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Architectural & Environmental Acousticians

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Noise Impact Assessment

Land off Lovell Road, Oakley

[redacted]

Noise Impact Assessment

Project: LAND OFF LOVELL ROAD, OAKLEY

Report reference: RP03-19142

Client:
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TABLE OF CONTENTS

1. INTRODUCTION

1.1 Cass Allen has been instructed by Red Eagle Securities to complete a Noise Impact Assessment to accompany a Call for Sites submission which seeks the allocation of Land off Lovell Road, Oakley for development comprising the erection of up to 23 dwellings.

1.2 The assessment has been carried out in accordance with relevant local and national planning guidance.

1.3 The aims of the assessment were:

- To establish the suitability of existing noise and vibration levels at the site for the proposed development;
- Where required, identify appropriate measures to optimise the acoustic design of the development and achieve acceptable noise and vibration levels in habitable areas.

1.4 This report contains technical terminology; a glossary of terms can be found at www.cassallen.co.uk/glossary.

2. PROJECT DESCRIPTION

2.1 The proposed development is situated in a residential area north of Lovell Road. To the east of the site is a railway line and existing residences with the A6 beyond. There are also a number of residences directly to the west of the site.

2.2 An annotated aerial photo of the site is shown in Figure 1 below. The current site layout is shown in Appendix 1.

Figure 1 Annotated Aerial Photo – Red-line Approximate Only

2.3 The proposal is to develop the site into a number of residential properties.

3. PLANNING POLICY

National Policy

3.1 Outline guidance for the assessment of noise affecting new developments is given in the National Planning Policy Framework (NPPF). Section 170 of the NPPF states:

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

and in Section 180:

> *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.*

Local Policy

3.2 Appropriate project criteria and design measures have been taken from previous discussions with Bedford Borough Council and are assessed in Section 4 below.

4. NOISE AFFECTING THE DEVELOPMENT

Design criteria – Internal noise levels

4.1 Appropriate design criteria for acceptable noise levels in acoustically sensitive areas of new developments are given in BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*'. This standard is supplemented by ProPG '*Planning and Noise for New Residential Development, May 2017*' which gives further clarity on the assessment of individual noise events and noise levels in gardens.

4.2 Relevant BS8233/ProPG design criteria are summarised in Table 1 below.

Table 1 BS8233/ProPG Internal Noise Criteria

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq,16hour	-
Dining	Dining room/area	40 dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hour	30 dB LAeq,8hour 45 dB LAmax,F[1]

[1] ProPG provides further clarity: *"In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB LAmax,F more than 10 times a night."*

4.3 ProPG also states that noise levels in external amenity areas of residential developments should be assessed and that noise levels should ideally not be above 50 to 55 dB LAeq,16hr. ProPG recognises however, that these guideline values may not be achievable in all circumstances where development is desirable. In these cases, ProPG states that the development should be designed to achieve the lowest practical noise levels in the amenity space.

Existing site noise and vibration levels

4.4 A noise survey was carried out at the site from the 16th to the 18th July 2019 to assess existing noise levels in the area. The full methodology and results of the noise survey are provided in Appendix 2.

4.5 Average noise levels at the site were either dictated by rail movements or road traffic on Lovell Road, depending on proximity to each noise source.

4.6 Maximum noise levels at the site were largely dictated by train passes on the railway. In the absence of rail movements, maximum noise levels at the south of the site were dictated by road traffic on Lovell Road.

4.7 Background noise levels (LA90) across the site were generally dictated by constant road traffic noise from the A6 and Lovell Road.

4.8 Ground-borne vibration was subjectively assessed during the site survey. It was found that, even with large goods train passes, ground-borne vibration was imperceptible at the closest point of the site to the railway. Vibration is therefore not a significant matter for this development and is not considered further.

Assessment

4.9 Based on the results of the site noise survey, a 3D computer noise model was developed to predict and assess the noise levels that will exist across the entire development.

4.10 The 3D noise model was developed using Cadna/A v2020 environmental noise modelling software. Cadna/A incorporates the calculation methodology outlined in the Department of Transport Welsh Office - *Calculation of Road Traffic Noise* (CRTN) for the assessment of road traffic noise propagation, CRN for rail noise.

4.11 The layout of the development and surrounding area was input into the model. To calculate the spread of noise levels around the site, average and maximum noise levels were input for the surrounding noise sources and calibrated to the results of the on-site noise measurements.

4.12 The methodology and results of the noise modelling are provided in Appendix 3. It can be seen from the modelling results that noise levels will be highest on facades of the development facing the railway and lowest on facades at the centre of the site which are screened from the surrounding noise sources.

Internal noise levels in noise-sensitive rooms

4.13 Full construction details for the development have not been finalised as the project is at an early design stage. It has therefore been assumed that the external walls of the development will be constructed using a standard masonry construction (e.g. 102mm brick, 100mm insulated cavity, 100mm concrete block) or a light-weight construction designed to achieve a similar level of sound insulation (this is technically achievable subject to detailed design). Consequently, internal noise levels would be dictated by external noise ingress via glazing and ventilators.

4.14 The ventilation scheme for the project has not yet been decided and therefore, for the purpose of the assessment, it has been assumed that units will be ventilated via trickle ventilators in the external facades with openable windows for the provision of purge ventilation (as per System 1 or System 3 from Building Regulations Part F).

4.15 Calculations were carried out using facade modelling software in accordance with the methodology given in BS8233:2014 to calculate the sound insulation performance required of the glazing and ventilation to achieve the nominated internal noise criteria in the 'worst-case' habitable rooms of the development (i.e. the habitable rooms that will be subject to the highest external noise levels).

4.16 If acceptable internal noise levels can be achieved in 'worst case' habitable rooms then it follows that acceptable internal noise levels can be achieved in all other habitable rooms of the development using similar glazing and ventilator types.

4.17 The results of the calculations are summarised in Table 2 below.

Table 2 Acoustic Requirements for 'Worst Case' Habitable Rooms

'Worst Case' Rooms	Glazing Performance Requirements (inc. Frames)	Ventilator Performance Requirements
Bedrooms facing railway	33 dB Rw+Ctr	50 dB Dne,w + Ctr
Living rooms facing railway	35 dB Rw+Ctr	50 dB Dne,w + Ctr

Note The requirements given are approximate only and should be confirmed at the detailed design stage when full design details are available.

4.18 The required sound insulation performance values in Table 2 could typically be achieved by the glazing and ventilator types shown in Table 3.

Table 3 Typical Glazing / Ventilator Acoustic Performances

Glazing (in Good Quality Sealed Frames)	Typical Weighted Sound Reduction (Rw + Ctr)
8.8mm/16/4mm acoustically upgraded thermal double glazing	33
6mm/6to20/10.8mm acoustically upgraded thermal double glazing	35
Example Ventilator	**Typical Acoustic Performance (Dnew + Ctr)**
Passivent Airbrick + STM	50

4.19 It should be noted that it will be possible to use lower acoustic performance facade elements for facades that are further from or acoustically screened from the surrounding noise sources. This could be investigated further at the detailed design stage.

4.20 It can be seen from the above that acceptable internal noise levels will be achievable in the development subject to the installation of suitable glazing and ventilation systems (which could be secured with a suitable planning condition). It is our view therefore that the proposed development is, in principle, acceptable with regard to the noise levels that will exist within the habitable rooms.

Noise levels in external amenity areas

4.21 The layout of the development has also been reviewed in relation to the BS8233/ProPG recommendation that noise levels in external amenity areas should ideally not exceed 50 – 55 dB LAeq,T.

4.22 The site topography is such that the railway line is significantly elevated in comparison to the residences. As such, the effectiveness of fencing/ barriers is limited however it is recommended that 1.8m high close-boarded timber fencing is used around the gardens to reduce noise levels in these gardens as far as practicable (as per BS8233/ProPG guidance).

4.23 With the fencing in place, noise levels in the external amenity areas at the east of the development (Plots 1-4) are predicted to still exceed the BS8233/ProPG recommended levels by 3-6 dB. Whilst this is not ideal, it is not uncommon for noise levels in gardens in residential areas to be higher than the BS8233/ProPG recommended levels. Indeed Cass Allen provided the acoustic assessment for the site to the North-West (Ref. 17/02094/MAR) which was subject to similar levels of noise from the same noise source. This development was granted permission on 5th Feb 2018. We can confirm that the proposed mitigation in that instance is the same as for this application (1.8m close-boarded timber fencing).

4.24 As the noise levels in these areas will have been reduced as far as practicable, BS8233:2014 advises that the allocation of this site for residential purposes should not be withheld due to elevated garden noise levels.

Summary

4.25 Based on both internal and external noise levels as well as ground-borne vibration levels, it is considered that the development as proposed is in-line with the relevant guidance, Standards and policy.

5. CONCLUSIONS

5.1 Cass Allen was instructed by Red Eagle Securities to assess the suitability of the site for the proposed development with regard to noise and vibration.

5.2 The assessment was carried out in accordance with relevant local and national planning guidance.

5.3 A noise and vibration survey was carried out at the site. Noise levels at the site are dictated by rail movements and road traffic noise emissions from Lovell Road. Ground-borne vibration was imperceptible at the closest point of the site to the railway.

5.4 A 3D noise model of the development was constructed based on the results of a site noise survey. The noise model was used to calculate noise levels at all facades of the development.

5.5 Noise affecting the development has been assessed in accordance with relevant national and local policy, British Standards and acoustics guidance. The design of the development is considered to be acceptable subject to the adoption of acoustically upgraded glazing and ventilation and acoustic screening around gardens. This can be investigated further at the detailed design stage.

5.6 In summary of the above it is our view that the site is suitable for residential development in terms of noise and vibration levels and that the site should be allocated for this purpose.

Appendix 1 Site Layout

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Appendix 2 Survey Results

Survey Summary:

The survey comprised short-term operator attended noise and vibration measurements/ observations and longer-term unattended noise monitoring at the site. Noise levels at the site were generally dictated by road traffic on surrounding roads and noise from train passes on the adjacent railway. Vibration levels at the site were very low.

Survey Period:

16/07/2019 to 18/07/2019

Survey Objectives:

- To identify noise and vibration sources that contribute to ambient noise levels at the site;
- To measure noise levels around the site over a typical day and night-time period.

Equipment Used (Appendix 2, Table 1):

Type	Manufacturer	Model	Serial Number
Sound level meter[1] (noise logger)	Rion	NL-32	01213688
Calibrator	Rion	NC-74	34551703
Accelerometer (attached to DA-20)	Rion	PV-57I	53105 (Z axis)

Note 1: All sound level meters were calibrated before and after measurement periods and no significant drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

Weather Conditions:

The observed weather conditions were acceptable for acoustic measurement throughout the attended survey periods (low-medium wind speeds and no rain). Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring. There was one short period of inclement weather on the afternoon of the 17/07/19 however this did not significantly impact on the measurement results.

Measurement Positions (Appendix 2, Table 2):

Position (refer plan below)	Description
N1	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby noise sources. Position of closest proposed façade to Lovell Road.
N2	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby noise sources. Position of closest proposed residential facade to railway.
N3	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby noise sources. Medium-term measurement of road traffic during school closing period.
L1	Unattended noise logging position. 1.5m above ground. Free-field. Direct line of sight to nearby noise sources.

Site Plan showing Measurement Positions (Appendix 2, Figure 2):

Attended Noise Monitoring Results (Appendix 2, Table 3):

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	LA90, dB	Observations
18/07/2019	N1	15:47	5 mins	59	79	45	Measurement dictated by road traffic and train passes.
		15:53	5 mins	52	64	46	
		15:58	5 mins	56	75	43	
	N2	16:07	5 mins	67	87	43	
		16:13	5 mins	49	63	45	No train passes during measurement. Road traffic only.
		16:20	5 mins	60	50	48	Measurement dictated by road traffic and train passes.
	N1	16:29	5 mins	57	75	44	
		16:36	5 mins	50	58	45	
		16:41	5 mins	50	64	42	
	N3	14:39	2 hrs	63	81	47	Noise dictated by road traffic on Lovell Road. School children also walking past measurement location.

Unattended Noise Monitoring Results (Appendix 2, Table 4):

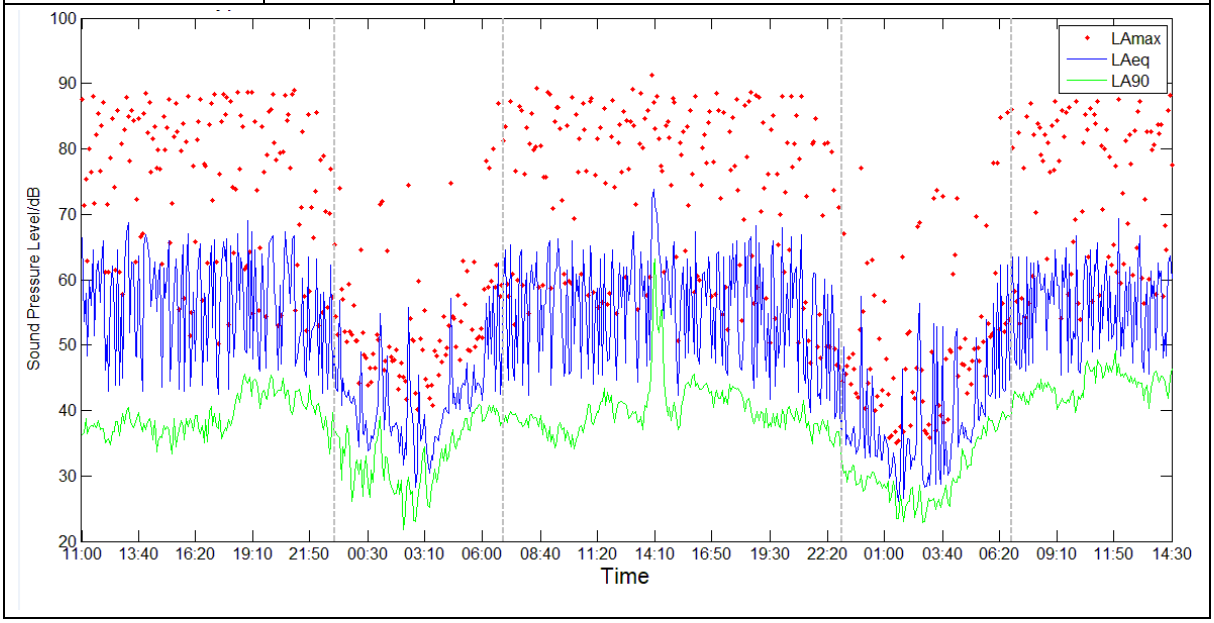
Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB[1]	LAeq,8hr, dB	LA90,5mins, dB[1]	LAmax, dB[2]
16/07/2019 to 18/07/2019	L1	62	38	49	29	72

Note 1: Typical lowest measured during the period shown.

Note 2: Highest typical maximum noise level during the night-time (not exceeded more than 10-15 times per night).

Unattended Noise Monitoring Results (Appendix 2, Figure 3):

Meas. Period	Position
16/07/2019 to 18/07/2019	L1

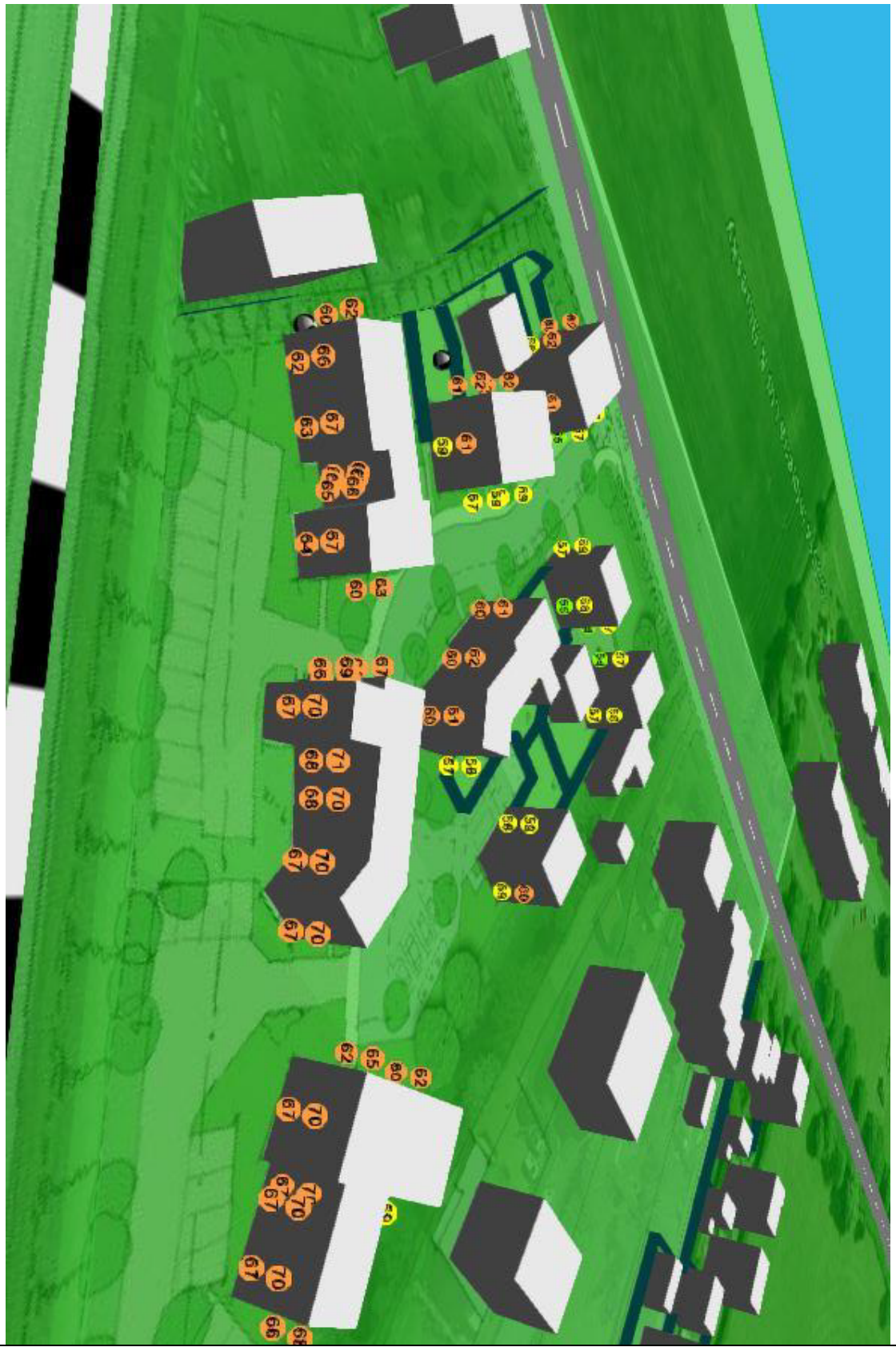


Appendix 3 Modelling Results

Modelling Software:	CADNA/A Version 2020
Modelled Scenarios:	Day and night-time average and maximum noise levels across the site
Data inputs:	• Noise survey results • Topographical data for the site • Proposed development layout
Calculation Algorithms Used:	• Calculation of Road Traffic Noise 1988 – Department of Transport • ISO 9613-1:1993 Acoustics-Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere • ISO 9613-2:1996 Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation

Modelling Printout (Appendix 3, Figure 1):

Scenario	Daytime average noise levels (dB LAeq,16hr)



Modelling Printout (Appendix 3, Figure 2):

Scenario	Night-time average noise levels (dB LAeq,8hr)

Modelling Printout (Appendix 3, Figure 3):

Scenario	Night-time maximum noise levels (dB LAmax)

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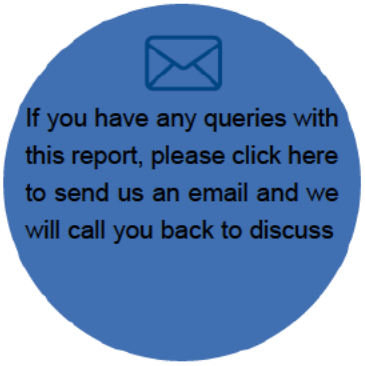

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