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41 PARKWAY, CAMDEN, LONDON

PLANNING COMPLIANCE REVIEW

Report 17380.PCR.01

For:

Numan Devrim

41 Parkway

London

NW1 7PN

Site Address	Report Date	Revision History
41 Parkway, Camden, London, NW1 7PN	09/04/2017	Rev. A – 10/07/2018

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List of Attachments

1.0 INTRODUCTION

KP Acoustics Ltd, 1 Galena Road, London, W6 0LT, has been commissioned by Numan Devrim, 41 Parkway, London, NW1 7PN to undertake an environmental noise survey at the aforementioned address.

The background noise levels measured will be used to determine daytime and night-time noise emission criteria for an existing plant installation, in agreement with the planning requirements of The London Borough of Camden.

This report presents the overall methodology and results from the environmental survey followed by calculations to demonstrate the feasibility of the existing plant installation to satisfy the emissions criterion at the closest noise-sensitive receiver and outline mitigation measures as appropriate.

2.0 ENVIRONMENTAL NOISE SURVEY AND EQUIPMENT

2.1 Procedure

Automated noise monitoring was undertaken on site as shown in Site Plan 17380.SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receiver relative to the existing plant installation under planning application. The duration of the survey was between 09:54am on 28/03/2018 and 17:19 on 29/03/2018.

Initial inspection of the site revealed that the background noise profile at the monitoring location was dominated by noise from a neighbouring kitchen extract fan installation serving the restaurant at 43 Parkway, in addition to road traffic noise from the surrounding roads.

It is understood that the kitchen extract system under application for the restaurant at 41 Parkway is currently installed on site and operational. As the kitchen extraction system is currently in operation between 9:00am and 11:00pm, it was not possible to switch off the unit for the full duration of the noise survey. Therefore, in order to obtain a representative background noise when the plant unit was non-operational, the system was switched off for a minimum duration of 10 minutes every hour, which can be seen by the fluctuating L_{A90} level on time history 17380.TH1. Please note that the level does not drop off significantly when the kitchen extraction fan was switched off due to the noise profile being dominated by noise from the neighbouring plant installation.

The weather during the course of the survey was generally dry with wind speeds within acceptable tolerances and therefore suitable for the measurement of environmental noise. The measurement procedure generally complied with ISO 1996-2:2007 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels*'.

2.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed.

The equipment used was as follows.

- 1 No. Svantek Type 957 Class 1 Sound Level Meter
- B&K Type 4231 Class 1 Calibrator

3.0 RESULTS

The results from the continuous noise monitoring are shown as a time history of L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} averaged over 5 minute sample periods in Figure 17380.TH1.

Minimum background noise levels and average ambient noise levels are shown in Table 3.1.

	Minimum background noise level $L_{A90:\ 5min}$ dB(A)	Average ambient background noise level $L_{Aeq:\ 5min}$ dB(A)
Daytime (07:00-23:00)	53	72
Night-time (23:00-07:00)	52	56
Operating hours (9:00 – 23:00)	53	73

Table 3.1 Minimum measured background and average ambient noise levels

4.0 NOISE CRITERIA

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

"The proposed plant and machinery shall be operated so as to ensure that any noise generated is "not audible" outside the nearest residential premises. To demonstrate inaudibility, you will need to provide calculations that show that the plant noise level is 10dBA below the lowest background level (LA90 (15minutes)) 1m from the nearest residential window, over the proposed operating hours. Tonality must also be taken into consideration."

Further to concerns raised by the Local Authority, the initial version of the report considers the neighbouring kitchen extraction unit to be part of the background noise profile of the area. The Local Authority feedback was that this is new system, and has not been regularised in planning terms. Therefore, the Local Authority has requested that the calculations and assessment is undertaken during a period in which the neighbouring extraction fan is off.

It should be noted that the purpose of the environmental noise survey is to collect representative noise data in relation to the nearest noise sensitive receiver. Therefore, all existing noise sources need to be considered within the noise profile of the area, regardless of being regularised by the Local Authority. During the site visit it is not known what plant is regularised, and furthermore we have no authority in requesting that neighbouring plant is switched off.

As shown in time history Figure 17380.TH1, it is clearly shown that between the hours of 22:49 on 28/03/2018 and 09:29 on 29/03/2018 that the kitchen extraction systems serving the restaurants at 41 and 43 Parkway are switched off by the abrupt dropping of the noise levels.

In order to render the assessment as robust as practically possible, the night-time criterion of 42dB(A) will be used to ensure the amenity of the closest residential receiver will be protected. This is the lowest measured background noise level on site with all kitchen extract fans off.

Note that compliance to the above criterion would inherently demonstrate compliance to BS4142:2014 '*Methods for rating and assessing industrial and commercial sound*'.

	Night-time (23 :00-07 :00)
Noise criterion at nearest receiver	42 dB(A)

Table 4.1 Proposed Noise Emissions Criterion

5.0 DISCUSSION

It is understood that the plant installation is comprised of the following unit:

- 1 No. Helios GBW 500/4 Kitchen Extraction Fan

The kitchen extraction fan is installed to the rear elevation as shown in 17380.SP1. The closest noise sensitive receiver to this location has been identified as a First-Floor Kitchen/Dining Room window located approximately 1.3 metres away from the plant installation location.

The sound power levels as provided by the manufacturer for the unit is shown in Table 5.1.

	Sound Power Level (dB) in each Frequency Band							
Unit	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
Helios GBW 450/4 - Casing Breakout	59	59	62	57	56	47	41	33
Helios GBW 450/4 - Outlet	61	61	73	74	74	73	69	60

Table 5.1 Manufacturer's Sound Power Level

5.1 Objective overview

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

Nearest Noise Sensitive Window	Criterion	Noise Level at closest Receiver
Receiver (Kitchen/Dining Room window at First Floor level)	42 dB(A)	41 dB(A)

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

As shown in Appendix B and Table 5.2, transmission of noise to the nearest sensitive windows due to the effects of the plant installation fully satisfies the emissions criterion set based on the requirements of The London Borough of Camden, providing that the mitigation measures outlined in Section 5.2 are implemented.

5.2 Proposed Mitigation Measures

In order to reduce noise emissions from the proposed kitchen extraction fan to within the criteria specified in Section 4.0, an acoustic silencer should be installed directly after the fan within the ductwork. The acoustic silencer should provide the insertion loss figures shown in Table 5.3.

	Insertion Loss (dB) in each Frequency Band							
Unit	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
Acoustic Silencer (min. 1200mm Length, 45% free area)	3	7	14	21	27	26	17	12

Table 5.3 Required attenuation levels of proposed silencer

In addition to the acoustic silencer, we would recommend that the fan case itself is enclosed with acoustically treated panels.

The panels should provide the minimum attenuation characteristics shown in Table 5.4.

	Insertion Loss (dB) in each Frequency Band							
Unit	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
Acoustic enclosure panels for Case Fan unit	5	6	10	15	17	19	19	19

Table 5.4: Required attenuation levels of proposed enclosure

In order to ensure that no structure-borne noise is transferred within any noise-sensitive spaces, we would recommend adopting any suitable elements of the anti-vibration strategy shown in Appendix C.

The aforementioned silencer and acoustically treated panels could be provided by companies such as EEC, Noico, AVK, or any other supplier of noise control products.

5.3 Noise Impact Assessment

The predicted noise level at nearest noise sensitive receiver as shown in Table 5.2 is to be considered outside of the nearest residential window. Window may be closed or partially closed leading to further attenuation, as follows. Further calculations have been undertaken to assess whether the noise emissions from the plant units installation would be expected to meet the recognised British Standard recommendations, in order to further ensure the amenity of nearby noise sensitive receiver.

British Standard 8233:2014 '*Sound insulation and noise reduction for buildings – Code of Practice*' gives recommendations for acceptable internal noise levels in residential properties. Assuming worst case conditions, of the closest window being for a dining room, BS8233:2014 recommends 40 dB(A) as being the value for internal conditions during daytime hours.

With calculated external level at nearest noise sensitive receiver as shown in Table 5.2, the residential window itself would need to provide nominal attenuation in order for the conditions to be achieved. According to BS8233:2014, even a partially open window offers 10-15dB attenuation, thus leading to a further reduced interior noise level.

Receiver	Design Range – *For dinning room in BS8233:2014 for indoor ambient noise level*	Noise Level at Receiver
Receiver at First Floor level (Kitchen/Dining Room)	40 dB(A)	26-31 dB(A)

Table 5.5 Noise levels and criteria inside nearest residential.

Predicted levels are shown in Table 5.5, with detailed calculations shown in Appendix B. It can therefore be stated that, as well as complying with the requirements of The London Borough of Camden the noise emissions from the plant installation would be expected to meet the most stringent recommendations of the relevant British Standard.

6.0 CONCLUSION

An environmental noise survey has been undertaken at 41 Parkway, Camden, London, by KP Acoustics Ltd between 09:54am on 28/03/2018 and 17:19 on 29/03/2018. The results of the survey have enabled criteria to be set for noise emissions from the existing plant installation.

Using manufacturer noise data, noise levels are predicted at the nearby noise sensitive receiver for compliance with current requirements.

Calculations show that noise emissions from the proposed plant installation would meet the requirements of The London Borough of Camden, providing that the mitigation measures described in Section 5.2 are implemented.

No other measures would be deemed necessary in order to protect the amenity of the nearest noise sensitive receiver.

Report by:
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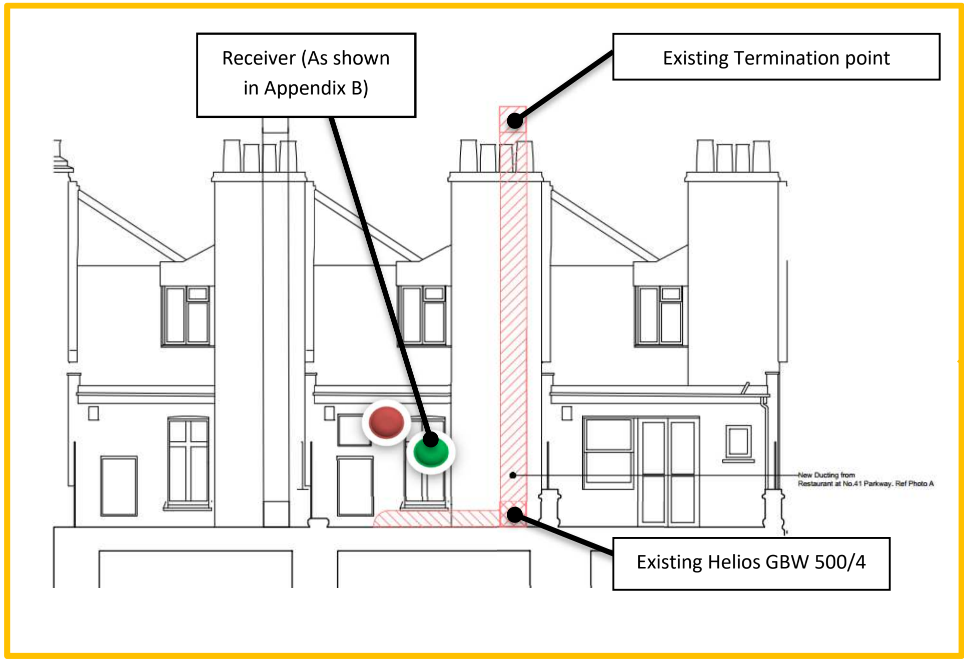

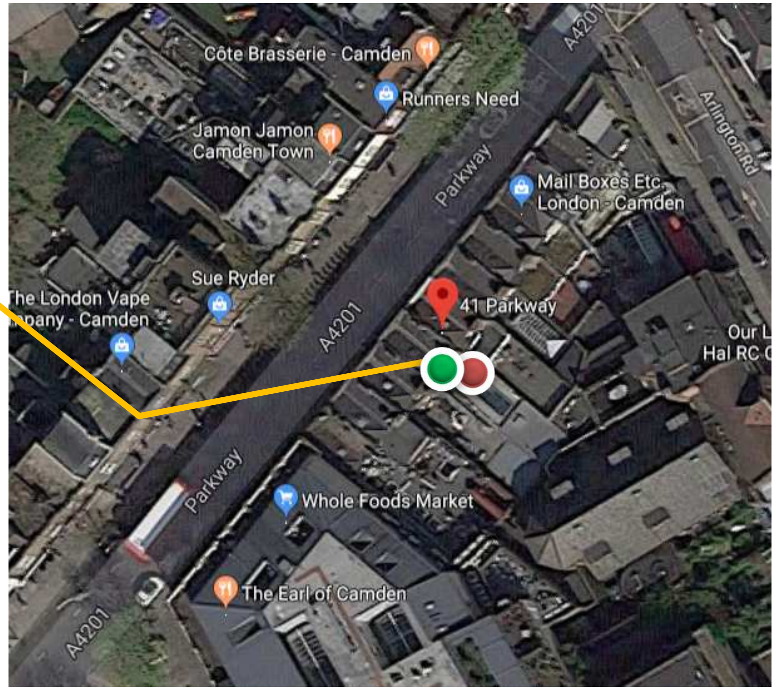

Noise Survey Monitoring Position

Closest Noise Sensitive Receiver

Title:

Indicative site plan showing proposed plant installation, noise monitoring position and closest noise sensitive receiver

Date: 10 July 2018

FIGURE 17380.SP1

KP acoustics

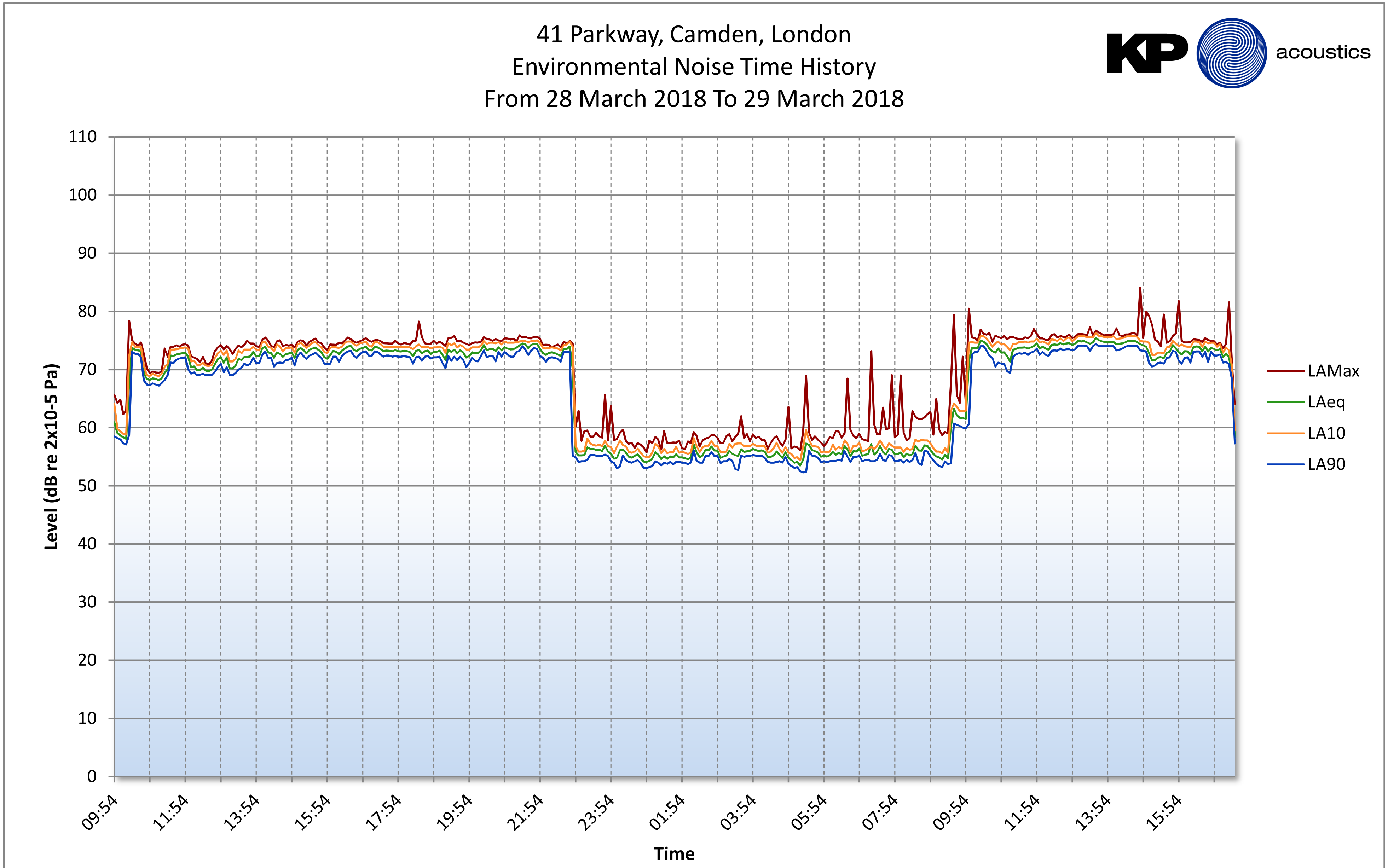

Figure 17380.TH1

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

41 Parkway, Camden, London

PROPOSED PLANT UNIT EMISSIONS CALCULATIONS

Source: Plant Unit Installation	*Frequency, Hz*								
Receiver: Nearest Noise Sensitive window, as shown in SP1	***63***	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Manufacturers Sound Power Levels									
Helios GBW 500/4 - Casing Breakout									
Helios GBW 500/4 - (Sound Power Level, dB)	59	59	62	57	56	47	41	33	
Correction to Sound Pressure Level at 1m	-11	-11	-11	-11	-11	-11	-11	-11	
Corrections due to surface reflection (1)	3	3	3	3	3	3	3	3	
Attenuation provided by proposed case fan enclosure with with acoustically treated panels	-5	-7	-10	-15	-17	-19	-19	-19	
Total Sound Pressure Levels from Helios GBW 500/4 - Casing Breakout at closest noise sensitive receiver	**46**	**44**	**44**	**34**	**31**	**20**	**14**	**6**	**38**
Helios GBW 500/4 - Outlet									
Helios GBW 500/4 - (Sound Power Level, dB)	61	61	73	74	74	73	69	60	
Correction to Sound Pressure Level at 1m	-11	-11	-11	-11	-11	-11	-11	-11	
Attenuation provided by distance (min. 6m)	-16	-16	-16	-16	-16	-16	-16	-16	
Attenuation Provided by Directivity	-2	-4	-6	-8	-8	-11	-11	-11	
Attenuation due to end reflection loss	-8	-4	-1	0	0	0	0	0	
Attenuation provided by proposed silencer (1200mm Length, 45% free area)	-3	-7	-14	-21	-27	-26	-17	-12	
Total Sound Pressure Levels from Helios GBW 500/4 - Outlet at closest noise sensitive receiver	**21**	**19**	**25**	**18**	**12**	**9**	**14**	**10**	**22**
Helios GBW 500/4 - Rectangular Duct breakout									
Helios GBW 500/4 - (Sound Power Level, dB)	61	61	73	74	74	73	69	60	
Attenuation provided by duct length, dB	-3	-2	-1	0	0	0	0	0	
Normalized duct breakout transmission loss (TL_{out}), dB	-19	-22	-26	-28	-31	-35	-41	-45	
Correction due to duct breakout area (10 log(S/A)), dB	12	12	12	12	12	12	12	12	
$L_{w(out)}$	51	49	58	58	55	50	40	27	
10log(πrL)+10	-5	-5	-5	-5	-5	-5	-5	-5	
Lp, dB	46	44	53	53	50	45	35	22	
Corrections due to surface reflection (1)	3	3	3	3	3	3	3	3	
Attenuation provided by proposed silencer (1200mm Length, 45% free area)	-3	-7	-14	-21	-27	-26	-17	-12	
Total Sound Pressure Levels from Rectangular Duct breakout (outlet) at closest noise sensitive receiver	**46**	**40**	**42**	**35**	**26**	**22**	**21**	**13**	**37**
Sound pressure level 1m from closest noise sensitive receiver	**49**	**46**	**46**	**38**	**32**	**24**	**23**	**16**	**41**

Design Criterion	**42**

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.

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.