



Please reply to Bath

**HIGHFIELD FARM, TETBURY**  
**ENVIRONMENTAL NOISE ASSESSMENT**

Acoustics Report B385/R01  
15<sup>th</sup> March 2010

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## 1 Introduction

This acoustic report documents our environmental noise assessment at the land adjoining Highfield Farm, Tetbury. The assessment is in three parts:

- Noise survey of existing road traffic & predictions of industrial noise used to determine the PPG24 Noise Exposure Category for mixed noise sources of the site
- Prediction of industrial noise and noise survey of existing background noise levels across the site to determine likelihood of complaints according to BS4142
- Determination of compliance with WHO guidance upper ambient noise limit for external amenity areas for combined road traffic, industrial and school related noise

The report is laid out in the following sections:

- Section 2: Overview of the development
- Section 3: Summary of environmental noise assessment
- Appendix A: External noise survey, analysis & predictions used to determine:
  - Day & night noise levels at various locations around the site
  - Noise Exposure Category boundaries for mixed noise sources across the site according to PPG24
  - Likelihood of complaints arising from industrial noise according to BS4142
  - Compliance with WHO guidance upper ambient noise limit for external amenity areas
- Appendix B: Guidance documents & standards

## 2 Overview of the development

The site, on which a new housing estate is proposed, consists of open fields to the south, east & west of Highfield Farm; Figure 1. The fields are currently used either as paddocks or are fallow. The site gradually inclines upwards to the west.

Surrounding the site are; Figure 1:

- North: Highfield Farm and open fields;
- East: London Road with SIAC Tetbury Steel and Tetbury Audi beyond;
- South: Housing estate;
- West: Sir William Romney's School and football & rugby pitches.

London Road is a busy main road with high volumes of traffic throughout the day and night.

SIAC Tetbury Steel have informed us that all manufacturing operations have been suspended for the foreseeable future and that at present only the offices are operational.

Finalised plans of the housing development are not yet available and consequently this report does not assess individual plots.

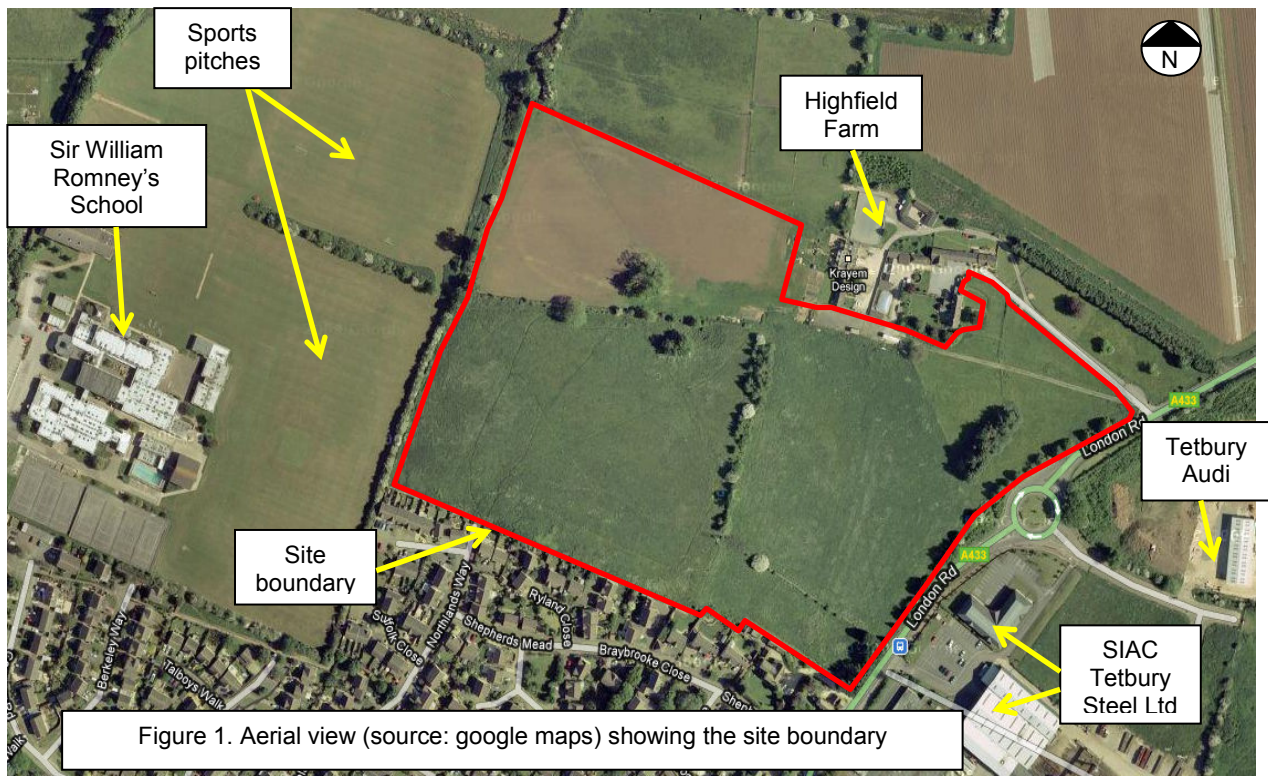


Figure 1. Aerial view (source: google maps) showing the site boundary

### 3 Summary of Environmental Noise Assessment

#### 3.1 Noise survey

F&B conducted a noise survey on 9/10 February 2010 to determine the environmental noise levels affecting the land to the east, south & west of Highfield Farm, Tetbury. The measurement methods and results of the noise surveys are recorded in Appendix A, together with calculations by which external noise levels have been established at different locations around the site.

The dominant noise source for the whole site is road traffic on London Road. During the survey no activity noise was observed from the adjacent commercial developments, SIAC Tetbury Steel and Tetbury Audi. Some activity noise from Sir William Romney's School was noted, which though audible did not significantly contribute to the overall noise environment.

#### 3.2 Sir William Romney's School sports pitch activity noise

During the survey the sports pitches were not in use. To predict the activity noise impact on the nearest proposed housing F&B measurement data obtained elsewhere was used. The sports pitch activity noise is predicted to be audible at the nearest housing, though it will not increase the ambient noise levels above WHO's upper guidance limit of external amenity areas.

#### 3.3 SIAC Tetbury Steel Activity Noise

Currently the manufacturing operations of SIAC Tetbury Steel are suspended and as a consequence no measurements of activity noise could be made. At the request of Ray Brasington, Cotwolds District Council EHO, we have conducted our assessment of SIAC activity

noise affecting the proposed housing site using SIAC site boundary noise limits imposed as part of their planning consent (Appendix A, section A2.6). The predicted noise levels have been included in the determination of the site's Noise Exposure Category and in the assessment of compliance with WHO guidance for ambient noise limits in external amenity areas.

The likelihood of complaints arising from SIAC activity noise at the proposed housing is predicted to be within BS4142 category "of marginal significance" for both day and night. However, it should be noted that during the night the background noise level falls below 30dB(A) and therefore an assessment for the night period will not be valid according to BS4142.

### 3.4 Noise Exposure Category

PPG24 classifies a whole site according to the highest noise level exposure at any of the proposed dwellings. Based on the provisional location of dwellings nearest London Road the site will be in PPG24 Noise Exposure Category C for mixed noise sources by day and night (Appendix A, section 2.7). However, the current housing scheme has yet to be finalised and with a small relocation of the dwellings nearest to London Road further west, the site would fall within NEC B day and night; Figure A3.

It should be noted that it is only a relatively small area of the site fronting London Road that is within NEC C, with the majority of the site being in NEC A.

### 3.5 External amenity areas

For the majority of the open site the combined SIAC & road traffic ambient noise level is predicted to fall below WHO guidance upper limit of LAeq 55dB for external amenity areas. This limit coincides with the NEC A day limit; the NEC A boundary is indicated on Figure A2.

With the introduction of housing and close boarded timber garden fences, shielding attenuation will reduce the ambient noise levels by approximately 10dB. For this situation gardens that are predicted to be within NEC B on the open site, where the category upper limit is LAeq 63dB by day, would then be within WHO guidance upper ambient noise limit of LAeq 55dB.

### 3.6 Unoccupied internal noise levels

The Local Authority (LA) will usually stipulate unoccupied interior noise limits for habitable rooms, which are typically within the 'good' to 'reasonable' range given in BS8233:1999. Using the measured & predicted noise levels documented in this report a suitable layout and building envelope sound insulation scheme can be developed in order that the LA internal noise limits are met throughout the development.

## A1 Noise survey

Survey date: Tuesday/Wednesday 9/10 February 2010

Personnel present: Paul Smith of F&B

### A1.1 Unattended surveys

Microphones at 1.2m above local ground level, attached to tripods, were located at positions A, D, H & I; Figure A1. The noise monitors recorded readings from consecutive 15-minute samples of noise, with the same sample period used for each monitor. Full tabulated results are given in Table A4. All measurements are free-field.

The monitors at positions [A] & [I] were set to operate over a full 24-hr period. However, due to battery failure the monitor at position [I] only operated for eight hours, though sufficient data was obtained at position [I] for the purpose of our assessment.

### A1.2 Spot readings

Manned measurements, with the noise monitor attached to a tripod as A1.1, were made at positions A to I; Figure A1. A ten minute measurement duration was used, which in each case coincided with a 15-minute sample period of the unattended measurements. All readings are free-field. Full tabulated results are given in Table A6 together with the frequency spectrum corrections for each position in Table A7.

### A1.3 Equipment

- Positions A & I: Brüel & Kjær Type 2231 sound level meter
- Position H: Norsonic 110 Sound Analyser
- Position D: Brüel & Kjær Type 2238 sound level meter
- Positions A - I: Brüel & Kjær Type 2260 sound level meter

All meters were calibrated before and after the survey using a Brüel & Kjær Type 4231 calibrator with no deviations found. The weather during the survey was dry with a slight easterly breeze and did not affect the measurements.

Appendix A  
Noise survey & data analysis

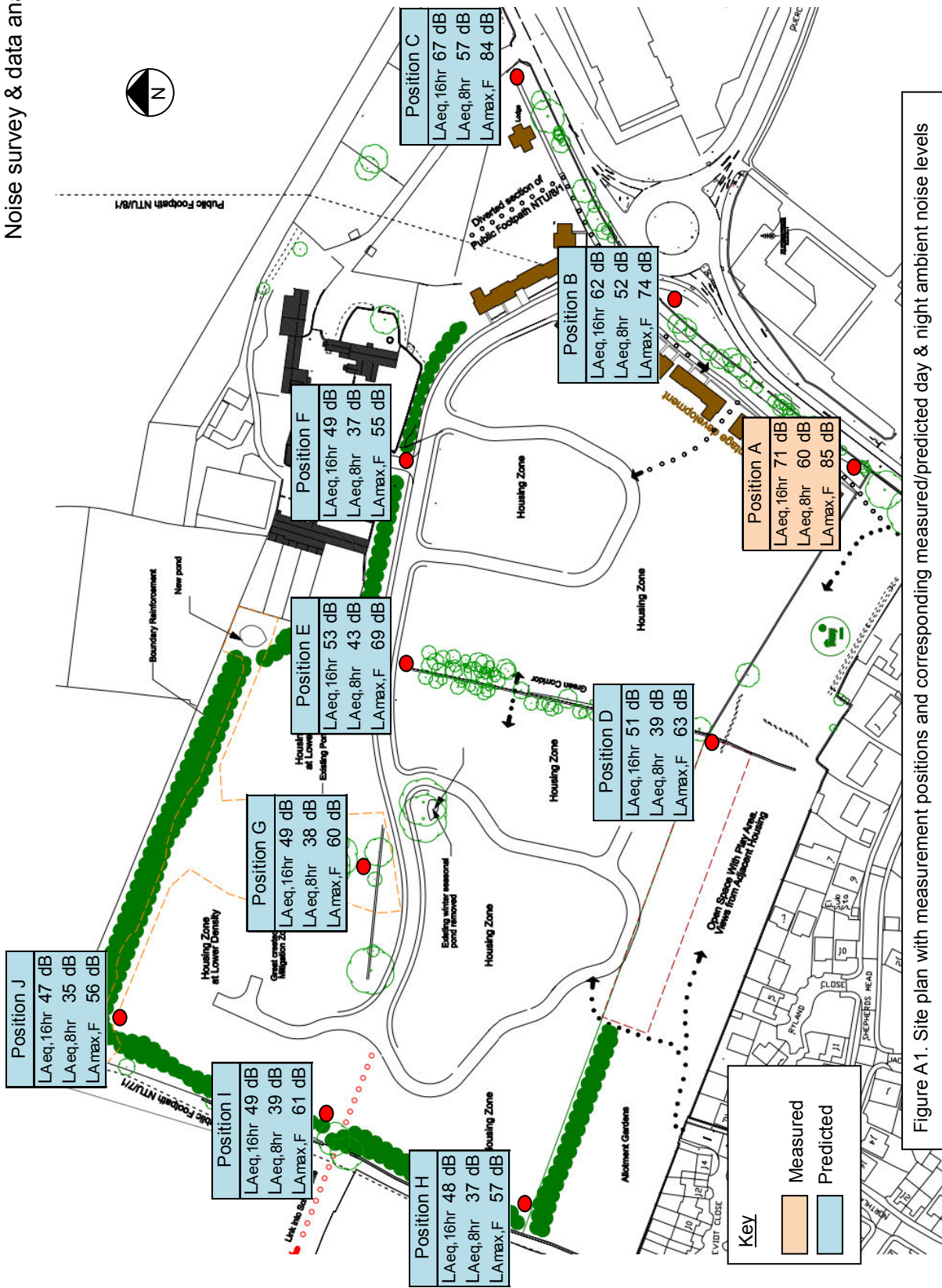


Figure A1. Site plan with measurement positions and corresponding measured/predicted day & night ambient noise levels

## A2 Analysis

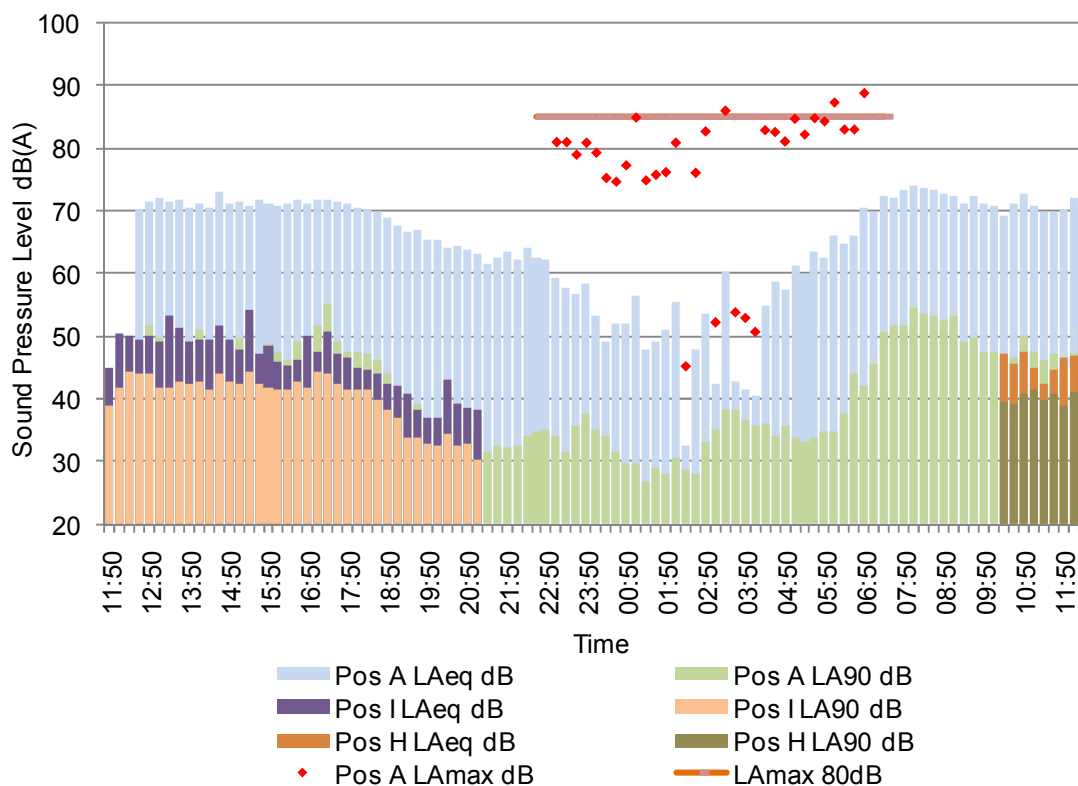
### A2.1 Observations of environmental noise

- The noise levels recorded at [A] – [I] include all noise sources affecting the site during the survey period;
- The dominant noise source observed for all positions was road traffic on London Road;
- During the survey no activity noise was observed from the nearby commercial developments, SIAC Tetbury Steel & the Audi Garage. We have been informed that all manufacturing operations at SIAC have been suspended for the foreseeable future;
- Activity noise emanating from the School, consisting of a drum class (acoustic kit) and pupils circulating externally, was audible at position [H]. However, this noise did not affect the measured ambient noise level.

### A2.2 Unmanned measurements

Figure A2 shows the variation in measured ambient (L<sub>Aeq</sub>), background (L<sub>A90</sub>) and night period maxima (L<sub>Amax</sub>) noise levels at [A] (London Road site boundary), [H] & [I]. The ambient and background noise levels at both [H] & [I] show a consistent relationship with the higher noise levels measured at [A]. This indicates that the dominant noise source affecting all three positions is road traffic on London Road.

Figure A2. Positions A, I & H noise monitor data (free-field)



### A2.3 Derivation of a representative value of $L_{Amax,F}$ at position A

From the 24-hr data collected at position [A], a typical maximum level was computed by the following method.

1. The 8-hr data (23:00 – 07:00hrs) is inspected for outlying values of  $L_{Amax,F}$ , these are excluded and the standard deviation & arithmetic mean of the of the remaining values is calculated.
2. The sum of the arithmetic mean and the standard deviation, as calculated above, is assigned as the representative value of  $L_{Amax,F}$ .

The resultant typical maximum level at position [A] is  $L_{Amax,F}$  85 dB; Figures A1 & A2:

### A2.4 Use of measurements made at positions B to I

The results of measurements made at [B] - [I] were compared with the simultaneous 15-min record from the 24-hr survey at [A] by computing the difference between the sample values of  $L_{Aeq}$ ,  $LA90$  &  $L_{Amax}$ :

$$L_{diff,Ti(LAx)} = L_{s,Ti(LAx)} - L_{o,Ti(LAx)} \text{ dB}, \quad \dots(1)$$

where,

$L_{s,Ti(LAx)}$  = sample reading at positions [B] – [I] made at time  $T_i$ , dB,

$L_{o,Ti(LAx)}$  = 24-hr sample reading (position [A]) made at time  $T_i$ , dB.

$L_{Ax}$  =  $L_{Aeq}$ ,  $L_{Amax}$  or  $LA90$

$L_{diff,Ti(LAx)}$  is negative if the reading is less than the 24-hr sample reading.

Where multiple measurements have been made the average  $L_{diff,Ti(LAx)}$  is computed.

In all cases the  $L_{diff,Ti(LAx)}$  will be due to varying distance from the dominant noise source (road traffic on London Road). Expected values of day  $L_{Aeq,16hr}$  &  $LA90$  (lowest value) and night  $L_{Aeq,8hr}$ ,  $LA90$  (lowest value) &  $L_{Amax,F}$  (typical value), were computed for each measurement position [B] – [I] by adding  $L_{diff,Ti(LAx)}$  to the corresponding parameter value for day or night obtained from the 24-hr survey data at position [A]; Table A1. For day & night  $L_{Aeq}$  the same numerical correction is applied.

For example:

At spot position [J], using the 24-hr data for position [A]:

$$L_{Aeq,16hr}[A] = L_{Aeq,16hr}[A] + L_{diff,Ti(L_{Aeq})}, \text{ dB}$$

$$L_{Aeq,8hr}[A] = L_{Aeq,8hr}[A] + L_{diff,Ti(L_{Aeq})}, \text{ dB}$$

$$L_{Amax,F}[A] = L_{Amax,F}[A] + L_{diff,Ti(L_{Amax})}, \text{ dB}$$

Position	Level difference in reference to pos A			Predicted existing environmental noise levels				
				Day		Night		
	Ldiff, Ti(LAeq)	Ldiff, Ti(LA90)	Ldiff, Ti(LAmax)	LAeq,16hr dB	LA90 dB	LAeq,8hr dB	LA90 dB	LAmax dB
A				71	44	60	27	85
B	9	-3	11	62	47	52	27*	74
C	3	-4	1	67	48	57	27*	84
D	22	5	22	48	39	38	27*	63
E	18	6	17	53	38	42	27*	69
F	25	6	30	46	38	36	27*	55
G	23	7	25	48	37	38	27*	60
H	24	8	28	47	36	37	27*	57
I	22	7	24	48	37	38	27*	61
J	26	10	29	45	34	35	27*	56

\*Ldiff,T(LA90) has not been applied as the lowest measured LA90 value at position A is considered representative across the site

### A2.5 Sports Pitch Activity Noise

During the noise survey Sir William Romney's Schools' football & rugby pitches were not in use. To determine the likely noise levels affecting the site with the pitches in use F&B measurements of a football training session elsewhere have been used; Table A2.

	m	LAeq,15min dB
Measured football training season activity noise @ side of pitch		57.1
Distance of measurements from effective noise source (centre of group of players)	15	
Approximate distance from nearest pitch to site boundary	40	
Distance correction		4.3
Predicted pitch activity noise @ west site boundary		52.8

The sports pitch activity noise at the west site boundary, where it will be loudest, is predicted to be approximately 5dB above the existing ambient noise level and therefore will be audible.

The combined road traffic noise (derived from the highest 1hr measurement made between 09:00 – 19:00hrs at position A) and SIAC Tetbury Steel and sports pitch activity noise is predicted to be LAeq,1hr 54 dB during the day at the west site boundary, which is within WHO's limits for external amenity areas.

## A2.6 SIAC Tetbury Steel Activity Noise

SIAC Tetbury Steel have informed us that currently only their offices are open with all manufacturing operations suspended for the foreseeable future. During the survey no activity noise was observed emanating from the site.

Ray Brasington (EHO Cotswold Districted Council) has advised us that in the absence of noise measurements of SIAC Tetbury Steel manufacturing operations the noise limits given in the planning approval (Planning ref: CT.1085-1-X-AP, Condition D) for SIAC Tetbury Steel are to be used in our assessment:

Activity noise limit at SIAC Tetbury Steel site boundary:

- 07:00 - 19:00hrs Mon-Fri & 07:00 – 13:00hrs Sat: LAeq 60dB(A)
- At all other times: LAeq 45dB(A)

The above limits are Corrected Noise Levels (CNL), which Ray Brasington informs us includes a correction to account for the impulsive nature of the steelworks activity noise and therefore can be considered Rating Levels according to BS4142 (this report, Appendix B, section B1.4).

Predictions of the steelworks activity noise at locations A to J have been conducted based on; Table A3:

- Steelworks activity noise limit at the London Road SIAC site boundary
- Assumed steelworks noise source at 75m inside the London Road SIAC site boundary. This noise source location, determined by the greatest distance at any point from the rectangular 360m x 150m site boundary, will produce the highest steelwork ambient noise levels across the proposed housing site.
- Distance correction using  $10 \times \log(d_2/d_1)$ , where  $d_1$  is the distance from the assumed noise source to SIAC site boundary and  $d_2$  is the distance from the assumed noise source to the receptor location.
- Ground absorption correction using (source: Department of Transport “Calculation of Road Traffic Noise”, Appendix 1, Chart 8):

$$5.2 \times \log((6 \times H - 1.5) / d) \quad \dots(2)$$

where,

H is the height of the receiver, taken to be 1.5m above ground

d = direct distance across open fields

To determine the likelihood of complaints according to BS4142 (Appendix B) the lowest predicted background noise level, LA90, derived from the survey data at the receiver location (Section A2.4) is deducted from the predicted SIAC Tetbury Steel activity noise level.

For positions A & C the SIAC activity noise will be fully masked by the road traffic noise which is 10dB higher. In these cases an assessment is not valid.

During the night the difference between the background and activity noise levels is below 5dB and therefore is within BS4142 category “of marginal significance”. However, as the background noise is below 30dB and in some instances the predicted SIAC noise less than LAeq 35dB, BS4142 states that an assessment in this case will not be valid.

Appendix A  
 Noise survey & data analysis

At positions B & D – I, the difference between the background and activity noise levels during the day ranges from 6 to 8 dB. This falls between BS4142 categories “complaints are likely” and “of marginal significance”. However, the activity noise has been predicted on an open site. With dwellings on the site, shielding of the SIAC activity noise of between 5 and 10dB is likely. At positions B & D – I, the likelihood of complaints would then be comfortably within the BS4142 category “of marginal significance”.

Table A3. Predicted SIAC Tetbury Steel activity noise & likelihood of complaints								
Receptor location	Approximate distance from SIAC source to receptor locations (m)	Distance correction	Approximate direct distance across open fields (m)	Ground absorption correction	Predicted SIAC activity noise level on open site		Lowest background noise level	
					(A) 07:00 - 19:00hrs Mon- Fri & 07:00 - 13:00hrs Sat	(B) At all other times	(C) 07:00 - 19:00hrs	(D) 19:00 - 07:00hrs
					LAeq dB	LAeq dB	LA90 dB	
A	172	3.6	3	0.0	56	41	44	27
B	254	5.3	15	1.6	53	38	47	27
C	335	6.5	90	5.6	48	33	48	27
D	310	6.2	130	6.4	47	32	40	27
E	400	7.3	220	7.6	45	30	38	27
F	373	7.0	163	7.0	46	31	38	27
G	460	7.9	280	8.2	44	29	37	27
H	490	8.2	330	8.5	43	28	36	27
I	535	8.5	370	8.8	43	28	37	27
J	600	9.0	420	9.1	42	27	34	27

### A2.7 Final representative external free-field noise levels

Table A4 & Figure A1 give the final predicted free-field day and night noise levels at various locations around the open site. These have been computed by combining:

- Predicted SIAC Tetbury Steel activity noise;
- Measured road traffic noise.

Table A4. Final representative external free-field noise levels on open site

Position	Predicted SIAC activity noise level on open site		Predicted Road traffic noise levels			Final representative external free-field noise levels			Noise Exposure Category	
	7:00 - 19:00hrs Mon- Fri & 07:00 - 13:00hrs Sat	At all other times	Day (07:00 - 23:00hrs)	Night (23:00 - 07:00hrs)		Day (07:00 - 23:00hrs)	Night (23:00 - 07:00hrs)		Day	Night
	L <sub>Aeq</sub> dB	L <sub>Aeq</sub> dB	L <sub>Aeq,16hr</sub> dB	L <sub>Aeq,8hr</sub> dB	L <sub>Amax</sub> dB	L <sub>Aeq,16hr</sub> dB	L <sub>Aeq,8hr</sub> dB	L <sub>Amax</sub> dB		
A	56	41	71	60	85	71	61	85	C	C
B	53	38	62	52	74	62	52	74	B	B
C	48	33	67	57	84	67	57	84	C	C
D	47	32	48	38	63	51	39	63	A	A
E	45	30	53	42	69	53	43	69	A	A
F	46	31	46	36	55	49	37	55	A	A
G	44	29	48	38	60	49	38	60	A	A
H	43	28	47	37	57	48	37	57	A	A
I	43	28	48	38	61	49	39	61	A	A
J	42	27	45	35	56	47	35	56	A	A

## A2.8 PPG24

Based on the provisional location of dwellings nearest London Road the site will be in PPG24 Noise Exposure Category C by day and night; Table A5.

Period	Measured (free-field), $L_{Aeq,T}$ dB	Noise Exposure Category	Noise Exposure Category Range, $L_{Aeq,T}$ dB
Day (07:00 - 23:00hrs)	71	C	63 - 72
Night (23:00 - 07:00hrs)	60	C	57 - 66

The current housing scheme has yet to be finalised. With a small relocation further west of the dwellings nearest to London Road, the site would fall within NEC B day and night; Figure A2.

## A2.9 External amenity areas

WHO's upper guidance limit for ambient noise level in external amenity areas is  $L_{Aeq}$  55dB; Appendix B. This limit coincides with the upper day limit for NEC A, for which the boundary and on the open site is identified in Figure A3.

With housing on the site and the possibility of closeboarded timber garden fences a shielding in garden areas from road traffic and SIAC activity noise of 10dB is expected. Therefore a predicted noise level on an open site of  $L_{Aeq}$  65dB, after shielding attenuation, would be expected to just meet WHO's upper guidance value.

The upper day period limit for NEC B is  $L_{Aeq}$  63dB. The NEC B boundary, as identified in Figure A3, provides a good indication of the boundary of compliance with WHO's upper guidance limit in gardens where shielding attenuation provided by buildings and imperforate fences is included.

Appendix A  
Noise survey & data analysis

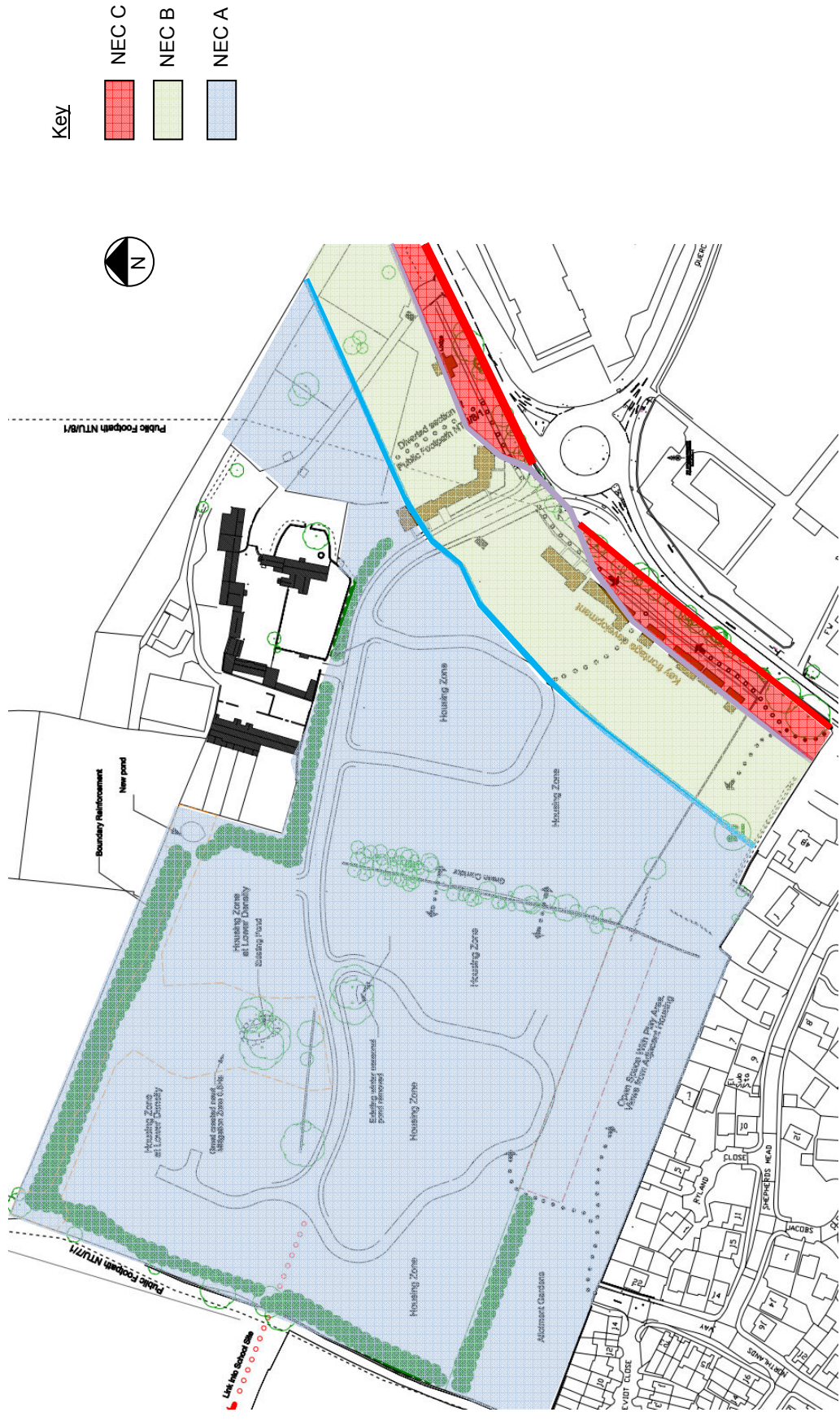


Figure A3 – Site plan showing NEC boundaries on an open site



Appendix A  
 Noise survey & data analysis

Position		dB(A)	Octave Band Centre Frequency, Hz							
			63	125	250	500	1000	2000	4000	8000
A	Measurement 1	72.6	74.0	69.5	67.2	67.9	67.8	66.3	62.4	58.5
	Measurement 2	72.7	73.8	69.8	67.2	68.3	68.0	66.3	61.6	58.0
	Measurement 3	71.3	75.0	69.1	65.0	66.0	67.2	65.3	58.6	52.8
	dB average	72.2	74.3	69.5	66.6	67.5	67.7	66.0	61.1	57.1
	Spectral correction		2.1	-2.7	-5.6	-4.7	-4.5	-6.2	-11.1	-15.1
B	Measurement 1	62.4	71.5	65.0	59.7	55.9	58.4	56.1	49.6	41.8
	Measurement 2	62.8	70.3	64.0	59.9	57.6	58.7	56.2	50.2	43.3
	dB average	62.7	70.9	64.5	59.8	56.8	58.6	56.2	49.9	42.6
	Spectral correction		8.2	1.8	-2.9	-5.9	-4.1	-6.5	-12.8	-20.1
C	Measurement 1	68.1	67.5	62.3	60.1	61.3	64.8	61.6	55.9	52.7
	Measurement 2	66.5	69.5	62.1	60.1	61.2	63.4	59.7	51.7	46.4
	dB average	67.4	68.6	62.2	60.1	61.3	64.2	60.8	54.3	50.6
	Spectral correction		1.2	-5.2	-7.3	-6.1	-3.2	-6.6	-13.1	-16.8
E	Measurement 1	52.7	67.1	60.6	55.2	51.1	44.3	39.5	32.9	26.3
	Spectral correction		14.4	7.9	2.5	-1.6	-8.4	-13.2	-19.8	-26.4
F	Measurement 1	46.2	57.9	48.2	39.8	37.8	42.3	39.7	35.2	31.3
	Measurement 2	46.0	58.9	49.3	44.8	43.3	41.4	37.3	29.0	28.4
	Measurement 3	46.1	62.4	52.4	45.0	42.6	41.4	36.5	29.0	28.4
	dB average	46.2	60.2	50.3	43.8	41.8	41.7	38.1	32.1	29.6
	Spectral correction		14.0	4.1	-2.4	-4.4	-4.5	-8.1	-14.1	-16.6
G	Measurement 1	50.1	67.2	58.8	51.6	46.0	41.7	37.4	36.9	40.2
	Measurement 2	46.1	55.7	47.0	48.2	43.8	41.5	34.9	28.0	22.0
	dB average	48.7	64.5	56.1	50.2	45.0	41.6	36.3	34.4	37.3
	Spectral correction		15.8	7.4	1.5	-3.7	-7.1	-12.4	-14.3	-11.4
H	Measurement 1	44.4	57.3	47.3	42.6	42.3	40.7	32.9	25.8	25.6
	Spectral correction		12.9	2.9	-1.8	-2.1	-3.7	-11.5	-18.6	-18.8
I	Measurement 1	49.6	63.7	55.2	52.1	48.6	42.2	35.1	35.5	30.6
	Measurement 2	51.6	71.4	63.5	54.1	45.4	42.9	35.9	29.9	29.4
	dB average	51.2	69.1	61.1	53.2	47.3	42.6	35.5	33.5	30.0
	Spectral correction		17.9	9.9	2.0	-3.9	-8.6	-15.7	-17.7	-21.2
J	Measurement 1	46.1	56.6	49.1	47.9	45.0	39.9	33.3	31.0	33.0
	Measurement 2	46.5	62.7	53.4	42.1	45.2	41.2	32.1	32.2	32.6
	Measurement 3	45.5	56.0	45.5	47.8	42.0	40.2	33.4	29.4	36.5
	dB average	46.2	59.6	50.5	46.6	44.3	40.5	33.0	31.0	34.4
	Spectral correction		13.4	4.3	0.4	-1.9	-5.7	-13.2	-15.2	-11.8

## B1 Guidance Documents & Standards

### B1.1 PPG24 Planning & Noise

To assist local planning authorities in assessing sites for residential development, with respect to noise, Government guidance is available in PPG24, "Planning Policy Guidance 24". For a given noise source (mixed noise sources in this instance), PPG24 categorises a site into one of four Noise Exposure Categories depending on its free-field noise exposure; Table 1.

PPG24 also states for night time noise levels: "*Sites where individual noise events regularly exceed 82 dB LA<sub>max</sub> (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the L<sub>Aeq,8h</sub> (except where the L<sub>Aeq,8h</sub> already puts the site in NEC D)*"

The values in Table B1 are specified in terms of the LA<sub>eq</sub> noise level, which is defined as the steady noise level that has the same energy as the actual fluctuating noise over the same time period.

The values in Table B1 refer to values on 'an open site' at 1.2 – 1.5 m above ground.

Noise Exposure Category (NEC)	Daytime Noise Level L <sub>Aeq,16hours</sub> From 7.00 to 23.00	Nighttime Noise Level L <sub>Aeq,8hours</sub> From 23.00 to 7.00	Planning guidance
A	<55	<45	Noise need not to be considered as a determining factor in granting planning permission, although the noise level at the high end should not be regarded as a desirable level
B	55-63	45-57	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	63-72	57-66	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	>72	>66	Planning permission should normally be refused.

## B1.2 Unoccupied Internal Noise Limits (BS8233)

Table B2. BS8233 guidance for ambient noise levels in habitable & work rooms			
Indoor Ambient Noise Levels in Spaces when they are unoccupied. From BS 8233: 1999 (Table 5)			
Criterion	Typical Situation	Design Range LAeq,T [dB]	
		Good	Reasonable
Reasonable resting/sleeping conditions.	Living Rooms	30	40
	Bedrooms*	30	35
* For a reasonable standard in bedrooms at night, individual noise events (measured with F time-weighting) should not normally exceed 45 dB LAmax.			

## B1.3 Guidance External Amenity Areas Noise Limits (WHO)

The World Health Organization's (WHO) Guidelines for Community Noise section 4.3.1 provides guideline ambient noise limits for external amenity areas during the day in relation to the likely level of annoyance:

*"To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed LAeq 55dB for a steady, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed LAeq 50dB."*

## B1.4 BS4142: Rating industrial noise affecting mixed residential and industrial areas

BS4142 provides a method of assessing the likelihood of complaints arising from industrial noise affecting people residing in dwellings.

The industrial noise is either measured or predicted at the receiver position as a discrete entity, distinct and free of influence from other noise contributing to the ambient noise environment. This is termed the Specific Level.

Certain acoustic features of industrial noise can increase the likelihood of complaint such as:

- The noise contains a distinguishable, discrete, continuous note (whine, hiss, screech, hum, etc.);
- The noise contains distinct impulses (bangs, clicks, clatters, or thumps);
- The noise is irregular enough to attract attention.

To account for any of the above a 5dB correction is applied to the Specific Level to obtain the Rating Level.

The likelihood of complaints is determined by subtracting the measured background noise level at the receptor location from the Rating Level, where:

- A difference of around +10dB or more indicates that complaints are likely;
- A difference of around +5dB is of marginal significance;
- If the rating level is more than 10dB below the measured background noise level then this is a positive indication that complaints are unlikely.

Note that the assessment method given in BS4142 is not valid where either/or:

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- Background noise levels are below LA90 30dB;
- Rating Levels are below LAeq 35dB.