.8	174.1	163.7
SSCEE Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Rated Cooling Capacity $P_{rated,c}$	2,4,5		111.6	123.1	132.7
Declared Cooling Capacity 35°C Pdc	2,3,5	kW	111.1	122.6	132.2
Declared EER_d 35°C			3.4	3.37	3.3
Declared Cooling Capacity 30°C Pdc	2,3,5	kW	123.8 / 61.6	137.1 / 62.8	148.1 / 73.8
Declared EER_d 30°C			4.64 / 4.54	4.61 / 4.62	4.50 / 4.41
Declared Cooling Capacity 25°C Pdc	2,3,5	kW	134.2 / 66.9	149.1 / 68.2	161.3 / 80.4
Declared EER_d 25°C			6.39 / 6.22	6.26 / 6.36	6.03 / 5.89
Declared Cooling Capacity 20°C Pdc	2,3,5	kW	143.4 / 71.5	159.4 / 73.0	172.3 / 85.9
Declared EER_d 20°C			9.42 / 9.09	8.90 / 9.36	8.30 / 8.06
Sound Power Level LWA			81	82	82
Air flow rate		m³/h	55348	55348	55348
Off mode P_{OFF}		kW	0.098	0.098	0.098
Thermostat-off mode P_{TO}		kW	0.535	0.536	0.615
Standby Mode P_{SB}		kW	0.126	0.126	0.126
Crankcase heater mode P_{CK}		kW	0.045	0.045	0.045

(1) Nominal conditions as stated in EU 2016/2281 Table 22.
(2) Nominal conditions as stated in EU 2016/2281 Table 21
(3) Performance data (Nett) is supplied in accordance with EN14511-1:2013.
(4) Performance data (Gross) is supplied excluding absorbed pump power as per EN14511-1:2013.
(5) All performance data based upon standard waterside configuration.

Technical Data

Sound Data - DCC

		Frequency								
	Sound	63Hz dB	125Hz dB	250Hz dB	500Hz dB	1000Hz dB	2000Hz dB	4000Hz dB	8000Hz dB	Total dB(A)
DCC011SX-04AK00	Power	86	79	77	77	79	67	67	57	81
	Pressure @10m	54	47	45	45	47	35	35	25	49
DCC014SX-04AL00	Power	86	79	77	77	81	67	66	53	82
	Pressure @10m	54	47	45	45	49	35	34	21	50
DCC017SX-04AM00	Power	86	79	77	83	89	68	66	52	89
	Pressure @10m	54	47	45	51	56	36	34	20	57
DCC021SX-06BS00	Power	88	81	79	79	83	69	68	55	84
	Pressure @10m	56	49	46	46	50	36	36	23	52
DCC023SX-04BT00	Power	86	79	77	84	90	70	68	53	91
	Pressure @10m	54	47	45	52	58	37	36	21	59
DCC024SX-06BT00	Power	88	81	79	85	90	70	68	54	91
	Pressure @10m	55	49	46	52	58	38	36	21	59
DCC011DX-04ACC0	Power	86	79	77	77	79	67	67	57	81
	Pressure @10m	54	47	45	45	47	35	35	25	49
DCC013DX-04ACD0	Power	86	79	77	77	80	67	67	56	82
	Pressure @10m	54	47	45	45	48	35	35	24	50
DCC014DX-04ADD0	Power	86	79	77	77	81	67	66	53	82
	Pressure @10m	54	47	45	45	49	35	34	21	50
DCC015DX-04ADF0	Power	86	79	77	81	86	68	66	53	87
	Pressure @10m	54	47	45	49	54	36	34	21	55
DCC016DX-04AJJ0	Power	86	80	77	74	78	68	67	54	80
	Pressure @10m	54	47	45	42	46	36	35	22	48
DCC018DX-04BJK0	Power	86	80	77	77	81	68	69	58	82
	Pressure @10m	54	47	45	45	48	36	37	26	50
DCC019DX-04AFK0	Power	86	79	77	81	86	69	68	58	87
	Pressure @10m	54	47	45	49	54	37	36	25	55
DCC020DX-06AFK0	Power	88	81	79	82	86	69	69	58	87
	Pressure @10m	55	49	46	49	54	37	36	25	55
DCC021DX-04AKK0	Power	86	79	77	79	82	69	70	60	84
	Pressure @10m	54	47	45	47	50	37	38	28	52
DCC022DX-06AKK0	Power	88	81	79	79	82	69	70	60	84
	Pressure @10m	55	49	46	47	50	37	38	28	52
DCC024DX-06BKL0	Power	88	81	79	79	83	70	70	59	84
	Pressure @10m	56	49	46	47	51	37	37	26	52
DCC025DX-06BKL0	Power	89	82	80	80	83	70	70	59	86
	Pressure @10m	57	50	47	47	51	38	37	26	52
DCC027DX-06BLL0	Power	88	81	79	80	84	70	69	56	85
	Pressure @10m	56	49	46	47	51	37	37	24	53
DCC028DX-08BLL0	Power	89	82	80	80	84	70	69	56	85
	Pressure @10m	57	50	47	48	51	38	37	24	53

1 dB(A) is the overall sound level, measured on the A scale.
2 All sound data measured at nominal conditions: Water in/out 12/7°C at 35°C ambient.
3 Based on standard unit, for units fitted with optional pump packages please contact Airedale.

8.0 Photographs

View from White Wing Roof – Looking south (plant location centre shot behind wall)

Aerial View of White Wing Roof – Looking south (plant location centre shot behind wall)

9.0 Design Scheme Extract

NEW MECHANICAL PLANT ON THE ROOF – LEVELS 01, 02, 03 & 04

During the works to construct the Crawford staircase and lift a new services riser was constructed with an area identified to house a new air-cooled chiller unit. London Borough of Camden planning 2016/3083/P and listed building reference 2016/4254/L dated 19th October 2016. The infill walling to the service riser was built to a sufficient height to mask the chiller unit. This riser runs from the Level 01 plant room to the roof as illustrated below. The work will involve lifting a new air-cooled chiller into this space. The structure was designed to receive the unit which will sit on a proprietary support system. The equipment chosen by the Museum will be specified not to exceed the pre-existing background noise levels. A recent background noise survey is included with this application.

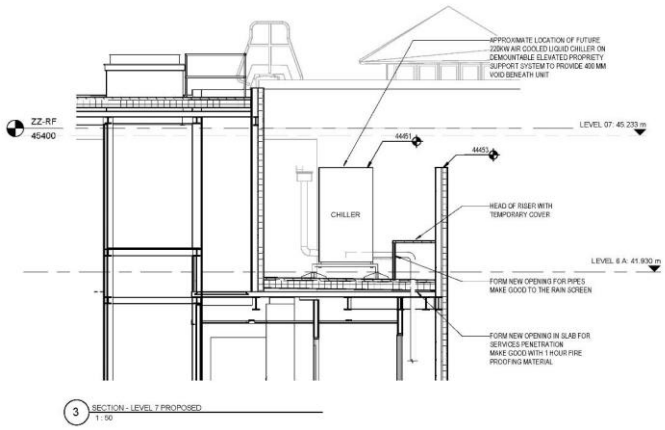


Figure 5- section through White Wing lightwell showing mechanical plant location

10.0 Glossary of Acoustic Terms

Sound is measured in decibels (dB). To establish a reference framework it is useful to consider two noise levels which are at the extreme ends of the range to be considered. At the low end, 35 to 40 dB (A) is the normal noise level in a quiet living room, 35 dB (A) is the noise level given as a target for suburban bedrooms by the Wilson Report; a government report on noise published in 1963. At the high end is the noise level experienced at the pavement edge of a busy city centre street, a level of 75 to 80 dB (A).

The sensitivity of the human ear varies with pitch or frequency. The designation "A" used in this assessment simply means that the noise level was measured using a meter which is able electronically to respond very closely to the performance of the human ear.

Decibels are measured using a logarithmic scale, and therefore two numerically equal values cannot be added together arithmetically. Two equal noise levels occurring together form a new level which is 3 dB (A) higher than either alone. Thus two identical vehicles each producing 65 dB (A) outside someone's window will produce, not 130 dB (A), but 68 dB (A) if both engines are running together at the same distance from the microphone.

If one sound source is 10 dB (A) below an adjacent louder source, then the combined effect will be virtually no different to the louder one alone.

Experiments have shown that most people will indicate that a sound has become twice as loud, when on a measuring meter it has risen by about 10 dB (A). Also it is generally accepted that a difference in 3 dB (doubling in energy terms) is the smallest incremental step that can be distinguished by the average human ear.

Some additional acoustic terms are also referred to in this report. These are:

LA10: is the noise level just exceeded for 10% of the measurement period, and calculated by statistical analysis.

L_A90. This is the sound level exceeded for 90% of a time interval T. L_A90 and it is termed background sound or noise level. It is effectively a measure of the minimum noise level which is experienced in the absence of specific noisy events such as brake squeal or engine backfire.

$L_{A\ eq(T)}$ is the equivalent continuous sound level over a time T, which can be described as the "energy - average" noise level.

L_A max is the highest noise level recorded by the measuring meter during a single event e.g. overlying aircraft. In this assessment the meter was set to "fast" response.

Ambient Sound - This is the all encompassing sound at a given location at a within a specified time frame and comprises the sound from all near and distant sources.

Noise - Noise was defined in the Wilson Report on 1964 as "unwanted sound'. Noise excluded vibration, except where indicated otherwise.

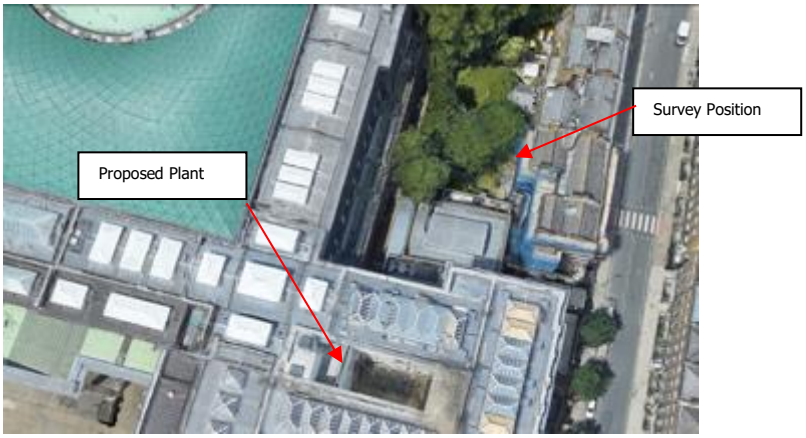
Appendix 1 - Baseline Survey

A1.1 A single survey position was established at ground floor level in the rear garden of the subject building (1A Montague Street). The survey equipment and survey location can be seen in the photograph below:

View of Survey Position (Looking north)

A1.2 A Svantek 959 precision grade sound level meter was used to objectively measure the local sound environment from around 11:30 hrs on 20th April 2017 to 12:30hrs on 22nd April 2017. The meter was mounted on a tripod at a height approximately 1.5m above ground level.

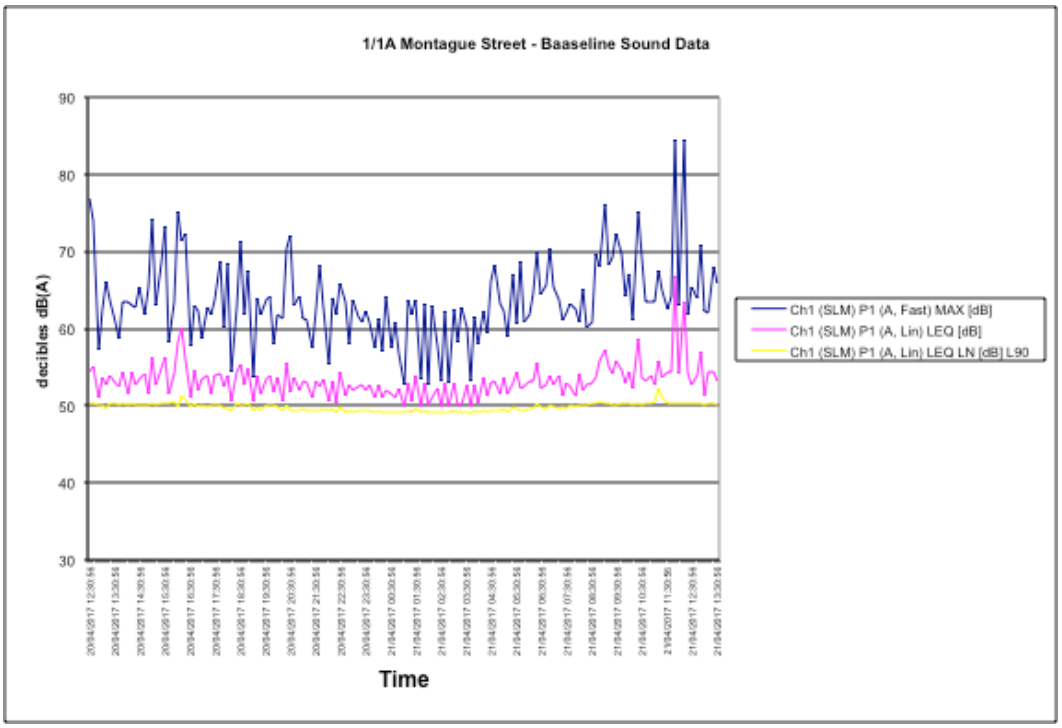
A1.3 The memory features of the meter were used to automatically capture and store sound energy data every 10 minutes. The meter (Serial number 11229) was calibrated on site prior to the commencement of the survey to 104dB using a Castle Associates acoustic calibrator (serial number 0500301). A calibration check was also performed at the end of the survey period. No drift in calibration was observed. The weather was fine and dry throughout the survey with a light south westerly breeze (less than 5m/s).



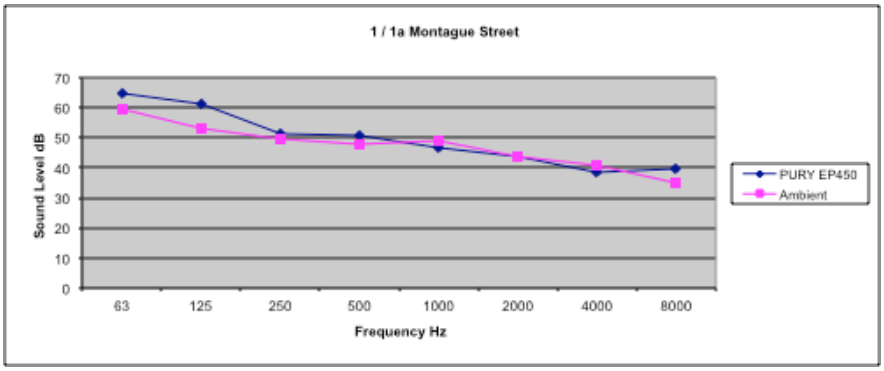
Ariel View of Survey Position & Proposal Location

A1.4 Survey Results

A1.5 The following graph, compiled from the raw survey data shows the time / sound level history recorded at the survey point.



A1.6 The above graph confirms a subjective assessment that the sound environment in the rear garden of No.1 / 1A Montague Street is materially impacted by the existing Hirayama Studio plant which operates 24/7. The following graph provides a frequency analysis comparison between the measured ambient sound and the proposed plant. It can be seen from the following graphs that the proposed plant will exhibit a very similar tonal signature to that already existing. This is relevant to the BS 4142: 2014 assessment which advises that where new tonal components are to be introduced by a new noise source it may be appropriate to apply up to a 15dB penalty to account for potentially annoying tonal components. In this case it is considered that no tonal penalty is justified.



A1.7 Discussion of the Survey Results

A1.8 The local sound environment is materially impacted by day and night from the adjoining chiller plant. Reference to the above graph shows there is very little diurnal variation in either the ambient (L_{Aeq}) or background (L_{A90}) noise levels.