Annex 11.3

South Killingholme Protected Species

(Applied Ecology)

SOUTH KILLINGHOLME PROTECTED SPECIES

Report for

Able UK Ltd

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Contents

1 INTRODUCTION

1.1 BACKGROUND

1.1.1 Applied Ecology Ltd was appointed by Able UK Ltd in July 2010 to complete protected animal species surveys of land adjoining the south bank of the River Humber near South Killingholme, Immingham.

1.1.2 The work was commissioned in response to recommendations made in an extended Phase 1 habitat survey completed by AEL over the period April-May 2010[1]. The land area for which protected species survey work was required by Able UK Ltd is shown by a figure in **Appendix 1**.

1.1.3 Survey work to confirm the presence and distribution of water vole, reptiles and to record general levels of bat activity in the site has been completed. Survey work that details the location of badger setts, and the presence of great crested newt was completed as part of the extended Phase 1 study referred to above.

[1] Applied Ecology Ltd (June 2010) *South Killingholme Phase 1 Ecology Survey*. Report for Institute of Estuarine and Coastal Studies University of Hull issued 9 June 2010.

2 WATER VOLE

2.1 BACKGROUND

Ecology

2.1.1 The water vole *Arvicola amphibius* is distributed throughout Britain, though is scarce in northern Scotland and is absent from Ireland. The species is undergoing a long-term population decline caused by changes in habitat, pollution of watercourses and predation from the introduced American Mink *Mustela vison*.

2.1.2 Water voles occur mainly along well vegetated banks of slow flowing rivers, canals, drainage ditches, and standing water bodies. They eat grasses and waterside vegetation. Water voles excavate extensive burrow systems into the banks of water ways. These have sleeping/nest chambers at various levels in the steepest parts of the bank, and usually have underwater entrances to give the animals a secure route for escape if danger threatens.

2.1.3 Lawns of closely cropped grass, occasionally with small piles of characteristically bitten plant stems, may be found near burrow entrances. Water voles tend to be more active during the day than at night. Male voles live along approximately 130 metres of bank, while females have ranges about 70 metres long. They deposit distinctive lozenge shaped droppings in latrines. Latrine sites made up of dropping piles occur throughout and at the edges of their range during the breeding season.

2.1.4 Water voles usually have three or four litters a year, depending on the weather conditions. In mild springs the first of these can be born in March or April, though cold conditions can delay breeding until May or even June.

Legislation

2.1.5 The protection to water vole under the Wildlife & Countryside Act 1981 (as amended) has been extended since 6 April 2008. This means that water vole is now fully protected under section 9 of the WCA. This legal protection makes it an offence to:

- intentionally kill, injure or take (capture) a water vole;
- possess or control a live or dead water vole, or any part of the water vole;

- intentionally or recklessly damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection or disturb water voles while they are using such a place.
- Sell, offer for sale or advertise for live or dead water voles.

2.1.6 Offences under Section 9 carry a maximum penalty of a fine (currently up to £5,000), imprisonment for up to six months or both. Licences are available from Natural England to allow activities that would otherwise be offences, but there is no provision under the WCA for licencing what would otherwise be offences for the purposes of development, maintenance or land management.

2.1.7 Such activities must be covered by the defence in the WCA that permits otherwise illegal actions if they are the incidental result of a lawful operation and could not be reasonably avoided. In practice this would mean agreeing an appropriate mitigation strategy with the Environment Agency to ensure that unnecessary damage is avoided, and all reasonable steps are taken to minimise impacts on water voles and their burrows as part of development construction.

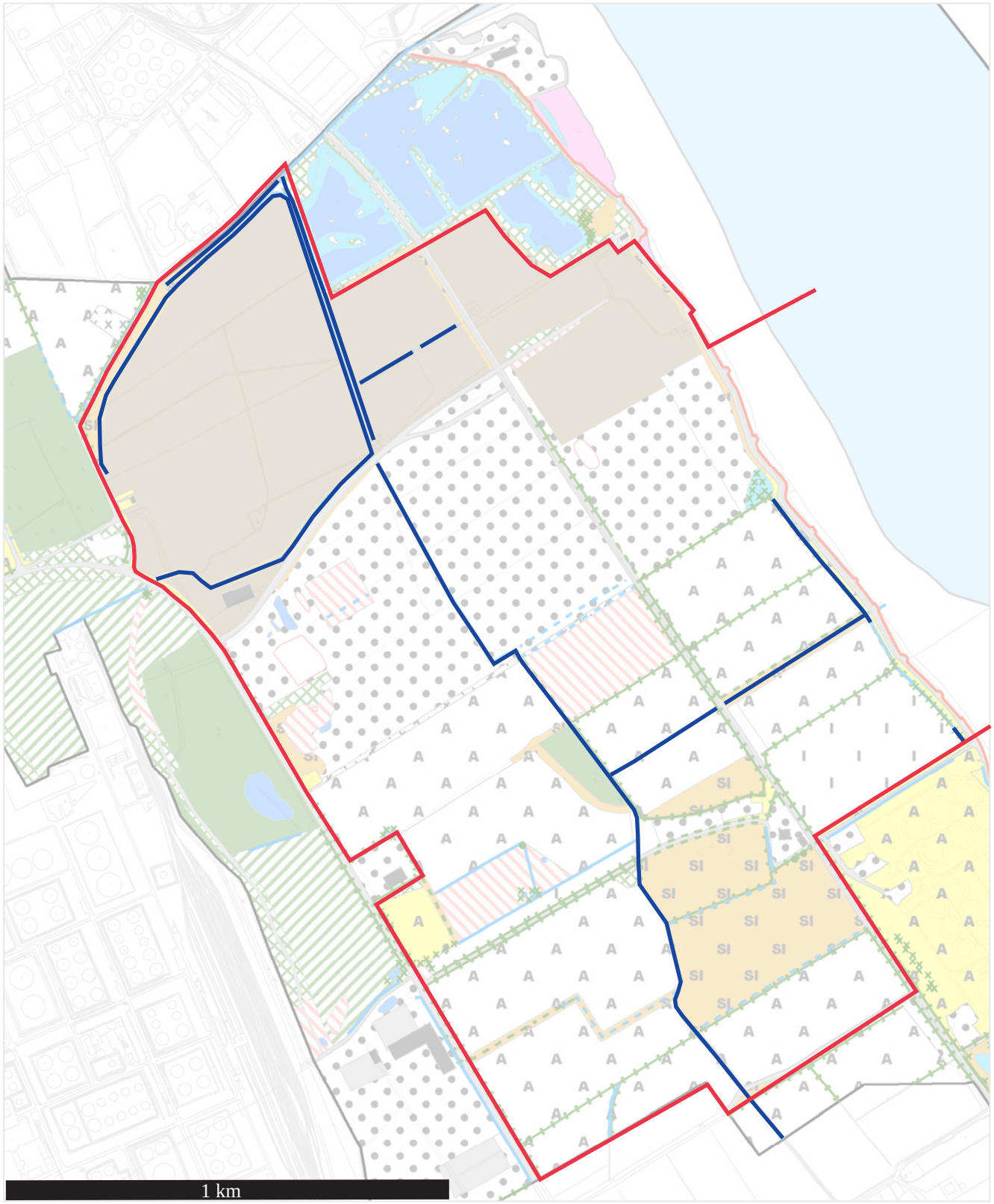
2.2 SURVEY APPROACH

2.2.1 The survey was completed by two experienced AEL ecologists Rick Goater (MIEEM) and Dr Chris Woolley. The survey was conducted on 19, 20 and 21 July 2010 with both surveyors working together as a team for health and safety reasons

2.2.2 Water vole field evidence was searched for along the entire length of the water courses shown by **Figure 2.1**. This comprised the animals themselves, their characteristic bank side burrows and runs, grazed grass lawns around burrow entrances, and small collections of grass and rush stems, bitten off and piled in a manner characteristic of the species. In addition, latrines, consisting of accumulations of water vole droppings, often trodden into a paste by the animals, and also more loosely scattered droppings along bank side runs were searched for.

2.2.3 In order to aid estimation of the numbers of breeding water voles within the site, and to assess their distribution, all latrines and burrow holes found were mapped.

2.2.4 For the most part, the ditches were shallow enough for survey to be carried out with at least one surveyor wading 'in-stream', the other observing from one bank and concentrating his search there, while the wading surveyor concentrated on the other bank. Along most survey sections, bank side vegetation was not so



South Killingholme
Figure 2.1: Water vole survey area

dense that it prevented detailed searching for field evidence. Some though, particularly sections 4, 7, 8 and the west bank of 9 (see results section **Figure 2.2**) presented dense growth of common reed *Phragmites australis* and common couch *Elytrigia repens*, often with bramble *Rubus fruticosus* which, especially if the water was deep, prevented such detailed examination. In these cases, access was achieved, where possible, from the top of the two banks and the ground carefully searched, usually until clear evidence of the presence of water vole was found.

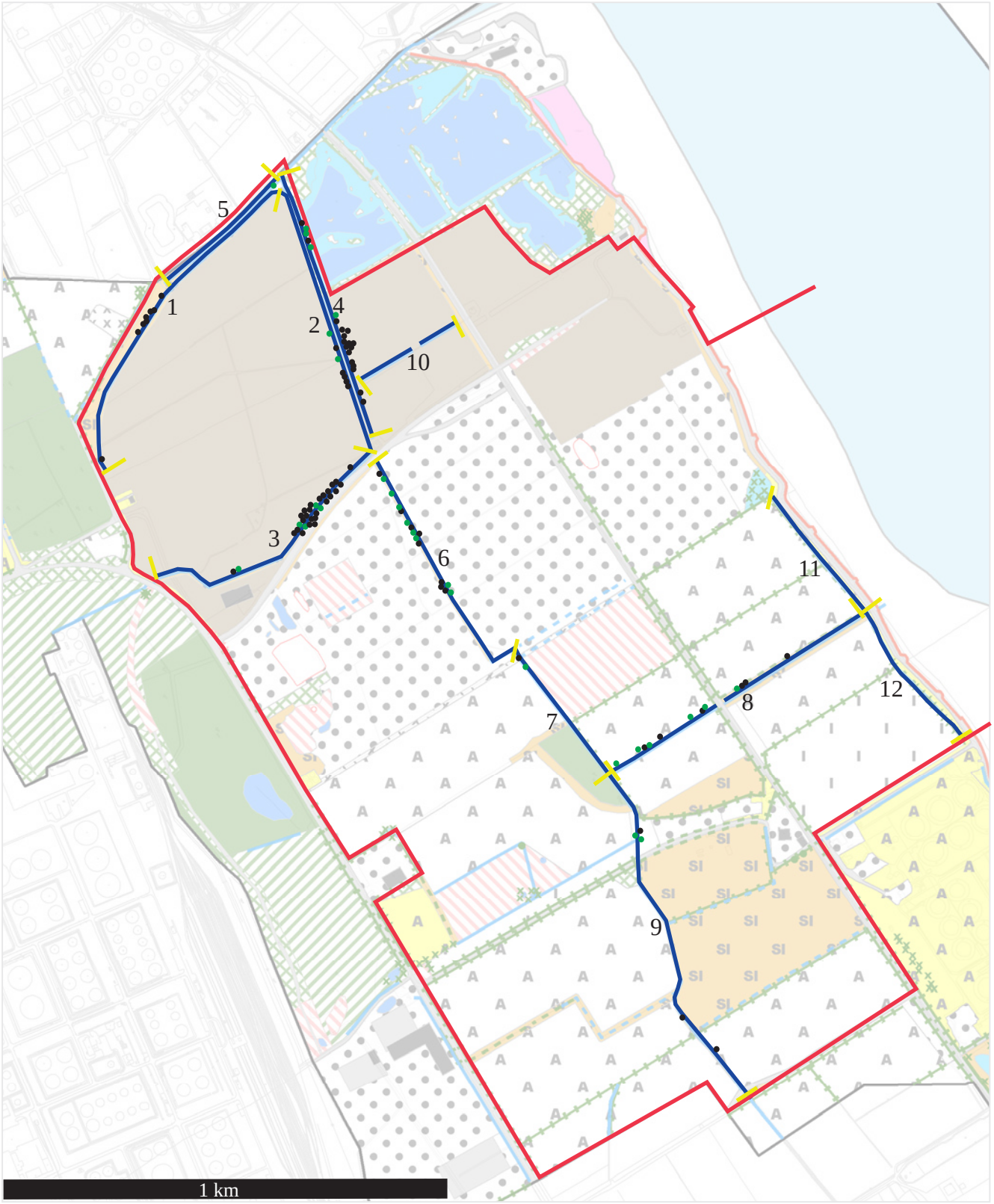
2.3 SURVEY FINDINGS

2.3.1 Evidence of the presence of water vole was recorded along most the site's water courses, with only sections 10, 11 and 12, showing no signs of the species (see **Figure 2.2**). The reed-clad banks of Section 10 (**Photo 1**), which was dry at the time of survey, were made up of the same stone material used to surface the car storage area within which it ran, and this material was not suitable for water vole burrowing. Sections 11 and 12 were also unsuitable for water vole being very shaded by tall reed growth and overhanging hedges, as well as being almost dry throughout and without banks in which voles could burrow.

2.3.2 Twenty-nine water vole latrines (**e.g. Photo 2**) were found within the whole survey area. Using the accepted formula $y = 1.48 + 0.683x$, where y = water vole numbers and x = number of latrines[2], the water vole population on the site was judged to be approximately 22 breeding females. Where deep water and dense vegetation made survey coverage difficult, it is likely that some burrows and latrines will not have been recorded and therefore the figures should be treated as minimum numbers.

2.3.3 Although water vole latrines and burrows (**Photos 3-4**) appeared to be somewhat clustered, most being recorded within sections 1, 2, 3, 4, 6 and 8, clear evidence of the presence of water vole was found almost continuously between these clusters. Runs, probably created by water vole, were present and easily discerned wherever turf and vegetation was present, except in large parts of sections 1, 2, 3, and 5 (whose banksides had been stabilised by netting (**Photo 5**), rendering the habitat less attractive for the species), and the central part of section 4, which was heavily shaded by overhanging hedges and was without suitable water vole food resources.

[2] Morris *et al.* (1998) Estimating numbers of the water vole *Arvicola terrestris*: a correction to the published method. *Journal of Zoology*, **246**: 61 - 62



Black dots indicate approximate positions of water vole burrows
Green dots indicate approximate positions of water vole latrines
Yellow lines demarcate water course section numbersdiscussed in the text

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South Killingholme
Figure 2.1. : Water vole survey results

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Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

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Photo-sheet 1 of 1

Photos taken July 2010

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2.3.4 Section 9 was grazed and poached by cattle on a large part of its eastern bank and no evidence of the presence of water vole was found there. Its opposite bank was heavily vegetated and surveyor access was awkward, but water vole evidence was found there.

2.3.5 Wherever runs were present, in the surveyed sections, scattered water vole droppings were present in large numbers. Evidence in the form of feeding remains (**Photo 6**) was less widespread but was particularly evident along the west bank of section 6 and on both banks of section 8.

2.3.6 The only water vole observed during the survey was an adult on the north bank of the east end of section 5, close to the only latrine present in this section. No other water vole evidence was found along this section, most of which was easy to survey.

2.4 CONCLUSIONS

2.4.1 Water vole is widely distributed in suitable habitat throughout the survey area and any future development involving damage to watercourses and to bankside vegetation could impact negatively on water vole and would require appropriate mitigation and compensation as necessary.

3 REPTILES

3.1 BACKGROUND

3.1.1 All UK native reptile species are protected by law. The Wildlife & Countryside Act 1981 (and later amendments) provides the legal framework for this protection. Sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca* are rare species that have restricted distributions in the UK and the greatest level of legal protection. Neither of these species would be expected to occur at the South Killingholme site on the basis of their known distributions in the UK.

3.1.2 The more widespread and common reptile species, namely common lizard *Lacerta vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix natrix*, and adder *Vipera berus* are protected against deliberate or reckless killing and injury. Natural England (formerly English Nature[3]) considered that reptiles are likely to be threatened and the law breached by activities such as the following:

- Archaeological and geotechnical investigations
- Clearing land, installing site offices or digging foundations
- Cutting vegetation to a low height
- Laying pipelines or installing other services
- Driving machinery over sensitive areas
- Removing rubble, wood piles and other debris.

3.1.3 Under the Wildlife & Countryside Act 1981, a conviction can result in a fine, and/or up to six months imprisonment for each offence. Harm to more than one animal may be taken as separate offences.

3.2 SURVEY APPROACH

3.2.1 Locations considered to present potentially suitable habitat for reptiles were identified during the initial extended Phase 1 habitat survey. These comprised south-west facing grassy bank and ditch-side habitats of the tidal river defences bordering the east of the survey area, sunny grass and scrub-edge habitats associated with the railway line running from north to south through the site, some ditch-side grassland within the north-central part of the site and tussocky

[3] English Nature (2004) *Reptiles: guidelines for developers*.

grassland banks within arable land near the east of the site. These areas were surveyed for the presence of reptiles using artificial refugia.

3.2.2 A total of 146 artificial reptile refugia, made of roofing felt (dimensions approximately 1m x 0.5m), were placed within the identified habitat areas on 20 July 2010, in locations judged to provide attractive conditions for reptiles to bask and shelter as indicated in **Figure 3.1.**

3.2.3 The refugia warm up in the sun, providing conditions both below and on top for reptiles to absorb heat after periods of relative cold. Thus they are good places to check for the presence of reptiles after sun rise and after sun shine following periods of cool or rainy weather. Spring and autumn are regarded as the optimal times for checking refugia, but reptiles will use them throughout their active period.

3.2.4 The refugia were checked on seven separate occasions for the presence of reptiles over the period 24 August – 15 September 2010 at a time of year and in weather conditions that were conducive for reptile activity on or under refugia.

3.2.5 Survey visits were completed as follows:

24 August (two checks)– 0830-1030 and 16.30-17.30 in overcast and sunny weather conditions between occasional rain showers – air temp varied between 12.8 and 16.9^{0}C – average wind speed 1.3m/s

25 August (two checks) – 08.00-10.00 and 16.00-17.00 in sunshine with clouds – air temp 16.5 and 21.1^{0}C – average wind speed 0.9m/s

14 September (two checks) – 9.00-11.00 and 16.00-17.00 overcast, air temperature 15.6-17.2^{0}C - average wind speed 2.2m/s

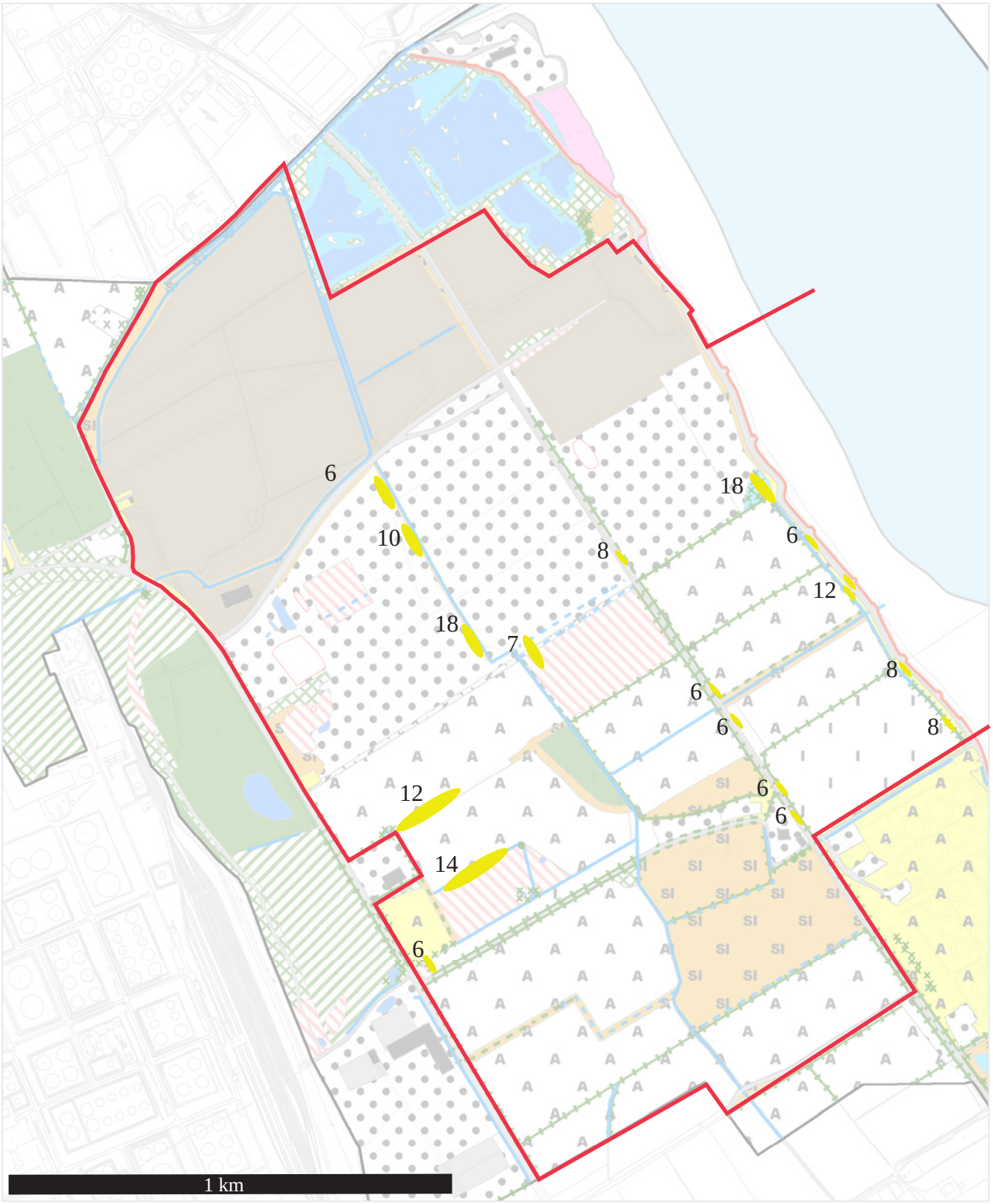
15 September (one check) – 09.30-11.00 overcast, 16.6-17.4^{0}C - average wind speed 2.9m/s.

3.3 SURVEY FINDINGS

3.3.1 No reptiles were found on or under any refugia on any of these occasions, and no reptiles were seen while walking between refugia in any location.

3.4 CONCLUSIONS

3.4.1 On the basis of the current survey findings, it does not appear that the site



Key

6 Reptile refugia locations and number of refugia at each site shown

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South Killingholme

Figure 3.1 : Locations of reptile refugia

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supports a large or important population of reptiles, and if reptiles are present they are likely to be so in very low numbers.

3.4.2 On the basis of the habitats present, we would anticipate that the site supports Grass Snake *Natrix natrix*, but as highlighted above if this species is present, it is clearly not present in numbers that would be of material concern with respect to future development within the site.

4 BATS

4.1 BACKGROUND

Ecology

4.1.1 The distribution and conservation status of the 17 species known to occur in mainland UK are shown in **Table 1.**

Table 1: Distribution and conservation status of the 17 bat species known to occur in mainland UK (Status from Hutson[4] and the Bat Conservation Trust[5])

COMMON NAME	SPECIES NAME	DISTRIBUTION/STATUS	IUCN STATUS
Natterer's Bat	*Myotis nattereri*	Widespread/Frequent	Vulnerable
Daubenton's Bat	*M. daubentonii*	Widespread/Common	Not threatened
Whiskered Bat	*M. mystacinus*	Widespread/Scarce	Vulnerable
Brandt's Bat	*M. brandti*	Widespread/Scarce	Vulnerable
Bechstein's Bat	*M. bechsteinii*	Restricted/Rare	Vulnerable
Greater Mouse-eared Bat	*M. myotis*	Classified as extinct within U.K.	Vulnerable
Soprano Pipistrelle Bat	*Pipistrellus pygmaeus*	Widespread/Common	Not threatened
Common Pipistrelle Bat	*P. pipistrellus*	Widespread/Common	Not threatened
Nathusius' Pipistrelle Bat	*P. nathusii*	Unknown	Not threatened
Brown Long-eared Bat	*Plecotus auritus*	Widespread/Common	Not threatened
Leisler's Bat	*Nyctalus leisleri*	Widespread/Scarce	Vulnerable
Noctule Bat	*N. noctula*	Widespread/Common	Not threatened
Serotine Bat	*Eptesicus serotinus*	Restricted/ Frequent	Vulnerable
Barbastelle Bat	*Barbastella barbastellus*	Restricted/Rare	Endangered
Greater Horseshoe Bat	*Rhinolophus ferrumequinum*	Restricted/Rare	Vulnerable
Lesser Horseshoe Bat	*R. hipposideros*	Restricted/Rare	Vulnerable
Grey Long-eared Bat	*Plecotus austriacus*	Restricted/Rare	Not threatened

4.1.2 The Bat Conservation Trust (BCT) website lists six of the 17 species that have been identified by the UK Government as needing special conservation help due to their rarity or significant decline. All six species have Species Action Plans

[4] Hutson, A.M. (1993) Action Plan for the Conservation of bats in the United Kingdom,
[5] The Bat Conservation Trust, accessed at www.bat.org.uk.

(SAPs). These plans have the objective of increasing their existing population levels through protecting and enhancing the quality of their roosting and foraging habitats. Plans exist for the following species:

- Greater Horseshoe Bat (*Rhinolophus ferrumequinum*);
- Lesser Horseshoe Bat (*R. hipposideros*);
- Bechstein's Bat (*Myotis bechsteinii*);
- Barbastelle Bat (*Barbastella barbastellus*);
- Soprano Pipistrelle Bat (*Pipistrellus pygmaeus*);
- Brown Long-eared Bat (*Plecotus auritus*); and
- Noctule (*Nyctalus noctula*).

4.1.3 The majority of the bats found in mainland UK all belong to the family Vespertilionidae. Although each species may have its own specific preferences for the structures it uses for roosting, and different dietary and foraging habitat needs, all of these bats show a common life history and annual cycle of behaviour. These include the following characteristics and/or events.

4.1.4 All bats use torpor to save energy whenever food supplies are scarce. Torpid bats use less than 1% of the energy used by active bats, even when resting. Winter torpor, or hibernation, involves extended torpor for many days. It generally occurs between November and April. Winter roosts must provide cool, damp conditions. Such conditions occur in underground structures such as caves, disused mines and tunnels.

4.1.5 When fully active, bats must have access to large amounts of insect food supplies. Individuals may need to eat over 50% of their body weight per day. This particularly applies to females nursing young. Summer roosts must provide bats with warm conditions to reduce the costs of regulating their body temperature. Normally bats congregate in colonies in summer to share the costs of keeping warm. Maternity colonies are the largest. They may use holes and crevices in trees or building attics as summer roosts, especially those warmed by the sun.

4.1.6 Some bat summer roosts contain only a few, or even a single bat. Mature males often occupy such roosts as mating sites.

4.1.7 Bats normally use the same summer and winter roosts, especially maternity roosts and hibernation sites, on an annual cycle over long time periods. Species that use

trees for roosting are most likely to use a number of different summer roosts. Some bat populations have been shown to occupy 19 different roosts in a single summer.

4.1.8 Bat reproduction is unique among mammals. Bats usually mate in the autumn and early winter, but sometimes also in spring. Males may advertise for females from their roosts using social calls (Pipistrelles, Noctules, Leisler's), or visit underground swarming sites and wait for females to arrive (*Myotis* bats, Brown long-eared, Serotines). Sperm is stored until the spring by both sexes.

4.1.9 Fertilization occurs in spring, and pregnancy proceeds up to June, when single births occur. Poor weather (cold, or wet and windy) prevents bats from feeding at any time of the summer. The use of torpor to survive poor weather may prolong a female's pregnancy and/or reduce her milk supplies during lactation. Hence climatic conditions affect reproductive performance survival and ultimately population levels over time.

4.1.10 Numbers at maternity colonies peak between June and mid August, when climate and insect availability are normally most favourable. The single young are large (about 20% or more of the mother's body weight) at birth and grow rapidly. They are fully grown and weaned by about 45 days after birth. By late August large maternity colonies have dispersed; the bats moving to alternative summer roosts. In September and October, bats mate and store fat for winter hibernation.

Legislation

4.1.11 All UK bat species are protected by two separate legislative frameworks: the Conservation (Natural Habitats, &c.) Regulations 1997 and the Wildlife and Countryside Act 1981, as amended,

4.1.12 Under Section 39 (part 1) of the amended Regulations a person commits an offence if he:

> *"(b) deliberately disturbs wild animals of any such species [i.e. a European Protected Species] in such a way as to be likely significantly to affect:*
>
> *I. the ability of any significant group of animals of that species to survive, breed, or rear or nurture their young; or*
>
> *II. the local distribution or abundance of that species."*

4.1.13 Although the term a 'significant group' cannot easily be defined, and may vary between species, the construction of this limb of the offence clearly excludes individual animals from its scope.

4.1.14 A person would also commit an offence under Section 39 if he:

> "*(d) damages or destroys a breeding site or resting place of such an animal [European Protected Species].*"

4.1.15 Destruction or damage to a bat roost, whether a bat is present or not, would constitute an offence as bats return to the same places year after year, and there are no qualifications, exemptions or defences for this apart from a licence (see below). Any degree of damage could qualify as an offence and there is no threshold of 'significant' as for the deliberate disturbance offence. Section 39 (part 11) goes on to state that a person guilty of an offence "*is liable on summary conviction to imprisonment for a term not exceeding six months or a fine not exceeding level 5 on the standard scale, or to both.*"

Licences

4.1.16 In England, such offences can be licensed by Natural England for a number of purposes set out in regulation 44. These include 'imperative reasons of over-riding public interest', which could cover the deliberate significant disturbance or destruction of a bat roost during development operations. Licences can only be issued where there is no satisfactory alternative and where the action authorised will not adversely affect the conservation status of the species involved. Section 9 of The Wildlife & Countryside Act, 1981 (as amended) make a person guilty of an offence if intentionally or recklessly:

(a) he damages or destroys any structure or place which any wild animal on Schedule 5 [all bat species] uses for shelter or protection;

(b) he disturbs any such animal while it is occupying a structure or place which it uses for shelter or protection; or

(c) he obstructs access to any structure or place which any such animal uses for shelter or protection.

4.1.17 The existence of two separate disturbance offences in two separate legislative frameworks presents a challenge of interpretation and application. Neither can be dismissed as they both operate in rather different ways. The offence in the

Regulations does not apply to non-significant disturbance and seems unlikely to apply to individual bats, but is licensable for development purposes, particularly with respect to damage or destruction of a bats breeding site or resting place. The offence in the WCA applies to individual animals, but only in places of shelter or protection, is not licensable for development, but is subject to two important defences. These are:

1. that the action took place within a dwelling-house; or
2. that the act was the incidental result of a lawful operation and could not reasonably have been avoided.

4.1.18 For bats, these defences cannot be relied upon, except in the living-area of a dwelling–house, unless Natural England have been notified and allowed a reasonable time to advise on whether the proposed operation should be carried out and, if so, the method to be used.

4.2 SURVEY APPROACH

4.2.1 It has been confirmed by Able UK Ltd that development proposals will not involve the removal or refurbishment of any existing building or built structure within the site, and no significant adverse impacts are therefore expected to occur to building roosting bats.

4.2.2 In the absence of any development information, the focus of the current bat survey was to get a better understanding of the use of the site by bats and in particular to assess the range of species that use the site and levels of activity.

4.2.3 Two bat activity surveys have been completed using automated bat detectors (Anabat SD1 and SD2 models) located in a range of habitats considered to be of greatest potential value to foraging bats within the site. The surveys have been completed on 24 July and 24-25 August 2010.

4.2.4 The 24 July survey commenced 15 minutes before sun set (sun set was at 21.12) in dry weather conditions (air temperature 16.5 Degrees Celsius) and a light wind (average wind speed – 0.7m/s) and continued for 2.5 hours before the detectors were removed from site because of weather predictions for rain in the night.

4.2.5 The 24 August survey commenced 15 minutes before sun set (sun set was at 20.10 air temperature 14.3^{o}C, average wind speed 0.7m/s) and continued throughout the night with the detectors programmed to switch off at 30 minutes after sun rise

after which point they were removed.

4.2.6 No rain fell at any point during either survey, and conditions were suitable for bats to be active throughout.

4.2.7 A total of six Anabat bat detectors, positioned across the site in the locations shown by **Figure 4.1**, were used on each survey occasion. Each detector was raised off the ground to a minimum height of 1.5m with their microphones pointing sky ward. Cable ties were used to firmly attach the detectors to the limb of a tree or another fixed structure top prevent them moving during the survey or being disturbed by animals on the ground. This six survey locations can be summarised as follows:

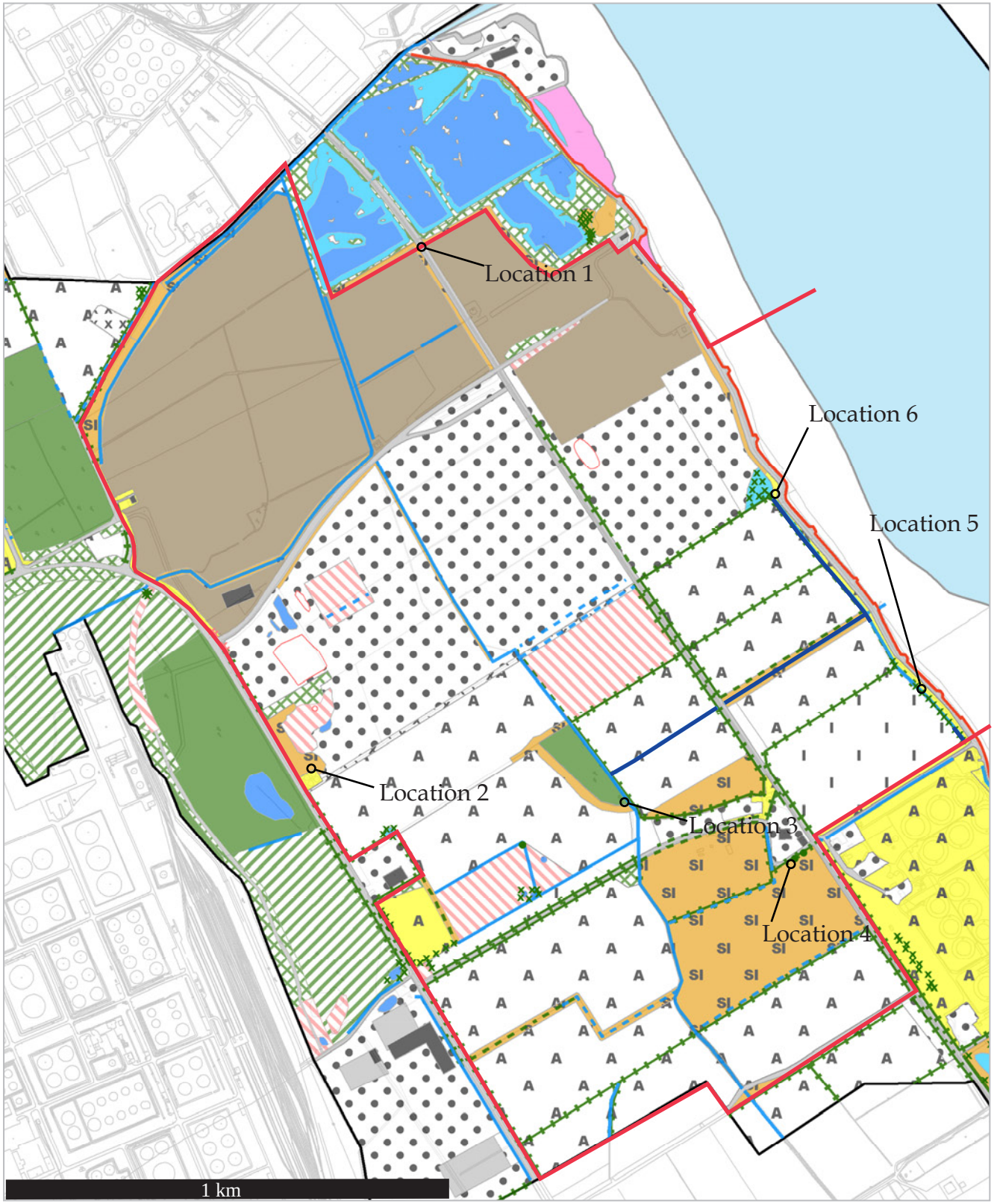
- Location 1 – rail bridge over ditch with dense hawthorn dominated scrub bounding of standing water, swamp and lagoon to the north
- Location 2 – scrub next to Sewage Treatment Works northern boundary
- Location 3 – between water filled drainage ditch on the edge of broadleaved woodland block
- Location 4 – Hedgerow along cattle grazed pasture
- Location 5 – Hedgerow behind river wall
- Location 6 – Scrub and swamp behind river wall

4.2.8 All bat calls were downloaded onto a PC and analysed using Analook software in an attempt to establish bat species.

4.3 SURVEY FINDINGS

4.3.1 The table overleaf summarises the results of the two surveys and verifies that a minimum of five bat species were making use of the site over the survey period. These were in order of call abundance:

- Common pipistrelle *Pipistrellus pipistrellus*
- Noctule or Leisler's bat *Nyctalus* sp
- *Myotis* sp.
- Soprano pipistrelle *Pipistrellus pygmaeus*



South Killingholme

Figure 4.1: Locations of Anabat detectors - July & August 2010

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- Brown Long-eared bat *Plecotus auritus*.

4.3.2 No bat calls were recorded at times after sun set to suggest the presence of a bat roost located close to any of the six recording positions. For example *Nyctalus* bats typically emerge from their roosts early often at or just after sun set. The earliest recorded call of this species group was at 32 minutes after sun set (average 37 minutes, range 32-46 minutes), suggesting the bat had commuted from a day roost location a considerable distance from the site – possibly from a location to the north of the River Humber.

4.3.3 The average first recording time for the most commonly recorded bat species, Common Pipistrelle, was 74 minutes after sun set (range 47-124 minutes). This species also emerges relatively early from their day roosts – normally around 15-30 minutes after sun set, but frequently much earlier. Again the late first contact time for this species suggests that it had not been day roosting close to any of the recording positions during the survey. However, the last call at 05.08 in the morning on 25 August at Location 3 suggests that its day roost location was not far from the detector (possibly in the adjoining woodland) as it would have been light at that time in the morning and the bat was clearly still foraging at that time.

4.3.4 The majority of the recording locations, namely the two along the southern edge of the River Humber (Locations 5 & 6), the hedgerow alongside the cattle pasture (L4) and the scrub next to the STW (L2) consistently recorded very few bat calls on both survey occasions indicting that the site as whole is not of particularly high importance for foraging bats.

4.3.5 Locations 1 and 3 appeared to offer the most optimal conditions for bats and were both relatively "busy" during periods of the night with a Common Pipistrelle bat or bats foraging close to the detectors.

Table 4.1: Summary results of bat activity surveys completed in July & August 2010

	First Bat	Species
Location 1 – July	*Nyctalus* (32 minutes after sun set) *P. pipistrellus* (124)	*Nyctalus* sp (Occasional : calls between 21.44 and 23.11) *Plecotus auritus* (Rare: call at 23.06) *P. pipistrellus* (Rare: call at 23.16)
L1 – August	*Nyctalus* (46) *P. pipistrellus* (47)	*Nyctalus* (Rare: call (commuting) at 20.56) *P. pipistrellus* (Frequent: calls (foraging) from 20.57 until 00.43) *P. pygmaeus* (Rare: calls at 02.06 and 04.14) *Myotis* sp. (Rare: call at 03.23)
L2 – July	*Pipistrellus pipistrellus* (57) *Myotis* sp. (143)	*P. pipistrellus* (Rare: calls at 22.09, 22.58 & 23.06) *Myotis* sp. (Rare: call at 23.35)
L2 - August	*Pipistrellus pipistrellus* (47) Myotis sp. (97)	*P. pipistrellus* (Rare: calls at 20.57, 21.08 & 21.22) *Myotis* sp. (Rare: calls at 21.47, 00.42 & 02.50) *P. pygmaeus* (Rare: calls at 00.45 & 01.28)
L3 - July	*Pipistrellus pipistrellus* (61)	*P. pipistrellus* (Rare: calls at 22.13 and 22.30)
L3 – August	*Pipistrellus pipistrellus* (68)	*P. pipistrellus* (Frequent: calls (foraging) from 21.18 until 05.08) *P. pygmaeus* (Rare: calls (foraging) at 03.48-03.49)
L4 - July	No bat calls recorded	-
L4 - August	*Pipistrellus pipistrellus* (78)	*P. pipistrellus* (Occasional: calls 21.28 until 03.03)
L5 - July	*Pipistrellus pipistrellus* (80)	*P. pipistrellus* (Rare: calls between 22.32-22.33)
L5- August	*Nyctalus* (34)	*Nyctalus* (Rare: call at 20.44)
L6 - July	No bat calls recorded	-
L6 – August	*Nyctalus* (35) *P. pipistrellus* (104) *Myotis* sp. (348)	*Nyctalus* (Rare: calls 20.45-20.47) *P. pipistrellus* (Rare: calls at 21.54(foraging) and 01.50) *Myotis* sp (Rare: single call at 01.58)

4.4 CONCLUSIONS

4.4.1 In general terms the site appears to be of low relative value to foraging bats. This can probably be explained by the fact that large expanses of land within the study area are very exposed and are devoid of habitats that generate large quantities of insect food that would make them attractive locations for bats to feed. The apparent exceptions to this are areas of open water, notably the drainage ditch network, and lagoon/swamp habitat, and broadleaf woodland which all appear to be of high relative value to bats in the local area.

4.4.2 The survey findings infer that the site is not particularly important for roosting bats. However, the survey was designed to sample habitats considered to offer bats with the best foraging opportunity within the site, and did not take into account possible roost locations in its design. Detailed inspections of buildings and mature trees would be required before anything more definitive and reliable on the status of bat roosting within the site could be said. Such survey work is only recommended if buildings and mature trees / woodland are likely to be impacted by development proposals moving forward – either directly through demolition/habitat loss or indirectly through increased illumination after dark.

Appendix 1

KEY

Rev	Date	Description	By	Chk	App
A	04/06/10	Preliminary Issue	RK	RC	RC

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Project: ABLE

Client: ABLE UK Ltd

Title: 2009 Aerial Photograph

PRELIMNARY

Scale:	Drawn By	Checked By	Approved By
1:5,000@A1	R Keirl	R Cram	R Cram
Date:	04/06/2010	04/06/2010	04/06/2010

Drawing No. KI - 92025

Revision: A