LIBERTY PROPERTIES DEVELOPMENTS LIMITED

PROPOSED RESIDENTIAL DEVELOPMENT

RHOSROBIN, WREXHAM

ENVIRONMENTAL NOISE STUDY

R0804b-REP01-PC

16 MAY 2014

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REPORT DETAILS

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SUMMARY

Red Acoustics has been commissioned by Liberty Properties Developments Ltd to provide an assessment of environmental noise and vibration impacting upon a proposed residential development application site located on green belt land at Rhosrobin, Wrexham. This report examines the environmental noise and vibration conditions at the application site and determines the Noise Exposure Categories and vibration criteria across the site recommended by British Standards and applicable planning guidance and determines its suitability for a residential development as proposed.

This report examines the environmental noise conditions at the site and advises on the noise exposure categories across the site. The report also assess the effectiveness of introducing a noise barrier along the A483 site boundary.

It has been determined that the majority of the site falls under NEC C during the daytime period and NEC B throughout the night. With the introduction of a noise barrier along the A483 site boundary the NEC category is reduced resulting in a NEC B and A split across site in the night time period. The daytime NEC category is unaffected by the introduction of a noise barrier.

The proposed site is deemed suitable for a residential development in accordance with currently available planning guidance and BS8233, provided an intelligent site layout design is implemented with adequate noise control measures, such as the use of noise barriers / bund along the A483 site boundary along with acoustically rated glazing and ventilation. Also, it should be noted that the addition of houses / buildings within the development site will provide additional screening of road traffic noise for dwellings across the development site. This screening will further enhance the acoustic amenity for future occupants.

Vibration measurements carried out at the application site have indicated that groundborne train vibration levels from the adjacent railway line fall below the range at which there is low probability of causing adverse comments. Therefore no vibration mitigation measures are proposed.

The noise and vibration assessment indicates that there is no noise or vibration related constraint relating to the proposed development that would preclude planning consent being granted.

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1.0 INTRODUCTION

Red Acoustics has been commissioned by Liberty Properties Developments Ltd to provide an assessment of environmental noise and vibration impacting upon a proposed residential development application site located on green belt land at Rhosrobin, Wrexham. This report examines the environmental noise and vibration conditions at the application site and determines the Noise Exposure Categories and vibration criteria across the site recommended by British Standards and applicable planning guidance and determines its suitability for a residential development as proposed.

The assessment has involved taking noise and vibration measurements at the application site during daytime and night-time periods. The measurements have then been used to develop and calibrate a noise propagation model, thereby determining the anticipated noise levels and associated NEC categories across the site.

2.0 DESCRIPTION OF THE SITE

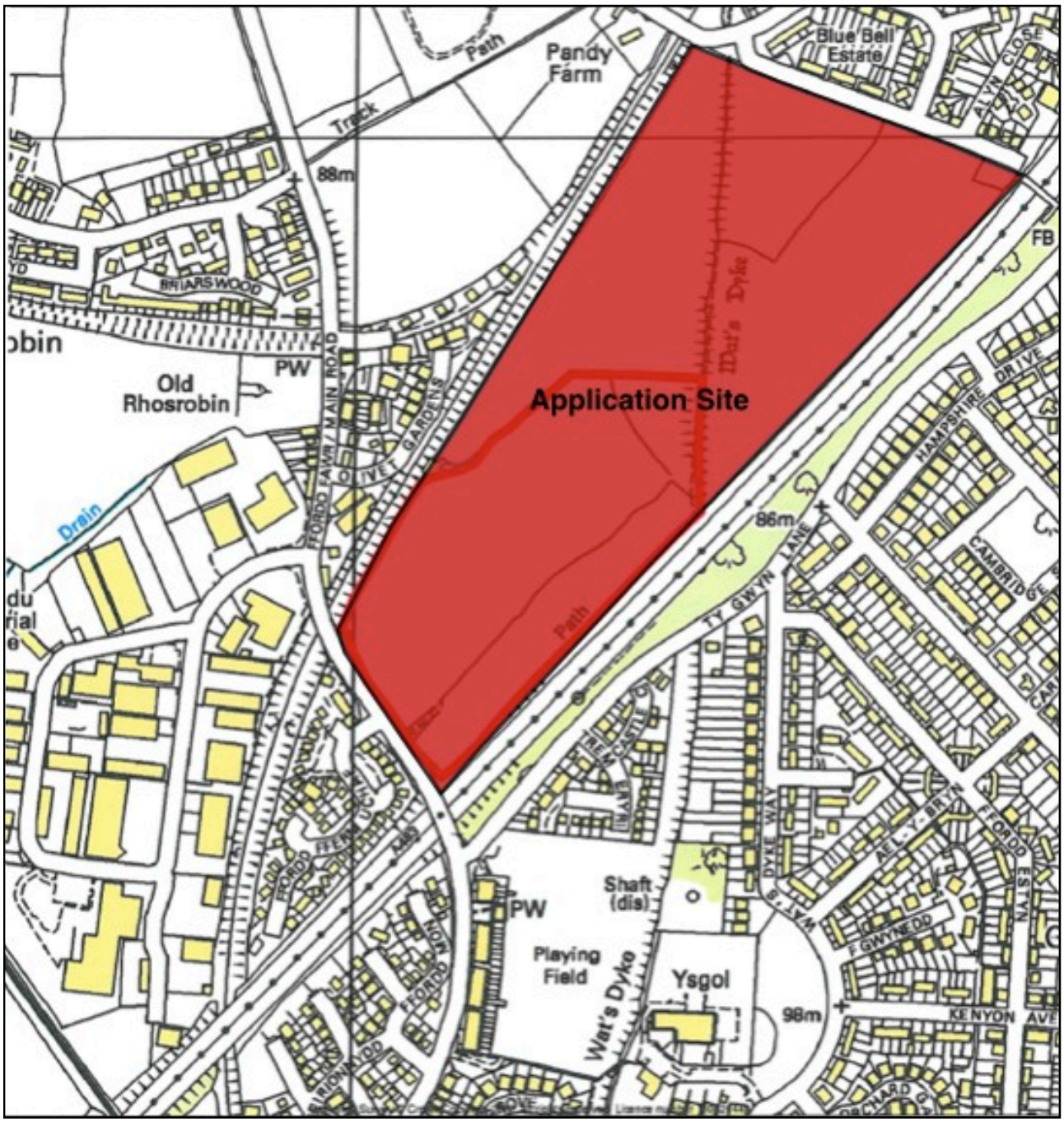
The application site is located within a semi rural location off New Road B5425, Old Rhosrobin. Old Rhosrobin is a small village which lies approximately three kilometres to the north west of Wrexham town centre.

The proposed application site is bounded by the Wrexham to Chester single railway line which runs along the full length of the northwest edge of site, with the northern half of the line leading on to agricultural land and the southern half leading on to a small residential development. The north east of site is bounded by Plas Acton Road leading on to residential houses at Pandy. The main A483 truck road bounds the full extent of the southeast side of the application site. The B5425 New road bounds the western edge of the proposed application site.

The general noise climate around the proposed application is dominated by road traffic noise emitting from the main A483 truck road.

A plan of the existing site is shown in Figure 2.1.

Figure 2.1: Application Site Location



3.0 PLANNING GUIDANCE WALES - TECHNICAL ADVICE NOTE 11 (TAN 11), NOISE: 1997

Planning Guidance Wales Technical Advice Note 11 (TAN 11) provides guidance on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development.

TAN 11 outlines the considerations to be taken into account in determining planning applications for both noise sensitive developments and those activities that generate noise. It aims to help local planning authorities in their consideration of applications for residential development near transport related noise sources.

The guidance provides a method whereby a plot of land can be rated and placed into a Noise Exposure Category (NEC) for residential development.

The recommended range of noise levels for each NEC covering day and night-time periods in relation to road noise and mixed noise sources are presented in Table 3.1 below. It should be noted that TAN 11 states that it may be appropriate in some cases for local planning authorities to vary the noise levels that the NEC's apply to. For instance, where there is a clear need for new residential development in a noisy area, some or all NECs may be increased by 3dB(A) above the recommended levels.

Table 3.1: Noise Levels Corresponding to the NEC for New Dwellings

$L_{Aeq,T}$ dB(A)	A	B	C	D
Mixed Sources and Road Traffic 0700 - 2300	<55	55 - 63	63 - 72	>72
Mixed Sources and Road Traffic 2300 - 0700*	<45	45 - 57	57 - 66	>66
* sites where noise events at night regularly exceed 82 dB L_{Amax} (slow time weighting) several times in any hour should be treated as being in Category C				

Measurement results are separated into day and night-time periods, and the average L_{Aeq} found for each period. The results are used to determine which category the residential development will fall into. TAN 11 advises that local planning authorities should have regard to the advice presented in Table 3.2 when considering the NEC in which a development lies.

Table 3.2: Explanation of Noise Exposure Categories

NEC	Advice
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 a desirable level.
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.
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.

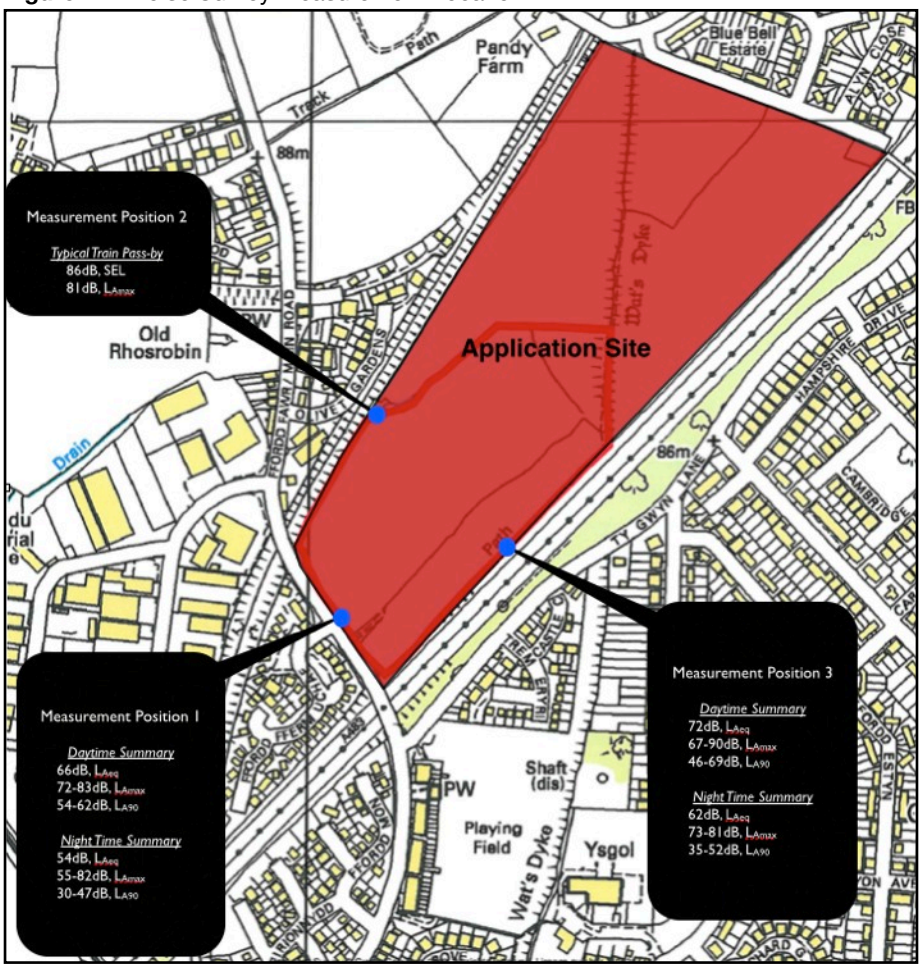
With regard to the achievement of satisfactory acoustic conditions within dwellings, Annex A section 6 of TAN 11 states that 'The NEC principle cannot therefore be applied sensibly to such developments and it will be more appropriate to refer to specific guidance on internal noise standards in respect of each activity. General information can be found in BS 8233: 1987' ('Sound insulation and noise reduction or buildings').

4.0 ENVIRONMENTAL NOISE SURVEYS

In order to determine the prevailing environmental noise levels at the site, manned surveys were conducted by Red Acoustics Ltd at the site during the daytime period on the 12th November and night time on 12th / 13th November 2013.

The noise climate around the site generally comprises road traffic noise from the A483 truck road, local traffic movements on new road and to the northern edge of site noise is dominated by train movements along the adjacent railway line. The measurement locations used to for the surveys as shown in Figure 4.1, establish typical traffic and railway noise and vibration levels impacting upon the proposed residential development application site and have been used to calibrate a noise mapping model.

Figure 4.1: Noise Survey Measurement Location



The measured and calculated noise levels can be used to determine the Noise Exposure Categories at the site in accordance with TAN 11 and the acoustic requirements of the facades of the buildings to achieve satisfactory internal noise levels within the proposed dwellings in line with the recommendations of British Standard BS8233:1999.

Full survey details and instrumentation are given in Appendix A.

Appendix B contains a summary of the results obtained from the manned surveys.

Table 4.1 summarises the measured noise levels at the site.

Table 4.1: Summary of Measured Environmental Noise and Vibration Levels

	Measured Noise Levels					
	Daytime			Night-time		
Location	dB, L_{Aeq}	dB, L_{Amax}	dB L_{A90}	dB, L_{Aeq}	dB, L_{Amax}	dB L_{A90}
P01	64 to 68 (typically 66)	72 to 83	54 to 62	45 to 58 (typically 54)	55 to 82	30 to 47
P02 Train Noise	Typical Passing Train Noise Level in Terms of 'Sound Exposure Level' (SEL) = 86dB					
P03	62 to 74 (typically 72)	67 to 90	46 to 69	59 to 64 (typically 62)	73 to 81	35 to 52

It should be noted that the noise levels measured are not necessarily indicative of noise levels at the facades of the proposed dwellings. Measurements were carried out at Position 3 with the sound level meter mounted on a tripod at a height of approximately 1.4m above the ground. Measurements at Position 1 were carried out with the microphone mounted on a 4m high mast to allow clear line of sight of the adjacent road. Each noise measurement was five minutes in duration.

The instrumentation used to measure vibration at Position 2 also simultaneously measured noise levels over 1 second intervals thereby allowing individual train movements to be identified and their noise output quantified. Noise levels were measured during the passing of each train in terms of the 'sound exposure levels' (SEL) and the maximum sound pressure level, L_{Amax}.

The train passing the proposed development site on the eastern line during day and night were slow moving two car light passenger trains with up to 33 movements during day and 7 movements during the night.

Details of noise levels predicted across the site using computer modelling are given in Section 6.0.

Reference should be given to Section 7.0 with regards to providing adequate levels of protection against noise.

5.0 CALCULATION OF RAILWAY NOISE EXPOSURES

Railway noise is evaluated in terms of the 'equivalent continuous noise level', L_{Aeq}. The relevant guidelines for assessing railway noise at a new residential development sites are included in Welsh Government Technical Advise Note TAN 11: Noise (1997).

TAN 11 requires railway noise to be evaluated in separate day and night L_{Aeq} values. These L_{Aeq} values can be calculated from the results of the noise survey using the formula:

$$L_{Aeq\,(T)} = SEL_{\,average} + 10 \text{ Log } N - 10 \text{ Log } T$$

Where $L_{Aeq\,(T)} = L_{Aeq}$ over time period T

$SEL_{\,average}$ = Average 'Sound Exposure Level'

N = Number of train pass by's in time period T

T = Time period in seconds

Railway noise calculations have been undertaken for the proposed residential development site and summary are shown below in Table 5.1.

Table 5.1: Summary of Railway Calculation

Measurement Location	Daytime dB L_{Aeq} (07:00-23:00 hrs)	Night-time dB L_{Aeq} (23:00-07:00 hrs)
P02	53	50

Assessment of Railway Impact Noise

The recommended range of noise levels for each NEC's in TAN 11 covering day and night-time periods in relation to mixed noise sources are presented in Table 5.2 below.

Table 5.2: Noise Levels Corresponding to the NEC for New Dwellings

$L_{Aeq,T}$ dB(A)	A	B	C	D
Rail Traffic 0700 - 2300	<55	55 - 66	66 - 74	>74
Rail Traffic 2300 - 0700*	<45	45 - 59	59 - 66	>66
* sites where noise events at night regularly exceed 82 dB L_{Amax} (slow time weighting) several times in any hour should be treated as being in Category C				

6.0 NOISE PROPAGATION MODELLING

To determine the propagation of road traffic and train noise across the proposed development site, CadnaA 3D noise mapping software has been used to predict the residual daytime and night-time noise levels across the site based on the survey data taken at the measurement positions around the site and topographical data. The computer model calculates train noise propagation in accordance with the method detailed in 'Calculation of Railway Noise'.

Cadna A is a software program for the prediction and assessment of noise levels in the vicinity of:

- industrial facilities
- sport and leisure facilities
- roads, railways and airports
- music venues
- any other noisy equipment including ventilation plant

The program provides for easy entry and configuration of landscapes with all components that influence sound emission and propagation, the calculation and the documentation of the noise levels in accordance with national standards and regulations, and the presentation of the results with noise contour plots and coloured noise maps.

Figure 6.1 shows 3D views of the noise propagation model, indicating the proposed development, topography across the site and the adjacent roads and rail lines.

Figure 6.1: 3D CadnaA Views Showing Noise Model

Figure 6.2 shows the predicted L_{Aeq} noise propagation across the site during daytime periods.

Figure 6.2: CadnaA View Showing Predicted Daytime L_{Aeq} Noise Propagation Across the Site at 1.5m Height

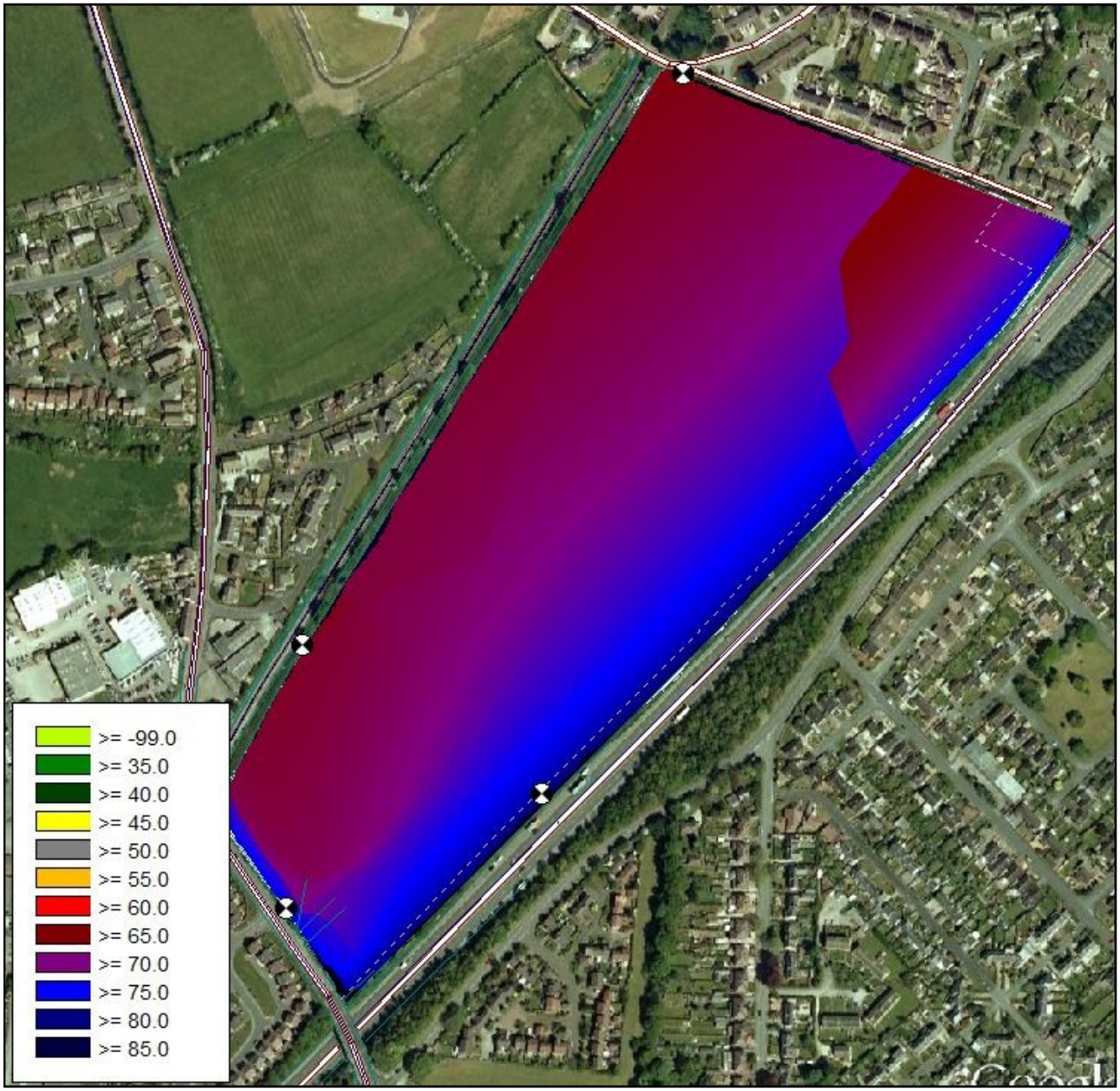


Figure 6.3 shows the predicted L_{Aeq} noise propagation across the site during night-time periods.

Figure 6.3: CadnaA View Showing Predicted Night Time L_{Aeq} Noise Propagation Across the Site at 4m Height

Figure 6.4 shows the predicted noise exposure categories (NEC) across the site during daytime periods.

Figure 6.4: CadnaA View Showing Predicted Daytime Noise Exposure Categories Across the Site

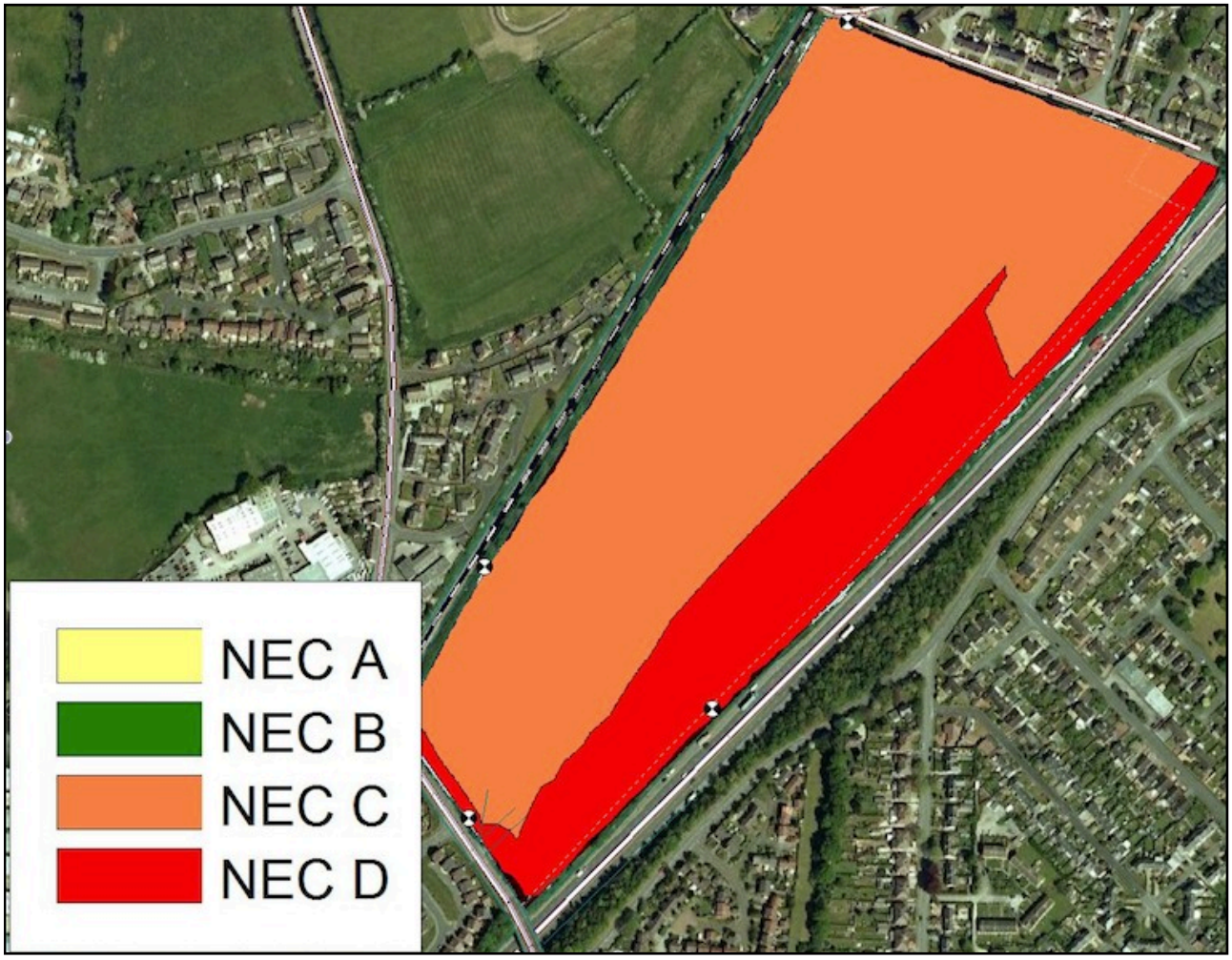
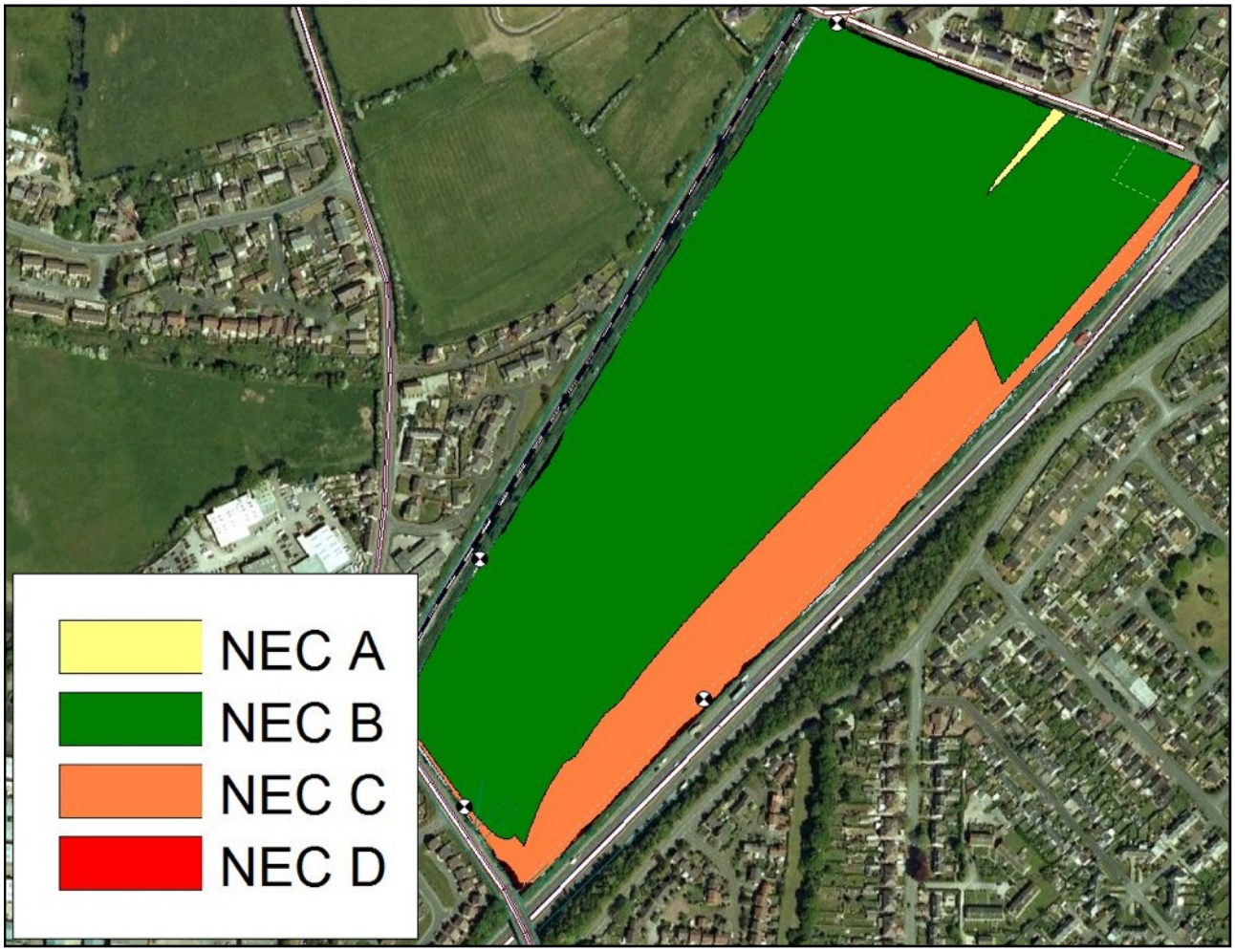


Figure 6.5 shows the predicted NECs across the site during night time periods based on calculated ambient noise levels

Figure 6.5: CadnaA View Showing Predicted Night Time Noise Exposure Categories Across the Site



Assessment With 2 Meter Barrier

Figures 6.6 to 6.9 show the effect of a two meter barrier applied to the full extent of the southeast side of the application site on reducing road traffic noise noise from A483 truck road.

Figure 6.6: CadnaA View Showing Predicted Daytime L_{Aeq} Noise Propagation Across the Site at 1.5m Height - With 2m Barrier

Figure 6.7: CadnaA View Showing Predicted Night Time L_{Aeq} Noise Propagation Across the Site at 4m Height - With 2m Barrier

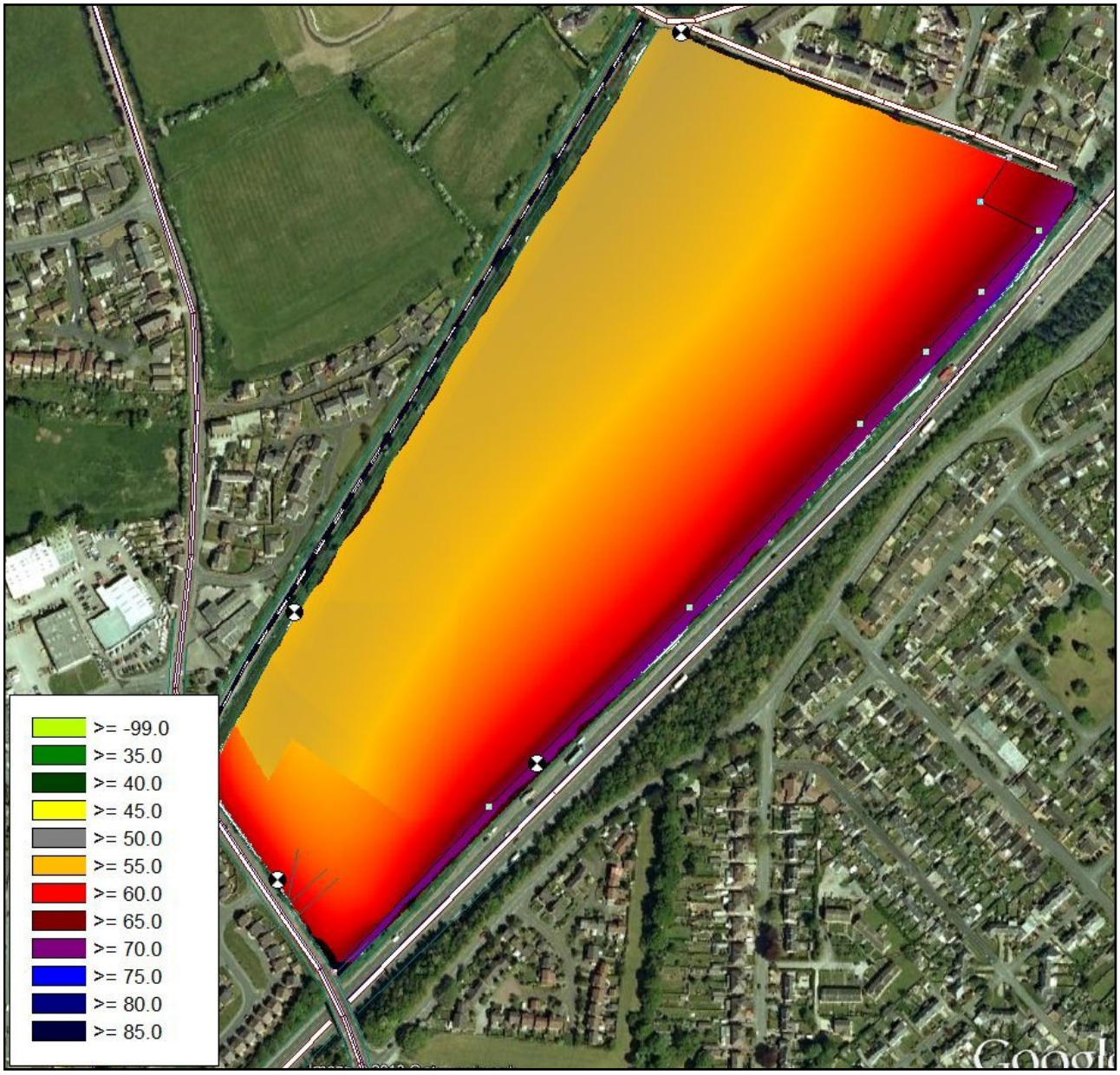


Figure 6.8: CadnaA View Showing Predicted Daytime Noise Exposure Categories Across the Site - With 2m Barrier

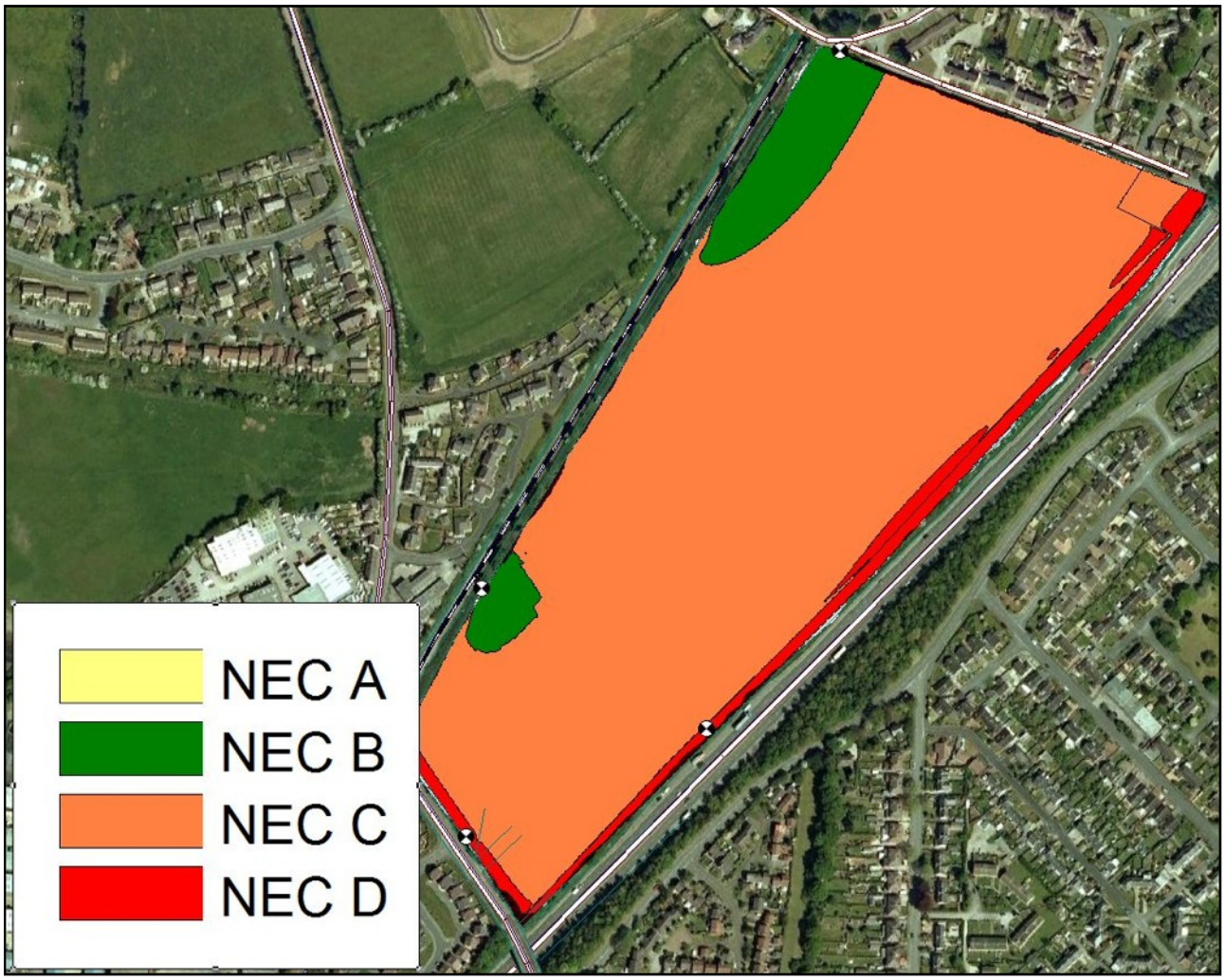
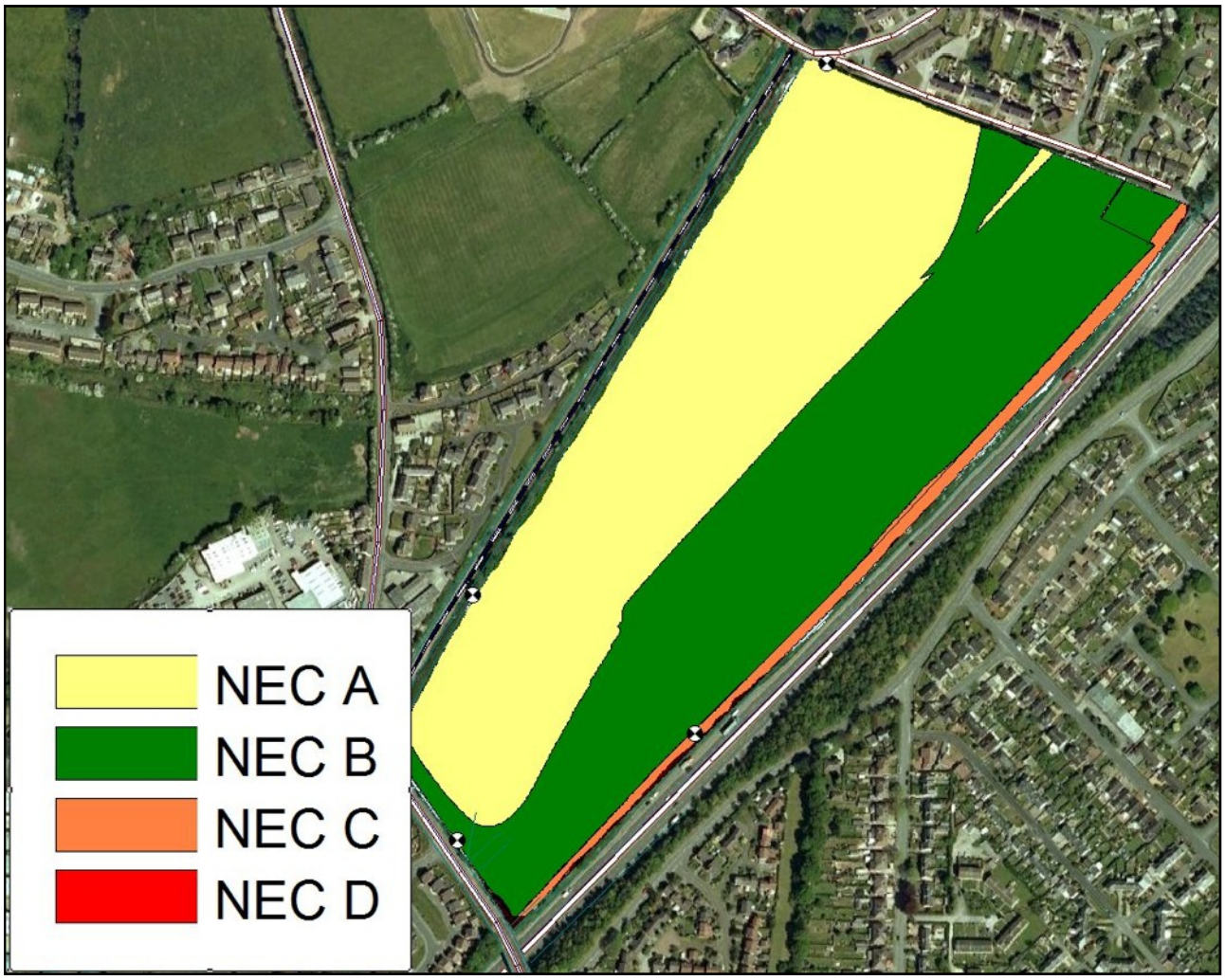


Figure 6.9: CadnaA View Showing Predicted Night Time Noise Exposure Categories Across the Site - With 2m Barrier



Assessment With 3 Meter Barrier

Figures 6.10 to 6.13 show the effect of a three meter barrier applied to the full extent of the southeast side of the application site on reducing road traffic noise noise from A483 truck road.

Figure 6.10: CadnaA View Showing Predicted Daytime L_{Aeq} Noise Propagation Across the Site at 1.5m Height - With 3m Barrier

Figure 6.11: CadnaA View Showing Predicted Night Time L_{Aeq} Noise Propagation Across the Site at 4m Height - With 3m Barrier

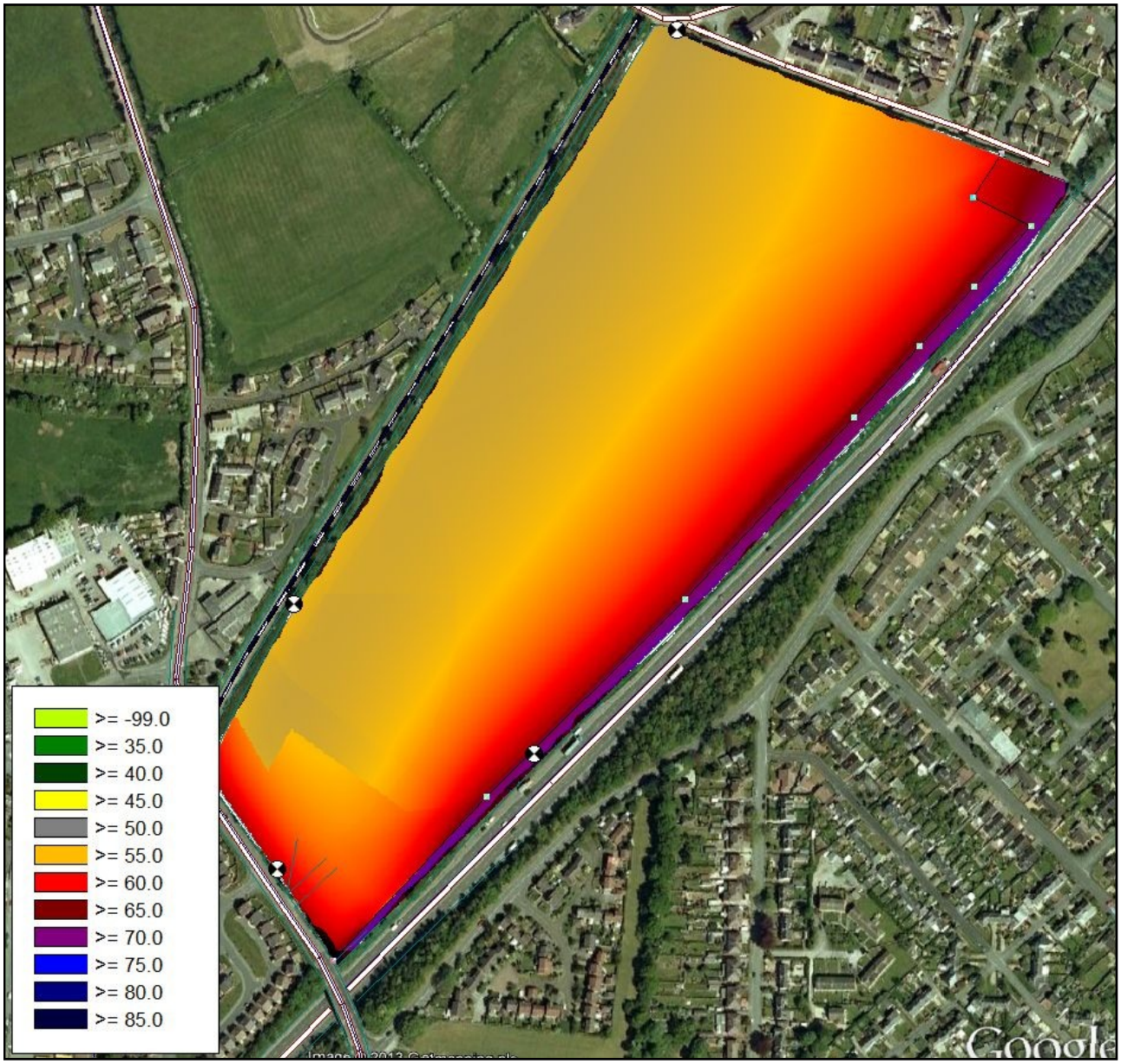


Figure 6.12: CadnaA View Showing Predicted Daytime Noise Exposure Categories Across the Site - With 3m Barrier

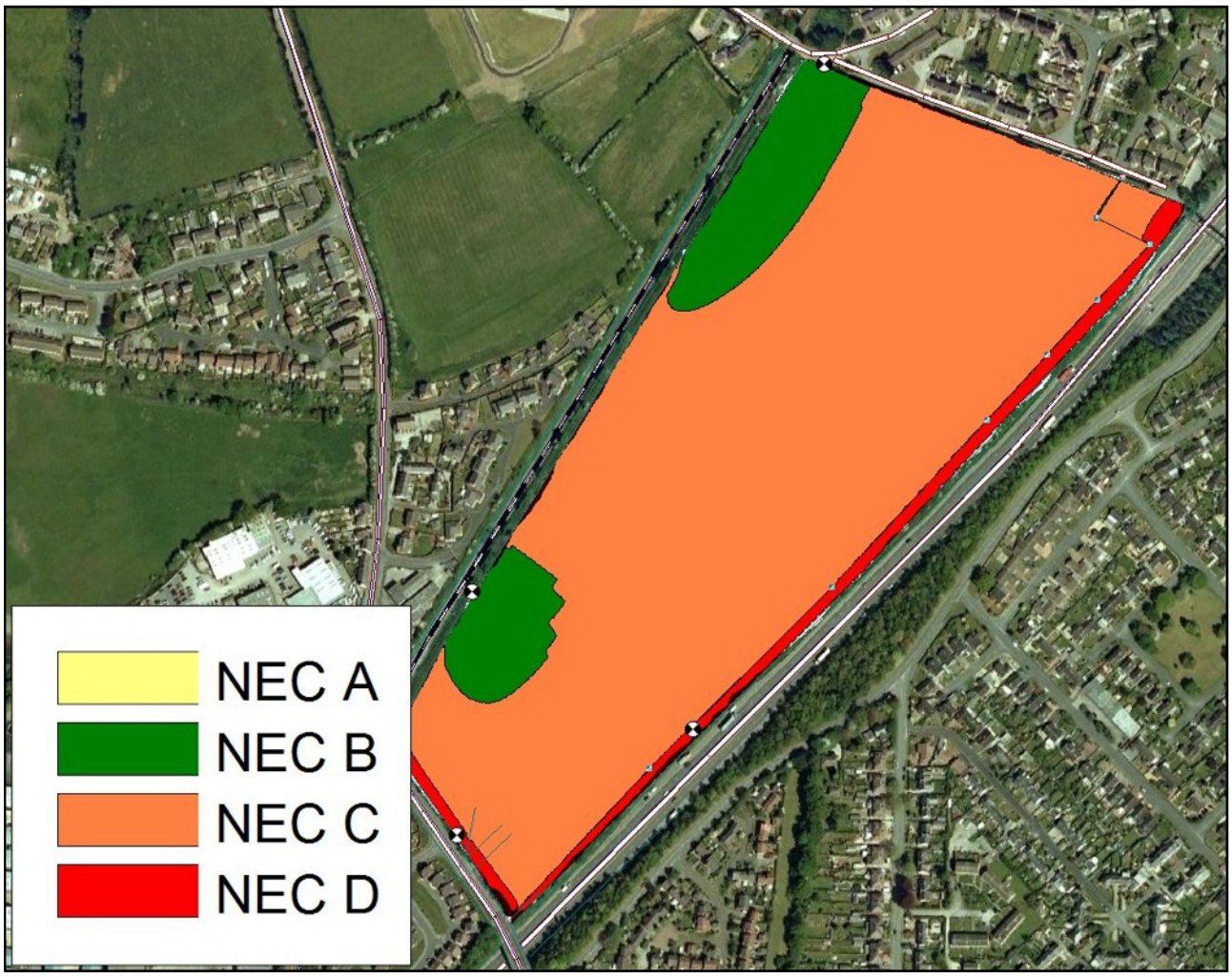
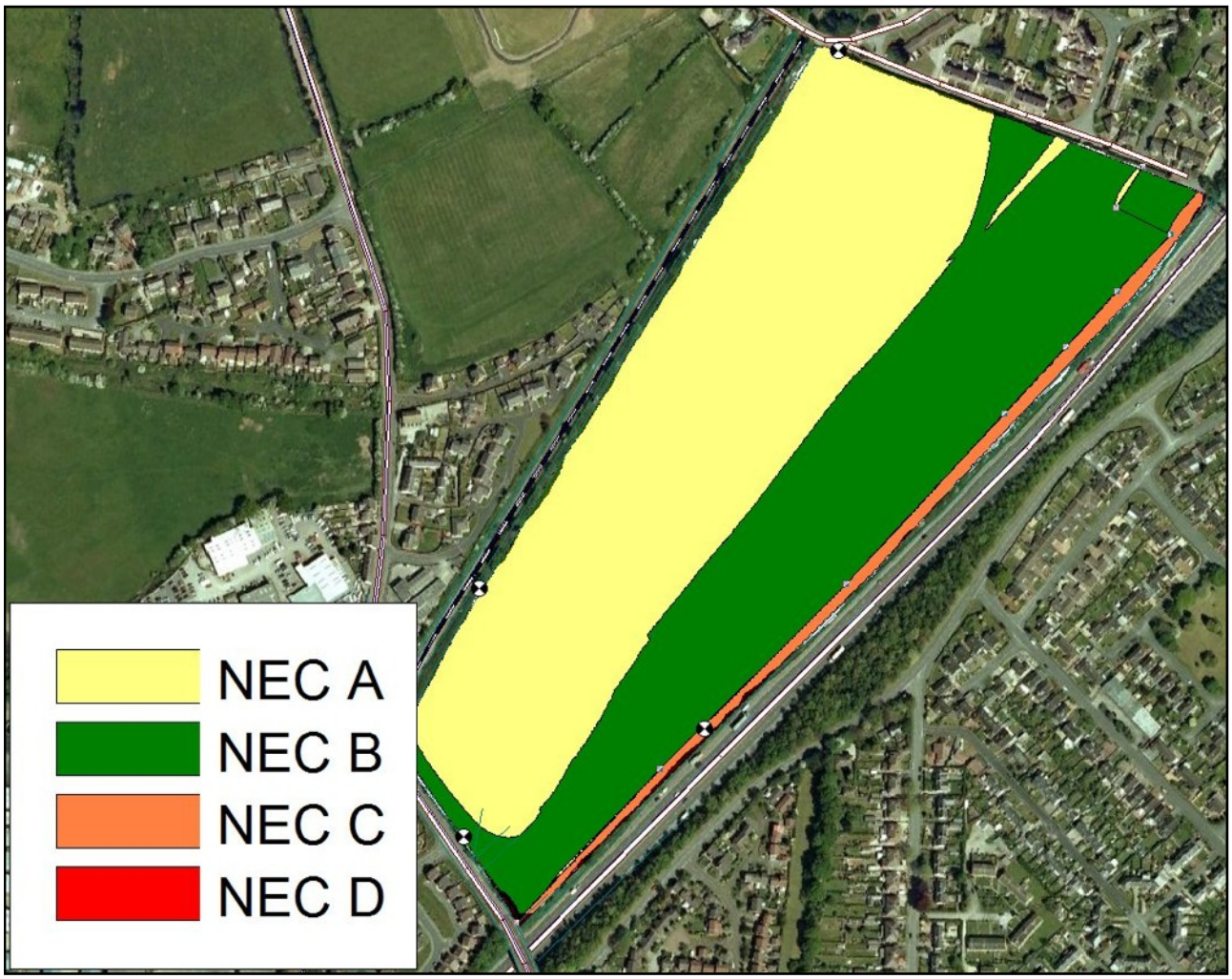


Figure 6.13: CadnaA View Showing Predicted Night Time Noise Exposure Categories Across the Site - With 3m Barrier



7.0 NOISE INGRESS

It has been determined that the majority of the site falls under NEC C during both daytime and night time periods.

For sites that fall under NEC C, TAN 11 states the following:

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.

It is Red Acoustics experience that sites falling within NEC C suitable for residential development if suitable noise attenuation measures are implemented. To ensure a commensurate level of protection against noise, reference should be made to target noise ingress criteria as given below.

Broadband Design Criteria

As referred to in TAN 11, BS8233: 1999 'Sound Insulation and Noise Reduction for Buildings' provides appropriate broadband criteria for acceptable intrusive noise levels in dwellings, specifically bedroom and living room areas, due to 'anonymous' noise, such as road traffic.

These criteria range between 30dB L_{Aeq} to 40dB L_{Aeq} for living rooms during the day (07:00 to 23:00 hours), and 30dB L_{Aeq} to 35dB L_{Aeq} for bedrooms during the night (23:00 to 07:00 hours). The upper limit is deemed to provide 'reasonable' conditions. In addition, the Standard also suggests a single maximum 45dB L_{Amax} criterion for intrusive noise events in bedrooms. These criteria are also comparable with World Health Organisation (WHO) guidelines.

It is therefore recommended that, in order to maintain the amenity of dwellings in terms of environmental noise, the following criteria be applied for the development based on the worst case daytime and night-time noise levels measured on site:

Living Rooms, daytime (0700 to 2300):	40 dB L_{Aeq}
Bedrooms, night time (2300 to 0700):	35 dB L_{Aeq}, 45 dB L_{Amax}

Design Recommendations

By taking into account the levels of noise measured at the site, the propagation of noise across the site (see Section 6.0 above), the likely acoustic characteristics of the noise sensitive receiving space (i.e. living rooms or bedrooms) the sound reduction required to be provided by the façade can be determined.

At this stage no fixed site layout plan is available for the development. Plot specific recommendations are to be provided by Red Acoustics once a site plan is determined.

It is recommended that the proposed house layouts are designed such that habitable spaces are located away from sources of noise. Habitable spaces such as living rooms and bedrooms should be located on the 'quiet facade' away from sources of noise whilst non-habitable spaces such as kitchens, bathrooms and utility spaces are located facing towards sources of noise.

Further plot specific recommendations are to be provided by Red Acoustics once a site plan is determined.

8.0 TRAIN VIBRATION

In order to determine the risk of disturbance to occupants of the proposed development due to vibration induced by passing train movements, measurements of ground-borne vibration were conducted by Red Acoustics at measurement position 2 at the nearest railway boundary using a PCB Piezotronic triaxial accelerometer in order to determine resultant weighted Vibration Dose Values (VDV) during typical train pass-by events.

The instrumentation used during the vibration surveys was set up in accordance with the appropriate human vibration weightings specified in BS6472.

Continuous measurements of vibration dose values (VDV) were logged in consecutive 5-minute samples during the period referred to above.

A high-sensitivity PCB triaxial accelerometer was mounted on a DIN mounting plate. The plate was buried in the ground at the boundary fence position and sat on ground spikes. The accelerometer was mounted with the following orientation:

- Channel 1: X-Axis (Horizontal and perpendicular to the railway lines)
- Channel 2: Y-Axis (Horizontal and parallel to the railway lines)
- Channel 3: Z-Axis (Vertical)

Figure 7.1 shows the weighted 5-minute daytime and night-time groundborne VDV's measured at the nearest site boundary at the application site.

Part 1 of BS6472:2008 'Guide to evaluation of human exposure to vibration in buildings' provides guidance on the interpretation of VDV's with respect to estimating the probability of adverse comment which might be expected from human beings experiencing vibration in buildings. Consideration is given to the time of day and use made of occupied space in buildings, whether residential, office or workshop. Table 7.1 contains the daytime and night-time criteria recommended by BS6472 against which measured VDV levels can be compared in order to assess the likelihood of adverse comment.

Figure 7.1: Summary Measured Vibration Dose Values (VDV) – Measurement Position 2

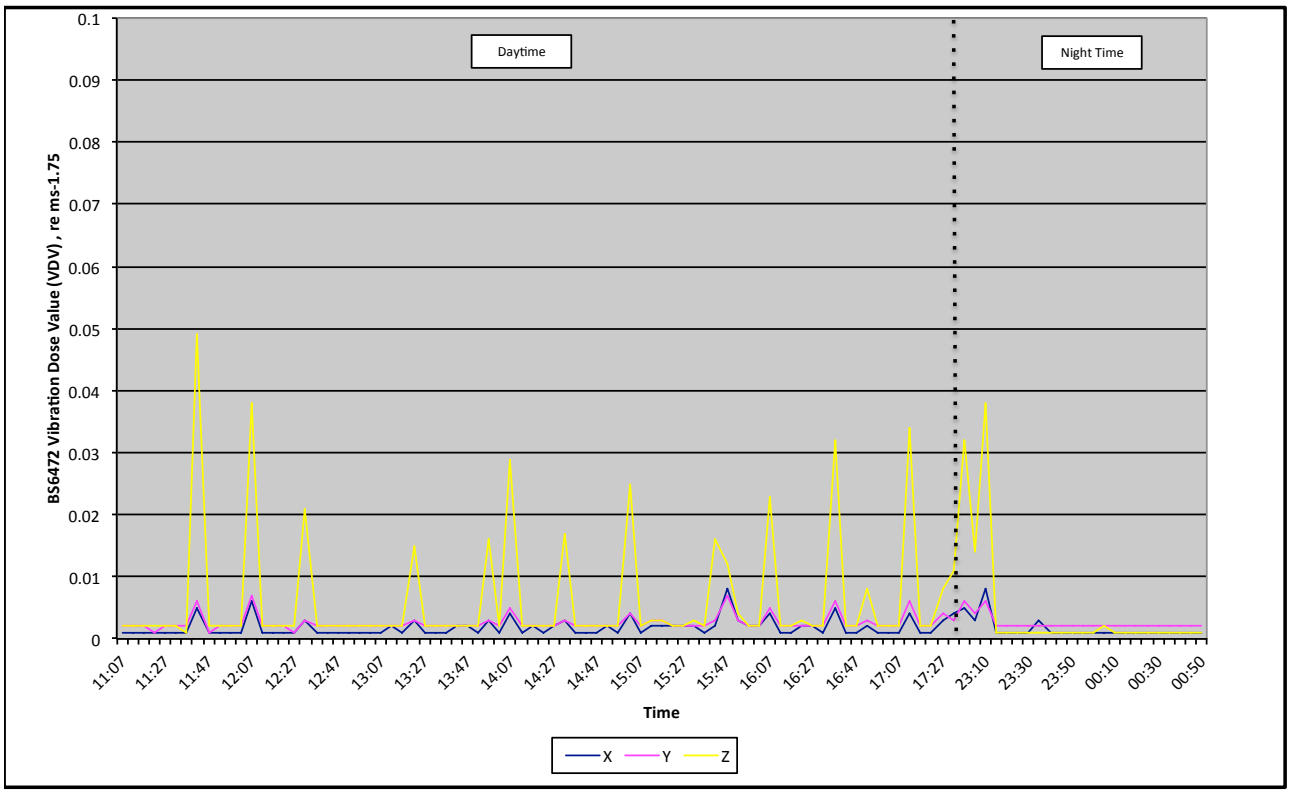


Table 7.1: BS6472 Vibration Dose Value (VDV) Ranges Which Might Result in Various Probabilities of Adverse Comment Within Residential Buildings

Place and Time	Low probability of adverse comment $ms^{-1.75}$	Adverse comment possible $ms^{-1.75}$	Adverse comment probable $ms^{-1.75}$
Residential buildings 16h day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8h night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

The vibration measurements conducted found that the highest weighted daytime and night-time groundborne VDV's measured at the application site were 0.049 $ms^{-1.75}$ and 0.038 $ms^{-1.75}$ respectively by train pass-by's at the nearest site boundary. These levels are below the range in which BS6472 considers there to be a low probability of adverse comment. Consequently this concludes that 'there would appear to be no implication due to vibrations on the proposed development' during a full 16 hour daytime and 8 hour night-time period even if we considered all train movements generated this worst case vibration level measured on site.

9.0 CONCLUSIONS

Red Acoustics has been commissioned by Liberty Properties Developments Ltd to produce an environmental noise study of the land at Rhosrobin, Wrexham. This report examines the environmental noise conditions and determines the Noise Exposure Categories across the site.

It has been determined that the majority of the site falls under NEC C during the daytime period and NEC B throughout the night. With the introduction of a noise barrier along the A483 site boundary the NEC category is reduced resulting in a NEC B and A split across site in the night time period. The daytime NEC category is unaffected by the introduction of a noise barrier.

The proposed site is deemed suitable for a residential development in accordance with currently available planning guidance and BS8233. Provided a intelligent site layout design is implemented with adequate noise control measures, such as the use of noise barriers / bund along the A483 site boundary along with acoustically rated glazing and ventilation.

Also, it should be noted that the addition of houses / buildings within the development site will provide additional screening of road traffic noise for dwellings across the development site. This screening will further enhance the acoustic amenity for future occupants.

It can been seen in Section 7 above that vibration measurements carried out at the application site have indicated that groundborne train vibration levels from the adjacent railway line fall below the range at which there is low probability of causing adverse comments. Therefore no vibration mitigation measures are proposed.

The noise and vibration assessment indicates that there is no noise or vibration related constraint relating to the proposed development that would preclude planning consent being granted.

APPENDIX A:
NOISE SURVEY DETAILS

Location

Land at Rhosrobin

Wrexham

Survey Dates

Manned Daytime Surveys - 12th November 2013

Manned Night-time Survey - 12th and 13th August 2013

Weather

Calm and dry during all surveys. Daytime temperature 6-10°C. Night-time temperature 4°C.

Personnel Present During Measurements

Paul Clark - Red Acoustics Limited

Instrumentation

Equipment Description	Type Number	Manufacturer	Serial Number	Date of Last Calibration
4 Channel Sound and Vibration Analyser	SVAN 958 Type 1	SVANTEK	20894	29th July 2013
Sound Calibrator	SVAN SV_31 Class 1	SVANTEK	24827	26 February 2013
Tri-Axial Accelerometer	PCB 356B18 1V/g	PCB Piezotronic	113409	22 April 2011
Sound Level Meter	SVAN 957 Type 1	SVANTEK	28043	12 December 2012
Preamplifier	SVAN SV12L	SVANTEK	31144	12 December 2012
Microphone Capsule	SVAN 7052E	SVANTEK	53618	12 December 2012
Sound Level Meter	SVAN 957 Type 1	SVANTEK	28042	12 December 2012
Preamplifier	SVAN SV12L	SVANTEK	31143	12 December 2012
Microphone Capsule	SVAN 7052E	SVANTEK	53617	12 December 2012
Sound Calibrator	Type 1251 IEC 60942-1997 Class 1	Norsonic	32273	13 February 2013

Methodology

Before and after the measurements the sound level meters were check calibrated to an accuracy of ±0.3dB using their associated Class 1 Calibrators. No drift in the instruments' sensitivities were noted across any of the survey periods.

Calibration Certificates

All calibration certificates are held on file by Red Acoustics Ltd and are available on request.

APPENDIX B: SUMMARY RESULTS

Survey Results

Tables B1 to B5 summarise the results obtained from the manned daytime and night-time noise and vibration surveys.

Table B1: Summary of Measured Noise Levels – Position 1 Day Time 12th November 2013

				L_{eq} (dB) @ Octave Band Centre Frequency (Hz)						
Start Time	L_{Aeq} dB	L_{AMax} dB	L_{A90} dB	63	125	250	500	1k	2k	4k
10:06	66.2	76.9	58.6	69.6	63.5	61.0	60.5	63.6	59.2	48.4
10:11	66.1	74.9	59.6	68.9	62.3	59.9	59.4	63.7	59.2	47.9
10:16	65.3	72.7	58.2	67.5	60.0	56.9	58.4	63.0	58.6	46.8
10:21	65.4	76.2	57.3	68.1	62.1	58.4	58.6	63.1	58.5	46.6
10:26	64.7	74.6	57.1	66.6	59.4	56.3	57.8	62.4	58.1	46.8
10:31	65.7	73.2	57.3	68.5	61.2	59.4	59.6	63.3	58.8	47.3
10:36	65.0	76.5	56.0	72.3	63.3	58.5	58.5	62.5	58.1	46.6
10:41	65.3	76.2	56.7	67.0	60.4	57.7	58.6	62.8	58.4	47.0
10:46	64.8	75.1	57.0	68.5	63.9	57.5	58.2	62.3	58.3	47.1
10:51	66.6	79.1	58.8	69.0	60.9	58.4	60.6	64.3	59.6	48.2
10:56	66.1	73.4	57.6	68.2	59.7	59.2	59.6	63.8	59.2	47.7
11:01	64.6	74.1	55.3	66.2	58.9	56.2	57.6	62.4	58.0	46.2
11:06	65.8	77.8	55.5	67.1	61.0	60.1	59.8	63.4	58.7	47.3
11:11	65.8	75.5	57.1	68.5	62.5	59.4	59.7	63.4	58.8	48.3
11:16	65.7	77.0	57.4	67.5	66.0	58.6	58.8	63.4	58.9	46.9
11:21	65.8	78.2	57.3	67.9	61.2	58.2	59.6	63.4	59.0	48.6
11:26	64.0	75.3	54.0	66.8	60.6	57.7	58.0	61.6	57.1	45.3
11:31	66.0	77.0	57.4	68.6	60.2	60.3	59.7	63.7	58.9	47.3
11:36	64.9	74.3	54.6	67.1	60.3	58.2	58.7	62.6	57.9	46.2
11:41	65.1	75.0	56.1	67.5	59.2	57.1	58.3	63.0	58.2	46.4

				L_{eq} (dB) @ Octave Band Centre Frequency (Hz)						
Start Time	L_{Aeq} dB	L_{AMax} dB	L_{A90} dB	63	125	250	500	1k	2k	4k
11:46	66.3	75.7	56.8	68.6	63.9	59.9	60.4	63.9	59.4	48.3
11:51	65.2	75.2	56.5	67.6	59.8	57.6	58.8	62.9	58.2	46.5
11:56	65.5	75.2	56.2	68.7	59.8	58.6	60.0	63.2	58.2	46.4
12:01	65.9	77.7	55.6	69.4	64.8	61.0	60.5	63.4	58.4	48.0
12:06	65.3	75.4	57.5	68.3	62.0	59.7	59.5	63.0	58.0	46.2
12:11	66.1	76.6	57.3	71.2	63.1	60.7	60.8	63.7	58.8	47.3
12:16	64.3	75.0	56.2	68.3	61.7	59.0	58.7	61.8	56.8	47.7
12:21	65.5	73.1	57.1	71.1	61.3	58.7	59.2	63.3	58.3	46.1
12:26	66.0	79.6	57.9	68.2	63.0	61.0	59.8	63.5	58.7	49.6
12:31	65.0	73.1	57.6	69.6	62.4	58.6	58.9	62.8	57.5	45.6
12:36	65.0	73.6	57.3	69.5	60.4	58.0	58.4	62.8	57.8	45.5
12:41	64.5	73.9	56.3	69.7	60.2	58.7	58.3	62.3	57.2	45.2
12:46	65.0	75.7	57.2	69.3	64.5	59.9	59.2	62.6	57.4	48.0
12:51	64.7	75.3	55.8	68.7	59.7	57.3	58.3	62.5	57.6	45.6
12:56	65.1	73.9	56.2	68.5	61.9	57.7	58.7	62.9	58.1	45.2
13:01	66.1	78.2	57.5	68.6	63.1	61.4	61.5	63.6	58.6	46.9
13:06	65.4	73.3	56.7	68.8	62.2	58.2	58.6	63.3	58.3	45.8
13:11	64.7	75.5	55.3	69.2	61.6	58.3	58.9	62.4	57.3	45.1
13:16	65.8	76.2	56.9	68.8	61.4	60.8	61.6	63.4	57.9	47.7
13:21	64.9	76.4	57.4	67.1	60.1	58.0	60.4	62.6	57.2	45.1
13:26	65.2	72.9	58.4	68.1	60.5	59.1	59.3	63.0	57.6	45.2
13:31	64.8	73.7	57.4	69.2	60.8	58.5	58.9	62.6	57.3	44.6
13:36	65.5	77.9	56.5	69.2	63.4	61.3	62.6	62.7	57.6	45.5
13:41	65.5	74.9	57.4	69.6	63.3	59.2	59.5	63.3	58.0	45.0
13:46	64.7	76.1	56.8	67.7	62.0	59.0	58.7	62.4	57.5	44.7
13:51	65.1	73.5	56.7	68.8	60.8	58.2	58.7	63.0	57.7	45.1
13:56	64.5	72.5	56.5	67.0	59.8	57.7	58.2	62.5	57.1	43.6
14:01	65.3	74.6	56.7	68.2	62.1	60.5	59.7	63.0	57.8	45.4
14:06	65.1	74.0	57.6	67.2	66.4	59.7	58.7	63.0	57.5	44.2

				L_{eq} (dB) @ Octave Band Centre Frequency (Hz)						
Start Time	L_{Aeq} dB	L_{AMax} dB	L_{A90} dB	63	125	250	500	1k	2k	4k
14:11	65.4	74.1	57.2	69.5	60.4	58.8	59.4	63.2	57.8	45.7
14:16	65.1	73.1	55.9	68.1	60.9	58.3	59.1	63.0	57.7	45.4
14:21	65.1	74.6	56.5	68.3	60.7	60.1	59.5	62.8	57.6	45.3
14:26	66.6	78.8	56.9	71.7	65.4	62.2	62.0	64.0	58.9	47.4
14:31	65.2	79.6	55.8	68.2	61.5	62.8	60.9	62.7	56.8	45.0
14:36	65.5	73.1	57.4	70.7	61.1	59.2	59.7	63.2	58.1	46.3
14:41	65.7	74.0	58.4	67.4	59.2	58.5	59.2	63.6	58.6	45.5
14:46	66.0	75.5	58.8	69.6	63.9	59.5	60.2	63.9	58.5	46.0
14:51	66.0	73.5	58.8	69.1	60.6	59.9	60.2	63.9	58.4	46.4
14:56	65.6	76.0	55.2	68.6	62.0	60.1	60.1	63.3	58.1	45.4
15:01	66.1	75.4	58.3	70.3	60.2	59.3	60.0	63.9	58.8	46.9
15:06	66.1	76.7	58.1	70.1	62.3	60.5	60.4	63.9	58.5	46.7
15:11	66.6	76.1	58.3	69.5	60.5	59.9	60.7	64.4	59.2	47.1
15:16	66.2	77.3	58.0	68.2	60.4	60.5	60.4	63.9	58.8	46.4
15:21	65.9	74.5	58.1	69.9	61.1	58.5	59.8	63.8	58.6	46.1
15:26	66.0	74.8	58.2	70.5	63.8	61.0	60.1	63.8	58.5	45.5
15:31	66.2	76.4	59.8	67.7	62.6	59.4	60.2	64.0	59.0	46.6
15:36	66.4	82.7	58.3	70.5	67.2	65.1	62.6	63.4	58.2	45.1
15:41	66.9	76.6	60.5	69.8	62.4	59.3	60.2	64.7	59.9	48.7
15:46	66.5	75.5	59.6	69.5	63.1	60.2	60.9	64.2	59.0	47.0
15:51	66.9	80.8	59.2	69.5	66.0	65.0	62.1	64.2	59.1	48.1
15:56	67.3	76.7	60.7	69.2	61.6	60.2	61.7	65.0	59.9	46.9
16:01	66.1	76.6	59.4	68.2	61.9	61.0	60.2	63.8	58.7	45.9
16:06	65.7	72.7	58.5	68.1	60.7	57.9	59.4	63.6	58.5	45.7
16:11	66.4	75.7	59.7	71.5	62.6	59.1	60.3	64.1	59.3	47.3
16:16	67.0	76.0	59.9	70.4	62.5	59.9	60.5	64.8	59.9	47.4
16:21	66.7	78.8	59.1	70.4	62.0	59.5	60.7	64.5	59.5	46.7
16:26	65.4	74.1	58.5	69.3	61.2	58.4	59.2	63.2	58.2	45.5
16:31	67.1	80.6	59.1	69.1	68.0	64.3	61.6	64.5	59.5	47.0

				L_{eq} (dB) @ Octave Band Centre Frequency (Hz)						
Start Time	L_{Aeq} dB	L_{AMax} dB	L_{A90} dB	63	125	250	500	1k	2k	4k
16:36	67.5	74.0	62.3	70.2	62.1	60.1	60.9	65.3	60.5	47.4
16:41	67.2	80.6	60.7	72.4	69.8	63.0	61.3	64.6	59.9	48.6
16:46	67.3	75.4	61.5	71.0	64.1	60.8	61.2	65.1	60.1	47.9
16:51	66.6	75.4	60.2	69.8	62.6	62.1	61.2	64.2	59.3	46.2
16:56	64.8	72.3	59.0	69.1	61.3	58.1	58.6	62.6	57.6	45.1
17:01	67.4	77.0	61.5	72.3	65.5	60.6	60.9	65.1	60.4	49.6
17:06	66.8	74.9	60.7	70.8	63.7	61.1	61.1	64.5	59.6	47.0
17:11	67.3	73.7	61.3	70.7	62.5	60.1	60.8	65.2	60.2	47.2
17:16	67.2	76.8	61.5	70.2	62.2	62.0	61.4	64.9	59.8	47.3
17:21	67.5	76.8	60.8	70.7	66.3	62.1	61.6	65.1	60.4	48.5

Table B2: Summary of Measured Noise Levels – Position 1 Night Time 12th & 13th November 2013

				L_{eq} (dB) @ Octave Band Centre Frequency (Hz)						
Start Time	L_{Aeq} dB	L_{AMax} dB	L_{A90} dB	63	125	250	500	1k	2k	4k
23:01	58.4	79.7	47.3	64.0	66.8	56.1	52.3	55.0	50.9	40.5
23:06	57.3	69.4	46.3	61.0	53.1	49.3	50.7	55.1	50.5	36.7
23:11	57.8	74.4	44.5	61.1	59.1	55.2	53.7	54.8	49.7	37.5
23:16	55.6	70.2	45.9	55.5	48.6	46.9	49.1	53.8	48.0	33.9
23:21	54.8	69.0	43.5	60.1	53.3	46.8	47.6	52.7	47.7	34.0
23:26	55.4	72.0	42.4	64.3	53.9	46.1	48.4	53.3	48.0	34.1
23:31	55.1	70.2	45.3	58.4	49.0	46.0	47.9	53.1	48.0	34.3
23:36	57.3	72.9	43.0	61.0	50.2	48.3	50.1	55.5	49.9	36.6
23:41	54.1	73.9	43.0	67.4	58.1	52.1	49.1	50.9	46.1	33.3
23:46	52.9	68.7	43.7	54.0	49.3	45.8	46.4	50.8	45.6	31.6
23:51	53.6	67.2	44.5	56.9	51.2	46.6	47.3	51.6	46.2	32.6
23:56	53.4	68.0	43.5	56.4	48.9	45.4	46.8	51.4	46.1	32.5
00:01	52.5	72.2	41.9	54.2	47.9	45.9	47.5	50.2	45.0	32.3
00:06	49.3	66.0	42.4	54.6	49.5	41.9	41.9	47.4	41.6	26.8

				L_{eq} (dB) @ Octave Band Centre Frequency (Hz)						
Start Time	L_{Aeq} dB	L_{AMax} dB	L_{A90} dB	63	125	250	500	1k	2k	4k
00:11	53.2	71.1	41.3	54.1	47.7	44.2	45.4	51.2	46.4	32.8
00:16	53.8	69.6	40.1	60.0	54.8	46.7	47.2	51.6	46.6	32.4
00:21	52.5	70.7	40.2	55.9	51.8	43.0	44.5	50.2	46.1	31.0
00:26	50.5	66.1	44.3	55.6	49.1	40.5	42.6	48.6	43.4	27.4
00:31	49.2	68.9	37.2	51.4	49.3	41.4	41.9	47.4	41.6	26.7
00:36	54.5	71.3	34.1	52.0	45.8	44.0	46.8	52.3	48.4	34.0
00:41	51.9	67.5	39.8	53.8	53.9	46.3	45.8	49.4	44.7	32.6
00:46	50.5	66.9	37.9	57.7	47.8	39.4	42.9	48.8	42.9	28.2
00:51	44.8	54.7	34.4	49.3	44.7	34.2	36.8	42.9	37.9	22.8
00:56	52.4	69.3	35.0	57.7	49.4	45.8	45.7	50.4	45.2	31.4
01:01	48.3	60.2	37.7	51.2	45.9	36.3	41.4	46.8	40.0	24.5
01:06	58.1	82.0	30.4	54.6	50.6	48.3	53.7	55.9	50.1	40.7
01:11	55.4	74.6	39.4	61.6	53.3	47.4	48.9	52.7	48.9	39.7

Table B3: Summary of Measured Vibration Dose Values – Position 2 Daytime 12th November 2013

	Vibration Dose Valuse $ms^{-1.75}$		
Start Time	X axis	Y axis	Z axis
11:07	0.001	0.002	0.002
11:12	0.001	0.002	0.002
11:17	0.001	0.002	0.002
11:22	0.001	0.001	0.002
11:27	0.001	0.002	0.002
11:32	0.001	0.002	0.002
11:37	0.001	0.002	0.001
11:42	0.005	0.006	0.049
11:47	0.001	0.001	0.002
11:52	0.001	0.002	0.002
11:57	0.001	0.002	0.002
12:02	0.001	0.002	0.002

	Vibration Dose Valuse $ms^{-1.75}$		
Start Time	X axis	Y axis	Z axis
12:07	0.006	0.007	0.038
12:12	0.001	0.002	0.002
12:17	0.001	0.002	0.002
12:22	0.001	0.002	0.002
12:27	0.001	0.001	0.002
12:32	0.003	0.003	0.021
12:37	0.001	0.002	0.002
12:42	0.001	0.002	0.002
12:47	0.001	0.002	0.002
12:52	0.001	0.002	0.002
12:57	0.001	0.002	0.002
13:02	0.001	0.002	0.002
13:07	0.001	0.002	0.002
13:12	0.002	0.002	0.002
13:17	0.001	0.002	0.002
13:22	0.003	0.003	0.015
13:27	0.001	0.002	0.002
13:32	0.001	0.002	0.002
13:37	0.001	0.002	0.002
13:42	0.002	0.002	0.002
13:47	0.002	0.002	0.002
13:52	0.001	0.002	0.002
13:57	0.003	0.003	0.016
14:02	0.001	0.002	0.002
14:07	0.004	0.005	0.029
14:12	0.001	0.002	0.002
14:17	0.002	0.002	0.002
14:22	0.001	0.002	0.002
14:27	0.002	0.002	0.002
14:32	0.003	0.003	0.017

	Vibration Dose Valuse $ms^{-1.75}$		
Start Time	X axis	Y axis	Z axis
14:37	0.001	0.002	0.002
14:42	0.001	0.002	0.002
14:47	0.001	0.002	0.002
14:52	0.002	0.002	0.002
14:57	0.001	0.002	0.002
15:02	0.004	0.004	0.025
15:07	0.001	0.002	0.002
15:12	0.002	0.003	0.003
15:17	0.002	0.003	0.003
15:22	0.002	0.002	0.002
15:27	0.002	0.002	0.002
15:32	0.002	0.002	0.003
15:37	0.001	0.002	0.002
15:42	0.002	0.003	0.016
15:47	0.008	0.007	0.012
15:52	0.003	0.003	0.004
15:57	0.002	0.002	0.002
16:02	0.002	0.002	0.002
16:07	0.004	0.005	0.023
16:12	0.001	0.002	0.002
16:17	0.001	0.002	0.002
16:22	0.002	0.002	0.003
16:27	0.002	0.002	0.002
16:32	0.001	0.002	0.002
16:37	0.005	0.006	0.032
16:42	0.001	0.002	0.002
16:47	0.001	0.002	0.002
16:52	0.002	0.003	0.008
16:57	0.001	0.002	0.002
17:02	0.001	0.002	0.002

	Vibration Dose Valuse $ms^{-1.75}$		
Start Time	X axis	Y axis	Z axis
17:07	0.001	0.002	0.002
17:12	0.004	0.006	0.034
17:17	0.001	0.002	0.002
17:22	0.001	0.002	0.002
17:27	0.003	0.004	0.008
17:28	0.004	0.003	0.011

Table B4: Summary of Measured Vibration Dose Values – Position 2 Night Time 12th & 13th November 2013

	Vibration Dose Valuse $ms^{-1.75}$		
Start Time	X axis	Y axis	Z axis
23:00	0.005	0.006	0.032
23:05	0.003	0.004	0.014
23:10	0.008	0.006	0.038
23:15	0.001	0.002	0.001
23:20	0.001	0.002	0.001
23:25	0.001	0.002	0.001
23:30	0.001	0.002	0.001
23:35	0.003	0.002	0.001
23:40	0.001	0.002	0.001
23:45	0.001	0.002	0.001
23:50	0.001	0.002	0.001
23:55	0.001	0.002	0.001
00:00	0.001	0.002	0.001
00:05	0.001	0.002	0.002
00:10	0.001	0.002	0.001
00:15	0.001	0.002	0.001
00:20	0.001	0.002	0.001
00:25	0.001	0.002	0.001
00:30	0.001	0.002	0.001
00:35	0.001	0.002	0.001
00:40	0.001	0.002	0.001
00:45	0.001	0.002	0.001
00:50	0.001	0.002	0.001

Table B5: Summary of Measured Noise Levels – Position 3 Daytime 12th November 2013

				L_{eq} (dB) @ Octave Band Centre Frequency (Hz)						
Start Time	L_{Aeq} dB	L_{AMax} dB	L_{A90} dB	63	125	250	500	1k	2k	4k
11:32	70.9	77.8	64.1	71.8	66.2	62.0	65.1	68.1	64.6	53.8
11:37	70.1	77.6	63.0	70.1	65.3	61.4	63.5	67.3	64.2	54.3
11:42	70.4	77.1	63.5	69.8	65.5	61.4	64.0	67.7	64.4	53.6
11:47	70.0	77.2	64.7	70.8	69.4	63.0	64.2	67.1	63.8	53.5
11:52	70.3	78.1	65.3	73.1	67.4	61.9	63.5	67.6	64.3	53.5
11:57	70.1	76.4	63.6	70.4	65.3	60.6	63.5	67.2	64.2	52.9
12:02	70.1	77.4	64.6	70.7	66.0	60.9	63.7	67.6	63.8	52.8
12:07	70.8	77.0	64.3	72.8	66.3	61.2	64.1	68.2	64.6	53.4
12:12	70.5	77.9	64.4	72.5	67.5	61.6	64.0	67.9	64.4	52.9
12:17	70.2	78.5	63.0	70.8	65.7	61.1	63.9	67.7	63.9	52.4
12:22	70.9	77.8	65.2	73.2	66.8	61.4	64.7	68.3	64.6	53.1
12:27	70.2	76.8	63.8	69.8	65.8	62.1	63.4	67.7	64.0	52.5
12:32	70.8	81.0	64.2	70.9	67.5	63.0	65.2	68.0	64.5	53.4
12:37	70.2	77.8	64.0	72.5	69.2	62.8	63.6	67.6	63.8	52.4
12:42	70.8	77.8	65.1	71.7	68.7	63.5	64.2	68.2	64.5	53.0
12:47	70.6	77.4	65.0	71.4	66.2	61.6	64.0	68.0	64.4	53.1
12:52	71.5	78.2	65.9	71.7	66.1	61.7	64.4	69.0	65.3	53.7
12:57	71.3	89.9	65.3	72.6	68.5	62.5	65.2	68.6	65.2	54.2
13:02	71.2	79.4	63.8	72.0	68.0	62.0	64.9	68.5	64.9	53.4
13:07	71.2	77.2	64.9	71.6	67.7	61.9	64.8	68.7	64.9	53.3
13:12	70.9	77.9	65.1	70.4	66.4	62.1	63.9	68.4	64.8	53.1
13:17	70.7	78.0	65.0	71.7	68.3	63.1	65.4	68.1	64.0	52.5
13:22	69.9	76.9	64.1	71.3	66.8	61.7	63.8	67.4	63.5	52.0
13:27	70.7	78.6	64.4	74.2	67.6	62.1	64.6	68.0	64.4	53.0
13:32	70.3	77.4	64.1	70.6	66.1	61.4	64.0	67.7	64.0	52.3
13:37	70.8	77.6	65.0	71.2	67.0	62.3	64.3	68.2	64.5	52.7
13:42	70.5	77.5	65.3	71.2	66.7	62.0	64.3	68.0	64.0	52.2
13:47	70.6	77.1	64.2	71.5	67.7	62.8	64.3	68.1	64.2	53.0

				L_{eq} (dB) @ Octave Band Centre Frequency (Hz)						
Start Time	L_{Aeq} dB	L_{AMax} dB	L_{A90} dB	63	125	250	500	1k	2k	4k
13:52	70.4	77.8	64.0	73.5	68.6	63.6	65.5	67.7	63.5	52.2
13:57	70.0	78.1	64.0	69.9	65.9	62.1	64.2	67.5	63.4	51.8
14:02	70.4	78.2	63.8	72.0	67.9	62.1	64.4	67.9	63.9	52.1
14:07	70.0	78.0	64.0	70.6	67.5	61.9	64.1	67.5	63.4	51.6
14:12	70.8	78.1	64.3	71.3	67.0	62.5	64.3	68.1	64.6	53.1
14:17	70.8	77.7	65.5	71.5	66.6	62.6	64.8	68.2	64.4	52.6
14:22	71.1	80.4	65.2	71.7	67.7	62.4	64.8	68.4	64.8	53.8
14:27	71.3	80.3	65.1	70.9	66.5	63.4	64.9	68.7	65.1	53.7
14:32	71.4	78.3	64.2	71.2	67.5	63.2	65.4	68.8	64.9	53.8
14:37	70.4	78.4	63.9	71.9	67.6	63.3	64.5	67.7	64.0	53.1
14:42	70.1	77.2	63.6	70.6	66.4	60.7	63.6	67.5	64.0	52.4
14:47	71.8	80.5	65.3	71.3	68.8	64.0	65.3	69.1	65.6	54.2
14:52	72.5	79.7	66.1	71.1	66.7	63.2	66.0	69.9	66.4	55.3
14:57	71.5	78.4	65.1	72.0	66.8	62.5	65.3	68.8	65.3	53.9
15:02	72.2	82.7	65.3	71.2	66.7	62.4	65.4	69.7	66.0	54.7
15:07	72.3	78.2	66.7	72.8	67.3	63.4	65.8	69.8	66.0	54.5
15:12	72.1	79.7	66.0	71.4	66.9	62.7	65.4	69.4	66.0	54.5
15:17	71.9	77.4	65.7	71.3	67.1	62.8	65.2	69.2	65.8	54.3
15:22	72.1	78.2	66.1	71.4	68.5	63.5	65.3	69.4	66.1	54.6
15:27	71.7	77.9	65.9	71.0	66.5	62.1	64.4	69.0	65.7	54.2
15:32	72.5	78.9	66.7	70.9	67.3	62.7	65.2	69.9	66.6	54.8
15:37	72.4	79.8	65.9	72.0	67.8	63.2	65.5	69.7	66.5	55.4
15:42	72.8	78.1	65.8	72.7	68.5	63.0	65.4	70.1	66.9	55.0
15:47	72.6	78.7	66.2	71.7	68.6	64.2	66.1	69.9	66.4	55.0
15:52	72.2	78.7	66.1	71.1	67.6	62.7	64.7	69.6	66.4	54.8
15:57	72.8	80.0	67.3	72.4	68.7	63.5	65.0	70.1	67.0	55.3
16:02	73.0	79.2	67.8	71.7	68.6	63.6	65.8	70.3	67.0	55.4
16:07	73.1	79.0	67.8	71.8	69.7	64.6	66.1	70.5	67.2	55.8
16:12	73.8	78.7	68.2	72.4	67.5	63.8	66.3	71.1	68.1	56.6

				L_{eq} (dB) @ Octave Band Centre Frequency (Hz)						
Start Time	L_{Aeq} dB	L_{AMax} dB	L_{A90} dB	63	125	250	500	1k	2k	4k
16:17	73.4	78.5	67.3	73.3	68.1	63.0	65.8	70.8	67.6	55.7
16:22	72.9	78.8	66.7	72.7	67.0	62.9	65.7	70.3	67.1	55.4
16:27	73.2	77.9	67.7	71.2	68.7	63.8	64.9	70.4	67.6	55.7
16:32	73.2	78.6	68.3	71.8	67.2	63.2	65.5	70.5	67.6	55.5
16:37	73.3	78.7	67.9	72.1	68.6	63.8	65.7	70.6	67.7	55.7
16:42	72.9	79.7	67.4	71.5	68.1	63.4	64.9	70.2	67.4	55.4
16:47	73.7	79.6	68.7	71.2	67.5	62.9	65.0	71.0	68.3	56.0
16:52	73.6	78.8	68.9	72.3	67.6	62.6	65.3	70.9	68.0	55.7
16:57	73.3	79.7	68.1	71.5	66.8	62.5	65.3	70.6	67.8	55.5
17:02	73.4	79.0	68.5	72.1	67.7	62.8	65.3	70.8	67.8	55.6
17:07	73.4	78.6	68.4	71.4	69.7	64.5	65.5	70.7	67.8	55.7
17:12	73.5	78.1	69.4	72.0	68.2	63.2	65.4	70.8	67.9	55.7
17:17	73.3	77.9	68.6	71.7	67.0	62.7	65.2	70.7	67.7	55.5
17:22	73.0	78.3	68.3	71.3	67.5	62.3	65.2	70.4	67.3	55.1
17:27	73.2	78.5	68.1	70.9	68.2	63.5	65.7	70.6	67.6	55.5
17:32	73.2	78.5	68.0	71.0	67.7	62.5	64.6	70.6	67.7	55.6
17:37	73.1	78.9	68.5	70.9	68.5	64.3	65.4	70.5	67.4	55.5
17:42	68.3	90.1	60.6	72.4	69.9	66.7	62.9	64.6	62.0	51.4
17:47	64.5	66.5	63.0	70.2	65.8	58.7	55.2	62.2	57.9	44.6
22:42	63.9	74.1	53.3	65.2	59.6	54.4	56.0	61.4	57.9	44.9
22:47	62.4	73.5	45.6	58.1	56.0	50.7	52.4	59.9	56.9	42.3
22:52	63.0	75.0	51.4	61.7	58.3	52.8	54.5	60.5	57.2	43.3
22:57	61.6	72.2	50.3	59.8	58.2	51.2	52.5	59.2	56.0	41.3

Table B6: Summary of Measured Noise Levels – Position 3 Night Time 12th & 13th November 2013

				L_{eq} (dB) @ Octave Band Centre Frequency (Hz)						
Start Time	L_{Aeq} dB	L_{AMax} dB	L_{A90} dB	63	125	250	500	1k	2k	4k
23:02	61.1	73.3	47.4	66.0	65.7	52.8	53.5	58.4	54.9	40.6
23:07	63.1	75.1	48.8	65.4	62.2	55.2	56.2	60.7	56.8	43.2
23:12	62.1	74.2	49.0	63.4	60.0	52.5	54.0	59.7	56.1	42.3
23:17	62.1	73.0	50.8	60.5	57.5	51.9	54.1	59.8	56.0	41.6
23:22	61.8	74.7	45.7	62.2	63.5	53.8	54.3	59.1	56.0	42.3
23:27	60.9	72.6	45.9	61.8	56.3	51.7	53.4	58.6	54.7	40.7
23:32	62.1	73.3	49.4	65.7	58.2	52.8	55.9	59.6	55.5	42.0
23:37	61.9	75.2	47.9	64.3	58.3	51.9	56.1	59.4	55.4	42.0
23:42	62.5	74.1	49.1	65.7	60.2	54.2	56.5	60.1	55.9	42.9
23:47	62.0	73.5	48.3	64.3	58.8	54.6	55.5	59.2	56.1	43.9
23:52	62.6	72.5	51.7	63.1	59.8	53.3	55.7	60.2	56.5	42.3
23:57	61.7	72.7	47.7	59.9	57.8	51.5	53.1	59.5	55.6	41.6
00:02	61.6	73.8	46.9	58.1	56.6	52.5	52.0	59.1	56.1	42.1
00:07	61.8	74.2	47.6	60.5	58.2	52.8	54.9	59.4	55.6	42.3
00:12	61.7	73.4	46.7	61.9	57.1	51.2	54.0	59.2	55.9	43.2
00:17	60.7	74.5	44.2	58.4	56.3	50.0	52.4	58.2	54.9	41.3
00:22	62.2	74.5	45.6	61.2	61.2	52.8	55.3	59.7	55.8	42.7
00:27	63.5	74.0	47.0	63.1	58.9	53.8	57.3	61.2	56.9	43.8
00:32	58.9	74.8	39.2	59.3	57.3	54.0	53.2	56.2	52.3	38.7
00:37	58.6	72.5	35.1	55.0	51.9	46.5	49.7	56.3	52.7	39.1
00:42	60.4	75.9	43.1	58.8	61.1	53.0	54.7	57.6	54.0	41.3
00:47	59.8	74.6	43.4	65.8	57.6	51.8	53.7	57.2	53.3	40.9
00:52	62.8	81.4	40.2	57.6	63.4	64.9	56.1	58.1	56.2	49.5