



**Protected Species Constraints Survey of land associated
with the catchment area for a potential transport
infrastructure option 3a between Bourne Airfield and
Grange Road, Cambridge.**

For
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August 2017

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Notice to Interested Parties

To achieve the study objectives stated in this report, we were required to base our conclusions on the best information available during the period of the investigation and within the limits prescribed by our client in the agreement.

No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. Thus, we cannot guarantee that the investigations completely defined the degree or extent of e.g. species abundances or habitat management efficacy described in the report.

Document Information

Report title:	Protected Species Constraints Survey of land associated with the catchment area for a potential transport infrastructure option 3a, between Bourne Airfield and Grange Road, Cambridge.
Client:	Mr Adrian Shepherd
Document ref:	P0608-R-001b Updated
Author(s):	Darren Frost
Report date:	August 2017

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0 NON- EXECUTIVE SUMMARY

- 0.1 In January and August 2017 Cambridge Ecology Ltd successfully completed a robust desk-based ecology data search and Protected Species Scoping (Walkover) Survey on land associated with the catchment area for a potential transport infrastructure option 3a. between Cambridge and Cambourne along the A428 corridor.
- 0.2 This survey was required to highlight the potential for ecological features (e.g. protected species) to be present, which may need to be considered in relation to the scheme design and maintaining compliance with wildlife legislation and planning policy as well as identifying potential biodiversity enhancement opportunities.
- 0.3 It was considered that the survey provided a robust and valid indication of the potential for the site to support protected species. The survey was considered to have been carried out methodically and all accessible areas searched thoroughly to locate signs indicating the presence of protected species.
- 0.4 The potential presence of protected species has highlighted the need to carry out further species-specific surveys, to inform the scheme design, planning process and determine the most appropriate mitigation and compensation measures necessary to address their presence. A series of surveys have been recommended, in the Recommendations. (Section 4).
- 0.5 In addition, the scheme provides an opportunity to deliver biodiversity enhancement. If the enhancement measures described in the recommendations section (Section 4), were included in the scheme design at an early stage and implemented fully, then the development proposals could contribute to national and local planning policy requirements relating to biodiversity enhancement targets.
- 0.6 Bearing in mind the ability for wildlife to periodically move to new locations, it is recommended that if the planning application and/or development proposals were likely to be delayed for three years from the date of this study, then a further equivalent ecological survey (and or certain species specific surveys) would be required to update the results provided in this report and inform the development proposals in the future. To address this potential issue, an equivalent ecological survey should be carried out in two to three years.

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Factor	Description	Comment
Statutory and non-statutory sites within 2km	<p>6 present within the survey area.</p> <p>30 present within 2km</p>	<ul style="list-style-type: none"> • Madingley Wood Site of Special Scientific Interest • Knapwell Roadside Verge - County Wildlife Site • Madingley Sliproad Verge - County Wildlife Site • Scrub east of M11 verge - County Wildlife Site • Coton Path Hedgerow - County Wildlife Site • Bin Brook - City Wildlife Site
Protected Habitat data search	The presence of Deciduous Woodland, Traditional Orchard, Hedgerows, Waterbodies and Floodplain Grazing Marsh within the survey area.	
Protected Species data search within 2km	<p>Records of protected and notable species within 2km during the last 10 years included:</p> <ul style="list-style-type: none"> • Three species of amphibian - Common Toad, Common Frog and Great Crested Newt. • One species of reptile - Grass Snake. • 64 species of bird, listed on various conservation designations, • 28 records of Water Vole. • At least 86 records of Badger. • At least 23 records of six species of bat – Brown Long-eared Bat, Common and Soprano Pipistrelle, Noctule, Serotine, and Western Barbastelle. • Five records of European Otter. • Four records of Brown Hare. • Four records of Hedgehog. • One species of fish - Bullhead. • Five species of insect, including White-letter Hairstreak butterfly, Hill Cuckoo Bee, and Rustic, Mottled rustic and Blood-vein moths. 	Records indicate that protected and notable species were present from locations within the survey area.
Survey Results	<p>Main habitat present within and adjacent to the survey area was arable land.</p> <p>Other habitats included improved grassland, flood plain grazing land, un-improved grassland, hedgerows, waterbodies, dense and scattered scrub, ancient woodland, traditional orchard, broad-leaved woodland plantation, tall ruderal wet and dry ditches, ponds and other waterbodies.</p> <p>The signs of actual protected species were found during the scoping survey namely Badger signs</p> <p>The survey area has potential to support the life cycle of numerous protected species. These included:</p> <ul style="list-style-type: none"> • Great Crested Newt • Reptiles • breeding and wintering birds • Badger 	Recommendations made for appropriate habitat and species-specific surveys

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Factor	Description	Comment
	<ul style="list-style-type: none"> • Bats • Otter • Water Vole • Brown Hare • Hedgehog • Invertebrates - aquatic and terrestrial • Plants. <p>Other ecological features found within the survey area included:</p> <ul style="list-style-type: none"> • an artificial Badger sett current status - unknown. • bat boxes, current status - unknown • an Alien invasive species - Giant Hogweed and Himalayan Balsam. 	
Species Specific Surveys	<p>The following species-specific surveys are recommended:</p> <ul style="list-style-type: none"> • Great Crested Newt • Reptiles • Birds - breeding and wintering • Badger • Bats • Otter • Water Vole • Aquatic and terrestrial invertebrates • Habitats • Botany • Alien Invasive Species 	<p>These surveys are necessary to inform the planning process, identify appropriate mitigation and compensation measures. Provide guidance on any enhancement measures that may be incorporated as part of the scheme design.</p>
Enhancement Measures	<p>Opportunity to meet local and national planning policy guidelines for Ecology and meet biodiversity targets.</p> <p>Enhancement measures are recommended to be incorporated as part of the scheme design at an early stage, rather than a retrofitted.</p>	<p>Enhancements include:</p> <ul style="list-style-type: none"> • an extensive Green Bridge over the M11. • incorporating beetle banks and conservation • New Hedgerows • managing existing Hedgerows • Waterbodies (Ponds and wet ditches) • Woodlands - e.g. extension to Madingley Wood SSSI • Traditional Orchards - Community Orchard • Scattered Scrub • Species-rich Grassland • Arable Field Margins • commitment to develop long term (25 year) site management plans for existing designated sites such as the County Wildlife Sites that are within and adjacent to the proposed route • commitment to develop long term (25 year) site management plans for all new habitats.

1 INTRODUCTION

Background to the study

- 1.1 On behalf of Cambridgeshire County Council, Cambridge Ecology Ltd was commissioned to carry out a desk-based ecology data search and Protected Species Scoping (Walkover) Survey on land associated with the catchment area for a potential transport infrastructure option 3a between Cambridge and Cambourne along the A428 corridor. The route will include two main sections, (i) between Madingley Rise and Grange Road and (ii) Madingley Road and Bourne Airfield. between Bourne Airfield and Grange Road, Cambridge, Cambridgeshire.
- 1.2 The initial surveys were carried out in January 2017. This survey was then updated in August 2017 to include additional areas at Scotland Farm and Bourne Airfield and Madingley Road. The potential alternative location of the park and ride car park and on-road guided bus route.
- 1.3 Wildlife such as bats, Badgers, Great Crested Newt and nesting birds etc are protected by National and International law. Protected and Biodiversity Action Plan (BAP) species such as native reptiles are also a material consideration for individual planning consents under the National Planning Policy Framework (NPPF), which promotes the enhancement of natural and local environments through planning, and encourages a move towards achieving net gains for biodiversity where possible (DCLG, 2012).
- 1.4 This survey was required to identify, at an early stage, the potential for ecological features (namely protected species), which may be present and could potentially cause a constraint to the proposed development; and which would need to be considered further (through species specific surveys) in relation to maintaining compliance with wildlife legislation and planning policy.
- 1.5 For clarity in this report the development site (or 'site') land refers to land within the red line boundary of the catchment area for proposed option 3a development (see Figure 1.1).

Aims and objectives

- 1.6 The aim of this survey was to highlight the site's potential to support protected species and habitats.
- 1.7 The key objectives of the literature search and survey were to:
 - collate baseline data for the site through a review of recent biological records,
 - provide a record of the ecological features present within the site/study area

- determine whether any species (some of which could be protected) were currently or had been utilising the site, in particular bats, amphibians, reptiles and birds.
- identify any potential ecological constraints that might require species specific surveys.

1.8 The data collected would be used as the basis to:

- highlight potential ecological features that may be affected by possible future development on or near the site; for which additional species-specific surveys may be required
- enable any possible future development to address and maintain any existing ecological features of biodiversity value,
- enable any possible future development to incorporate potential opportunities to enhance the ecological value of the site.

Relevant Legislation and Policy

1.9 Relevant legislation and policies relating to the remit of this survey are listed below and outlined in more detail in the proceeding tables, divided into protected habitats and species.

- The Conservation (Natural Habitats & Conservation.) (Amendments) Regulations 2010;
- Natural Environment and Rural Communities (NERC) Act 2006;
- The Wildlife and Countryside Act 1981 (as amended);
- National Planning Policy Framework 2012;
- Government Circular (ODPM 06/2005) Biodiversity and Geological Conservation - Statutory Obligations & Their Impact Within the Planning System.
- The UK and Cambridgeshire Biodiversity Action Plan.

2 METHODS

Desk-based literature search

- 2.1 A desk-based literature search (of various sources – see 2.2 below) was undertaken in January 2017 to gather existing ecological information relating to the proposed survey area. Only records of species and habitats less than ten years old (since January 2007) were included, older records were noted, but less likely to be relevant, except where more recent relevant records were not available.
- 2.2 Records of protected species were gathered from various databases. These included the following sources:
- Cambridge and Peterborough Environmental Records Centre
 - Cambridgeshire Bat Group
 - Natural England (<http://www.naturalengland.org.uk>);
 - Multi-Agency Geographical Information Coverage (MAGIC) (<http://www.magic.gov.uk>);
 - National Biodiversity Network Database (NBN) (<http://www.searchnbn.net/help/helpIndex.jsp>);
- 2.3 In addition, a report writing by Mr James Cadbury entitled ' Save the West Fields Ecological and Landscape Appraisal' and a report prepared by Bedfordshire, Cambridgeshire & Northamptonshire Wildlife Trust on behalf of Cambridge City Council, entitled 'Survey of Selected Watercourses in Cambridge 2014' was also made available for review during the literature search.
- 2.4 The scope of the literature search for protected species and habitats data comprised an area up to 2km from the site.

Protected Species Scoping Survey

- 2.5 A protected species scoping survey was carried out, involving a slow walk across all accessible area to locate signs indicating the presence of protected species and assess the site's suitability to support protected species, including priority and rare species, in accordance with approved guidelines.
- 2.6 The survey area included a buffer up to 250m beyond the red line boundary of the red line boundary of the catchment area for proposed option 3a development. This excluded areas where access was not possible and avoided area beyond features such as major roads, and residential developments that were considered to present barriers to movement by wildlife and beyond which the proposed development would be unlikely to exert an adverse effect.

- 2.7 Photographs were taken (see Photographs Section 10) to illustrate the presence of protected species; or verify features showing evidence that protected species were present.
- 2.8 The survey was carried out on the survey on the 23rd and 27th January and updated to include additional areas at Scotland farm and Bourne Airfield and Madingley Road on the 2nd and 3rd August 2017 and performed by Darren Frost BSc (Hons) CEnv MCIEEM CBiol MRSB. Mr Frost is a Chartered Environmentalist based near Cambridge with fifteen years of experience in environmental consultancy. He has undertaken surveys, produced ecological assessments and provided advice on legislative constraints and solutions to private and public-sector developments throughout the UK. He holds Bat, Great Crested Newt, White-clawed Crayfish survey licences and Schedule 1 bird species (Barn Owl) disturbance licences from Natural England.
- 2.9 Mr Frost meets the requirements for knowledge, skills and practical experience as set out in the Competencies for Species Survey guidelines (CIEEM 2013) for all surveys undertaken.
- 2.10 **Amphibians:** all known and accessible ponds within 250m of the site (unless ecologically separated from the site by significant barriers, such as major roads or rivers or where access was not possible) were identified for their potential to support breeding protected amphibians, (e.g. Great Crested Newt).
- 2.11 **Bats:** Mature trees and suitable buildings within the site boundary were surveyed externally from the ground, to evaluate their potential to support roosting bats (see Table 2.1 for evaluation criteria).

Table 2.1 Bat roost evaluation protocol for trees and buildings

Bat Roost Potential	Field Signs
Confirmed Roost	Evidence of the past or current presence of bats, e.g. bats, droppings, staining.
Potential Roost Site	At least some features (optimal or sub-optimal) suitable to support roosting bats. Character and condition of tree/building suitable to support roosting bats.
Negligible Potential Roost Site	No features present, character and condition of tree/building unsuitable to support roosting bats

- 2.12 **Badgers:** A visual assessment for the presence of habitats, suitable to support Badger was carried out; including searches for setts, hair, latrines, prints, snuffle marks or other signs of Badgers.
- 2.13 **Dormice:** A visual survey for the presence of suitable habitat; such as woodland/suitable hedges with good under-storey/shrub layer and a range of food plant species (e.g. hazel, bramble and honeysuckle) was carried out to assess if dormice were likely to be present.

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- 2.14 **Otter:** A visual assessment for the presence of habitats, suitable to support Otter was carried out; including searches for signs of Otter such as spraints and holts.
- 2.15 **Water Vole:** A visual assessment for the presence of habitats, suitable to support Water Vole was carried out; including searches for signs of Water Vole such as latrines, feeding remains and burrows.
- 2.16 **Birds:** Observations of bird activity and suitable nesting/wintering habitat were noted, to determine if any areas would be suitable for WCA Schedule 1 birds, Birds of Conservation Concern or other common and widespread nesting birds.
- 2.17 **Reptiles:** A visual assessment for the presence of habitats, suitable to support reptiles was carried out.
- 2.18 **Invertebrates:** The site was inspected for significant areas of rotting deadwood, open mosaic habitat, and high quality aquatic or other habitats; (e.g. short ephemeral perennial and bare-ground); which could be used by significant assemblages of invertebrates, or by any of the invertebrates highlighted in the data search. Any water bodies were assessed for their potential to support white-clawed crayfish.
- 2.19 **Species and habitats listed on Section 41 of the NERC Act 2006:** all habitats, animal and plant species that were identifiable at the time of the survey were recorded.
- Important habitats – as listed on the UK BAP priority habitats.
 - Important species – as listed on the UK BAP priority species.
 - Important hedgerows – as defined by The Hedgerow Regulations 1997.
- 2.20 **Non-Native Invasive Species:** A visual inspection for the presence of species listed under Schedule 9 to the Wildlife and Countryside Act 1981 (as amended), was carried out.

Limitations and Assumptions

- 2.21 The survey provided a robust and valid indication of the potential for the site to support protected species. The survey was considered to have been carried out methodically and all accessible areas searched thoroughly to locate signs indicating the presence of protected species.
- 2.22 It should be noted that the absence of certain protected species, such as bats and reptiles, would not preclude their presence on a site. There would always be a risk that protected species were over-looked, either owing to the timing (both time of day and time of year) of the survey, the scarcity of the species at the site or the ability of protected species to move to new sites periodically and therefore move into an area after the survey had been carried out. For some species signs and evidence are rarely found during a single survey visit, even if the species is on site.

- 2.23 The desk study used available records and historical data for the local area. The biological records are useful as a general guide to supplement the site visits. However, the absence of records does not necessarily indicate the absence of species from the site. Biological records alone do not provide a reliable indication of species presence/absence, as records depend entirely on survey effort in the area, which is highly variable.
- 2.24 The ecological features reported in this document represent those identified at the time of the survey on the 23rd and 27th January 2017.

3 RESULTS

Desk-based literature search

3.1 The key ecological features associated with the study area fell largely within the following categories:

- Statutory and non-statutory designated sites
- Protected habitats and species; and
- Non-protected habitats and species.

3.2 This section outlines the baseline data for the site under these broad headings and incorporates the results from the desk-based literature search.

Statutory Designated Sites of Nature Conservation Importance

3.3 Statutory sites are those that are legally protected and development within or near them is strictly controlled, such as Sites of Special Scientific Interest (SSSI). There was one statutory designated site within the survey area; Madingley Wood - Site of Special Scientific Interest (SSSI).

3.4 There were three other statutory sites within 2km of the survey area; Caldecote Meadows, Hardwick Wood and Traveller's Rest Pit (SSSI).

3.5 The details of these sites are shown in Table 3.1 and illustrated in Figure 3.1 and 3.2.

Non-Statutory Designated Sites of Nature Conservation Importance

3.6 Non-statutory designated sites include Local Wildlife Sites (LWS), Sites of Importance for Nature Conservation (SINC) and other locally designated sites that receive some limited protection. There were 5 non-statutory designated sites within the survey area:

- Knapwell Roadside Verge - County Wildlife Site
- Madingley Sliproad Verge - County Wildlife Site
- Scrub east of M11 verge - County Wildlife Site
- Coton Path Hedgerow - County Wildlife Site
- Bin Brook - City Wildlife Site

3.7 There were 27 non-statutory sites within 2km of the survey area.

3.8 The details of this site are shown in Table 3.1 and illustrated in Figure 3.1 and 3.2.

Protected Habitats

3.9 The desk-based research indicated that there were BAP habitats and Habitat of Principal Importance (NERC Act 2006) present within the survey area. These included Deciduous Woodland, Traditional Orchard Hedgerows, Waterbodies and Floodplain Grazing Marsh.

Protected Species

- 3.10 The data search from January 2017 found records (within the last 10 years) for protected or notable species within 2km of the development site, records of protected and notable species (Species of Principal Importance) were found, these included:
- Three species of amphibian - Common Toad, Common Frog and Great Crested Newt. 36 records of Great Crested Newt from six sites, including within the survey area.
 - One species of reptile - Grass Snake. 28 records from eleven sites, including within the survey area.
 - 64 species of bird, listed on various conservation designations,
 - 28 records of Water Vole, from eight sites, including within the survey area at Bin Brook.
 - At least 86 records of Badger from 16 sites, including within the survey area.
 - Records of six species of bat – Brown Long-eared Bat, Common and Soprano Pipistrelle, Noctule, Serotine and Western Barbastelle. From at least 3 sites, including within the survey area.
 - Five records of European Otter, from two sites, including within the survey area at Bin Brook.
 - Four records of Brown Hare, from two sites.
 - Four records of Hedgehog, from two sites.
 - Five species of insect, including White-letter Hairstreak butterfly, Hill Cuckoo Bee, and Rustic, Mottled rustic and Blood-vein moths, from two sites.
 - One species of fish - Bullhead in Bin Brook.
 - Presence of two species of alien invasive plant (Giant Hogweed, Himalayan Balsam) adjacent to Bin Brook.

Table 3.1: Statutory and Non-statutory designated sites within 2km of the site

Site Name	Grid Ref	Within Survey Area or within 2km	Area (ha)	Reasons for designation
Site of Special Scientific Interest				
Madingley Wood	TL400596	Survey Area	15.23	An example of the ash-maple woodland type characteristic of the chalky boulder clay of eastern England. The western sector of the wood is of ancient origin whilst the eastern half is relatively recent, thus providing valuable opportunities for study.
Caldecote Meadows	TL348577	2km	9.33	An area of herb-rich grassland of a calcareous loam type, holding plant communities which are of nationally restricted distribution. Meadows of this type were once widespread throughout Cambridgeshire but are now scarce in the county.
Hardwick Wood	TL354576	2km	15.47	The ancient core of the site is ash-field maple woodland containing both

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Site Name	Grid Ref	Within Survey Area or within 2km	Area (ha)	Reasons for designation
				Oxlip and Primrose, a woodland type which is nationally restricted in distribution. The ground flora contains interesting plants.
Traveller's Rest Pit	TL429598	2km	2.25	This is a Geological Conservation Review site, and provides a unique exposure in fossiliferous cold stage gravels, sands and silts of a high-level terrace (Observatory Gravels) of the River Cam.
Local Nature Reserve				
Paradise	TL446572	2km	2.17	n/a
Sheep's Green and Coe Fen	TL448574	2km	16.85	n/a
County Wildlife Site				
Barton Road Pool (Bolton's Pit)	TL435574	2km	1.22	Grade C site in the JNCC Invertebrate Site Register
Bucket Hill Plantation Grassland	TL345587	2km	1.64	Supports frequent numbers of at least 3 strong neutral grassland indicator species and at least 8 neutral grassland indicator species
Cambridge Botanic Gardens	TL455571	2km	15.87	Grade C site in the JNCC Invertebrate Site Register. Site of Importance in the Bryophyte Site Register (NCC 1985) for Cambridgeshire
Coe Fen	TL449575	2km	6.6	Supports more than 20 mature pollard willows.
Coton Path Hedgerow	TL4258	Survey Area	0.94	Supports populations of two Nationally Scarce vascular plant species.
Hedgerows East of M11	TL4258	Survey Area	2.05	Supports populations of Nationally Scarce vascular plant species and a vascular plant species which is rare in the county.
Jason Farm Grassland	TL353581	2km	2.32	Supports at least 0.05ha of the NVC community MG5 Crested Dog's-tail - Black Knapweed grassland.
Knapwell RSV	TL3361	Survey Area	0.9	Supports populations of Nationally Scarce vascular plant species (<i>Trifolium ochroleucon</i> and <i>Melampyrum cristatum</i>)
Madingley Slip Road RSV	TL390597	Survey Area	1.47	Supports frequent numbers of at least 6 strong calcareous grassland indicator species.
Paradise LNR	TL445571	2km	2.27	Supports at least 0.5ha of NVC community W6 (Alder - Stinging Nettle woodland).
River Cam	TL45	2km	0	Is a major river (together with adjacent semi-natural habitat) that has not been grossly modified by canalisation and/or poor water quality. Additionally it has areas with concentrations of mature pollard willows.

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Site Name	Grid Ref	Within Survey Area or within 2km	Area (ha)	Reasons for designation
Sheep's Green	TL447576	2km	8.72	Supports a population of a vascular plant rare in Cambridgeshire (<i>Catabrosa aquatica</i>); and because it supports at least 20 mature pollard willows.
Skaters' Meadow Group	TL440569	2km	4.56	Supports three or more strong neutral grassland indicator species in frequent numbers. Qualifies as part of the riparian habitat in the River Cam valley.
City Wildlife Site				
Adams Road Sanctuary	TL437587	2km	1.6	Recent woodland more than 1ha in area with 5 or more woodland plants. Also supports breeding populations of common frog, common toad and Great Crested Newt.
Ascension Parish Burial Ground	TL435597	2km	0.81	Supports two or more strong neutral grassland indicator species in frequent numbers.
Bin Brook	TL438584	Survey Area	0.81	Supports breeding populations of a mammal species (water vole) protected by the Wildlife and Countryside Act 1981. Also qualifies for its group of at least 5 mature pollard willows in association with other semi-natural habitat.
Bird Sanctuary, Conduit Head	TL428594	2km	0.81	Supports S6 Greater Pond Sedge swamp, S7 Lesser Pond Sedge swamp and 0.5-1ha woodland with 5 or more woodland plants and 10% or more mature woodland. Also supports Great Crested Newt.
Drain at Garret Hostel Lane	TL444585	2km	0.07	Unmodified drain joining River Cam. Also supports mammal species protected by the Wildlife and Countryside Act 1981.
Hobson's Conduit / Vicar's Brook	TL454562	2km	1.52	Chalk stream together with adjacent semi-natural habitat that has not been grossly modified through canalisation and/or poor water quality. Also supports a small group of pollard willows in a semi-natural setting.
Hobson's Conduit North	TL451573	2km	0.89	Chalk stream together with adjacent semi-natural habitat that has not been grossly modified through canalisation and/or poor water quality.
Little St Mary's Churchyard	TL448579	2km	0.23	Supports a nationally scarce species of non-vascular plant (<i>Rhynchospora curviseta</i>).
Lower Vicar's Brook, New Bit and Coe Fen Straits	TL451571	2km	2.5	Chalk stream with adjacent semi-natural habitat that has not been grossly modified through canalisation and/or poor water quality.
Meadow and	TL444583	2km	2.07	Area of undeveloped floodplain

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Site Name	Grid Ref	Within Survey Area or within 2km	Area (ha)	Reasons for designation
Ditch Opposite King's College				directly associated with the River Cam County Wildlife Site.
Meadows and Drains	TL440565	2km	19.08	Area of undeveloped floodplain directly associated with the River Cam County Wildlife Site. Principal interest is the groups of mature and young pollard willows lining the eastern bank of the River Cam.
Midsummer Common	TL456590	2km	13.47	Area of undeveloped floodplain directly associated with the River Cam County Wildlife Site.
Perse Girls' School Reedbed	TL446570	2km	0.44	Area of undeveloped floodplain directly associated with the River Cam County Wildlife Site.
Scrub East of M11 Verge	TL421589	Survey Area	2.27	Scrub over 0.5ha in area with four or more woody species. Plus hedgerow more than 100m long and 2m wide at widest point with four or more woody species.
Trinity Meadow	TL442585	2km	1.81	Supports grassland with two or more strong neutral grassland indicator species and four or more strong calcareous grassland indicator species in frequent numbers.
Protected Road Verges				
Knapwell - S23	TL334600 -	Survey Area	-	Neutral/calcareous grassland, presence of a local red data book species
Madingley Slip Road RSV	TL390597	Survey Area	-	Neutral/calcareous grassland, presence of a local red data book species

Walk-Over Survey Protected Species

- 3.11 Overall the survey area provided suitable habitat for various protected and notable species to complete their life-cycle.
- 3.12 Photographs show the characteristics of the habitats at the site and the surrounding area and therefore illustrate their suitability to support protected species.
- 3.13 Figure 3.3 shows the indicative location of habitats and features indicating the actual and/or potential location of protected species.

Amphibians – Great Crested Newt

- 3.14 During the site visit a thorough search was carried out of suitable areas and natural refugia to detect the presence of amphibians. No amphibians were found.
- 3.15 The survey area contained at least 12 waterbodies that could be used by amphibian species as potential breeding sites. These were mainly ponds, located towards the eastern end of the survey area. There were also

terrestrial habitats that could be considered to provide suitable foraging and hibernating areas for amphibians. These included amongst the woodland, scrub, hedgerows and tall ruderal habitat. Photographs illustrate examples, especially 1-4.

Reptiles

- 3.16 During the site visit a thorough search was carried out of suitable areas and natural refugia to detect the presence of reptiles, in particular Common Lizard, Grass Snake and Slow Worm. No reptiles were found.
- 3.17 The survey area contained fragmented areas of terrestrial and aquatic habitat that could be considered to provide suitable breeding, foraging, sheltering, basking and hibernating areas for reptiles. These included the woodland, scrub, hedgerows, grassy verges and tall ruderal habitat. Photographs illustrate examples, especially 5 and 7.

Birds

- 3.18 Due to the nature of the ecology survey carried out (a Protected Species Walk-Over Survey single site visit), the number of bird species observed was not considered to be comprehensive or representative of the likely breeding or wintering bird assemblage.
- 3.19 The survey area contained areas of terrestrial and aquatic habitat that could be considered to provide suitable breeding, nesting, foraging, roosting and wintering areas for birds.
- 3.20 The open arable fields could provide feeding and roosting areas for wintering plovers such as Lapwing and Golden Plover.
- 3.21 The network of hedgerows, scrub, woodland, orchard, grassland and aquatic areas could provide feeding and roosting areas for wintering thrushes such as Fieldfare and Redwing and breeding areas for farmland bird species. Photographs illustrate examples, especially 6-7 and 12- 22.
- 3.22 During the survey a total of 20 bird species were recorded. These comprised, Blackbird, Blue Tit, Carrion Crow, Chaffinch, Collared Dove, Common Buzzard, Fieldfare, Great Tit, Great Spotted Woodpecker, Hedge Sparrow, Magpie, Moorhen, Redwing, Robin, Song Thrush, Sparrowhawk, Woodcock, Wood Pigeon, Wren and Yellowhammer therefore included species of conservation value based on their listing on certain designations (i.e. UKBAP priority species, Species of Principal Importance and BoCC Red/Amber List species).
- 3.23 Of particular note was the area of scrub/orchard in Coton where at least 16 Woodcock were found wintering. Photograph illustrate examples, 5 and 19.

Mammals

Badger

- 3.24 During the site visit a thorough search was carried out of suitable areas and to detect the presence of Badgers. In August 2017 signs of Badger activity were found comprising snuffle holes and latrines. These signs were located close to the car park of Coton Orchard and next to Cambridge Road.
- 3.25 It was recognised that the survey area provided habitat for Badgers to fulfil their life-cycle. This included foraging habitat and areas where sett building could occur.
- 3.26 During the survey numerous animal burrows and excavations were encountered. This included an artificial sett created on land east of the M11. Photographs illustrate examples, especially 8 and 9.
- 3.27 At the time of the survey the actual presence of active Badger setts could not be determined.

Bats

Roosting Bats in trees

- 3.28 During the site visit a thorough search was carried out of suitable areas and natural refugia to detect the presence of bats. At the time of the survey no bats were found during the searches/inspections made of the trees.
- 3.29 At least 39 trees were considered to provide potential roosting sites for bats. this is because these trees contained at least some (optimal and/or sub-optimal) features that could be used by bats for roosting. Their indicative location is shown in Figure 3.3.
- 3.30 It was noted that bat boxes were present in at least two sections of the survey area. At the western end near Bourne Airfield an Oak tree at least two bat boxes had been installed. Towards the eastern end to the south of the Cambridge West research park was a young woodland plantation also containing at least three bat boxes. Photographs illustrate examples, especially 10 and 11.

Roosting Bats in buildings

- 3.31 Within the survey area none of the buildings that were accessible were considered suitable to support roosting bats. In the wider area, beyond the development site, there were a residential, commercial and farm buildings that could support roosting bats.

Foraging and Commuting Bats

- 3.32 The habitat (scrub, woodland, aquatic and grassland areas) within the survey area was considered to provide suitable foraging habitat for bats. The network of hedgerows and field boundaries provided suitable

commuting routes to connect roost sites to foraging areas. It was however recognised that the arable field habitat was considered to have a limited variety of features suitable for bat foraging.

Otter and Water Vole

- 3.33 During the site visit a thorough search was carried out of suitable areas and to detect the presence of Otter and Water Vole. No actual signs were found.
- 3.34 It was recognised that the survey area, particularly the eastern end associated with Bin Brook provided a limited amount of habitat for Otter and Water Vole to fulfil their life-cycle. This included foraging habitat and areas where holt and burrow building could occur. Photographs illustrate examples, especially 12 and 13.

Other protected mammal species

- 3.35 The survey area also provided habitat suitable for use by Brown Hare and Hedgehog (NERC Act Section 41 Species) to complete various stages of their life-cycle. Dormouse were not considered likely to be present in the survey area.

Invertebrates

White-clawed Crayfish

- 3.36 It was considered that the section of Bin Brook that was within the survey area provided suitable habitats for White-clawed Crayfish. However, the engineered and developed nature of the adjacent sections of waterway would suggest that this species was unlikely to be present in this area.

Terrestrial Invertebrates

- 3.37 The site comprised a variety of habitats (e.g. waterbodies, tall ruderal, woodland, orchard, and grassland) and therefore had the potential to support a range of invertebrate groups and species of principal importance. The survey was carried out during the winter when invertebrates would normally be less detectable. Photographs illustrate examples especially 5, 14 and 19.

Plants

- 3.38 During the site visit a thorough search was carried out of suitable areas to detect the presence of notable plant species. None were found.
- 3.39 At the time of the survey there were signs indicating the presence of alien invasive plant species, namely Giant Hogweed and Himalayan Balsam within the survey area. Photographs illustrate examples, especially 15.

Habitats

Designated Sites

- 3.40 Within the survey area six designated sites, namely Madingley Wood SSSI, Scrub east of the M11, Coton Path Hedgerows, Knapwell Roadside Verge and Madingley Sliproad Verge CWS and Bin Brook CiWS. These specially designated sites of potential shelter for a variety of flora and fauna species.

Other Habitats

- 3.41 Within the survey area other habitats present comprised, arable, improved grassland, flood plain grazing land, un-improved grassland, hedgerows, waterbodies, dense and scattered scrub, ancient woodland, traditional orchard, broad-leaved woodland plantation, tall ruderal wet and dry ditches, ponds and other waterbodies. Photographs illustrate examples of the habitats present.
- 3.42 It was also recognised that individual private nature reserves were present such Coton Countryside Reserve and an environmental grassy margin Photograph 22.

4 RECOMMENDATIONS

4.1 As a result of this initial protected species constraints survey a number of recommendations can be made. These relate to further survey work and also potential ecological enhancement opportunities. Both of which would be required to inform the scheme design and planning process.

4.2 The ecology study findings indicated that further species-specific surveys, are required. These include the following:

- Great Crested Newt - numerous waterbodies are present, there is suitable terrestrial habitat and biological records indicate this species is present in the vicinity. The Great Crested Newt surveys should include:
 - eDNA analysis of waterbodies
 - Population surveys of waterbodies shown by eDNA to support Great Crested Newt.
- Reptiles - there is suitable terrestrial habitat and biological records indicate reptile species are present in the vicinity. The Reptile should surveys include:
 - Presence/absence
 - Population surveys
- Bird Surveys - there is suitable habitat for breeding and winter birds and biological records indicate species such as Barn Owl, Kingfisher, Lapwing and Golden Plover are present in the vicinity. The bird surveys should include:
 - Breeding bird surveys of all habitats
 - Wintering bird surveys of suitable habitat especially scrub, woodland, grassland and arable land.
- Badger – Badger signs and numerous animal excavation are present, there is suitable terrestrial habitat and biological records indicate this species is present in the vicinity. The Badger surveys should include:
 - Presence/absence
 - Sett identification and activity
- Bat - numerous trees are present with bat roost potential. There is suitable habitat such as a network of hedgerows for commuting and areas for foraging. Biological records indicate that bat species are present in the vicinity using the area for roosting commuting and foraging. This includes Western Barbastelle bat which is now frequently detected during bat surveys around Cambridge city (Belcher pers. comm.). Western Barbastelle bat is cited as a key feature of Eversden and Wimpole Woods Special Area of Conservation (SAC), located approximately 7km to the south west. It

is possible that this area has the potential to include key foraging and commuting routes for this species. The bat surveys should include:

- Stage 1 Bat Inspection to identify trees requiring emergence surveys
 - Stage 2 Bat Emergence of suitable trees
 - Stage 2 Bat Activity transects of suitable commuting and foraging areas.
- Water Vole - there is suitable aquatic (waterbodies/ditches and stream) and terrestrial habitat and biological records, including a survey carried out by the Wildlife Trust in 2014 indicate this species is present in the vicinity especially in Bin Brook. The Water Vole should surveys include:
 - Presence/absence
- Otter - there is suitable aquatic (waterbodies and stream) and terrestrial habitat and biological records, including a survey carried out by the Wildlife Trust in 2014 indicate this species is present in the vicinity especially in Bin Brook. The Otter surveys should include:
 - Presence/absence
- Invertebrate Surveys - there is suitable aquatic and terrestrial habitat to provide the necessary conditions to support a notable assemblage of invertebrates. There are few significant biological records indicating that invertebrate species are under recorded in the area. The invertebrate surveys should include:
 - Terrestrial
 - Aquatic
- Botany - there is a mosaic of aquatic and terrestrial habitat to provide the necessary conditions to support a notable assemblage of plants. Giant Hogweed and Himalayan Balsam alien invasive species, are present in the survey area. There are no significant biological records indicating that plant species are under recorded in the area. The botanical surveys should include:
 - Phase 1 Habitats
 - Specialist Plant
 - Non-Native Invasive
 - County Wildlife Site condition status

4.3 The results of the surveys would be needed in order that a robust and full assessment of ecological impacts of the scheme could be carried out. It would essential that this information was included as part of the preparation of an Environmental Statement for the scheme.

4.4 It is recognised that the development proposals provide an opportunity to incorporate habitat creation and enhancements as part of the scheme. This

initial ecology survey indicates that there is potential for the proposed route to support a notable assemblage of flora and fauna, including protected species and habitats, (the actual level of value can only be determined from the results of the further survey work that has been recommended). However, it is clear a large part of the survey area is dominated by arable land, which is of generally low value for biodiversity. The construction of a busway, albeit a linear features, provides potential for the development to incorporate new habitats as well as improve and link existing habitats.

4.5 The habitat creation and enhancements that should be included as part of the scheme design include:

- an extensive Green Bridge over the M11 to reconnect two areas of land separated by the motorway.
- incorporating beetle banks and conservation
- new Hedgerows
- managing existing Hedgerows
- Waterbodies (Ponds and wet ditches)
- Woodlands - e.g. extension to Madingley Wood SSSI either through natural regeneration to create new buffer and/or planting to reduce any disturbance impacts.
- Traditional Orchards - Community Orchard
- Scattered Scrub
- Species-rich Grassland
- Arable Field Margins
- incorporating features into the scheme design. For instance:
 - suitably designed and substantial underpasses - enable the safe passage of animals across the busway route.
 - creating of cuttings, banks and slopes for interesting flora, invertebrates and reptiles.
 - no/minimal lighting to avoid affect commuting and foraging nocturnal animals especially bats.
- commitment to develop long term (25 year) site management plans for existing designated sites such as the County Wildlife Sites that are within and adjacent to the proposed route
- commitment to develop long term (25 year) site management plans for all new habitats.
- commitment to a long term (25 year) site monitoring programme.

4.6 The mosaic of habitat creation should aim to protect, buffer, strengthen and connect existing woodlands and hedgerows and include the provision of new green lanes, neutral grassland and ponds.

4.7 It is recognised that mitigation and compensation measures would also likely be required to address specific species adverse impacts from the development proposals. The detail of the mitigation and compensation measures would only be identified once the results of the species specific surveys had been analysed.

- 4.8 However, the mitigation and compensation measures would be expected to be kept completely separate from the habitat creation and enhancements measures recommended here.

5 KEY POINTS AND FINDINGS

- 5.1 In January 2017 Cambridge Ecology Ltd successfully completed a robust desk-based ecology data search and Protected Species Scoping (Walkover) Survey on land associated with the catchment area for a potential transport infrastructure option 3a. between Cambridge and Cambourne along the A428 corridor.
- 5.2 The walk over survey was updated in August 2017 to include additional areas at Scotland farm and Bourne Airfield and Madingley Road. These sites were added as they could potentially be alternative locations for park and ride car parks and on-road guided bus routes
- 5.3 The report has collated baseline biological data, provided a record of the ecological features present within the survey area and determined the actual or likely presence of protected species, highlighting potential ecological constraints that might require species specific surveys and opportunities to enhance the ecological value of the site.
- 5.4 The desk-based literature search found:
- six statutory designated and non-statutory designated sites within the survey area
 - thirty statutory designated and non-statutory designated sites within 2km of the survey area.
 - the presence of traditional orchard, deciduous woodland, hedgerows, waterbodies and flood plain grazing marsh habitats (UK-BAP priority habitats) were noted within 2km of the survey area.
 - records (within the last 10 years) of protected species within 2km of the development site. These included:
 - Three species of amphibian - Common Toad, Common Frog and Great Crested Newt.
 - One species of reptile - Grass Snake.
 - 64 species of bird, listed on various conservation designations,
 - 28 records of Water Vole.
 - At least 86 records of Badger.
 - At least 23 records of six species of bat – Brown Long-eared Bat, Common and Soprano Pipistrelle, Noctule, Serotine, and Western Barbastelle.
 - Five records of European Otter.
 - Four records of Brown Hare.
 - Four records of Hedgehog.
 - Five species of insect, including White-letter Hairstreak butterfly, Hill Cuckoo Bee, and Rustic, Mottled rustic and Blood-vein moths.
- 5.5 The ecology survey of the site found:
- the dominant habitats present within the survey area as a whole was arable land, other habitats included improved grassland, flood plain

- grazing land, un-improved grassland, hedgerows, waterbodies, dense and scattered scrub, ancient woodland, traditional orchard, broad-leaved woodland plantation, tall ruderal wet and dry ditches, ponds and other waterbodies.
- the survey area has potential to support the life cycle of numerous protected species including European Protected Species, UKBAP and NERC Act S41 species - Species of Principal Importance. These included: Amphibians/Great Crested Newt, Reptiles, breeding and wintering birds, Badger, Bats, Otter, Water Vole, Brown Hare and Hedgehog, aquatic and terrestrial invertebrates and plants.
 - Actual signs of Badger, including snuffle holes and latrines and an artificial Badger sett.
 - bat boxes.
 - an Alien invasive species - Giant Hogweed and Himalayan Balsam.
- 5.6 In combination, the habitats present in the survey area would be likely to provide a mosaic of habitats of greater value to biodiversity than their individual worth.
- 5.7 The actual and potential presence of protected species highlighted the need to carry out further species-specific surveys, to inform the planning process and determine the most appropriate mitigation and compensation measures necessary to address their presence. A series of surveys have been recommended, see the recommendations section (Section 4).
- 5.8 In addition, the scheme provides an opportunity to deliver biodiversity enhancement. If the enhancement measures described in the recommendations section (Section 4), were included in the scheme design at an early stage and implemented fully, then the development proposals could contribute to national and local planning policy requirements relating to biodiversity enhancement targets.
- 5.9 Bearing in mind the ability for wildlife to periodically move to new locations, it is recommended that if the planning application and/or development proposals were likely to be delayed for three years from the date of this study, then a further equivalent ecological survey (and or certain species-specific surveys) would be required to update the results provided in this report and inform the development proposals in the future. To address this potential issue it would be recommended an equivalent ecological survey be carried out in two to three years (assuming the building work has not commenced in that time).

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7 FIGURES

Figure 1.1: Plan of the survey area (Red Line Boundary).

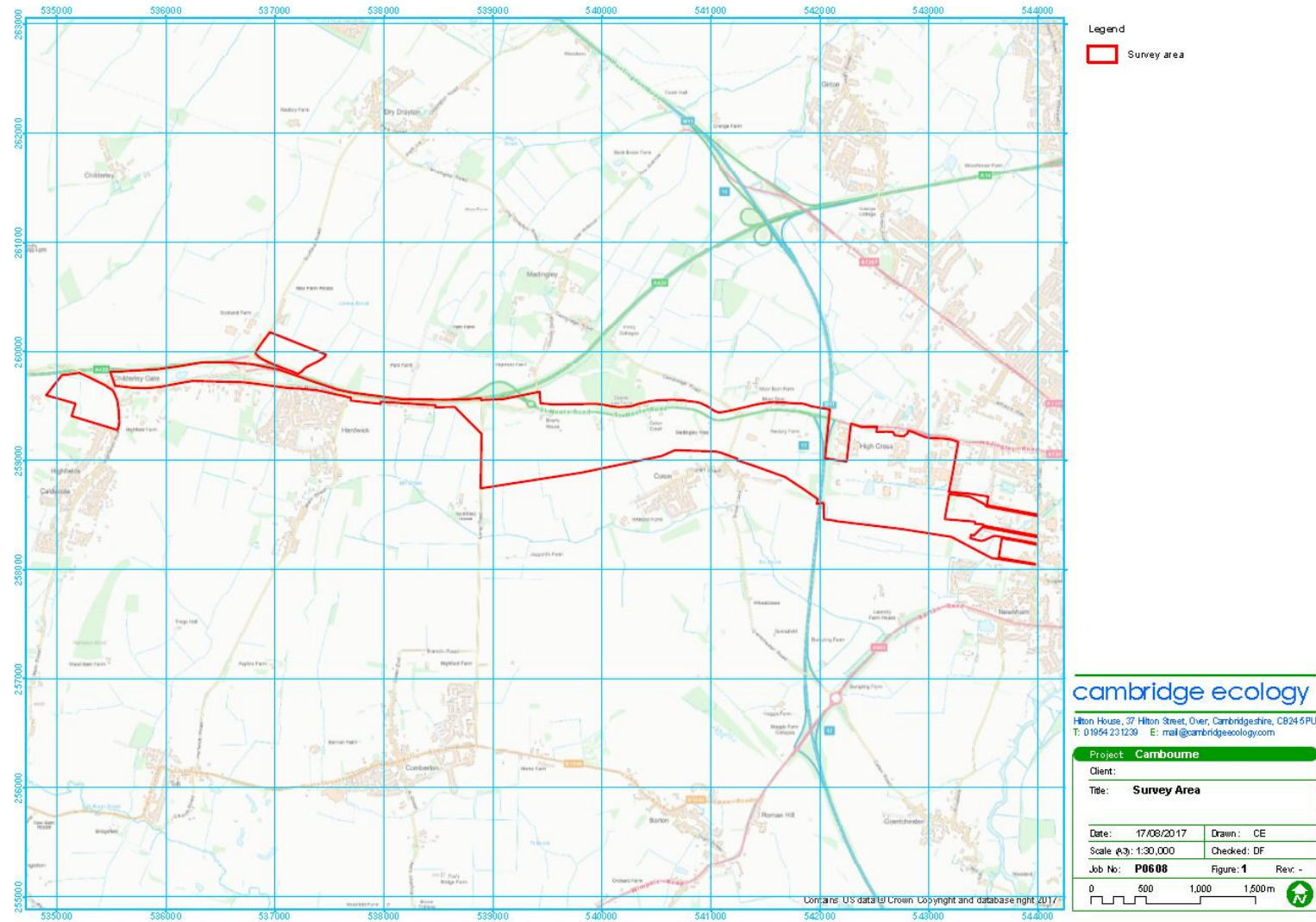


Figure 3.1: Map showing the proximity of statutory and non-statutory designated sites within 2km of the western portion of the survey area.

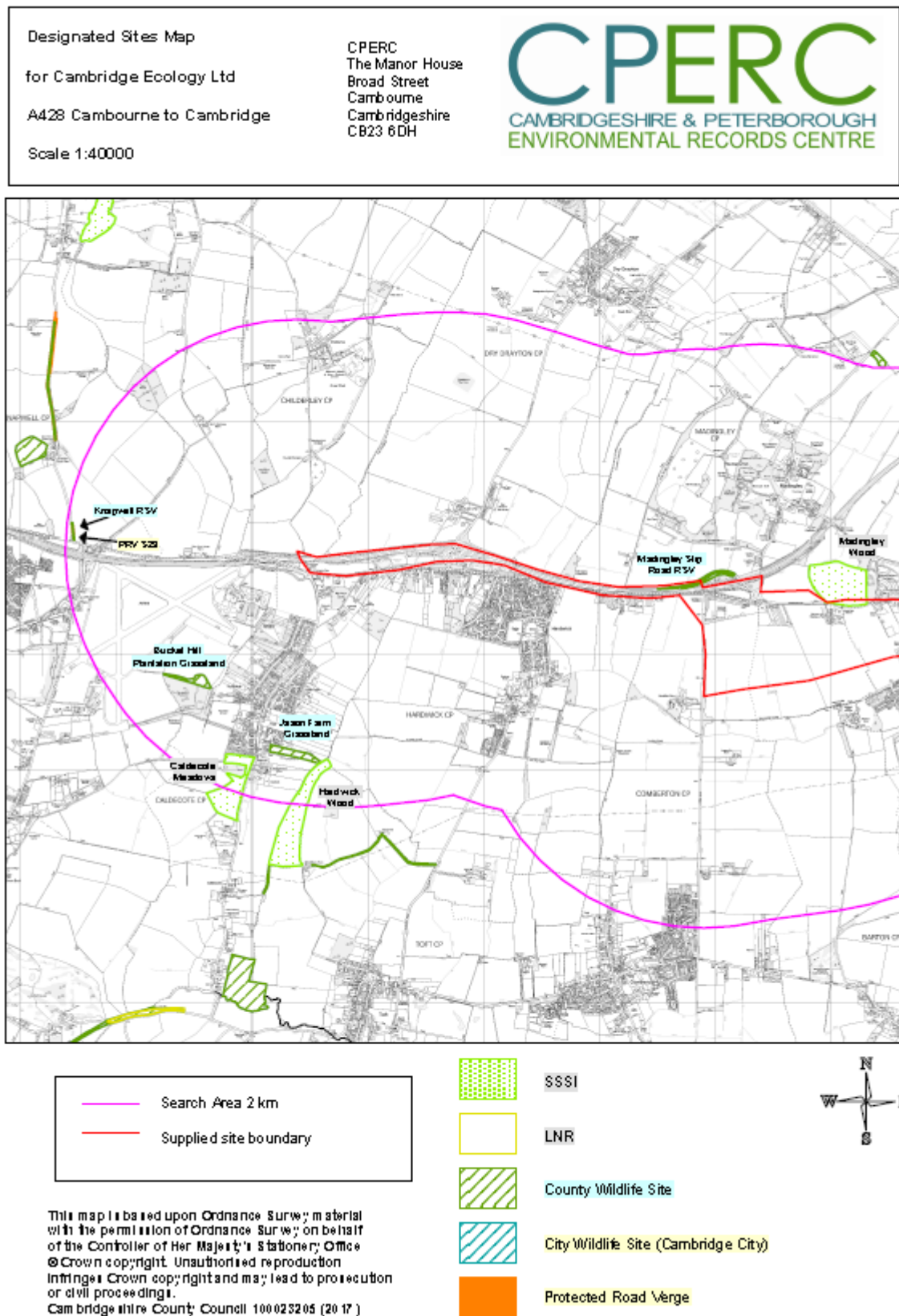


Figure 3.2: Map showing the proximity of statutory and non-statutory designated sites within 2km of the eastern portion of the survey area.

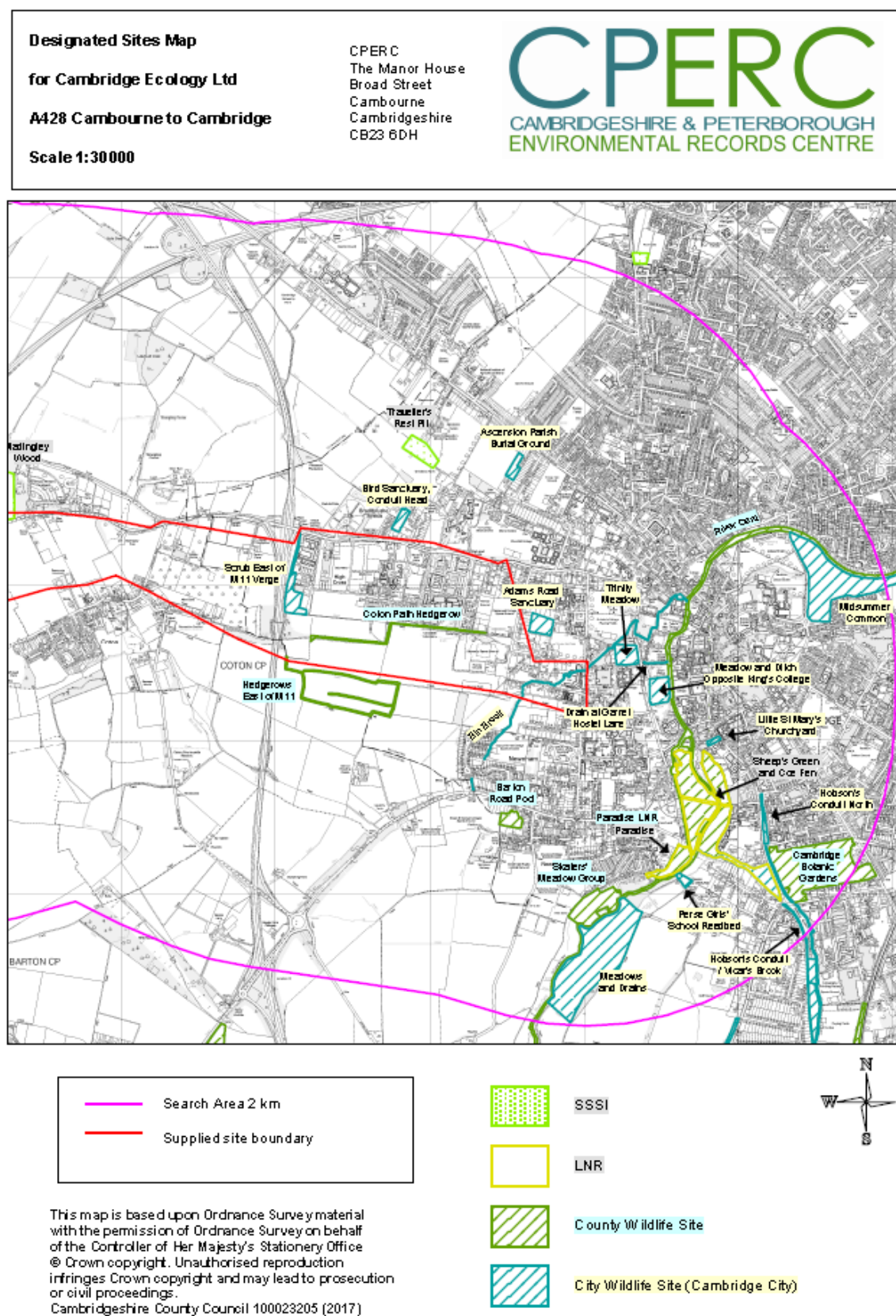


Figure 3.3a: Ecological Constraints map - Western Section

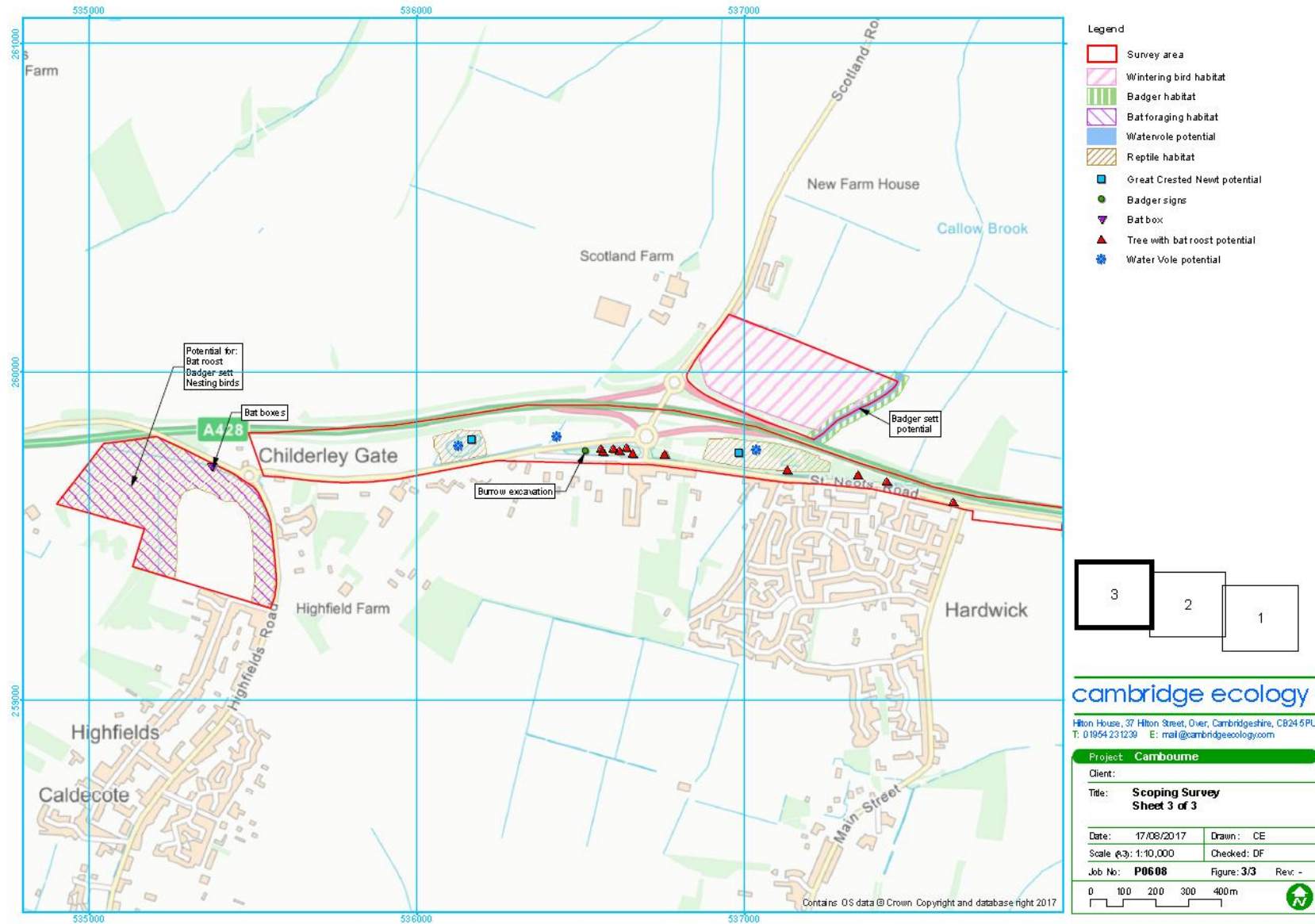


Figure 3.3b: Ecological Constraints map - Central Section

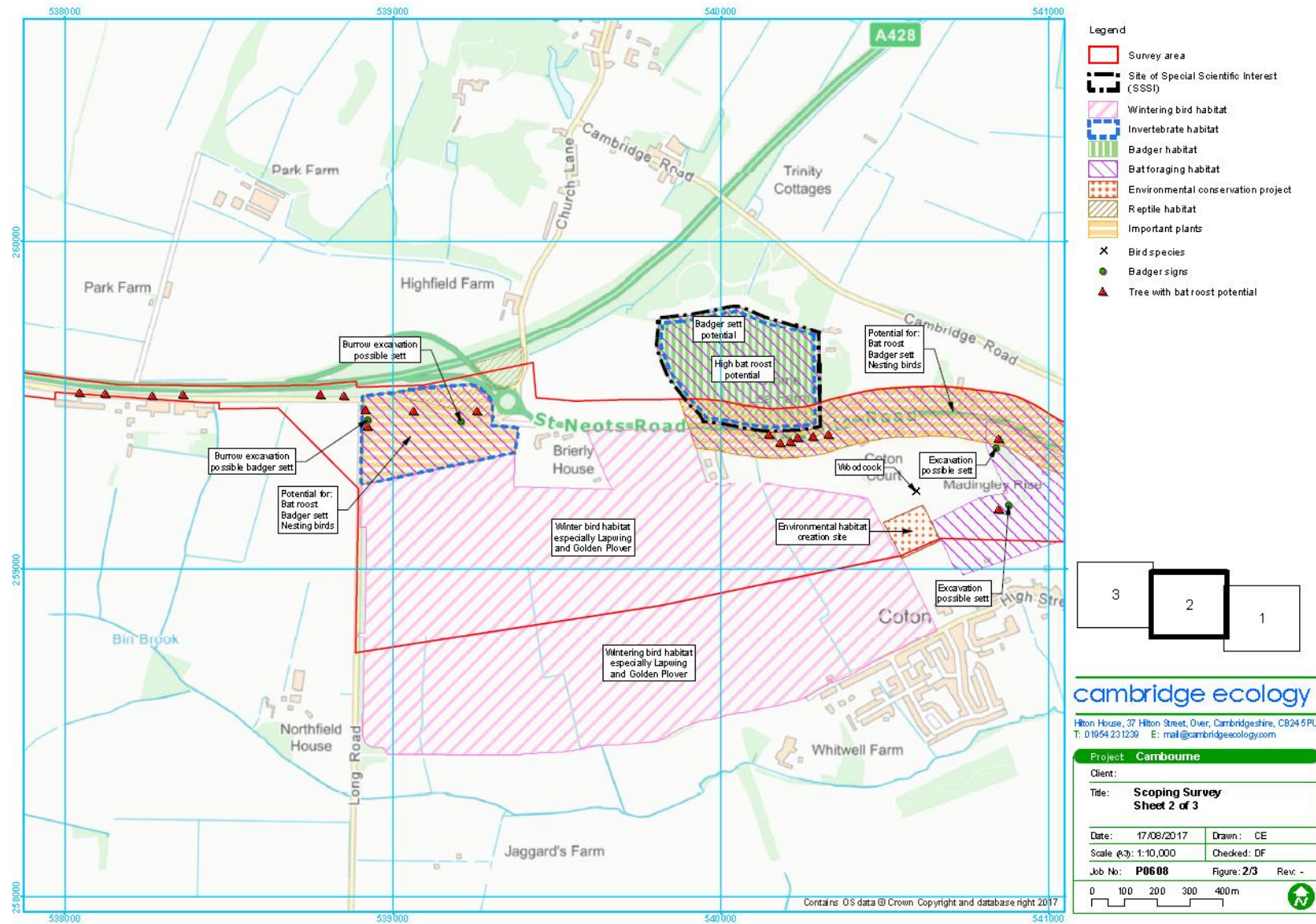
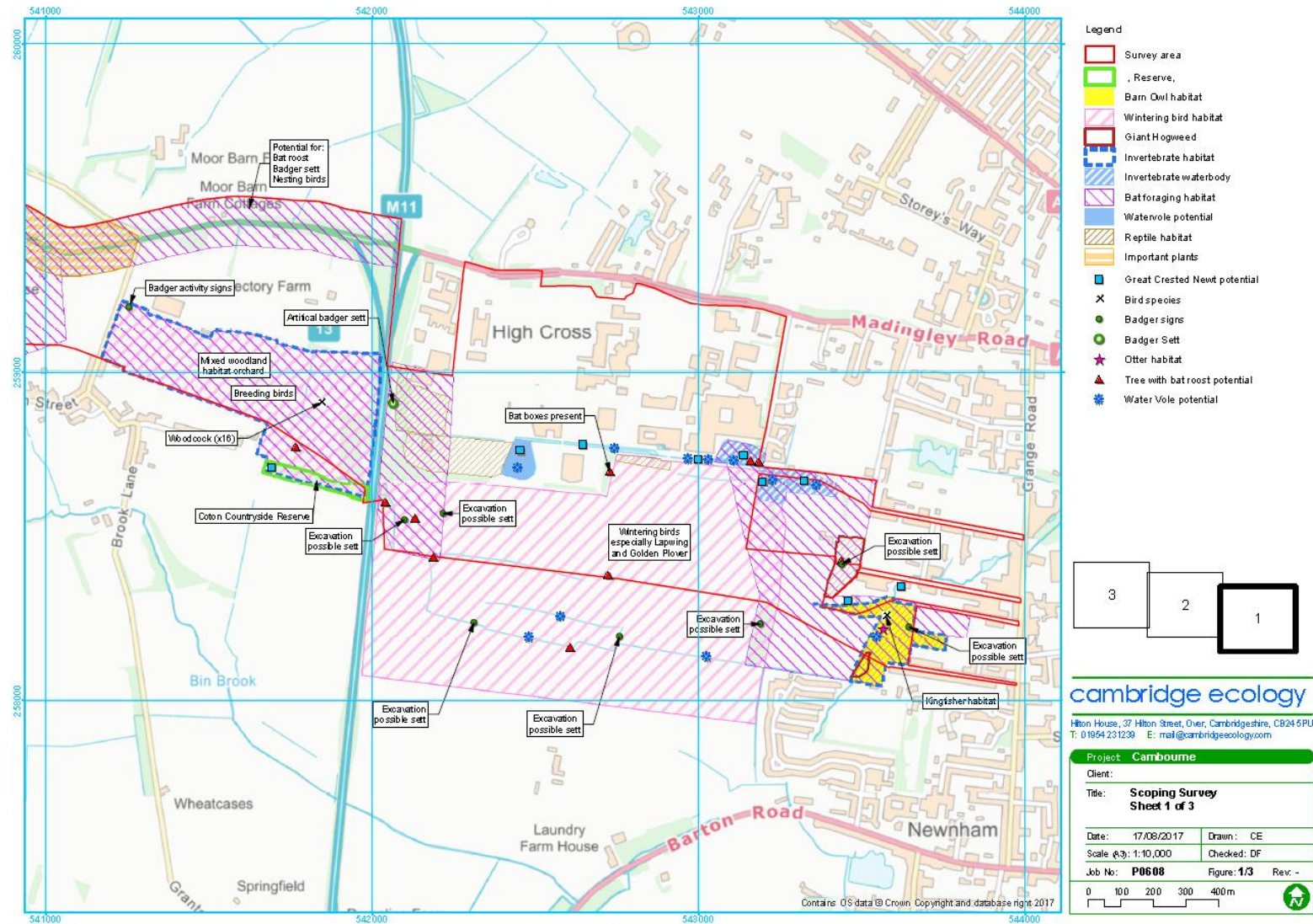







Figure 3.3c: Ecological Constraints map - Eastern section






8 PHOTOGRAPHS

Photo No.	Photograph	Description
1		Example of waterbody with Great Crested Newt potential
2		Example of waterbody with Great Crested Newt potential




Protected Species Constraints Survey of land associated with the catchment area for a potential transport infrastructure option 3a

3		Example of waterbody with Great Crested Newt potential
4		Example of waterbody with Great Crested Newt potential
5		Example of Habitat with Reptile and Invertebrate potential. Also location of wintering Woodcock




Protected Species Constraints Survey of land associated with the catchment area for a potential
transport infrastructure option 3a

6		Example of habitat with winter bird potential
7		Example of habitat with breeding bird potential
8		Example of animal excavation with Badger potential




Protected Species Constraints Survey of land associated with the catchment area for a potential transport infrastructure option 3a

9		Example of artificial Badger sett next to M11
10		Example of trees with bat boxes attached next to Bourne Airfield
11		Example of trees with bat boxes attached next to Research Park




Protected Species Constraints Survey of land associated with the catchment area for a potential
transport infrastructure option 3a

12		Bin Brook CiWS example of Kingfisher, Water Vole, Otter and White-clawed Crayfish habitat
13		Bin Brook CiWS example of Kingfisher, Water Vole, Otter and White-clawed Crayfish habitat
14		Example of Barn Owl and Invertebrate habitat




Protected Species Constraints Survey of land associated with the catchment area for a potential transport infrastructure option 3a

15		Example of Giant Hogweed
16		Example of protected hedgerow habitat
17		Example of traditional orchard habitat



Protected Species Constraints Survey of land associated with the catchment area for a potential
transport infrastructure option 3a

18		Madingley Wood SSSI
19		Example of Scattered scrub habitat and location of wintering Woodcock
20		Example of arable habitat

Protected Species Constraints Survey of land associated with the catchment area for a potential transport infrastructure option 3a

21		Example of fallow tall ruderal habitat
22		Example of private environmental conservation margin habitat
23		Signs of Badger activity - Latrine

Protected Species Constraints Survey of land associated with the catchment area for a potential
transport infrastructure option 3a

24		Signs of Badger activity - snuffle holes
25		Example of Himalayan Balsam in Bin Brook