

Project

Former Hampstead Police Station Acoustic Impact assessment

Prepared for

Rostrack Limited 10 Perrins Court London NW3 IQS

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Version History

Version	Date	Comments	Approved by
ΡI	23/12/2022	-	Dave Clarke BEng(Hons) CEng MIOA
P2	09/06/2023	Client details changed.	Chris Wright BA(Hons) MIOA

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Summary

Rostrack Limited are preparing a planning application to refurbish the former Hampstead Police Station, situated on the corner of Downshire Hill and the A502, to form residential units and commercial office floorspace over 1000 m².

SRL have been appointed to complete a noise assessment to support this application by specifying the window and ventilator sound insulation performances needed to achieve appropriate indoor ambient noise levels as recommended in BS 8233:2014: '*Guidance on sound insulation and noise reduction for buildings*'

Acceptable internal noise levels can be achieved with "standard" thermal double glazing and non-acoustic trickle ventilators (where required) to all rooms.

Only bedrooms on facades facing away from the adjacent roads are predicted to meet the Approved Document O (ADO) internal noise limits (ADO section 4.2) with open windows. bedrooms facing Downshire Hill and Rosslyn Hill will require an overheating assessment.

Planning therefore should not be refused on the basis of noise.

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1.0 Introduction

Rostrack Limited are preparing a planning application to refurbish the former Hampstead Police Station, situated on the corner of Downshire Hill and Rosslyn Hill, to form residential units and commercial office floorspace over 1000 m². The refurbishment will include replacing the existing windows.

The main noise sources affecting the site are road traffic on Downshire Hill, to the north west of the site, and the Rosslyn Hill, to the south west of the site. A plan of the proposed development is given in Figure 1 A noise impact assessment is required to support the planning application and therefore Rostrack Limited have appointed SRL Technical Services Ltd.

Figure I- Proposed Site Layout



2.0 Noise Policy and Guidance

2.1 ProPG: Planning and Noise

Professional Practice Guidance on Planning and Noise (ProPG) was published in June 2017. It provides guidance on a recommended approach for managing noise appropriately within the planning system for new housing. It is not an official government code of practice, nor does it replace or provide an authoritative interpretation of the law or government policy, but it does help to draw together existing policies, such as the National Planning Policy Framework (NPPF) and provides additional guidance which helps fill in some of the current gaps.

This document has been jointly created by three bodies: The Institute of Acoustics, the Association of Noise Consultants and the Chartered Institute of Environmental Health. The key message is the drive to adopt Good Acoustic Design for every new housing scheme to protect people from the harmful effects of noise.

ProPG: Planning and Noise aims to establish a framework for assessing proposed developments by looking at the potential 'risks' from noise affecting the site and establishing suitable noise criteria. The fundamental approach is to do an initial Risk Assessment of the site in terms of noise and unless the risk is deemed to be negligible, you are expected to do a full noise assessment. This involves establishing suitable noise criteria and developing a Good Acoustic Design to achieve them, wherever possible.

However, the foreword of ProPG also points out that: 'Good acoustic design does not mean "gold plating" or significantly increasing costs. This guidance seeks to encourage and promote design outcomes that are proportionate and reasonable in the particular circumstances of each development site.'

Hence, while the aim of a noise assessment like this is to provide acceptable amenity, it is recognised that the scheme sits within an existing community already exposed to similar road traffic along the routes around the site itself.

2.2 British Standard 8233:2014 - Guidance on sound insulation and noise reduction for buildings

In residential developments, external noise levels must be controlled so that acceptable internal noise levels are achieved. For this assessment, I have used the guidance in British Standard 8233:2014 'Guidance on sound insulation and noise reduction for buildings' (BS 8233). These are summarised in Table 1.

Table I - Recommended residential indoor ambient noise level criteria from BS 8233:2014

Room Type	Time Period, hh:mm		
	07:00 to 23:00	23:00 to 07:00	
Living room	35 dB L _{Aeq,T}	-	
Dining room/area	40 dB L _{Aeq,T}	-	
Bedroom	35 dB L _{Aeq,T}	30 dB L _{Aeq,T}	

The latest version of BS8233 does not include a maximum noise level criterion. Note 4 (pg 29) of the standard states:

'NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{AFmax}, depending on the character and number of events per night. Sporadic noise events could require separate values.'

2.3 Office Spaces

Section 7.7.4 of BS 8233:2014 gives typical noise levels for various unoccupied non-domestic rooms based on the activity in each room. It states that the ambient noise levels should not exceed the design ranges in the Standard. The ambient noise level is the combined level from external noise break-in and building services plant, but it excludes noise from any activities (and, usually, equipment) in the room. Using Table 6 of the Standard as a guide, I have summarised in the internal ambient noise levels in Table 2.

Table 2 – Recommended	Civic Centre internal	ambient noise level criteria
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Room BS 8233:2014 Activity		Level range for indoor ambient noise d B L _{Aeq,7} *
Meeting Room	'Study and work requiring concentration'	35 - 45
Open Plan Office	'Study and work requiring concentration'	35 - 45
Open Plan Cafe	'Speech or telephone communications'	50 - 55

*BS 8233:2014 gives level ranges, typically only the maximum desirable noise level needs to be decided, therefore an ambient indoor noise less than the range is also acceptable.

2.4 Approved Document O of the Building Regulations

Approved Document O (ADO) of the Building Regulations (2021 Edition) applies to new residential buildings where planning has been submitted after 15 June 2022. ADO sets out requirement O1 and the normal means of meeting that requirement. Requirement O1 "Overheating mitigation" requires that:

- 1. Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel ("residences") to
 - a. limit unwanted solar gains in summer;
 - b. provide an adequate means to remove heat from the indoor environment.
- 2. In meeting the obligations in paragraph (1)
 - a. account must be taken of the safety of any occupant, and their reasonable enjoyment of the residence; and
 - b. mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it.

Part 2 a) of requirement OI relates to the acoustic performance of the building shell. It is recognised that to achieve '*reasonable enjoyment of the residence*', the design of the building needs to take account of noise at night. Section 3 of ADO goes on to set noise levels at which windows would likely need to be closed by occupants.

- 3.2 In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).
- 3.3 Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.
 - a. 40dB LAeq,T, averaged over 8 hours (between 11pm and 7am).
 - b. 55dB L_{AFmax}, more than 10 times a night (between 11pm and 7am).

2.5 BS 4142: 2014+A1:2019 Methods for rating and assessing industrial and commercial sound

BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' provides a method to assess whether "sound of an industrial and/or commercial nature" is likely to have an adverse impact at noise sensitive receptors.

BS 4142's assessment methodology considers how loud the noise is and its character (e.g. whether it contains hisses, bangs or clicks). The assessment is then based on how loud (and how annoying) the source noise is compared with the existing background noise at the receptor.

The following corrections can potentially be applied for the acoustic character:

Tonality – a correction of up to +6 dB can be applied depending on how tonal the specific noise is:

- +2 dB for a tone which is just perceptible at the receptor
- +4 dB for a tone which is clearly perceptible at the receptor, and
- +6 dB for a tone which is highly perceptible at the receptor

Impulsivity – a correction of up to +9 dB can be applied if the noise is impulsive:

- +3 dB for impulsivity which is just perceptible at the receptor
- +6 dB for impulsivity which is clearly perceptible at the receptor, and
- +9 dB for impulsivity which is highly perceptible at the receptor

If the source is both tonal and impulsive it is usual to only apply the correction for the characteristic which is most dominant.

Intermittency – when the noise source has identifiable on/off conditions (e.g. an item of plant which switches on and off), and these on/off conditions are readily distinguishable against the residual acoustic environment, a correction of up to +3 dB can be applied.

Other sound characteristics – where the noise source is not tonal or impulsive but has another characteristic that is readily distinguishable against the residual acoustic environment, a correction of up to +3 dB can be applied.

The rating level is determined by applying these corrections to the "specific" noise level emitted by the plant. The rating level is then compared with the measured background level. The difference between the rating level and the typical background level can then be interpreted using guidance from BS 4142, depending on the context.

3.0 Noise and Survey Data

I measured noise on site from 11:00 to 14:00 on Monday 28th November 2022. I also measured from 23:00 on Monday to 00:00 Tuesday 29th November 2022 to capture the expected peak noise levels during the night. Daytime measurements were for 15-minute periods; the night-time measurements were for 15-minute periods per hour broken down into three consecutive 5-minute intervals. These periods were chosen to obtain a steady noise level from road traffic noise sources, and sample typical maximum noise levels from vehicular movements along the roads.

Details of the survey are in Appendix A and tabulated results are detailed in Appendix B.

The main noise source near the development is road traffic along both Rosslyn Hill and Downshire Hill. Road traffic was noted as regular during the day, and less frequent at night.

Figure 2 shows the measurement locations used for this assessment in relation to the existing site layout (highlighted red). ST denotes 'short term' and LT denotes 'long term'.

Figure 2- Site Plan and Measurement Positions

3.1 Daytime ambient noise levels

Table 3 summarises the noise levels measured during the daytime and night-time.

Measurement	Description of measurement	Daytime Noise Levels	Night-time Noise Levels
Position	location	dB L _{Aeq,16hr}	dB L _{Aeq,8 hr}
STI	Downshire Hill	62*	52
ST2	Corner of Downshire Hill and Rosslyn Hill	65*	60
ST3	Rosslyn Hill	65*	58
LT2	Rosslyn Hill	63	58

Table 3 - Ambient noise levels at the building

* Calculated from the measured LA10 using the shortened measurement procedure given in Department of Transport's 'Calculation of Road Traffic Noise' (CRTN) and the methodology in Transport Research Laboratory "Method for Converting the UK Road Traffic Noise Index LA10,18h to the EU Noise Indices for Road Noise Mapping"

3.2 Background Noise Levels

Table 4 – Typical background noise levels

Position	Day	Night
	dB L _{A90}	dB L _{A90}
LTI	34	30
LT2	52	43

Full survey details are in Appendix A.

3.3 Noise Limits

Based on the survey data above, the following noise limits are recommended at the nearest noise sensitive receptors, the site is surrounded by dwellings, noise from plant will need to be controlled to these noise sensitive receptors.

Receptors	Period	Typical Background Noise Level L _{A90, T} dB	Highest Permissible Plant Noise Rating Level L _{ArTr} d B
Rosslyn Hill	Daytime 07:00 - 23:00	52	52
LT2	Night 23:00 - 06:00	43	43
Other Local Receptors	Daytime 07:00 - 23:00	34	34
LTI	Night 23:00 - 06:00	30	30

Table 5 – Rating noise limits for new plant (based on LTI survey data, see Table 5)



4.0 Noise Assessment

4.1 Façade specification

The external walls of the residential dwellings are brick or blockwork, with internal plasterboard linings. These types of construction will provide sufficient sound insulation against external noise, and it will be the windows and ventilation openings that will be the weakest elements acoustically.

Using internal layouts and elevations provided to us by Rostrack Limited, I have calculated the noise break in to habitable rooms and acceptable internal noise levels will be achieved with standard thermal double glazing and non-acoustic trickle ventilators (if required).

4.2 Approved Document O

Openable windows are an appropriate overheating strategy only for bedrooms with façades facing away from Downshire Hill and Rosslyn Hill. This is pending an overheating assessment.

Appendix A - Survey Details

A1. Location of Survey

Former Hampstead Police Station, London, NW6 IUL

A2. Date & Time of Survey

Day: Monday 28th November 2022: 11:00 - 14:00h Night: Monday 28th November 2022: 23:00 – 00:00h Day: Tuesday 29th November 2022: 06:00 – 07:00h

A3. Personnel Present During Survey

Sam Finch and Tom Conboy

A4. Weather Conditions during Survey

Day: Light cloud cover, average temperature approx. 9 °C average, light wind.

A5. Instrumentation

Bruel & Kjaer - Noise Meter HE2

Description	SRL No.	Make	Туре	S/N
Sound Level Meter (HE2)	615	Brüel & Kjær	2250	2579806
Pre-amp	616	Brüel & Kjær	ZC0032	22126
Microphone	617	Brüel & Kjær	4189	2584598
Calibrator	618	Brüel & Kjær	4231	2583398

Description	SRL No.	Make	Туре	S/N
Sound Level Meter (HLI, Green)	777	Norsonic	Nor 140	1404560
Calibrator	753	Brüel & Kjaer	Туре 423 І	2545771
Pre-amp	777	Norsonic	Туре 1209	13927
Microphone	777	Norsonic	Туре 1225	157421
De-humidifier	777	Norsonic	Туре 1284	255

Norsonic - Noise Logger HLI (used as LTI)

Norsonic - Noise Logger HL2 (used as LT2

Description	SRL No.	Make	Туре	S/N
Sound Level Meter (HL2, Purple)	779	Norsonic	Nor 140	1404737
Calibrator	169	Brüel & Kjaer	Туре 4230	1541905
Pre-amp	779	Norsonic	Туре 1209	23081
Microphone	779	Norsonic	Туре 1225	128712
De-humidifier	779	Norsonic	Туре 1284	330

A6. Calibration Procedure

Before and after the survey the measurement apparatus was check calibrated to an accuracy of ±0.3 dB

Appendix B – Survey Data

Table 6 - Attended data

Position	Start Date/time	Elapsed Time	dB L _{Amax}	dB L _{Aeq}	dB L _{A90}
STI	28/11/2022 11:21	00:15:00	79	65	51
ST2	28/11/2022 12:12	00:15:00	78	61	50
ST3	28/11/2022 13:00	00:15:00	80	60	49
STI	28/11/2022 23:04	00:05:00	74	55	37
ST2	28/11/2022 23:22	00:05:00	74	56	37
ST3	29/11/2022 06:01	00:05:00	68	51	37
STI	29/11/2022 06:19	00:05:00	83	61	43
ST2	28/11/2022 11:38	00:15:00	83	65	56
ST3	28/11/2022 12:28	00:15:00	96	66	55
STI	28/11/2022 13:16	00:15:00	81	64	53
ST2	28/11/2022 23:10	00:05:00	72	60	39
ST3	28/11/2022 23:28	00:05:00	72	60	39
STI	29/11/2022 06:07	00:05:00	77	65	49
ST2	29/11/2022 06:25	00:05:00	78	65	43
ST3	28/11/2022 11:53	00:15:00	98	70	54
STI	28/11/2022 12:44	00:15:00	84	63	53
ST2	28/11/2022 13:32	00:15:00	78	63	53
ST3	28/11/2022 23:16	00:05:00	80	61	38
STI	28/11/2022 23:34	00:05:00	78	62	41
ST2	29/11/2022 06:13	00:05:00	78	60	39
ST3	29/11/2022 06:31	00:05:00	75	62	44

Figure 3 – LTI Data





Figure 4- LT2 Data

Sudbury Consultancy

Holbrook House Little Waldingfield Sudbury Suffolk CO10 0TF Tel: +44 (0)1787 247595

Birmingham Consultancy

Cornwall Buildings 45 Newhall Street Birmingham B3 3QR Tel: +44 (0)121 270 6680

Manchester Consultancy

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South Africa Consultancy

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