

**W.A. HINES & PARTNERS : ACOUSTIC & NOISE CONTROL CONSULTANTS & DESIGNERS**

**P.W. Hines** MEM A.S.A.

CONSULTANTS

**D.S.J. Higgins** A.R.I.B.A., M.I.O.A.

**O. Clingan** Bsc (Hons), M.I.O.A.

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**PROPOSED EXTERNAL A/C CONDENSER INSTALLATION**

**FLAT ROOF AREA**

**1-3 DENMARK STREET, LONDON WC2**

***NOISE IMPACT ASSESSMENT***

*M<sub>2</sub> Commercial Interiors Ltd  
Suite 521 Linen Hall  
162-168 Regent Street  
London  
W1B 5TF*

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**2 Theobald Court  
Theobald Street  
Borehamwood  
Herts WD6 4RN**

**Telephone:** 020 8953 2022  
**Facsimile:** 020 8953 6232  
**Email:** [hinesprtn@aol.com](mailto:hinesprtn@aol.com)

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## 1.00 INTRODUCTION

**1.01** A planning application to install *4 No A/C Condenser Units* on the flat roof area of *1-3 Denmark Street, London WC2*, to replace existing units and to provide air-conditioning to the newly refurbished office areas, is to be submitted to *Camden Council*. To meet the requirements of the *Council* in respect of noise from the units, prevailing background noise levels have been established and this report prepared to show the predicted noise levels from the units outside the nearest noise sensitive windows, relative to the *Council's* standard noise conditions.

**1.02** To comply with the *Council's* requirements the following information is provided:-

- *The location of the nearest noise sensitive windows to the proposed Condenser Units.*
- *The distance in metres of the windows from the Condenser Units.*
- *The proposed operational hours of the Condenser Units.*
- *The background noise levels over the proposed hours of operation.*
- *The time, date and weather conditions during the measurement of the background levels.*
- *Instrumentation used.*
- *Noise levels produced by the proposed Condenser Units including octave data.*
- *Predicted noise levels of the Condenser Units at nearest windows referenced to the requirements of the Council.*

**1.03** A visit to the building has been made and the location of the proposed and existing *Condenser Units* on the flat roof has been viewed. During the visit the nearest noise sensitive windows to the proposed *Condenser Units* were also identified and noise monitoring equipment was set up on the roof to establish the prevailing background conditions over a full 24 hour period. The existing *Condenser Units* were not operating during the continuous monitoring period. Using all available information, calculations have been made to determine the noise levels at these windows with the proposed *Condenser Units* operating. A “worst case” condition has been taken.

## 2.00 THE BUILDING, SITE VISIT & PROPOSALS

### *The Building*

- 2.01 *1-3 Denmark Street, WC2* is a large office building on four floors standing at the corner of *Denmark Street* and *Flitcroft Street*. *Denmark Street* is one way and during the day passing traffic is often stationary by the building due to traffic light control. On both sides of *Denmark Street* there are shops on the ground floors and offices generally on the upper floors. *St Giles in the Fields Church* is directly to the east.

### *Site Visit*

- 2.02 A visit to the vacant building was made on *Wednesday 3 October 2012*. The visit identified the nearest noise sensitive windows to the proposed roof units to be the offices in *Denmark Street*. These would be approximately *17M* from the units. The nearest residential windows were identified as those in the high rise apartments on the north side of *St Giles High Street* at approximately *63M* and in the terraced houses in *Stacey Street* to the south at approximately *67M*.
- 2.03 During the site visit views from the roof showing the existing *Condenser Unit* installation on the roof, the surrounding area and the nearest noise sensitive windows were taken and are shown in the *Photographs*. The location of the building and the surrounding area is shown on the *Location Plan*.

***Existing Condenser Unit Installation***

- 2.04** There are 3 *No Condenser Units* at present installed on the roof of the building. These units are to be removed and replaced as stated. Noise from the existing units therefore would effect the prevailing background noise levels on the roof and in the surrounding area. The type and model of the existing units were noted and manufacturer's noise level data obtained. This data is shown in **Table 1**.

**Table 1**

Existing Condenser Unit	63	125	250	500	1K	2K	4K	8K	LpA
PUHZ P200 YMF-B (2 No)	57	57	56	54	51	48	41	36	56
PUHZ P250 YMF-B (1 No)	58	58	57	55	52	49	42	37	57

***The Proposals***

- 2.05** As the vacant building is to be fully refurbished and air-conditioned, 4 *No Mitsubishi Condenser Units, Type PUHZ - RP100VKA* are proposed to be installed on the flat roof area of the building to replace the 3 *No existing Condenser Units*. The proposal is to mount the new *Condenser Units* on a supporting steel frame off the flat roof as the existing units. The ***Existing/Proposed Roof Plans*** show the layouts.

- 2.06** *Mitsubishi Condenser Units* have been selected as they are capable of providing the airconditioning demand at low noise output. Typical noise levels for a Type PUHZ - RP100VKA external unit, as provided by the manufacturers, are shown in **Table 2**.

**Table 2**

External Condenser Unit	63	125	250	500	1K	2K	4K	8K	LpA
PUHZ - RP100VKA (4 No)	58	52	49	48	45	40	34	37	51

- 2.07** As the refurbished offices could be used at any time, the proposed *Condenser Units* could operate continuously both during the day and night.

*Existing Noise Levels***2.08**

At the time of the site visit the prevailing background conditions were measured in terms of *LA90* & *LAeq* and octaves over the frequency range of 63 - 8K Hz on the roof of the building using a *Rion NA27* integrating sound level meter with a wind protected microphone. The noise levels measured are shown in **Table 3**. One of the existing *Condenser Units* was then turned on and further measurements made. These noise levels are also shown in **Table 3**. It will be seen that the measured noise levels from the existing unit are generally higher than provided by the manufacturer. Even when considering the prevailing background influence this could indicate some slight deterioration.

**2.09**

The equipment was then set up on the roof to obtain the prevailing background conditions over a full 24 hour period. The existing *Condenser Units* on the roof were not operating during this period. The prevailing background conditions were measured in terms of *LA90*, *LAeq*, *LAMax* & *LAMin*. The meter was calibrated before and after the measurements. These background noise levels are shown in the table and graph in **Appendix A**. The weather during the survey period was generally dry with little wind.

**Table 3**

Existing Conditions On Roof	LA90	LAeq	63	125	250	500	1K	2K	4K	8K
Background Levels	57	60	63	60	55	53	52	48	43	29
	56	59	62	60	55	53	52	48	43	30
	58	61	64	61	56	54	52	48	41	26
One Existing Condenser Unit Operating @ 1M	63	64	72	66	61	60	58	58	49	37
	63	64	70	66	61	61	58	58	49	37
	62	63	69	66	60	58	56	58	48	36

### 3.00 NOISE ASSESSMENT PROCEDURES & STANDARDS

#### *National Planning Policy Framework*

3.01 The *National Planning Policy Framework* was published on 27 March 2012 and came into force with immediate effect. Amongst the documents listed as being replaced by this document was *PPG24*, which was formerly the central national planning guidance document relating to noise in the UK.

3.02 Whereas *PPG24* provided quantified advice the *NPPF* provides purely guidance (although the *NPSE* refers to assessment criteria in a general sense). *Section 8* of the *NPPF* “*Healthy Communities*” makes no reference to environmental noise, the only comments relating to noise being listed below.

3.03 *Section 11* “and enhancing the natural environment” advises that the planning system should contribute to and enhance the natural and local environment by”:-

- *Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.*

3.04 With regard to *Planning Policies* and *Decisions* these should aim to:-

- *avoid noise giving rise to significant adverse impacts on health and quality of life as a result of new development.*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions.*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of nearby land uses since they were established.*
- *identify and protect areas of tranquillity that have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*



*Noise Policy Statement for England*

**3.05** The *Noise Policy Statement for England* was published by the *Department for Environment, Food and Rural Affairs (DEFRA)* in *March 2010*. The complete document includes the *Policy Statement* itself and an *Explanatory Note*.

Key concepts used in the NPSE are:

- *NOEL or “no observed effect” meaning the level (of noise) below which no effect on health or quality of life can be detected.*
- *LOAEL or “lowest observed adverse effect” meaning the level (of noise) above which adverse effects on health and quality of life can be detected.*
- *SOAEL or “significant observed adverse effect” meaning the level (of noise) above which significant adverse effects on health and quality of life can occur.*

**3.06** The aims of the NPSE are:-

- *Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of the policy on sustainable development.*
- *Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of the policy on sustainable development.*
- *Where possible, contribute to the improvement of health and quality of life through the effective management of environmental, neighbour and neighbourhood noise within the context of the policy on sustainable development.*

3.07 With regard to the situation which lies somewhere between *LOAEL* and *SOAEL* Paragraph 2.3 of the *Explanatory Note* makes it clear that the approach to the minimisation of noise from environmental and related sources should be reasonable and balanced stating:-

- *Furthermore, the broad aim of noise management has been to separate noise sources from sensitive noise receivers and to noise. Of course, taken in isolation and to a literal extreme, noise minimisation would mean no noise at all. In reality, although it has not always been stated, the aim has tended to be to minimise noise as far as reasonably practical. This concept can be found in the Environmental Protection Act 1990, where, in some circumstances, there is a defence of "best practicable means" in summary statutory nuisance proceedings.*

3.08 When considering the impact of noise of industrial or commercial origin however reference to the current standards *BS4142:1997* and *BS8233:1999* is still appropriate. In consideration of the principle requirements of these standards therefore and *Camden Council's* adopted noise control policy of ensuring that prevailing background conditions do not increase unreasonably, the noise from the *Condenser Units*, as measured at the nearest noise sensitive office window should be at a level to ensure *35 dB LAeq inside* as stated in *BS8233* and at the nearest residential windows, should be *10 dB below the lowest background LA90 (15 mins)* to satisfy the requirements of *BS4142* and the *Council*.

#### **Noise Limit Levels**

3.09 Considering the lowest background noise levels measured during the 24 hour survey period therefore, as shown in *Appendix A*, the noise produced by the proposed *Condenser Units* on the roof at the nearest noise sensitive windows assuming, the *Council* requirements and a typical reduction for an open office window of *10 dB LpA*, should not exceed:-

#### **Office**

*Internal level 35 dB + open window reduction 10 dB = **45 dB LAeq***

#### **Residential**

*Lowest night time background 51 dB LA90 minus 10 dB = **41 dB LAeq**  
(No acoustic feature correction has been allowed)*

**4.00 NOISE ASSESSMENT*****Operation & Calculated Noise Levels***

**4.01** The operation of the 4 No Mitsubishi Condenser Units will fluctuate due to demand and prevailing ambient air temperatures. At best no units will operate at all and at worst all four units could operate at the same time.

**4.02** From the data supplied by the unit manufacturer for the units proposed (**Table 2**), taking the “worst case”, the overall maximum noise levels that would exist @ 1M with all 4 units operating has been calculated. Further calculations have then be made to determine the final external noise levels considering the relative distance and orientation of the units from the nearest noise sensitive windows (offices/flats). The resulting external noise levels, against the required noise limit levels, are shown in **Table 4**.

**Table 4**

4 No Condenser Units	63	125	250	500	1K	2K	4K	8K	LpA	Limit Level
@ 1M	64	58	55	54	51	46	40	43	57	
Nearest Office Window @ 17M	39	33	30	29	26	21	15	18	31	45
Nearest Flat Window @ 63M	28	22	19	18	15	10	39	44	20	41

**4.03** The calculations have used the following expression:-

**Reduction due to distance**

$$LP2 = LP1 - 20 \log (R1/R2)$$

Where:-  
*LP2 is the noise level at the nearest window*  
*LP1 is the overall noise at front of the units*  
*R1 is the distance of the units to the nearest window*  
*R2 is the source measured distance (1M)*

*Calculated Noise Levels relative to Noise Limit Levels*

- 4.04** Considering the recommendation of both *BS4142* and *BS8233*, it will be seen from *Table 4* that the “*worst case*” noise at the nearest noise sensitive windows (both offices and flats) due to the operation of the proposed *Condenser Units* on the roof, would meet the required noise limits, even if all the units operate continuously together and at night.
- 4.05** It will also be seen from *Tables 1 & 2*, that the noise from the proposed *Condenser Units* would be lower than the noise from the existing *Condenser Units*. As such, should the proposed *Condenser Units* be installed and operated, existing noise levels would be reduced.