

264 BELSIZE ROAD, LONDON

Noise Impact Assessment

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EXECUTIVE SUMMARY

The acoustics team at RPS Consulting (UK) have been appointed to undertake a noise impact assessment in support of a planning application for the alterations and extensions to an existing, redundant, non-residential institution building to C3 permanent residential use, to form 4 no. three-bedroom duplex residential dwellings.

An environmental noise survey has been undertaken at the site to quantify the existing noise climate and derive representative day and night-time ambient noise levels, and typical maximum night-time noise levels at the façades of the proposed development in line with the requirements of Camden Council and BS 8233:2014.

It has been found that through the use of relatively standard façade, glazing and ventilation design solutions internal ambient noise levels in the proposed development are likely to meet the lowest observed adverse effect level (LOAEL) criterion of Camden Council.

In addition, noise levels in external areas are likely to meet the Camden Council 'significant observed adverse effect level' (SOAEL) criterion of Camden Council and in some areas are likely to be below the LOAEL criterion.

Plant noise emission limits have been derived in line with the requirements of Camden Council to minimise the impacts of noise from the proposed Air Source Heat Pumps (ASHPs) on nearby noise-sensitive receptors.

It has been found that through the use of appropriate mitigation measures significant adverse noise impacts as a result of the development are unlikely to occur and adverse noise impacts have been mitigated and minimised.

Contents

EXECUTIVE SUMMARY	I
1 INTRODUCTION	1
2 POLICY & GUIDANCE	2
2.1 Noise Policy Statement for England	2
2.2 National Planning Policy Framework	2
2.3 Planning Practice Guidance – Noise (PPG-N).....	3
2.4 Local Planning Policy	3
2.5 British Standard 8233:2014.....	5
2.6 Additional Information	6
3 BASELINE NOISE SURVEY	7
3.1 Site Description	7
3.2 Methodology & Instrumentation	7
3.3 Meteorological Conditions.....	9
3.4 Results and Discussion.....	9
3.5 Noise Climate.....	10
4 SITE SUITABILITY ASSESSMENT	11
4.2 Internal Noise Level Prediction Methodology.....	11
4.3 Internal Noise Levels.....	12
4.4 Overheating.....	13
4.5 External Amenity Areas.....	14
4.6 Plant Noise Emission Limits.....	15
5 SUMMARY & CONCLUSIONS.....	18

Tables

Table 2.1: Summary of Guidance from NPSE and PPGN	3
Table 2.2 Table B in Appendix E of the Camden Local Plan	4
Table 2.3 Internal ambient noise criteria.	5
Table 3.1: Equipment used during the unattended and attended noise surveys.	9
Table 3.2: Summary of Baseline Sound Level Data.....	10
Table 4.1 Predicted spectra for use in internal noise assessment.	11
Table 4.2 Typical specification for glazing and ventilation elements.....	12
Table 4.3: Predicted Internal Noise Levels (Windows Closed)	13
Table 4.4: Predicted Internal Noise Levels (Windows Open).....	13
Table 4.5 Table C in Appendix E of the Camden Local Plan	16
Table 4.6 Plant noise emission limits	17

Figures

Figure 3.1: Site Overview	7
Figure 3.2: Sound Monitoring Locations.....	8
Figure 4.1: South Facing Amenity Areas.....	15
Figure 4.2:North Facing Amenity Areas	15

Appendices

Appendix A National Planning Policy

Appendix B Time History Graphs

Appendix C Short-Term Noise Survey Data

1 INTRODUCTION

- 1.1 The Acoustics Team of RPS Planning and Environment (RPS) has been appointed by Castle Trading Ltd to provide a noise assessment in support of a planning application for the alterations and extensions to an existing, redundant, non-residential institution building to C3 permanent residential use, to form 4 no. three-bedroom duplex residential dwellings.
- 1.2 This report provides details of a baseline sound survey undertaken at the site to quantify the local noise climate and the levels incident upon the refurbished façade elements. Subsequently, a noise impact assessment has been carried out and mitigation measures have been identified to meet the relevant local and national noise policy aims / requirements.
- 1.3 The assessment has been undertaken based upon appropriate information on the proposed development provided by the project team. RPS is a member of the Association of Noise Consultants (ANC), the representative body for acoustics consultancies, having demonstrated the necessary professional and technical competence. The assessment has been undertaken with integrity, objectivity and honesty in accordance with the Code of Conduct of the Institute of Acoustics (IOA) and ethically, professionally and lawfully in accordance with the Code of Ethics of the ANC.
- 1.4 The technical content of this assessment has been provided by RPS personnel, all of whom are corporate (MIOA) members or noncorporate associate members (AMIOA) of the IOA (the UK's professional body for those working in acoustics, noise and vibration). This report has been peer reviewed within the RPS team to ensure that it is technically robust and meets the requirements of our Integrated Management System.

2 POLICY & GUIDANCE

2.1 Noise Policy Statement for England

2.1.1 The Noise Policy Statement for England (NPSE), published in March 2010 by Defra, aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.

2.1.2 Paragraph 1.6 of the NPSE sets out the long-term vision and aims of Government noise policy:

“Noise Policy Vision

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.”

“Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life;*
- *and where possible, contribute to the improvement of health and quality of life.”*

2.1.3 The aims require that all reasonable steps should be taken to avoid, mitigate and minimise adverse effects on health and quality of life whilst also taking into account the guiding principles of sustainable development, which include social, economic, environmental and health considerations.

2.2 National Planning Policy Framework

2.2.1 The National Planning Policy Framework (NPPF) sets out the Government’s planning policies for England and how these are expected to be applied. The emphasis of the Framework is to allow development to proceed where it can be demonstrated to be sustainable. In relation to noise, Paragraph 185 of the Framework states:

“Planning policies and decisions should ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from the development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.’*

2.3 Planning Practice Guidance – Noise (PPG-N)

- 2.3.1 The Government has published Planning Practice Guidance on a range of subjects including noise. The guidance forms part of the NPPF and provides advice on how to deliver its policies. The PPG-N reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards (BSs) and contains examples of acoustic environments commensurate with various effect levels. This guidance is reproduced in the following table:

Table 2.1: Summary of Guidance from NPSE and PPGN

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			
Not present	No Effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.4 Local Planning Policy

Camden Planning Guidance – Amenity January 2021

- 2.4.1 The Camden Planning Guidance (adopted 2021) is a supplementary planning document outlining key planning considerations for new developments.
- 2.4.2 Section 6 of the guidance refers to noise and vibration. Paragraph 6.8 states the following:

“When assessing acoustic reports, the Council will consider the reported measurements against the noise thresholds set out in Appendix 3 of the Local Plan. The thresholds are expressed as ‘effect levels’, which sets out a hierarchy of expected changes in behaviour and impact on health and

wellbeing in response to increasing noise levels (measured in decibels - dB). The 'effect levels' are summarised below and explained in detail in National Planning Practice Guidance (NPPG). The table detailing each 'effect level' from NPPG is also set out in Appendix 1 to this guidance for ease of reference.

- *No observed effect level (NOEL) – the level below which no effect can be detected on health and quality of life.*
- *Lowest observable adverse effect level (LOAEL) – the level above which changes in behaviour (e.g. closing windows for periods of the day) and adverse effects on health (e.g. sleep disturbance) and quality of life can be detected.*
- *Significant observed adverse effect level (SOAEL) – the level above which adverse effects on health and quality of life occur. This could include psychological stress, regular sleep deprivation and loss of appetite.”*

2.4.3 Paragraph 6.11 goes on to say:

“In instances where noise mitigation is necessary, proposals will be expected to include appropriate attenuation to alleviate or mitigate the impact of noise and vibrations to an acceptable level. Where noise mitigation has not been proposed adequately, but is considered necessary, the Council will consider the use of planning conditions or a legal agreement. Guidance regarding mitigation can be found within BS 8233:2014 Guidance on sound insulation and noise reduction for buildings”

2.4.4 Table B in Appendix E of The Camden Local Plan (adopted 2017) quantifies the effect levels provided in Table 2.1 above. This is reproduced in Table 2.2 below.

Table 2.2 Table B in Appendix E of the Camden Local Plan

Dominant Noise Source	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAEL (Red)
Anonymous noise such as general environmental noise, road traffic, and rail traffic.	Noise at 1 metre from noise sensitive façade	Day	<50 dB LAeq,16h	50 dB – 72 dB LAeq,16h	>72 dB LAeq,16h
		Night	<45 dB LAeq,8h	45 dB – 62 dB LAeq,8h	>62 dB LAeq,8h
	Inside a bedroom	Day	<35 dB LAeq,16h	35 dB – 45 dB LAeq,16h	>45 dB LAeq,16h
		Night	<30 dB LAeq,8h	30 dB – 40 dB LAeq,8h	>40 dB LAeq,8h
			<42 dB L _{Amax,F}	40 dB – 73 dB L _{Amax,F}	>73 dB L _{Amax,F}
	Outdoor living space (free-field)	Day	<50 dB LAeq,16h	50 dB – 55 dB LAeq,16h	>55 dB LAeq,16h
Non-anonymous noise.	See guidance on non-anonymous noise.				

2.5 British Standard 8233:2014

- 2.5.1 BS 8233:2014¹ provides guideline values for desirable internal ambient noise levels in unoccupied spaces including.
- 2.5.2 Guidance in respect of desirable indoor ambient noise levels in dwellings is contained in Table 4 of BS 8233:2014 and are reproduced below.

Table 2.3 Internal ambient noise criteria.

Activity	Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)	
		$L_{Aeq,16h}$ (dB)	$L_{Aeq,8h}$ (dB)	L_{AFmax} (dB)
Resting	Living room	35	-	-
Dining	Dining area	40	-	-
Sleeping & Daytime Resting	Bedroom	35	30	45

NOTE 4 Regular individual noise events (e.g aircraft, trains) can result in sleep disturbance. A guideline value may be set in terms of the Sound Exposure Level (SEL) or $L_{Amax,F}$, depending on the character and number of events within a given night. In noise-sensitive rooms during the night-time period, good acoustic design can generally be adopted such that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times per night. However, where it is not reasonably practicable to achieve this criteria, the choice of criteria will be dictated by additional factors such as the source, number, predictability, and regularity of noise events

- 2.5.3 With reference to noise levels in residential external amenity areas BS 8233:2014 provides the following guidance

For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited. Other locations, such as balconies, roof gardens and terraces, are also important

in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels

¹ British Standard 8233:2014 – Guidance on sound insulation and noise reduction for buildings.

of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.

2.6 Additional Information

- 2.6.1 The guidance in Professional Practice Guidance – Planning and Noise² (ProPG) applies to new residential development and thus is not directly applicable to this development. However, where relevant, elements of this assessment have been followed guidance from the ProPG since it encourages good practice in terms of acoustic design.
- 2.6.2 By complying with the requirements of Camden Council and BS 8233 it is considered that the national policy aims of the NPSE and NPPF will also be met.

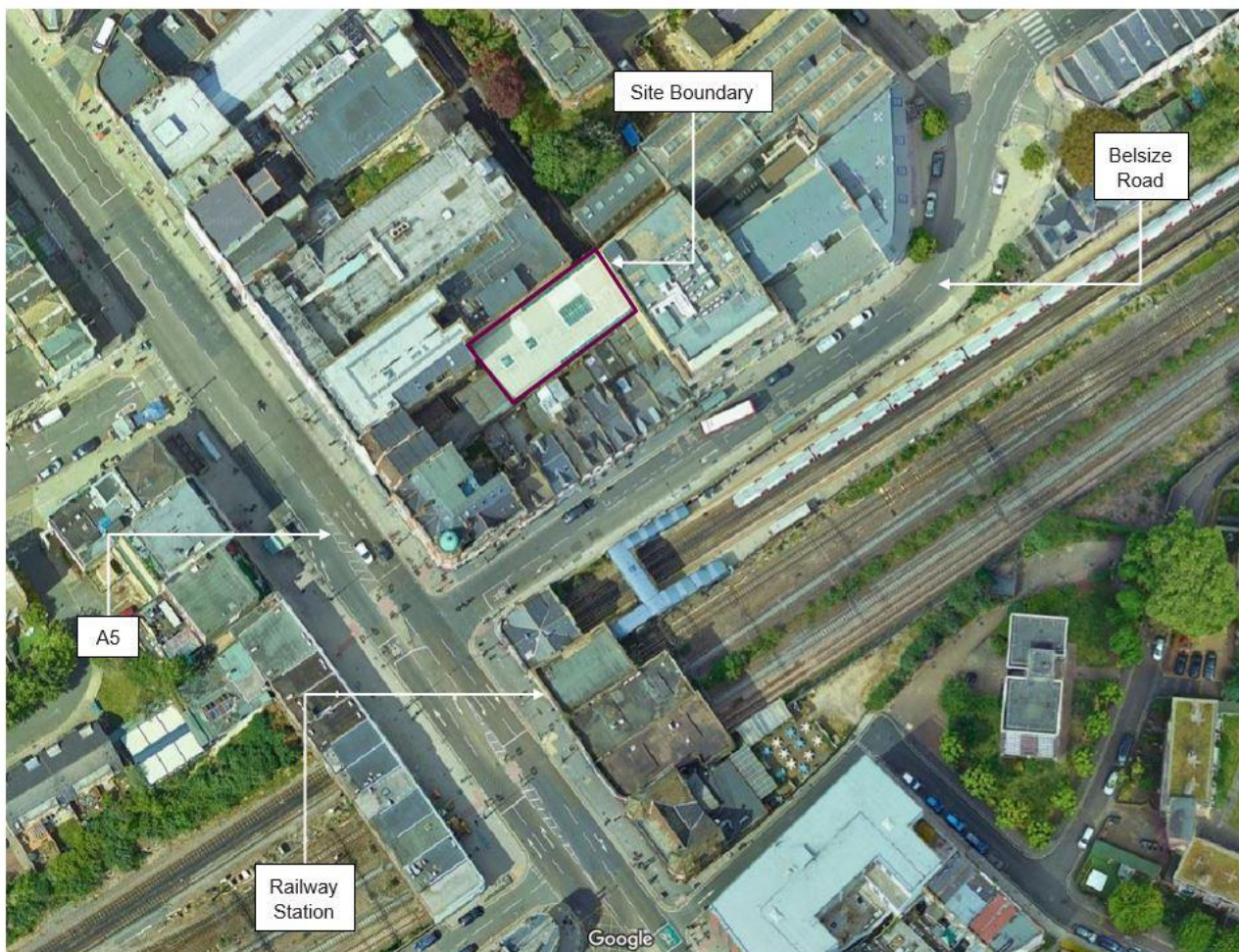
² ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development (2017)

3 BASELINE NOISE SURVEY

3.1 Site Description

- 3.1.1 The site is located to the rear of 264 Belsize Road, North Maida Vale, London, NW6 4BT.
- 3.1.2 The ground floor section to the front is accessed directly from Belsize Road, leading to a steel frame two-storey building at the rear. The first floor of the rear building comprises a steel portal frame, clad in insulated profiled metal panel
- 3.1.3 The building was used by the International Gospel Community Church between 11th November 2009 and was vacated 30th October 2016.
- 3.1.4 The site is approximately 35 m east of Kilburn High Road (A5) and approximately 50 m northeast of Kilburn High Road train station.
- 3.1.5 Belsize Road features retail units at ground level with residential dwellings above. The area surrounding the site is urban and contains a mixture of residential and commercial properties.
- 3.1.6 The site location is shown below in Figure 3.1.

Figure 3.1: Site Overview



3.2 Methodology & Instrumentation

- 3.2.1 An unattended noise survey was undertaken at the site to quantify the existing local noise climate. the survey commenced at 1200 hours on Friday 21st October and concluded at 1100 hours on

Thursday 27th October 2022. Continuous noise measurements were undertaken at two locations, labelled as LT1 and LT2 in Figure 3.2 and described below:

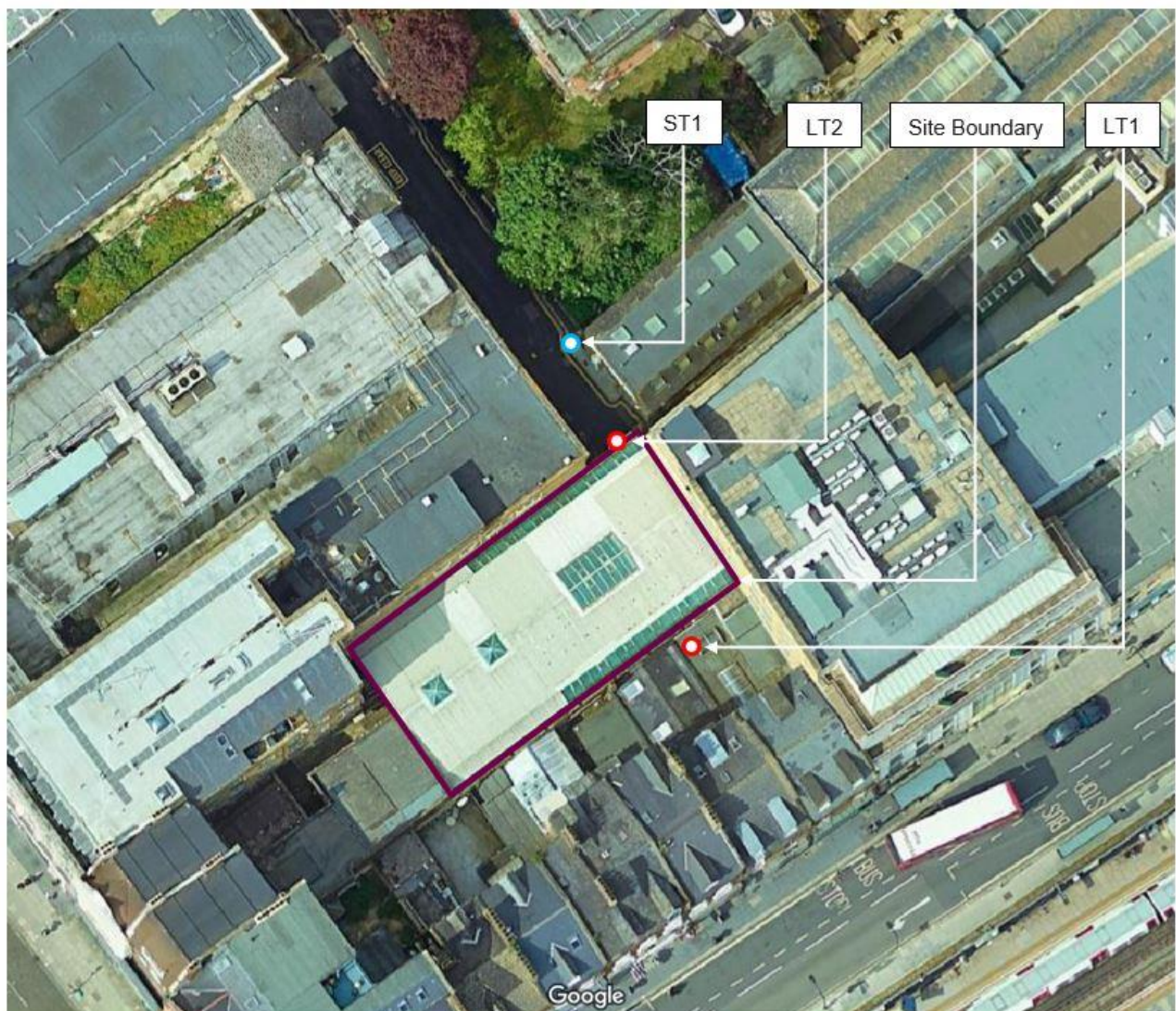
- LT1 – Free-field measurement position at 1.5 m above the first-floor roof to the rear of 264 Belsize Road;
- LT2 – Measurement position at first-floor level, protruding an open window by 1 m from the rear façade on Kilburn Place.

3.2.2 Due to an equipment malfunction, the measurements at LT2 were repeated to ensure sufficient data was obtained to inform the assessment. Additional measurements at LT2 were undertaken commencing at 1130 hours on Wednesday 2nd November and concluding at 1115 hours on Wednesday 9th November 2022.

3.2.3 The long-term measurements were supplemented by short-term measurements, undertaken between 1015 hours and 1045 hours on Thursday 27th October 2022 at the location labelled as ST1 in Figure 3.2 and described below:

- ST1 – Free-field measurement position at 1.5 m above local ground level on Kilburn Place

Figure 3.2: Sound Monitoring Locations



- 3.2.4 Measurements of the L_{Aeq} , L_{Amax} , and L_{A90} were undertaken at 100ms intervals and temporally averaged over 15-minute periods for the duration of the survey. The equipment listed in Table 3.1 below was used to undertake the survey:

Table 3.1: Equipment used during the unattended and attended noise surveys.

Measurement Location	Make / Model	Serial Number	Calibration Ref / Start / End	Last Calibration Date
LT1	Rion NL52	386736	94.0 / 94.0 / 94.0	19/10/2021
LT2	Rion NL31	352030	94.0 / 94.0 / 94.0	30/09/2021
ST2	Rion NL52	998563	94.0 / 94.0 / 94.0	02/03/2022
Calibrator	Rion NC-74	34472822	N/A	27/09/2022

- 3.2.5 All sound level measurements were made using 'Class 1' Rion NL-52 and NL-31 sound level meters (SLM). The SLMs were set up to log the A-weighted broadband sound pressure level (SPL) in 100 ms periods. The measured data was post-processed into 15-minute periods for all levels. The measured L_{Amax} levels were also processed to calculate 1-minute to allow for assessment of individual noise night-time noise events.

3.3 Meteorological Conditions

- 3.3.1 Meteorological conditions were monitored for the duration of the survey period using an RPS weather station, deployed at position LT1. The weather data is presented alongside the time history graphs in Appendix B.
- 3.3.2 During the original survey period for measurements at LT1 (between Friday 21st October 2022 and Thursday 27th October 2022) there were a total of 10 rain events, although wind speeds remained low throughout the survey period, at less than 5 m/s.
- 3.3.3 During the second survey period for measurements at LT2 (between Wednesday 2nd November 2022 and Wednesday 9th November 2022) there were a total of 16 rain events and, as above, wind speeds remained acceptably low throughout the survey period, at less than 5m/s.
- 3.3.4 Measurement data obtained during periods of adverse weather have been omitted from the subsequent analysis.

3.4 Results and Discussion

- 3.4.1 The results of the unattended noise survey are presented graphically in Appendix B, and a graph of the attended noise survey is provided in Appendix C. The day and night-time levels measured at each position are presented in Table 3.2 below.
- 3.4.2 It should be noted that additional survey period (due to equipment malfunction) included Bonfire Night which occurs annually on the 5th November. During this time, noise from fireworks is likely to have significantly influenced the measured levels, particularly during the evening and night-time periods. As such, all data measured between 0000 hours on the 4th November and 0700 hours on the 7th November have been omitted from the analysis.
- 3.4.3 It was noted whilst on site that decommissioning (strip-out) works were being undertaken on the existing building. Intermittent, high noise levels were noted to arise from drilling, hammering, and other activities required to strip the internal elements of the buildings. It was further observed that this site work was being undertaken with the rear shutter door open to allow access to the skip situated on Kilburn Place, directly below position LT2.

- 3.4.4 Access to an alternative, suitably secure location which is representative of the proposed façade was not available. The measured data obtained at LT2 has thus been affected by construction noise, as can be seen by the difference between the measured $L_{Aeq,T}$ levels at ST1 and LT2 during the daytime. Based on the above, it is important to note that the measurements at LT2 in particular can be considered a ‘worst-case’ scenario assessment, and that the actual daytime levels (in the absence of intermittent construction noise) may be lower than those presented above.
- 3.4.5 As mentioned in paragraph 0, upon review of the site prior to commencing the survey, a number of delivery areas were identified on Kilburn Place at the rear of the retail units fronting the A5. The measurements undertaken at ST1 attempted to capture any delivery noise events for inclusion in the assessment.
- 3.4.6 However, no deliveries occurred during the survey period. A review of the time-history graph in Appendix B had not identified any periods of significantly increased noise that could be a result of local deliveries. As such, this noise impact assessment assumes that the main source of noise affecting the site is transportation noise and specific assessment of commercial / industrial noise is not required.

Table 3.2: Summary of Baseline Sound Level Data

Location	Daytime (07:00 – 23:00)		Night-time (23:00 – 07:00)			
	Ambient Sound Level, dB $L_{Aeq,T}$	Background Sound Level*, dB $L_{A90,15min}$	Ambient Sound Level, dB $L_{Aeq,T}$	Background Sound Level*, dB $L_{A90,T}$	Maximum Sound Level**, dB L_{AFmax}	10 th Highest L_{AFmax} Per Night***
LT1	50	41	44	37	75	63
LT2	54	47	46	40	77	68
ST1	48	46	-	-	-	-

NOTE:

* Calculated as the 25th percentile value of $L_{A90,15min}$ during the day / night-time measurement periods** This is the maximum measured L_{AFmax} noise levels during the relevant survey period

*** This has been calculated using 1-minute measurement periods.

3.5 Noise Climate

- 3.5.1 Whilst deploying the monitoring equipment, the sound climate at LT1 was judged to be dominated by road traffic noise. There was also influence from railway noise due to trains entering and leaving Kilburn High Road station. Traffic and railway noise was also audible at ST1 and LT2, however the position was mostly screened from these sources by surrounding buildings.
- 3.5.2 As discussed in paragraph 3.4.3, influence from decommissioning works was noted at measurement position LT2. Whilst on site, noise was noted to arise from construction activities such as drilling and hammering.
- 3.5.3 Air conditioning units are located on the rear façade of the development, although they were noted to be disconnected and as such did not influence the measured data.

4 SITE SUITABILITY ASSESSMENT

- 4.1.1 To assess the suitability of the site for residential development, internal noise levels in the proposed development have been predicted and compared to Camden Council requirements. In addition, noise levels in external amenity areas have also been assessed.

4.2 Internal Noise Level Prediction Methodology

- 4.2.1 Day and night-time internal ambient noise levels have been predicted using the rigorous method detailed in Annex G of BS 8233:2014, and the noise survey data and indicative room and glazing dimensions obtained from the Design & Access Statement (ref: 564 – DAS 220513.pdf). If the room or glazing dimensions are to vary significantly from what is assessed, a review of the design may be required.
- 4.2.2 It is assumed the building is of masonry construction with the façade based around a cavity masonry wall. If the construction differs significantly from what has been assessed, this assessment should be revised to ensure a suitable sound insulation performance is achieved.
- 4.2.3 The Energy Strategy for the development (ref: 220619 264 Belsize Road Energy Strategy.pdf) states that natural ventilation is proposed as the whole-dwelling ventilation strategy. As such, consideration has also been given to ventilation elements on the façade.
- 4.2.4 As discussed above, the noise climate is dominated by traffic noise from local roads. As such, a typical traffic spectrum has been applied to the measured broadband level to obtain the input data for this assessment. Similarly, the night-time $L_{Amax,F}$ level is likely to arise due to trains entering and leaving Kilburn High Road station and thus a typical railway noise spectrum has been applied to the measured $L_{Amax,F}$ levels. The full spectra for each position are presented in
- 4.2.5 Table 4.1 below.

Table 4.1 Predicted spectra for use in internal noise assessment.

LT1	Noise Level (dB)								dB(A)
	at Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	
Daytime, $L_{Aeq,16h}$	42	48	49	46	46	43	38	35	50
Night-time, $L_{Aeq,8h}$	36	42	43	40	40	37	32	29	44
Night-time, $L_{Amax,F}^3$	61	57	62	61	59	52	46	41	63
LT2	Noise Level (dB)								dB(A)
	at Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	
Daytime, $L_{Aeq,16h}$	48	54	55	52	52	49	44	41	56
Night-time, $L_{Aeq,8h}$	43	49	50	47	47	44	39	36	51
Night-time, $L_{Amax,F}^4$	62	58	63	62	60	53	47	42	64

³ This the 10th highest L_{AFmax} event per night as per guidance in the ProPG.

⁴ This the 10th highest L_{AFmax} event per night as per guidance in the ProPG.

4.3 Internal Noise Levels

- 4.3.1 An assessment of the sound reduction performance of the glazing and ventilation elements required to meet the internal criteria in Table 2.3 has been undertaken.
- 4.3.2 Our assessment has shown that the Camden Council 'LOAEL' internal noise criteria for both the day and night-time periods in living areas and bedrooms, respectively, can be achieved using standard thermal double glazing offering a sound insulation performance of approximately 30 dB R_w .
- 4.3.3 The glazing specification applies to all glazed elements including windows, balcony doors, etc. It should be ensured that any element of the window system does not compromise the sound reduction performance of the glazing.
- 4.3.4 Should the ventilation strategy require façade openings (such as trickle vents) to achieve 'whole dwelling ventilation' rates it is necessary to consider the impact of these openings on the sound insulation of the façade.
- 4.3.5 It has been calculated that standard trickle vents, offering approximately 35 dB $D_{n,e,w}$ sound insulation, will result in internal ambient noise levels that meet the Camden Council 'LOAEL' criteria.
- Typical performances for these elements (based on example glazing configurations) are provided in Table 4.2 below.

Table 4.2 Typical specification for glazing and ventilation elements.

Glazing	Sound Reduction Index, R , (dB) at Octave Band Centre Frequency (Hz)						Single Figure
	125	250	500	1k	2k	4k	R_w
Glazing e.g 4 mm Glass, 12 mm Gap, 4 mm Glass	20	18	26	33	33	30	30
Ventilation	Element Normalised Level Difference, $D_{n,e}$, (dB) at Octave Band Centre Frequency (Hz)						Single Figure
	125	250	500	1k	2k	4k	$D_{n,e,w}$
Ventilation Elements e.g Direct Path Trickle Vents	35	35	34	35	34	29	35

- 4.3.6 The outline performance requirements in Table 4.2 assumes that only one ventilation opening is required. Should more than one ventilation opening be required in a space to meet the requirements of Approved Document F (equivalent area requirements), the required acoustic performance in terms of $D_{n,e,w}$ will need to be increased by $+10 \log N$, where N is the number of vents required. For example, if two vents are required to provide sufficient equivalent area the performance of each vent will need to be increased by 3 dB.
- 4.3.7 Based on the above assumptions, the following internal ambient noise levels have been predicted:

Table 4.3: Predicted Internal Noise Levels (Windows Closed)

Assessment Period	External Noise Level, dB(A)	Predicted Internal Noise Level (Windows Closed), dB(A)
Daytime, $L_{Aeq,16h}$	50	29
Night-time, $L_{Aeq,8h}$	44	25
Night-time, $L_{Amax,F}$	63	38

4.3.8 It can be seen from the table above that with standard glazing and ventilation opening solutions, predicted internal noise levels inside the proposed development (with windows closed and ventilators open) are likely to meet the Camden Council 'LOAEL' criteria.

4.3.9 It is important to note that the above calculations are for the purpose of demonstrating compliance with the relevant planning requirements. This should be fully reviewed and revised at a later design stage to confirm compliance with relevant requirements.

4.4 Overheating

4.4.1 The assessment of internal noise levels has been undertaken based on the scenario where windows are closed. However, windows may need to be opened to provide thermal comfort which may increase the internal noise levels.

4.4.2 The impact that this may have is dependent upon two factors:

- The level of noise inside a space if / when windows are open to provide relief from overheating; and
- How often windows will require opening to provide relief from overheating (i.e. the duration for which occupants are exposed to excess noise levels).

4.4.3 Assuming a typical reduction in noise level of 13 dB for a partially open window, the predicted noise levels inside the proposed development when windows are open is presented in Table 4.4.

Table 4.4: Predicted Internal Noise Levels (Windows Open)

Assessment Period	External Noise Level, dB(A)	Predicted Internal Noise Level (Windows Open), dB(A)
Façades facing Belsize Road		
Daytime, $L_{Aeq,16h}$	50	37
Night-time, $L_{Aeq,8h}$	44	31
Night-time, $L_{Amax,F}$	63	50
Façades facing Kilburn Place		
Daytime, $L_{Aeq,16h}$	56	43
Night-time, $L_{Aeq,8h}$	51	38
Night-time, $L_{Amax,F}$	64	51

4.4.4 Whilst the levels predicted in Table 4.4 exceed the Camden Council 'LOAEL' internal noise criteria, as discussed in paragraph 3.4.4, due to the influence of decommissioning works upon the measured noise levels during the survey period (particular at LT2 / Kilburn Place facing façade), it is likely that external noise levels are lower than those adopted for this assessment.

- 4.4.5 It should also be noted that the proposed design of the balconies (as shown in Figure 4.1 and Figure 4.2) will provide shielding to the building façade and are likely to help reduce noise ingress via open windows.
- 4.4.6 Therefore, due to the relatively low external noise levels incident on the building façade it is considered unlikely that significant adverse impacts are likely to occur should windows need to be opened to provide relief from overheating. However, the level of impact will depend on how often windows need to be open.
- 4.4.7 To reduce any adverse noise impacts, the proposed dwellings should, where possible, be designed to reduce the duration of and how often windows are required to be opened to remove excess heat (i.e. avoid overheating). This will in turn reduce adverse noise impacts, as occupants will be exposed to increased noise levels for a shorter period of time.
- 4.4.8 The impact of overheating should be reviewed in more detail at the design stage and where necessary appropriate mitigation measures should be incorporated into the design to minimise adverse noise impacts.

4.5 External Amenity Areas

- 4.5.1 In relation to noise levels in external amenity areas, the ProPG refers to BS 8233:2014 that states:
- “the acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$.”*
- 4.5.2 The standard continues:
- “These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.”*
- 4.5.3 BS 8233:2014 also gives the following guidance in the second paragraph of section 7.7.3.2:
- “...In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.”*
- 4.5.4 The drawings provided within the Design & Access statement show the external amenity areas to be situated on the façades facing both Belsize Road and Kilburn Place as shown in Figure 4.1 and Figure 4.2 below.
- 4.5.5 The daytime noise level LT1, representative of façades facing Belsize Road, was measured to be 50 dB $L_{Aeq,16h}$. This level meets the Camden Council’s ‘LOAEL’ criterion for external noise levels.
- 4.5.6 The daytime noise level at LT2, representative of façades facing Kilburn Place, was measured to be 56 dB $L_{Aeq,16h}$. This level exceeds the Camden Council’s ‘LOAEL’ criterion for external noise levels. However, as noted above, this location was affected by construction noise due to ongoing decommissioning works. The short-term data at ST1, in the absence of construction noise, likely provides a more representative depiction of the noise levels at this location. The maximum measured $L_{Aeq,15min}$ at this location was 48 dB and, although measured over a shorter time period, is below the Camden ‘LOAEL’ criterion.
- 4.5.7 It should also be noted that the semi enclosed design of the balconies will help to reduce noise levels in these spaces compared to the measured free-field noise levels.

Figure 4.1: South Facing Amenity Areas



Figure 4.2: North Facing Amenity Areas



Indicative massing



View from Kilburn Place as existing

4.6 Plant Noise Emission Limits

- 4.6.1 The Energy Strategy for the development states that Air Source Heat Pumps (ASHPs) are proposed as the primary centralised heat source for the development. We understand that these units will be installed externally at roof level, although this will be confirmed at a later design stage.
- 4.6.2 In the absence of exact specifications and layouts at this stage, plant noise limits have been derived in line with the requirements of Camden Council to minimise the impact of any plant noise emissions upon existing nearby noise-sensitive receptors.

- 4.6.3 Appendix E of the Camden Local Plan states the following regarding industrial and commercial noise sources:

“A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 ‘Methods for rating and assessing industrial and commercial sound’ (BS 4142) will be used. For such cases, a ‘Rating Level’ of 10 dB below background (15 dB if tonal components are present) should be considered as the design criterion”.

- 4.6.4 Table C of Appendix E of the Local Plan provides context to the criteria in terms of the PPG-N. This has been reproduced in Table 4.5 below for brevity and ease of reference.

Table 4.5 Table C in Appendix E of the Camden Local Plan

Existing Noise Sensitive Receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAEL (Red)
Dwellings	Garden used for main amenity (free-field) and outside living or dining or bedroom window (façade)	Day	‘Rating Level’ 10 dB below background.	‘Rating Level’ between 9 dB below and 5 dB above background.	‘Rating Level’ greater than 5 dB above background
	Outside bedroom window (façade)	Night	‘Rating Level’ 10 dB below background and no events exceeding 57 dB L_{Amax}	‘Rating Level’ between 9 dB below and 5 dB above background or noise events between 57 dB and 88 dB L_{Amax} .	‘Rating Level’ greater than 5 dB above background and/or events exceeding 88 dB L_{Amax} .

- 4.6.5 Representative background sound levels, $L_{A90,T}$ have been derived from the noise survey data with reference to the guidance in BS 4142:2014+A1:2019. The guidance states the following when considering ‘representative’ background levels:

“A representative level should account for the range of background sound levels and should not automatically be assumed to be either the minimum or modal value.”

- 4.6.6 The representative background sound level has been derived through statistical analysis of the measured sound data. In this case, the level has been derived by calculating the sound level at which the cumulative frequency of occurrence is equal to or greater than 25%. The results are presented in Table 4.6 below.
- 4.6.7 The plant noise emission limits have been derived based on Camden Council’s request that a Rating Level of 10 dB below the background level be the design criterion, corresponding to the ‘LOAEL’ in terms of PPG-N. However, it should be noted that whilst this level should be targeted, national planning policy does not require that the LOAEL⁵ be achieved in all instances, with BS 4142:2014+A1:2019 highlighting the importance of context when assessing commercial and industrial sound.

⁵ Based on the guidance in BS 4142:2014 it could also be argued that the LOAEL for commercial / industrial noise would be higher (i.e. less onerous) than a rating level 10 dB below the background sound level.

- 4.6.8 The plant noise emission limits have been derived from the measured data at LT1 since this was unaffected by construction noise and likely better represents the noise levels at receptors closest to the proposed installation location.

Table 4.6 Plant noise emission limits

Location	Plant Noise Limits (dB)			
	Day (07:00 to 23:00 hours)		Night (23:00 to 07:00 hours)	
	Representative Background Sound Level, $L_{A90,15min}$	Plant Noise Emission Limit, $L_{Ar,Tf}$	Representative Background Sound Level, $L_{A90,15min}$	Plant Noise Emission Limit, $L_{Ar,Tf}$
Nearest noise-sensitive receptors.	41	31	37	30

- 4.6.9 Context may be applied to the night-time plant noise emission limit of 30 dB(A) by considering the internal noise levels stated in BS 8233:2014. The internal criterion for sleeping conditions in bedrooms at night is 30 dB(A). Although this standard is typically considered for ‘anonymous’ environmental noise sources such as road traffic, it does illustrate how low the proposed noise limit would be.

- 4.6.10 This approach of considering absolute noise levels rather than those set relative to the background in such circumstances is consistent with BS 4142:2014+A1:2019 which states:

“Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.”

- 4.6.11 Based upon the current and historic (1997) versions of BS 4142, we would suggest that a noise limit of 30 dB $L_{Aeq,T}$ externally could be considered onerous. The limit is 5 dB lower than what is considered “very low” in accordance with the old standard and is the same as the internal noise level for sleeping conditions at night.
- 4.6.12 The noise limits are to apply at 1 m from the nearby residential windows. Any plant with a tonal component would be subject to a further +5 dB penalty in line with Local Authority requirements although as stated above it is also necessary to consider the absolute level of the sound.

5 SUMMARY & CONCLUSIONS

- 5.1 The acoustics team at RPS Consulting (UK) have been appointed to undertake a noise impact assessment in support of a planning application for the alterations and extensions to an existing, redundant, non-residential institution building to C3 permanent residential use, to form 4 no. three-bedroom duplex residential dwellings.
- 5.2 An environmental noise survey has been undertaken at the site to quantify the existing noise climate and derive representative day and night-time ambient noise levels, and typical maximum night-time noise levels at the façades of the proposed development in line with the requirements of Camden Council and BS 8233:2014.
- 5.3 It has been found that through the use of relatively standard façade, glazing and ventilation design solutions internal ambient noise levels in the proposed development are likely to meet the lowest observed adverse effect level (LOAEL) criterion of Camden Council.
- 5.4 In addition, noise levels in external areas are likely to meet the Camden Council 'significant observed adverse effect level' (SOAEL) criterion of Camden Council and in some areas are likely be below the LOAEL criterion.
- 5.5 Plant noise emission limits have been derived in line with the requirements of Camden Council to minimise the impacts of noise from the proposed Air Source Heat Pumps (ASHPs) on nearby noise-sensitive receptors.
- 5.6 It has been found that through the use of appropriate mitigation measures significant adverse noise impacts as a result of the development are unlikely to occur and adverse noise impacts have been mitigated and minimised.



APPENDICES

National Planning Policy

PLANNING POLICY & GUIDANCE

National Planning Policy Framework

The National Planning Policy Framework (NPPF) [i] sets out the Government's planning policies for England and how these are expected to be applied. The emphasis of the Framework is to allow development to proceed where it can be demonstrated to be sustainable. In relation to noise, Paragraph 185 of the Framework states:

“Planning policies and decisions should ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from the development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;**
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and**
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.’**

The point ‘a)’ refers to ‘significant adverse impacts’ which relates to the ‘significant observed adverse effect level’ (SOAEL) in the Noise Policy Statement for England (NPSE), although the term ‘effect’ is used instead of the term ‘impact’. However, these have been deemed to be interchangeable in this context. Therefore, given the comments above on the NPSE with regard to assessment methods and criteria, the current content of the NPPF does not require any change in previously adopted approaches.

Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) [ii], published in March 2010 by Defra, aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.

Paragraph 1.6 of the NPSE sets out the long-term vision and aims of Government noise policy:

“Noise Policy Vision

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.”

“Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.”*

The aims require that all reasonable steps should be taken to avoid, mitigate and minimise adverse effects on health and quality of life whilst also taking into account the guiding principles of sustainable development, which include social, economic, environmental and health considerations.

With regard to the terms ‘significant adverse’ and ‘adverse’ included in the ‘Noise Policy Aims’, these are explained further in the ‘Explanatory Note’ as relating to established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation which are:

‘NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on human health and quality of life due to noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.’

Defra has then extended these concepts for the purpose of the NPSE to introduce the concept of:

‘SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.’

The accompanying explanation states:

‘It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available’.

Planning Practice Guidance - Noise (PPGN)

The Government has published Planning Practice Guidance on a range of subjects including noise [iii]. The guidance forms part of the NPPF and provides advice on how to deliver its policies. The PPGN reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards (BSs) and contains examples of acoustic environments commensurate with various effect levels. Paragraph 006 of the PPGN explains that:

‘The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.’

According to the PPGN, factors that can influence whether noise could be of concern include:

- “the source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- for a new noise making source, how the noise from it relates to the existing sound environment;
- for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- the spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise i.e. whether or not the noise contains particular tonal characteristics or other particular features); and
- the local arrangement of buildings, surfaces and green infrastructure, and the extent to which it reflects or absorbs noise.
- More specific factors to consider when relevant include:
 - the cumulative impacts of more than one source;
 - whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations.
 - in cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur;
 - Noise Action Plans (where they exist), and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations should be taken into account. Defra’s website has information on Noise Action Plans and Important Areas. Local authority environmental health departments will also be able to provide information about Important Areas.
 - the effect of noise on wildlife. Noise can adversely affect wildlife and ecosystems. Particular consideration needs to be given to the potential effects of noisy development on international, national and locally designated sites of importance for biodiversity;
 - where external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.
 - some commercial developments including restaurants, hot food takeaways, night clubs and public houses can have particular impacts, not least because activities are often at their peak in

the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the noise that may be made by customers in the vicinity.”

Note that the NPPF was revised in July 2021 such that the third bullet of paragraph 123 of the NPPF is now contained within paragraph 187 of the NPPF. This now states:

‘187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.’

The PPGN provides a relationship between various perceptions of noise, effect level and required action in accordance with the NPPF. This is reproduced in the table below.

Noise Exposure Hierarchy Based on the Likely Average Response

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum

Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The PPGN describes sound that is not noticeable to be at levels below the NOEL. It describes exposures that are noticeable but not to the extent there is a perceived change in quality of life as below the LOAEL and need no mitigation. With reference to the definition of noise in the NPSE, such immissions are 'sound' and not 'noise'. On this basis, the audibility of sound from a development is not, in itself, a criterion to judge noise effects that is commensurate with national planning policy.

The PPGN suggests that noise exposures above the LOAEL cause small changes in behaviour. Examples of noise exposures above the LOAEL provided in the PPGN is having to turn up the volume on the television; needing to speak more loudly to be heard; where there is no alternative ventilation, closing windows for some of the time because of the noise; or, a potential for some reported sleep disturbance. In line with the NPPF and NPSE, the PPGN states that consideration needs to be given to mitigating and minimising effects above the LOAEL but taking account of the economic and social benefits being derived from the activity causing the noise.

The PPGN suggests that noise exposures above the SOAEL cause material changes in behaviour. Examples of noise exposures above the SOAEL provided in the PPGN are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present; and/or there is a potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. In line with the NPPF and NPSE, the PPGN states that effects above the SOAEL should be avoided and that whilst the economic and social benefits being derived from the activity causing the noise must be taken into account, such exposures are undesirable.

The PPGN suggests that a noise impact may be partially offset if the residents of affected dwellings have access to a relatively quiet part of their dwelling, private external amenity area and/or external public or private amenity space nearby.

ⁱ Ministry of Housing, Communities and Local Government. National Planning Policy Framework: HMSO. July 2021.

ⁱⁱ Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. Defra. 2010.

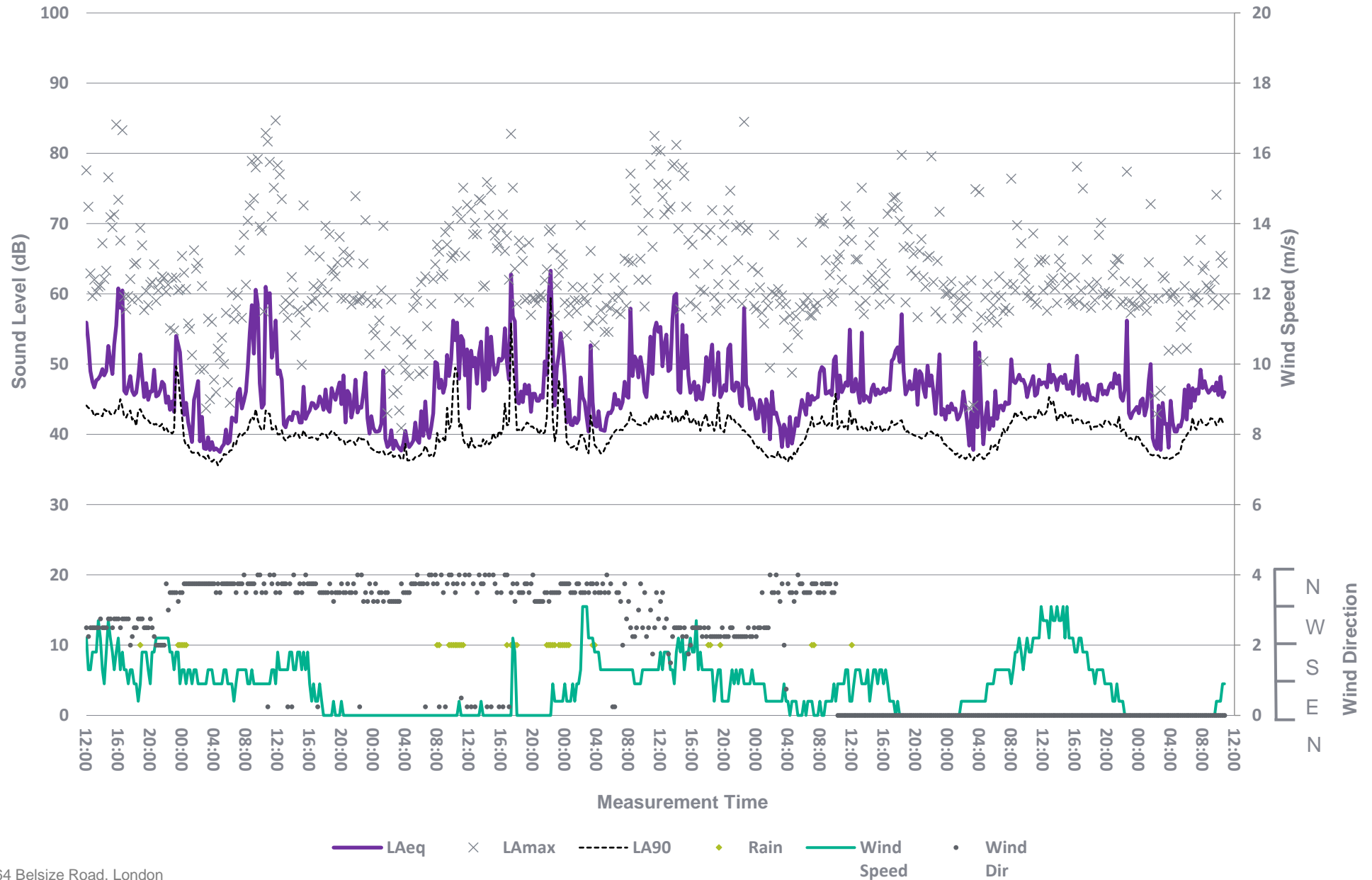
ⁱⁱⁱ Ministry of Housing, Communities and Local Government. National Planning Practice Guidance – Noise. March 2019

Appendix B

Time History Graphs

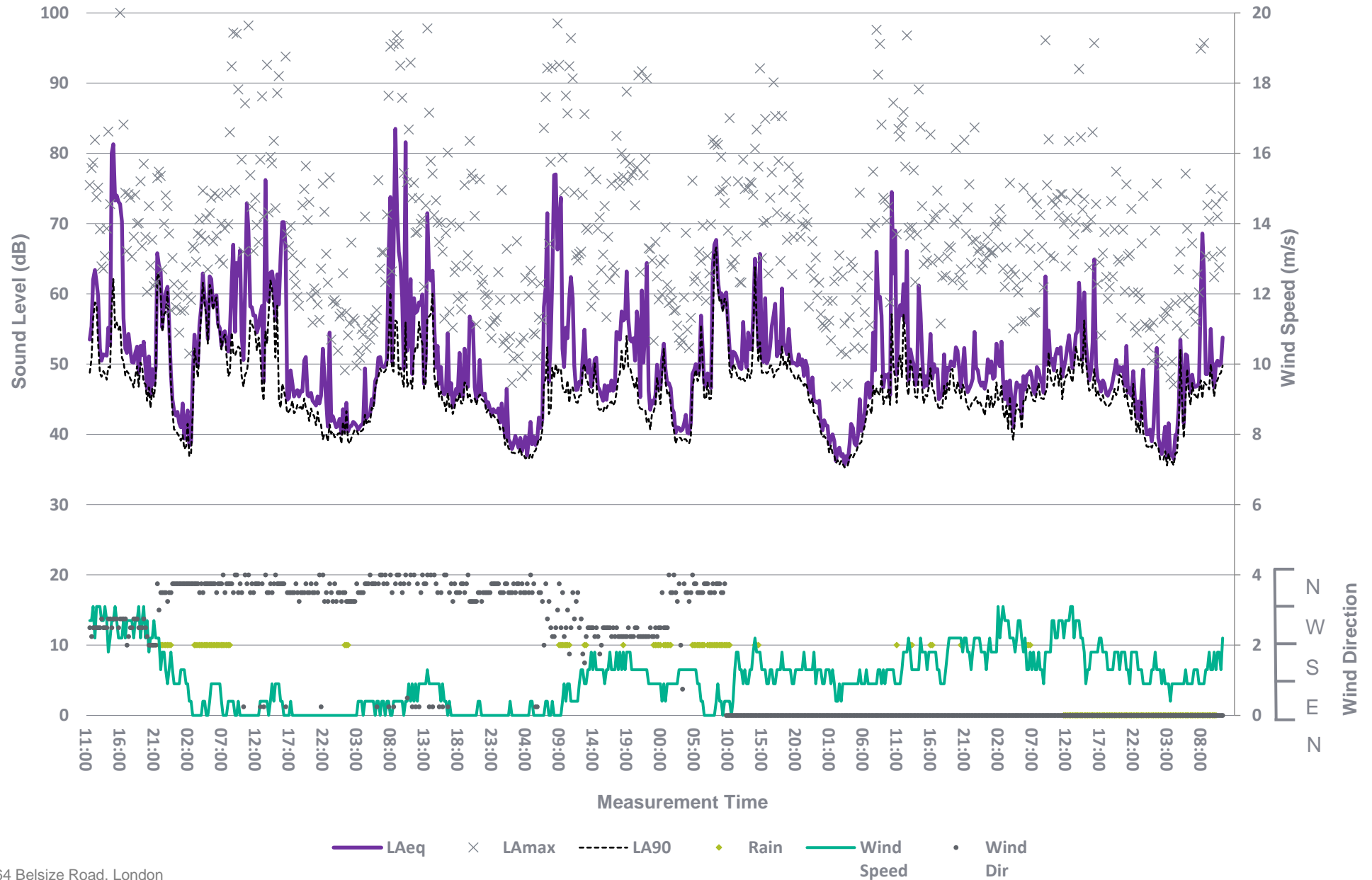
Appendix B1

Measured Noise Levels at LT1, 21 to 27 October 2022



Appendix B2

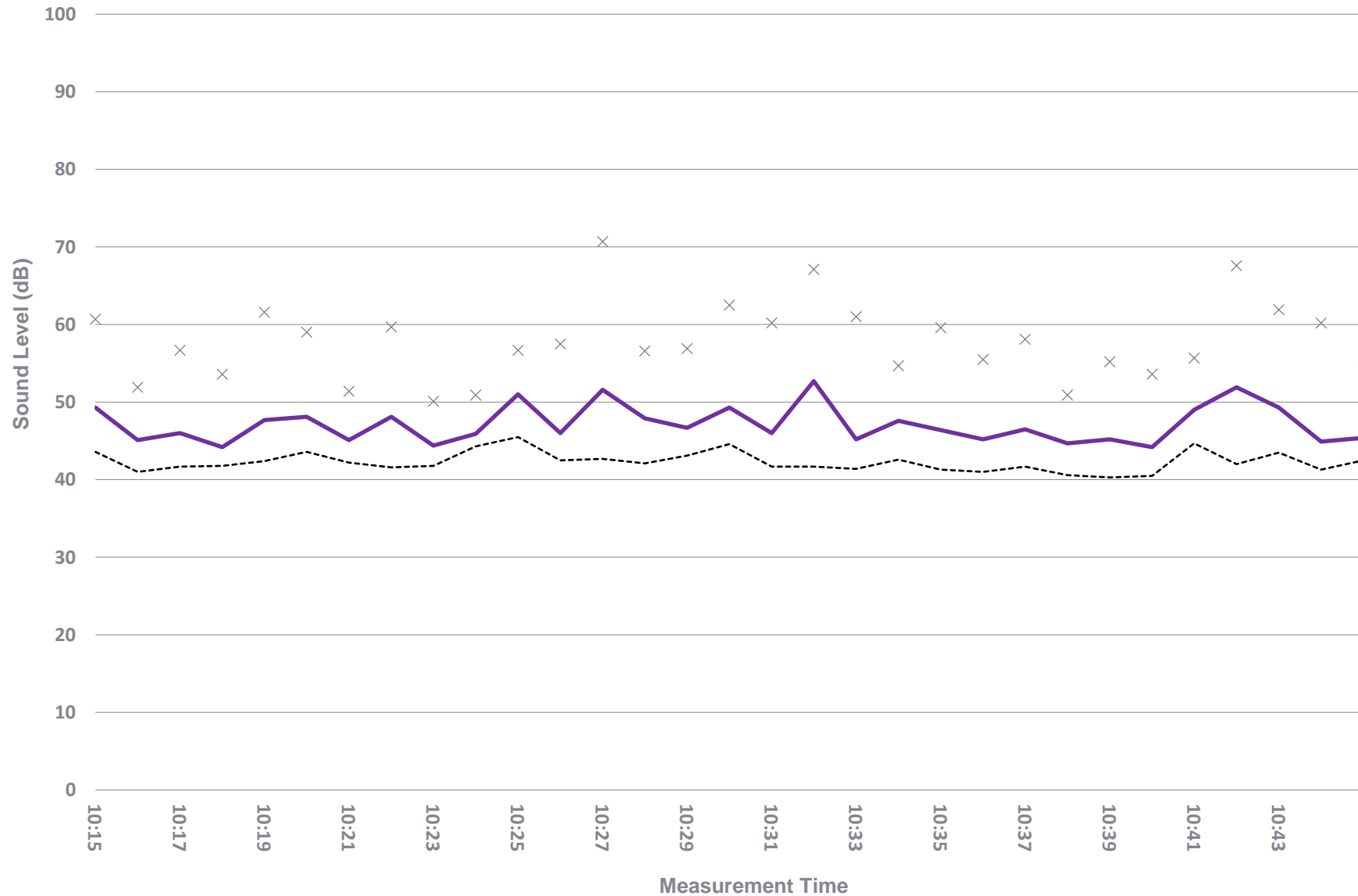
Measured Noise Levels at LT2, 2 to 9 November 2022



Short-Term Noise Survey Data

Appendix C

Measured Noise Levels at ST1, 27 October 2022



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