FORMANT.

STRAIGHTFORWARD ACOUSTIC DESIGN

MAES OFFA, FOUR CROSSES

NOISE IMPACT ASSESSMENT

Project no. P1126
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Revision P01

FORMANT.
STRAIGHTFORWARD ACOUSTIC DESIGN

CONTENTS

REVISION HISTORY

Date	Revision	Notes
13/01/2021	P01	For information

EXECUTIVE SUMMARY

Formant has been appointed to assess the noise levels at the site of a proposed new residential development at Maes Offa, Four Crosses. The site is located adjacent to the A483, which is a significant noise source during daytime and night-time hours. This report summarises the results of a baseline noise survey undertaken at the site and provides initial guidance on how to mitigate potential noise impacts on the proposed residential development.

SITE NOISE LEVELS

The noise climate at the existing site is dominated by traffic noise from the A483. Attended short-term measurements were made at 15, 30 and 45 m from the site boundary to capture the spatial variation in noise levels across the site. The noise levels varied from 54 to 58 $dBL_{Aeq,30mins}$.

An unattended noise logger was left running for 48 hours to quantify the variation in site noise levels with time. The logger was located to the north of the site, roughly midway between the eastern and western boundaries. The noise levels were around 53 and 48 dBL_{Aeq} during daytime and night-time respectively but these levels may be slightly lower than normal due to the reduced traffic flows arising from the Covid-19 Tier 4 lockdown measures in place during the survey. A correction factor has been incorporated into the noise assessment to account for this risk and **the noise levels used in the assessment are 56-60 dBL_{Aeq8h} (daytime) and 51-54 dBL_{Aeq8h} (night-time).**

SITE SUITABILITY

The significant levels of traffic noise mean that the site falls within the NEC B category in TAN 11 and between the 'Low' and 'Medium' risk categories in ProPG. This means **the site is considered suitable for residential development subject to a good acoustic design process being followed.**

GOOD ACOUSTIC DESIGN

The following key acoustic design issues should be addressed as the design progresses:

1) Screening of road traffic by a combination of the massing of the development itself, provision of a noise barrier or increased earth bund height, etc.
2) Orientation and layout of the buildings to maximise self-screening and minimise the need for façade treatments and to ensure external amenity areas can achieve the required noise levels.
3) Ventilation strategy and façade design upgrades to minimise noise intrusion

1 INTRODUCTION

Formant has been appointed to assess the noise levels at the site of a proposed residential development at Maes Offa, Four Crosses, Powys. The proposed development comprises four dwellings, plus associated gardens and garages.

This report provides:

1) A description of the proposed development and the potential noise impacts
2) A summary of applicable legislation, policy and guidance
3) The results of a baseline noise survey at the site
4) An initial assessment of the site suitability for residential development
5) Details of noise mitigation measures which could be incorporated into the design

2 PROPOSED DEVELOPMENT

EXISTING SITE

The existing site is bounded by the A483 to the west, a local access road to the east and residential dwellings to the north and south. An earth bund of approx. 1.5 m height runs along the western boundary of the site and this provides a small degree of screening from tyre noise at ground level within the site. The earth bund but is unlikely to provide beneficial screening at first floor height and above as it will not block line of sight to the vehicles on the A483.

Noise from traffic on the A483 dominates the noise climate at the site. In particular, a number of large HGVs passed the site during the survey, contributing significant levels of noise at the site.

PROPOSED DEVELOPMENT

The proposed development comprises four new-build residential dwellings within a portion of the garden of the adjacent dwelling. Figure 1 shows the site location and the measurement positions.

Figure 1 Existing site plan and measurement locations (MP1 to MP4)

3 LEGISLATION, POLICY AND GUIDANCE

3.1 NATIONAL POLICY

PLANNING POLICY WALES

Planning Policy Wales (PPW) sets out the policy framework for all planning applications in Wales. It provides broad objectives with respect to creating appropriate soundscapes and managing noise pollution. With regards new developments, it states that developers must:

- 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.

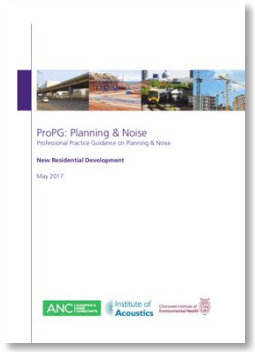
TECHNICAL ADVICE NOTE 11 (WALES)

Technical Advice Note (Wales) 11 (TAN11) sets out the Welsh Assembly Government's current policy on noise-related planning issues. TAN11 introduces the concept of Noise Exposure Categories (NECs) and provides recommendations to either approve/refuse planning based on which NEC the site falls into. This simplistic approach is not in keeping with the PPW requirement to consider noise as a holistic part of the planning process, therefore supplementary guidance should also be considered to assess site suitability.

3.2 SUPPLEMENTARY GUIDANCE

PRO PG

Professional Practice Guidance on Planning & Noise was prepared by the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH), together with practitioners from a planning and local authority background. It provides a method for undertaking noise impact assessments for new residential developments and has formed the basis for the assessment set out in this report.



The assessment methodology covers an initial site risk assessment for the site, which then informs the level of detail for a second stage assessment covering four elements. It is summarised by the flow chart in

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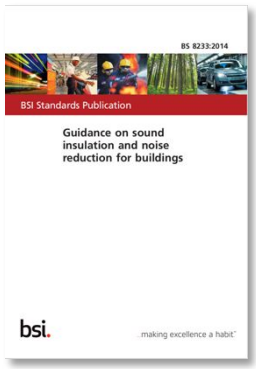

BS 8233:2014

BS 8233:2014 has been adopted as the method for assessing noise break-in to buildings and noise levels in external amenity areas. It recommends noise

limits for different types of buildings and a calculation method to quantify noise break-in levels.

4 BASELINE NOISE SURVEY

MEASUREMENT METHODOLOGY

A baseline noise survey was undertaken by Formant between 04 and 06 January 2021.

Attended short-term noise measurements were undertaken by Paul Driscoll MIOA between 12:30 - 14:15 hrs on 4th January 2021 and an unattended noise logger was left at the site for the following 48 hours. Noise measurements were taken at approximately 1.3 metres above local ground level, at a distance of at least 3 metres from the façade of buildings or any other reflecting surfaces and are considered representative of free field measurements. Measurements were made in line with BS 7445:2003 *Description of Environmental Noise*.

EQUIPMENT

The following measurement equipment was used to conduct the survey:

- 01dB Fusion Sound level meter, SNo. 12075,
- Cirrus CR:515 Calibrator, SNo. 82501

All measurement equipment owned or hired and operated by Formant has annual or bi-annual calibration checks carried out by external companies traceable to UKAS or national standards. Copies of all calibration records are kept and can be provided upon request.

DESCRIPTION OF NOISE CLIMATE

The noise climate around the site during the survey was dominated by traffic noise on the A483. No other significant contributing noise sources were noted. The survey was undertaken during a period where Wales was under Tier 4 lockdown measures impose as a result of the Covid 19 pandemic. It is anticipated that the number of vehicles may have been less than under non-lockdown conditions, but the type and variety of vehicles is considered to be representative.

NOISE PARAMETERS

A full range of noise data was captured during the survey including the following statistical measurements:

L_{Amax}	The sound pressure level of the single noisiest event during the measurement period.
L_{Aeq}	Time averaged sound pressure level. This is generally considered to be an acceptable representative descriptor of environmental noise;
L_{A90}	Sound pressure level exceeded for 90% of the measurement period, this is generally accepted to be indicative of the continuous background noise level.

MEASUREMENT RESULTS

A summary of the key noise survey results is provided in Table 1 and the time history graph of the results from the unattended noise logger is provided in Figure 2.

Position	Details	Photo
MP1 1 m from eastern site boundary	04/01/2021 12:56 Duration 30 mins **L_{Aeq} 54 dB** $L_{Amax(F)}$ 70 dB L_{A90} 47 dB	
MP2 Centre of site, approx. 30 m from western site boundary	04/01/2021 13:27 Duration 30 mins **L_{Aeq} 56 dB** $L_{Amax(F)}$ 71 dB L_{A90} 50 dB	
MP3 Centre of site, approx. 15 m from western site boundary	04/01/2021 13:58 Duration 30 mins **L_{Aeq} 59 dB** $L_{Amax(F)}$ 70 dB L_{A90} 51 dB	
MP4 North of site. Approx. midway between west and east site boundaries	04/01/2021 to 06/01/2021 **DAYTIME** Duration 16hr **L_{Aeq} 53 dB** $L_{Amax(F)}$ 77 dB L_{A90} 41 dB **NIGHT-TIME** Duration 8hr **L_{Aeq} 48 dB** $L_{Amax(F)}$ 66 dB* L_{A90} 26 dB	

* Night time $L_{Amax(F)}$ night time values were determined by considering the data shown in Figure 3 in order to derive the level 'not normally exceeded' during night time hours.

Table 1: Noise survey results summary

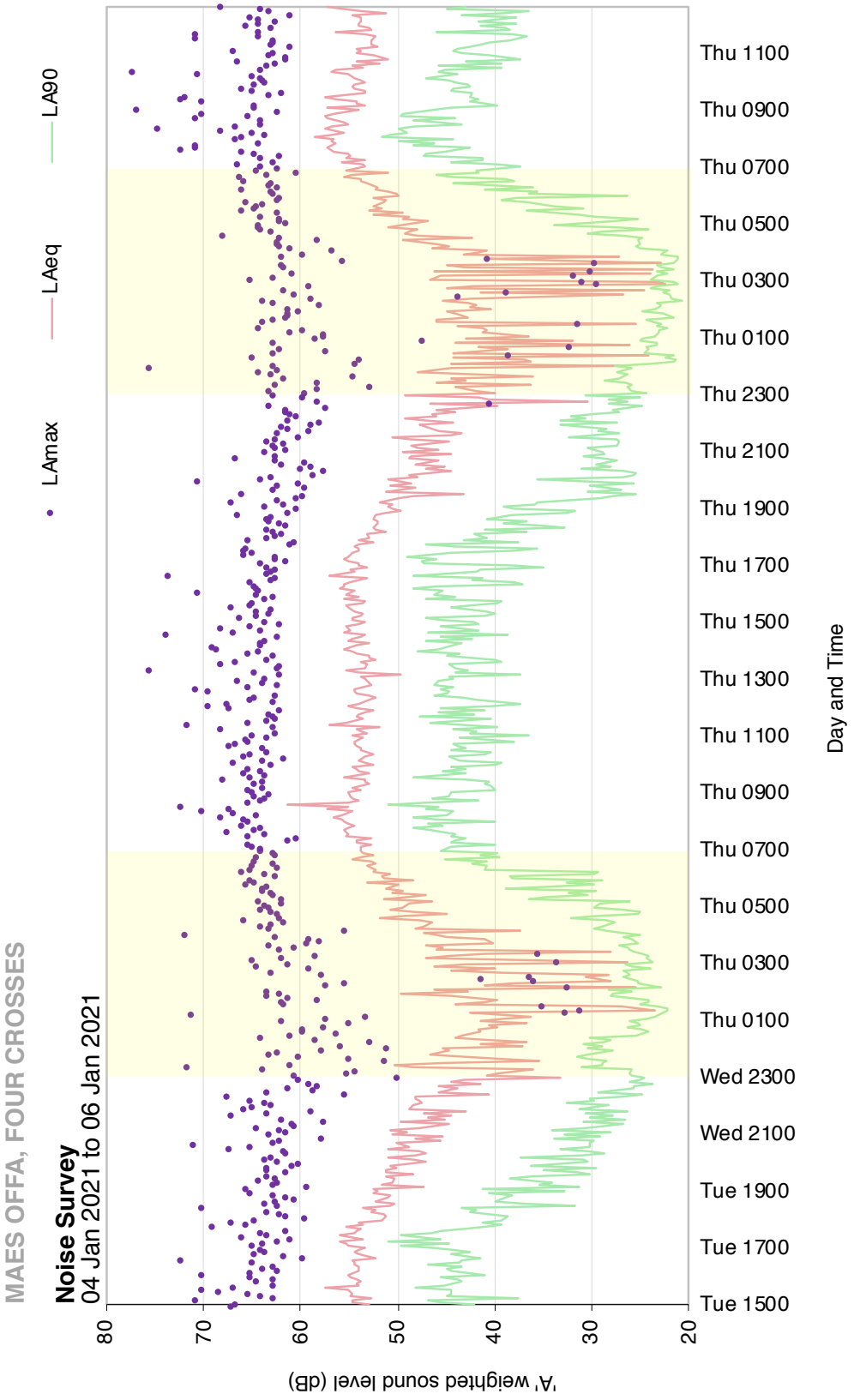

Figure 2 Time history graph for unattended logger

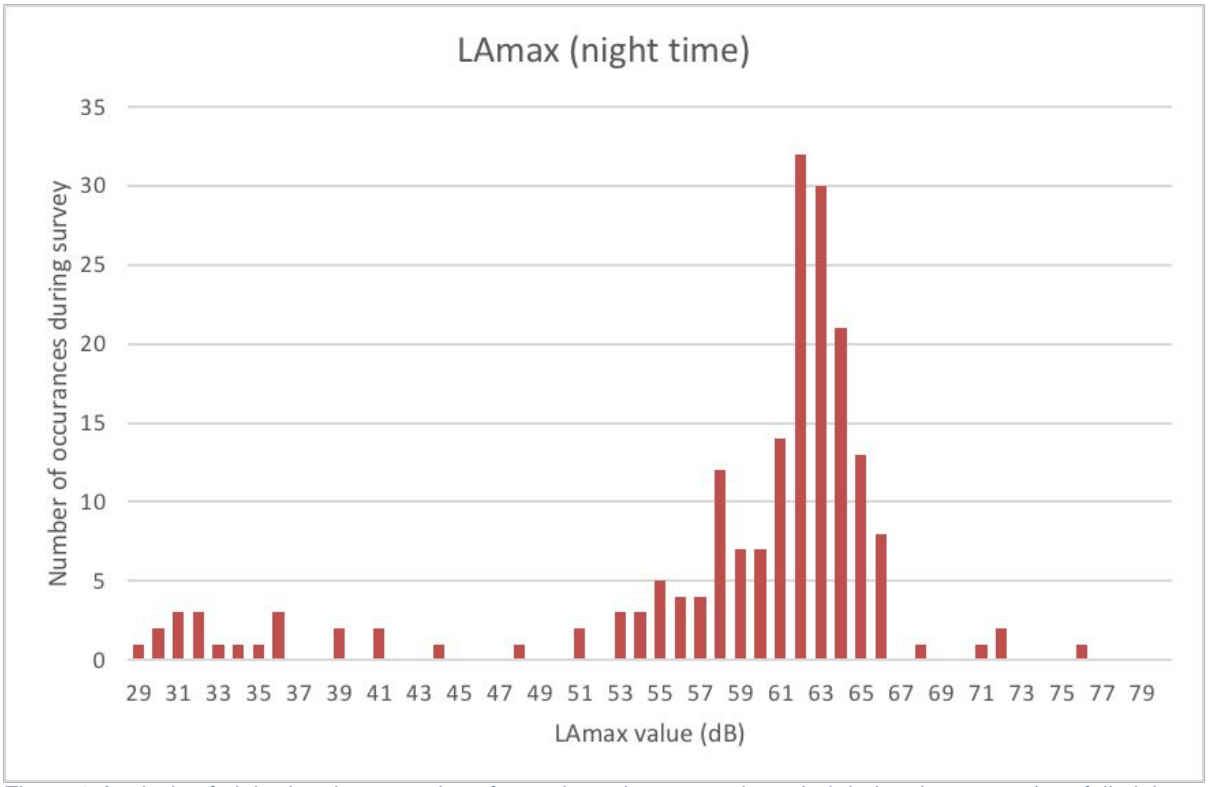

Figure 3 Analysis of night-time $L_{Amax(F)}$ values for each 5-minute sample period during the survey (two full night-time periods)

4.1 MEASUREMENT UNCERTAINTY

The baseline noise survey was undertaken whilst Wales was under Tier 4 lockdown conditions due to the Covid 19 pandemic. This means that only essential travel is permitted and as a result the road traffic flows on the A483 may have been lower than under non-lockdown conditions.

The reduction in traffic flows is unlikely to have significantly affected the background or maximum noise levels as these represent the times when no vehicles pass the site, or when a particularly noisy vehicle passes the site respectively. However, the ambient noise levels are likely to have been affected by the reduced number of vehicles.

It is not possible to ascertain exactly how much the traffic flows were below 'non-lockdown' numbers during the survey but it is possible to make a comparison with the Welsh Assembly Government's noise mapping data for the site. The noise mapping data itself is only an estimate, as it does not always accurately account for site topography and other screening from noise sources, and the grids are at 4 m above ground level, where the site would be less well screened by the earth bund. The comparison shows a significant difference between the WAG modelled data ($L_{Aeq16hr}$ ~58-66 dB) and the measured data $L_{Aeq16hr}$ ~53-56 dB).

We therefore propose to include a conservative +3 dB penalty on the ambient noise levels at the site for the purposes of this assessment, in order to account for potential increases in traffic flows post-lockdown. For reference +3 dB would typically represent a doubling in road traffic numbers.

4.2 SUMMARY OF NOISE SURVEY RESULTS

The following data have been derived for used in the initial site noise risk assessment, based on the results of the noise survey. The range in ambient noise data represents the variance in noise levels from the west to the east of the site, as distance from the A483 increases.

Parameter	Daytime (0700-2300 hrs)	Night-time (2300-0700 hrs)
Ambient noise levels $L_{Aeq,T}$	56-60 dB	51-54 dB
Maximum noise levels $L_{Amax(F)}$	70 dB	66 dB
Background noise levels $L_{A90,T}$	41 dB	26 dB

Table 2 Site noise data for use in initial risk assessment

5 INITIAL NOISE RISK ASSESSMENT

5.1 TAN11 NOISE EXPOSURE CATEGORIES

The site falls into NEC B as shown in the table below:

Noise Source	Time period	Noise Exposure Category (NEC)			
		A	B	C	D
Road traffic noise	Daytime (0700-2300 hrs)	<55	55-63	63-72	>72
	Night-time (0700-2300 hrs)	<55	45-57	57-66	>66

Table 3 Noise levels corresponding to the TAN11 Noise Exposure Categories for New Dwellings $L_{Aeq,T}$ (dB)

TAN11 states that for sites in NEC B, *"Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection."*

5.2 PRO PG RISK ASSESSMENT

The noise levels at the site of the site place it in between the '**Low**' and **'Medium'** risk categories as defined in Pro PG and illustrated in Figure 2.

For 'low risk' sites, Pro PG states that:

> *"At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development."*

For 'Medium risk' sites, Pro PG states that:

> *" 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.."*

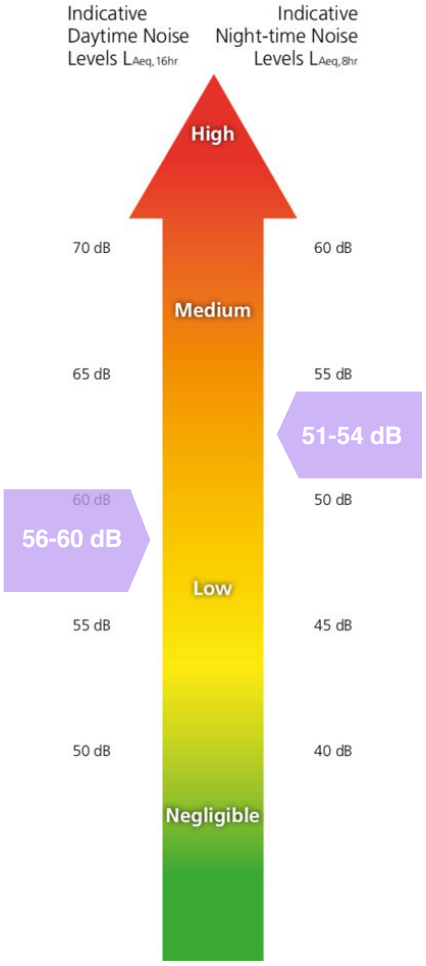

Figure 4 ProPG Initial site noise risk assessment categories and predicted site levels at front and rear facades

6 GOOD ACOUSTIC DESIGN

This section provides some initial guidance on good acoustic design measures which may need to be considered at the site in order to minimise potential noise impacts on the proposed residential development:

The indicative site layout shown below has been annotated to illustrate the key acoustic issues which will need to be addressed:

Figure 5 Indicative site layout and good acoustic design measures to be addressed during the next stage.

7 CONCLUSIONS

The results of the baseline noise survey show that the site is exposed to significant traffic noise levels, however it falls within the NEC B category in TAN 11 and between the 'Low' and 'Medium' risk categories in ProPG.

The site noise levels at ground level during daytime hours range from 56-60 dBL_{Aeq16h}. This exceeds both the 'desirable' 50 dBL_{Aeq} target and the 55 dBL_{Aeq} 'upper limit' for external amenity spaces, therefore some form of screening would be required to provide suitable external amenity spaces.

At first floor level and above, noise levels may be significantly higher due to the lack of screening from the A483 and care will need to be taken to design the development to mitigate this issue.

Overall, the site is considered potentially suitable for residential development, subject to a good acoustic design process being followed, with the following key acoustic design issues being addressed:

1) Screening of road traffic by a combination of the massing of the development itself, provision of a noise barrier or increased earth bund height, etc.
2) Orientation and layout of the buildings to maximise self-screening and minimise the need for façade treatments and to ensure external amenity areas can achieve the required noise levels.
3) Ventilation strategy and façade design upgrades to minimise noise intrusion.