PROPOSED GILMAC BUILDING
CRANFORD WAY
LONDON N8

NOISE IMPACT ASSESSMENT
REPORT 2195/NIA

17 May 2006
Revision Number: 0

For: Gilmac Building Services Ltd
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CONTENTS:

1.0 Introduction

A new building is proposed at Cranford Way, London N8 for the use of Gilmac Building Services Ltd. As well as housing Gilmac offices on the 2nd and 3rd Floors of the building it is proposed to relocate the company's joinery department to the Ground and 1st Floors. The noise associated with the operation of the joinery is of concern due to the proximity of residential properties to the site.

RBA Acoustics have been appointed to undertake an assessment of the predicted noise levels resulting from the use of the Ground and 1st Floor areas by the Gilmac joinery at noise sensitive residential locations. The results of the assessment will be used in order to establish the likelihood of complaint due to noise from the site. Where appropriate, methods of noise mitigation, such that noise impacts are minimised, will be suggested.

2.0 Methodology

2.1 Potential Impacts

There are a number of activities associated with the operation of the Gilmac joinery. The major noise sources are detailed as follows:

- Hand tools
- Floor-mounted tools (eg circular saws, lathes etc)
- Spray painting
- Mechanical ventilation

The contributing noise levels of these sources will be predicted at the nearest residential window and within the garden of nearby properties and the level of impact assessed.

2.2 Assessment Criteria

The criterion for the assessment of operational noise from the site has been developed with reference to British Standard 4142 (1997): *Method for rating industrial noise affecting mixed residential and industrial areas.* The standard recommends a comparative approach, assessing the predicted source level against the measured background and provides a useful basis for determining whether noise from the operation is likely to cause complaint.

Reference is also made to British Standard 8233 (1999): *Sound insulation and noise reduction for buildings – Code of Practice*, with regards to acceptable internal noise levels within residential properties and external levels within gardens. BS8233 is primarily intended for use in the design of new buildings as opposed to assessing changes in external noise level and is strictly applicable to anonymous sources only (road traffic etc). However, the standard does describe desirable internal noise levels against which a worthwhile assessment of predicted levels can be made.

3.0 Baseline Conditions

3.1 Site Description

The proposed site at Cranford Way comprises an unused parcel of land adjacent to the existing Gilmac office building. The site is bordered to the North by an existing industrial unit, to the East by a large industrial unit and to the South and West by the existing Gilmac building and the large electrical substation and its associated equipment and buildings.

3.2 Noise Sensitive Receptors

The area around the proposed site is predominantly industrial, with the nearest residential properties to the East on Rathcoole Avenue and Rathcoole Gardens. These properties are approximately 55-60m away from the nearest façade of the proposed Gilmac building and in some cases are screened by the buildings on the site of the electrical substation.

These receptors have been selected as being representative of the most noise sensitive properties in relation to the proposed Gilmac site. These receptor locations are detailed further on the attached Site Plan 2195/SP1.

3.3 Baseline Noise Levels

Noise monitoring was undertaken between 13:00 and 15:00 hours on 16 May 2006 at a location representative of the receptors detailed in Section 3.2 in order to obtain a description of currently prevailing noise levels during a period typical of normal working hours. This measurement position is detailed further on the attached Site Plan 2195/SP1.

The noise measurements were taken outside the front façade of the residences on Rathcoole Avenue as access to the rear of the properties overlooking the proposed site was restricted due to the substation. Noise levels measured at this location were considered to be representative of prevailing noise levels to the rear of the site due to the position of the closest major road – Tottenham Lane – to the residences. In fact, noise levels at the front of the site are considered to result in a worst case assessment as the measurement position was screened from noise associated with the existing industrial units and substation that the rear façade of the residences would be subject to.

Measurements were made over periods of approximately 15 minutes duration within each hour at the measurement position. Weather conditions over the survey period were dry and bright with no breeze and as such favourable for noise monitoring.

The results of the baseline noise measurements are detailed in Table 2195/T1 below. In addition to dBA values, octave band data were also recorded in order to gain further description of baseline noise levels. These results are included in the attached Graph 2195/G1.

Table 2195/T1
Measured Noise Levels

Description	Time Period	Sound Pressure Level (dB) re $2x10^{-5}$ Pa			
		L_{A10}	L_{A90}	L_{Aeq}	L_{Amax}
Rathcoole Avenue	12:00-13:00	56.9	36.7	54.5	78
	13:00-14:00	58.5	39.6	56.5	78.8

Ambient noise levels were found to be mostly determined by the traffic along Tottenham Lane and occasional movements on Rathcoole Avenue. Noise from industrial operations from the Cranford Way area was audible on some occasions as were train movements from the nearby railway.

3.4 Source Noise Levels

In addition to the baseline noise survey at the proposed site location, noise level measurements were also undertaken at the existing Gilmac joinery at Waterloo Road, London NW2. Measurements were taken at a number of locations within the workshop over 10 minute periods in order to establish a level of reverberant noise, taking into account the various operations and equipment used throughout the course of a working day.

The reverberant measurements recorded over a typical working period of approximately 1.5 hours within the workshop established an average L_{Aeq} of 73.8dB. The results should therefore be considered typical of working levels within the workshop. The reverberant measurements undertaken within the existing Gilmac joinery are also detailed as octave band levels in Graph 2195/G2.

3.5 Instrumentation

Noise level measurements were undertaken using the following instrumentation:

Table 2195/T2
Measurement Equipment

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Expiry Date
01dB A&V Type 1 Sound Level Meter	Solo 01	11595	-	17 /11/07
01dB A&V Pre Amplifier	PRE 21 S	12009		
Gras ½" Microphone	MCE 212	45099		
01dB-Stell Calibrator	Cal 21	51231453	51231453-01/12/05	1/12/06

The sound level meter was calibrated both prior to and on completion of the survey with no calibration drift observed.

4.0 Noise Impact Assessment

Noise impacts resulting from the use of the Ground and 1st Floors of the proposed new Gilmac building by the joinery operation have been predicted and assessed in relation to the criteria stated in Section 2.2.

4.1 Assumptions

The following assumptions have been made in the noise impact assessment:

- A +5dB correction has been added to predicted noise levels to account for any tonal and irregular noise components (reference BS4142) as well as for intermittent use
- Entrance to the new building is on the East façade
- Due to the height of the building and the location of offices upwards of the 2nd floor, noise the through the Ground and 1st Floor walls would be dominant transfer path
- Distances between site and receptor positions detailed in Table 2195/T3
- Sound reduction indices of external building fabric have been based upon data for a typical external wall construction of 2x75mm block with a 50mm cavity
- It is also assumed that the roof lights will be double glazed with a typical specification of 4mm glass/ 12mm airspace/4mm glass

Table 2195/T3
Distance separating site and nearest residential window/centre of garden

Description	Horizontal Distance (m)	
	Residential Window	Centre of Garden
Rathcoole Avenue	58	51

4.2 Predicted Noise Levels

Table 2195/T4 below details predicted noise levels from the operation of Gilmac joinery at the identified noise sensitive receptors.

Table 2195/T4
Predicted Noise Levels at Receptors

Receptor	Predicted Level at Window $L_{Aeq, 60\ mins}$ (dB)	Predicted Level in Garden $L_{Aeq, 60\ mins}$ (dB)
Rathcoole Avenue	3.7	4.7

4.3 Assessment of Noise Levels

BS4142 Assessment

This assessment of noise levels is based upon a comparison between the measured background noise level and the predicted levels from the site operation.

The Table 2195/T5 below details the results of the comparison of the predicted noise levels at the noise sensitive receptors against the lowest measured (worst case) background noise levels.

Table 2195/T5
Comparison of Predicted Levels against Lowest Background

Receptor	Baseline (dB)	Difference in Level at Window (dB)	Difference in Level in Garden (dB)
Rathcoole Avenue	36.7	-33.0	-32.0

BS4142 assesses the impact of a noise source in terms of its likelihood to cause complaint. The greater the difference between the predicted noise level and the background, the greater the likelihood of complaint.

BS4142 (Paragraph 9) states the following:

- A difference of +10dB or more indicates that complaints are likely.
- A difference of around +5dB is of marginal significance.
- If the rating level is more than 10dB below the measured background noise level then this is a positive indication that complaints are unlikely.

When assessed in accordance with BS4142, predicted noise levels at receptors on Rathcoole Avenue (at windows and within gardens) are at levels where complaints would be unlikely.

BS8233 Assessment

BS8233 makes reference to acceptable internal noise levels for residential properties and also external noise levels within gardens. These levels are as follows:

- Bedrooms 30-35 dB L_{Aeq}
- Living Rooms 30-40 dB L_{Aeq}
- Gardens 50-55 dB L_{Aeq}

In addition, typical levels of sound insulation provided by residential windows are described. A worst case scenario of a partially opened window is reported to provide 10-15 dB sound insulation. An assessment can be made of noise levels from the operation of the Gilmac joinery by subtracting the sound insulation performance from the predicted noise levels at each receptor in order to establish an internal noise level. This predicted internal level can then be assessed against the criteria described above.

Although BS8233 does not specifically outline the time periods over which these criteria should be considered suitable, it does note the time period should be appropriate for the activity involved. Due to the daytime only operation of the proposed joinery, it is therefore considered appropriate for an assessment of noise levels within living rooms and gardens only.

As discussed in Section 2.2, BS8233 refers to noise levels from anonymous sources such as road traffic. For specific sources a more stringent criteria may be considered appropriate. To this end a 5dB correction should be applied, resulting in an assessment criterion of 25-35 dB L_{Aeq} for internal levels and 45-50 dB L_{Aeq} within gardens.

Predicted internal noise levels at each noise sensitive receptor are detailed in the Table 2195/T6 below.

Table 2195/T6
Predicted Internal Noise Levels and within Gardens

Receptor	Internal Noise Level (dB)	Noise Level within Garden (dB)
Rathcoole Avenue	0*	4.7

*Reductions in noise levels due to the building structure, distance and residential glazing exceed the likely joinery internal noise levels

From the table above it can be seen that there are no exceedances of the daytime criteria within living rooms or within gardens.

5.0 Noise Mitigation Measures

The BS4142 and BS8233 assessments identified that noise levels were not predicted to cause any impact in terms of likelihood of complaint or the exceedance of recommended internal and amenity space criteria.

Therefore no mitigation is recommended. We would however suggest that details of the proposed external building fabric elements be forwarded to us during the detailed design stage to ensure the levels of sound insulation required and assumed in this assessment are provided by the structure.

6.0 Mechanical Ventilation

The proposed new Gilmac building is likely to require mechanical ventilation throughout, in particular the finishing section of the joinery where spray-painting is used and ventilated areas are essential.

It is usual for planning conditions to be imposed on new building services installations in order to ensure no nuisance is created by the introduction of new building services plant. An assessment is typically undertaken during the design stage when details of the proposed plant are available and calculations to specify any noise attenuation devices required can be carried out.

Any assessment shall be undertaken in accordance with Local Authority policy regarding new mechanical services plant.

7.0 Conclusion

An investigation has been undertaken into the noise levels resulting from the use of the Ground and 1st Floor areas of the proposed Gilmac building on Cranford Way by the Gilmac joinery.

The assessment of noise levels at nearby noise sensitive residential locations has been carried out based upon measurements of activities within the existing Gilmac joinery site and baseline noise monitoring at receptors close to the proposed location.

Predicted noise levels at receptors on Rathcoole Avenue (at windows and within gardens), when assessed in terms of BS4142, are at levels where complaints would be unlikely. Noise levels assessed in terms of BS8233 are well below the recommended guidelines for internal and external residential areas. In fact predicted levels would suggest that the operation of the Gilmac joinery would be inaudible at the nearest residential receptors.

Acoustic Terminology

A brief explanation of the acoustic terminology used in this report is given below:

dB : Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.

dB(A) : The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level.

Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.

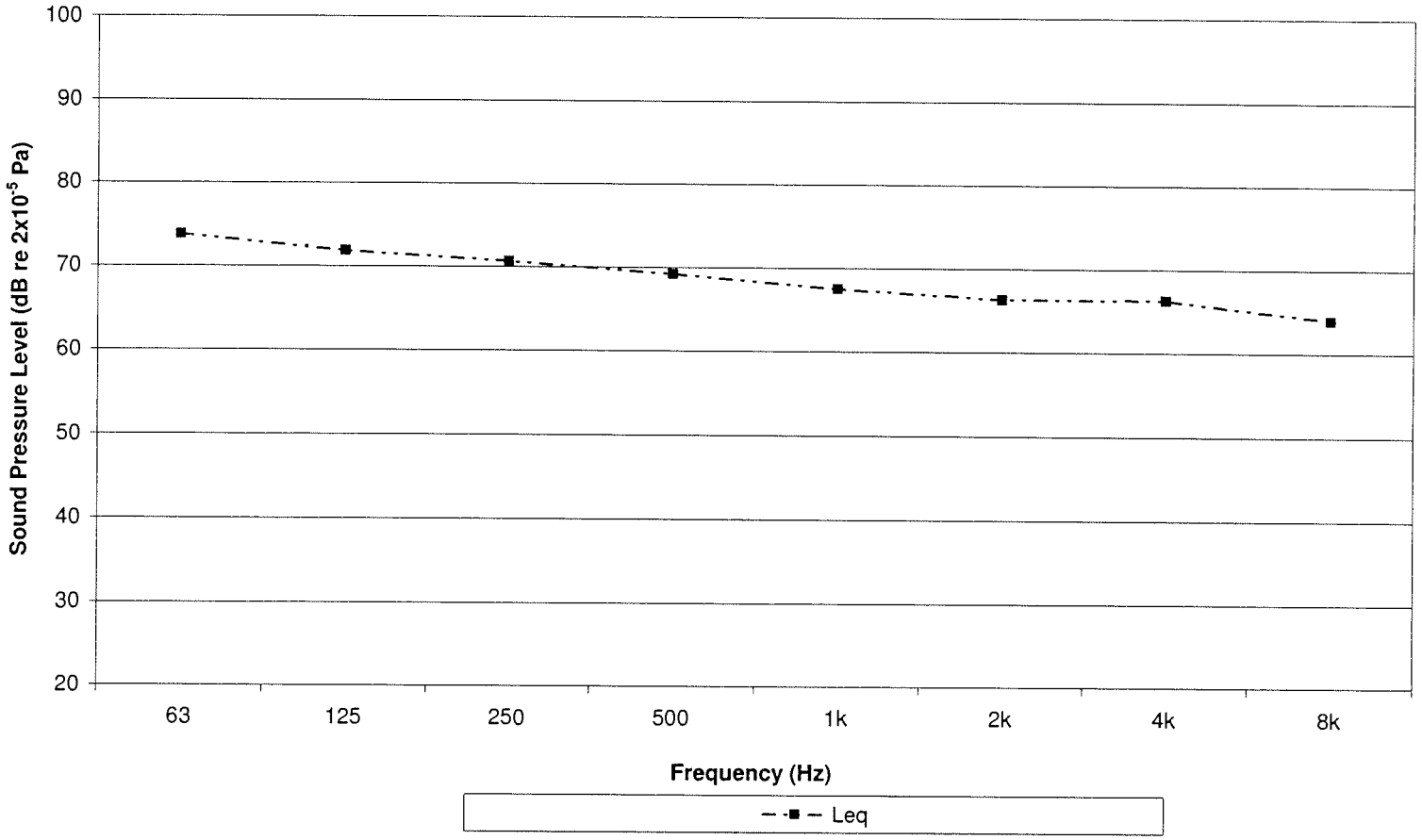
L_{An} (e.g L_{A10}, L_{A90}) If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.

L_{eq} : The concept of L_{eq} (equivalent continuous sound level) has up to recently been primarily used in assessing noise in industry but seems now to be finding use in defining many other types of noise, such as aircraft noise, environmental noise and construction noise.

L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (1 hour).

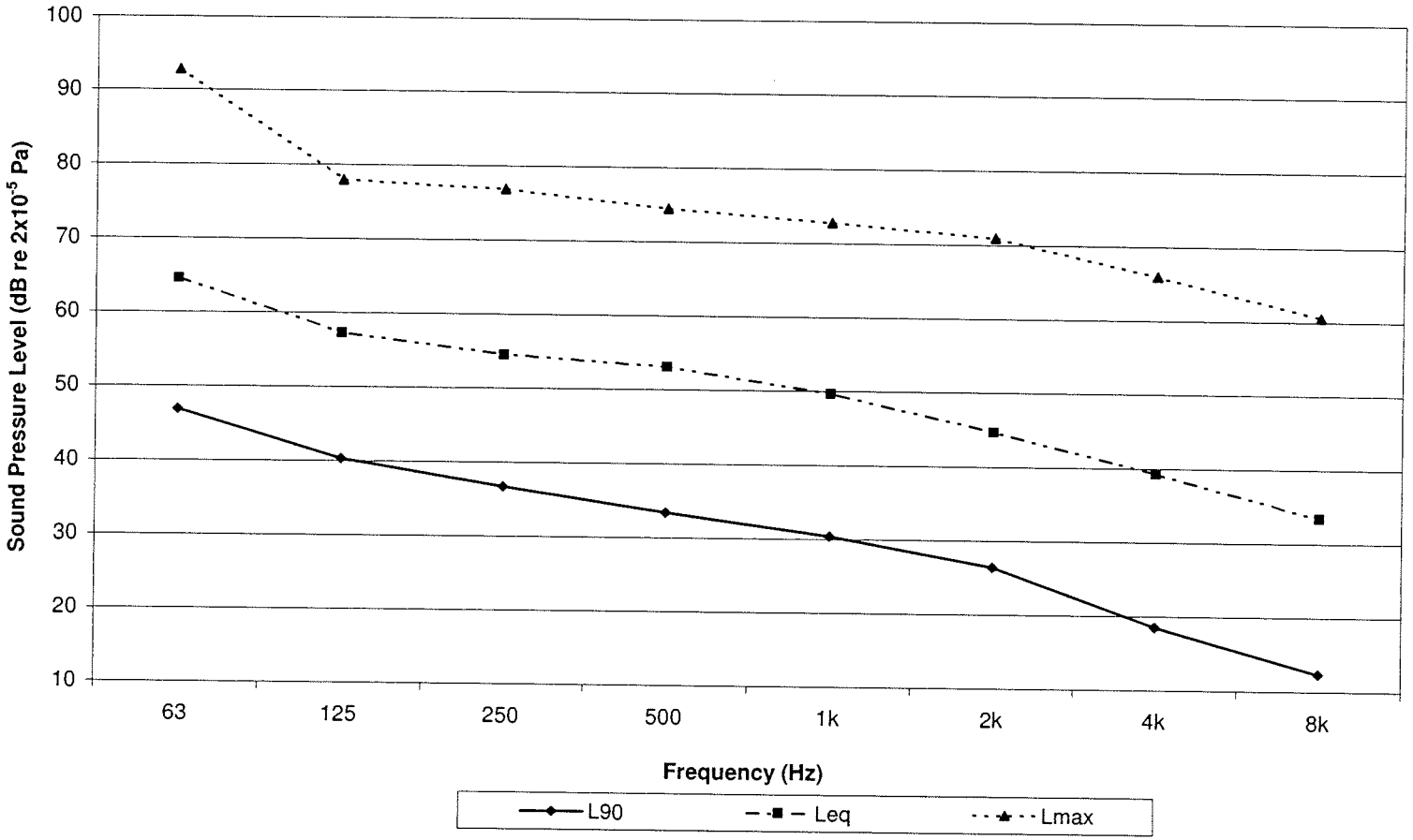
L_{Aeq} is the level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.

Proposed Gilmac Site, Cranford Way, London N8
Octave Band Noise Level Measurements
Measurements within Existing Gilmac Joinery, Waterloo Road, London NW2

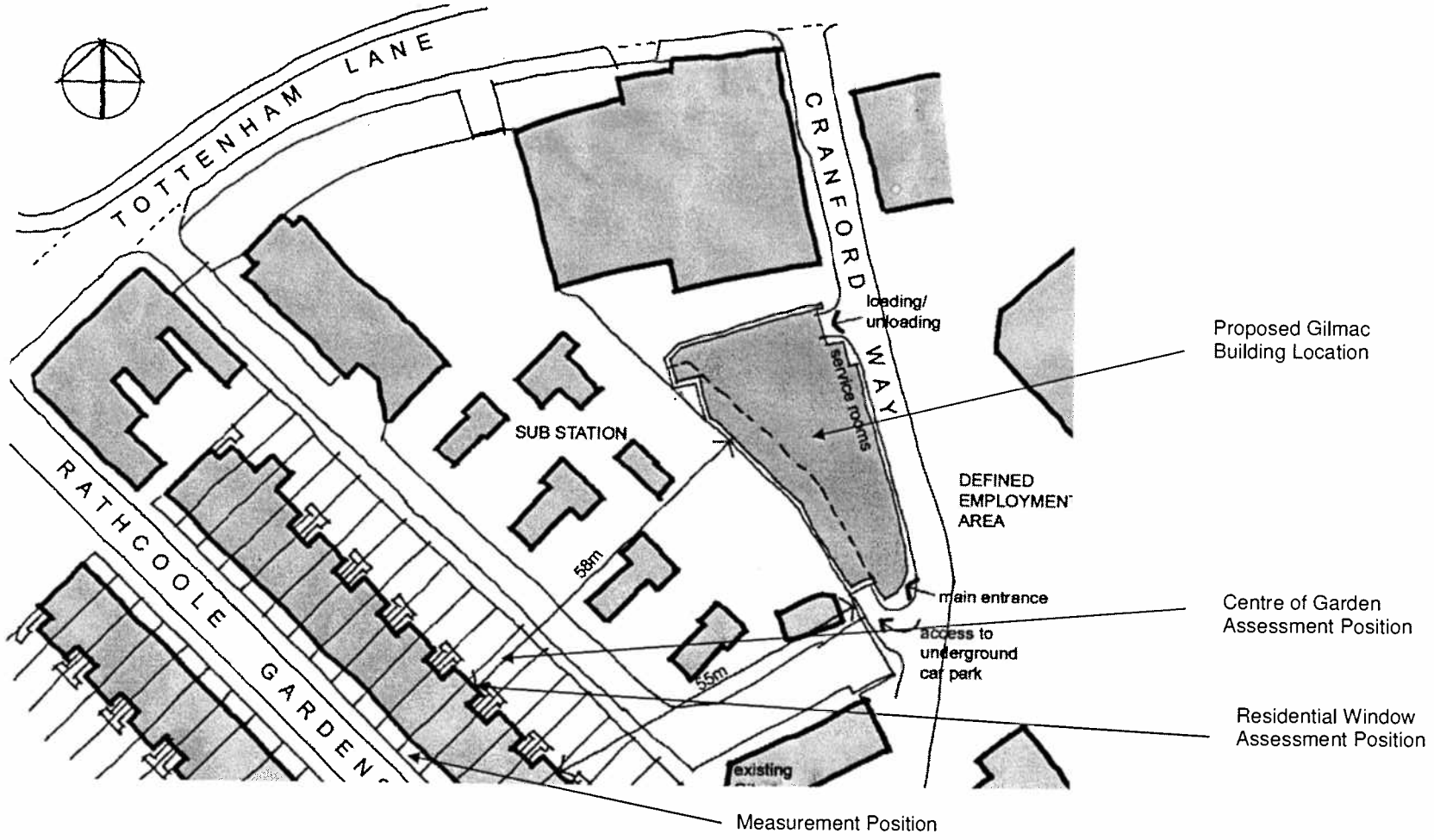


Graph 2195/G2

Proposed Gilmac Site, Cranford Way, London N8
Octave Band Noise Level Measurements
Rathcoole Avenue



Graph 2195/G1



Gilmac, Cranford Way, London N2	Figure 2195/SP1	RBA ACOUSTICS
	17 May 2006	
Site Plan and Measurement Positions	Not to Scale	

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