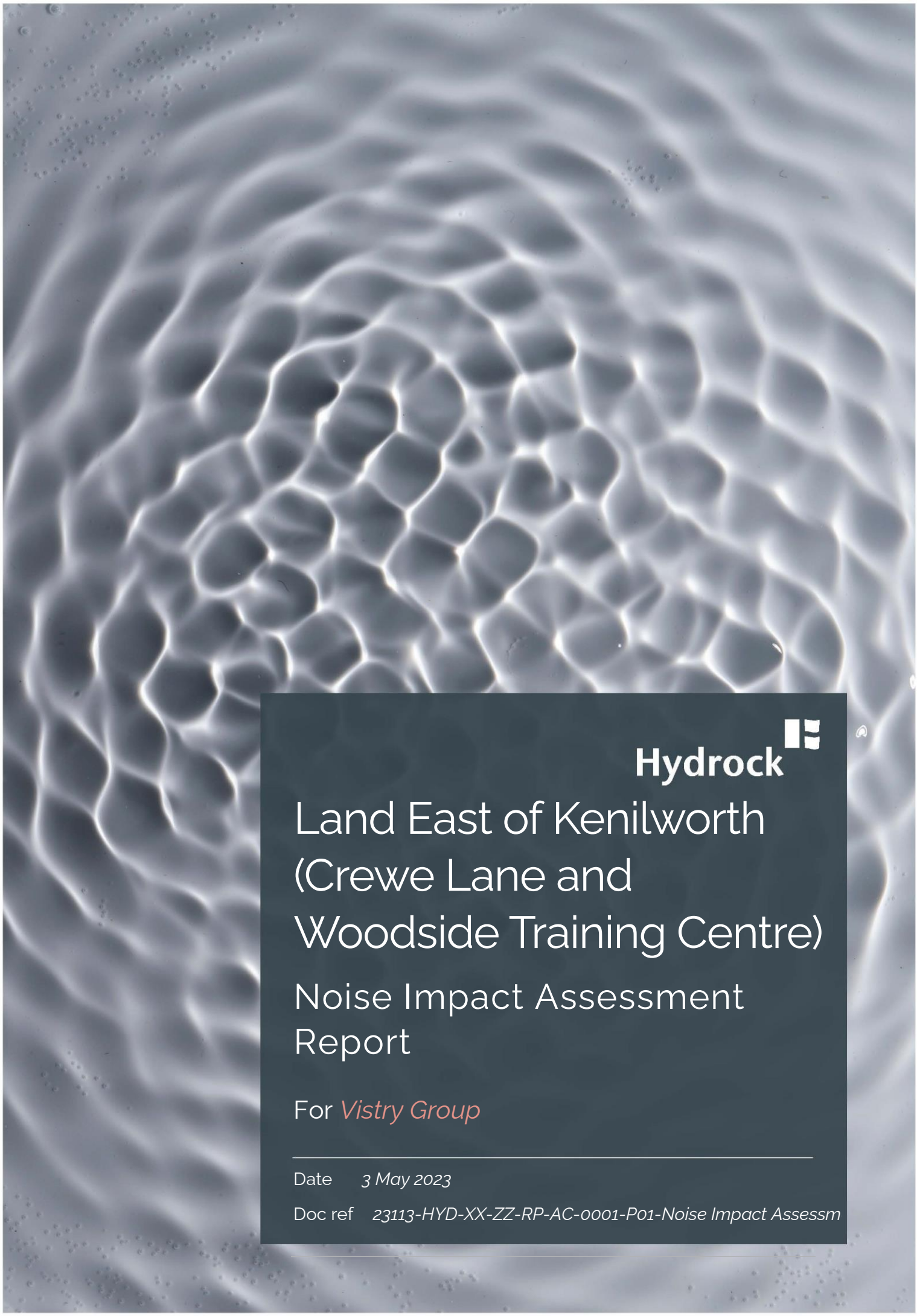

Hydrock

Land East of Kenilworth (Crewe Lane and Woodside Training Centre)

Noise Impact Assessment Report

For *Vistry Group*

Date *3 May 2023*

Doc ref *23113-HYD-XX-ZZ-RP-AC-0001-P01-Noise Impact Assessm*

Document control sheet

Issued by	Hydrock Consultants Limited 5-7 Tanner Street London SE1 3LE United Kingdom	T +44 (0)203 8468456 E london@hydrock.com hydrock.com
Client	Vistry Group	
Project name	Land East of Kenilworth (Crewe Lane and Woodside Training Centre)	
Title	Noise Impact Assessment Report	
Doc ref	23113-HYD-XX-ZZ-RP-AC-0001-P01-Noise Impact Assessment	
Project number	23113	
Status	S2 - Suitable for Information	
Date	03/05/2023	

Document production record		
Issue number	P01	Name
Prepared by		Laura Mazzeo
Checked by		Gizem Okten
Approved by		Gizem Okten

Document revision record			
Issue number	Status	Date	Revision details
P01	S2	03/05/2023	First Shared Issue

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Appendices

1. Introduction

Hydrock has been appointed by Vistry Group, to provide an update to the previously issued Temporary Noise Impact Assessment Report.

A temporary report was issued by Hydrock in support of the planning application. This report was based on environmental noise measurement taken in 2015 and 2016 by others. A new survey has been carried out by Hydrock and the assessment has been updated based on the new collected data.

This report provides information on the following:

- Results of the environmental noise survey undertaken to establish the existing noise climate across the site.
- External building fabric sound insulation requirements for compliance with planning criteria.
- Mitigation measures to provide a suitable internal/external noise environment for future occupants.
- Noise emission limits associated with the building services external plant.

This report is technical in nature, therefore, a glossary of acoustic terminology is provided in Appendix A to assist in understanding this report.

2. Site Description

The proposed development site is located at land east of Kenilworth (Crewe Lane and Woodside Training Centre), Warwickshire, under the Jurisdiction of Warwickshire District Council.

This report refers to the Accommodation Site, within the wider development. This included a total of 55 accommodation units with 1 – 5 bedroom each. The area has been highlighted in the site plan below.

Figure 1 Site plan

3. Planning Policy and Guidance

The following policy, standards and guidance documents will apply to the proposed development which are detailed in below sections:

- National Planning Policy Framework (NPPF);
- Noise Policy Statement for England (NPSE);
- World Health Organisation (WHO) 1999: Guidelines for Community Noise;
- Local Planning Policy: Warwick District Council Nose Policy
- BS 8233:2014 - Guidance on sound insulation and noise reduction for buildings; and
- BS 4142:2014 + A1 2019 - Methods for rating and assessing commercial and industrial sound
- Approved Document O: Overheating (ADO)

3.1 National Planning Policy Framework (NPPF)

Revised in July 2021, this document sets out the Government's planning policies for England and supersedes the previous version of the NPPF (first published in 2012). It makes the following reference to noise in the section entitled Conserving and Enhancing the Natural Environment:

> *"174. Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *[…]*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."*

It also makes the following references to noise in the Section entitled Ground Conditions and Pollution:

> *"185.. 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:*
>
> *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 the quality of life65;*
>
> *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.*
>
> *65 See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."*

And

> *"187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse*

effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

3.2 Noise Policy Statement for England (NPSE)

Published in March 2010, the Noise Policy Statement for England (NPSE) sets out the long-term vision of Government noise policy as follows:

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

The NPSE identifies three observed effect levels, names "No Observed Effect Level" (NOEL), "Lowest Observed Adverse Effect Level" (LOAEL) and "Significant Observed Adverse Effect Level" (SOAEL).

The NPSE contains little detail on assessment methodologies and specific parameters at which the varying observed effect levels would occur in the context of a residential development.

3.3 Local Planning Policy: Warwick District Council Noise Policy

The development site is located within the administrative boundary of Warwick District Council (WDC). The Noise Policy adopted in August 2022 sets out the Council's supplementary planning advice for controlling noise from new development to protect existing noise sensitive receptors in the area, and protecting noise sensitive new development from existing noise

The document makes reference to BS4142:2014 and BS8233:2014 as the documents which are relevant to the applications related to noise.

WDC Environmental Health Office was contacted to get confirmation of their plant noise policy. Mathew Shirly confirmed, on the 2nd of May 2023, the below in relation to external plant noise emissions::

> *'Noise arising from any plant or equipment (measured as $L_{Aeq,5\ minutes}$), when measured (or calculated to) one metre from the façade of any noise sensitive premises, shall not exceed the background noise level (measured as $L_{A90,T}$). If the noise in question involves sounds containing a distinguishable, discrete, continuous tone (whine, screech, hiss, hum etc) or if there are discrete impulses (bangs, clicks, clatters, thumps etc.) or if the noise is irregular enough to attract attention, 5dB(A) shall be added to the measured level.'*

3.4 BS 8233:2014 - Guidance on sound insulation and noise reduction for buildings

As discussed above, there is no specific guidance on noise assessment methods or criteria contained within the NPPF and NPSE. In lieu of this, the approach that is generally adopted when assessing the impact of environmental noise sources on residential developments is to undertake an assessment in accordance with BS 8233:2014.

BS8233:2014 provides internal and external ambient noise level criteria which are applicable to steady noise without a specific character affecting domestic buildings. The standard states it is desirable that the internal ambient noise levels not exceed the criteria set out in the **Error! Reference source not found.** below.

Activity	Location	Daytime (07:00-23:00)	Night-time (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 $L_{Aeq,8hour}$

Table 1 BS-8233 Internal noise limits for domestic buildings

Whilst BS 8233:2014 recognises that a guideline value may be set in terms of SEL or L_{AFmax} for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated. Accordingly, reference has been made in this assessment to the World Health Organisation (WHO) 1999: Guidelines for Community Noise.

With respect to external amenity spaces, such as gardens and balconies, it is stated that it is desirable that the noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances such as within city centres urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

3.5 World Health Organisation (WHO) 1999: Guidelines for Community Noise

This document draws upon research from Vallet and Vernet to provide the following advice on night-time noise:

> *"For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night"*

3.6 BS 4142:2014 + A1 2019 - Methods for rating and assessing commercial and industrial sound (BS4142)

BS 4142 describes methods for rating and assessing the impact of industrial and commercial sound on dwellings, including fixed plant installations.

The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

A BS 4142 assessment is made by determining the difference between the specific noise under consideration and the background sound level, as represented by the L_{A90} parameter, determined in the absence of the commercial sound. The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time. This parameter therefore excludes short duration noise events, such as individual vehicle movements, and represents the underlying continuous noise.

The commercial or industrial sound is assessed in terms of the equivalent continuous noise level, L_{Aeq}. The equivalent continuous noise level (L_{Aeq}) of the commercial or industrial sound, over the applicable assessment period, is known as the specific sound level.

A character correction penalty can be applied to the specific sound level where the commercial noise exhibits distinguishable tones, impulsiveness, intermittency or other characteristics which "are otherwise readily distinctive against the residual acoustic environment".

The specific noise level with the character correction (if necessary) is known as rating level (L_{Ar}) and the difference between the background noise and the rating level is determined to make the BS 4142 assessment. The following is then considered.

"Typically, the greater this difference, the greater the magnitude of 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 highlights the importance of considering the context in which a sound occurs. Factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact.

3.7 Approved Document O (ADO)

Approved Document O (ADO) provides guidance on complying with Part O of the Building Regulations with respect to overheating in residential buildings.

The simple way to comply with Part O is to provide adequate window openings such that comfortable internal temperatures can be maintained during the hottest times of the year. However, the document precludes the use of open windows for overheating control if this would result in internal noise levels above 40 dB L_{Aeq} during night time hours or 55 dB L_{Amax}, more than 10 times a night. It is noted, therefore, that ADO allows noise limits 10dB higher than BS8233:2014 and WHO Guidelines during the overheating condition.

When a window is wide open to provide cooling in an area at a high risk of overheating the difference between external and internal noise level is expected to be approximately 6 dB, and 15 dB, at best when partially open. Therefore, where façade noise level exceeds approximately 46 dB L_{Aeq} or will regularly exceed approximately 61 dB L_{Amax} during the night-time period (07:00 hrs to 23:00 hrs), comfortable internal temperatures must be maintained by means other than open windows.

Alternatives could include careful design of the building's thermal performance to maintain a constant internal temperature, which may include solar shading and exposed thermal mass combined with suitable mechanical ventilation system. It is likely that in many cases air conditioning will be the best option for residential buildings exposed to high levels of environmental noise where open windows cannot for part of the overheating strategy.

4. Environmental Noise Survey

4.1 Survey Equipment and procedure

Unattended long-term measurements were undertaken at two locations representative of the site noise levels. Measurements were undertaken, between 13:15 hours of Friday 14th April 2023 and 11:30 hours of Monday 17th April 2023, to establish the noise climate in the area. The measurement positions are shown in Figure 2 below.

Figure 2 Measurement locations

All measurements were made at a free-field location using Class 1, integrating sound level meters. The equipment was calibrated before and after the measurements with no significant drift recorded (≤0.5 dB).

All measurement equipment has been laboratory calibrated within the appropriate calibrated interval. Details of the equipment used for the environmental noise measurements are shown in Table 2 below.

Location	Manufacturer	Instrument	Type	Serial number	Calibration Due date
ML 1	Rion	Sound level meter	NL52	775959	14/07/2023
ML2	NTi	Sound Level Meter	XLA-2	A2A-20385-E0	06/04/2024

Table 2 Environmental Noise Survey Equipment

Site observations show that the predominant noise source in the area is traffic noise, mainly from the A45 (Warwick Bypass) to the south east of the site, with a small contribution from Glasshouse Lane to the west of the site.

The weather during the survey was generally dry with light winds, and therefore considered acceptable for the duration of the survey.

4.2 Noise Survey Results

To inform the assessment in accordance with the criteria outlined in Section 3 of this report, the following parameters have been derived from the survey results at each location.:

- Daytime and night-time equivalent continuous noise levels ($L_{Aeq,T}$);
- Lowest value of the most commonly occurring (Typical) background noise level measured each day (Day and night period $L_{A90,T}$);
- Typical night-time maximum event levels (L_{AFmax})

The noise survey results for measurement locations ML1 and ML2 are shown below in Table 3 and in graphic form in Appendix B of this report. .

Location	Daytime (07:00-23:00 Hours)		Night-time (23:00 – 07:00 Hours)		
	$L_{Aeq,16h}$ dB	[1] Typical $L_{A90,15\ min}$ dB	$L_{Aeq,\ 8h}$ dB	[1] Typical $L_{A90,15min}$ dB	[2]Typical L_{AFmax} dB
ML 1	56	47	50	28	73
ML2	65	43	59	33	71

Table 3 Summary of Measured Noise Levels

[1] The Typical background noise level is the most common value of the measured LA90 levels during the respective period.
[2] The typical L_{AFmax} value is the 90th percentile of the measured L_{AFmax} levels during the respective period.

These levels will be used to determine sound insulation requirements for the building envelope and to set the building services noise emissions limits.

5. Noise Mapping

In order to determine the noise levels on the proposed site, a noise model has been created using DataKustik CadnaA environmental noise prediction and mapping software, based on the measured noise levels and the methodology described within CRTN and ISO 9613.

Appendix C provides the noise level maps of the proposed site during daytime (07:00- 23:00 hours) and night-time hours (23:00 – 07:00 hours). The presented noise levels are in terms of the equivalent continuous noise level (L_{AeqT}) for the period and typical maximum events (L_{Amax}) for night-time hours.

It should be noted that at this stage, detailed information has not yet been developed regarding façade construction, ventilation strategy, room dimension etc. The guidance contained herein is therefore subject to development during technical design and should not be used for tender purposes.

6. Building Fabric & Ventilation

6.1 Building Fabric & Ventilation Strategy for the proposed development

Predicted noise levels incident at the different facades of the proposed residential buildings are presented in Appendix C for daytime $L_{Aeq, 16hour}$, night-time $L_{Aeq, 8hour}$, and night-time L_{Amax}.

A summary of the predictions is presented in Table 4 below:

Period	Predicted noise levels incident on the facades
Daytime L_{Aeq} (07:00-23:00 hours)	47-53 dB
Night-Time L_{Aeq} (23:00-07:00 hours)	44-51 dB
Night-time L_{Amax} (23:00-07:00)	48-63 dB

Table 4 Predicted noise levels

In order to determine the required sound insulation performance of the facade elements and suitable ventilation strategy, the following assumptions are made:

- A representative bedroom area of 15m^2 and 2.5m height
- External walls should achieve a minimum 51 dB R_w sound insulation performance,
- A window size of 3m^2,
- A reverberation time of 0.5 seconds in habitable rooms;

Based on the above presented levels, a standard double-glazing solution with a minimum 32 (-5) dB R_w (C_{tr}), such as 6/12/6 build up, would be sufficient to achieve the internal noise levels required by BS8233:2014 with windows closed and ventilation provided with a trickle vent with similar sound insulation performance.

6.1.1 Purge ventilation requirements

The use of opening windows for rapid purge ventilation (I.e to expel paint fumes or burnt toast odours as per Approved Document F) is acceptable on all facades. This is on the basis that windows will be opened for short periods and may be closed as occupant discretion once odours have been purged.

6.1.2 Relief of summertime overheating

The requirements in relation to noise levels during overheating periods, included in Approved Document O have been presented in above section 3.7.

Noise levels at the facades are expected to exceed 46 dB $L_{Aeq,8hours}$ for some areas of the development and /or 61 dB L_{Amax} during the night-time period. Following the guidance presented in ADO, alternative means of cooling would be required, these could include careful design of the building's thermal performance to maintain a constant internal temperature, such as solar shading and exposed thermal mass combined with suitable mechanical ventilation system.

A summary of the minimum sound insulation performance required for glazing together with the ventilation strategy are provided within Table 5 with the associated facades shown in Figure 6 below.

. Facade	Suggested background ventilation	Sound insulation performance		Example glazing configuration
	Part F- Mechanical Ventilation with Heat Recovery (MVHR), openable windows for purge ventilation only.	Glazing	32 (-5) dB R_w (C_{tr}),	6mm glazing / 12 mm airgap / 6mm glazing
	Part F- Background ventilators and intermittent extract fans, openable windows for Purge and Overheating. Nominal acoustic trickle vent minimum 32dB $D_{ne,w}$ advised. Or Part F- Mechanical Ventilation with Heat Recovery (MVHR), openable windows for purge ventilation only if proposed for non-acoustic reasons such as development energy efficiency.	Glazing	32 (-5) dB R_w (C_{tr}),	6mm glazing / 12 mm airgap / 6mm glazing

Table 5 Minimum sound insulation performance required for glazing and the suggested background ventilation strategy for each building facade (please read together with Figure 3 below)

Figure 3 Minimum sound insulation performance required for glazing and the suggested background mechanical ventilation strategy for each building façade (please read together with table 5 above)

Note: Alternative glazing configurations may be suitable subject to adequate acoustic performance being achieved. Performance requirements relate to the glazing tested "in situ" with the proposed frame system, and suitable test certificates for proposed selections should be provided to the project acoustician for evidence of compliance at the appropriate design stage.

7. External Amenity Areas

Based on the provided site plan, it is understood that there will be external amenity spaces proposed along the site. As stated previously in section 3.4. It is desirable that the noise levels at amenity spaces should not exceed a free-field level of 55 dB $L_{Aeq,16hours}$.

An assessment has been undertaken to determine the noise levels affecting these areas by creating a 3D noise model of the site using CadnaA software based on the measured noise levels and the methodology described within CRTN. The predicted daytime equivalent continuous noise levels ($L_{Aeq,16hours}$) at the area are presented in Appendix C

The results of the assessment have shown that noise levels at the proposed amenity spaces are expected to be below 55 dB $L_{Aeq,16h}$ and in accordance with BS8233:2014.

8. Building Services Noise Emission Limits

At the time of writing, it is not known whether or where specific external plant items or areas will be proposed on the site. However, there may be an expectation for external plant installations, therefore an assessment has been undertaken to determine plant noise emissions limits.

Plant noise emission limits are assessed in accordance with BS 4142:2014+A1 2019 – methods for rating and assessing commercial and industrial sound and the requirements presented in section 3.3.

Accordingly, it is suggested that the maximum emission level from non-tonal plant should not exceed the typical (modal average) background noise levels measured 1m away from the nearest noise sensitive window.

The cumulative noise emission limits that will apply to the plant items associated with the proposed development are provided in Table 5 below.

Period	Building services noise emission limit (Non-Tonal)
Daytime (07:00-23:00 hours)	43 dB $L_{Aeq,T}$
Night-Time (23:00-07:00 hours)	28 dB $L_{Aeq,T}$

Table 6 Building services noise emission limits

No specific character corrections have been applied to the values above. Additional corrections may be applied in accordance with BS4142:2014 + A1 2019 upon review of the proposal.

9. Conclusion

Hydrock has been appointed by Vistry Group to undertake an environmental noise survey and impact assessment for the proposed new residential development at land east of Kenilworth (Crewe Lane and Woodside Training Centre), Warwickshire.

A noise survey has been undertaken to establish representative daytime and night-time noise levels in and around the proposed site location in accordance with current guidance.

A noise assessment has been undertaken, with consideration given to the following:

- The impact of road traffic noise on the proposed development,
- Noise impacts associated with any proposed fixed plant and/or services associated with the development,

Calculations indicate that double glazed windows would provide sufficient sound insulation to achieve the target internal ambient noise levels with windows closed. The results of the assessment have also shown that background ventilation shall be provided via use of trickle vents.

Areas where alternative means of ventilation are required to comply with ADO guidance have been highlighted.

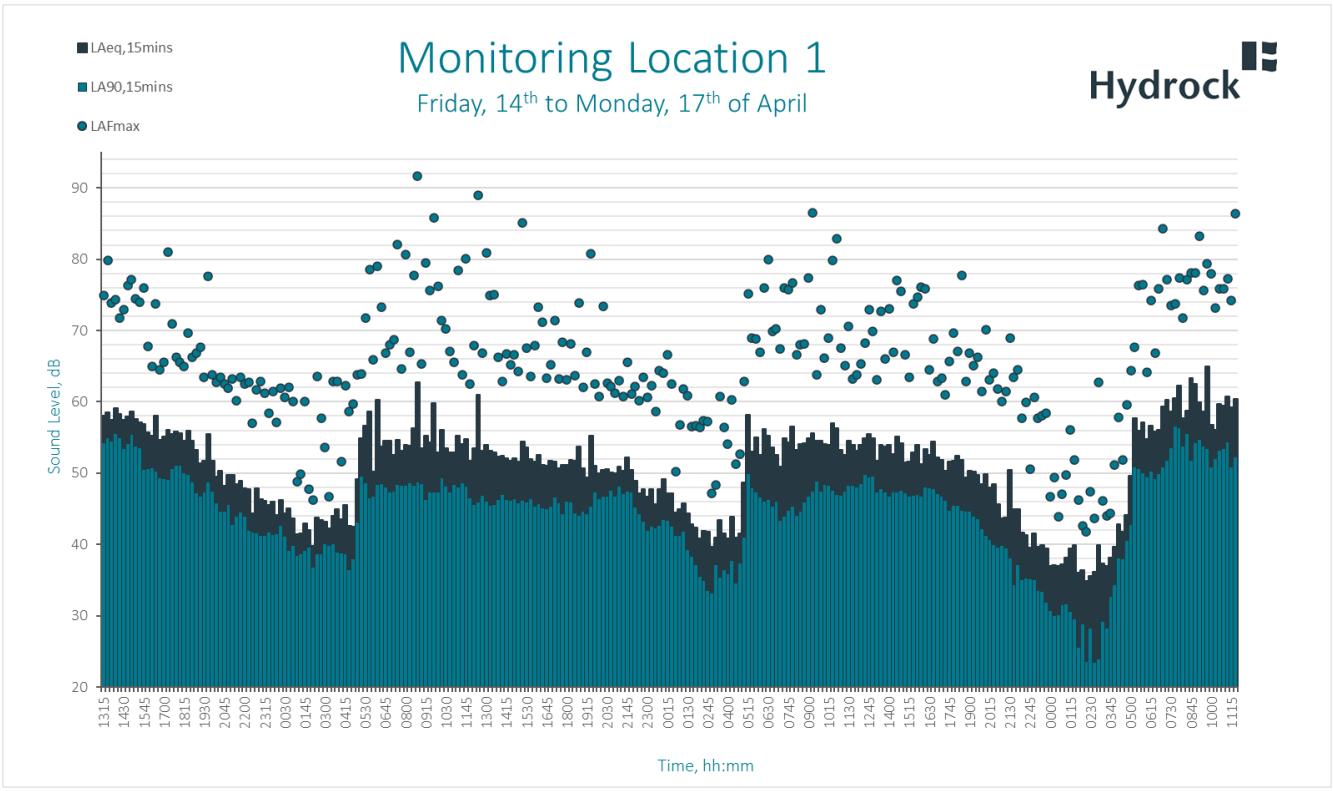
An assessment of the external amenity areas has also been undertaken for residential elements of the scheme. It is anticipated all of the proposed amenity spaces would achieve the target external noise limit of 55 dB $L_{Aeq,16h}$.

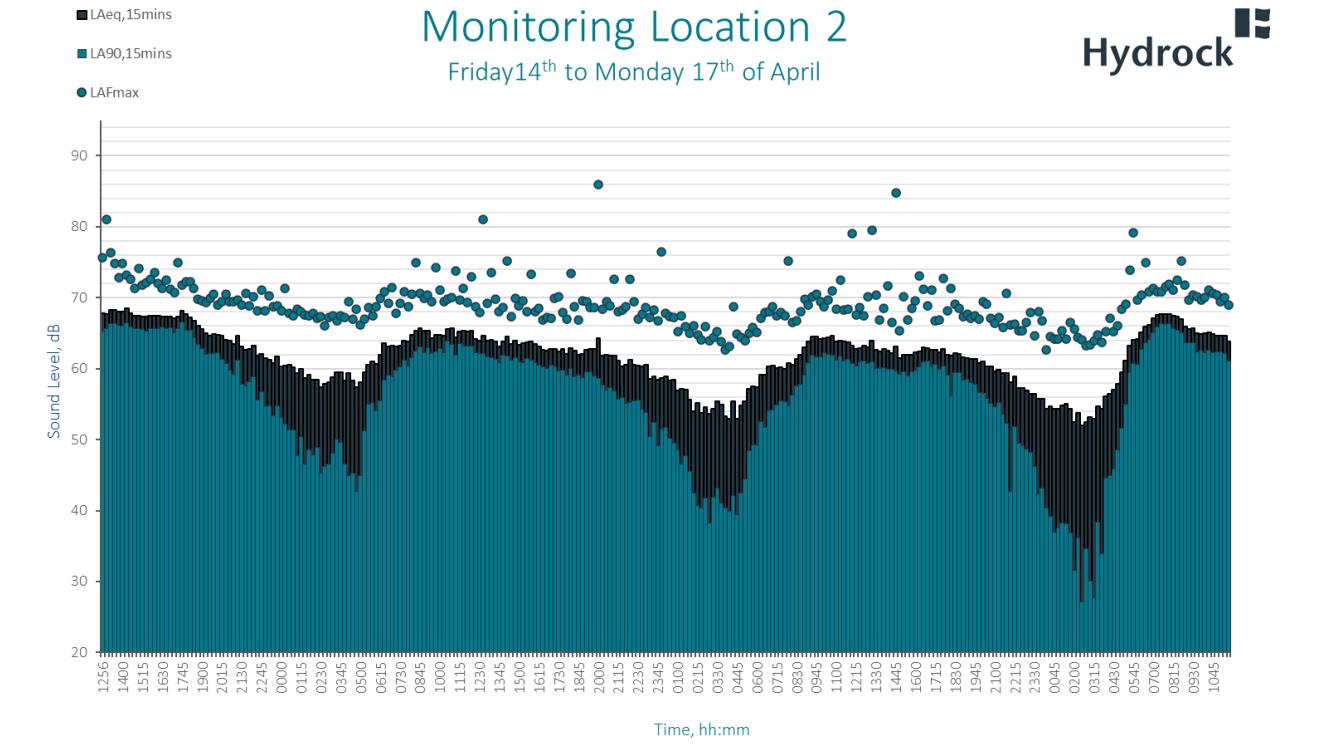
Atmospheric plant noise emission limits have been established and are likely to be achieved with appropriate consideration for the selection of low-noise plant and proprietary attenuation measures as appropriate during technical design.

Appendix A Glossary of Technical Terms

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, 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.
L_{10} and L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time, and the L_{90} is the level exceeded for 90% of the time.
R_w	R_w is the single-number quantity which characterizes the sound insulating properties of a given material over a range of frequencies. This is typically measured in a laboratory in accordance with BS EN ISO 717-1.
$D_{n,e,w}$	$D_{n,e,w}$ is the single number quantity which characterizes the airborne sound insulation performance across a given 'element' and is typically used to describe the acoustic performance of trickle ventilators etc.
C_{tr}	C_{tr} is a correction term applied to single-number sound insulation values (R_w, $D_{n,e,w}$ etc.) to afford additional weighting against low frequency performance.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and at least 3m from buildings.

Appendix B Noise Survey Results





Appendix C Predicted Noise Levels at the proposed facades

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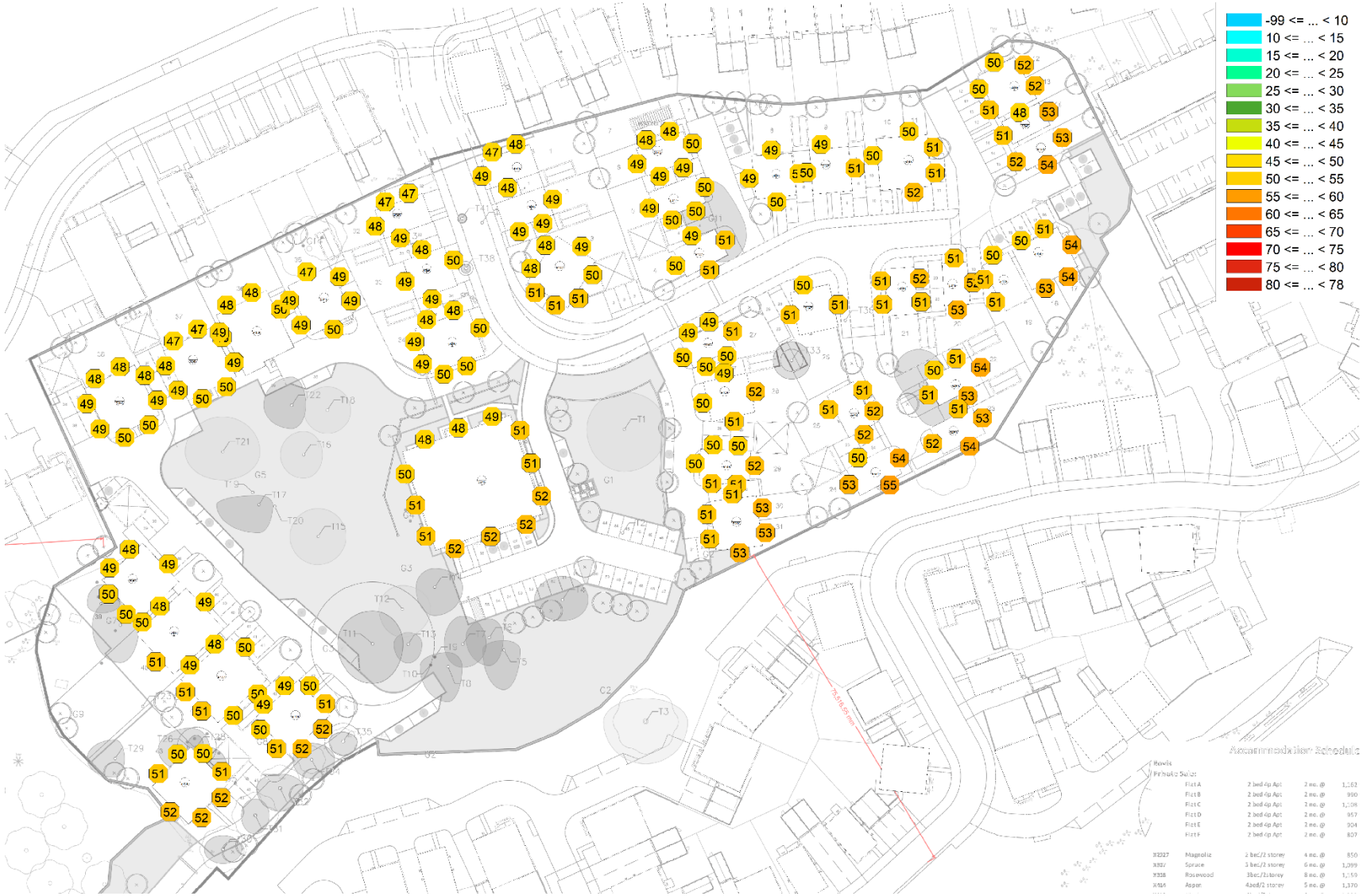
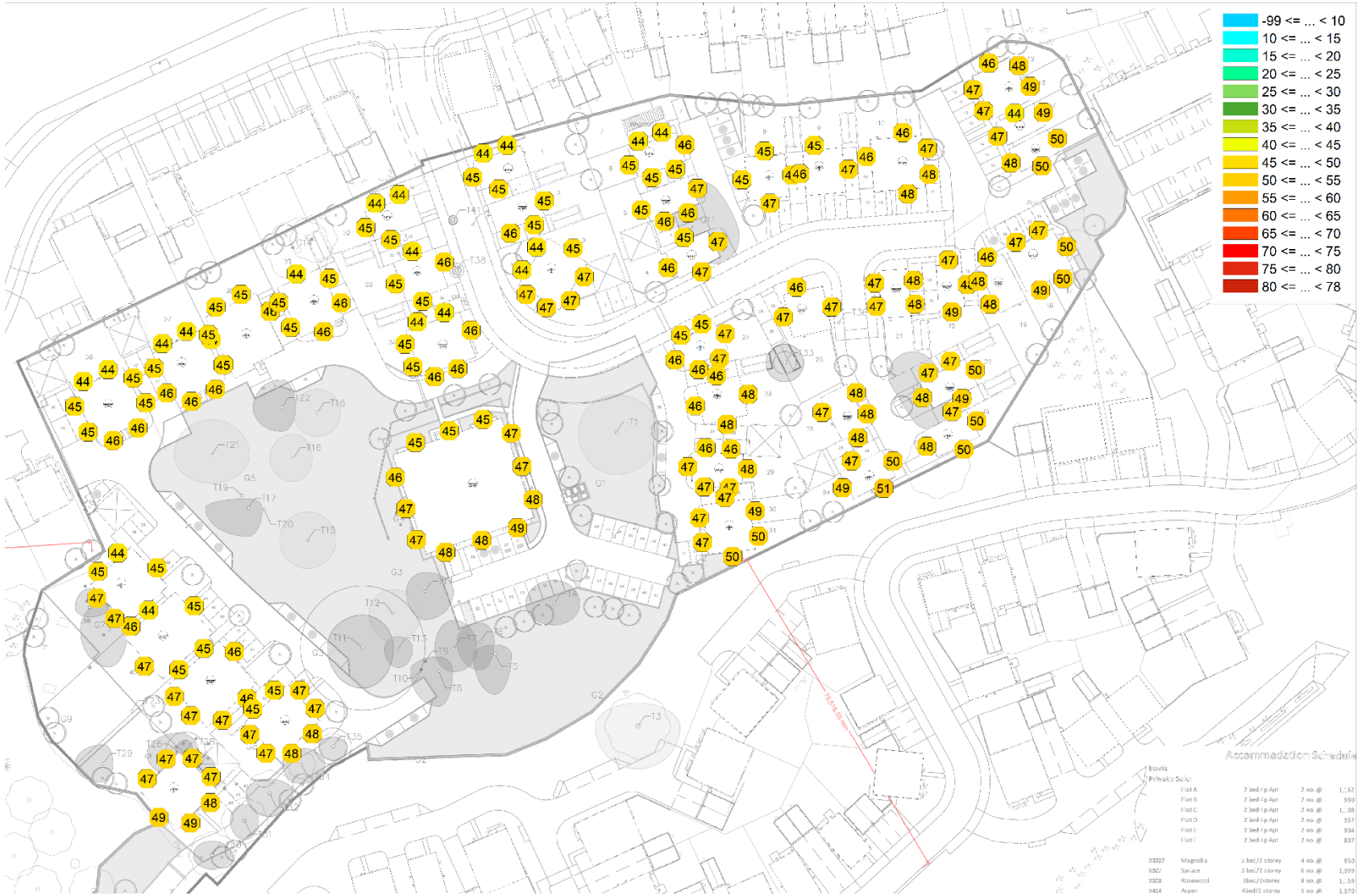
Daytime equivalent continuous noise levels ($L_{Aeq,16h}$)



Night-time equivalent continuous noise levels ($L_{Aeq,16h}$)



Daytime equivalent continuous noise levels ($L_{Aeq,16h}$) in the amenity areas

Night time maximum noise levels (L_{AFmax})