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Planning Partnership

APPENDIX 1

ECOLOGICAL IMPACT ASSESSMENT - NOVEMBER 2019 AND ASSOCIATED APPENDICES AND REPORTS

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Proposed "Kim Wilkie" Designed Landscape Enhancement Features With The Provision of Public Access (Amendment to WSCC/029/18/SP)

Land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217)

Ecological Impact Assessment

November 2019

Client:	Mathews Group
Revision:	01: November 2019
Surveys Conducted:	May 2018 – September 2019
Report Issued:	17th November 2019

Report for:- Mathews Group

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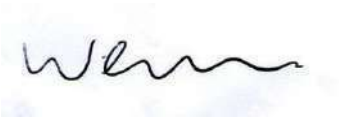

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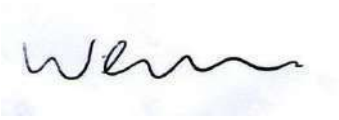

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Ecological Impact Assessment

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Ref. Rev.1_17/11/2019

SUMMARY

This report presents the results of an Ecological Impact Assessment (EcIA) that has been undertaken for features associated with **land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217)**.

An Ecological Baseline Survey and Impact Assessment (EcIA) was completed in May 2011 and was issued as evidence for the original Planning Application, the evidence of the original survey was built upon by Environmental Business Solutions (EBS) in there Ecological Impact Assessment report issued May 2018 using survey data collated from spring 2017 to summer 2018. This EcIA is in support of a full planning application for restoration works to Knepp Mill Pond by the construction of landscape enhancement features using imported inert materials, together with the provision of public access and amenity, on land at Knepp Castle Estate, West Grinstead. This proposal comprises an amendment to the latest current approved scheme that was substantively granted planning permission in October 2018 (WSCC/029/18/SP) and commenced 2018. This application seeks to amend to the proposed landscaping scheme to create what is described as a "high quality parkland providing a vista and bookend to views, to and from Knepp castle to the southwest". The proposal would result in the maximum land levels in this area increasing to 29m AOD on a plateau stretching across an area approximately midway between Buck Barn Cottages and Hill House Farm. The approved scheme has a maximum height of 26m AOD on a smaller area east of this. The amphitheatre would slope down relatively steeply from this area to another plateau at 23m AOD, where a small, circular pond would be created.

A large area of additional tree / shrub planting would be provided on the northern slopes of the feature, the northern extent of which would be at a higher level, in closer proximity of Buck Barn Bungalows than is currently the case.

The shape and extent of the bunds along the A29 are also to be amended, and an acoustic fence to be implemented east of Hillhouse Farm.

It is also proposed to make permanent the current temporary construction access on the A272 at the north of the site, and for this to be extended east, to the rear of Buck Barn Bungalows, then south , to the to the east of bunds and parallel to the A24. The extended route would provide a new access for Hill House Farm, and a new access would also be provided from the south to industrial units between Hill House and Floodgate Farm. This would allow the existing two accesses directly onto the A24 to be closed.

It is also proposed to realign the public right of way (PROW) further west, curving north inside a new woodland that would be created on the outer slopes of the amphitheatre. A new carpark would be created at the southern end of the Floodgate Farm landscape feature.

It is understood that the amount of additional material required for the works would be approximately 250,000m³, and that the works would take a maximum of 3 additional years to complete.

Since the land currently supports a combination of agricultural pasture, hedgerows, grassed areas, standing water, wetland edges and wooded areas etc., it is necessary to assess the potential ecological impacts of such a proposal.

The scope of survey and assessment presented in this report has included consideration of:
a) statutory and non-statutory designations; **b)** vegetation and plant species; **c)** protected species of fauna; and **d)** species and habitats of principal importance, as listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

This Ecological Impact Assessment (EcIA), will form part of an Environmental Impact Assessment (EIA), with this report providing baseline information at the screening and scoping stage of the EIA process.

EBS have, at the request of their clients, continuously surveyed the entire area covered by the

original EcIA. Therefore, this report incorporates the latest proposed redline boundary along with a wider area. The results within this report incorporates results previously published in 2018 along with findings collated during May 2018 through to September 2019. The results to date have shown that there are important ecological considerations, including historical evidence of breeding birds, water voles and a small breeding population of reptiles, plus the presence of vegetation types that constitute BAP priority habitat (see **Section 4.1** for the full details, including other considerations). The predicted impacts upon Valued Ecological Receptors have been accurately identified and bespoke mitigation and compensation measures can be prescribed.

This Ecological Impact Assessment (EcIA) has been prepared, in accordance with guidelines provided by the Charted Institute of Ecology and Environmental Assessment (CIEEM) to support a planning application for the proposed restoration scheme. Full details of the proposals are provided in the subsequent sections of this report.

1.0 INTRODUCTION

Knepp Castle Estate is located approximately 1km south of Southwater, and in total extends to an area of approximately 1.400ha. This comprises Knepp Castle, Knepp Mill Pond, parkland, woodland, areas of grassland, grazing land, farmhouses and cottages, rural officers and light industry units, together with a polo club and polo fields. The estate is predominately located to the west of the north-south A24, with significant majority located south of the east-west A272. The application proposal relates to land that is within the part of the estate known as Knepp Park. This covers an area of approximately 274ha and is located immediately west of the A24 and south of the a272. The modern Knepp Castle was built by the architect John Nash in the early 19th century, and a parkland landscape designed by Humphrey Repton was laid out around it, probably at this time. Knepp Mill Pond was originally a hammer pond for the iron-working industry, but after this industry fell into decay the estate has been farmland, and during the 20th century this became increasingly intensive.

The present owner has an ambition to restore the estate's historic landscape, and the works described below form an integral part of this restoration project. Two other parts of this project, the 're-wilding' of the deer park by returning it to near-natural grazing by a variety of large herbivores, and of the River Adur and its floodplain through the estate are proceeding separately and in parallel to these works.

1.1 PROJECT DESCRIPTION

The latest application envisages a number of amendments to the approved, part implemented works on site. These can be summarised as:

1.1.1 This proposal comprises an amendment to the latest current approved scheme that was substantively granted planning permission in October 2018 (WSCC/029/18/SP) and commenced 2018.

1.1.2 Amendment to the proposed landscaping scheme to create what is described as a "high quality parkland providing a vista and bookend to views, to and from Knepp castle to the southwest".

1.1.3 Amendment in the maximum land levels in this area increasing to 29m AOD on a plateau stretching across an area approximately midway between Buck Barn Cottages and Hill House Farm. The approved scheme has a maximum height of 26m AOD on a smaller area east of this. The amphitheatre would slope down relatively steeply from this area to another plateau at 23m AOD

1.1.4 Creation of a small, circular pond.

1.1.5 Additional tree / shrub planting would be provided on the northern slopes of the feature, the northern extent of which would be at a higher level, in closer proximity of Buck Barn Bungalows than is currently the case.

1.1.6 The shape and extent of the bunds along the A29 are also to be amended, and an acoustic fence to be implemented east of Hillhouse Farm.

1.1.7 Proposal to make permanent the current temporary construction access on the A272 at the north of the site, and for this to be extended east, to the rear of Buck Barn Bungalows, then south , to the to the east of bunds and parallel to the A24. The extended route would provide a new access for Hill House Farm, and a new access would also be provided from the south to industrial units between Hill House and Floodgate Farm. This would allow the existing two accesses directly onto the A24 to be closed.

1.1.8 Proposal to realign the public right of way (PROW) further west, curving north inside a new woodland that would be created on the outer slopes of the amphitheatre.

1.1.9 Creation of a new carpark at the southern end of the Floodgate Farm landscape feature.

1.1.10 It is understood that the amount of additional material required for the works would be approximately 250,000m³.
1.1.11 Works would take a maximum of 3 additional years to complete.
1.1.12 See Drawing RCo201 / Fig 01 Rev 01 09-05-19 (Ramsay & Co Landscape Architecture), appended.

1.2 Ecological Assessment

Ecological survey and assessment work has been conducted on an intermittent basis since 2009 at land at Knepp Castle Estate. The 2017 – 2019 surveys have been conducted by experienced ecologists employed by Environmental Business Solutions (EBS).

The requests for such surveys have been prompted by ongoing preparation of an amended planning application.

There is an intention to finalise and submit the planning application in 2019 and therefore be a requirement for an Ecological Impact Assessment (EcIA), which will form part of a full Environmental Impact Assessment (EIA) has been identified.

A plan showing the red-line boundary of the survey area has been consistently used by all ecologists during the undertaking of surveys. This red-line boundary has also been used in the draft landscaping proposals plan that has been made available to EBS. The land encompassed by the red-line boundary is hereafter termed '**the Site**' or '**the Application Site**' throughout the rest of this report. This red-line boundary incorporates land outside of the actual proposed areas for the development. See Fig A.1.1 Appendix 1.

1.3 Objectives

EBS identified the objectives of the EcIA within this report to be as follows:-

- Ascertain the presence or absence of statutory and non-statutory ecological designations within and around the red-line boundary of the Application Site.
- Account for all vegetation and habitat types within and adjoining the Site, including preparation of plant species lists where appropriate.
- Identify any occurrences of rare and/or protected plant species and also any non- native invasive plant species as listed on Schedule 9 of the *Wildlife and Countryside Act 1981 (WCA 1981)*.
- Using aforementioned plant species lists, identify National Vegetation Classification (NVC) communities and 'habitats of principal importance' under the NERC Act 2006.
- Undertake up to date habitat appraisal for protected species, to provide a clear account of the potential value for roosting, commuting & foraging bats; Badger; Water vole; Great crested newt and Schedule 1 and notable birds. Additionally, collate existing presence/absence and population monitoring results for such wildlife and identify any further survey requirements that must be implemented prior to the issuing of an EcIA.
- Similarly, undertake up to date habitat appraisal in relation to other wildlife (such as breeding birds and 'species of principal importance' listed in the NERC Act 2006) and collate and analyse existing survey results. Identify whether any further surveys are required in order to present a robust account of baseline conditions at the Site.
- From the survey results, identify any ecological concerns or constraints and provide preliminary feedback on appropriate mitigation and compensation measures, to avoid impacts on protected

species and other local wildlife. Also identify whether there are likely to be any requirements for protected species licensing.

2.0 METHODOLOGIES

2.1 Personnel

2017 - 2019 work:

This ecological appraisal has been prepared by **Mr William Gaudie BSc Hons (Wildlife Conservation) MCIEEM**, with the assistance of Ms Kelly Hamer BSc Hons (Wildlife Conservation). All survey work conducted in 2017 has been completed by these two ecologists.

Mr Gaudie is Principal Ecologist at Environmental Business Solutions (EBS) and holds Natural England class survey licenses (**class licence registration number 2015- 8032-CLS-CLS**) in respect of Great crested newt (**WML CL08 Level 1**) and bats (**WML CL18 - Bat Survey Level 2**). He is an experienced consultant with a wide skill base in respect of ecological surveying and assessment, including plant species and habitat identification, detection of protected faunal species, assessment of potential impacts in accord with CIEEM Guidance on EcIA's and also the design and implementation of mitigation, compensation and habitat enhancement schemes.

Ms Hamer is an Assistant Ecologist at EBS, holding suitable experience to conduct fieldwork and data search work, under the guidance of the Principal Ecologist.

2009 - 2010 work:

Survey and assessment work conducted in this time-frame was led by staff at Ecological Services Ltd (ESL). The results of these surveys are found in ESL report "Ecological Baseline Survey and Impact Assessment for Part of the Knepp Castle Estate Dated March 2010 (Appended)

2.2 Desk Study & Data Search

Desk study:

A range of desk and internet based resources were used to obtain background information prior to attending the Site. These included paperwork from past survey results, plus information from a range of internet resources, as follows:

- Paperwork dating from 2010 - in ESL report "Ecological Baseline Survey and Impact Assessment for Part of the Knepp Castle Estate Dated March 2010
- Google Earth 5 (http://earth.google.co.uk) for aerial photographs, including historic photographs in the case of Google Earth.
- Bing Maps (www.bing.com/maps) for a 1:25,000 Ordnance Survey map extract.
- Multi-Agency Geographic Information for the Countryside (MAGIC) collaborative database website (http://magic.defra.gov.uk/MagicMap.aspx), for information on key environmental schemes and statutory designations.
- Ongoing surveys by EBS (2017 – 2018) See EcIA issued 2018.

Data search:

In March 2017 a data search was conducted with the Sussex Biodiversity Record Centre (SxBRC) for a 2km radius around the Site's central grid reference. This was to identify known occurrences of protected species and also the locations of any statutory and non- statutory sites of ecological importance and any Section 41 habitats present. Due to EBS continuously being on site throughout 2017 – 2019 it is assumed that a new search is not necessary at the moment.

2.3 Vegetation & Habitats

An Extended Phase 1 Habitat Survey was carried out throughout the Application Site, with this being an iterative process that was conducted in **late-March 2017- Early September 2019**.

The Phase 1 Habitat Survey is a standardised method used to record habitat types and characteristic vegetation, as set out in the "*Handbook for Phase 1 Habitat Survey – a technique for Environmental Audit*" published by the *Joint Nature Conservation Committee (JNCC 2003)*. The methodology is 'Extended' through the additional recording of specific features indicating the presence, or likely presence, of protected species or other species of nature conservation significance.

Plant species lists were compiled where appropriate and the Site was searched for uncommon plant species, plant species listed as protected in the *Wildlife and Countryside Act 1981 (WCA 1981)*, plants listed as 'Priority Species' in the former UK Biodiversity Action Plan (UK BAP) and comparably 'species of principal importance', as listed under Section 41 of the extant NERC Act.

All hedgerows were surveyed and assessed in accord with Schedule 1, Part II (wildlife and landscape), Schedule 2 and Schedule 3 of the *Hedgerows Regulations (1997)*.

Where woodland habitats were present, any evidence of Ancient Woodland Indicator (AWI) plant species was also to be recorded, with such species being determined in accord with the reference guides listed below (for the collated/collective species list that has been used, see **Table A2.1** in **Appendix 2** in this report):

- 'Ancient woodland: guidance material for local authorities' (English Nature 2002/3), as collated by K. Kirby
- 'The Wildflower Key' (Rose et al 2004), again as collated by K. Kirdy and comparable to the preceding AWI list
- The 'Woodland Species' list in The Hedgerow Regulations 1997
- The AWI species list presented by the Woodland Trust on the web-page http://www.backonthemap.org.uk/theproject/analysis/species

All higher plant nomenclature within this report is written in accord with *Stace's New Flora of the British Isles (Stace, C. A. 1997)*.

Searches were carried out for the presence of invasive species, as covered by Section 14 and listed on Schedule 9 in the *WCA 1981* (as amended) (Schedule 9 as updated April 2010). This legislation makes it illegal to cause the species to spread in the wild, whether by dispersal of seed, fragments of plants or root systems.

Any occurrences of 'Priority Habitat' (as listed in the former UK BAP) and comparably 'habitats

of principal importance' (as listed under Section 41 of the extant NERC Act) were noted. Where possible, the plant species lists were also used to identify National Vegetation Classification (NVC) communities *(Rodwell, J. S. Volumes 1 – 5, 1991 – 2000)*, as the NVC provides a systematic and comprehensive analysis of British vegetation.

2.4 Fauna

2.4.1 Bat Species

UK bat species are provided full legal protection under Schedule 5 (Section 9) of the *WCA 1981 (as amended)* and under *The Conservation of Habitats and Species Regulations 2010 (the Regulations 2010)*, making them European Protected Species. In combination this legislation makes it illegal to intentionally kill, injure, harm or disturb bats and illegal to damage, disturb or obstruct access to bat roosts.

The 2009/10 surveys showed 5 species present; common pipistrelle, soprano pipistrelle, noctule, serotine and brown long-eared bat.

Therefore, during the Extended Phase 1 Surveys in 2017 - 2019, all features at the Site thought to be possibly affected by the project were preliminarily assessed for their *habitat suitability* and *potential* to support roosting, hibernating, foraging and commuting bats.

It was established that no buildings or other structures would be physically affected, hence no internal and external inspection of buildings was undertaken.

Trees were made the subject of daylight inspection, undertaken from the ground. This was to identify potential roost habitats such as rot holes, crevices and lifting bark, enabling the trees to be categorised in accord with the 'protocol for visual inspection of trees', presented in Table 8.4 (page 60) in the *Bat Surveys. Good Practice Guidelines – 3rd Edition. Bat Conservation Trust. 2016*. The aim was to identify whether detailed survey work was required at a later date, in order to determine presence or absence of roosts.

Habitat appraisal was also applied in relation to the Application Site's potential value for active foraging and commuting bats.

2.4.2 Badger

Badgers *(Meles meles)* and their setts are protected under the *Protection of Badgers Act 1992*. This legislation makes it illegal to kill, injure or take Badgers or to interfere with a Badger sett, with the *Act* defining 'a sett' as being "any structure or place which displays signs indicating current use by a Badger".

Records of Badger presence have not been provided in the above data search. No records of badger activity was found in the 2009/10 surveys. As badgers are widespread and common in West Sussex, the Extended Phase 1 Surveys during in 2017 - 2019, all land throughout the Application Site and up to a 30m radius around it was searched for evidence of Badger, with the aim of identifying any combination of the following field signs:

- Sett holes, wider than high, often with spoil heaps in front, sometimes also with discarded bedding;
- Disturbed ground and small holes from foraging activity;

- Trampled dispersal pathways and breach points under boundary fences;
- Distinctive hairs, snagged on fences etc. or found at sett entrances;
- Dung pits/ latrines;
- Characteristically shaped footprints;
- Scratching at the base of trees and other features.

2.4.3 Birds

Wild birds, their nests and their eggs are protected under Part 1 of the *WCA 1981*, which makes it illegal to kill or injure a bird and to destroy its eggs or its nest whilst it is in use or being built. Game birds are an exception and are protected under the separate *Game Acts*, which fully protect them during the close season. In addition, certain bird species (such as Barn owl and Kingfisher) are specially protected under Schedule 1 of the *WCA 1981 (as amended),* making it illegal to disturb these birds and their young at the nest.

When discussing the conservation status of wild birds, an important reference used in this report has been the 'red', 'amber' and 'green' status lists presented in the document titled *Birds of Conservation Concern 3 (BoCC3)* (http://www.bto.org/sites/default/files/u12/bocc3.pdf).

All visible and audible birds were recorded during the Extended Phase 1 Habitat Surveys during 2017 - 2019 and all habitats were assessed for their *potential value* for nesting, roosting, feeding, and wintering birds, as based on habitat structure, location and botanical composition.

2.4.4 Great Crested Newt & Other Amphibians

The Great Crested Newt (GCN) *(Triturus cristatus)* is provided full legal protection under Schedule 5 (section 9) of the *WCA 1981 (as amended)* and under *the Regulations 2010*, making it a European Protected Species. The legislation makes it illegal to intentionally kill, injure, harm or disturb Great Crested Newts (GCNs) and illegal to damage, destroy or obstruct access to any place used by sheltering or breeding GCNs.

Whilst the species breeds in water it forages, shelters and hibernates on land, typically within 250m of its breeding pond but sometimes up to 500m from the pond. Where planning proposals entail disturbance of land within range of GCN breeding ponds there is therefore a risk of killing, injury and/or habitat loss, which would contravene the legislation that protects them. This makes it a legal requirement to consider GCNs in relation to planning proposals, both in terms of aquatic habitat and terrestrial habitat.

Also, although the Common toad (*Bufo bufo*) is not afforded comparable legal protection to the GCN, it is regarded as a material consideration for planning applications because it is listed as a 'priority species' in the former UK BAP and a 'species of principal importance' in Section 41 of NERC Act 2006.

Reference to collated ecological results showed that GCN presence/absence survey work had been conducted in 2009. No Great Crested Newts were noted during these surveys.

A full re-survey, plus aquatic habitat appraisal, was conducted EBS in 2017 and 2019.

Additionally, terrestrial habitat appraisal and risk assessment was applied.

a) Overview & desk study:

Prior to attending the Application Site, the following desktop study was undertaken:

- The pond labels and results from the 2009 survey were studied.
- A 1:25,000 Ordnance Survey map and aerial photographs from Google Earth and Bing Maps were checked for all evidence of ponds within the Site and also within 250m unobstructed dispersal range of the Site's red-line boundary
- Additionally, the map and photographs were used in order to identify ponds in a 250 - 500m unobstructed search radius, to identify whether a high density of ponds was present.
- Where any water-bodies were identified, their approximate sizes and their distances from the red-line boundary were recorded.
- An indication of the land-use and structure throughout the intervening terrestrial habitat was also recorded.

b) Aquatic habitat appraisal:

Any ponds within dispersal range of the Site were to be made the subject of aquatic habitat appraisal where possible. Suitability Index (SI) scores were to be determined during the walkover surveys, from which final Habitat Suitability Index (HSI) scores could then be calculated in the office.

HSI scoring is a method of assessing the quality of a pond in terms of GCN breeding and associated habitat requirements, quantifying ten standard SI parameters, including water quality, flora, and impacts from waterfowl. The methodology of assessment and the thresholds for each of the ten assessment criteria are presented in the *ARG UK Advice Note 5 (May 2010)*, which quotes *Oldham et al. (2000).*

The final HSI score reflects the *suitability* of the pond for breeding GCN, though notably it cannot show the presence or absence of the species. The score is interpreted using Table B, as shown below.

Table B: Interpreting HSI scores

HSI score	Pond Suitability for GCN
<0.5	Poor
0.5-0.59	Below Average
0.6-0.69	Average
0.7-0.79	Good
>0.8	Excellent

Consideration of Common toad allowed for the fact that this species has similar habitat requirements to GCN, but notably it is tolerant of the presence of fish (unlike GCN).

2.4.5 Water Vole

Water voles *(Arvicola amphibious)* and their habitat are provided full legal protection under Schedule 5 (Section 9) of the *WCA 1981* (as amended), which makes it illegal to intentionally kill, injure or take Water voles and to damage, disturb or destroy their 'place of shelter', i.e. their habitat.

Water voles are characteristically associated with a range of aquatic habitat types, including ponds, field drains, reservoirs, wetlands and rivers.

There are records of Water vole presence along the western and southern banks of Knepp Mill Pond and in the wider area the most recent being 2005.

In 2017 and 2018, all water features within or adjoining the Application Site were therefore identified with the aid of an Ordnance Survey map and aerial photographs. These were made the subject of habitat appraisal during the Extended Phase 1 Habitat Survey.

All water features were subjected to detailed presence / absence survey based on their aquatic and bankside structures, their connectivity and their botanical value as a food source for Water voles.

2.4.6 Otter

In England and Wales Otters *(Lutra lutra)* are protected under Section 9(4)(b) and (c) and (5) of the *WCA 1981* and they are fully protected under *the Regulations 2010*. Collectively, this makes it illegal to deliberately or intentionally capture, injure, kill, harm or disturb Otter and illegal to damage, destroy or obstruct access to an Otter holt.

Otters will utilise a wide range of aquatic habitat types, including large ponds, drainage channels, reservoirs, wetlands and rivers.

A review of the collated survey results for the Application Site revealed no records of Otter survey or appraisal work in preceding years.

In 2017 and 2019, all water features within or adjoining the Application Site were identified with the aid of an Ordnance Survey map and aerial photographs. These were made the subject of habitat appraisal during the Extended Phase 1 Habitat Survey.
All water features were subjected to detailed presence / absence survey based on their aquatic and bankside structures, their connectivity and their botanical value as a food source for Otters.

2.4.7 Reptiles

All native British reptiles are provided partial legal protection against intentional killing and injury under Schedule 5 (Section 9) of the *WCA 1981* (as amended). In addition, Sand lizard *(Lacerta agilis)* and Smooth snake *(Coronella austriaca)* are fully protected under the *WCA 1981* (as amended) *and* under *the Regulations 2010*.

There are records of both Slow-worms and Grass Snakes within the red-line boundary and in the wider area as recently as 2016.

In 2017, all habitats within or adjoining the Application Site were therefore identified with the aid of an Ordnance Survey map and aerial photographs. These were made the subject of habitat appraisal during the Extended Phase 1 Habitat Survey.

All suitable areas affected by the project were subjected to detailed presence / absence surveys. An area of suitable reptile habitat was noted in 2017. Due to these findings the are was subjected to a reptile translocation Reasonable Avoidance Measures (RAMs) was under-taken. No reptiles were noted and the area was deemed sterile in reference to reptile presence.

2.4.8 Dormice

Dormouse and the places they use for shelter or protection receive European protection under The Conservation of Habitats and Species Regulations 2010 (Habitats Regulations 2010, as amended). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. This protection means that dormice, and the places they use for shelter or protection, are capable of being a material consideration in the planning process.

Regulation 41 of the Habitats Regulations 2010 (as amended), states that a person commits an offence if they:

- deliberately capture, injure or kill a dormouse;
- deliberately disturb dormice; or
- damage or destroy a breeding site or resting place.

The closest records of Dormice to the Site is over 1000m to the east and separated by B roads.

In 2017 - 2019, as a precautionary measure all suitable habitat areas affected by the project were subjected to surveys.

2.4.9 Large Mammals

Red Deer (*Cervus elaphus*) and Roe deer (*Capreolus capreolouss*) roam free and in large numbers across most of the estate.

2.4.10 Other Wildlife

Habitat appraisal was applied in respect of Brown hare *(Lepus europaeus)* and Hedgehog *(Erinaceus europaeus)*, which are both UK BAP priority species and NERC Act 'species of principal importance'.

Consideration of aquatic and terrestrial invertebrates is also presented in this report, focussing on any invertebrate species with the statuses of UK BAP priority species, NERC Act 'species of principal importance' and/or local BAP priority species. The consideration of aquatic invertebrates is entirely based on the 2009 survey results from an aquatic invertebrate specialist, whilst the consideration of terrestrial invertebrates is reliant on habitat appraisal.

Any evidence of other wildlife occurrences was to be noted during the survey, including species such as Red fox, Weasel, Stoat, Rabbit and rodents. This was simply to provide a more comprehensive baseline understanding of the Site's ecology: all such species have no notable conservation status.

2.5 Evaluation Methods

Although the UK Biodiversity Action Plan (BAP) was succeeded by 'The Post-2010 Biodiversity Framework' in July 2012, evaluation of habitats and fauna with reference to the old UK BAP

lists of 'priority habitats' and 'priority species' still proves helpful in qualifying their 'value'. The lists of priority habitats and species presented in the former UK BAP also form the basis of list of *'habitats and species of principal importance'* presented in Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act, which came into force on 1st Oct 2006. This requires the Secretary of State to regard such habitats and species as conservation priorities under the UK Post-2010 Biodiversity Framework.

Furthermore, local BAP lists are important for identifying species and habitats that are notable on a countywide basis (rather than nationally).

Resultantly, throughout this report there remains reference to UK BAP priority species and habitats. There is also reference to habitats of principal importance and species of principal importance, in accord with Section 41 of the NERC Act 2006.

3.0 RESULTS

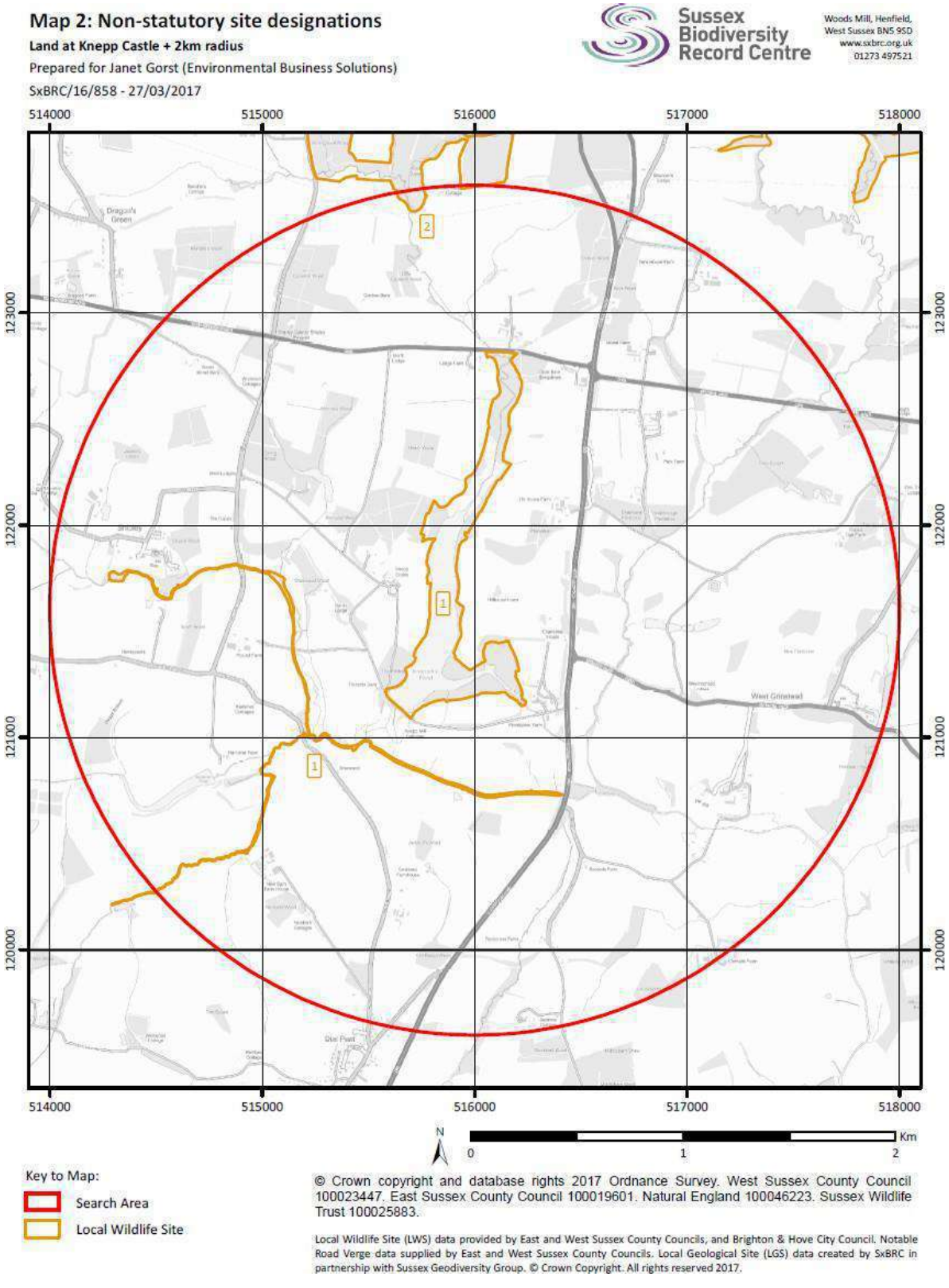
3.1 Desk Study & Data Search

3.1.1 Designated Sites

The Application Site is centred at grid reference **TQ 159 217**. The ecological designation information for a 2.0km radius from this centre point is as listed below and illustrated / labelled in **Fig. 3.1.1**

- There are no Statutory sites within 2.0km of the Site.
- There are 2x non-statutory designations of county-level importance within 2.0km radius of the Application Site. Both are categorised as Local Wildlife Sites (LWS). These are labelled on **Fig.3.1.1** and they are accounted for as follows:
    - **Knepp Mill Pond, the River Adur & Lancing Brook LWS (H18).** Knepp Mill Pond is a large area of open water with well developed marginal vegetation and extensive tall fen. It is of County importance for wintering and breeding birds and includes a heronry. The site includes a stretch of the River Adur (to it's south), which has diverse emergent and aquatic vegetation, including several local species, and its tributary, Lancing Brook. The lake forms part of the proposed site itself with the River SAdur & Lancing Brook approximately 250m south of the site (See Box 1 for further information).
    - **Horsham Common, Alder Copse, Coate's Furzefield & Constable's Furze LWS (H30).** A diverse woodland complex including semi-natural woodland, semi- mature Oak plantation, young broadleaved plantation, conifer plantation, streams and herb-rich meadow. The flora, butterflies, birds and mammals are of great interest, The woodland is managed in the interests of both commercial forestry and nature conservation. It is positioned approx. 940m north-west of the red-line boundary at its closest. (See Box 2 for further information).

Fig 3.1.1: Non-statutory site designations within 2.0km (TQ 159 217).
1 = LWS H18, 2 = LWS H30 (Ref Sussex Biodiversity Record Centre – Report SxBRC/16/858)



Box 1. (Ref Sussex Biodiversity Record Centre – Report SxBRC/16/858)

Local Wildlife Site (LWS)

West Sussex

Site Name:	**Kneppmill Pond, the River Adur & Lancing Brook**		
Site Ref:	H18	**Owner:**	Private
District:	Horsham	**Size (ha):**	33.8
Parish:	Shipley	**Date:**	Identified May 1992
National Grid Ref:	TQ152214	**Author:**	Marion Finch
Habitat:	Lake, tall fen, river, stream, semi-natural woodland and scrub		

Summary

Kneppmill Pond is a large area of open water with well-developed marginal vegetation and extensive tall fen. It is of County importance for wintering and breeding birds and includes a heronry.

The site includes a stretch of the River Adur, which has diverse emergent and aquatic vegetation, including several local species, and its tributary, Lancing Brook.

Site description

The open water of the lake is surrounded by a wide band of marginal vegetation, dominated by Reedmace *Typha* spp, Bulrush *Scirpus lacustris*, Reed Canary-grass *Phalaris arundinacea* and Meadowsweet *Filipendula ulmaria*. Other species include Yellow Loosestrife *Lysimachia vulgaris*, Hemlock Water-dropwort *Oenanthe crocata* and Yellow Flag *Iris pseudacorus*. The northern end is completely overgrown with similar species, forming extensive tall fen. Willow scrub and a strip of woodland with a mixed shrub layer and occasional exotic trees occur on the banks, and there is a small herb-rich clearing on the west bank.

The River Adur varies considerably within the site. Parts are well-vegetated with plants growing across the channel in places. Others are more open, with floating species such as Yellow Water-lily *Nuphar lutea*, Duckweed *Lemna* sp and Floating Sweet-grass *Glyceria fluitans*. Arrowhead *Sagittaria sagittifolia*, Flowering-rush *Butomus umbellatus* and Bulrush occur amongst the marginal vegetation, and the local Tubular Water-dropwort *Oenanthe fistulosa* and Wood Club-rush *Scirpus sylvaticus* are present. Lancing Brook has a similarly diverse emergent and aquatic flora.

Kneppmill Pond is an important ornithological site as it includes a heronry, and supports large numbers of wintering wildfowl, and breeding Tufted Ducks, Great Crested Grebe and Mute Swan. Eight species of dragonfly have been recorded, including the local Variable Damselfly and Ruddy Darter.

Management recommendations

The site is too complex to give detailed management recommendations here. Management aims should be to maintain the variety and quality of the habitats by preventing contamination or drying-up of the water bodies. Maintaining open water in the lake and ideally leaving a 'buffer zone' of unintensively managed land either side of the River and Brook.

Box 2. (Ref Sussex Biodiversity Record Centre – Report SxBRC/16/858)

Local Wildlife Site (LWS)

West Sussex

Site Name:	**Horsham Common, Alder Copse, Coate's Furzefield & Constable's Furze**		
Site Ref:	H30	**Owner:**	Private
District:	Horsham	**Size (ha):**	26.5
Parish:	Shipley	**Date:**	Identified May 1992
National Grid Ref:	TQ158238	**Author:**	Graham Roberts
Habitat:	Semi-natural woodland, broadleaved plantation, coniferous plantation, neutral meadow, pond and stream		

Summary

This diverse woodland complex includes semi-natural woodland, semi-mature Oak plantation, young broadleaved plantation, conifer plantation, streams and a small herb-rich meadow. The flora, butterflies, birds and mammals are all of great interest. The woodland is managed in the interests of both commercial forestry and nature conservation.

Site description

The most interesting areas botanically are the woodland edges. It seems likely that some of these are strips or shaws or ancient semi-natural woodland. Pedunculate Oak standards occur with Ash, Field Maple and Hazel coppice. Notable plants include Wild Daffodil *Narcissus pseudonarcissus*, Early-purple Orchid *Orchis mascula*, Yellow Archangel *Lamiastrum galeobdolon*, Wood Spurge *Euphorbia amygdaloides*, Wych Elm, Crab-apple and Wild Cherry. Also of interest are stands of Hornbeam coppice and elsewhere Alder.

Small stream flowing through the woodland are important features. Plants associated with them include Hart's-tongue *Phyllitis scolopendrium*, Ramsons *Allium ursinum*, Cuckooflower *Cardamine pratensis*, Meadowsweet *Filipendula ulmaria*, Pendulous Sedge *Carex pendula* and Wild Angelica *Angelica sylvestris*.

A small meadow or woodland glade situated between Constable's Furze and Horsham Common is of great interest. Its herb-rich sward includes notable species such as Dyer's Greenweed *Genista tinctoria*, Devil's-bit Scabious *Succisa pratensis*, Sneezewort *Achillea ptarmica*, Betony *Stachys officinalis* and Cowslip *Primula veris*. Black Knapweed *Centaurea nigra* is abundant. Wild Strawberry *Fragaria vesca*, Agrimony *Agrimonia eupatoria*, Wild Carrot *Daucus carota*, Bitter-vetch *Lathyrus montanus*, Tormentil *Potentilla erecta*, Bluebell *Hyacinthoides non-scripta* and Bugle *Ajuga reptans* also occur in the glade.

The Woodland supports a rich avifauna including Treecreeper, Marsh Tit, Chiffchaff, Nuthatch, Great Spotted Woodpecker and Green Woodpecker, Dormice are known to occur. Notable butterflies recorded include Purple Hairstreak, Silver-washed Fritillary and White Admiral.

Management recommendations

The present sympathetic management appears to encourage a rich wildlife. Maintaining wide rides and glades are an important part of this.

3.1.2 Section 41 Habitats

A number of habitats are found within the proposed site boundary;

- Open Water
- Lowland Fen
- Wood-pasture & Parkland
- Ancient Woodland
- Deciduous Woodland

These habitats are shown on Fig 1A, appendix 1.

3.1.3 Protected & Priority Species

In combination, results from the 2009 surveys at the Application Site and a 2017 desk study using SxBRC have revealed evidence of the presence of a range of protected species within 2.0km radius of the Application Site. Only records dating from the past 20 years have been documented within this report. The species accounted for in the search are summarised in the list on the following page and distances shown in brackets indicate the closest recorded occurrences from the Site.

- Amphibians:

Protected species: The 2009 surveys of ponds within the Application Site identified no GCN presence. Further surveys conducted in 2017 mirrored these results. The closest recorded occurrences of GCN is recorded as 950m south of the site and 1500m north west of the site. *Therefore GCN require minor further consideration*.

BAP priority species: Common toad were also recorded within 500m of the site. *Common toad therefore merits further consideration*.

- Birds (Schedule 1 protection and BOCC red-list species[2]):

Schedule 1 protected species: Barn owl, Brambling, Common kingfisher, Fieldfare, Little ringed plover and Redwing have been recorded within 5km range. *These species all merit further consideration by means of habitat assessment to see if the Application Site supports them*.

BOCC red-listed birds: Grasshopper warbler, Grey partridge, Herring gull, House sparrow, Lapwing, Lesser spotted woodpecker, Reed bunting, Skylark, Song thrush, Starling, Tree pipit, Willow warbler and Yellowhammer have been recorded within 5km range. These species warrant minor further consideration as to whether they occur within the Site.

- Mammals:

Protected species:

Badger: No records of Badger records were supplied by SxBRC in 2017. The 2009/10 surveys showed no occurrence within the application site. This species warrant minor further consideration as to whether they occur within the Site.

Water vole. Numerous records of water vole have been recorded along the western and southern banks of Knepp Mill Pond and in the immediate area. Water vole therefore merits further consideration by means of presence / absence surveys and possible mitigation.

Otter. No records of Otter presence were supplied by SxBRC in 2017. Otter therefore merits no further consideration.

Dormice. The nearest record of Dormice supplied by SxBRC is approximately 1.0km west of the site and separated by B roads. This species warrant minor further consideration as to whether they occur within the Site.

Bats. The 2009/10 surveys showed a wide variety of bats roosting and foraging within the site. Information gleamed from records supplied by SxBRC in 2017 confirmed these findings. Bats therefore require further investigation regarding any suitable trees or buildings affected by the proposals.

- Reptiles:

Slow worm and Grass snake have been recorded within the redline boundary and its immediate area. During surveys conducted by EBS in 2017 a small pooulation of Grass snake and Slow worm was noted at the southern end of the then redline boundary (Now outside red-line boundary. These species warrant further consideration by means of presence / absence surveys and possible mitigation.

3.2 Vegetation & Habitats

3.2.1 Location & Surroundings

Fig. 3.2.1 (A) presents an aerial photograph (© Google Earth), exemplifying the location of the Site in relation to its surrounds and area surveyed. **Fig. 3.2.1 (B)** shows the new proposed red-line.

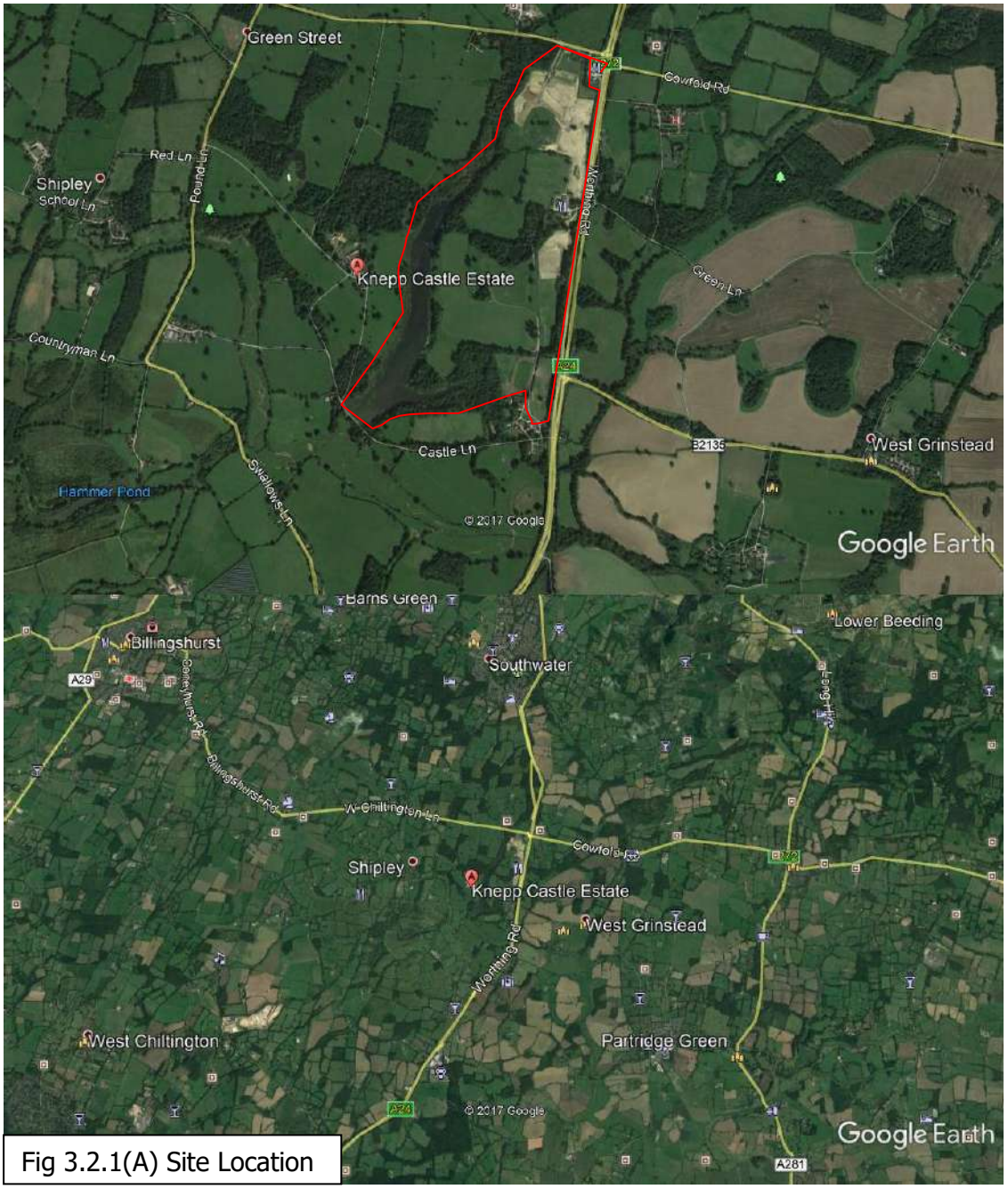
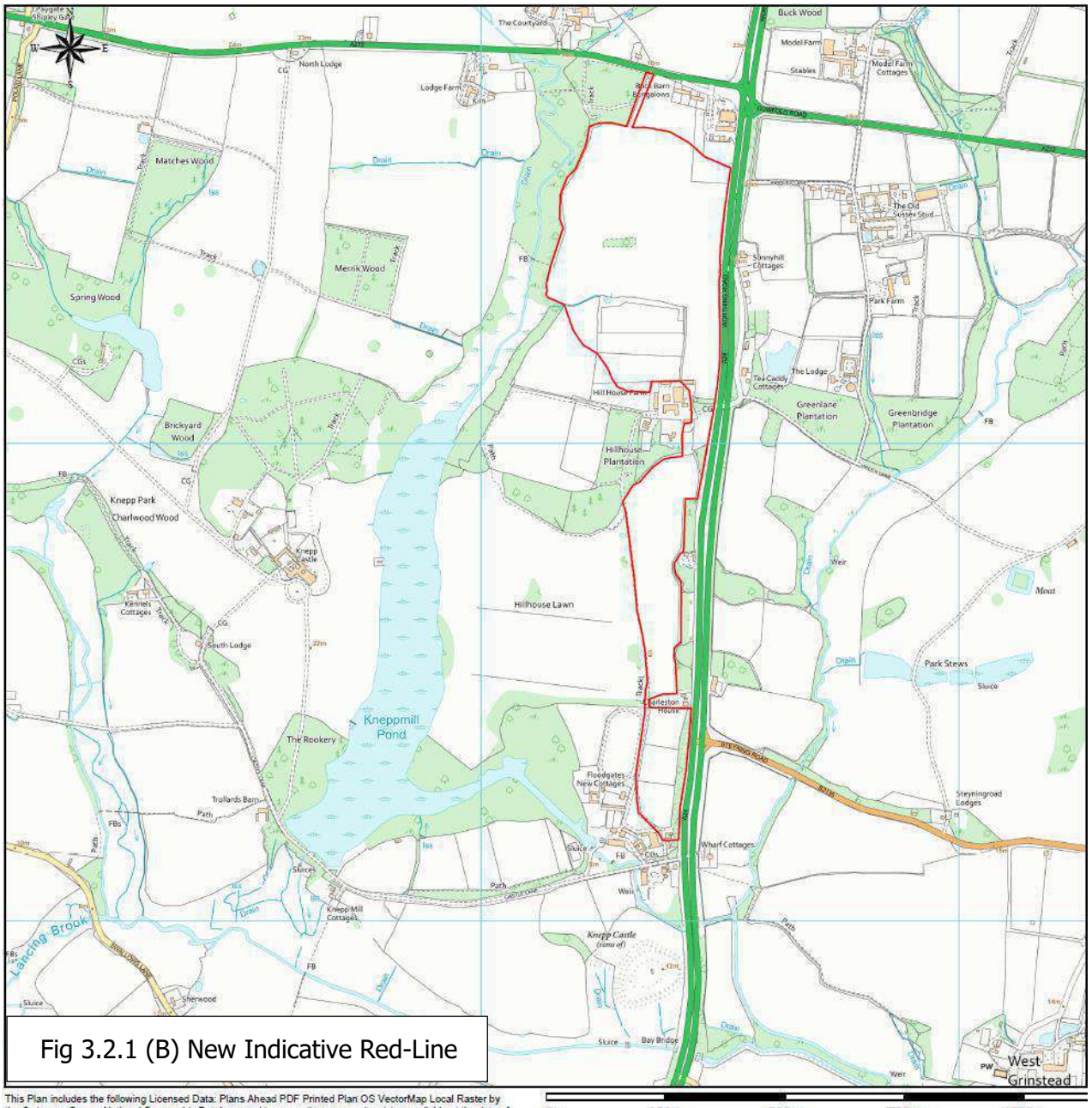


Fig 3.2.1(A) Site Location



As shown, the Site is a rural location surrounded in the immediate area by open countryside and agriculture. It is flanked on its eastern boundary by the busy A24 and it is located approx. 3.5km to the south of the town of Southwater. This mosaic of terrestrial and aquatic vegetation and habitat types, together with influence of the surrounding countryside, has all been taken into consideration when assessing the Application Site in the context of its setting.

3.2.2 Features within the Site

Fig. 1A (**Appendix 1**) presents a labelled vegetation and habitat map of the Application Site and surrounding area, as prepared using an aerial photograph (© Google Earth), overlaid with illustration and labels to convey the results from the walkover ecological survey and assessment work.

The red-line boundary is shown on **Fig. 2A (Appendix 1)** it highlights the areas of proposed works and the following paragraphs and sub- headings account for all features and vegetation types within this boundary. Where the survey has extended beyond the red-line boundary (so as to encompass a wider zone of influence) the results are presented in **Section 3.2.3**.

Semi-improved grassland:

There are several areas of Semi-improved grassland throughout the site varying in both size and species richness, as exemplified in **Fig. 1A** (appended). The largest areas are found in the fields south of Knepp Mill pond and on the southern edge of the polo fields. Flora noted in these areas comprise of Yorkshire fog *Holcus lanatus,* meadow grasses *Poa spp.,* selfheal *Prunella vulgaris,* fescues *Festuca rubra,* white clover *Trifolium repens,* creeping buttercup *Ranunculus repens,* spear thistle *Cirsium vulgare,* bugle *Ajuga reptans,* common dog violet *Viola riviniana,* broad-leaved dock *Rumex obtusifolius,* cinquefoil *Potentilla reptans,* common ragwort *Senecio jacobaea* and greater plantain *Plantago major*. These areas appear to be managed by a combination of mowing and livestock grazing.

Part of the site described as semi-improved grassland has been designated as Wood Pasture and Parkland BAP Priority Habitat. However, the areas affected by the development do not come under this designation.

A collective plant species list including the semi-improved grassland is presented in **Table A2.1** (**Appendix 2**) and this exemplifies how botanically poor the swards are.

Improved and amenity grassland

The polo pitch located at the centre of the site and to the east of Kneppmill pond comprises amenity grassland that is maintained regularly to a short sward height.

There are areas of improved grassland across the site, mainly comprising paddocks for grazing horses. Species recorded withing these areas include white clover, meadow grasses, creeping buttercup, greater plantain, perennial rye grass *Lolium perenne,* and common mouse-ear *Cerastium fontanum.* Species poor improved grassland is also found on the spoil heaps to the north of the site and consist mainly of creeping thistle *Cirsium arvense,* common ragwort, common chickweed *Stellaria media,* germander speedwell *veronica chamaedrys,* broad-leaved dock and white clover.

Parts of the site described as improved and amenity grassland has been designated as Wood Pasture and Parkland BAP Priority Habitat. However, the areas affected by the development do not come under this designation.

A collective plant species list including the improved and amenity grassland is presented in **Table 1.A** (**Appendix 2**) and this exemplifies how botanically poor the swards are. *There is no representation of an NVC community and the vegetation is not an example of a UK BAP priority habitat*.

Woodland

Knepp Mill Pond is bordered to *the* east by areas of woodland, except where the polo pitch meets the pond at the centre of the site. Woodland areas mainly comprise broad- leaved species including elder *Sambucus nigra,* oak *Quercus robur,* ash *Fraxinus excelsior,* hawthorn *Crategus monogyna* and willow *Salix spp.* There are also sections of mixed woodland comprising a range of coniferous and broad-leaved species. Ground flora species recorded within woodland areas include bluebell *hyacinthoides non-scripta,* wood anemone *Anemone nemorosa,* ground ivy *Glechoma hederacea* and dog's mercury *Mercurialis perennis.*

Areas around the south-east edge of Knepp Mill pond is classified as Ancient and semi- natural woodland. Other areas of woodland are classified as Priority Habitat Inventory – Deciduous woodland.

A collective plant species list is presented in **Table 1.A** (**Appendix 2**). No areas of ancient woodland will be affected by the proposals and only limited areas of deciduous woodland will be affected. *The vegetation is an example of a UK BAP priority habitat*.

Standing water and marginal vegetation

Knepp Mill Pond is a large lake measuring approximately 105,000m² and forms the western boundary of the survey site. Immediately surrounding the lake and on the edge of woodland habitat there are areas of marginal vegetation. Areas of reed and fen vegetation at the margins of the lake provide important wildlife habitat and form part of the sites wildlife designation.

Knepp Mill Pond is intermittently drained. Whilst the lake had water during the 2017 surveys, the lake had been emptied in the preceding weeks and the site managers describe the lake being drained annually for a variable period of time.

Four smaller ponds (under 100m²) are located to the east of Knepp Mill Pond and vary in water quality and habitat suitability for great crested newts. (See Fig 1A Appendix 1 for pond locations). All were identified a having poor suitability for GCN.

Marginal vegetation.

Immediately surrounding the lake and on the edge of woodland habitat there are areas of marginal vegetation. Areas of reed and fen vegetation at the margins of the lake provide important wildlife habitat and form part of the sites wildlife designation.

The area is classified as Priority Habitat Inventory – Lowland Fens. However; it is estimated that less than 1% of the habitat will be directly disturbed and only temporary.

Hedgerows

Boundary hedgerows are present throughout the site and vary in their level of intactness and species richness (See Fig 1A Appendix 1 for locations). Hedgerow survey results are provided in Table 3.2.2 Below.

Table 3.2.2. Hedgerow survey results: Knepp Estate 2017

Ref.*	Approx Length	Woody species** Within 30m sample section	Woodland ground Flora *** within 30m sample section	Runs alongside bridleway, footpath or road	Associated Features ****					Important hedgerow
					i	ii	iii	iv	v	
H1	100m	Hawthorn Blackthorn Elder	Lord's and Ladies	N	N	Y	N	N	Y	N
H2	175m	Hawthorn Blackthorn Elder		N	N	Y	Y	N	Y	N
H3	500m	Hawthorn Blackthorn Elder Horse chestnut	Lord's and Ladies	Y	N	Y	Y	N	N	N
H4	200m	Hawthorn Blackthorn Elder Sycamore Oak	Lord's and Ladies	N	Y	N	Y	N	N	N

*Location reference given in Fig A1 Appendix 1
**Species listed within Schedule 3 of The Hedgerow Regulations 1997.
***Species listed in Schedule 2 of The Hedgerow Regulations 1997.
****Associated features outlined in Hedgerow Regulations (1997)
(i) a bank or wall supporting the hedgerow
(ii) less than 10% gaps
(iii) on average at least one tree per 50m
(iv) at least 3 species from a list of 57 woodland plants (ground flora)
(v) a ditch along at least half its length

Only poor quality hedgerows are found on site. No hedgerows are affected by the development.

Spoil piles and earth banks

Areas to the north and along the eastern boundary have recently been worked into earth banks to facilitate noise bounds and landscaping. In their current state they consist of bare soil with ruderal vegetation consisting mainly of creeping thistle *Cirsium arvense, bramble Rubus fruticosus,* common ragwort, common chickweed *Stellaria media,* germander speedwell *veronica chamaedrys,* broad-leaved dock and white clover

3.3 Fauna

3.3.1 Bats

The 2009/10 surveys showed 5 species of bat present; common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), noctule (*Nyctalus noctule*), serotine (*Eptesicus serotinus*) and brown long-eared bat (P*lecotus auritus*). The data search supplied by SxBRC showed a further 8 species within 2km.

There are no buildings or other built structures affected by the project. There are 5 mature and large trees within the red-line boundary that are set for felling. Full bat surveys will ensure no bat are harmed during the development and no bat roosts will be damaged.

In relation to foraging and commuting bats, daylight assessment indicates that the woodlands are likely to provide sheltered air-space and an attraction of insects, hence *moderate-high potential value for active bats*. The air-space around Knepp Mill pond will also be of value. By comparison, throughout the open semi-improved grassland fields and bare earth areas of the Application Site there is limited potential value and low likelihood of use by active bats.

In summary, preliminary daylight assessment indicated that 5 trees ear-marked for removal show high potential for bat roosts. therefore bats require further consideration.

3.3.2 Badger

Habitat appraisal within the Site indicates that there is structural suitability for Badger within the woodland areas. The walkover survey has therefore entailed checks for evidence of Badger throughout the Site and at least a 30m radius from the red-line boundary. Signs of setts, desire lines, snuffle holes, scratched trees, dung pits, paw prints and hairs were searched for. N*o evidence of Badger presence was noted during the 2017 walkover surveys*.

It is judged that there is very low likelihood of future colonisation, but that there should be precautionary further consideration of Badger if a substantial period of time passes before any invasive work takes place at the Site.

3.3.3 Birds

The 2017 data search presented records of a range of bird species occurring within 2.0km radius of the Application Site, including species affiliated with grassland (e.g. Skylark and Meadow-pipit), shrubs and trees (e.g. Green woodpecker and Bulfinch), marshland (e.g. Reed bunting and water-bodies (e.g. Common kingfisher, Teal and Wigeon). The data search listed 4x Schedule 1 species, namely Bewick's Swan, Scup, Common Scoter, Honey Buzzard, Red Kite, Marsh Harrier, Brambling, Common Crossbill, Black Redstart, , Firecrest, Barn Owl, Wryneck, Cetti's Warbler, Woodlark, Osprey, Hobby, Peregrine, Green Sanpiper, Black Tern, Common kingfisher, Fieldfare, and Redwing, plus another 14 bird species with BoCC red list conservation status.

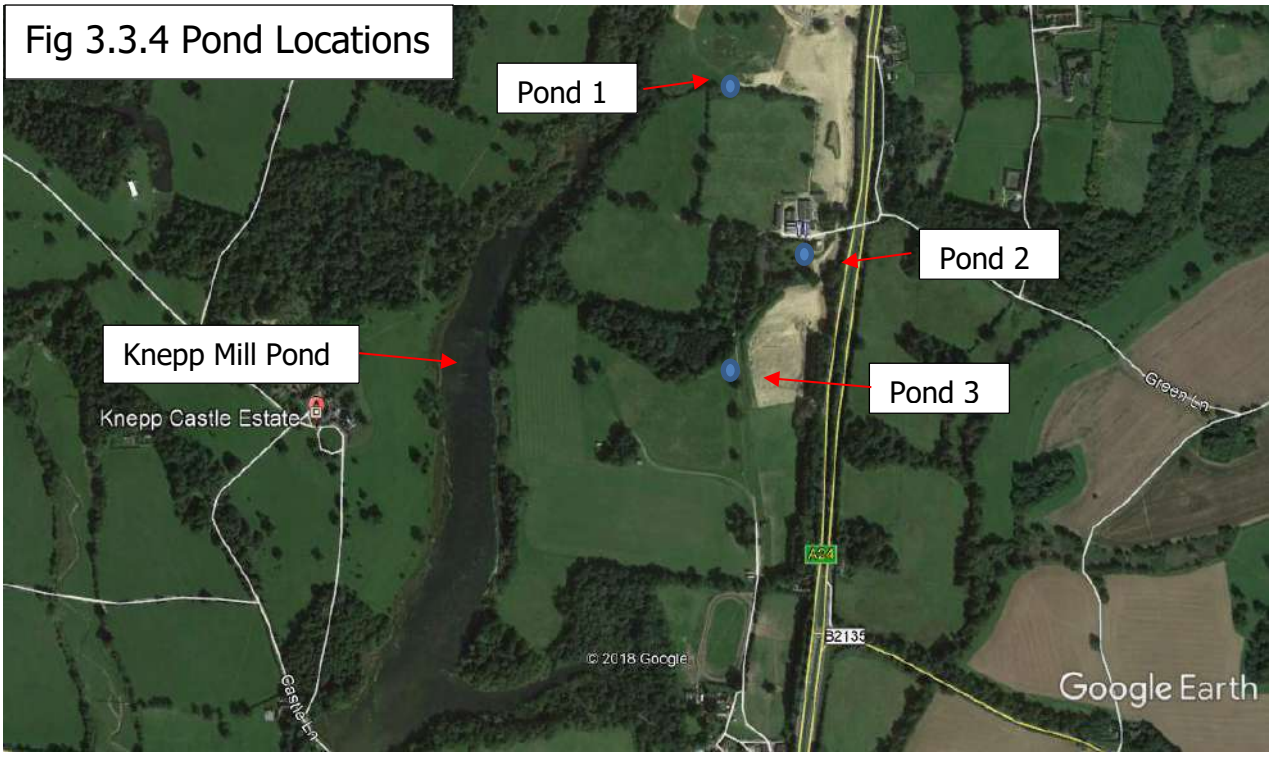
Results from summer bird surveys in 2009 have given further information about bird occurrences. There is a small Heronry composing of at least 5 nests situated on the lake edge within Hog Wood. Additionally all incidental observations of birds during visits in 2017 - 2019 have been recorded, giving rise to a comprehensive bird species list for the Site, as presented in **Table 2.2** (**Appendix 2**).

As a measure of best-practice all bird species should be given further consideration.

3.3.4 Great Crested Newt & Other Amphibians

a) Overview & desk study:

The 2017 data search from SxBRC gave no record of GCN occurrence within the immediate area but within 2.0km of the site. Surveys conducted in 2009 showed no evidence of GCN presence.
In 2017, inspection of maps and aerial photographs was used as a basis to determine pond distribution within the Application Site and also in a 250m radius around the red-line boundary (Repeated in 2019). From this, a total of 3 likely ponds were identified. Pond 1 was found to be completely dry and overgrown, ponds 2 & 3 were surveyed using N.E. recommendations. See Fig 3.3.4 for locations.



Note that the large water-body of Knepp Mill pond was labelled on **Fig. 3.3.4**, but discounted from further GCN survey and assessment because of its size, waterfowl presence and stock of coarse fish.

b) Aquatic habitat appraisal:

Walkover surveys and inspections of all potential water-bodies in April 2017 established that pond 1 was completely dry and overgrown, but ponds 2 and 3 were suitable to be made the subject of HSI assessments. Brief descriptions are presented in the following tables 3.3.4 a - d.

All ponds were re-appraised in spring 2019 and findings were re-confirmed.

Table 3.3.4 a. Pond 1: Situated at grid reference **TQ 162 222**
Pond completely dry and overgrown with scrub.

Summary: This *former* pond has senesced No HSI assessment available. Not considered as a pond for this report. NOTE: The 2009 survey also shows it as dry.

Table 3.3.4 b Pond 2: Situated at grid reference **TQ 162 218**

Small circular pond within a garden with mown lawns. Approx 45m² with a depth of approx. 1.0m. Steep but shallow banks. Vegetated at bank with pampas grass, buttercup, common nettle. Small amounts of lesser bulrush and yellow flag iris.

HSI Criterion	**Description relating to this pond**	**Score**
SI_1 Location	**Zone A** (optimal)	**1.0**
SI_2 Pond area	Open water has a surface area of 4**5m².**	**0.05**
SI_3 Pond drying	It is judged that the pond **never dries**.	**0.9**
SI_4 Water quality (turbidity, pollution etc):	**Low.** Few invertebrates noted.	**0.33**
SI_5 Shade	0% due to absence of trees or shrubs	**1.0**
SI_6 Fowl	Minor. There is abundant cover for nesting Coot or Mallard.	**0.67**
SI_7 Fish	Minor.	**0.33**
SI_8 Ponds (not separated by major barriers):	From a combination of maps and aerial photographs, historically there are **13 additional ponds** within 1km of the survey pond not separated by major infrastructure.	**1.0**
SI_9 Terrestrial habitat	**Poor**. Garden area	**0.33**
SI_{10} Macrophytes	**20%**.) within this open water area.	**0.35**
	HSI score = 0.45 (Poor)	

Summary: As presented, the HSI assessment shows that the pond has a final score of **0.45**. This suggests it is '**poor**' in terms of its habitat suitability for Great Crested Newts.

Table 3.3.4 c Pond 3: Situated at grid reference **TQ 162 218**

Small pond approx. 50m². Depth of 1.0m. Banks are vegetated with common nettle. Broad-laved dock and cock's-foot. Mature oak and hawthorn are present giving plenty of shade. No aquatic plants.

HSI Criterion	Description relating to this pond	Score
SI_1 Location	**Zone A** (optimal)	**1.0**
SI_2 Pond area	Open water has an area of approx. **50m².**	**0.10**
SI_3 Pond drying	It is estimated that the pond **never dries**, but that it sometimes / regularly floods.	**0.9**
SI_4 Water quality (turbidity, pollution etc):	**Poor.** Very grey, turbid, shaded. Netting revealed only Freshwater hoglouse (A).	**0.01**
SI_5 Shade	60% due to trees on banks.	**0.4**
SI_6 Fowl	**Minor.** Low number of Mallard during the surveys, but poor for nesting or feeding	**0.67**
SI_7 Fish	Estimated low likelihood due to poor water and only **minor** if at all.	**0.67**
SI_8 Ponds (not separated by major barriers):	From a combination of maps and aerial photographs, historically there are **13 additional ponds** within 1km of the survey pond not separated by major infrastructure.	**1.0**
SI_9 Terrestrial habitat	**Moderate**. Some suitable habitat but much amenity and improved grassland in immediate area.	**0.67**
SI_{10} Macrophytes	0%.	**0.3**
HSI score = 0. 36 (poor)		

Summary: As presented, the HSI assessment shows that the pond has a final score of **0.36** so it is '**poor**' in terms of its habitat suitability for Great Crested Newts.

Table 3.3.4 d. Knepp Mill pond: Centred at grid reference **TQ 158 215**		
Large elongated pond, stocked with abundant coarse fish.		
HSI Criterion	**Description relating to this pond**	**Score**
SI_1 Location	**Zone A** (optimal)	**1.0**
SI_2 Pond area	**+100,000m²**. Pond is over 2000m². Therefore factor omitted from HIS score	**N/A**
SI_3 Pond drying	Pond is drained annually.	**0.9**
SI_4 Water quality (turbidity, pollution etc):	**Good** – Abundance species	**1.0**
SI_5 Shade	**50%** - There are blocks of trees around most of south and east banks.	**1.0**
SI_6 Fowl	**Major**. With evidence of heavy grazing by geese and other fowl	**0.01**
SI_7 Fish	**Major**. Pond stocked with coarse fish.	**1.0**
SI_8 Ponds (not separated by major barriers):	From a combination of maps and aerial photographs, historically there are **13 additional ponds** within 1km of the survey pond not separated by major infrastructure.	**1.0**
SI_9 Terrestrial habitat	**Moderate**.	**0.67**
SI_{10} Macrophytes	**<10%**	**0.34**
HSI score = 0.34 (Poor)		
Summary: As presented, the HSI assessment shows that the pond has a **final score of 0.34**, which suggests it is **'poor'** in terms of its habitat suitability for Great Crested Newts. The most limiting factor is the likely presence of coarse fish, and numerous waterfowl and scarcity of aquatic vegetation. NOTE: The 2009 survey gave evidence of a small population of Smooth newt at this pond.		

In summary, no ponds within the survey area are considered suitable for Great Crested Newt breeding. *Due to low suitability of ponds and no historical records of GCNs in the immediate area, GCN do not require further consideration.*

3.3.5 Water Vole

Records supplied by SxBRC show the presence of Water Vole around the southern and western banks of Knepp Mill pond. Therefore, the eastern bank of (the area affected by the proposals) was surveyed for signs of water vole during July 2017 and . The lake edge was searched for signs of water vole presence such as; burrows, droppings, runs, latrines and feeding signs. No signs of water vole was noted along the western edge. These surveys were repeated in April 2018 and again in March 2019. Again, no signs of water vole presence was noted. However; habitat assessment of the lake edge gives the impression of being suitable for water vole (See Appendix 3).

In summary, although no signs of water vole presence was noted during surveying, the habitat was adjudged to be suitable for water vole breeding and there is historical evidence of water vole breeding within Knepp Mill pond. *Due to the suitability of the pond and the* historical records of water voles in the area, water voles do require minor further consideration.

3.3.6 Otter

Results from the 2009 data search and surveys give no records of Otter occurrence. However, during the water vole survey (above), the eastern bank of (the area affected by the proposals) was also surveyed for signs of otter during July 2017. The lake edge was searched for signs of otter presence such as; pathways, spraints, runs, latrines and feeding signs. No signs of water vole was noted along the western edge. However; habitat assessment of the lake edge gives the impression of being suitable for otter.

In summary, although no signs of otter presence was noted during surveying, the habitat was adjudged to be suitable for otter breeding / hunting. *Due to the suitability of the pond, otters do require minor further consideration.*

3.3.7 Reptiles

Surveys of reptiles conducted in 2009 and data search results from SxBRC in 2017 both showed the presence of Grass snake and slow worm within the redline boundary. An area of suitable reptile habitat likely to be impacted upon during the development was identified during habitat assessment. The lake margins merging with the area north of Hog Wood and east of Bow Wood. This area was subjected to full reptile surveys as per "Froglife (1999) Reptile survey: an introduction to planning, conducting and interpreting surveys for lizard and snake conservation. Advice Sheet 10. Froglife, Halesworth". This entailed placing artificial refugia in the areas of interest and inspecting them on 9 occasions throughout summer 2017 (See Reptile survey report Appendix 3).

During the surveys a peak count of 3 adult slow worms and 2 adult grass snakes was noted. They are evaluated as low populations and do not qualify for the Key Reptile Site Register. The area surveyed was subjected to a set of RAMs outlining a translocation projection in 2019. No reptiles were noted and the area deemed "sterile" ref' reptiles.

In summary, although only small populations of Slow worm and Grass snake occurrence was noted; *reptiles do require further consideration.*

3.3.8 Other Wildlife

Mammals:

There is suitable habitat for Brown hare (NERC Act species of principal importance) within the Site, primarily along the southern and western cloughs, plus along field edges. However, surrounding urbanisation makes the land quite isolated and also vulnerable to disturbance by people and dogs. No evidence of Brown hare was recorded during the walkover surveys in 2014 or 2015. Minor precautionary consideration may be appropriate.

There is negligible potential value for Hedgehog (NERC Act species of principal importance) in association with the agriculturally improved grassland fields, but there is habitat suitability for dispersing, sheltering and foraging along hedgerows and throughout the southern and western cloughs. This may require minor precautionary consideration.

There are patchy field signs indicative of Red fox and Rabbit occurrence throughout the Site, but no evidence of a fox den was discovered during 2017 - 2019 surveys.

Invertebrates:

Comprehensive invertebrate surveys were conducted in 2009 (See MJCA Report "Ecological Baseline Survey and Impact Assessment for Part of the Knepp Castle Estate Dated March 2010 (See Appendix 4)). The survey was split into 3 habitats; amphibious lakeside habitat, Grassland and Woodland. A relatively high number of species (393) were recorded within the 3 habitats. No invertebrate species that is afforded protection under UK or European legislation or appears on the UK BAP Priority Species list was noted.

Disturbance to lake margins will be confined to a narrow breach and will be temporary. Suitable habitat for existing invertebrate species will be left in situ either side of the breach and it is estimated that less than 1% of the lake margin will be affected. Disturbance to woodland and scattered trees will be minimum as no areas will be directly affected by the project including haul roads. The grassland area supports a very low invertebrate diversity and the recorded assemblage does not feature any species of profound conservation interest, in fact it is proposed that the planned restoration of the area will increase the invertebrate biodiversity.

In summary, the effects of the development on invertebrates will be negligible; *invertebrates do not require further consideration.*

4.0 ECOLOGICAL EVALUATION

4.1 Methods of Ecological Evaluation

A key consideration in assessing the potential impacts of any development on local flora and fauna is to define the habitat areas and species that must be considered. In identifying these 'receptors', it is important to recognise that a development can affect flora and fauna directly (e.g. the land-take required) and indirectly, by affecting land outside of the development area (e.g. through noise generatio
n). The approach that has been undertaken in this study is to:

- Identify the ecological receptors that could be affected directly or indirectly by the proposals; and
- Undertake an assessment of their value in terms of nature conservation, in order to determine whether they are considered 'Valued Ecological Receptors' and, separately, to consider the legal protection afforded to some species and the consequential implications for the proposals.

4.1.1 Valued Ecological Receptors

It is impractical for an assessment of the ecological impacts of a development to consider every species and habitat that may be affected; instead it should focus on 'Valued Ecological Receptors'. Valued Ecological Receptors are species and habitats that are valued in some way, and could be significantly affected by the proposed development; other Valued Ecological Receptors may occur on or in the vicinity of the Site of the proposed development but do not need to be considered because there is no potential for them to be affected significantly.

The value of species and habitats is assessed with reference to:

- Their importance in terms of 'biodiversity conservation' value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations);
- Any social benefits that species and habitats deliver (e.g. relating to enjoyment of flora and fauna by the public); and
- Any economic benefits that they provide.

Species and habitats have been valued, from a biodiversity conservation perspective, using the following scale:

- International
- UK
- National (i.e. England)
- Regional (i.e. south-east)
- County
- District
- Parish
- Less than parish.

The approach taken in this report is to consider a species of county or greater importance in biodiversity conservation terms to be a Valued Ecological Receptor.

Therefore, if a population of a particular species present at the Site is considered to be of district value or less, no significant effect can be termed to occur.

For habitats, the approach that has been adopted is that a habitat of district or greater importance is considered to be a Valued Ecological Receptor. No significant effect can therefore occur to habitats of lower value unless it has an economic or social value (e.g. an open space that is used extensively for informal recreation by local when the area's wildlife is an important contribution to this Further guidance as to the type of criteria used to allocate value to a species or habitat is provided in Table 4.1.1 below.

Table 4.1.1. Definitions of terms relating to ecological value.

Value	Definition
International or UK	Species that form the cited interest of SSSI, SAC, Ramsar and SPA's.
National	Other non-cited species which contribute to the integrity of a SSSI or SPA. Ecologically sensitive species such as rare birds (<300 breeding pairs in the UK) and the less common birds of prey (peregrine falcon and barn owl, for example). Ecologically sensitive species such as rare birds (<300 breeding pairs in the UK) and the less common birds of prey (peregrine falcon and barn owl, for example). Species present in nationally important numbers (>1% UKpopulation). Species listed on Annex 1 of the EU Birds Directive, Annex 1 and 2 of the EU Habitats Directive and/or Schedule 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended).
Regional or County	Species present in regionally important numbers (>1% regional population). Good quality/ condition examples of species populations or habitats listed within UK and County Biodiversity Action Plans. Species populations/ assemblages identified as being of county importance by local Biodiversity Record Centre or other local expert organisation (e.g. Ornithological Society). Habitats designated as County Wildlife Sites (or equivalent SNCI term).
District	Species populations or habitats identified as being of district importance by local Biodiversity Record Centre. Biodiversity Action Plan habitats or species populations that have been subject to significant modifications, including fragmentation and improvement;
Parish	Other native species populations or areas of semi-natural habitats, mainly comprising receptors that are widespread within the UK but of some conservation note due to factors such as recent decline in numbers or extent. Note that this category can include low numbers of widespread and common BAP species where these individual animals do not contribute significantly to the local population
Less than parish	Species-poor and ubiquitous habitats that show extensive influence from man such as amenity grassland or ephemeral/ short perennial vegetation colonising tarmac or gravel Species that remain common and widespread e.g. magpie and feral pigeon

4.1.2 Legal Protection of Species

There is also a need to identify all legally protected species that could be affected by the proposals in order for measures to be implemented to ensure that contravention of the relevant legislation is avoided. Such measures must be acceptable to Natural England. By implication, therefore, it is inappropriate to assess the significance of effects within the context of a species legal protection - effects on such species have to avoid contravention of the law (i.e. to be 'non-significant' through avoiding potential effects or by implementing an agreed mitigation/enhancement strategy, often under licence issued by Natural England.), otherwise the development cannot be taken forward.

In certain situations, however, adherence to measures that are designed to ensure that the law is not contravened may not prevent a significant effect relating to a species of biodiversity conservation, social or economic value occurring (i.e. in the context of the species being a 'Valued Ecological Receptor' - see above). For example, it may be possible to avoid contravening the law regarding a species by trans-locating the population from the development Site. However, if the species is sufficiently rare in the locality, it may be concluded that the loss of the population from the Site could be a significant effect in biodiversity conservation terms. Such an effect would therefore need to be subject to detailed assessment and mitigation.

4.3 Results of Ecological Valuation

4.3.1 Statutory / Non statutory Designated Sites

Analysis of the proposal will identify whether it could have any negative or positive impacts on the integrity and ecological value of the two nearby LWSs. The duration and magnitude or extent of any predicted impacts will need to be identified, from which it will then be determined whether or not the impact(s) will class as significant.

Kneppmill Pond, the River Adur & Lancing Brook LWS (H18). Knepp Mill Pond is a large area of open water with well developed marginal vegetation and extensive tall fen. It is of County importance for wintering and breeding birds and includes a heronry. The site includes a stretch of the River Adur (to it's south), which has diverse emergent and aquatic vegetation, including several local species, and its tributary, Lancing Brook. The lake forms part of the proposed site itself with the River SAdur & Lancing Brook approximately 250m south of the site.

This LWS is considered as a Valued Ecological Receptor.

Horsham Common, Alder Copse, Coate's Furzefield & Constable's Furze LWS (H30). A diverse woodland complex including semi-natural woodland, semi-mature Oak plantation, young broadleaved plantation, conifer plantation, streams and herb-rich meadow. The flora, butterflies, birds and mammals are of great interest, The woodland is managed in the interests of both commercial forestry and nature conservation. It is positioned approx. 940m north-west of the red-line boundary at its closest.

This LWS is considered a Valued Ecological Receptor.

4.3.2 BAP priority habitats / habitats qualifying for LWS interest / BAP Priority Habitats:

Deciduous Woodland. Although only minimum disturbance is expected to the woodland areas, they do represent a priority habitat.

This habitat is therefore considered as a Valued Ecological Receptor.

Lake Margins / Lowland Fen. Although only minimum disturbance is expected to the lake margin / lowland fen areas, they do represent a priority habitat.

This habitat is therefore considered as a Valued Ecological Receptor.

Wood-pasture & Parkland. Although only minimum disturbance is expected to the wood-pasture & parkland areas (classified as amenity grassland) by the proposed haul road, it does represent a priority habitat.

This habitat is therefore considered as a Valued Ecological Receptor.

4.3.3 Receptors. Fauna

Bats

The proposal entails removing a number of mature trees (See Ramsay & Co Landscape Architecture report "Existing Tree Schedule: Knepp Castle Estate: Wilkie Landform Scheme, West Grinstead, West Sussex – Date: 09th December 2019 / Revision 07 – Planning Issue (Wilkie Scheme), therefore survey work will need to be applied by means of individual inspection by daylight and/or nocturnal monitoring of such trees. If this identifies any occurrence of roosting bats and/or substantive use of air-space by commuting or foraging bats within the zone of influence then an impact assessment and mitigation proposals will be required. Mitigation licensing will only be required if the work is predicted to have an unavoidable impact on one or more roosts, but avoidance of impacts on active foraging and/or commuting bats will also be considered.

Bats on Site are considered as Valued Ecological Receptors.

Badger

The impact assessment may not need to include Badger if there remains no evidence of this species, but it will still be appropriate to undertake pre-commencement presence/absence checks along the cloughs, anywhere within 30m radius of proposed invasive work.

Badgers on Site are considered as Valued Ecological Receptors.

Breeding birds

An impact assessment must be applied and mitigation measures must be prescribed, particularly focussing on the Schedule 1 species, BAP priority species and BOCC red- list species that have been identified in the surveys, to ensure that there is mitigation to minimise short-term impacts of habitat loss and there is compensation to provide medium- long term replacement habitat value.

Standard mitigation must also be applied for avoidance of impacts on wild birds during the breeding season, which is typically March to August inclusive. The existing planning conditions prevent dredging work on the southern area of the Mill Pond between 01st January and 30th June in any year, in the interests of protecting the heronry, located in Bow Wood.

As well as assessing negative impacts and applying mitigation measures, opportunities for positive long-term impacts must be explored. The mosaic of vegetation types currently present within the Site provides habitat value for a range of species and the landscaping scheme should seek to also provide this in the medium-long term.

Breeding birds on Site are considered as Valued Ecological Receptors.

Reptiles

Grass snake and slow worm are known to be present close to the lake margins and proposed haul road.

Reptiles on Site are considered as Valued Ecological Receptors.

Water Vole

Although no water vole presence was noted in the 2017 surveys, they are known to of bred at Knepp Mill pond along the southern and western banks within migratory range.

Water voles on Site are considered as Valued Ecological Receptors.

Red & Roe Deer

Both species of deer roam free across the Site.

Red & Roe deer are considered as Valued Ecological Receptors.

4.4 Summary of Valued Ecological Receptors

A summary of the Valued Ecological Receptors identified for the Site and study area is shown in Table 7. below. The potential impacts on these Receptors from the proposed development will be considered further in Section 5.

Table 7. Summary table showing identified Valued Ecological Receptors.

ECOLOGICAL RECEPTOR	VALUE
Kneppmill Pond, the River Adur & Lancing Brook LWS (H18).	County
Horsham Common, Alder Copse, Coate's Furzefield & Constable's Furze LWS (H30).	County
Deciduous Woodland.	County
Lake Margins / Lowland Fen.	County
Wood-pasture & Parkland.	County
Bats	County
Badgers	County
Water vole	County
Reptiles	County
Breeding Birds	County
Red & Roe Deer	County

4.5 ECOLOGICAL IMPACT ASSESSMENT

This section will discuss the potential effect that may arise from the proposed works on the Valued Ecological Receptors identified in Section 4 of this report. Each will be discussed in turn, assessing likely impacts from the infill and restoration of the quarry and the consequential significance of any impacts identified.

Consideration of possible effects on other ecological receptors and in relation to nature conservation legislation is also discussed.

4.6 ASSESSMENT OF POTENTIAL EFFECTS ON VALUED ECOLOGICAL RECEPTORS

4.6.1 Kneppmill Pond, the River Adur & Lancing Brook LWS (H18).

It is considered that significant effects to Kneppmill Pond, the River Adur & Lancing Brook LWS (H18). will not occur. This is because of:

- The draining of the lake is an annual occurrence;
- The proposals will not generate additional recreational pressure within the SBI or result in other indirect disturbance impacts to Protected Species;
- The restricted nature of the activities.
- The localised nature of the effects associated with the proposals
- Mitigation and compensation proposals.

4.6.2 Horsham Common, Alder Copse, Coate's Furzefield & Constable's Furze LWS (H30).

It is considered that significant effects to Horsham Common, Alder Copse, Coate's Furzefield & Constable's Furze LWS (H30). will not occur. This is because of:

- The distance from the AONB to the nearest part of the Site;
- The proposals will not generate additional recreational pressure within the AONB or result in other indirect disturbance impacts to Protected Species;
- The restricted nature of the activities.
- The localised nature of the effects associated with the proposals
- Mitigation and compensation proposals

4.6.3 Deciduous Woodland**.**

It is considered that significant effects to shrubs and trees will not occur. This is because of:

- Only small numbers of mature trees and shrubs will be lost to thedevelopment;
- Shrubs and trees will only be cleared outside of the breeding bird survey;
- Additional planting of native trees and shrubs will be built into final scheme layout;
- Any trees to be felled will be subject to stringent bat roost surveys;
- Mitigation and compensation proposals

4.6.4 Lake Margins and Lowland Fens

It is considered that significant effects to the lake margins and lowland fens will not occur. This is because of:

- Less than 10% of the lake margin will be affected by the development;
- An area of poorly vegetated pond margin has been identified for creation of haul road entrance into lake;
- Additional wetland areas will be created adjacent to lake.
- Area affected will be fully restored post development
- Mitigation and compensation proposals

4.6.5 Wood Pasture and Parkland

It is considered that significant effects to wood pasture and parkland will not occur. This is because of:

- The only areas of wood pasture and parkland affected by the development is amenity grassland that will be fully restored post-development;
- Additional planting of native trees and shrubs will be built into final scheme layout.
- Mitigation and compensation proposals

4.6.6 Bats

It is considered that significant effects to Bats will not occur. This is because of:

- No mature trees will be felled without a full bat roost survey being conducted;
- Shrubs and trees on site will ensure a continuous habitat forforaging;
- Additional planting of native trees and shrubs will be built into final scheme layout.
- Mitigation and compensation proposals

4.6.7 Badgers

It is considered that significant effects to badgers will not occur. This is because of:

- Full badger surveys will be conducted immediately prior to works commencing to ensure no setts will be affected by the project
- Mitigation and compensation proposals

4.6.8 Water Voles

It is considered that significant effects to water voles will not occur. This is because of:

- No signs of water vole presence have been noted in the immediate area of the proposals
- If construction areas change to nearer the lake edge, then precautionary presence absence surveys will be repeated prior to works beginning;
- Mitigation and compensation proposals

4.6.9 Reptiles

It is considered that significant effects to reptiles will not occur. This is because of:

- Areas of suitable habitat have been set aside prior to works commencing;
- Mitigation and compensation proposals have been implemented.

4.6.10 Breeding Birds

It is considered that significant effects to breeding birds close to the study area will not occur. This is because of:

- Trees adjacent to the Site will be fully protected to BS5837 standards;
- Breeding birds may use parts of the Site and will be present within the adjacent woodlands.
- The grassland habitats to be lost are currently unsuitable for breeding birds as the sward height is not sufficient for most ground-nesting species.
- Only temporary noise disturbance is likely during construction.
- Works to remove shrub and trees will take place outside of the bird breeding season if possible (e.g. March to August). If this is not possible, an ecologist will inspect individual shrubs and trees to confirm whether birds are nesting. No vegetation will be removed if birds are nesting in accordance with the Wildlife and Countryside Act 1981 (as amended).
- The existing planning conditions prevent dredging work on the southern area of the Mill Pond between 1st January and 30th June in any year, in the interest of protecting the heronry, located in Bow Wood.

4.6.11 Red & Roe Deer

It is considered that significant effects to deer species will not occur. This is because of:

- Areas of suitable habitat will be set aside prior to works commencing;
- Mitigation and compensation will be agreed prior to commencement of project;
- Mitigation and compensation proposals

4.7 Summary of Significant Effects

4.7.1 Negative Significant Effects.

A small stretch of lake margin will be temporarily disturbed during the development, however these will be more than adequately compensated for by the creation of new wetland areas and the maintenance of existing lake margin. No permanent negative significant effects are predicted as a result of the proposed development at the Site as appropriate mitigation measures will be adopted as part of scheme design, governed by planning conditions/ecological licences as appropriate.

4.7.2 Positive Significant Effects.

The creation of extra woodland blocks, and pond along with (already approved) woodland blocks, wild areas, rough grassland and wetland will help create habitat corridors and a mosaic of differing habitats. This will help increase the overall biodiversity of not only the Site itself but of the surrounding areas.

4.8 Summary of Opportunities for Biodiversity Gain - Through Habitat Creation.

4.8.1 Woodland.

Areas of native woodland and individual trees and shrubs are to be planted creating habitat coridors. Species will be include; Holly, Wild Pear, Field Rose, Wild Service, Yew, Hornbeam, Small Leaved Lime, Aspen, Common Oak, Hawthorn (*Crataegus monogyma*), Common Hazel (*Corylus avellana*), Sessile Oak (*Quercus petraea*), Wild Cherry (*Prunus padus*), Blackthorn *(Prunus spinosa*), Dog Rose (Rosa canina), Elder (*Sambuca nigra*), and Rowan (*Sorbus aucuparia*).

The areas will create nesting and foraging areas for a variety of birds, will encourage invertebrates and generate refugia for amphibians and reptiles. Small mammals are also likely to use the habitat. See Appendix 1 Figs A1.4.1 and A1.4.2

4.8.2 Small Pond.

A small pond will be created close to the amphitheatre area. The areas will create nesting and foraging areas for a variety of birds, will encourage invertebrates and generate refugia for amphibians and reptiles.

4.8.3 Wild areas.

A number of fenced areas are included in the plans. These areas will require no planting and will encourage natural regeneration. The Estate's re-wilding project has demonstrated with evidence that this approach has wide raging biodiversity benefits.

The areas will create foraging areas for a variety of birds and bat species, will encourage invertebrates and generate refugia for amphibians and reptiles. Small mammals are also likely to use the habitat.

4.8.4 Wetland.

Large areas of wetland will be established. The wetland areas will be planted to assume a marsh habitat similar to that advised in the Million Pond Project (WWW.pondconservation.org.uk/millionponds) using a mixture of emergent herbaceous vegetation, commonly dominated by grasses, sedges, and reeds with an important herb rich community. The area is ideal for grazing at low stocking densities.

The areas will be designed to attract amphibians, reptiles and birds including wild fowl, it is envisaged that bat species will also use the area for foraging.

4.8.5 General

Any disturbance to the ecology of the area will be temporary and will be adequately compensated for. The client has worked closely with EBS to vastly improve the ecological value of the site. The planting of wild areas, thousands of new trees and the creation of wetland areas all go towards an important biological gain over the existing farm and orchard areas in compliance with the National Planning Policy Framework (NPPF).

Habitat will be established and maintained through appropriate maintenance strategies. Additional habitat diversity will be provided through:

- Retention of suitable tree features, elsewhere within woodland adjacent to the Site, that currently provide the potential for roosting bats;
- The erection of bat and bird boxes in suitable locations;
- The creation of log pile refugia/hibernacula for invertebrates, reptiles and amphibians;
- The 'planting' of semi-buried wood for invertebrates such as stag beetle.

4.9 Recommendations

As various species can colonise suitable habitats throughout the year it is recommended that pre-development checks within suitable habitat features are conducted immediately prior to the works starting in order to confirm the pre-construction use of the Site by legally protected species including badgers and breeding birds. This will include a series of Reasonable Avoidance Measures to be prepared and supervised by suitably qualified ecologists at EBS.

Should any such signs be identified during these checks appropriate action must be taken, which may include formal licence applications to Natural England to allow works to proceed, production of detailed method statements, or delaying works in certain areas.

4.9.1 Badger Reasonable Avoidance Measures

Although no badger setts have been discovered on site to date, badgers do use the site for foraging and transecting on forages excursions, therefore RAMs are required to ensure that no harm to badgers and or their setts occurring during the duration of the development. RAMs will include the following guidelines;

- Prior to any works commencing, on site surveys will be concluded to ensure that no badger setts have been created within the proposed development site.
- If any evidence of Badger sett activity is discovered within the working zone at any time of the operation then EBS will be informed immediately and possible application for a Natural England disturbance licence may be required.
- The site will only be released to operations once the above have been successfully confirmed with no evidence of new badger setts being found.
- All contractors on site will be made aware of guidelines outlined in; Badgers and Development, English Nature 2002. ISBN 1 85716 6140. IN7.5
- All contractors to be made aware of possible effect of higher traffic volume on badgers.
- Construction work on site only allowed between 08:00 and 18:00hrs
- Any holes or trenches left open overnight to have means of escape provided such as a ramp or wide plank.
- All materials (especially those containing lime) to be securely stored out of access of badgers
- Any fires to be lit away from wooded areas.
- Any alterations to the boundary should not block access for badgers to move freely in and out of the site.

- Any signs of badger presence should be reported to EBS immediately and all work on site stopped until otherwise advised by a suitably qualified ecologist at EBS.

4.9.2 Water Vole Reasonable Avoidance Measures

Although no water voles have been discovered in the immediate area of the development during the 2017 / 2018 / 2019 surveys, there are historical records of water voles being present in the west and south banks of the lake. Therefore, as a precautionary approach it is recommended that a set of Rams be agreed prior to the project beginning if the plans come within 30m of the lake. RAMs will include the following guidelines;

- A destructive hand-search will be conducted under the strict supervision of a suitably qualified ecologist prior to installation of haul road creation within 20m of area affected to ensure that no water voles are harmed during the operation.

- If any evidence of water vole presence is discovered at any time of the operation then all works will halt immediately and a new set of RAMs will be agreed.

- The site will only be released to operations once the above have been successfully confirmed with no evidence of Water Vole being found.

- See Appendix 3

4.9.3 Breeding Bird Reasonable Avoidance Measures

Although a full breeding bird survey has not been conducted, habitats on site have been assessed as being suitable for breeding birds. Therefore a set of RAMs are required to ensure that no harm occurs to breeding birds and or their nests during the duration of the development. RAMs will include the following guidelines;

- All scrub, tree and hedge removal will take place between September – February inclusive (outside of the breeding bird season).

- If any vegetation is to be removed during the breeding bird season then a breeding bird survey must be conducted by a suitably qualified ecologist prior to commencement.

- Although no ground nesting birds were found to be breeding on site, the area could be used for nesting in the future. Therefore, if the development is postponed so as to start within the breeding bird season, as a precautionary measure, the entire site will be walked to ensure no nests have been set down within the grassed areas.

- The existing planning conditions prevent dredging work on the southern area of the Mill Pond between 01st January and 30th June in any year, in the interests of protecting the heronry, located in Bow Wood.

4.9.4 Tree Protection Reasonable Avoidance Measures

Some wooded areas and individual trees may be lost to the development, whilst others will be retained. Therefore it is recommended that a set of Rams be agreed prior to the project beginning. RAMs will include the following guidelines;

- Retained trees will be protected to BS5837 recommendation

4.9.5 Invasive Species Mitigation

The entire site will be re-assessed prior to works commencing and any areas of invasive species noted. A plan of eradication will be agreed within the Site management.

4.9.6 Potential Tree Bat Roosts

A number of trees have been identified for removal (See Ramsay & Co Landscape Architecture report "Existing Tree Schedule: Knepp Castle Estate: Wilkie Landform Scheme, West Grinstead, West Sussex – Date: 09th December 2019 / Revision 07 – Planning Issue (Wilkie Scheme). 6 of these trees have been evaluated as being of high potential for bat roosts. These trees were subject to emergence / re-entry surveys during 2019. No roosts were noted during the surveys, however; they still have high potential for future bat roost support and therefore; a set of RAMs are required to ensure that no harm occurs to roosting bats and or their roosts during the duration of the development. RAMs will include the following guidelines;

- All individual trees ear-marked for removal will be subject to preliminary bat roost potential surveys immediately prior to felling.
- If trees are thought to have potential to support bat roosts then further surveys will be conducted during the bat activity season (April – September).
- All surveys will be conducted as per guidelines - *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016).

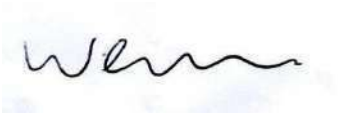
4.10 Summary

The actual site at present lacks the presence of any known breeding Protected Species except for a small population of reptiles, and although contains a mosaic of habitats, contains no habitats that are afforded special protection or interest. The site is surrounded in the larger aspect by open countryside and woodland. These areas along with any protected species within the wider area will be guarded by complying with stringent mitigation methods.

By following stringent Reasonable Avoidance Measurements, it is thought that no protected species (or their habitats) listed on Schedules 1, 5 and 9 of the Wildlife and Countryside Act 1981 (as amended*) and those protected under the Conservation of Habitats and Species Regulations 2010 (as amended) and The Protection of Badgers Act 1992 will be harmed.

Mitigation for the habitat loss would be achieved by the creation of important habitats combined with the phased working and restoration of the site. The phasing of the works has ensured that a proportion of suitable habitat for notable species is always available during the works. The development of the Site actually gives an opportunity to vastly improve the biodiversity of the area. The n a t i v e tree species planting, additional ponds and wetlands, hedgerow creation and areas being left to natural succession will enhance the ecology of the area. The new layout will create both habitat corridors and wildlife havens, providing ecological niches and an overall high net biological gain over the present habitats and the wider area.

Any disturbances will be temporary and will be adequately compensated for and protected with stringent mitigation measures employed and monitored throughout the development phase and into the developments active period.



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The UK Biodiversity Steering Group Report. Volume 2. Action Plans. H.M.S.O. (1995), London.

The Conservation of Habitats and Species Regulations 2010

Wildlife and Countryside Act (1981). H.M.S.O., London.

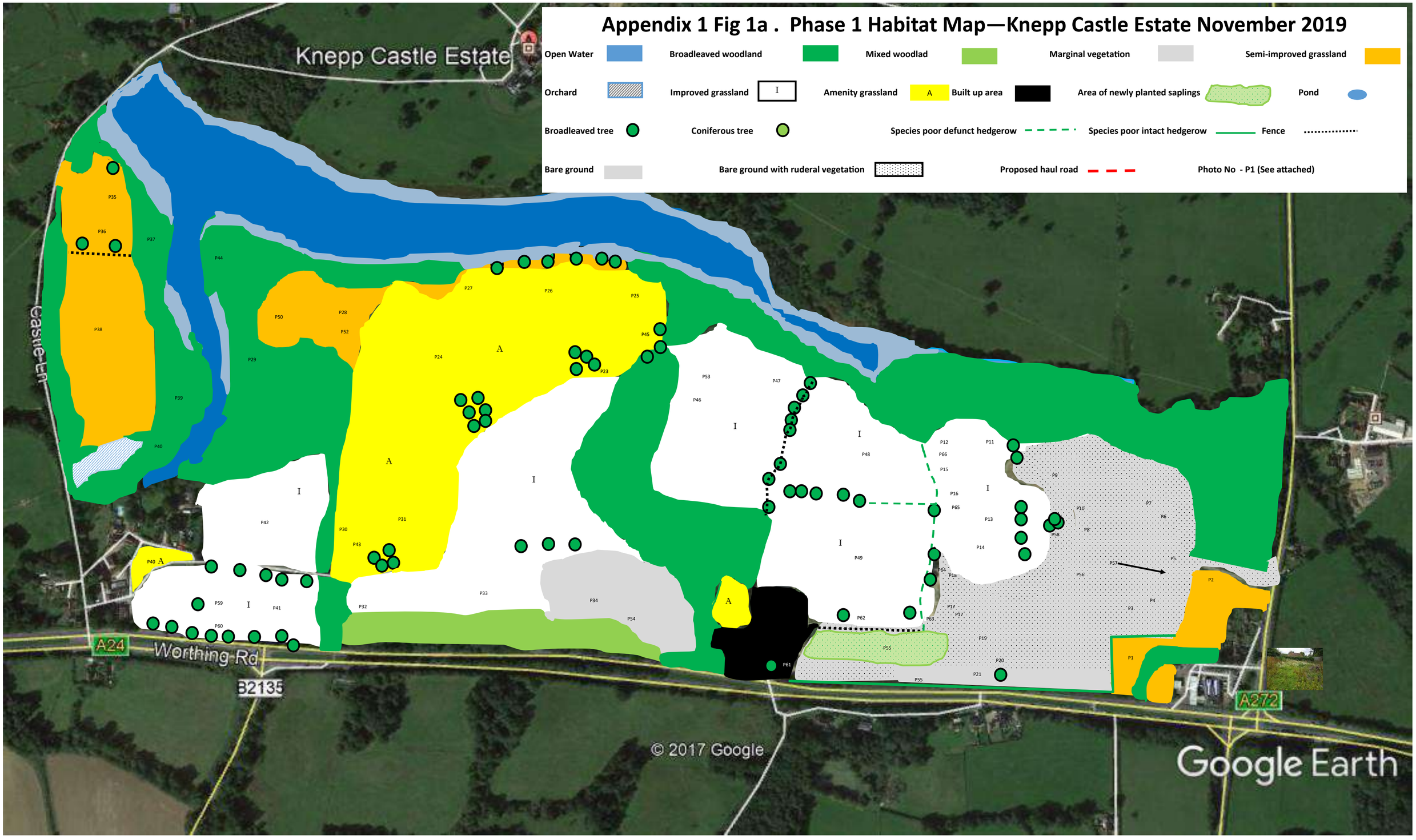
Appendix 1 Fig 1a . Phase 1 Habitat Map—Knepp Castle Estate November 2019

Open Water | Broadleaved woodland | Mixed woodlad | Marginal vegetation | Semi-improved grassland

Orchard | Improved grassland (I) | Amenity grassland (A) | Built up area | Area of newly planted saplings | Pond

Broadleaved tree | Coniferous tree | Species poor defunct hedgerow | Species poor intact hedgerow | Fence

Bare ground | Bare ground with ruderal vegetation | Proposed haul road | Photo No - P1 (See attached)




P1


P2


P3


P4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P47


P48


P49


P50


P51


P52 Cleared of reptiles 2019


P53 Area used to store materials from lake dredging


P54. Noise bund creation 2018/19


P55 Area of sapling planting Along haul road


P56. Area of bare ground, currently being worked


P57. Top of mound looking towards Buck Barn Bungalows


P58 Trees to be retained


P59 To be removed. High bat roost potential


P60 To be removed. Low bat roost potential


P61 To be removed. High bat roost potential

P62 To be removed. High bat roost potential

P63 To be removed. High bat roost potential

P64 To be removed. High bat roost potential

P65 To be removed. Low bat roost potential

P66 To be removed. Low bat roost potential

P8 To be removed. Low bat roost potential

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POTENTIAL BAT ROOST FEATURE SURVEY
TREES EAR-MARKED FOR REMOVAL

Proposed "Kim Wilkie" Designed Landscape Enhancement Features with the provision of Public Access (Amendment to WSCC/029/18/SP)

Land at Knepp Castle Estate, West Grinstead, West Sussex
(Grid Ref: TQ 159 217)

November 2019

Client:	Mathews Group
Issue Date:	9th November 2019
Surveys Conducted:	February 2019

CONTENTS

1 INTRODUCTION

1.1 Purpose of this Report

Planning permission is being proposed for re-landscaping on land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217). An initial assessment was carried out in 2018 by Environmental Business Solutions as part of an Ecological Impact Assessment. These initial surveys highlighted a number trees that will be affected by the proposed development.

Environmental business Solutions (EBS) were commissioned to conduct a full inspection of the trees to assess if the trees affected contained features suitable to support roosting bats. The bat surveys were undertaken according to standard best practice survey guidelines, which include: The Bat Mitigation Guidelines (2004); The Bat Workers Manual (2004); and The Bat Conservation Trust, Bat Surveys: Good Practice Guidelines (2012).

The results showed 6 individual trees with high potential for bat habitation. All other trees affected by the development were assessed as having negligible / low suitability to support bat roosts. It is therefore the opinion of EBS that further surveys are required to assess if bats are actually roosting in the 6 trees highlighted as having high bat roost potential. This report should be read in conjunction with Environmental Business Solutions report "Proposed "Kim Wilkie" Designed Landscape Enhancement Features with the provision of Public Access (Amendment to WSCC/029/18/SP) - Land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217) - Ecological Impact Assessment - November 2019".

1.2 Ecological Context

Knepp Castle Estate is located approximately 1km south of Southwater, and in total extends to an area of approximately 1.400ha. This comprises Knepp Castle, Knepp Mill Pond, parkland, woodland, areas of grassland, grazing land, farmhouses and cottages, rural officers and light industry units, together with a polo club and polo fields. The estate is predominately located to the west of the north-south A24, with significant majority located south of the east-west A272. The application proposal relates to land that is within the part of the estate known as Knepp Park. This covers an area of approximately 274ha and is located immediately west of the A24 and south of the a272.

For maps of tree positions and development red-line boundary, please refer to Environmental Business Solutions report "Proposed "Kim Wilkie" Designed Landscape Enhancement Features with the provision of Public Access (Amendment to WSCC/029/18/SP) - Land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217) - Ecological Impact Assessment - November 2019".

1.3 Structure of this Report

The remainder of the report is structured as follows:

- *Section 2* describes the survey methods;
- *Section 3* contains the results;
- *Section 4* details the ecological evaluation and conclusions for the site;
- *Section 5* lists the documents referred to in this report; and
- *Appendix A* contains the *Figures* and *Appendix B* the Legislation.

2 METHODS

2.1 Background Data Search

In March 2017 a data search was conducted with the Sussex Biodiversity Record Centre (SxBRC) for a 2km radius around the Site's central grid reference. This was to identify known occurrences of protected species and also the locations of any statutory and non-statutory sites of ecological importance and any Section 41 habitats present. Due to EBS continuously being on site throughout 2017 – 2019 it is assumed that a new search is not necessary at the moment.

2.2 Field Survey

The Bat Conservation Trust (BCT) provides guidance for bat survey work in Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn) (2016). The survey methodologies presented within this document were used as guidance.

2.2.1 Weather Conditions.

26th Feb 2019 - Clear , dry with good visibility. Max temp 15ºC

27th Feb 2019 – Clear , dry with good visibility. Max temp 15ºC

28th Feb 2019 – 80% cloud cover, dry (light rain 3pm onwards) with good visibility. Max temp 12ºC

2.2.2 Tree Inspection

The ground level tree assessment was completed using binoculars and a high powered torch. Features potentially suitable for roosting bats such as woodpecker holes, rot holes and crevices, were recorded using specially-designed survey sheets. The trees were then classified using the criteria in *Table 1*.

Table 1: Classification Criteria for Bat Roosting Potential for Buildings and Trees

Category	Description
Negligible potential	Negligible habitat features on site likely to be used by roosting bats.
Low potential	A structure / 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.
Moderate potential	A structure / tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, condition and surrounding habitat but unlikely to support a roost of high conservation status.

Category	Description
High potential	A structure / tree with one or more potential roost sites that are obviously suitable for 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.
Confirmed roost	Bats or evidence of bats recorded within the building / tree during the initial inspection surveys or during dusk/dawn surveys. A confirmed record (supplied by records centre/local bat group) would also apply.

3 RESULTS

3.1 Background Data Search

Multiple records of numerous bat species are recorded within the search area see Environmental Business Solutions report “Proposed “Kim Wilkie” Designed Landscape Enhancement Features with the provision of Public Access (Amendment to WSCC/029/18/SP) - Land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217) - Ecological Impact Assessment - November 2019”.

3.2 Tree Surveys

All trees highlighted for removal (See separate Tree Schedule report by Ramsay & Co Landscape Architecture – 09th December 2019 Revision 01 attached) were surveyed. Six individual mature trees were noted to have high potential to support bat roosts. Four tree groups were noted as having only negligible / low potential for bat roosts. These are described in Table 2 below. No other trees are ear-marked for removal.

Table 2: Tree Assessment for Roosting Bats

Tree No.	Tree species	DBH in mm	Bat potential feature description	Category of bat roosting potential
TG08	*Quercus robur, Quercus ilex*	125mm Est. / Avg.	Crowded group of semi mature tree. No obvious cracks, rot holes peeling bark etc.	Negligible
SG11	*Acer Campere, Crataeguss monogyna, Prunus spinosa, Salixsp.*	100mm Est. / Avg.	Mixed informal hedgerow to edge of ditch – mainly scrubby shrubs with few semi-mature tree specimens. No obvious cracks, rot holes peeling bark etc.	Negligible
SG12	*Acer Campere, Crataeguss monogyna, Prunus spinosa, Salixsp.Fraxinus excelsior, Tillia sp.*	200mm Est. / Avg.	Mixed ribbon of vegetation to edge of ditch, mainly shrubs with intermittent semi/early mature tree specimens. No obvious cracks, rot holes peeling bark etc.	Low
T13	*Quercus robur*	1085mm	Large Oak. Extensive crown. Several cracks, cavities. Fungal infection at base.	High
T14	*Quercus robur*	1080mm	Large Oak. Extensive crown. Several cracks, cavities.	High
T15	*Quercus robur*	1085mm	Large Oak. Substantial main stem. Expansive crown. Dead wood. High cavities. Several cracks, cavities.	High
T16	*Quercus robur*	1100mm	Large mature Oak. Several cracks, cavities, peeling bark.	High
T21	*Quercus robur*	855mm	Large Oak. Close to access road. Little sign of life, multiple deadwood. Several cracks, cavities. Middle of group of 3 oaks.	High
TL29	*Cuprocyparis leylandii*	400mm Est. / Avg.	Dense line of conifers along A24 road. No obvious cracks, rot holes peeling bark etc. Difficult to assess due to closeness of trees.	Low
T32	*Quercus robur*	1190mm	Large mature Oak. Several cracks, cavities, dead wood.	High

4 EVALUATION AND CONCLUSIONS

6 individual trees show signs of high bat roost potential. All other tree showed only low / negligible suitability. All trees with high potential should be subjected to full 3x dusk emergence / dawn re-entry surveys to confirm use by bats. All other trees should be soft felled under the supervision of a suitably qualified ecologist.

5 REFERENCES

Collins, J. (edn) (2016), 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).' Bat Conservation Trust, London.

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Environmental Business Solutions report "Proposed "Kim Wilkie" Designed Landscape Enhancement Features with the provision of Public Access (Amendment to WSCC/029/18/SP) - Land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217) - Ecological Impact Assessment - November 2019".

APPENDIX A - FIGURES

Photos of trees affected by development

Tree T32. High bat roost potential.

Tree Group TL29. Low bat roost potential.

Tree T21. High bat roost potential.

Tree T16. High bat roost potential.

Tree T15. High bat roost potential.

Trees T13 & T14. High bat roost potential.

Tree Group SG12. Low bat roost potential.

Tree Group SG 11. Negligible bat roost potential.

Tree Group TG08. Negligible bat roost potential.

APPENDIX B - LEGISLATION

Bats

All species of British bat are protected by *The Wildlife and Countryside Act 1981* (as amended) extended by the *Countryside and Rights of Way Act 2000*. This legislation makes it an offence to:

- intentionally kill, injure or take a bat;
- possess or control a bat;
- intentionally or recklessly damage, destroy or obstruct access to a bat roost; and
- intentionally or recklessly disturb a bat whilst is occupies a bat roost.

Bats are also European Protected Species listed on The Conservation of Habitats and Species Regulations 2010. This legislation makes it an offence to:

- deliberately capture, injure or kill a bat;
- deliberately disturb bats, including in particular any disturbance which is likely (a) to impair their ability - (i) to survive, to breed or reproduce, or to rear or nurture their young; or (ii) hibernate or migrate, where relevant; or (b) to affect significantly the local distribution or abundance of the species to which they belong.
- damage or destroy a breeding site or resting place of a bat; and
- possess, control, transport, sell, exchange a bat, or offer a bat for sale or exchange.

All bat roosting sites receive legal protection even when bats are not present.

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EMERGENCE / RE-ENTRY BAT ROOST SURVEYS TREES WITH HIGH BAT ROOST POTENTIAL EAR-MARKED FOR REMOVAL

Proposed "Kim Wilkie" Designed Landscape Enhancement Features with the provision of Public Access (Amendment to WSCC/029/18/SP)

Land at Knepp Castle Estate, West Grinstead, West Sussex
(Grid Ref: TQ 159 217)

November 2019

Client: Mathews Group
Issue Date: 9th November 2019

Surveys Conducted: May – September 2019

Executive Summary

Planning permission is being proposed for re-landscaping on land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217). An initial assessment was carried out in 2018 by Environmental Business Solutions as part of an Ecological Impact Assessment. These initial surveys highlighted a number trees that will be affected by the proposed development. Further surveys in February 2019 showed 6 trees ear-marked for removal as having a high potential to support bat roosts.

Environmental business Solutions (EBS) were commissioned to conduct 3x full emergence / re-entry bat surveys of the trees to assess if the trees supported roosting bats. The bat surveys were undertaken according to standard best practice survey guidelines, which include: The Bat Mitigation Guidelines (2004); The Bat Workers Manual (2004); and The Bat Conservation Trust, Bat Surveys: Good Practice Guidelines (2012).

Subsequent dawn / dusk bat surveys (3 per tree) were conducted throughout May – September 2019 by Environmental Business Solutions (EBS). Pipistrelle bat presence was noted during dawn / dusk surveys but not on trees ear-marked for removal.

It is the opinion of EBS that at present it is unlikely that bats are roosting in the trees ear-marked for removal at present. A cautionary approach should be taken and further surveys should be undertaken if the proposals are substantially delayed. As the current trees have high suitability for bat habitation compensation by way of bat boxes being positioned within the site and sensitive design of future landscaping to attract bats is also recommended.

Overall it was concluded that if the above mitigation and compensation measures are followed then the proposed demolition will not have a negative impact on the local bat population within the surrounding environment as the buildings do not appear to contain roosts at present.

This report should be read in conjunction with Environmental Business Solutions report “Proposed “Kim Wilkie” Designed Landscape Enhancement Features with the provision of Public Access (Amendment to WSCC/029/18/SP) - Land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217) - Ecological Impact Assessment - November 2019”.

Bill Gaudie,
BSc hons (Wildlife Conservation), MCIEEM
Natural England Licence No CLS001191
ECOLOGICAL CONSULTANT

1. Introduction.

1.1 Purpose / Context of Report. This report has been prepared by W Gaudie BSc hons, MCIEEM of Environmental Business Solutions (EBS) at the request of Mathews Group in relation to the identification and location of protected bat species within trees ear-marked for removal on land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217)

1.2 Proposed Development. Proposed "Kim Wilkie" Designed Landscape Enhancement Features with the provision of Public Access (Amendment to WSCC/029/18/SP) - Land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217)

1.3 Site Overview. Knepp Castle Estate is located approximately 1km south of Southwater, and in total extends to an area of approximately 1.400ha. This comprises Knepp Castle, Knepp Mill Pond, parkland, woodland, areas of grassland, grazing land, farmhouses and cottages, rural officers and light industry units, together with a polo club and polo fields. The estate is predominately located to the west of the north-south A24, with significant majority located south of the east-west A272. The application proposal relates to land that is within the part of the estate known as Knepp Park. This covers an area of approximately 274ha and is located immediately west of the A24 and south of the A272. For maps of tree positions and development red-line boundary, please refer to Environmental Business Solutions report "Proposed "Kim Wilkie" Designed Landscape Enhancement Features with the provision of Public Access (Amendment to WSCC/029/18/SP) - Land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217) - Ecological Impact Assessment - November 2019".

Fig 1. Site location – Wider area.

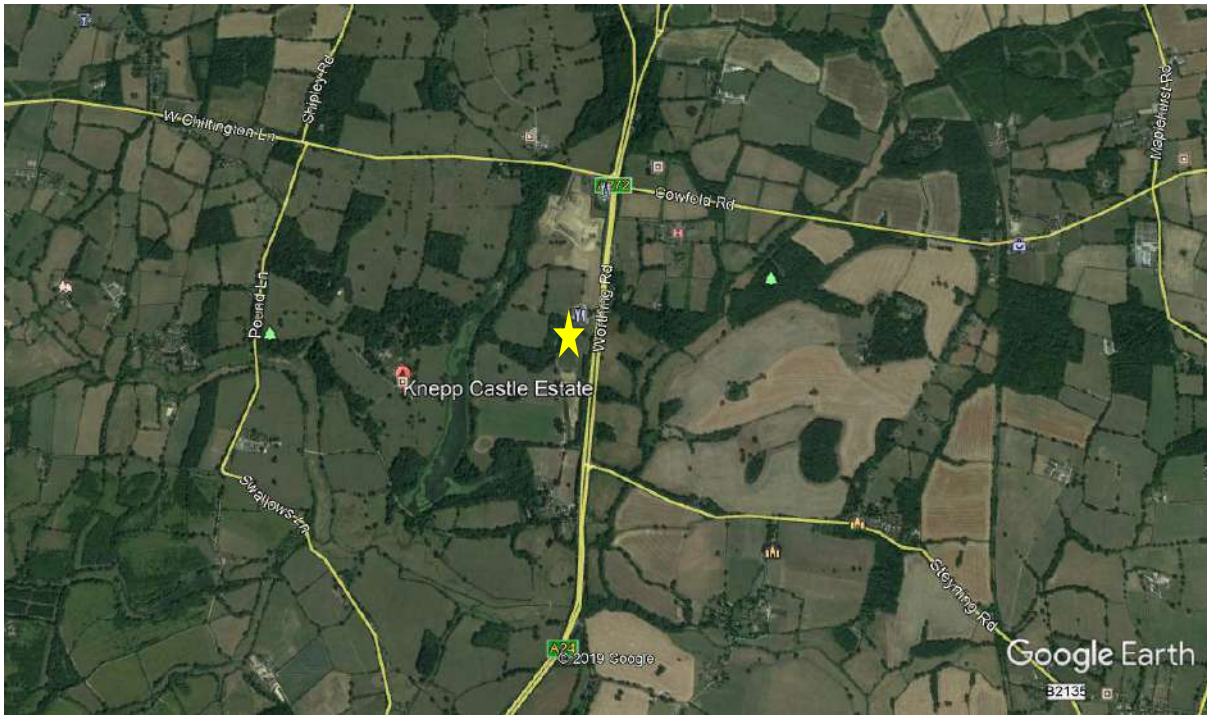
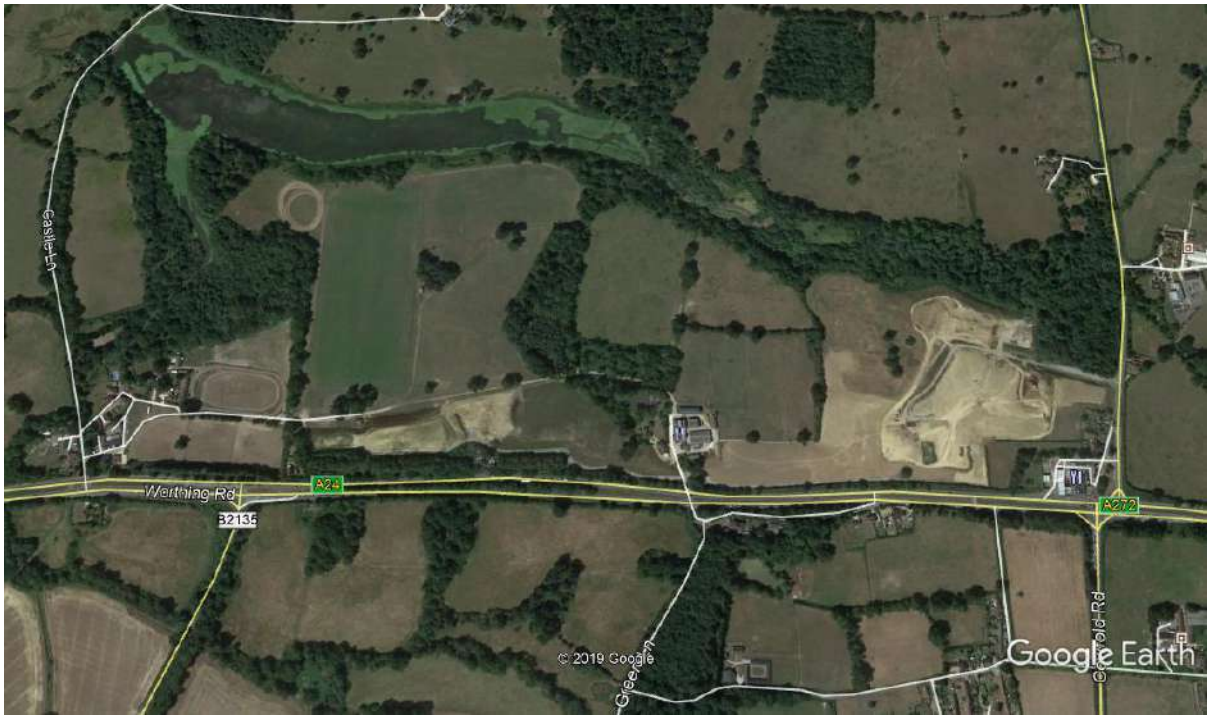


Fig 2. Site Location-immediate area



2. Methodology

2.1 Preliminary Ecological Appraisal.

2.1.1 Initial surveys conducted by Environmental Business Solutions (EBS) in February were conducted to assess the suitability of the trees to support bat roosts. (as per Section 4.3 of Collins, J, (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines, (3rd edn), The Bat Conservation Trust, London, ISBN-13: 978-872745-96-1). See EBS Report November 2019 "Potential Bat Roost Feature Survey for full details.

2.2 Data search.

2.2.1 Refer to Environmental Business Solutions report "Proposed "Kim Wilkie" Designed Landscape Enhancement Features with the provision of Public Access (Amendment to WSCC/029/18/SP) - Land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217) - Ecological Impact Assessment - November 2019".

2.3 Surveyor Information.

2.3.1 Mr W Gaudie, BSc hons (Wildlife Conservation), MCIEEM. Natural England Licence No CLS001191. Over 15 years experience in bat surveying.

2.3.2 Miss K Hamer BSc hons (Wildlife Conservation). Trainee with over 6 years experience in bat surveying.

2.4 Bat dusk and dawn surveys.

2.4.1 Dates. see Table 1 below.

2.4.2 Conditions. See Table 1 below.

2.4.3 Timings. Dusk: 0.5hr prior to sunset to 2.25hs after sunset. Dawn: 2.25hrs prior to sunrise to 0.5 after sunrise.

2.4.4 Surveyors. Mr W Gaudie, BSc hons wildlife conservation, MCIEEM. Natural England Licence No CLS001191, Miss K Hamer BSc hons (Wildlife Conservation).

2.4.5 Area surveyed. Outside of buildings, see Figs 3, 4 and 5 in Appendix for positions of surveyors

2.4.6 Method. As per; Bat Conservation Trust (2016). *Bat Surveys – Good Practice Guidelines 3rd Edition.* **Bat Conservation Trust, London**. ISBN 13 978-1-872745-96-1.

2.4.7 Equipment. 2 x Ciel CDB 301 HD/FD bat detector, , Garmin etrex GPS, Meteos Skywatch weather station, Yukon NVMT.2.3x42 night vision.

Table 1. Dawn / dusk weather conditions

Survey	Visit No	Date	Sun Rise Sun Set	Tree Survey	Min Temp ºC	Wind M/S	Rain
Dusk	1	210519	20.54	32	12.0	4	Light early on
Dawn	1	220519	05.04	32	10.0	3	Nil
Dusk	1	220519	20.55	21	10.0	3	Nil
Dawn	1	230519	05.03	21	10.5	3	Nil
Dusk	1	230519	20.57	16	11.0	3	Nil
Dawn	1	240519	05.02	16	10.0	4	Nil
Dusk	1	240519	20.58	15	15.0	3	Nil
Dawn	1	250519	05.01	15	13.5	4	Light 04.30 -05.20
Dusk	1	250519	20.59	13/14	14.5	5	Nil
Dawn	1	260519	05.00	13/14	13.0	6	Nil
Dusk	2	070719	21.18	32	15.0	2	Nil
Dawn	2	080719	04.58	32	14.0	1	Nil
Dusk	2	080719	21.17	21	14.0	2	Nil
Dawn	2	090719	04.59	21	13.5	4	Nil
Dusk	2	090719	21.17	16	15.0	4	Nil
Dawn	2	100719	05.00	16	14.5	2	Nil
Dusk	2	100719	21.16	15	16.0	3	Nil
Dawn	2	110719	05.01	15	14.5	3	Nil
Dusk	2	110719	21.15	13/14	18.0	3	Nil
Dawn	2	120719	05.02	13/14	15.0	5	Nil
Dusk	3	080919	19.35	32	13.0	1	Nil
Dawn	3	090919	06.29	32	12.5	5	Nil
Dusk	3	090919	19.32	21	12.0	2	Nil
Dawn	3	100919	06.30	21	10.0	2	Nil
Dusk	3	100919	19.30	16	12.0	2	Nil
Dawn	3	110919	06.32	16	13.5	8	Nil
Dusk	3	110919	19.28	15	15.5	8	Nil
Dawn	3	120919	06.33	15	14.0	6	Nil
Dusk	3	120919	19.26	13/14	15.0	6	Nil
Dawn	3	130919	06.35	13/14	16.0	4	Nil

3. Results

3.1 Preliminary Ecological Appraisal

3.1.1 6x trees evaluated as having high bat roost potential. See EBS Report November 2019 “Potential Bat Roost Feature Survey for full details.

3.2 Pre-Survey Data.

3.2.1 Bats recorded within near area.

3.2.2 For full details see Environmental Business Solutions report “Proposed “Kim Wilkie” Designed Landscape Enhancement Features with the provision of Public Access (Amendment to WSCC/029/18/SP) - Land at Knepp Castle Estate, West Grinstead, West Sussex (Grid Ref: TQ 159 217) - Ecological Impact Assessment - November 2019”.

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3.3 Bat dusk and dawn surveys.

3.4.1 No bats were recorded entering or leaving any of the trees during dawn / dusk surveys.

3.4.2 Pipistrelle bats (*Pipistrellus pipistrelus*) were noted transecting in the immediate area of trees to the north (See Table 2 for details).

Table 2. Details of Bat observations

Survey	Visit	Tree	Comments
Dusk	2	T15	3x Common Pipistrelle noted flying west to east, north of T15 approx 21.30hr
Dawn	2	T15	1x Common Pipistrelle noted flying east to west, north T15 approx 21.30hr
Dusk	2	T13 T14	6x Common Pipistrelle noted flying west to east, north of T13 and T14 approx 21.30 – 22.00hr
Dusk	3	T13 T14	8x Common Pipistrelle noted flying west to east, north of T15 approx 20.30 - 21.15hr

4. Evaluation

4.1 Analysis of Results.

4.1.1 Six trees were assessed as being of high Suitability for bat roosts.

4.1.2 Pippistrelle bats noted in immediate area of 4x trees surveyed.

4.1.3 No bats were recorded entering or leaving any of the trees surveyed during dawn / dusk surveys.

4.1.4 All species of bat are fully protected under the Wildlife and Countryside Act 1981, the European Conservation (Natural Habitats etc.) Regulations 1994, and the Countryside and Rights of Way Act 2000. This legislation makes it illegal to possess or control any live or dead specimens, to damage, destroy or obstruct access to any structure or place used for shelter, protection or breeding, and to intentionally disturb a bat while it is occupying a structure or place which it uses for that purpose. Due to these results it is the opinion of EBS that bats are unlikely to be roosting in any of the trees ear-marked for removal at the present time .

4.1.5 The 6 trees are highly suitable for bat roost habitation and could be occupied in the future.

4.2 Limitations.

4.2.1 None

4.3 Potential Impacts of Development.

4.3.1 Designated Sites. Due to the size of the proposed development it thought that no designated site will be impacted upon.

4.3.2 Roosts. It is not thought that bats are roosting in any of the trees at present.

4.3.3 Foraging and Community Habitat. The proposed development is not thought to have any detrimental ecological effects to the area. Any disturbance will be minimal and temporary.

5. Recommendations.

5.1 Further Surveys

5.1.1 If tree works are to be conducted during the bat activity season, then the above surveys must be repeated immediately prior to work commencing.

5.1.2 If tree works are to be conducted outside of the bat activity season, then full physical surveys will be required immediately prior to work commencing.

5.2 Mitigation Measures.

5.2.1 Due to high suitability of bat roost potential on all 6 trees, all trees should be soft felled under the supervision of a suitably qualified ecologist.

5.3 Compensation.

5.3.1 Natural England Bat Mitigation Guidelines (2004) states “Where roosts of low conservation significance are to be lost to development, bat boxes may provide an appropriate form of mitigation, either alone or, preferably, in combination with the provision of new roosts in buildings. In such cases, the type of bat box provided should be appropriate to the species.” As the current trees do not hold any roosts no compensation is deemed necessary. However, as the trees have high suitability for bat roosts, EBS think it appropriate for new bat boxes to be erected around the remaining site prior to any tree works commencing.

6. Summary. Full dusk/dawn surveys provided no evidence of bat habitation in any of the trees ear-marked for removal. Due to the findings of these surveys, it is thought that the proposed development is unlikely to have any negative effect on any bat populations at the present time. It is the opinion of EBS that if the above recommendations regarding mitigation and compensation are followed then the development will result in a nett gain to biodiversity in the immediate area.

Bill Gaudie,
BSc hons (Wildlife Conservation), MCIEEM

7 References

Bat Conservation Trust (2016). Bat Surveys – Good Practice Guidelines 3rd Edition. Bat Conservation Trust, London. ISBN 13 97998-1-872745-96-1

RSPB (2002) The Population Status of Birds in the UK 2002-2007

The Conservation (Natural Habitats, etc.) Regulations 1994. HMSO

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APPENDIX

Figs 3, 4 & 5 Trees Ear-Marked for Removal, Positions of Surveyors, Bat Activity

Photo's of Trees Ear-Marked for Removal

Fig 3. Trees Ear-Marked for Removal, Positions of Surveyors

Trees ear-marked for removal

Positions of surveys during Dawn / Dusk surveys

Pipistrelle bat activity Recorded,

TG08 – Negligible BRP

SG11 – Negligible BRP

SG12 – Low

T13 / T14 – High BRP

T15 – High BRP

T16 – High BRP

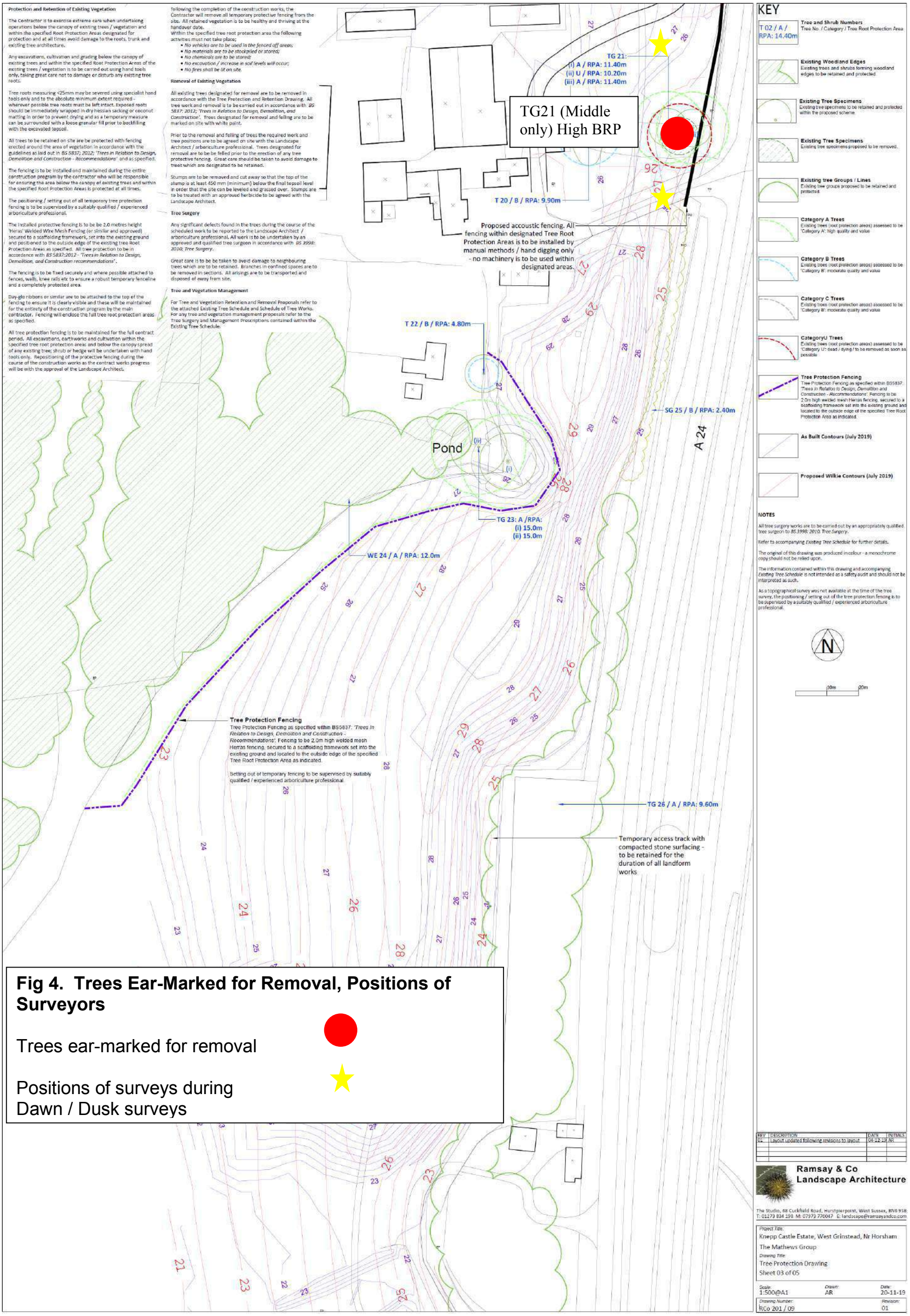

Fig 4. Trees Ear-Marked for Removal, Positions of Surveyors

Trees ear-marked for removal

Positions of surveys during Dawn / Dusk surveys

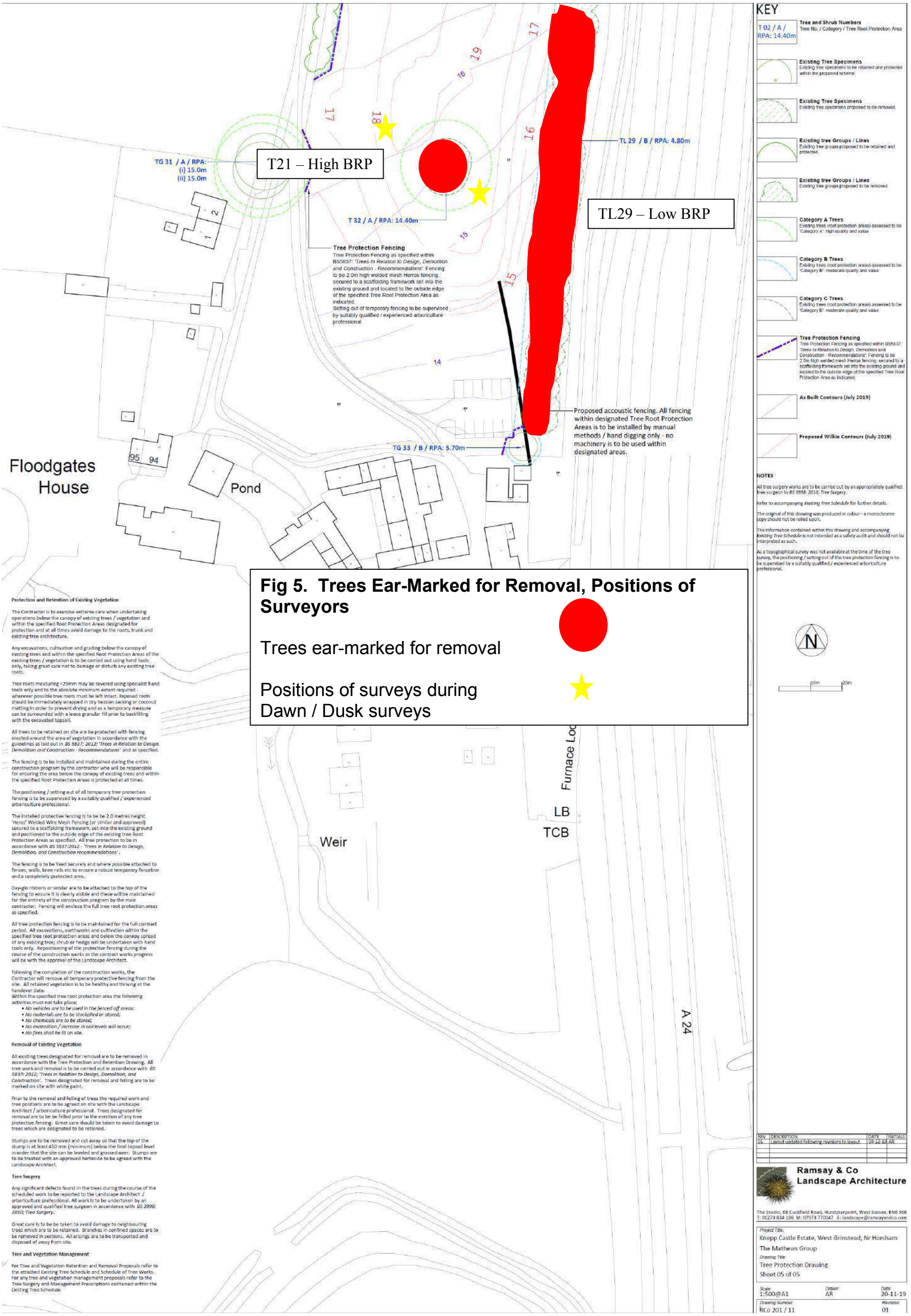

Fig 5. Trees Ear-Marked for Removal, Positions of Surveyors

Trees ear-marked for removal

Positions of surveys during Dawn / Dusk surveys

Photos of trees affected by development

Tree T32. High bat roost potential.

Tree Group TL29. Low bat roost potential.

Tree T21. High bat roost potential.

Tree T16. High bat roost potential.

Tree T15. High bat roost potential.

Trees T13 & T14. High bat roost potential.

Tree Group SG12. Low bat roost potential.

Tree Group SG 11. Negligible bat roost potential.

Tree Group TG08. Negligible bat roost potential.