Land at Endsleigh and Weston: Possible Development Locations:

Habitat assessment of the potential impacts of possible development locations on the Box, Cheddar, Mells and Bath & Bradford on Avon, and Wye Valley & the Forest of Dean SACs

DRAFT FOR ACCEPTANCE

by

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February 2013

1. The greater horseshoe bat is an endangered species listed on Annex II of the 'Habitats' Directive, brought into UK law by the Conservation (Natural Habitats &c.) Regulations,1994 (as amended); replaced by Schedule 2 of the Conservation of Habitats and Species Regulations 2010, from 1st April 2010. The Habitat Regulations Directive required that Special Areas for Conservation (SACs) were designated in member states as Natura 2000 sites, in order to conserve certain populations of endangered species and threatened habitats.

2. Greater horseshoe bats are conservation dependent, in the UK, since they are at the extreme limits of their geographic range which is determined by climate, suitable roost availability and habitat. Essentially horseshoe bats are Mediterranean in origin, and need to forage at intervals through the winter hibernation period. They also selectively forage on a limited range of nocturnal insects, particularly large moths and dung beetles. Finally, they will only forage over habitats that have the right physical structure. This is normally woodland edge adjacent to some grazed pastures. Alternatively, substantial hedgerows which are tall and at least 3 metres wide, can provide suitable foraging habitat if they border grazed pastures, rather than arable land.

3. Long-term ringing studies have established that these bats move among the SACs listed above. Some of the recorded movements are permanent, involving emigration from one SAC and immigration into another. More frequently, movements involve regular movements from maternity roosts to type III mating winter roosts. It is at these sites, which may be 40 km apart, that gene flow takes place. See section 16 below for more details.

4. Mells Valley is a 28.22 ha site in Somerset (SAC EU code UK0012658; Centroid ST657476). Bath and Bradford on Avon is a 107.16 ha site in Bath and North East Somerset and Wiltshire (SAC EU code UK0012584; Centroid ST834688). The Mells Valley Sac is adjacent to the Bath and Bradford on Avon SAC, and the Iford SSSI (0.39 ha; ST802589). Mells is not designated for its Annex 1 habitats,

but its semi-natural dry grasslands and scrubland facies on calcareous substrates, plus caves that are not open to the public are qualifying features. The primary reason for its SAC designation is the presence of an Annex II bat species. The SAC supports a significant greater horseshoe bat (*Rhinolophus ferrumequinum*) population, including a large maternity roost and hibernation sites nearby, and other unknown sites forming about 12% of the UK population.

5. Iford Manor is an SSSI, (ST802589) designated for its large greater horseshoe bat maternity roost of c240 adults within a barn. It covers 0.39 ha.

6. The Bath and Bradford on Avon SAC covers 107.16 ha, spread between Wiltshire and Bath & NE Somerset (SAC EU code; centroid ST834688. It is not designated for its Annex 1 habitats, nor for any qualifying habitat features. The primary reason for its SAC designationis the presence of two Annex II bat species. As for Mells Valley, this SAC also supports a significantl greater horseshoe bat (*Rhinolophus ferrumequinum*) population, which forms about 15% of the UK population. It includes several maternity roosts and many hibernation sites, mostly located within disused oolitic limestone mines. The second Annex II bat species is the Bechstein's bat (*Myotis bechsteinii*). The Sac contains a number of known hibernation sites for this species, but no known maternity roosts. The Lesser horseshoe bat (*R. hipposideros*) is listed as a qualifying Annex II species for this SAC.

7. Box Mine SSSI – see paragraph 6 above.

8. Cheddar Gorge is a major component of the North Somerset and Mendip Bats SAC which covers 561.19 ha (SAC EU code UK0030052; centroid ST480544). A primary reason for SAC is designation is the presence of two Annex 1 habitats (semi-natural dry grasslands on calcareous substrates and Tilio-Acerian forests of slopes, screes and ravines). A qualifying feature, but not a primary reason for designation, is the presence of many caves not open to the public.
   The presence of two Annex II bats species is a primary reason for SAC designation. They are greater and lesser horseshoe bats. The former forms about 3% of the UK population.

9. The Wye Valley and Forest of Dean Bat Sites SAC covers 142.7 ha (EU code 0014794; centroid SO605044; is split between Gloucestershire and Monmouthshire.) There are no habitat features specified for this SAC, but its exceptional forest habitats are separately designated. The primary reason for SAC designation is because it contains by far, the greatest concentration of lesser horseshoe bats, with 26% of the UK population. The second primary reason is the presence of about 6% of the UK population of greater horseshoe bats.

10. Woodchester Valley SSSI was designated as such due to the presence of a significant maternity roost of some 200 greater horseshoe bats using

Woodchester Mansion. It also contains a colony of some 550 adult lesser horseshoe bats. It lies close to the Forest of Dean, just across the River Severn.

11. The xx ha Endsleigh and the xx ha Weston sites are not part of any SAC; neither are they part of any SSI, such as the one at Iford. However, they are situated close enough to them to have important impact upon their integrities. Furthermore, the foraging and commuting areas of Annex II bats within a SAC are protected even if they are outside it. Normally only radio-tracking studies are able to determine foraging and commuting routes that are associated with specific nursery roosts. Geoff Billington conducted radio-tracking studies of greater horseshoe bats at the Mells nursery roost in June 2000, and at the Byfield Mine nursery roost, Combe Down in May and August, also in 2000. His results for the Combe Down colony showed that some of the radio-tracked bats foraged near Newton St Loe, which is within 2 km of the Weston site. Furthermore, occasional historical mist-netting captures of foraging bats have been made by bird ringers.

12. There have been no field surveys (either radio-tracking or static bat-call activity surveys) to assess the actual use by either foraging or commuting horseshoe bats of these two sites. To date only a day's field visit to assess their habitat quality potential by recording photographic evidence from various accessible points, of Endsleigh and the four zones into which Weston was sub-divided. The visit, photos and a detailed knowledge of the many potential horseshoe bat roost sites present over a wide area, have been combined to make a preliminary judgement of their likely importance to horseshoe bats.

13. The loss of the whole Endsleigh site for greater horseshoe bats is judged likely to have very little impact on the large horseshoe populations known to be present in the SACs and SSSIs. This view is taken since the land is on a high, flat plateau which is very exposed to winds, and no known roosts are within 3-5 km. Its habitat is primarily amenity grassland and buildings. It lacks suitable foraging areas and commuting routes are poor, with frequent large gaps.

14. The loss of some habitats within the four zones of the Weston site for greater horseshoe bats is judged likely to have a potentially significant impact on the large horseshoe populations known to be present in the SACs and SSSIs. This view is taken since much of the land is on steep slopes which are less exposed to winds, especially at lower levels. Furthermore, the slopes are mostly south-west facing. The best habitat includes grazed grassland providing suitable foraging areas and good commuting routes. Other parts of the Weston site is much less likely to be used by foraging horseshoe bats. They are the large fields that lack significant continuous significant hedgerows or woodland edge, and that are very exposed to prevailing south-westerly winds.

15. Most radio-tracking studies carried out in the late 1990's and 2000's have shown that adult greater horseshoe bats usually travel from 3 to 5 km from maternity roosts to foraging areas. However, bats from Dean Hall regularly travelled over 10 km from the roost to forage. Exceptionally these bats can travel up to 22 km from habitat-stressed maternity roosts. The Combe Down R-T study showed that bats foraged at various distances, mainly between 3 & 5 lm, but up to 10.5 km, to the south, east and west of the roost within Byfield Mine, the then location of the maternity roost. Certain foraging areas (11 & 14) and two night roosts were located close to Newton St Loe, near Weston.

16. Another factor that influences the likelihood of even perfect foraging habitats being used by these bats is proximity to day roosts (maternity; winter types 1-3). R-T studies suggest that good habitat over 10 km away is unlikely to be significantly used. Weston is within 2 km of Newton St Loe, and 2.5-3 km from a type 3 mating roost near Upton Cheyney. Hence there is a reasonable chance that bats using these roosts would forage over the better habitats at Weston. If bats travelled from the Mount Pleasant Mine to forage over Weston, they would have to travel about 10 km if they flew around the south-western edges of Bath to arrive there.

17. Long-term ringing studies have shown that individual greater horseshoe bats use various types of daytime roost throughout their lives. They are born within a nursery or maternity roost, and subsequently use up to three types of hibernation roosts (hibernacula) annually. Type 1 hibernacula are usually close to, or even within the nursery roost site, if it is an underground cave or mine system. Clusters of bats, consisting of young of the year, immature bats of both sexes, and mature males in mid winter. Type 2 hibernacula have few young of the year, but clusters of immature bats of both sexes and mature males may occur in mid winter. Type 3 hibernacula are used as mating sites by single mature males which are visited by small groups of mature females in autumn and spring. A viable population needs at least one Type I, several Type 2 and many Type 3 hibernacula associated with its nursery roost. In addition, night roosts may briefly be occupied whilst foraging if the weather deteriorates. Heavy rain and wind will often force them into using small structures, such as porches or open barns that are unsuitable as day roosts, but useful as night roosts.

18. Greater horseshoe bats from different nursery roosts associate at all types of hibernacula. Genetic interchange seems to occur at the mating sites where males from other nursery roosts may meet unrelated females and mate with them. Out-breeding is known to be beneficial to the survival of male greater horseshoe bats, so having many Type 3 sites spread over a wide area is beneficial to all SAC populations (see large-scale map of the Severn Estuary and Bristol Channel).

19. Ringing data from greater horseshoe bats collected over many decades show that these bats can travel up to 110 km between their various roosts. Such long

distances are rare, and usually permanent. However, individuals can regularly travel to and from roosts that are up to 50 km apart. Ringing and DNA studies currently being undertaken show that genetic interchange occurs among all of the nine nursery roosts that exist within a 50 km radius of Bath. Interchange takes place continuously through either mating at Type 3 hibernacula, or from occasional permanent emigration/immigration movements.

20. Obstacles to greater horseshoe bat commuting journeys, both long and short, may involve wide roads, including motorways, large bodies of water, and well-lit areas alongside roads or urban developments. Greater horseshoe bats are known to be particularly vulnerable to their impacts around dusk. However, gaps of about 10 to 12 metres in linear features used by these bats around dusk, seem not to be as important as barriers later on in complete darkness. Ringed greater horseshoe bats have travelled from Brockley Stables to a cave near Uley near Stroud, and from Mells to Woodchester, near Stroud. Such journeys involve crossing at least one motorway. Greater horseshoe bats, even young of the year, regularly cross the M5 motorway and the River Severn to reach important hibernacula in the Forest of Dean from Woodchester Mansion. They seem to be able to cross open water that is at least 150 metres wide, as well as the open areas on either side.

21. It is advisable to minimise any factor that could delay the emergence of bats around dusk, such as street or other lights, because most insects are available at that time, and delays can adversely impact on bat's energy budgets.

22. This preliminary assessment, for the reasons reviewed above, concludes that the Endsleigh site can probably be developed without any significant harmful impacts on greater or lesser horseshoe bat populations in any associated SAC. Parts of Weston that have good foraging habitat and are within 3 km of two known daytime roosts are likely to have some level of use. This level can only be determined by dusk surveys. Lesser horseshoe bats show similar behaviour and roost needs, but commute shorter distances to foraging areas. Their daytime roosts near Weston are unknown, so no assessment of their use of the site is possible without dusk surveys.

BIBLIOGRAPHY

Billington, G. (2000) Radio tracking study of greater horseshoe bats at Mells, near Frome, Somerset in June 2000. *English Nature Research Reports* ***No. 403,*** 1-24.

Billington, G. (2000) Combe Down Greater Horseshoe Bats: radio tracking study Project commissioned by Bat Pro Ltd on behalf of Bath and North East Somerset Council. 1-31 (*unpub.*).

Billington, G. (2002) Radio tracking study of greater horseshoe bats at Brockley Hall Stables

Site of Special Scientific Interest, May – August 2001. *English Nature Research Reports* ***No. 442,*** 3-36..

Billington, G. (2008) Radio tracking study of Greater Horseshoe Bats at Dean Hall, Littledean, Cinderford. *Natural England Research Report* ***NERR012,*** 1-19.

Duvergé, P.L., Rydell, J., Jones, G. & Ransome, R.D. (1999) Functional significance of emergence timing in bats. *Ecography* **23,** 32-40.

JNCC 2011 Bath and Bradford-on-Avon Bats – Special Area of Conservation –SAC – Habitats Directive

JNCC 2011 Mells Valley – Special Area of Conservation –SAC – Habitats Directive

Jones, G. and Billington, G. E. (1999) Radio tracking study of greater horseshoe bats at Cheddar, North Somerset. *English Nature* (*unpub.*) **Contract Ref: F14/01/572** 1-44

Jones, G., Duvergé, P.L. & Ransome, R.D. (1995) Conservation biology of an endangered species: field studies of greater horseshoe bats. In *Bats: Behaviour, Ecology, Evolution* (ed. P.A. Racey & S.M. Swift) Symp. Zool. Soc. Lond. **67,** 309-324.

Ransome, R.D. (1968) The distribution of the Greater horseshoe bat, *Rhinolophus ferrumequinum*, during hibernation, in relation to environmental factors. *J.Zool. Lond.* **154**, 77-112.

Ransome, R.D. (1989) Population changes of Greater horseshoe bats studied near Bristol over the past twenty-six years. *Biol. J. Linn. Soc*. **38**, 71-82.

Ransome, R.D. (1996) The management of feeding areas for greater horseshoe bats. *English Nature Research Reports* **No. 174**, 1-74.

Ransome, R.D. (1997a) The management of greater horseshoe bat feeding areas to enhance population levels. *English Nature Research Reports* **No. 241**, 1-63.

Ransome, R.D. (1997c) Survey of current and historical use by hibernating Greater Horseshoe Bats of the Disused Mines at Combe Down, Bath. *Report to English Nature, Avon & Somerset Team.* **Contract Ref: F14/01/527**.

Ransome, R.D. (1998a) The impact of maternity roost conditions on populations of greater horseshoe bats. *English Nature Research Reports* **No. 292**, 1-80.

Ransome, R.D. 2000. Monitoring diets and population changes of greater horseshoe bats in Gloucestershire and Somerset. *English Nature Research Reports,* **No. 341,**

Ransome, R.D. 2002. Winter feeding studies on greater horseshoe bats. *English Nature*

Research Reports, **No. 449,** 1-47.

Mitchell-Jones, A.J. & Ransome, R.D. (1998) Conserving greater horseshoe bat feeding areas: II. Environmental prescriptions. *Myotis* **36,** 71-76.

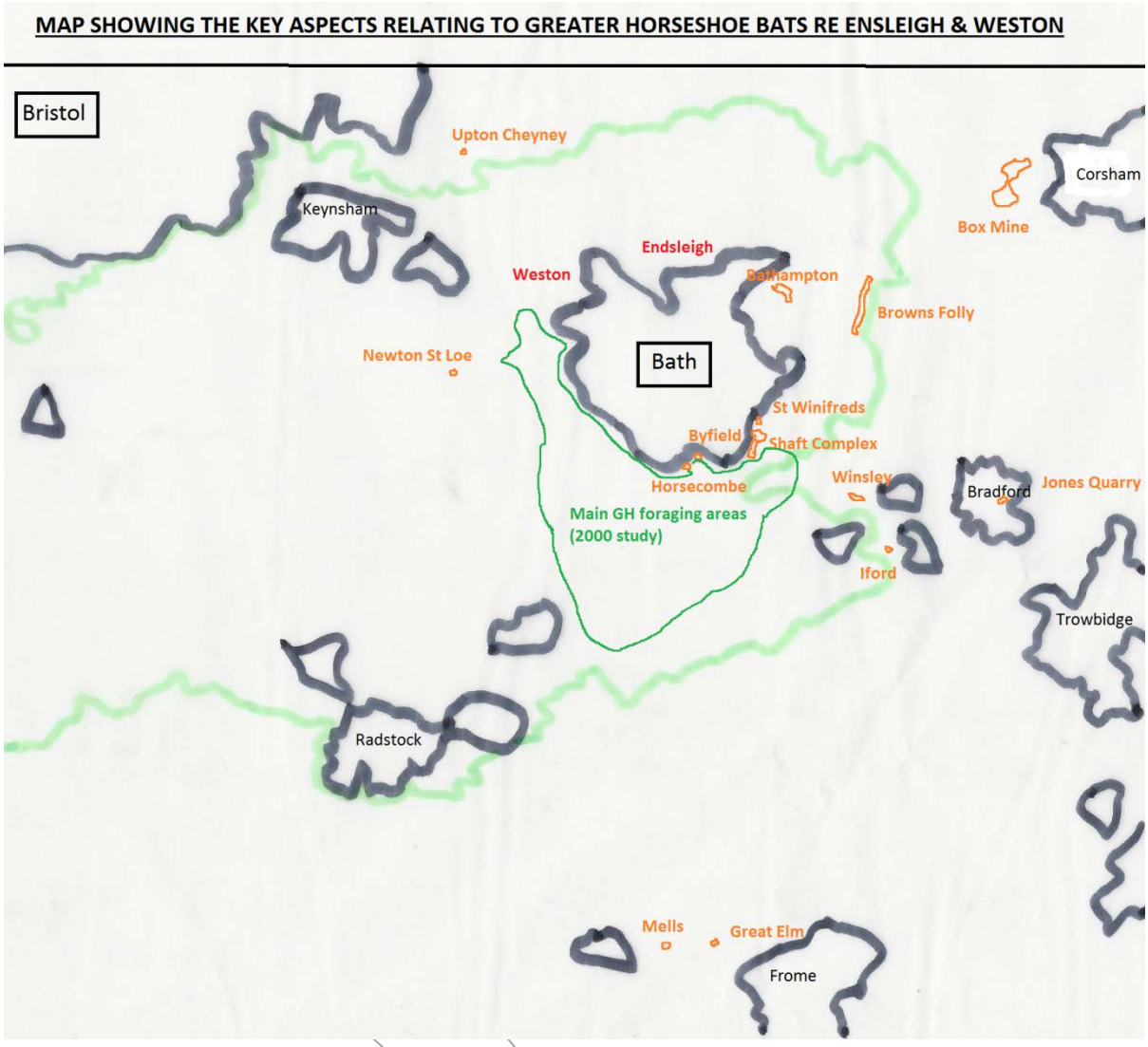
Rossiter, S.R., Jones, G., Ransome, R.D. & Barratt E.M. (2001) Outbreeding increases offspring survival in wild greater horseshoe bats (*Rhinolophus ferrumequinum*). *Proc. R. Soc. Lond. B.* **268,** 1055-1061.

Ransome, R.D. (1990) *The natural history of hibernating bats*. London: Christopher Helm. 235 pages.

Williams, C (2002) The winter activity of the *Rhinolophus hipposideros*, the lesser horseshoe bat. PhD thesis. The Open University. 248 pp.

Archive\Word.docs\BNES\2012 SAC KR\Assessment of use of land at Endsleigh and Weston by GH bats

ASSESSMENT OF THE POTENTIAL USE OF ENDSLEIGH AND WESTON BY GREATER HORSESHOE BATS



KEY: areas defined by black lines = rough limit of urbanised areas

Orange names are GH bat roosts of various types (maternity; hibernacula – types 1, 2 or 3)

Dark green line (thin) defines the main foraging areas discovered in the 2000 radio-tracking study

Green (fat) line is the limit of Bath & NE Somerset Council's region

See also the map showing the spatial distribution of greater horseshoe bat roosts in the areas bordering the Severn Estuary and Bristol Channel.

TABLE ASSESSING THE LIKELY FORAGING USE BY GREATER HORSESHOE BATS OF ENDSLEIGH AND WESTON (BY ZONE)

ASPECT	ENDSLEIGH	WESTON ZONE 1	WESTON ZONE 2	WESTON ZONE 3	WESTON ZONE 4
Height asl metres	231	100 - 140	110 - 160	110 - 150	100 - 125
Slope Aspect	None - flat	W to WSW no valley	SW with valley	SW with valley	SW no valley
Shelter	Very little – only sparse conifers	Variable – very good low down; poor higher up	Mostly poor – few tree-lines	Variable – good low down and along good tree lines. Poor on higher ground.	Mostly good – sheltered slopes with strong hedgerows & tree-lines.
Grazing	None	Horses and sheep over large fields	Not possible to fully assess due to lack of access. Some cattle.	Sheep plus possibly cattle.	Some sheep, but also arable.
Overall bat habitat assessment level (see separate tables)	2	5	2	6	7
Proximity to known horseshoe bat roosts	About 8 km	About 2 km	About 3 km	About 3.5 km	About 4 km
Overall assessment of likely use by GH bats	Very low	Medium at lower levels; low at higher levels	Very low	Low use (due to distance)	Low use (due to distance)

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WESTON ZONES USED: RED LINES SHOW LIMITS (see separate map for Zone 4 complete)

WESTON ZONES USED: RED LINES SHOW LIMITS TO ZONES. MOSTLY ZONE 4 (see separate map for Zones 1-3)