HEPWORTH
ACOUSTICS
Noise and Vibration Consultants

POTENTIAL GYPSY AND TRAVELLER SITES, NEWPORT

NOISE ASSESSMENT

On behalf of:
Newport City Council

Report No. 31394.1v1
April 2013

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NOISE ASSESSMENT

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Newport City Council to carry out a set of noise assessments relating to each of three potential Gypsy and Traveller Sites, which have been identified as being proximate to sources of potentially significant noise levels.

1.2 The three sites considered by this assessment are as follows:

- Brickyard Lane
- Former Ringland Allotments
- Road Safety Centre and Adjacent Land at Hartridge Farm Road.

1.3 The sites at Brickyard Lane and Former Ringland Allotments are exposed to road traffic noise only, associated with the M4 and A48 respectively. The site at Hartridge Farm Road is exposed to A48 road traffic noise at the north and also railway noise from the London/Swansea mainline to the south and the RSPCA dogs kennels to the southeast corner.

1.4 The brief for these assessments is to determine typical prevailing daytime (0700-2300hrs) and night-time (2300-0700hrs) noise levels attributable to road and rail traffic at each of the three sites, and to provide assessment and recommendations with regard to potential noise mitigation that may be employed in order to achieve road and rail traffic noise levels at possible Gypsy and Traveller caravans / pitches at each site, not exceeding the following:

- External Daytime – 55 dB $L_{Aeq,16h}$ in outdoor living areas
- Internal Daytime – 40 dB $L_{Aeq,16h}$ in habitable rooms within caravans
- Internal Night-time – 35 dB $L_{Aeq,16h}$ in habitable rooms within caravans

1.5 No specific noise limits have been advised with regard to the RSPCA dog kennels at the Hartridge Farm Road site, however an assessment of potential impact of noise from this source has been provided.

1.6 In terms of potential noise mitigation, this is essentially limited to two forms: acoustic screening, which may be provided by way of appropriately specified fencing, walls or earth bunding, and, for the control of internal noise levels only, the sound insulation provision of the caravan itself.

1.7 With regard to the latter of these forms of mitigation, the precise sound insulation provision of a particular may be somewhat varied and, in addition to the provision of the basic fabric of the caravan may be affected by the presence of any ventilation openings, and whether these are open or closed. Furthermore, it not considered likely that it will be reasonably practicable to implement effective upgrades to a caravan to improve the sound insulation.

1.8 Based on some previous experience of testing the sound insulation of "park homes" (i.e. permanent static caravans), which may typically be slightly better than a more standard mobile caravan, we would anticipate an overall single-figure noise reduction of around 20-25dBA, outside to inside, with windows closed. The noise reduction may be towards the upper end of this range with any ventilators closed and towards the lower end of the range with the ventilators open. With windows open, we would anticipate an overall single-figure noise reduction of around 10-15dBA, outside to inside, which is a commonly accepted noise reduction for buildings of any kind with windows partially open.

1.9 However, whilst the likely noise reductions described above are or significance and are described within the assessments provided, the sound insulation provision of the caravans is considered to be of secondary importance in terms of the aim of this exercise. This is because the sound insulation of the caravans will be a constant factor between sites, whereas the principle issues, which it is considered should be taken as being of primary importance in terms of the aim of this exercise, are the prevailing noise levels and the scope for mitigation by way of acoustic screening, as these are variable between sites.

1.10 For each of the 3 sites, we have been provided with indicative plans providing potential layouts of pitches, each understood to be a requisite 20m x 20m in area, internal access roads and other features and facilities. It is understood that these plans are highly indicative and may be subject to some amount of alteration should the relevant sites come forward for use, however the plans have been used to inform our assessments as they provide useful guidance in terms of the opportunities and constraints that exist at each site.

1.11 Noise surveys were undertaken at each of the three sites over the course of Tuesday 9th and Wednesday 10th of April 2013, including the intervening evening and night-time period.

1.12 All noise measurements were undertaken using a Norsonic 118 type 1 integrating sound level meter (serial no. 31617) and a Bruel & Kjaer 2260 type 1 integrating sound level meter (serial no. 2467014). Calibration checks were carried out on the equipment before and after each survey period using a Bruel & Kjaer Acoustic Calibrator, Type 4231 (serial no. 2482589) and no variation in the calibration level was noted.

1.13 The weather during the survey was dry and calm with wind speeds typically below 5m/s. For all measurements the microphone was fitted with a windshield and mounted at a height of 1.5m above local ground in ‘free-field’ conditions.

1.14 The results of the noise surveys and assessment of the measured/calculated overall noise levels and discussion of impact and potential for mitigation are set out in the subsequent sections of this report for each site in turn.

1.15 The various noise indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 BRICKYARD LANE

2.1 This section details the survey and assessment of noise at the Brickyard Lane site.

Site Description

2.2 The Brickyard Lane site is bounded by the M4 to the west, by the M4/J24 westbound entry/exit slip to the southwest, by farmland on Brickyard Lane to the east, and by an existing residential site to the north.

2.3 The northern area of the site is understood to be unusable. This northern area is relatively flat and below the level of the M4 carriageways. The site generally slopes upwards towards the south. The southern half of the site also generally slopes gently upwards moving east away from the M4, before sloping back downwards towards Brickyard Lane.

Noise Survey

2.4 Unattended noise measurements were undertaken at the boundary of the site with the M4, identified as Location 1.1 in Figure 1, in 10-minute samples over the periods 1300-1600hrs and 2300-0700hrs. Location 1.1 is broadly level with the M4.

2.5 The overall daytime $L_{Aeq,16h}$ noise level at Location 1.1 has been determined in accordance with the 'Shortened Measurement Procedure' described in the Department of Transport document 'Calculation of Road Traffic Noise' (CRTN), 1988. This procedure involves taking noise measurements in terms of $L_{A10,T}$ over representative time periods within any three consecutive hours between 1000hrs and 1700hrs. By taking the $L_{A10,3h}$ as the arithmetic mean of the measured L_{A10} values, the $L_{A10,18h}$ value can then be calculated. The correction to obtain the $L_{A10,18h}$ value from the $L_{A10,3h}$ level is -1 dB. The $L_{A10,18h}$ values have then been converted into the equivalent $L_{Aeq,16h}$ values (in accordance with Paragraph 9, Annex 1, of the former Department of the Environment document PPG 24) by applying a correction of -2 dB.

2.6 The overall night-time $L_{Aeq,8h}$ noise level at Location 1.1 has been determined based on the logarithmic average of all $L_{Aeq,10m}$ noise levels recorded during the full night-time period.

2.7 It is noted that indicative plans for pitches indicate that a further 6m buffer between the site boundary with the M4 and nearest pitch is affordable. As such, further attended noise measurements were undertaken at 6m back from Location 1.1 at the site boundary, identified as Location 1.2 in Figure 1.

2.8 Also, it is of note that noise levels may be lower at locations further into the worst-case pitches close to and level with the M4. As such, further attended noise measurements were undertaken at a further location 10m back from Location 1.2 (i.e. the middle of the pitch), identified as Location 1.3 in Figure 1.

2.9 Towards the north of Location 1.1, the site falls below the level of the M4, such that noise levels may be reduced due to natural acoustic screening. As such, further attended noise measurements were undertaken at a 6m back from the south boundary towards the northwest corner of the usable site area, identified as Location 1.4 in Figure 1.

2.10 Finally, further attended noise measurements were undertaken at a location identified as Location 1.5, which is substantially further east of the M4 compared to the above locations.

2.11 All noise measurements at Locations 1.2, 1.3, 1.4 and 1.5 were undertaken in 5-minute samples, and these were concurrent with further individual 5-minute measurement samples at Location 1.1. In broad accordance with the 'Comparative Measurements' technique set out in CRTN, the overall daytime and night-time noise levels at Locations 1.2, 1.3, 1.4 and 1.5 have been determined by applying the average difference in measured L_{A10} noise levels at these locations with the concurrent measurements at Location 1.1, to the overall daytime and night-time noise levels at Location 1.1.

2.12 Overall noise levels derived for Locations 1.2, 1.3, 1.4 and 1.5 are present in Table 1. Overall noise levels at Location 1.1 have not been included in Table 1 as measurements at this location were undertaken only for the purpose of deriving overall levels at the other locations. Full noise survey results for the Brickyard Lane site are provided in Appendix II.

Table 1: Summary of Noise Levels at Brickyard Lane

Location	Noise Level	
	Daytime	**Night-time**
	dB $L_{Aeq,16h}$	**dB $L_{Aeq,8h}$**
1.2	66	61
1.3	64	59
1.4	64	59
1.5	62	57

Assessment of Impact / Potential Mitigation

2.13 Based on the noise levels presented in Table 1, it can be seen that, at the given locations, a noise reduction of 7-11 dBA is required to adequately control noise levels in outdoor living areas, and a noise reduction of 22-26 dBA is required to adequately control noise levels in internal habitable rooms.

2.14 It is noted that Location 1.2 is considered to be the worst-case area of the site (accounting for a 6m buffer from the site boundary). Also, with the exception of areas at greatest distances from the M4, particularly towards the southern tip of the site where site topography provides substantial screening of M4 noise, it is not anticipated that noise levels at any areas of the site where the M4 remains visible will be significantly lower than those presented for Location 1.5.

2.15 In terms of the required reduction of up to 7-11 dBA to adequately control noise levels in outdoor living areas, this level of reduction is typically achievable using acoustic screens. However, to achieve this, it is necessary for the screen location to be close-up to either the source of noise (the M4) or the receiver of the noise (the pitch). It is seemingly not practicable to locate acoustic screening close to the source of noise at this site, and as such acoustic screening would be required to the boundary of the pitches themselves.

2.16 Towards the northern end of the useable land close to the M4, the effectiveness of acoustic screening may be severely limited by site topography, with the site falling below the level of the M4. As such it may be difficult to achieve the required noise reductions in these areas, unless very tall acoustic screens are considered.

2.17 Furthermore, in a situation where a pitch was located close to the M4 boundary and a second pitch adjacent to the east of that (e.g. along the southwest site boundary), it is likely that the reduction of acoustic screening (resulting from the greater distance from the screen) would be greater than the increased attenuation from being further from the M4. As such it is likely that secondary acoustic screens may be required to protect the second pitch.

2.18 Due to the high noise levels and complexity of the topography of the site, and pending a confirmed layout, it would be necessary to undertake more detailed assessment work and acoustic modelling to determine the precise height and location requirements for acoustic screens in all areas of the site, and hence the feasibility of providing adequate screening within practical restrictions. However, in broad terms, an acceptable external level may be achievable by way of acoustic screens along the boundary of pitches closest to the M4 of no more than 3m in height, where the pitch is level with or at higher level compared to the M4, or where only slightly below the M4. In general, it would be necessary for the acoustic screen to be located along the boundary of the pitch, and it may be necessary in certain areas to return the acoustic screen along the side of the pitch, albeit potentially at reduced height

2.19 To be acoustically effective, acoustic screens would need to be of overall mass not less than 10kg/m^2 and nominal thickness not less than 20mm (e.g. close-boarded timber, brickwork, blockwork). The construction should be imperforate with no holes or gaps and should be sealed at the base.

2.20 As discussed, in areas where the site is at a substantially lower level that the M4, it may not be possible to achieve adequate acoustic screening.

2.21 In terms of the required reduction of up to 22-26 dBA to adequately control noise levels in internal habitable areas, based on the anticipated outside to inside noise reductions described in Section 1.0, in the absence of any acoustic screening it is likely that the target noise levels will be exceeded when windows are open, but that they will be just achieved or marginally exceeded with windows closed. However, accounting for the acoustic screening described above to control external noise, where this is practicable to achieve 55 dB $L_{Aeq,16h}$ externally, it is likely that the target noise levels will be comfortably achieved with windows closed and will be just achieved or marginally exceeded with windows partially open. Any marginal exceedance that may occur with windows open would not be expected to be significant.

3.0 FORMER RINGLAND ALLOTMENTS

3.1 This section details the survey and assessment of noise at the Former Ringland Allotments site.

Site Description

3.2 The Former Ringland Allotments site is bounded by the A48 Southern Distributor Road to the west and by Cot Hill to the north. The site generally slopes gently upwards moving east away from the A48.

3.3 It is noted that indicative plans for pitches indicate that a further 6m buffer between the site boundary with the A48 and nearest pitch is affordable.

Noise Survey

3.4 Attended noise measurements were undertaken at a point 6m back from the boundary of the site with the A48 towards the southern end of the site, identified as Location 2.1 in Figure 2. Daytime noise measurements were undertaken over the periods 1402-1611hrs in 20-minute samples and 2300-0045hrs in 10-minute samples.

3.5 The overall daytime $L_{Aeq,16h}$ noise level at Location 2.1 has been determined in accordance with the 'Shortened Measurement Procedure' described in the Department of Transport document 'Calculation of Road Traffic Noise' (CRTN), 1988. This procedure involves taking noise measurements in terms of $L_{A10,T}$ over representative time periods within any three consecutive hours between 1000hrs and 1700hrs. By taking the $L_{A10,3h}$ as the arithmetic mean of the measured L_{A10} values, the $L_{A10,18h}$ value can then be calculated. The correction to obtain the $L_{A10,18h}$ value from the $L_{A10,3h}$ level is -1 dB. The $L_{A10,18h}$ values have then been converted into the equivalent $L_{Aeq,16h}$ values (in accordance with Paragraph 9, Annex 1, of the former Department of the Environment document PPG 24) by applying a correction of -2 dB.

3.6 The overall night-time $L_{Aeq,8h}$ noise level at Location 2.1 has been determined based on the logarithmic average of all $L_{Aeq,10m}$ noise levels recorded during the night-time survey period. In our experience the $L_{Aeq,T}$ noise level over the first two hours of the night-time period is typically representative of the overall $L_{Aeq,8h}$ night-time noise level, at sites where the dominant noise source is a major road traffic route.

3.7 It is noted that noise levels may be lower at 6m from the site boundary towards the north of the site, where there is a slightly greater distance between the site boundary and the A48. As such, further attended noise measurements were undertaken at 6m back from the site boundary towards the northern end of the site, identified as Location 2.2 in Figure 2.

3.8 Also, it is of note that noise levels may be lower at locations further into the worst-case pitches close to the A48. As such, further noise measurements were undertaken at a further location 10m back from Location 2.1 (i.e. the middle of the pitch), identified as Location 2.3 in Figure 2.

3.9 All noise measurements at Locations 2.2 and 2.3 were undertaken in 5-minute samples, and these were concurrent with further individual 5-minute measurement samples at Location 2.1. In broad accordance with the 'Comparative Measurements' technique set out in CRTN, the overall daytime and night-time noise levels at Locations 2.2 and 2.3 have been determined by applying the average difference in measured L_{A10} noise levels at these locations with the concurrent measurements at Location 2.1, to the overall daytime and night-time noise levels at Location 2.1.

3.10 Overall noise levels derived for Locations 2.1, 2.2 and 2.3 are present in Table 2. Full noise survey results for the Former Ringland Allotments site are provided in Appendix II.

Table 2: Summary of Noise Levels at Former Ringland Allotments

Location	Noise Level	
	Daytime	**Night-time**
	dB $L_{Aeq,16h}$	**dB $L_{Aeq,8h}$**
2.1	66	56
2.2	65	55
2.3	62	52

Assessment of Impact / Potential Mitigation

3.11 Based on the noise levels presented in Table 2, it can be seen that, at the given locations, a noise reduction of 7-11 dBA is required to adequately control noise levels in outdoor living areas, and a noise reduction of 22-26 dBA is required to adequately control noise levels in internal habitable rooms.

3.12 In terms of the required reduction of up to 7-11 dBA to adequately control noise levels in outdoor living areas, this level of reduction is typically achievable using acoustic screens. However, to achieve this, it is necessary for the screen location to be close-up to either the source of noise (the A48) or the receiver of the noise (the pitch). It is seemingly not practicable to locate acoustic screening close to the source of noise at this site, and as such acoustic screening would be required to the boundary of the pitches themselves.

3.13 It is considered that an acoustic screen of approximately 2.5m in height, extending the full length of the boundary of the pitches nearest to the A48, and returned at least half-way along the side of the northernmost and southernmost pitches only, will provide adequate control of external noise in external living areas.

3.14 To be acoustically effective, acoustic screens would need to be of overall mass not less than 10kg/m^2 and nominal thickness not less than 20mm (e.g. close-boarded timber, brickwork, blockwork). The construction should be imperforate with no holes or gaps and should be sealed at the base.

3.15 In terms of the required reduction of up to 22-26 dBA to adequately control noise levels in internal habitable areas, based on the anticipated outside to inside noise reductions described in Section 1.0, in the absence of any acoustic screening it is likely that the target noise levels will be exceeded when windows are open, but that they will be just achieved or marginally exceeded with windows closed. However, accounting for the acoustic screening described above to control external noise, it is likely that the target noise levels will be comfortably achieved with windows closed and will be just achieved or marginally exceeded with windows partially open. Any marginal exceedance that may occur with windows open would not be expected to be significant.

4.0 ROAD SAFETY CENTRE AND ADJACENT LAND AT HARTRIDGE FARM ROAD

4.1 This section details the survey and assessment of noise at the Road Safety Centre and Adjacent Land at Hartridge Farm Road site.

Site Description

4.2 The Road Safety Centre and Adjacent Land at Hartridge Farm Road site is bounded by the A48 Southern Distributor Road to the north and northwest, by Hartridge Farm Road to the east and by the London/Swansea mainline to the south. The RSPCA dogs kennels are located to the southeast corner of the site

4.3 The northern area of the site is generally at a higher level compared to the A48 and this infers a natural buffer area between the A48 and the northernmost pitches. It is also noted that indicative plans for pitches indicate that a 30m buffer between the site boundary with the railway line and nearest pitch is affordable.

Noise Survey

4.4 Attended noise measurements were undertaken at the closest proposed pitch location to the A48 at the north of the site, identified as Location 3.1 in Figure 3. Daytime noise measurements were undertaken over the periods 1430-1637hrs in 20-minute samples and 2315-0100hrs in 10-minute samples.

4.5 The overall daytime $L_{Aeq,16h}$ noise level at Location 3.1 has been determined in accordance with the 'Shortened Measurement Procedure' described in the Department of Transport document 'Calculation of Road Traffic Noise' (CRTN), 1988. This procedure involves taking noise measurements in terms of $L_{A10,T}$ over representative time periods within any three consecutive hours between 1000hrs and 1700hrs. By taking the $L_{A10,3h}$ as the arithmetic mean of the measured L_{A10} values, the $L_{A10,18h}$ value can then be calculated. The correction to obtain the $L_{A10,18h}$ value from the $L_{A10,3h}$ level is -1 dB. The $L_{A10,18h}$ values have then been converted into the equivalent $L_{Aeq,16h}$ values (in accordance with Paragraph 9, Annex 1, of the former Department of the Environment document PPG 24) by applying a correction of -2 dB.

4.6 The overall night-time $L_{Aeq,8h}$ noise level at Location 3.1 has been determined based on the logarithmic average of all $L_{Aeq,10m}$ noise levels recorded during the night-time survey period. In our experience the $L_{Aeq,T}$ noise level over the first two hours of the night-time period is typically representative of the overall $L_{Aeq,8h}$ night-time noise level, at sites where the dominant noise source is a major road traffic route.

4.7 It is noted that noise levels may be lower at locations further into the worst-case pitches close to the A48. As such, further noise measurements were undertaken at a further 10m back from Location 3.1 (i.e. the middle of the pitch), identified as Location 3.2 in Figure 3.

4.8 All noise measurements at Location 3.1 were undertaken in 5-minute samples, and these were concurrent with further individual 5-minute measurement samples at Location 3.1. In broad accordance with the 'Comparative Measurements' technique set out in CRTN, the overall daytime and night-time noise levels at Location 3.2 have been determined by applying the average difference in measured L_{A10} noise levels at this location with the concurrent measurements at Location 3.1, to the overall daytime and night-time noise levels at Location 3.1.

4.9 Further to the above, a survey of rail traffic noise levels was carried out over the period 16:53-18:53hrs. Train pass-by measurements were undertaken in terms of the L_{AE} (SEL) noise index at the closest proposed pitch location to the railway line at the south of the site, identified as Location 3.3 in Figure 3. The majority of trains passing the site are passenger services operated by First Great Western, Arriva and Cross Country and are a mixture of 8-carriage diesel intercity trains and 2/3-carriage local trains. There is also occasional freight rail activity passing the site.

4.10 A good sample of noise measurements for all train types and directions was achieved during the noise survey.

4.11 Based on passenger timetable information sourced via the operators' websites, and on freight timetable sourced from Freightmaster (a frequently updated subscription-based online resource providing indicative rail freight timetables/routes), worst-case weekday train pass-by frequencies have been determined for the daytime and night-time periods. This accounts for worst-case interpretations of potential freight movements.

4.12 Based on the logarithmic average of all L_{AE} noise levels for each train type and direction and worst-case weekday train pass-by frequencies, daytime and night-time noise levels at Location 3.3 have been determined.

4.13 Overall noise levels derived for Locations 3.1, 3.2 and 3.3 are present in Table 3. Full noise survey results for the Road Safety Centre and Adjacent Land at Hartridge Farm Road site are provided in Appendix II.

Table 3: Summary of Noise Levels at Road Safety Centre & Adj. Land at Hartridge Fm Rd

Location	Noise Level	
	Daytime	Night-time
	dB $L_{Aeq,16h}$	dB $L_{Aeq,8h}$
3.1	60	49
3.2	55	44
3.3	60	54

4.14 In addition to the above, a number of visits were made to the south east corner of the Road Safety Centre and Adjacent Land at Hartridge Farm Road site, close to the RSPCA dog kennels, during the survey period, including the daytime, evening and night-time periods. During the majority of visits there was little or no dog barking taking place, however during a daytime visit on Wednesday 10th April 2013 there was some notable dog barking taking place. A set of five 2-minute noise measurements was undertaken during periods of barking of varying intensity close to the existing Road Safety Centre building, identified as Location 3.4 in Figure 3, over the period 1309-1331hrs, and it was found that typical noise levels were in the range 51-56 dB L_{Aeq}.

4.15 However, although not witnessed/measured, it is considered likely that during periods when dogs were particularly excited or agitation (e.g. feeding time or when new dogs/people enter the kennels) noise levels may be somewhat higher than this, typically up to 60dB L_{Aeq} or at worst-case up to 65dB L_{Aeq}.

Assessment of Impact / Potential Mitigation

4.16 Based on the noise levels presented in Table 3, it can be seen that, at the given locations, a noise reduction of up to 5 dBA is required to adequately control road/rail noise levels in outdoor living areas, and a noise reduction of up to 20 dBA is required to adequately control road/rail noise levels in internal habitable rooms.

4.17 In terms of the required reduction of up to 5 dBA to adequately control road/rail noise levels in outdoor living areas, this level of reduction is typically achievable using acoustic screens.

4.18 It is considered that an acoustic screen of approximately 1.8m in height, extending the full length of the boundary of the pitches nearest to the A48 to the north, and to the boundary of the pitches nearest to the railway line to the north, and returned at least half-way along the side of the easternmost and westernmost of these pitches only, will provide adequate control of external noise in external living areas.

4.19 To be acoustically effective, acoustic screens would need to be of overall mass not less than 10kg/m^2 and nominal thickness not less than 20mm (e.g. close-boarded timber, brickwork, blockwork). The construction should be imperforate with no holes or gaps and should be sealed at the base.

4.20 In terms of the required reduction of up to 20 dBA to adequately control road/rail noise levels in internal habitable areas, based on the anticipated outside to inside noise reductions described in Section 1.0, in the absence of any acoustic screening it is likely that the target noise levels will be exceeded when windows are open, but that they will be comfortably achieved with windows closed.

4.21 However, accounting for the acoustic screening described above to control external noise, it is likely that the target noise levels will be comfortably achieved with windows closed and will be just achieved or marginally exceeded with windows partially open. Any exceedance that may occur with windows open would not be expected to be significant.

4.22 Notwithstanding the above quoted noise levels at Location 3.4 and potential for higher noise levels on occasions as described, it is anticipated that when considered over a full daytime and night-time period, with substantial quiet periods between periods of barking, overall noise levels in the vicinity of the RSPCA kennels would be relatively low. However, taking account of the characteristics of the noise from dog barking, there would still be potential for disturbance to be caused.

4.23 Accordingly, to provide reasonable control of noise form dog barking, it is recommended that pitches should be located no less than 30m from the boundary of the RSPCA dog kennels. Further to this, it is recommend that all plots within approximately 60m of the RSPCA site are provided with an acoustic screen of approximately 1.8m in height, extending around all necessary boundaries of the pitches to prevent a line-of-sight to the kennels.

5.0 SUMMARY AND CONCLUSIONS

5.1 Hepworth Acoustics has undertaken a set of noise assessments relating to each of three potential Gypsy and Traveller Sites, which have been identified as being proximate to sources of potentially significant noise levels.

5.2 Noise surveys have been undertaken at selected locations at each site and daytime and night-time noise levels have been determined.

5.3 Recommendations regarding the feasibility and outline specification for appropriate noise mitigation measures have been made in order to achieve appropriate external and internal acoustic criteria in line with the assessment brief.

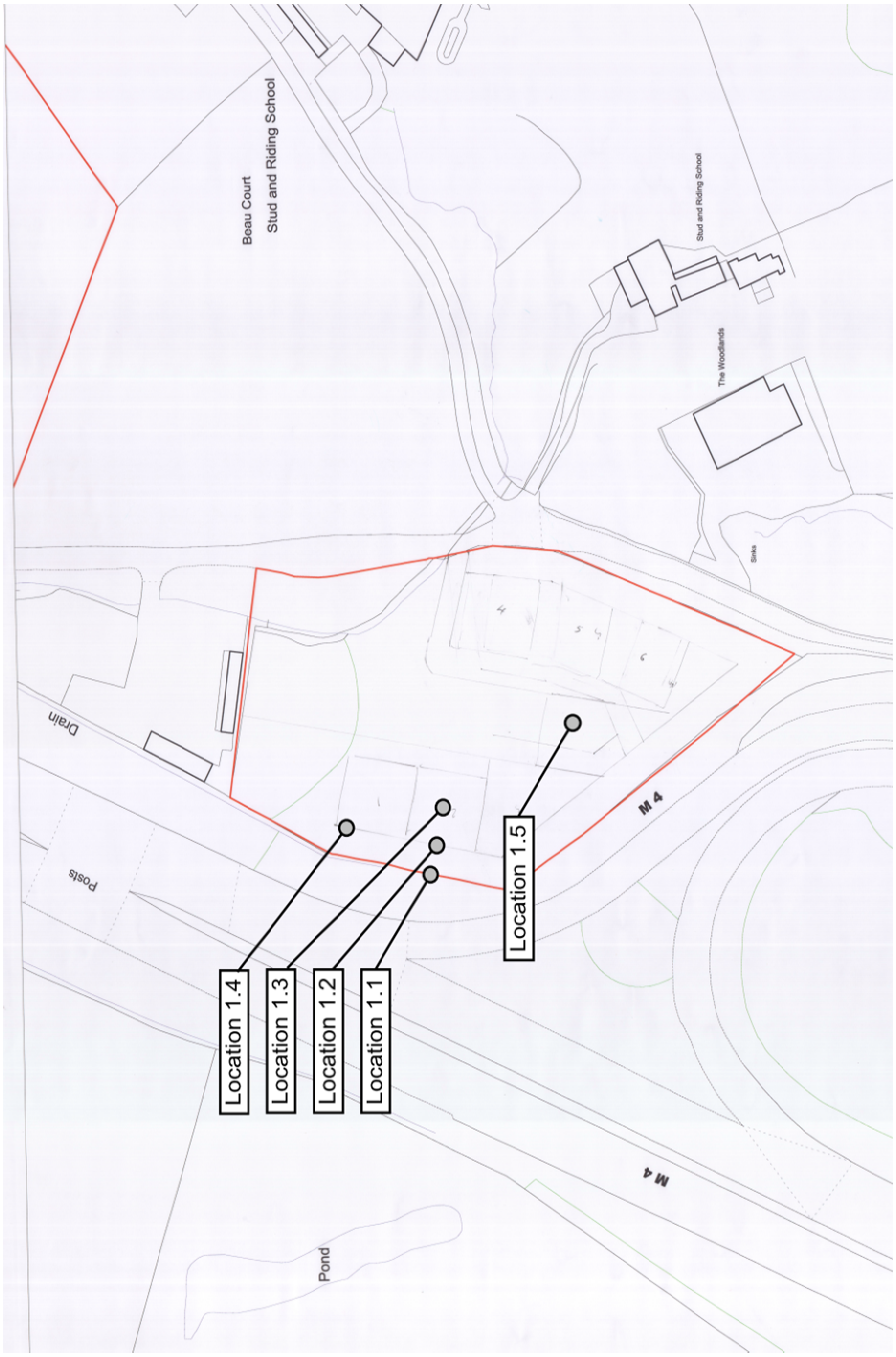

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Figure 1 - Site Location / Indicative Layout Plan and Noise Measurement Locations
Brickyard Lane

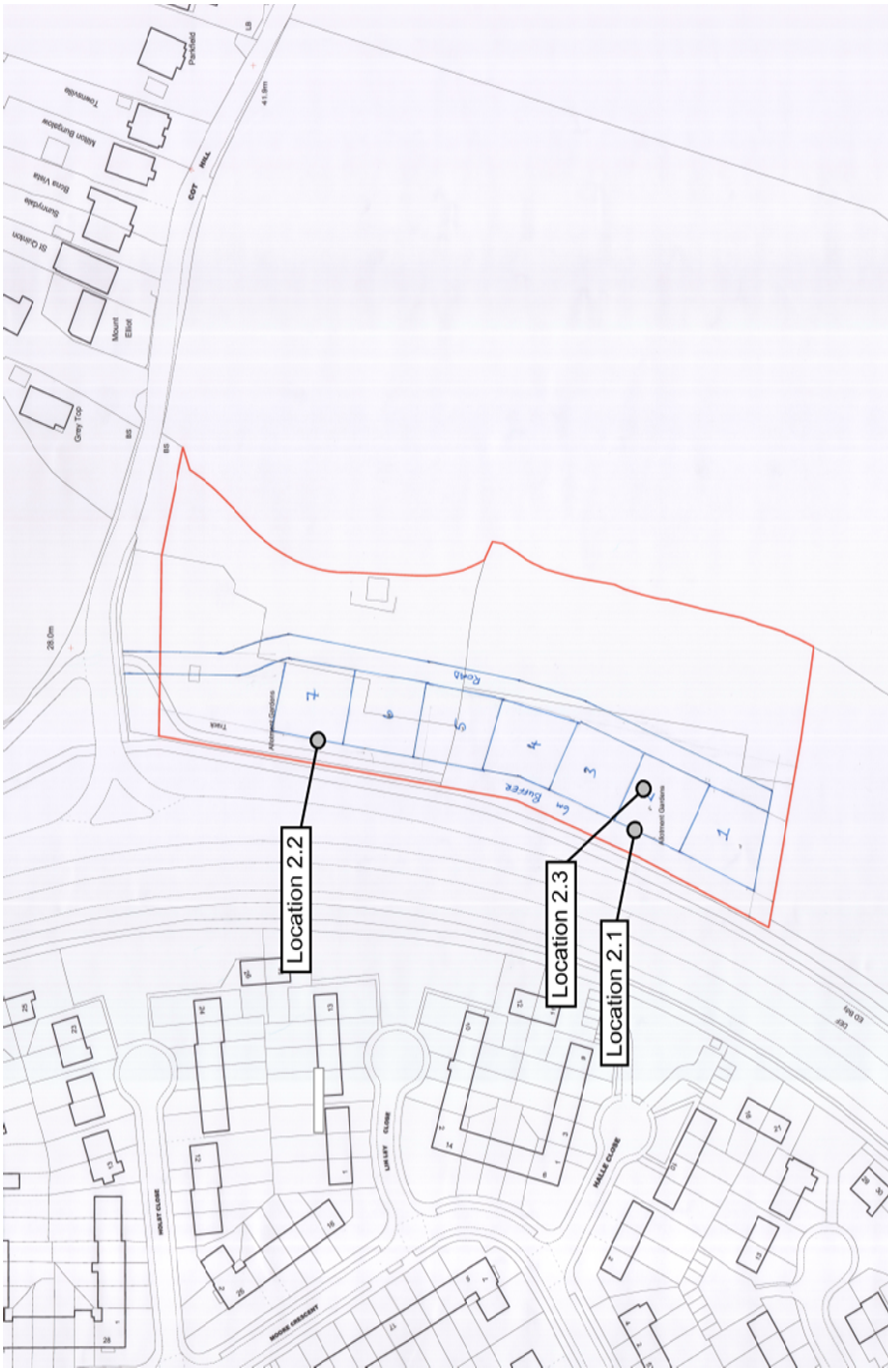

Figure 2 - Site Location / Indicative Layout Plan and Noise Measurement Locations
Former Ringland Allotments

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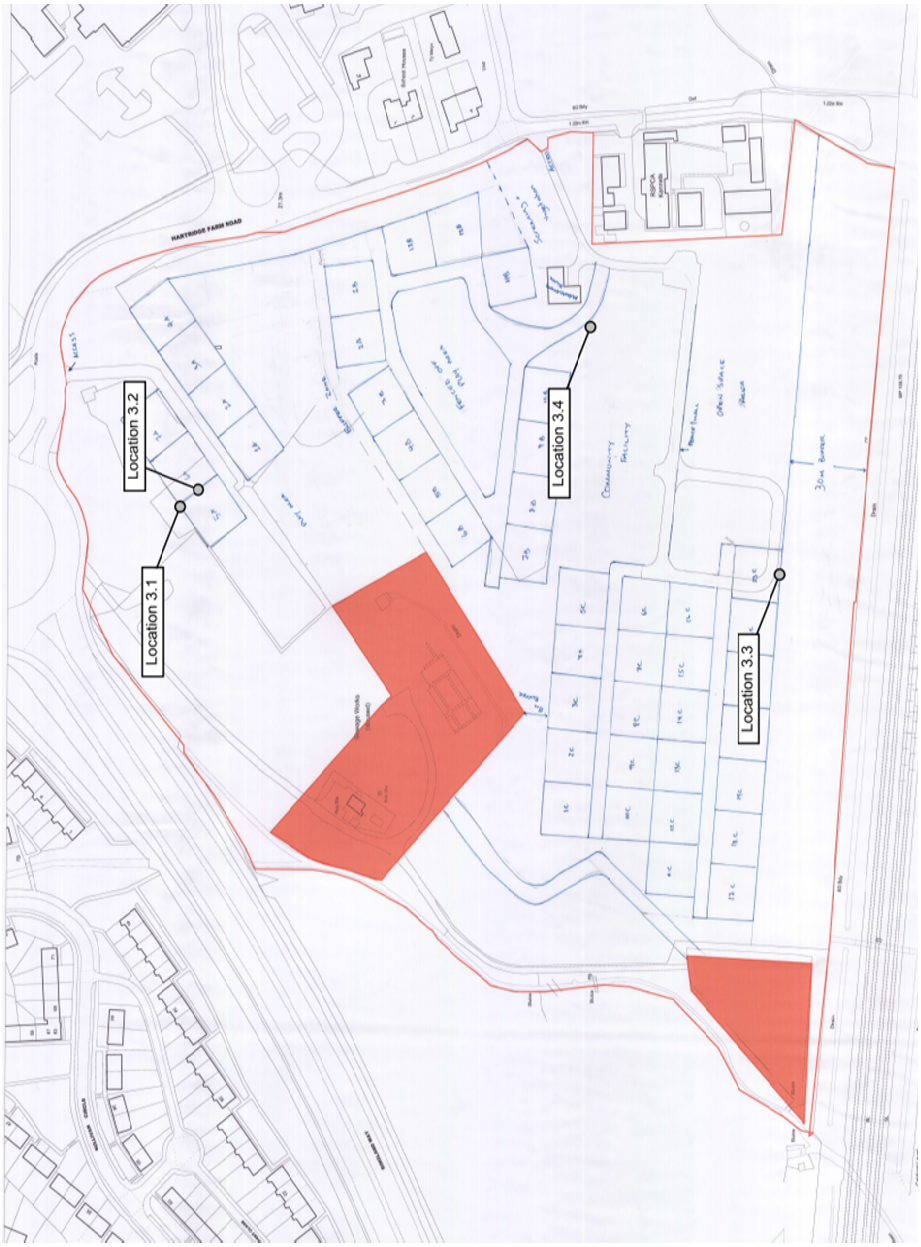

Figure 3 - Site Location / Indicative Layout Plan and Noise Measurement Locations
Road Safety Centre and Adjacent Land at Hartridge Farm Road

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Appendix I – Noise Units and Indices

a) Sound Pressure Level and the decibel (dB)

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

b) Frequency and hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20,000 Hz. However, the upper frequency limit gradually reduces as a person gets older.

c) Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB level. However, when the noise level varies with time, the measured dB level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The index used in this report is described below together with a glossary of terms.

L_{Aeq} This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total energy as the real fluctuating noise, measured over the same time period.

L_{Amax} This is the maximum A-weighted noise level that was recorded during the monitoring period.

L_{A10} This the A-weighted noise level exceeded for 10% of the time period. L_{A10} is used as a measure of traffic noise.

L_{A90} This is the A-weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

Appendix II – Noise Survey Results

Dates: Tuesday 9th - Wednesday 10th April 2013

Equipment: Norsonic 116 type 1 integrating sound level meter (serial no. 31270)

Bruel & Kjaer 2260 type 1 integrating sound level meter (serial no. 2467014)

Weather: Dry and calm

Location 1.1

Time		Noise Level dB			
Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
13:00	13:10	68	76	71	65
13:10	13:20	69	79	71	65
13:20	13:30	69	77	71	65
13:30	13:40	69	75	71	66
13:40	13:50	68	75	71	65
13:50	14:00	68	74	70	64
14:00	14:10	68	77	71	64
14:10	14:20	69	77	71	65
14:20	14:30	69	75	71	65
14:30	14:40	68	76	70	64
14:40	14:50	68	75	71	65
14:50	15:00	68	82	71	65
15:00	15:10	69	75	71	65
15:10	15:20	69	81	71	66
15:20	15:30	68	77	71	65
15:30	15:40	68	75	71	65
15:40	15:50	68	74	71	66
15:50	16:00	69	76	71	65
23:00	23:10	64	75	67	55
23:10	23:20	63	73	67	54
23:20	23:30	62	74	66	53
23:30	23:40	62	73	67	51
23:40	23:50	62	72	67	51
23:50	00:00	61	73	66	50
00:00	00:10	62	76	66	51
00:10	00:20	62	75	67	50
00:20	00:30	61	72	66	51
00:30	00:40	62	73	66	50
00:40	00:50	63	74	67	50
00:50	01:00	62	73	66	51
01:00	01:10	61	73	65	49
01:10	01:20	62	75	67	48
01:20	01:30	62	74	67	49
01:30	01:40	61	73	66	48
01:40	01:50	61	72	66	49
01:50	02:00	62	76	67	50
02:00	02:10	62	75	66	48
02:10	02:20	61	73	66	46

Time		Noise Level dB			
Start	**End**	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
02:20	02:30	59	71	62	48
02:30	02:40	61	73	66	48
02:40	02:50	59	73	62	47
02:50	03:00	61	74	65	48
03:00	03:10	61	75	66	50
03:10	03:20	61	73	66	50
03:20	03:30	62	74	67	49
03:30	03:40	64	74	69	53
03:40	03:50	62	74	67	48
03:50	04:00	61	73	66	49
04:00	04:10	61	73	65	48
04:10	04:20	63	73	67	51
04:20	04:30	62	73	67	50
04:30	04:40	62	75	66	51
04:40	04:50	63	74	68	52
04:50	05:00	65	75	69	54
05:00	05:10	64	75	68	55
05:10	05:20	64	74	69	55
05:20	05:30	65	75	69	56
05:30	05:40	67	87	70	59
05:40	05:50	66	75	70	58
05:50	06:00	66	80	70	58
06:00	06:10	66	74	70	59
06:10	06:20	66	74	69	59
06:20	06:30	66	76	70	60
06:30	06:40	67	74	70	60
06:40	06:50	68	79	71	63
06:50	07:00	68	76	71	63
10:10	10:15	68	75	71	64
10:15	10:20	67	74	70	62
10:25	10:30	68	75	70	63
10:30	10:35	67	76	70	63
10:40	10:45	68	76	70	63
10:45	10:50	67	73	69	63
10:55	11:00	67	75	70	62
11:00	11:05	68	80	70	63

Location 1.2

Time		Noise Level dB			
Start	**End**	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
10:10	10:15	67	72	69	63
10:15	10:20	65	73	68	61

Location 1.3

Time		Noise Level dB			
Start	**End**	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
10:25	10:30	64	71	66	60
10:30	10:35	63	68	66	60

Location 1.4

Time		Noise Level dB			
Start	**End**	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
10:40	10:45	64	71	67	60
10:45	10:50	62	69	65	59

Location 1.5

Time		Noise Level dB			
Start	**End**	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
10:55	11:00	62	75	64	57
11:00	11:05	62	69	64	58

Location 2.1

Time		Noise Level dB			
Start	**End**	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
14:02	14:22	66	79	68	58
14:58	15:18	66	78	69	59
15:51	16:11	66	78	69	60
23:00	23:10	56	68	60	41
23:32	23:42	56	72	61	39
00:04	00:14	57	72	62	39
00:35	00:45	56	74	59	39
11:35	11:40	65	77	69	57
11:40	11:45	66	77	69	58
11:50	11:55	65	75	68	58
11:55	12:00	65	75	67	58

Location 2.2

Time		Noise Level dB			
Start	**End**	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
11:35	11:40	62	73	64	54
11:40	11:45	62	72	65	55

Location 2.3

Time		Noise Level dB			
Start	**End**	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
11:50	11:55	64	75	67	57
11:55	12:00	64	73	67	56

Location 3.1

Time		Noise Level dB			
Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
14:30	14:50	61	76	63	57
15:24	15:44	61	77	62	58
16:17	16:37	61	70	63	57
23:15	23:25	51	64	54	39
23:47	23:57	51	62	54	41
00:19	00:29	47	66	51	36
00:50	01:00	47	60	51	35
13:45	13:50	61	75	63	57
13:55	14:00	59	69	62	55

Location 3.2

Time		Noise Level dB			
Start	End	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
13:45	13:50	57	70	59	53
13:55	14:00	55	65	56	52

Location 3.3

Time	Train Type	Direction	Carriages	Noise Level dB	
				L_{AE}	L_{Amax}
16:53	Passenger	East	2	77.9	73.7
16:56	Freight	East	25	84.3	73.4
16:59	Passenger	East	8	87.7	81.4
17:03	Passenger	West	2	82.5	78.8
17:04	Passenger	East	3	80.0	77.0
17:13	Passenger	West	8	87.1	80.7
17:18	Passenger	West	3	85.2	80.9
17:23	Passenger	East	3	82.9	78.5
17:33	Passenger	East	8	87.4	80.2
17:34	Passenger	West	2	77.4	74.0
17:44	Passenger	West	8	88.8	83.6
17:44	Passenger	East	2	81.0	77.2
17:47	Passenger	West	3	84.6	80.7
17:53	Passenger	East	3	80.3	76.0
17:59	Passenger	East	8	87.3	80.9
18:03	Passenger	East	2	75.4	71.4
18:06	Passenger	West	3	79.8	76.2
18:15	Passenger	West	8	89.0	82.6
18:20	Passenger	West	2	80.7	77.2
18:20	Passenger	East	3	84.4	81.0
18:30	Passenger	West	2	83.4	80.0
18:31	Passenger	East	8	87.8	83.4
18:37	Freight	West	28	81.7	68.7
18:38	Passenger	West	2	82.5	78.8
18:46	Passenger	West	8	87.8	81.8
18:47	Passenger	West	2	77.7	73.9
18:49	Passenger	West	3	85.0	82.1
18:50	Freight	East	22	82.2	71.3
18:52	Freight	West	15	81.8	70.6

Location 3.4

Time		Noise Level dB			
Start	**End**	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
13:09	13:11	55	67	59	44
13:14	13:16	51	66	54	44
13:25	13:27	56	69	61	45
13:27	13:29	55	68	59	47
13:29	13:31	55	67	60	46