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REPORT No. 661052-1

**122-126 Kilburn High Road
London, NW6 4HY**

**ENVIRONMENTAL NOISE
SURVEY REPORT**

PREPARED: 7th November 2016

Presented By: Paul Cotton

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1.0 Introduction

- 1.1 Dentix UK Ltd has commissioned Noico Ltd to conduct an environmental noise survey at 122-126 Kilburn High Road, London, NW6 4HY.
- 1.2 The purpose of the survey is to obtain statistical noise data and to determine the background noise levels at the site. Based on the noise survey data, noise criteria are to be established for limiting noise emission from the mechanical plant installations serving the premises. The noise criteria are to be set in accordance with the requirements of the local planning authority (The London Borough of Camden Council).
- 1.3 In addition to the survey, Noico has also been instructed to carry out a noise assessment on the proposed new mechanical plant installations in order to establish whether the planning noise requirements will be met and specify suitable noise mitigation measures if they are not. It is understood that the proposed plant will operate between the hours of 09:00 and 21:00. Our assessment has therefore been based on this plant operating period.
- 1.4 The development site comprises ground floor commercial buildings with four stories of residential accommodation located above. The development site is, in the main, located within a mixture of residential and commercial properties.

2.0 Instrumentation

- 2.1 A precision grade Norsonic 140 'Type 1' Integrating Sound Level Meter was used for the survey. This was equipped with an environmental microphone and extension cable. The instrument was powered by an external battery and stored in a weatherproof case.
- 2.2 The instrument was calibrated prior and subsequent to use with no calibration drift recorded.

3.0 Survey Details

- 3.1 Location: Access to a 1st floor residential façade was not possible at the time of the survey. The environmental noise analyser microphone was therefore located externally within the rear courtyard at ground floor level. This position was chosen as it was considered to be representative of the background noise level experienced at the nearest noise sensitive properties.

From observations made on site, the nearest noise affected properties are considered to be the residential properties on the upper floors of the development site itself. The nearest affected residential windows to the proposed plant location are at the rear of the building, facing towards Quex Mews. Please refer to figure 2 of this report for details. Note, the exact position of the nearest noise-affected properties is to be confirmed by the local planning authority, prior to final design of any necessary mechanical plant noise control measures.

- 3.2 Period: Monitoring was carried out continuously from approximately 15:15 hrs on the 1st November 2016 through to 15:15 hrs on the 3rd November 2016. The instrument was set up to monitor noise levels continuously and store data in fifteen minute intervals.
- 3.3 Weather: The prevailing weather condition throughout the majority of the survey period was satisfactory for noise monitoring, being dry, mild and with little to moderate breeze.

Windspeed, although not recorded, was considered to be less than 5 m/s throughout the survey period.

- 3.4 Site Noise Characteristics: The ambient noise level was characterised by road traffic noise, in particular along Quex Road. Additionally, noise from mechanical plant serving adjacent buildings was also audible, and is likely to be contributing to the ambient noise level in the area. It is thought that no unusual events occurred during the survey period and the data are considered to be a true representation of ambient noise levels.

4.0 Survey Results

- 4.1 The results of the environmental survey are presented in graphical and numerical format in the attached appendices, showing the recorded values of L_{Aeq} and L_{A90} .
- 4.2 See Appendix 1 for a glossary of terms.
- 4.3 With reference to the measured data, the minimum background noise level (rounded to the nearest dB) measured during the survey period was:

Daytime (07:00 to 23:00hrs)	-	34 L_{A90}
Night time (23:00 to 07:00hrs)	-	33 L_{A90}
Proposed plant operating period (09:00 to 21:00hrs)	-	37 L_{A90}

5.0 Environmental Noise Level Criteria

- 5.1 Criteria for mechanical services noise emission are normally based upon the prevailing level of background noise in the period of concern and may be set against this to a level as normally defined by the local planning authority.
- 5.2 The London Borough of Camden Council has advised that noise arising from fixed plant installations should not exceed a level of 5dB beneath the minimum background noise level when measured at a distance of 1m from the window of the nearest noise affected property.
- 5.3 To conform to the above criteria, and in accordance with the minimum background noise levels measured during the survey (summarised in 4.3 above), noise from the proposed plant installations should not exceed the following value.

Please note, due to the location of the sound level meter adjacent to reflective surfaces, a correction factor of -3dB has been applied to the design noise criteria.

Plant operation (09:00 to 21:00 hrs)	-	29dB L_{Aeq}
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Note: These levels must be achieved cumulatively with all plant operating, and as measured at 1 metre from the window of the nearest affected property.

6.0 Plant Noise Assessment

- 6.1 We understand the following new plant equipment is to be installed within a plant room located at ground floor level adjacent to the courtyard.

1 no. Hitachi model RAS-10FSXN1E condensing unit with an operating sound pressure level of 58dB(A) (measured at a distance of 1m).

1 no. Hitachi model RAS-6H(V)NC1E condensing unit with an operating sound pressure level of 58dB(A) (measured at a distance of 1m).

1 no. Hitachi model RAS-8HNCE condensing unit with an operating sound pressure level of 59dB(A) (measured at a distance of 1m).

6.2 Location of nearest noise affected windows:

The nearest noise affected windows are considered to be at 1st floor level to the rear of the residential property facing Quex Mews. The distance from the plant room opening to the windows is approximately 10 metres.

6.3 Calculation:

Our calculation predicting the resultant noise level at the nearest noise affected windows identified above are summarised as follows:

Description	dB(A)
RAS-10FSXN1E SPL	58
RAS-6H(V)NC1E SPL	57
RAS-8HNCE SPL	59
Combined level	63
Reverberation correction	6
Distance correction	-22
Receiver façade correction	3
Specific noise level @ 1m from receiver	50
Correction for tonality	0
Rating Noise Level	50
Criterion (see section 5.3 above)	29
Noise Impact	21

6.4 It can be seen that the total noise level from the plant installation as measured at 1m from the nearest noise affected property will be 21dB(A) over the target noise criteria and, as such, noise mitigation measures will be required in order to satisfy the requirements of the local authority.

7.0 Noise Mitigation Measures:

The proposed plant-room and equipment will require the following 'typical' treatment in order to ensure noise from plant does not exceed the requirements of the local authority.

7.1 Air Intake:

The plant-room will require all wall and ceiling surfaces to be clad with 75-100mm thick wall lining system.

The main opening serving intake air to the plant area will need to be constructed from acoustic louvres, typically 350mm deep and providing the following minimum insertion loss values (dB):

63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
4	8	11	18	24	25	21	18

7.2 Exhaust Air:

The exhaust air from each item of plant will need attenuating in the form of proprietary duct attenuators, typically 1200mm long and providing the following minimum insertion loss values (dB):

63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
7	12	19	34	43	36	32	18

7.3 The above recommendations are typical only and are subject to further comment/review following more detailed acoustic design/analysis in conjunction with the nominated mechanical design engineers.

8.0 Conclusion

8.1 A background noise level survey has been carried out at 122-126 Kilburn High Road, London, NW6 4HY.

8.2 Based upon the survey results and discussions with the local planning authority, criteria applicable to noise from the mechanical services plant have been established.

Noise mitigation measures have been provisionally specified in order to ensure noise from plant fully satisfies the requirements of the local authority.

Appendix 1 - Glossary of Terms

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is $2 \times 10^{-5} \text{ N/m}^2$. The sound pressure level existing when microphone measured pressure is $2 \times 10^{-5} \text{ N/m}^2$ is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p).
Frequency	Is related to sound pitch; frequency equals the ratio between velocity of sound and wavelength.
A weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.
Background Noise Level	The value of $L_{A90,T}$, ref. BS4142:1997.
Traffic Noise Level	The value of $L_{A10,T}$.
Specific Noise Level	The value of $L_{Aeq,T}$ at the assessment position produced by the specific noise source, ref. BS4142:1997.
Rating Level	The specific noise level, corrected to account for any characteristic features of the noise, by adding a 5 dBA penalty for any tonal, impulsive or irregular qualities, ref. BS4142:1997.
Specific Noise Source	The noise source under consideration when assessing the likelihood of complaint.
Assessment Position	Unless otherwise noted, is a point at 1 m from the façade of the nearest affected sensitive property.

Appendix 2 - Environmental Noise Monitoring Data

Date	LAeq	LA90
(2016/11/01 15:15:03.00)	52.2	48.2
(2016/11/01 15:30:03.00)	49.3	48.4
(2016/11/01 15:45:03.00)	49.5	48.4
(2016/11/01 16:00:03.00)	49.4	48.4
(2016/11/01 16:15:03.00)	51.1	48.3
(2016/11/01 16:30:03.00)	50.1	48.3
(2016/11/01 16:45:03.00)	49.8	48.2
(2016/11/01 17:00:03.00)	49.9	48.3
(2016/11/01 17:15:03.00)	50.3	48.5
(2016/11/01 17:30:03.00)	49.4	48.4
(2016/11/01 17:45:03.00)	50.2	48.5
(2016/11/01 18:00:03.00)	50.7	48.2
(2016/11/01 18:15:03.00)	49.5	48.1
(2016/11/01 18:30:03.00)	49.3	48.1
(2016/11/01 18:45:03.00)	49.4	48.1
(2016/11/01 19:00:03.00)	49.3	48
(2016/11/01 19:15:03.00)	49.4	48.4
(2016/11/01 19:30:03.00)	49.5	48.3
(2016/11/01 19:45:03.00)	52.3	48.4
(2016/11/01 20:00:03.00)	49.5	48.2
(2016/11/01 20:15:03.00)	49.3	48.2
(2016/11/01 20:30:03.00)	49.2	48.3
(2016/11/01 20:45:03.00)	48.3	37.5
(2016/11/01 21:00:03.00)	45.1	35.3
(2016/11/01 21:15:03.00)	40	34.4
(2016/11/01 21:30:03.00)	45.7	34
(2016/11/01 21:45:03.00)	41.4	34.4
(2016/11/01 22:00:03.00)	50.2	48.7
(2016/11/01 22:15:03.00)	49.4	48
(2016/11/01 22:30:03.00)	49.1	48
(2016/11/01 22:45:03.00)	49.1	48.2
(2016/11/01 23:00:03.00)	49.4	48.2
(2016/11/01 23:15:03.00)	49.1	48.2
(2016/11/01 23:30:03.00)	49.3	48.4
(2016/11/01 23:45:03.00)	50.9	49
(2016/11/02 00:00:03.00)	49.9	49.2
(2016/11/02 00:15:03.00)	49.8	49.1
(2016/11/02 00:30:03.00)	50.2	49.2
(2016/11/02 00:45:03.00)	50.1	49.4
(2016/11/02 01:00:03.00)	50.1	49.4
(2016/11/02 01:15:03.00)	50.1	49.5
(2016/11/02 01:30:03.00)	50.1	49.4
(2016/11/02 01:45:03.00)	50	49.1
(2016/11/02 02:00:03.00)	50	48.9
(2016/11/02 02:15:03.00)	50	48.7

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Date	LAeq	LA90
(2016/11/02 02:30:03.00)	49.6	48.6
(2016/11/02 02:45:03.00)	50	48.9
(2016/11/02 03:00:03.00)	49.8	48.9
(2016/11/02 03:15:03.00)	49.8	48.6
(2016/11/02 03:30:03.00)	49.7	48.5
(2016/11/02 03:45:03.00)	49.7	48.1
(2016/11/02 04:00:03.00)	49.3	48
(2016/11/02 04:15:03.00)	49.3	47.8
(2016/11/02 04:30:03.00)	48.9	47.4
(2016/11/02 04:45:03.00)	48.6	47.2
(2016/11/02 05:00:03.00)	49.1	47.3
(2016/11/02 05:15:03.00)	48.6	47
(2016/11/02 05:30:03.00)	48.7	47.1
(2016/11/02 05:45:03.00)	48.4	47
(2016/11/02 06:00:03.00)	48.5	47.1
(2016/11/02 06:15:03.00)	48.8	47.4
(2016/11/02 06:30:03.00)	48.7	47.3
(2016/11/02 06:45:03.00)	48.9	47.2
(2016/11/02 07:00:03.00)	48.6	47.2
(2016/11/02 07:15:03.00)	49.3	47.5
(2016/11/02 07:30:03.00)	48.8	47.2
(2016/11/02 07:45:03.00)	48.7	47.3
(2016/11/02 08:00:03.00)	42.2	38.5
(2016/11/02 08:15:03.00)	41.3	37.7
(2016/11/02 08:30:03.00)	43.2	38.1
(2016/11/02 08:45:03.00)	43	38.6
(2016/11/02 09:00:03.00)	44.5	38.3
(2016/11/02 09:15:03.00)	41.5	38
(2016/11/02 09:30:03.00)	43.2	37.5
(2016/11/02 09:45:03.00)	45.5	38.2
(2016/11/02 10:00:03.00)	42.7	37.4
(2016/11/02 10:15:03.00)	64.1	39.4
(2016/11/02 10:30:03.00)	68.3	42.1
(2016/11/02 10:45:04.00)	45.1	39.3
(2016/11/02 11:00:03.00)	45	38.6
(2016/11/02 11:15:03.00)	52.1	38.7
(2016/11/02 11:30:03.00)	43.3	38.5
(2016/11/02 11:45:03.00)	49.5	39.1
(2016/11/02 12:00:03.00)	45.7	39.8
(2016/11/02 12:15:03.00)	50	39.4
(2016/11/02 12:30:03.00)	42.5	39.5
(2016/11/02 12:45:03.00)	42.1	39
(2016/11/02 13:00:03.00)	43.8	39.2
(2016/11/02 13:15:03.00)	46	39.2
(2016/11/02 13:30:03.00)	43.9	39.5

Date	LAeq	LA90
(2016/11/02 13:45:03.00)	47	38.9
(2016/11/02 14:00:03.00)	43.1	39.2
(2016/11/02 14:15:03.00)	50	39.7
(2016/11/02 14:30:03.00)	42.1	39.3
(2016/11/02 14:45:03.00)	46.3	40.2
(2016/11/02 15:00:03.00)	46.3	40.3
(2016/11/02 15:15:03.00)	43.9	39.1
(2016/11/02 15:30:03.00)	44.2	40.5
(2016/11/02 15:45:03.00)	45.1	40.1
(2016/11/02 16:00:03.00)	43.6	40.3
(2016/11/02 16:15:03.00)	46.5	40
(2016/11/02 16:30:03.00)	48.9	40.1
(2016/11/02 16:45:03.00)	44.8	40.2
(2016/11/02 17:00:03.00)	44	40.1
(2016/11/02 17:15:03.00)	48.9	40
(2016/11/02 17:30:03.00)	44.1	39.1
(2016/11/02 17:45:03.00)	48.2	39.1
(2016/11/02 18:00:03.00)	44.5	39.1
(2016/11/02 18:15:03.00)	42.5	39.4
(2016/11/02 18:30:03.00)	43.2	39.5
(2016/11/02 18:45:03.00)	45.5	38.1
(2016/11/02 19:00:03.00)	48	38.6
(2016/11/02 19:15:03.00)	43	38.3
(2016/11/02 19:30:03.00)	53	38.5
(2016/11/02 19:45:05.00)	59.4	37.1
(2016/11/02 20:00:03.00)	43.1	37.7
(2016/11/02 20:15:03.00)	52.7	36.9
(2016/11/02 20:30:03.00)	52.8	51.9
(2016/11/02 20:45:03.00)	51.2	50.2
(2016/11/02 21:00:03.00)	50.9	50.1
(2016/11/02 21:15:02.00)	51.3	50
(2016/11/02 21:30:03.00)	50.6	49.8
(2016/11/02 21:45:03.00)	50.3	49.5
(2016/11/02 22:00:03.00)	50.4	49.7
(2016/11/02 22:15:03.00)	50.6	49.8
(2016/11/02 22:30:03.00)	50.9	50.1
(2016/11/02 22:45:03.00)	50.9	50.1
(2016/11/02 23:00:03.00)	50.9	50.1
(2016/11/02 23:15:02.00)	51.1	50.3
(2016/11/02 23:30:03.00)	51.6	50.4
(2016/11/02 23:45:03.00)	51.3	50.5
(2016/11/03 00:00:03.00)	51.3	50.7
(2016/11/03 00:15:02.00)	51.3	50.6
(2016/11/03 00:30:03.00)	51.4	50.7
(2016/11/03 00:45:03.00)	51.7	50.9

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Date	LAeq	LA90
(2016/11/03 01:00:02.00)	51.5	50.8
(2016/11/03 01:15:03.00)	51.4	50.6
(2016/11/03 01:30:03.00)	51.3	50.5
(2016/11/03 01:45:03.00)	51	50.3
(2016/11/03 02:00:03.00)	51.1	50.3
(2016/11/03 02:15:03.00)	51.2	50.4
(2016/11/03 02:30:03.00)	51.1	50.3
(2016/11/03 02:45:03.00)	50.9	50.1
(2016/11/03 03:00:03.00)	51	50.2
(2016/11/03 03:15:03.00)	51	50.3
(2016/11/03 03:30:03.00)	51	50.2
(2016/11/03 03:45:03.00)	50.9	50.1
(2016/11/03 04:00:03.00)	50.7	50
(2016/11/03 04:15:05.00)	50.6	50
(2016/11/03 04:30:03.00)	50.7	50
(2016/11/03 04:45:03.00)	50.9	50.1
(2016/11/03 05:00:02.00)	50.9	50.2
(2016/11/03 05:15:03.00)	51	50.3
(2016/11/03 05:30:03.00)	48	33.2
(2016/11/03 05:45:03.00)	39.8	33.5
(2016/11/03 06:00:03.00)	40.6	34.3
(2016/11/03 06:15:02.00)	44	35.3
(2016/11/03 06:30:03.00)	43.5	36.6
(2016/11/03 06:45:03.00)	41.2	36.9
(2016/11/03 07:00:03.00)	41.7	36.7
(2016/11/03 07:15:03.00)	45.6	37.2
(2016/11/03 07:30:03.00)	46.2	38.2
(2016/11/03 07:45:03.00)	47.9	38.8
(2016/11/03 08:00:03.00)	44.6	38.8
(2016/11/03 08:15:03.00)	43.3	39
(2016/11/03 08:30:03.00)	46.7	39.8
(2016/11/03 08:45:03.00)	45.9	39.3
(2016/11/03 09:00:02.00)	43.5	40
(2016/11/03 09:15:03.00)	44.2	39.4
(2016/11/03 09:30:03.00)	80.6	41.1
(2016/11/03 09:45:03.00)	83.7	40.4
(2016/11/03 10:00:03.00)	47.7	39.8
(2016/11/03 10:15:03.00)	41.8	39
(2016/11/03 10:30:03.00)	43.3	39.4
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(2016/11/03 12:00:03.00)	73.9	40.6

Date	LAeq	LA90
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(2016/11/03 12:30:03.00)	53.7	40.5
(2016/11/03 12:45:03.00)	49.4	39
(2016/11/03 13:00:03.00)	48.4	39.9
(2016/11/03 13:15:03.00)	42.9	39.2
(2016/11/03 13:30:03.00)	55.3	40.1
(2016/11/03 13:45:03.00)	48.1	39.1
(2016/11/03 14:00:03.00)	55.6	39.8
(2016/11/03 14:15:03.00)	52.7	40.1
(2016/11/03 14:30:03.00)	50.8	39.4
(2016/11/03 14:45:03.00)	53.2	38.6
(2016/11/03 15:00:03.00)	42.5	38.5
(2016/11/03 15:15:03.00)	60.2	40.3

Figure 1

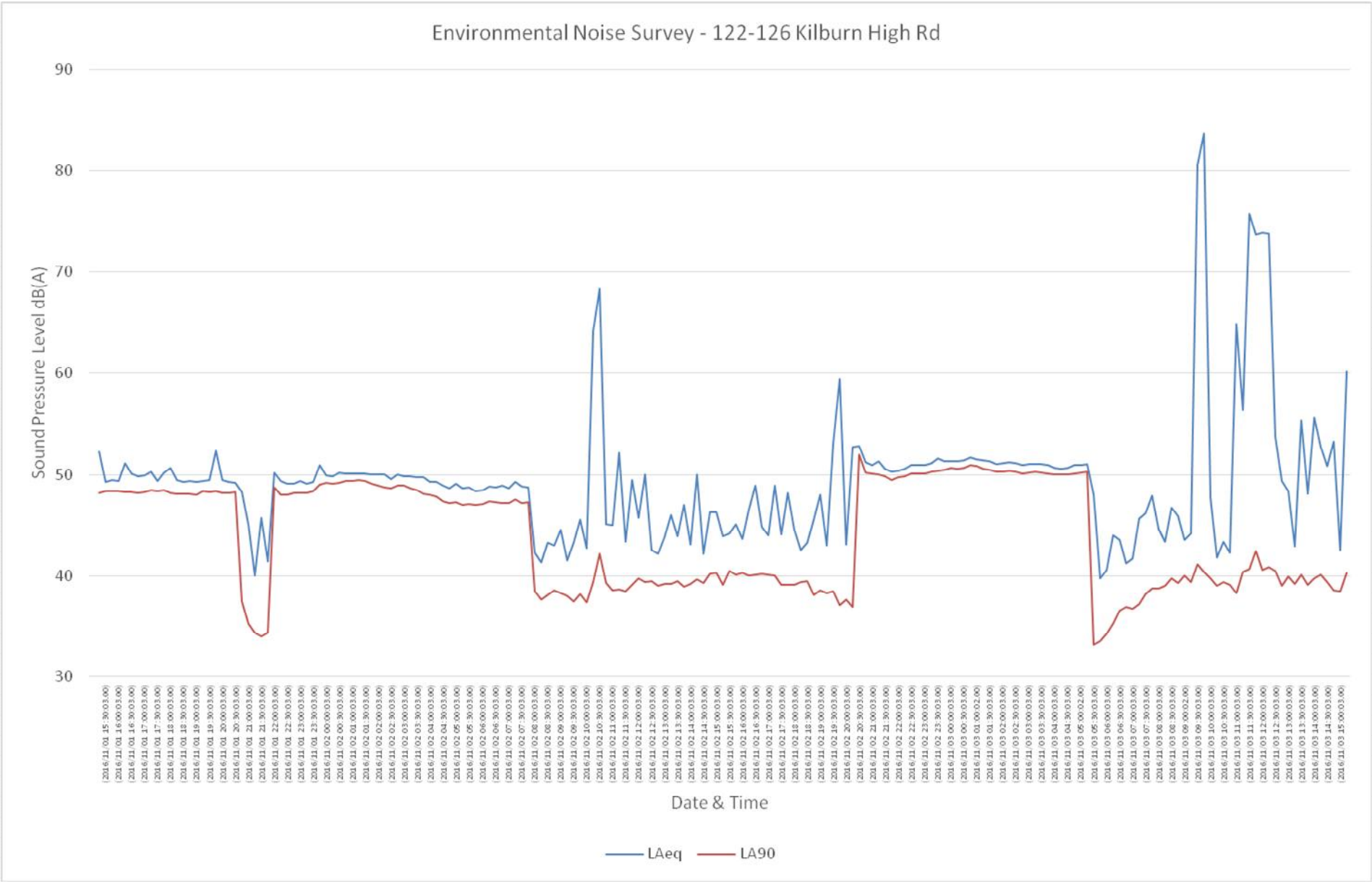
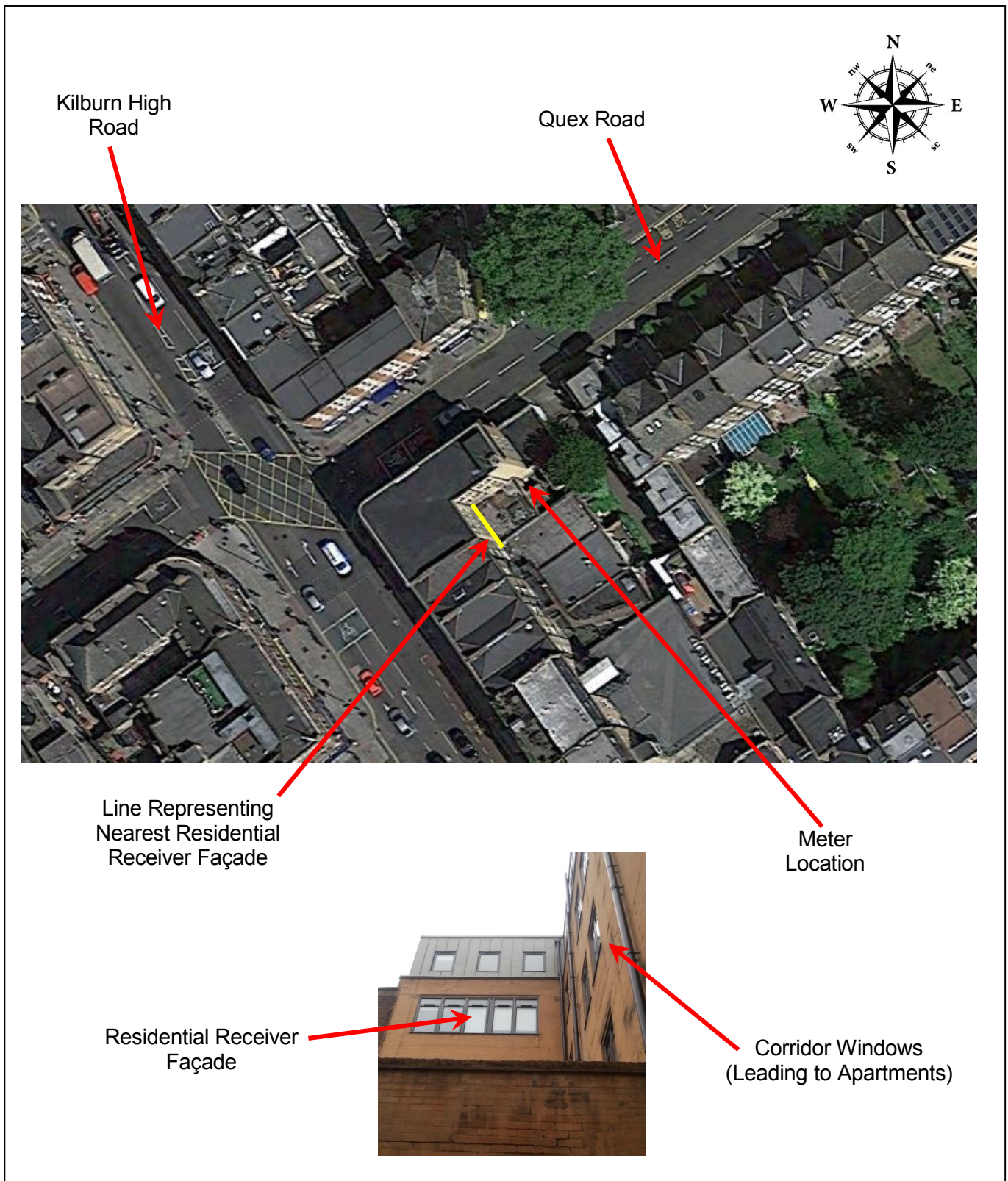



Figure 2



	Project: 122-126 Kilburn High Road	Title: Noise Survey Position
	Dwg No. 661052 Rev A	Date: 7 th November 2016
Patrick House, Station Road Hook, Hampshire RG27 9HU	Tel: 01256 766207 Fax: 01256 768413	