

A large teal graphic on the left side of the page, consisting of a triangle at the top and a trapezoid below it, forming a shape that resembles a stylized letter 'M' or a mountain peak.

Proposed Gypsy and Traveller Site, Langley Close, Magor

Noise Assessment

February 2024

Confidential

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Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
0	09/02/24	R Roper	A Monk-Steel	R Perkins	First draft for client comment

Document reference: 100115516 | NS001 | P01 | 100115516

Information class: Standard

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Contents

1	Introduction	1
1.1	Project description	1
1.2	Site description	1
1.3	Scope of the assessment	2
2	Guidance and legislation	4
2.1	Planning Policy Wales	4
2.2	Local authority policy and guidance	5
2.3	TAN 11	6
2.4	ProPG	8
2.5	British Standard BS4142:2014+A1:2019	10
2.6	British Standard BS 8233:2014	10
2.7	World Health Organization guidance	11
2.8	British Standard BS 7445:2003	11
3	Survey methodology	12
3.1	Measurement procedure	12
3.2	Measurement locations	13
3.3	Equipment	13
3.4	Weather conditions	14
3.5	Limitations	14
4	Measurement results	15
4.1	Long term	15
4.2	Short term	16
5	Assessment	18
5.1	TAN 11	18
5.2	ProPG	18
5.3	BS 4142	19
5.4	BS 8233	20
6	Conclusions	21
A.	Acoustic Glossary	22

B Comparison between 5 minute sample measurements at ST and LT locations 23

Tables

Table 3.1: Noise measurement location details	13
Table 3.2: Inventory of noise measurement equipment	13
Table 3.3: Weather summary	14
Table 4.1: LT1 measurement results (free-field measurement)	16
Table 4.2: Summary of ST measurements (15 minutes for each measurement)	17

Figures

Figure 1.1: Proposed site layout	2
Figure 4.1: LT1 plot of results of the long term measurement	16

1 Introduction

1.1 Project description

Monmouthshire County Council (MCC) has a legal and moral duty to ensure everyone has access to good quality homes. MCC recognises that safe, culturally-appropriate accommodation is necessary for individuals to flourish in other parts of their lives. In accordance with the Housing (Wales) Act, 2014, MCC has identified a need for additional sites to house the Gypsy and Traveller families already living in Monmouthshire.

Three Council owned sites in Monmouthshire have been identified as potentially suitable to meet the current needs for the Gypsy and Traveller community. Mott MacDonald was commissioned by MCC to conduct noise surveys and assessments at proposed development sites in Monmouthshire at:

- Langley Close, Magor,
- Land at Bradbury Farm, Crick; and
- Land at Oak Grove Farm, Portskewett.

It is proposed to develop one of these sites as a Gypsy and Travellers site.

Mott MacDonald has been appointed by MCC to provide a noise assessment report as part of MCC's Gypsy and Traveller Accommodation Assessment (GTAA) identification study for the Langley Close, Magor, Monmouthshire (hereafter referred to as "**the proposed Gypsy and Traveller site**" or simply "the site"), one of the three council-owned identified sites for potential development.

This report describes the noise impact assessment for the proposed development at Langley Close and assesses the potential impact on the development due to existing noise levels and sets criteria for any noise emissions from the site.

1.2 Site description

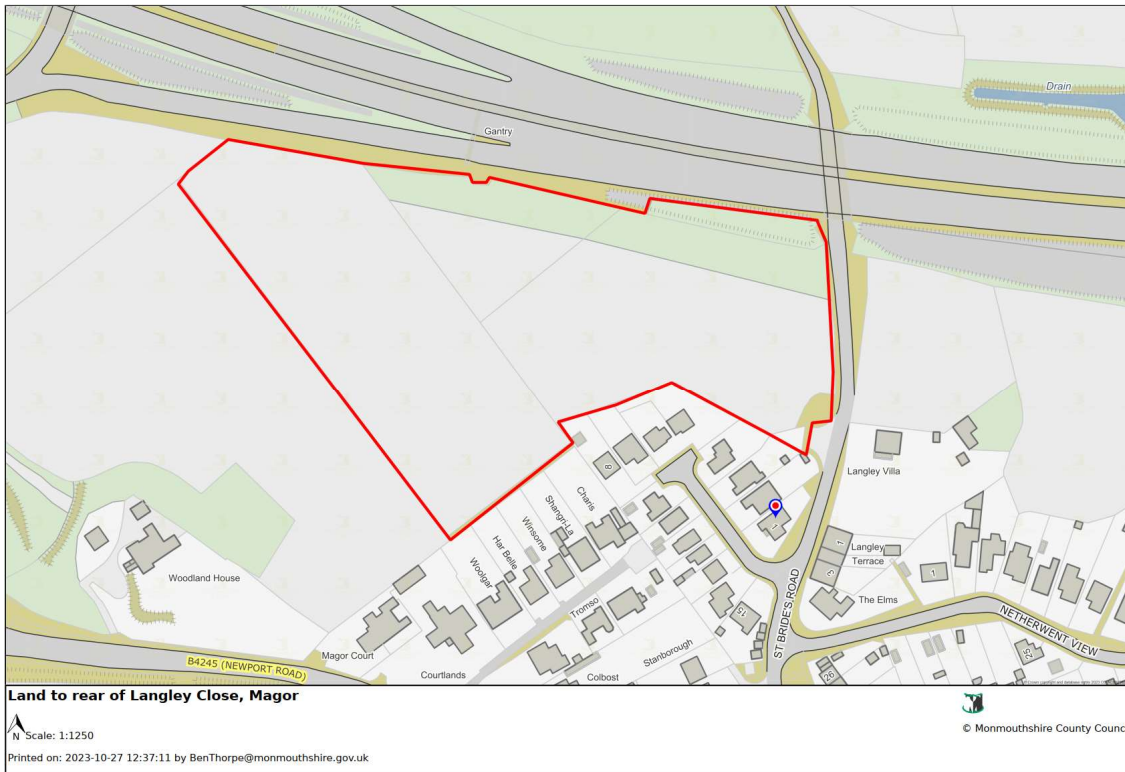
The site currently comprises three grazed agricultural fields south of the west bound off ramp of the M4 motorway Junction 23A to the Magor Interchange with the A4810 road which is to the west of the site but separated from it by further fields. Immediately to the south of the site are the residential areas of Langley Close and an unnamed cul de sac off the B4245 Newport Road.

The proposed Gypsy and Travellers site is understood to comprise the construction of up to six pitches that will include parking and a collective utility block with access gained via St Brides Road which runs along the eastern boundary of the site.

The noise environment on the site is dominated by traffic noise from the M4 motorway and the off ramps to Magor Interchange. Intermittent vehicle noise occurs from St Brides Road but this is negligible in comparison with that from the M4.

The site layout is shown in Figure 1.1.

Figure 1.1: Proposed site layout



Source: Monmouthshire County Council

1.3 Scope of the assessment

The purpose of the survey was to quantify the ambient noise levels impacting the site and the background sound levels at the nearby noise sensitive receptors (NSRs).

The suitability of the proposed site is considered using Technical Advice Note, TAN 11: Noise (1997), Professional Practice Guidance on Planning and Noise (ProPG) with due consideration to Technical Advice Note 11: Air Quality, Noise and Soundscape' (2022) and 'Supporting Document 1: Soundscape Design' (2022).

Noise levels due to existing noise sources potentially impacting the proposal are assessed in terms of the implications for the internal noise levels within a typical mobile home using British Standard (BS) 8233 (2014) 'Guidance on sound insulation and noise reduction for buildings'. As the type and construction of these mobile homes will vary this will be indicative only. Any outline mitigation measure proposed will be aimed at the layout and landscaping of the site as the design of mobile homes is clearly beyond the control of the designers. At the time of this report the proposed layout of the site is not known and therefore the proposed mitigation measures are only discussed in outline.

Environmental noise limits for any proposed new plant associated with the development, such as toilet extract fans or generators, would be set in accordance with the guidance in BS 4142 (2014+A1:2019) 'Methods for rating and assessing industrial and commercial sound', in the context of the TAN 11, Planning Policy Wales and any specific local authority requirements.

This report details the monitoring methodology, noise assessment methodology and any assumptions and limitations associated with the monitoring, and documents the results of the baseline monitoring.

The baseline monitoring data has been processed in accordance with the requirements of BS 4142 in order to set criteria for noise emissions from any mechanical plant such as toilet extracts, generators, air-conditioning units etc associated with the proposed development.

The baseline monitoring data has also been processed in accordance with British Standard BS 7445 (2003) '*Description and measurement of environmental noise*' and BS 8233 (2014) '*Guidance on sound insulation and noise reduction for buildings*'.

2 Guidance and legislation

2.1 Planning Policy Wales

Planning Policy Wales (PPW) points out some similarities between air quality and noise in the way they impact a proposed site. Noise is not just considered in terms of its level. PPW also discusses the 'soundscape'. Selected sections of Planning Policy Wales, Edition 11 | February 2021 are reproduced below:

Air Quality and Soundscape

6.7.1 Clean air and an appropriate soundscape, contribute to a positive experience of place as well as being necessary for public health, amenity and well-being. They are indicators of local environmental quality and integral qualities of place which should be protected through preventative or proactive action through the planning system. Conversely, air, noise and light pollution can have negative effects on people, biodiversity and the resilience of ecosystems and should be reduced as far as possible.

6.7.3 Certain sounds, such as those created by trees, birds or water features, can contribute to a sense of tranquillity whilst others can be reassuring as a consequence of their association with the normality of everyday activities. Problematic forms of sound are generally experienced as noise pollution and can affect amenity and be prejudicial to health or a nuisance.

6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

6.7.5 In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.

6.7.6 In proposing new development, planning authorities and developers must, therefore:

- *address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors*
- *not create areas of poor air quality or inappropriate soundscape; and*
- *seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.*

To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer.

6.7.8 Good design, for example setting back buildings from roads to avoid canyon effects and using best practice in terms of acoustic design to ensure the appropriate and intended acoustic environment of completed developments should be incorporated at an early consideration in the design and planning process.

2.2 Local authority policy and guidance

Langley Close falls under the ‘Monmouthshire County Council Adopted Local Development Plan 2011-2021’ which was adopted 27 February 2014 and sets out the plans, visions and policies for development.

6.3.60 Policy EP1 seeks to prevent development proposals that would result in unacceptable risk or harm due to air, light, noise or water pollution, contamination or land instability.

EP1 - Amenity and Environmental Protection

Development, including proposals for new buildings, extensions to existing buildings and advertisements, should have regard to the privacy, amenity and health of occupiers of neighbouring properties. Development proposals that would cause or result in an unacceptable risk /harm to local amenity, health, the character /quality of the countryside or interests of nature conservation, landscape or built heritage importance due to the following will not be permitted, unless it can be demonstrated that measures can be taken to overcome any significant risk:

-
- Noise pollution;

.....

The Replacement Local Development Plan (RLDP) – (2018 to 2033) includes the ‘Replacement Local Development Plan Sustainability Appraisal Scoping Report Appendix 1 – Review of Plans, Policies, Programmes and Strategies November 2022, in which Monmouthshire Council includes the following section of table:

Table 2.1 Selected Section of Table Sustainability Appraisal Scoping Report Appendix 1 – Review of Plans, Policies, Programmes and Strategies

ISA Theme: Health & Well-being	
International, European, National (UK), National Wales	
Planning Policy Wales Edition 11 (2021) Technical Advice Note (TAN) 11: Noise (1997) (Revised TAN currently being consulted on by WG) Technical Advice Note (TAN) 16: Sport, recreation and open space (2009)	<i>Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes. It translates our commitment to sustainable development into the planning system so that it can play an appropriate role in moving towards sustainability. Planning Policy Wales (PPW) puts a commitment to achieving the Well-being goals of the Well-being of Future Generations Act at the centre of the planning system in Wales. PPW notes that planning</i>

authorities have a role to play in the prevention of physical and mental illnesses caused by pollution, isolation from society and activities, and must consider the impact of new development on communities and prioritise health protection. It requires planning authorities to:

- Contribute to the protection and, where possible, the improvement of people’s health and wellbeing as a core component of achieving the well-being goals and responding to climate change.*
 - Consider the possible impacts of developments – positive and/or negative – on people’s health at an early stage will help to clarify the relevance of health and the extent to which it needs to be considered.*
 - Ensure, as far as is practicable, that noise-sensitive developments, such as hospitals, schools, and housing, that need to be located close to the existing transportation infrastructure to facilitate access, are designed in such a way as to limit noise levels within and around those developments.*
 - Consider national air quality objectives, recognising that they represent a pragmatic threshold above which government considers the health risks associated with air pollution are unacceptable.*
-

2.3 TAN 11

Planning Policy Wales is supplemented by a series Technical Advice Notes (TAN) that provide detailed planning advice on different subjects. TAN 11: Noise (1997) provides a methodology for assessing the suitability of a site for residential development near existing sources of noise. It provides threshold noise levels for Noise Exposure Categories (NECs), which determine the suitability of the site for residential development and within which various levels of consideration to mitigation should be given. These noise exposure categories are provided for road, rail, aircraft and mixed sources. Separate noise level ranges are specified for the day-time and night-time periods for each of the NECs. The degree of consideration required for each Noise Exposure Category is described in Table 2.2 below.

Table 2.2: Noise exposure categories for dwellings

Noise Exposure Categories	
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.

Noise Exposure Categories

C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example, because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused.

Source: TAN11, Annex A, Table 1

The noise level ranges of the various categories are shown in Table 2.3 below.

Noise Table 2.3: Recommended Noise Exposure Categories (NEC) for new dwellings near existing noise sources

Noise levels⁽¹⁾ corresponding to noise exposure categories in $L_{Aeq, T}$ dB

Noise source	Time period	Noise exposure category			
		A	B	C	D
Road traffic	Day time 07:00 to 23:00	< 55	55-63	63-71	> 72
	Night time 23:00 to 07:00 ⁽²⁾	< 45	45-57	57-66	> 66
Rail traffic	Day time 07:00 to 23:00	< 55	55-66	66-74	> 74
	Night time 23:00 to 07:00 ⁽²⁾	< 45	45-59	59-66	> 66
Air traffic ⁽³⁾	Day time 07:00 to 23:00	< 57	57-66	66-72	> 72
	Night time 23:00 to 07:00 ⁽²⁾	< 48	48-57	57-66	> 66
Mixed sources ⁽⁴⁾	Day time 07:00 to 23:00	< 55	55-63	63-72	> 72
	Night time 23:00 to 07:00 ⁽²⁾	< 45	45-57	57-66	> 66

Notes

⁽¹⁾ Noise levels: the noise level(s) ($L_{Aeq, T}$) used when decided the NEC of a site should be representative of typical conditions.

⁽²⁾ Night-time noise levels (2300-0700): sites where individual noise events regularly exceed 82 dB L_{Amax} (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq, 8 \text{ hour}}$ (except where the $L_{Aeq, 8 \text{ hour}}$ already puts the site in NEC D.

⁽³⁾ Aircraft noise: daytime values accord with the contour values adopted by the Department of Transport which relate to levels measured 1.2m above open ground. For the same amount of noise energy, contour values can be up to 2 dB(A) higher than those of other sources because of ground reflection effects.

⁽⁴⁾ Mixed sources: this refers to any combination of road, rail, air and industrial noise sources. The "mixed source" values are based on the lowest numerical values of the single source limits in the table. The "mixed source" NECs should only be used where no individual noise source is dominant.

To check if any individual noise source is dominant (for the purposes of this assessment) the noise level from the individual sources should be determined and then combined by decibel additional (remembering first to subtract 2 dB(A) from any aircraft noise contour values). If the level of any one source then lies within 2 dB(A) of the calculated combined value, that source should be taken as the dominant one and the site assessed against the appropriate NEC for that source, rather than using the "mixed source" NECs. If the dominant source is industrial noise see paragraph B17 of Annex B (of TAN 11).

If the contribution of the individual noise sources to the overall noise level cannot be determined by measurement and/or calculation, then the overall measured level should be used and the site assessed against the NECs for "mixed sources".

Source: TAN 11, Annex A, Table 2

In relation to noise from industrial or fixed mechanical sources TAN 11 recommends the use of BS4142 as described in Section 2.5 below.

2.4 ProPG

Professional Practice Guidance on Planning and Noise (ProPG)⁴ provides guidance which reflects the policy set out in National Planning Policy Framework (NPPF), Noise Planning Statement for England (NPSE) and Planning Practice Guidance - Noise (PPGN) specifically to be used for new residential developments.

ProPG encourages sustainable and better acoustic design for new residential developments and aims to protect people from the harmful effects of noise. The aims of ProPG are to:

*“advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
encourage the process of good acoustic design in and around new residential developments;
outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
improve understanding of how to determine the extent of potential noise impact and effect; and;
assist the delivery of sustainable development.”*

While noise can override other planning concerns, neither the NPSE nor the NPPF expect noise to be considered in isolation from economic, social or other environmental dimensions of Scheme. Instead, the NPPF states that economic, social and environmental gains from the development should be sought jointly.

ProPG states that there are no specific noise levels at which noise becomes a material consideration or at which development is prohibited; instead, the decision to grant or refuse planning consent should 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
- whether or not a good standard of amenity can be achieved

This is consistent with the aims of the NPSE.

Two specific factors set out in PPGN, that influence whether noise could be a concern, are particularly relevant for residential development in areas subject to high levels of transportation noise. These are as follows:

- Consideration should *“be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential developments, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary”*
- *“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.”*

ProPG sets out a risk-based, sequential two-staged approach to address noise aspects of a Scheme. These stages are:

Stage 1 – an initial noise risk assessment of the Scheme site which should:

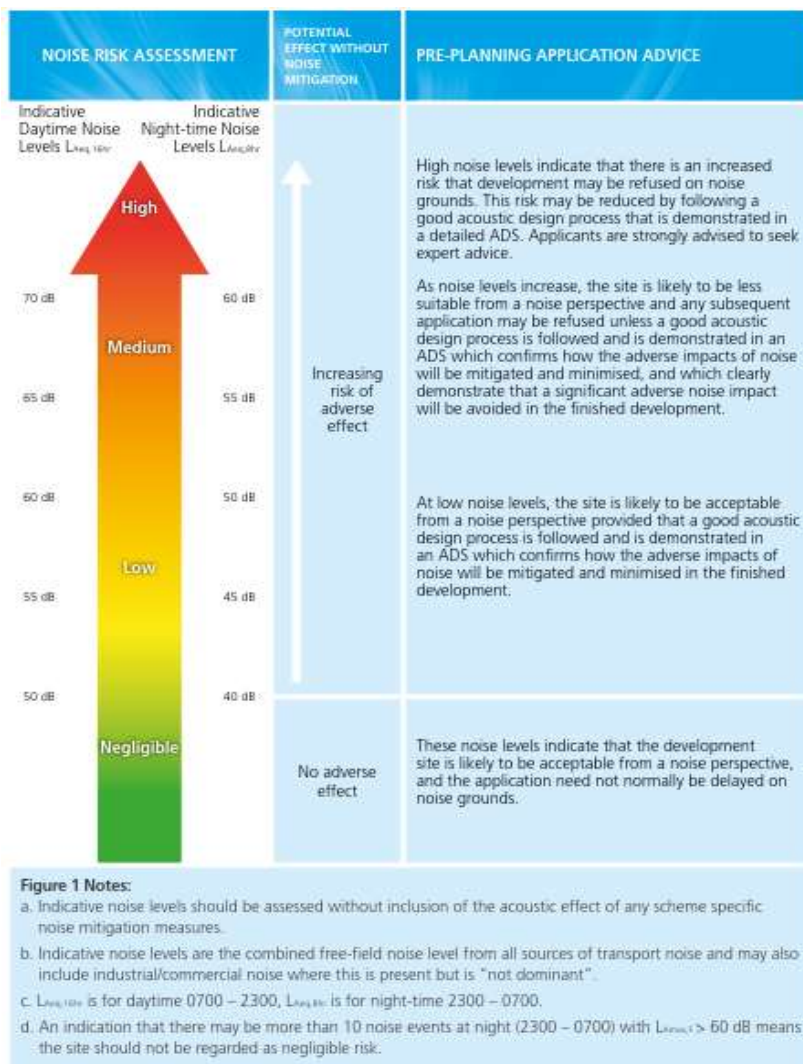
- provide an indication of the likely risk of adverse effects if no subsequent mitigation were to be included as part of the development plans; and
- indicate whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective

Stage 2 – a systematic consideration of four key elements which are:

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

The Stage 1 Risk assessment process is outlined in Figure 2.1. It shows how noise levels are associated with an increased risk of adverse effect from noise and the pre-planning advice associated with noise levels. It should be noted that a noise risk assessment based on the daytime and night-time L_{Aeq} noise levels at a site does not form the basis of a recommendation for residential development and so this will only form part of the overall assessment.

Figure 2.1: Stage 1 – Initial site noise risk assessment



Source: ProPG

Section 5.0 of this report addresses the initial noise risk associated with this development based on ProPG Stage 1.

2.5 British Standard BS4142:2014+A1:2019

BS 4142 provides a method for assessing the impact of industrial noise sources on residential receivers. In this sense, industrial noise sources include mechanical plant associated with new buildings and developments.

The relevant parameters are as follows.

- Background Sound Level in $L_{A90,T}$;
- Specific Sound Level, or Source Sound Level, in $L_{Aeq,T}$; and
- Rating Level in $L_{Aeq,T}$ which is the specific sound level plus any penalties given for the characteristic features of the sound.

The rating method detailed within the standard is widely accepted as an effective means of assessing the significance of building plant noise. The level of sound from proposed new plant (the overall rating level) is predicted in terms of L_{Aeq} and compared to the existing background sound level, in terms of L_{A90} . The L_{A90} is to be representative of the period being assessed. If the specific sound includes tonal, impulsive or other features likely to attract attention, assessed at the off-site noise sensitive receptors (e.g. residential), a character penalty, from 2 to 18 dB (although unlikely to exceed 10dB) is added to the specific sound level. Plant that contains these character features should therefore be avoided where practical.

The outcome of the assessment is defined in BS 4142 with the following points that relate to the difference between the background sound level and the rating level:

- Typically, the greater this difference, the greater the magnitude of the impact
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context
- A difference of around +5dB 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.

2.6 British Standard BS 8233:2014

BS 8233 (2014) 'Guidance on sound insulation and noise reduction for buildings', provides guidance for the control of noise in and around new or refurbished buildings. Within the guidance, values for the internal ambient noise levels for different building uses are recommended. It states that it is 'desirable' that internal noise levels in dwellings do not exceed 35dB $L_{Aeq,16hr}$ in living rooms and bedrooms during the day, 40dB $L_{Aeq,16hr}$ in dining rooms during the day and 30dB $L_{Aeq,8hr}$ in bedrooms at night. These values are often used to inform the level of sound insulation required in the walls, glazing and ventilation at the detailed design stage of the proposed residential developments.

BS 8233 provides some guidance on acceptable exterior noise levels within amenity spaces. It states: "For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable."

2.7 World Health Organization guidance

The World Health Organization (WHO) Guidelines for Community Noise and Night Noise Guidelines provides guidance on maximum noise levels within residential dwellings during night-time periods which can cause sleep disturbance. Guidance advises that internal noise levels should not exceed 45dB $L_{Amax,f}$ (not to be exceeded 10 to 15 times a night) due to individual events.

The WHO Environmental Noise Guidelines for the European Region provides evidence-based recommendations on the health effects of noise. The guidelines complement the expert-based recommendations of the WHO 'Night Noise Guidelines' (2009) (NNG). Guidelines provide source specific recommendations for road traffic, railway, aircraft and wind turbine noise, and indoor as well as outdoor exposure levels for leisure noise.

2.8 British Standard BS 7445:2003

BS 7445:2003 '*Description and measurement of environmental noise*' sets out the basic requirements for the measurement of environmental noise on site and its processing and description using the various environmental noise parameters.

3 Survey methodology

3.1 Measurement procedure

A noise survey was undertaken in December 2023 and January 2024.

The survey comprised both unattended, continuous long-term (LT) measurement and attended, short-term measurements (ST). Automatic unattended monitoring was conducted from Saturday 09 December to Thursday 21 December 2023 and attended measurements were conducted on Friday 05 January 2024.

Measurement positions were selected to be representative of the noise climate across the site and at the nearest sensitive receptors potentially subject to operational noise as a result of the development.

All equipment used for baseline noise measurements complied with Class 1 requirements given in BS EN 61672¹. The sound level meters were fitted with a microphone and windshield suitable for outdoor measurement. All measurements, Short term (ST) and Long Term (LT) measurements were taken at a height of between 1.2m and 1.5m above local ground. The long term (LT) measurement was located near the southern boundary of the site close to the residential property.

Unless otherwise stated, all ST measurement locations were 'free-field' meaning they are at least 3.5m from an acoustically reflective façade. Measurements were completed by a Mott MacDonald acoustician competent in environment noise monitoring and completed in accordance with the principles of BS 7445².

The calibration level of all equipment was checked before and after the measurement periods and no significant changes were noted.

Equipment was configured to measure using the fast time weighting and A-frequency weighting in 15-minute intervals for both the LT and ST measurements.

Noise levels were measured in decibels for a range of stated descriptors that are defined below.

- L_{Amax} – the highest value of the A-weighted sound pressure level with a specified time weighting that occurs during a given event.
- $L_{Aeq,T}$ – also referred to as the continuous equivalent noise level, it is the A-weighted sound pressure level that is the same amount of sound energy as the time varying noise over the same period of time (T).
- $L_{A10,T}$ – the A-weighted sound pressure level that is exceeded for 10% of a given time interval (T).
- $L_{A90,T}$ – also referred to as the background noise level, it is the A-weighted sound pressure level that is exceeded for 90% of a given time interval (T).

A-weighting – As seen in the parameters above, this is a frequency weighting designed to mimic the frequency response of the human ear by providing corrections for the frequencies which the human ear is less sensitive to.

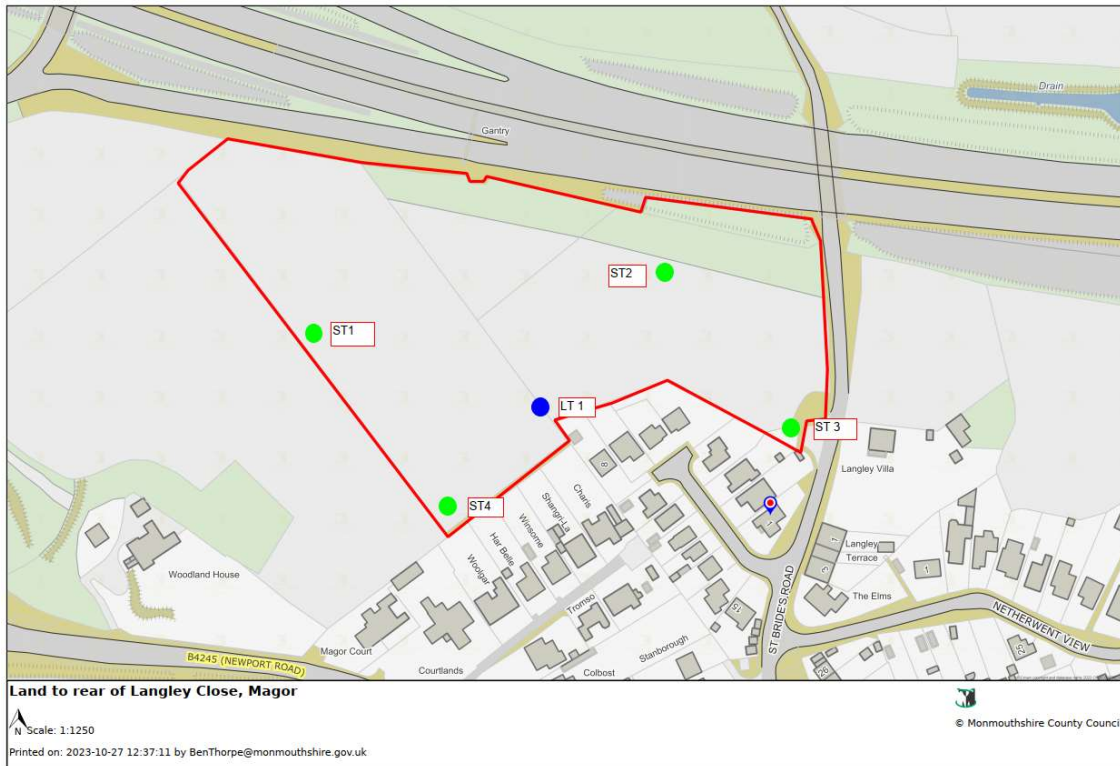
¹ BS EN 61672-1:2013 'Electroacoustics-Sound level meters Part 1: Specifications.'

² British Standards Institution BS 7445 Description and measurement of environmental noise. Part 1: Guide to quantities and procedures, 2003,

3.2 Measurement locations

Measurement locations and details are provided in Figure 3.1 and Table 3.1.

Figure 3.1: Noise measurement locations



Source: Monmouthshire County Council with Mott MacDonald mark-up

Table 3.1: Noise measurement location details

Measurement ID	Measurement type	Microphone height from existing ground (m)
LT1	Free field	1.2m / 1.5m
ST1	Free field	1.2m
ST2	Free field	1.2m
ST3	Free field	1.2m
ST4	Free field	1.2m

Source: Mott MacDonald

3.3 Equipment

A full inventory of all equipment used during the baseline noise surveys is shown in Table 3.2

Table 3.2: Inventory of noise measurement equipment

Item	Model	Serial Number	Calibrated until
LT	Rion NL-52	898306	20-Sep-25
ST	Rion NL-52	1176426	04/05/2024
Calibrator	Rion NC75	34913591	21/02/2023

Source: Mott MacDonald

3.4 Weather conditions

The weather conditions during the attended survey (ST measurements and installation) were considered suitable for undertaking noise measurements.

Weather conditions were measured at LT1 during the survey and reported below.

During the automatic unattended noise survey there were periods when wind speeds exceeded 5m/s and periods which were subject to rain. These periods have been excluded during the processing of the measured noise data.

Table 3.3 presents details of the weather conditions.

Table 3.3: Weather summary

Date	Average Temp (Degrees C)	Average Wind Speed (m/s)	Average Rainfall (mm)
09/12/2023			
10/12/2023	10.1	1.5	0.0
11/12/2023	10.2	1.5	0.1
12/12/2023	9.7	0.6	0.0
13/12/2023	9.4	0.4	0.1
14/12/2023	6.6	0.5	0.0
15/12/2023	6.3	0.1	0.0
16/12/2023	6.9	0.3	0.0
17/12/2023	9.9	1.2	0.0
18/12/2023	9.9	1.4	0.0
19/12/2023	10.6	1.3	0.4
20/12/2023	9.0	0.6	0.3
21/12/2023	9.5	0.8	0.0

Source: Mott MacDonald

3.5 Limitations

Inevitably there is a degree of variation in measured noise levels. Contributory factors to this variation include tolerances in instrumentation readings, meteorological conditions, and the inherent difference in the acoustic environment during the course of the day and indeed over longer periods as the noise sources influencing a given location vary. Every effort has been made to limit variation in the measurements reported. The following efforts have been made in order to reduce measurement uncertainty.

- Undertaking surveys with appropriately qualified and trained acoustic engineers
- Use of measurement equipment calibrated to appropriate standards by accredited bodies and checked on site using calibrated reference sound sources
- Following best practice methodology for environmental noise measurement set out in BS 7445
- Measuring under appropriate meteorological conditions
- Measuring at times and locations that are representative of the noise climate at any particular location
- Analysing the data to notice trends and anomalies, ensuring the data is representative for the location

4 Measurement results

This section presents the full data results for both Long-Term (LT) and Short-term (ST) noise measurements.

For the purposes of the assessment, only the L_{Aeq} and L_{A90} parameters are presented for the LT measurements and L_{Aeq} for the ST measurements.

LT L_{Aeq} noise measurements are shown for daytime (07:00 to 23:00), and night-time (23:00 to 07:00) in accordance with guidance provided by TAN 11 and BS 4142.

LT L_{A90} noise measurements have been analysed to determine a single number value which is considered to be the representative background noise level during the relevant assessment periods in accordance with guidance provided by BS 4142. In this case the lowest 10th percentile value of the $L_{A90,15min}$ values has been used.

4.1 Long term

Position LT1 was located near to a field boundary close to the southern edge of the field next to a residential property on Langley Close. It was installed at 09:40 on 09 December 2023 and collected at 11:10 on 21 December 2023.

The major noise source was road traffic noise from the M4 motorway and off ramps to the Magor Interchange.

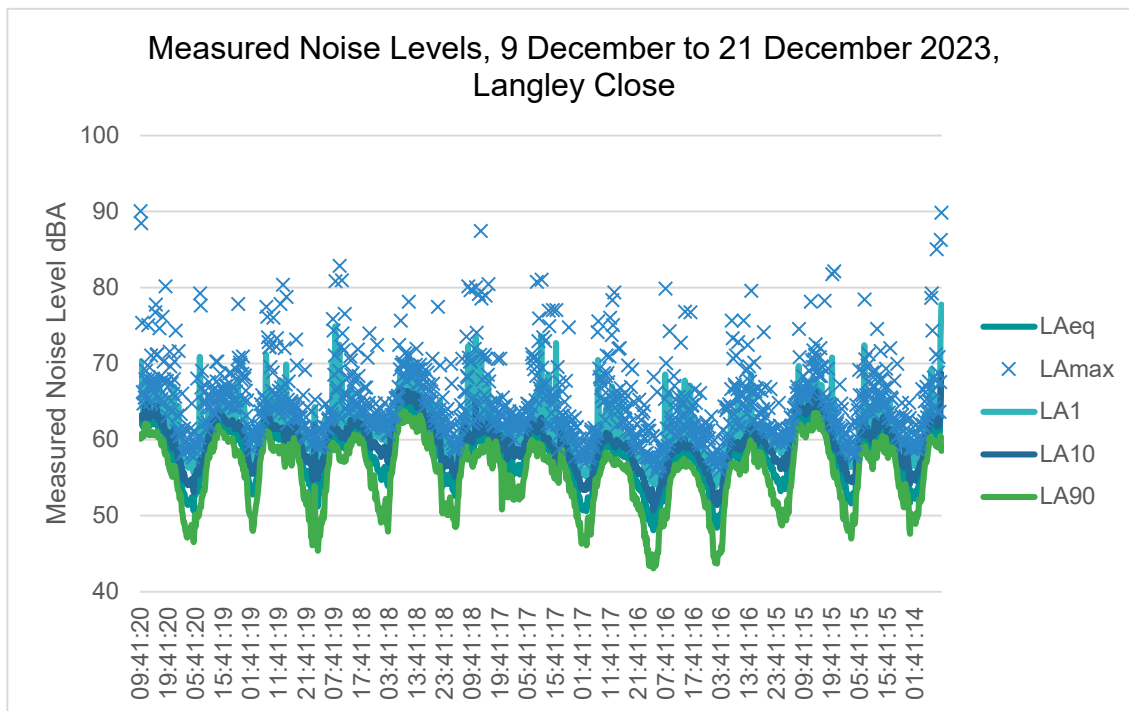
The levels relevant to the assessment are summarised in Table 4.1 below. Figure 4.1 shows the time history of the measurement.

Partial measurement periods at the start and end of the survey have been included.

Table 4.1: LT1 measurement results (free-field measurement)

Date	Average $L_{Aeq, T}$ dB		$L_{A90, T}$ dB	
	Day (07:00-23:00)	Night (23:00-07:00)	Day (07:00-23:00)	Night (23:00-07:00)
9 December 2023	61.3	53.3	55.8	47.3
10 December 2023	60.5	57.7	53.2	49.7
11 December 2023	59.9	56.2	52.5	46.3
12 December 2023	60.1	58.1	54.3	49.1
13 December 2023	62.9	56.2	56.0	49.7
14 December 2023	59.6	57.7	54.1	52.3
15 December 2023	58.8	53.2	53.3	46.8
16 December 2023	57.8	50.9	51.5	43.4
17 December 2023	57.0	53.1	51.1	44.4
18 December 2023	58.6	57.2	54.1	49.4
19 December 2023	62.2	55.8	55.1	48.0
20 December 2023	59.4	56.2	52.7	49.4
21 December 2023	62.1		59.1	
Baseline level for assessment	60.0	55.5	54.1	48.0

Figure 4.1: LT1 plot of results of the long term noise monitoring



4.2 Short term

The noise climate of the short term monitoring positions was dominated by road traffic noise from the M4 motorway and offramps to the Magor Interchange.

In order to determine the geographical variation in noise level across the site relative to the measured noise levels at LT1 an automatic unattended noise logger was set up at LT1 during the attended measurements. This was set up such that 5-minute samples at the ST locations

were synchronous with the 5 minute samples at LT1. The difference between the measured $L_{Aeq, 5 \text{ minute}}$ samples were then used to calculate an estimate of the $L_{Aeq, 16hr}$ and $L_{Aeq, 8hr}$ at the ST locations. This comparison is shown in Appendix C.

The supplementary ST noise levels and comments on the main noise sources are summarised in Table 4.2 below.

Table 4.2: Summary of ST measurements (5 minutes for each measurement)

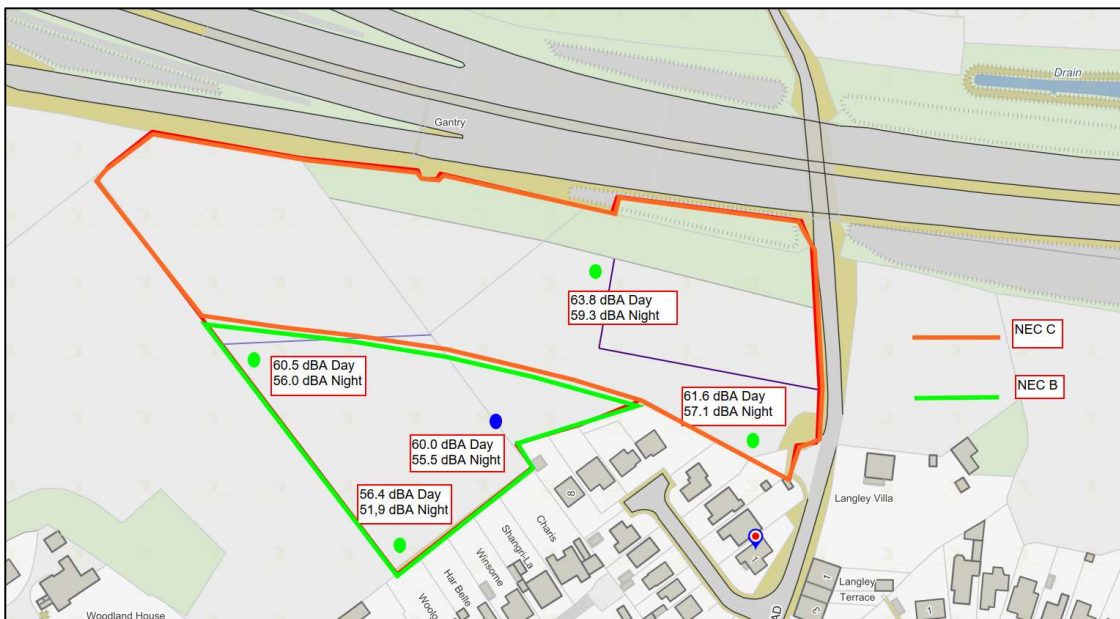
ST	Date	Start time	$L_{Aeq, T}$ dB	$L_{Amax, T}$ dB	$L_{A10, T}$ dB	$L_{A90, T}$ dB	Main noise source and comments
NE		08:35	66	70.1	67.7	63.1	M4 and Off ramp,
NE		08:40	65.4	69.4	67.3	62.9	M4 and Off ramp,
NE		09:30	64.1	68.6	65.8	61.8	M4 and Off ramp,
NE		09:35	64.2	68.5	66.2	61.7	M4 and Off ramp,
NW		08:55	61.4	64.2	62.6	59.8	M4 and Off ramp,
NW		09:00	61.1	64.5	62.3	59.5	M4 and Off ramp,
NW		09:45	58.1	62.3	59.2	56.8	M4 and Off ramp,
NW		09:50	57.2	61.1	58.6	55.3	M4 and Off ramp,
SW		09:00	57.8	60.8	58.9	56.7	M4 and Off ramp,
SW		09:05	58.5	61.2	59.4	57.5	M4 and Off ramp,
SW		09:55	54.3	60.1	55.6	52.4	M4 and Off ramp,
SW		10:00	53.5	56.4	54.8	52.0	M4 and Off ramp,
SE		09:15	62.1	65.3	63.3	60.4	M4 and Off ramp,
SE		09:20	61.4	64	62.5	60.2	M4 and Off ramp,
SE		10:10	60.5	63.1	61.7	59.1	M4 and Off ramp,
SE		10:15	60.5	64.7	62.0	58.5	M4 and Off ramp,

5 Assessment

5.1 TAN 11

The measured $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ values at each of the measurement locations have been used to determine which areas of the site are within the NEC Categories shown in Table 2.3. These areas have been drawn in Figure 5.1 below:

Figure 5.1: Areas within TAN 11 NEC Categories



Source: Mott MacDonald

It can be seen that the majority of the site would fall within NEC C for which *'Planning permission should not normally be granted. Where it is considered that permission should be given, for example, because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.'*

The southern part of the site however falls within NEC B for which *'Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.'*

5.2 ProPG

Measured L_{Aeq} Levels on site at LT1, approximately 150m from the M4 offramp were $60dBL_{Aeq,16hr}$ during daytime and $55.5dBL_{Aeq,8hr}$ at night. Comparing these levels with the chart shown in Figure 1 indicates that the ProPG Stage 1 Risk assessment methodology would assign a *'Medium'* risk during daytime and night.

Calculated $L_{eq,16hour}$ levels up to 63.8 dB and up to 59.3dB at the short-term measurement location closest to the M4 motorway. This monitoring locations was approximately 32m from the edge of the M4 motorway off ramp. Comparing these levels with the chart shown in Figure 2.1 indicates that the ProPG Stage 1 Risk assessment methodology would assign a *'Medium'* risk during daytime and *"high"* risk at night due to noise at this part of the site.

ProPG is generally aimed at developments comprising substantial bricks and mortar buildings or other relatively massive constructions. The Gypsy and Traveller site would however accommodate mobile homes. These have lower sound insulation values than more substantial homes and this needs to be taken into account.

BS 8233 states that it is 'desirable' that internal noise levels in dwellings do not exceed 35dB $L_{Aeq,16hr}$ in living rooms and bedrooms during the day, 40dB $L_{Aeq,16hr}$ in dining rooms during the day and 30dB $L_{Aeq,8hr}$ in bedrooms at night. It is estimated that a mobile home may provide a sound insulation value of around 15dB to 20dB with windows closed.

Based on the measured noise levels at LT1 at 105m from the M4, internal levels would be estimated to be around 45dB $L_{Aeq,16hr}$ during daytime and 40dB $L_{Aeq,8hr}$ at night. These are above the internal noise level recommendations provided by BS 8233.

The calculated $L_{Aeq,16hr}$ at the northern end of the site was 63.8dB during daytime and the $L_{Aeq,8hr}$ at night was 59.3dB. Internal noise levels with a mobile home would therefore be up to 49dB at this location during daytime and 44dB at night. These levels exceed the internal recommendations of BS 8233.

Achieving the internal noise levels within mobile homes recommended by BS 8233 by distance attenuation alone would not be feasible. At the most southerly of monitoring locations the calculated $L_{Aeq,16hr}$ levels are up to 56.4dB and up to 51.9dB. At this location internal levels would be estimated to be around 41dB $L_{Aeq,16hr}$ during daytime and 37dB $L_{Aeq,8hr}$ at night. These levels still exceed the internal noise level recommendations of BS 8233 even though this location is farthest from the M4 motorway.

It may be possible to construct a noise barrier or earth bund along the northern boundary of the site which would significantly attenuate noise levels from the M4. This barrier would however need to be of a considerable height to achieve the required level of noise attenuation at the eastern end of the site and would probably need to return southward along the eastern boundary of the site.

It is therefore considered that the southern part of the site may possibly be suitable for development as a Gypsy and Traveler Site provided mitigation measures are implemented. However, the mitigation required would need to comprise noise barriers/bunds which would be of significant height particularly at the eastern end of the site.

5.3 BS 4142

There are not expected to be any major noise sources associated with the Gypsy and Traveller site, but minor plant such as toilet extract fans, generators and air conditioning units etc may potentially be expected.

Background L_{A90} sound levels of 54.0dB during daytime and 48.1dB during night-time were measured on site. BS 4142 state that "*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*" and the background noise level is often used as a noise limit for noise emissions from new developments.

It is therefore recommended that noise levels created by any plant associated with the proposed Gypsy and Traveller site should be limited to 54dB $L_{Aeq,1hr}$ during daytime and 48dB $L_{Aeq,15min}$ at night at the nearest potentially affected residences.

5.4 BS 8233

BS 8233 also provides some guidance on acceptable exterior noise levels within amenity spaces. It states: *“it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.”*

The measured noise levels at LT1, and ST1 to ST4 all exceeded with 50dB $L_{Aeq,T}$.

It would therefore be advisable to provide localised noise screening for the outdoor amenity areas within the site. This may take the form of solid noise barriers or landscaped bunds between the M4 motorway and the residential plots of the site as described above for control of internal noise levels within mobile homes.

6 Conclusions

This report documents the findings of the baseline noise monitoring and assessment undertaken for the proposed Gypsy and Traveller site at Langley Close.

Measured noise levels have been used to assess the risk of noise having an adverse impact upon the site in accordance with the ProPg Stage 1 Risk Assessment method. This assessment shows there is a 'high' risk of noise adversely impacting the northern part of the site. The rest of the site would be subject to a 'medium' risk of noise adversely impacting the site.

However, the above guidance is intended primarily to deal with dwellings which are constructed from bricks and mortar. Mobile homes provide significantly lower levels of sound attenuation between exterior and interior. It is estimated that a mobile home may provide a sound insulation value of around 15dB to 20dB with windows closed.

Based on the levels of noise measured on the site interior noise levels would exceed the recommended noise levels given in BS 8233 across the whole site. However, if an earth bund or solid noise barrier were constructed along the northern edge of the site this may provide sufficient sound attenuation that the internal noise criteria recommended by BS 8233 would be met within mobile homes on the southern part of the site. This barrier/ bund would however need to be of significant height and may need to extend down the eastern boundary of the site. This is likely present significant technical issues in attempting to achieve satisfactory internal noise levels within mobile homes.

In setting noise criteria for mechanical plant associated with the site it may be more appropriate to set criteria in terms of absolute levels taken from BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* or Night noise guidelines for Europe 2009 rather than relative levels in terms of BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.

Noise level limits of 54dB $L_{Aeq,1hr}$ during daytime and 48dB $L_{Aeq,15min}$ at night proposed for fixed plant noise emissions from the site.

Measured noise levels at all locations on the site exceeded the 50dB $L_{Aeq,T}$ value recommended by BS 8233 for external amenity areas. It would therefore also be necessary to provide localised noise screening for the outdoor amenity areas. This may take the form of solid noise barriers or landscaped bunds between the M4 and the residential plots of the site. This barrier would need to be of significant height in order to achieve the desired exterior level of 50 dB $L_{Aeq,T}$ especially at the eastern end of the site.

If planning permission is granted, a Stage 2 Acoustic Assessment should be conducted in which the landscape design of the proposed site should be developed to incorporate acoustic screening for the plots closest to the north-eastern corner.

A. Acoustic Glossary

A-weighting	The human ear also has a non-linear frequency response, being most sensitive in the frequency range 1 kHz to 4 kHz and is less sensitive at higher and lower frequencies. The A-weighting is a frequency function commonly applied to the linear output of a microphone to simulate the subjective response of the ear. A-weighted levels are usually indicated by a subscript A or postscript (A).
Z-weighting	A flat frequency response between 10Hz and 20kHz excluding microphone response.
Decibel	Sound and noise are commonly described using the decibel (dB) scale, which is logarithmic in nature to relate to the response of the human ear. The range of human hearing commonly varies from the threshold of audibility (0dB) to the threshold of pain (120dB). Such limits are seldom experienced in practice and typical levels might vary between 30dB in a quiet bedroom at night to 90dB at the kerbside of a busy road.
Sound Pressure Level (Lp)	The logarithmic measure of the root mean square sound pressure relative to a reference sound pressure. The reference sound pressure in air is 20 micro Pascals and represents the threshold of hearing in a healthy young person.
Equivalent continuous noise level Leq	The equivalent continuous noise level, $L_{Aeq,T}$, is the notional level of a steady sound which, at a given position and over the same period of time (T), would deliver the same sound energy as the fluctuating one. Used to quantify time-varying noise from industrial sources.
Maximum sound pressure level L(max)	The lowest sound pressure level reached within the measurement period.
Minimum sound pressure level L(min)	The lowest sound level reached within the measurement period.
Ln	A statistical parameter where the sound pressure level exceeded for a 'n' percentage of the measurement period.
Fast weighting	The sound pressure level is weighted to the response time of the ear (125ms).
Slow weighting	The sound pressure level is weighted to the response time of 1 second.

B Comparison between 5 minute sample measurements at ST and LT locations

ST						LT1					
	Time	LAeq	LAmaz	LA10	LA90	Difference LAeq	Time	LAeq	LAmaz	LA10	LA90
NE	08:35	66	70.1	67.7	63.1	3.6	08:35	62.4	65.3	63.6	60.6
NE	08:40	65.4	69.4	67.3	62.9	2.9	08:40	62.5	65.5	63.7	61.1
NE	09:30	64.1	68.6	65.8	61.8	4.2	09:30	59.9	62.5	61.1	58.5
NE	09:35	64.2	68.5	66.2	61.7	4.3	09:35	59.9	62.5	61.1	58.5
						3.75					
	Time	LAeq	LAmaz	LA10	LA90	Difference LAeq	Time	LAeq	LAmaz	LA10	LA90
NW	08:55	61.4	64.2	62.6	59.8	0.1	08:55	61.3	64.6	62.5	59.7
NW	09:00	61.1	64.5	62.3	59.5	0.9	09:00	60.2	63.2	61.5	58.7
NW	09:45	58.1	62.3	59.2	56.8	-1.2	09:45	59.3	63.5	60.4	57.6
NW	09:50	57.2	61.1	58.6	55.3	-1.3	09:50	58.5	62.3	59.8	56.9
						0.5					
	Time	LAeq	LAmaz	LA10	LA90	Difference LAeq	Time	LAeq	LAmaz	LA10	LA90
SW	09:00	57.8	60.8	58.9	56.7	-2.4	09:00	60.2	63.2	61.5	58.7
SW	09:05	58.5	61.2	59.4	57.5	-2.5	09:05	61	64.5	62.2	59.8
SW	09:55	54.3	60.1	55.6	52.4	-4.5	09:55	58.8	61.7	60.2	56.7
SW	10:00	53.5	56.4	54.8	52	-5	10:00	58.5	62.4	60.2	56.5
						-3.6					
	Time	LAeq	LAmaz	LA10	LA90	Difference LAeq	Time	LAeq	LAmaz	LA10	LA90
SE	09:15	62.1	65.3	63.3	60.4	1.6	09:15	60.5	63.7	61.8	58.9
SE	09:20	61.4	64	62.5	60.2	1.6	09:20	59.8	64.3	61	58.3
SE	10:10	60.5	63.1	61.7	59.1	1.5	10:10	59	62.5	60.4	57.2
SE	10:15	60.5	64.7	62	58.5	1.5	10:15	59	62.2	60.4	57.3
						1.55					

