Our ref: W4361_let_White Cross Farm_17-07-24

Your ref: Land at White Cross Farm, Wallingford

Ecological Consultancy for Planning
Research & Development

Simon Heaton
Planning Consultant
Heaton Consulting
07958 043814
simon@heatonsconsulting.com
by email only

17th July 2024

Dear Simon,

Re: Site Walkover & Update 2024 – Proposed Sand and Gravel Extraction at Land at White Cross Farm, Wallingford

I am writing to you following an ecology site walkover and updated habitat survey that I undertook on 11th July 2024.

I can confirm that there has been no significant change in the status of habitats since the previous ecological appraisal was undertaken and formally reported in support of this planning application.

The majority of the southern area of the site is still in cultivation, with areas of arable land and agriculturally improved grassland. Areas of semi-improved grassland and marshy grassland are still present within the northern areas of the site, with grazing by cattle creating floodplain grazing marsh. All of other habitats, including scrub, the building, wet and dry ditches and trees, also remain unchanged. I attach some photographs to the end of this letter to confirm the above.

Given that there has been no significant change in habitat status, it is considered that the ecological baseline upon which the existing ecological impact assessment is based is robust. There is considered to be no change in the status of notable and protected species since this previous baseline was established, and no need to undertake any further protected species surveys or assessments.

It is my understanding that there have also been some very subtle changes to the Conceptual Restoration Plan, the most recent version being V3. The changes are limited to the proposed areas of reedbed and wet woodland, where there has been a minor change the relative areas of these two proposed habitats.

Both of these habitats are habitats of ‘high distinctiveness’ and thus, both habitats will deliver the same number of Habitat Units within the Statutory Biodiversity Metric. Given this, the minor change in the relative areas of these two habitat types will have no change on the outcome of the Metric calculation for Biodiversity Net Gain.

So, in conclusion, the existing ecological baseline is solid and robust, and there is no recommendation to undertake any further ecology surveys. The minor changes to the Conceptual Restoration Plan will not result in any changes to the outcome of the biodiversity net gain assessment.

I trust this brief report is sufficient for your records.

Yours sincerely,

Edward Bodsworth **MA (Cantab) PhD MCIEEM**
DIRECTOR

Marshy grassland

Mature poplar tree and semi-improved grassland

Bank of the River Thames

Existing building

Dense scrub

Improved grassland

Our ref: W4361_let_White Cross Farm_02-02-22

Your ref: Land at White Cross Farm, Wallingford

Ecological Consultancy for Planning
Research & Development

Simon Heaton
Planning Consultant
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07958 043814
simon@heatonsconsulting.com
by email only

2nd February 2022

Dear Simon,

Re: Further Information Request – Proposed Sand and Gravel Extraction at Land at White Cross Farm, Wallingford

I am writing to you with regard to the further information request from Oxfordshire County Council in their letter dated 22nd November 2021 under Regulation 25 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, reference MW.0115/21.

Within that letter, further information was requested on the following four topics:

- Confirmation whether the tree identified as a potential Black Poplar is to be retained.
- Confirmation of presence or likely absence of invasive species within the site.
- Clarification regarding discrepancies between the area values and habitat types detailed in the Biodiversity Metric and those within the Restoration Strategy.
- A proposed habitat plan with the habitat types labelled as per the biodiversity metric

I am hoping that the following information will provide the necessary information.

Black Poplar Tree
I can confirm that the tree identified as a black poplar is to be retained, and is correctly identified as a black poplar.

Invasive Species
No non-native, invasive plant species have been found within the site.

Photograph 14 of the ecology report, which is of a wet ditch, is not particularly clear but does not show New Zealand pygmyweed *Crassula helmsii*, but is showing a mixture of native species including water mint *Mentha aquatica*, fool's water-cress *Apium nodiflorum*, and brooklime *Veronica beccabunga*.

Discrepancies in the Biodiversity Metric
There are some 'discrepancies' between the area values and habitat types detailed in the Biodiversity Metric and those within the Restoration Strategy, but these should be explained through the attached proposed habitats map.

The differences are mainly down to how different habitats are categorised, and inputted, into the Metric which has its own categorisation system that the Restoration Plan does not strictly follow.

The following points should be noted.

- We calculate less proposed agricultural area than the Restoration Plan. This is because we have measured the agricultural area (cereal crops) as running to the edge of cultivated land, and have calculated the field margins as separate habitat. We assume the restoration plan puts these habitats together.
- We give more area as reedbed, this is because we have combined the mesotrophic lake and reedbed into one habitat (as they are likely to function as one habitat, and unlikely to be distinct habitats in our opinion).
- The total site area should be the same.
- The Restoration Plan maps individual trees in the restoration plan. We have included these in linear habitats for the Metric calculation.
- The Restoration Plan shows deciduous woodland creation. We have included this as creation of hedgerow with trees, which we have included as a linear habitat.

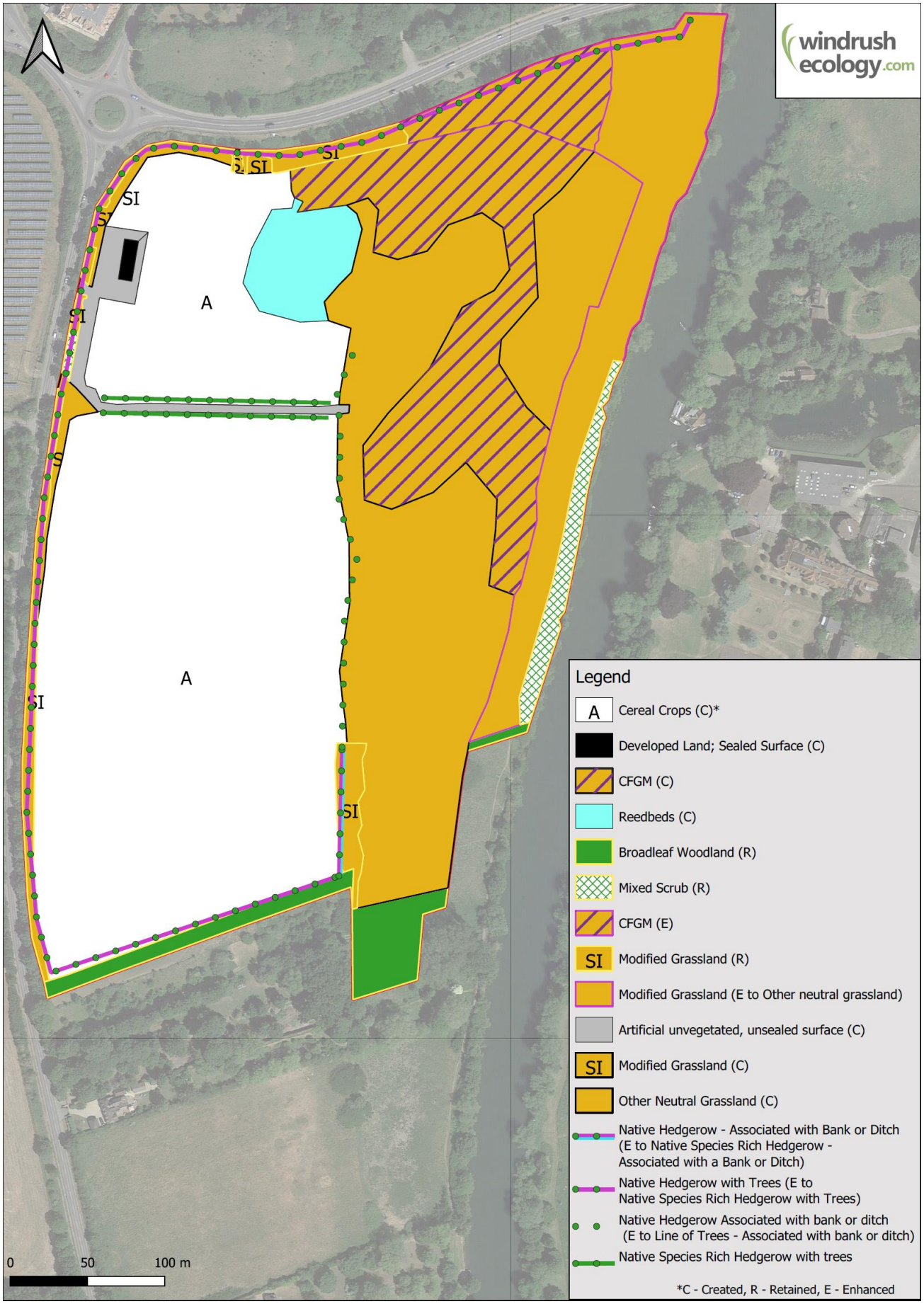
I have attached the Metric calculation, in its Excel format.

Proposed Habitat Plan
I have attached this as a PDF, but have included a copy below.

I hope that this provides the necessary detail, as requested.

Yours sincerely,

Edward Bodsworth **MA (Cantab) PhD MCIEEM**
DIRECTOR


windrush ecology.com
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Legend
A Cereal Crops (C)*
Developed Land; Sealed Surface (C)
CFGM (C)
Reedbeds (C)
Broadleaf Woodland (R)
Mixed Scrub (R)
CFGM (E)
SI Modified Grassland (R)
Modified Grassland (E to Other neutral grassland)
Artificial unvegetated, unsealed surface (C)
SI Modified Grassland (C)
Other Neutral Grassland (C)
Native Hedgerow - Associated with Bank or Ditch (E to Native Species Rich Hedgerow - Associated with a Bank or Ditch)
Native Hedgerow with Trees (E to Native Species Rich Hedgerow with Trees)
Native Hedgerow Associated with bank or ditch (E to Line of Trees - Associated with bank or ditch)
Native Species Rich Hedgerow with trees
*C - Created, R - Retained, E - Enhanced

Land at White Cross Farm, Wallingford, Oxfordshire

Ecological Appraisal

August 2021

on behalf of **Greenfield Enviro**

Windrush Ecology Limited – Howbery Park – Benson Lane – Wallingford OX10 8BA
Tel 01491 822681 – Web www.windrushecology.com – Email enquiry@windrushecology.com
Company Registration No: 7068178 – Place of Registration – 4 Witan Way, Witney, Oxfordshire OX28 6FF

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Nothing in this report constitutes legal opinion.

Client	Greenfield Enviro
Job name	Land at White Cross Farm, Wallingford, Oxfordshire
Survey dates	5th July 2021 & 18th August 2021
Report date	20th August 2021
Report title	Ecological Appraisal
Reference	W4361_Land at White Cross Farm_20-08-21

	Signed	**Name**	**Position**	**Date**
Prepared by		Robbie Birkett *MSci*	Senior Ecologist	17/08/21
Reviewed by		Edward Bodsworth *MA (Cantab) PhD MCIEEM*	Director	20/08/21

Report Contents

1 Introduction

1.1 Site Description & Context

The Land at White Cross Farm (referred to as the 'site' for the purpose of this report) is located to the east side of the Reading Road on the edge of Wallingford, Oxfordshire, approximately 1.1km to the south-east of the town centre. The site is located immediately to the west of the River Thames at approximate central Ordnance Survey grid reference SU 605 878.

Please refer to Appendix 2 for plans showing the location of the site.

The site is located within the floodplain of the River Thames and mostly comprises arable land, improved grassland (sown), semi-improved grassland and marshy grassland. Other habitats include scrub, hedgerows, some bare ground, scattered trees, dry and wet ditches, tall herb/ruderal and hard-standing. There is a disused, steel-framed "Dutch" barn, part clad in corrugated sheet located towards the centre of the site. Surrounding this building is an area of scrub and, to the south of the barn, a stack of old hay/straw bales.

There is a ditch which extends through the site from south-north, this is very shallow in depth and is surrounded by a defunct hedgerow. During the surveys, this ditch was almost completely dry, with only one area of shallow water noted in July 2021. A wet ditch extends from the northern boundary to the River Thames in a south-easterly direction.

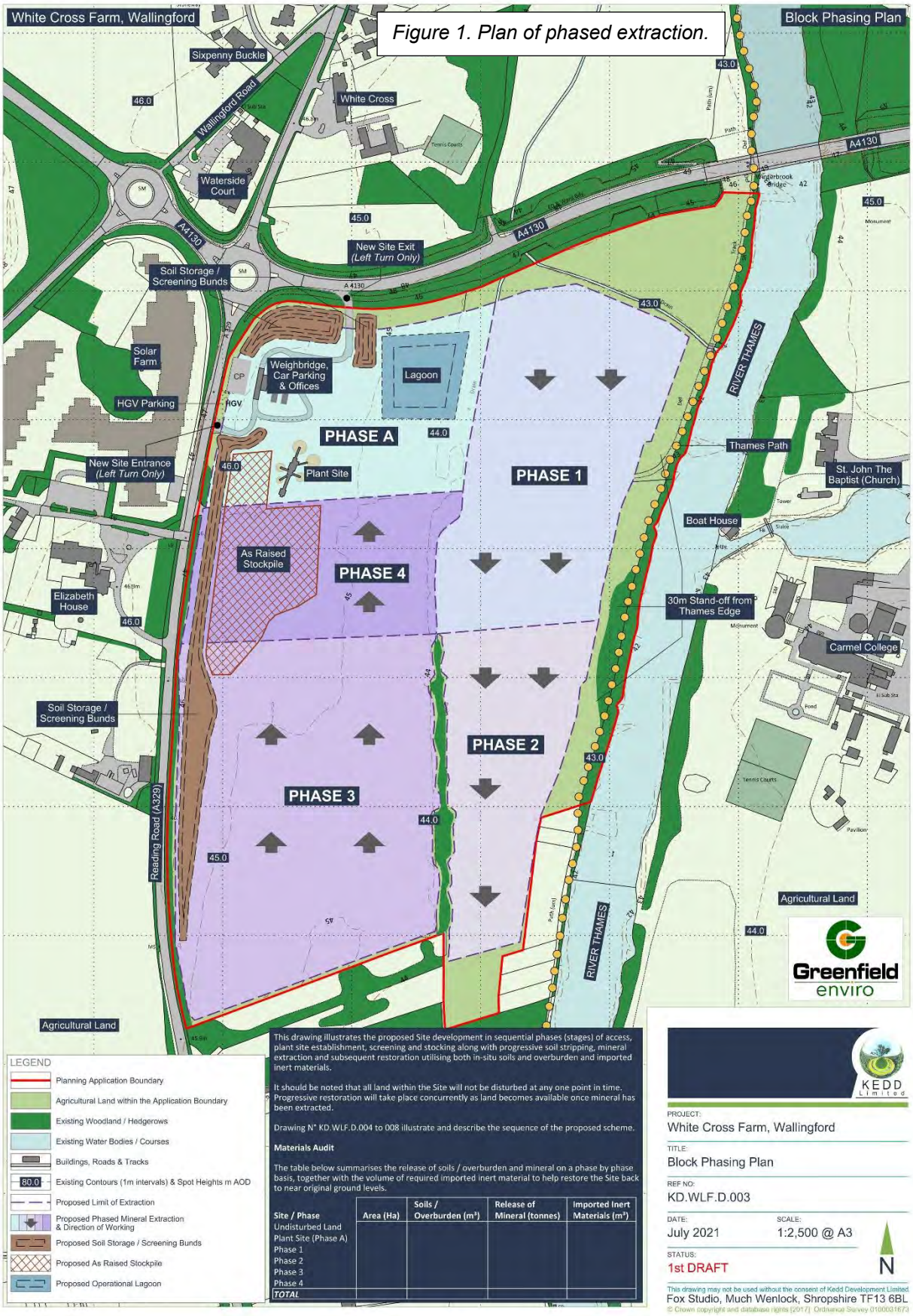
The site is located alongside the River Thames, which is considered to be a significant habitat within the context of the site and the wider local area. The river not only provides a freshwater habitat adjacent to the site boundary, but also provides habitat connectivity within the landscape, as well as habitat for protected and notable species. Outside of the town and villages, the wider landscape is largely agricultural, comprising arable farmland and improved/semi-improved grassland, divided by hedgerows and fence lines. To the east side of the River Thames is Mongewell Park and Carmel College, which comprise grassland, woodland and parkland habitats, as well as a lake.

1.2 Proposals

There is a proposal to extract gravel and sand from the site, in phases, and to restore the site for agricultural use and for the creation of wildlife habitats.

Please refer to Figure 1 for a plan of the phased extraction.

Figure 1. Plan of phased extraction.



1.3 Aims of Study

The aims of this study are to provide an update to previous ecological assessment and surveys undertaken by Pleydell Smithyman in 2016 and Windrush Ecology in 2019.

The study aims to determine if there have been any significant changes in habitat status and ecological value since 2019, and to assess any potential changes in the status of protected species since 2019.

It should be noted that the aim is not to provide a complete and comprehensive re-survey of the site, but a confirmation that with no significant changes in ecological status, the conclusions and recommendations of the 2019 study are appropriate and robust.

1.4 Background

1.4.1 *Ecological Assessment 2016*

In 2016, an ecological assessment of the site was undertaken by Pleydell Smithyman (Pleydell Smithyman 2016). This assessment included an extended Phase 1 habitat survey, bat activity survey and roost assessment, water vole survey, otter survey, breeding bird survey, wintering bird survey and reptile survey.

The results of this assessment are summarised in Table 1.

Table 1. Summary of ecological assessment (Pleydell Smithyman, 2016).

Study	Summary of Findings/Conclusions
Phase 1 habitat survey	The following habitats were identified within the site: • Arable land • Building • Hard-standing ground • Semi-improved grassland • Marshy grassland • Hedgerow • Parkland/Scattered trees • Standing water - wet ditch • Scrub • Tall herb / ruderal • Fence In addition to these habitats, the River Thames forms the eastern boundary of the site.
Bat activity	At least six species of bat (soprano pipistrelle, common pipistrelle, *Myotis* sp., serotine, Leisler's bat and noctule) were detected foraging and commuting. Of these, soprano pipistrelle and common pipistrelle were the most frequently encountered.
Bat roosts	Two trees present within the site offer moderate roosting potential for bats. One is a silver birch (*Betula pendula*) that contains a number of holes and a crack within one of its limbs. The other is a poplar (*Populus* sp.) tree that offers suitable roosting features in the form of cracks and holes. One building is present within the site; a steel-framed Dutch barn with a corrugated steel roof. The barn is open and there were no suitable roosting features for bats.
Water voles	No water voles, or evidence of water voles, were found during the surveys.
Otters	No otter holts were identified, however spraints, feeding remains comprising fish parts, signal crayfish remains, and swan mussel shells were found.
Breeding birds	A total of 26 species were found to be confirmed, probable and possible breeding species; thus the overall site falls into the district importance category. The site therefore is evaluated as having a district level of importance as a site for breeding bird assemblages present in the area. It was considered that the Dutch barn was being used as a nesting site by a pair of barn owls (*Tyto alba*).
Wintering birds	A total of 37 species were recorded using the site and thus the overall site falls into the 'district' importance category. The site is therefore evaluated as having a 'district' level of importance as a wintering site for the bird assemblage present in this area.
Reptiles	A peak count of two grass snakes (*Natrix helvetica*) were recorded. The results suggest that a small viable population of grass snakes are using the site. No other reptile species were recorded.

1.4.2 *Ecological Assessment in 2019*

Email correspondence with Louise Fox, Ecology Officer of Oxfordshire County Council, was initiated in March 2019, and it the scope of field survey work was agreed at that time. It was agreed that the following surveys would be undertaken during 2019:

- Water vole survey (including from within the watercourse)
- Otter survey
- Badger survey
- Botanical survey
- Bat survey of two trees (tree climbing survey to inspect potential roost features)
- Bat activity survey – focusing on the River Thames corridor

Following an ecological walkover in March 2019, it was agreed that breeding bird surveys, wintering bird surveys and reptile surveys would not require updating, as the assemblages of these groups are unlikely to have significantly changed, given the fact that the habitats remain largely unchanged between 2016 and 2019.

The status of the site remains largely unchanged between 2019 and 2021, with only subtle changes in habitat status and ecological value. The results of the 2019 surveys are therefore presented below, alongside any updates that are required following the updated surveys in 2021. It should be noted that in 2021, only the following protected species surveys were repeated:

- Water vole survey (from outside the watercourses only)
- Otter survey
- Badger survey
- Bat survey of two trees (tree climbing survey to inspect potential roost features)

It was not considered necessary to repeat the botanical survey or the bat activity surveys, due to the fact that the ecological status of habitats has remained largely unchanged between 2019 and 2021.

2 Methodology

2.1 Desk Study

The Thames Valley Environmental Records Centre (TVERC) was contacted in July 2021 to collate records that it holds for protected/notable species and non-statutory sites of nature conservation importance within a 1km radius of the site.

The Multi-Agency Geographic Information for the Countryside (www.magic.gov.uk) website was searched for information regarding internationally protected sites (e.g. Special Areas of Conservation) within 5km of the survey area and statutory sites of nature conservation importance (e.g. Sites of Special Scientific Interest) within a 1km radius of the site. Other Internet resources interrogated as part of the desk study include:

- Bing Maps - www.bing.com/maps
- Google Earth - www.earth.google.co.uk
- Google maps - www.google.co.uk/maps

Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 and the Oxfordshire Biodiversity Action Plan (BAP) were also consulted to gather information pertaining to priority habitats and species for conservation action at the national and local level.

Aerial photography interpretation is used to place the site into an ecological context and to provide information on the nature of the habitats beyond the site boundary. The information gathered is used to provide a baseline to the habitat assessment.

2.2 Field Surveys

2.2.1 *Extended Phase 1 Habitat Survey*

An extended Phase 1 Habitat Survey was undertaken on 5th July 2021 and 18th August 2021 by Edward Bodsworth *MA (Cantab) PhD MCIEEM*. A walkover of the site was conducted on both dates, and a description of the habitats present was prepared using standard Phase 1 Habitat Survey methodology (JNCC 2010).

Target notes were also prepared on features of particular ecological interest and an assessment was made of the site's potential to support protected and notable species (such as species listed under Section 41 of the NERC Act 2006).

2.2.2 *Assessment for Roosting Bats*

Trees within the site were assessed for their potential to offer shelter to roosting bats, in accordance with best practice (Collins, 2016; see Table 1). The trees were assessed from ground level (using binoculars) as either having high, moderate, low or negligible potential to shelter roosting bats according to the criteria shown in Table 2.

The assessment was undertaken on 21st March 2019 and repeated on 5th July 2021.

Table 2. Criteria for the assessment of buildings and trees for roosting bats (Collins, 2016)

Potential	Features
Negligible	Negligible habitat features on site likely to be used by roosting bats
Low	A structure or tree with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation significance.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Potential roost features (PRFs) in trees that may be used by bats include (Collins, 2016):

- woodpecker holes;
- rot holes;
- hazard beams:
- other vertical or horizontal cracks and splits (such as frost cracks) in stems or branches;
- partially detached bark;
- knot holes arising from naturally shed branches, or branches previously pruned back to the branch collar;

- man-made holes (e.g. cavities that have developed from flush cuts) or cavities created by branches tearing out from parent stems;
- cankers (caused by localised bark death) in which cavities have developed;
- other hollows or cavities, including butt-rots;
- double leaders forming compression forks with included bark and potential cavities;
- gaps between overlapping stems or branches;
- partially detached ivy with stem diameters in excess of 50mm; and bat, bird or dormouse boxes

A tree climbing survey was undertaken on 18th August 2021, to repeat two surveys in 2019. During the survey, a rope and harness was used to access the trunk and boughs of two trees (silver birch and poplar) to inspect the potential roost features of both trees.

The surveyor used an endoscope and torch to inspect the features for bats and evidence of roosting bats. The surveys were undertaken by Edward Bodsworth *MA (Cantab) PhD MCIEEM,* with assistance from Tracy Gray *BSc GradCIEEM*. Dr Bodsworth holds licences from Natural England to undertake bat surveys of this nature (Natural England Level 3 and Level 4 Licence nos. 2020-45379-CLS-CLS & 2020-45382-CLS-CLS).

2.2.3 *Water Vole Survey*

Two water vole *Arvicola amphibius* surveys were undertaken, on 16th April 2019 and 6th June 2019, with an updated survey on 5th July 2021.

A survey of watercourses (western bank of the River Thames and the wet ditch) was undertaken with reference to the *Water Vole Conservation Handbook* (Strachan & Moorhouse 2011) and the *Water Vole Mitigation Handbook* (Dean *et al.* 2016). The survey in 2021 was undertaken from the bank only; the survey in June 2019 was undertaken from the bank and from a canoe within the River Thames.

A systematic search of the bank and margins of the watercourses was undertaken, and the surveyors looked for water voles and evidence of water voles such as:

- Feeding signs, including feeding stations and characteristically gnawed vegetation;
- Latrines and individual droppings;
- Burrows, nests and feeding lawns (areas of shortly-grazed grassland at the entrance to a burrow); and
- Footprints and obvious runways in vegetation and along the edge of the watercourses.

The habitat was assessed for its suitability for water voles and notes were made on the presence of emergent and submerged aquatic vegetation, the presence of earth banks, permanent running water and overhanging vegetation.

The surveys were undertaken by Edward Bodsworth *MA (Cantab) PhD MCIEEM,* with assistance from Tracy Gray *BSc GradCIEEM*.

2.2.4 *Otter Survey*

During the water vole surveys on 16th April 2019, 6th June 2019 and 5th July 2021, observations were also made for otter *Luta lutra* footprints, spraints, slides and feeding remains. The watercourses were assessed for their potential to offer foraging habitat and shelter to otters, particularly breeding otters.

The surveys were undertaken by Edward Bodsworth *MA (Cantab) PhD MCIEEM,* with assistance from Tracy Gray *BSc GradCIEEM*.

2.2.5 *Botanical Survey*

Botanical surveys were undertaken by Edward Bodsworth *MA (Cantab) PhD MCIEEM* on 28th May 2019 and 6th June 2019. The surveys were focussed on the semi-improved and marshy grassland habitats, and involved the use of random quadrats to estimate plant species abundance and to create a species list for the grassland habitats.

It was not considered necessary to repeat the botanical surveys in 2021, as the status of the habitats has not significantly changed.

2.2.6 *Bat Activity Surveys*

Bat activity surveys were undertaken in May and June 2019; on 7th May, 28th May and 6th June. Each survey involved a walked transect through the site, with listening stations along the River Thames (see Figure 2). The specific aim of the survey was to observe and record bat activity over and along the river.

Each survey was undertaken by Edward Bodsworth *MA (Cantab) PhD MCIEEM* and Jan-Piet Stuursma. Both surveyors hold licenced from Natural England to survey for bats in all counties of England (licence numbers: WLM-A34-Level 2 2015-12114-CLS-CLS and WLM-A34-Level 1 2018-37063-CLS-CLS).

The surveyors were equipped with Echometer Touch Bat Detectors, to view and analyse bat calls in real time, and to record bat calls, including GPS location data. Bats were identified to species-level where possible.

It was not considered necessary to repeat the bat activity surveys in 2021, as the status of the habitats has not significantly changed.

Table 3. Timing and weather conditions during bat activity surveys in 2019.

Date	Sunset Time	Start Time	End Time	Weather
07/05/19	20:38	20:30	22:00	12-10◦C, dry, Beaufort Scale 2, 80% cloud
28/05/19	21:09	21:00	22:30	15-13◦C, dry, Beaufort Scale 1, 100% cloud
06/06/19	21:18	21:15	22:45	14-12◦C, dry, Beaufort Scale 1, 10% cloud

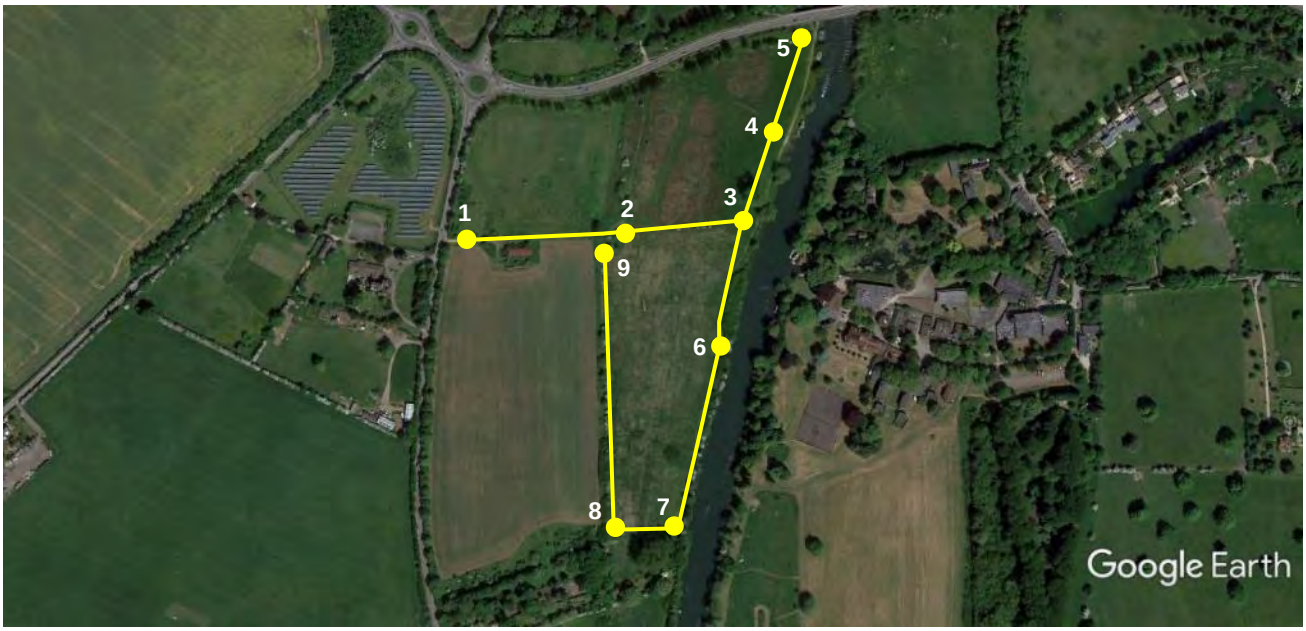


Figure 2. Aerial photograph showing the route of the bat activity survey transects (yellow line) in 2019, and the listening stations (numbered).

2.2.7 *Badger Survey*

A badger survey was undertaken on 21st March 2019, and repeated on 7th May 2019 and 5th July 2021. The surveys were undertaken by Edward Bodsworth *MA (Cantab) PhD MCIEEM*, and involved a walkover of the site and the recording of badger setts and evidence of badger activity including footprints, faeces, dung pits, latrines, trackways and badger hairs.

3 Results

3.1 Ecological Context

The ecological context of the site appears largely unchanged since 2019, and there has been no change in the boundary or status of statutory or non-statutory sites of nature conservation importance size the original ecology surveys and assessments were undertaken.

3.1.1 *Sites of Nature Conservation Importance*

4.1.1.1 Statutory Sites

There are no statutory sites of nature conservation importance, such as Sites of Special Scientific Interest (SSSI) within a 2km radius of the site.

The citation provided by Natural England regarding the SSSI risk assessment zone that falls within the site (for Warren Bank SSSI, approximately 4.9km away) states that quarrying and mineral extraction are not considered to cause an impact upon any of the SSSIs within the local area.

There are no sites of international nature conservation importance, such as Special Protection Areas, within a 5km radius of the site. The edge of Little Wittenham Special Area of Conservation (SAC0 is located approximately 5.2km from the site boundary.

4.1.1.2 Non-statutory Sites

Riverside Meadows, Wallingford is located approximately 1.1km to the north of the site boundary. This is an area of restored meadow grassland. Wallingford Castle Meadows is located approximately 1.7km from the site boundary and also contains floodplain meadow grassland.

The eastern sector of the site located within the Thames Valley Wallingford to Goring Conservation Target Area (CTA). This area covers flood plain areas between Wallingford and Goring with habitats that include fen, swamp, reedbed, wet woodland and wet grassland.

4.1.2 *Species Records*

The following sections summarise the protected/notable species records provided by the Thames Valley Environmental Records Centre.

4.1.2.1 Plants

There are several records of plant species, dating from 2016 and 2017, including bluebell *Hyacinthoides non-scripta*, narrow-leaved meadow grass *Poa angustifolia*, hoary plantain *Plantago media*, white mullein *Verbascum lychnitis*, rock rose *Helianthemum nummularium*, chicory *Cichorium intybus* and field scabious *Knautia arvensis*.

None of these scarce or protected plant species were found during the surveys of the site in 2016, 2019 or 2021.

4.1.2.2 Invertebrates

There are records of the long-horned soldier fly *Vanoyia tenuicornis* and the bloody crane's-bill weevil *Zacladus exiguous* from 2016. There are also records of stag beetle *Lucanus cervus*, with the most recent records dating from 2018.

There are also records of small heath butterfly *Coenonympha pamphilus*, dating from 2012 and of the white letter hairstreak *Satyrium w-album* from 2008.

The Records Centre holds several records for a number of different moth species, with most records dating from 1989. Given the age of these records, they may not be an accurate representation of the current status of moth species in the locality.

There is one record of the depressed river mussel *Pseudanodonta complanata*, dating from 2011, and this species is known to occur within the River Thames.

4.1.2.3 Amphibians

Common toad *Bufo bufo* was recorded from the search area in 2016. The wet ditch within the site offers a potential breeding habitat for this species.

4.1.2.4 Reptiles

There are records of grass snake *Natrix helvetica* and common lizard *Zootoca vivipara* from 2016 and 2017, respectively. Grass snake was recorded during the 2016 reptile survey, with a small population considered to be present within the site (peak count of two snakes).

In 2021, habitats still appeared to be suitable for grass snakes and it is considered likely that small numbers of grass snakes are present within the site.

4.1.2.5 Birds

The majority of records held by TVERC are for bird species, which include wetland species, birds of prey, as well as species of farmland and garden habitats. Species recorded from 2016 onwards

include greylag goose *Anser anser*, mallard duck *Anas platyrhynchos*, kestrel *Falco tinnunculus* and red kite *Milvus milvus*, as well as farmland species such as skylark *Alauda arvensis*, dunnock *Prunella modularis*, song thrush *Turdus merula*, linnet *Linaria cannabina*, bullfinch *Pyrrhula pyrrhula* and yellowhammer.

It should be noted that in June 2019, a pair of kestrels were noted as nesting within the barn owl box of the Dutch barn. Sounds, indicating that a chick/s may be present, were heard coming from the box, and two kestrels were seen flying away from the barn.

No kestrels, or kestrel nests, were found in 2021. There was no evidence of barn owls within the Dutch barn in 2021.

4.1.2.6 Bats

Both common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *P. pygmaeus* have been recorded from the local area, with records dating from 2018 and 2019. Other species that have been recorded include serotine *Eptesicus serotinus*, Daubenton's bat *Myotis daubentonii*, noctule *Nyctalus noctula*, lesser noctule *Nyctalus leisleri* and brown long-eared bat *Plecotus auritus*.

The bat activity surveys undertaken in 2016 and 2019 indicate that the site, particularly the River Thames corridor, is suitable for these bat species.

4.1.2.7 Water Vole

The most recent record of water vole *Arvicola amphibius* dates from 2017. Water voles are known from the River Thames and other watercourses within the wider local area.

4.1.2.8 Otter

The most recent record for otter *Lutra lutra* dates from 2015. Evidence of otter activity was noted along the River Thames during the previous (2016 and 2019) surveys.

4.1.2.9 Badger

The Records Centre holds five records for badgers *Meles meles* from within the search radius, with records dating from 2016.

4.2 Habitats

Photographs of the site are presented in Appendix 1. Appendix 2 illustrates the location of the site and provides an aerial photograph of the site within the surrounding landscape. A Phase 1 Habitat Plan (from July 2021) is provided in Appendix 3.

4.2.1 *Overview*

The site comprises areas of arable land, improved grassland, semi-improved grassland and marshy grassland, with boundary hedgerows, a dry ditch (with defunct hedgerow), a wet ditch and an eastern boundary formed by the River Thames. There is a Dutch barn within the site, as well as scrub and some scattered trees. Associated with the barn is an area of ruderal vegetation, and elder scrub, with old straw bales. Please refer to Appendix 3.

4.2.2 *Arable Land*

The majority of the western area of the site is under arable cultivation. The areas of arable land were under cultivation at the time of the surveys, with a crop of wheat.

4.2.3 *Semi-improved Grassland*

The areas of semi-improved grassland are dominated by common grasses, including cock's-foot *Dactylis glomerata*, meadow foxtail *Alopecurus pratensis*, Yorkshire fog *Holcus lanatus*, perennial rye grass *Lolium perenne* and tufted hair grass *Deschampsia cespitosa*.

Herbaceous species noted within these areas include dandelion *Taraxacum officinale*, creeping buttercup *Ranunculus repens*, meadow buttercup *Ranunculus acris*, cut-leaved crane's-bill *Geranium dissectum*, red clover *Trifolium pratense*, white clover *Trifolium repens*, ribwort plantain *Plantago lanceolata*, sow thistle *Sonchus asper*, common ragwort *Senecio jacobaea*, lesser celandine *Ranunculus ficaria*, greater plantain *Plantago major*, stinging nettle *Urtica dioica*, cleavers *Galium aparine*, yarrow *Achillea millefolium*, cow parsley *Anthriscus sylvestris*, spear thistle *Cirsium vulgaris*, hogweed *Heracleum sphondylium*, creeping thistle, teasel *Dipsacus fullonum*, common vetch *Vicia sativa*, common bistort *Persicaria bistorta*, broad-leaved dock *Rumex obtusifolius*, common mouse-ear *Cerastium fontanum*, creeping cinquefoil *Potentilla reptans*, Germander speedwell *Veronica chamaedrys* and dove's-foot cranes-bill *Geranium molle*.

No rare or uncommon species were noted during the survey, and the species-assemblage is typical of grassland that has undergone some agricultural improvement. No orchids were noted.

The grassland is not considered to meet the criteria for grassland habitats of 'principal importance' as listed within Section 41 of the NERC Act 2006, such as Lowland Meadow.

Areas of grassland along the public footpath to the western side of the River Thames were more species-poor, reflecting disturbance from walkers and nutrient enrichment along the path.

In 2019, the botanical surveys were undertaken in May and June, in order to pick up species that may have been previously missed. The species assemblage of the semi-improved grassland is largely the same as that found within the study of 2016, with no significant additional species. Given this, it is considered that the results of the Phase 1 habitat survey undertaken in 2016, and subsequent conclusions of the study, are robust.

The parcel of land within the north-western area of the site was previously (in 2019) sprayed with herbicide. This area has been allowed to develop back into semi-improved grassland and is currently (in 2021) used for the grazing of livestock.

4.2.4 *Improved Grassland*

An area of improved grassland is present to the eastern side of the dry ditch (this area was previously in arable cultivation in 2019). The grassland has been sown and comprises a monoculture of grassland (ley), with little or no herbaceous species.

4.2.5 *Marshy Grassland*

Areas of marshy grassland are also dominated by grass species, including meadow foxtail, cock's-foot and tufted hair grass, with barren brome *Bromus sterilis*, soft brome *Bromus hordeaceus* and Yorkshire fog also noted in lower abundance. Many areas are dominated by soft rush *Juncus effusus*.

Herbs tend to occur in much lower abundance than grasses and rushes, and include cleavers, stinging nettle, broad-leaved dock, curled dock *Rumex crispus*, teasel, cut-leaved crane's-bill, yarrow, red clover, lesser celandine, creeping thistle, meadowsweet *Filipendula ulmaria*, cuckoo flower *Cardamine pratensis*, silverweed *Argentina anserina*, ground ivy *Glechoma hederacea*, wild angelica *Angelica sylvestris*, common figwort *Scrophularia nodosa*, field speedwell *Veronica persica*, bugle *Ajuga reptans*, tufted vetch *Vicia cracca* and meadow vetchling *Lathyrus pratensis*.

In 2019, the botanical surveys were undertaken in May and June, in order to pick up species that may have been previously missed. The species assemblage of the marshy grassland is largely the same as that found within the study of 2016, with no significant additional species. Given this, it is considered that the results of the Phase 1 habitat survey undertaken in 2016, and subsequent conclusions of the study, are robust.

4.2.6 *Other Habitats*

Other habitats within the site remain unchanged since 2019. In summary, the other habitats include:

- Building
- Hard-standing ground
- Hedgerow
- Parkland/Scattered trees
- Standing water - wet ditch
- Dry ditch
- Scrub
- Tall herb / ruderal
- Fence
- Running water (adjacent River Thames)

The central ditch, with defunct hedgerow (running north-south) was mostly dry during the surveys in 2019 and 2021. Some shallow standing water was noted in July 2021, but the ditch is considered to be dry. The wet ditch (which runs roughly west-east, within the northern area of the site) contained abundant water mint *Mentha aquatica*, fool's water-cress *Apium nodiflorum*, and brooklime *Veronica beccabunga*.

Please refer to Appendix 3 for a Phase 1 habitat plan of the site as in July 2021.

4.3 Species

4.3.1 *Water Voles*

No water voles, or evidence of water voles, were found during the survey in 2021. In particular, no water vole burrows were found along the bank of the River Thames. This is the same result as in 2016 and 2019.

However, the western bank of the river is considered to offer potential, and suitable, habitat to the species with earth banks and marginal vegetation providing both cover and potential food.

4.3.2 *Otters*

No otter holts were found during the survey and there is no evidence that otter holts, or lying-up sites, within the site. No evidence of otter activity was recorded in 2021.

What appeared to be an old otter spraint was found on the concrete bridge over the wet ditch; this was noted only on 21st March 2019, and not subsequently.

In 2016, spraints, feeding remains comprising fish parts, signal crayfish remains, and swan mussel shells were found.

4.3.3 *Roosting Bats*

Only one tree (a sliver birch; see Target Note 2 in Appendix 3) is considered to offer potential shelter to roosting bats. This tree has a number of rot holes within its trunk, and is assessed as having 'low'

potential to offer shelter to bats (Collins, 2016) given the results of the current study, and previous surveys undertaken in 2016.

No bats, or evidence of bats, were found within the features of this tree during the tree climbing surveys in 2019 or 2021. This is in line with the results from 2016, during which no bats were seen to emerge from this tree during the bat activity surveys.

The mature poplar tree does not appear to exhibit features that bats could use for shelter. The tree was climbed in 2019 and 2021, and some shallow rot features were noted and inspected. However, these features were found to be too shallow and exposed to offer any shelter to bats. The poplar is therefore assessed as having 'negligible' potential (Collins, 2016) to offer shelter to roosting bats.

The Dutch barn is also assessed as having 'negligible' potential (Collins, 2016) to offer shelter to roosting bats. The building is open and has no dark or enclosed roof/loft spaces.

4.3.4 *Bat Activity 2019*

Four species of bat (soprano pipistrelle *Pipistrellus pygmaeus*, common pipistrelle *P. pipistrellus*, *Myotis* sp. and noctule *Nyctalus noctula*) were detected during all three of the bat activity surveys in 2019. The habitats remain unchanged in 2021, and so the bat species assemblage is considered to be the same as recorded in 2019.

Of these, common pipistrelle, soprano pipistrelle and the *Myotis* species (considered to be Daubenton's bat *M. daubentonii*) were the most frequently encountered over and along the River Thames. Daubenton's bats were observed foraging over the river, as were common and soprano pipistrelles, and on occasion, noctules.

In addition to these species, serotine *Eptesicus serotinus* was also recorded on two occasions. In addition, one brown long-eared bat *Plecotus auritus* call was also detected on one occasion, as well as a possible other species of the genus *Myotis*.

As with the surveys in 2016, the overall abundance of bats detected during the course of the surveys is assessed to be low to moderate. Bat activity appeared to be mainly associated with the River Thames, and there was little activity at listening stations that were away from the river. The river corridor is likely to form a key foraging and commuting habitat for local bat populations, although the assemblage appears to be typical for riverine habitats within a farmland landscape.

The river bank is largely open along the eastern boundary of the site, with some young trees (alder and willow) as well as dense blackthorn scrub along certain sections. The scrub appears to create a potential linear feature, which bats could use for navigation, although it is considered that the majority of the bat activity was focussed over the watercourse, with bats moving and feeding over the water.

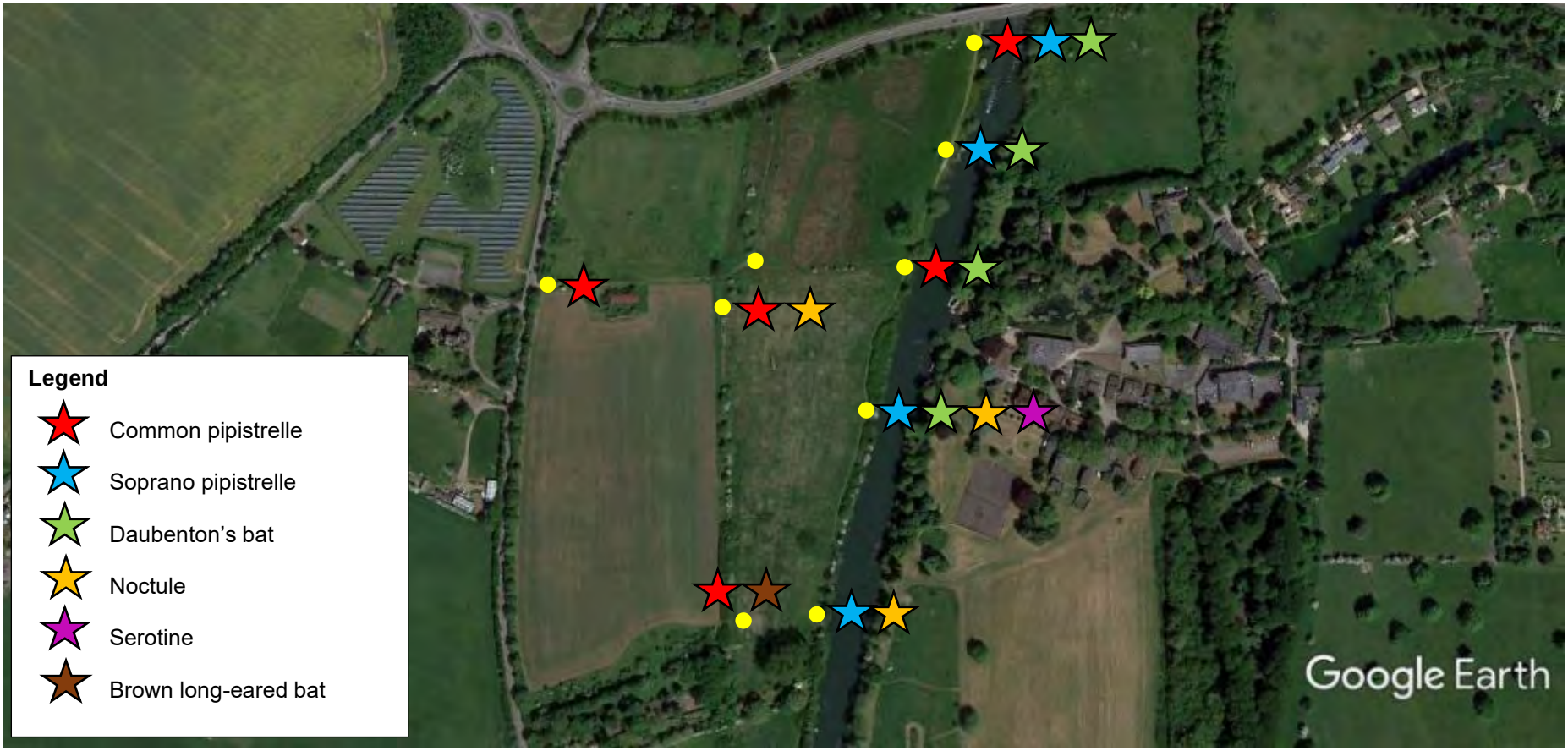


Figure 3. Aerial photograph showing the listening stations (yellow circles) of the bat transects, as well as the species of bat that were recorded at each station (indicated by the different coloured stars) in 2019. Please note that this plan is indicative and does not show numbers of bat 'passes' at each location, merely the species of bat that have been recorded from each station, to give an indication of species distribution within the site.

4.3.5 *Reptiles*

Habitats within the site appear to be largely unchanged with regard to reptiles, and the site is still considered suitable for a small population of grass snakes *Natrix helvetica*, as recorded in 2016. Of particular note are piles of straw and old straw bales associated with the Dutch barn, as these may offer potential egg-laying sites.

It should be noted that since 2016, further areas of grassland have been ploughed and the land taken under arable cultivation. In addition, in 2019 the north-western field has been sprayed with herbicide, and comprised an area of largely bare ground. Arable land and bare ground are not considered to be suitable for reptiles, and so there is likely to have been a reduction in the area of suitable habitat for reptiles between 2016 and 2019.

In 2021, the north-western parcel of land had reverted to semi-improved grassland and appears to offer potential habitat to grass snakes. It is considered likely that semi-improved grassland and marshy grassland support small numbers of grass snakes.

4.3.6 *Badgers*

No badger setts or evidence of badger activity were noted in 2021. This the same result as in 2016 and 2019.

4.3.7 *Barn Owl*

No fresh barn owl pellets were noted within the Dutch barn in 2021, and no barn owls were seen within the building. There appears to be no active barn owl nest within the owl box within the building.

4.3.8 *Kestrel*

Two kestrels were seen flying from the barn owl box in June 2019. Noises, which may indicate the presence of a chick/s, were heard in 2019 and it is considered that the barn owl box is being used by the pair of kestrels as a nest site.

No kestrels, or kestrel nests, were observed in 2021.

5 Discussion

5.1 Sites of Nature Conservation Importance

The eastern sector of the site located within the Thames Valley Wallingford to Goring Conservation Target Area (CTA). This area covers flood plain areas between Wallingford and Goring with habitats that include fen, swamp, reedbed, wet woodland and wet grassland. Given this, plans for the site should include habitat restoration and creation to address the objectives of the CTA.

5.2 Habitats

The surveys undertaken in 2021 conclude that the status and value of habitats within the site remain largely unchanged since 2016 and 2019, and there are unlikely to have been significant changes in the ecological status of the site, and the species that it supports.

The majority of the site comprises semi-improved grassland, marshy grassland, arable land and improved grassland. The main changes since 2019 are that an area of bare ground (that had been sprayed with herbicide to remove vegetation) has been recolonised by semi-improved grassland. In addition, a parcel of arable land (to the east of the central dry ditch) had been sown with grassland (improved grassland).

The botanical surveys in 2019 confirmed that the conclusions of the 2016 habitat survey are robust, and are a true representation of the grassland habitats within the site. The conclusion of the previous study was that '*the habitats present within the site are generally of low ecological value. The habitat considered to be of the greatest ecological value is the marshy grassland, wet ditch and defunct hedgerow present in the field adjacent to the River Thames'.* This conclusion is the same as in 2021.

The proposals are for the extraction of sand and gravel, through phases or extraction, with restoration to agricultural land (within the western parcel of the site) and wildlife habitats (within the eastern parcel of the site). During the development, there will be loss of semi-improved grassland, improved grassland, marshy grassland and arable land within the proposed areas of extraction.

In addition, there will also be loss of:

- Building
- Hard-standing ground
- Parkland / Scattered trees
- Dry ditch (partial loss)
- Scrub
- Tall herb / ruderal

Small sections of hedgerow will also be lost to create new access and egress to the site. The River Thames will be buffered by a zone of retained grassland and scrub habitats alongside the western bank of the river. The wet ditch and area of semi-improved/marshy grassland within the north-eastern corner of the site will also be retained, as will part of the dry ditch and boundary hedgerows.

Habitat loss will be compensated for, and biodiversity enhancement provided, within the restoration phase. Within the restoration, the following habitats will be created:

- Arable land
- Lowland/wet meadow with scrapes (mosaic habitat of grassland and wetland)
- Native tree/hedge planting – to deliver landscape structure and habitat corridor
- Lagoon
- Gravel face/ditch
- New barn

The arable land will be restored within the western parcel of the site, the majority of which is currently arable farmland, and the wildlife habitats (meadow, scrapes, standing water) will be created within the eastern parcel of the site, alongside the retained buffer zone to the River Thames. In this way, the wildlife habitats will be connected to, and will be strengthened by, the adjacent River Thames, which is an important wildlife corridor. The proposed habitat creation will be located within the Thames Valley Wallingford to Goring Conservation Target Area (CTA). The proposed habitat creation (in the form of wet meadow, lagoon and seasonal wetland scrapes, will contribute towards the aims and objectives of the CTA which include fen, swamp, reedbed, wet woodland and wet grassland.

The proposed habitats, after restoration, are considered to be suitable for reptiles, such as the grass snake, amphibians, such as the common toad, and for foraging bats. The proposed new wetland features ay also offer habitat to water voles, and potential foraging opportunities for otters.

Breeding birds will be able to use the proposed new native planting and hedgerows for nesting, and the proposed wetland and wet grassland mosaic will offer potential nesting, foraging and overwintering habitat to wetland bird species.

The proposed wet grassland, wet scrapes and wetland habitat mosaic is likely to provide suitable habitat for a number of invertebrates, including grassland species, as well as aquatic species, and species of bare ground habitats. The creation of the wet grassland wetland habitat mosaic within the eastern parcel of the site is considered to be of significant ecological value, and the scheme is considered to deliver biodiversity net gain (see below).

5.3 Biodiversity Impact Calculation

A Biodiversity Impact Assessment was conducted, using the Biodiversity Metric 3.0. The Biodiversity Metric 3.0 updates and replaces the beta Biodiversity Metric 2.0 (JP029) published in 2019. Biodiversity Metric 3.0 is a biodiversity accounting tool that can be used for the purposes of calculating biodiversity net gain. The calculation ascertains whether the proposals achieve a net gain in biodiversity, calculated as biodiversity units and percentage biodiversity units.

To effectively assess the impact of the proposals the habitats within the site were classified according to the habitat types given in the UK Hab classification system (Butcher *et al.*, 2020). Habitats were assessed for their condition and strategic significance according to the criteria given within the Biodiversity Metric (Crosher *et al.*, 2019) through onsite visits and the interrogation of internet resources including MAGIC (www.magic.gov.uk) and Google Earth (www.earth.google.co.uk).

The areas of given habitats in both their current state (baseline) and the proposed development (restoration) were mapped using satellite imagery, with the resulting areas inputted into the Biodiversity Metric alongside relevant habitat condition and strategic significance classifiers.

The condition assessment was conducted by Edward Bodsworth *MA (Cantab) PhD MCIEEM*.

5.3.1 *Limitations*

Whilst this report presents a characterisation and evaluation of habitat status at the time of study, it should not be taken as an exhaustive representation of the ecological status of the site either at present or into the future.

5.3.2 *Site Habitat Status Before Development*

5.3.2.1 Habitats within the Site

The table below presents the habitat baseline in the form of Phase 1 habitat terminology, as used within this report, and the UK Hab equivalent, as used within the Defra Metric 3.0.

Phase 1 Habitat type	**UK Hab equivalent**
Arable land	Cropland – cereal crops
Broadleaved woodland	Woodland and forest – other woodland; broadleaved
Building (barn)	Urban – developed land; sealed surface
Dense scrub	Heathland and scrub – mixed scrub (moderate)
Bare ground/track	Urban – artificial unvegetated, unsealed surface
Improved grassland	Grassland – modified grassland (poor)
Marshy grassland	Grassland – Floodplain Wetland Mosaic (CFGM)
Scattered scrub (elder)	Heathland and scrub – mixed scrub (poor)
Semi-improved grassland	Grassland – modified grassland (moderate)

Phase 1 Habitat type	UK Hab equivalent
Semi-improved grassland with tall ruderal	Grassland – modified grassland (poor)
Defunct hedgerow – associated with ditch	Native hedgerow – associated with ditch
Hedgerow with trees (to boundaries)	Native hedgerow with trees

5.3.2.2 Habitat Condition Assessment

The condition assessment has been based on the Phase 1 habitat surveys conducted in July and August 2021. The baseline has identified semi-improved grassland and marshy grassland, as well as arable land and improved grassland, as being the dominant habitats within the site.

The semi-improved grassland is not considered to meet the criteria for a habitat of 'principal importance', such as Lowland Meadow, and is considered to be of 'moderate' condition, based on species composition and abundance of herbs versus grass species.

The areas of marshy grassland (Floodplain Wetland Mosaic CFGM) are considered to be of 'fairly poor' condition. Coastal and floodplain grazing marsh is not a specific habitat but a landscape type which supports a variety of habitats; the defining features being hydrological and topographical rather than botanical. Grazing marsh is defined as periodically inundated pasture or meadow, typically with ditches or rills containing standing brackish or fresh water. The majority of sites have low botanical grassland interest, but can support bird species of high conservation value, while the ditches can be especially rich in plants and invertebrates.

Within the site, the extent of wet ditches is limited, and the wet ditch to the north-eastern side of the site will be retained. The ditches are not considered to be particularly biodiverse, and no rare or uncommon wetland species are present within the ditches or the marshy grassland. The context of the marshy grassland is also considered to reduce its ecological value, with disturbance from people and dog walkers along the Thames Path and the agricultural activities within the areas of arable and improved grassland.

Improved grassland is of poor condition, as it is a sown monoculture of grassland over former arable land. Scrub along the River Thames is considered to be of moderate ecological value, as there are stands of blackthorn in association with the banks of the river. Elsewhere, particularly around the barn, the scrub is considered to be of poor condition, as it is primarily elder and bramble.

UK Hab	Condition	Area (hectares/km)
Cropland – cereal crops	Not applicable	6.50
Woodland and forest – other woodland; broadleaved	Moderate	0.50
Urban – developed land; sealed surface	Not applicable	0.02
Heathland and scrub – mixed scrub	Moderate	0.29
Urban – artificial unvegetated, unsealed surface	Not applicable	0.19
Grassland – modified grassland	Poor	2.49

UK Hab	Condition	Area (hectares/km)
Grassland – Floodplain Wetland Mosaic (CFGM)	Fairly poor	2.50
Heathland and scrub – mixed scrub	Poor	0.39
Grassland – modified grassland	Moderate	5.40
Grassland – modified grassland	Poor	0.27
Native hedgerow – associated with ditch	Poor	0.29 km
Native hedgerow with trees	Moderate	0.99 km

5.3.2.3 Habitat Strategic Significance

The eastern area of the site is located within the Thames Valley Wallingford to Goring Conservation Target Area (CTA). This area covers flood plain areas between Wallingford and Goring with habitats that include fen, swamp, reedbed, wet woodland and wet grassland. Given this, areas of semi-improved grassland and marshy grassland (CFGM) are located within the CTA and thus within an area formally identified in local strategy.

5.3.3 *Site Habitat Status After Development*

The proposals are for the restoration of arable land within the western parcel of the site, and the creation of wildlife habitats within the eastern parcel of the site. The wildlife habitats will include retained areas of semi-improved grassland and marshy grassland (CFGM), which will also be enhanced to improve their botanical diversity.

In addition to this, wet meadow habitats, with a lagoon and wet scrapes will also be created, alongside new areas of neutral grassland (meadow). The plan within the eastern area of the site is to create a valued habitat mosaic of wetland and grassland, that will complement and be complemented by the proximity of the River Thames. The proposed new habitats are considered to be a significant ecological enhancement to the existing situation, and former extraction sites are known to be of high ecological value within the Thames Valley.

The Metric is unable to pick up some of the micro-habitats that will also be created, such as the proposed gravel face alongside one of the wetland scrapes, which will create a bare ground habitat and ‘draw-down zone’ that is likely to be of value to invertebrates. The scrapes themselves will be seasonal wetland features, offering a habitat mosaic as well as dynamism through seasonal changes in water levels.

Given that habitats within the eastern area of the site will be specifically created for their ecological value, the condition of the new habitats is taken as ‘good’. Figure 4 provides a plan of the proposed restoration.

UK Hab	Condition	Area (hectares)
Cropland – cereal crops	Not applicable	8.12
Urban – developed land, sealed surface (new barn)	Not applicable	0.02
Grassland – other neutral grassland (wet meadow)	Good	3.04

UK Hab	Condition	Area (hectares)
Lakes – temporary lake, ponds and pools (lagoon and scrapes)	Good	0.50
Urban – artificial unvegetated, unsealed surface (new track)	Not applicable	0.01
Grassland – modified grassland	Good	0.71
Grassland – Floodplain Wetland Mosaic (CFGM)	Good	2.5
Native hedgerow – associated with ditch	Poor	0.19 km - retained
Native hedgerow with trees	Moderate	0.90 km - retained
Native species rich hedgerow with trees	Good	0.59 km – created

5.3.4 *Calculation*

The result of the calculation is a net gain in biodiversity, both for habitats and hedgerows.

Total net unit change in habitats: **+17.33 habitat units and +14.89 hedgerow units**
Total net % change: **+23.11% habitat units and +161.56% hedgerow units**

Given the above, the proposals deliver significant biodiversity net gain.

Figure 4. Plan of restoration.

5.4 Species

5.4.1 *Water Voles*

Water voles are considered to be absent from the western bank of the River Thames, which forms the eastern site boundary. However, the western bank of the river is considered to offer potential, and suitable, habitat to the species.

The studies undertaken in 2016, 2019 and 2021 concluded that there was no evidence of water voles from the bank of the River Thames, or from wet and dry ditches within the site. However, the western bank of the river was considered to offer potential habitat to water voles and it was recommended that further surveys for water voles should be undertaken prior to the commencement of works, to confirm the continued absence of the species. The current study supports these conclusions.

The proposed new lagoon, wetland features and seasonally wet scrapes may provide suitable habitat for water voles. Fringing inundation vegetation will provide cover and potential food for this species, and the earth banks of the new wetland features will be suitable for burrowing. There are no foreseeable impacts of the proposed extraction on the banks of the River Thames and the river will be buffered from the proposed works by a buffer zone.

5.4.2 *Otters*

Otter holts, resting places and breeding sites are considered to be absent from the site. However, otters are considered to be present within the adjacent habitat of the River Thames, and are likely to use this stretch of the river for dispersal and foraging. Otters may occasionally come on to the banks to feed and to leave spraint.

The study undertaken in 2016 supports this conclusion, as evidence of feeding and otter activity along the bank was recorded during that study, although no holts were found. That study concluded that "*it is evident that otters use the River Thames, and are likely to use it frequently. No otter holts were found during the surveys however these could be created at any time. It is therefore recommended that regular update surveys are undertaken to identify any changes that may occur within the site or along the eastern site boundary along the River Thames. The surveys should be undertaken every year, with a survey undertaken prior to the commencement of any quarry works*", and this study supports these conclusions.

No species-specific measures are proposed for otters, although recommendations are made with regard to sensitive and appropriate lighting (see Section 5.4.4). It is considered that the proposed habitat restoration will provide benefits for otters, in that the River Thames will be buffered by a new wetland and grassland mosaic that may reduce potential disturbance along the river, although the Thames Path will still be present along the western bank of the river.

5.4.3 *Roosting Bats*

There is no evidence to indicate that trees within the site are offering shelter to roosting bats, and this is the same conclusion as the study in 2016 and 2019.

One silver birch tree is considered to have the potential to offer shelter to roosting bats, and this should be taken into account prior to the felling of this tree. Given that the tree has been surveyed twice, including a tree climbing survey, it is concluded that the tree has 'low' potential to offer shelter to roosting bats.

The Dutch barn is also assessed as having 'negligible' potential (Collins, 2016) to offer shelter to roosting bats. The building is open and has no dark or enclosed roof/loft spaces.

The proposals offer potential opportunities to provide roosting opportunities of bats in new buildings. This could include standard bat boxes mounted on the external elevations, or integrated or bespoke bat roosting features within the fabric of the walls. Target species could be those that favour river habitats for foraging, such as the soprano pipistrelle and Daubenton's bat. Bat boxes could be erected on, or integrated into, the proposed new barn.

5.4.4 *Bat Activity*

The study in 2019 concluded that the River Thames is used by local bat populations for foraging and habitat connectivity, with a species assemblage that is typical of riverine, floodplain and farmland habitats. The river is a landscape feature which provides a habitat corridor for several species of bat, particularly common pipistrelle, soprano pipistrelle, and Daubenton's Bat.

The previous study, undertaken in 2016, would tend to support this conclusion, with that study concluding that the "*River Thames offers excellent connectivity to the wider landscape for foraging and commuting bats. The overall suitability of the site for foraging and commuting bats is of medium quality*". The current study indicates that this conclusion is still valid.

A lighting strategy should be developed, to avoid light spillage into areas that may affect bat activity. Lighting should be avoided around any new bat roosting features, including proposed bat boxes and integrated bat roosting features on the new buildings. Light spillage over the River Thames should be avoided. This will ensure that bat activity within the site is not adversely affected by artificial lighting.

If lighting is required, it should be kept at low level and at low intensity, with hoods and baffles used to direct the light to where it is required (Bat Conservation Trust 2008, Emery 2008). To minimise the impact on bats, the use of low pressured sodium lamps is recommended in preference to mercury or metal halide lamps which have a UV element that can affect the distribution of insects and attract bats to the area, affecting their natural behaviour (Bat Conservation Trust 2008).

The key principals for choosing a suitable type of lamp are:

- Avoid blue-white short wavelength lights: these have a significant negative impact on the insect prey of bats. Use alternatives such as warm-white (long wavelength) lights as this will reduce the impact on insects and therefore bats.
- Avoid lights with high UV content: (e.g. metal halide or mercury light sources) or reduce/completely remove the UV content of the light. Use UV filters or glass housings on lamps which filter out a lot of the UV content.

Selecting an appropriate lamp unit that is designed to be environmentally friendly will minimise light spill, but further controls can be imposed by installing directional accessories such as baffles, hoods and louvres on lamps to direct light away from ecologically sensitive areas (such as the River Thames).

LED (Light Emitting Diode) units are an effective way to direct the light into small target areas and are recommended for lighting the proposed parking and turning area. Composite LEDs can be switched off to reduce/direct the light beam to specific areas.

5.4.5 *Reptiles*

The status of reptiles is likely to have remained the same as indicated by the 2016 study, with a small population of grass snake present within the site. Old straw bales offer potential breeding sites for this species, and areas of marshy and semi-improved grassland, along with the wet and dry ditches, offer habitat and shelter. Other species of reptile are considered to be absent.

It is considered that the results and assessment of the reptile surveys undertaken in 2016 are correct and robust. The previous study states that "*The areas of suitable habitat included marshy grassland and semi-improved grassland which provides areas of cover from predators, as well as a likely source of prey such as invertebrates and small mammals. The wet ditches and the River Thames corridor provide different habitats that are likely to support amphibians and other invertebrates that could provide a source of prey for grass snakes. The hedgerows present surrounding the site could also provide a source of cover and invertebrate and small mammal prey for reptiles. The hay bales present within the site appear to have been in-situ for a number of years and could provide suitable breeding habitat, particularly for egg laying grass snakes. The River Thames provides an excellent source of connectivity to further suitable habitat to the north and south of the site*".

The study undertaken in 2016 concluded that "*the population is considered small, and the site would provide significant problems in fencing due to the potential for a highly adapted aquatic snake such as the grass snake to use aquatic habitats to bypass fencing. It would be very difficult to permanently remove them from the site. It is therefore considered unnecessary to undertake a full reptile translocation, but to employ measures that make the site unsuitable for grass snakes by removal/destruction of habitat*".

It is considered that a Reptile Mitigation Strategy, to include measures to encourage reptiles to move away from the proposed areas of extraction, will be required.

Enhancement for reptiles could be delivered through the creation of log piles within areas of proposed new native planting and the wetland/grassland mosaic habitats. These features will provide shelter for reptiles, as well as habitat for fungi and invertebrates.

5.4.6 *Badgers*

Badger setts are considered to be absent from the site. No evidence of badgers was found within the current, or previous, studies. Given this, there are considered to be no ecological constraints regarding badgers at the site.

5.4.7 *Birds*

5.4.7.1 Barn Owl

The barn owl box within the Dutch barn appears to be currently unused, and there is no evidence of an active barn owl nest in 2019. Previous surveys in 2015 indicated that the barn owl box was used as a nest site in the past.

It is recommended that the owl box is removed from the barn outside of the nesting period, to discourage owls and kestrels from nesting in the box prior to the removal of the building.

5.4.7.2 Kestrel

The barn owl box was considered to be in active use as a nest site by a pair of kestrels in June 2019.

This is a change since the 2016 survey, when it was considered that the box was being used by barn owls. The box will have to be removed when it is confirmed that nesting kestrels, or other species, are not using the box, and that the young birds have fledged and left.

Enhancement for birds could include bird boxes, including boxes mounted on trees or poles that would be suitable for kestrel and barn owl.

5.4.7.3 Other Species

Surveys for overwintering birds and breeding birds were not undertaken as part of this study in 2019 or 2021. However, given the fact that the status of the habitats remains largely unchanged, with an increase in arable land and bare ground, the status of breeding and overwintering birds is also likely to remain unchanged and it is considered that the results of 2016 remain robust and representative.

The proposed habitat creation during the restoration phase is likely to create suitable habitats for wetland bird species, including overwintering birds. The proposed wet grassland, lagoon and wetland scrapes will provide potential foraging habitats and are likely to deliver ecological enhancement for wetland bird species.

6 References

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7 Appendix 1. Photographs

Photograph 1. Marshy grassland; March 2019.

Photograph 2. Semi-improved grassland; March 2019

Photograph 3. Arable land; March 2019.

Photograph 4. Arable land; August 2021.

Photograph 5. Improved grassland, former arable land; August 2021.

Photograph 6. Dutch barn; August 2021.

Photograph 7. Silver birch tree with bat roost potential; tree climbing survey revealed no evidence of bats. August 2021

Photograph 8. Bank of the River Thames; August 2021.

Photograph 9. Wet ditch; March 2019.

Photograph 10. Barn owl box within Dutch barn; August 2021.

Photograph 11. Marshy grassland; August 2021.

Photograph 12. Semi-improved grassland alongside the Thames Path; August 2021.

Photograph 13. Mature poplar tree included in the tree climbing survey; no evidence of bats. August 2021.

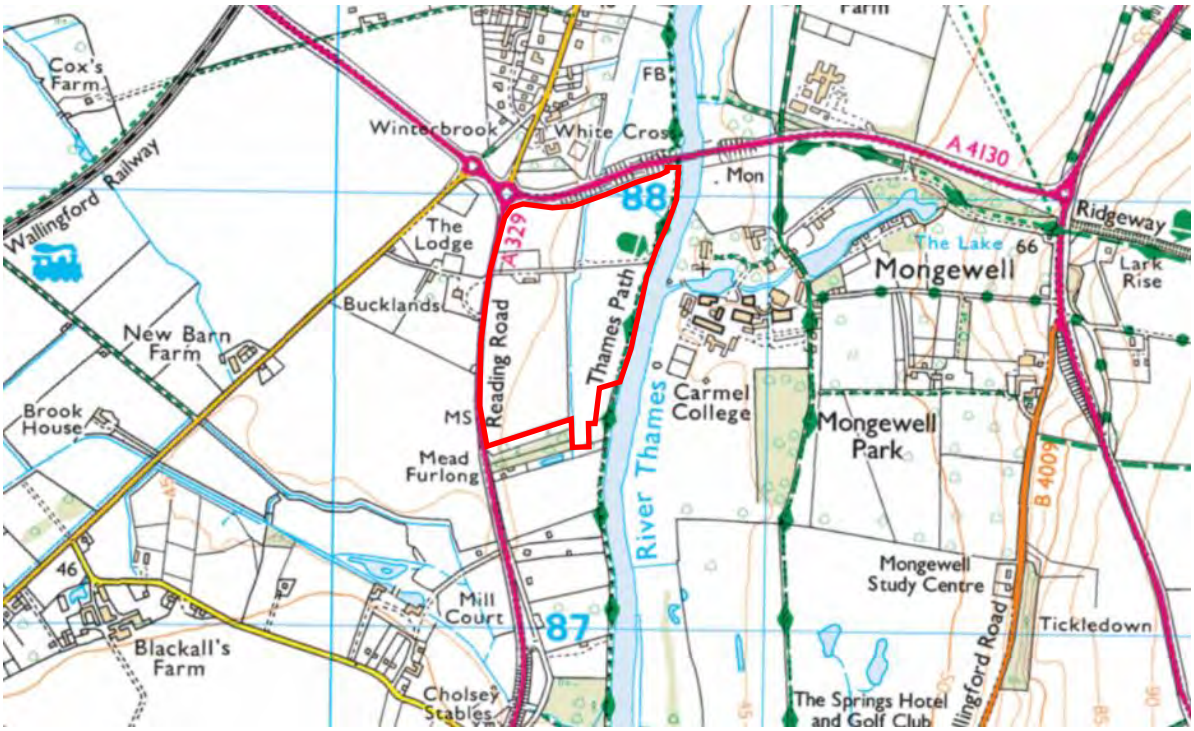
Photograph 14. Detail of the wet ditch; August 2021.

Photograph 15. Dry ditch; August 2021.

Photograph 16. Grazed, semi-improved grassland within the north-western area of the site, formerly bare ground in 2019.

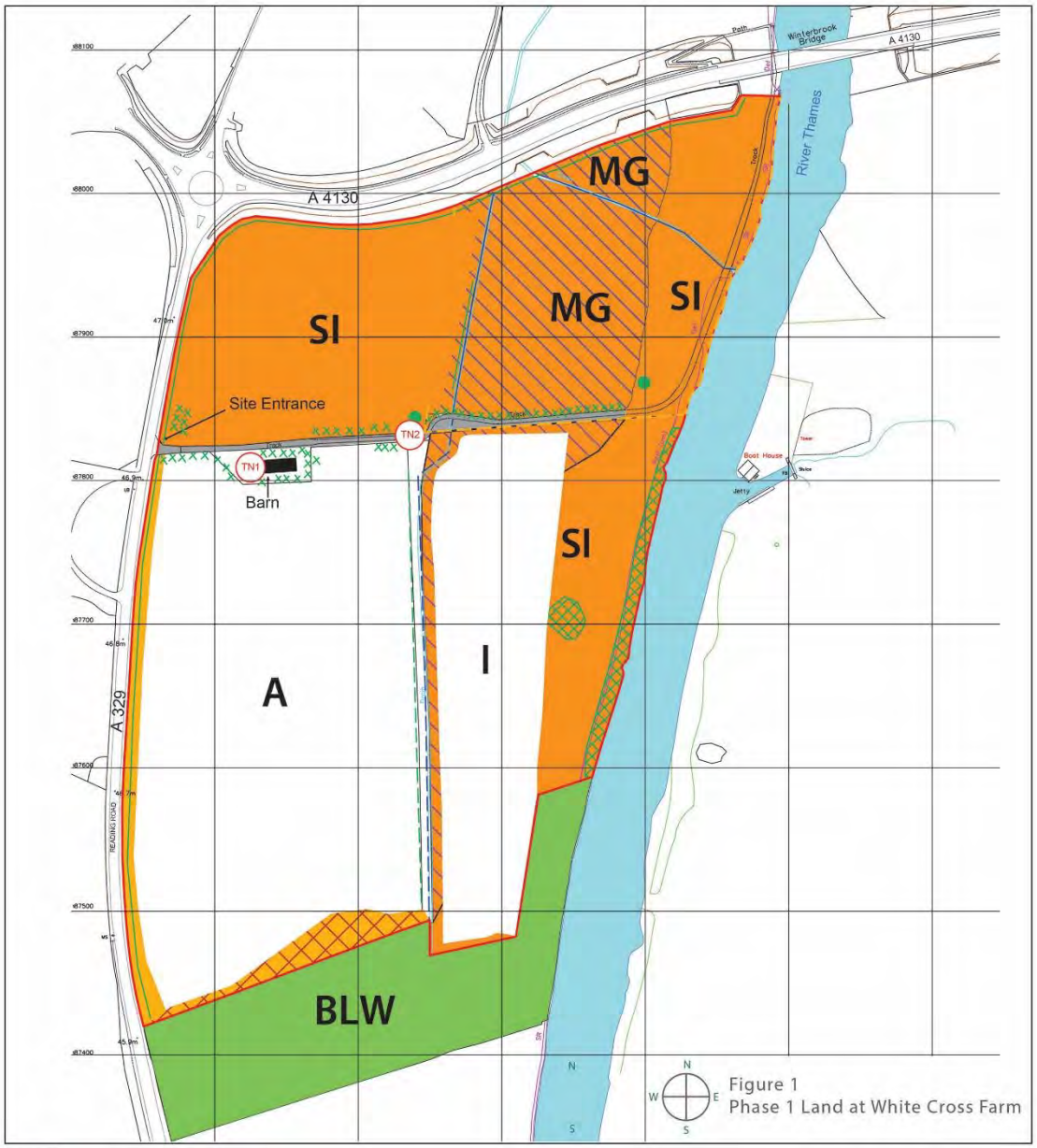
8 Appendix 2. Site Location Plans

Aerial photograph showing the approximate location of the land at Holmewood House, Sindlesham, outlined in red.



Ordnance Survey map showing the approximate location of the site (indicated by the red arrow) within the local area.

9 Appendix 3. Phase 1 Habitat Plan



Legend

Site boundary	Defunct hedgerow
Additional are added in April 2016	Hedgerow with scattered trees
A — Arable land	Dense scrub
SI — Semi-improved grasland	Scattered scrub
MG — Marshy grassland	Standard tree
Semi-improved grasland/tall ruderal	Building
BLW — Broadleaf woodland	Hard-standing
Wet ditch	I — Improved grassland
Dry ditch	TN1 — Target note number

windrush ecology.com

Project Name
Land at White Cross Farm

Production Date
117th August 2021

Project Owner
TB

Windrush Ecology Ltd. (Head Office)
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Target Notes

TN1 – Dutch barn. Negligible bat roost potential. Active kestrel nest present in June 2019. No evidence of current nesting by barn owls.

TN2 – Silver birch tree with ‘low’ bat roost potential.

10 Appendix 4. TVERC Biodiversity Report

Please refer to separate report prepared by the Thames Valley Environmental Records Centre.

Thames Valley
Environmental Records Centre

TVERC

Enabling data-driven decisions to better enhance and protect our natural environment

BIODIVERSITY REPORT

Site:	Land at White Cross Farm, Wallingford
TVERC Ref:	TVERC/21/363
Prepared for:	Windrush Ecology
On:	2021-07-28
By:	Thames Valley Environmental Records Centre
	datasearch@tverc.org
	www.tverc.org

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- For information on protected species designations please visit http://www.tverc.org/cms/sites/tverc/files/Species%20Status%20Guidance_0.pdf
- For information on the various statutory and non-statutory site designations please visit http://www.tverc.org/cms/sites/tverc/files/Site%20Guidance.pdf

PROTECTED AND NOTABLE SPECIES RECORDS

Taxon Group	Common Name	Latin Name	European Directives	UK Legislation	NERC s41	Other Designations	No of records	Earliest Record	Latest Record
Amphibians	Common Toad	Bufo bufo	EC	NA	WACA-Sch5-s9.5a	NERC-S41	1	31/05/2016	31/05/2016
Birds	Barn Owl	Tyto alba	EC	NA	WACA-Sch1-p1	NA	3	12/02/1998	23/06/2016
	Barn Owl	Tyto alba	OOS	NA	WACA-Sch1-p1	NA	36	12/02/1998	23/06/2016
	Barnacle Goose	Branta leucopsis	OOS	BirdsDir-A1	NA	NA	1	03/04/2002	03/04/2002
	Bittern	Botaurus stellaris	OOS	BirdsDir-A1	WACA-Sch1-p1	NERC-S41	2	01/07/2001	01/07/2001
	Black-headed Gull	Chroicocephalus ridibundus	EC	NA	NA	NA	4	16/05/2009	30/06/2016
	Black Redstart	Phoenicurus ochruros	OOS	NA	WACA-Sch1-p1	NA	2	19/10/2000	28/10/2001
	Bullfinch	Pyrrhula pyrrhula	EC	NA	NA	NERC-S41	6	11/06/1999	08/06/2018
	Bullfinch	Pyrrhula pyrrhula	OOS	NA	NA	NERC-S41	1	11/06/1999	08/06/2018
	Common Sandpiper	Actitis hypoleucos	EC	NA	NA	NA	1	29/04/2015	26/06/2015
	Corncrake	Crex crex	OOS	BirdsDir-A1	WACA-Sch1-p1	NERC-S41	12	13/05/1999	09/07/1999
	Cuckoo	Cuculus canorus	EC	NA	NA	NERC-S41	2	01/03/2008	26/06/2015
	Dunnock	Prunella modularis	EC	NA	NA	NERC-S41	7	01/03/2008	30/06/2016
	Fieldfare	Turdus pilaris	EC	NA	WACA-Sch1-p1	NA	1	18/04/2000	24/03/2015
	Fieldfare	Turdus pilaris	OOS	NA	WACA-Sch1-p1	NA	2	18/04/2000	24/03/2015
	Golden Plover	Pluvialis apricaria	EC	BirdsDir-A1	NA	NA	1	16/11/2004	14/04/2016
	Golden Plover	Pluvialis apricaria	OOS	BirdsDir-A1	NA	NA	2	16/11/2004	14/04/2016
	Grey Partridge	Perdix perdix	EC	NA	NA	NERC-S41	1	16/05/2009	13/07/2009
	Grey Wagtail	Motacilla cinerea	EC	NA	NA	NA	1	26/11/2004	31/05/2008

Taxon Group	Common Name	Latin Name	European Directives	UK Legislation	NERC s41	Other Designations	No of records	Earliest Record	Latest Record
	Grey Wagtail	Motacilla cinerea	OOS	NA	NA	NA	1	26/11/2004	31/05/2008
	Greylag Goose	Anser anser	EC	NA	NA	NA	2	29/04/2015	23/06/2016
	Hen Harrier	Circus cyaneus	OOS	BirdsDir-A1	WACA-Sch1-p1	NERC-S41	1	22/04/2000	22/04/2000
	Hobby	Falco subbuteo	OOS	NA	WACA-Sch1-p1	NA	9	25/06/1998	23/05/2006
	Honey-buzzard	Pernis apivorus	OOS	BirdsDir-A1	WACA-Sch1-p1	NA	1	18/09/2002	18/09/2002
	House Martin	Delichon urbicum	EC	NA	NA	NA	2	16/05/2009	30/06/2016
	House Sparrow	Passer domesticus	EC	NA	NA	NERC-S41	3	16/05/2009	30/06/2016
	Kestrel	Falco tinnunculus	EC	NA	NA	NA	4	16/05/2009	30/06/2016
	Kingfisher	Alcedo atthis	EC	BirdsDir-A1	WACA-Sch1-p1	NA	3	28/04/1999	24/03/2015
	Kingfisher	Alcedo atthis	OOS	BirdsDir-A1	WACA-Sch1-p1	NA	1	28/04/1999	24/03/2015
	Lapwing	Vanellus vanellus	EC	NA	NA	NERC-S41	2	28/12/2004	14/04/2016
	Lapwing	Vanellus vanellus	OOS	NA	NA	NERC-S41	1	28/12/2004	14/04/2016
	Lesser Redpoll	Acanthis cabaret	EC	NA	NA	NERC-S41	1	14/04/2016	14/04/2016
	Lesser Spotted Woodpecker	Dendrocopos minor	EC	NA	NA	NERC-S41	1	24/01/2003	31/05/2008
	Lesser Spotted Woodpecker	Dendrocopos minor	OOS	NA	NA	NERC-S41	2	24/01/2003	31/05/2008
	Linnet	Linaria cannabina	EC	NA	NA	NERC-S41	3	29/01/2015	23/06/2016
	Mallard	Anas platyrhynchos	EC	NA	NA	NA	5	01/03/2008	08/06/2018
	Marsh Harrier	Circus aeruginosus	OOS	BirdsDir-A1	WACA-Sch1-p1	NA	1	06/05/2006	06/05/2006
	Marsh Tit	Poecile palustris	OOS	NA	NA	NERC-S41	1	05/03/2013	05/03/2013
	Meadow Pipit	Anthus pratensis	EC	NA	NA	NA	2	29/01/2015	14/04/2016
	Mistle Thrush	Turdus viscivorus	EC	NA	NA	NA	5	01/03/2008	08/06/2018

Taxon Group	Common Name	Latin Name	European Directives	UK Legislation	NERC s41	Other Designations	No of records	Earliest Record	Latest Record
	Montagu's Harrier	Circus pygargus	OOS	BirdsDir-A1	WACA-Sch1-p1	NA	1	01/07/1998	01/07/1998
	Mute Swan	Cygnus olor	EC	NA	NA	NA	1	01/03/2008	31/05/2008
	Oystercatcher	Haematopus ostralegus	OOS	NA	NA	NA	1	11/05/2003	11/05/2003
	Peregrine	Falco peregrinus	OOS	BirdsDir-A1	WACA-Sch1-p1	NA	5	27/10/1998	10/10/2006
	Pied Flycatcher	Ficedula hypoleuca	OOS	NA	NA	NA	1	15/04/2003	15/04/2003
	Red Kite	Milvus milvus	EC	BirdsDir-A1	WACA-Sch1-p1	NA	7	18/09/2002	30/06/2016
	Red Kite	Milvus milvus	OOS	BirdsDir-A1	WACA-Sch1-p1	NA	2	18/09/2002	30/06/2016
	Redwing	Turdus iliacus	EC	NA	WACA-Sch1-p1	NA	2	29/01/2015	24/03/2015
	Reed Bunting	Emberiza schoeniclus	EC	NA	NA	NERC-S41	6	01/03/2008	08/06/2018
	Skylark	Alauda arvensis	EC	NA	NA	NERC-S41	3	16/05/2009	30/06/2016
	Snipe	Gallinago gallinago	EC	NA	NA	NA	1	25/12/2004	06/02/2015
	Snipe	Gallinago gallinago	OOS	NA	NA	NA	1	25/12/2004	06/02/2015
	Song Thrush	Turdus philomelos	EC	NA	NA	NERC-S41	12	01/03/2008	08/06/2018
	Spotted Flycatcher	Muscicapa striata	EC	NA	NA	NERC-S41	1	20/09/2000	31/05/2008
	Spotted Flycatcher	Muscicapa striata	OOS	NA	NA	NERC-S41	1	20/09/2000	31/05/2008
	Starling	Sturnus vulgaris	EC	NA	NA	NERC-S41	4	01/03/2008	30/06/2016
	Stock Dove	Columba oenas	EC	NA	NA	NA	4	01/03/2008	08/06/2018
	Stone-curlew	Burhinus oedicnemus	OOS	BirdsDir-A1	WACA-Sch1-p1	NERC-S41	2	23/04/2000	23/04/2000
	Swift	Apus apus	EC	NA	NA	NA	4	16/05/2009	30/06/2016
	Swift	Apus apus	RSPB	NA	NA	NA	1	16/05/2009	30/06/2016

Taxon Group	Common Name	Latin Name	European Directives	UK Legislation	NERC s41	Other Designations	No of records	Earliest Record	Latest Record
	Tawny Owl	Strix aluco	EC	NA	NA	NA	2	01/03/2008	25/06/2015
	Turtle Dove	Streptopelia turtur	OOS	NA	NA	NERC-S41	1	16/05/1999	16/05/1999
	Willow Warbler	Phylloscopus trochilus	EC	NA	NA	NA	2	01/03/2008	26/06/2015
	Yellow Wagtail	Motacilla flava subsp. flavissima	EC	NA	NA	NERC-S41	1	16/09/2006	23/06/2016
	Yellow Wagtail	Motacilla flava subsp. flavissima	OOS	NA	NA	NERC-S41	1	16/09/2006	23/06/2016
	Yellowhammer	Emberiza citrinella	EC	NA	NA	NERC-S41	3	16/05/2009	30/06/2016
Higher Plants - Flowering Plants	Bluebell	Hyacinthoides non-scripta	BSBI	NA	WACA-Sch8	NA	1	01/01/2017	27/09/2017
	Chicory	Cichorium intybus	BSBI	NA	NA	NA	1	29/06/2014	27/09/2017
	Chicory	Cichorium intybus	LN	NA	NA	NA	1	29/06/2014	27/09/2017
	Common Cudweed	Filago vulgaris	EC	NA	NA	NA	1	05/06/2009	23/05/2016
	Common Rock-rose	Helianthemum nummularium	BSBI	NA	NA	NA	1	01/01/2017	27/09/2017
	Field Scabious	Knautia arvensis	BSBI	NA	NA	NA	1	01/01/2017	27/09/2017
	Hoary Plantain	Plantago media	BSBI	NA	NA	NA	1	01/01/2017	27/09/2017
	Narrow-leaved Meadow-grass	Poa angustifolia	BSBI	NA	NA	NA	1	01/01/2017	27/09/2017
	White Mullein	Verbascum lychnitis	LN	NA	NA	NA	1	01/06/2017	30/06/2017
Invertebrates - Beetles	A Beetle	Aphthona nigriceps	OBRC	NA	NA	NA	2	05/08/1992	06/08/1993
	Bloody Cranesbill Weevil	Zacladus exiguus	EC	NA	NA	NA	1	10/08/2016	10/08/2016
	Stag Beetle	Lucanus cervus	PTES	HabDir-A2np	WACA-Sch5-s9.5a	NERC-S41	6	25/07/1998	12/06/2018
Invertebrates - Butterflies	Small Heath	Coenonympha pamphilus	BC	NA	NA	NERC-S41	12	30/06/1990	22/07/2012

Taxon Group	Common Name	Latin Name	European Directives	UK Legislation	NERC s41	Other Designations	No of records	Earliest Record	Latest Record
	White-letter Hairstreak	Satyrium w-album	BC	NA	WACA-Sch5-s9.5a	NERC-S41	32	06/07/2000	02/08/2008
Invertebrates - Dragonflies & Damselflies	Common Club-tail	Gomphus vulgatissimus	OBRC	NA	NA	NA	2	05/08/1992	05/08/1992
Invertebrates - Molluscs	Depressed (or Compressed) River Mussel	Pseudanodonta complanata	EA	NA	NA	NERC-S41	1	01/09/2011	01/09/2011
Invertebrates - Moths	Beaded Chestnut	Agrochola lychnidis	LN	NA	NA	NERC-S41	2	01/01/1989	01/01/1989
	Blood-vein	Timandra comae	LN	NA	NA	NERC-S41	3	01/01/1989	01/01/1989
	Brighton Wainscot	Oria musculosa	LN	NA	NA	NERC-S41	1	07/08/1970	07/08/1970
	Brindled Beauty	Lycia hirtaria	LN	NA	NA	NERC-S41	1	01/01/1989	01/01/1989
	Broom Moth	Ceramica pisi	LN	NA	NA	NERC-S41	2	01/01/1989	01/01/1989
	Brown-spot Pinion	Agrochola litura	LN	NA	NA	NERC-S41	1	01/01/1989	01/01/1989
	Buff Ermine	Spilosoma lutea	LN	NA	NA	NERC-S41	3	01/01/1989	01/01/1989
	Centre-barred Sallow	Atethmia centrago	LN	NA	NA	NERC-S41	1	01/01/1989	01/01/1989
	Cinnabar	Tyria jacobaeae	LN	NA	NA	NERC-S41	2	01/01/1989	01/01/1989
	Dark-barred Twin-spot Carpet	Xanthorhoe ferrugata	LN	NA	NA	NERC-S41	3	01/01/1989	01/01/1989
	Dot Moth	Melanchra persicariae	LN	NA	NA	NERC-S41	2	01/01/1989	01/01/1989
	Garden Dart	Euxoa nigricans	LN	NA	NA	NERC-S41	3	01/01/1989	01/01/1989
	Garden Tiger	Arctia caja	LN	NA	NA	NERC-S41	2	01/01/1989	01/01/1989
	Ghost Moth	Hepialus humuli humuli	LN	NA	NA	NERC-S41	2	01/01/1989	01/01/1989
	Green-brindled Crescent	Allophyes oxyacanthae	LN	NA	NA	NERC-S41	1	01/01/1989	01/01/1989

Taxon Group	Common Name	Latin Name	European Directives	UK Legislation	NERC s41	Other Designations	No of records	Earliest Record	Latest Record
	Lackey	Malacosoma neustria	LN	NA	NA	NERC-S41	1	01/01/1989	01/01/1989
	Large Nutmeg	Apamea anceps	LN	NA	NA	NERC-S41	2	01/01/1989	01/01/1989
	Latticed Heath	Chiasmia clathrata	BC	NA	NA	NERC-S41	1	24/05/2012	24/05/2012
	Rosy Rustic	Hydraecia micacea	LN	NA	NA	NERC-S41	1	01/01/1989	01/01/1989
	Sallow	Cirrhia icteritia	LN	NA	NA	NERC-S41	2	01/01/1989	01/01/1989
	Shoulder-striped Wainscot	Leucania comma	LN	NA	NA	NERC-S41	1	01/01/1989	01/01/1989
	Small Square-spot	Diarsia rubi	LN	NA	NA	NERC-S41	3	01/01/1989	01/01/1989
	Spinach	Eulithis mellinata	LN	NA	NA	NERC-S41	1	01/01/1989	01/01/1989
	White Ermine	Spilosoma lubricipeda	LN	NA	NA	NERC-S41	3	01/01/1989	01/01/1989
Invertebrates - True Flies	Long-horned Soldier	Vanoyia tenuicornis	EC	NA	NA	NA	1	10/08/2016	10/08/2016
Lower Plants - Mosses	A Moss	Dialytrichia saxicola	BBS	NA	NA	NA	2	01/01/2009	23/03/2009
Mammals - Terrestrial (bats)	Brown Long-eared Bat	Plecotus auritus	BSBBG	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	1	18/08/2010	12/06/2014
	Brown Long-eared Bat	Plecotus auritus	EC	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	2	18/08/2010	12/06/2014
	Common Pipistrelle	Pipistrellus pipistrellus	EC	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NA	18	03/05/2009	18/06/2018
	Daubenton's Bat	Myotis daubentonii	EC	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NA	3	18/08/2010	24/07/2015
	Lesser Noctule	Nyctalus leisleri	EC	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NA	1	20/08/2015	20/08/2015
	Noctule Bat	Nyctalus noctula	EC	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	6	19/07/2012	18/06/2020
	Serotine	Eptesicus serotinus	EC	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NA	3	20/08/2015	18/06/2020

Taxon Group	Common Name	Latin Name	European Directives	UK Legislation	NERC s41	Other Designations	No of records	Earliest Record	Latest Record
	Soprano Pipistrelle	Pipistrellus pygmaeus	EC	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	30	03/05/2009	18/06/2019
	Soprano Pipistrelle	Pipistrellus pygmaeus	SODC	HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	1	03/05/2009	18/06/2019
	Unidentified Bat	Myotis	EC	HabDir-A2np, HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	7	19/07/2012	20/08/2015
Mammals - Terrestrial (excl. bats)	Eurasian Badger	Meles meles	EC	NA	Badgers-1992	NA	3	20/02/2006	08/07/2016
	Eurasian Badger	Meles meles	MOP	NA	Badgers-1992	NA	2	20/02/2006	08/07/2016
	European Otter	Lutra lutra	EC	HabDir-A2np, HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41	4	01/05/2010	26/06/2015
	European Otter	Lutra lutra	LN	HabDir-A2np, HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41	2	01/05/2010	26/06/2015
	European Otter	Lutra lutra	OS	HabDir-A2np, HabDir-A4	HabReg-Sch2, WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41	3	01/05/2010	26/06/2015
	European Water Vole	Arvicola amphibius	BBOWT	NA	WACA-Sch5-s9.4a/s9.4b/s9.4c	NERC-S41	8	01/01/1995	05/05/2017
Reptiles	Common Lizard	Zootoca vivipara	EC	NA	WACA-Sch5-s9.1k/s9.5a	NERC-S41	3	21/06/2014	25/04/2017
	Common Lizard	Zootoca vivipara	LN	NA	WACA-Sch5-s9.1k/s9.5a	NERC-S41	2	21/06/2014	25/04/2017
	Common Lizard	Zootoca vivipara	MOP	NA	WACA-Sch5-s9.1k/s9.5a	NERC-S41	1	21/06/2014	25/04/2017
	Grass Snake	Natrix helvetica	BC	NA	WACA-Sch5-s9.1k/s9.5a	NERC-S41	1	10/06/2012	14/06/2018
	Grass Snake	Natrix helvetica	EC	NA	WACA-Sch5-s9.1k/s9.5a	NERC-S41	13	10/06/2012	14/06/2018

INVASIVE SPECIES RECORDS

Taxon Group	Common Name	Latin Name	Status	No of records	Earliest Record	Latest Record
Higher Plants - Flowering Plants	Indian Balsam	Impatiens glandulifera	INNS-Priority-2015	3	15/07/2011	09/09/2018
	Least Duckweed	Lemna minuta	INNS-Other-2015	1	15/07/2011	15/07/2011
	Nuttall's Waterweed	Elodea nuttallii	INNS-Priority-2015	1	15/07/2011	15/07/2011
	Orange Balsam	Impatiens capensis	INNS-Other-2015	1	09/09/2018	09/09/2018
Mammals - Terrestrial (excl. bats)	American Mink	Neovison vison	INNS-Priority-2015	1	10/04/2005	10/04/2005

Land at White Cross Farm, Wallingford

Designated Sites Map

Conservation Target Area

Thames Wallingford to Goring CTA (Conservation Target Area)

The floodplain of the Thames between Wallingford and Goring.

Joint Character Area: Thames and Avon Vales

Landscape type: River Meadowlands

Geology: Alluvium

Topography: Flat riverside land.

Area of CTA: 183 hectares

Biodiversity:

- Fen, swamp and reedbed. South Stoke Marsh. A very important site for birds and invertebrates and the largest area of wetland along the Thames in Oxfordshire. There is also extensive swamp habitat at Cholsey Marsh.
- Wet Woodland: A number of small areas of wet woodland, some on islands in the Thames, that support populations of Lodden lily.
- Wet grassland. There are a few wet meadow sites including Cholsey Marsh and fields near Wallingford.

Access: Thames path, Cholsey Marsh Nature Reserve

Archaeology:

Oxfordshire Biodiversity Action Plan Targets associated with this CTA:

1. Lowland fen, reedbed (and swamp) – management[1].
2. Wet woodland - management.
3. Floodplain grazing marsh – management (and there may be potential to extend the area).

[1] "Management" implies both maintaining the quantity, and maintaining and improving the quality of existing BAP habitat and incorporates the following target definitions: "Maintaining extent" and "Achieving Condition".

12 Appendix 5. Proposed Post-extraction (Restoration)

13 Appendix 6. Biodiversity Impact Calculation

Please refer to separate Excel spreadsheet for the completed Defra Metric 3.0.

PROPOSED WHITECROSS QUARRY DEVELOPMENT

WALLINGFORD

Biodiversity Metric

(For full & detail results see Excel Spreadsheet)

White Cross Farm

Headline Results

Return to results menu

On-site baseline	*Habitat units*	74.97
	Hedgerow units	9.22
	River units	0.00
On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	92.30
	Hedgerow units	24.11
	River units	0.00
On-site net % change (Including habitat retention, creation & enhancement)	*Habitat units*	23.11%
	Hedgerow units	161.56%
	River units	0.00%
Off-site baseline	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	17.33
	Hedgerow units	14.89
	River units	0.00
Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	23.11%
	Hedgerow units	161.56%
	River units	0.00%
Trading rules Satisfied?		No - Check Trading Summary

14 Appendix 7. Legislation & Policy Guidance

14.1 Conservation of Habitats and Species Regulations 2017

In relation to wildlife and nature conservation, two key Directives have been adopted by the European Community. These are (i) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds ("The Birds Directive" formerly 79/409/EEC); and (ii) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora ("The Habitats Directive"). These Directives provide for the protection of animal and plant species of European importance and the habitats which support them, particularly through the establishment of a network of protected sites.

The Habitats Directive is transposed into domestic law through the Conservation of Habitats and Species Regulations 2017. These regulations came into force on 1st April 2017 and consolidate the many changes that have been made to the domestic law over the years since the predecessor regulations made in 1994. The regulations provide for the designation and protection of European Sites, the protection of European protected species and the adaptation of planning and other controls for the protection of European Sites.

14.2 Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981 (as amended) (WCA) consolidated and amended existing national legislation to implement the Convention of the Conservation of European Wildlife and Natural Habitats (The Bern Convention) and the Birds Directive. There have been various amendments since the original enactment. Schedules 1 and 5 of the Act identify species of bird and other animal in relation to which the Act makes killing, injury, taking and disturbance an offence while Schedule 8 to the Act lists species of plant in relation to which the Act makes it an offence to intentionally pick, uproot or destroy.

14.3 The Natural Environment and Rural Communities Act 2006

Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 places a duty on the Secretary of State to publish, review and revise lists of living organisms and types of habitat in England that are of principal importance for the purpose of conserving English biodiversity. It also requires the Secretary of State to take, and promote the taking of, steps to further the conservation of the listed organisms and habitats. This is important in the context of planning decisions as the National Planning Policy Framework affords planning policy protection to the habitats of species listed by virtue of Section 41.

14.4 The National Planning Policy Framework

The National Planning Policy Framework was revised on 20 July 2021 and sets out the government's planning policies for England and how these are expected to be applied. This revised Framework replaces the previous National Planning Policy Framework published in March 2012, revised in July 2018 and updated in February 2019.

The NPPF states that planning policies and decisions should contribute to and enhance the natural and local environment by:

- protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
- recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;

- maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
- minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
- remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.

Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas, and should be given great weight in National Parks and the Broads. The scale and extent of development within all these designated areas should be limited, while development within their setting should be sensitively located and designed to avoid or minimise adverse impacts on the designated areas.

When considering applications for development within National Parks, the Broads and Areas of Outstanding Natural Beauty, permission should be refused for major development other than in exceptional circumstances, and where it can be demonstrated that the development is in the public interest. Consideration of such applications should include an assessment of:

- the need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy;
- the cost of, and scope for, developing outside the designated area, or meeting the need for it in some other way; and
- any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated.

Within areas defined as Heritage Coast (and that do not already fall within one of the designated areas mentioned in paragraph 176), planning policies and decisions should be consistent with the special character of the area and the importance of its conservation. Major development within a Heritage Coast is unlikely to be appropriate, unless it is compatible with its special character.

To protect and enhance biodiversity and geodiversity, plans should:

- Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and

- Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.

When determining planning applications, local planning authorities should apply the following principles:

- If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- Development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
- Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons, and a suitable compensation strategy exists; and
- Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.

The following should be given the same protection as habitats sites:

- ❖ Potential Special Protection Areas and possible Special Areas of Conservation;
- ❖ Listed or proposed Ramsar sites; and
- ❖ Sites identified, or required, as compensatory measures for adverse effects on a habitats site, (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.

The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitat's site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.

14.5 Bats

As with many animal species within the UK, declines in the abundance and distribution of many bat species have been documented through recent decades. The reasons for these declines are various and complex but it is considered that the major factors are changes in landuse and agriculture, the loss of woodlands and hedgerows and the loss of suitable roosting sites.

Bats are particularly sensitive to human activity due to the fact that they roost within buildings, trees and underground structures such as mines, and the availability of suitable roost sites is considered to be a key factor in the conservation of bats within the UK. As a consequence, all species of bat and their roost sites are protected under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) and under The Conservation of Habitats and Species Regulations 2017. Taken together, these make it an offence to:

(a) Deliberately capture or intentionally take a bat

(b) Deliberately or intentionally kill or injure a bat
(c) To be in possession or control of any live or dead wild bat or any part of, or anything derived from a wild bat
(d) Damage or destroy a breeding site or resting place of such an animal or intentionally or recklessly damage, destroy or obstruct access to any place that a wild bat uses for shelter or protection
(e) Intentionally or recklessly disturb any wild bat while it is occupying a structure or place that it uses for shelter or protection
(f) Deliberately disturb any bat, in particular any disturbance which is likely
- to impair their ability;
(i) to survive, breed, reproduce or to rear or nurture their young; or
(ii) in the case of hibernating or migratory species, to hibernate or migrate; or
- to affect significantly the local distribution or abundance of the species to which they belong

A bat roost may be any structure a bat uses for breeding, resting, shelter or protection. It is important to note that since bats tend to re-use the same roost sites, current legal opinion is that a bat roost is protected whether or not the bats are present at the time.
Although the law provides strict protection to bats, it also allows this protection to be set aside (derogation) under The Conservation of Habitats and Species Regulations 2017 through the issuing of licences (referred to as European Protected Species Licences or EPSL). Where a lawful operation is required to be carried out but which is likely to result in one of the above offences, a licence may be obtained from Natural England (the statutory body in England with responsibility for nature conservation) to allow the operation to proceed. However, in accordance with the requirements of The Conservation of Habitats and Species Regulations 2017, a licence can only be issued where the following requirements are satisfied:

- The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment';
- 'There is no satisfactory alternative';
- The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'.

These three criteria are often referred to as the 'three tests' of the Regulations. All three must be satisfied in order for a licence to be granted.
Certain bat species are listed on Annex II of The Conservation of Habitats and Species regulations 2017. Special Areas of Conservation (SAC) can be designated for such species.

14.6 Otters

Otters *Lutra lutra* are protected under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) and under The Conservation of Habitats and Species Regulations 2017. Taken together, these pieces of legislation make it an offence to:

(a) Deliberately capture or intentionally take an otter
(b) Deliberately or intentionally kill or injure an otter
(c) To be in possession or control of any live or dead wild otter or any part of, or anything derived from a wild otter
(d) Damage or destroy a breeding site or resting place of an otter or intentionally or recklessly damage, destroy or obstruct access to any place that a wild otter uses for shelter or protection
(e) Intentionally or recklessly disturb any wild otter while it is occupying a structure or place that it uses for shelter or protection
(f) Deliberately disturb an otter, in particular any disturbance which is likely

- to impair their ability to survive, breed, reproduce or to rear or nurture their young
- to affect significantly the local distribution or abundance of the species

Although the law provides strict protection to otters, it also allows this protection to be set aside (derogation) under The Conservation of Habitats and Species Regulations 2017 through the issuing of licences. Where a lawful operation is required to be carried out but which is likely to result in one of the above offences, a licence may be obtained from Natural England (the statutory body in England with responsibility for nature conservation) to allow the operation to proceed.

Although the law provides strict protection to otters, it also allows this protection to be set aside (derogation) under The Conservation of Habitats and Species Regulations 2017 through the issuing of licences (referred to as European Protected Species Licences or EPSL). Where a lawful operation is required to be carried out but which is likely to result in one of the above offences, a licence may be obtained from Natural England (the statutory body in England with responsibility for nature conservation) to allow the operation to proceed. However, in accordance with the requirements of The Conservation of Habitats and Species Regulations 2017, a licence can only be issued where the following requirements are satisfied:

- The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment';
- 'There is no satisfactory alternative';
- The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'.

These three criteria are often referred to as the 'three tests' of the Regulations. All three must be satisfied in order for a licence to be granted.

14.7 Nesting Birds

Nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. The nesting season for most species is between March and August inclusive.

Species listed on Schedule 1 of the Act, which includes the barn owl *Tyto alba*, are also protected from disturbance whilst nesting, and whilst preparing to nest.

14.8 Reptiles

All British species of reptile are protected by the Wildlife and Countryside Act 1981. Part of Section 9(1) and all of Section 9(5) apply. This means they are protected against intentional killing and injuring (but not taking).

Rarer species, including the smooth snake *Coronella austriaca* and sand lizard *Lacerta agilis*, are fully protected under the Act, which protects them from intentional disturbance and destruction of habitat.

14.9 Water Voles

Water voles *Arvicola amphibius* receive full protection under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to:

- intentionally kill, injure or take (capture etc.) water voles
- intentionally or recklessly damage, destroy, obstruct access to water vole burrows

- intentionally or recklessly disturb a water vole whilst occupying a burrow