

Addendum to Report No. NVE2506-1
Issued on 6th August 2007

A Survey of Background Noise
at 146-162 Kilburn High Road and 4-10 Kingsgate Road,
Kilburn, London NW6

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Comments of Tom Brodowski on
Report No. 721022/R1/F entitled
"Robert O'Hara Architects 146 -162 Kilburn High Road
Environmental Noise Assessment"
issued in June 2005.

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Over two years ago a noise survey was undertaken at 146 – 162 Kilburn High Road premises and a report prepared by MLM Environmental Limited, i.e. Report No. 721022/R1/F entitled “Robert O’Hara Architects 146 -162 Kilburn High Road Environmental Noise Assessment” issued in June 2005. A copy of the report is enclosed with this addendum. This report refers to the proposed residential and commercial development at that time.

Since then Kingsgate Land Limited has proposed a new development, which is reduced in size, however, it consists of the same number of buildings positioned at the same locations. The major difference is that the old development proposed an internal atrium and the current development is proposing an open internal courtyard at the first floor level.

The planners/environmental health officers have said that the survey of 2005 can be submitted again as traffic levels have not changed much.

In reviewing the latest scheme by Kingsgate Land Limited, I do not believe that there are many negligible differences.

However, I believe that the design criteria on this project can be relaxed for living rooms, i.e. 40dB L_{Aeq} 0700-2300. This is compatible with reasonable resting conditions in living rooms according with Table 5 of BS8233: 1999.

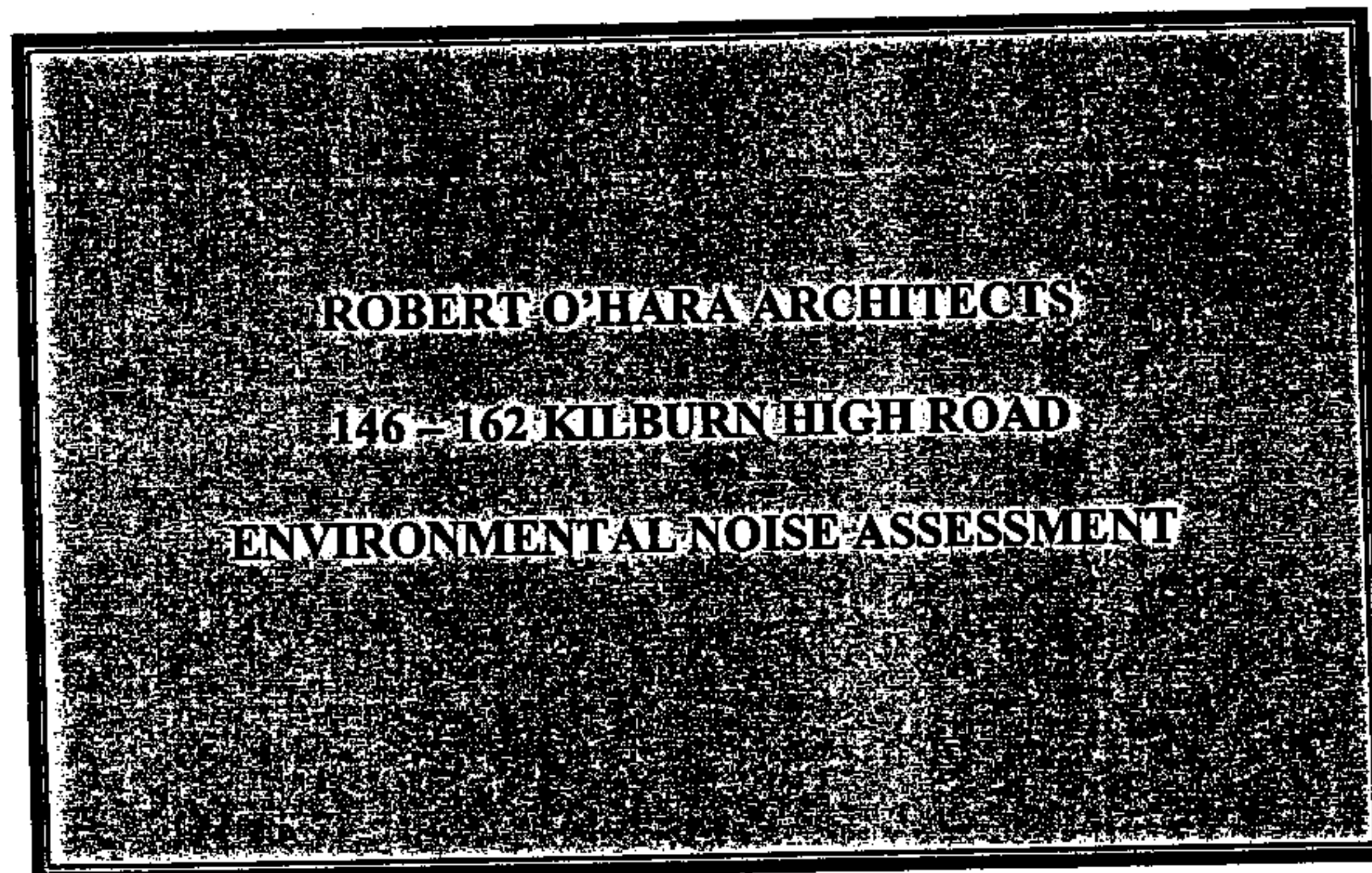
Furthermore, the requirement for glazing in the 2005 report refers to facades rather than the uses of rooms, i.e. bedrooms or living rooms. This is important because the internal noise criteria for bedrooms are driven by the maximum noise levels and for living rooms should be driven by average noise levels.

Taking the above into consideration, I recommend that the glazing and ventilation shown in table 1 below be used on the latest project.

Table 1 - Predicted internal noise levels in the proposed residential apartments

Location	Type of room	Daytime dBAeq	Night-time dB _{Aeq} dBL _{Amax}		Indicative Glazing R _w (dB)	Ventilation
Overlooking Kilburn High Road	Bedroom		21	45	50 10/200/6	Mechanical
	Living	38			35 4/16/4	Mechanical
Overlooking Kingsgate Road	Bedroom		25	45	31 4/12/4	Natural
	Living	33			31 4/12/4	Natural
Overlooking Kingsgate Place	Bedroom		19	41	31 4/12/4	Natural
	Living	29			31 4/12/4	Natural
Overlooking the internal courtyard	Bedroom		*	*	31 4/12/4	Natural
	Living	*			31 4/12/4	Natural

* It should be expected that levels of noise at the façade overlooking the internal courtyard should not be higher than those at the facades overlooking Kingston Place. Standard thermal double-glazed units (typically R_w 31dB) should, therefore, be more than adequate for the bedrooms and living rooms overlooking the internal courtyard.



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Appendix : Survey Details

Figure 1 Site plan

Survey data, graphs and tables

1. BRIEF FOR CONSULTANCY

Visit the site of the proposed residential and commercial development at Kilburn High Road and measure the noise currently affecting the site from nearby road traffic and any other relevant sources over a 24-hour period.

Assess the impact of noise sources affecting the development and consider what, if any, mitigation measures would be required in order to achieve satisfactory noise conditions within the proposed residential apartments.

Present the findings and recommendations in a technical report, suitable for submission to the local authority in support of a planning application.

2. SUMMARY

The development will be most affected by traffic noise on the Kilburn High Road, which is constant day and night.

When assessed under PPG 24, the noise exposure categories at the façades of the proposed development range from B to D, however, it is not considered reasonable to determine the suitability for development on PPG24 assessment alone, as current glazing and ventilation design can ensure acceptable internal noise levels in comparison with the standards upon which PPG24 was based.

For habitable rooms on 1st –3rd floor façades overlooking Kilburn High Road, calculations indicate that glazing with sound insulation performance of R_w 50 (e.g. 10-200-6 deep void configuration). The 4th floor will require R_w 40 (e.g. 10-12-6.4). Mechanical ventilation (individual units or whole house ducted systems) will be necessary to provide adequate noise protection for residents in all cases on this facade.

Façades facing Kingsgate Road and facing the Somerfield roof, will require glazing with sound insulation specification of R_w 35 (typically 4-16-4 configuration) with ventilation by trickle vents. All other façades will require only standard thermal glazing (R_w 31 4-12-4) with trickle vents.

Façades facing the internal courtyard will require only good thermal double-glazed units (typically R_w 30 dB), also with trickle vents for background ventilation.

The above noise control measures should ensure compliance with local authority criteria. No other noise control measures are deemed necessary for this site.

3. INTRODUCTION

There is a proposal to develop the site between Kilburn High Road and Kingsgate Road in Kilburn, London, NW6, and construct a mixed development of residential apartment blocks and ground floor retail premises.

The site currently consists of a Victorian red-brick fronted four-storey commercial terrace with various retail stores on the ground floor and commercial offices above. The area immediately surrounding the site is generally commercial, with residential apartments over commercial/retail premises.

The new development will consist of a building of a modern design with apartments on Kilburn High Road and Kingsgate Place which will also overlook a central glazed atrium. There is also a separate new apartment block planned for above the roof of the adjacent Somerfield supermarket, which will have habitable façades overlooking both Kingsgate Road and the roof of Somerfields.

This assessment has considered the existing noise environment affecting the site, the layout of the apartment blocks and current guidance for noise affecting residential areas (Tables 1 and 2).

4. GUIDANCE FOR DESIGN CRITERIA

We understand that the primary criterion by which the application will be assessed is Planning Policy Guidance 24 (PPG 24). This will provide guidance as to the general suitability of the site for development.

PPG 24 uses the assessment criterion of 'Noise Exposure Categories' (NECs) as a guidance to local authorities for planning applications. These are summarised below for road traffic:

Table 1. PPG 24 categories for road traffic noise.

dBL _{Aeq} at new dwellings		NEC	'PPG 24' general points
Day	Night		
<55	<45	A	Noise not considered a factor in Planning Permission
55-63	45-57	B	Noise should be taken into account, possible conditions apply
63-72	57-66	C	Planning not normally granted, unless no better sites available, protection measures required
>72	>66	D	Planning should normally be refused

The NECs correspond to average (dB L_{Aeq}) noise levels measured for day (07:00-23:00) and night (23:00-07:00).

It should be noted that PPG 24 was written some years ago. The noise level limits for the NECs are based on achieving acceptable internal noise levels in new dwellings, as suggested by BS 8233, but the assumed façade performance, and in particular the glazing performance, is modest by today's standards. Windows, glazing units and ventilation systems of superior acoustic performance are readily available, and low internal noise levels are achievable with higher external noise levels than PPG 24 would deem acceptable.

There is an alternative range of guidance available on the recommended internal noise levels to be achieved within residential accommodation. The various levels are set out in Table 2 overleaf for comparison.

Table 2. Guidance for internal noise levels.

Guidance	Living rooms	Bedrooms
WHO Guidelines for Community Noise	35 L_{Aeq} 0700-2300	30 L_{Aeq} 2300-0700
BS 8233:1999 Sound insulation and noise reduction for buildings – Code of practice	30-40 L_{Aeq} 0700-2300	30-35 L_{Aeq} 2300-0700

WHO and BS8233 also recommend that the maximum noise levels affecting bedrooms should not exceed 45dBA max at night. Glazing and other mitigation measures have been considered which will achieve the design standard noise levels given above.

5. SURVEY METHOD

The monitoring positions used for the survey were based on an assessment of site conditions and existing noise sources. Road traffic on Kilburn High Road and Kingsgate Road were deemed to be the only significant noise sources affecting the site.

Two 24-hour noise-monitoring positions were established at locations representing the noise environment at the façades of the new development. Cirrus 821A Environmental Noise Analysers were positioned at:

P1 – At a first floor window of Banderway House, 0.5m from the façade, and 3 metres from the kerb of Kilburn High Road.

P2 – On the roof of the Somerfield store at first floor level overlooking Kingsgate Road.

Noise levels with the criteria dB L_{Aeq} , L_{A90} , L_{A10} and L_{Amax} were recorded at 1-hour sampling periods. These measurements cover the accepted parameters for average, background, traffic and maximum noise levels.

Further sample measurements in 1/1 octave parameters were taken at positions P1 and P2 to establish the frequency spectra of the passing traffic.

Figure 1 in the appendix shows the noise monitoring positions.

During the survey period the weather was warm and dry with a light SW wind 1-3m/s.

6. SURVEY RESULTS

Table 3. Summary of Existing Ambient Noise Levels at site boundary

Measurement Position		dB L _{Aeq}	dB L _{A10}	dB L _{Amax} *	dB L _{A90}			
P1								
Day 07:00-23:00 average		72.6	74.3	95.5	64.6			
Night 23:00-07:00 average		70.9	73.8	94.6	56.4			
P2								
Day 07:00-23:00 average		62.0	63.7	86.6	53.0			
Night 23:00-07:00 average		54.5	56.8	74.2	49.0			
Daytime 13:30 to 15:30	Octave band centre frequency Hz (dB Lin)							
	63	125	250	500	1k	2k	4k	8k
P1	79.5	72.3	68	65.3	64.9	62.8	58.9	52.7
P2	69.3	67.2	65.4	60.2	58.2	56.6	51.3	45.2

* It was noted from the results that there were some very high maxima levels recorded during the night at measurement position P1. However, because there were only five occasions during the 8-hour night-time measurement period when the maximum levels exceeded 90dBA (the source of these likely to be emergency services vehicle sirens), it was considered reasonable to assess the average maxima for this report.

Explanation of Terms

The L_{Aeq} indicates the average noise level and is the 'equivalent continuous noise level over a sample period. It is the single parameter now commonly used to describe a noise environment. Most of the guidance on noise now uses 'L_{Aeq}' to define acceptable levels.

The L_{A10} indicates traffic noise levels and is the noise level exceeded for 10% of the sample period. It gives a good indication of the spread of noise events in a given environment. Near a busy road, the L₁₀ and the L_{eq} are closely correlated, with the L₁₀ typically 2-3dB higher than the L_{eq}. Here, the L_{eq} is correlated closely with the L₁₀, indicating a noise environment dominated by traffic noise.

The L_{Amax} represents the noisiest event affecting the site during each one-hour sampling period.

L_{A90} indicates the noise level exceeded for more than 90% of the time and represents the background noise levels.

Extrapolated noise levels, incident on the façades of the new apartment blocks, are shown in Table 4 below. Corrections for the distance between the measurement positions and the façades of the proposed buildings are included, as well as for façade effect.

Table 4. Predicted Noise Levels incident on the façades of the proposed new dwellings

Location	Day	Night	
	dB L_{Aeq}	dB L_{Aeq}	dB L_{Amax}
Residential apartments overlooking Kilburn High Road (1 st – 3 rd Floor)	73	71	95
Residential apartments overlooking Kilburn High Road (4 th Floor)	66	64	85
Residential apartments overlooking Kingsgate Road	64	56	76
Residential apartments overlooking Kingsgate Place	<60	<50	<72

All other façades are either facing away from significant noise sources or are shielded by other parts of the development.

Table 5 below shows the predicted PPG 24 'NECs' at the relevant parts of the development.

Table 5 Predicted PPG 24 Noise Exposure Categories

Location	dB L_{Aeq} (free field)*		PPG 24 'NEC'	
	Day	Night	Day	Night
Residential apartments overlooking Kilburn High Road	70	68	C	D
Residential apartments overlooking Kingsgate Road	61	54	B	B
Residential apartments overlooking Kingsgate Place	<60	<50	B	B

* The free field values used in Table 5 to arrive at the relevant NECs (as per PPG 24 requirements) are based on the façade levels in Table 4 less the 2.5dB previously added for the façade effect.

7. DISCUSSION AND RECOMMENDATION FOR NOISE CONTROL

The PPG 24 NECs of 'C' for the daytime period and 'D' for the night-time on the Kilburn High Road façade are commensurate with the expected noise from traffic on a busy London primary route. As previously discussed, however, it is not considered reasonable to determine the suitability for development on PPG24 assessment alone, as current glazing and ventilation design can ensure acceptable internal noise levels in comparison with the standards upon which PPG24 was based.

Calculations indicate that the internal noise levels would be as Table 6 below. The predicted levels are based on the assumption that the building fabric will not compromise the overall sound insulation performance of the façades as suggested by the 'Indicative Glazing' specification.

It should be noted that the suggested glazing performances and configurations shown in the table are based on the development details supplied.

Table 6. Predicted internal noise levels.

Location (habitable rooms)	Daytime	Night time		Indicative Glazing
	dBL _{Aeq}	dBL _{Aeq}	dB L _{Amax}	
Residential apartments overlooking Kilburn High Road (1 st – 3 rd Floor)	23	21	45	R _w 50dB* (see below)
Residential apartments overlooking Kilburn High Road (4 th Floor)	26	24	45	R _w 40dB* (see below)
Residential apartments overlooking Kingsgate Road	34	26	46	R _w 35dB (4-16-4)**
Residential apartments overlooking Kingsgate Place	<35	<25	<46	R _w 31dB (4-12-4)**
Residential apartments overlooking Somerfield roof	<35	<30	<40	R _w 35dB (4-16-4)**

* Ventilation by mechanical means

** Example glazing configuration

The requirement for glazing R_w 50 dB for habitable rooms on the Kilburn High Road 1st to 3rd floor façade is driven by the high maximum noise levels and is not achievable with a single double-glazed unit. To achieve this level of sound insulation, it will be necessary to install either a deep void system (10mm-200 gap-6mm) or a good quality primary double-glazing (as per the above R_w 35) plus a secondary single glazed frame (6mm + glass) with at least a 200mm gap to the primary glass.

The requirement for glazing R_w 40 dB for habitable rooms on the Kilburn High Road 4th floor façade is less than the lower floors due to this floor being set back from the other levels and being protected from noise to a certain extent by the glass balustrades. It is proposed that there will be sliding doors to the balconies outside this façade; it will therefore be necessary to achieve the required glazing with primary glazing only. Glazing with a configuration of 10mm-12mm gap-6.4mm (laminated) will achieve the required sound insulation value; or similar approved.

Façades overlooking the Somerfield roof may be affected by existing external air-conditioning plant. The noise from these is not dominant during the day, but may be more noticeable at night depending on how much the new apartments shield traffic noise. The recommended glazing shown in the table above for habitable rooms facing the roof reflects the likely noise levels from the plant during the night.

Façades facing the internal atrium will require only standard thermal double-glazed units (typically R_w 31 dB) with trickle vents for background ventilation.

The predicted internal noise levels shown in Table 6 above are generally within the criteria of BS 8233 and the WHO guidelines for overall noise levels. As is often the case, it is the maximum noise levels that determine the acoustic performance requirements of the façades. Some internal maxima levels are shown to be 1dB over the recommended 45dB at night. This is, however, insignificant as it is below the threshold of human response.

Ventilation

To ensure adequate ventilation for habitable rooms with glazed façades overlooking Kilburn High Road, it is likely that there will be a requirement for the use of a whole house (heat recovery) system or individual ducted ventilation units. It will not be possible to open windows and still achieve internal noise levels that conform to the local authority criteria. It is also likely that traffic pollution will preclude the use of openable windows on this façade.

For habitable rooms in all other parts of the development, good quality trickle vents can supply background ventilation.

Commercial activities

The ground floor of the development will be commercial / retail use. There may be external air handling and possibly refrigeration plant associated with the commercial operations that will potentially have a noise impact on the residential units above. Consideration of the effect of the plant can be considered when detail is available. However, it is likely that individual commercial tenants' needs will necessitate planning approval for specific external plant. We are advised that it will therefore be the responsibility of the applicant to demonstrate noise control schemes to limit noise emissions from external plant.

Appendix

1	Site location	Kilburn High Road, London, NW6
2	Date	Wednesday 22 nd – Thursday 23 rd June 2005
3	Personnel	Martin Loven Mark Richardson Heulwen Livesey
4.	Test locations	See Figure 1
5	Equipment	2 x Cirrus 821A Type 1 Environmental Noise Analysers. 1 x CEL 573 Type 1 Sound Level Meter
6	Calibration	All equipment was checked before and after use with a pure-tone electronic calibrator. None of the equipment used during this survey showed drift of more than 0.1dB during the survey. Calibration standards are checked regularly and are traceable via NAMAS to National Standards held at NPL. Results are presented adjusted in accordance with the calibration to the nearest 0.1 dB.