Appendix 6.5 Bat call identification

Recorded bat calls (full spectrum .wav files) were run through Wildlife Acoustics Kaleidoscope Pro auto-identification software, and then the zero-crossings output files were analysed / verified using the Analook software to confirm the identity of the bats present. Where a zero-crossings file was empty, the original full-spectrum (wav) file was checked, to confirm whether or not a bat pass had been recorded. Where possible, the bat was identified to species level. Species of the genera Myotis and Plecotus were analysed to genus level as overlapping call parameters make species identification problematic (Hundt, 2012).

For pipistrelle species the following criteria, based on measurements of peak frequency, were used to classify calls:

- Common pipistrelle ≥ 42 and <49 kHz
- Soprano pipistrelle ≥ 51 kHz
- Nathusius' pipistrelle <39 kHz
- Common pipistrelle / Soprano pipistrelle ≥ 49 and <51 kHz
- Common pipistrelle / Nathusius' pipistrelle ≥ 39 and <42 kHz

Calculation of relative activity

The SM4 detectors were configured to record above the level of ambient noise, such as from wind or rain, and set to define a bat pass (P) as a call note of >2 milliseconds (ms) separated from another by more than one second.

AnalookW (Version 4.2, 2017) software was used to verify bat calls. The software enables analysis of the relative activity (referred to as 'activity' in the text below) of different species of bats by counting the number of bat passes (P) recorded within a unit of time – hour (h) was used. More than one pass of the same species was counted within a sound file if multiple bats were recorded calling simultaneously. During analysis of sound files, it was possible to estimate the minimum number of bats recorded on individual sound files but not whether consecutive sound files had recorded, for example, a number of individual bats passing as they commute to a feeding habitat or one bat calling repeatedly as it flies up and down a feature cannot be distinguished. Although relative abundance cannot therefore be estimated from this analysis, the number of bat passes does provide an indication of the importance of features / habitats to bats by assigning a level of bat activity that is associated with that feature, regardless of the type of activity.

Analysis by sunset-sunrise times

As part of the analysis of nocturnal patterns of behaviour for bats the data were split into discrete time periods relating to their proximity to sunset or sunrise. The time categories (time codes: TC) were as follows:

- TC 0 = before sunset / after sunrise
- TC 1 = 0-20 min after sunset
- TC 2 = 20-40 min after sunset
- TC 3 = 40-60 min after sunset
- TC 4 = 60-80 min after sunset

- TC 5 = 80-100 min after sunset

- TC 6 = 100-120 min after sunset

- TC 7 = Middle of night (varies across seasons)

- TC 8 = 120-100 min before sunrise

- TC 9 = 100-80 min before sunrise

- TC 10 = 80-60 min before sunrise

- TC 11 = 60-40 min before sunrise

- TC 12 = 40-20 min before sunrise

- TC 13 = 20-0 min before sunrise

For each of these categories P/h was calculated to allow a comparison between the activity level recorded in different time periods, and a correction factor was applied to TC7 data to allow for variation in night length throughout the survey season.