

## 1. EXECUTIVE SUMMARY

- 1.1.1 There is a public perception that Test, Evaluation, Demilitarisation, and Training support activities (the Range Activities) at the Ministry of Defence (MOD) Land Ranges operated by QinetiQ can produce noise and vibration that may be damaging to property through airborne or seismic shock waves.
- 1.1.2 Southdowns Environmental Consultants Ltd (Southdowns) has been appointed by QinetiQ, on behalf of the MOD, to undertake an independent investigation into whether, and to what extent, Range Activities result in potentially damaging effects to building structures at locations surrounding the Land Range.
- 1.1.3 The measurement of sound pressure levels and ground-borne vibration commenced in the vicinity of the Pendine Range on 3<sup>rd</sup> November 2014 for a period of 6 months at 10 no. off-Range monitoring locations. In addition, 2 no. on-Range monitoring systems were installed within the confines of the MOD Pendine Land Range.
- 1.1.4 A feature of the monitoring equipment deployed, was the use of a GPS clock to synchronise a time base across all monitoring systems deployed. Combined with this was the use of a networked central triggering system which allowed for synchronised triggering between on-Range, and all off-Range monitoring locations, allowing data capture at the off-Range monitoring locations at the precise time of an on-Range Activity.
- 1.1.5 Signal processing techniques were used to analyse the recorded signals captured and test whether a causal link exists between activities occurring on-Range and the signals captured at off-Range locations.
- 1.1.6 The study has identified a 'probable' causal link between Range Activities and measured effects at off-Range monitoring locations, for up to 79% of the triggered activities. If those activities falling into the 'possible' causality category are included, then up to 91% (PEN\_OS3) of the on-Range Activities would show a causal link at off-Range monitoring locations.
- 1.1.7 The results of the study indicate that 96 % (N = 822) of the Range Activity data points captured at off-Range monitoring locations remained below the adopted study threshold for secondary vibration effects including rattling of objects of 120 dB  $L_{Zpeak}$ .
- 1.1.8 Of the remaining 4% (N = 33), the highest measured sound pressure level at an off-Range location which was attributable to a Range Activity was 134 dB  $L_{Zpeak}$ . This falls below the adopted study threshold to prevent glass and plaster damage of 140 dB  $L_{Zpeak}$ , by 6 dB.
- 1.1.9 There is no evidence of appreciable ground-borne vibration (propagation of vibration through the ground) being received at any of the off-Range monitoring locations.
- 1.1.10 Whilst not considered to be directly relevant in cases where vibration propagated through the ground is minimal or absent, nor when building damage risk is the sole consideration, the maximum level at any location also falls below the threshold of 134 dB  $L_{Zpeak}$  recommended by the USBM for blasting regime design purposes as a 'safe' maximum.



- 1.1.11 None of the measurements that relate to confirmed Range Activity at off-Range locations, exceeded the lower action value of 135 dB  $L_{Cpeak}$ , set out in the Control of Noise at Work Regulations 2005.
- 1.1.12 The magnitudes of sound / air overpressure and vibration resulting from the on-Range Activities catalogued during the monitoring period, are unlikely to have resulted in damage to building structures at locations surrounding the Range when compared to the thresholds derived and adopted for this study.
- 1.1.13 The Range Activities observed during the study period have been described by QinetiQ as being representative of typical activities undertaken on the Pendine Range, relating to scheduling, type, size and frequency of firing.
- 1.1.14 As such, based upon consideration of the data gathered and assessment thresholds derived, the continuation of Range Activities under the same conditions of operation and management by QinetiQ would lead to the conclusion that any building damage as a result of activities at the Pendine Range is improbable.