LOVE
DESIGN
STUDIO

NOISE ASSESSMENT (FOR PLANNING)

Land at 160 Malden Road, Kentish Town, NW5 4BT
by Love Design Studio

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CONTENTS

EXECUTIVE SUMMARY

Love Design Studio has been commissioned to undertake a planning stage noise assessment for a proposed new residential development at 160 Malden Road in Kentish Town.

In support of these assessment works, a baseline noise survey was undertaken to determine the prevailing environmental noise levels at the façades of the proposed building.

The results of the assessments were analysed and reviewed in line with the aims and advice contained within the National Policy Statement for England, the National Planning Policy Framework, Planning Practice Guidance and the Institute of Acoustics Professional Practice Guidance for new residential development.

The advice in the IoA ProPG document indicates that at the worst-affected façade noise levels are in the medium-risk range but that the risk may be reduced by following a good acoustic design process.

The assessment has demonstrated that the requirements established in BS 8233:2014 will be met inside all habitable rooms when fitted with suitable double-glazed windows and standard trickle ventilators with the exception of bedrooms facing Malden Road which should have typical Acoustic trickle ventilators specified.

The site can, therefore, be considered suitable for the proposed change of use.

Love Design Studio has also carried out a noise survey to set noise limits for plant to be installed at the proposed office and residential development located along 160 Malden Road, Kentish Town which may be found in Appendix E.

INTRODUCTION

Love Design Studio has been commissioned to undertake a planning stage noise assessment for a proposed new residential development at 160 Malden Road in Kentish Town.

This report presents the results of an environmental noise survey, the applicable policies and guidance, and a noise impact assessment demonstrating the suitability of the site for the proposed residential use.

To assist with the understanding of this report a brief glossary of acoustic terms can be found in **Appendix A**. A more in-depth glossary of acoustic terms can be assessed at the following web address http://www.acoustic-glossary.co.uk/.

SITE LAYOUT AND DEVELOPMENT PROPOSALS

The site is located along Malden Road, Kentish town in an area comprised of both residential and commercial premises. The proposed development includes an office space and 15 new dwellings, replacing the existing MOT testing centre and car wash.

An image showing the site location, the surrounding area and the noise and vibration monitoring locations used in this assessment is presented in **Appendix B**.

The floor plans of the development are shown in **Appendix C**.

POLICY CONTEXT

A great deal of change has occurred in recent years in the assessment of noise impacts and their relationship with planning decisions. The following sections introduce the applicable policies, either national or local, which ought to be considered to support the planning application.

NOISE POLICY STATEMENT FOR ENGLAND

The Noise Policy Statement for England (NPSE[1]), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy aims, as presented in this document, are:

"THROUGH THE EFFECTIVE MANAGEMENT AND CONTROL OF ENVIRONMENTAL, NEIGHBOUR AND NEIGHBOURHOOD NOISE WITHIN THE CONTEXT OF GOVERNMENT POLICY ON SUSTAINABLE DEVELOPMENT:

AVOID SIGNIFICANT ADVERSE EFFECTS ON HEALTH AND QUALITY OF LIFE;

MITIGATE AND MINIMISE ADVERSE EFFECTS ON HEALTH AND QUALITY OF LIFE; AND

WHERE POSSIBLE, CONTRIBUTE TO THE IMPROVEMENT OF HEALTH AND QUALITY OF LIFE."

The NPSE makes reference to the concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as used in toxicology but applied to noise impacts. It also introduces the concept of SOAEL (Significant Observed Adverse Effect Level) which is described as the level above which significant adverse effects on health and quality of life occur.

The first aim of the NPSE is to avoid significant adverse effects, taking into account the guiding principles of sustainable development (as referenced in Section 1.8 of the NPSE). The second aim seeks to provide guidance on the situation that exists when the potential noise impact falls between the LOAEL and the SOAEL, in which case: ***"...ALL REASONABLE STEPS SHOULD BE TAKEN TO MITIGATE AND MINIMISE ADVERSE EFFECTS ON HEALTH AND QUALITY OF LIFE WHILE ALSO TAKING INTO ACCOUNT THE GUIDING PRINCIPLES OF SUSTAINABLE DEVELOPMENT."***

Importantly, the NPSE goes on to state that: "This does not mean that such adverse effects cannot occur."

The NPSE does not provide a noise-based measure to define SOAEL, acknowledging that the SOAEL is likely to vary depending on the noise source,

[1] Noise Policy Statement for England, Defra, March 2010

the receptor and the time in question. NPSE advises that: ***"NOT HAVING SPECIFIC SOAEL VALUES IN THE NPSE PROVIDES THE NECESSARY POLICY FLEXIBILITY UNTIL FURTHER EVIDENCE AND SUITABLE GUIDANCE IS AVAILABLE."***

It is therefore likely that other guidance will need to be referenced when applying objective standards for the assessment of noise, particularly in reference to the SOAEL, whilst also taking into account the specific circumstances of a proposed development.

NATIONAL PLANNING POLICY FRAMEWORK

A new edition of NPPF was published in July 2021 and came into effect immediately. The original National Planning Policy Framework (NPPF[2]) was published in March 2012, with a revision in July 2018 and February 2019 - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The 2021 revised edition contains no new directions or guidance with respect to noise, and hence, all previous references remain extant. The paragraph references quoted below relate to the July 2021 edition.

Paragraph 174 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst others) ***"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, WATER OR NOISE POLLUTION OR LAND STABILITY."***

The NPPF goes on to state in Paragraph 185:

"PLANNING POLICIES AND DECISIONS SHOULD …

(A) 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 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 …

The NPPF document does not refer to any other documents or British Standards regarding noise other than the NPSE.

[2] National Planning Policy Framework, DCLG, March 2012

Paragraph 2 of the NPPF states that ***"PLANNING LAW REQUIRES THAT APPLICATIONS FOR PLANNING PERMISSION MUST BE DETERMINED IN ACCORDANCE WITH THE DEVELOPMENT PLAN UNLESS MATERIAL CONSIDERATIONS INDICATE OTHERWISE."***

Paragraph 12 of the NPPF states that ***"THE PRESUMPTION IN FAVOUR OF SUSTAINABLE DEVELOPMENT DOES NOT CHANGE THE STATUTORY STATUS OF THE DEVELOPMENT PLAN AS THE STARTING POINT FOR DECISION MAKING. WHERE A PLANNING APPLICATION CONFLICTS WITH AN UP-TO-DATE DEVELOPMENT PLAN (INCLUDING ANY NEIGHBOURHOOD PLANS THAT FORM PART OF THE DEVELOPMENT PLAN), PERMISSION SHOULD NOT USUALLY BE GRANTED. LOCAL PLANNING AUTHORITIES MAY TAKE DECISIONS THAT DEPART FROM AN UP-TO-DATE DEVELOPMENT PLAN, BUT ONLY IF MATERIAL CONSIDERATIONS IN A PARTICULAR CASE INDICATE THAT THE PLAN SHOULD NOT BE FOLLOWED."***

Paragraph 119 states that ***"PLANNING POLICIES AND DECISIONS SHOULD PROMOTE AN EFFECTIVE USE OF LAND IN MEETING THE NEED FOR HOMES AND OTHER USES, WHILE SAFEGUARDING AND IMPROVING THE ENVIRONMENT AND ENSURING SAFE AND HEALTHY LIVING CONDITIONS. STRATEGIC POLICIES SHOULD SET OUT A CLEAR STRATEGY FOR ACCOMMODATING OBJECTIVELY ASSESSED NEEDS, IN A WAY THAT MAKES AS MUCH USE AS POSSIBLE OF PREVIOUSLY-DEVELOPED OR 'BROWNFIELD' LAND."***

PLANNING PRACTICE GUIDANCE – NOISE

An updated Planning Practice Guidance (PPG[3]) for noise was published on 22 July 2019 and provides additional guidance and elaboration on the NPPF. It advises that when plan-making and decision-taking, the Local Planning Authority should consider the acoustic environment in relation to:

- 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; and
- Whether or not a good standard of amenity can be achieved.

This guidance introduced the concepts of NOAEL (No Observed Adverse Effect Level), and UAEL (Unacceptable Adverse Effect Level). NOAEL differs from NOEL in that it represents a situation where the acoustic character of an area can be slightly affected (but not such that there is a perceived change in the quality of life). UAEL represents a situation where noise is 'very disruptive' and should be 'prevented' (as opposed to SOAEL, which represents a situation where noise is 'disruptive', and should be 'avoided').

As exposure increases above the LOAEL, the noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those

[3] Planning Practice Guidance – Noise, https://www.gov.uk/guidance/noise--2, 22 July 2019

effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.

The LOAEL is described in PPG[4] as the level above which ***"NOISE STARTS TO CAUSE SMALL CHANGES IN BEHAVIOUR AND ATTITUDE, FOR EXAMPLE, HAVING TO TURN UP THE VOLUME ON THE TELEVISION OR NEEDING TO SPEAK MORE LOUDLY TO BE HEARD"***.

PPG identifies the SOAEL as the level above which ***"NOISE CAUSES A MATERIAL CHANGE IN BEHAVIOUR SUCH AS KEEPING WINDOWS CLOSED FOR MOST OF THE TIME OR AVOIDING CERTAIN ACTIVITIES DURING PERIODS WHEN THE NOISE IS PRESENT."***.

In line with the Explanatory Note of the NPSE, the PPG goes on to reference the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG[5] acknowledges 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."***.

The relevant guidance in the PPG in relation to the adverse effect levels is summarized below:

Table 1 PPG Noise Effects Table

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	No Observed Adverse Effect	No specific measures required

[4] Paragraph: 005 Reference ID: 30-005-20190722
[5] Paragraph: 006 Reference ID: 30-006-20190722

Response	Examples of Outcomes	Increasing Effect Level	Action
	such that there is a perceived change in the quality of life.		
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

Response	Examples of Outcomes	Increasing Effect Level	Action
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 Planning Practice Guidance[6] states the following in relation to mitigation measures:

"FOR NOISE SENSITIVE DEVELOPMENTS, MITIGATION MEASURES CAN INCLUDE AVOIDING NOISY LOCATIONS IN THE FIRST PLACE; DESIGNING THE DEVELOPMENT TO REDUCE THE IMPACT OF NOISE FROM ADJOINING ACTIVITIES OR THE LOCAL ENVIRONMENT; INCORPORATING NOISE BARRIERS; AND OPTIMISING THE SOUND INSULATION PROVIDED BY THE BUILDING ENVELOPE."

[6] Paragraph: 010 Reference ID: 30-010-20190722

In addition, the Guide notes that it may also be relevant to consider[7]:

"... WHETHER ANY 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".

[7] Paragraph: 006 Reference ID: 30-006-20190722

ACOUSTIC STANDARDS AND GUIDANCE – SITE SUITABILITY ASSESSMENT

INSTITUTE OF ACOUSTICS PROFESSIONAL PRACTICE GUIDANCE

The Institute of Acoustics published a guidance document for new residential development in May 2017, in conjunction with the ANC and the Chartered Institute of Environmental Health, ***"TO PROVIDE PRACTITIONERS WITH GUIDANCE ON A RECOMMENDED APPROACH TO THE MANAGEMENT OF NOISE WITHIN THE PLANNING SYSTEM IN ENGLAND"***.

The document advocates a two-stage process for consideration of noise affecting new residential developments. Stage 1 is an initial risk assessment of the proposed development site, based on the ambient noise levels in the area. Stage 2 recommends consideration of four main elements:

- demonstration of a ***"GOOD ACOUSTIC DESIGN PROCESS"***
- observation of internal noise guidelines
- an assessment of noise affecting external amenity areas
- consideration of other relevant issues

The initial risk assessment considers the indicative day-time and night-time equivalent continuous noise levels which indicates an "increasing risk of adverse effect" with increasing noise levels[8].

For Stage 2, the ProPG document recommends that the guidance in BS 8233:2014 is followed.

BS 8233:2014 GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS.

This Standard provides recommended guideline values for internal noise levels within dwellings which are similar in scope to guideline values contained within the World Health Organisation (WHO) document, Guidelines for Community Noise (1999[9]). These guideline noise levels are shown in Table 2, below:

Table 2 BS 8233:2014 Desirable Internal Ambient Noise Levels for Dwellings

[8] Figure 1, IoA ProPG for New Residential Development, May 2017
[9] World Health Organisation Guidelines for Community Noise, 1999

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16h}$	30dB $L_{Aeq,8h}$

BS 8233:2014 advises that: ***"REGULAR INDIVIDUAL NOISE EVENTS…CAN CAUSE SLEEP DISTURBANCE. A GUIDELINE VALUE MAY BE SET IN TERMS OF SEL OR LAMAX,F DEPENDING ON THE CHARACTER AND NUMBER OF EVENTS PER NIGHT. SPORADIC NOISE EVENTS COULD REQUIRE SEPARATE VALUES."*** A typical requirement, derived from WHO guidance and previous editions of BS 8233, is that night-time internal L_{AMax} noise levels should not normally exceed 45dB.

The standard also provides advice in relation to design criteria for external noise. It states that:

"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 50DB $L_{AEQ,T}$, WITH AN UPPER GUIDELINE VALUE OF 55DB $L_{AEQ,T}$ 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.

…

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 OF 55DB $L_{AEQ,T}$ OR LESS MIGHT NOT BE POSSIBLE AT THE OUTER EDGE OF THESE AREAS, BUT SHOULD BE ACHIEVABLE IN SOME AREAS OF THE SPACE."

WORLD HEALTH ORGANISATION, GUIDELINES FOR COMMUNITY NOISE, 1999 (WHO)

The World Health Organisation (WHO) Guidelines for Community Noise (1999) recommends suitable internal and external noise levels based on dose response research. The levels recommended in this guidance could be correlated to the LOAEL. Relevant guidance from this document is presented below.

Sleep Disturbance (Night-time internal LOAEL): If negative effects on sleep are to be avoided, the equivalent sound pressure level should not exceed 30dBA indoors for continuous noise.

Interference with Communication (Daytime internal LOAEL): Noise tends to interfere with auditory communication, in which speech is a most important signal. However, it is also vital to be able to hear alarming and informative signals such as door bells, telephone signals, alarm clocks, fire alarms etc., as well as sounds and signals involved in occupational tasks. The effects of noise on speech discrimination have been studied extensively and deal with this problem in lexical terms (mostly words but also sentences). For communication distances beyond a few metres, speech interference starts at sound pressure levels below 50dB for octave bands centred on the main speech frequencies at 500, 1 000 and 2 000 Hz. It is usually possible to express the relationship between noise levels and speech intelligibility in a single diagram, based on the following assumptions and empirical observations, and for speaker-to-listener distance of about 1 metre:

a) Speech in relaxed conversation is 100% intelligible in background noise levels of about 35dBA and can be understood fairly well in background levels of 45dBA.
b) Speech with more vocal effort can be understood when the background sound pressure level is about 65dBA.

The WHO guidelines also propose that external sound levels for amenity use should not exceed 50-55dB $L_{Aeq,16hr}$ during daytime hours.

WORLD HEALTH ORGANISATION (WHO) 2009

The introduction of the Directive on Environmental Noise obliges Member States to assess and manage noise levels. With the support of the European Commission, the WHO Regional Office for Europe has developed night noise guidelines for Europe to help Member States develop legislation to control noise exposure.

The guidelines are based on scientific evidence on the effects of noise and the thresholds above which these effects appear to harm human health.

There is limited evidence that night noise is related to hypertension, heart attacks, depression, changes in hormone levels, fatigue and accidents.

The WHO report summarises the threshold levels of night noise above which a negative effect starts to occur or above which the impact becomes dependent on the level of exposure. For example, the threshold level for waking in the night and/or too early in the morning was 42dB.

It also establishes that there are differences in the intensity and frequency of noise depending on the source, which lead to different impacts. Road traffic is characterised by low levels of noise per event, but as there are a high number of events, on average it has a greater effect on awakenings than air traffic, which has high levels of noise per event but fewer events.

Integrating these findings, the report proposed a guideline target limit of outdoor night noise of 40dB (annual average defined as 'Lnight' in the Environmental Noise Directive). There is not sufficient evidence that the biological effects observed below this level are harmful to health but adverse effects are observed above 40dB.

BUILDING REGULATIONS

Part L of the Building Regulations mandates that buildings become more airtight, and Part F stipulates ventilation requirements. Even though there appears to be a contradiction in this, Part L limits uncontrollable ventilation, while Part F ensures that ventilation requirements are provided in a controlled manner.

VENTILATION REQUIREMENTS FOR DWELLINGS

BACKGROUND VENTILATION

Three types of ventilation are required under Part F. Whole building ventilation provides nominally continuous air exchange which may be reduced or ceased when the building is not occupied. It can be provided via background ventilators operating alone, or together with:

- passive stack ventilators;
- continuous mechanical extract; or
- continuous mechanical supply and extract with heat recovery.

Extract ventilation is applicable to rooms where most water vapour and/or pollutants are released (e.g. kitchens and bathrooms). It can be provided by intermittent fans, passive stack or continuous mechanical extract with or without mechanical supply and heat recovery.

The four systems described in Part F do not present solutions which utilise the use of opening windows for background ventilation. Opening windows do not provide a controllable means of ventilation and also pose security risks.

PURGE VENTILATION

Purge ventilation is required throughout the building to aid the removal of high concentrations of pollutants and water vapour. It is commonly provided simply by opening windows and doors.

Even though purge ventilation is recommended via opening windows, the temporary and intermittent occurrence of this does not normally result in an unacceptable increase of internal noise levels.

Part F goes on to say[10] that "Purge ventilation provisions may also be used to improve thermal comfort, although this is not controlled under the Building Regulations."

SUMMARY IN RELATION TO VENTILATION

In summary, background ventilation for new residential dwellings, and residential dwellings formed by a material change of use, should be provided via one of the four systems in Approved Document F. The composite external

[10] Paragraph 4.15 in Approved Document F

building fabric should be designed to ensure that appropriate internal noise levels due to external incident noise are met during background ventilation.

Purge ventilation for new residential dwellings should be provided via open windows. The slight increase of internal noise levels should be considered acceptable.

BUILDING REGULATIONS – PART O

Approved Document O1: Overheating mitigation of the Building Regulations 2010, came into force in June 2022. Section 3 in the Approved Document includes the following:

NOISE

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 $L_{Aeq,T}$, *AVERAGED OVER 8 HOURS (BETWEEN 11PM AND 7AM).*

b. 55dB L_{AFmax}, *MORE THAN 10 TIMES A NIGHT (BETWEEN 11PM AND 7AM).*

3.4 WHERE IN-SITU NOISE MEASUREMENTS ARE USED AS EVIDENCE THAT THESE LIMITS ARE NOT EXCEEDED, MEASUREMENTS SHOULD BE TAKEN IN ACCORDANCE WITH THE ASSOCIATION OF NOISE CONSULTANTS' MEASUREMENT OF SOUND LEVELS IN BUILDINGS WITH THE OVERHEATING MITIGATION STRATEGY IN USE.

NOTE: GUIDANCE ON REDUCING THE PASSAGE OF EXTERNAL NOISE INTO BUILDINGS CAN BE FOUND IN THE NATIONAL MODEL DESIGN CODE: PART 2 – GUIDANCE NOTES (MHCLG, 2021) AND THE ASSOCIATION OF NOISE CONSULTANTS' ACOUSTICS, VENTILATION AND OVERHEATING: RESIDENTIAL DESIGN GUIDE (2020).

SITE SUITABILITY ASSESSMENT METHODOLOGY

ENVIRONMENTAL NOISE SURVEY

An unattended environmental sound pressure level survey was undertaken between 11.45 hours on Monday 17th January and 15.00 hours on Tuesday 18th January 2023. Automatic measurement equipment was located at two positions along Malden Road and in the yard at the rear of the existing garage on the site. The survey was undertaken in order to establish the typical incident environmental noise levels at the proposed residential development.

Full details of the survey are provided in **Appendix D** alongside time history graphs of the measurement results. The relevant results of the survey have been summarised in Table 3 and Table 4.

Table 3 Summary of survey results

Position	Measurement period	Range of recorded sound pressure levels (dB)			
		$L_{Aeq(15mins)}$	$L_{Amax(15mins)}$	$L_{A10(15mins)}$	$L_{A90(15mins)}$
01, Malden Road, immediately adjacent to site	Daytime (07.00 – 23.00 hours)	60 - 73	74 - 101	64 - 76	44 - 63
	Night-time (23.00 – 07.00 hours)	51 - 63	71 - 92	50 - 68	37 - 50
02, in rear yard of existing garage	Daytime (07.00 – 23.00 hours)	46 - 57	55 - 85	48 - 58	43 - 53
	Night-time (23.00 – 07.00 hours)	38 - 51	49 - 79	40 - 50	36 - 43
03, Malden Road, to west of site	Daytime (07.00 – 23.00 hours)	62 - 72	74 - 100	67 - 72	45 - 59
	Night-time (23.00 – 07.00 hours)	53 - 65	72 - 87	51 - 70	38 - 48

Measurements were made at two positions along Malden Road to determine whether the noise climate immediately adjacent to the site was dominated by traffic noise or noise from the existing garage. The sound levels at positions 01 and 03 are very similar to one another and it can therefore be concluded that noise measured at position 01 is predominantly not due to the garage, and will not change when the garage ceases operation.

The environmental noise levels at each survey position are summarised in Table 4.

Table 4 Summary of free field environmental noise levels

Period	Parameter	Sound pressure level, dB		
		Pos 01	Pos 02	Pos 03
Monday 17th January daytime*	$L_{Aeq,T}$	66	52	67
17th – 18th January night-time	$L_{Aeq,8hours}$	59	44	60
Tuesday 18th January daytime*	$L_{Aeq,T}$	67	54	67
Overall daytime	**$L_{Aeq,\ 16\ hours}$**	**66**	**53**	**67**
Overall night-time	**$L_{Aeq,\ 8\ hours}$**	**59**	**44**	**60**

**not complete 16 hour measurements*

Measured octave band sound pressure levels corresponding to the overall values above are given in Table 5.

Table 5 Measured octave band sound pressure levels at the measurement locations

Position	Period	Incident sound pressure levels (dB) at Octave Band Centre Frequencies (Hz)								dBA
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
01	Daytime $L_{eq,\ 16\ hours}$	68	63	61	60	62	59	52	49	**66**
	Night-time $L_{eq,\ 8\ hours}$	63	59	57	55	56	52	44	38	**59**
	Night-time $L_{Max,F}$	84	80	77	73	72	73	69	61	**79**
02	Daytime $L_{eq,\ 16\ hours}$	60	61	57	48	47	43	35	30	**53**
	Night-time $L_{eq,\ 8\ hours}$	51	47	45	41	39	36	28	24	**44**
	Night-time $L_{Max,F}$	66	60	55	62	65	55	44	37	**66**
03	Daytime $L_{eq,\ 16\ hours}$	69	64	62	61	64	61	53	47	**67**
	Night-time $L_{eq,\ 8\ hours}$	63	58	56	54	56	53	45	42	**60**
	Night-time $L_{Max,F}$	82	77	73	71	79	71	64	60	**80**

In accordance with guidance in the IoA ProPG document, the night-time $L_{Max,F}$ data relate to the sound level of the tenth-highest event measured at each position, assessed in terms of $L_{AFMax\ 10\ sec}$.

NATURE OF SOURCE NOISE

During installation and removal of the sound measurement equipment positioned on the site the major noise sources affecting the site were observed to be local road traffic on the Malden Road elevation and plant serving neighbouring properties at the rear. While there was some noise observed from the existing garage and car wash at measurement position 01 it was noted to not have a significant influence on the overall sound levels, and particularly at night when the business was not operating.

PREDICTED FAÇADE SOUND LEVELS

The measurement positions along Malden Road were approximately 3m above the road surface and approximately 0.5m from the kerb. Noise levels measured at the meters will therefore be higher than at the nearest proposed residential façade, which is approximately 3m from the kerb. Sound levels at the side elevations will be further reduced to the road being partially-screened from the windows by the building orientation. Sound levels at the rear of the building will be as measured at position 02. Predicted sound levels at the key residential elevations are as shown in Table 6.

Table 6 Predicted octave band sound pressure levels at residential façades

Elevation	Period	Incident sound pressure levels (dB) at Octave Band Centre Frequencies (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
Front, Ground and First Floors	Daytime $L_{eq,\ 16\ hours}$	66	61	59	58	60	57	50	47	**64**
	Night-time $L_{eq,\ 8\ hours}$	61	57	55	53	54	50	42	36	**57**
	Night-time $L_{Max,F}$	81	77	74	70	69	70	66	58	**76**
Front, Second and Third Floors	Daytime $L_{eq,\ 16\ hours}$	65	60	58	57	59	56	49	46	**63**
	Night-time $L_{eq,\ 8\ hours}$	60	56	54	52	53	49	41	35	**56**
	Night-time $L_{Max,F}$	78	74	71	67	66	67	63	55	**73**

Elevation	Period	Incident sound pressure levels (dB) at Octave Band Centre Frequencies (Hz)								dBA
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
Rear, all floors	Daytime $L_{eq, 16\ hours}$	60	61	57	48	47	43	35	30	**53**
	Night-time $L_{eq, 8\ hours}$	51	47	45	41	39	36	28	24	**44**
	Night-time $L_{Max,F}$	66	60	55	62	65	55	44	37	**66**
Side, all floors	Daytime $L_{eq, 16\ hours}$	61	56	54	53	55	52	45	42	**59**
	Night-time $L_{eq, 8\ hours}$	56	52	50	48	49	45	37	31	**52**
	Night-time $L_{Max,F}$	76	72	69	65	64	65	61	53	**71**

NOISE IMPACT ASSESSMENT

INITIAL RISK ASSESSMENT

Results for the highest existing ambient noise levels at the front elevations are shown below and compared with the risk guidance values shown in Figure 1 of ProPG.

Table 7 Comparison of external sound pressure levels with ProPG guidance

Period/ Parameter	External sound level, dB	ProPG Noise Risk Assessment category
Daytime $L_{Aeq\ 16hr}$	64	Medium
Night-time $L_{Aeq\ 8hr}$	57	Medium
Night-time $L_{Amax,f}$	76	Non-negligible

The ProPG document notes that:

AT LOW NOISE LEVELS, THE SITE IS LIKELY TO BE ACCEPTABLE FROM A NOISE PERSPECTIVE PROVIDED THAT A GOOD ACOUSTIC DESIGN PROCESS IS FOLLOWED AND IS DEMONSTRATED IN AN ADS[11] WHICH CONFIRMS HOW THE ADVERSE IMPACTS OF NOISE WILL BE MITIGATED AND MINIMISED IN THE FINISHED DEVELOPMENT.

AS NOISE LEVELS INCREASE, THE SITE IS LIKELY TO BE LESS SUITABLE FROM A NOISE PERSPECTIVE AND ANY SUBSEQUENT APPLICATION MAY BE REFUSED UNLESS A GOOD ACOUSTIC DESIGN PROCESS IS FOLLOWED AND IS DEMONSTRATED IN AN ADS WHICH CONFIRMS HOW THE ADVERSE IMPACTS OF NOISE WILL BE MITIGATED AND MINIMISED, AND WHICH CLEARLY DEMONSTRATE THAT A SIGNIFICANT ADVERSE NOISE IMPACT WILL BE AVOIDED IN THE FINISHED DEVELOPMENT.

Even where noise levels are high ***"THE RISK MAY BE REDUCED BY FOLLOWING A GOOD ACOUSTIC DESIGN PROCESS"*** which ***"CONFIRMS HOW THE ADVERSE IMPACTS OF NOISE WILL BE MITIGATED AND MINIMISED."***

Note that this initial indication of risk "*is not the basis for the eventual recommendation to the decision maker*" but instead should inform the assessment and design process.

[11] Acoustic Design Statement, i.e this report

INTRUSIVE NOISE ASSESSMENT AND EXTERNAL BUILDING FABRIC SPECIFICATIONS

In order to assess the suitability of the site for the proposed dwellings it is important to predict the internal noise levels within habitable rooms.

The composite acoustic performance required of any portion of the building envelope will depend on its location relative to the principal noise sources around the site and the nature of the spaces behind it (noise criteria, size, room finishes etc.). To control intrusive sound to acceptable levels the following glazing and ventilation specifications are required:

Table 8 Glazing and ventilator specifications

	Glazing Specification	Ventilator Specification
Front façade, ground and first floors		
Kitchen/Living Rooms	Type A	Standard non-acoustic trickle ventilator
Bedrooms	Type A	Typical Acoustic trickle ventilator
All other façades		
Kitchen/Living Rooms	Type A	Standard non-acoustic trickle ventilator
Bedrooms	Type A	

Table 9 Proposed building envelope specifications

External building fabric element	Construction element	Sound reduction indices or Normalised Level Difference (for ventilators) dB at Octave band Centre Frequencies (Hz)							
		63	125	250	500	1k	2k	4k	8k
Type A glazing	4mm glass/16mm cavity/4mm glass	21	24	20	25	34	37	40	40
Standard Non-Acoustic Trickle Ventilator		30	32	32	31	33	31	31	31
Typical Acoustic Trickle Ventilator		30	27	30	35	34	46	40	40
External brick/block wall or lightweight construction with similar acoustic performance		35	41	45	45	54	58	55	55
Tiled/slated roof, 25mm plasterboard ceiling, 100mm mineral wool		25	27	37	43	48	52	50	50

The detailed calculation methodology described in BS 8233:2014 has been used in the assessment.

INTERNAL NOISE LEVELS

Internal noise levels have been calculated based on the predicted incident sound levels and the proposed external building fabric elements shown in Table 8 and
Table 9. The results of the calculations are shown in Table 10.

For each elevation the worst-case room of each type has been assessed. This is the room with the largest window area per m^2 of floor area, derived from the plans and elevations in **Appendix C**. Intrusive noise levels in other rooms of the same type on the same elevation will be no higher than the values shown, and in most cases will be lower.

Table 10 Predicted ambient noise levels in internal areas

Elevation	Room	Reference*	External noise levels, dB	Predicted internal noise levels, dB	Proposed LOAEL, dB	Difference, dB
Front, ground and first floors	Kitchen/ living/ dining	L_{Aeq}, daytime	64	33	35	-2
	Bedroom	L_{Aeq}, daytime	64	33	35	-2
		L_{Aeq}, night-time	57	28	30	-2
		L_{Amax}, night-time	76	45	45	0
Front, second and third floors	Kitchen/ living/ dining	L_{Aeq}, daytime	63	32	35	-3
	Bedroom	L_{Aeq}, daytime	63	33	35	-2
		L_{Aeq}, night-time	56	28	30	-2
		L_{Amax}, night-time	73	44	45	-1
Rear	Kitchen/ living/ dining	L_{Aeq}, daytime	53	28	35	-7
	Bedroom	L_{Aeq}, daytime	53	29	35	-6
		L_{Aeq}, night-time	44	19	30	-11
		L_{Amax}, night-time	66	38	45	-7
Side	Bedroom	L_{Aeq}, daytime	59	32	35	-3
		L_{Aeq}, night-time	52	27	30	-3

Elevation	Room	Reference*	External noise levels, dB	Predicted internal noise levels, dB	Proposed LOAEL, dB	Difference, dB
		L_{Amax}, night-time	71	45	45	0

*Daytime $L_{Aeq,16hr}$, night-time $L_{Aeq,8hr}$

The assessment has demonstrated that the typical requirements established in BS 8233:2014 will be met inside all habitable rooms when standard double glazing and non-acoustic trickle ventilators (with the exception of acoustic trickle vents to bedrooms facing the main road) are installed with the acoustic specifications given in Table 8 and
Table 9.

Where background ventilation is provided by an MVHR system or similar, trickle ventilators will not be used and internal sound levels will therefore be lower than tabulated above. MVHR systems must be provided with intake and discharge attenuation, where necessary, to control intrusive levels to meet the BS 8233:2014 guidance values shown in Table 2 of this report.

EXTERNAL AMENITY LEVELS

Ground floor flats will have private gardens at the rear of the building, while occupants of flats on the other floors will have access to private or shared terraces at the rear. Based on the measured sound levels at position 02, ambient sound levels at the rear of the property will be in the region of 53dB $L_{Aeq\ 16\ hr}$, and therefore between the lower and upper guidance values (50dB $L_{Aeq\ 16\ hr}$ and 55dB $L_{Aeq\ 16\ hr}$ respectively) in BS 8233:2014 for external amenity areas.

Flats fronting onto Malden Road will also have small private gardens or terraces. While the noise levels at these locations will be higher than the upper guidance value in BS 8233:2014, the standard notes that

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.

BUILDING REGULATIONS PART O

It is important to note that the building envelope sound insulation specifications and associated advice given in this report are based on meeting the design criteria under the "Whole Dwelling Ventilation" conditions set out in Approved Document F (and formerly referred to as "background ventilation" in previous editions of the AD), as distinct from "Extract Ventilation" or "Purge Ventilation" conditions within the AD, and from the overheating condition (which is only briefly mentioned in AD F).

Current requirements are set out in Table 11. The highest sound reduction value required for each elevation is in **bold** face. Note that only night-time sound levels in bedrooms need to be assessed for compliance with Approved Document O.

Table 11 Overheating mitigation and acoustics

Elevation	Room Type	Parameter	External sound level, dB	Minimum sound reduction required, dBA*	See Note
Front, ground and first floors	Bedroom	$L_{Aeq\ 8\ hr\ night\text{-}time}$	57	17	See Note 2
		$L_{AfMax\ (10th\ highest)\ night\text{-}time}$	76	**21**	
Front, second and third floors	Bedroom	$L_{Aeq\ 8\ hr\ night\text{-}time}$	56	16	See Note 2
		$L_{AfMax\ (10th\ highest)\ night\text{-}time}$	73	**18**	
Rear	Bedroom	$L_{Aeq\ 8\ hr\ night\text{-}time}$	44	4	See Note 1
		$L_{AfMax\ (10th\ highest)\ night\text{-}time}$	66	**11**	
Side	Bedroom	$L_{Aeq\ 8\ hr\ night\text{-}time}$	52	12	See Note 2
		$L_{AfMax\ (10th\ highest)\ night\text{-}time}$	71	**16**	

* Difference between external sound level and internal criterion

Notes:

1. Mitigation of overheating by opening windows likely to acceptable, subject to confirmation of effective window open area required
2. Mitigation of overheating by opening windows NOT acceptable and an alternative means of providing the additional ventilation will be required. For example, louvred ventilation panels with an attenuation of Dne,w + Ctr 21dB or higher on the front elevation and Dne,w + Ctr 16dB or higher on the side elevation

CONCLUSION

Love Design Studio has been commissioned to undertake a planning stage noise assessment for a proposed new residential development at 160 Malden Road in Kentish Town.

In support of these assessment works, a baseline noise survey was undertaken to determine the prevailing environmental noise levels at the façades of the proposed building.

The results of the assessments were analysed and reviewed in line with the aims and advice contained within the National Policy Statement for England, the National Planning Policy Framework, Planning Practice Guidance and the Institute of Acoustics Professional Practice Guidance for new residential development.

The advice in the IoA ProPG document indicates that at the worst-affected façade noise levels are in the medium risk range but that the risk may be reduced by following a good acoustic design process".

The assessment has demonstrated that the requirements established in BS 8233:2014 will be met inside all habitable rooms when fitted with suitable double-glazed windows and standard trickle ventilators with the exception of bedrooms facing Malden Road which should have typical Acoustic trickle ventilators specified.

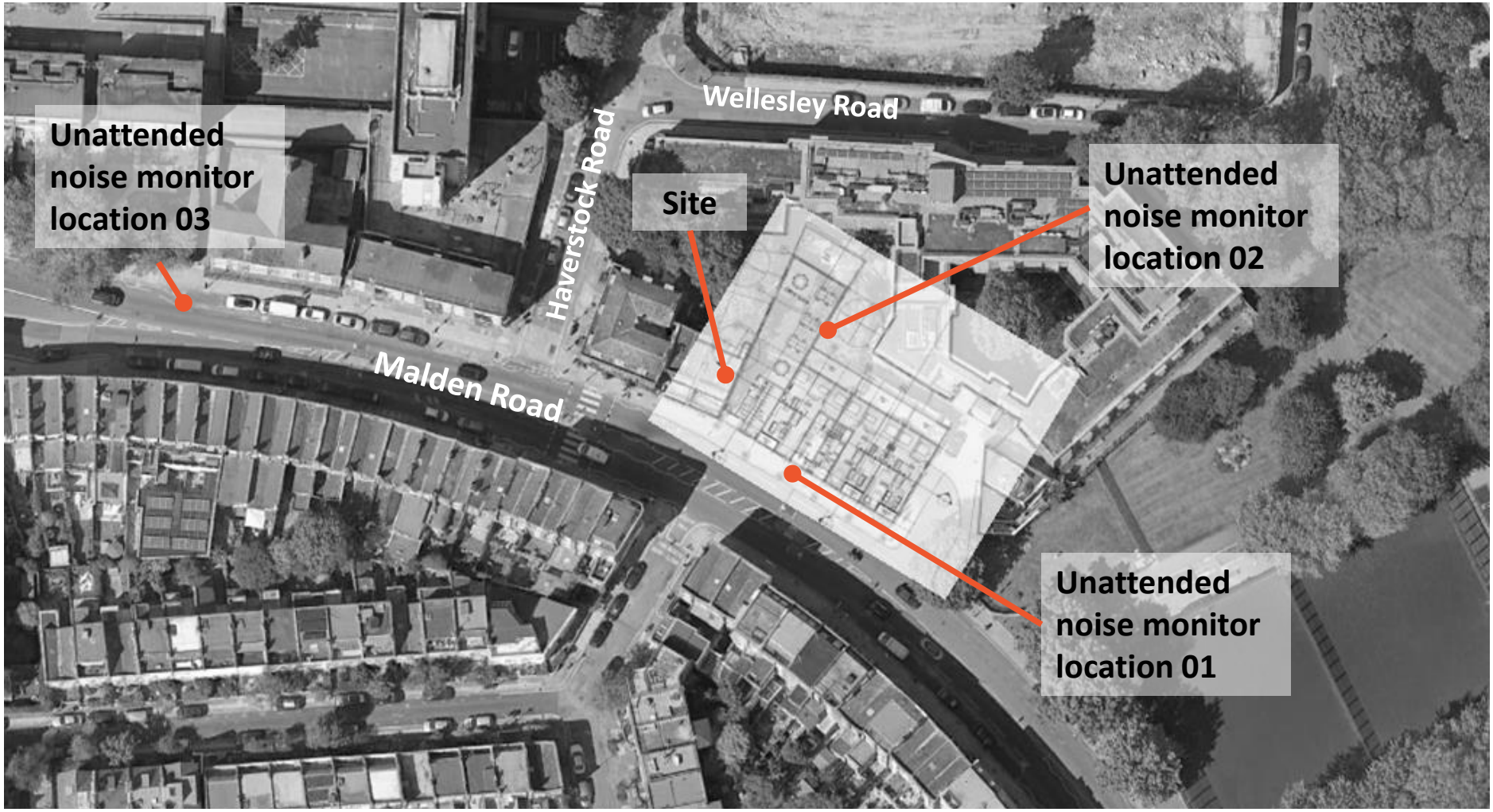
The site can, therefore, be considered suitable for the proposed change of use.

APPENDIX A - ACOUSTIC TERMINOLOGY

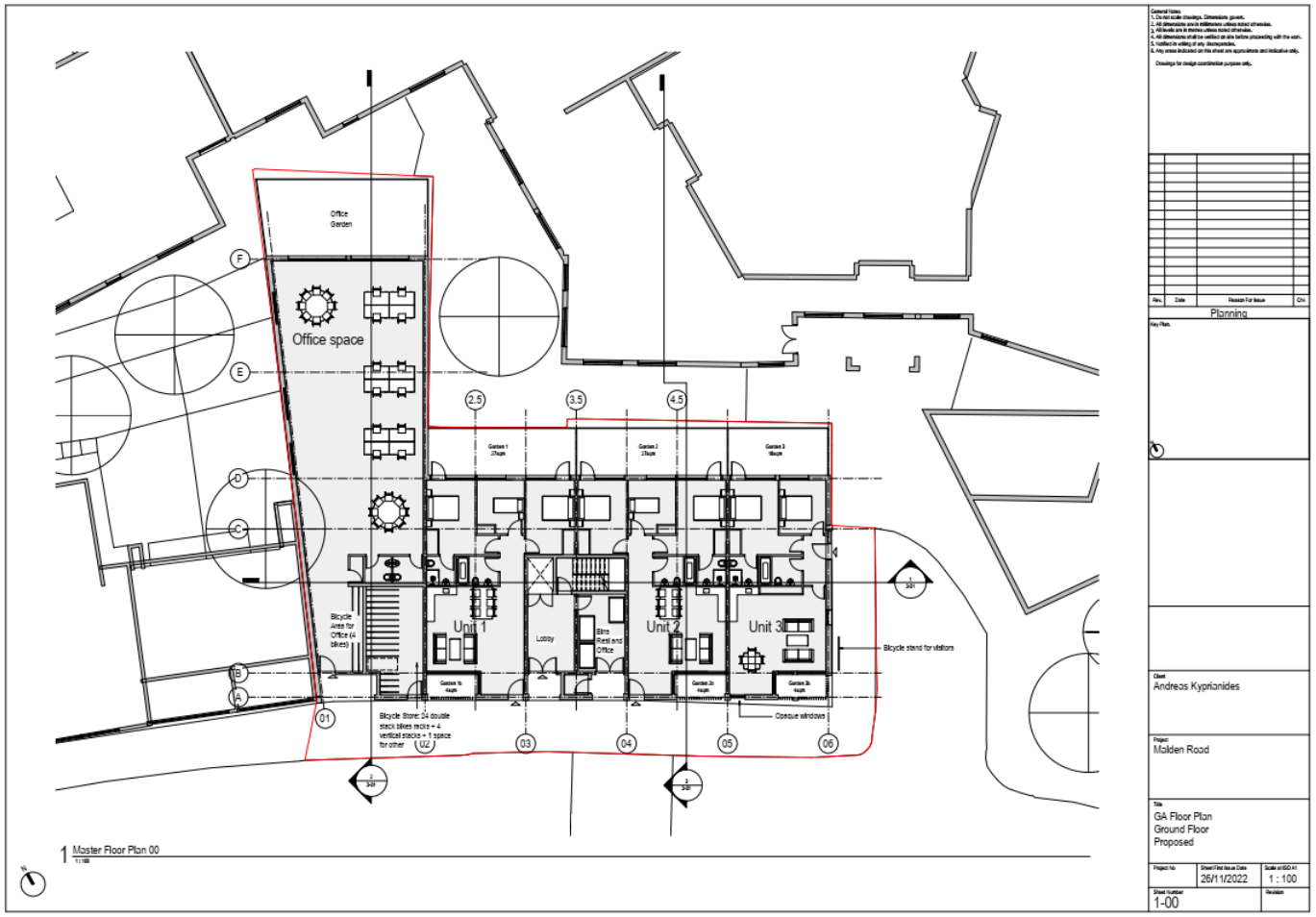
Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 $\log_{10}$ (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa. The threshold of normal hearing is in the region of 0dB and 140dB is the threshold of pain. A change of 1dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3dB(A) is the minimum perceptible under normal conditions, and a change of 10dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30dB(A); normal conversation about 60dB(A) at 1 metre; heavy road traffic about 80dB(A) at 10 metres; the level near a pneumatic drill about 100dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.

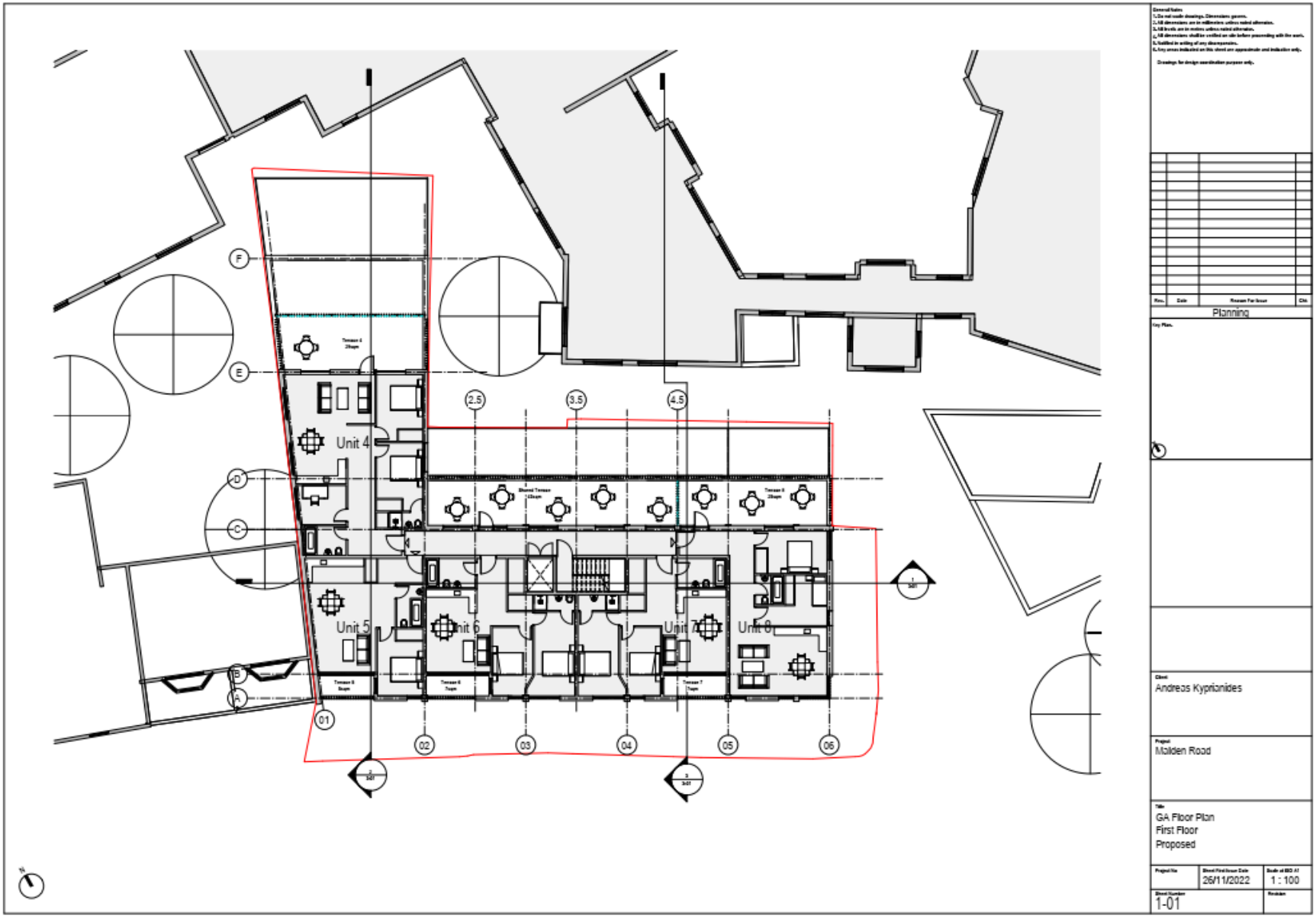
Parameter	Description
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A – weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the “average minimum” noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

APPENDIX B - PLACES OF INTEREST



APPENDIX C - PLANS AND ELEVATION DRAWINGS

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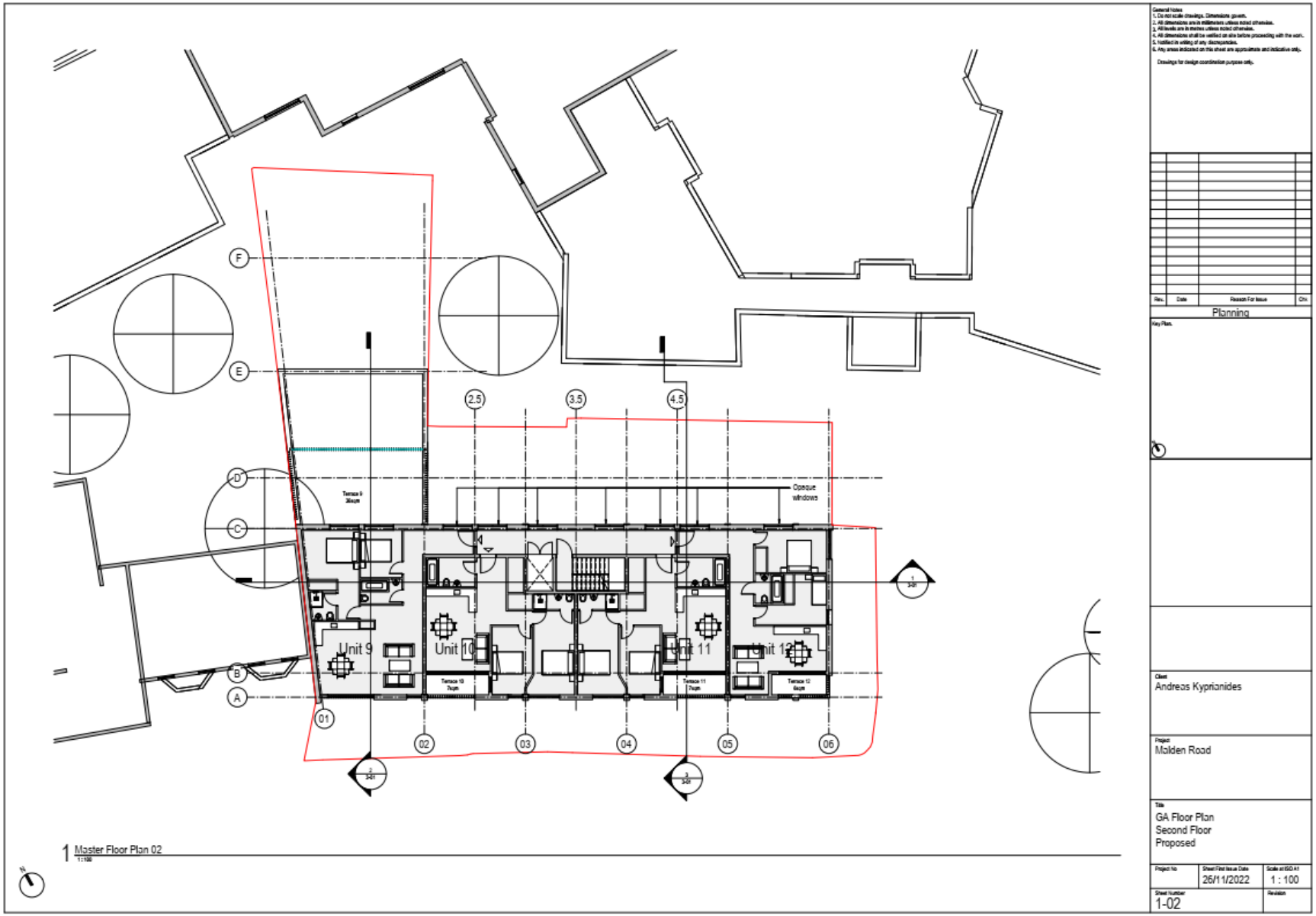
Unit 5
Unit 6
Unit 7
Unit 8
F
E
D
C
B
A
01
02
03
04
05
06
2.5
3.5
4.5
Planning
Andreas Kyprianides
Molden Road
GA Floor Plan
First Floor
Proposed
26/11/2022
1 : 100
1-01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E
D
C
B
A
01
02
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04
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06
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3.5
4.5
Unit 9
Unit 10
Unit 11
Unit 12
Opaque windows
1 Master Floor Plan 02
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Planning
Andreas Kyprianides
Molden Road
GA Floor Plan
Second Floor
Proposed
26/11/2022
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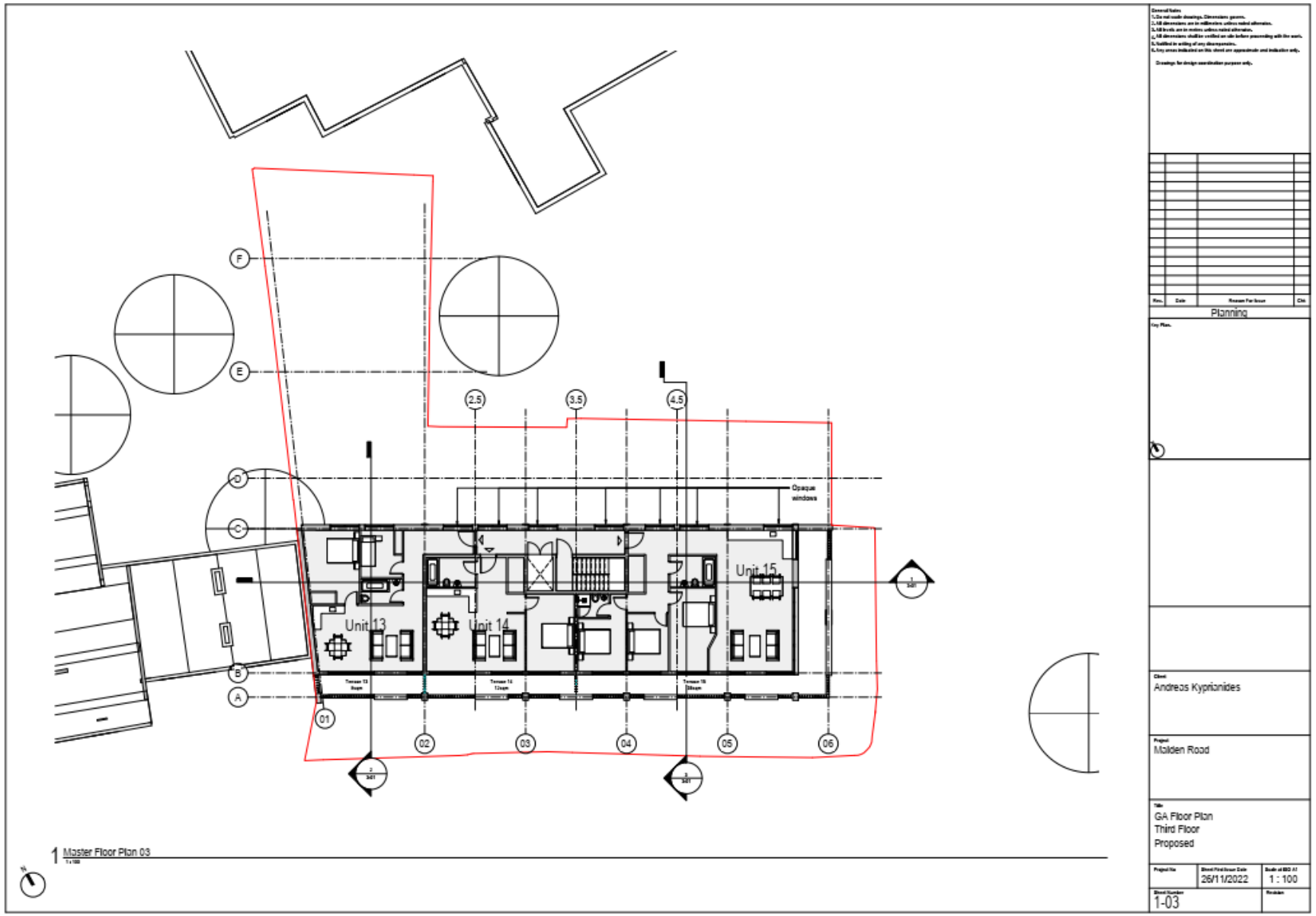
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B
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01
02
03
04
05
06
Opaque windows
Unit 13
Unit 14
Unit 15
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Planning
Andreas Kyprianides
Malden Road
GA Floor Plan
Third Floor
Proposed
26/11/2022
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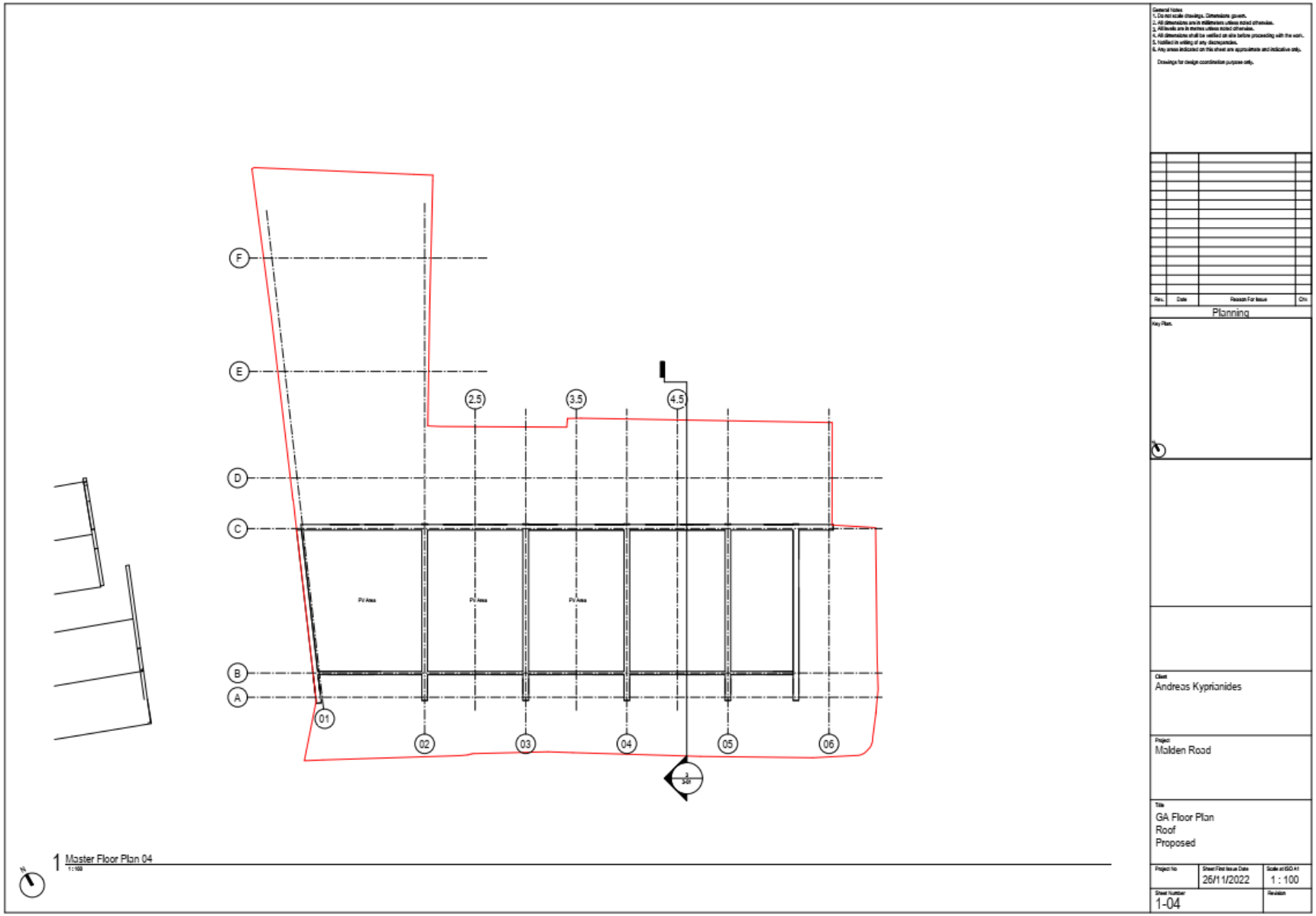
1-03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E
D
C
B
A
2.5
3.5
4.5
01
02
03
04
05
06
PV Area
PV Area
PV Area
1 Master Floor Plan 04
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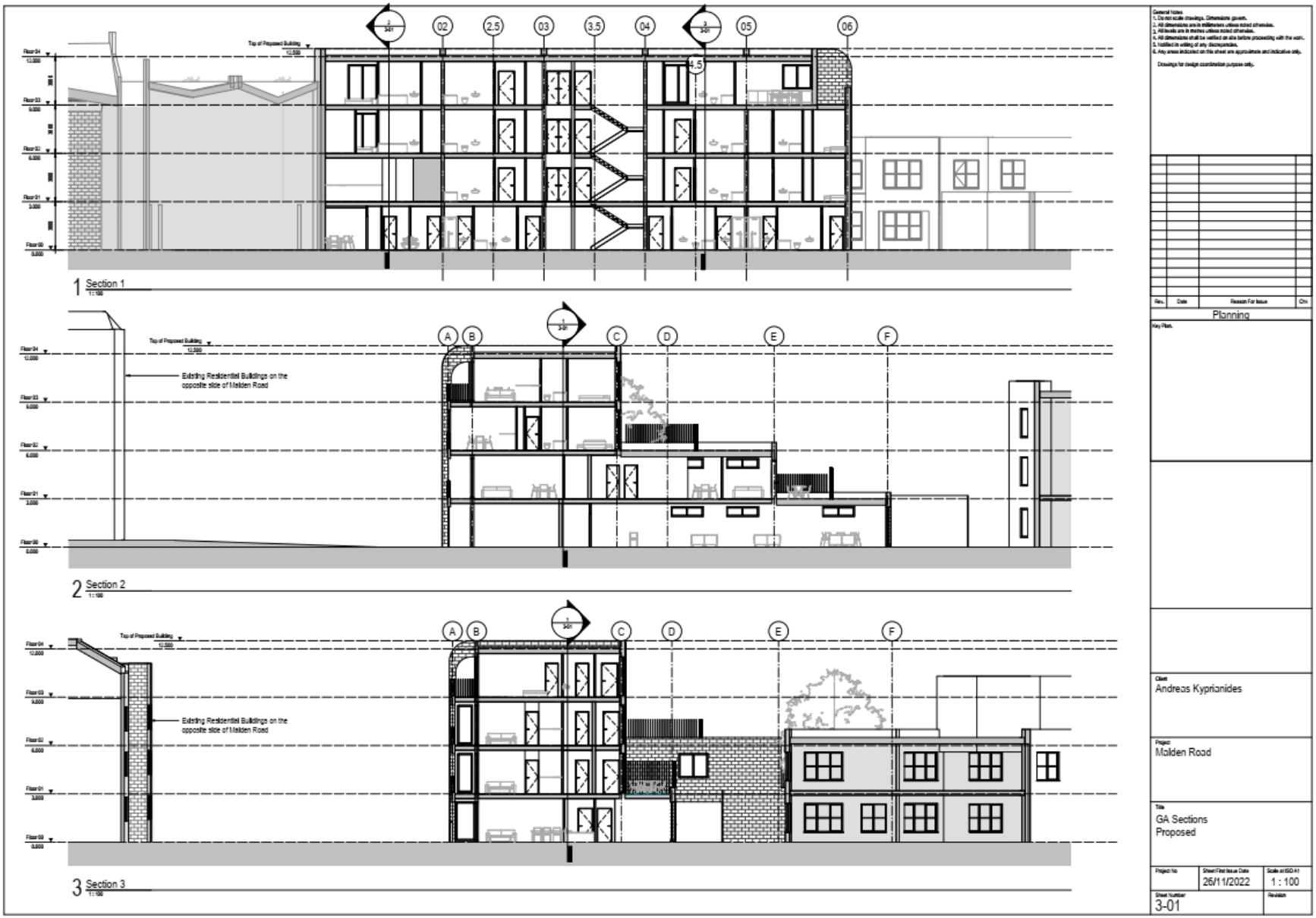
Planning
Andreas Kyprianides
Molden Road
GA Floor Plan
Roof
Proposed
26/11/2022
1 : 100
1-04


1 Section 1
1:100
2 Section 2
1:100
3 Section 3
1:100
Existing Residential Buildings on the opposite side of Malden Road
Existing Residential Buildings on the opposite side of Malden Road
Planning
Andreas Kyprianides
Malden Road
GA Sections
Proposed
26/11/2022
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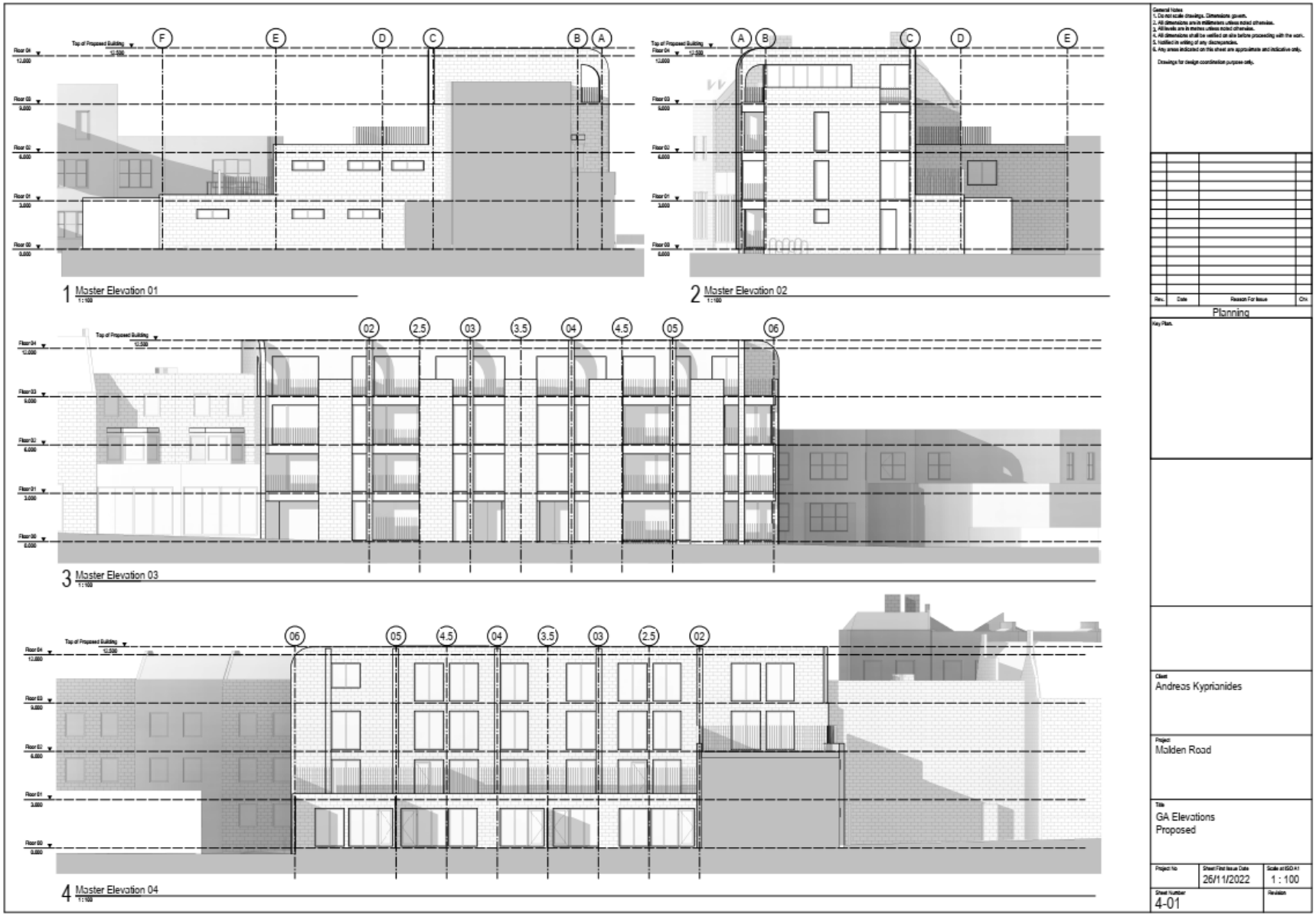
3-01


F E D C B A
1 Master Elevation 01
A B C D E
2 Master Elevation 02
02 2.5 03 3.5 04 4.5 05 06
3 Master Elevation 03
06 05 4.5 04 3.5 03 2.5 02
4 Master Elevation 04
General Notes
1. Do not scale drawings. Dimensions given.
2. All dimensions are in millimeters unless noted otherwise.
3. All levels are in metres unless noted otherwise.
4. All dimensions shall be verified on site before proceeding with the work.
5. Notified in writing of any discrepancies.
6. Any areas indicated on this sheet are approximate and indicative only.
Drawings for design coordination purpose only.
Rev. Date Reason For Issue Chk
Planning
Key Plan.
Client
Andreas Kyprianides
Project
Malden Road
Title
GA Elevations
Proposed
Project No
Sheet First Issue Date
26/11/2022
Scale at ISO A1
1 : 100
Sheet Number
4-01
Revision

APPENDIX D - ENVIRONMENTAL SOUND SURVEY

DETAILS OF ENVIRONMENTAL SOUND SURVEY

Measurements of the existing sound levels were undertaken between 11.45 hours on Monday 17th January and 15.00 hours on Tuesday 18th January 2023.

The sound level meters were programmed to record the A-weighted L_{eq}, L_{90}, L_{10} and L_{max} noise indices..

MEASUREMENT POSITION

Three sound level meters were used, as shown in **Appendix B**. The meters at positions 01 and 03 were located on lamp-posts alongside Malden Road, with the microphone in each case approximately 3m above road level. The microphone of the meter at position 02 was mounted on a tripod approximately 1.8m above ground level and more than 3m from any other reflecting surface.

In accordance with BS 7445-2:1991 ***'DESCRIPTION AND MEASUREMENT OF ENVIRONMENTAL NOISE – PART 2: GUIDE TO THE ACQUISITION OF DATA PERTINENT TO LAND USE', THE MEASUREMENTS WERE UNDERTAKEN UNDER FREE-FIELD CONDITIONS.***

EQUIPMENT

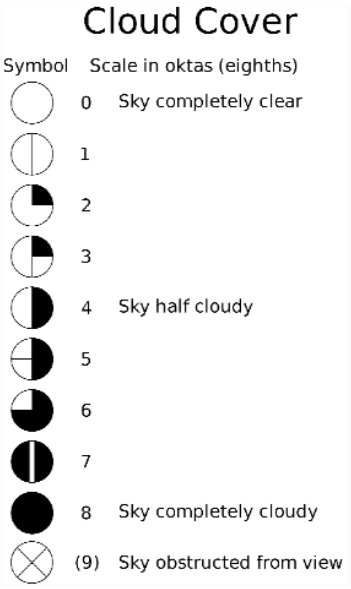
Details of the equipment used during the survey are provided in the table below. The sound level meter was calibrated before and after the survey; no significant change in the calibration level was noted.

Position	Description	Model / serial no.	Calibration date	Calibration certificate no.
01	Class 1 Sound level meter	Svantek 971A / 124660	27/07/2022	Factory conformation certificate
	Condenser microphone	ACO Pacific 7152 / 82792		
	Preamplifier	Svantek SV18A / 126257		
	Calibrator	Svantek SV33B / 125546	29/06/2022	Factory conformation certificate

Position	Description	Model / serial no.	Calibration date	Calibration certificate no.
02	Class 1 Sound level meter	Svantek 971A / 124655	26/07/2022	Factory conformation certificate
	Condenser microphone	ACO Pacific 7152 / 84710		
	Preamplifier	Svantek SV18A / 126200		
	Calibrator	Svantek SV33B / 125706	09/09/2022	Factory conformation certificate
03	Class 1 Sound level meter	Svantek 971 / 111624	23/11/2022	1503962-1
	Condenser microphone	ACO Pacific 7052E / 80036		
	Preamplifier	Svantek SV 18 / 112639		
	Calibrator	Svantek SV 33B / 83850	24/10/2022	1503647-1

WEATHER CONDITIONS

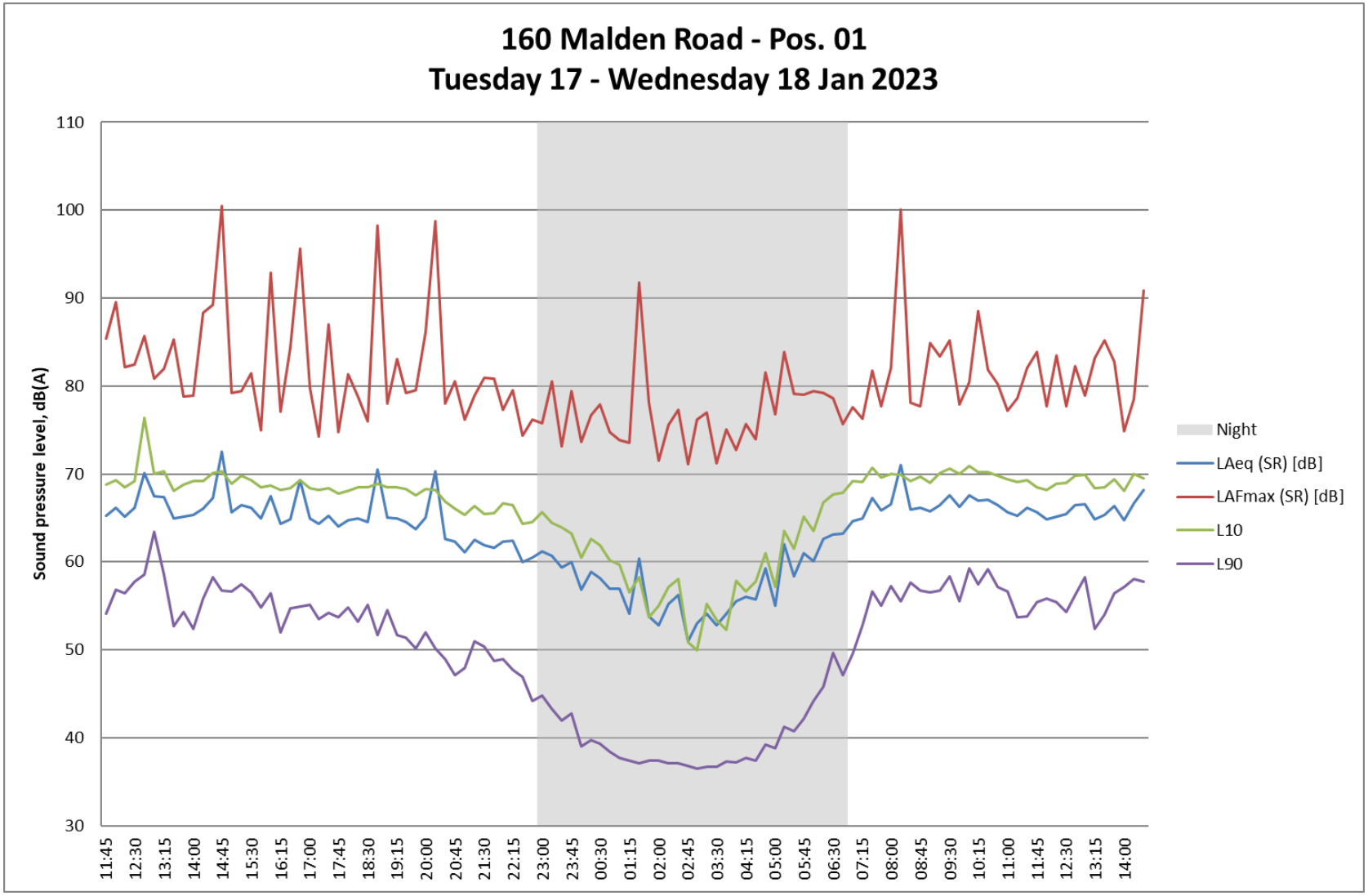
Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the beginning and end of the survey.

Weather Conditions				
Measurement Location	**Date/Time**	**Description**	**Beginning of Survey**	**End of Survey**
As indicated on Appendix B	11.45 17 Jan 2023 - 15.00 18 Jan 2023	Temperature (°C)	-2	3
		Precipitation:	No	No
		Cloud cover (oktas - see guide)	4	2
		Presence of fog/snow/ice	Some ice on sheltered areas	Some ice on sheltered areas
		Presence of damp roads/wet ground	Some wet patches	Some wet patches
		Wind Speed (m/s)	<1	2-3
		Wind Direction	-	ENE
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	-	-

RESULTS

During installation and removal of the sound measurement equipment the main noise sources affecting the site were observed to be traffic at the front of the site and services plant at the rear.

The results of the survey are presented in time history graphs overleaf.


160 Malden Road - Pos. 01
Tuesday 17 - Wednesday 18 Jan 2023
Sound pressure level, dB(A)
110
100
90
80
70
60
50
40
30
11:45
12:30
13:15
14:00
14:45
15:30
16:15
17:00
17:45
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08:45
09:30
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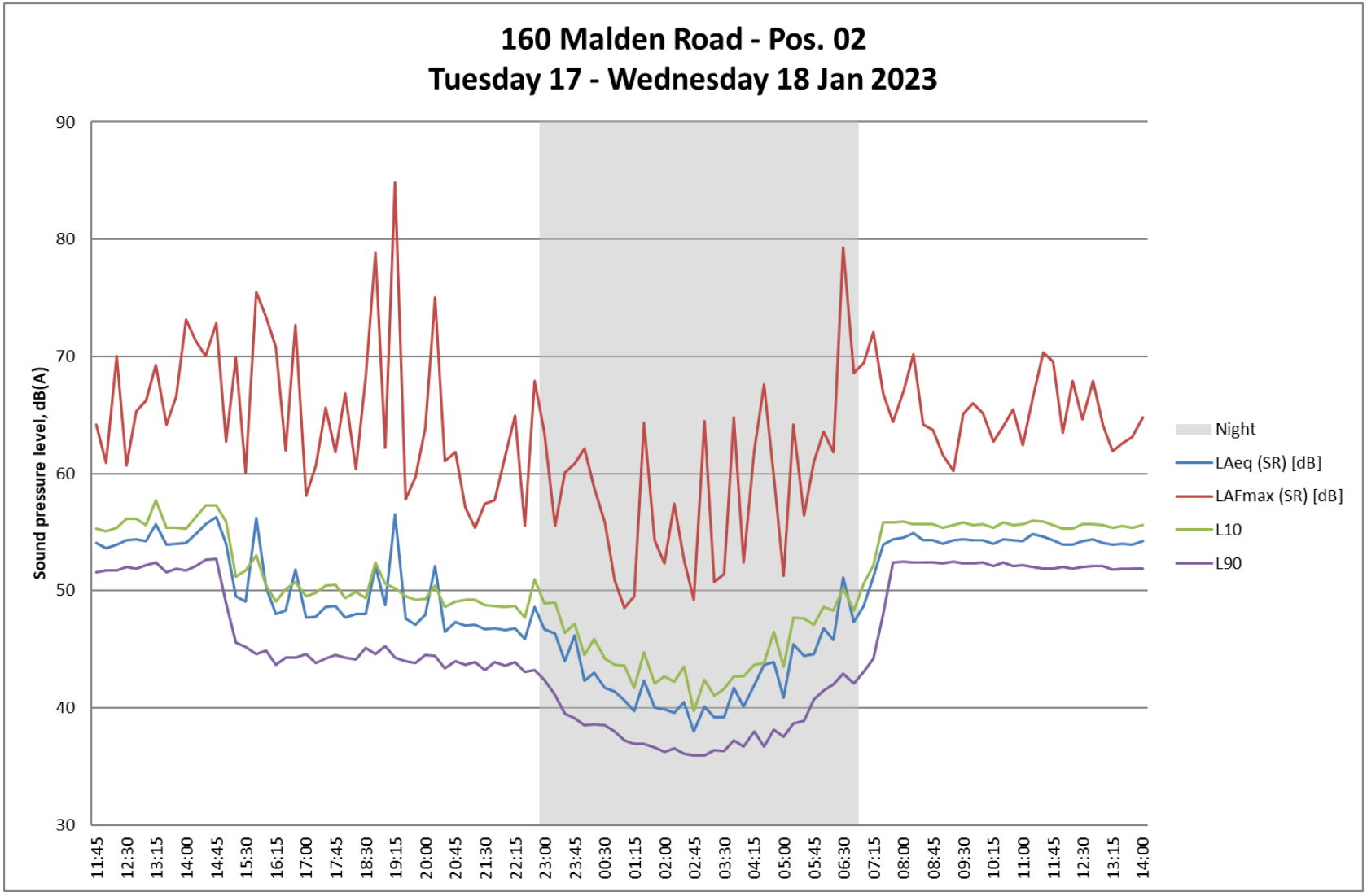
Night
LAeq (SR) [dB]
LAFmax (SR) [dB]
L10
L90


160 Malden Road - Pos. 02
Tuesday 17 - Wednesday 18 Jan 2023
Sound pressure level, dB(A)
90
80
70
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50
40
30
11:45
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09:30
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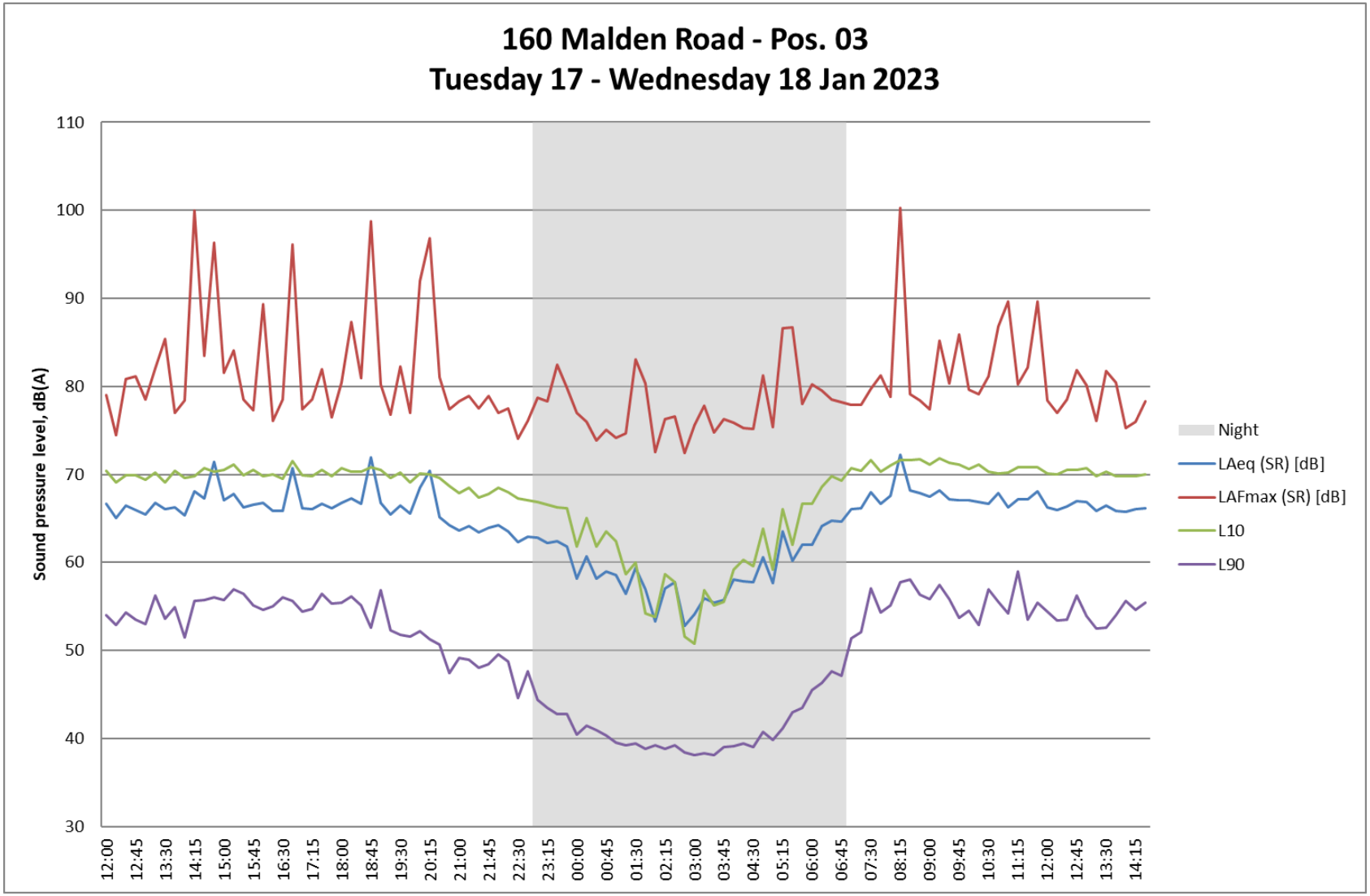
Night
LAeq (SR) [dB]
LAFmax (SR) [dB]
L10
L90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Tuesday 17 - Wednesday 18 Jan 2023
Sound pressure level, dB(A)
110
100
90
80
70
60
50
40
30
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16:30
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00:45
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03:45
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05:15
06:00
06:45
07:30
08:15
09:00
09:45
10:30
11:15
12:00
12:45
13:30
14:15
Night
LAeq (SR) [dB]
LAFmax (SR) [dB]
L10
L90

DOCUMENT INFORMATION

Authorisation and Version Control	
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APPENDIX E – PLANT NOISE GUIDANCE DOCUMENT

Love Design Studio has also carried out a noise survey to set noise limits for plant to be installed at the proposed office and residential development located along 160 Malden Road, Kentish Town.

LOVE DESIGN STUDIO

PLANT NOISE DESIGN GUIDANCE (NOT FOR PLANNING)

Land at 160 Malden Road, Kentish Town, NW5 4BT
by Love Design Studio

January 2023
PR455_V0

CONTENTS

EXECUTIVE SUMMARY

Love Design Studio has carried out a noise survey to set noise limits for plant to be installed at the proposed office and residential development located along 160 Malden Road, Kentish Town.

It is assumed that services plant will be installed on the roof of the building. Plant serving the offices may include small MVHR ventilation units and toilet extract fans. Air source heat pumps may serve the flats.

Based on the information contained within this report, the following plant noise emission limits apply:

Guidance on maximum refrigeration plant noise emission limits

Plant	Period	Maximum plant noise emission level
Office plant	Office hours (08.00 – 18.00 hrs)	66dB L_{wA} sound power level
Residential plant (east)	Daytime (07.00 – 23.00 hours)	74dB L_{wA} sound power level
	Night-time (23.00 – 07.00 hours)	66dB L_{wA} sound power level
Residential plant (west)	Daytime (07.00 – 23.00 hours)	75dB L_{wA} sound power level
	Night-time (23.00 – 07.00 hours)	67dB L_{wA} sound power level

INTRODUCTION

Love Design Studio has been commissioned to provide guidance on the maximum noise emissions for new plant serving the proposed new office and residential development at 160 Malden Road in Kentish Town.

This report contains recommendations based on project information available at the time of the assessment and the results of a baseline noise survey. Further guidance can be provided when plant selections have been made.

To assist with the understanding of this report a glossary of acoustic terms can be found in **Appendix A**. An in-depth glossary of acoustic terms can be viewed online at www.acoustic-glossary.co.uk.

DETAILS OF DEVELOPMENT PROPOSALS

The proposed development is located along Malden Road, Kentish town in an area comprised of both residential and commercial premises. The proposed development includes an office space and 15 new dwellings, replacing the existing MOT testing centre and car wash.

Plant requirements and locations are to be finalised. For the purposes of this initial assessment it is assumed that plant may comprise a small MVHR ventilation unit and associated air source heat pump serving the office space, an extract fan serving the office toilets and air source heat pumps serving the flats. Plant serving the office is to be located on the roof of the west wing of the building, at ground floor level. The plant serving the flats will be located on the east and west ends of the roof of the main building. These locations are indicated in Figure 1.

Figure 1 Locations of plant and position of Receptor R1

Residential plant (west) on roof

Residential plant (east) on roof

It is assumed that plant serving the offices will operate only during normal business hours, 08.00 to 18.00, Monday to Friday. Plant serving the flats may run at any time.

NEAREST NOISE SENSITIVE RECEPTORS

The area to the rear of the site is predominantly residential, with Wellesley Road Care Home (Receptor R1) immediately to the north. In addition, noise to the rear of the proposed new flats has also been considered.

An aerial photograph showing the site and surrounding area, the nearest noise sensitive properties and noise monitoring location used in this assessment is presented in **Appendix B**.

EXISTING NOISE CLIMATE

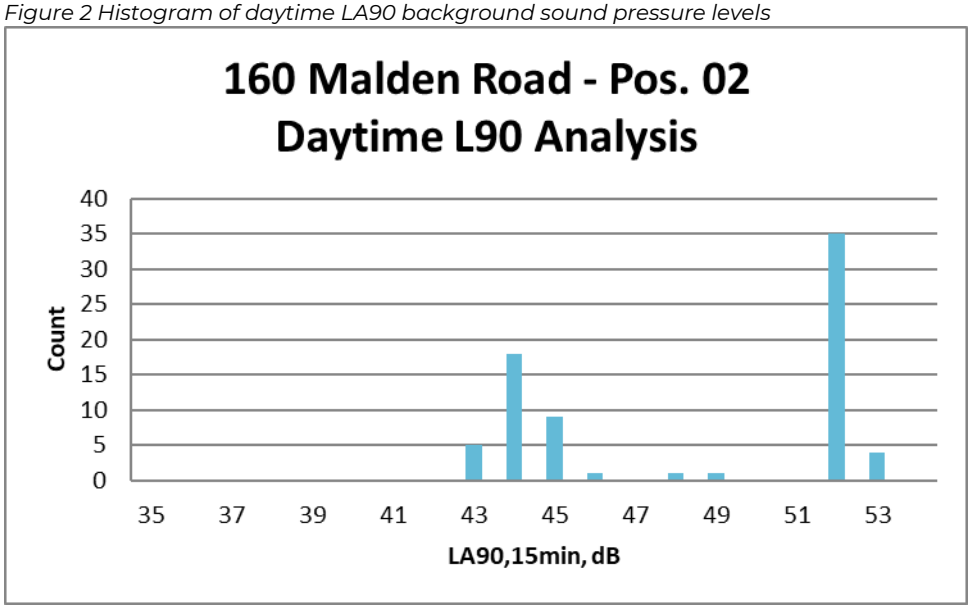
An environmental noise survey was undertaken to establish the typical background sound levels at a location representative of the noise climate outside the façades of the nearest noise sensitive receptors to the proposed plant area, during the quietest times at which the plant will operate. For consistency with the planning noise assessment, the survey location is referred to as position 02.

The results of the environmental sound survey are summarised in Table 1 below. The full set of measurement results and details of the survey methodology are presented in Error! Reference source not found..

Table 1 Summary of survey results

Measurement period	Range of recorded sound pressure levels (dB)			
	$L_{Aeq(15mins)}$	$L_{AFmax(15mins)}$	$L_{A10(15mins)}$	$L_{A90(15mins)}$
Daytime (07.00 – 23.00 hours)	46 - 57	55 - 85	48 - 58	43 - 53
Night-time (23.00 – 07.00 hours)	38 - 51	49 - 79	40 - 50	36 – 43
Office hours (08.00 – 18.00 hours)	48 - 56	58 - 76	49 - 58	44 - 53

Figure 2 Histogram of daytime LA90 background sound pressure levels

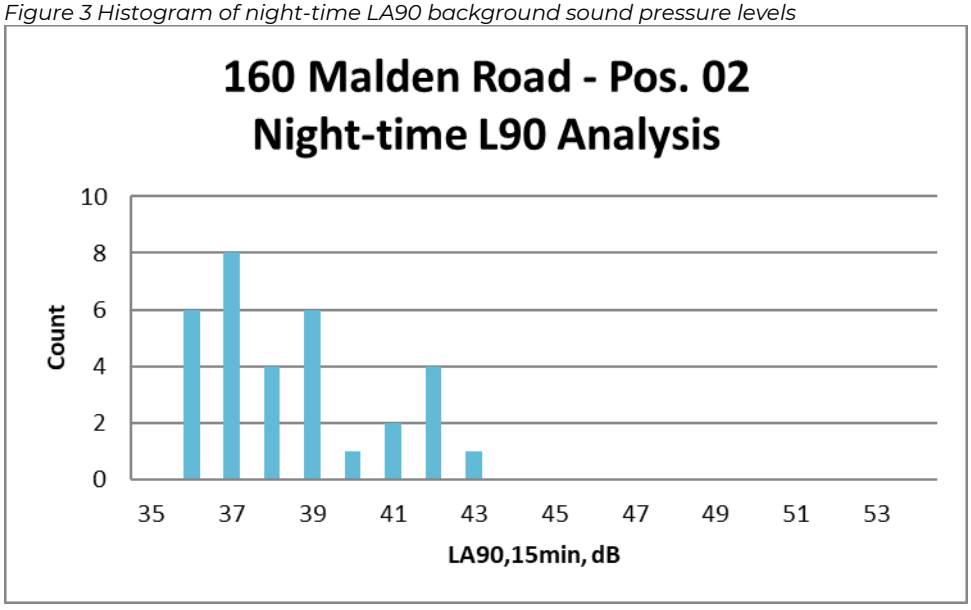


Further statistical analysis has been carried out on the data, and the mean, modal and median values are shown in Table 2 below.

Table 2 Statistical analysis of $L_{A90,15min}$ levels during the daytime period

dB, L_{A90} daytime period	
mean	48
modal	52
median	52

Figure 3 Histogram of night-time LA90 background sound pressure levels

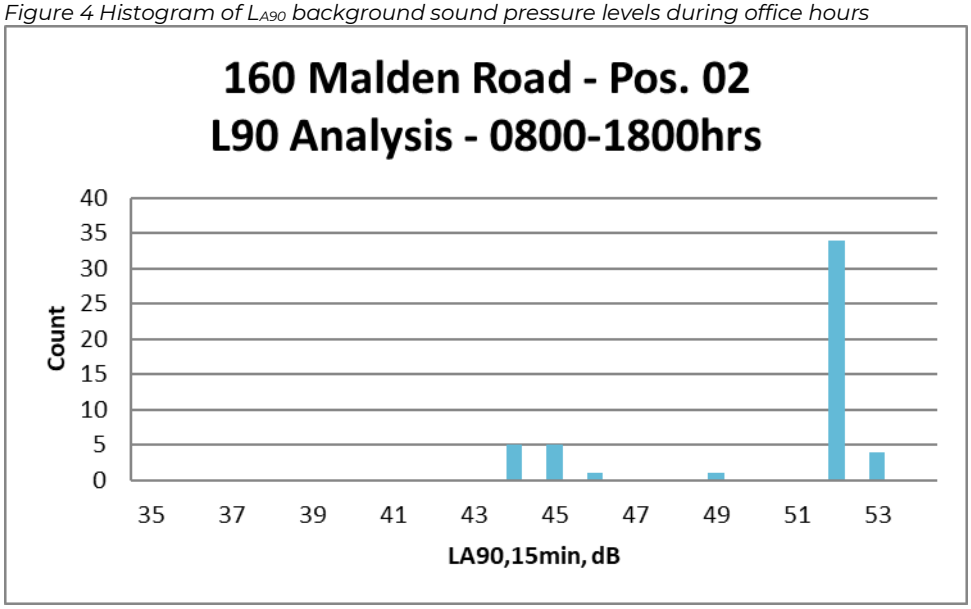


Further statistical analysis has been carried out on the data and the mean, modal and median values are shown in Table 3 below.

Table 3 Statistical analysis of $L_{A90,15min}$ levels during the night-time period

dB, L_{A90} night-time period	
mean	38
modal	37
median	38

Figure 4 Histogram of L_{A90} background sound pressure levels during office hours



Further statistical analysis has been carried out on the data, and the mean, modal and median values are shown in Table 4 below.

Table 4 Statistical analysis of $L_{A90,15min}$ levels during office hours

dB, L_{A90} daytime period	
mean	50
modal	52
median	52

The following values are considered representative of the existing background sound pressure levels at nearby noise sensitive premises:

- 44dB L_{A90} during the daytime period;
- 37dB L_{A90} during the night-time period; and
- 45dB L_{A90} during normal office hours (08.00 to 18.00 hrs).

PLANT NOISE DESIGN CRITERIA

LONDON BOROUGH OF CAMDEN

Section 6 of the Camden Planning Guidance Amenity, published January 2021, gives guidance on noise and vibration.

Clause 6.8 refers to noise thresholds within Appendix 3 of the Local Plan and to the principles of No observed effect level (NOEL), Lowest observable adverse effect level (LOAEL) and Significant observed adverse effect level (SOAEL) and defines their meanings. Specifically, in the context of this report, LOAEL is defined as:

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.

SOEAL is defined as:

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.

Clause 6.27 states that:

DEVELOPMENTS PROPOSING PLANT, VENTILATION, AIR EXTRACTION OR CONDITIONING EQUIPMENT AND FLUES WILL NEED TO PROVIDE THE SYSTEM'S TECHNICAL SPECIFICATIONS TO THE COUNCIL ACCOMPANYING ANY ACOUSTIC REPORT. "BS4142 METHOD FOR RATING INDUSTRIAL AND COMMERCIAL SOUND' CONTAINS GUIDANCE AND STANDARDS WHICH SHOULD ALSO BE CONSIDERED WITHIN THE ACOUSTIC REPORT.

Appendix 3 within the Camden Local Plan published 2017 states:

"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 (15dB IF TONAL COMPONENTS ARE PRESENT) SHOULD BE CONSIDERED AS THE DESIGN CRITERION)."

Table C of the appendix – reproduced here as Table 5 - states the criteria at which development related noise levels will be acceptable:

Table 5 Table C: Noise levels applicable to proposed industrial and commercial development (including plant and machinery)

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dBL_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{Amax}

10dB SHOULD BE INCREASED TO 15DB IF THE NOISE CONTAINS AUDIBLE TONAL ELEMENTS. (DAY AND NIGHT). HOWEVER, IF IT CAN BE DEMONSTRATED THAT THERE IS NO SIGNIFICANT DIFFERENCE IN THE CHARACTER OF THE RESIDUAL BACKGROUND NOISE AND THE SPECIFIC NOISE FROM THE PROPOSED DEVELOPMENT THEN THIS REDUCTION MAY NOT BE REQUIRED. IN ADDITION, A FREQUENCY ANALYSIS (TO INCLUDE, THE USE OF NOISE RATING (NR) CURVES OR OTHER CRITERIA CURVES) FOR THE ASSESSMENT OF TONAL OR LOW FREQUENCY NOISE MAY BE REQUIRED.

****LEVELS GIVEN ARE FOR DWELLINGS, HOWEVER, LEVELS ARE USE SPECIFIC AND DIFFERENT LEVELS WILL APPLY DEPENDENT ON THE USE OF THE PREMISES.***

BS 4142:2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

BS 4142:2014+A1:2019 is intended to be used to assess the likely effects of sound on people residing in nearby dwellings. The scope of BS 4142:2014 includes ***"SOUND FROM FIXED PLANT INSTALLATIONS WHICH COMPRISE MECHANICAL AND ELECTRICAL PLANT AND EQUIPMENT".***

The procedure contained in BS 4142:2014 is to quantify the "*specific sound level*", which is the measured or predicted level of sound from the source in question over a one hour period for the daytime and a 15 minute period for the night-time. Daytime is defined in the standard as 07:00 to 23:00 hours, and night-time as 23:00 to 07:00 hours.

The specific sound level is converted to a rating level by adding penalties on a sliding scale to account for either potentially tonal or impulsive elements. The standard sets out objective methods for determining the presence of tones or impulsive elements, but notes that it is acceptable to subjectively determine these effects.

The penalty for tonal elements is between 0dB and 6dB, and the standard notes: ***"SUBJECTIVELY, THIS CAN BE CONVERTED TO A PENALTY OF 2 DB FOR A TONE WHICH IS JUST PERCEPTIBLE AT THE NOISE RECEPTOR, 4 DB WHERE IT IS CLEARLY PERCEPTIBLE, AND 6 DB WHERE IT IS HIGHLY PERCEPTIBLE."***

The penalty for impulsive elements is between 0dB and 9dB, and the standard notes: "*Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible*."

The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;
- 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 or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

The standard does state that ***"ADVERSE IMPACTS INCLUDE, BUT ARE NOT LIMITED TO, ANNOYANCE AND SLEEP DISTURBANCE. NOT ALL ADVERSE IMPACTS WILL LEAD TO COMPLAINTS AND NOT EVERY COMPLAINT IS PROOF OF AN ADVERSE IMPACT."***

The standard goes on to note that: ***"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."***

In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014 edition places emphasis upon an appreciation of the context, as follows:

"AN EFFECTIVE ASSESSMENT CANNOT BE CONDUCTED WITHOUT AN UNDERSTANDING OF THE REASON(S) FOR THE ASSESSMENT AND THE CONTEXT IN WHICH THE SOUND OCCURS/WILL OCCUR. WHEN MAKING ASSESSMENTS AND ARRIVING AT DECISIONS, THEREFORE, IT IS ESSENTIAL TO PLACE THE SOUND IN CONTEXT."

BS 4142:2014 requires uncertainties in the assessment to be considered, and where the uncertainty is likely to affect the outcome of the assessment, steps should be taken to reduce the uncertainty.

PROPOSED CRITERIA

To comply with London Borough of Camden's usual requirements, the cumulative noise rating level of proposed plant should be controlled to a level at least 10dB below the representative L_{A90} background sound level at the nearest residential property. This would also result in a sound level significantly below that at which a 'low impact' may be expected, according to BS 4142:2014.

As such noise from the new plant should not exceed the limits shown in Table 6.

Table 6 Proposed plant noise emissions level limits at nearest residential receptors

Period	Plant rating level (dB $L_{Ar,Tr}$)
Daytime (07.00 – 23.00 hours)	34
Night-time (23.00 – 07.00 hours)	27
Office hours (08.00 – 18.00 hours)	35

The above limits have not been approved by the local authority at this stage.

OUTLINE GUIDANCE - AC PLANT NOISE LIMITS

Cumulative noise levels from the proposed plant should not exceed the following limits to achieve compliance with the criteria detailed in Table 6.

Table 7 Guidance on maximum AC and refrigeration plant noise emission limits

Plant	Period	Maximum plant noise emission level (LAeq)
Office plant	Office hours (08.00 – 18.00 hours)	66dB L_{wA} sound power level
Residential plant (east)	Daytime (07.00 – 23.00 hours)	74dB L_{wA} sound power level
	Night-time (23.00 – 07.00 hours)	66dB L_{wA} sound power level
Residential plant (west)	Daytime (07.00 – 23.00 hours)	75dB L_{wA} sound power level
	Night-time (23.00 – 07.00 hours)	67dB L_{wA} sound power level

Where possible, uncertainty in the above assessments has been minimised by taking the following steps:

- The meter and calibrator used have a traceable laboratory calibration and the meter was field calibrated before and after the measurements.
- Uncertainty in the calculated impacts has been reduced by the use of a well-established calculation method.
- Care was taken to ensure that the measurement positions were representative of the noise climate outside the nearby residential dwellings and not in positions where higher noise levels were present.
- The above guidance is based on a minimum distance of 13m between the proposed plant to the nearest receptors.

The following should be taken into account during the design of the proposed plant:

- The local authority is anticipated to require details of the proposed plant and a noise impact assessment report as part of the planning application.
- Love Design should be consulted once the exact plant layout/selection is confirmed to ensure noise requirements can be achieved.

SUMMARY

Love Design Studio has been commissioned to provide guidance on the maximum noise emissions for new plant serving the proposed new office and residential development at 160 Malden Road in Kentish Town.

An environmental noise survey has been undertaken to establish the existing prevailing noise levels at a location representative of the noise climate outside the nearest noise sensitive receptors to the proposed plant area.

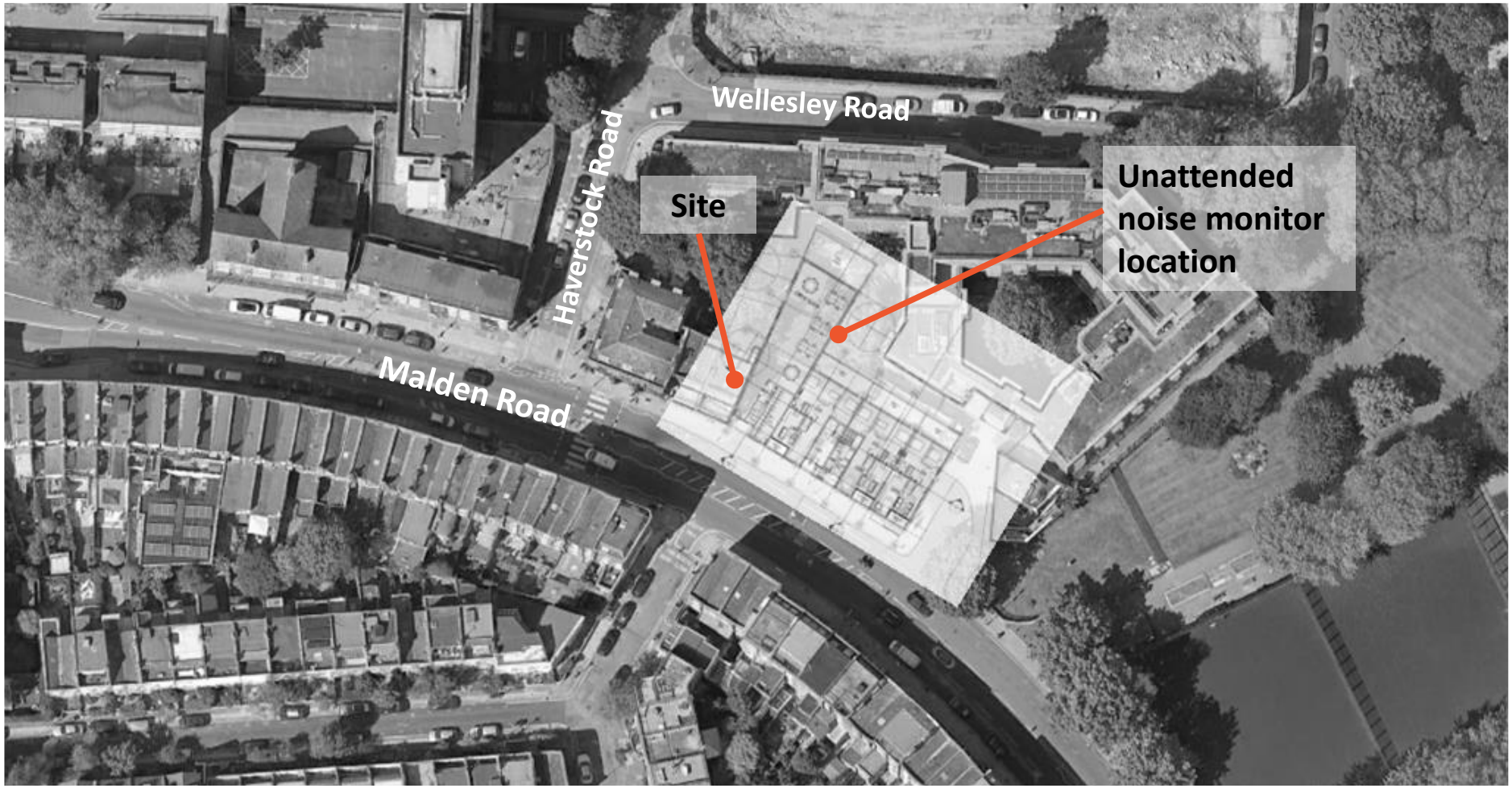
Guidance on the maximum noise emissions from the proposed plant has been provided based on meeting the local authority's usual requirements.

APPENDIX A - ACOUSTIC TERMINOLOGY

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 $\log_{10}$ (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa. The threshold of normal hearing is in the region of 0dB and 140dB is the threshold of pain. A change of 1dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3dB(A) is the minimum perceptible under normal conditions, and a change of 10dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30dB(A); normal conversation about 60dB(A) at 1 metre; heavy road traffic about 80dB(A) at 10 metres; the level near a pneumatic drill about 100dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.

Parameter	Description
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A – weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the “average minimum” noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

APPENDIX B – SITE PLAN



APPENDIX C - ENVIRONMENTAL SOUND SURVEY

DETAILS OF ENVIRONMENTAL SOUND SURVEY

Measurements of the existing background sound levels were undertaken between 11.45 hours on Monday 17th January and 15.00 hours on Tuesday 18th January 2023.

The sound level meter was programmed to record the A-weighted L_{eq}, L_{90}, L_{10} and L_{max} noise indices for consecutive 15-minute sample periods for the duration of the survey.

MEASUREMENT POSITION

The location of the sound level meter is shown in **Appendix B**. The microphone of the meter was mounted on a tripod approximately 1.8m above ground level and more than 3m from any other reflecting surface.

In accordance with BS 7445-2:1991 *'Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use'*, the measurements were undertaken under free-field conditions.

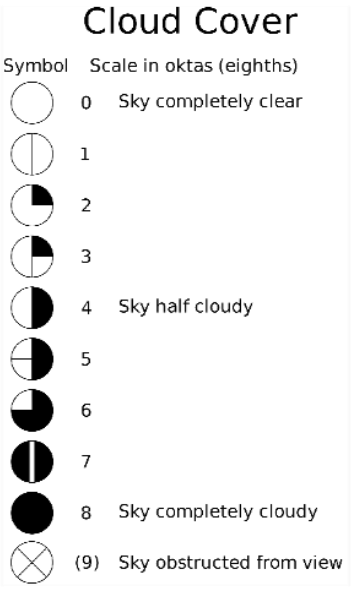
EQUIPMENT

Details of the equipment used during the survey are provided in the table below. The sound level meter was calibrated before and after the survey; no significant change in the calibration level was noted.

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Svantek 971A / 124655	26/07/2022	Factory conformation certificate
Condenser microphone	ACO Pacific 7152 / 84710		
Preamplifier	Svantek SV18A / 126200		
Calibrator	Svantek SV33B / 125706	09/09/2022	Factory conformation certificate

WEATHER CONDITIONS

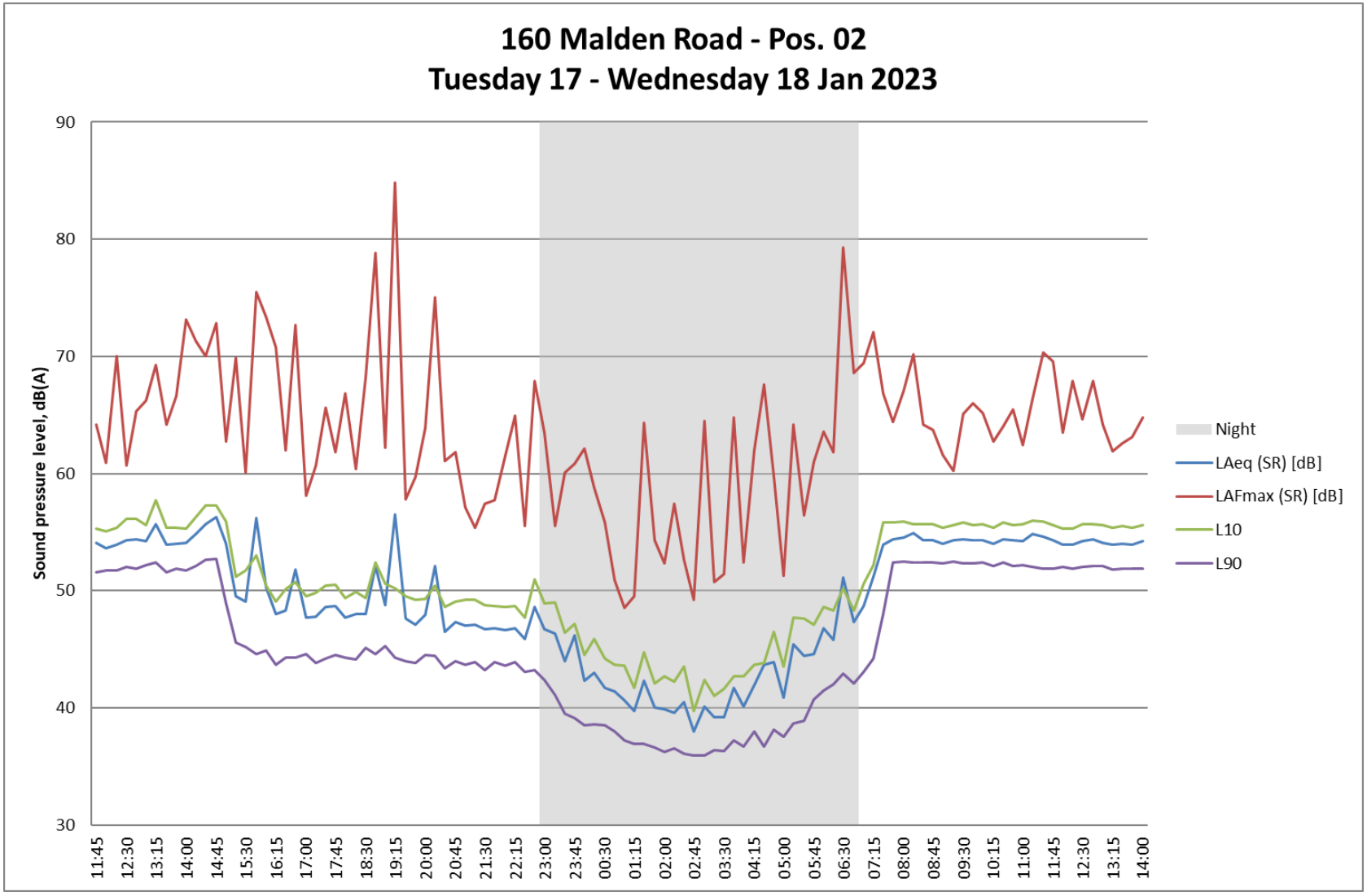
Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the beginning and end of the survey.

Weather Conditions				
Measurement Location	**Date/Time**	**Description**	**Beginning of Survey**	**End of Survey**
As indicated on Appendix B	11.45 17 Jan 2023 - 15.00 18 Jan 2023	Temperature (°C)	-2	3
		Precipitation:	No	No
		Cloud cover (oktas - see guide)	4	4
		Presence of fog/snow/ice	Some ice on sheltered areas	Some ice on sheltered areas
		Presence of damp roads/wet ground	Some wet patches	Some wet patches
		Wind Speed (m/s)	<1	<1
		Wind Direction	-	-
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	-	-

RESULTS

During installation and removal of the sound measurement equipment the main noise source affecting the site was observed to be plant serving neighbouring buildings.

The results of the survey are presented in a time history graph overleaf.


160 Malden Road - Pos. 02
Tuesday 17 - Wednesday 18 Jan 2023
Sound pressure level, dB(A)
90
80
70
60
50
40
30
11:45
12:30
13:15
14:00
14:45
15:30
16:15
17:00
17:45
18:30
19:15
20:00
20:45
21:30
22:15
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02:45
03:30
04:15
05:00
05:45
06:30
07:15
08:00
08:45
09:30
10:15
11:00
11:45
12:30
13:15
14:00
Night
LAeq (SR) [dB]
LAFmax (SR) [dB]
L10
L90

DOCUMENT INFORMATION

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