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CLAY TARGET SHOOTING NOISE PROPOSED CODE OF PRACTICE

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1 INTRODUCTION

The Department of the Environmental (as was) recently funded a study by BRE to study how best to measure clay target shooting noise and to establish the correlation between such measurements and community response. The Chartered Institute of Environmental Health has incorporated the results of this research into a consultation draft for Clay Target Shooting Noise, dated October 1997 [1]; it is intended that this document would be adopted under Section 71 of The Control of Pollution Act 1974. The BRE research is the only study of its kind ever to have been conducted in the UK or elsewhere. Some of the research findings are surprising and all have important implications for the assessment of clay target shooting.

This paper examines the main findings of the BRE research, compares it with the two most commonly used standards for assessing clay target shooting noise, by reference to measurements made at a typical shooting ground, and finally draws conclusions.

2 THE RESEARCH

The BRE research report has not yet been published, but some details have emerged -

a. The level of background noise, or the excess of the shooting noise over the background was not established as an important factor, with the possible exception of high background noise levels.
b. The research did not establish that Sunday shooting was generally more disturbing than shooting on other days of the week.
c. Also the research did not establish that the frequency (oftenness) of shooting and the rates of fire were important in deciding the degree of disturbance.
d. Measurements should be made using a graphic level recorder and sound level meter, or a short-Leq meter with source coding buttons, if the criterion is appropriately amended.
e. The most suitable descriptor of shooting noise is the logarithmic average of the 25 loudest shots in a 30 minute period using LAFmax.
f. Widespread annoyance is unlikely below around 55 dB(A) [as measured in e. above], but likely above around 65 dB(A). Thus a level of, say, 60 dB(A) may be deemed acceptable at one site, but not at another."

As we understand the research, the conclusions as how best to measure this noise are based on measurements around 20 shooting grounds. The analysis of community response against shooting noise impact was based on a subset of 8 shooting grounds. All noise measurements were made with a positive wind component, e.g. at locations to the southwest of a shooting ground measurements were always made with a light northeasterly wind. The October public consultation draft of the Code of Practice [1] endorses points d, e and f above.

3 COMPARISON WITH OTHER ASSESSMENT METHODS

The two main standards for assessing noise to date, have been produced by the CPSA [2] and CIEH [3] (based on work by MJAC [4]). Both documents are very detailed. Only a brief summary is given below.

The CIEH draft Professional Practice Noise

This document requires the noise of individual gunshots to be measured, and then compares the logarithmic average level of all measurable gunshots against a limit value that depends upon the preexisting background level of noise in the area:

Background Level [L_{A90}]	Ave level of shots [dBAF] [dBAF = dBAI - 5 dB]
45 to 50	65
40 to 45	60
35 to 40	55
30 to 35	50

This code says that "*It is recommended that unless by virtue of planning consent, accepted existing use, or mutual agreement between the shoot organiser(s) and the local community, shooting should not normally take place on any Sunday, Bank or Public Holiday, or evening period.*" Also "*The hours of shooting on weekdays (inclusive of Saturday) should be confined to be between 9.30 am and 6.00 pm subject to a single organised event taking place over a maximum duration of one four-hour consecutive period.*"

The Clay Pigeon Shooting Association Proposals

This Code of Practice attempts to weigh the factors of noise level, character of noise, duration of exposure, time of day and so on by recommending inter alia that:-

1. The logarithmic average level of all measurable gunshots should not exceed 60 dBA 'Fast' at any noise sensitive premises.

2. That unless there is specific local agreement, shooting hours should be restricted to:-
   Mondays to Saturdays 0930 - 1830 hrs.
   Sundays 1000 - 1700 hrs. [shooting not to exceed 4 hrs.]

Summary

Both the existing assessment methods consider that Sundays are more sensitive than other days of the week, and permit the measurements to be made using by writing down the results from the display of a standard sound level meter; also, both derive the logarithmic average of all measurable gunshots. The CIEH draft Professional Practice Note also considers that the excess of shooting noise over background level is important.

4 ASSESSMENT OF A SHOOTING GROUND

Figure 1 shows a real shooting ground "somewhere in the south of England". The shoot lies to the northeast of the measurement position, and a busy bypass lies to the southwest of measurement position, when the wind is from the northeast the shoot noise is relatively high and the background relatively low, and the situation is reversed when the wind is from the southwest.

On a particular day the weather conditions were constant with a light northeast wind. It can be seen that there is no screening by barriers and little variation in separation distance or firing direction from stand to stand; however, even at this ground, there was a 30 dB(A) variation between the loudest and quietest shots (see Figure 3). Over the course of 2n hours, some 850 individual shots were measured; therefore, 170 shots represent approximately 30 minutes worth of data. It is possible to compare the "rolling" logarithmic average of 170 shots (30 minutes), against the "rolling" average of the loudest 25 of the same 170 shots, i.e. to compare the "BRE" assessment method against that of the CPSA (and CIEH). The background noise level at the measurement location was 42 LA90.

Figure 2 shows the results of the comparison. It can be seen that on this day, the assessment methods were relatively stable; both varied within a 3.5 dBA band. The BRE method was around 76.5 dBA and the CPSA/CIEH around 71 dBA; the mean difference between the two methods was 5.5 dBA, again for this shoot on this day.

By contrast, on days when the wind was from the southwest, the CPSA/CIEH method would produce a rating of 55 dBA compared with a BRE rating of 56 dBA. The background noise levels were 50 LA90. The different wind direction produced lower shooting noise levels, and higher background noise levels; hence, the range of measurable gunshots was compressed. Such a variation in noise impact for different weather conditions is not unusual.

5 DISCUSSION

5.1 Comparison with CPSA and CIEH Recommendations

Looking at the results from the real shoot, it seems likely that for most shoots, the BRE method will be between 1 and 6 dBA above the CPSA/CIEH method.

The CPSA code of practice seeks to avoid ratings in excess of 61 to 65 dBA (using BRE method), which ties in reasonably well with the BRE's conclusions that widespread annoyance is likely above around 65 dB(A) (using BRE method).

If we now compare the BRE assessment method with that of CIEH, for many shooting locations the daytime background noise levels are between 35 and 45 LA90. Accordingly the CIEH Code of Practice seeks to avoid ratings in excess of 56 to 66 (using BRE method), depending on the background level of noise and the variability of shooting noise.

If we now assess the real shoot results using all three methods; noise levels on the first occasion exceeded the recommended limits of both the CPSA and CIEH, and the BRE research would indicate that widespread annoyance is likely. On the second occasion noise levels were within the recommended limits of the CPSA and CIEH, and the BRE research would indicate that widespread annoyance is unlikely. None of the assessment methods give guidance on the implications of variation in noise impact from day to day.

5.2 Comments and Observations on the BRE Research Findings

Statistically, the larger the spread between the quietest and loudest shots, the larger the difference between the BRE and CPSA/CIEH methods will be; equally the higher the firing rate, the higher the BRE rating would be, because it is more likely than in 30 minutes, 25 loud shots will occur in the upper end of the distribution; at low firing rates many of the 25 loudest shots will occur in the centre of the distribution.

If shooting noise impact is to be assessed objectively, there is a need to characterise the typical impact of a shoot, even if the corresponding perception by members of the public is unclear. This must include the likely effect of wind, e.g. to quantify periods when there is a positive component towards (or away) from noise sensitive premises and may highlight periods when shooting may be expected to produce greater or lesser annoyance. This will be of most significance if the noise sensitive premises are not prevailing downwind of the shoot. The level of resources invested must be site specific and preferably agreed with the planning/environmental health authority.

The BRE research indicates that shoots may engender complaint by their mere presence, and establishing a dose response relationship between noise levels and annoyance was very difficult. It may be that so many people were annoyed by the mere presence of the shot, such that usual significant determinants of community annoyance were masked. For example construction produces annoyance often be its mere presence, and there seems to be a poor dose response relationship between noise levels and annoyance. However, it has been found that restricting noise to weekday periods (if possible) does make the disturbance more bearable. Controlling hours of operation of clay target shooting may therefore be appropriate though no link between time of day and annoyance has been found.

The work carried out by BRE is a cross sectional study, i.e. the measurements were made under a constant weather condition and consequently do not reflect the range of impact that can be found at many shoots (see above); it may be that annoyance varies from day to day or month to month. A longitudinal study, reflecting the range in daily noise impacts, may provide useful information on thresholds of annoyance although such work is bound to require very significant resources in terms of measurement. We consider that annoyance diminishes with decreasing noise levels: it may be that the relationship between prevailing annoyance and minimum and maximum noise impact is more consistent than the threshold has been found to be.

Finally the BRE research recommends using a graphic level recorder connected to the ac output of a sound level meter since reading the display of a sound level meter and writing down the results is too slow and cumbersome. However, to date most clay pigeon shoots have been assessed using the second method, and it has not been found to be too slow. In addition few local authorities and noise consultants have graphic level recorders, so the requirement to use one would make carrying out measurements difficult. Finally most of the available graphic level recorders cannot accurately analyse the ac output to produce a "fast" result.

6 CONCLUSIONS

It seems likely that the BRE assessment method produces shotgun noise ratings between 1 and 6 dBA higher than the CPSA/CIEH assessment method; the difference will depend mainly on the spread of shot noise levels and to a lesser extent on the firing rate.

Any assessment method needs to contain recommendations on how to include within the assessment, variation in noise levels cause by meteorological effects. This should follow an extension to the BRE work based on a longitudinal study of clay target shooting noise.

Further consideration also needs to be given to the practicality of the proposed BRE noise measurement method.

7 REFERENCES

[1] "Clay target shooting, guidance on the management and control of noise, public consultation draft, October 1997", Chartered Institute of Environmental Health, British Shooting Sports Council, Clay Pigeon Shooting Association.

[2] "Draft Code of Practice on Noise from Clay Pigeon Shooting 1989" Clay Pigeon Shooting Association.

[3] "Noise from Clay Target Shooting - Professional Practice Note, draft for consultation June 1993" Chartered Institute of Environmental Health (Withdrawn)

[4] "Code of Practice on Noise from Clay Target Shooting" Midland Joint Advisory Council for Environmental Protection - Fourth Revision August 1994.

FIGURE 1: A Shooting Ground somewhere in the South of England.

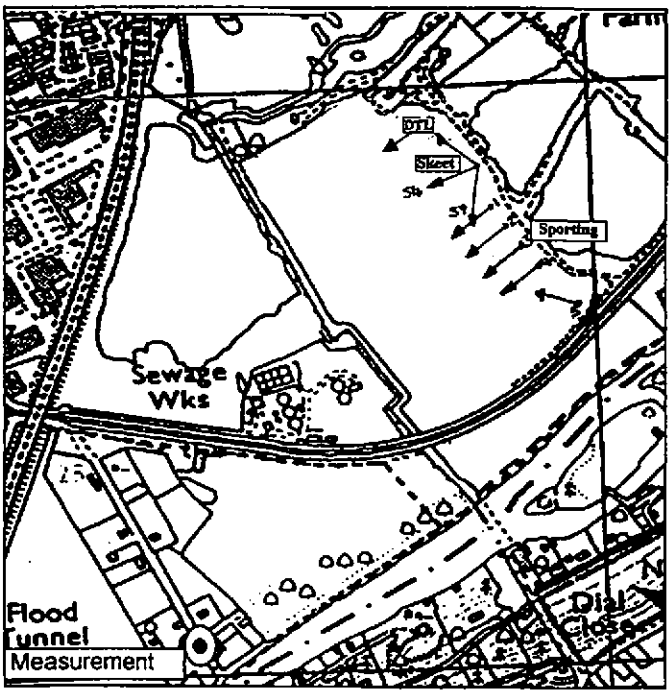

Figure 2: Comparison of the BRE and CPSA assessment methods

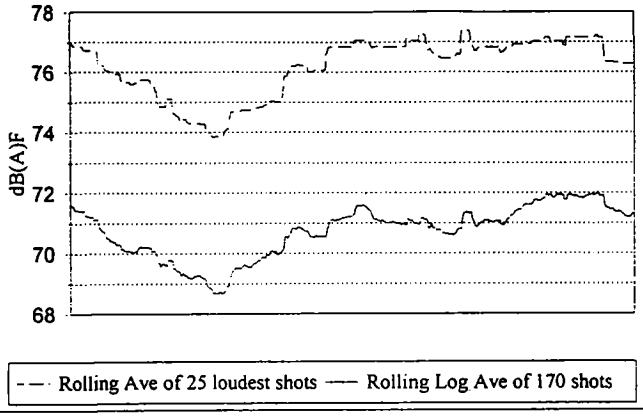

Figure 3

Frequency Distribution of Shots