MILLER GOODALL
ACOUSTICS AND AIR QUALITY

NOISE ASSESSMENT

on behalf of

PEACOCK AND SMITH

for the site at

PENISTONE ROAD, FENAY BRIDGE, HUDDERSFIELD

REPORT DATE: 9 APRIL 2024

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Summary

A noise assessment was undertaken to predict the potential impact of noise on a proposed residential development at Penistone Road, Fenay Bridge, Huddersfield. This was initially prepared to support a planning application for the development. This version of the report has been prepared in response to a planning condition (condition 16) and incorporates the updated layout for the development.

Measurements have been taken to determine the ambient noise levels affecting the proposed dwellings at the site. The results of the noise survey were used to create a CadnaA noise model of the site.

Based on the predictions of the noise model, a recommended glazing and ventilation specification has been provided to enable the recommended internal noise limits to be achieved within the properties. The survey did not identify an impact from the adjacent commercial use to the site; however, an enhanced mitigation requirement has been specified for houses facing towards the commercial use as a precautionary measure following discussions with Kirklees Council (KC) and as described in a letter from Miller Goodall to KC dated 21 July 2021.

With the implementation of these recommendations, it is considered that a suitable and commensurate level of protection against noise and vibration will be provided to the occupants of the proposed dwellings and the site is suitable for development.

The information provided within this report provides sufficient evidence to discharge the planning condition.

Record of changes

Prepared By	Reid Malster AMIOA	Reviewed By	Kyran Ebanks AMIOA
Signed		Signed	
Date	21 August 2020	Date	21 August 2020

Version	Date	Change	Initials
1	21 August 2020	Initial issue	RM
2	4 December 2023	Updated Layout, additional information as required for discharge of condition 16	SC
3	9 April 2024	Incorporated enhanced mitigation requirement to eastern boundary as per 21st July 2021 letter to KC	MR

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Contents

1 Introduction

1.1 Miller Goodall Ltd has, on behalf of Peacock and Smith, undertaken a noise assessment in respect of the impact of noise on a proposed residential development.

1.2 The report provides an assessment of road traffic noise from Penistone Road, and commercial noise from an adjacent industrial unit.

1.3 The approved scheme has received the following condition relating to noise:

Condition 16

16. Plans and particulars relating to the Reserved Matters of layout and/or appearance shall, notwithstanding the submitted information, include a further Noise Impact Assessment report. The Noise Impact Assessment shall:

1. Clearly show which habitable rooms in which plots will not achieve satisfactory indoor sound levels with windows open and for these rooms provide a detailed specification of the noise mitigation measures that are necessary to achieve satisfactory indoor sound levels, including an alternative ventilation scheme where required.

2. Clearly show which external amenity areas at which plots will have daytime noise levels that exceed 50dB LAeq,16hour and for these plots provide a detailed specification for the additional noise mitigation measures that are required so that the outdoor noise levels at these plots does not exceed 50dB LAeq,16hour.

All works which form part of the approved scheme shall be completed prior to occupation of the aforementioned plots and retained thereafter.

Reason: In the interest of protecting the amenity of future occupiers through mitigating the impacts of noise pollution, in accordance with Polices LP24 and Lp52 of the Kirklees Local Plan.

1.4 This assessment aims to provide sufficient information to discharge the noise conditions.

2 Site Description

2.1 The site is located in Lepton, a suburb of Huddersfield, around 4 miles to the east from the Town Centre. The site is located along the A629 Penistone Road, and this is the main noise source affecting the proposed development site.

2.2 The site totals 3.65 Hectares and currently consists of open field. Directly south of the site an existing industrial unit housing Reliance Precision Limited is located, an engineering firm that design and manufacture specialist geared and vacuum systems. We understand that activities at the site occur internally.

2.3 The proposed development site was allocated as Housing Development Land in the Kirklees Local Plan (adopted in 2019).

2.4 The site location outline is shown in Appendix 1.

3 Proposed Development

3.1 The proposal is to develop the site for new build residential use involving the erection of 67 dwellings. Road access to the development site is located off Rowley Lane. An indicative plan has been provided and this is shown in Appendix 1.

4 Policy Context

4.1 Noise Policy Statement for England

4.1.1 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."*

4.1.2 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 the quality of life occur.

4.1.3 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 Statement). 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".

4.1.4 Importantly, the NPSE goes on to state:

"This does not mean that such adverse effects cannot occur".

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

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

4.1.6 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.

4.2 National Planning Policy Framework

4.2.1 The National Planning Policy Framework (NPPF[2]) initially published in March 2012, was updated in July 2021. One of the documents that the NPPF replaces is Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise"[3].

4.2.2 The revised NPPF advises that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives). One of these is an environmental objective which is described in par. 8 (c):

"to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

4.2.3 At par. 174 we are advised that:

"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."

4.2.4 Par. 185 goes on to state:

> *"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 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."*

[2] National Planning Policy Framework, Ministry of Housing, Communities and Local Government, July 2021

[3] Planning Policy Guidance 24: Planning and Noise, DCLG, September 1994

4.2.5 Par. 187 seeks to ensure that any development does not prejudice the legally permitted operations and activities of other, existing non-residential uses, stating:

"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."

4.2.6 The NPPF document does not refer to any other documents regarding noise other than NPSE.

4.3 Planning Practice Guidance – Noise

4.3.1 As of March 2014, a Planning Practice Guidance[4] for noise was issued which provides additional guidance and elaboration on the NPPF, the guidance was updated in July 2019. 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.

4.3.2 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 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".

4.3.3 Examples of these factors include:

- The source and absolute noise level of the source along with the time of day that it occurs;
- Where the noise is non-continuous, the number of noise events and pattern of occurrence;
- The frequency content and acoustic characteristics of the noise;
- The effect of noise on wildlife;
- The acoustic environment of external amenity areas provided as an intrinsic part of the overall design;
- The impact of noise from certain commercial developments such as night clubs and pubs where activities are often at their peak during the evening and night.

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

4.3.4 The PPG also provides general advice on the typical options available for mitigating noise. It goes on to suggest that Local Plans may include noise standards applicable to proposed developments within the Local Authority's administrative boundary, although it states that:

"Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed".

4.3.5 The PPG was amended in December 2014 to clarify guidance on the potential effect of noise from existing businesses on proposed new residential accommodation. Even if existing noise levels are intermittent (for example, from a live music venue), noise will need to be carefully considered and appropriate mitigation measures employed to control noise at the proposed accommodation.

5 Acoustic Standards and Guidance

5.1 ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development – May 2017

5.1.1 ProPG: Planning and Noise is new guidance with the aim of delivering sustainable development and promoting good health and well-being through the effective management of noise which may impact on new residential developments. The guidance aims to complement the national planning policy and encourages the use of good acoustic design at the earliest phase of the planning process. It builds upon the recommendations of various other guidance documents including NPPF, NPSE and PPG-Noise, BS 8233 and WHO.

5.1.2 The guidance is applicable to new residential developments which would be exposed predominantly to noise from existing transport sources. The ProPG advocates a risk based approach to noise using a two-stage process:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements: –

- Element 1 – demonstrating a 'Good Acoustic Design Process';
- Element 2 – observing internal 'Noise Level Guidelines';
- Element 3 – undertaking an 'External Amenity Area Noise Assessment'; and
- Element 4 – consideration of 'Other Relevant Issues'.

5.1.3 The ProPG approach is underpinned by the preparation and delivery of an 'Acoustic Design Statement' (ADS), whereby the higher the risk for noise at the site, the more detailed the ADS. The ADS should address the following issues:

- Present the initial site noise risk assessment, including the pre-development acoustic conditions prior to development;
- Describe the external noise levels that occur across the site both before and after any necessary mitigation measures have been incorporated. The external noise assessment with mitigation measures in place should use an informed judgement of typical worst-case conditions;

- Demonstrate how good acoustic design is integrated into the overall design and how the proposed acoustic design responds to specific circumstances of the site;
- Confirm how the internal noise level guidelines will be achieved, including full details of the design measures and building envelope specifications;
- A detailed assessment of the potential impact on occupants should be undertaken where individual noise events are expected to exceed 45 dB $L_{AF,max}$ more than 10 times a night inside bedrooms;
- Priority should be given to enable the use of openable windows where practical across the development. Where this is not practical to achieve the internal noise level guidelines with windows open, then full details of the proposed ventilation and thermal comfort arrangements must be provided;
- Present the findings of the external amenity area noise assessment;
- Present the findings of the assessment of other relevant issues;
- Confirm for a low risk site how adverse impacts of noise will be mitigated and minimised;
- Confirm for a medium or high noise risk site how adverse impacts of noise will be mitigated and minimised and clearly demonstrate that a significant adverse noise impact has been avoided.

5.1.4 ProPG target noise levels are based on existing guidance from BS 8233 and WHO (see below). Table 1 below outlines the guidance noise levels for different room types during day and night times.

Table 1: ProPG guideline indoor ambient noise levels for dwellings

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

5.1.5 The footnotes to this table suggest that internal noise level limits can be relaxed by up to 5 dB where development is considered necessary or desirable, and still represent “reasonable” internal conditions. They also suggest that in such cases, external levels which exceed WHO guidance target levels (see WHO section below) may still be acceptable provided that reasonable internal noise levels are achieved. Although, where the acoustic environment of external amenity areas is intrinsic to the overall design, “noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$”. The wording of ProPG (and BS 8233:2014) is clear that exceedance of guideline noise levels in external areas should not prohibit the development of desirable developments in any event.

5.2 BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

5.2.1 This standard carries the full weight of an adopted British Standard, provides recommended guideline acoustic design criteria for new dwellings and is supported by guidance contained within WHO GCN[5]. The guideline noise design criteria of BS 8233 apply to external noise "*without a specific character"* (previously and sometimes termed or referred to as "*anonymous noise"*) such as that associated with road and rail traffic.

Internal Amenity

5.2.2 The Standard states that for external noise without a specific character, such as road traffic, it is desirable that the internal ambient noise level does not exceed the guideline values shown in Table 2 below.

5.2.3 The note to paragraph 7.7.1 states that where noise has a specific character (i.e. it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content) *"lower noise limits might be appropriate".*

Table 2: BS 8233: 2014 guideline indoor ambient noise levels for dwellings

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

5.2.4 Note 7 to Table 4 of BS 8233 states:

"Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

5.2.5 Guidance on reasonable acoustic design criteria for individual noise events are also provided, and the Standard advises that:

"regular individual noise events…can cause sleep disturbance. A guideline value may be set in terms of SEL[6] or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values".

[5] World Health Organisation Guidelines for Community Noise, 1999

[6] Sound exposure level or L_{AE}

5.2.6 For Internal spaces, the Standard states that;

"..to avoid sleep disturbance, sound pressure levels at the outside facades of living spaces should not exceed 45 dB L_{Aeq} (taken as a façade level, and equating to a free-field external level of 42 dB L_{Aeq}) and 60 dB L_{AFmax} so that people may sleep with bedroom windows open."

External Amenity

5.2.7 BS 8233:2014 adopts guideline external noise values provided in WHO for external amenity areas such as gardens, patios and private outdoor amenity spaces. BS 8233:2014 adopts guideline external noise level limits provided in WHO for external amenity areas such as gardens and patios. The standard states that it is "*desirable*" that the external noise does not exceed 50 dB $L_{Aeq,16hr}$ with an upper guideline value of 55 dB $L_{Aeq,16hr}$ whilst recognising in paragraph 7.7.3.2 that development in higher noise areas, such as urban areas or those close to the transport network, may require a compromise between elevated noise levels (i.e., above 55 dB $L_{Aeq,16hr}$) and other factors that determine if development in such areas is warranted. In such circumstances, the development should be designed to achieve the lowest practicable noise levels in external amenity areas, but should not be prohibited.

5.2.8 The standard also states:

"Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."

5.3 World Health Organisation (WHO) Guidelines for Community Noise 1999

5.3.1 The WHO Guidelines 1999 recommends that to avoid sleep disturbance, indoor night-time guideline noise values of 30 dB L_{Aeq} for continuous noise and 45 dB L_{AFmax} for individual noise events should be applicable. It is to be noted that the WHO Night Noise Guidelines for Europe 2009[7] makes reference to research that indicates sleep disturbance from noise events at indoor levels as low as 42 dB L_{AFmax}. The number of individual noise events should also be taken into account and the WHO guidelines suggest that indoor noise levels from such events should not exceed approximately 45 dB L_{AFmax} more than 10 – 15 times per night.

5.3.2 The WHO document recommends that steady, continuous noise levels should not exceed 55 dB L_{Aeq} on balconies, terraces and outdoor living areas. It goes on to state that to protect the majority of individuals from moderate annoyance, external noise levels should not exceed 50 dB L_{Aeq}.

[7] WHO Night Noise Guidelines for Europe 2009

6 Noise Survey

6.1 Measurements of Existing Noise Sources

6.1.1 Noise measurements were undertaken at a location consistent with the proposed development in accordance with BS 7445-1: 2003[8] by Reid Malster of Miller Goodall Ltd. The calibration of the sound level meter was checked before and after measurements with negligible deviation (<0.1 dB). Details of the equipment used are shown in Table 3, below.

Table 3: Noise monitoring equipment

Equipment Description	Type Number	Manufacturer	Serial No.	Date Calibrated	Calibration Certification Number
Class 1[9],[10] Integrating Real Time 1/3 Octave Sound Analyser	NOR 140	Norsonic	1406815	10/07/19	32276
Microphone	NOR 1225	Norsonic	355519	10/07/19	32275
Class 1 Calibrator[11]	NOR 1251	Norsonic	34123	20/07/20	04743/2
Outdoor microphone housing	NOR 1217	Norsonic	12175738	N/a	N/a

6.1.2 Noise monitoring was undertaken at the times specified in Table 4, below. Weather conditions were determined both at the start and on completion of the survey. It is considered that meteorological conditions were appropriate for environmental noise measurements. Measurement locations are shown in Appendix 1.

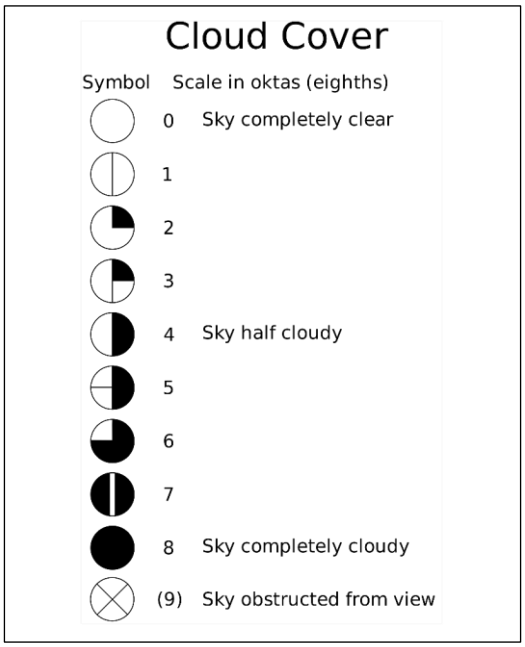
[8] BS 7445-1: 2003 Description and measurement of environmental noise - Part 1: Guide to quantities and procedures

[9] IEC 61672-1 (2002) Electroacoustics – Sound level meters Part 1: Specifications

[10] IEC 61260 (1995) Electroacoustics – Octave-band and fractional-octave-band filters

[11] IEC 60942 (2003) Electroacoustics – Sound calibrators

Table 4: Dates, times and weather conditions during noise measurements

Measurement Locations	Date/Time	Weather conditions		
		Description	At Start of Survey	On Completion
P1	30/07/20 17:00 – 31/07/20 17:00	Temperature:	24 ºC	32 ºC
		Precipitation:	Dry	Dry
		Cloud cover (oktas – see opposite):	5	6
		Any fog/snow/ice?	No	No
		Any damp roads/wet ground?	No	No
		Wind speed:	2 m/s	None
		Wind direction:	Variable	
		Any conditions that may cause temp. inversion (e.g. calm nights with no cloud):	No	No

6.1.3 Measurements were taken at times considered to be representative of the periods during which the proposed residential accommodation would be subject to the highest levels of ambient noise. Measurements were made under free-field conditions at a height of 1.5 m above the ground.

6.1.4 The noise sources within the vicinity of the measurement locations are summarised in Table 5, below:

Table 5: Description of noise sources affecting the site

Measurement Locations	Noise Sources
MP1	Road traffic noise from Penistone Road, occasional vehicle noise from nearby industrial use

6.1.5 At the time of monitoring, we understand that Reliance Precision Ltd was operating normally and very little commercial noise was audible when listening at position MP1. It is our understanding from the company's website that production activities are internal and mostly consist of the assembly of parts. When listening east of the site in proximity to the offices no noise was audible at the site boundary.

6.1.6 The monitoring data shown in Chart 1 below does not seem to indicate a clear impact from the use of the industrial site (Reliance Precision Ltd), and during site visit the onsite consultant could not perceive a specific noise level in periods of no passing traffic. This assessment therefore focusses on road traffic noise from Penistone Road as the most dominant noise source affecting the site.

6.2 Monitoring Results

6.2.1 A summary of the broadband measurement data is provided in Chart 1 and Table 6 below. All data are sound pressure levels in dB re 20 μPa.

Chart 1: Noise Monitoring Results

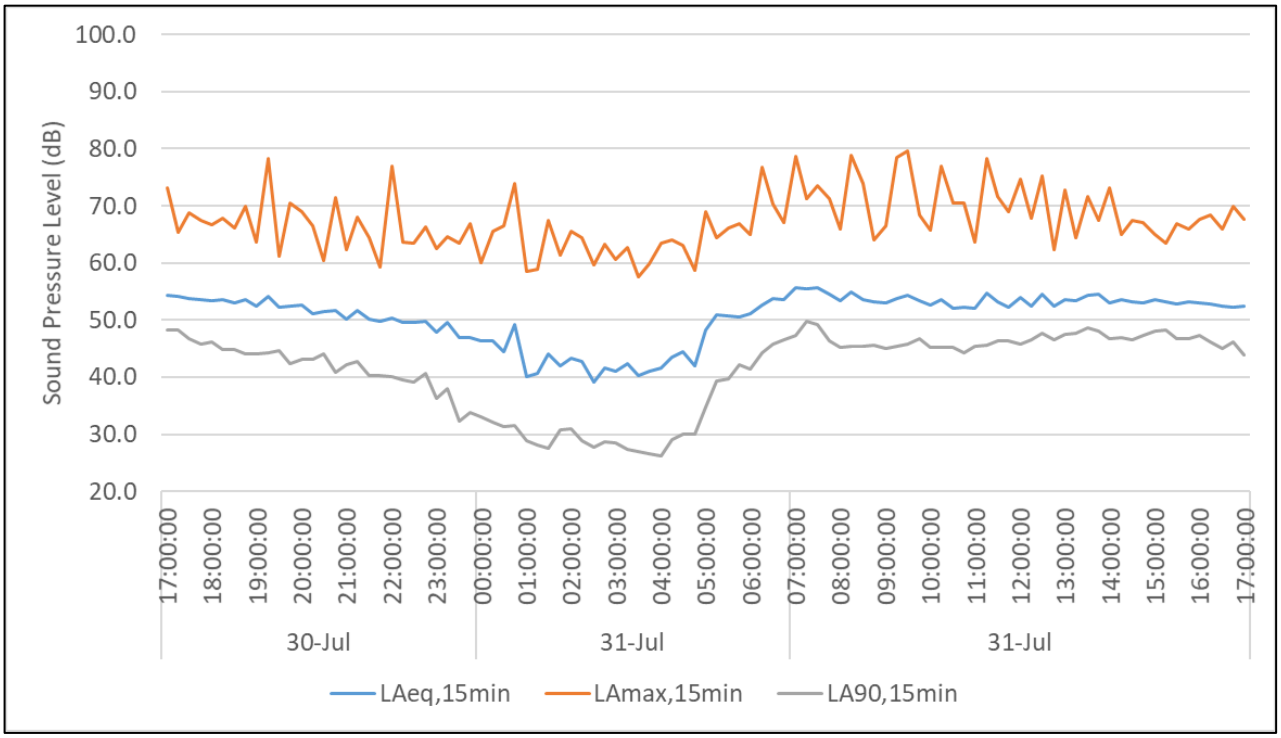


Table 6: Noise Monitoring Results

Monitoring Period	Average $L_{Aeq,T}$ Level (dB)	Modal $L_{A90,T}$	L_{AFmax} Range
30/07/20 17:00-23:00- 31/07/20 07:00-17:00 (daytime average)	53	48	59-80
30/07/20 23:00 – 31/07/20 07:00 (night-time)	48	29	58-77

6.2.2 The results of the noise monitoring have been assessed against the ProPG noise risk levels to determine the potential effect of noise on the proposed site without mitigation measures. The risk level has been determined based on the predicted daytime and night-time noise levels at the worst affected façade(s) for the proposed development.

6.2.3 Noise monitoring data has been used to calibrate a computer noise model of the site. During visits to the site and site walkovers it was determined that the road traffic from Penistone Road was the most dominant. As such day and night-time noise from each of these sources have been modelled.

6.2.4 Octave band frequency data was obtained during surveying and this was utilised within noise ingress calculations to determine suitable mitigation in terms of glazing and ventilation requirements. This source data is provided in Table 7, below.

Table 7: Octave band free-field external noise level spectra at MP1

Measurement Descriptor	Sound Pressure Level, dB in Octave Band Centre Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Daytime noise level	61.0	53.8	44.7	46.2	50.5	45.4	39.4	33.3	53.1
Night-time noise level	54.1	46.5	38.1	41.9	45.6	39.7	31.3	23.1	47.8
Maximum noise level (based on 11th highest night-time L_{Amax})	74.2	66	56.5	61.7	63.5	57.6	50.7	43.6	66.1

6.2.5 The night-time maximum noise level spectrum was based on the 95th percentile of night-time L_{AFmax} events, adjusted to give a level equal to the 11th highest L_{AFmax} event.

7 Impact of Existing Noise Sources on the Development

7.1 Computer Modelling

7.1.1 Predictions of existing noise levels on the site have also been undertaken using the CadnaA noise modelling package. Specific model parameters were applied as follows:

- Propagation of noise using algorithms within ISO 9613: 1993 *Acoustics - Attenuation of sound during propagation outdoors*. Roads were modelled as line sources at a height of 0.5 m above ground level and calibrated using spectral data measured during the survey;
- Default ground absorption G = 0.8 (equivalent to grassed areas and consistent with the dominant ground cover at the site);
- Ground attenuation: spectral all sources;
- No adverse meteorological effects;
- Two orders of reflection; and
- Topographical data was obtained DEFRA LIDAR data.

7.1.2 The model was also inclusive of 1.8m high garden fencing which is marked on the site plan provided in Appendix 1.

7.2 Validation of the Noise Model

7.2.1 A noise level receptor point was incorporated into the CadnaA model at the noise survey measurement location to calibrate the model using the measured octave band L_{eq} and L_{Fmax} noise levels.

7.3 Noise Model Predictions

7.3.1 Three scenarios were modelled using the indicative master plan provided: daytime L_{Aeq} noise levels affecting the site, night-time L_{Aeq} noise levels and night-time L_{AFmax} noise levels. Modelling outputs are provided in Appendix 2.

7.3.2 Table 8 shows a ProPG risk assessment for the site based upon the variable noise levels predicted over the undeveloped site, demonstrating that this is a low risk site.

Table 8: ProPG Noise Risk Level Assessment

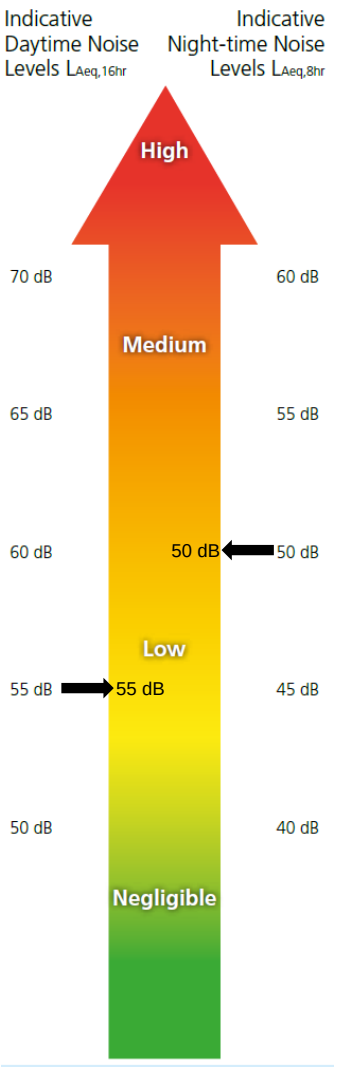
Noise Risk Assessment	Potential Effect Without Noise Mitigation	Pre-Planning Application Advice
	Increasing risk of adverse effect	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed 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 to 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.
	No Adverse effect	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.
Typical Night-time L_{Amax} (dB)	**> 60 dB?**	**L_{Amax} Level Comment**
68	**Yes**	An indication that that there may be more than 10 noise events at night-time with L_{Amax} > 60 dB means the site should not be regarded as negligible risk.

Table 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.

7.4 Predicted Internal Noise Levels Assessed to ProPG Guidance Levels

7.4.1 Based on ProPG guidance levels, it is proposed that noise from the development is controlled to 30 dB L_{Aeq} in bedrooms at night and 35 dB L_{Aeq} in habitable rooms during the day, and that noise from individual events such as vehicle pass-bys does not regularly exceed an indoor level of 45 dB L_{AFmax}.

7.4.2 The generally accepted rule of thumb is that a window left open for ventilation provides 10 - 15 dB attenuation from external noise sources with the WHO Guidelines for Community Noise suggesting 15 dB. The DEFRA report NANR116: Open/Closed Window Research[12] suggests the figure to be between 12 and 18 dB for road and rail traffic. ProPG indicates that where external noise levels are more than 15 dB higher than the internal noise targets, openable windows should not be relied upon as the sole means of ventilation and some form of acoustically attenuated ventilation may be required. This equates to an external noise level of 45 dB L_{Aeq} / 60 dB L_{Amax} during the night or 50 dB L_{Aeq} during the day.

7.4.3 External noise levels at the dwellings closest to Penistone Road are approximately 5 dB above the threshold levels below which internal noise levels remain achievable with the use of open windows for ventilation, and therefore mitigation measures to reduce the noise impact have been applied as described in the following section of this report. It should be noted however that as the exceedance is marginal, only nominal mitigation in the form of standard thermal double glazed windows with standard trickle ventilators will be necessary in the worst-case dwellings facing the road.

7.5 Mitigation for Achieving Good Acoustic Design

7.5.1 In order to assess the potential glazing and ventilation requirements for dwellings, noise ingress calculations were undertaken based on the methodology in BS EN 12354-3[13]. The following assumptions were made regarding the internal rooms:

- Assessed within first floor bedrooms and ground floor living rooms with an internal volume of 30 m^3
- 'Normal' internal surface finishes e.g. carpeted with curtains etc.
- Glazed area of 1.5 m^2 per room.

7.5.2 The areas of the proposed site where internal noise is predicted to exceed the criteria when windows are open are rooms on elevations closest to, and facing, Penistone Road. The majority of the site will allow for openable windows for proposed dwellings situated internally, which benefit from the screening provided by the proposed plots around the boundary of the site.

7.5.3 Although no risk of noise impact was identified from the adjacent commercial use of Reliance Precision Limited (south) or the Offices (east), the glazing and ventilation specification is recommended for the proposed dwellings on these boundaries as a precaution, if the future occupants desire to have their windows closed. This was approach was initially discussed in a letter from Miller Goodall to KC dated 21 July 2021.

7.5.4 A summary of the noise ingress calculations are in Table 9, below. Appendix 3 shows a façade mark-up of where the glazing and ventilation specification should be applied.

[12] NANR116: 'Open/closed window research' Sound Insulation through ventilated open windows, Defra April 2007

[13] BS EN 12354-3:2000 Building acoustics. Estimation of acoustic performance in buildings from the performance of elements - Airborne sound insulation against outdoor sound

Table 9: Predicted internal noise levels at worst-case façades

Description	External Noise Levels		Predicted Internal Noise Levels		BS 8233 Criteria		Exceedance of Criteria		Proposed Glazing and Ventilation
	dB $L_{Aeq,T}$	dB L_{AFmax}	dB $L_{Aeq,T}$	dB L_{AFmax}	dB $L_{Aeq,T}$	dB L_{AFmax}	dB $L_{Aeq,T}$	dB L_{AFmax}	
Daytime Ground Floor	55	-	30	-	35	-	-5	-	Type 1
Night-time First Floor	50	68	26	44	30	45	-4	-1	

- **Type 1** - Glazing with minimum weighted sound reduction index of 27 dB $R_W + C_{tr}$ (e.g. 4/12/4 double glazing); ventilators with a minimum element normalised sound level difference of 27 dB $D_{ne,\,w} + C_{tr}$.
- **Type 2** - Glazing with minimum weighted sound reduction index of 27 dB $R_W + C_{tr}$ (e.g. 4/12/4 double glazing); ventilators with a minimum element normalised sound level difference of 35 dB $D_{ne,\,w} + C_{tr}$.

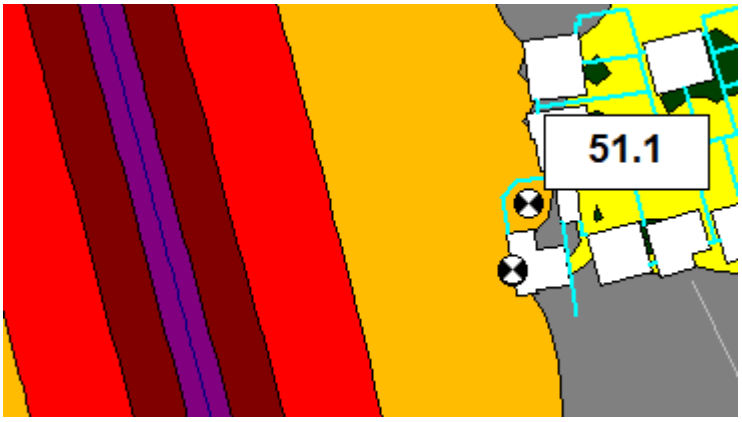
7.5.5 It can be seen from Table 9 that rooms on the noisiest elevations are predicted to satisfy the internal noise level requirements with glazing with a sound reduction index of 27 dB $R_w + C_{tr}$; this could be achieved using double glazing with a 4/12/4 configuration. Background ventilation could be provided by trickle ventilators with a minimum element normalised sound level difference of at least 27 dB $D_{ne,w} + C_{tr.}$

7.5.6 In relation to Condition 16.1, a markup has been provided in Appendix 3 which show which habitable rooms will require the recommended noise mitigation measures to achieve satisfactory indoor sound levels.

7.6 External Noise Levels

7.6.1 The predictions of the noise model demonstrate that noise levels in external amenity areas across the site will be below 50 dB $L_{Aeq,16hour}$, except in a single garden in the southwest corner closest to the road, as shown in Image 1 below:

Image 1: Daytime L_{Aeq} noise level in closest garden



7.6.2 As the noise grids are calculated at 4m x 4m resolution, the full screening effect of the existing 1.8m solid timber fence is not clearly defined, and therefore a noise receptor point has been placed in the centre of the garden at a height of 1.5m above ground, which shows the predicted level of (51.1 dB).

7.6.3 The 1 dB exceedance over the criteria is small and the predicted level remains below the guideline upper level of 55 dBA, so additional mitigation may not be considered necessary. Nevertheless in order to reduce the noise level to 50 dB in this garden, the solid timber garden fence would need to be increased to extend to 2 m above ground (instead of the currently proposed 1.8 m).

8 Acoustic Design Statement

Typical Issues for low / medium risk sites	Statement
Relevant noise sources identified	This assessment has considered noise from road traffic. Potential noise from an adjacent industrial unit was identified, but was considered not a risk.
Greater coverage across the site (all buildings, all relevant heights)	Noise grids have been predicted to cover the entirety of the undeveloped site.
Opportunities to mitigate the noise source within the site	Design utilised building massing as a noise barrier
Maximise separation	N/A
Existing topographical advantages; Change site level	N/A
Noise barriers – screening opportunities	Rear gardens to have fencing
Site layout – protecting residential units	Design utilises building massing as a noise barrier
Site layout – protecting external amenity space	Achieved utilising self-screening by new houses and by fencing
Access to quiet open space on or off-site	Achieved by provision of shielded rear gardens.
Building layout to self-screen sensitive rooms	N/A
Orientation of noise sensitive rooms away from the source of noise exposure i.e. quiet facades	N/A
Building treatment to screen openings	N/A
Window location & size on affected facades	N/A
Façade insulation design	Standard brick/block façade construction, is not the weak point of the façade.
Complete Acoustic Design Process throughout	Yes

9 Consideration of Other Discipline Requirements

9.1 It is recommended that you confirm the suitability of all recommended noise mitigation measures with your architects, structural engineers, building contractors, fire consultants and material manufacturers prior to procurement and field application so that when the recommended noise control measures are implemented on site they will satisfy the requirements of all disciplines, therefore, should not cause any health and safety issues.

10 Conclusions

10.1 A noise assessment has been undertaken at the site of a proposed residential development off Penistone Road, Huddersfield. Measurements have been taken to determine the ambient noise levels affecting the proposed dwellings at the site.

10.2 Conditional planning consent has been granted and condition 16 has been addressed as part of this assessment.

10.3 Façade levels have been predicted for daytime and night time at dwellings over the site. Predicted levels have been used to determine specifications for glazing and ventilation to ensure internal criteria for living spaces is achieved. The survey did not identify an impact from the adjacent commercial use to the site; however, an enhanced mitigation requirement has been specified for houses facing towards the commercial use as a precautionary measure following discussions with Kirklees Council (KC) and as described in a letter from Miller Goodall to KC dated 21 July 2021.

10.4 Outdoor living spaces will be protected by plot boundary fencing to ensure levels do not exceed 50 dB $L_{Aeq,16h}$, except for one garden which is predicted to have a daytime average noise level of 51 dBA. This can be mitigated to achieve 50 dBA by increasing the garden fence height by 0.2 m to achieve 2m total height.

10.5 With the implementation of these recommendations, it is considered that a suitable and commensurate level of protection against noise will be provided to the occupants of the proposed dwellings and the site is suitable for development.

10.6 In conclusion, the noise assessment has provided sufficient information for the discharge of condition 16.

APPENDICES

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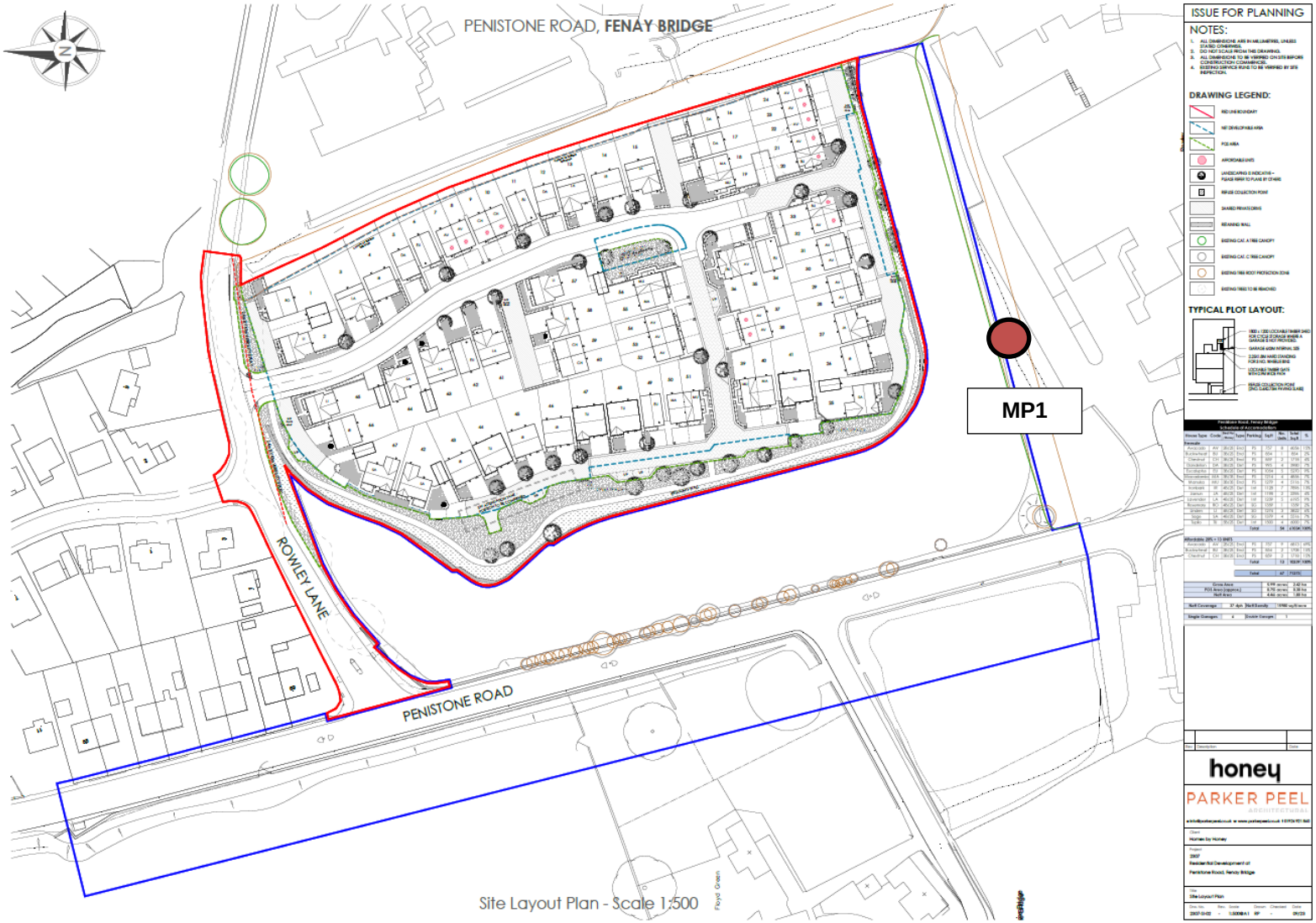
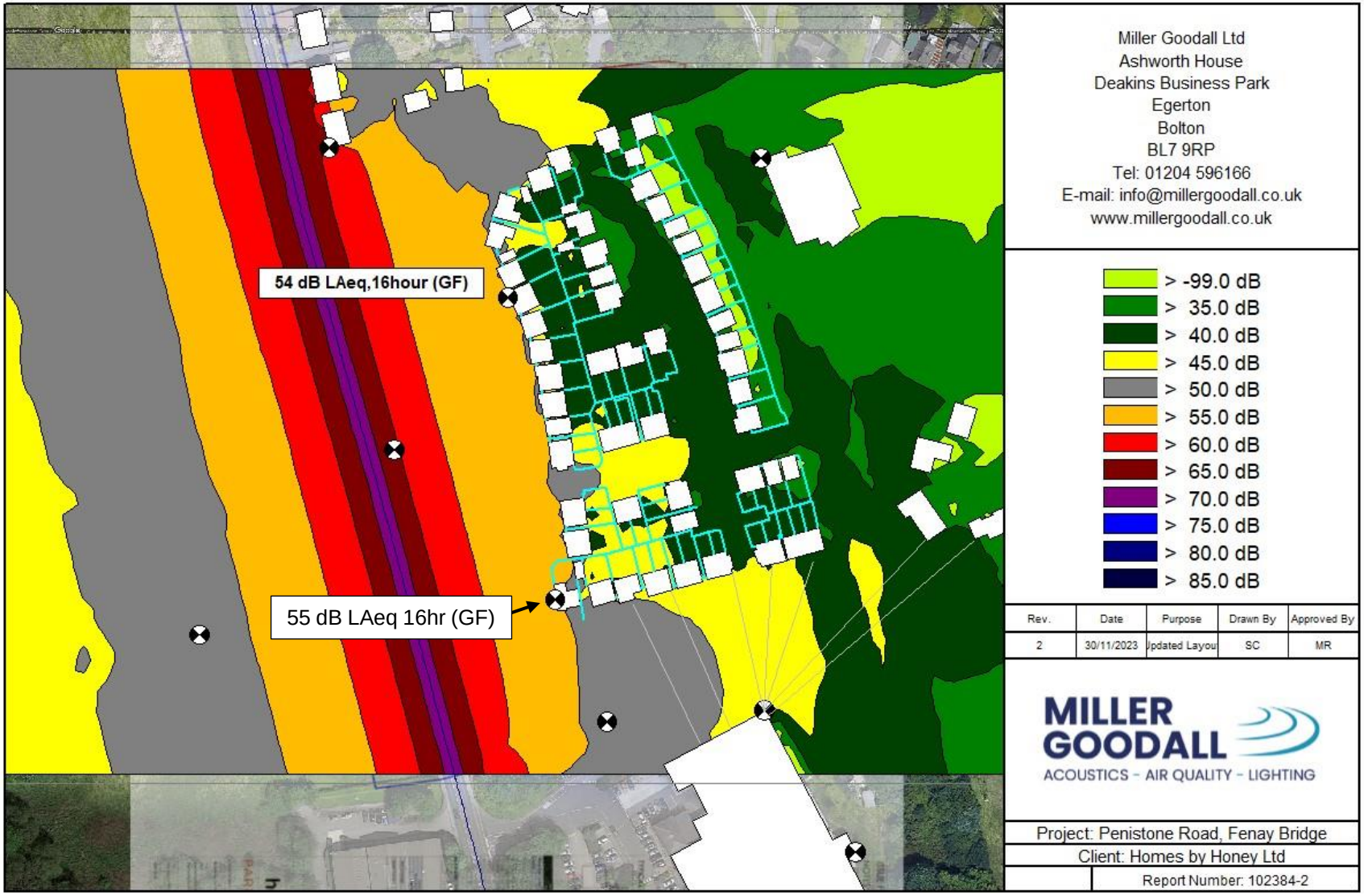
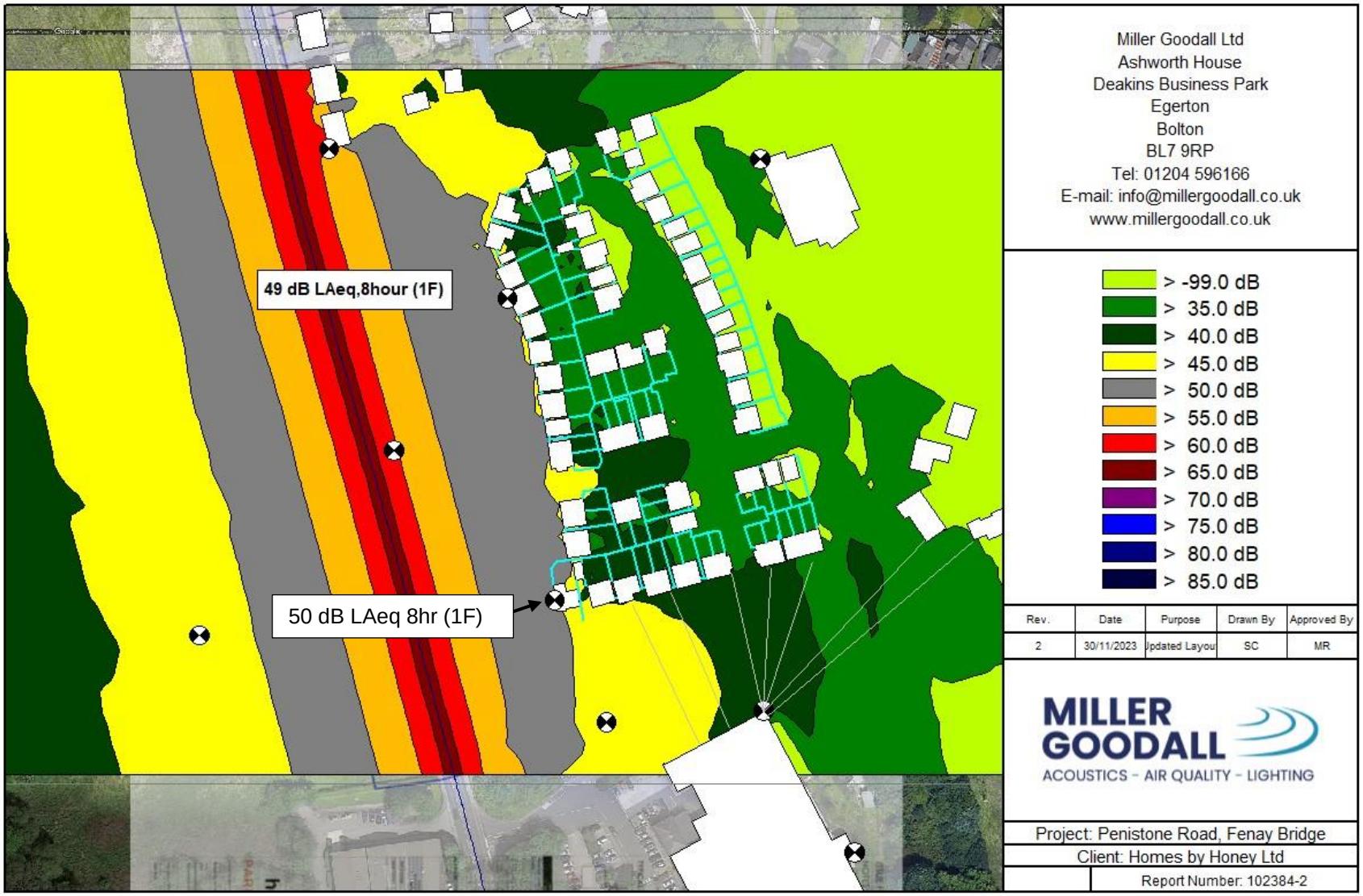
Appendix 1: Site Plan (red outline) and monitoring location



Appendix 2A: Noise Model Predictions: Daytime $L_{Aeq,16hour}$ (dB) 1.5 m Grid Height



Appendix 2B: Noise Model Predictions: Night-time $L_{Aeq,8hour}$ (dB) 4 m Grid Height



Appendix 3A: Ground Floor (Living Rooms) - Façade Mark-up

Appendix 3B: First Floor (Bedrooms) - Façade Mark-up

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Glossary of Terms

Decibel (dB) The unit used to quantify sound pressure levels; it is derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 µPa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is usually only perceptible under controlled conditions.

dB L_A 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 L_A broadly agree with an individual's assessment of loudness. A change of 3 dB L_A is the minimum perceptible under normal conditions, and a change of 10 dB L_A corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB L_A; normal conversation about 60 dB L_A at 1 meter; heavy road traffic about 80 dB L_A at 10 meters; the level near a pneumatic drill about 100 dB L_A.

$L_{A90,T}$ The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 2014+A1:2019 it is used to define background noise level.

$L_{Aeq,T}$ The equivalent continuous sound level. The sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter.

L_{Amax} The highest A weighted noise level recorded during the time period. It is usually used to describe the highest noise level that occurred during the event.

$L_{A10(18\ hour)}$ Often referred to as the UK road traffic noise index, this is the arithmetic average of the values of L_{A10} hourly for each of the 18 one hour periods between 06:00 and 00:00.

R_w Single number rating used to describe the sound insulation of building elements and is defined in BS EN ISO 10140-2: 2010 (formerly BSEN ISO 140-3:1995). It is derived by measurement under laboratory conditions and does not take into account the effects of flanking transmissions.

$D_{ne,w}$ The weighted element-normalized level difference is a single figure rating used to describe the sound insulation of small elements within a larger construction and is defined in BS EN ISO 10140-2:2010 (BSEN ISO 140-10:1991). It is most often used to rate the sound insulation performance of ventilator units e.g. trickle vents.

C_{tr} A single-number spectrum adaptation term used to characterise the sound insulation rating with respect to urban traffic. It is defined in ISO 717-1:20-13.

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