



88 Knights
Way, Reading
RG4 8RH

Noise Impact Assessment

September
2023



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<i>Revision</i>	-	<i>Rev A</i>	<i>Rev B</i>
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1. Executive Summary

An assessment has been carried out of the present noise climate at **88 Knights Way, Reading RG4 8RH** and the impact of that noise on the proposed development. The proposed scheme involves the demolition of the existing building and erection of a single storey detached dwelling. Revision A to the report includes additional assessment of noise from the nursery, at the request of the Council's Environmental Health Officer, after it was unusually quiet during the original set of noise level measurements.

The site is in a predominantly residential area and shares access with the rear of a block of flats at Grove Road, and "The community food co-op". Immediately adjacent the site is an electricity sub-station. Immediately to the north-west of the site is Emmer Green Kindergarten which is typically open 0800 hrs – 1800 hrs Monday to Friday, 49 weeks a year (closed for 1 week at Christmas, the week after Easter and August Bank Holiday week).

The assessment is based on the results of an environmental noise survey that was been carried out over a 6 day period at the proposed development site in April 2023 and a short term noise measurement survey carried out in September 2023 and considers the requirements of local and national planning policy and best practice guidance.

The initial site risk assessment identified that the site as *low* risk in terms of noise.

It has been identified that the requirements of the Local Authority in respect of internal noise levels can only be achieved through careful consideration of the building envelope. We note that this does not necessitate that the windows be sealed shut but requires that an alternate primary means of ventilating the properties is provided (as defined by the Building Regulations Approved Document F). The construction assumptions that have led to this conclusion are:

- **The façade build-up will be a standard brick and block construction (or equivalent) to achieve an R_w of approximately 55 dB.**
- **A typical double-glazing system in a 4/16/4 configuration (or equivalent) will be installed to give a Sound Reduction Index (SRI) of 28 dB $R_{w,i}$.**
- **Appropriately specified acoustic trickle vents, with a $D_{n,e,w}$ of at least 34 dB, will be installed to allow adequate ventilation without the requirement to open windows.**
- **Purge ventilation (as defined by ADF) through open windows.**
- **Mitigation of overheating (where required) through open windows.**

The assessment has also shown that the external noise level criteria would be achieved within the proposed rear garden.

Overall, it has been shown that, through careful consideration of the building envelope construction, the proposed development should avoid future residents being exposed to harmful levels of noise. It can therefore be concluded that significant adverse impacts on the health or quality of life of those future residents would be avoided, in line with the aims of the NPPF, NPSE and PPG-Noise.

2. Introduction

This report has been prepared to support the planning application for the proposed development at **88 Knights Way, Reading RG4 8RH**. The proposed scheme involves the demolition of the existing building and erection of a single storey detached dwelling. Revision A to the report includes additional assessment of noise from the nursery, at the request of the Council's Environmental Health Officer, after it was unusually quiet during the original set of noise level measurements.

The report assesses, through on-site noise measurements, the impact of the existing noise climate on the proposed development.

A glossary of acoustic terminology is provided in **Appendix 1**.

The site is in a predominantly residential area and shares access with the rear of a block of flats at Grove Road, and "The community food co-op". Immediately adjacent the site is an electricity sub-station. Immediately to the north-west of the site is Emmer Green Kindergarten which is typically open 0800 hrs – 1800 hrs Monday to Friday, 49 weeks a year (closed for 1 week at Christmas, the week after Easter and August Bank Holiday week).

The location of the proposed development site is provided in **Figure 2.1** and the proposed site layout is presented in **Figure 2.2**.

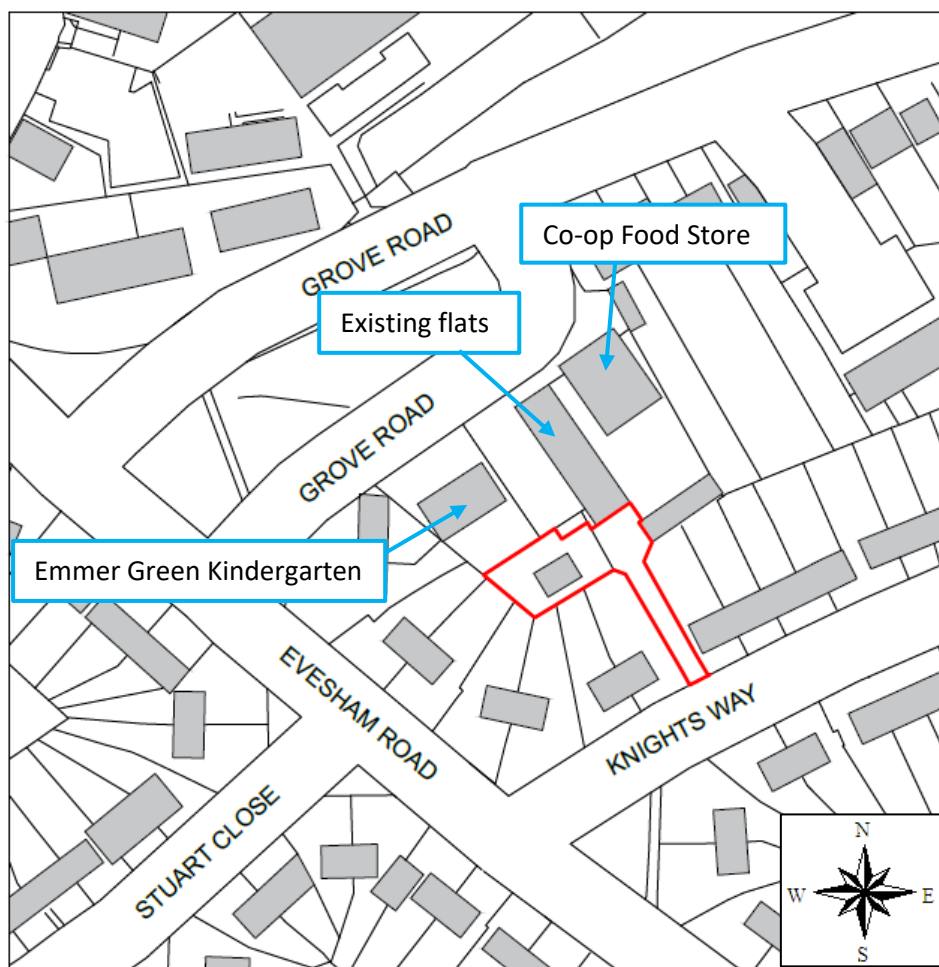


Figure 2.1: Site Location. Site boundary marked in Red.



Figure 2.2: Proposed Site Layout

3. Planning Policy

3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was released in March 2012 and last updated in July 2021. The purpose of the planning system is to contribute to the achievement of sustainable development and to encourage good design. There are three dimensions to sustainable development: economic, social and environmental.

Central to the NPPF, paragraph 10 states: *'At the heart of the National Planning Policy Framework is a presumption in favour of [permitting] sustainable development'*. This is expanded upon in paragraph 11, where it is stated:

'...For decision-taking this means:

- *approving development proposals that accord with an up-to-date development plan without delay; or*
- *where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:*
 - *the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or*
 - *any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole'*

Paragraph 174 states *'Planning policies and decisions should contribute to and enhance the natural and local environment by... preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of... noise pollution...'*.

Paragraph 185 states: *'Planning policies and decisions should also 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:*

- *mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life (see Explanatory Note to the Noise Policy Statement for England (DEFRA)).*
- *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*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'*

3.2. Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) aims to *'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'.*

3.3. Local Planning Policy

The site is located within the administrative boundary of Reading Borough Council. Policy EN16 from the Reading Borough Local Plan (adopted November 2019) is relevant to noise impact on the proposed development, and states:

“EN16: POLLUTION AND WATER RESOURCES

Development will only be permitted where it would not be damaging to the environment and sensitive receptors through land, noise or light pollution; where it would result in no deterioration in, or ideally enhance, ground and surface water quality; and where adequate water resources, sewerage and wastewater treatment infrastructure will be in place to support the proposed development prior to occupation.

Proposals for development that are sensitive to the effects of noise or light pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution.

Development will only be permitted on land affected by contamination where it is demonstrated that the contamination and land gas can be satisfactorily managed or remediated so that it is suitable for the proposed end use and will not impact on the groundwater environment, human health, buildings and the wider environment, during demolition and construction phases as well as during the future use of the site.”

The Local Plan provides further guidance on noise within the same section as Policy EN16 as below:

“Exposure to high levels of noise can have a significant effect on human health. This policy deals with noise issues in general, whilst policy EN17 deals particularly with noise-generating equipment. It is worth noting that there is a Professional Practice Guide on Planning and Noise available which provides guidance on design of residential developments to take account of noise, and taking account of this from the early design stage will help to reduce noise effects on future residents.”

Accordingly, Syntegra will utilise the guidance set out in **Section 4** of this report, which includes the Professional Practice Guidance on Planning and Noise (ProPG) as indicated.

4. Guidance Documents

4.1. Planning Practice Guidance for Noise

The Planning Practice Guidance for Noise (PPG-Noise) was published in March 2014 and last updated in July 2019. The PPG provides advice on how to determine the noise impact on development:

'Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

- *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.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy.'

The document goes on to provide a definition for the levels of noise exposure at which an effect may occur:

'Significant observed adverse effect level: *this is the level of noise exposure above which significant adverse effects on health and quality of life occur.*

Lowest observed adverse effect level: *this is the level of noise exposure above which adverse effects on health and quality of life can be detected.*

No observed effect level: *this is the level of noise exposure below which no effect at all on health and quality of life can be detected.'*

It is important to understand that as the PPG-Noise does not provide any advice with respect to specific noise levels/ limits for different sources of noise, it is appropriate to consider other sources of advice and guidance documents when considering whether new developments would be sensitive to the prevailing acoustic environment.

4.2. Professional Practice Guidance on Planning & Noise.

The Professional Practice Guidance (ProPG) on Planning and Noise for New Residential Development was published in May 2017 by the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH). The document has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England and provides numerical acoustic standards in line with the objectives of the Government's planning and noise policy. As a collaboration between the ANC, IOA and CIEH the document has been designed to encourage a good acoustic design process and aims to protect people from the harmful effects of noise.

The ProPG notes that it ‘does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy on which users should take their own advice as appropriate’.

The ProPG advocates a two-stage approach, first providing an initial noise risk assessment of the proposed development site before undertaking a systematic approach to the noise impact assessment. The results of the initial noise risk assessment are an indication as to how detailed the noise impact assessment will need to be in order to satisfactorily assess all acoustic challenges.

4.2.1. Stage 1: Initial Site Noise Risk Assessment

The initial noise risk assessment compares the site noise levels (which can be obtained by measurement or prediction, or a combination of the two, as appropriate) against a risk scale and determines the risk of adverse effects from noise at the site. The purpose of the initial noise risk assessment is to provide an indication of the level of acoustic challenges at the site. In general, the higher the level of risk identified, the greater the level of detail that will be required within the noise impact assessment in order to satisfactorily demonstrate that adverse impacts will be minimised to an acceptable level.

The initial risk assessment and associated notes are provided in Figure 1 of the ProPG and reproduced in **Table 4.1**.

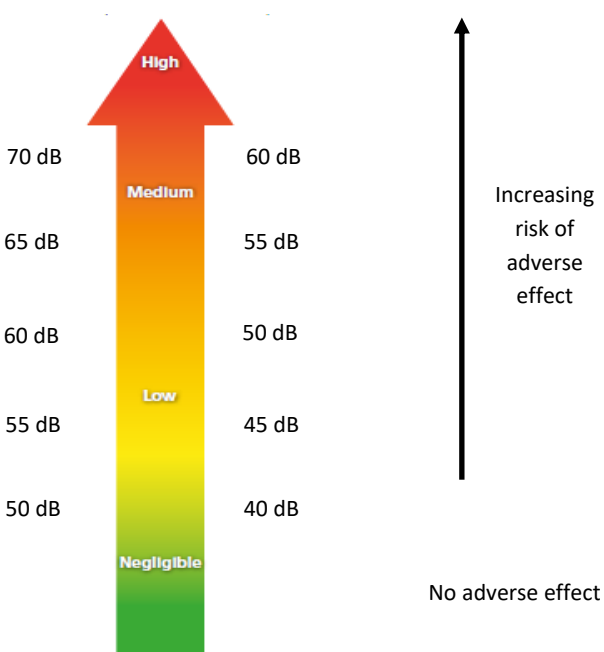
Noise Risk Assessment		Potential Effect Without Noise Mitigation	Pre-Planning Application Advice
Indicative Daytime Noise Levels, $L_{Aeq,16hr}$	Indicative Night-time Noise Levels, $L_{Aeq,8hr}$		
		Increasing risk of adverse effect	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed Acoustic Design Statement (ADS). Applicants are strongly advised to seek expert advice.
			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.
			At low noise levels, the site is likely be acceptable from a noise perspective provided that 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 in the finished development.
			These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.
		No adverse effect	
Notes: a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures. b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is “not dominant”. c. $L_{Aeq,16hr}$ is for daytime 0700 hrs – 2300 hrs, $L_{Aeq,8hr}$ is for night-time 2300 hrs – 0700 hrs. d. An indication that there may be more than 10 noise events at night (2300 hrs – 0700 hrs) with $L_{Amax,F} > 60$ dB means that the site should not be regarded as negligible risk.			

Table 4.1: Stage 1: Initial Site Risk Assessment

Where sites are exposed to industrial or commercial noise that is considered to be “dominant” then an assessment in line with BS 4142:2014 ‘Methods for rating and assessing industrial and commercial sound’ should be carried out.

4.2.2. Stage 2: Full Assessment

4.2.2.1. Stage 2: Element 1 – Good Acoustic Design Process

Following a good acoustic design process is an implicit part of achieving good design as required by Government planning and noise policy. It is imperative that acoustic design is considered at an early stage of the development process and the aim should be to avoid “unreasonable” acoustic conditions and prevent “unacceptable” acoustic conditions.

Good acoustic design does not simply mean compliance with the recommended internal and external noise criteria. Instead, an integrated solution should be provided whereby the optimal acoustic outcome is achieved, without design compromises that will adversely affect living conditions and the quality of life of residents or other sustainable design objectives and requirements.

A good acoustic design should consider (in this order):

- *‘Maximising the spatial separation of noise sources and receptors.*
- *Investigating the necessity and feasibility of reducing existing noise levels and relocating existing noise sources.*
- *Using topography and existing structures (that are likely to last the expected life of the noise-sensitive scheme) to screen the proposed development site from significant sources of noise.*
- *Incorporating noise barriers as part of the scheme to screen the proposed development site from significant sources of noise.*
- *Using the layout of the scheme to reduce noise propagation across the site.*
- *Using the orientation of buildings to reduce the noise exposure of noise-sensitive rooms.*
- *Using the building envelope to mitigate noise to acceptable levels.’*

4.2.2.2. Stage 2: Element 2 – Internal Noise Level Guidelines

The ProPG contains Figure 2, which is a table with associated notes drawing on the advice contained within BS 8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’, the World Health Organization’s Guidelines for Community Noise 1999 (WHO guidelines) and current best practice. This table is reproduced in **Table 4.2**.

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$ 45 dB $L_{Amax,F}$ (Note 4)

NOTE 1 The Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The internal L_{Aeq} target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the internal L_{Aeq} target levels recommended in the Table.

NOTE 3 These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.

NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form.

Table 4.2: ProPG Internal Noise Level Guidelines

4.2.2.3. Stage 2: Element 3 – External Amenity Area Noise Assessment

The ProPG considers the advice provided within BS 8233:2014 and the PPG-Noise in respect of external amenity areas, and presents the following advice, which is selected from both documents, in order to carry out a full assessment of noise levels:

- 'If 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.'*
- '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 $L_{Aeq,16hr}$.'*
- '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.'

- iv. *'Whether or not external amenity spaces are an intrinsic part of the overall design, consideration of the need to provide access to a quiet or relatively quiet external amenity space forms part of a good acoustic design process'*
- v. *'Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:*
 - *A relatively quiet façade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e., an enclosed balcony) as part of their dwelling; and/or*
 - *a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different, protected, location); and/or*
 - *a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
 - *a relatively quiet, protected, publically accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations.'*

4.2.2.4. Stage 2: Element 4 – Assessment of Other Relevant Issues

The final element of Stage 2 is an assessment of 'other relevant issues' and the ProPG suggests that the following issues are considered before making any final conclusions with respect to noise impacts:

- i. *'compliance with relevant national and local policy'*
- ii. *'magnitude and extent of compliance with ProPG'*
- iii. *'likely occupants of the development'*
- iv. *'acoustic design v. unintended adverse consequences'*
- v. *'acoustic design v. wider planning objectives'*

The ProPG notes that *'not all of the issues listed above will arise in every planning application and some may already have been addressed as an inherent part of good acoustic design. In addition, LPAs [Local Planning Authorities] may wish to add other relevant issues depending on local circumstances and priorities.'*

5. Baseline Noise Levels

In order to determine the extent to which the site is currently affected by noise, a detailed measurement study has been carried out at the site. Measurements have been carried out in order to characterise the existing noise climate over a 6-day period.

The soundscape of the site comprised distant road traffic noise from Evesham Road and very occasional local vehicle movements. Noise from children playing both in the garden and internally with windows open at the nursery was audible but not considered loud whilst on site. Noise from the substation was inaudible. Light aircraft and bird noises were noted during set up. Some nearby construction type noise was noted at collection which was clearly not typical of the local soundscape.

The noise measurements utilised a Norsonic 140 and a Svantek 958 Type 1 Precision Sound Level Meter; both with current certificates of calibration. The full list of equipment is detailed in **Appendix 3**. Before and after the measurement period the equipment was calibrated in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB). Noise Measurements were carried out in consecutive 5 minutes periods with a 1 second resolution.

Measurements were carried out between 1200 hrs on Thursday 13th April 2023 and 1100 hrs on Tuesday 18th April 2023.

During the noise measurement survey, daytime temperatures were up to 16°C, dropping to approximately 3°C overnight. Wind speeds were generally moderate to high (3 – 5 m/s) at the start of the survey, reducing to low (< 1 m/s) for the majority of the survey. Wind direction was variable, being predominantly south-westerly on Thursday 13th April, south-easterly on 14th April, north-westerly on 15th April, south-easterly changing to south-westerly on the 16th April and then north-easterly for the remainder of the survey. Cloud cover was noted to be 50% at the start of the survey and 10% at the end.

Noise measurements were carried out at Measurement Position 1 (MP1) to the north of the site in a free-field position at the approximate façade position of the proposed dwelling. The microphone was elevated to approximately 2m – 2.5m above the ground level to have a direct line of sight to the nursery garden and windows behind the boundary fence.

Noise measurements were also carried out at Measurement Position 2 (MP2) to the east of the site in a free-field position at the approximate façade position of the proposed dwelling. The microphone was located at approximately 1.5m above the ground level. The position was chosen to measure the noise from local vehicle movements including any deliveries to the Co-op store, and potential noise from the sub-station.

The noise monitoring positions are shown in **Figure 5.1**.



Figure 5.1: Noise Monitoring Location

Table 5.1 below displays a summary of the measured noise levels and detailed measurement results are presented in **Appendix 4**.

Measurement Position	Period (hours)	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)
MP1	Daytime (0700 – 2300)	51	68
	Night-time (2300 – 0700)	43	63
MP2	Daytime (0700 – 2300)	46	64
	Night-time (2300 – 0700)	45	64

Table 5.1: Summary of Equivalent Free-Field Noise Levels

Note: The average noise levels stated are logarithmic for L_{Aeq} . The $L_{Amax,F}$ noise levels stated are the arithmetic average of the hourly noise levels during the daytime (0700 hrs – 2300 hrs) and the 10th highest $L_{Amax,F,5min}$ noise level at night (2300 hrs – 0700 hrs), as noted in Table 4.2.

5.1. Nursery Noise Levels

Additional manned noise level measurements were carried out between 1000 hrs and 1200 hrs on Thursday 7th September 2023.

The noise measurements utilised a Norsonic 140 Precision Sound Level Meter with a current certificate of calibration. The full list of equipment is detailed in **Appendix 3**. Before and after the measurement period the equipment was calibrated in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB). Noise Measurements were carried out in consecutive 5 minutes periods with a 1 second resolution.

During the noise measurement survey the temperature was approximately 23°C – 28°C. There was no discernible wind and no cloud cover.

Noise measurements were carried out at MP1, as indicated in **Figure 5.1** above, in a free-field position at the approximate façade position of the proposed dwelling. The microphone was elevated to approximately 2m – 2.5m above the ground level to have a direct line of sight to the nursery garden and windows behind the boundary fence.

The local noise climate was dominated by noise from children playing when outside in the garden and equally by children playing inside the nursery (with windows open) and distant road traffic noise. Occasional aircraft passing were also noted during the survey period. The children were located in the garden at the start of the survey and then moved inside and alternated throughout the measurement period.

Table 5.2 below displays a summary of the measured noise levels and detailed measurement results are presented in **Appendix 4**.

Measurement Position	Period (hours)	L _{Aeq,T} (dB)	L _{Amax} (dB)
MP1	1000-1015	54	70
	1015-1030	48	63
	1030-1045	49	66
	1045-1100	50	67
	1100-1115	47	66
	1115-1130	46	63
	1130-1145	48	60
	1145-1200	43	59
	1000-1200	49	64

Table 5.2: Nursery Noise Levels

5.2. Assessment Noise Levels

In order to represent a very worst-case assessment, the noise levels during the first 15 minutes of measurements in **Table 5.2** will be utilised to represent the entire daytime noise level across the site, despite only being present on the worst-affected façade whilst children are playing in the nursery garden. Additionally, the worst-case period night-time noise levels measured at MP2 will be utilised to represent the entire proposed development for the purposes of this assessment. The assessment noise levels are presented in **Table 5.3**.

Assessment Position	Period (hours)	L _{Aeq,T} (dB)	L _{Amax} (dB)
Proposed Residential	Daytime (0700 – 2300)	54	70
	Night-time (2300 – 0700)	45	64

Table 5.3: Assessment Noise Levels

6. Initial Site Risk Assessment

The initial site risk assessment has been carried out by comparing the results of the noise measurement survey against the criteria presented in **Table 4.1**. The outcome of the initial site risk assessment is presented in **Table 6.1**.

Assessment Position	Daytime Ambient Noise Level $L_{Aeq,16hr}$ (dB)	Initial Noise Risk Assessment (Daytime)	Night-time Ambient Noise Level $L_{Aeq,8hr}$ (dB)	Initial Noise Risk Assessment (Night-time)
Proposed Residential	54	Low	45	Low

Table 6.1: Initial Site Risk Assessment

The results of the initial site risk assessment based on the measured noise levels indicate that the site has a *low* risk in terms of noise during the daytime and night-time. The pre-application advice associated with this risk category is:

Low: 'At low noise levels, the site is likely be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an Acoustic Design Statement (ADS) which confirms how the adverse impact will be mitigated and minimised in the finished development.'

7. Full Assessment

7.1. Internal Noise Level Assessment – Background Ventilation Conditions

Note 5 of **Table 4.2** suggests that internal noise levels should ideally be achieved in as many properties as possible with windows open. Due to the relatively high noise levels present at the site, those habitable rooms on the majority of facades and elevations will not be able to achieve the requirement with windows open, and therefore the sound insulation of the building façade will be required to mitigate noise levels. We note that this does not necessitate that the windows be sealed shut but requires that an alternate primary means of ventilating the properties is provided (as defined by the Building Regulations Approved Document F). In carrying out our assessment, Syntegra have therefore made the following assumptions:

- The façade build-up will be a standard brick and block construction (or equivalent) to achieve an R_w of approximately 55 dB.
- A typical double-glazing system in a 4/16/4 configuration (or equivalent) will be installed to give a Sound Reduction Index (SRI) of 28 dB R_w .
- Appropriately specified acoustic trickle vents, with a $D_{n,e,w}$ of at least 34 dB, will be installed to allow adequate ventilation without the requirement to open windows.
- Purge ventilation (as defined by ADF) through open windows.

Table 7.1 identifies the likely L_{Aeq} and L_{Amax} internal noise levels, assuming windows closed, utilising the *Simple Calculation Method* described in BS 8233:2014. It can be seen that habitable rooms will achieve the requirements of the ProPG with closed windows.

Assessment Location	Period (hrs)	External Noise Levels (dB) (ref. Table 5.3)	Sound Reduction from Glazing (dBA)	Internal Noise Levels (dB)	ProPG Noise Level Criteria	Compliance with ProPG Criteria
Proposed Development	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	54	28	26	35	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	45		17	30	
	Night-time L_{Amax} (2300 – 0700)	64		36	45	

Table 7.1: Internal Noise Levels – Background Ventilation Conditions

7.2. Internal Noise Level Assessment – Overheating Conditions

Table 7.2 identifies the likely night-time L_{Aeq} and L_{Amax} internal noise levels assuming windows open and identifies whether open windows are suitable for the mitigation of overheating.

Assessment Location	Period (hrs)	External Noise Levels (dB) (ref. Table 5.3)	Sound Reduction from Open Window (dBA)	Predicted Internal Noise Levels (dB)	ADO Noise Level Criteria (dB)	Open Windows Suitable for the Mitigation of Overheating
Front Façade	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	45	10-15	30-35	40	Yes
	Night-time L_{Amax} (2300 – 0700)	64		49-54	55	

Table 7.2: Internal Noise Levels – Overheating Conditions

7.3. External Noise Level Assessment

The site layout in **Figure 2.2** indicates a rear garden around the north and west of the property.

The measured daytime noise level at MP1 is 51 dB $L_{Aeq,16hr}$ in the absence of nursery noise, and this is raised to 54 dB L_{Aeq} whilst children are playing in the nursery garden. Accordingly, noise levels would be below the upper guideline value and much of the garden is likely to achieve the lower guideline value (50 dB $L_{Aeq,16hr}$). Noise levels within amenity areas would therefore be acceptable.

7.4. Consideration of Other Issues

The assessment has shown that a reasonable internal noise environment can be achieved, in line with the requirements of the Local Authority, BS 8233 and the ProPG through careful consideration of the building envelope and ventilation requirements. Whilst it would be ideal to achieve the internal level criteria with open windows, it is common to achieve the criteria relying on closed windows in noisier areas. Such an approach is advocated in the PPG-Noise.

The assessment has also shown that the external noise level criteria would be achieved within the proposed rear garden.

Overall, it has been shown that, through careful consideration of the building envelope construction, the proposed development should avoid future residents being exposed to harmful levels of noise. It can therefore be concluded that significant adverse impacts on the health or quality of life of those future residents would be avoided, in line with the aims of the NPPF, NPSE and PPG-Noise.

8. Conclusion

An assessment has been carried out of the present noise climate at **88 Knights Way, Reading RG4 8RH** and the impact of that noise on the proposed development.

The assessment is based on the results of an environmental noise survey that was been carried out over a 6 day period at the proposed development site in April 2023 and a short term noise measurement survey carried out in September 2023 and considers the requirements of local and national planning policy and best practice guidance.

The initial site risk assessment identified that the site as *low* risk in terms of noise.

It has been identified that the requirements of the Local Authority in respect of internal noise levels can only be achieved through careful consideration of the building envelope. We note that this does not necessitate that the windows be sealed shut but requires that an alternate primary means of ventilating the properties is provided (as defined by the Building Regulations Approved Document F). The construction assumptions that have led to this conclusion are:

- **The façade build-up will be a standard brick and block construction (or equivalent) to achieve an R_w of approximately 55 dB.**
- **A typical double-glazing system in a 4/16/4 configuration (or equivalent) will be installed to give a Sound Reduction Index (SRI) of 28 dB $R_{w,i}$.**
- **Appropriately specified acoustic trickle vents, with a $D_{n,e,w}$ of at least 34 dB, will be installed to allow adequate ventilation without the requirement to open windows.**
- **Purge ventilation (as defined by ADF) through open windows.**
- **Mitigation of overheating (where required) through open windows.**

The assessment has also shown that the external noise level criteria would be achieved within the proposed rear garden.

Overall, it has been shown that, through careful consideration of the building envelope construction, the proposed development should avoid future residents being exposed to harmful levels of noise. It can therefore be concluded that significant adverse impacts on the health or quality of life of those future residents would be avoided, in line with the aims of the NPPF, NPSE and PPG-Noise.

9. Appendix 1: Glossary of Acoustic Terminology

Term	Description
'A'-Weighting	<i>This is the main way of adjusting measured sound pressure levels to take into account human hearing, and our uneven frequency response.</i>
Decibel (dB)	<i>This is a tenth (deci) of a bel. The decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of ratio between two quantities expressed in logarithmic form.</i>
$L_{Aeq,T}$	<i>The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. T may be as short as 1 second when used to describe a single event, or as long as 24 hours when used to describe the noise climate at a specified location. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.</i>
L_{A10}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 10 per cent of a given time and is the L_{A10T}. The L_{A10} is used to describe the levels of road traffic noise at a particular location.</i>
L_{A50}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 50 per cent of a given time and is the L_{A50T}.</i>
L_{A90}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 per cent of a given time and is the L_{A90T}. The L_{A90} is used to describe the background noise levels at a particular location.</i>
L_{Amax}	<i>The 'A'-weighted maximum sound pressure level measured over a measurement period.</i>

10. Appendix 2: Professional Statement

David Yates

David Yates is a full member of the Institute of Acoustics (MIOA) and has over ten years' experience in acoustic consultancy. David has particular expertise in environmental noise providing acoustic consultancy for residential and mixed-use planning applications, plant noise and vibration, construction noise and the design of acoustic, noise and vibration control. David is also experienced in providing sound insulation testing and design advice. David is familiar with the application of all relevant standards associated with his work, including but not limited to, BS 4142, BS 8233, BS 7445, BS 6472, BS 5228, BS 140 series, BS 16283 series and BS 717 series. David manages the acoustic department and is responsible for maintaining Syntegra's ANC membership.

11. Appendix 3: List of Equipment

Equipment Type	Manufacturer	Serial Number	Calibration Certification Number	Date of Last Calibration Check
Nor-140 Type 1 Sound Level Meter	Norsonic	1406389	TCRT21/1767	November 2021
Nor-1225 Microphone	Norsonic	225519	TCRT21/1767	November 2021
Nor-1209 Preamplifier	Norsonic	20598	TCRT21/1767	November 2021
Nor-1251 Sound Calibrator	Norsonic	35115	TCRT22/1700	November 2022
SVAN 958	Svantek	92843	TCRT23/1132	February 2023
MK 255 Microphone	Microtech Gefell	20197	TCRT23/1132	February 2023
SV12L Preamplifier	Svantek	106885	TCRT23/1132	February 2023
SV36 Sound Calibrator	Svantek	73463	TCRT22/1680	November 2022

12. Appendix 4: Detailed Noise Measurement Results

Measured Noise Levels – MP1 – 13/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
1200-1300	50	70	53	44
1300-1400	49	69	50	46
1400-1500	53	72	55	48
1500-1600	50	68	53	48
1600-1700	50	72	52	45
1700-1800	46	66	48	44
1800-1900	44	65	45	43
1900-2000	43	59	45	42
2000-2100	43	66	47	40
2100-2200	39	53	40	37
2200-2300	38	61	40	36
2300-0000	36	54	37	35
1200-2300	48	66	48	43
2300-0000	36	54	37	35

Measured Noise Levels – MP1 – 14/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
0000-0100	36	56	37	35
0100-0200	40	65	38	34
0200-0300	36	56	38	33
0300-0400	37	48	40	34
0400-0500	39	53	41	36
0500-0600	47	64	51	40
0600-0700	50	68	52	47
0700-0800	53	71	55	47
0800-0900	50	66	52	48
0900-1000	50	69	52	47
1000-1100	51	70	53	48
1100-1200	50	65	52	47
1200-1300	61	75	66	47
1300-1400	51	68	54	47
1400-1500	47	63	49	44
1500-1600	46	66	47	43
1600-1700	48	68	50	45
1700-1800	49	70	51	45
1800-1900	45	61	46	43
1900-2000	45	68	46	43
2000-2100	48	68	49	47
2100-2200	49	67	50	47
2200-2300	44	64	46	40

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
2300-0000	39	52	40	38
0700-2300	52	67	51	45
2300-0700	44	58	42	37

Measured Noise Levels – MP1 – 15/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
0000-0100	37	54	38	35
0100-0200	35	49	37	33
0200-0300	34	49	35	32
0300-0400	35	50	36	32
0400-0500	38	55	41	34
0500-0600	46	62	49	40
0600-0700	49	73	53	42
0700-0800	47	66	50	43
0800-0900	47	75	49	42
0900-1000	48	68	50	43
1000-1100	50	75	51	46
1100-1200	49	70	51	45
1200-1300	48	65	50	46
1300-1400	50	69	53	47
1400-1500	48	68	50	43
1500-1600	48	64	49	42
1600-1700	49	72	52	42
1700-1800	51	72	54	43
1800-1900	49	76	53	42
1900-2000	47	66	49	41
2000-2100	45	63	49	39
2100-2200	37	52	38	36
2200-2300	39	56	41	36
2300-0000	37	49	38	35
0700-2300	48	67	49	42
2300-0700	42	55	41	35

Measured Noise Levels – MP1 – 16/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
0000-0100	34	43	35	32
0100-0200	33	48	34	31
0200-0300	33	47	33	31
0300-0400	32	47	34	32
0400-0500	36	50	39	34
0500-0600	47	63	51	37
0600-0700	48	69	50	45
0700-0800	45	62	47	42
0800-0900	47	68	50	42
0900-1000	48	67	52	44
1000-1100	62	77	66	45
1100-1200	50	71	54	43
1200-1300	51	74	55	42
1300-1400	49	68	49	46
1400-1500	48	67	50	43
1500-1600	47	67	49	42
1600-1700	48	76	52	40
1700-1800	45	66	48	40
1800-1900	49	75	50	40
1900-2000	47	70	49	43
2000-2100	45	67	50	37
2100-2200	38	60	39	34
2200-2300	39	60	43	32
2300-0000	33	54	36	32
0700-2300	52	68	50	41
2300-0700	42	53	39	34

Measured Noise Levels – MP1 – 17/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
0000-0100	32	50	35	30
0100-0200	30	45	31	29
0200-0300	30	44	30	28
0300-0400	31	46	33	29
0400-0500	37	50	40	33
0500-0600	49	66	53	40
0600-0700	50	68	52	44
0700-0800	51	71	53	46
0800-0900	47	64	49	45
0900-1000	51	68	53	48
1000-1100	55	77	58	50
1100-1200	53	73	55	48
1200-1300	49	69	52	46

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
1300-1400	51	67	55	46
1400-1500	53	68	55	47
1500-1600	50	68	53	46
1600-1700	50	78	50	46
1700-1800	50	74	55	44
1800-1900	46	66	47	43
1900-2000	46	67	47	41
2000-2100	47	68	51	42
2100-2200	39	64	42	37
2200-2300	37	51	39	34
2300-0000	35	52	38	32
0700-2300	50	68	51	44
2300-0700	44	53	39	33

Measured Noise Levels – MP1 – 18/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
0000-0100	42	65	37	31
0100-0200	31	56	32	29
0200-0300	32	47	34	30
0300-0400	33	54	35	30
0400-0500	38	54	41	31
0500-0600	47	64	48	39
0600-0700	49	68	52	44
0700-0800	50	68	52	44
0800-0900	50	70	52	47
0900-1000	56	77	59	51
1000-1100	57	74	59	56
0700-1100	55	72	55	49
0000-0700	44	58	40	33

Measured Noise Levels – MP2 – 13/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
1200-1300	45	64	48	40
1300-1400	43	61	45	41
1400-1500	52	68	54	49
1500-1600	49	64	52	43
1600-1700	45	74	49	39
1700-1800	41	63	43	38
1800-1900	40	65	41	37
1900-2000	39	61	40	36
2000-2100	38	59	40	35
2100-2200	33	55	34	31
2200-2300	35	66	35	31
2300-0000	31	48	33	30
1200-2300	45	64	44	38
2300-0000	31	48	33	30

Measured Noise Levels – MP2 – 14/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
0000-0100	30	54	32	29
0100-0200	36	60	39	28
0200-0300	29	42	32	27
0300-0400	31	44	32	29
0400-0500	34	51	35	31
0500-0600	53	72	58	34
0600-0700	52	68	57	44
0700-0800	49	69	52	44
0800-0900	46	63	47	44
0900-1000	45	63	48	42
1000-1100	50	70	54	45
1100-1200	45	64	48	43
1200-1300	57	72	63	41
1300-1400	46	68	48	42
1400-1500	43	65	44	40
1500-1600	42	61	45	39
1600-1700	44	70	48	40
1700-1800	45	66	47	39
1800-1900	40	61	41	39
1900-2000	40	67	42	39
2000-2100	45	65	46	43
2100-2200	47	65	48	45

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
2200-2300	42	60	44	39
2300-0000	35	54	36	33
0700-2300	48	66	48	42
2300-0700	47	56	40	32

Measured Noise Levels – MP2 – 15/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
0000-0100	33	53	35	30
0100-0200	31	65	33	28
0200-0300	29	47	31	27
0300-0400	30	47	31	27
0400-0500	34	53	36	32
0500-0600	53	70	58	35
0600-0700	52	70	58	39
0700-0800	43	62	46	40
0800-0900	42	60	43	37
0900-1000	44	63	47	39
1000-1100	46	69	48	40
1100-1200	43	65	46	40
1200-1300	46	70	48	39
1300-1400	44	63	47	40
1400-1500	46	69	51	41
1500-1600	45	69	49	36
1600-1700	46	68	48	37
1700-1800	45	65	49	40
1800-1900	46	67	50	39
1900-2000	41	65	44	36
2000-2100	40	58	42	34
2100-2200	32	57	34	31
2200-2300	34	50	36	31
2300-0000	32	50	33	30
0700-2300	44	64	46	37
2300-0700	47	57	39	31

Measured Noise Levels – MP2 – 16/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
0000-0100	30	43	31	28
0100-0200	28	42	29	26
0200-0300	27	40	28	26
0300-0400	27	45	28	26
0400-0500	32	50	35	29
0500-0600	45	69	49	35

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
0600-0700	46	69	48	43
0700-0800	44	64	45	39
0800-0900	42	67	45	38
0900-1000	47	67	50	38
1000-1100	49	76	52	41
1100-1200	44	65	47	36
1200-1300	46	70	49	38
1300-1400	44	62	46	40
1400-1500	44	68	47	39
1500-1600	42	62	44	39
1600-1700	41	61	44	36
1700-1800	43	64	47	36
1800-1900	42	71	44	36
1900-2000	42	64	44	37
2000-2100	40	66	43	34
2100-2200	37	69	42	29
2200-2300	34	55	33	29
2300-0000	29	57	30	28
0700-2300	44	66	45	36
2300-0700	40	52	35	30

Measured Noise Levels – MP2 – 17/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
0000-0100	28	53	30	26
0100-0200	26	42	27	25
0200-0300	26	41	28	25
0300-0400	26	41	26	25
0400-0500	32	50	34	27
0500-0600	48	71	53	34
0600-0700	49	68	52	41
0700-0800	49	63	52	45
0800-0900	44	65	46	41
0900-1000	46	67	48	43
1000-1100	46	66	48	44
1100-1200	45	65	47	42
1200-1300	45	66	49	40
1300-1400	48	62	52	42
1400-1500	48	66	51	40
1500-1600	46	66	49	41
1600-1700	43	74	45	41
1700-1800	42	66	43	39
1800-1900	44	73	47	39
1900-2000	48	77	54	37

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
2000-2100	43	63	47	35
2100-2200	35	60	38	33
2200-2300	33	50	34	31
2300-0000	30	45	33	28
0700-2300	46	66	47	39
2300-0700	43	51	35	29

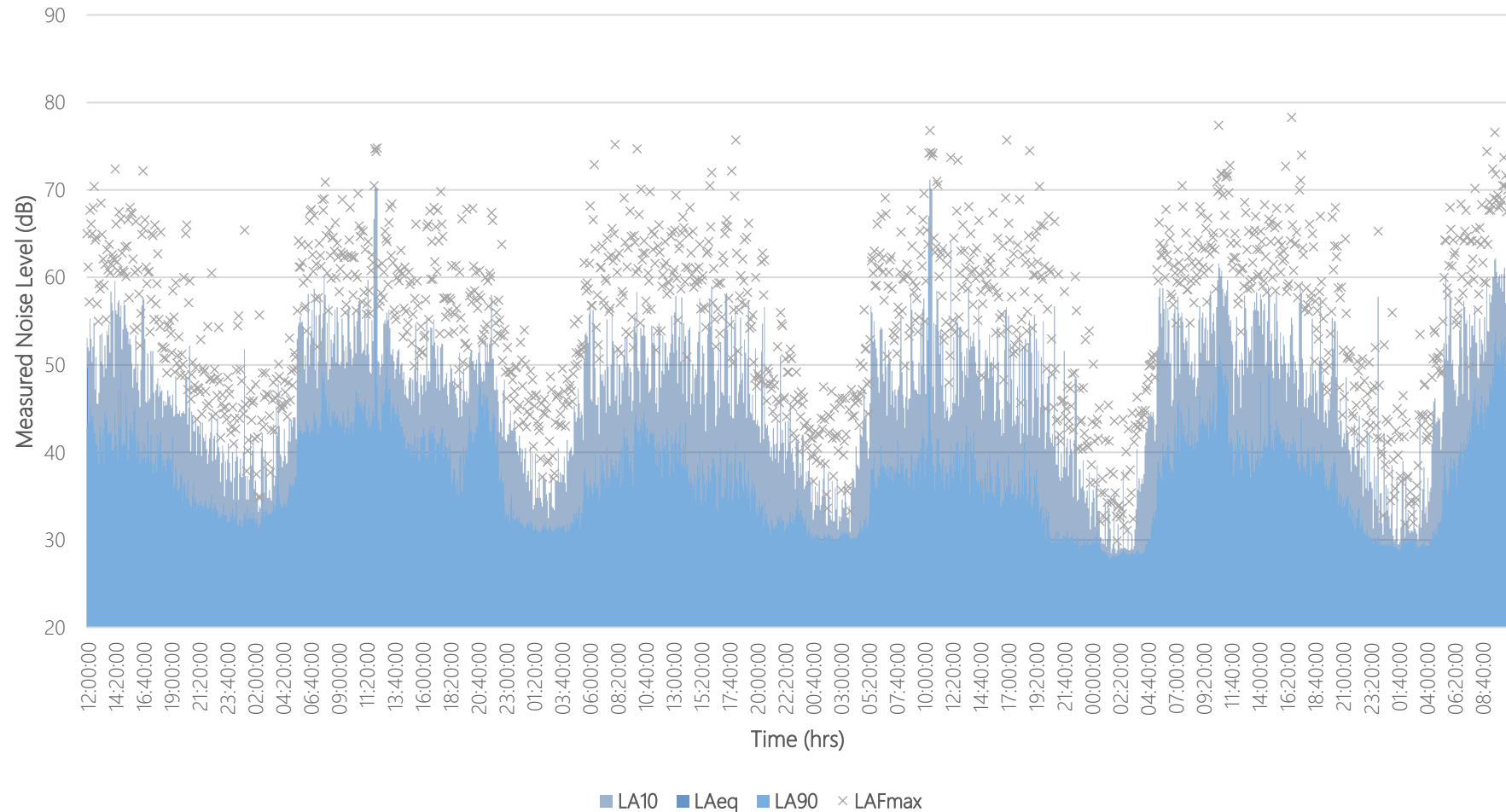
Measured Noise Levels – MP2 – 18/04/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
0000-0100	39	62	42	27
0100-0200	27	48	29	25
0200-0300	27	42	28	26
0300-0400	29	47	30	26
0400-0500	35	55	37	32
0500-0600	51	72	56	35
0600-0700	49	70	49	46
0700-0800	50	71	54	44
0800-0900	46	66	47	44
0900-1000	52	70	54	47
1000-1100	52	75	54	49
1100-1200	49	61	49	49
0700-1200	50	69	52	47
2300-0000	45	57	39	31

Measured Noise Levels – MP1 – 07/09/2023

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
1000-1015	54	70	57	47
1015-1030	48	63	51	42
1030-1045	49	66	53	43
1045-1100	50	67	53	44
1100-1115	47	66	50	39
1115-1130	46	63	49	41
1130-1145	48	60	51	40
1145-1200	43	59	46	38
1000-1200	49	64	51	42

MP1 Measured Noise Levels from 1200 hrs on 13/04/2023 to 1055 hrs on 18/04/2023



MP2 Measured Noise Levels from 1200 hrs on 13/04/2023 to 1100 hrs on 18/04/2023

