MAX FORDHAM

London Irish Centre

Noise Impact Assessment

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ISSUE HISTORY

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CONTENTS

1.0 INTRODUCTION

1.1 Overview

The London Irish Centre, located in Camden, London is proposed to be refurbished. The refurbishment will involve retention and elevational alterations of existing buildings at No.50, 51 and 52 Camden Square and the McNamara Hall. Demolition in part and redevelopment to provide new and reconfigured community floorspace; associated landscaping and cycle parking.

This report presents the noise impact assessment associated with the refurbishment works, which will form part of the planning application to be submitted to Camden Council.

The report adopts the following format:

- **Section 2**: Design criteria on which this assessment is based.
- **Section 3**: Environmental noise measurements.
- **Section 4**: Façade sound insulation – residential units.
- **Section 5**: Façade sound insulation – McNamara Hall.
- **Section 6**: Impact of activity noise at the external terrace on existing neighbouring properties.
- **Section 7**: Impact of plant noise on existing neighbouring properties.
- **Section 8**: Summary of the main conclusions.
- **Appendix**: Glossary, Plant Equipment Noise Levels and Proposed Layouts/Elevations.

2.0 ASSESSMENT CRITERIA

2.1 National Planning Policy

National Planning Policy Framework, 2018
Planning Policy Guidance Note 24 (PPG24), which was generally used for overall guidance to planners regarding environmental noise, particularly for residential sites, was replaced in March 2012 by the more general advice given in the National Planning Policy Framework, with the most recent update being July 2018.

The National Planning Policy Framework, 2018 (NPPF), outlines the government's environmental, economic and social policies for England and how these are expected to be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. The plans should provide a positive vision for the future of each area, addressing local needs such as housing and other economic, social and environmental priorities.

The National Planning Policy Framework states 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 of land instability". Furthermore, it states that planning policies and decisions should aim to:

- mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- identify and protect areas of tranquility which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;
- integrate new development effectively with existing business and community facilities. Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established.

Noise Policy Statement for England, 2010
The Noise Policy Statement for England (2010) (NPSE) sets out the government's long term noise policy, to "promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development".

NPSE also states: "Excessive noise can have wide-ranging impacts on the quality of human life, health (for example owing to annoyance or sleep disturbance) and use and enjoyment of areas of value such as quiet places and areas with high landscape quality."

In addition, NPSE cites, in the Explanatory Notes section, the following supporting aims:

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

The explanatory note also introduces guidance to assist in defining the adverse impacts:

- No Observed Effect Level (NOEL) – the level below which no effect can be detected. Below this level, no detectable effect on health and quality of life due to noise can be established;
- Lowest Observed Adverse Effect Level (LOAEL) – the level above which adverse effects on health and quality of life can be detected;
- Significant Observed Adverse Effect Level (SOAEL) – the level above which significant adverse effects on health and quality of life occur.

NPSE acknowledges that it is not possible to have a single objective noise-based measure that defines these criteria that is applicable in all situations and for all noise sources, receptors and times.

National Planning Practice Guidance (2014)
The National Planning Practice Guidance (2014) (PPG) is a web-based resource that replaced previous planning guidance, and supports the National Planning Policy Framework, providing clarity on the practical application of the policy.

The PPG advises that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also acknowledges that neither the NPSE nor the NPPF expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the Proposed Development.

The PPG also outlines considerations for local authorities as part of the planning process:

- whether or not a significant adverse effect is occurring or likely to occur;
- whether or not an adverse effect is occurring or likely to occur;
- whether or not a good standard of amenity can be achieved.

2.2 Local Authority Policy

Camden Council
It is anticipated that Camden Council will require the following planning conditions to be complied with:

Plant Equipment Noise
The level of noise emitted from any new plant shall be lower than the existing background level by at least 10 dBA. Noise levels shall be determined at one metre from the window of the nearest noise sensitive premises. The measurements and assessments shall be made in accordance with BS 4142.

British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' ("BS4142") is a widely accepted method for assessment of the impact of noise from plant equipment.

The plant noise level (corrected to account for characteristics such as tonality and intermittency) is compared against the representative background noise level without the noise source operating. The difference between the corrected plant noise level and the background noise level determines the significance of impact of the noise under assessment.

Typically, the greater this difference the greater the magnitude of the impact. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact as set out in Table 2.1 below.

BS4142 Plant noise rating level	Associated Impact
+10dB or more than background	"Likely to be an indication of a significant adverse impact, depending on the context".
Around +5dB than background	"Likely to be an indication of an adverse impact, depending on the context"
0dB (i.e. where rating level does not exceed the background level)	"An indication of the specific noise source having a low impact, depending on the context."

Table 2.1 BS4142 - 2014 Industrial Noise Rating.

Activity Noise
The level of noise (Leq) emitted from any activity shall be lower than the existing background level by at least 10 dB on any octave band from 63Hz to 8KHz. Noise levels shall be determined at one metre from the window of the nearest noise sensitive premises.

Internal Noise Levels in Residential Units
British Standard 8233:2014 'Guidance on sound insulation and noise reduction for buildings' provides guidance on internal ambient noise levels, resulting from break-in of external noise, which should not be exceeded in various locations within dwellings. These are set out in Table 2.2.

Activity	Location	Day LAeq,16hr (07:00 to 23:00)	Night LAeq,8hr (23:00 to 07:00)
Resting	Living Room	35dB	-
Dining	Dining Room/Area	40dB	-
Sleeping	Bedroom	35dB	30dB

Table 2.2 - BS8233 Indoor Ambient Noise Levels for Dwellings.

The standard does not recommend any specific maximum limits for individual noise events but notes that 'a guideline value may be set in terms of SEL or L_{AFmax}, depending on the character and number of events per night'.

It is noted that indoor ambient noise levels apply when rooms have 'adequate ventilation (e.g. trickle ventilators should be open)'.

3.0 ENVIROMENTAL NOISE SURVEY

3.1 Introduction

MFLLP carried out a 73-hour noise survey at the site from 15:00h on Friday 29th November 2019 to 16:00h on Monday 2nd December 2019. This section presents the methodology and results of the noise survey.

3.2 Methodology

The sound level meter was installed on a roof (1.5m above roof level) at the location indicated in figure 3.1. At this location the measured noise levels are deemed representative of the noise levels that the facades of 50 Camden Square are exposed to and of the background noise levels in the immediate adjacency of the London Irish Centre.

The weather was good throughout the survey with low wind speeds and limited precipitation. A microphone windshield was used as a precaution. Measurements were taken in five-minute intervals with data stored every 30 seconds.

The noise environment at the site is formed by the contribution of road traffic (on Murray Mews, Murray Street and Camden Square), railway traffic (main line to Kings Cross, which passes underneath the London Irish Centre) and plant equipment installed behind the rear façade of 50 Camden Square.

The measurements were undertaken with a Norsonic 140 precision sound level analyser (serial number 1405942). This equipment complies with BS EN IEC 61672 class 1. Further details are available on request, including the calibration certificate for the equipment used.

The sound level meter was field-calibrated at the beginning and end of measurements with a Nor 1251 sound calibrator (serial number 30895), complying with BS EN IEC 60942 class 1. No significant calibration deviation occurred. The sound level meter batteries were also checked both before and after the measurements. The meter uses a free field response microphone.

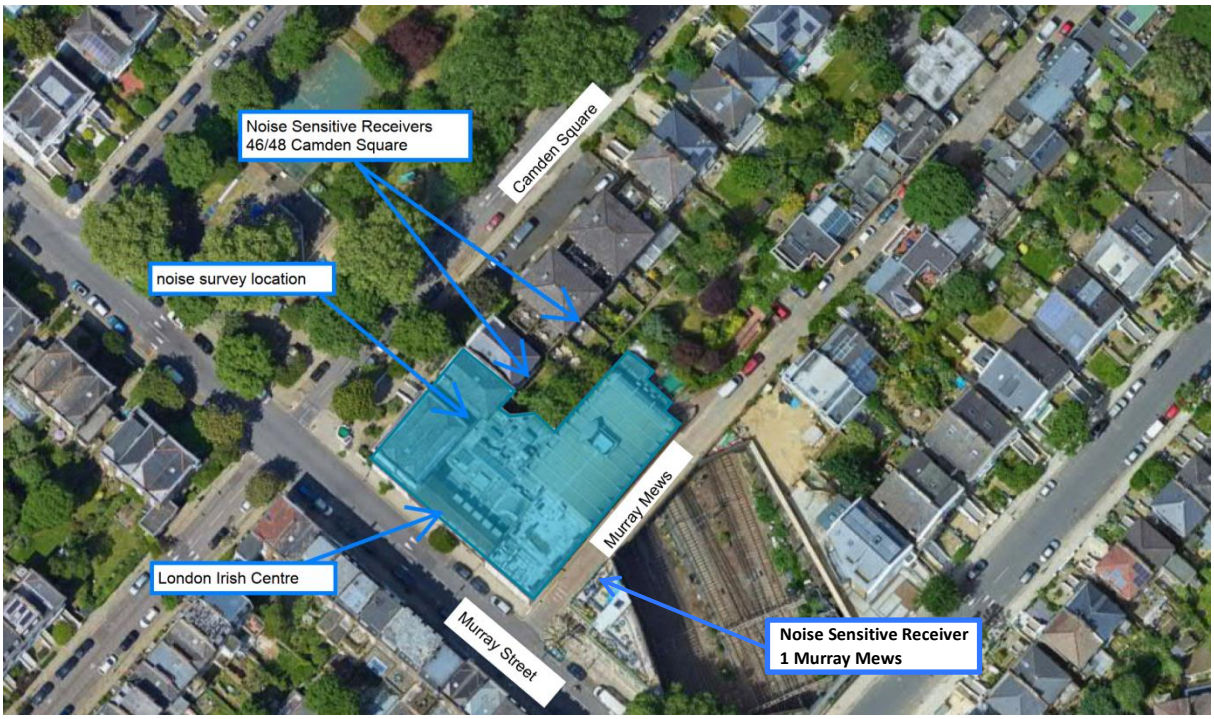


Figure 3.1 – Aerial photo (courtesy of Google) showing the London Irish Centre, noise survey location and noise sensitive receivers.

3.3 Results

The time history of the measured noise levels is presented in Figure 3.2. A summary of the results is presented in Table 3.1. Background noise levels are also presented for the period from 11pm to 1am as this information is relevant if licensing is extended (beyond 11pm) up to 1am. Spectral background noise levels for day time, night time and from 11pm to 1am are presented in Table 3.2.

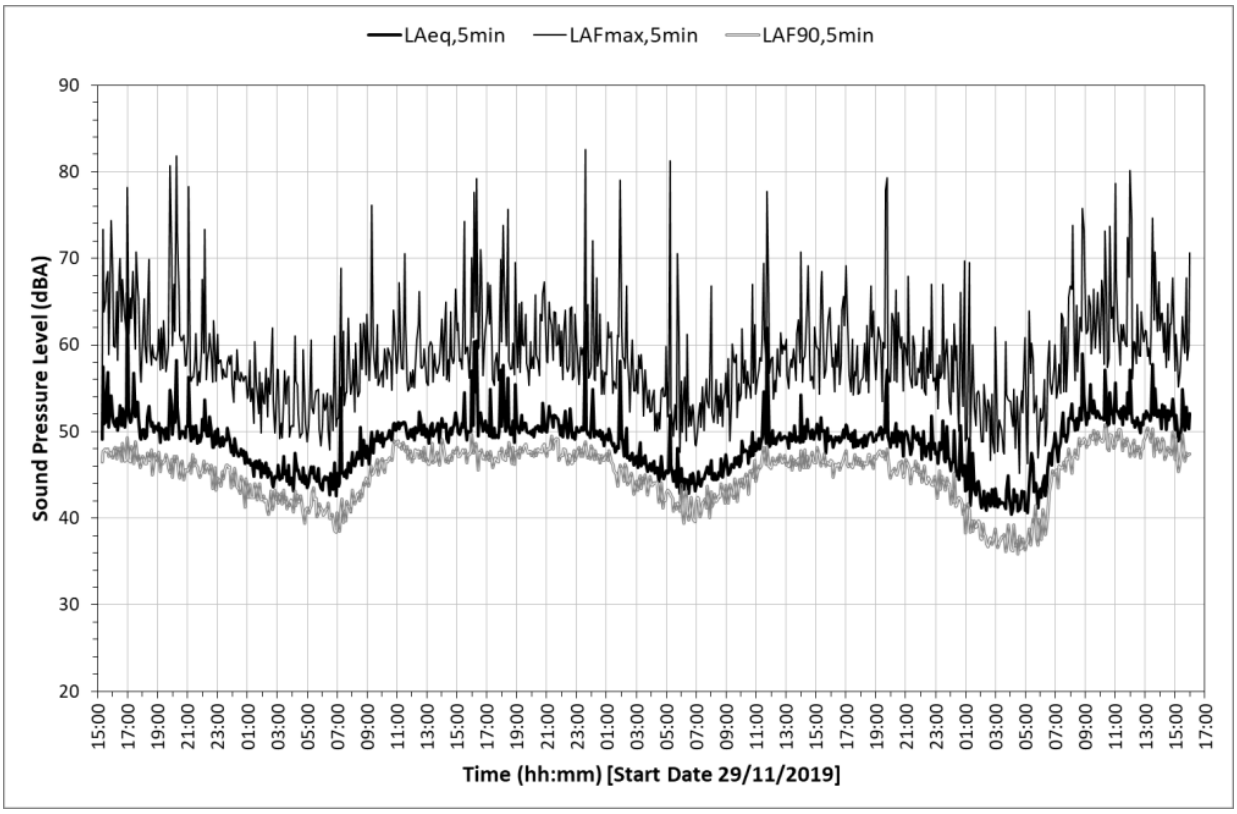


Figure 3.2 - Noise survey results: LAeq (average), LAFmax (maximum) and LAF90 (background) noise levels.

	Day Time dB LAeq	Day Time dB dB LA90	Night Time dB LAeq	Night Time dB LA90	11pm to 1am dB LA90	Nigh Time dB LAFmax
Environmental Noise Levels, dB	51	47	44	42	45	60

Table 3.1 - Environmental noise levels for day time (07:00 to 23:00), night time (23:00 to 07:00) and from 11pm to 1am.

	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
L90, day (7am to 11pm)	47	44	42	41	33	22	15	15
L90,night (11pm to 7am)	43	41	38	36	26	17	15	15
L90, (11pm to 1am)	45	42	40	39	31	20	13	13

Table 3.2 – Spectral background noise levels for day time (07:00 to 23:00), night time (23:00 to 07:00) and from 11pm to 1am.

4.0 FAÇADE SOUND INSULATION ASSESSMENT - RESIDENTIAL

The façade acoustic performance (glazing and wall elements) required to meet the target internal noise levels (specified in section 2.2) is presented in Table 4.1.

	Sound Reduction Index, dB Rw
Glazing – dB Rw Living Rooms, Dining Rooms, Bedrooms	29 dB Rw
Walls – dB Rw Living Rooms, Dining Rooms, Bedrooms	40 dB Rw

Table 4.1 – Minimum glazing and wall sound insulation performance requirements for residential facades.

See Appendix C (Figure App_C.1) for the location of residential units.

5.0 FAÇADE SOUND INSULATION ASSESSMENT - ACTIVITY NOISE

It is expected that Camden Council will require that activity noise (i.e., mainly amplified music) does not exceed 10 dB below background noise levels from 63Hz to 8KHz at the nearest sensitive receiver (see Section 2.2).

The McNamara Hall frequently host events using amplified music. Its nearest sensitive receiver (NSR) is located at 1 Murray Mews at approximately 12m from McNamara Hall façade, as shown in Figure 3.1.

In order to meet the expected planning conditions at the NSR the maximum music levels and the facade (glazing and wall) sound insulation performance of the McNamara Hall have been specified (see Table 5.1). These values are suitable to the vast majority music genres and events except, for example, a heavy rock music concert.

As the McNamara Hall will be fully air conditioned opening windows or doors is not required for ventilation purposes. It follows that the maximum music levels indicated in Table 5.1 assume closed doors and windows.

The sound limiter currently installed at the McNamara Hall is recommended to be kept in the refurbished Hall but adjusted to the new maximum music levels indicated in Table 5.1.

	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Maximum noise Level at NSR (7am-11pm), dB Leq,5min	37	34	32	31	23	12	5	5
Maximum noise Level at NSR (11pm-7am), dB Leq,5min	33	31	28	26	16	7	5	5
Maximum noise Level at NSR (11pm-1am), dB Leq,5min	35	32	30	29	21	10	3	3
Maximum music level at McNamara Hall (7am-11pm), dB Leq,5min	90	90	95	95	90	85	85	85
Maximum music level at McNamara Hall (11pm-1am), dB Leq,5min	88	88	93	93	88	83	83	83
Minimum Façade performance at McNamara Hall, dB Rw	35	42	47	51	52	55	63	63

Table 5.1 – Existing external background noise conditions, maximum music levels and minimum façade sound insulation performance at the MacNamara Hall.

An example of a glazing build-up capable of meeting the targets indicated in Table 5.1 is shown below (this is effectively a primary + secondary glazing system):

- Double glazing 10mm / 16mm cavity /8mm
- 250mm cavity
- 10mm glazing

Examples of solid wall and ceiling build-up capable of meeting the targets indicated in Table 5.1 are:

Wall

- 100mm brick outer leaf
- 50mm cavity
- 150mm Kingspace Kooltherm K12 insulation board
- 150mm metsec framing
- 100mm finishes zone (either plasterboard or timber panelling – design TBC)

Ceiling

- 80mm pebble ballast
- 130mm blue roof drainage layer
- 245mm XPS insulation
- 5mm DPC (inverted roof system)
- 18mm marine ply deck
- 150mm profiled metal deck
- 650mm steel girders
- finish below the metal deck that will be visible inside the auditorium TBC – options would be
    - Exposed structure with acoustic panels as required
    - Plasterboard ceiling
    - Timber panelling

See Appendix C (Figure App_C.2) for an elevation of McNamara Hall (Murray Mews view).

6.0 EXTERNAL TERRACE – ACTIVITY NOISE

The third floor external terrace (see Figure 6.1) is expected to be used when there is a function inside and be accessible for occasional use by LIC staff and visitors. A management plan will be put in place by the LIC to control the noise levels generated at this space and breaking out to nearby residential properties. The management plan will include any planning conditions that Camden Council decides to impose on the use of this space.

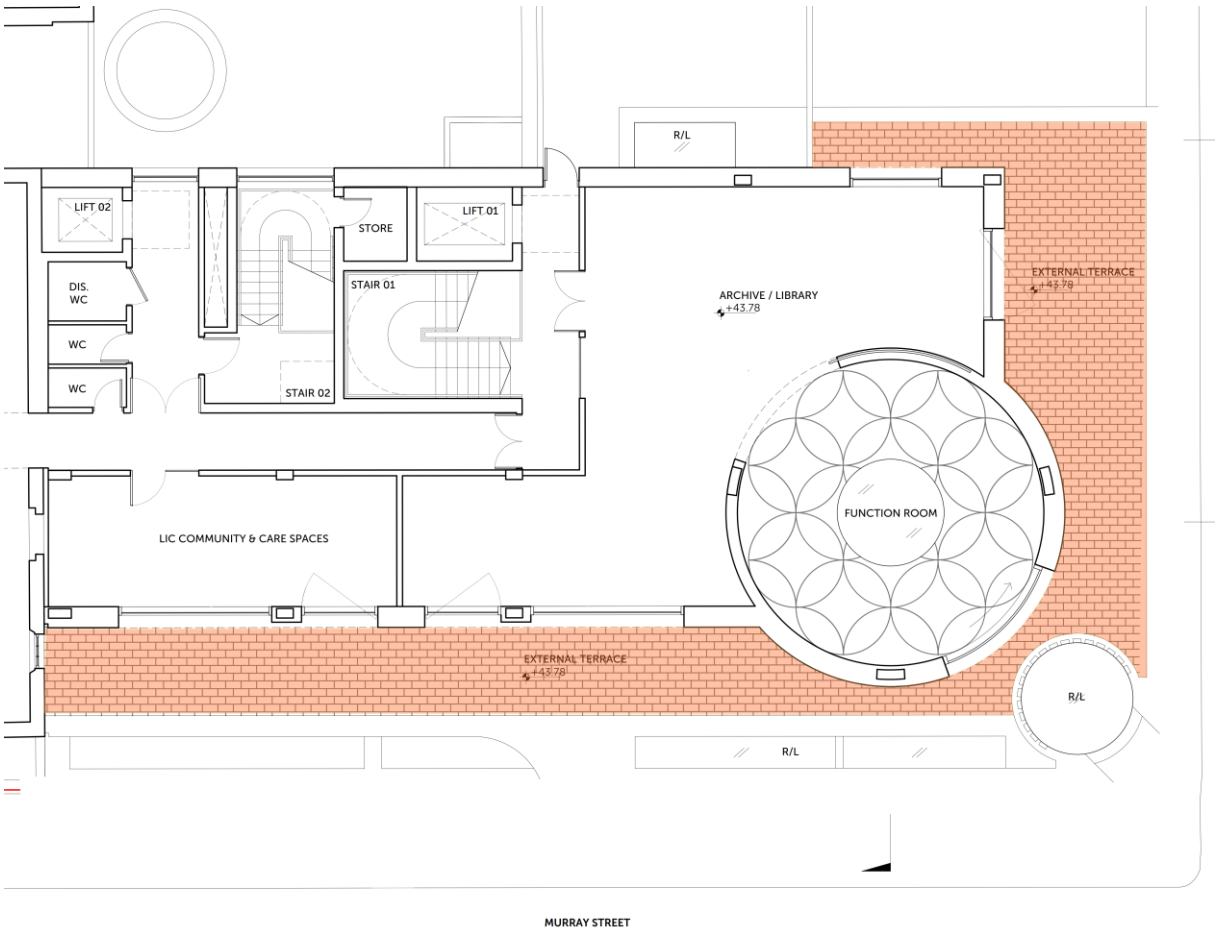


Figure 6.1 – External Terrace –Third Floor (highlighted in orange).

7.0 PLANT NOISE EMISSION ASSESSMENT

The noise impact of the plant equipment planned to be installed in external areas has been assessed at the nearest sensitive receivers (NSR), i.e., rear façade of 46/48 Camden Square.

Table 7.1 presents the existing background noise levels and the noise levels that should not be exceeded by the simultaneous contribution of all items of plant equipment at the nearest sensitive receivers.

	Day Time	Night Time
Measured background noise levels LA90, dB	47 dB LA90	42 dB LA90
Plant Noise Limit LAr,T, dB	37 dB LAr	32 dB LAr

Table 7.1 – Existing background noise levels and maximum plant noise levels at nearest sensitive receivers.

Table 7.2 presents the noise levels that should not be exceeded by each item of plant equipment at the nearest sensitive receivers.

	Day Time dB LAeq	SPL dB @ distance m	Max noise level at NSR, dBA
Toilet Extract Fan (1 no.)	Nuaire DE6	39 dB LAeq @ 3m	19
Kitchen Extract Fan (1 no.)	Nuaire SQFA64	62 dB LAeq @ 3m	29
Kitchen Supply Fan (1 no.)	Nuaire SQFA64	62 dB LAeq @ 3m	29
Air Handling Unit (2 no.)	Flaktwoods eQ Prime-032	63 dB LAeq @ 1m	29
Air Conditioning (5 no.)	Daikin RXYQ14T	61 dB LAeq @ 1m	34
Heating (2no.)	Daikin EDLQ016CW1	59 dB LAeq @ 1m	29

Table 7.2 – Plant equipment noise levels (manufacturer information) and maximum noise levels for each item of equipment at the nearest sensitive receivers.

Figure 7.1 and Figure 7.2 show the proposed layout for the plant equipment. Noise control measures include i) installing attenuators on the atmosphere side connections of all fans and AHUs, ii) surrounding heating and air handling units with noise barriers (or acoustic louvres) and iii) encasing the supply and extract kitchen fans.

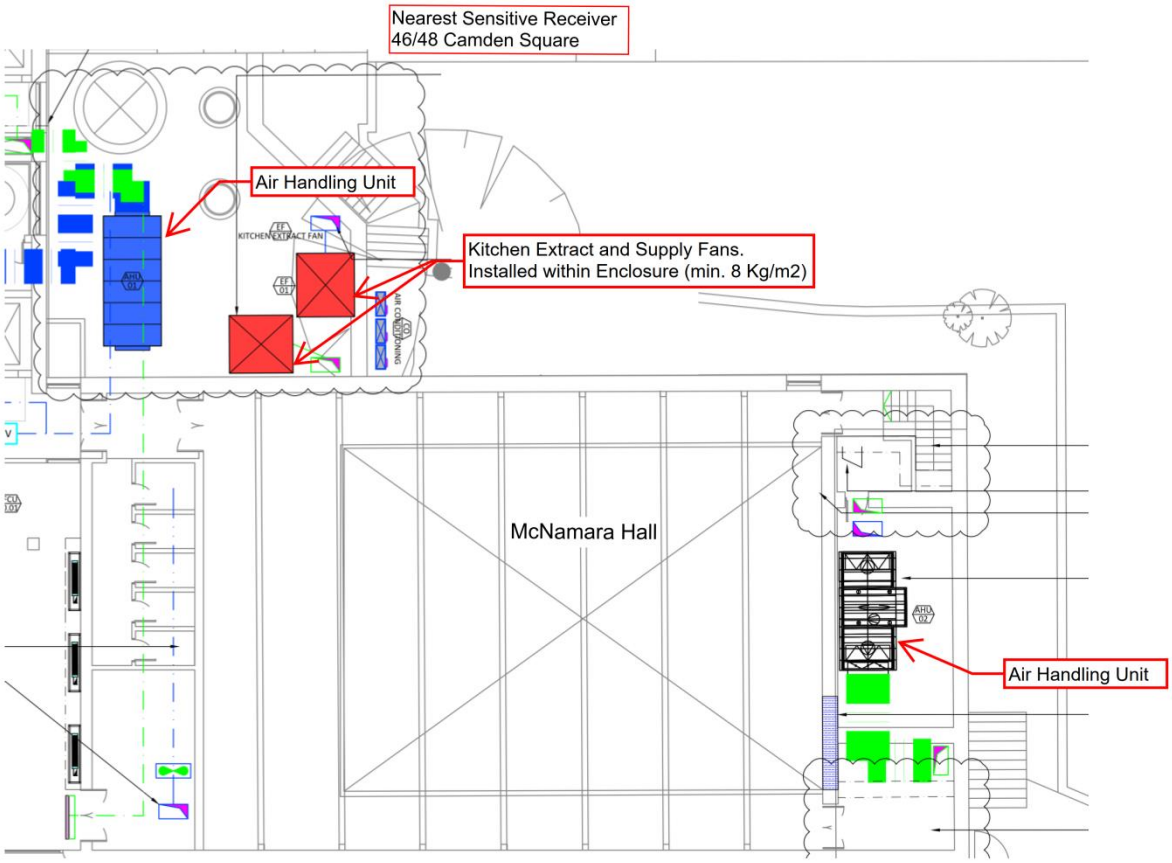


Figure 7.1 – External plant equipment layout on Level 2 – areas adjacent to the McNamara Hall.

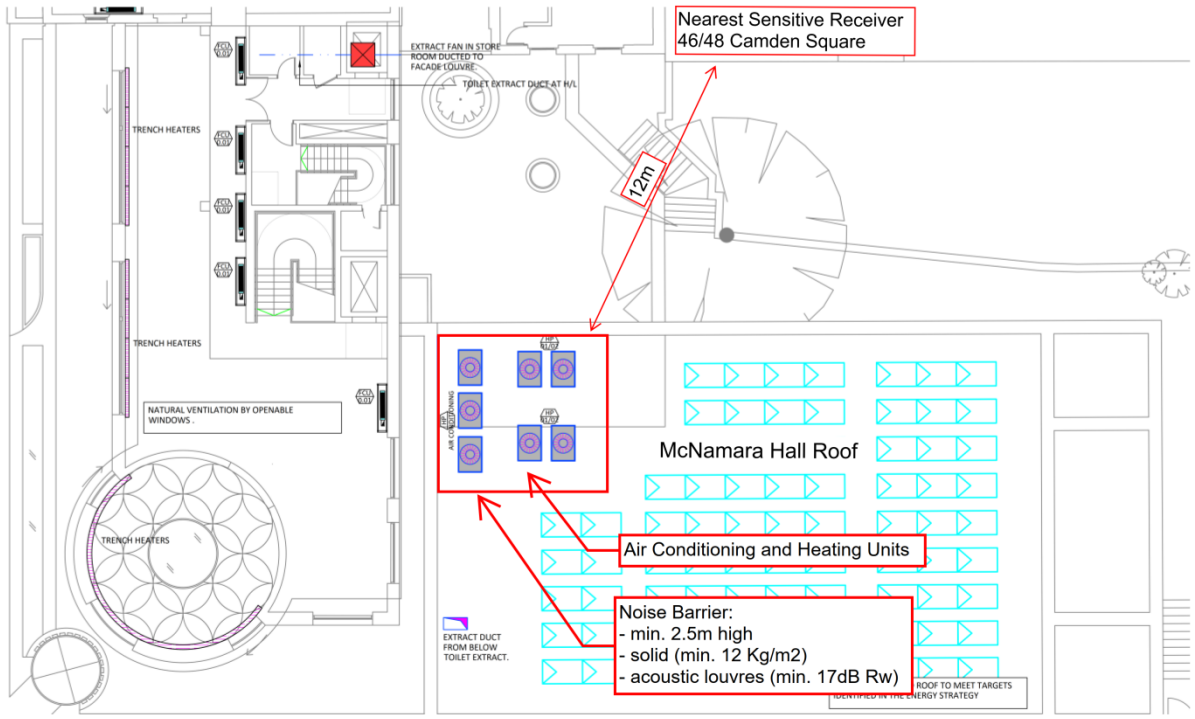


Figure 7.2 – External plant equipment layout on Level 3 – roof of the McNamara Hall.

Vibration Isolation

The table below indicates the anti-vibration mounts that may typically be required. However, each individual item of plant and machinery will require assessment and specific anti-vibration mount selection.

Plant	Type of Anti-Vibration Mounts	Typical Static Deflection (mm)
Pumps and Pressurisation Units	Concrete inertia base with open spring mounts	10-25
Air Handling Units	Enclosed spring mounts	25
Fans	Enclosed spring mounts/hangers	10-15
Chillers	Unconstrained natural rubber mounts	10-15

Table 7.3 - Vibration isolation guidance.

8.0 SUMMARY

Overview

- Max Fordham LLP Acoustics Team has prepared a noise impact assessment of the proposed refurbishment of the London Irish Centre, located in Camden, London.
- The refurbishment includes community performance/events spaces, charity offices & ancillary residential accommodation.

Assessment Criteria

- Acoustic design criteria for i) internal noise levels within residential units and ii) for limits to plant equipment noise and activity noise emissions (i.e., amplified music) at near sensitive receivers has been indicated.

Noise Survey

- A long term noise survey (73 hours) has been carried out on site to quantify the existing noise climate.
- The results of this survey allowed establishing i) the average and maximum noise level conditions present at the future residential units façade and ii) the background noise levels expected at the nearest noise sensitive receivers (46/48 Camden Square and 1 Murray Mews) during day time and night time periods.

Residential Facades

- The sound insulation performance required to meet internal noise level targets in residential units has been specified for walls and glazing elements.

Plant Equipment Noise

- The most significant noise generating items of plant equipment are chillers (5 no.), air source heat pumps (2 no.), kitchen supply and extract fans (2 no.) and air handling units (2 no.).
- These units will be installed on the roof (at Level 3) and at two locations adjacent to the McNamara Hall (at Level 2).
- Noise control measures include installing attenuators on the atmosphere side connections of all fans and AHUs and installing noise barriers or acoustic louvres around chillers and air source heat pumps.

Activity Noise – Amplified Music

- The maximum music levels at the McNamara Hall have been specified along with the facade (glazing and wall) sound insulation performance, which meets the assumed planning condition for activity noise.
- As the McNamara Hall is fully air conditioned there is no need to open windows or doors for ventilation purposes. Therefore, the maximum music levels have been specified assuming that external doors and windows are kept closed.
- The sound limiter currently installed at the McNamara Hall is recommended to be kept in the refurbished Hall but adjusted to the new maximum music levels.

Activity Noise – External Terrace

- The external terrace (third floor) is expected to be used when there is a function inside and be accessible for occasional use by LIC staff and visitors.
- A management plan will be put in place by the LIC to control the noise levels generated at this space and breaking out to nearby residential properties.
- The management plan will include any planning conditions that Camden Council decides to impose on the use of this space

APPENDIX

A - Glossary of Acoustic Terminology

SOUND PRESSURE LEVEL (SPL), L (dB)
The sound level measured on a logarithmic scale, with unit decibel dB. This scale is linearly weighted, as opposed to A-weighted (see below). A free-field SPL refers to a level determined far enough from surfaces or facades, apart from the ground, so as not to be influenced by reflections from those surfaces.

A-WEIGHTED SOUND PRESSURE LEVEL, L_A (dBA)
A-weighted sound pressure level values are frequency-weighted in a way that approximates the frequency response of the human ear and allows sound levels to be expressed as a single figure value.

EQUIVALENT CONTINUOUS A-WEIGHTED SPL, $L_{Aeq,T}$ (dBA)
Energy average of the A-weighted sound pressure level over a time period, T. The level of a notional continuous sound that would deliver the same A-weighted sound energy as the actual fluctuating sound over the course of the defined time period, T.

MAXIMUM A-WEIGHTED SPL, L_{AFMax} (dBA)
Maximum A-weighted sound pressure level measured with fast time weighting.

BACKGROUND NOISE LEVEL, $L_{AF90,T}$
The A-weighted sound pressure level exceeded for 90% of a given time period, T. The 'F' subscript indicates the meter used a standard 'fast' time constant of $1/8^{th}$ of a second.

Lday
The A-weighted equivalent sound pressure level over the 16-hour day period of 07:00 – 23:00 hours. Can also be expressed as LAeq,16hr(7am-11pm).

Lnight
The A-weighted equivalent sound pressure level over the 8-hour night period of 23:00 – 07:00 hours. Can also be expressed as LAeq,8hr(11pm-7am).

BS 8233
British Standard 8233 (2014): "Sound insulation and noise reduction for buildings – Code of practice" (ISBN 0 580 33009 5)

BS 4142
British Standard 4142 (1997): "Method for rating industrial noise affecting mixed residential and industrial areas" (ISBN 0 580 28300 3)

B - Plant Equipment Noise Levels

Nuaire DE6 - Toilet Extract Fan

EXTRACT FAN SIZE DE6 - SOUND DATA

Unit Code		Sound Power Levels dB re 1pW 63	125	250	500	1K	2K	4K	8K	Breakout dBA @ 100% @ 3m	LwA	Breakout dBA @ 75% @ 3m	Breakout dBA @ 50% @ 3m
DE6-ES	Induct Inlet	92	88	76	69	68	63	62	55	40	79	34	25
	Induct Outlet	92	88	76	69	68	63	58	51		76		
	Breakout	76	68	67	54	55	44	39	32		78		
DE6A-ES	Induct Inlet	81	88	81	66	55	56	53	49	39	75	33	24
	Induct Outlet	89	89	71	68	66	62	57	50		75		
	Breakout	69	68	67	52	47	40	34	28		78		

Nuaire SQFA64 – Kitchen Extract/Supply Fan

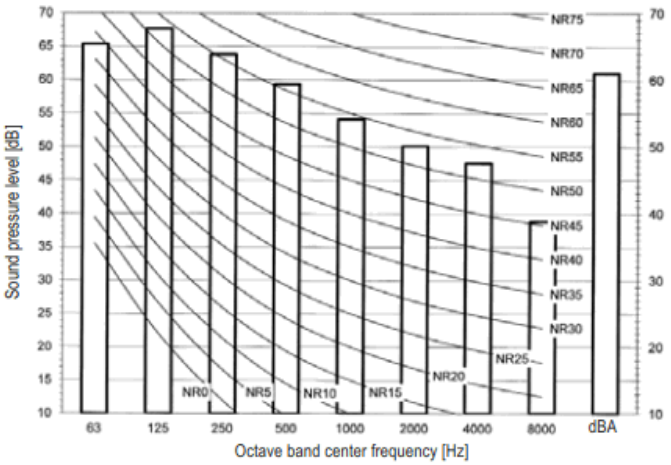
SQUIF EXTRACT FANS

ELECTRICAL & SOUND

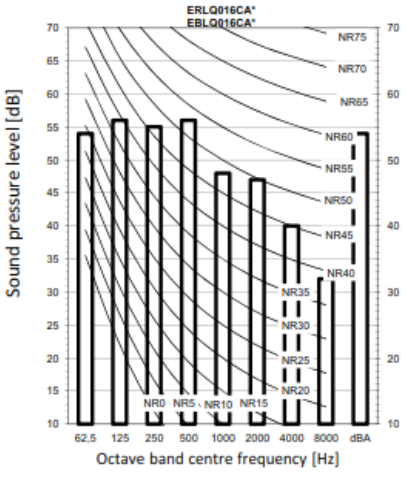
Curve	Code	Phase	RPM	Motor Power (kW)	FLC (amps)	SC (amps)	SC ★/▲	Data Type	Sound Power Levels (dB re 10 -12 W) Octave band mid frequency (Hz) 125	250	500	1K	2K	4K	8K	dBA @ 3m
1	SQFA41-3	3	1450	0.37	1.1	5.2	-	I	90	79	70	70	70	69	62	50
	SQFA41-1	1	1410	0.37	2.8	11.2		O	91	74	68	74	75	70	64	
2	SQFA42-3	3	1450	0.75	2	9.0	-	I	92	82	77	74	76	75	67	53
	SQFA42-1	1	1370	0.75	5.4	21		O	93	78	74	78	80	77	69	
3	SQFA43-3	3	1450	1.1	2.5	12	-	I	95	83	79	77	78	78	71	56
	SQFA43-1	1	1420	1.1	7	35		O	96	79	77	82	83	79	73	
4	SQFA44	3	1450	2.2	4.8	28.8	-	I	93	89	82	77	80	80	71	58
								O	87	86	87	81	82	82	68	
5	SQFA45	3	1450	4	9.1	59	-	I	99	87	85	85	84	83	81	62
								O	100	83	82	89	89	84	83	
6	SQFA46	3	1450	7.5	15.2	108	-	I	103	92	86	86	85	86	83	63
								O	92	90	91	89	87	87	81	
7	SQFA61	3	960	0.75	2.1	8.82	-	I	89	84	75	70	73	73	64	47
								O	83	81	80	74	75	75	61	
8	SQFA62	3	960	1.1	3	13.2	-	1	96	83	78	76	75	74	72	56
								O	97	78	76	80	79	75	74	
9	SQFA63	3	960	2.2	5.9	28.9	-	I	100	87	79	76	76	77	73	59
								O	101	82	77	80	80	78	75	
10	SQFA64	3	960	4	9.4	61.2	20.4	I	103	91	82	79	77	77	74	62
								O	104	86	80	83	82	78	76	

The electrical and sound information in the table is nominal. Breakout dBA@3m is spherical, free field.
Start currents (sc) are DOL. * Motor electrical supply, 1=1 phase (230V, 50Hz) 3=3phase (400V, 50Hz)
I - Induct Inlet O - Induct Outlet.

Daikin RXYQ14T – Air Conditioning



Daikin ERLQ016CA - Heating



Flaktwoods – eQ Prime-032 – Air Handling Unit

SOUND POWER LEVELS
(standard: EN13053 ISO/CD 13347-2)

	Lw per octave band (dB)								LwA
Octave band (Hz)	63	125	250	500	1k	2k	4k	8k	dB(A)
Fresh air connection	70	75	78	70	67	66	62	58	74
Supply air connection	72	77	78	80	79	78	74	70	84
Extract connection	71	76	81	73	68	66	62	58	76
Exhaust connection	72	77	78	80	79	78	74	70	84
To surroundings	69	70	70	63	66	65	62	48	71

C – Proposed Plans and Elevation

Example Floor (Second Floor)

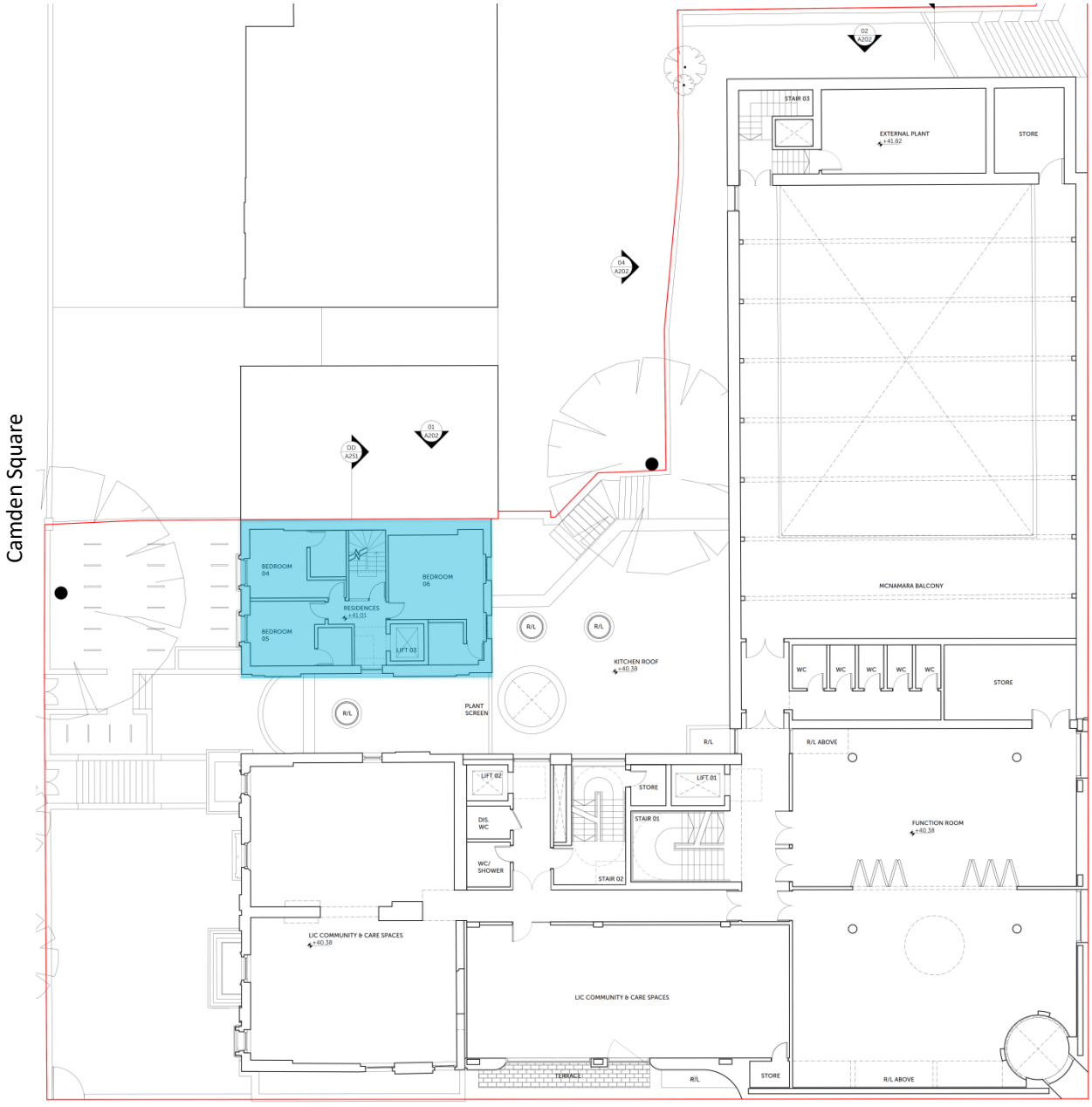


Figure App_C.1: Layout showing second floor ancillary residential area (highlighted in blue).

McNamara Hall

McNamara Hall Murray Mews Elevation

Figure App_C.2: McNamara Hall Murray Mews elevation: 01 and 02 - brick wall; 03 – timber framed glazing ; 07 – metal screen.