Survey provided to:

Procol Ltd

For

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1.0 Introduction

Acoustix Consultancy have been contracted to provide an assessment of the current noise levels in line with BS 4142:1997 in order to determine the potential impact of the installation of plant at One Kemble Street, London. The plant is to be placed on the roof of the building of One Kemble Street. It has been assumed that this plant will run 24 hours a day.

2.0 Site Description and Measurement Position

The building is a 16 story building in a mixed commercial and residential area in London. It stands significantly taller than the surrounding buildings (approximately 60 metres). This is shown in Figure 1.

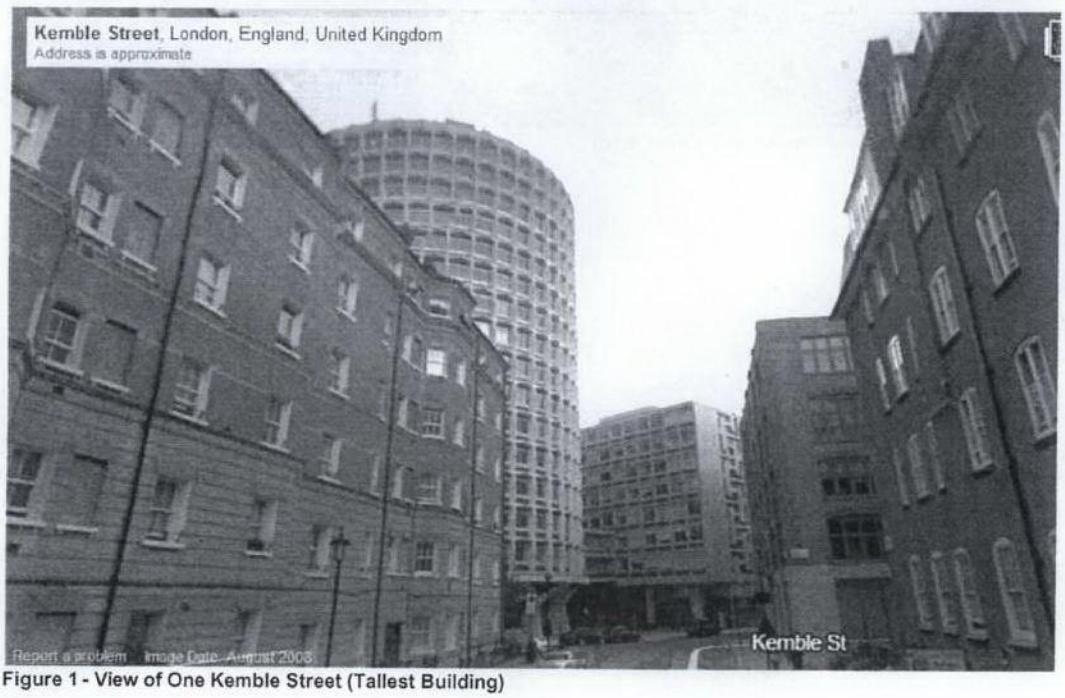


Figure 1 - View of One Kemble Street (Tallest Building)

Figure 2 - Aerial View of One Kemble Street (Red)

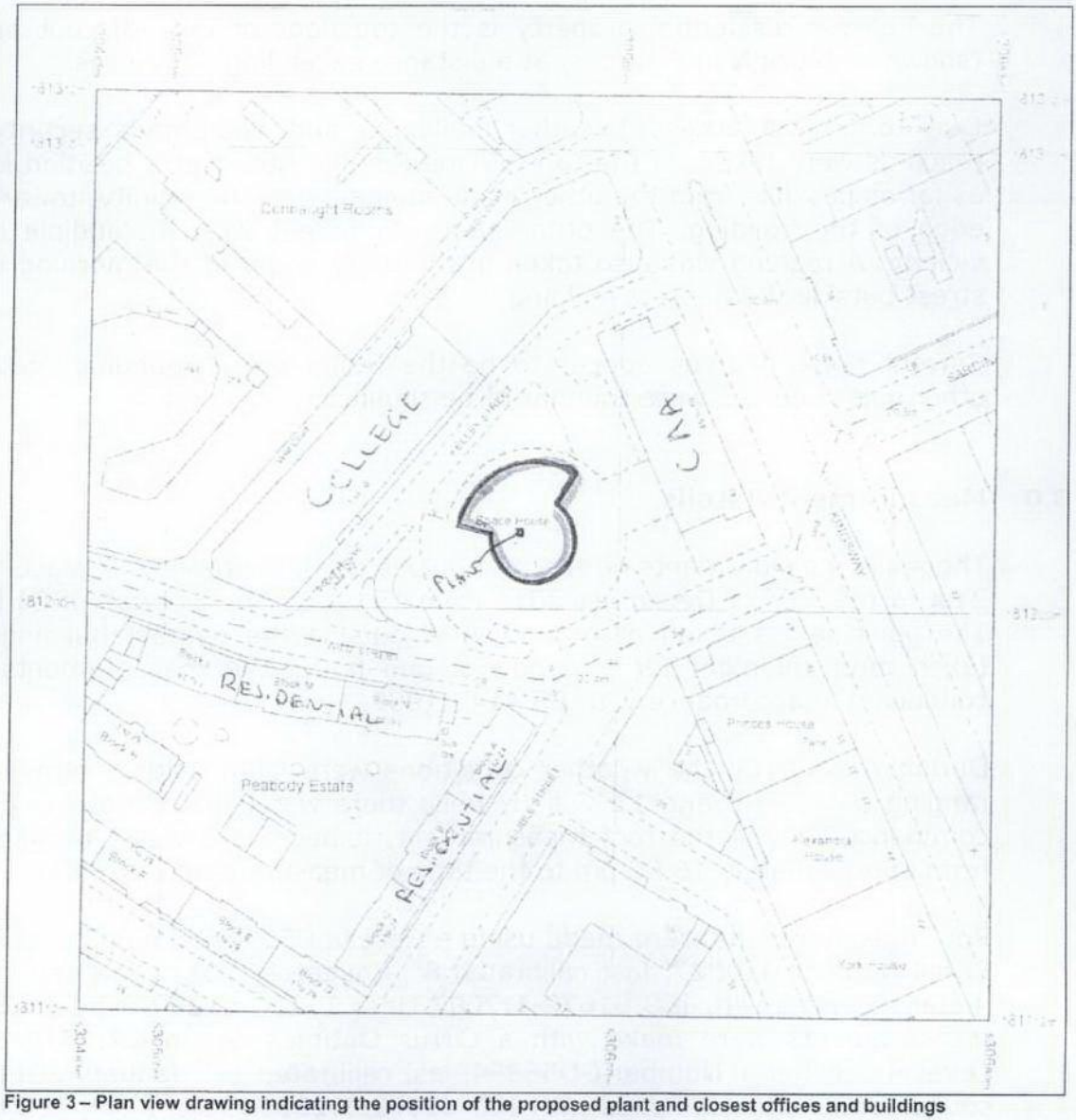


Figure 3 – Plan view drawing indicating the position of the proposed plant and closest offices and buildings

The closest office to the plant is on the 15th floor of One Kemble Street itself. The distance of the proposed position of the plant to the edge of the building is approximately 17 metres and the windows of the 15th floor are approximately 7 metres below the top of the building, giving an effective distance of approximately 18 metres.

The nearest residential property is the top floor of the adjacent building (shown as block N in Figure 3) at a distance exceeding 35 metres.

Due to limited access to other buildings and equipment security, the readings were taken on the roof of One Kemble Street at a position located as far as possible from the other plant equipment in the vicinity, towards the edge of the building. The other plant equipment was not audible in this vicinity. A reading was also taken in the early hours of the morning on the street outside the nearest building.

Current noise sources appear to be the traffic on surrounding roads. No other noise sources were thought to be significant.

3.0 Measurement Details

The noise measurements on the roof of One Kemble Street took place on the 21st to the 22nd of December 2011 from 15.20 pm for a period of 24 hours. The noise levels taken at ground level outside the nearest building were taken after midnight for a period of one hour. The measurements were conducted in accordance with BS 4142:1997.

During the survey the weather conditions were calm, with a temperature ranging between 6 and 13°C and, while there was light rain at the time of commencement of the roof measurement, it became dry and remained so from approximately 16.00 pm to the time of measurement cessation.

Roof measurements were made using a Casella CEL-450 Sound Level Meter, Serial Number 429027, last calibrated 8th November 2011. This sound level meter complies with IEC 61672-1:2002 class 1, IEC 61260 Type 1. Ground measurements were make with a Cirrus Optimus Green CR:171B Sound Level Meter, Serial Number GO56364, last calibrated 19th January 2011. This sound level meter complies with IEC 61672-1:2002 Class 1 and IEC 61260 Type 1.

Both meters were calibrated before and after the site measurements using a Cirrus Research CR:513A Class 1 Calibrator , Serial Number 031526, Last Calibrated 21st June 2011, and no significant calibration shift was noted.

4.0 Measurement Results

Third octave noise levels were taken at 10 minute intervals and the data was defined as follows:

$L_{Aeq, T}$	The "A" weighted equivalent continuous Noise Level
$L_{A90, T}$	The "A" weighted level exceeded for 90% of the sample period
$L_{A10, T}$	The "A" weighted level exceeded for 10% of the sample period
L_{Amax}	The "A" weighted maximum noise level

The lowest measured background noise level, $L_{A90,10min}$, on the roof during this 24 hour period was 51 dBA. The lowest measured background noise level at ground level during night time hours was 38 dBA. It is thought that the difference in noise level between the roof of One Kemble Street and that at street level is due to the shielding by buildings at street level and the noise generated by existing plant on the roof of One Kemble Street.

5.0 Proposed Plant Assessment

The manufacturer of the proposed plant has provided data for Sound Pressure Levels taken from 1 m from the plant in free field conditions.

BS 4142:1997 describes an assessment method whereby rating levels of plant noise from are defined according to likelihood of causing complaints:

"Assess the likelihood of complaints by subtracting the measured background noise level from the rating level
The greater this difference the greater the likelihood of complaints
A difference of around +10 dB or more indicates that complaints are likely
A difference of around +5 dB is of marginal significance.
If the rating level is more than 10 dB below the measured background noise level then this is a positive indication that complaints are unlikely".

According to BS 4142:1997, the rating level of the plant should ideally be at a sound pressure level of 10 dB below the lowest background noise level reading at the nearest noise sensitive property in order to achieve a noise level where 'complaints are unlikely'.

Distance and barrier attenuation for the plant noise was calculated, assuming a distance of 20 meters. A penalty of +3 dBA has been applied to account for reflections off buildings and a penalty of +5 dBA was applied to

the noise level of the plant due to the peak sound pressure level at 500 Hz, indicating a tonal quality to the noise. The results are displayed in Table 1, below.

Frequency	63	125	250	500	1000	2000	4000	8000	Level dB(A)
Plant Noise (dBA)	53.8	54.9	54.4	58.8	53.0	48.2	39.0	42.1	**63**
Nearest Office - 15th Floor, One Kemble Street									
Distance Attenuation to 15th Floor Window	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	
Barrier Attenuation to 15th Floor Window	11.1	13.8	16.8	19.8	22.8	25.8	25.8	31.8	
Resulting Plant Noise at Window of 15th Floor Window	17.6	16.0	12.5	13.9	5.1	-2.7	-14.9	-17.0	**22**
Reflection Correction	3	3	3	3	3	3	3	3	
Tonal Correction	5	5	5	5	5	5	5	5	
Rating Level of Plant at 15th Floor Window	25.5	24.0	20.5	21.9	13.1	5.3	-6.9	-9.0	**30**
Nearest Residence – Block N, 5th Floor									
Distance Attenuation to Block N Window	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9	
Barrier Attenuation to Block N Window	8.0	9.9	12.5	15.3	18.3	21.3	24.3	27.3	
Resulting Plant Noise at Block N Window	14.9	14.1	11.1	12.6	3.8	-4.0	-16.2	-18.3	**20**
Reflection Correction	3	3	3	3	3	3	3	3	
Tonal Correction	5	5	5	5	5	5	5	5	
Rating Level of Plant at Block N Window	22.9	22.1	19.1	20.6	11.8	4.0	-8.2	-10.3	**28**
Ground Level									
Distance Attenuation to Ground Level	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	
Barrier Attenuation to Ground Level	9.8	12.2	15.1	18.1	21.1	24.1	27.1	30.1	

Resulting Plant Noise at Ground Level	8.5	7.1	3.8	5.2	-3.6	-11.4	-23.6	-27.8	
Reflection Correction	3	3	3	3	3	3	3	3	
Tonal Correction	5	5	5	5	5	5	5	5	
Rating Level of Plant at Ground Level	16.5	15.1	11.8	13.2	4.4	-3.4	-15.6	-17.8	**21**
Building Roof Edge – One Kemble Street (Measurement Position)									
Distance Attenuation to Ground Level	24.6	24.6	24.6	24.6	24.6	24.6	24.6	24.6	
Resulting Plant Noise at Roof Edge	29.2	30.3	29.8	24.2	28.4	23.6	14.4	15.3	
Reflection Correction	3	3	3	3	3	3	3	3	
Tonal Correction	5	5	5	5	5	5	5	5	
Rating Level of Plant at Roof Edge	37.2	38.3	37.8	42.2	36.4	31.6	22.4	23.3	**46**
Measured L90 at Edge of Roof	30.5	38.3	44.6	45.5	46.1	40.3	31.7	22.2	**51**

Table 1 - Summary of Measured and Calculated Noise Levels (dBA) in Octave Bands

The results above show that the expected noise level resulting from the proposed plant falls below the lowest potential background noise level at the nearest building. This does not achieve a level where, according to BS 4142:1997, 'complaints are unlikely'; however it is significantly below the level where 'complaints are of marginal significance'. It is our opinion, therefore, that the plant installation is unlikely to cause complaints 20 meters away.

Should complaints arise, the rating levels of the plant must be reduced in order to achieve a rating level at the edge of the building of less than 5 dB below the background noise level at that property. Proposed attenuation required in octave bands is displayed in Table 2 below:

Frequency	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Level**
Resulting plant rating Level at Edge of Building	37.2	38.3	37.8	42.2	36.4	31.6	22.4	23.3	**46**
Desired Noise Levels = 5dB below LA90	25.5	33.3	39.6	40.5	41.1	35.3	26.7	17.2	**46**
Noise reduction required (dB)	12	5	0	2	0	0	0	6.1	

Table 2 - Suggested Level of Mitigation Required should Complaints Arise

It should be noted that these calculations are a simplistic method of calculating the noise level at the boundary of the nearest noise sensitive property. It should also be noted that noise levels of the plant provided are calculated and not measured. It is strongly advised that should the plant fail to meet requirements outlined by the council that further measurements be made with the plant in operation in order to specify, more accurately, the mitigation required.

6.0 Discussion

For the assessment procedure, the likelihood of a specific noise source causing complaints depends on its magnitude relative to background noise levels, and whether the noise source has certain audible characteristics (e.g. tonal frequency, discrete or continuous, or other distinguishable features). Under BS 4142, the rating level for community noise is defined as the rating level for specific noise minus the background noise. A difference of 10dB or greater indicates, "complaints are likely," whereas a difference of 5dB or less is defined to be of "marginal significance."

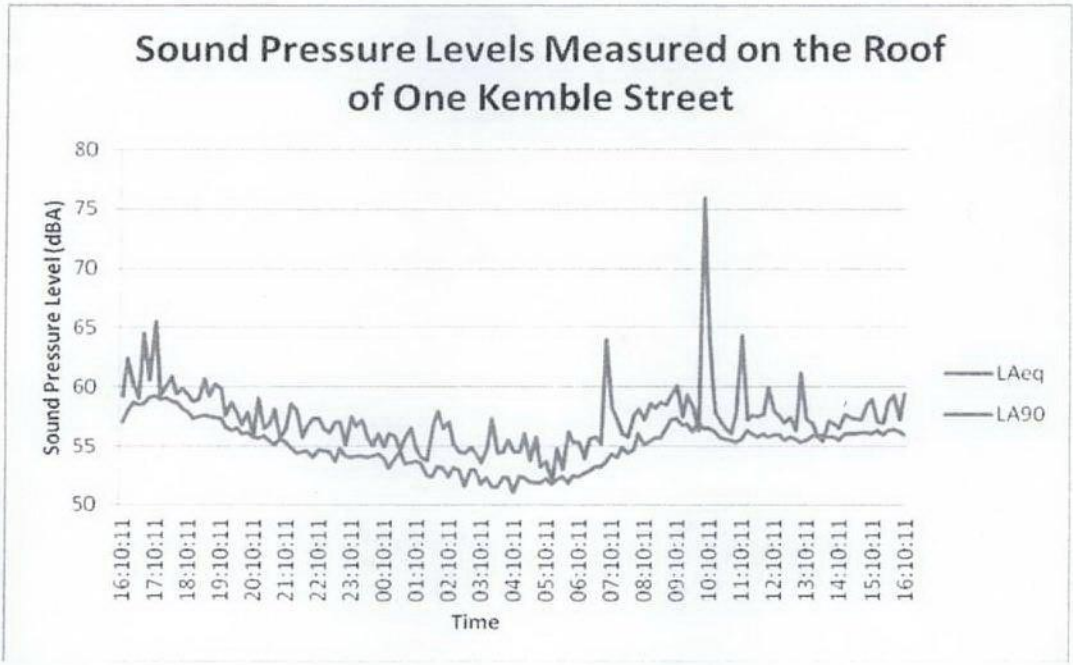
The results indicate that the noise rating levels resulting from the plant at the nearest noise sensitive properties is of marginal to no significance. However, should complaints arise, the level mitigation suggested is displayed in octave bands in Table 2.

7.0 Conclusion

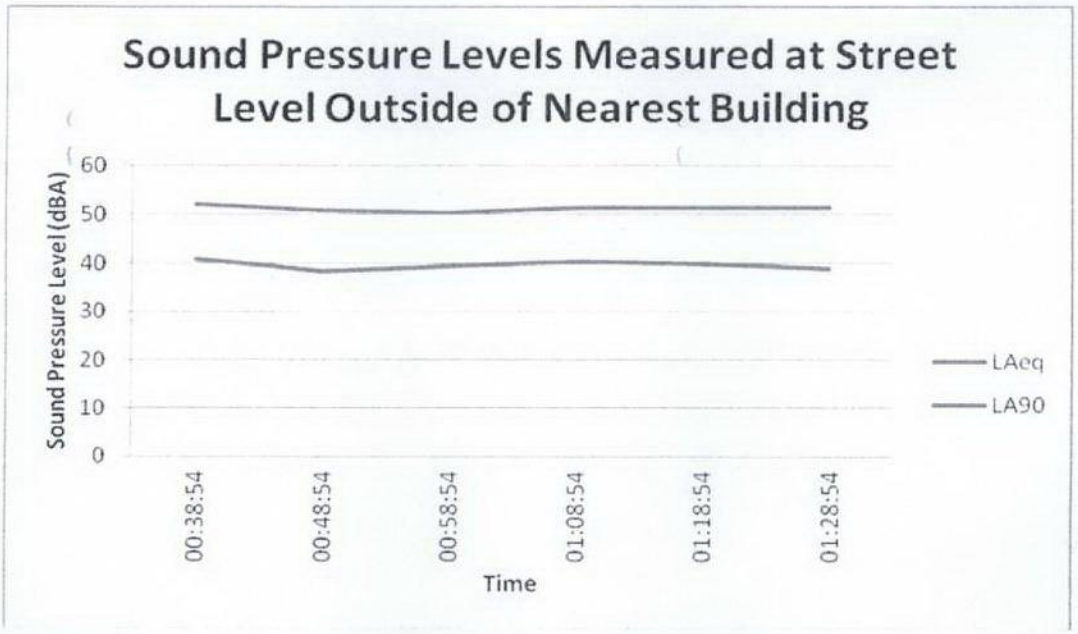
An environmental noise survey has been undertaken to establish the background noise level at One Kemble Street in accordance with the guidance given in BS4142:1997.

It has been found that potential noise levels from the proposed plant is below the background noise levels at the nearest noise sensitive properties and are therefore of marginal to no significance. However, if complaints do arise, measures must be taken to mitigate these noise levels as outlined in Table 2.

Appendix A: Measurement Summary



Roof Measurement Summary – Ambient noise measured without Specific Noise Source



Ground Measurement Summary – Ambient noise measured without Specific Noise Source