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GLADMAN DEVELOPMENTS LTD

LAND OFF HEMPSTED LANE, GLOUCESTER

ECOLOGICAL IMPACT ASSESSMENT

MAY 2022

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DATE ISSUED:	**May 2022**
JOB NUMBER:	**GM10710**
REPORT NUMBER:	**009**
VERSION:	**V2.0**
STATUS:	**FINAL**

GLADMAN DEVELOPMENTS LTD

LAND OFF HEMPSTED LANE, GLOUCESTER

ECOLOGICAL IMPACT ASSESSMENT

MARCH 2020 (UPDATED MAY 2022)

PREPARED BY:

[redacted]

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EXECUTIVE SUMMARY

Wardell Armstrong LLP (WA) was commissioned by Gladman Developments Ltd. to undertake an Ecological Impact Assessment (EcIA) for a proposed residential development located at land off Hempsted Lane, Gloucester

A Preliminary Ecological Appraisal (PEA) was produced by WA in September 2019. An updated walkover survey was undertaken by WA in April 2022 which identified the following may be subject to potential adverse effects from the proposed development and are considered in this EcIA:

- Statutory and non-statutory designated sites;
- Natural Environmental and Rural Communities Act 2006 (NERC) Section 41 (S.41) Habitat of Principal Importance: Hedgerows;
- Section 41 (S.41): Ponds;
- Bats;
- Breeding birds;
- European otter;
- Amphibians - including GCN;
- Bony fish - including European eels and Atlantic salmon;
- White-clawed crayfish;
- Water vole;
- European badger;
- Common reptiles;
- Hedgehog;
- (S41) Invertebrates; and
- (S41) Flowering plants.

Further surveys for badger, bats and GCN were undertaken in 2019. Updated badger and GCN assessments were undertaken in April 2022. Updated surveys for bats and are being undertaken in 2022 and the report will be updated on completion. The bat surveys in 2019 identified that the site is used for foraging and commuting by at least eleven species of bat.

Pond scoping surveys in 2019 for GCN identified twelve waterbodies within 500m of the site which have potential to support GCN. Pond 6 within the red line boundary was assessed as offering suitable habitat for GCN in April 2022 but was found to be dry in early-May.

The EcIA has identified that the proposed development is likely to have a significant adverse effect on the Cotswold Beechwoods Special Area of Conservation (SAC) from an increase in recreational pressure, however this can be mitigated for by the provision of greenspace within the proposed development. No significant adverse effects are anticipated on the Severn Estuary SAC/SPA/Ramsar or Walmore Common SPA/Ramsar as a result of the proposed development.

The proposed development is located within 2km of two statutory and two non-statutory conservation designations. There are also 8 'unconfirmed sites' which are proposed for designation as Local Wildlife Sites.

No direct or indirect effects are anticipated on Green Farm Orchard LNR & LWS, Alney Island NNR & LWS, Sud Meadow LWS, Robinswood Hill Country Park LWS, Daniel's Meadow & Brook U, Minsterworth & Corn Ham U, Glos-Llanthony Secunda U, Glos-Linden U and Glos-Linden U.

Netheridge Reserve & Black Ditch U is located downstream and adjacent or in close proximity to the site and therefore could be adversely affected during the construction works due to dust soiling or silt pollution entering the stream along the south-western boundary of the site. A best practice dust mitigation plan will be implemented during construction to prevent dust soiling effects on these designations. Best practice guidelines as outlined in the CIRIA SuDS Manual 2015 will be followed to prevent damage and pollution to the retained waterbodies/courses on site and thus the designations. These will be delivered via a Construction Environmental Management Plan (CEMP) for the site. During operation, water quality will be treated prior to discharge and the proposed development will implement a surface water drainage system which provides sustainable drainage measures. No footpaths will be created within 10m of the stream along the south-western boundary of the site which will avoid damage and limit disturbance to this habitat. A Landscape Ecological Management Plan (LEMP) will be developed for the site which will set out management prescriptions for the areas of public open space and ensure that appropriate measures are undertaken during implementation to safeguard the stream and any water voles which may be present.

Without mitigation measures, the proposed development is considered to result in a number of significant adverse effects on important ecological features. These include the permanent loss of S41 hedgerows from the site, potential damage to adjacent habitats within the site from machinery and dust arising from construction and potential pollution to the stream along the south-western boundary.

Habitat loss within the site will be mitigated by a range of habitat creation and enhancement measures as part of the Public Open Spaces being created within the site. A LEMP will be prepared to ensure that all habitat measures are implemented and managed appropriately in future. A range of other enhancement measures undertaken for wildlife will deliver a net gain for species including bats, common reptiles, common amphibians and hedgehogs.

Potential effects as a result of dust and pollution will be mitigated for by best construction practices delivered through a CEMP.

Without mitigation, significant adverse effects on birds, bats, badger, great crested newt, hedgehog, common reptiles, otter and water vole, European eel, Atlantic salmon and white clawed crayfish are anticipated and there is also potential to contravene legislation pertaining to these species.

The degree of protection varies between species. In general, it is an offence to intentionally kill or injure individual animals, or disturb their nests, roosts, or hibernacula. Mitigation measures have been designed to avoid impacts on and contravening the relevant legislation for each protected species considered to be an important ecological feature relevant to the site.

Mitigation includes implementing a Precautionary Working Method Statement (PWMS) for protected species during vegetation clearance; minimising noise, dust, and light emissions during construction; preventing damage to retained habitats during construction; habitat creation and enhancements; a sensitive lighting scheme; and appropriate management of retained and created habitats post-construction. Additionally, the proposed development will provide new habitats and enhancements for species that will overall have a beneficial effect on biodiversity and contribute towards a net gain as stated in the NPPF.

Following the implementation of mitigation measures, the identified significant adverse effects on the important ecological features are considered not to be significant. The proposed development could result in a significant beneficial residual effect on bats, common reptiles, amphibians and hedgehogs.

1 INTRODUCTION

1.1 Terms of Reference

1.2 Wardell Armstrong LLP (WA) was commissioned by Gladman Developments Ltd. to undertake an Ecological Impact Assessment (EcIA) for a proposed residential development located at land off Hempsted Lane, Gloucester, centred on approximate National Grid Reference SO 81530 16529.

1.3 Site Description

1.3.1 The site is situated off Hempsted Lane, Gloucester, as shown on Drawing Number GM10710-001 (Survey Area Location Plan).

1.3.2 The survey area is approximately 12.2 hectares and comprises of three arable fields with a south facing gradient that are bordered by hedgerows, treelines, dry ditches and scrub. A moderate sized pond is located in the south of the site which was wet at the time of the survey. There are two existing access points located on Hempsted Lane and Rea Lane. The survey area is bordered by a stream, nature reserves, a bridleway, residential dwellings, Rea Lane and the A430.

1.3.3 The surrounding habitat is a mosaic of nature reserves, wetlands, waterbodies, farmland and a number of small, scattered woodlands. Urban environments include mixed-use developments comprised of commercial and residential buildings. The site is situated between the River Severn and the Gloucester and Sharpness Canal.

1.4 Description of the Development

1.4.1 Detailed development proposals are not currently available however, it is anticipated that approximately 215 residential dwellings and associated infrastructure and areas of public open space are proposed.

1.5 Scope of Report

1.5.1 EcIA is a process of identifying, quantifying, and evaluating potential effects of development on habitats, species and ecosystems. EcIA supports implementation of national biodiversity strategies and national planning policies for safeguarding biodiversity and supporting the delivery of sustainable development. This assessment demonstrates how the project accords with relevant planning policy and legislation.

1.5.2 The purpose of this report is to provide an ecological impact assessment which includes:

- Details of relevant national and local planning policy with regards to nature conservation and relevant legislative background;
- Description of survey and assessment methodology;
- A description of the baseline conditions for the application site;
- An evaluation of the application site in terms of its value for nature conservation;
- An assessment of potential ecological impacts of the proposed development including habitat loss and fragmentation, disturbance and potential off-site impacts and whether those impacts are likely to result in significant effects on Important Ecological Features;
- Proposed mitigation measures in terms of significant adverse effects on Important Ecological Features;
- A description of measures that can be implemented to enhance biodiversity; and
- Identification of residual effects taking into account proposed mitigation measures.

2 BACKGROUND AND PREVIOUS SURVEYS

2.1.1 A Preliminary Ecological Appraisal (PEA), comprising a desk study and Extended Phase 1 (EP1) Habitat Survey was undertaken in May / June 2019 with an updated survey and desk study in April 2022 to update the EcIA. A copy of the PEA (2019) is provided in Appendix 1. The PEA identified that the following may be subject to potential adverse effects from the proposed development:

- Statutory and non-statutory designated sites;
- S.41 Habitat: Hedgerows;
- S.41 Habitat: Pond;
- S.41 Habitat: Stream;
- Dry ditch;
- Bats;
- Birds;
- European otter;
- Amphibians including great crested newts;
- Bony fish including European eels and Atlantic salmon;
- White-clawed crayfish;
- Water vole;
- European badger;
- Common reptiles;
- European Hedgehog;
- S41 Invertebrates; and
- S41 Flowering plants.

2.1.2 The above ecological receptors are therefore considered further within this EcIA.

3 PLANNING POLICY AND LEGISLATION

3.1 Planning Policy

3.1.1 The relevant planning policies related to this EcIA are listed below with further detail provided in Appendix 2.

- *National Planning Policy Framework (July 2021);*
- *National Planning Practice Guidance (Updated June 2021);*
- *Gloucester, Cheltenham and Tewkesbury Joint Core Strategy 2011-2031 (Adopted December 2017); and*
- *Draft Gloucester City Plan 2016 – 2031 (November 2020).*

3.2 Legislative Framework

3.2.1 The main statutory species protection is provided by The Conservation of Habitats and Species and Planning (Various Amendments) (England and Wales) Regulations 2018 and the Wildlife and Countryside Act 1981 (as amended).

3.2.2 The degree of protection varies between species; in general, it is an offence to intentionally kill or injure individual animals or disturb their roosts or hibernacula. A licence may be required to interfere with any protected species or their roosts and resting places.

3.2.3 Priority species and habitats agreed under the UK BAP are those which are identified as being the most threatened and requiring conservation action. The UK BAP was superseded by '*The UK Post-2010 Biodiversity Framework* 'which was published in July 2012 with work focussing at the country level, but the list of priority habitats and species remain the basis for the biodiversity work in the countries. Therefore, species listed under Section 41 (S41) of the 2006 Natural Environment and Rural Communities (NERC) Act 2006 were reviewed as these are the rarest and most threatened in England.

3.2.4 An overview of species (fauna) protection and legislation is provided in Appendix 2.

4 METHODOLOGY

4.1 Protected and Notable Species

4.1.1 Further specialist surveys considered relevant following the completion of the PEA (2019) included:

- Badger;
- Bat Activity & Automated Surveys*;* and
- Great crested newt (GCN) *(Triturus cristatus).*

4.1.2 Dates, times and weather conditions for the bat activity surveys are provided in Appendix 3.

4.1.3 Updated surveys for bat emergence/re-entry, bat activity and automated surveys are being undertaken following the updated walkover survey (April 2022).

Badger

4.1.4 All information on badgers has been provided within the confidential Badger Impact Assessment (Appendix 4). Owing to the sensitive nature of the data included, the report and findings should be made available to bona fide individuals only.

Bat Activity Survey

4.1.5 Following the Extended Phase 1 Habitat undertaken in July 2019 and updated walkover in April 2022, the site was assessed as being of moderate suitability for commuting / foraging bats. Current best practice guidelines (Collins, J. (ed.) 2016) recommend that for sites of 'moderate' suitability, one visit per transect per month is undertaken between April and October during suitable weather conditions with at least one of these comprising a dusk and dawn survey within the same 24hr period. April and October are sub-optimal months for bat activity. Due to the timing of instruction in 2019 and project timescales only surveys in July, August and September 2019 have been completed.

4.1.6 The activity surveys undertaken in 2019 followed the guidance provided in the *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, J. (ed) 2016). The surveys were undertaken by two surveyors and comprised one walked transect over the survey area to allow complete coverage of the site with occasional listening stops. Each listening stop lasted approximately five minutes. The survey routes walked are shown on Drawing Numbers GM10710-101 to GM10710-104.

Equipment and data analysis

4.1.7 Echo Meter Touch (Wildlife Acoustics, Inc., Massachusetts) bat detectors and iPads (Apple Inc., California) were used to detect foraging or commuting bats and the built-in Kaleidoscope classifiers were used to assist species identification. Bat Box Duet bat detectors were also used by some surveyors to detect bats and digital recordings were made from the bat detectors and analysed later using BatSound analysis programme version 4.2. Species identification was made on the basis of the characteristics of the call including peak frequency, minimum and maximum frequency, call duration and inter pulse interval. Observations of bat behaviour, size and the direction of the flight path were also noted where possible.

Automated Survey

4.1.8 To supplement the walked transect survey, three automated bat detectors (Wildlife Acoustics, Inc.) were deployed per survey. The detectors were programmed to record ultrasound continuously from 30 minutes before local sunset to 30 minutes after local sunrise for five consecutive nights. The location of the automated bat detectors is provided on Drawing Number GM10710-105 Location of Automated Detectors.

4.1.9 After retrieval of the recording devices the data files were downloaded as Wildlife Acoustic Audio Compression Files (WAC) and converted to Kaleidoscope Pro 4 Output files and analysed using Kaleidoscope Pro 4 analysis software (Wildlife Acoustics, Inc).

4.1.10 Bat Activity Index (BAI) values were calculated for each species recorded at each automated detector location. These indices are calculated by taking the mean nightly pass rates for the automated survey data over the period of their deployment.

Great Crested Newt

4.1.11 The aquatic features were scoped for their suitability to support amphibians and subject to an HSI assessment on the 31st July, 21st August and 15th October 2019. During the updated walkover survey in April 2022, only Waterbody 6 was accessible and subject to an updated HSI assessment. By early-May Waterbody 6 was dry. The reference and location of each waterbody is shown on Drawing Number GM10710-003 Waterbody Location Plan which is provided in Appendix 1. A photograph and description of each waterbody is provided in Appendix 5.

Habitat Suitability Index

4.1.12 The HSI has been developed as a way of evaluating habitat quality and quantity for GCN; however, the HSI is not a substitute for surveys. The HSI score is now required as part of the Natural England disturbance licensing system for each waterbody that would be subject to activities likely to result in adverse impacts to a local GCN population. The HSI is a numerical index between 0 and 1 (with 1 being optimal habitat) and uses ten suitability indices, all of which are factors thought to affect GCN but can only be calculated for still waterbodies and not moving watercourses. A copy of the HSI calculations can be found in Appendix 6. The HSI can be broken down into:

- <0.5 = Poor
- 0.5 – 0.59 = below average
- 0.6 – 0.69 = average
- 0.7 – 0.79 = good
- >0.8 = excellent

4.2 Determining Value of Ecological Receptors

4.2.1 The conservation status of a site is defined in the Habitats Directive as this relates to internationally designated sites. The CIEEM guidance modifies the definition in order for it to be applicable to sites, habitats or species within any defined geographical area.

4.2.2 The assessment of the nature conservation value of the site has been based on the PEA, protected species surveys and the widely applied criteria described in 'A Nature Conservation Review' (Ratcliffe, 1977)[1]. These include: i) Size; ii) Diversity; iii) Naturalness: iv) Typicalness; v) Rarity; and vi) Potential Value. A summary of these criteria is set out in Appendix 7.

[1] Ratcliffe, D.A. (1977). *A Nature Conservation Review*. Cambridge University Press, Cambridge.

4.2.3 The levels of conservation value are detailed in Table 1.

Table 1: Nature Conservation Value		
Category Value	***Relevance to Site***	***Examples***
International	Europe	Special Areas of Conservation, Special Protection Areas, Ramsar Sites (or a site proposed for, or considered worthy of such a designation); a regularly occurring substantial population of an internationally important species (listed on Annex IV of the Habitats Directive).
National	England	A nationally designated site (e.g. Site of Special Scientific Interest (SSSI), or a site proposed for, or considered worthy of such designation); a viable area of habitat type listed in Annex 1 of the Habitats Directive or a smaller areas of such habitat which are essential to maintain the viability of a larger whole, a regularly occurring substantial population of a nationally important species (e.g. listed on Schedules 5 & 8 of the Wildlife and Countryside Act 1981 (as amended)); A site where field study shows that the site would meet published SSSI Selection Guidelines.
Regional	South-west of England	Areas of internationally or nationally important habitat that are degraded but are considered readily restorable; a regularly occurring locally significant population of a species listed as being nationally scarce.
County	Gloucestershire	A site designated as a statutory county wildlife site (Local Nature Reserve) or a non-statutory designated site (e.g., Sites of Importance for Nature Conservation (e.g. Local Wildlife Sites (LWS), County Wildlife Sites (CWS)) or a site listed on the Ancient Woodland Inventory (AWI). A site where field study shows the site would meet published county LWS/CWS selection criteria. Viable areas of priority habitat identified in the LBAP where protection of all areas of that habitat is a published target; a regularly occurring, locally significant population of species which is listed in a County Red Data Book or LBAP on account of its regional rarity or localisation.
District	Gloucester	A site designated as a non-statutory district wildlife site. A good example of common or widespread habitat in the local area (e.g. those listed as broad habitats on the LBAP); Habitats that are scarce in the district or appreciably enrich the district ecological resource. A population of a species that is listed in the LBAP because of its rarity in the locality.

Table 1: Nature Conservation Value		
Category Value	***Relevance to Site***	***Examples***
Local	Parish to site	Areas of heavily modified or managed vegetation of low species diversity or low value as habitat to species of nature conservation interest. Value within the context of the survey area (e.g. small areas of semi-improved grassland, isolated mature trees).

4.2.4 Individual species may be protected under European or National legislation. Such protection is relevant to the assignment of value to such species, but additional factors, such as population size and the nature of the distribution of the species are also considered.

4.2.5 The assignment of undesignated features, such as UK Priority habitats and species or areas of Ancient Woodland may not fall clearly into the designations as described above. Therefore, a number of other criteria are used to assess the nature conservation value of a defined area of land.

4.2.6 Some features that are currently of no particular ecological interest in themselves may nevertheless perform an ecological function. For example, they may act as a buffer against negative effects. This affects their value.

4.3 Evaluation of Significance

4.3.1 The Ecological Impact Assessment (EcIA) follows the methodologies within the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) *'Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, 3rd Edit*ion', hereafter referred to as the 'CIEEM guidelines'.

4.3.2 CIEEM Guidelines Paragraph 4.1 indicates that the assessment of impacts should take into account both the value and sensitivity of ecological receptors:

> *'One of the key challenges in EcIA is to decide which ecological features are important and should be subject to detailed assessment. Such ecological features will be those that are considered to be important and potentially affected by the project.'*

4.3.3 Paragraph 5.8 of the CIEEM Guidelines indicates that it is important to assess the significance of the effects of impacts upon each ecological feature:

> *'There could be any number of possible impacts on important ecological features arising from a development. However, it is only necessary to describe in detail the impacts that are likely to be significant'.*

4.3.4 For the purpose of this report, it has been assumed that each important ecological receptor likely to be encountered within the site and the wider landscape will have potential to be affected by the proposed development. The assessment of likely significant effects within this report will therefore focus upon a receptor's value and the significance of effects upon it.

4.3.5 The CIEEM guidelines define a significant effect as:

> '*An effect that either supports or undermines biodiversity conservation objectives for important ecological features'.*

Characterising Ecological Effects

4.3.6 Effects are described and assessed with reference to the following characteristics:

- Positive or negative – is the change in accordance with nature conservation policy regarding that ecological feature?
- Extent – over what area will the impact occur?
- Magnitude – what will the quantifiable effect in terms of size, amount, intensity and volume be on ecological features?
- Duration – over what periods of time will the effect last?
- Timing – when would the effect occur?
- Frequency – how often over a period of time would the effect occur?
- Reversibility – can the effects be recovered from over a reasonable timescale?

Evaluation of Significance – Designated Sites

4.3.7 The CIEEM Guidelines detail how ecologically significant effects should be determined for designated sites, ecosystems, habitats and species.

4.3.8 For designated international sites, use can be made of published conservation objectives for each site against which the significance of impacts can be assessed.

4.3.9 For sites of national value, published SSSI guidelines for the selection of SSSIs, the SSSI site citation and Natural England's published condition summary for each unit of an SSSI can be used.

4.3.10 Designated conservation sites of County value (i.e. Local Wildlife Sites) will have been assessed for inclusion by a partnership of organisations, usually associated with the county environmental record centre. The citation and/or reasons for inclusion of the site as a LWS can be requested to assist with assessing the significance of effects upon such sites.

4.3.11 For sites of lesser value, including district/local, there may be available information on their rationale for selection based upon the Ratcliffe criteria. These are all useful resources to assist with the assessment of significance of an effect on a district or local designated site.

Evaluation of Significance – Ecosystems

4.3.12 No published conservation objectives or designation criteria are normally available for ecosystems, however, determining whether effects on ecosystems are significant should be based upon whether or not the effect is likely to result in a change in ecosystem structure and function. This is based upon consideration of whether or not the impacts will result in an effect on:

- Processes or key characteristics and / or;
- The nature, extent, structure and function of component habitats and / or;
- The average population size and viability of component species.

Evaluation of Significance – Habitats and Species

4.3.13 Habitat types listed on Annex 1 of the Habitats Directive and species listed on Annex II have published accounts which provide information on their status and distribution in the UK as well as a description and summary of ecological characteristics. This information can be used against which to assess the significance of effects on their conservation status, even if they are not designated.

4.3.14 For habitats and species of lesser value, published information is less readily available, however, reference to UKBAP priority habitat and species action plans, county or local BAPs will provide information on the conservation status of habitats and species against which impacts can be assessed for their effects on the extent, structure and function of habitats and the abundance and distribution of species.

4.3.15 In addition, reports or publications, often written at the county-scale can provide useful context against which to assess the significance of impacts upon a habitat or species. For instance, County Bird Reports and County Floras will provide more detail with regard the status and current trends for birds and habitats, plants in a given area.

4.4 Nomenclature

4.4.1 Vascular plant names follow '*New Flora of the British Isles'* (Stace 2019) with vernacular names as provided in the Botanical Society of the British Isles website (BSBI, 2013). All other flora and fauna names follow the National Biodiversity Network (NBN) Atlas (NBN, 2017). The common and scientific name of species/taxa is provided (if available) when first mentioned in the text, with only the vernacular name referred to thereafter.

4.5 Limitations

4.5.1 The bat surveys have not attempted to produce a comprehensive list of all bat species and their activities within the site, as any ecological survey will be limited by factors that affect their presence, such as time of year, weather conditions, migration pattern and behaviour. The surveys instead aim to provide a general overview of the range of bat species using the site and to highlight key commuting corridors and pinpoint possible bat roosts.

4.5.2 Echolocation calls of the brown long-eared bats (*Plecotus auritus*) are significantly quieter than many other bat species within this country, therefore this species can be difficult to record and may at times go unrecorded. Similarly, some bats produce louder calls which travel greater distances with less attenuation, as a result louder calls produced at greater distances from the detectors will be recorded (during activity and automated surveys) more readily whereas quieter calls produced from the same location maybe missed which can lead to bias.

4.5.3 Species from the genera *Myotis* and *Nyctalus* are difficult to distinguish individual species from sonogram calls alone. Where an individual species cannot be determined, a genus is recorded.

4.5.4 Due to project timescales in 2019 it was not possible to undertake spring bat activity surveys (April to June). However, the survey effort in 2019 was considered sufficient as it was considered likely that undertaking further bat activity surveys would not provide any additional information on bat activity on site or affect the level of bat

mitigation proposed at the site. However, updated bat activity surveys are being undertaken in 2022 and this report will be updated upon completion.

4.5.5 During the surveys in 2019 access was not granted from the landowner to survey Waterbody 9 and Waterbody 12 was inaccessible due to dense willow scrub surrounding the pond.

4.6 In 2019 the water level of Waterbody 14 was not visible due to very dense bankside vegetation and Waterbody 15 could not be pond scoped due to very dense vegetation on all sides.

4.7 During the 2022 updated walkover survey only Waterbody 6 was surveyed and assessed for GCN. All other waterbodies were inaccessible due to land access.

4.8 **Quality Assurance & Environmental Management**

4.8.1 The surveys and assessments have been overseen by and the report checked and verified by a member of CIEEM, who is bound by its code of professional conduct. All surveys and assessments have been undertaken with reference to the recommendations given in British Standard (BS) 42020, and as stated within specialist guidance, as appropriate and referenced separately.

5 BASELINE CONDITIONS AND NATURE CONSERVATION EVALUATION

5.1.1 The baseline conditions are those which are anticipated to exist at the time the Proposed Development commences. The baseline conditions have been informed by the 2019 PEAR, protected species surveys and the updated walkover survey. It is considered unlikely that the habitats will change significantly between the time of writing and the start of the development activities. Therefore, this data is considered to be a reliable indication of the baseline conditions.

5.1.2 The following section also evaluates the ecological features making up the baseline for the site. Each ecological feature is given a site value used to assess the significance of the impact of the proposed development. The categories of values are detailed in Table 2.

5.2 Nature Conservation Designations

5.2.1 There are two statutory and two non-statutory conservation designated sites within 2km of the site. There are also 8 'unconfirmed sites' which are proposed for designation as Local Wildlife Sites. A summary of these designations and the location in relation to the site, is provided in Table 2 below.

Table 2: Designated Sites

Site Name and Status[2]	*Reason for Designation*	*Approximate Distance and Location from the site*
Alney Island LNR & LWS	Coastal & Floodplain grazing marsh, ponds, ditch, lowland meadows, wet woodland, reedbed, plant & dragonfly interest	1.7km north
Green Farm Orchard LNR & LWS	Green Farm Orchard is designated for its remnant old apple and pear orchard. Some of the trees are very old making them an excellent habitat for wildlife. The site is very well used by birds and pipistrelle bats and also contains a good invertebrate population including Emperor moth *Saturnia pavonia* caterpillars, which are of local importance to Gloucestershire. The LNR provides an important addition to the wildlife corridor that runs along the Gloucester and Sharpness canal.	1km south

[2] **SPA** – Specially Protected Area, **SAC** – Special Area for Conservation, **Ramsar** – site designated under the Ramsar Convention, **SSSI** – Site of Special Scientific Interest, **SINC** – Site of Importance for Nature Conservation, **NNR** – National Nature Reserve, **LNR** – Local Nature Reserve, **LWS** – Local Wildlife Site, **U** – Unconfirmed Site

Table 2: Designated Sites		
Site Name and Status[2]	***Reason for Designation***	***Approximate Distance and Location from the site***
Sud Meadow LWS	Semi-natural grassland.	1.9km north
Robinswood Hill Country Park LWS	Robinswood Hill Country Park LWS is designated for its semi-natural grasslands and populations of amphibians breeding in ponds. The country park supports mainly neutral lowland grassland and hay meadows, with calcareous grassland, broadleaved woodland and scrub. These habitats support plant species such as common spotted *Dactylorhiza fuchsia* and pyramidal orchids *Anacamptis pyramidalis*, badger, bird species such as kestrel *Falco tinnunculus,* sparrowhawk *Accipiter nisus* and green woodpecker *Picus viridis*, and a range of invertebrate species such as common darter *Sympetrum striolatum* and southern hawker *Aeshna cyanea* dragonflies.	1.8km east
Netheridge Reserve & Black Ditch U	Wetland site consisting of a lake with adjacent ponds, reedbeds, watercourses and drainage channels. Water voles were introduced to this site in 2005 and 2008.	30m south west
Daniel's Meadows & Brook U	Semi-improved neutral grassland and water vole interest.	1.9km south
Minsterworth & Corn Ham U	Low-lying damp meadows bordering River Severn. Majority now improved, but some Juncus meadows present.	1.9km west
Glos-Llanthony Secunda U	Pond or lake, Amphibian breeding pond-potential	1.6km (location unknown)
Glos-Linden U	Pond or lake, Amphibian breeding pond-potential	1.8km northeast
Glos-Linden U	Road, pavement and/or verge. Toad patrol location-potential	1.8km northeast

5.2.2 Alney Island LNR & LWS and Green Farm Orchard is considered to be of **County** value for nature conservation.

5.2.3 The LWSs and 'unconfirmed sites' are considered to be of **District** value for nature Conservation.

Natura 2000 Sites

5.2.4 In addition to the above, in their pre-application response Gloucester City Council (GCC) have identified Cotswold Beechwoods SAC, which is located approximately 6.6km to the southeast of the site, and the Severn Estuary SPA/SAC and Ramsar, located 11km to the south-west of the site as designations which may be affected by the development of the site. During the updated desk study undertaken in April 2022, Walmore Common Ramsar/SPA was identified approximately 6.7km west of the site.

Cotswold Beechwood SAC

5.2.5 This SAC is also designated as a NNR and SSSI. The SAC is approximately 590ha and the primary reason for its designation is the *Asperulo-Fagetum* beech forest it supports.

5.2.6 The JNCC citation states that "*The Cotswold Beechwoods represent the most westerly extensive blocks of Asperulo-Fagetum beech forests in the UK. The woods are floristically richer than the Chilterns, and rare plants include red helleborine Cephalanthera rubra, stinking hellebore Helleborus foetidus, narrow-lipped helleborine Epipactis leptochila and wood barley Hordelymus europaeus. There is a rich mollusc fauna. The woods are structurally varied, including blocks of high forest and some areas of remnant beech coppice*".

5.2.7 The designation also supports, semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) which is an Annex 1 habitat and a qualifying feature, but not a primary reason for selection.

5.2.8 In their pre-application response to Gladman Developments Limited (dated 07.01.2020), GCC have therefore requested that a Habitat Regulations Assessment is undertaken in respect of potential recreational impacts on this designation as a result of the development.

River Severn SPA / SAC / Ramsar

5.2.1 The Severn Estuary SAC, SPA, and Ramsar site is located approximately 11km south west from the development site at its closest point.

5.2.2 The Severn Estuary is designated for its marine habitats, fish species and wintering bird populations it supports.

5.2.3 The Severn Estuary is also designated for the following habitats:

- Sandbanks which are slightly covered by sea water all the time (Severn Estuary SAC and Ramsar);
- subtidal sandbanks (SAC and Ramsar);
- Estuaries (SAC and Ramsar);
- Mudflats and sandflats not covered by seawater at low tide; intertidal mudflats and sandflats (SAC and Ramsar);
- Reefs/rocky platforms (SAC); and
- Atlantic salt meadows (SAC and Ramsar).

5.2.4 The following species are qualifying features of the Severn Estuary SAC, SPA, and Ramsar:

- Sea lamprey *Petromyzon marinus* (SAC, Ramsar);
- River lamprey *Lampetra fluviatillis* (SAC, Ramsar);
- Atlantic salmon *Salmo salar* (Ramsar);
- Twaite shad *Alosa fallax* (SAC, Ramsar);
- European eel *Anguilla Anguilla* (Ramsar);
- Allis shad *Alosa alosa* (Ramsar);
- Sea trout *Salmo trutta* (Ramsar);
- Bewick's swan (Non-breeding*) Cygnus columbianus bewickii* (SPA and Ramsar)
- Common shelduck (Non-breeding) *Tadorna tadorna* (SPA and Ramsar);
- Gadwall (Non-breeding) *Anas strepera* (SPA and Ramsar);
- Dunlin (Non-breeding) *Calidris alpina alpina* (SPA and Ramsar);
- Common redshank (Non-breeding) *Tringa totanus* (SPA and Ramsar);
- Greater white-fronted goose (Non-breeding); *Anser albifrons* (SPA and Ramsar); and
- Water bird assemblage (SPA and Ramsar).

5.2.5 In their pre-application response to Gladman Developments Limited (dated 07.01.2020), GCC have therefore requested that a Habitat Regulations Assessment is undertaken in respect of potential recreational impacts on this designation as a result of the development.

5.2.6 ***Walmore Common Ramsar/SPA***

5.2.7 Walmore Common Ramsar and SPA is located approximately 6.7km west from the development site, at its closest point.

5.2.8 Walmore Common is designated as it is an internationally important site for supporting populations of Bewick's swan *Cygnus columbianus bewickii* and other winter wader birds. The habitats present include neutral grassland and open water ditches.

5.2.9 SPAs, SACs and Ramsar sites are of **International** value.

5.3 Habitats

5.3.1 The habitats recorded within the site and identified in the 2019 PEAR as being subject to potential adverse effects are summarised, below. Full details can be found within the PEA Report (WA, 2019). Habitats have not changed significantly since 2019; areas of scrub have altered and a section of hedgerow has been removed.

S.41 Habitat: Hedgerows

Species Rich Hedgerows

5.3.2 There are 6 species rich hedgerows within the survey area which are predominately located around the boundaries of the site (H1, H2, H5 and H7). H3 extends partway into the site from the northern boundary and H6 partway into the site from the southern boundary.

5.3.3 Each of these hedgerows has at least five woody species covering at least 80% of the entire hedgerow and therefore considered to be a 'priority habitat'. The hedgerows also provide suitable habitat for breeding and nesting birds and as well as foraging habitat for small mammals, invertebrates and bats. The species rich hedgerows are therefore considered to be of **District** nature conservation value.

Species Poor Hedgerows

5.3.4 A species poor hedgerow (H4) is located along the central section of the northern boundary, adjacent to the row of houses.

5.3.5 The hedgerows surveyed all consist of at least 80% native woody species and therefore qualify as a 'priority habitat' regardless of whether they are classified as species rich or species poor.

5.3.6 The species poor hedgerows within the site also provide suitable foraging, commuting and nesting habitat for wildlife and are therefore considered to be of **Local** value for nature conservation of site relevance.

S.41 Habitat: Pond

5.3.7 Waterbody 6 is approximately 1700m², surrounded by arable crop and approximately 15m from the southwest hedgerow.

5.3.8 At the time of the Phase 1 Habitat survey (July 2019) the pond was dry, however the updated survey in April 2022 found the pond to be holding water with a depth between 10-20cm. Dominant species within the pond area include square stalked willowherb (*Epilobium tetragonum),* water plantain (*Alisma plantago-aquatica),* rose bay willowherb (*Chamerion angustifolium)* and cuckoo flower (*Cardamine pratensis).* By 3rd May 2022 the pond was dry again.

5.3.9 Marginal habitat consists of semi-improved grassland.

5.3.10 It is understood this feature is an attenuation pond created in connection with development at Miller Way to the north and the A430 (Secunda Way) along the eastern boundary of the site. This attenuation pond was created in the southern part of the site prior to its inclusion within the flood plain.

5.4 The pond is therefore considered to be of **District** value for nature conservation.

S.41 Habitat: Stream

5.5 The stream along the southwestern boundary of the site is approximately 1m wide and <10cm deep, has a moderate flow in a westerly direction, a gravely substrate, and densely vegetated, steep banks. The stream connects to a network of waterways within the nature reserve and finally into the River Severn.

5.5.1 Rivers and streams are a S41 Priority habitat. The stream also has the potential to provide suitable commuting and foraging routes for a range of species, including bats, water vole and otter and forms part of the Netheridge Reserve & Black Ditch U and is therefore considered to be of **District** nature conservation value.

Dry Ditch

5.5.2 Dry ditches are located in the centre of the site and along the eastern boundary. The ditches are approximately 0.5m deep with a moderate gradient and densely vegetated.

5.5.3 Whilst both ditches contain no water or aquatic vegetation, and the terrestrial flora they support are common and widespread, these features provide habitat diversity and connectivity to the stream along the southern boundary of the survey area.

5.5.4 The dry ditches are considered to be of **Local** nature conservation value.

5.6 Fauna

Amphibians including great crested newts

5.6.1 The desk study returned six records of GCN within 2km of the site, including one approximately 185m to the northwest of the site, of which only 1 is located within 500m of the site boundary. This record is for a juvenile female located approximately 150m to the north west of the site at Chartwell Close.

5.6.2 Records for other amphibians within 2km of the site comprise:

- 16 records of common frog *Rana temporaria.*
- 13 records of common toad *Bufo bufo.*
- 4 records of palmate newt *Lissotriton helveticus.*
- 9 records of smooth newt *Lissotriton vulgaris.*

5.6.3 Great crested newt is included in the Biodiversity Action Plan for Gloucestershire.

5.6.4 A review of MAGIC has identified one great crested newt Natural England Licence (2014-2726-EPS-MIT) granted in 2014, for the damage of a resting place. The record is located to the northwest of the site, although the exact location is unclear. Should the location of the record be on the western side of the River Severn then this river would be a significant barrier to dispersal.

5.6.5 A review of OS data in 2019 and 2022 identified 21 waterbodies within 500m of the survey area as shown on Drawing Number GM10710-003 (Waterbody Location Plan) which is provided in Appendix 1.

5.6.6 Table 3 summarises the results of the pond scoping surveys undertaken in 2019.

Table 3: HSI Scores and Pond Scoping Results		
Waterbody Number	***Description***	***HSI Score***
1	Wet, still ditch. This ditch connects to Pond 2. The ditch is dry further south.	0.66 – Average
2	This pond is a large scrape within poor semi-improved grassland, the northern part of this pond is holding water and the southern part is dry.	0.59 – Below Average
3	A large waterbody within a field grazed by sheep.	0.59 – Below Average
4	This stream is approximately 1m wide and <10cm deep, has a moderate flow in a westerly direction, a gravely substrate, and densely vegetated banks.	-
5	A medium sized damp pond located within a poor semi-improved field grazed by cattle.	0.51 – Below Average
6	This pond is dry. It is approximately 1700m², surrounded by arable crop. Dominant species within the pond area include bulrush and soft rush (*Juncus effuses*) suggesting it is wet/damp at other times of year.	-
7	Shallow, medium flowing ditch. Banks densely vegetated.	0.73 – Good
8	Wet ditch with steep, densely vegetated banks. The ditch is surrounded by semi-improved grassland, mature trees and woodland.	0.58 – Below Average
9	Access refused.	-
10	Medium sized pond with bulrush and flag Iris around edges, covered in pondweed (*Potamogeton sp.*), mature trees surrounding north and east sides of pond.	0.73 – Good
11	Large pond with dense vegetation on banks with species such as common reed and rush sp. present. The wider area is surrounded by woodland areas and scrub.	0.83 – Excellent
12	Could not access pond due to dense scrub.	-
13	Wet, shallow pond, it is densely vegetated with bulrush and semi mature willows (*Salix* sp.) around the margins.	0.55 – Below Average
14	The water level could not be seen in this ditch due to dense bankside vegetation, however it is potentially shallow from areas that could be accessed. Densely vegetated with bulrush and flag Iris, dense scrub is located either side of the ditch.	-
15	No access because of very dense vegetation surrounding ditch. Ditch densely vegetated with bulrush and flag Iris.	-
16	Wet, shallow ditch vegetated with bulrush and compact rush (*Juncus conglomeratus*).	0.83 – Excellent
17	Wet ditch, surrounded by improved mowed grassland. It is vegetated with bulrush and flag Iris.	0.67 – Average
18	Wet shallow ditch surrounded by improved mowed grassland.	0.50 – Poor

Table 3: HSI Scores and Pond Scoping Results		
Waterbody Number	***Description***	***HSI Score***
19	Deep canal with concrete banks, no floating or marginal vegetation.	-
20	Dry ditch.	-
21	River Severn, flowing river, unsuitable for GCN.	-

5.6.7 During the 2022 updated walkover survey only Waterbody 6 was surveyed and assessed for GCN. All other waterbodies were inaccessible due to land access. Waterbody 6 was assessed as having average suitability with a HSI score of 0.67. Waterbody 6 was located at the toe of a small hill and was approximately 10 to 25 cm deep at the time of the survey. The pond was heavily vegetated with aquatic plants including square stalked willowherb, water plantain, rosebay willowherb and cuckoo flower with some marginal areas densely covered in algae.

5.6.8 The pond scoping results in 2019 revealed that there were twelve waterbodies which range from poor to excellent suitability for great crested newts located within 500m of the site. Five waterbodies were considered unsuitable and four waterbodies were unable to be accessed or assessed properly. During the updated walkover in 2022, only Waterbody 6 was accessible and noted as having average suitability for GCN due to presence of aquatic vegetation and open areas within the margins of the pond. There is potential for great crested newts to be present in up to sixteen of these waterbodies, even if in poor condition. Therefore, there is potential for great crested newts to be present in suitable terrestrial and aquatic habitats within the site particularly as there is a lack of significant barriers to dispersal existing in the intervening habitats located between the site and the waterbodies.

5.6.9 The terrestrial habitats on site however have limited potential to be used by amphibians, including great crested newt, with the field margins and hedgerows being of most value. The pond (waterbody 6) in the southern part of the site was wet at the time of the 2022 updated walkover survey but was dry by 3rd May.

5.6.10 The stream along the southwestern boundary of the site contains water with a moderate flow and is likely to support fish which may restrict usage by amphibians, however aquatic vegetation in some sections could restrict water flow and provide refuges from fish to allow amphibians to utilise this water course.

5.6.11 Waterbody 6 was noted as being suitable for breeding populations of GCN during the 2022 walkover. However, during a visit on 3rd May 2022 Waterbody 6 was found to be dry. It is therefore concluded that Waterbody 6 is unlikely to support GCN. The site may be used by low numbers of common amphibian species which are likely to be of no more than **Local** value for nature conservation.

Badger

5.6.12 All information on badgers has been provided within the **confidential** Badger Impact Assessment (Appendix 4). Owing to the sensitive nature of the data included, the report and findings should be made available to bona fide individuals only. No signs of badger were recorded during the updated walkover survey in April 2022.

Bats

5.7 **Desk Study**

5.8 GCER holds records of the following species within 2km of the site namely:

Common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula*, brown long-eared *Plecotus auritus*, Barbastelle *Barbastella barbastellus*, Daubenton's *Myotis daubentonii*, whiskered/Brandt's *Myotis mystacinus / Myotis branti*, greater horseshoe *Rhinolophus ferrumequinum*, and lesser horseshoe *Rhinolophus hipposideros*.

5.9 Roost records within 2km include:

- Whiskered/Brandt's roost (2015), 0.5km north of the site;
- Greater/Lesser Horseshoe (2018), 0.5km west of the site.
- Brown long-eared roost (2014), 1.5km north of the site; and
- Common pipistrelle roost (2015), 1.5km north of the site.

5.10 Bats (Barbastelle, Bechstein's bat, pipistrelle, greater horseshoe bat, lesser horseshoe bat) are included in the Biodiversity Action Plan for Gloucestershire.

5.11 **Activity Surveys**

5.11.1 Overall, at least eleven of the 17 British breeding species were recorded within the survey area during the activity surveys.

5.11.2 Species present during the 2019 bat activity surveys each month (July - September) are summarised in Table 4 below.

Table 4: Species present during the 2019 walked transect and automated detector surveys per month. Ticks (✔) represent species recorded that month and (-) were not recorded.

Species	*Month*		
	July	*August*	*September*
Common pipistrelle	✔	✔	✔
Soprano pipistrelle	✔	✔	✔
***Myotis* spp.**	✔	✔	✔
Noctule	✔	✔	✔[1]
Lesser horseshoe	✔	✔[1]	✔[1]
Nathusius' pipistrelle	✔[1]	✔[1]	-
Leisler's	✔[1]	✔[1]	-
Serotine	✔[1]	✔[1]	-
Greater horseshoe	-	✔[1]	✔[1]
Long-eared sp.	-	✔[1]	✔[1]
Barbastelle	-	-	✔[1]

[1] This species was only recorded during automated detector surveys.

5.11.3 As shown in Table 4, five of the eleven species were recorded consistently during the entire survey period including common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus*, *Myotis* spp., noctule *Nyctalus noctula* and lesser horseshoe *Rhinolophus hipposideros*. Nathusius' pipistrelle *Pipistrellus nathusii*, Leisler's *Nyctalus leisleri* and serotine *Eptesicus serotinus* were recorded in July and August. Greater horseshoe *Rhinolophus ferrumequinum* and long-eared sp. *Plecotus* were recorded in August and September and barbastelle was recorded in September.

Walked Transect Survey Results

5.11.4 The majority of the activity during 2019 was identified along the southwest and western hedgerow. Foraging and commuting behaviours were also identified along hedgerow H2 and scattered activity was associated with all hedgerow boundaries. No bat activity was observed within the open arable fields. Locations of bats recorded during the walked transects are shown on Drawing Numbers GM10710/101-104.

5.11.5 Of the five species recorded during the walked transect surveys, common and soprano pipistrelle and *Myotis* spp. were recorded every month, whereas noctule was only recorded in July and August and lesser horseshoe was only recorded in July.

5.11.6 In July, bats were observed along all boundaries of the western field. Soprano pipistrelles were observed commuting and foraging along all boundaries of this field and common pipistrelles were observed along the western and south

western hedgerows. A lesser horseshoe was observed commuting along the western hedgerow, *Myotis spp.* were primarily associated with the southwestern hedgerow and noctule was observed commuting close to the south-western boundary. Soprano and common pipistrelle foraging and commuting activity was also observed along the hedgerow boundaries of the central and eastern fields.

5.11.7 In August, the dusk walked transect survey identified common pipistrelle activity along all boundary hedgerows. Soprano pipistrelles were observed foraging and commuting along the western and southwestern hedgerows. *Myotis* spp. were identified along the southwestern hedgerow and noctule was recorded twice towards the south of the site. The dawn walked transect survey identified common pipistrelle activity along the northern, western and central eastern hedgerow and along the eastern treeline. Soprano pipistrelle activity was identified along the western, southwestern and central western hedgerow.

5.11.8 In September, common pipistrelle activity was identified along all hedgerow boundaries except the eastern treeline. *Myotis* spp. were recorded along the northern and western hedgerows and soprano pipistrelles were also observed along the western hedgerow.

Automated Detector Results

5.11.9 The locations of the automated detectors during the surveys in 2019 are shown on Drawing Number GM10710-105 Location of Automated Detectors.

5.11.10 A summary of activity recorded on the automated detectors and how it varies over the months is provided in Table 5 below.

Table 5: Total Calls Recorded Per Automated Detector Per Month

Month	***Automated Detector Location***			***Total calls/month***
	1	***2***	***3***	
	Total calls per automated detector			
July 2019	409	41	182	**632**
August 2019	271	321	260	**852**
September 2019	180	186	63	**429**
Total calls / Location	**860**	**548**	**505**	

5.11.11 The majority of calls recorded during the automated detector surveys were at Location 1 (47.3%), followed by Location 2 (27.4%) and Location 3 (25.3%) (Figure1).

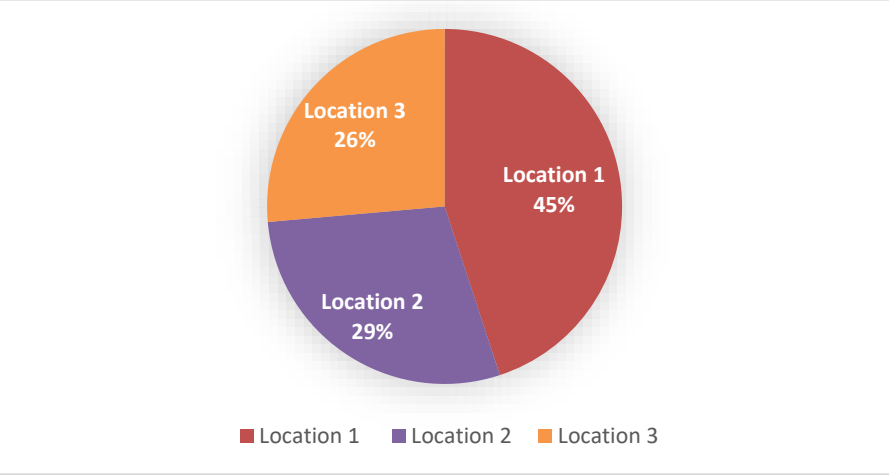

Figure 1 – Percentage of total activity per location during the 2019 static detector surveys

Species

5.11.12 The majority of total calls were common pipistrelle (63%), followed by *Myotis spp.* (17.6%), soprano pipistrelle (9.1%) and noctule (5.5%). All remaining recorded bats make up less than 2% of total calls recorded as shown in Figure 2. The high percentage of common pipistrelle and soprano pipistrelles is to be expected because they are common and widespread species. A high percentage of *Myotis spp.* was recorded likely due to the suitable surrounding habitat. The presence of greater horseshoe and barbastelle bats is significant given that these species are two of the rarest in England.

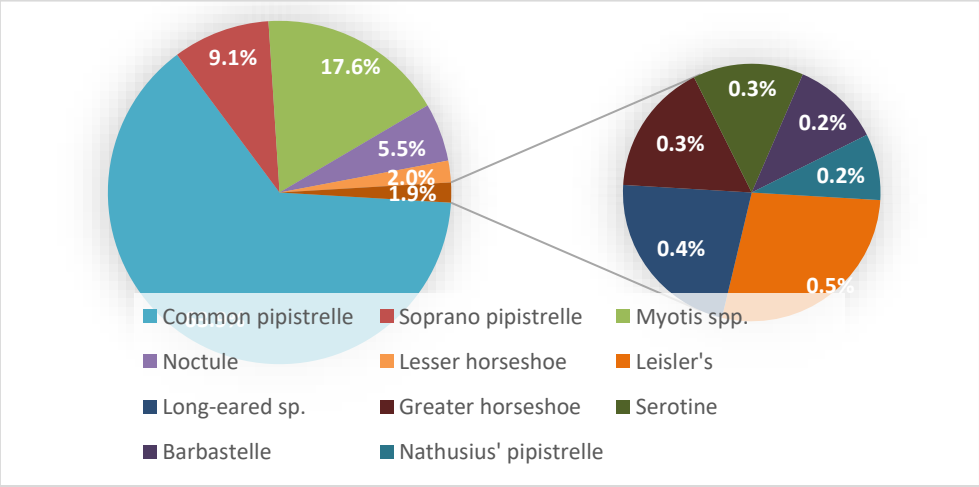

Figure 2 – Percentage of total activity by species during 2019 static detector surveys

5.11.13 All 11 bat species identified were recorded at detector Location 2 located along the central western hedgerow. At least 10 species were recorded at Location 1 and at least 8 species were recorded at Location 3.

5.11.14 Four passes of barbastelle were recorded in September at Location 2. Leisler's and long-eared bats were both recorded at Locations 1 and 2. All other species were recorded at all three locations as shown in Figure 3.

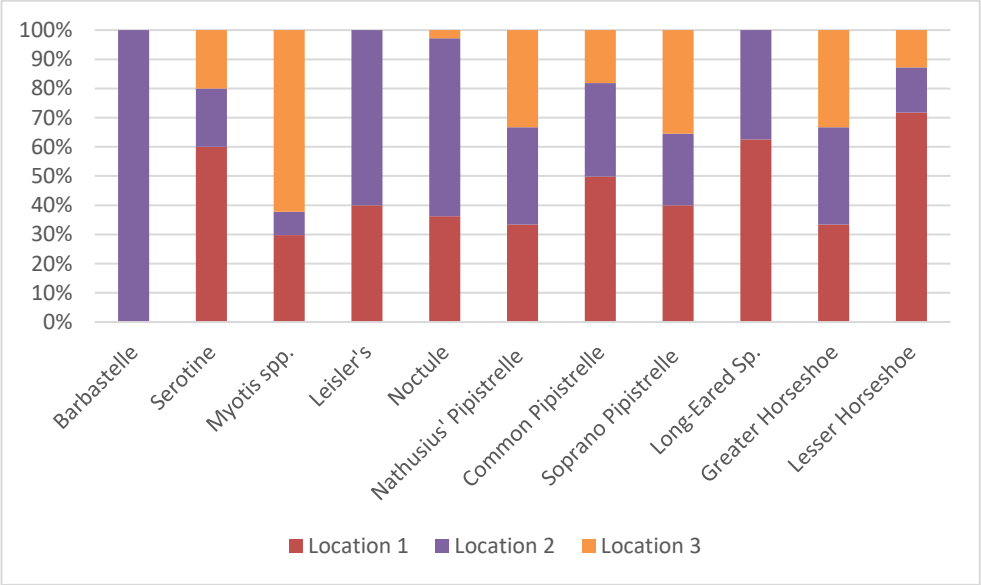

Figure 3 - Total Percentage of species recorded per automated detector location (July-September)

5.11.15 Common pipistrelle account for the highest number of total passes at all three locations. *Myotis* spp. were highest at Locations 1 and 3 followed by soprano pipistrelle. Noctule was the second highest at Location 2. The highest count for lesser horseshoe passes was 28 at Location 1. Location 1 also recorded the highest count for long-eared sp. and serotine. Recordings of greater horseshoe and Nathusius' pipistrelle passes were evenly recorded across the site. The highest count for barbastelle was at Location 2, as show in Table 6.

Table 6: Total species passes during automated detector Surveys 2019

Species	***Automated Detector Location***			***Total Passes***
	L1	***L2***	***L3***	
Barbastelle	0	4	0	4
Serotine	3	1	1	5
***Myotis* Spp.**	100	27	209	336
Leisler's	4	6	0	10

Table 6: Total species passes during automated detector Surveys 2019				
Species	***Automated Detector Location***			***Total Passes***
	L1	***L2***	***L3***	
Noctule	38	64	3	105
Nathusius' pipistrelle	1	1	1	3
Common pipistrelle	609	391	222	1222
Soprano pipistrelle	70	43	62	175
Long-eared sp.	5	3	0	8
Greater horseshoe	2	2	2	6
Lesser horseshoe	28	6	5	39
Grand Total	**860**	**548**	**505**	**1913**

Evaluation

5.11.16 Based on the results so far, overall, bat species diversity on the site includes at least 11 of the 17 British resident species and activity was identified along all hedgerow and tree line boundaries, no activity was noted in the middle of the open arable fields during the surveys. The highest levels of activity were noted along the boundaries of the western and central fields, with lower levels of activity along the boundaries of the eastern field, likely due to artificial light spill from the A430 and Hempsted Lane. This correlates with the static detector survey results which identified Location 3 (located approximately 50m from the A430) as recording the lowest diversity and total passes.

5.11.17 The majority of bat activity comprised that of common and widespread species specifically common pipistrelle, accounting for 64% of the activity and soprano pipistrelle, accounting for 9% of the activity within the site. Activity was recorded along all hedgerow and treeline boundaries during the walked transect survey and during the automated detector surveys the highest activity levels for these species was identified along the western hedgerow/bridleway. Given the upward trend in the British populations of common and soprano pipistrelle bats as well as the availability of other habitat within the wider landscape, these species are considered to be of **Local** nature conservation value based on current survey results.

5.11.18 Species of *Myotis* make up 17.6% of total static detector calls recorded and were frequently recorded during the walked transect survey along the bridleway, western and southwestern hedgerows. The static detector along the southwestern hedgerow (Location 3) recorded the highest number of *Myotis spp*. passes compared to the other two locations. The *Myotis* species recorded is likely to be Daubenton's given that

Location 3 is adjacent to the stream and wetland nature reserve. Given the level of *Myotis spp.* activity along the southwestern hedgerow, the population of this genus using the site is considered to be of **District** nature conservation value.

5.11.19 Noctule makes up 5.5% of total automated detector calls. The majority of the calls were recorded at Location 2, which is to be expected because noctules are a high-flying bat and the detector at location 2 was the least cluttered by vegetation. Given that noctule is relatively common and widespread in England, this species is considered to be of **Local** nature conservation value based on current survey results.

5.11.20 Lesser horseshoe makes up 2% of total automated detector calls, the majority of which were recorded at Location 1. This correlates with the walked transect results which identified a lesser horseshoe along the western hedgerow during the July visit. Gloucestershire is thought to be a stronghold for this species. Given that lesser horseshoe populations are stable but still considered rare in England, although Gloucestershire is thought to be a stronghold for this species,[3] the population of this species using the site is considered to be of **District** nature conservation value based on current survey results.

5.11.21 Barbastelle and greater horseshoe were recorded in low numbers during the surveys. Barbastelle is considered rare in Gloucestershire with a scattered distribution.[3] The distribution of greater horseshoe bats in the UK is limited to south-west England and south Wales. In Gloucestershire, this species is on the edge of their range in the UK. There are two known maternity colonies located within Gloucestershire and the distribution of greater horseshoe activity reflects the two areas surrounding the maternity roosts.[3] Given that both of these species are classified as rarest in England, the populations of these species using the site are considered to be of **District** nature conservation value based on current survey results.

5.11.22 Serotine and Nathusius' pipistrelle were recorded at all three locations in low numbers, a peak count of 3 passes at Location 1 for serotine and a peak count of 1 pass at all locations for Nathusius' pipistrelle, therefore, it is considered that the populations of these species using the site are of **Local** nature conservation value based on current survey results.

5.11.23 Leisler's and long-eared bat sp. were recorded in low numbers at Locations 1 and 2 which is to be expected if a device is on site for an extended period of time. These

[3] https://glosbats.org.uk/bats-in-gloucestershire/

species are not particularly rare in England and therefore it is considered that the populations of these species using the site are of **Local** nature conservation value based on current survey results.

5.11.24 Based on their conservation value alone, the populations of common and soprano pipistrelle, noctule, serotine, Nathusius' pipistrelle, Leisler's and long-eared bats using the site is not currently considered to be an 'important' ecological feature for the purposes of this assessment. However, all bats are legally protected species under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species and Planning (Various Amendments) (England and Wales) Regulations 2018. They are also listed as S41 species therefore must be considered to determine whether or not there is potential to contravene the governing legislation. All bat species will therefore be taken forward for an assessment of effects of development upon them.

Birds

5.11.25 GREC identified the following records of priority and red status birds within 2km search area in the last 10 years:

Table 7: GREC Bird Records

Species	*Status*	*Latest Record*	*On – Site (✔/ X)*	*Summer / Winter*
Arctic tern (*Sterna paradisaea*)	Amber	2013	X	Passage
Barn owl (*Tyto alba)*	Schedule 1	2016	✔	Both (foraging only)
Bewick's swan (*Cygnus columbianus subsp. bewickii*)	Red	2014	✔	Winter
Bittern (*Botaurus stellaris*)	Amber	2014	X	Winter
Black redstart (*Phoenicurus ochruros*)	Schedule 1	2015	X	Winter
Black-headed gull (Chroicocephalus ridibundus	Amber	2019	✔	Both (Foraging only)
Black-tailed godwit (*Limosa limosa*)	Schedule 1	2014	X	Winter
Yellow wagtail (Motacilla flava subsp. flava)	Red	2012	✔	Summer
Bluethroat (Luscinia svecica)	Schedule 1	2013	X	Passage
Brent Goose (Branta bernicla)	Amber	2019	X	Winter
Bullfinch (Pyrrhula pyrrhula)	Amber	2018	✔	Both

Caspian gull (Larus cachinnans)	Amber	2012	X	Winter
Cetti's warbler (*Cettia cetti*)	Schedule 1	2016	✔	Both
Common crossbill (*Loxia curvirostra*)	Schedule 1	2015	X	Both
Common gull (*Larus canus*)	Amber	2016	✔	Winter
Common sandpiper (*Actitis hypoleucos*)	Amber	2016	X	Passage / winter
Common tern (*Sterna hirundo*)	Amber	2014	X	Passage
Crane (*Grus grus*)	Amber	2014	X	Summer
Cuckoo (*Cuculus canorus*)	Red	2016	✔	Summer
Curlew (*Numenius arquata*)	Red	2019	✔	Winter
Dunlin (*Calidris alpine*)	Amber	2019	X	Winter
Dunnock (*Prunella modularis*)	Amber	2019	✔	Both
Fieldfare (*Turdus pilaris*)	Schedule 1	2019	✔	Winter
Gadwall (*Anas strepera*)	Amber	2019	X	Both
Garganey (*Anas querquedula*)	Schedule 1	2015	X	Passage / Summer
Glaucous gull (*Larus hyperboreus*)	Amber	2014	X	Winter
Goldeneye (*Bucephala clangula*)	Red	2014	X	Winter
Goshawk (*Accipiter gentilis*)	Schedule 1	2014	✔	Both (Hunting only)
Grasshopper warbler (*Locustella naevia*)	Red	2016	X	Summer
Green sandpiper (*Tringa ochropus)*	Amber	2018	X	Both
Grey wagtail (*Motacilla cinerea*)	Red	2016	✔	Winter
Greylag goose (*Anser anser)*	Amber	2018	X	Winter
Herring gull *(Larus argentatus)*	Red	2019	X	Both
Hobby (*Falco subbuteo*)	Schedule 1	2016	✔	Summer (Hunting only)
House martin (*Delichon urbicum)*	Red	2014	X	Summer
House sparrow (*Passer domesticus*)	Red	2018	✔	Both
Kestrel (*Falco tinnunculus*)	Amber	2019	✔	Both (Hunting only)
Kingfisher (*Alcedo atthis*)	Schedule 1	2019	✔	Both
Lapwing (*Vanellus vanellus*)	Red	2016	✔	Both
Lesser redpoll (*Acanthis cabaret*)	Red	2016	X	Winter
Linnet (*Linaria cannabina*)	Red	2019	✔	Both

Little ringed plover (*Charadrius dubius)*	Schedule 1	2017	X	Summer
Marsh tit (*Poecile palustris*)	Red	2011	X	Both
Merlin (*Falco columbarius*)	Schedule 1	2014	X	Winter
Mistle thrush (*Turdus viscivorus*)	Red	2016	✔	Both
Moorhen (*Gallinula chloropus)*	Amber	2019	X	Both
Nightingale (*Luscinia megarhynchos*)	Red	2016	X	Summer
Peregrine (*Falco peregrinus*)	Schedule 1	2018	X	Both
Pink footed goose *(Anser brachyrhynchus)*	Amber	2015	X	Winter
Pintail (*Anas acuta)*	Amber	2019	X	Both
Pochard (*Aythya farina)*	Red	2016	X	Winter
Red kite (*Milvus milvus*)	Schedule 1	2019	✔	Both (Foraging only)
Redstart (*Phoenicurus phoenicurus)*	Amber	2019	X	Summer
Redwing (*Turdus iliacus*)	Schedule 1	2019	✔	Winter
Reed bunting (*Emberiza schoeniclus*)	Amber	2019	✔	Both
Rook (*Corvus frugilegus)*	Amber	2019	✔	Both
Ruff (*Philomachus pugnax)*	Schedule 1	2016	X	Both
Shelduck (*Tadorna tadorna)*	Amber	2019	X	Both
Short-eared owl (*Asio flammeus*)	Amber	2016	✔	Winter
Shoveler (*Spatula clypeata)*	Amber	2019	X	Both
Skylark (*Alauda arvensis*)	Red	2016	✔	Both
Song thrush (*Turdus philomelos*)	Red	2019	✔	Both
Sparrowhawk (*Accipiter nisus)*	Amber	2014	X	Both
Spotted flycatcher (*Muscicapa striata*)	Red	2016	X	Summer
Tree pipit (*Anthus trivialis*)	Red	2014	X	Summer
Mallard	Amber	2019	✔	Both
Starling (Sturnus vulgaris)	Red	2018	X	Both
Stock dove	Amber	2019	✔	Winter (Foraging)
Swift (*Apus apus)*	Red	2019	✔	Summer
Meadow pipit	Amber	2016	✔	Winter
Tawny owl	Amber	2015	✔	Both (Hunting only)
Teal (*Anas crecca*)	Amber	2019	X	Both

Whooper swan (*Cygnus cygnus)*	Amber	2019	X	Winter
Whimbrel (*Numenius phaeopus)*	Red	2014	X	Summer
Whinchat (*Saxicola rubetra)*	Red	2019	✔	Summer
Whitethroat (*Curruca communis)*	Amber	2019	✔	Summer
Wigeon (*Anas Penelope)*	Amber	2019	X	Both
Willow warbler *(Phylloscopus trochilus)*	Amber	2019	X	Summer
Woodpigeon (*Columba palumbus)*	Amber	2019	✔	Both
Yellowhammer	Red	2015	✔	Both
Yellow wagtail *(Motacilla flava)*	Red	2018	✔	Both

5.11.26 Many of the species associated with wetlands require either large lakes, gravel pits, dense reedbeds, reservoirs or other large coastal wetland habitat. These species include: arctic tern, bittern, black-tailed godwit, bluethroat, brent goose, caspian gull, common sandpiper, common tern, crane, dunlin, gadwall, garganey, glaucous gull and goldeneye. As the southern section of the site is a floodplain, which only holds water at certain times of the year some of these species may use the site occasionally over winter, however it is unlikely they will be using it for breeding or feeding.

5.11.27 Black redstarts are largely limited to coastal and urban areas; therefore, they are unlikely to be present on the site.

5.11.28 Grasshopper warbler, marsh tit, nightingale, spotted flycatcher, tree pipit and common crossbill are all associated with woodland and open heathland habitats. As there is no woodland or heathland habitats on the site these species are unlikely to be present.

5.11.29 There is no woodland habitat on site to support merlin and there are no suitable nesting sites/buildings for peregrine. No evidence of these species was observed during the EP1 survey therefore it is unlikely that they are using the site.

5.11.30 The site consists of arable fields, trees, hedgerows, stream and temporary floodplain habitats which have the potential to support a variety of breeding birds including yellow wagtail, bullfinch, Cetti's warbler, cuckoo, dunnock, house sparrow, kingfisher, lapwing, linnet, mistle thrush, reed bunting, skylark, song thrush, mallard, yellowhammer which have been recorded within 2km of the site.

5.11.31 The site also provides wintering and foraging opportunities for a variety of species including barn owl, Bewick's swan, black-headed gull, common gull, curlew, fieldfare, goshawk, grey wagtail, hobby, kestrel, red kite, redwing, short-eared owl, stock dove, meadow pipit, tawny owl and lesser redpoll.

5.11.32 The foraging habitats on site are considered poor for barn owl, however a barn owl was observed opportunistically foraging over the arable fields during a bat survey on the site on site in 2019.

5.11.33 Farmland birds (skylark, linnet, reed bunting, corn bunting, tree sparrow, grey partridge, bullfinch, turtle dove, song thrush) are listed in the Biodiversity Action Plan for Gloucestershire. The arable farmland habitats within the site have potential to support these LBAP species and five of these species have been recorded within 2km of the site. Should populations of these species be present within the site then the farmland bird assemblage could potentially be of at least **District** value to nature conservation.

5.11.34 The remaining breeding and wintering bird assemblages likely to be using the site are likely to be of value at a **Local** scale. Whilst the bird assemblage is of local nature conservation value, breeding birds will be taken forward for further assessment as the application site provides suitable habitat for species listed on Schedule 1 of the Wildlife & Countryside Act 1981 (as amended), protected, notable and S41 species. In addition, breeding birds are protected under the Wildlife and Countryside Act 1981 (as amended) and therefore must be considered to determine whether or not there is potential to contravene the governing legislation.

European otter

5.11.35 The desk study returned three records of otter within 2km of the site, all of which are associated with the Gloucester and Sharpness Canal, which is located 0.1km to the east. Otters are listed on the Biodiversity Action Plan for Gloucestershire.

5.11.36 No evidence of otter activity was observed along the stream along the southern boundary of the site during the Extended Phase 1 Habitat Survey (2019) and the updated walkover survey (2022) however, this stream connects with the canal in the east and could therefore be used by otter on an occasional basis as a movement corridor or for foraging. Otters are a highly mobile species and have large home ranges and it is not possible to conclude that individuals will not use this section of stream in the future. Individuals of this species which may occasionally use the site are

considered to be of **Local** value to nature conservation. However, as otter is a protected and S41 species, this species will be taken forward for further assessment.

Water vole

5.11.37 There are two recent records for water voles on Daniels Brook approximately 1.8km to the south of the site. Water vole are listed on the Biodiversity Action Plan for Gloucester.

5.11.38 The stream along the southwestern boundary is part of the Netheridge Reserve, which is managed by Gloucestershire County Council (GCC) and Gloucestershire Wildlife Trust (GWT) for water voles. The stream along the southwestern boundary connects to the watercourses and wetland areas that comprise the Netheridge Reserve. No evidence of water vole was observed along the stream along the southwestern boundary of the site, however the watercourse is suitable for supporting this species therefore their presence is assumed. Water voles are widespread in the UK and can be locally common but are vulnerable to extinction. Given that a colony may be present within the site and that water vole are listed on the Biodiversity Action Plan for Gloucester, any population of water vole using the site is considered to be of at least **District** value to nature conservation.

Bony fish including European eels and Atlantic salmon

5.11.39 There were no recent records of Atlantic Salmon or European eels returned on the desk study within the last 10 years.

5.11.40 The stream along the southwestern boundary of the site has the potential to provide suitable habitat for eel and connects to The Rea where there are records for this species. The stream is unsuitable for supporting Atlantic salmon.

5.11.41 Any eel population present could be of at least **Local** value for nature conservation.

White-clawed Crayfish

5.11.42 There are no records for white-clawed crayfish within 2km of the site and the stream along the southwestern boundary of the site is considered to have limited suitability for supporting this species due to its location on the floodplain. Any white-clawed crayfish present would be vulnerable to being displaced by flood waters. White-clawed crayfish are therefore not considered further in this assessment.

Common reptiles

5.11.43 GCER hold records for grass snake, common lizard and slow worm within 2km of the survey area:

- 1 record of grass snake (*Zootoca vivipara*) approximately 1.7km to the north-west of the site from 2020.
- 10 records of slow worm (*Anguis fragilis*). The closest record is approximately 400m to the southeast of the site, recorded in 2018. The most recent record is approximately 2.1kmto the northeast of the site, from 2018

5.11.44 During the Extended Phase 1 Habitat Survey (2019) and updated walkover survey (2022), the habitats within the site were considered to provide limited potential for common reptiles, with the hedgerows and scrub being of most value.

5.11.45 If present, the population of reptiles on site would be likely to be low. Reptiles which may be using the site are therefore considered to be of **Local** nature conservation value.

5.11.46 Based upon their conservation value alone, the population and assemblage of common reptiles using the site is not considered to be an 'important' ecological feature for the purpose of EcIA. However, common reptiles are afforded legal protection under the provisions of the Wildlife & Countryside Act 1981 (as amended), therefore they must be assessed to determine whether or not there is the potential to contravene the governing legislation. They will therefore be taken forward for an assessment of the effects of development upon them.

European Hedgehog

5.11.47 GCER hold 68 records of European hedgehog within 2km of the survey area. The habitats within the site, notably the hedgerows and scrub could provide suitable foraging, resting and hibernating opportunities for hedgehogs, but are overall considered to be of low suitability for this species. The site is therefore unlikely to support a population of high value of this species. Hedgehog is therefore considered to be of **Local** nature conservation value. As hedgehog is listed on S41 of the NERC Act, they will be considered further to assess whether the construction and operation phase activities have the potential to give rise to significant adverse effects on this species.

S41 Invertebrates

5.11.48 GERC have provided records for the following notable and priority invertebrates within 2km of the site:

- **White ermine** (*Spilosoma lubricipeda*) - is a S41 species in terms of research only and associated with a variety of habtats including gardens, hedgerows, grassland in most rural and urban habitats. The caterpillar feeds on a range of plants including common nettle and dock species[4].
    - **Small phoenix** (Ecliptopera silaceata) is a S41 species associated with both woodland and open habitats. The main larval foodplants are willowherb species.
    - **Ghost moth** (Hepialus humuli humuli) is a S41 species in terms of research only and is associated with "grassy and weedy places in woodland and open areas"5. The caterpillars feed on a variety of herbaceous plants including common nettle, dock species, burdocks and wild strawberry (Fragaria vesca).
    - **Mouse Moth** (Amphipyra tragopoginis) is a S41 species and is associated with a variety of habitats. The larva also feed on a variety of plants so habitat type seems relatively unimportant to this species.
    - **Green-brindled Crescent** (Allophyes oxyacanthae) is a S41 priority species and is associated with woodland, scrub, hedgerow and gardens. The larvae feed on a variety of woody species including hawthorn and blackthorn.
    - **Rustic** (Hoplodrina blanda) is a S41 species associated with a variety of open habitats. The larva feed on a variety of herbaceous plants.
    - **Rosy Rustic** (Hydraecia micacea) is a S41 species associated with a variety of open habitats. The larva feed on a variety of herbaceous plants.
    - **Brown-spot Pinion** (Agrochola litura) is a S41 species associated with woodland and heathland. When young, the larvae feed on herbaceous plants when young, and then the leaves of deciduous trees, such as oak species and hawthorn.
    - **Centre-barred Sallow** (Atethmia centrago) is a S41 species associated with woodland and hedgerows. The main foodplant is ash.

[4] https://butterfly-conservation.org/moths/white-ermine

[5] https://butterfly-conservation.org/moths/ghost-moth

- **Deep-brown Dart** (Aporophyla lutulenta) is a S41 species associated with a variety of habitats. The larvae feed on grass species and shrubs such as hawthorn.
- **Powdered Quaker** (Orthosia gracilis) is a S41 species associated with a variety of habitats, often occurring where willow species are present.
- **Feathered Gothic** (Tholera decimalis) is a S41 species. The main foodplants are grass species therefore this species is associated with rough grassland and down land.

5.11.49 The primarily arable habitats within the site are considered unsuitable to support the above species. These species could occur however in the more suitable habitats such as the hedgerows. As these habitats are limited within the site, any populations of the above species would likely be small and restricted in extent within the site and therefore considered to be of **Local** nature conservation value.

S41 flowering plants.

5.11.50 There is a record of tubular water-dropwort (*Oenanthe fistulosa*) 1.7km to the north of the survey area along the River Severn. This species is associated with wetlands and along waterbodies therefore the stream corridor along the south western boundary and the pond have the potential to provide suitable habitat for this species. This species favours lightly shaded habitats and is a poor competitor therefore ideal habitat conditions are those subject to a cutting or grazing regime[6]. This species was not observed during the Extended Phase 1 Habitat Survey, pond scoping surveys or updated walkover survey and given the lack of management of the stream corridor and pond, is considered unlikely to be present.

5.12 Summary

5.12.1 Table 8 below summarises the Nature Conservation Value for each ecological feature, identifies the sensitive receptors (important ecological features) and the reasons for including / excluding this feature from further assessment.

[6] Stroh, P.A. 2015. *Oenanthe fistulosa* L. Tubular Water Dropwort. Species Account. Botanical Society of Britain and Ireland.

Table 8: Summary of Evaluation of Significance & Sensitive Receptors				
Category	***Feature***	***Nature Conservation Value***	***Sensitive Receptor (Important ecological feature to be considered further)***	***Reason for excluding / including within further assessment***[7]
Statutory and Non-Statutory Designated Sites	Cotswold Common Beechwoods SAC	International	Yes	International Designation
	Severn Estuary SPA / SAC / Ramsar	International	Yes	International Designation
	Walmore Common Ramsar/SPA	International	Yes	International Designation
	Alney Island (LNR & LWS)	County	Yes	local Nature Reserve
	Green Farm Orchard LWS	District	Yes	Local Wildlife Site
	Sud Meadow LWS	District	Yes	Local Wildlife Site
	Robinswood Hill Country Park LWS	District	Yes	Local Wildlife Site
	Netheridge Reserve & Black Ditch U	District	Yes	Proposed Local Wildlife Site
	Daniel's Meadows & Brook U	District	Yes	Proposed Local Wildlife Site
	Minsterworth & Corn Ham U	District	Yes	Proposed Local Wildlife Site
Habitats	S.41 Habitat: Hedgerows	Local / District	Yes	S41 Priority Habitat
	S.41 Habitat: Pond	District	Yes	S41 Priority Habitat
	S41 Habitat: Stream	District	Yes	S41 Priority Habitat
	Dry Ditch	Local	No	Habitat not of high conservation value
Species	Badger	Information on Badger is provided in Confidential Appendix 4 which is provided separately to this report.		
	Bats	Local – District	Yes	WCA & CHSR
	Birds	Local – District	Yes	WCA
	Otter	Local	Yes	S41 Priority Species, WCA & CHSR

[7] **WCA** – Wildlife and Countryside Act 1981 (as amended); **BA –** Badger Act 1992; **CHSR -** The Conservation of Habitats and Species and Planning (Various Amendments) (England and Wales) Regulations 2018, **S41** – Section 41 of the NERC Act; Red List – RSPB's list of species of high conservation concern.

Table 8: Summary of Evaluation of Significance & Sensitive Receptors				
Category	***Feature***	***Nature Conservation Value***	***Sensitive Receptor (Important ecological feature to be considered further)***	***Reason for excluding / including within further assessment***[7]
	Amphibians	Local	Yes	WCA
	Water vole	District	Yes	WCA & S41 Priority Species
	Bony fish including European eels and Atlantic salmon	Local (Eel only)	Yes	S41 Priority Species
	White-Clawed Crayfish	N/A	No	Unlikely to be present
	Reptiles	Local	Yes	WCA & S41 Priority species
	Hedgehog	Local	Yes	S41 Priority Species
	S41 Invertebrates	Local	Yes	S41 Priority Species
	S41 flowering plants.	N/A	No	Unlikely to be present

Baseline Conditions without Development (the 'Do Nothing' scenario)

5.12.2 Existing habitats within the survey area are predominantly managed for agriculture i.e arable land with boundary hedgerow.

5.12.3 Should the survey area continue to be used for agriculture and current national trends remain, a further decline of species diversity associated with farmland habitats is expected within the survey area. Examples of this include intensive management of hedgerow field boundaries including chemical spraying.

5.12.4 Should the mature trees continue to be unmanaged, it is expected that the level of decaying / dead wood as well as natural roosting features would increase and therefore the suitability for roosting bats would increase.

6 ASSESSMENT OF EFFECTS, MITIGATION AND RESIDUAL EFFECTS

6.1.1 The CIEEM Guidelines state:

> *"The assessment should include potential impacts on each ecological feature determined as 'important' from all phases of the project (e.g. construction, operation and decommissioning)"*
>
> and
>
> *"One of the key challenges of Ecological Impact Assessment is to decide which ecological features (habitats, species, ecosystems and their functions/processes) are important and should be subject to detailed assessment….it is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable".*

6.1.2 The rationale used to select or deselect species, habitats and sites from detailed impact assessment needs to be clearly explained in relation to its value and whether or not there is potential for legislation to be contravened. In the case of this EcIA, all ecological features that are assessed as being of **District** to **International** value are considered to be 'important' and therefore require further assessment. In addition, where protected species are present and their population/assemblage has been assessed as being of **Local** value and the project has the potential to contravene legislation, these are also considered to be important ecological features and will be assessed further.

6.1.3 In accordance with CIEEM Guidelines, effects are assessed for each stage of the Proposed Development, mitigation measures proposed and the significance of residual effects identified for each ecological receptor in turn.

6.1.4 Potential impacts have been broadly assessed based on the information provided in the 'Development Framework Plan (Drawing Number GM10710 – 012 Rev H).

Mitigation

6.1.5 Impacts in the first instance should be avoided in line with the 'mitigation hierarchy':

- Avoidance – Seek design options that avoid harm to ecological features.
- Mitigation – Adverse effects should be avoided or minimised through the implementation of mitigation measures.

- Compensation – Where there are significant residual adverse effects, despite the mitigation measures proposed, these should be offset by appropriate compensatory measures.
- Enhancement – Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

6.1.6 The CIEEM Guidelines refers to avoiding and/or minimising impacts by incorporating measures into the scheme design at the earliest stages. This approach has been adopted to inform the design and layout of the Proposed Development, thereby avoiding some significant effects upon ecological features from the outset.

6.1.7 Habitats on site will be permanently lost as a result of the residential development, landscaping and the infrastructure. However, the built development will be predominantly located on the areas of arable land, thereby minimising effects upon some of the more ecologically valuable habitats (i.e. hedgerows, stream corridor and ponds) within the site.

6.2 Design Solutions and Assumptions

6.2.1 The Masterplanning process has sought to retain as many of the hedgerows and standard trees within hedgerows within the site as possible, which will be incorporated into areas of public open space. This will retain movement corridors for wildlife across the site. Where this has not been possible, due to development parcels or road layout, the loss of sections of hedgerows have been kept to a minimum.

6.2.2 An existing waterbody (drainage basin) will be retained within the site and a new drainage basin will be created to the north-east of the existing waterbody to receive surface runoff from the built development.

6.2.3 The stream located along the south-western boundary of the site is being retained.

6.3 Assessment of Effects

Statutory and Non-statutory Designated Sites

Cotswold Common Beechwoods SAC

6.3.1 The SAC is designated for its *Asperulo-Fagetum* beech forest and semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia).

6.3.2 In their pre-application response to Gladman Developments Limited (dated 07.01.2020), GCC requested that a Habitat Regulations Assessment is undertaken in

respect of potential recreational impacts on Cotswold Beechwoods SAC as a result of the development, which is provided in Appendix 8. The findings of the HRA are summarised below and written in the context of an Ecological Impact Assessment which can consider 'mitigation by design' in order to determine effects.

Construction Phase Effects

6.3.3 The proposed development site is located approximately 6.6km to the southeast of the Cotswold Common Beechwoods SAC, as the crow flies.

6.3.4 Due to the distance from the site, no significant permanent or temporary direct impacts on the habitats of this designated site as a result of the construction phase of the proposed development have been identified.

Mitigation

6.3.5 No mitigation required.

Operational Phase Effects

6.3.6 The proposed development will comprise up to 215 residential dwellings. Following construction, there will be an increase in the population in the area which could increase the pressure from recreational activities, especially walking, cycling and dog walking, on the qualifying features of the designation. There could also be significant adverse effects on the SAC should there be a change in air quality from increased traffic within 200m of Cotswold Beechwoods SAC.

6.3.7 Increased visitor pressure at the SAC could cause a loss of ground flora through trampling and path widening in the grassland and woodland habitats for which the SAC is designated. The SAC could also be subject to habitat and water erosion from an increase in mountain biking or horse-riding activities, particularly if bikers and riders stray from bridleways. Increased visits from dog-walkers originating from the proposed development could contribute to local nutrification of the soil from faeces which could affect calcareous ground flora composition.

6.3.8 A visitor survey conducted by Footprint Ecology in 2019[8] found that 45% of visitors were using the SAC for walking (without a dog) followed by 40% for dog-walking. The

[8] Footprint Ecology (2019) Cotswold Beechwoods Visitor Survey 2019

SAC was also being used by visitors for running/jogging, horse riding, cycling/mountain biking, family outing, work, bird/wildlife watching and enjoying scenery and fresh air.

6.3.9 A key finding of the visitor survey was that *'linear distances between survey points and home postcodes showed the average (mean) was 27.5 km (± 5.2 SE), but half lived within 7.2 km (median) and three quarters within 20.5 km (of the survey point interviewed at). Considering only those visiting directly from home the values were; average (mean) of 14.9 km, 50% of 6.0 km (median) and 75% of 15.4 km.'*

6.3.10 The visitor survey results suggest that approximately 17% of visitors originated from Gloucester post codes and overall 50% of visitors originated from within 7.2km of the site (directly from home 50% within 6km). The proposed development is located approximately 6.6km from the SAC and so falls between these two values. The survey results also show that the majority of people (79%) have visited the SAC before indicating that repeat visits by any new resident is a possibility.

6.3.11 Given the visitor survey findings, it is likely that new residents from the proposed development will visit the SAC at some point and may do so more than once. Due to the distance between the proposed development and the SAC it is highly unlikely that the new residents will visit the SAC on a regular daily basis and new residents may not contribute significantly to effects on the SAC when considered alone. However, when considered in-combination with other developments, particularly those being brought forward / being allocated in the current or emerging Local/City Plans for Gloucester, Stroud, Tewkesbury, Cotswold and Cheltenham districts, the new residents at the proposed development could contribute to a significant effect on the SAC from an increase in recreational pressure.

6.3.12 The development proposals include for the following areas of public open space as shown on the Development Framework Plan (Drawing Number GM10710 – 012 (Rev H dated 20.01.20)) provided in Appendix 1. Access through and beyond the development to existing agricultural land will be maintained:

- 4.81ha Public Open Space (informal recreation) to include footways;
- 0.87ha of incidental greenspace, habitat enhancement and meadow-grass margins;
- 0.04ha of Local Equipped Area for Play; and
- 0.1ha of Neighbourhood Equipped Area for Play.

6.3.13 These areas will provide an area of suitable alternative greenspace which new residents will be able to use on a regular day to day basis. Residents from other nearby existing residential areas would also be able to utilise these new areas of public open greenspace which may detract them from visiting the SAC. The public open space will form part of the green infrastructure within the local area. Residents will be encouraged to use these newly created open spaces for their recreational activities by creating paths through the open space that make it accessible to residents.

6.3.14 Given the above open space proposals, it is considered that there will be no significant effects on Cotswold Beechwoods SAC as a result of the development.

6.3.15 The woodland and grassland habitats within the SAC are both sensitive to emissions. In the Habitat Regulations Assessment report prepared for the Gloucester City Plan[9] which sets out site allocations for housing, significant effects which may occur through changes in air quality as a result of increased traffic on the A46 which is located within 200m of the SAC were considered. Their assessment highlighted only two of the site allocations as potentially causing in-combination effects. These were both located within 3km of the SAC. It can therefore be inferred that any development located over 3km from the SAC would not generate traffic close to the SAC which would be likely to significantly affect the SAC. The proposed development is located 6.6km from the SAC to the west of the M5 corridor. It is anticipated that new residents would not be using the A46 on a regular, daily basis for commuting and general travel and therefore no significant effects on the SAC are anticipated in relation to changes in air quality.

Mitigation

6.3.16 No mitigation required.

Residual Effects

6.3.17 There will be no significant residual effects on Cotswold Beechwood SAC from either the construction phase or the operational phase of the development.

Severn Estuary SAC/SPA/Ramsar

6.3.18 The Severn Estuary SAC/SPA/Ramsar is designated for its marine habitats, fish species and wintering bird populations it supports.

[9] Enfusion (2019) Gloucester City Plan 2011-2031 HRA Revised Screening and Appropriate Assessment Report

6.3.19 In their pre-application response to Gladman Developments Limited (dated 07.01.2020), GCC requested that a Habitat Regulations Assessment is undertaken in respect of potential recreational impacts on Severn Estuary SPA as a result of the development, which is provided in Appendix 8. The findings of the HRA are summarised below and written in the context of an Ecological Impact Assessment which can consider 'mitigation by design' in order to determine effects.

Construction Phase Effects

6.3.20 The proposed development site is located approximately 11km to the northeast of the Severn Estuary SAC/SPA/Ramsar, as the crow flies.

6.3.21 Due to the distance from the site, no significant permanent or temporary direct impacts on the habitats of this designated site as a result of the construction phase of the proposed development have been identified.

Mitigation

6.3.22 No mitigation required.

Operational Phase Effects

6.3.23 The proposed development will comprise up to 215 residential dwellings. Following construction, there will be an increase in the population in the area which could increase the pressure from recreational activities, especially walking, cycling and dog walking, on the qualifying features of the designation.

6.3.24 The Habitat Regulations Assessment report prepared for the Gloucester City Plan presents expert advice from statutory and non-statutory consultees regarding potential for recreational pressures to impact on the Severn Estuary SAC/SPA/Ramsar site, particularly on the bird populations for which the SPA and Ramsar site are designated.

6.3.25 Natural England (NE) advice given to GCC highlighted how despite the distance between the site's designated boundaries (in this case 11km away), the Gloucester City Plan area abuts the River Severn. The river is functionally linked to the designated site and the life and productivity of the SPA birds.

6.3.26 NE further advised that *"As of yet there is no established zone of influence for recreational pressures on the Severn Estuary SAC/SPA/Ramsar site in Gloucester City or an evidence-based understanding of what scale of development would trigger impacts."*

6.3.27 Stroud District Council (SDC), a neighbouring authority, have developed a Strategy for Avoidance of Likely Significant Adverse Effects on the Severn Estuary SAC/SPA/Ramsar Site (December 2017)[10] which was informed by a visitor survey conducted by EPR[11] in 2016. The visitor survey found that over half (51.6%) of the groups interviewed used the site for dog walking. According to the report, a linear visitor catchment distance of 7.7 km from the Severn Estuary (Stroud District) has been proposed, based on 75% of groups living within the Stroud District having travelled from within this distance. The report states that whilst a visitor catchment of 7.7km would only pick up 50% of the total visitors (including those from outside the District), it would include 81% of walkers and dog walkers. It also shows that increasing the catchment distance to 10km would not pick up significantly more total visits than at 7.7km.

6.3.28 SDC's Strategy for Avoidance of Likely Significant Adverse Effects on the Severn Estuary SAC/SPA/ Ramsar Site therefore defines a 7.7km zone of influence for the Stroud area for use in HRAs.

6.3.29 The proposed development is located approximately 11km from the Severn Estuary. Using the 7.7km zone of influence defined by SDC, this would indicate no significant effects on the Severn Estuary from recreational impacts from the proposed development. Further to this the development proposals provide a suitable alternative area of greenspace which new residents will be able to utilise on a regular day to day basis. The public open space will form part of the green infrastructure of the area. Residents will be encouraged to use these newly created open spaces for their recreational activities by creating paths through the open space that make it accessible to residents.

Mitigation

6.3.30 No mitigation required.

Residual Effect

6.3.31 There will be no significant residual effects on Severn Estuary SAC/SPA/Ramsar from either the construction phase or the operational phase of the development.

[10] Stroud District Council (2017) Strategy for Avoidance of Likely Significant Adverse Effects on the Severn Estuary SAC, SPA and Ramsar Site

[11] EPR (2016) Severn Estuary (Stroud District) Visitor Survey Report

Walmore Common Ramsar/SPA

6.3.32 Walmore Common Ramsar/SPA is located approximately 6.7km west from the development site at its closest point.

6.3.33 Walmore Common is designated as it is internationally important for supporting populations of Bewick's swan *Cygnus columbianus bewickii* and other winter wader birds. The habitats present include neutral grassland and open water ditches.

Construction Phase

6.3.34 Due to the distance from the site, no significant permanent or temporary direct impacts on the habitats of this designated site as a result of the construction phase of the proposed development have been identified.

Mitigation

6.3.35 No mitigation required.

Operational Phase Effects

6.3.36 The Habitat Regulations Assessment report prepared for the Gloucester City Plan presents the potential significant effects alone or in combination with other local plans.

6.3.37 The GCP HRA report stated that it is considered unlikely that recreational increase will affect the designation due to the distance from the site allocations and the small scale of the developments.

6.3.38 The HRA for the Forest of Dean and Stroud Local Plan Review both screened out this designated site for disturbance due to the reasons stated above therefore the GCP concluded that there will be no adverse effects on Walmore Common SPA, alone or in combination.

6.3.39 The GCP outlined that although the SPA is functionally linked to the River Severn which links to the development site, it is unlikely any significant effects will arise due to the distance and small size.

6.3.40 It has been noted that changes to water levels and quality could occur through the incorporation of renewable energy along the River Severn and canal however there are multiple policies in place to mitigate for the effects of this on the SPA.

6.3.41 The GCP stated that there is potential for traffic to increase along the A48, which is located within 200m of the SPA. The increase in air pollutants is likely to be short

ranged and will not directly affect the SPA due to a distance of more than 5km between the site and designation.

6.3.42 Mitigation measures from in combination plans are also in place which would encompass Walmore Common SPA therefore it can be concluded that the SPA will not be adversely affected by increased air pollution.

Residual Effects

6.3.43 There will be no significant residual effects on Walmore Common Ramsar/SPA from either the construction phase or the operational phase of the development.

Green Farm Orchard LNR

6.3.44 Green farm orchard is designated for its remainders of an old apple and pear orchard.

Construction Phase Effects

6.3.45 The LNR is situated directly east of the Gloucester and Sharpness Canal, which is connected hydrologically to the stream along the south western boundary of the site. The watercourse flows from the canal in a westerly direction.

6.3.46 Due to the hydrological connectivity with the site there is potential for poolution during the construction phase to affect the LNR.

Mitigation

6.3.47 Standard pollution prevention measures delivered as part of a Construction Environment Management Plan (CEMP) would avoid any risk of pollution affecting the LNR.

Operational Phase Effects

6.3.48 Following construction, there will be an increase in the population in the area which could increase the pressure from recreational activities, especially walking, cycling and dog walking, on the habitats and species this designation supports.

6.3.49 A public footpath is situated along the southern boundary of Green Farm Orchard LNR, with roads and public rights of way connecting the site to the designation. However, as the LNR is approximately 1km away (as the crow flies), it is considered that residents moving into the development are more likely to use the surrounding countryside to the south and west of the development on a regular day to day basis.

6.3.50 Additionally, areas of public open space have been incorporated into the design of the proposed development which will form part of the green infrastructure of the area.

Residents will be encouraged to use these newly created open spaces for their recreational activities by creating paths through the open space that make it accessible to residents.

6.3.51 Therefore, whilst some residents from the development may utilise the LNR, it is considered that there will be no significant increase in footfall, noise or disturbance events from the residents moving into the development on this designated site.

Mitigation

6.3.52 No mitigation required.

Residual Effect

6.3.53 There will be no significant residual effects on the LNR from either the construction phase or the operational phase of the development.

Alney Island (LNR & LWS), and Sud Meadow LWS

6.3.54 Alney Island LNR and LWS is designated for coastal & floodplain grazing marsh, ponds, ditch, lowland meadows, wet woodland, reedbed, plant and dragonfly interest.

6.3.55 Sud Meadow LWS is designated for its semi-natural grassland.

Construction Phase Effects

6.3.56 These designations are located approximately 1.7km from the site (as the crow flies) and are upstream from the site, therefore, no significant permanent or temporary direct impacts on the habitats of these designated sites as a result of the construction phase of the proposed development have been identified.

Mitigation

6.3.57 No mitigation required.

Operational Phase Effects

6.3.58 Following construction, there will be an increase in the population in the area which could increase the pressure from recreational activities, especially walking, cycling and dog walking, on the habitats and species these designations support.

6.3.59 Four long distance footpaths pass through Alney Island LNR/LWS which is a prime location for viewing the 'Severn bore', which reaches its peak at this location, attracting visitors from around the globe.

6.3.60 A public footpath is present along the northern boundary of Sud Meadow LWS, parallel to the River Severn. Access to this designation is available via the Severn Way track in the south-west, and Hemmingsdale Road and Sudmeadow Road in the south-east.

6.3.61 An increase in footfall and potential increase in dog presence from residents moving into the development could lead to a change in the ground flora of the grassland vegetation due to increased trampling and erosion along paths, although this effect may be reduced due to the presence of footpaths.

6.3.62 Areas of public open space have been incorporated into the design of the proposed development. These areas of public open space will form part of the green infrastructure of the area. Residents will be encouraged to use these newly created open spaces for their recreational activities by creating paths through the open space that make it easily available to residents.

6.3.63 Therefore, whilst some residents from the development may utilise the designations, it is considered that there will be no significant increase in footfall, noise or disturbance events from the residents moving into the development on these designated sites.

Mitigation

6.3.64 No mitigation is required.

Residual Effect

6.3.65 There will be no significant residual effect on the LNR and LWSs from either the construction phase or the operational phase of the development.

Robinswood Hill Country Park LWS

6.3.66 Robinswood Hill Country Park LWS is designated for its semi-natural grasslands and populations of amphibians breeding in ponds.

Construction Phase Effects

6.3.67 Due to the distances of these designations from the site, no significant permanent or temporary direct impacts on the habitats of this designated site as a result of the construction phase of the proposed development have been identified.

Mitigation

6.3.68 No mitigation is required.

Operational Phase Effects

6.3.69 Following construction, there will be an increase in the population in the area which could increase the pressure from recreational activities, especially walking and dog walking (cycling is not permitted) on the habitats and species these designations support.

6.3.70 Numerous way-marked trails pass through Robinswood Hill Country Park LWS with extensive views across the Severn Vale, the Forest of Dean and the Cotswolds. A café and play area are also present, attracting visitors. Visitor numbers are not controlled but visiting hours are restricted to 9:00am to 18:30pm most days.

6.3.71 A ProW borders the southern boundary of The Knoll, Robinwood Hill U connecting to a network of trails within Robinswood Hill Country Park LWS. A series of pathways surrounds the nursing home, but access is restricted to members of the public.

6.3.72 Increased footfall to the designations from residents moving into the development could potentially affect the designation by increasing the erosion of ground flora within the grassland both alongside paths and away from paths. Negative interactions with the woodland through increased noise levels and disturbance could potentially lead to changes in the woodland bird assemblage.

6.3.73 Areas of public open space have been incorporated into the design of the proposed development. These areas of public open space will form part of the green infrastructure of the area. These newly created open spaces will be accessible to new residents for their recreational activities by the creation of footpaths.

6.3.74 Therefore, whilst some residents from the development may utilise the designations, it is considered that there will be no significant increase in footfall, noise or disturbance events from the residents moving into the development on these designated sites.

Mitigation

6.3.75 No mitigation is required.

Residual Effects

6.3.76 There will be no significant residual effect on the LWS and U from either the construction phase or the operational phase of the development.

Netheridge Reserve & Black Ditch U

6.3.77 Netheridge Reserve and Black Ditch U is designated for its wetland and population of water voles and is located adjacent to the south--west of the site. The watercourse along the southwestern boundary of the site is part of this designation.

Construction Phase Effects

6.3.78 There will be no habitat loss of the stream along the south western boundary of the site which forms a part of the Netheridge Reserve and Black Ditch U. The creation of public open space and footpaths close to the southwestern boundary could potentially affect the ditch through damage e.g. through encroachment of machinery. This could also potentially disturb water voles, damage their burrows and decrease their foraging area temporarily. These effects could be significant at a district scale.

6.3.79 The stream along the southwestern boundary of the site flows in a westerly direction from the Gloucester and Sharpness Canal in the east to watercourses within The Rea, Hempsted U to the east, which in turn flow into the River Severn beyond. The construction of the Proposed Development without mitigation could have a direct, temporary, long-term effect on the water quality within the watercourses on site, and therefore the water quality within the U designations and potentially also affect the water vole population. These designations could potentially be adversely affected during the construction works as a result of the following:

- Exposure of bare ground, earth movement, mobilising of sediment into surface water receptors through runoff from the site;
- Wheel washing run-off, or muddy run-off from highways and construction access tracks within the site;
- Pollution due to vandalism of stores or plant;
- Poor/inappropriate storage of materials and chemicals/fuels and wastes such as on permeable surfaces, adjacent to watercourses or without sufficient bunding capacity;
- Accidental spillages of fuels and polluting materials such as concrete;
- Creation of preferential pathways via piling operations, drainage schemes and services corridors; and

- Pumping of silt-laden surface water or groundwater accumulated on the application site or via de-watering directly into controlled waters.

6.3.80 The severity of the adverse effect on the watercourses on site and therefore the designations is dependent on the scale and longevity of the pollution event. It is considered that without mitigation and depending on the scale of the pollution event there could be a significant adverse effect at up to a district scale on the designations.

6.3.81 The designations could also potentially be affected by an increase in dust during the construction phase of the development. The closest point of Netheridge Reserve & Black Ditch U is adjacent to the southern boundary of the site and the closest point of

6.3.82 The Air Quality Assessment (Wardell Armstrong January 2010) states that "*During the construction phase, the risk of dusk soiling effects is classed as medium for earthworks and construction and low for trackout; the risk of human health effects is classed as low for earthworks, construction and for trackout*". It is considered that there would be a direct significant temporary adverse effect on the U designations at a district scale without mitigation.

Mitigation

6.3.83 Best practice guidelines as outlined in the CIRIA SuDS Manual 2015 will be followed to prevent damage or pollution to the retained waterbodies on site. Mitigation will be implemented by way of inclusion within the CEMP for the Site. The CEMP will address activities such as vehicle washing, works in or near water, storage of construction equipment and materials, waste management and water use and disposal.

6.3.84 Water quality associated with the development runoff will be managed through the following treatment train before it discharges to the watercourse;

- Gully Pots on highways to remove physical sediment and contaminant;
- Hydrocarbon interceptor; and
- Attenuation pond to collect residual fine sediment and adsorbed contaminants.

6.3.85 As stated in the Air Quality Assessment, a best practice dust mitigation plan will be written and implemented for the site. This will set out the practical measures that will be incorporated as part of a best working practice scheme. This will take into account the recommendations included within the Institute of Air Quality Management '*Guidance on the Assessment of Dust from Demolition and Construction*', which include but are not limited to:

- Revegetate mitigation and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable;
- Protection of surfaces and exposed material from winds until disturbed areas are sealed and stable;
- Dampening down of exposed materials, which will be stored as far from sensitive receptors as possible;
- Ensuring sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Avoidance of activities that generate large amounts of dust during windy conditions;
- Ensuring bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
- Avoiding dry sweeping of large areas;
- Using water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the Site. This may require the sweeper being continuously in use;
- Ensuring that all vehicles entering and leaving the site are covered when loaded to prevent escape of materials during transport;
- Implementing a wheel washing system (with rumble grids to dislodge accumulated dust and mu prior to leaving site where reasonably practicable);
- Minimising vehicle movements and limitation of vehicle speeds – the slower the vehicle speeds, the lower the dust generation;
- Ensuring there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever the site and layout permits; and
- Access gates to be located at least 10m from receptors, where possible.

Operational Phase Effects

6.3.86 There is the potential for the water quality of the stream along the southwestern boundary, therefore the U designations, to be affected once the site is operational due to the following:

- Sediment within surface water runoff;
- Contaminants from vehicle movements within the site (i.e. pollutants within the runoff from hard standing areas such as roads and parking areas);
- Accidental spillages; and
- Discharge of wastes, chemicals or foul water to surface water sewer drains or ground.

6.3.87 The change of land use from agricultural to residential development will reduce the level of agricultural chemicals discharged into the ditches and watercourses, however, there will be an increase in run-off from hard surfaces within the development once complete which in turn could increase pollution within the ditches and watercourses. A proposed drainage basin is located within the site which will receive surface water runoff from the built development.

6.3.88 Following construction, there will be an increase in the population in the area which could increase the pressure from recreational activities, especially walking and dog walking, on the habitats and species these designations supports.

6.3.89 Increased footfall from residents moving into the development could lead to a change in ground flora of the grasslands due to increased trampling and erosion of paths. Additionally, an increase in noise and disturbance events and potential dog presence could potentially impact upon fauna using the areas, particularly water vole for which the Netheridge Reserve & Black Ditch U is partly designated for.

6.3.90 Two pathways are present within the Netheridge Reserve & Black Ditch U, however the wetland area is not accessible via public rights of way/footpaths. Areas of public open space are proposed in the southern part of the site, adjacent to the stream along the south western boundary of the site, which forms part of this designation, therefore habitat management and disturbance from recreational activities in close proximity to this stream could give rise to significant adverse effects on this designation.

6.3.91 Public rights of way around The Rea, Hempsted U are limited, a PRoW intersects a small section of the designation to the east from Rectory Lane and Rea Lane, connecting to a footpath parallel to the River Severn, with a short footpath surrounding a waterbody at the southern boundary of the designation. Therefore, whilst some residents from the development may utilise this short section of footpath, impacts on this designation arising from recreation are not considered to be significant.

Mitigation

6.3.92 Water quality associated with the development runoff will be managed through the following treatment train before it discharges to the watercourse;

- Gully Pots on highways to remove physical sediment and contaminant;
- Hydrocarbon interceptor; and
- Attenuation pond to collect residual fine sediment and adsorbed contaminants.

6.3.93 The Proposed Development will implement a surface water drainage system that provides sustainable drainage measures. Surface runoff will be received into a proposed drainage basin. The surface water drainage system will aim to enhance existing habitats and provide new habitats within the Site wherever possible.

6.3.94 Areas of public open space have been incorporated into the design of the proposed development which will form part of the green infrastructure of the area. These newly created open spaces will be accessible to new residents for their recreational activities via footpaths however these will not be located in close proximity (i.e. within 10m) of the stream along the south western boundary.

6.3.95 A LEMP will be developed for the site which will set out management prescriptions for the areas of public open space and ensure that appropriate measures are undertaken during the implementation of the LEMP to safeguard the stream and any water voles which may be present. This could be through appropriate timing and methods of working.

Residual Effects

6.3.96 Following mitigation, there will be no significant adverse residual effects on the stream along the south western boundary and therefore the Netheridge Reserve & Black Ditch U. It is considered that there will be significant beneficial residual effect on the water quality within the watercourses on site following the cessation of

agricultural farming practices and therefore the designations at a district level, providing that no pollution events occur from surface runoff entering the watercourses post-construction.

Daniel's Meadows & Brook U

Daniel's Meadow & Brook U which is located approximately 1.9km to the south of the site, is designated for its semi-improved grassland and water vole interest. Daniel's Brook which intersects the designation in the south-east, connects to the Gloucester and Sharpness Canal, which connects to the stream along the south western boundary of the site.

Construction Phase Effects

6.3.97 Whilst this designation is hydrologically connected to the site, the stream along the south western boundary flows in a westerly direction away from the Gloucester and Sharpness Canal and Daniels Brook, therefore no significant permanent or temporary direct or indirect impacts on the this designation as a result of the construction phase of the proposed development have been identified.

Mitigation

6.3.98 No mitigation is required.

Operational Phase Effects

6.3.99 Following construction, there will be an increase in the population in the area which could increase the pressure from recreational activities, especially walking and dog walking, on the habitats and species this designation supports.

6.3.100 Increased footfall from residents moving into the development could lead to a change in ground flora of the grasslands due to increased trampling and erosion of paths. Additionally, an increase in noise and disturbance events and potential dog presence could potentially impact upon fauna using the areas, particularly water vole for which Daniel's Meadow & Brook U is partly designated for. However, access to the designation is limited. An approximate 2km walk is required along the busy A430 or via Hempsted Lane and Bristol Road to reach the designation from the site by foot, or a four-minute drive by car. The surrounding countryside to the south and west of the development are most likely to be regularly used by residents from the development on a daily basis rather than the designation.

6.3.101 Areas of public open space have been incorporated into the design of the proposed development and will form part of the green infrastructure of the area. These newly created open spaces will be accessible to new residents for their recreational activities by the creation of footpaths however these will not be located in close proximity (i.e. within 5m) of the stream along the south western boundary.

6.3.102 Therefore, whilst some residents from the development may utilise this designation, it is considered that there will be no significant increase in footfall, noise or disturbance events from the residents moving into the development on this designation.

Mitigation

6.3.103 No mitigation is required.

Residual Effects

6.3.104 There will be no significant residual effect on this designation from either the construction phase or the operational phase of the development.

Minsterworth & Corn Ham U

6.3.105 Minsterworth & Corn Ham U is designated for low-lying damp meadows bordering the River Severn. The majority is now improved grassland, but some *Juncus* meadows present. The designation is situated approximately 1.9km to the west of the site. A series of ditches are present across the designation.

Construction Phase Effects

6.3.106 Due to the distance from the site, and no hydrological connections being identified, no significant permanent or temporary direct impacts on the habitats of this designated site as a result of the construction phase of the proposed development have been identified.

Mitigation

6.3.107 No mitigation is required.

Operational Phase Effects

6.3.108 Following construction, there will be an increase in the population in the area which could increase the pressure from recreational activities, especially walking and dog walking, on the habitats and species this designation supports.

6.3.109 Increased footfall from residents moving into the development could lead to a change in ground flora of the grasslands due to increased trampling and erosion of paths. Additionally, an increase in noise and disturbance events and potential dog presence could potentially impact upon fauna using the areas. However, access to the designation is limited. A ProW is present running parallel to the River Severn along the south-east, south and west of the designation, the remainder of the designation is not accessible to the public.

6.3.110 The surrounding countryside to the south and west of the development are most likely to be used by residents from the development rather than the designation.

6.3.111 Areas of public open space have been incorporated into the design of the proposed development. These areas of public open space will form part of the green infrastructure of the area. Residents will be encouraged to use these newly created open spaces for their recreational activities by creating paths through the open space that make it easily available to residents.

6.3.112 It is therefore considered that there will be no increase in footfall, noise or disturbance events from the residents moving into the development on this designated site.

Mitigation

6.3.113 No mitigation is required.

Residual Effects

6.3.114 There will be no significant residual effect on the designation from either the construction phase or the operational phase of the development.

Habitats

S.41 Habitat: Hedgerows

Construction Phase Effects (Hedgerow Loss and Damage)

6.3.115 The Masterplanning process has sought to retain as many of the hedgerows and standard trees within hedgerows within the site as possible, which will be incorporated into areas of public open space. This will retain movement corridors for wildlife across the site. Where this has not been possible, due to development parcels or road layout, the loss of sections of hedgerows have been kept to a minimum.

6.3.116 The proposals will require the loss of approximately 187m (13.5%) of species rich hedgerows within the site to accommodate infrastructure and built development

which will be permanent and irreversible. Approximately 987m of species rich hedgerows and the entire length of species poor hedgerows (210m) will be retained. The hedgerow losses and gains are summarised in Table 9 below:

Table 9: Summary of Hedgerow Losses and Gains

Hedgerow Reference	***Existing Length (m)***	***Length to be Lost***	***Length Retained***
H1 (Species Rich)	125	0	125
H2 (Species Rich)	140	5m (2 x 2.5m footpaths)	135
H4 (Species Poor)	210	0	210
H5 (Species Rich)	148	22.5 (20m vehicular access + 2.5m footpath)	125.5
H6 (Species Rich)	190	44.5 (development parcel and 2.5m footpath)	145.5
H7 (Species Rich)	456	0	456
TOTAL	**1384**	**187**	**1197**

6.3.117 Works to create the open space and built development, such as ground preparation and re-seeding could lead to damage of retained hedgerow vegetation, including trees, shrubs and ground flora.

6.3.118 The existing areas adjacent to the hedgerows are currently part of an agricultural landscape, with ploughing already occurring in many of the fields either right up to their edges or within a few metres. It is, therefore, unlikely that works to create adjacent open space would introduce any new effects with regard to damage to roots of the trees over that already occurring during normal agricultural activities. Damage or removal of trees, shrubs or ground flora could, however, still occur by ingress from plant involved in construction activities and if resulting in the removal of mature trees, could result in a long-term effect.

6.3.119 Overall, the loss / damage of hedgerow habitat could give rise to adverse effects on this habitat type significant at up to a district scale.

Mitigation

6.3.120 As part of the proposed development approximately 330m of hedgerow planting will be undertaken. The new hedgerows will comprise native species of local provenance. The ratio of proposed hedgerow planting (gain) to hedgerow loss is 1:1.76. The new planting has been located in the southwest part of the site, separating the area of Public Open Space and built development. This hedgerow planting will result in an overall gain of approximately 143m of hedgerow habitat.

6.3.121 The retained hedgerows will be protected from ingress by machinery during construction works by the erection of tree protection fencing at an appropriate distance. The exact distance will be informed by the Tree Protection Plan (Drawing GM10710-018-A) and recommended root protection zone. Fencing will be in accordance with BS 5837:2012 Trees in relation to design, demolition and construction. This will provide a buffer to the hedgerows from construction phase activities. It is important that the fencing is maintained over the course of the construction phase with regular monitoring of its position and condition undertaken and any damage or re-positioning is rectified promptly. This mitigation will be implemented by way of inclusion within the CEMP for the Site.

Operational Phase Effects

6.3.122 The proposed development could preclude management of hedgerows if the layout and design of open space areas are inappropriately designed and/or if sympathetic on-going management is not secured as part of the management regime for open spaces.

6.3.123 Lack of sympathetic hedgerow management would lead to changes in the structure of hedges. Without management, the hedgerows are likely to grow tall and become more open in structure and in addition, the diversity in hedgerow structure across the site, would reduce. A variety of hedgerow structures across a site promotes use by various species, promoting biodiversity, especially with regard to breeding and foraging birds.

6.3.124 A lack of hedgerow management across the site would result in a long-term and non-reversible adverse effect on hedgerow structure and function. However, it is unlikely to lead to a loss in the diversity of woody species which makes the hedgerow 'species-rich'. There will be a significant adverse effect at the district scale.

Mitigation

6.3.125 Areas of public open space will be designed so that access for machinery to undertake hedgerow management is retained. In addition, the maintenance regime for the retained hedgerows within the site will be detailed within a LEMP to be implemented to achieve a mixture of hedgerows of different heights and widths, all with thick, bushy bases.

6.3.126 This is likely to be achieved by implementing the following:

- Maintain hedgerows to a height of no less than 2m (except when laid or coppiced as part of a regular management cycle);
- Do not cultivate or apply fertilisers, manures or pesticides to land within 2m of the centre of the hedgerow;
- Cut each hedgerow no more than once every three calendar years, cutting no more than a third of the hedgerows each year or, cut each hedgerow no more than once every two calendar years between 1st January and 28th February only, cutting no more than a half of the hedgerows each year;
- Do not cut hedgerows during the bird breeding season (1st March to 31st August);
- Where already present, saplings can be left to grow into hedgerow trees at intervals, for example four trees randomly spaced over 200m; and
- Where a length of hedge has more than 10% gaps, plant up gaps with locally native shrubs typical of the hedge to achieve a hedgerow which has no more than 10% gaps.

Residual Effects

6.3.127 It is considered that there will be no significant residual effect on hedgerows at any scale from the construction or operational phase of the development.

S.41 Habitat: Pond

Construction Phase Effects

6.3.128 The existing attenuation pond is being retained within area of public open space within the development. Works to create the open space and built development, such as ground preparation and re-seeding could lead to direct damage of the pond although this effect would to be limited to the margins and not affect the entire extent of the pond. Additionally, this pond could be indirectly affected by a pollution event. These adverse impacts are considered to be temporary and reversible in nature and would be significant at a district scale.

Mitigation

6.3.129 Best practice guidelines as outlined in the CIRIA SuDS Manual 2015 will be followed to prevent damage or pollution to the retained pond on site. Temporary barrier fencing will be installed at a suitable distance from the perimeter of the pond to prevent ingress from machinery. Measures to protect the retained pond during construction will be implemented by way of inclusion within a CEMP for the site.

Residual Effects

6.3.130 No residual adverse effects on the pond are anticipated. With the introduction of enhancement measures (see Section 8) the proposed development is likely to result in a significant beneficial effect on this feature.

S.41 Habitat: Stream

Construction Phase Effects and Mitigation

6.3.131 The impacts on water quality within the stream along the southwestern boundary and appropriate mitigation measures have been discussed within the Netheridge Reserve & Black Ditch Usection above (Paragraphs 7.3.65 – 7.3.85).

Residual Effects

6.3.132 No residual effects from the construction phase are anticipated.

Operational Phase Effects and Mitigation

6.3.133 The impacts on water quality within the stream along the southwestern boundary and appropriate mitigation measures have been discussed within the Netheridge Reserve & Black Ditch Usection above (Paragraphs 7.3.65 – 7.3.85).

Residual Effects

6.3.134 No residual effects from the operational phase are anticipated.

Fauna

Amphibians

Construction Phase Effects - Site Clearance (loss of foraging/commuting/resting/ breeding habitat)

6.3.135 The baseline studies suggest that there is limited potential for GCN to be using the habitats on site, however their presence cannot be entirely ruled out.

6.3.136 The on-site pond (Waterbody 6) is being retained, however there is a risk that it could be directly and indirectly impacted upon as a result of construction activities or creation of habitat in areas of Public Open Space.

6.3.137 The creation of infrastructure, built development and habitat creation/enhancements in the areas of Public Open Space will result in permanent and temporary losses of terrestrial habitat potentially used by amphibians, if present.

6.3.138 It is therefore considered that there are two main impacts on GCN from the construction of the Proposed Development.

Construction Phase effects - Habitat Loss/Damage

6.3.139 The extent of terrestrial habitat damage/loss has been inputted into Natural England's Rapid Risk Assessment (RRA) tool which has been used to assess the likely requirement for a European Protected Species (EPS) mitigation licence. The RRA tool which forms part of the Natural England licence method statement (Natural England, 2008[12]) assesses the risk of an offence being committed based on the size of the working area and distance from a breeding pond for GCN.

6.3.140 Based on terrestrial habitat loss/damage in the proximity of waterbody 6 and 4 of 0.01ha of land within 100m of a breeding pond, 0.02ha within 100-250m of a breeding pond and 0ha between 250 and 500m, the RRA suggests that risk of an offence is **Green: offence highly unlikely to occur**, assuming that no GCN are harmed as a result of the proposed works. However, the risk assessment tool does not take into account

[12] Natural England (2008*) Great Crested Newt Method Statement Form* WML –A14-2 – version December 2015

site-specific details such as population size, terrestrial habitat quality, dispersal barriers and timing and duration of the works.

6.3.141 Approximately 4.81ha of Public Open Space and 0.87ha of 'incidental greenspace, habitat enhancement and meadow and grassland margins' will be created as part of the development proposals. These areas of habitat will be created in the western, southern and eastern parts of the site. An approximately 330m length of hedgerow is being created in the south western part of the site and will provide another connecting corridor between hedgerow H1 in the north west and hedgerow H7 and the stream along the south western boundary. Habitat creation measures will therefore significantly increase the amount of suitable habitat available for use by amphibians, including GCN, for foraging, resting / hibernation and breeding in the long-term.

Construction Phase effects - Disturbance/Killing/Injuring individual GCN

6.3.142 There is a risk that a small number of GCN could be disturbed and/or harmed by clearance and construction works that affect hedgerows, scrub and field margins, if present. This risk increases if works are undertaken whilst GCN are hibernating (i.e. once night-time temperatures are consistently below 5 degrees C – generally November to February inclusive) as being disturbed during this time increases the risk of mortality.

6.3.143 The creation of areas of Public Open Space also has the potential to disturb/kill/injure GCN that may be present at the time of the works. These works will also create habitats suitable for GCN and which may encourage them into these parts of the site (e.g. rubble/soil mounds and basins).

6.3.144 It is considered likely that only a very small number of GCN would be utilising the terrestrial habitats in the site and also that these individuals would mainly be restricted to the hedgerows, scrub and field margin habitats within close proximity to the aquatic features.

6.3.145 The proposed development is likely to significantly increase the amount of suitable habitat available for GCN in the long-term which in turn would be expected to improve the Favourable Conservation Status of the local GCN population.

Mitigation – Habitat Damage / Loss

6.3.146 The loss of terrestrial habitat is considered unlikely to constitute an offence under the Habitat Regulations.

Mitigation – Damage to retained Pond

6.3.147 Construction works will not be undertaken in close proximity to Waterbody 6 or the stream along the southwestern boundary of the site.

6.3.148 Waterbody 6 will be protected from ingress by machinery during the works to create open space by the erection of protective barrier fencing at an appropriate distance.

6.3.149 Best practice guidelines as outlined in the CIRIA SuDS Manual 2015 will be followed to prevent damage or pollution to the retained pond on Site. Measures to protect the retained pond during construction will be implemented by way of inclusion within a CEMP for the Site.

Mitigation – Killing / Injury to individuals

6.3.150 It is considered that risk of harm to GCN can be reduced through the implementation of Reasonable Avoidance Measures (RAMs). An EPS licence from Natural England is therefore not considered necessary for works within the site.

6.3.151 RAMs are included with the Precautionary Working Method Statement (PWMS) for reptiles and amphibians provided in Appendix 9 however a summary is provided below:

- In order to prevent damage to retained hedgerows and trees, excavations near these habitats will be undertaken in accordance with BS5837:2012 – Trees in relation to construction;
- A buffer along the retained hedgerows/field margins to be clearly marked to prevent excavations from encroaching into this habitat;
- Undertaking excavation works within the arable fields between November and February (inclusive) i.e. when GCN activity is expected to be low or negligible (providing that night-time temperatures are consistently below 5 degrees C);
- Materials which could potentially be used by amphibians as refuges will be stock piled more than 500m from Waterbody 6 and the stream along the south western boundary or, if this is not practicable will be temporarily stockpiled within 500m, but will be stored above ground (e.g. on a wooden pallet) and wrapped in a geotextile membrane or stored in bags to prevent use by GCN as hibernacula;
- Keeping the length of construction / landscaping works to a minimum (risk of harm to GCN is reduced the shorter the duration of the works);

- Cutting taller grassland vegetation and scrub to 150mm and maintaining a short sward prior to construction to increase the area's unsuitability for GCN;
- Wooden planks to be positioned within any open excavations to allow any animals (including GCN) to escape; and
- A toolbox talk and/or method statement will be given to contractors to notify them of the potential presence of GCN, the methods employed to protect them, if present, and what to do if one is discovered.

6.3.152 If GCN are encountered at any time, works will cease and advice sought from an Ecologist.

Operational Phase Effects

6.3.153 Inappropriate management of the retained Waterbody 6, could result in adverse effects on any individual GCN which may be using this water body in future.

Mitigation

6.3.154 A LEMP will be developed for the site which will take into account appropriate timings and methods to avoid any effects on amphibians including GCN.

Residual Effects

6.3.155 Should the above mitigation measures be implemented and Public Open Space creation and additional habitat enhancements (as set out in Section 8) be undertaken, a beneficial effect on amphibians, including GCN, is anticipated.

Badger

6.3.156 All information on badgers has been provided within the confidential Badger Impact Assessment (Appendix 4). Owing to the sensitive nature of the data included, the report and findings should be made available to bona fide individuals only.

Bats

6.3.157 Bats are fully protected under the Conservation of Habitats and Species Regulations 2017. Therefore, despite some species that are using the site have been assessed as local nature conservation value (and therefore not an 'important ecological feature'), the effects of the proposed development on them must be assessed to determine whether or not construction and operational phase activities have the potential to contravene legislation pertaining to bats.

Construction Phase Effects (Site clearance – habitat loss and damage)

6.3.158 The proposed development will result in the loss of approximately 11.60ha of arable, 187m of linear scrub and 187m of species rich hedgerow.

6.3.159 The central north to south connectivity within the site will be permanently lost, however connectivity around the boundary of the site will be retained.

6.3.160 Works to create the infrastructure, built development and the attenuation area could also lead to damage of retained hedgerows and tree/woodland vegetation including trees, shrubs and ground flora.

The removal and damage of habitats could have two main effects on bats:

(Loss of / Isolation of Potential Roost Sites)

6.3.161 The updated walkover survey (2022) identified two mature trees with moderate bat roost potential. One ash tree in hedge 6 was noted to have a large trunk cavity and one oak tree in hedge 7 had a woodpecker hole, knothole and bark scar. Both trees are likely to be retained however if removal is needed, further surveys are required. If the trees will be impacted by the proposed works it is recommended that presence absence surveys (dusk emergence and/or pre-dawn re-entry surveys) in accordance with standard methodology are undertaken. A minimum of two emergence/re-entry surveys will be required.

6.3.162 The suitability of a tree's potential for supporting roosting bats varies over time, as weathering for example may create suitable features (such as fallen limbs), which are not currently present. The removal / potential damage to trees could therefore result in the loss of future bat roosts as well as the killing and / or disturbance of any bats present at the time. If a roost is present in future then the severity of the effect would depend on the species, type and size of roost found but its potential loss would be permanent and irreversible.

(Loss of foraging / commuting habitat)

6.3.163 The construction activities will be concentrated on the areas of sub-optimal bat foraging habitat (i.e. arable fields) with the majority of optimal habitats including hedgerow, mature trees, and scrub being retained and /or incorporated into the landscaping of the development. However, the loss of approximately 374m of hedgerow / scrub habitat has the potential to reduce the amount of foraging / commuting habitat available to the bats using the site and alter the commuting corridors between roosting and foraging habitats. The updated walkover survey (2022) revealed that Hedgerow H3 (approximately 115m) had been entirely removed

as well as some areas of scrub that extend further southwards connecting to hedgerow H7 and the stream along the south western boundary of the site. The linear scrub extending north from hedgerow H6 (approximately 70m) will also be lost as will approximately 44.5m of hedgerow H6. Approximately 5m of hedgerow H2, and 22.5m of hedgerow H5 will also be lost to accommodate two new footpaths and the main access road into the site. There is also the potential for retained woodland and hedgerows to be damaged as part of construction activities.

6.3.164 The retained hedgerow habitat will continue to provide foraging and commuting habitat for bats using the site. The retained attenuation feature will also continue to provide foraging habitat for bats. In addition to this a drainage basin is being created as part of the development proposals, to the north of the existing Waterbody 6. A detailed specification for this feature is not currently available, however it is understood that wildlife friendly features can easily be incorporated.

6.3.165 The bat assemblage on site is likely to decrease due to the reduction of suitable foraging and commuting habitat. The removal of northern linear features may have a significant effect on sensitive species such as greater horseshoe, lesser horseshoe, *Myotis* and long-eared sp.

6.3.166 Greater horseshoe bats, which are classified as being one of the rarest bats in England, were recorded at all three automated detector locations, albeit in low numbers. This species avoids urban areas, therefore the proximity of built development to the northern boundary has the potential to result in the 'loss' of these features and thus the potential to decrease commuting routes to foraging grounds from roosts for this species.

6.3.167 Barbastelle bats are also classified as one of the rarest bats in England and numbers are considered to be low due to the loss of suitable habitat[13]. Barbastelles have a specialised diet, comprising almost exclusively of moths[14]. Barbastelles were only recorded at automated detector Location 2, which was placed along H3, therefore approximately 115m of suitable barbastelle foraging habitat has been lost to the recent removal of H3.

13 Bat Conservation Trust; https://cdn.bats.org.uk/pdf/About%20Bats/barbastelle_11.02.13.pdf?mtime=20181101151250 (Accessed January 2020)

14 Matt R. K. Zeale, Ian Davidson-Watts, Gareth Jones, Home range use and habitat selection by barbastelle bats (*Barbastella barbastellus*): implications for conservation, Journal of Mammalogy, Volume 93, Issue 4, 14 September 2012, Pages 1110–1118

6.3.168 Bats, including greater horseshoe and barbastelle, will still be able to utilise the retained western, southern and eastern boundaries, and the Development Framework Plan identifies a new hedgerow connecting hedgerows H1 and H7 which will create an additional commuting route. No significant adverse effects on these species are therefore anticipated.

6.3.169 Noctule and Leisler's are high flying bats[15] and forage in open spaces, which makes them less susceptible to reduced connectivity around the site. The proposed access gaps through the field boundaries and loss of the northern linear features are not expected to have a significant effect on these species.

6.3.170 Lesser horseshoe, long-eared, Nathusius' pipistrelle and serotine bats are all considered to be less common in England and were all recorded at automated detector location 2 in low numbers. However, since the highest number of passes by any one species in one month was 3, no significant effect is expected from the loss of the northern linear features on these species.

6.3.171 The loss of approximately 20m of hedgerow H5, to create and the main access road into the site, is likely to prevent and reduce the number of bats commuting along this hedgerow and reduce the overall amount of suitable foraging habitat on-site. The walked transect survey identified individual common and soprano pipistrelle activity along this hedgerow. Common and soprano pipistrelles are the most common bat species in England, which is likely due to their ability to adapt to changing environments and tolerate suburban conditions better than most other species. They are more likely to cross gaps in vegetation compared with other sensitive species[16]. Since this hedgerow is located adjected to an urban environment and was not identified to be an important commuting or foraging route for pipistrelles, no significant adverse effects are anticipated.

6.3.172 Three footpaths measuring approximately 2m have been proposed through hedgerows H2, H5 and H6. Species tolerant of urban environments, such as pipistrelle sp. are known to cross gaps larger than 2m in vegetation. For sensitive species, such as lesser horseshoe, gaps as little as 10m could prevent movement along a flight line[17].

15 Ruczyński, I., Zahorowicz, P., Borowik, T., and Hałat, Z. (2017) Activity patterns of two syntopic and closely related aerial-hawking bat species during breeding season in Białowieża Primaeval Forest 62: 65

16 J.D Hale, A. J. Fairbrass, T. J. Matthews, G. Davies and J. P. Sadler (2015) The ecological impact of city lighting scenarios: exploring gap crossing thresholds for urban bats. Global Change Biology 21, 2467–2478

17 Schofield, H. W. 2008. The Lesser Horseshoe Bat Conservation Handbook. Ledbury: The Vincent Wildlife Trust.

Due to the small size of the proposed gaps no significant adverse effects are anticipated.

Mitigation

6.3.173 Any trees scheduled for removal or likely to be affected by the proposed works will be reassessed for bat roost potential immediately prior to works and a presence/absence survey will be undertaken on trees which are classified as moderate-high bat roost potential.

6.3.174 It is recommended that an updated bat activity survey is undertaken to determine how bats are using the site.

6.3.175 To supplement the walked transect survey, it is recommended that three static bat detectors are deployed per transect route following current best practice guidelines (Collins, J. (ed.) 2016) for 5 consecutive nights per month in suitable weather conditions.

6.3.176 A toolbox talk will be given to all contractors prior to any tree removal works so that they are aware of the potential risks to roosting bats and the penalties associated with their disturbance.

6.3.177 Retained trees / woodland will be protected in accordance with BS 5837:2012 and the Tree Protection Plan to prevent damage to retained trees during the proposed works. This will provide a buffer from construction phase activities.

6.3.178 Mature trees located within the retained areas of woodland and treelines will be protected from ingress by machinery by the erection of tree protection fencing at an appropriate distance as informed by the Tree Protection Plan. It is important that the fencing is maintained over the course of the construction phase with regular monitoring of its position and condition undertaken and any damage or re-positioning is rectified promptly.

Construction Phase Effects (Disturbance from Lighting/Noise/Dust/Vibrations)

6.3.179 The construction works could disturb bats which are foraging and/or roosting within the site through changes in lighting and noise levels and from an increase in dust and vibrations. Sudden high levels of human activity including elevated light and noise levels in close proximity to foraging/commuting habitats and roosts may cause bats to stop using specific foraging sites and commuting corridors. This could affect their local

distribution and local abundance or indeed impair their ability to survive, breed, and reproduce or to rear their young in contravention of legislation.

6.3.180 The effects however are likely to be short term and largely avoided as working hours will be restricted to minimise noise impacts and are unlikely to cause disturbance during the times when bats are active (i.e. at night). Pipistrelle and noctule species known to be using the site are considered to be tolerant with regards to low-pressure sodium lighting[18] and are known to roost in residential areas with high levels of disturbance.

6.3.181 Increased disturbance could however have a significant effect on the more sensitive species using the site, such as *Myotis* sp., greater horseshoe, lesser horseshoe, barbastelle and long-eared bats. This adverse effect could be significant at a local level for these species.

Mitigation

6.3.182 Noise and lighting levels associated with the construction activities will be kept to a minimum where possible. Night-time working will be avoided, no direct illumination of the vegetation boundaries will occur, and security flood lighting will not be used. These measures will be set out and delivered through the implementation of a Construction and Environmental Management Plan (CEMP).

Residual Effects

6.3.183 No significant residual effect is anticipated.

Operational Phase Effects (Increased Human Disturbance)

6.3.184 The proposed development has the potential to cause disturbance to bats in the form of post development interference effects from increased activity, noise and especially from the installation of street lighting, which will likely alter the assemblage of bats using the site, and how they use the habitats.

6.3.185 The desk study identified a known whiskered/brandt's roost located approximately 0.5km north of the site. The desk study also identified a potential roost located approximately 0.5km west of the site for Greater or Lesser Horseshoe Bat and a Brown-long eared roost located 1.9km north. A non-sensitive lighting scheme along the western section of the site may prevent access to suitable foraging grounds,

especially the Netheridge Reserve & Black Ditch U located south of the site, potentially having a significant effect on the known roost.

6.3.186 The bat assemblage of more suburban tolerant species, including pipistrelles, noctules and Leisler's, is unlikely to change. However, research suggests that prevalent street-lighting types are not generally linked with increased activity of common and widespread bat species[19]. No beneficial effects to the existing populations of pipistrelles, noctules and Leisler's are therefore anticipated.

6.3.187 The presence of sensitive species including barbastelle, greater horseshoe, lesser horseshoe, *Myotis* species and long eared sp. around the northern section of the site will likely be reduced due to the change of use to a suburban environment. Potential artificial light sources that could affect bats includes street lighting, security lighting outside of residential houses, light spill from the windows of residential houses and car headlights. There is potential for the number of these sensitive species to be reduced throughout the site including along the southern and western boundaries due to installation of external lighting.

6.3.188 *Myotis* sp. were the second highest recorded species on site with the highest number of passes at automated detector location 3. The walked transect also identified a number of *Myotis* bats foraging and commuting along the southwest hedgerow (H7). The number recorded is indicative of an important commuting and foraging route for *Myotis sp.*. *Myotis sp*. are very light sensitive, therefore if the southwestern hedgerow (H7) is to be lit there will be a significant effect on species of *Myotis sp*.

6.3.189 The 2019 bat surveys identified that the majority of lesser horseshoe bat passes were recorded at automated detector location 1 in the northwest corner of the site. Lesser horseshoes were also observed foraging and commuting along the western boundary (H1). Lesser horseshoes are very light sensitive and research suggests that lesser horseshoe bats will avoid flying along lit hedgerows and will be forced instead to use less ideal commuting routes (ones that indirectly lead to feeding areas)[20]. If the western boundary (H1) is proposed to be lit, this is likely to have a significant effect on lesser horseshoe bats.

[19] Mathews et al, 2015. Barriers and benefits: implications of artificial night-lighting for the distribution of common bats in Britain and Ireland.

20 'Street lighting disturbs commuting bats' by Emma Louise Stone, Gareth Jones and Stephen Harris Current Biology 19, 1-5, July 14 2009

6.3.190 Barbastelle and greater horseshoe bats are considered to be rare in England[21] . Both species are very light sensitive and generally avoid urban areas. A non-sensitive lighting plan proposing lighting around key features of the site including the southwest boundary (H7), western boundary (H1) and proposed hedgerow will have a significant effect on these species.

6.3.191 On completion of the development, the level of traffic and patterns of use could increase the risk of vehicle collision with bats around the site at night. The current Development Framework Plan shows vehicle access into the site from the northeastern boundary. No through roads are proposed so the only traffic anticipated would be from residents' vehicles. The site will also be residential in nature and therefore car speeds are likely to be low and use of the roads is likely to decrease significantly during the night which will decrease the risk of bat road mortality.

6.3.192 It is therefore considered unlikely that this will have a significant adverse effect on the Favourable Conservation Status (FCS) of bats within the area.

6.3.193 The proposed development could result in an increase in domestic cats in the area which could lead to increased predation pressure by cats on bats. The severity of this effect is difficult to predict as it will depend upon the eventual density of cats in the development, but this could be significant at a local to district level on the local bat populations.

Mitigation

6.3.194 In order to minimise the effects of increased lighting on bats, the southwestern hedgerow (H7) and the western boundary (H1) will not be lit to more than 0.5 Lux.

6.3.195 The informal parkland proposed in the south of the site will not be lit ensuring dark foraging areas are available for barbastelle and greater horseshoe bats.

6.3.196 Throughout the rest of the Public Open Space proposed within the south-west of the site, wherever possible, areas will be completely unlit; however, where it is not feasible to impose unlit areas, measures will be implemented to reduce artificial lighting to an adequate level including a sensitive lighting scheme and planting.

[21] Bat Conservation Trust

6.3.197 A sensitive lighting scheme will be developed for the site at the Reserved Matters stage or via an appropriate planning condition. The lighting scheme will be designed by a lighting professional with input from an ecologist and with reference to the IJP and BCT guidelines on Bats and Artificial Lighting.[22]

6.3.198 The sensitive lighting design will control obtrusive lighting by means of the following integral good lighting design practice measures:

- Use of shields as necessary;
- Minimising uplift of luminaires;
- Selection of luminaires with good upward lighting cut-off characteristics;
- Selection of luminaires with suitable optics for their intended location;
- Careful consideration to luminaire positioning and orientation;
- Maintenance of suitable stand-off distances or screening from luminaires to ecological receptors;
- Limiting luminaire mounting heights;
- Not over-lighting, by minimising total lumen output accordingly to achieve the minimum site lighting requirements; and
- Recessed lighting within the rooms of the properties facing the proposed dark corridors.

6.3.199 The detailed lighting strategy will also reference the dark corridors and sensitive lighting zones to be maintained on the site and will include maps showing lux contours and the forecast spread and power of lighting.

6.3.200 Potential increased predation of bats by cats is unable to be mitigated for.

Operational Phase Effects (Public Open Space Management)

6.3.201 Any future works to trees could lead to damage or loss of future bat roosts or the killing/injury/disturbance of any bats present, contravening the provisions within the Habitat Regulations.

[22] Bat Conservation Trust & Institute of Lighting Professionals (2018) Bats and Artificial Lighting in the UK. Guidance Note 08/18.

6.3.202 Inappropriate management could have an impact on the structure and diversity of the retained and created hedgerows / scrub, and on the invertebrate species they support which could affect foraging bats. While a number of bat species identified on site are opportunistic foragers, rarer bats with specialised diets were also recorded, potentially having a significant effect on rare species at the **district** scale.

6.3.203 It is likely that the continued open space management in relation to mature trees could contravene legislation pertaining to the protection of bats and could also lead to adverse impacts on the local bat populations over the long-term should roosts, if present, be subsequently destroyed. However continued management of the retained scrub / hedgerow is likely to have a positive impact on foraging bats.

Mitigation

6.3.204 The proposed development will be designed to enable the appropriate and sympathetic management of all vegetation and will be secured as part of the management regime which can be detailed within a LEMP.

6.3.205 All trees which are likely to be affected by the management works will be assessed for bat roost potential immediately prior to works and further surveys undertaken if necessary.

Residual Effect

6.3.206 Once mitigation measures are implemented and the hedgerow and tree planting has matured (approximately 5 - 10 years), it is considered that urban tolerant species such as pipistrelle sp. and *Nyctalus* sp. may benefit from the mosaic of habitats proposed to replace the existing monoculture fields and no significant residual effect on these species is expected.

6.3.207 Light sensitive species such as *Myotis* species, barbastelle and horseshoe species will still be able to utilise the retained boundary hedgerows, and once the hedgerow and tree planting has established along the south-western boundary of the built development, effectively creating a dark corridor on the south-western side, these species will be able to use these features as well. No significant residual effects on these species are therefore anticipated.

6.3.208 If the other recommended mitigation is appropriately implemented through a CEMP and LEMP, any residual effects resulting from the construction phase and operation of the site likely to contravene legislation pertaining to bats would not occur.

6.3.209 The above mitigation measures will ensure compliance with the relevant wildlife legislation and protection of bats in order to maintain the FCS of the local population.

6.3.210 However, the risk of increased predation of bats by cats will remain. It is considered unlikely that this residual adverse effect will be significant at a local level.

Birds

Construction Phase Effects

6.3.211 Impacts upon the bird assemblage during the construction phase will differ between species.

6.3.212 There is the potential for disturbance to breeding birds, and contravention of governing legislation, if any vegetation clearance is undertaken during the bird breeding season (March to August inclusive).

6.3.213 The construction works could also disturb breeding birds which could potentially be nesting within adjacent retained habitats. Sudden high level of human disturbance and noise may cause birds to abandon nests which could result in adverse effects on individual birds but are unlikely to affect the overall populations at a local level or above. As such, it is considered that noise disturbance during construction will not undermine the conservation status of the breeding birds potentially using the site at above the local scale and as such it is not a significant effect, therefore not requiring any further assessment or indeed mitigation.

6.3.214 All arable open ground habitat within the site will be lost to the proposed development which will result in the loss of any breeding bird species which are dependent on this habitat from the site. Skylark and yellow wagtail have been recorded within 2km of the site and are considered to be of high conservation concern (S41 species). Lapwing have also been recorded within 2km. In addition to their red BoCC status all three species are notable for their inclusion in the declining farmland bird species from the BTO and RSPB Farmland Bird Index. The loss of open ground habitat may have a significant effect on these species at a local level.

6.3.215 Yellowhammer, linnet, dunnock, bullfinch, song thrush, cuckoo and reed bunting are likely to occur within the arable field margins, hedgerows and mature trees. There will be a permanent loss of approximately 157m of hedgerow and associated field margin habitat, this includes the northern section of the central hedgerows and scrub corridors (H3 and H6). Sections of hedgerows H2, H5 and H6 will be lost due to the creation of additional access points. Hedgerows H1 and H7 are being retained. This

will reduce breeding habitat available for these bird species, however the site boundary hedgerows, margins and associated trees being retained and will continue to provide breeding habitat on site for these species.

6.3.216 The retained hedgerows and trees which will continue to provide habitats for tree-nesting species. Therefore, no significant effects of habitat loss on tree nesting species are anticipated.

6.3.217 New tree and hedgerow planting undertaken as part of the landscaping scheme at the site could have a beneficial effect on tree-nesting birds at a local level by providing additional tree-nesting habitat within the site once established.

6.3.218 There are records for species which rely on water within 2km of the site such as mallard and Cetti's warbler. There are numerous kingfisher records located along the Gloucester and Sharpness Canal which is connected to the stream along the south-western boundary of the site. The southern section of the site which includes the stream, pond and floodplain are being retained. Therefore, no significant effects from habitat loss are anticipated.

Mitigation

6.3.219 No vegetation clearance, including trees or hedgerows, will be cleared during the breeding season (March to August inclusive). If this is not possible then areas of vegetation requiring clearance will be checked by a suitably qualified ecologist, 24 hours in advance of works, for the presence of occupied nests. Any subsequent advice provided by the ecologist, as to how to accord with legislation, will be followed. This mitigation will be implemented by way of inclusion within a Construction and Environmental Management Plan (CEMP) for the development.

6.3.220 Within the southern section of the site a mosaic of habitats to include areas of long tussocky and short grassland and pond/drainage basins will provide suitable habitat for skylark, lapwing and yellow wagtail, however they are unlikely to breed in these areas as a result of recreational disturbance from new residents and dogs (see operational effects below). This grassland will also benefit barn owl as it provides better quality hunting habitat than arable land. Approximately half of the long grassland will be cut once a year in autumn on rotation, allowing the grassland areas to be used for breeding skylark over the spring/summer and retaining some rank areas for shelter and foraging over the winter.

Residual Effects

6.3.221 No significant residual effects are anticipated.

Operational Phase Effects

6.3.222 There is potential for birds to be disturbed by an increase in noise, lighting, recreational / footfall pressure and predation by domestic pets during the operational phase of the development. This may have a significant effect on certain wetland and farmland bird species if they are utilising the hedgerows, open spaces and stream.

6.3.223 The impacts of artificial light sources on birds is widely documented, lighting can cause birds to think the days are longer which in turn effects their behaviour patterns such as courtship, mating, reproductive cycles, migration and moulting. It has been identified that robins and blackbirds in urban areas lay their eggs up to two weeks earlier than those in woodland. Egg-laying occurs with the seasonal change in day length to coincide with peak periods of food availability therefore, laying eggs too early could result in a lack of food supply for the young[23].

6.3.224 The proposed development could result in an increase in domestic cats and dogs in the area which could lead to increased predation and disturbance pressure on birds. The severity of this effect is difficult to predict as it will depend upon the eventual density of cats and dogs in the development, but this could be significant at a local level on local bird populations.

6.3.225 The southern section of the site will be retained and new hedgerow and grassland planting will be incorporated.

Mitigation

6.3.226 To reduce the impacts on ground nesting birds such as skylarks, educational signage encouraging people to keep their dogs on leads during the breeding bird season (March – August) should be erected adjacent to wildlife grasslands.

6.3.227 The informal parkland area proposed in the south of the site will be unlit, ensuring suitable areas of dark habitat are retained.

[23] RSPB Lee Hollingsworth (2009) https://ww2.rspb.org.uk/birds-and-wildlife/bird-and-wildlife-guides/ask-an-expert/previous/streetlighting.aspx (Accessed: 23.01.2020)

Residual effects

6.3.228 It is likely that in the longer term, if ground nesting bird species such as skylark are on the site they will be replaced by those species more adapted to suburban conditions, although the creation of habitat types such as hedgerows, scrub and open grassland as part of the landscaping of the wider site including the south western part of the site should enable a proportion of these species to be retained within the wider development.

6.3.229 No significant long-term residual effects on tree nesting birds are anticipated from the development of the application site. Opportunities for ground nesting birds such as skylark, yellow wagtail and lapwing will be reduced because of the development and this may result in a permanent adverse residual effect on ground nesting birds at a local scale.

6.3.230 Potential increased predation of birds by cats is unable to be mitigated for, however it is considered unlikely that this residual adverse effect will be significant at a local level.

European Hedgehog

Construction and Operational Phase Effects

6.3.231 Hedgehog are most likely to use the hedgerow and scrub habitats within the site. These habitats could provide suitable foraging, resting and hibernating opportunities for hedgehog, but are overall considered to be of low suitability for this species. Therefore, construction activity in these habitats has the potential to kill or injure a low number of hedgehogs, if present.

Mitigation

6.3.232 Hedgehogs will be discouraged from construction areas by vegetation management. Vegetation which is suitable for hedgehogs will be maintained at a low sward height from May until October. Vegetation will be cleared in a two staged approach with the above ground growth cut to just above ground level and the root stock being excavated a minimum of 24 hours after. An Ecological Clerk of Works will be present during vegetation clearance.

6.3.233 Any excavations from construction activities will either be infilled overnight or mammal ramps placed within, if left open, to allow egress. Excavations will be checked in the morning for hedgehog before works commence.

6.3.234 The above mitigation measures will be implemented by way of inclusion within a CEMP for the Site.

Residual Effects

6.3.235 It is considered that there will be no significant residual effects on hedgehog at a local scale.

Common Reptiles

6.3.236 Common reptiles are legally protected from intentional killing or injury under the Wildlife and Countryside Act 1981 (as amended). Therefore, despite being assessed as local nature conservation value (and therefore not an 'important ecological feature'), the effects of the proposed development on them must be assessed to determine whether or not construction and operational phase activities have the potential to contravene legislation pertaining to reptiles.

Construction and Operational Phase Effects

6.3.237 The habitats on site are considered to have limited potential to support common reptiles, with the hedgerows and scrub being of most value. The proposed development will result in the loss of approximately 187m of hedgerow and 187m of linear scrub habitat, however the majority of the hedgerow habitat (approximately 1197m /71%) is being retained. The retained hedgerows and the creation of the proposed attenuation area (which will be mainly dry and likely will comprise grassland) will provide habitats for common reptiles in the long-term within the site. These habitats will continue to be connected to other suitable reptile habitats located off-site. As the numbers of any reptiles which may be found on site are considered to be very low, the loss of some of the limited suitable habitats for reptiles within the site is therefore not considered to be significant at a local level or above.

6.3.238 However, construction activity in these suitable habitat areas has the potential to kill or injure a low number of common reptiles, if present at the time of the works. Therefore, there is a risk that construction activities could contravene legislation pertaining to reptiles. As the majority of habitats within the site are considered suboptimal, it is considered that the loss of these will have a significant adverse effect on reptiles at a local scale only, if present.

6.3.239 Inappropriate management of habitats post-construction may result in harm or disturbance to any individual reptiles which may be present in the site post-construction.

Mitigation

6.3.240 The risk of harming reptiles during the construction phase of the development can be reduced through the implementation of Reasonable Avoidance Measures under a Precautionary Working Method Statement (PWMS).

6.3.241 A detailed PWMS is provided in Appendix 9, however a summary is provided below:

- Reptiles will be discouraged from construction areas by vegetation management.
- Materials / debris, which could be used by reptiles as refuges, will not be stored in close proximity to retained hedgerow habitat while reptiles are active.
- The retained hedgerows within the development will be protected by the erection of tree protection fencing in accordance with BS 5837:2012 Trees in relation to design, demolition and construction.

6.3.242 If reptiles are discovered during the site clearance activities, these individuals will be translocated into suitable retained and protected habitat elsewhere within the application site.

6.3.243 A LEMP will be developed for the site which will take into account appropriate timings and methods to avoid any effects on reptiles.

Residual Effects

6.3.244 There will be no significant adverse effects on reptiles.

Aquatic Fauna (Water vole, Otter, White-clawed crayfish, Bony Fish including European eels and Atlantic salmon)

Construction and Operational Phase Effects

6.3.245 The stream along the southwestern boundary is being retained as part of the development proposals and no construction works are proposed within 10m of the banks, however the creation of public open space, including footpaths to the southwestern boundary could potentially affect the ditch through damage e.g. through encroachment of machinery. This could also potentially disturb water voles, otter and white-clawed crayfish, damage their resting places and decrease their foraging area temporarily.

6.3.246 There is also the potential for the water quality of the stream along the southwestern boundary of the site, and consequently aquatic fauna using this feature and connecting watercourses, to be affected during construction and once the site is operational. These effects could be significant at up to a district scale.

6.3.247 Any pollution event affecting the stream along the southwestern boundary of the site could directly and indirectly affect the otter population using the canal by contaminating their food sources. However, whilst the stream connects to the canal in the east, the stream flows in a westerly directly therefore no effects on otters using the canal only from pollution are anticipated.

6.3.248 Potential effects on aquatic fauna have been discussed in detail under the Netheridge Reserve & Black Ditch U sections above (paragraphs 7.3.65 – 7.3.85).

Mitigation

6.3.249 Areas of Public Open Space have been incorporated into the design of the proposed development which will form part of the green infrastructure of the area. These newly created open spaces will be accessible to new residents for their recreational activities via footpaths however these will not be located in close proximity (i.e. within 10m) of the stream along the south western boundary.

6.3.250 Best practice guidelines as outlined in the CIRIA SuDS Manual 2015 will be followed to prevent damage or pollution to the retained watercourses on Site and therefore aquatic fauna. This mitigation will be implemented by way of inclusion within the CEMP for the Site. The CEMP will address activities such as vehicle washing, works in or near water, storage of construction equipment and materials, waste management and water use and disposal.

6.3.251 Mitigation for aquatic fauna have been discussed in detail under the Netheridge Reserve & Black Ditch U sections above (paragraphs 7.3.65 – 7.3.85).

Residual Effects

6.3.252 No significant residual effects on aquatic/semi-aquatic fauna (water vole, otter, white-clawed crayfish, bony fish including European eels and Atlantic salmon) are anticipated.

7 ENHANCEMENTS

7.1.1 In accordance with the requirements of the NPPF 2019 and BSI 42020:2013, ecological enhancements should be proposed that will result in a net gain in biodiversity. There are numerous opportunities to enhance the site further for biodiversity. These include the following:

- A mosaic of long tussocky and short grassland seeding within the south-western area would benefit foraging and nesting birds and other species on site;
- A range of native fruiting trees and shrubs planted throughout the site, to include a mixture of crab-apple *Malus sylvestris*, hazel, birch *Betula spp*, blackthorn, hawthorn, dog-rose *Rosa canina*, holly *Ilex aquifolium* and wild cherry *Prunus avium*, would provide additional foraging opportunities for birds and mammals;
- Seeding the bases of the existing and created hedgerows with an appropriate hedgerow wildflower mix would be beneficial for biodiversity;
- Planting suitable aquatic plants and wetland grassland seeding within the proposed drainage basin, will enhance this area for biodiversity;
- Enhancement of the existing pond on site by clearing a proportion of reeds and desilting the pond to create an open area of water;
- Provision of a further open pond with varied depths within the southwestern area with abundant aquatic emergent plants and appropriate grassland seeding and shrub planting will benefit farmland and wetland birds, invertebrates, foraging bats and amphibians. The existing pond and the newly created pond should be fenced to prevent dogs from entering;
- The creation of an additional ditch adjacent to the created hedgerow with trees along the southwestern boundary of the built development will benefit moth species, providing suitable foraging habitat for barbastelles and long eared bat species;
- Strips of long grassland / species rich field margin seeded adjacent to the existing and created hedgerows will encourage a diverse population of moths and other flying invertebrates which will benefit foraging bats;
- The erection of a variety of bird boxes on suitable trees within the site will enhance the site for breeding birds. Incorporating nest boxes/bricks into the new buildings would also benefit bird species known to nest in buildings such as swifts

and house sparrows;

- Provision of wood, brash and log piles in the areas of greenspace and along the retained perimeter hedgerows would provide refuges and hibernacula for invertebrates, hedgehogs, small mammals, common amphibians and common reptiles (if present). These can incorporate hedgehog houses; and
- Provision of bat boxes on suitable mature trees within the retained hedgerows. These can comprise a variety of boxes that are suitable for the range of bat species which have been recorded using the site. The boxes can be installed three per tree.

APPENDICES

Appendix 1

Preliminary Ecological Appraisal (V03) (Wardell Armstrong, September 2019)

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ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT

GLADMAN DEVELOPMENTS LTD

LAND OFF HEMPSTED LANE, GLOUCESTER

PRELIMINARY ECOLOGICAL APPRAISAL REPORT

SEPTEMBER 2019

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DATE ISSUED:	**SEPTEMBER 2019**
JOB NUMBER:	**GM10710**
REPORT NUMBER:	**003**
VERSION:	**V3.0**
STATUS:	**FINAL**

GLADMAN DEVELOPMENTS LTD

LAND OFF HEMPSTED LANE, GLOUCESTER

PRELIMINARY ECOLOGICAL APPRAISAL REPORT

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PREPARED BY:

[redacted]

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CONTENTS

APPENDICES

DRAWINGS	TITLE	SCALE
GM10710-001	Site Location Plan	1:25,000 @ A3
GM10710-002	Phase 1 Habitat Plan	1:2,500 @ A3
GM10710-003	Waterbody Location Plan	1:25,000 @ A3

EXECUTIVE SUMMARY

This report provides the results of a Preliminary Ecological Appraisal (PEA) for land off Hempsted Lane, Gloucester, centred on approximate National Grid Reference SU 85141 69429.

At the time of writing detailed development proposals are unknown, however we understand that residential development with associated infrastructure and areas of public open space are proposed.

The survey area comprises of three arable fields with a south facing gradient, bordered by hedgerows, treelines, scrub and dry ditches. A medium sized pond is located in the southern part of the survey area which was dry at the time of the survey. The habitat to the south and west of the survey area is a mosaic of nature reserves, wetlands, waterbodies, hedgerows, arable land and a number of small scattered woodlands. The River Severn is located to the west of the site. To the north is a residential area and to the east, are industrial and commercial buildings and The Gloucester and Sharpness Canal.

The Netheridge Reserve and The Rea 'unconfirmed' nature conservation designations are located adjacent to the survey area. The Netheridge Reserve is proposed for its wetlands and water vole population and The Rea is proposed for its marshy grassland. Within 2km there is a Local Nature Reserve (LNR), four Local Wildlife Sites (LWS) and a further 6 'unconfirmed' nature conservation designations.

The desk study has identified records for protected and notable species including bats, birds, European otters, great crested newts (GCN), bony fish, water voles, European badgers, common reptiles, hedgehogs, invertebrates and flowering plants within 2km of the survey area.

Receptors which the PEA has identified may be subject to adverse effects in the absence of mitigation are as follows:

- Statutory and non-statutory designated sites;
- Natural Environmental and Rural Communities Act 2006 (NERC) Section 41 (S.41) Habitat of Principal Importance: Hedgerows;
- Section 41 (S.41): Ponds;
- Bats;
- Breeding birds;
- European otters;
- Amphibians - including GCN;

- Bony fish - including European eels and Atlantic salmon;
- White clawed crayfish;
- Water voles;
- European badgers;
- Common reptiles;
- Hedgehog;
- (S41) Invertebrates; and
- (S41) flowering plants.

Additional protected species surveys are recommended prior to submission of a planning application:

- Bat activity surveys;
- Habitat Suitability Index survey for great crested newts of ponds within 500m of the survey area;
- Breeding bird surveys; and
- Badger surveys.

Surveys for water vole and European otter may be required, depending on the proximity of the works to the watercourse.

Mitigation[1], compensation[2] requirements are discussed in section 4 and biodiversity enhancement[3] opportunities are discussed in section 5 of the report.

Impacts on nature conservation designations and protected species, if present, will need to be assessed as part of an Ecological Impact Assessment for the site, for inclusion within a planning application.

[1] Mitigation are measures required in order to reduce the severity and magnitude of identified effects to an acceptable level.

[2] Compensation is required where effects cannot be fully mitigated.

[3] Enhancements are required in accordance with national planning policies in order to ensure no net loss of site biodiversity.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Wardell Armstrong LLP (WA) was commissioned by Gladman Developments Ltd. to undertake a Preliminary Ecological Appraisal (PEA) of a proposed development site located at land off Hempsted Lane, Gloucester, centred on approximate National Grid Reference SU 85141 69429. This report has been produced with reference to current guidelines for preliminary ecological appraisal (Chartered Institute of Ecology and Environmental Management (CIEEM, 2017) and British Standard BS 42020:2013 (BSI, 2013) which involves the evaluation of potential ecological constraints based on Extended Phase I (Joint Nature Conservation Committee (JNCC, 2010)) survey data and background desk study.

1.2 Scope of Report

1.2.1 The purpose of the appraisal is to identify the likely presence of ecological receptors within or near the application survey area that could be subject to adverse effects arising from the proposed development.

1.2.2 The following ecological features have been considered:

- Statutory and non-statutory designated sites;
- S.41[4] species and habitats;
- Areas of Ancient Woodland;
- Legally protected species; and
- Invasive species.

1.2.3 This report also seeks to identify any requirement for further specialist survey where the initial assessment cannot be relied upon to adequately determine presence or reliably infer absence of protected species/taxa. An indicative assessment of potential adverse effects is provided, although this is not a substitute for full Ecological Impact Assessment (CIEEM, 2019).

[4] Species of principal importance for the conservation of biodiversity listed on Section 41 of the Natural Environment and Rural Communities Act 2006

1.3 Site Context

1.3.1 The survey area is situated off Hempsted Lane, Gloucester, as shown on Drawing Number GM10710-001 (Site Location Plan).

1.3.2 The survey area is approximately 12.6 hectares and comprises of three arable fields with a south facing gradient that are bordered by hedgerows, treelines, dry ditches and scrub. A moderate sized pond is located in the south of the site which was dry at the time of the survey. There are two existing access points located on Hempsted Lane and Rea Lane. The survey area is bordered by a stream, nature reserves, a bridleway, residential dwellings, Rea Lane and the A430.

1.3.3 The surrounding habitat is a mosaic of nature reserves, wetlands, waterbodies, farmland and a number of small scattered woodlands. Urban environments include mixed-use developments comprised of commercial and residential buildings. The site is situated between the River Severn and the Gloucester and Sharpness Canal.

1.4 Description of Development

1.4.1 Detailed development proposals are not currently available however, we understand that approximately 250 - 300 residential dwellings and associated infrastructure and areas of public open space are proposed.

2 METHODOLOGY

2.1 Desk Study

2.1.1 The desk study was informed by review of existing available information provided by Gloucestershire Centre for Environmental Records (GCER) for a 2km search radius from the survey area boundary. Satellite and OS mapping were also used to gain contextual habitat information and identify aquatic features within 500m of the survey area.

2.1.2 Specific information was sought for:

- Statutory and non-statutory designated sites;
- S.41[5] species and habitats;
- Legally protected species; and
- Invasive species.

2.1.3 The Multi Agency Geographic Information for the Countryside (MAGIC) website was also utilised to gather data.

2.1.4 Priority species and habitats agreed under the UK BAP are those which were identified as being the most threatened and requiring conservation action. The UK BAP was superseded by '*The UK Post-2010 Biodiversity Framework*' which was published in July 2012 with work focussing at the country level, however the list of priority habitats and species remain the basis for the biodiversity work in the countries. Therefore, species listed under Section 41 (S.41) of the 2006 Natural Environment and Rural Communities (NERC) Act 2006 were reviewed as these are the rarest and most threatened in England.

2.2 Extended Phase 1 Habitat Survey

2.2.1 An Extended Phase 1 Habitat Survey of the survey area was undertaken by Wardell Armstrong LLP (WA) on 16th July 2019, broadly following the techniques outlined in the '*Handbook for Phase 1 Habitat Survey*' (Joint Nature Conservation Committee, 2010) and the '*Guidelines for Baseline Ecological Assessment*' (Institute of Environmental Assessment, 1995).

[5] Species of principal importance for the conservation of biodiversity listed on Section 41 of the Natural Environment and Rural Communities Act 2006

2.2.2 The purpose of this survey is to map the habitats present within the survey area and to assess the potential for protected species to be present. Species composition of each of the main habitats are expressed according to the DAFOR system[6]. Specific habitat features are mapped on Drawing Number GM10710-002 (Phase 1 Habitat Plan).

2.2.3 The presence of a legally protected species is a material consideration for a local planning authority dealing with a planning application for any development that would be likely to result in harm to the species or its habitat (National Planning Policy Framework, 2019). Therefore, preliminary investigations were undertaken during the Extended Phase 1 Habitat survey in respect of the potential presence of a legally protected species and BAP species. An overview of species protection is provided in Appendix 1.

2.2.4 In addition to the mapping and description of habitats, incidental observations of protected and/or S.41 species and the potential for such species to occur within the site (and in the surrounding landscape where relevant) were also noted. A separate waterbody location plan, showing ponds and other waterbodies located within 500m of the survey area, is provided on Drawing Number GM10710-003 (Waterbody Location Plan).

2.3 Preliminary Roost Level Roost Assessment (PGLRA) - Trees

2.3.1 A PRGLA of the trees was undertaken on 16th July 2019 by a suitably experienced ecologist in conjunction with the Extended Phase 1 Habitat Survey. The aim of the survey is to assess the potential of the trees to support roosting bats, identify any evidence of roosting bats and if there is a requirement for further surveys.

2.3.1 The trees were categorised using the assessment criteria in Table 4.1 of the *3rd ed. of the BCT Guidelines (Collins, 2016)*:

- Known or confirmed roost:
- **High**: Tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitats.

[6] D = dominant, A = abundant, F = frequent, O = occasional, R = Rare

- **Moderate**: Tree with one or more potential roost sites that could be used by numbers of bats due to their size, shelter, protection, conditions and surrounding habitats, but unlikely to support a roost of high conservation concern.
- **Low**: Tree with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
- **Negligible**: Structure or tree with no potential to support bats.

2.4 Nomenclature

2.4.1 Vascular plant names follow '*New Flora of the British Isles'* (Stace, 2010), all other flora and fauna names following the Botanical Society of Britain and Ireland (BSBI). The common (vernacular) and scientific name of species/taxa is provided (if available) when first mentioned in the text, with only the vernacular name referred to thereafter.

2.5 Assessment Limitations

2.5.1 Ecological surveys are limited by factors that affect the presence of plants and animals such as time of year, weather, migration patterns and behaviour. The survey was undertaken in July and therefore within the optimum recommended survey period for habitat surveys (April to September), however, the survey data may not be representative of other times of year.

2.5.2 The absence of desk study records cannot be relied upon to reliably infer absence of a species/habitat.

2.5.3 A number of records have limited contextual information and small grid reference numbers reducing the quality of the information provided by the data search, however such results still provide an indication of species present in the locality.

2.6 Quality Assurance & Environmental Management

2.6.1 The surveys and assessments have been overseen by and the report checked and verified by a member of CIEEM, whom is bound by its code of professional conduct. All surveys and assessments have been undertaken with reference to the recommendations given in British Standard BS 42020, and as stated within specialist guidance, as appropriate and referenced separately.

3 RESULTS AND EVALUATION

3.1 Statutory and Non-Statutory Designated Sites

3.1.1 Desk study results for designated sites within the 2km search radius are evaluated in Table 1, below.

3.1.2 Sites which are considered potentially sensitive to the development proposals by virtue of the sensitivity of supported species or habitat assemblages, the distance/ecological connectivity to the application site and the nature of the perceived impacts are highlighted in bold text and are discussed in the final sections of the report.

3.1.3 Sites for which potential adverse effects are not anticipated are excluded from further assessment.

Table 1: Designated Sites Evaluation.			
Site Name and Status[7]	**Reason for Designation**	**Approximate Distance and Location from the site**	**Potential Adverse Effects**
Alney Island LNR & LWS	**Coastal & Floodplain grazing marsh, ponds, ditch, lowland meadows, wet woodland, reedbed, plant & dragonfly interest**	**1.7km north**	**Yes – potential adverse effects from disturbance by increased human activity, including dog walking.**
Green Farm Orchard LWS	**Old Orchard**	**1km south**	**Yes – potential adverse effects from disturbance by increased human activity, including dog walking.**
Sud Meadow LWS	**Semi-natural grassland**	**1.7km north**	**Yes – potential adverse effects from disturbance by increased human activity, including dog walking.**
Robinswood Hill Country Park LWS	**Semi-natural grassland & Amphibians breeding in ponds**	**1.8km east**	**Yes – potential adverse effects from disturbance by increased human activity, including dog walking.**
Netheridge Reserve & Black Ditch U	**Wetland site consisting of 0.89 Ha lake with adjacent ponds, reedbeds, watercourses and drainage channels. "*70 water voles (Arvicola terrestris) released into the Netheridge Reserve on 17th August 2005. A further 60 water voles were released into the Netheridge Reserve on 20th May 2008 to boost the population following the floods of July 2007. These water voles have since colonised the adjacent drainage network*". This site is proposed for designation as a Key Wildlife Site (KWS).**	**Lake and wetland habitat including connected watercourse to the south of the site. including the stream along the south western boundary of the site.**	**Yes – potential adverse effects from pollution events entering the designation via the southern boundary stream and disturbance by increased human activity, including dog walking.**
The Rea, Hempsted U	**Marshy grassland with marginal vegetation, poor semi-improved grassland and woodland.**	**0.008km southwest**	**Yes – potential adverse effects from pollution events entering the designation via the southern boundary and disturbance by increased human activity, including dog walking.**

[7] **SPA** – Specially Protected Area, **SAC** – Special Area for Conservation, **Ramsar** – site designated under the Ramsar Convention, **SSSI** – Site of Special Scientific Interest, **SINC** – Site of Importance for Nature Conservation, **NNR** – National Nature Reserve, **LNR** – Local Nature Reserve, **LWS** – Local Wildlife Site, , **U** – Unconfirmed Site

Table 1: Designated Sites Evaluation.			
Site Name and Status[7]	**Reason for Designation**	**Approximate Distance and Location from the site**	**Potential Adverse Effects**
Manor Farm Hempsted U	**Improved and semi-improved grassland with old orchard.**	**0.3km north**	**Yes – potential adverse effects from disturbance by increased human activity, including dog walking.**
Newark Farm U	**Improved and semi-improved grassland with relic and new orchard trees.**	**0.41km north**	**Yes – potential adverse effects from disturbance by increased human activity, including dog walking.**
Crypt School U	**Disused railway line, triangle of grassland and school wildlife area.**	**1km southeast**	**Yes – potential adverse effects from disturbance by increased human activity, including dog walking.**
Daniel's Meadows & Brook U	**Semi-improved neutral grassland and water vole interest.**	**1.71km south**	**Yes – potential adverse effects from disturbance by increased human activity, including dog walking.**
Minsterworth & Corn Ham U	**Low-lying damp meadows bordering River Severn. Majority now improved, but some Juncus meadows present.**	**1.86km west**	**Yes – potential adverse effects from disturbance by increased human activity, including dog walking.**
The Knoll, Robinswood Hill U	**Mosaic of habitats including old orchard. Land around The Knoll nursing home.**	**1.99km east**	**Yes – potential adverse effects from disturbance by increased human activity, including dog walking.**

3.2 Habitats

3.2.1 All habitats within the survey area are described in Table 2, together with an indication of their S.41 status, according to the definitions given in *UK BAP Priority Habitat Descriptions* (Anon 2008 updated 2010). The table also provides an evaluation of the sensitivity of the habitats relative to the application proposals.

3.2.2 Habitats which have the potential to be subject to adverse effects are indicated with bold text and are discussed in the latter sections of the report. Habitats for which potential adverse effects are not anticipated are excluded from further assessment.

3.2.3 The location and extent of habitats is shown on Drawing Number GM10710-002 (Phase 1 Habitat Plan).

3.2.4 A review of OS data has identified 21 waterbodies within 500m of the survey area as shown on Drawing Number GM10710-003 (Waterbody Location Plan).

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**S.41**	**Potential Adverse Effects?**
<u>Pond</u> **The pond is approximately 1700m², surrounded by arable crop and 15m from the southwest hedgerow (see TN3 of drawing GM10710-002 Habitat Plan).** **At the time of the Phase 1 Habitat survey (July 2019) the pond was dry, however the plants present are indicative of damp / wet conditions suggesting that the feature could hold water at other times of the year.** **Dominant species within the pond area include bulrush (*Typha latifolia*) (D) and soft rush (*Juncus effuses*) (D).** **Marginal species include great willowherb (*Epilobium hirsutum*) (A), hoary willowherb (*Epilobium parviflorum*) (F), redshank (*Persicaria maculosa*) (F), common sorrel (*Rumex acetosa*) (O) and thistle sp. (*Asteraceae spp.*) (O).**		✓	**Yes – potential for damage / loss as a result of development proposals. See Table 3 amphibians and invertebrates.**

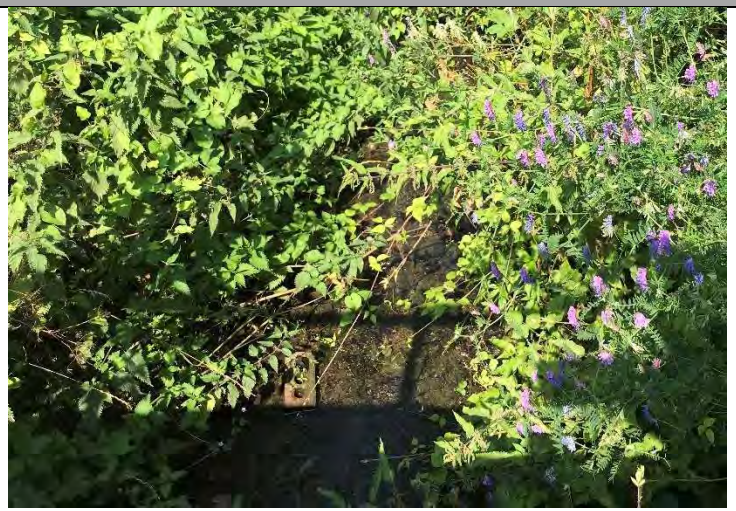
Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**S.41**	**Potential Adverse Effects?**
<u>Stream</u> **The stream is located adjacent to the southwestern boundary of the survey area.** **The stream is approximately 1m wide and <10cm deep, has a moderate flow in a westerly direction, a gravely substrate, and densely vegetated banks. The stream connects to a network of waterways within the nature reserve and finally into the River Severn.**		✓	**Yes – potential for damage to this habitat as a result of development proposals. See Table 3 re water voles, otters, GCN (and other amphibians), European eels and Atlantic salmon and invertebrates.**

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**S.41**	**Potential Adverse Effects?**
Species Rich Hedgerow with Trees **Species rich hedgerows with trees were identified along the northeast, southwest and the central east boundary, bordering the southern stream, residential houses in the western corner of the site and Hempsted Lane. There is a dry ditch bordering the west side of the central eastern hedgerow.** **The dominant species present is elm species (*Ulmus* sp.) and bramble (*Rubus fruticosus agg.*), with abundant hawthorn (*Crataegus monogyna*) and field maple (*Acer campestre*). Frequent species include elder (*Sambucus nigra*), blackthorn (*Prunus spinosa*) dog rose (*Rosa canina*), and dogwood (*Cornus sanguinea*). Rare species identified include holly (*Ilex aquifolium*).** **There are approximately 7 trees within these hedgerows. Species include: pedunculate oak (*Quercus robur*), ash (*Fraxinus excelsior*), hazel (*Corylus avellana*) and hawthorn.** **Other non-woody species present include: common nettle (*Urtica dioica*) (D), bindweed (*Calystegia silvatica*) (D), cleavers (*Galium aparine*) (A), common sorrel (F), thistle sp. (F), ivy (*Hedera spp.*) (F), great willowherb (F), hoary willowherb (F), germander speedwell (*Veronica chamaedrys*) (O), common ragwort (*Jacobaea vulgaris*) (O), common mallow (*Malva sylvestris*) (O), umbellifer sp.**	 **Northeast hedge bordering Hempsted Lane**	✓	**Yes – potential for loss / damage as part of development proposals.** **See Table 3 re birds, bats, water voles, otters, GCN (and other amphibians), common reptiles, hedgehogs and invertebrates.**

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**S.41**	**Potential Adverse Effects?**
(*Umbelliferae spp.)* (O), hog weed *(Heracleum sphondylium*) (O) and forget me not sp. (*Myosotis spp.*) (O), red dead nettle (*Lamium purpureum*) (R), lilac (*Syringa vulgaris*) (R), and purple loosestrife (*Lythrum salicaria*) (R).			
<u>Species Rich Hedgerow</u> Species rich hedgerows were identified along the northeast corner and the central west boundary, bordering the northern bridleway, Rea lane and residential houses. The dominant species present is elm sp. hawthorn and bramble (D). Other species include field maple (A), dog rose (A), elder (F), blackthorn (O) and dogwood (O). Other non-woody species present include bindweed (D), common nettle (A), cleavers (A), white briony (*Bryonia dioica*) (F), hoary willowherb (A), forget me not sp. (R) and vetch sp. (*Fabaceae spp.*) (R).		✓	**Yes – potential loss / damage as result of development proposals. See Table 3 re birds, bats, GCN (and other amphibians), common reptiles, hedgehogs and invertebrates.**

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**S.41**	**Potential Adverse Effects?**
<u>Species Poor Hedgerow with Trees</u> **The species poor hedgerow is located along the central section of the northern boundary bordering the gardens of the residential dwellings. The hedgerow is partly unmanaged. The gardens immediately to the north support a cluster of trees.** **The dominant species present are elm and hawthorn. Other species include horse chestnut (*Aesculus hippocastanum*) (O) and dogwood (O). Bramble is also present.** **Trees located within the residential gardens immediately north of the survey area boundary include hawthorn (F), field maple (O), copper beech (*Fagus sylvatica*) (O), rowan (Aesculus hippocastanum) (R) and silver birch (*Betula pendula*) (R).**		✓	**Yes – potential damage / loss as a result of development proposals.** **See Table 3 re birds, bats, water voles, otters, GCN (and other amphibians), common reptiles, hedgehogs and invertebrates.**
<u>Line of trees</u> The eastern boundary adjacent to the A430 consists of lines of trees. Sections of this habitat are broken up by scrub. The dominant tree species include elder, hawthorn and field maple. Other species include bramble (A), bind weed (A), common ragwort (F) and umbellifer sp. (*Apiaceae spp.*) (F).		X	No – this habitat is common and widespread species. See Table 3 re birds, bats, GCN (and other amphibians), common reptiles, hedgehogs and invertebrates.

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**S.41**	**Potential Adverse Effects?**
Scrub The scrub habitat is found primarily found along the eastern boundary and western central field boundaries. Other scattered scrub is located along the eastern, northern and western boundary. Dominant species include bramble, bindweed, willow herb. Other species include cleavers (A), elder (A), thistle sp. (F), grass sp. (*Poa spp*.) dog rose (O), hoary willowherb (O), herb Robert (*Geranium robertianum*) (R), germander speedwell (R) and fox and cubs (*Pilosella aurantiaca*) (R).		X	No – this habitat is common and widespread and is not considered to be of significant conservation value. See Table 3 re birds, bats, water voles, otters, GCN (and other amphibians), common reptiles, hedgehogs and invertebrates.

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**S.41**	**Potential Adverse Effects?**
<u>Dry ditch</u> **The dry ditch habitat is located along the west side of the central eastern hedgerow and along the west side of the western boundary hedgerow. The ditch is approximately 0.5m deep with a moderate gradient and densely vegetated. Dominant species include bramble, bindweed and willowherb species. Other species include cleavers (A), thistle sp. (F), grass sp. (F), dog rose (O), herb Robert (*Geranium robertianum*) (R), common sorrel (R) and germander speedwell (R).**		**X**	**Yes – whilst this ditch contains no water and aquatic vegetation, and the terrestrial flora it supports are common and widespread, this feature provides habitat diversity and connectivity to the stream along the southern boundary of the survey area. this feature could be lost / damaged as a result of development proposals.**

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**S.41**	**Potential Adverse Effects?**
<u>Arable Fields</u> There are three medium sized arable fields with south facing gradients.		X	No – this habitat is planted crop and is not considered to be of significant conservation value. (see table 3 – ground nesting birds).

3.3 Species

3.3.1 Protected and S.41 species are evaluated to identify potential ecological constraints in Table 3 below, based on the desk study records, presence, extent and viability of supporting habitat, ecological connectivity and perceived nature and extent of effects.

3.5.2 Species/taxa for which potential adverse effects are not anticipated are excluded from further assessment.

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study**	**Status[8]**	**Supporting Habitat**	**Potential Adverse Effect?**
Bats *Chiroptera*	**Yes – roost records within 2km include:** • **Whiskered/Brandt's (*myotis mystacinus/myotis branti*) roost (2015), 0.5km north** • **Brown long-eared (*plecotus auritus*) roost (2014), 1.5km north** • **Common pipistrelle (*pipistrellus pipistrellus*) roost (2015), 1.5km north** **Other records provided by the data search with limited information includes greater horseshoe (*Rhinolophus ferrumequinum*), lesser horseshoe (*Rhinolophus hipposideros*), common pipistrelle, soprano pipistrelle (*pipistrellus pygmaus*), noctule (*nyctalus noctula*), long-eared, Daubenton's (*myotis daubentonii*) and whiskered/Brandt's.**	**EPS, WCA5, S41, Bern**	**Yes – the hedgerows, treeline, scrub and pond have the potential to provide suitable foraging and commuting habitat and are considered to be of 'moderate' suitability for bats. The field boundary hedgerows provide connectivity to further suitable habitats including residential dwellings, wetlands, farmland, mature trees and a church.** **A PRA identified one pedunculate oak tree along the southwest hedgerow which is considered to be of low potential for bats due to a small amount of flaking bark see TN1 of GM10710-002 Habitat Plan.** **No other trees on site are considered suitable for supporting roosting bats however, a number of large mature oak trees further south along Rea Lane outside of the survey area have features suitable for supporting roosting bats.**	**Yes – habitat loss from proposed development has the potential to affect roosting bats, reduce foraging habitat and disrupt navigation routes. Increased human disturbance (including noise, lighting and predation by domestic pets) can also adversely affect bats.**

[8] **EPS** – European Protected Species, **WCA** – Fully protected under Section 9 of the Wildlife and Countryside Act, **WCA5** –Protected under Section 9, Part 5 of the Wildlife and Countryside Act only, **BA** – Protection of Badgers Act, **S41** – Natural Environment and Rural Communities Act 2006 (Section 41), **Bern** – The Bern Convention on the Conservation of European Wildlife and Natural Habitats, **UKBR (RSPB)** - RSPB UK Red listed birds, **UKBAm (RSPB)** - RSPB UK Amber listed birds, **BAP –** UK Biodiversity Action Plan

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study**	**Status[8]**	**Supporting Habitat**	**Potential Adverse Effect?**
Birds	**Yes – Records of priority and red status birds within 2km search area in the last 10 years include (but not limited to): barn owl (*Tyto alba*), Cetti's warbler (*Cettia cetti*), cuckoo (*Cuculus canorus*), curlew (*Numenius arquata*), fieldfare (*Turdus pilaris*), goshawk (*Accipiter gentilis*), grasshopper warbler (*Locustella naevia*), grey wagtail (*Motacilla cinerea*), hobby (*Falco subbuteo*), house sparrow (*Passer domesticus*), kestrel (*Falco tinnunculus*), kingfisher (*Alcedo atthis*), lapwing (*Vanellus vanellus*), lesser redpoll (*Acanthis cabaret*), linnet (*Linaria cannabina*), marsh tit (*Poecile palustris*), merlin (*Falco columbarius*), Mistle thrush (*Turdus viscivorus*), nightingale (*Luscinia megarhynchos*), peregrine (*Falco peregrinus*), red kite (*Milvus milvus*), redwing (*Turdus iliacus*), reed bunting (*Emberiza schoeniclus*), short-eared owl (*Asio flammeus*), skylark (*Alauda arvensis*), song thrush (*Turdus philomelos*), spotted flycatcher (*Muscicapa striata*) and tree pipit (*Anthus trivialis*).**	**WCA1, Bern, S41, BoCC**	**Yes – hedgerows, treelines and scrub provide suitable nesting, foraging and refuge habitat for a variety of bird species. The pond provides foraging opportunities for birds.** **Ground nesting birds, such as skylarks, are known to nest in arable fields.** **Fauna identified during the survey includes chaffinch (*Phylloscopus collybita*) using the central eastern hedgerow, blue tit (*Cyanistes caeruleus)* using the northeast hedgerow and wren (*Troglodytes troglodytes*) using the southwest hedgerow.**	**Yes – potential harm / disturbance to individual birds if works carried out during breeding season. Potential breeding and foraging habitat may be also lost/disturbed by the development. Disturbance caused by increased human activity, including dog walking.**

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study**	**Status[8]**	**Supporting Habitat**	**Potential Adverse Effect?**
European Otter *lutra lutra*	**Yes – there are 3 records for otters within 2km of the survey area with the most recent record from April 2015.**	**EPS, S41, Bern, WACA5**	**Yes, the southwest hedgerow adjacent to the stream provides refuge for otters. The stream and southwest hedgerow provides a potential commuting route to further suitable habitats including wetlands, streams and rivers.**	**Yes – individuals could potentially fall into excavations left open overnight and construction may lead to killing / injury of individuals. Pollutants entering the stream during and post construction will affect otters. Increased human activity including dog walking may disturb otters.**
Dormouse *Muscardinus avellanarius*	No records.	EPS, WCA5	No - The hedgerows are of very limited suitability for dormice as only a single hazel tree was identified and bramble, but these habitats also lack connectivity to suitable off-site areas, so dormouse is unlikely to be present.	No – this species is not considered to be present within the site.
Amphibians	**Great crested newt (*Triturus cristatus*)** **Yes –There are 4 records of GCN from 2013 with 4 being the highest number of individuals identified within one record. The closest record is located approximately 100m northwest of the survey area.**	**EPS, S41, WCA5, BAP**	**Yes – The pond has the potential to support breeding amphibians if wet at other times of year. The terrestrial habitats within the survey area are of limited value for amphibians, with the boundary hedgerows and scrub being of most value. A review of OS data has identified 21 waterbodies within 500m of the survey area.**	**Yes – Potential adverse effects from killing/injuring of individuals, and Loss and isolation of terrestrial habitat should amphibians be present in the on-site pond or ponds located within 500m of the survey area.**
	Common frog (*Rana temporaria*) **Yes – 6 records within 2km of the survey area. The most recent is from 2018.**	**WCA5, Bern**		

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study**	**Status[8]**	**Supporting Habitat**	**Potential Adverse Effect?**
	Common toad (*Bufo bufo*) **Yes – 5 records within 2km of the survey area. The most recent is from 2017.**	**S41, WCA5**		
	Palmate newt (*Lissotriton helveticus*) **Yes – 3 records within 2km of the survey area. The most recent is from 2018.**	**WCA5, Bern**		
	Smooth newt (*Lissotriton vulgaris*) **Yes – 4 records within 2km of the site. The most recent is from 2018 and 81 being the highest number of individuals identified within one record.**	**WCA5, Bern**		
Bony Fish	**Atlantic salmon (*Salmo salar*)** **Yes –There is 1 record for Atlantic Salmon from 2009 in the River Severn.**	**EPS, S41, BAP, Bern, OSPAR**	**No – On-site there is no suitable habitat. However, the stream bordering the southwest boundary provides suitable habitat for eels and connects to The Rea where there are records for Eels.** **The stream connects to the River Severn which supports Atlantic Salmon.**	**Yes – potential pollutants entering the stream could impact upon European eels and potentially Atlantic salmon.**
	European eel (*Anguilla anguilla*) **Yes –There is 1 record for European Eels from 2009 which identified 50 juveniles in The Rea 300m from survey area.**	**S41, BAP, Bern, OSPAR**		
White-Clawed Crayfish (WCC)	**No Records**		**Yes - the stream bordering the southwest boundary provides suitable habitat for WCC.**	**Yes – potential pollutants entering the stream could impact upon WCC.**

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study**	**Status[8]**	**Supporting Habitat**	**Potential Adverse Effect?**
Water Vole *Arvicola amphibius*	**Yes – there is 1 record for water voles within 2km of the survey area with the most recent record from April 2017.** **The stream along the southwest boundary is part of Netheridge Reserve, which is managed by Gloucestershire County Council (GCC) and Gloucestershire Wildlife Trust (GWT) for water voles. Additional water voles have been translocated to the reserve to boost the existing population. The reserve is a proposed Key Wildlife Site (KWS).**	**S41 WCA5 BAP**	**Yes, the stream and bankside vegetation along the south western boundary is suitable for water voles and are known to be using this feature.**	**Yes – Potential habitat loss / damage as a result of proposed development could impact on water vole. Using the stream. Pollution events could also impact water vole using the stream and those within the Netheridge Nature Reserve.**
European Badger *Meles meles*	**Information on Badger is provided in Confidential Appendix 3 which is provided separately to this report.**			
Reptiles	**Grass snake (*Zootoca vivipara*) Yes – 1 record within 2km of the site from 2011.**	**S41, WCA5**	**Yes – the boundary habitats on site, notably the hedgerows and scrub have the potential to support foraging and commuting reptiles.**	**Yes – vegetation clearance and construction activities have the potential to harm individuals if present at the time of the works.**
	Common lizard (*Natrix Helvetica*) Yes – 1 record within 2km of the site from 2011.			
	Slow worm (*Anmgpuihs ifbraiagnilsis*) Yes – 6 records within 2km of the site. The most recent is from 2018.			

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study**	**Status[8]**	**Supporting Habitat**	**Potential Adverse Effect?**
European Hedgehog *Erinaceus europaeus*	**Yes – 56 records were recorded within the 2km search area, with the most recent from June 2018.**	**S41, Bern, BAP**	**Yes – the hedgerows and scrub areas are suitable to support this species.**	**Yes – individuals could potentially fall into excavations left open overnight and construction may lead to killing / injury of individuals. Enclosed garden walls create barriers for hedgehogs and removal of hedgerows will fragment habitats.**
Invertebrates	**Species include but are not limited to: White ermine (Spilosoma lubricipeda), small phoenix (Ecliptopera silaceata), , ghost moth (Hepialus humuli humuli), White Ermine (Spilosoma lubricipeda), Mouse Moth (Amphipyra tragopoginis), Green-brindled Crescent (Allophyes oxyacanthae), Rustic (Hoplodrina blanda), Rosy Rustic (Hydraecia micacea), Brown-spot Pinion (Agrochola litura), Centre-barred Sallow (Atethmia centrago), Deep-brown Dart (Aporophyla lutulenta), Powdered Quaker (Orthosia gracilis) and Feathered Gothic (Tholera decimalis).**	**S41 BAP**	**Yes – habitats including the pond, hedgerows, treeline, scrub and dry ditches are suitable to support a variety of invertebrates including S41 species** **During the survey meadow brown (*Maniola jurtina*), peacock butterfly (*Aglais io*) and small tortoiseshell (*Aglais urticae*) along with a number of other unidentified butterflies, crickets, damselflies and dragonflies including an southern migrant hawker (*Aeshna affinis*) were observed around the pond and along the southwest and central eastern hedge.**	**Yes – habitat loss could affect invertebrates.**

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study**	**Status[8]**	**Supporting Habitat**	**Potential Adverse Effect?**
Flowering plants	**Tubular Water-dropwort (*Oenanthe fistulosa*) was identified 1.7km north along the River Severn.**	**S41, BAP**	**Yes – Tubular water-dropwort is found around wetlands and along waterbodies. The stream corridor along the south western boundary and the pond have the potential to provide suitable habitat for this species.**	**Yes – works in proximity to the stream corridor along the south western boundary could impact on tubular water-dropwort if present at the time of removal. Pollutants entering the stream could also affect this species if present.**
Invasive non-native species	Yes – The data search identified a number of invasive species that have been recorded within 2km of the site including but not limited to; Indian balsam (*Impatiens glandulifera)* and Japanese Knotweed (Fallopia japonica).	WCA (Schedule 9)	No – no invasive non-native species were identified on-site.	No – no invasive non-native species were identified on-site during the time of survey.

4 DISCUSSION AND RECOMMENDATIONS

4.1 Potential Constraints

4.1.1 The following have been evaluated as being subject to potential adverse effects:

- Statutory and non-statutory designated sites;
- S.41 Habitat: Hedgerows;
- S.41 Habitat: Pond;
- S41 Habitat: Stream;
- Dry Ditch;
- Bats;
- Birds;
- European otter;
- Amphibians including great crested newts;
- Bony fish including European eels and Atlantic salmon;
- White-Clawed Crayfish;
- Water vole;
- European badger;
- Common reptiles;
- European Hedgehog;
- S41 Invertebrates; and
- S41 flowering plants.

4.1.2 Potential effects, requirements for further survey, and potential mitigation required are discussed below for each of the above.

4.2 Statutory and non-statutory designated sites

4.2.1 Alney Island (LNR & LWS) is the only statutory designated site within 2km of the survey area located 1.7km to the north. Green Farm Orchard, Sud Meadow and Robinswood Hill Country Park Local Wildlife Sites and the Rea, Hempsted, Manor Farm Hempsted, Newark Farm, Crypt School, Daniel's Meadows & Brook, Minsterworth & Corn Ham, The Knoll, Robinswood Hill unconfirmed sites are located within 2km and could be

subject to potential adverse effects from the proposed development. The stream along the southern boundary of the survey area is part of the Netheridge Reserve (Unconfirmed site). Further assessment will therefore be required to assess potential significant effects arising from the proposed development and if mitigation measures required.

4.3 Habitats

S.41 Habitat: Hedgerows

4.3.1 It is recommended that the hedgerow along the south western boundary is retained. This hedgerow is adjacent to Netheridge Reserve and stream and potentially provides suitable habitat for water voles, commuting otters, birds, amphibians, reptiles and a commuting route for bats. It is recommended that the hedge (and stream) is protected from development by a suitable buffer and is not incorporated into residential gardens.

4.3.2 It is recommended that all other hedgerows are retained as much as possible. However, if this is not possible, the translocation of hedgerows to a suitable location on-site should be considered. Retained hedgerows should be protected in accordance with BS 5837:2012 Trees in Relation to Design, Demolition and Construction.

S.41 Habitat: Ponds

4.3.3 It is recommended that the on-site pond is retained and enhanced as part of the development proposals.

4.3.4 It is recommended that appropriate pollution prevention measures are implemented during construction and during the operational phases of the development where required to prevent pollution events that may affect the pond.

4.4 S41 Habitat: Stream and Dry Ditch

4.4.1 It is recommend that a suitable buffer is implemented along the stream and ditch corridors and that development works are not undertaken within the buffer, to prevent significant adverse effects on this feature.

4.4.2 It is recommended that appropriate pollution prevention measures are implemented during construction and during the operational phases of the development where required to prevent pollution events that may affect these features.

4.5 Fauna

Bats

4.5.1 The oak tree along the southwest boundary was assessed to be of 'low' suitability for bats due to partially flaking bark. It is recommended that this tree is retained due to its location within the southwest hedgerow and adjacent to the stream.

4.5.2 If removal of this tree is required it is recommended that it is soft felled with an Ecologist present. This tree should only be pruned or soft felled between March and October, when bats are active and less vulnerable to disturbance. Soft felling is a 'proceed with care' approach and requires the tree surgeon to carefully cut and lowering tree limbs to the ground and leaving them grounded overnight to allow any bats to make their way out. If felling is required during the winter period, it is recommended that a climb and inspect survey is carried out prior to felling.

4.5.3 The hedgerows, treelines, pond and adjacent stream have the potential to provide suitable foraging and commuting habitat. It is therefore recommended that bat activity surveys are undertaken to identify key foraging and commuting habitats within the survey area. Current best practice guidelines recommend that for habitats of 'moderate' suitability, one survey visit per month (April - October) is carried out. In addition, at least two remote bat detectors should be deployed per transect with data being collected over five consecutive nights.

Birds

4.5.4 The habitats on site have the potential to be used by a variety of birds, including skylark. Therefore a nesting bird survey is recommended to identify the use of the survey area by breeding birds.

4.5.5 The hedgerows, treelines and scrub habitats within the survey area provide refuge and foraging habitat for a wide range of bird species. It is recommended that as much as possible of all hedgerows are retained.

4.5.6 Any vegetation clearance should be undertaken outside of the breeding bird season (March to August inclusive). However, if it is necessary for works to be carried out during this time, a qualified ecologist or ornithologist should be present to carry out a nesting bird check within 48 hours of the works commencing. If nesting birds are recorded a suitable buffer will need to be put in place and works in the vicinity avoided until the young have fledged.

European otters

4.5.7 It is possible that the stream corridor along the south western boundary is used as a commuting route by otters. It is recommended that the southwest hedgerow is retained, and this boundary feature protected from development.

4.5.8 It is recommended that appropriate pollution prevention measures are implemented during construction and during the operational phases of the development where required to prevent pollution events that may affect the stream and consequently otter if present.

4.5.9 If development works (including landscaping) are required within 10m of the banks of the stream, then it is recommended that an otter survey is undertaken to determine if this species is present.

Amphibians including great crested newt (GCN)

4.5.10 The habitats within the survey area have potential to support amphibians including GCN and it is recommended that further surveys are undertaken on the 21 waterbodies located within 500m of the survey area. This would initially comprise a scoping survey including a Habitat Suitability Index (HSI) assessment and would assess their suitability for GCN and the requirement for further surveys.

Bony fish including European eels and Atlantic salmon

4.5.11 Eels have been recorded 300m south of the survey area at The Rea, which is connected to the stream adjected to the survey area through connecting streams and wetlands. Eels are especially sensitive to water pollutants. Presence should be assumed and therefore it is recommended that a permanent silt barrier is created to prevent chronic or episodic pollution events entering the stream, during or post construction, prior to any work commencing including the arrival of materials and machinery.

4.5.12 Atlantic salmon are present in the River Severn. The stream adjacent to the survey area flows into to the River Severn. It is therefore recommended that silt barriers to prevent pollution entering the stream are installed prior to any work commencing.

White-clawed crayfish

4.5.13 There are no records for white-clawed crayfish within 2km. However, the stream adjacent to the survey area provides suitable habitat.

4.5.14 It is recommended that appropriate pollution prevention measures are implemented during construction and during the operational phases of the development where

required to prevent pollution events that may affect the stream and consequently white-clawed crayfish if present.

Water voles

4.5.15 There is only 1 record for water voles within 2km of the survey area. However, it is understood that this is not representative of the local population. The stream along the southwest boundary is part of Netheridge Reserve, which is managed by Gloucestershire County Council (GCC) and Gloucestershire Wildlife Trust (GWT) for water voles. Additional water voles have been translocated to the reserve to boost the existing population and therefore water voles are assumed to be using the stream along the south western boundary.

4.5.16 It is recommended that appropriate pollution prevention measures are implemented during construction and during the operational phases of the development where required to prevent pollution events that may affect the stream.

4.5.17 <u>If works are required within 10m of the banks of the stream, then it is recommended that a water vole survey is undertaken to determine whether this species is present.</u>

Badgers

4.5.18 Information on badger is provided in Confidential Appendix 3, which is provided separately to this report.

Common reptiles

4.5.19 The habitat, notably hedgerows and field boundaries, scrub and dry ditch, have the potential to provide habitat suitable for common reptiles. Vegetation clearance and direct habitat loss have the potential to harm common reptiles if present at the time of the works.

4.5.20 The risk of harm to common reptiles can be reduced by the implementation of suitable reasonable avoidance measures, under a Precautionary Working Method Statement.

4.5.21 Such measures could include discouraging reptiles from the working area by appropriate vegetation management. The vegetation within the working area should be cleared or cut to ground level two weeks before the commencement of the construction works and maintained in this condition up until the commencement of the construction works in order to discourage reptiles from these areas.

4.5.22 Any debris present within the affected areas, which could be used by reptiles as refuges, should be removed. The removal of debris should be undertaken before

reptiles start to hibernate in late September or after reptiles emerge from hibernation in March and April.

European hedgehog

4.5.23 It is recommended that measures to prevent harm and disturbance to hedgehogs during site clearance and construction works are undertaken. Including providing means of escape from excavations left open overnight and adhering to good construction practices.

4.5.24 The retention of the hedgerow network, as much as is practicable, within the survey area would provide wildlife corridors through the development which could benefit hedgehogs. Biodiversity enhancements could also be incorporated into the development proposals to benefit hedgehogs.

4.5.25 In order to avoid works adversely affecting the local conservation status of hedgehogs, if present, it is recommended that any works which may affect potential hedgehog hibernation sites should be avoided during the hibernation period (November – March).

4.5.26 No surveys for this species are considered necessary.

S41 Invertebrates

4.5.27 The data search identified a number of S41 moth Priority Species within 2km. It is recommended that the majority of the hedgerows within the survey area are retained to protect moth larvae habitat.

4.5.28 A large number of butterflies, dragonflies and damselflies were observed during the survey along the southwest hedge, the central eastern hedgerow and around the pond. It is recommended that these habitats are retained to protect suitable habitat for invertebrates.

S41 flowering plants

4.5.29 It is recommended that the hedgerow along the south western boundary and existing pond are retained and protected from development, to preserve habitat suitable for Tubular Water-dropwort.

4.5.30 It is recommended that appropriate pollution prevention measures are implemented during construction and during the operational phases of the development where required to prevent pollution events that may affect the stream.

5 ECOLOGICAL ENHANCEMENTS

5.1 Introduction

5.1.1 In accordance with the requirements of the NPPF and BSI 42020:2013 ecological enhancements should be proposed which will result in a net gain in biodiversity. The below measures may be able to be incorporated into the proposed works to enhance the site for wildlife, although this list is not exhaustive and additional measures can be considered.

5.2 Habitats

5.2.1 The introduction of a second wildlife pond, located along the southwest hedgerow, included in the development design will benefit a variety of local species including amphibians, invertebrates and tubular water-dropwort. Ponds also provide valuable foraging potential for birds and bats. The creation of a pond habitat will be in keeping with the local wetland wildlife reserves and multiple ponds in proximity are more likely to sustain wildlife populations in the long term.

- The newly created pond should be left to colonise naturally, although a small amount of native species can be planted as suggested in Appendix 3.
- Non-native species must not be introduced.
- For a wildlife pond to be successful, fish must not be added.
- The existing pond and newly created pond should be fenced to prevent dogs from entering the pond.

5.2.2 It is recommended that the creation of wildlife friendly areas are incorporated within the landscape proposals for the development. Such areas should include a mosaic of habitats including grassland habitats which should be seeded with locally native species (see appendix 3) which will be beneficial to ground nesting birds, barn owls, invertebrates and other species. The grassland should be mown 1 in 3 years to prevent loss of the grassland.

5.2.3 Signage could also be erected next to wildlife grasslands encouraging people to keeps dogs on leads between 1st March and 31st August to protect ground-nesting birds.

5.3 Species

5.3.1 Where possible, integrated bat boxes, such as the '1FR bat tube by Schwegler' could be incorporated into the proposed development. Positioned away from windows, artificial light and installed higher than 3m. Boxes should be placed in a range of

locations at slightly different heights and facing in slightly different directions to give a choice of roost site options (Mitchell-Jones, 2004).

5.3.2 A variety of bats boxes can also be installed onto mature trees that are located away from artificial lights.

5.3.3 The provision of integrated bird boxes, such as the 'Schwegler 26 Brick Box Nest' could also be incorporated into the proposed development plans.

5.3.4 Provision of hibernaculum for the benefit of common reptiles and amphibians.

5.3.5 It is recommended that if boundary fences are used then 12cm gaps underneath or 12cm holes at the regular intervals along the base of the fences should be created to allow wildlife to commute between on-site habitats.

5.4 General Recommendations

5.4.1 If the site boundary alters and other habitats are identified to be lost or affected by the development, then further surveys for habitats and protected species may be required.

5.4.2 It is recommended that an update walkover is undertaken if 12 months has elapsed since this report is issued to see if there have been any substantial changes to the habitats present on the site.

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Appendix 1
Summary of Species (Fauna) Protection and Legislation

Appendix 1: Summary of Species (Fauna) Protection and Legislation

Summary of Legislation

Protection for animals included on Schedule 5 of the Wildlife and Countryside Act 1981 (As Amended)		
Section 9	Part 1	Intentionally kill, injure, take a scheduled animal
	Part 2	Possess or control (live or dead animal, part or derivative)
	Part 4 (a)	Intentionally or recklessly damage, destroy or obstruct access to any structure or place used by a scheduled animal for shelter or protection
	Part 4 (b)	Intentionally or recklessly disturb an animal occupying such a structure or place
	Part 5 (a)	Sell, offer for sale, possess or transport for the purpose of sale (live or dead animal, part or derivative)
	Part 5 (b)	Advertise for buying or selling such things

Protection for animals included on Schedule 2 of The Conservation of Habitats and Species and Planning (Various Amendments) (England and Wales) Regulations 2018		
A person commits an offence if they:		
Section 41	Part 1(a)	Deliberately captures, injures or kills any wild animal of a European protected species
	Part 1(b)	Deliberately disturbs wild animals of any such species. (1A) For the purpose of paragraph (1)(b), disturbance of animals includes in particular any disturbance which is likely a) to impair their ability i. to survive, breed or reproduce or to rear or nurture their young; or ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate. b) to affect significantly the local distribution or abundance of the species to which they belong
	Part 1(c)	Deliberately take or destroy the eggs of such an animal
	Part 1(d)	Damage or destroy a breeding site or resting place of such an animal
	Part 3	To: a) be in possession of, or to control, b) transport, c) sell or exchange, or d) to offer for sale or exchange. (4) For the purpose of (3) this applies to: a) any live or dead animal or part of animal i) which has been taken from the wild, and ii) which is a species or subspecies listed in Annex IV(a) to the Habitats Directive; and b) anything derived from such an animal or any part of such an animal.

Bats

All UK bat species are European Protected Species and afforded full protection through inclusion of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) Regulations 2018.

Lesser horseshoes, greater horseshoes, barbastelles and Bechstein's are listed as Annex II species on The Habitats Directive. Core areas of their habitat are designated as sites of Community importance (SCIs) and are included in the Natura 2000 network. These sites must be managed in accordance with the ecological needs of the species.

Barbastelle, Bechstein's, greater mouse-eared, pipistrelle, greater horseshoe and lesser horseshoe bats are included within the Natural Environment and Rural Communities (NERC) Act 2006 in respect of Section 41 (England). Species included in this list are considered by the Secretary of State to be "*of principal importance for the purpose of conserving biodiversity*". Bats are therefore listed as a priority species on the UK Biodiversity Action Plan (BAP). Barbastelle, Bechstein's, noctule, soprano pipistrelle, brown long-eared, greater horseshoe and lesser horseshoe bats are all UK BAP species.

Birds

All wild birds, their nests and eggs are protected throughout the breeding season (1 March to 31 August) under the Wildlife and Countryside Act, 1981 (as amended), which makes it an offence intentionally (with certain limited exceptions and in the absence of a licence) to:

- Kill or injure any wild bird;
- Take, damage or destroy the nest of any wild bird whilst it is in use or being built;
- Take or destroy the egg or any wild bird.

It is also an offence to possess any live or dead wild bird or egg, or anything derived from a wild bird or egg. Restrictions on trade and advertising also apply.

Bird species listed on Schedule 1 of the Wildlife and Countryside Act, 1981 (as amended) are afforded additional protection against intentional or reckless

disturbance whilst it is nest building, or at a nest containing eggs or young or disturbance to the young of a Schedule 1 bird.

In addition to this legal protection, the leading governmental and non-governmental conservation organisations in the UK have reviewed the population status of the birds regularly found here and produced a list of birds of conservation concern. Of the 244 species assessed, 67 were placed on the red list of high conservation concern, 96 on the amber list of medium conservation concern and 81 on the green list of low conservation concern. Consideration is therefore given to those species listed as being of conservation concern.

European Otters

European otters are listed as an Annex II species on The Habitats Directive. Core areas of their habitat are designated as sites of Community importance (SCIs) and are included in the Natura 2000 network. These sites must be managed in accordance with the ecological needs of the species.

Otters are afforded full legal protection through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) Regulations 2018.

Otters are included within the Natural Environment and Rural Communities (NERC) Act 2006 in respect of Section 41 (England). Species listed on this section are considered to be of principal importance for the conservation of biodiversity and as such are listed as a priority species on the UK Biodiversity Action Plan (BAP).

Great Crested Newts

Great crested newts are afforded full protection through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) Regulations 2018.

Great Crested Newts are listed as an Annex II species on The Habitats Directive. Core areas of their habitat are designated as sites of Community importance (SCIs) and are included in the Natura 2000 network. These sites must be managed in accordance with the ecological needs of the species.

This legislation covers all life stages of great crested newts.

Under the Wildlife and Countryside Act 1981, other amphibians, including smooth and palmate newts and common frogs cannot be sold or be offered for sale. The habitats of these amphibians are not legally protected, and they are not protected from intentional or deliberate killing or injuring.

Great crested newts are included within the Natural Environment and Rural Communities (NERC) Act 2006 in respect of Section 41 (England). Species listed on this section are considered to be of principal importance for the conservation of biodiversity and as such are listed as a priority species on the UK Biodiversity Action Plan (BAP).

Bony Fish - Atlantic Salmon and European Eels

Atlantic Salmon are listed as an Annex II species on The Habitats Directive. Core areas of their habitat are designated as sites of Community importance (SCIs) and are included in the Natura 2000 network. These sites must be managed in accordance with the ecological needs of the species.

European eels and Atlantic salmon are included within the Natural Environment and Rural Communities (NERC) Act 2006 in respect of Section 41 (England). Species listed on this section are considered to be of principal importance for the conservation of biodiversity and as such are listed as a priority species on the UK Biodiversity Action Plan (BAP).

European eels and Atlantic salmon are listed as Critically Endangered on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species and on the OSPAR list of threatened and/or declining species and habitats.

Other legislation affording protecting to eels include: European Eel Regulation (EC) No 1100/2007, the Eels (England and Wales) Regulations 2009.

White Clawed Crawfish

White clawed crayfish are listed as an Annex II species on The Habitats Directive. Core areas of their habitat are designated as sites of Community importance (SCIs) and are included in the Natura 2000 network. These sites must be managed in accordance with the ecological needs of the species.

Water Voles

The UK water vole population has undergone a dramatic decline particularly over the last two decades. A decline in numbers has been attributable to direct loss of habitat, habitat fragmentation, water pollution and through predation, in particular by mink.

Water voles are not a European Protected Species (EPS), however they are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981.

Water voles are included within the Natural Environment and Rural Communities (NERC) Act 2006 in respect of Section 41 (England). Species listed on this section are considered to be of principal importance for the conservation of biodiversity and as such are listed as a priority species in the UK Biodiversity Action Plan.

Badgers

Badgers are afforded full protection under the Protection of Badgers Act 1992, which makes it an offence to:

- Wilfully kill, injure or take a badger;
- Possess or control any live or dead badger or any part, or anything derived from, a dead badger;
- cruelly ill-treat a badger, or attempt to do so;
- To interfere with a sett by:
    - damaging or destroying it;
    - obstructing access to, or any entrance of, a badger sett;
    - causing a dog to enter a badger sett;
    - disturbing a badger when it is occupying a sett.;
- Sell a live badger or offer one for sale.

It is also an offence to mark, attach any ring, tag or other marking device to a badger unless authorised under licence.

Reptiles

Six native reptiles occur in Britain: the adder (*Vipera berus*), the grass snake (*Natrix natrix*), the smooth snake (*Coronella austriaca*), the sand lizard (*Lacerta agilis*), the common lizard (*Zootoca vivipara*) and the slow worm (*Anguis fragilis*).

The smooth snake and sand lizard are afforded complete protection through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) Regulations 2018.

These two species are very limited in their UK distribution and are not recorded in the Gloucester area. Other common reptiles (common lizard, grass snake, adder and slow worm) are protected against intentional killing and injuring, sale and possession.

All six reptile species are listed as priority species on the UK Biodiversity Action Plan.

Appendix 2
Target Notes

Appendix 2 – Target Notes

The target notes are shown on drawing GM10710-002 Phase 1 Habitat Plan.

TN1	Mature oak with flaking bark has low potential for roosting bats.	
TN2	Wooden poles have been installed to created a field boundary.	
TN3	Pond within survey area – currently dry but species present suggest the pond is wet at other times of the year.	

Appendix 3
Confidential Appendix on Badger Activity
(Provided Separately)

Appendix 4
Species List for Planting Scheme

Appendix 4: Native Species Listing for Planting Scheme

Tree planting

Native trees are more beneficial to wildlife than ornamental species in providing food for birds, bats, invertebrates and many others. The planting of tree species such as *Quercus robur* (pedunculate oak) would be particularly beneficial to wildlife and their addition to a landscape plan would enhance the ecological value within the site.

Trees, in general, provide feeding, nesting / roosting and sheltering opportunities for bats, birds and invertebrates. Berry or fruit bearing trees in particular will attract bird species such as blackbird, fieldfare, song thrushes and robin. Suitable species include: *Crataegus monogyna* (hawthorn), *Prunus spinosa* (blackthorn), *Ilex aquifolium* (holly), *Sorbus aucuparia* (rowan) and *Prunus avium* (wild cherry).

Grassland Creation

The survey area has the potential to support an area of grassland, grasslands created for wildlife provide valuable habitat for ground nesting birds, foraging birds, invertebrates and other species. The majority of the grassland should be left to colonise naturally, a small amount of locally native species from a suitable seed mix can be included such as *Lychnis flos-cuculi* (ragged robin), *Succisa pratensis* (Devil's Scabious), *Centaurea nigra* (common knapweed), *Euphrasia rostkoviana* (eyebright), *Lotus conrniculatus* (bird's-foot trefoil), *Sanguisorba officinalis* (great burnet), *Pilosella aurantiaca* (fox and cubs), *Cynosurus cristatus* (crested dog's-tail), *Anthoxanthum odoratum* (Sweet vernal grass) should be included.

Lawn and roadside verges

A wildflower seed mix suitable for regular mowing should be added into areas of garden lawn and roadside verges, to include low growing species such as *Galium verum* (lady's bedstraw), *Lotus conrniculatus* (bird's-foot trefoil), *Prunella vulgaris* (selfheal), *Thymus polytrichus* (thyme), *Trifloium pratense* (red clover), *Anagallis arvensis* (scarlet pimpernel) and *viola riviniana* (common dog-violet). Mowing is recommended after the flowers and grasses have set seed.

Ponds and other wetlands

On the banks of ponds species such as *Lychnis flos-cuculi* (ragged robin), *Juncus effuses* (soft rush), *Cardamine pratensis* (cuckoo flower), *Lysimachia nummularia* (creeping jenny) and *Filipendula ulmaria* (meadow sweet) can be planted.

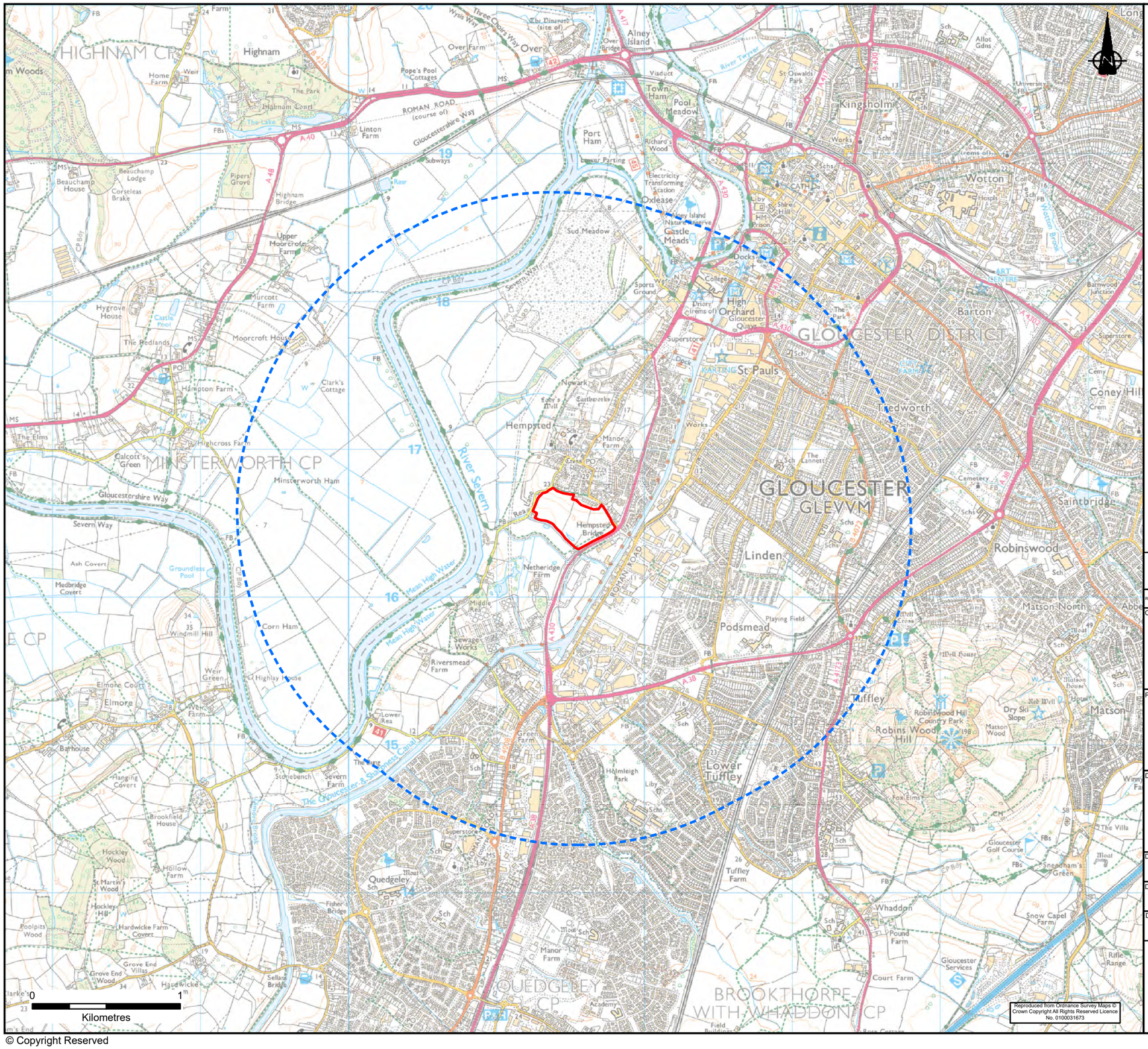
At the margins species planted can include: *Myosotis scorpoides* (water forget-me-not), *Sparganium erectum* (branched bur-reed), *Iris pseudacorus* (yellow flag iris), *Lythrum salicaria*

(purple loosestrife), *Caltha palustris* (marsh marigold), *Potentilla palustris* (marsh cinquefoil), *Hippuris vulgaris* (mare's tail) and *Potamogeton pectinatus* (fennel-like pondweed) can be planted.

Plants that can be planted in the deep marginal areas include *Sagittaria sagittifolia* (arrowhead), *Hydrocharis morsus-ranae* (frogbit), *Polygonum amphibium* (amphibious bistort), *Ranunculus aquatilis* (water crowfoot) and *Myriophyllum spicatum* (spiked water-milfoil).

Important oxygenating plants to be planted in deep water include *Callitriche stagnalis* (common water starwort), *Stratiates altoides* (water soldier).

DRAWINGS



KEY

Survey Area

2km Search Area

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
.	.	.	.	.	.

CLIENT

GLADMAN DEVELOPMENTS LTD

PROJECT

HEMPSTED LANE, GLOUCESTER

DRAWING TITLE

SURVEY AREA LOCATION PLAN

DRG No.	REV
GM10710-001	A

DRG SIZE	SCALE	DATE
A3	1:25,000	12/09/2019

DRAWN BY	CHECKED BY	APPROVED BY
EF	KW	AB

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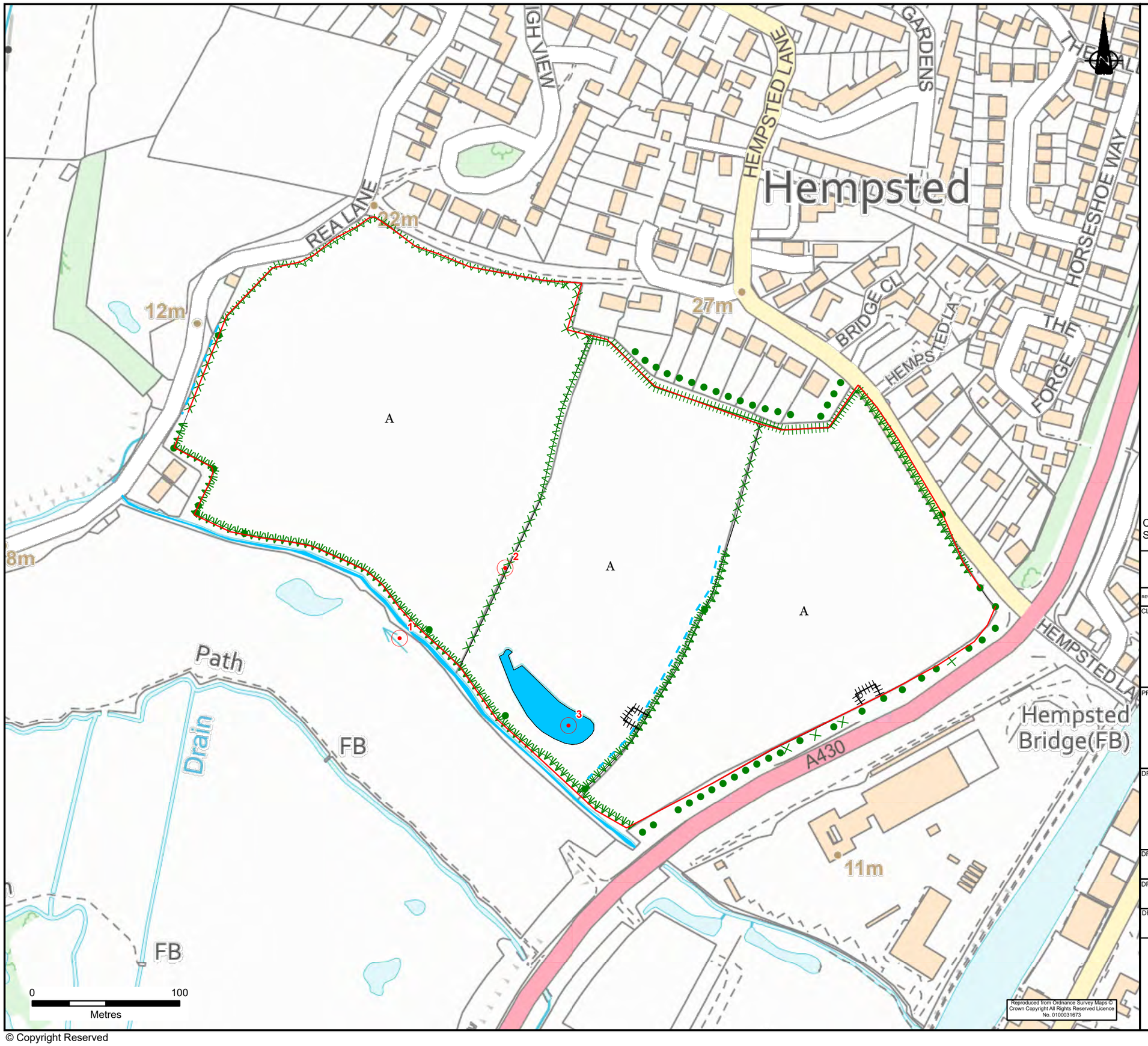

KEY

- Site Boundary
- Dry Pond
- Stream
- A — Cultivated/disturbed land - arable
- Scrub - scattered
- Broadleaved Parkland/scattered trees
- Intact hedge - native species-rich
- Hedge with trees - native species-rich
- Hedge with trees - species-poor
- Fence
- Dry ditch
- Target Notes

Classifications in accordance with Handbook for Phase 1 Habitat Survey - A technique for Environmental Audit (JNCC 2010)

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
B	Removal of Target Notes relating to badger activity	20/09/2019	EF	AB	AB

CLIENT

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PROJECT

HEMPSTED LANE, GLOUCESTER

DRAWING TITLE

PHASE 1 HABITAT PLAN

DRG No.	REV
GM10710-002	B

DRG SIZE	SCALE	DATE
A3	1:2,500	20/09/2019

DRAWN BY	CHECKED BY	APPROVED BY
EF	KW	AB

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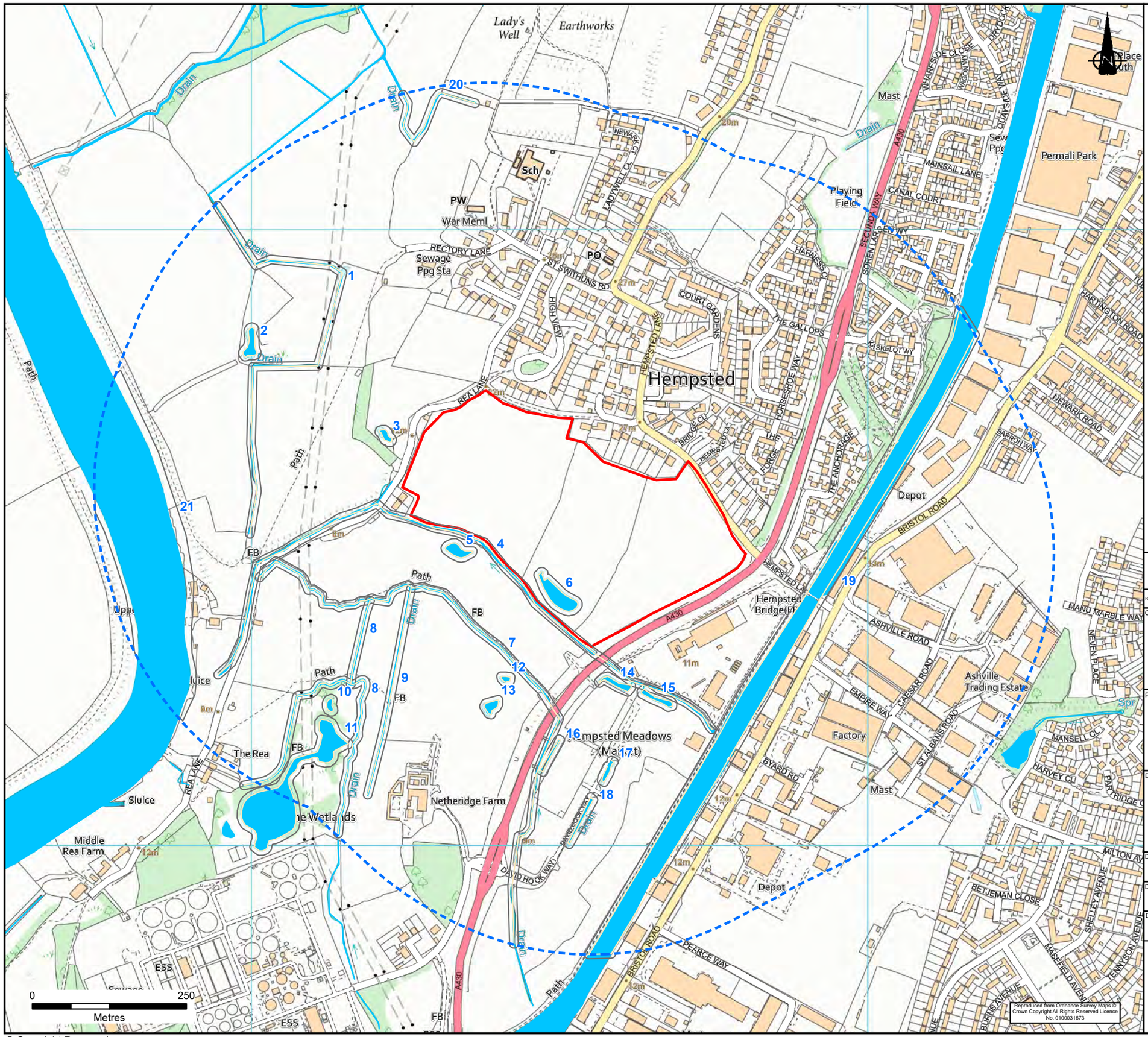

KEY

- Site Boundary
- 500m Search Area
- Waterbody

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
.	.	.	.	.	.

CLIENT

GLADMAN DEVELOPMENTS LTD

PROJECT

HEMPSTED LANE, GLOUCESTER

DRAWING TITLE

WATERBODY LOCATION PLAN

DRG No.		REV
GM10710-003		A
DRG SIZE	SCALE	DATE
A3	1:6,000	12/09/2019
DRAWN BY	CHECKED BY	APPROVED BY
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Appendix 2
Summary of Planning Policy and Legislation

Appendix 2 - Summary of Planning Policy and Legislation

National Planning Policy

National Planning Policy Framework (February 2019)

The National Planning Policy Framework (NPPF) is a material consideration for the purposes of planning decision making. The National Planning Policy Framework is clear that pursuing sustainable development includes moving from a net loss of biodiversity to achieving net gains for nature (paragraph 170, d), and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution.

Paragraph 175, d states that "…opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where it can secure measurable net gains for biodiversity"

National Planning Practice Guidance (Updated October 2018)

The National Planning Practice Guidance (NPPG) provides information on the implementation of the policies set out within the NPPF and how these policies are associated with supporting legislation, policies and supplementary guidelines.

Extracts from the NPPG which are relevant to nature conservation are:

> *"Section 40 of the Natural Environment and Rural Communities Act 2006 places a duty on all public authorities in England and Wales to have regard, in the exercise of their functions, to the purpose of conserving biodiversity. A key purpose of this duty is to embed consideration of biodiversity as an integral part of policy and decision making throughout the public sector, which should be seeking to make a significant contribution to the achievement of the commitments made by Government in its Biodiversity 2020 strategy."*
>
> *"Guidance on statutory obligations concerning designated sites and protected species is published separately …. Local planning authorities should take a pragmatic approach – the aim should be to fulfil statutory obligations in a way that minimises delays and burdens."*
>
> *"The National Planning Policy Framework is clear that pursuing sustainable development includes moving from a net loss of biodiversity to achieving net gains*

for nature, and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution."

Local Planning Policy

Gloucester, Cheltenham and Tewkesbury Joint Core Strategy 2011-2031 (Adopted December 2017)

Policy SD9: Biodiversity and Geodiversity

1. The biodiversity and geological resource of the JCS area will be protected and enhanced in order to establish and reinforce ecological networks that are resilient to current and future pressures. Improved community access will be encouraged so far as is compatible with the conservation of special features and interests.

2. This will be achieved by:

    i. Ensuring that European Protected Species and National Protected Species are safeguarded in accordance with the law;

    ii. Conserving and enhancing biodiversity and geodiversity on internationally, nationally and locally designated sites, and other assets of demonstrable value where these contribute to the wider network, thus ensuring that new development both within and surrounding such sites has no unacceptable adverse impacts;

    iii. Encouraging new development to contribute positively to biodiversity and geodiversity whilst linking with wider networks of green infrastructure. For example, by incorporating habitat features into the design to assist in the creation and enhancement of wildlife corridors and ecological stepping stones between sites;

    iv. Encouraging the creation, restoration and beneficial management of priority landscapes, priority habitats and populations of priority species. For example, by securing improvements to Strategic Nature Areas (as set out on the Gloucestershire Nature Map) and Nature Improvement Areas.

3. Any development that has the potential to have a likely significant effect on an international site will be subject to a Habitats Regulations Assessment.

4. Within nationally designated sites, development will not be permitted unless it is necessary for appropriate on-site management measures, and proposals can demonstrate that there will be no adverse impacts on the notified special interest features of the site.

5. Development within locally designated sites will not be permitted where it would have an adverse impact on the registered interest features or criteria for which the site was listed, and harm cannot be avoided or satisfactorily mitigated.

6. Harm to the biodiversity or geodiversity of an undesignated site or asset should be avoided where possible. Where there is a risk of harm as a consequence of development, this should be mitigated by integrating enhancements into the scheme that are appropriate to the location and satisfactory to the Local Planning Authority. If harm cannot be mitigated on-site then, exceptionally, compensatory enhancements off-site may be acceptable.

Policy SD14: Health and Environmental Quality

2. New development must:

   viii. Avoid any adverse impact from artificial light on intrinsically dark landscapes.

Policy INF3: Green Infrastructure

1. The green infrastructure network of local and strategic importance will be conserved and enhanced, in order to deliver a series of multifunctional, linked green corridors across the JCS area by:

   i. Improving the quantity and / or quality of assets;

   ii. Improving linkages between assets in a manner appropriate to the scale of development, and

   iii. Designing improvements in a way that supports the cohesive management of green infrastructure;

2. Development proposals should consider and contribute positively towards green infrastructure, including the wider landscape context and strategic corridors between major assets and populations. Where new residential development will create, or add to, a need for publicly accessible green space or outdoor space for sports and recreation, this will be fully met in accordance with Policy INF4. Development at Strategic Allocations will be required to deliver connectivity through the site, linking urban areas with the wider rural hinterland.

3. Existing green infrastructure will be protected in a manner that reflects its contribution to ecosystem services (including biodiversity, landscape / townscape quality, the historic environment, public access, recreation and play) and the connectivity of the green infrastructure network. Development proposals that will have an impact on woodlands, hedges and trees will need to include a justification for why this impact cannot be avoided and should incorporate measures acceptable to the Local Planning Authority to mitigate the loss. Mitigation should be provided on-site or, where this is not possible, in the immediate environs of the site.

4. Where assets are created, retained or replaced within a scheme, they should be properly integrated into the design and contribute to local character and distinctiveness. Proposals should also make provisions for future maintenance of green infrastructure.

DRAFT Gloucester City Plan 2016 – 2031 (January 2017)

Policy F2: Biodiversity

Small scale piecemeal erosion of background biodiversity is to be resisted, applications for small scale development will be judged as a component of a wider system and applications will need to show how biodiversity interests will be taken account of and mitigated against.

As a focus for growth in the County, we need to ensure that new development takes place in appropriate locations in order to safeguard the City's valued natural environment. For a number of reasons biodiversity has been in significant decline for a number of years and it is clear that Government expects development to play a role in protecting and where appropriate enhancing biodiversity.

Policy F4: Trees & hedgerows

Development will be supported where:

1. It does not have an adverse impact on trees, woodlands or hedgerows of wildlife, landscape, amenity, or cultural value; and

2. It includes the appropriate retention and new planting of trees and woodland; and

3. It does not have an adverse impact on ancient woodland or a veteran* tree; or

4. In the case of an unavoidable adverse impact on trees and woodlands of wildlife, landscape, amenity, or cultural value, appropriate compensatory provision is made.

   ** Please note: Veteran trees are defined as 'trees that are of interest biologically, culturally or aesthetically because of their age, size or condition'.*

Policy F5: Green infrastructure

Development proposals will have regard to Gloucester City Councils Green Infrastructure Plan (GIP) as articulated in the JCS Green Infrastructure Strategy. Proposals that do not contribute to the connectivity of the GIP will not be permitted unless other aspects of the overall GIP are supported. Development adjacent to or within the identified Green Infrastructure asset will be expected to connect to and support the GIP in particular the target points identified.

Policy F10: Mitigation through planting and SUDS

Development will be expected to help mitigate against the impacts of climate change. In this respect development that provides for trees, green roofs, green open space and Sustainable Urban Drainage Systems will be encouraged and supported.

Summary of Legislation

Protection for animals included on Schedule 5 of the Wildlife and Countryside Act 1981 (As Amended)		
Section 9	Part 1	Intentionally kill, injure, take a scheduled animal
	Part 2	Possess or control (live or dead animal, part or derivative)
	Part 4 (a)	Intentionally or recklessly damage, destroy or obstruct access to any structure or place used by a scheduled animal for shelter or protection
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	Part 5 (a)	Sell, offer for sale, possess or transport for the purpose of sale (live or dead animal, part or derivative)
	Part 5 (b)	Advertise for buying or selling such things

Protection for animals included on Schedule 2 of The Conservation of Habitats and Species and Planning (Various Amendments) (England and Wales) Regulations 2018		
A person commits an offence if he:		
Section 41	Part 1(a)	Deliberately captures, injures or kills any wild animal of a European protected species
	Part 1(b)	Deliberately disturbs wild animals of any such species. (1A) For the purpose of paragraph (1)(b), disturbance of animals includes in particular any disturbance which is likely a) to impair their ability i. to survive, breed or reproduce or to rear or nurture their young; or ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate. b) to affect significantly the local distribution or abundance of the species to which they belong
	Part 1(c)	Deliberately take or destroy the eggs of such an animal
	Part 1(d)	Damage or destroy a breeding site or resting place of such an animal
	Part 3	To: a) be in possession of, or to control, b) transport, c) sell or exchange, or d) to offer for sale or exchange. (4) For the purpose of (3) this applies to: a) any live or dead animal or part of animal i) which has been taken from the wild, and ii) which is a species or subspecies listed in Annex IV(a) to the Habitats Directive; and b) anything derived from such an animal or any part of such an animal.

Badgers

Badgers are afforded full protection under the Protection of Badgers Act 1992, which makes it an offence to:

- Wilfully kill, injure or take a badger;
- possess or control any live or dead badger or any part, or anything derived from, a dead badger;
- cruelly ill-treat a badger, or attempt to do so;
- To interfere with a sett by:
- damaging or destroying it;
- obstructing access to, or any entrance of, a badger sett;
- causing a dog to enter a badger sett;
- disturbing a badger when it is occupying a sett;
- Sell a live badger or offer one for sale.

It is also an offence to mark, attach any ring, tag or other marking device to a badger unless authorised under licence.

Bats

All UK bat species are European Protected Species and afforded full protection through inclusion of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of The Conservation of Habitats and Species and Planning (Various Amendments) (England and Wales) Regulations 2018.

Barbastelle, Bechstein's, greater mouse-eared, pipistrelle, greater horseshoe and lesser horseshoe bats are included within the Natural Environment and Rural Communities (NERC) Act 2006 in respect of Section 41 (England). Species included in this list are considered by the Secretary of State to be "*of principal importance for the purpose of conserving biodiversity*". Bats are therefore listed as S41 species with Barbastelle, Bechstein's, noctule, soprano pipistrelle, brown long-eared, greater horseshoe and lesser horseshoe bats listed as S41 Priority Species.

Birds

All wild birds, their nests and eggs ***are*** protected throughout the breeding season (1 March to 31 August) under the ***Wildlife*** and Countryside Act, 1981 (as amended), which makes it an offence intentionally (with certain limited exceptions and in the absence of a licence) to:

- Kill or injure any wild bird;
- Take, damage or destroy the nest of any wild bird whilst it is in use or being built;
- Take or destroy the egg or any wild bird.

It is also an offence to possess any live or dead wild bird or egg, or anything derived from a wild bird or egg. Restrictions on trade and advertising also apply.

Bird species listed on Schedule 1 of the Wildlife and Countryside Act, 1981 (as amended) are afforded additional protection against intentional or reckless disturbance whilst it is nest building, or at a nest containing eggs or young or disturbance to the young of a Schedule 1 bird.

In addition to this legal protection, the leading governmental and non-governmental conservation organisations in the UK have reviewed the population status of the birds regularly found here and produced a list of birds of conservation concern. Of the 244 species assessed, 67 were placed on the red list of high conservation concern, 96 on the amber list of medium conservation concern and 81 on the green list of low conservation concern. Consideration is therefore given to those species listed as being of conservation concern.

Great Crested Newts

Great crested newts are afforded full protection through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of The Conservation of Habitats and Species and Planning (Various Amendments) (England and Wales) Regulations 2018.

This legislation covers all life stages of great crested newts.

Under the Wildlife and Countryside Act 1981, other amphibians, including smooth and palmate newts, common toads and common frogs cannot be sold or be offered for sale. The habitats of these amphibians are not legally protected, and they are not

protected from intentional or deliberate killing or injuring.

Great crested newts are included within the Natural Environment and Rural Communities (NERC) Act 2006 in respect of Section 41 (England) as a Priority Species.

Reptiles

Six native reptiles occur in Britain: the adder (*Vipera berus*), the grass snake (*Natrix natrix*), the smooth snake (*Coronella austriaca*), the sand lizard (*Lacerta agilis*), the common lizard (*Zootoca vivipara*) and the slow worm (*Anguis fragilis*).

The smooth snake and sand lizard are afforded complete protection through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of The Conservation of Habitats and Species and Planning (Various Amendments) (England and Wales) Regulations 2018.

These two species are very limited in their UK distribution and are not recorded in the Egham area. Other common reptiles (common lizard, grass snake, adder and slow worm) are protected against intentional killing and injuring, sale and possession.

All six-reptile species are listed as S41 Priority Species.

Hedgerow Regulations 1997

Hedgerows that are considered to be 'important' are protected from removal under the Hedgerow Regulations 1997. If a hedgerow or section of a hedgerow considered to be 'important' requires removal then this requires assent from the local planning authority, unless covered by a suitable planning permission.

Appendix 3

Bat Activity Surveys 2019 -Dates/Times/Weather Conditions

Appendix 3 - Bat Activity Surveys 2019 – Dates/Times/Weather Conditions

Table 1 – Coventry MRF – Weather Conditions and Times and Dates of 2019 Activity Surveys				
Date	**(sunset/ sunrise)**	**Start Time (hrs)**	**End Time (hrs)**	**Weather Conditions**
31.07.19	21:01	21:01	23:01	Start: 18°C, dry, wind NW 7mph, 90% cloud cover. End: 16°C, dry, wind NW 4mph, 80% cloud cover.
21.08.19	20.21	20.21	22.21	Start: 19°C, dry, wind SW 8mph, 60% cloud cover. End: 18°C, dry, wind SW 8mph, 70% cloud cover.
22.08.19	06:04	04:04	06:04	Start: 14°C, dry, wind SSW 5mph, 50% cloud cover. End: 13°C, dry, wind SW 9mph, 70% cloud cover.
17.09.19	19:20	19:20	21:20	Start: 13°C, dry, wind 3mph, 0% cloud cover. End: 13°C, dry, wind 3mph, 0% cloud cover.

Table 2 – Dates of 2019 Automated Detector surveys		
Month	Dates	Limitations
July	26.07.19 – 31.07.19	-
August	21.08.19 – 27.08.19	-
September	12.09.19 – 17.09.19	-

Appendix 4

Confidential Badger Impact Assessment

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ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT

GLADMAN DEVELOPMENTS LTD

LAND OFF HEMPSTED LANE, GLOUCESTER

BADGER IMPACT ASSESSMENT - CONFIDENTIAL

MAY 2022

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DATE ISSUED:	**May 2022**
JOB NUMBER:	**GM10710**
REPORT NUMBER:	**0009**
VERSION:	**V2.0**
STATUS:	**FINAL**

GLADMAN DEVELOPMENTS LTD

LAND OFF HEMPSTED LANE, GLOUCESTER

BADGER IMPACT ASSESSMENT - CONFIDENTIAL

MAY 2022

PREPARED BY:

[redacted]

ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT

CONTENTS

DRAWINGS	**TITLE**	**SCALE**
GM10710-001	Survey Area Location Plan	1:25,000@A3
GM10710-106	Badger Activity Plan - October 2019	1:3000@A3

EXECUTIVE SUMMARY

Wardell Armstrong LLP (WA) was commissioned by Gladman Developments Ltd to undertake a badger (*Meles meles*) survey at a proposed development site located at land off Hempsted Lane, Gloucester, centred on approximate National Grid Reference (NGR) SU 85141 69429 in 2019. An updated survey was undertaken by WA in April 2022.

During the 2019 survey one confirmed badger sett, an outlier sett 'in current use', was identified on the northern boundary of the site. Two potential outlier setts 'not in current use' were identified outside of the site boundary, on land to the west of Rea Lane. Latrines, mammal paths and other signs of badger activity were also observed on and around the site. During the 2022 update survey no evidence of badger activity was identified.

The large arable fields on site provide only seasonal food for badgers exploiting the ripening crops and are considered to be sub-optimal. The hedgerows and boundary features are likely to be of most value for foraging badgers on site. Badgers using the site are also likely to forage in the optimal habitats surrounding the site such as the residential gardens to the north, and pasture, woodland and scrub to the south and west.

Based on the common status of badger, the level of activity recorded across the site and the presence of more suitable foraging habitat within the wider landscape, badgers are considered to be of **local** nature conservation value. Badgers are a legally protected species and, as such, there is the need to consider whether the proposed development has the potential to contravene governing legislation.

The proposed development has the potential to adversely affect the outlier sett along the northern boundary and the badger social group/s using the site for foraging. However, the 2022 update survey could not confirm the presence of the sett due to dense vegetation. Mitigation measures are required in order to minimise significant adverse effects on badger, during both the construction and operation phases of the development.

The proposed development will result in the loss of the outlier sett on site therefore the sett will require closing under a licence from Natural England. It is generally accepted that the loss of a single outlier sett will not result in significant long-term adverse impacts on the badger social group therefore a replacement artificial sett is not required.

Other measures will be implemented to prevent harm and disturbance to individual badgers during construction including placing wooden planks in all excavations as a means of egress for any badger or other mammal which may enter the excavation, no night-time working whenever possible and toolbox talks.

Disruption of badger movements throughout the site will be reduced by providing green corridors and dark corridors along the retained and created hedgerow and scrub. Wherever possible, these dark areas will be completely unlit; however, where it is not feasible to impose unlit areas, measures will be implemented to reduce artificial lighting to an adequate level.

There will be a loss of foraging habitat as a result of the development. The area to be lost mainly comprises suboptimal arable land. However, habitats are to be created on site which are arguably of higher value for foraging badgers, such as areas of public open space, greenspace, meadow grassland margins, hedgerows and trees. In addition, there is sufficient foraging habitat in the surrounding area to support badgers.

Mitigation and enhancement measures proposed will be implemented through a badger mitigation strategy or a Construction Environmental Management Plan and a Landscape and Ecology Management Plan in order to retain the existing social group of badgers in the site and reduce potential significant adverse effects.

Despite these measures there remains a small risk that the badger social group may still abandon the site altogether which would lead to a significant residual adverse effect at a local scale. Enhancements through bulb, tree and scrub planting within the retained and created habitats on site would provide an additional foraging resource in the area for badgers leading to potential beneficial effects on the social group.

It is recommended that immediately prior to any works being undertaken and if more than 12 months has elapsed since the last survey undertaken, an updated badger survey is undertaken to ensure there have been no changes to the status and number of setts within the site.

For badger welfare reasons, this report should be circulated to statutory consultees only and is not intended for general public release.

1 INTRODUCTION

1.1 Introduction

1.1.1 Wardell Armstrong LLP (WA) was commissioned by Gladman Developments Ltd to undertake a badger (*Meles meles*) survey at a proposed development site located at land off Hempsted Lane, Gloucester, centred on approximate National Grid Reference (NGR) SU 85141 69429 in 2019. The location and boundary of the site is shown on Drawing GM10710-001 (Survey Area Location Plan). An update survey was undertaken in April 2022 by WA.

1.1.2 ***For badger welfare reasons, this report should be circulated to statutory consultees only and is not intended for general public release.***

1.2 Site Description

1.2.1 The site is approximately 12.6 hectares and comprises of three arable fields with a south facing gradient that are bordered by hedgerows, treelines, dry ditches and scrub. A moderate sized pond is located in the south of the site which was holding water during the survey in April 2022. There are two existing access points located on Hempsted Lane and Rea Lane. The site is bordered by a stream, nature reserves, a bridleway, residential dwellings, Rea Lane and the A430.

1.2.2 The surrounding habitat is a mosaic of nature reserves, wetlands, waterbodies, farmland and a number of small scattered woodlands. Urban environments include mixed-use developments comprised of commercial and residential buildings. The site is situated between the River Severn and the Gloucester and Sharpness Canal.

1.3 Description of Development

1.3.1 Detailed developmental proposals are not currently available however, it is anticipated that approximately 250-300 residential dwellings, associated infrastructure and areas of public open space are proposed.

1.4 Previous Surveys

1.4.1 Information received from Gloucester Centre for Environmental Records (GCER) provided 5 records for badgers and badger activity within 2km of the site between 2012-2022, including the record from WA regarding the outlier sett and latrines identified in 2019 within the Site. Other records included the following:

i. Closest record approximately 0.26km north-east of the site within a residential area along Horseshoe Way, at approximate NGR SO819168 from 2012.

ii. A record from 2017 recorded approximately 1.1km north of the site along Spinnaker Road, at approximate NGR SO819177.

iii. Record of badger from 2019 located at NGR SO8116, approximately 430m west.

iv. Record of Badger from 2021 located at NGR SO8117, approximately 590m south.

1.4.2 Badger scat was identified in the northwest corner and near the scrub along the northern border of the site during the Extended Phase 1 Habitat Survey (2019). A number of potential badger runs were also identified along the southwest boundary in 2019.

1.5 Background Ecology and Legislation

1.5.1 Badgers are widespread and locally common in England and Wales and legislation is primarily aimed at preventing their deliberate persecution.

1.5.2 Badgers are found in a variety of habitats including urban areas, hedgerows and open pasture. Their staple diet is earthworms and short grassland such as pasture is important for foraging. However, badgers are also known to feed upon cereal crops, fruits, roots and tubers[1].

1.5.3 Badgers live in social groups and the members of each group jointly defend a territory. Other badgers are more or less excluded from this area, which will encompass sufficient foraging opportunities to support the group throughout the year. Badgers defecate in small (2 – 3cm deep) scrapes called dung pits and latrines, and these are often used to mark setts, important feeding areas and territory boundaries. A number of setts of different sizes and functions may be found within the range of a single group. In areas where badgers are at low density and in urban areas, territory boundaries may not be as well defined. If necessary, it is possible to move badgers from a sett, but the rate of success of such action varies and will depend on how crucial the sett is and whether suitable alternate setts exist.

1.5.4 Badgers are afforded full protection under the Protection of Badgers Act 1992, which makes it an offence to:

- Wilfully kill, injure or take a badger;

[1] Anon, *Badgers: A Guide for Developers* (2005) CCW; Anon, *Badgers and Development* (date unknown), English Nature

- Possess or control any live or dead badger or any part, or anything derived from, a dead badger;
- cruelly ill-treat a badger, or attempt to do so; and
- To interfere with a sett by:
    - damaging or destroying it;
    - obstructing access to, or any entrance of, a badger sett;
    - causing a dog to enter a badger sett;
    - disturbing a badger when it is occupying a sett; or
    - Sell a live badger or offer one for sale.

1.5.5 It is also an offence to mark, attach any ring, tag or other marking device to a badger unless authorised under licence.

1.6 **Scope of Report**

1.6.1 The purpose of this report is to provide an assessment of badger activity within the site and to assess potential impacts on badgers from the proposed development. This report, therefore, includes:

- Description of methodology;
- A description of the baseline conditions for the site, based on the results of the 2019 Extended Phase 1, badger activity survey at the site and the updated walkover survey (2022);
- An evaluation of the site in terms of its value for nature conservation;
- An assessment of potential impacts on badgers arising from the proposed development including habitat loss and fragmentation, disturbance and potential off-site impacts and whether those impacts are likely to result in significant effects on badger;
- Mitigation measures in terms of significant adverse effects on badger;
- Identification of residual effects taking into account proposed mitigation measures; and
- Enhancement measures.

2 METHODOLOGY

2.1 Survey Methodology

2.1.1 A badger survey was undertaken by WA on 15th October 2019 in order to assess the presence of badger activity within the site and surrounding area. An updated walkover survey was undertaken by WA on 1st April 2022.

2.1.2 The area was systematically searched, with particular attention paid to areas where the vegetation and/or the topography offer suitable sett sites for badgers.

2.1.3 All holes were examined closely in order to determine if they are or have ever been badger setts. The number of entrances and level of use were recorded, and the sett classified according to the criteria used in the National Badger Surveys [Cresswell *et al* (1990)[2] Wilson *et al* (1997)[3]. In addition to setts, the presence of hairs, footprints, pathways, dung pits, latrines and feeding signs were used to plot the patterns of movement of the badgers. Where pathways were confirmed as badger pathways (i.e. there is a clear link to a sett or additional evidence of badger activity nearby) these were also noted.

2.1.4 The resultant information was used to confirm the classification of the sett (i.e. main, annex, subsidiary or outlier). Further details are provided in Table 1.

Table 1. **Conventions used in classifying badger setts**

Sett Type	***Definition***
Main	Can comprise of one or several entrances often with large spoil heaps and obvious paths emanating from and between sett entrances. A number of activity features suggesting continuous presence and use. A breeding site.
Annex	Normally less than 150m from main sett, comprising several entrances. May not be in use all the time, even if main sett is very active.
Subsidiary	Usually at least 50m from main sett with no obvious pathways connecting to other setts. May be used regularly/intermittently often relating to clan/territory size, and changes in foraging regimes i.e. crop growing times.
Outlier	Little spoil outside entrances. No obvious pathways connecting to other setts and only used sporadically. May be used by foxes and rabbits.

[2] Cresswell P., Harris S., & Jefferies D.J. (1990). The history, distribution, status and habitat requirements of the badger in Britain. Nature Conservancy Council, Peterborough.

[3] Wilson G., Harris S., McLaren G. (1997). Changes in the British badger population, 1988 to 1997. People's Trust for Endangered Species, London.

2.1.5 Evidence recorded was then used to determine whether a sett is either in "current use" or "not in current use" (as per Natural England Guidance on 'current use' in the Determining of a Badger Sett, 2009)[4] by reviewing the level of activity at setts. A sett is classed as 'in current use' if the hole is unblocked (or open) and there are other signs of badger activity (footprints, well-worn paths, latrines and the presence of hairs).

2.1.6 Potential impacts of the proposed development on badgers has been assessed based on the information provided in the 'Development Framework Plan 2022' (Drawing Number CSA/6036/103).

2.2 Survey and Assessment Limitations

2.2.1 It was not possible to undertake a full assessment of badger activity within habitats off site during the badger survey in 2019 and the update survey in 2022 due to access restrictions and dense vegetation. However, a full assessment of the site itself was achieved.

2.2.2 The vegetation along the northern boundary where the outlier sett (BS1) was previously identified in 2019 was densely vegetated with scrub and hedgerow during the 2022 updated survey, therefore the outlier sett was not visible however, if active evidence of badger would have been identifiable within the vegetation. Therefore, is not considered to be a limitation to the results of the survey.

2.3 Quality Assurance and Environmental Management

2.3.1 The surveys and assessments have been overseen by and the report checked and verified by a member of CIEEM, who is bound by its code of professional conduct. All surveys and assessments have been undertaken with reference to the recommendations given in British Standard BS 42020, and as stated within specialist guidance, as appropriate and referenced separately. All of the participating ecologists have previous experience of undertaking badger surveys and are confident in identifying field signs.

[4] Natural England (2009) Guidance on 'Current Use' in the definition of a Badger Sett. Available at: https://webarchive.nationalarchives.gov.uk/20140605121602/http://www.naturalengland.org.uk/Images/WMLG17_tcm6-11815.pdf

3 RESULTS

3.1 2019

3.1.1 During the survey in 2019, an outlier sett (BS1) was identified within a species-poor hedgerow with trees along the northern boundary of the central field on site. The sett was dug into an earth pile approximately 1m long between garden boundary fencing and stock fencing and comprised one entrance 'in current use', approximately 40cm x 30cm. The sett was located at approximate NGR SO 81570 16633, as shown on Drawing Number GM10710-106 (Badger Activity Plan October 2019).

3.1.2 Loose soil was observed at the entrance with a well-used mammal path leaving the entrance and connecting to a larger path situated along the northern boundary of the central field. Latrines and snuffle holes were recorded around the sett.

3.1.3 A large number of latrines and dung piles were identified along the northern and western boundaries of the site, and along the southern boundary of the western field and the hedgerow and scrub dividing the western and central field. Mammal tracks were identified bisecting most linear features on site.

3.1.4 Badger activity was recorded within the wider environment over 50m from the Site.

3.1.5 The locations of the badger setts, latrines, mammal paths and other signs of badger activity observed in 2019 are shown on drawing GM10710-106 (Badger Activity Plan October 2019).

3.2 2022

3.2.1 During the updated walkover survey in 2022, no evidence of badger was identified within the site.

3.2.2 The distribution of badger activity in 2019 suggests the site was being used as foraging habitat for badgers, with an outlier sett along the northern boundary. The arable fields are sub-optimal foraging habitat and it is considered that badgers are likely to focus their foraging in the more optimal habitats such as the surrounding residential gardens to the north of the site, and pasture, woodland and scrub to the south and west.

4 NATURE CONSERVATION EVALUATION

4.1.1 No evidence of badger was identified within the Site at the time of the updated survey in 2022. Badger may use the site for foraging and commuting however, the lack of signs within the Site indicate it is not regularly used. The vegetation along the northern boundary where the outlier sett (BS1) was previously identified in 2019 was densely vegetated with scrub and hedgerow during the 2022 updated survey. No evidence of activity in the proximity of the outlier sett (BS1) was identified. Therefore, it is considered the outlier sett was not in use at the time of the survey.

4.1.2 Based on no evidence of activity during the updated survey in April 2022 and the presence of more suitable foraging habitat within the wider landscape, badgers are considered to be of **negligible ecological** importance and it is considered that no impacts to badger are likely to occur due to the current proposals for the Site.

4.1.3 Based upon their conservation status, badgers are not considered an 'important' ecological feature. However, badgers are a legally protected species under the provisions of the Protection of Badgers Act 1992 and the effects of the proposed development must be assessed in order to investigate whether or not there is the potential to contravene legislation. They will therefore be taken forward for an assessment of the impacts of development upon them.

5 ASSESSMENT OF EFFECTS, MITIGATION AND RESIDUAL EFFECTS

5.1.1 The assessment of the potential impacts of the proposed development needs to take into account both onsite effects as well as those that may affect adjacent areas of nature conservation importance. Effects can be permanent or temporary and can include:

- Direct loss of wildlife habitats;
- Fragmentation and isolation of habitats; and
- Disturbance to species.

Evaluation of Significance

5.1.2 The significance of potential impacts of the proposed development on badgers has been assessed using the significance criteria outlined in the Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland: Terrestrial, Freshwater, Coastal, and Marine'(CIEEM, 2018), hereafter referred to as the 'CIEEM guidelines'.

5.1.3 The Ecological Impact Assessment (EcIA) follows the methodologies within the CIEEM guidelines.

5.1.4 CIEEM Guidelines indicates that the assessment of impacts should take into account both the value and sensitivity of ecological receptors and that it is important to assess the significance of the effects of impacts upon each ecological feature.

5.1.5 The CIEEM Guidelines detail how ecologically significant effects should be determined for designated sites, ecosystems, habitats and species.

5.1.6 The development of the site has the potential to affect badgers by:

- Disturbance of or harm to individual animals;
- Disruption and permanent loss of foraging;
- Disruption / interruption to movements throughout the site and into surrounding land; and
- Post-construction interference impacts.

5.2 Construction Phase Effects

Disturbance/harm to individual animals

5.2.1 Badgers using the Site could also be disturbed by the increase in noise and lighting during construction activities. In particular, if security or construction lighting is directed at important foraging/commuting corridors or territorial boundaries, this could potentially disturb badger and could cause temporary or permanent displacement of badgers from the Site. Some construction activities may also introduce a significant increase in noise in the short-term which could potentially disturb badgers.

5.2.2 There is the potential for badgers to enter open excavations during construction works.

5.2.3 The above could cause disturbance and harm to individuals and therefore result in a significant adverse effect on individual badgers which would contravene legislation if not mitigated for.

Disruption and permanent loss of foraging

5.2.4 The development will result in the permanent loss of approximately 11.60ha of arable land (sub-optimal foraging habitat). The extent of a group's home range can vary between 15ha and 300ha (averaging 30ha in high density, 75ha in moderate density and 180ha in low density areas), not all of which provide useful foraging[5,6]. An average of approximately 70ha is typical for southwest England[7]. It is however accepted by most badger experts that the loss of 25% or more from a group's range could have a significant adverse impact.

5.2.5 If we assume the site falls within one badger social group territory and that territory is 70ha, then habitat loss equates to approximately 16.6% of foraging habitat. Approximately 187m of hedgerow /scrub (optimal foraging habitat) will also be permanently lost as a result of the development. Approximately 6ha of public open space, greenspace, meadow grassland margins, hedgerows and trees will be created as part of the development proposals which will benefit foraging badger. It is therefore considered that there will be no significant adverse effect on badgers as a

[5] Neal E. & Cheeseman C. (1996). *Badgers*. Poyser, London.
[6] Kruuk H. (1989). *The social badger: ecology and behaviour of a group-living carnivore (Meles meles*). Oxford University Press, Oxford.
[7] Clark, M. (2017) *Badgers* (3 ed.) Whittet Books Ltd, Essex.

result of the loss of foraging areas on site as the more valuable foraging habitats located off-site will still be available for them to exploit.

Disruption / interruption to movements throughout the site and into surrounding land

5.2.6 The retention of hedgerows, trees and scrub along the east, south and western boundaries of site, and the creation of public open space, greenspace, meadow grassland margins, hedgerows and trees in these areas will continue to provide connectivity for badger movement around the site and beyond.

5.2.7 The hedgerow along the northern boundary will be retained where possible and will therefore still be available for use by foraging and commuting badger. The three proposed pedestrian accesses through the northern boundary are unlikely to deter badger movement, however the creation of a proposed vehicular access in the eastern section could disrupt badger movement by disconnecting the eastern boundary from the north. Connectivity between the onsite habitats and the existing residential area to the north will still be available via the eastern corner of site but this could be limited given the existing road width and street lighting at this location.

5.2.8 Overall, the proximity of housing and infrastructure and the creation of vehicular access through the northern boundary is considered likely to have an effect on badger movement along and through this feature, by interrupting access to foraging habitats (residential gardens) to the north. However, this is unlikely to be significant to the badger social group given retained access through the southern part of the site.

5.2.9 The introduction of lighting during construction, should this spill onto the retained habitats (hedgerows and scrub), in addition to increased noise and human activity in the area, could potentially deter badgers from using these habitats and disrupt their movements. However, it is anticipated that working hours will be restricted with minimal night-time working due to the proximity of existing residential properties to the north. Badgers are also able to adapt to these changes by altering their behaviour which may include delaying their emergence times and avoiding affected areas until all activity has ceased.

5.2.10 No significant effects on badger movements through the site and beyond from construction lighting and noise is therefore anticipated.

Mitigation

5.2.11 Prior to the commencement of any works on site, a walkover survey by an appointed Ecological Clerk of Works (ECoW) will be undertaken to confirm that there has been no new badger activity since the previous survey (April 2022). If active badger setts or evidence of field signs are found, the ECoW will advise on any update mitigation measures required. These will either involve protecting and buffering the new setts from development or closing the setts under licence from Natural England. There are opportunities to provide an additional artificial sett within the site, if required.

5.2.12 If BS1 is present and shows signs of current use by badger during the walkover, the sett will be closed under licence from Natural England. Sett closures are generally not licenced to be carried out between November and July which is the badger breeding season. As BS1 is a disused outlier sett a replacement artificial sett will not be required.

5.2.13 Closure involves installing one-way gates across the opening of each sett entrance to allow badgers to only exit the sett and not re-enter. Badger proof fencing will cover the ground surrounding each gated entrance in order to deter further excavation during this period. Sett exclusion runs for a minimum period of 21 days and will be extended should badgers manage to gain re-entry to the sett. During the closure of a sett, a suitably qualified ecologist will visit the sett every third day to ensure the gates open and close freely and to check for signs of badger attempting re-entry. If re-entry to the sett occurs, a further 21 days of exclusion will be required. Trail cameras will also be installed to monitor the activity of badgers within and around the sett.

5.2.14 Following completion of 21 days of exclusion (with no successful re-entry), the setts will be destroyed under supervision of the licence holder or accredited agent. Gates and fencing will be removed, and each entrance will be excavated back to the chambers and back filled using a mini digger.

5.2.15 In order to safeguard badgers during construction, wooden planks will be placed in all excavations which are to remain open overnight. This will provide a means of escape for any badger or other mammal which may enter the excavation. Any temporarily exposed open pipe system will be capped in such a way as to prevent badgers from gaining access.

5.2.16 Night-time work will be avoided whenever possible.

5.2.17 Clear instructions (via toolbox talks) will be given to the workforce where care needs to be taken not to cause unlicensed damage to a sett or disturbance to badgers. Any

activity arising from the construction works which may cause disturbance to a sett will be undertaken as far away as possible from sett and its protection zone.

5.2.18 Vegetation located where access roads cross retained hedgerow corridors will be strengthened either side of the road to provide additional cover for badgers who may cross the road. This measure in addition to the hedgerow corridors being unlit could reduce the impact on disruption of badger movement, however this is not guaranteed.

5.2.19 The above measures will be detailed and implemented thorough inclusion in a badger mitigation strategy and/or Construction Environmental Management Plan (CEMP) for the site. Habitat creation and management will be detailed and implemented by way of inclusion in a Landscape and Ecology Management Plan (LEMP) for the site.

5.3 Operational Phase Effects (Open Space Management)

Post construction interference impacts

5.3.1 Increased human presence and lighting of residential and public areas could affect the badgers' patterns of activity. However, badgers are able to adapt to these changes by altering their behaviour which may include delaying their emergence times and avoiding affected areas until all activity has ceased. This would not affect the long-term survival of the social group. On completion of the development, the level of traffic and patterns of use could increase the risk of injury to badgers which could have a significant adverse effect on the group's survival. The current Development Framework Plan shows vehicle access into the site from the northeastern boundary. No through roads are proposed so the only traffic anticipated would be from residents' vehicles. The site will also be residential in nature and therefore car speeds are likely to be low and use of the roads is likely to decrease significantly during the night which will decrease the risk of badger road mortality.

5.3.2 No significant effects on badger from operational phase effects is therefore anticipated.

Mitigation

5.3.3 No mitigation required.

Residual Effects

5.3.4 It is considered unlikely that the badger social group would abandon the site for foraging. The site currently supports mostly sub optimal foraging habitat therefore

the creation of more suitable habitats within the areas of Public Open Space may actually be of benefit. Overall no residual adverse effects on badger are anticipated.

6 ENHANCEMENTS

6.1.1 The areas of public open space will be managed in a way that will maximise their foraging potential for badgers. Native fruiting trees and shrubs to include a mixture of crab-apple *Malus Sylvestris*, hazel *Corylus avellana*, elder *Sambucus nigra*, blackthorn *Prunus spinosa*, hawthorn *Crataegus monogyna*, dog-rose *Rosa canina*, guelder rose *Viburnum opulus* and wild cherry *Prunus avium* will be planted throughout the site to provide additional foraging opportunities for badgers. Bluebell *Hyacinthoides nonscripta* and pignut *Conopodium majus* bulbs will also be planted in informal areas of open space which badgers will be able to forage for.

6.1.2 Enhancement measures, such as suitable aquatic planting within the basins, woodpiles, brash piles and hibernacula, will be undertaken across the site for amphibians, reptiles and invertebrates. These measures will increase the density of these species within the area of assessment which in turn will increase foraging resources for badgers.

6.1.3 Wherever possible, the development design will fully take into consideration potential effects on badgers and other wildlife and incorporate dark corridors. The corridor should provide connectivity from one boundary hedgerow to another in the form of a species rich hedgerow, which will also shelter a section of the site from light spill. This dark corridor will be completely unlit on one side with light levels no greater than 0.5 lux.

6.1.4 The enhancement measures proposed will be implemented by way of their inclusion within the LEMP for the site.

7 SUMMARY

7.1.1 A summary of the effects, mitigation measures, enhancements and residual effects are provided in Table 2 below.

Table 2: Summary of effects, mitigation measures, enhancements and residual effects

Sensitive Receptor	Assessment of Effects	Mitigation	Enhancements	Residual Effects
Badgers	Disturbance/harm to individuals – significant at a local scale. Disruption and permanent loss of foraging – no significant effect Disruption / interruption to movements throughout the site and into surrounding land – no significant effect Post-construction interference effects –no significant effect	Pre-construction survey. Wooden planks to be placed in any excavations left open overnight. Night-time work to be avoided. Clear instructions to workforce via toolbox talk. Appropriate management of natural greenspace.	Planting of native berry and nut bearing trees and bulbs as part of landscaping. Incorporating dark corridors to provide connectivity, with light levels no greater than 0.5 lux.	Possible significant adverse residual effect at local scale should social groups abandon the site despite mitigation and enhancement measures

DRAWINGS

KEY

Survey Area

2km Search Area

0 1 Kilometres

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
.	.	.	.	.	.

CLIENT

GLADMAN DEVELOPMENTS LTD

PROJECT

HEMPSTED LANE, GLOUCESTER

DRAWING TITLE

SURVEY AREA LOCATION PLAN

DRG No.	REV
GM10710-001	A

DRG SIZE	SCALE	DATE
A3	1:25,000	12/09/2019

DRAWN BY	CHECKED BY	APPROVED BY
EF	KW	AB

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DO NOT SCALE FROM THIS DRAWING

LEGEND

Site Boundary

Badger Activity July 2019

Latrine

Animal Track — L

Badger Activity October 2019

Animal Holes

Dung Pit — DP

Footprints — FP

Latrine — L

Snuffle Holes — SH

Day Nest — DN

Badger Sett — BS

Animal Track

Possible Badger Sett (30m Buffer)

Badger Sett (30m Buffer)

Sett Classification

Main Sett	M
Annexe Sett	A
Subsidiary Sett	S
Outlier Sett	O

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

GLADMAN DEVELOPMENTS LTD

PROJECT

HEMPSTED LANE,
GLOUCESTER

DRAWING TITLE

BADGER ACTIVITY PLAN
OCTOBER 2019

CONFIDENTIAL

DRG No.	REV
GM10710-106	

DRG SIZE	SCALE	DATE
A3	1:3000	25.03.2020

DRAWN BY	CHECKED BY	APPROVED BY
AW	AC	AB

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Appendix 5
Pond Descriptions and Photographs

Appendix 5 – Pond Descriptions and Photographs

Reference	Pond Description	Photograph
1	Wet still ditch, species present include yellow flag Iris (*Iris pseudacorus*), common nettles (*Urtica dioica*), thistle sp. (*Cirsium sp*.), grasses, rush (*Juncaceae sp*.) and docks and sorrels (*Rumex sp*.). The ditch is bordered by a hedgerow to the east and scrub, stock and post fencing and poor semi improved grassland with areas of tall ruderal vegetation to the west. This ditch connects to Pond 2. The ditch is dry further south.	
2	This pond is a large scrape within a poor semi improved field, the northern part of this pond is holding water and the southern part is dry. There is no floating vegetation within this pond. The area holding water is approximately 50m2 however the whole pond area is much larger.	

3	A large waterbody within a field grazed by sheep, vegetation present within and surrounding the pond includes bull rush *(Typha latifolia),* yellow flag Iris, water mint *(Mentha citrate)* and common reed (Phragmites australis).	
4	This stream is approximately 1m wide and <10cm deep, has a moderate flow in a westerly direction, a gravely substrate, and densely vegetated banks.	

5	A medium sized damp pond located within a poor semi improved field grazed by cattle.	
6	This pond is dry. It is approximately 1700m², surrounded by arable crop and approximately 15m from the southwest hedgerow. Dominant species within the pond area include bulrush and soft rush (*Juncus effuses*) suggesting it is wet/damp at other times of year.	

7	Shallow, medium flowing ditch. Banks densely vegetated, species present include Bulrush, hawkweed (*Hieracium*), thistle sp., bindweed (*Convolvulus arvensis*), docks and sorrel sp., rosebay willow herb (*Chamaenerion angustifolium*), common nettles and bramble (*Rubus fruticosus*).	
8	Wet ditch with steep, densely vegetated banks. The ditch is surrounded by semi improved grassland, mature trees and woodland.	
9	Access refused.	

10	Medium pond, bulrush and yellow flag Iris around edges, covered in pondweed (*Potamogeton*), mature trees surrounding north and east sides of pond.	
11	Large wetland pond, dense vegetation on banks with species such as common reeds and rushes present. The pond is covered in pond weed. The wider area is surrounded by wooded areas and scrub.	

12	Could not access pond due to dense scrub.	
13	Wet, shallow pond, it is densely vegetated with bullrush and marginal semi mature willows (*Salix sp.*).	
14	The water level could not be seen in this ditch due to dense bankside vegetation, however it is potentially shallow from areas that could be accessed. Densely vegetated with bulrush and yellow flag Iris, dense scrub is located either side of the ditch.	

15	No access because of very dense vegetation surrounding ditch. Ditch densely vegetated with bulrush and yellow flag Iris.	
16	Wet, shallow ditch vegetated with bulrush and compact rush (*Juncus conglomeratus*), it is surrounded by trees and tall ruderal vegetation.	
17	Wet ditch, surrounded by improved mowed grassland. It is vegetated with bulrush and yellow flag Iris.	

18	Wet shallow ditch surrounded by improved mowed grassland. Vegetation within ditch includes bulrush, yellow flag Iris, garlic mustard (*Alliaria petiolate*) and hawkbit (*Leontodon sp*.).	
19	Deep canal with concrete banks, no floating or marginal vegetation.	

20	Dry ditch.	
21	River Severn, flowing river, unsuitable for GCN.	

Appendix 6
HSI Calculations

Appendix 6 – HSI Calculations

Waterbody 1 –

Geographic Location	1
Size of Waterbody	0.9
Permanence	0.1
Water Quality	0.67
Shade	1
Fowl	1
Fish	0.67
Pond Count	1
Terrestrial Habitat Quality	1
Macrophyte Cover	0.4
HSI Score	0.66198052

Waterbody 2 –

Geographic Location	1
Size of Waterbody	0.6
Permanence	0.1
Water Quality	0.33
Shade	1
Fowl	0.67
Fish	1
Pond Count	1
Terrestrial Habitat Quality	1
Macrophyte Cover	0.4
HSI Score	0.59221581

Waterbody 3 –

Geographic Location	1
Size of Waterbody	0.4
Permanence	0.5
Water Quality	0.67
Shade	1
Fowl	0.67
Fish	0.33
Pond Count	1
Terrestrial Habitat Quality	0.67
Macrophyte Cover	0.3
HSI Score	0.59908571

Waterbody 4 – HSI not undertaken as this waterbody is a stream

Waterbody 5 –

Geographic Location	1
Size of Waterbody	0.2
Permanence	0.1
Water Quality	0.33
Shade	1
Fowl	1
Fish	1
Pond Count	1
Terrestrial Habitat Quality	0.67
Macrophyte Cover	0.3
HSI Score	0.51555381

Waterbody 6 – Dry

Waterbody 7 –

Geographic Location	1
Size of Waterbody	0.8
Permanence	1
Water Quality	0.67
Shade	0.6
Fowl	0.67
Fish	0.67
Pond Count	1
Terrestrial Habitat Quality	0.67
Macrophyte Cover	0.5
HSI Score	0.73867099

Waterbody 8 –

Geographic Location	1
Size of Waterbody	0.2
Permanence	0.5
Water Quality	0.67
Shade	0.4
Fowl	0.67
Fish	0.67
Pond Count	1
Terrestrial Habitat Quality	1
Macrophyte Cover	0.4
HSI Score	0.58645466

Waterbody 9 – No access

Waterbody 10 –

Geographic Location	1
Size of Waterbody	0.2
Permanence	1
Water Quality	0.67
Shade	1
Fowl	0.67
Fish	0.67
Pond Count	1
Terrestrial Habitat Quality	1
Macrophyte Cover	0.8
HSI Score	0.73830267

Waterbody 11 –

Geographic Location	1
Size of Waterbody	0.8
Permanence	0.9
Water Quality	0.67
Shade	1
Fowl	0.67
Fish	0.67
Pond Count	1
Terrestrial Habitat Quality	1
Macrophyte Cover	0.8
HSI Score	0.83919848

Waterbody 12 – No access, dense vegetation

Waterbody 13 –

Geographic Location	1
Size of Waterbody	0.2
Permanence	0.1
Water Quality	0.67
Shade	1
Fowl	1
Fish	1
Pond Count	1
Terrestrial Habitat Quality	0.67
Macrophyte Cover	0.3
HSI Score	0.55338844

Waterbody 14 –

Geographic Location	1
Size of Waterbody	0.4
Shade	0.4
Pond Count	1
HSI Score	0.00000000

Waterbody 15 – No access densely vegetated

Waterbody 16 –

Geographic Location	1
Size of Waterbody	1
Permanence	1
Water Quality	0.67
Shade	1
Fowl	0.67
Fish	0.67
Pond Count	1
Terrestrial Habitat Quality	0.67
Macrophyte Cover	0.8
HSI Score	0.83318016

Waterbody 17 –

Geographic Location	1
Size of Waterbody	0.4
Permanence	1
Water Quality	0.67
Shade	1
Fowl	0.67
Fish	0.67
Pond Count	1
Terrestrial Habitat Quality	0.33
Macrophyte Cover	0.5
HSI Score	0.67573565

Waterbody 18 –

Geographic Location	1
Size of Waterbody	0.2
Permanence	0.5
Water Quality	0.33
Shade	0.6
Fowl	0.67
Fish	0.67
Pond Count	1
Terrestrial Habitat Quality	0.33
Macrophyte Cover	0.4
HSI Score	0.50925919

Waterbody 19 – Unsuitable

Waterbody 20 – Dry

Waterbody 21 – Unsuitable

Appendix 7

Nature Conservation Evaluation Criteria

Appendix 7 - Nature Conservation Evaluation Criteria

Criteria	Description
Size	Large, continuous areas of habitat are considered to be of greater importance than small or fragmented areas.
Diversity	Species and habitat diversity, including variations in topography and wetness, increase the wildlife value.
Naturalness	This reflects man's intervention or management of the habitat. Most habitats of this survey are semi-natural. Naturalness indicates the amount of modification of the land by man. Generally a less modified area results in an increase in the nature conservation value.
Rarity	The scarceness of a habitat, and the presence of rare/uncommon species, relates to its importance and priority for nature conservation. Rarity is related to the frequency of occurrence at national or county level.
Fragility	Fragile habitats are those where changes due to man's intervention, environmental factors or natural succession can directly threaten it. Scrub invasion, agricultural improvement, fire and changes in hydrological regime are the most common threats.
Typicalness	This relates to the quality of the habitat in terms of how good an example it is of a recognised type.
Position in an ecological/ geographical unit	The relationship of a site to adjacent areas of nature conservation value. It is important to recognise the important and characteristic formations, communities and species of a district.
Recorded history	The extent to which a site has been used for scientific study and research is a factor of some importance.
Potential wildlife value	The likely quality of the habitat for birds, mammals, reptiles, amphibians and invertebrates if it is managed for wildlife. If appropriate habitat management is undertaken, it is possible for an increase in the diversity and nature conservation value of an area.
Intrinsic appeal	The knowledge of the distribution and numbers of popular groups of species such as birds, is greater than for obscure groups. Similarly, colourful wild flowers and rare orchids arouse more enthusiasm than liverworts. It is pragmatic to give more weight to some groups than to others.
Criteria are based on Ratcliffe, D.A. (1977). *A Nature Conservation Review*, Cambridge University Press	

Appendix 8

HRA

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ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
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GLADMAN DEVELOPMENTS LTD

LAND OFF HEMPSTED LANE, GLOUCESTER

TECHNICAL REPORT TO INFORM HABITAT REGULATIONS ASSESSMENT

MAY 2022

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DATE ISSUED:	**MAY 2022**
JOB NUMBER:	**GM10710**
REPORT NUMBER:	**0010**
VERSION:	**V2.0**
STATUS:	**FINAL**

GLADMAN DEVELOPMENTS LTD

LAND OFF HEMPSTED LANE, GLOUCESTER

TECHNICAL REPORT TO INFORM HABITAT REGULATIONS ASSESSMENT

MAY 2022

PREPARED BY:

[redacted]

CONTENTS

APPENDICES

EXECUTIVE SUMMARY

Wardell Armstrong LLP was commissioned by Gladman Developments Limited to prepare a report to inform a Habitat Regulations Assessment (HRA) for a proposed residential development on land at Hempsted Lane, Gloucester.

This report considers the potential for 'likely significant effects' (LSEs) on Cotswold Beechwoods Special Area of Conservation (SAC), Walmore Common Special Protection Area (SPA)/Ramsar and Severn Estuary SPA/SAC/Ramsar as a result of the proposed development (the project). It also considers the potential for LSEs in-combination with other proposed developments and site allocations.

The assessment has been informed by an evidence base provided within a 'Habitat Regulations Assessment Revised Screening and Appropriate Assessment Report', for Gloucester City Plan 2011 – 2031 (Enfusion, 2019), as well as other relevant existing assessments including visitor surveys and recreation and mitigation strategies.

There will be no direct impacts on European sites, and due to distance, no impacts from noise or lighting and these are scoped out from assessment in the report.

The Stage 1 assessment screened out LSEs as a result of changes to air quality, water quality and levels and recreational impacts to Walmore Common SPA and the Severn Estuary SAC/SPA/Ramsar site.

A pathway for LSEs was identified for Cotswold Beechwoods SAC, because of an increase in recreational pressures in-combination with the site allocations set out in the emerging Gloucester City Plan (GCP) and neighbouring authorities' emerging and current Local Development Plans.

In the absence of a mitigation strategy which is currently being developed by Gloucester City Council (GCC), a precautionary approach has been adopted and appropriate mitigation proposed following guidance within Policy E8 of the emerging GCP. Mitigation will comprise the provision of public open and green spaces within the project area which can be used by the new residents (in addition to existing residents in surrounding residential areas) on a regular day to day basis. Following the implementation of mitigation measures, it is anticipated that there will be no adverse effects on the integrity of the European site from an increase in recreational pressure as a result of the project.

1 INTRODUCTION

1.1 Introduction

1.1.1 Wardell Armstrong LLP (WA) was commissioned by Gladman Developments Limited to prepare a report to inform a Habitat Regulations Assessment (HRA) for a proposed residential development on land at Hempsted Lane, Gloucester.

1.1.2 The objectives of an HRA (Stage 1) screening are to consider whether the Project would cause LSEs on the qualifying features of Natura 2000 (European) sites (and their overlapping designations where appropriate). The European sites relevant to this assessment are the Cotswold Beechwoods Special Area of Conservation, Walmore Common SPA/Ramsar and Severn Estuary SPA/SAC/Ramsar. It also considers the potential for LSEs in-combination with other proposed developments.

1.1.3 This report has been written to support Gloucester City Council (GCC) in their decision making, as the competent authority.

1.2 Habitat Regulations Consenting and Assessment Process

1.2.1 The requirement for an assessment of impacts on Natura 2000 (European) sites is set out within Article 6 of the EC Habitats Directive 1992 and interpreted into British law by the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) 2019. The aim of the Directive is to "*maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest*" (Habitats Directive, Article 2(2)). This aim relates to habitats and species, not the European sites themselves, although the sites have a significant role in delivering favourable conservation status.

1.2.2 The Habitats Directive applies the precautionary principle to European sites. Plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of the site(s) in question. Plans and projects with predicted adverse impacts on European sites may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network is maintained.

1.2.3 In order to ascertain whether or not site integrity will be affected, an assessment should be undertaken of the plan or project in question.

1.2.4 The phrase 'Habitats Regulations Assessment' (HRA) has come into use to describe the overall process set out in the Conservation of Habitats and Species Regulations from screening through to Imperative Reasons of Overriding Public Interest (IROPI). This has arisen in order to distinguish the process from the individual stage described in the law as an 'appropriate assessment' (AA). Throughout this report, we use the term HRA for the overall process and restrict the use of AA to the specific stage of that name.

1.2.5 The legislative basis for HRA is as follows:

Habitats Directive 1992, Article 6 (3) states that:

"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives."

The Conservation of Habitats and Species and Planning (Various Amendments) (England and Wales) Regulations 2018 state that:

"A competent authority, before deciding to … give any consent for a plan or project which is likely to have a significant effect on a European site … shall make an appropriate assessment of the implications for the site in view of that sites conservation objectives… The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site".

1.3 Report Structure

1.3.1 This report, prepared by Wardell Armstrong LLP, sets out the HRA Screening (Stage 1) and Appropriate Assessment (AA) (Stage 2) components of the HRA for the proposed development.

1.3.2 The objective of the Stage 1 assessment is to identify any aspects of the project that would cause 'Likely Significant Effects' (LSE) on the interest features of the European sites, specifically:

- Cotswold Beechwoods SAC;
- Walmore Common SPA/Ramsar; and
- Severn Estuary SPA/SAC/Ramsar.

1.3.3 Section 2 of this report sets out the methodology of the assessment including the objectives and scope of assessment, the collection of baseline data, the prediction of impacts and identification and quantification of LSE, including in-combination effects.

1.3.4 Section 3 summarises the proposals which comprise the main development site located adjacent to Hempsted Lane, Gloucester.

1.3.5 Section 4 contains a description of the relevant European sites (namely Cotswold Beechwoods SAC) screened into the assessment, with reference to their Conservation Objectives and based on desk top review.

1.3.6 Section 5 presents an initial **Stage 1 screening** of European sites to identify pathways for significant effects as a result of the project either alone or in combination.

1.3.7 Section 6 presents a **Stage 2 Appropriate Assessment** of those European sites or their qualifying features for which LSE have been identified.

1.3.8 Section 7 presents appropriate mitigation measures to ensure no adverse impacts on European site integrity.

2 METHODOLOGY

2.1 Habitats Regulations Assessment (HRA)

2.1.1 HRA of projects can be broken down into four discrete stages, each of which effectively culminates in a test. The stages are sequential, and it is only necessary to progress to the following stage if a test is failed. The stages are:

Stage 1 – Likely Significant Effect Screening Test

2.1.2 This is essentially a risk assessment, typically utilising existing data, records and specialist knowledge. The purpose of the test is to decide whether 'full' AA is required. The essential question is:

> *" Is the project, either alone or in combination with other relevant projects and plans, likely to result in a significant [adverse] effect upon European sites?"*

2.1.3 If it can be demonstrated that significant effects are unlikely, no further assessment is required. As a result of the People over Wind C-323/17 (Court of Justice of European Union, 12 April 2018) the ECJ have clarified that …*it is not appropriate at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site*.

2.1.4 The tasks undertaken to complete Stage 1 are:

- identification of European sites potentially affected by the proposed project;
- review of the proposed development works and identification of pathways to likely impacts;
- identification and consideration of other plans and projects; and
- an assessment of LSEs.

Stage 2 – Appropriate Assessment (AA)

2.1.5 If it cannot be satisfactorily demonstrated that significant effects are unlikely, an "Appropriate Assessment" will be required. This is focussed entirely upon the designated interest features of the European site(s) in question. The essential question here is:

> *"Will the project, either alone or in combination with other relevant projects and plans, actually result in an adverse effect upon the integrity of any European sites, without mitigation?"*

2.1.6 If it is concluded that significant adverse effects will occur, measures will be required to either avoid the impact in the first place, or to mitigate the ecological effect to such an extent that it is no longer significant. Note that, unlike standard Ecological Impact Assessment (EcIA), compensation for adverse effects (i.e. creation of alternative habitat) is not permitted at the AA stage.

Stage 3 - Assessment of alternative solutions

2.1.7 The process examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the European designated sites.

Stage 4: Assessment of compensatory measures – Imperative Reasons of Overriding Public Interest (IROPI) Test

2.1.8 If a project will have a significant adverse effect upon a European site, and this effect cannot be either avoided or mitigated, the project cannot proceed unless it passes the IROPI test. In order to pass the test, it must be objectively concluded that no alternative solutions exist. The project must be referred to Secretary of State on the grounds that there are IROPI as to why the project should nonetheless proceed.

Confirming Other Plans and Projects That May Act 'In Combination'

2.1.9 It is a requirement of the Regulations that the impacts of any plans or projects being assessed are not considered in isolation but in combination with other plans and projects that may also be affecting the European site(s) in question.

2.1.10 In-combination effects in this case will be dealt with by consideration of both the development of the main site and additional pressures (such as recreation) that this might bring to the area along with other proposed developments/site allocations in the area derived from the following local plans:

- Emerging Gloucester City Plan (GCP) – Pre-submission;
- Emerging Tewkesbury Local Plan – Pre-submission;
- Tewkesbury Borough Plan 2011-2031
- Stroud District Local Plan;
- Cotswold District Local Plan; and
- Cheltenham Borough Council Local Plan 2011-2031.

2.1.11 The assessment of the in-combination effects is set out in Sections 5 and 6 of this report.

2.2 The Scope of Assessment

2.2.1 The scope of the assessment has been guided by:

- Pre-application consultation response from GCC dated 07.01.2020;
- Management of Natura 2000 Site Guidance;
- ODPM Circular 06/2005 and Defra Circular 01/2005;
- CLG: Planning for the Protection of European Sites: Appropriate Assessment (2006); and
- Habitat Regulations Assessment Revised Screening and Appropriate Assessment Report for Gloucester City Plan 2011 – 2031 (Enfusion, 2019).

2.2.2 In summary, the scope of the assessment comprises the Cotswold Beechwoods SAC and Severn Estuary SPA/SAC/Ramsar, which were identified as potentially requiring a HRA by GCC in their pre-application response to Gladman Developments Limited (dated 07.01.2020) in respect of potential recreational impacts on these designations as a result of the development. Since the first draft of this report (2020), an additional site; Walmore Common SPA/Ramsar; has been identified within 10km of the project site and has been assessed within this report.

2.2.3 The HRA Revised Screening and Appropriate Assessment Report for Gloucester City Plan 2011-2031 confirms that the following issues should be considered in relation to Site Allocations SA01 – SA22 Mixed Use, Employment and Housing Site Allocations:

- atmospheric pollution through increased traffic that could reduce air quality;
- increased levels of disturbance - recreational activity, noise and light pollution;
- surface water run-off and sewage discharge, which could reduce water quality and levels; and
- land take, which could lead to the loss and fragmentation of habitats.

2.2.4 The emerging GCP has adopted a precautionary approach to effects on Cotswold Beechwoods SAC from development which is included under its own specific policy of the emerging GCP (Policy E8).

2.2.5 It is worth noting that the development site is not allocated for housing in the GCP (City Growth and Delivery Memorandum dated 08 Jan 2020) and therefore is not covered by the Site Allocations considered in the HRA of the GCP (Enfusion, 2019).

2.2.6 For the purposes of screening for LSE, this assessment disregards other potential issues listed in the HRA for GCP regarding site allocations (namely water quality and land take effects) as not being relevant to the proposed residential scheme due to the distance of the development from Cotswold Beechwoods SAC and Severn Estuary SPA/SAC/Ramsar.

2.3 Summary of Consultation Responses

2.3.1 The comments from the ecology advisor in the pre-application response from GCC dated 07.01.2020 were as follows:

"A biodiversity/ecological survey and reports will be required to understand current conditions and the potential impacts of the development together with proposals for mitigation and enhancement that are required.

It is expected that Natural England will respond to any application raising concerns that the development would be likely to increase visitor pressure on nearby European Sites of Conservation Interest, it may be advisable to contact them to check whether they require a Habitat Regulations Assessment to be undertaken by the applicant in order to review whether the proposed development (and its presumably increased number of residents) is considered likely to impact on European Sites such as Cotswold Beechwoods Special Area of Conservation and the Severn Estuary Special Protection Area (SPA)."

2.3.2 Natural England have not been consulted as part of this application.

2.4 Data Collection (Evidence Base)

2.4.1 The evidence base to inform the assessment has been derived from a review of published literature.

2.4.2 The key sources of published literature used to inform this assessment include those that have been used to inform the GLP HRA and various documents that were used to support the conclusions of the impact assessment within the EcIA. These sources are listed below:

- Enfusion (2019) Gloucester City Plan 2011-2031 HRA Revised Screening and Appropriate Assessment Report
- Footprint Ecology (2019) Cotswold Beechwoods Visitor Survey 2019
- Natural England (2015) Site Improvement Plan Cotswold Beechwoods

- EPR (2016) Severn Estuary (Stroud District) Visitor Survey Report
- Stroud District Council (2017) Strategy for Avoidance of Likely Significant Adverse Effects on the Severn Estuary SAC, SPA and Ramsar Site
- Wardell Armstrong LLP (2022) EcIA

2.5 Identification of Interest Features and Conservation Objectives

2.5.1 The qualifying features of the European sites were obtained from the Joint Nature Conservation Committee (JNCC) website (www.jncc.gov.uk).

2.6 Prediction of Impacts

2.6.1 Predicted impacts are characterised in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) *'Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, version 1.1*.

2.6.2 The CIEEM guidelines are considered by ecologists as the most appropriate methodology for predicting likely impacts on the qualifying features of European sites.

3 DESCRIPTION OF THE PROJECT

3.1.1 The project area covers 12.22ha.

3.1.2 The planning application is for a residential development delivering:

- 203 residential dwellings (5.71ha in extent);
- Public Open Space;
- Local Equipped Area for Play;
- Neighbourhood Equipped Area for Play;
- Incidental greenspace;
- Drainage basin and swales;
- Tree and hedge planting;
- Access roads; and
- Public footways.

4 NATURA 2000 SITES

4.1 European Sites Potentially Affected by the Development at Hempsted Lane

4.1.1 Three European sites are located within approximately 11km from the proposed residential scheme at Hempsted Lane, Gloucester as follows:

- Cotswold Beechwoods SAC (approximately 6.6km south east from the project)
- Walmore Common SPA/Ramsar (approximately 6.7km west from the proposed development); and
- Severn Estuary SPA/SAC/Ramsar (approximately 11km south west from the proposed development)

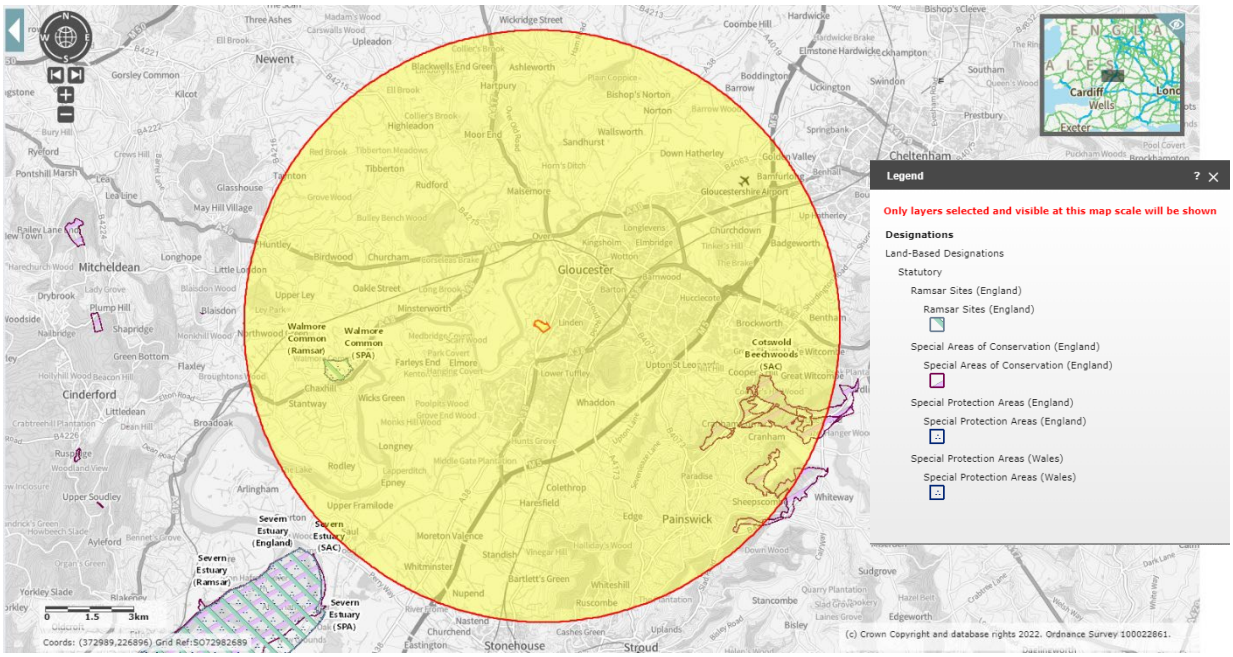

Figure 1 – Map of European sites within the vicinity of the project.

4.1.2 A detailed description of the designations is given below.

4.2 Cotswold Beechwoods SAC - UK0013658

General Description

4.2.1 Cotswold Beechwoods SAC is located approximately 6.6km to the south-east of the proposed development site. This site is also designated as a National Nature Reserve (NNR) and Site of Special Scientific Interest (SSSI). The SAC is approximately 590ha in extent and the primary reason for its designation is for *Asperulo-Fagetum* beech forest.

4.2.2 The citation[1] states that the Annex I habitat that is the primary reason for site designation is "*The Cotswold Beechwoods represent the most westerly extensive blocks of Asperulo-Fagetum beech forests in the UK. The woods are floristically richer than the Chilterns, and rare plants include red helleborine Cephalanthera rubra, stinking hellebore Helleborus foetidus, narrow-lipped helleborine Epipactis leptochila and wood barley Hordelymus europaeus. There is a rich mollusc fauna. The woods are structurally varied, including blocks of high forest and some areas of remnant beech coppice*".

4.2.3 The Annex I habitat present as a qualifying feature, but not a primary reason for selection of this site is 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites).

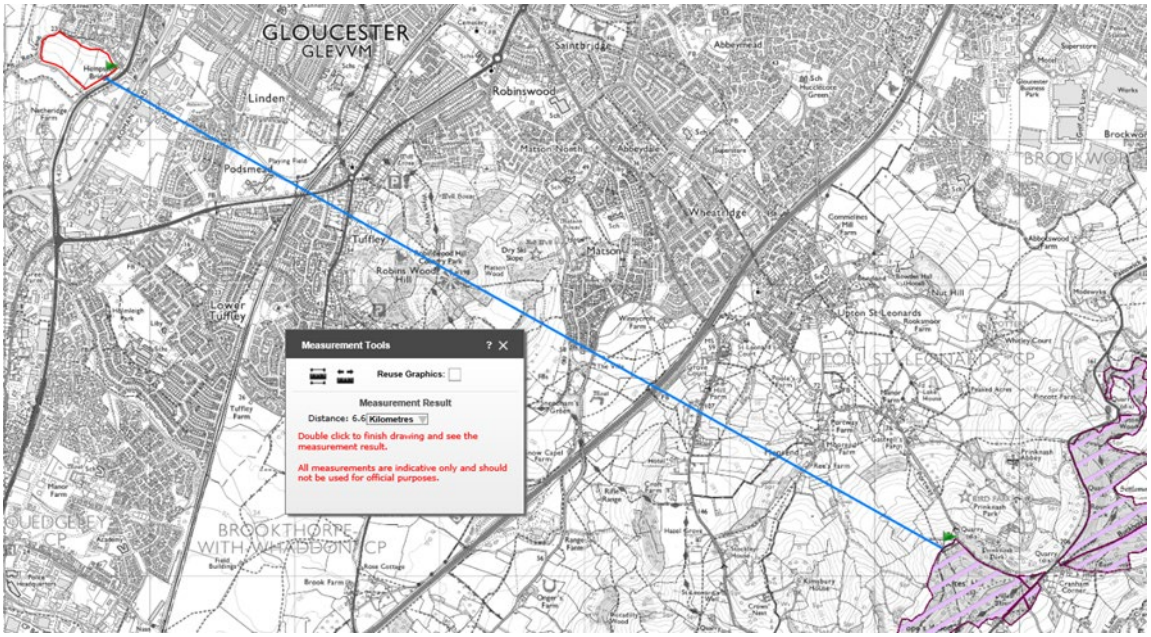

Figure 2: Map showing location of project area in the north-west in relation to Cotswold Beechwoods SAC as highlighted in the south-east.

Conservation Objectives

4.2.4 The conservation objectives for Cotswold Beechwoods SAC are as set out by Natural England in their document '*European Site Conservation Objectives for Cotswold Beechwoods Special Area of Conservation Site Code: UK0013658*':

[1] https://sac.jncc.gov.uk/site/UK0013658

'Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- *The extent and distribution of qualifying natural habitats;*
- *The structure and function (including typical species) of qualifying natural habitats; and*
- *The supporting processes on which qualifying natural habitats rely.'*

Current Status of Cotswold Beechwoods SAC

4.2.5 The condition of the SSSI units which make up the Cotswold Beechwoods SAC vary between favourable, unfavourable recovering and unknown.[2] The closest Cotswold Commons and Beechwoods SSSI unit to the Proposed Development site is Unit 8 and is in favourable condition.

4.3 Walmore Common SPA / Ramsar - UK9007051

General Description

4.3.1 Walmore Common Ramsar/SPA is located approximately 6.4km west of the development site at its closest point.

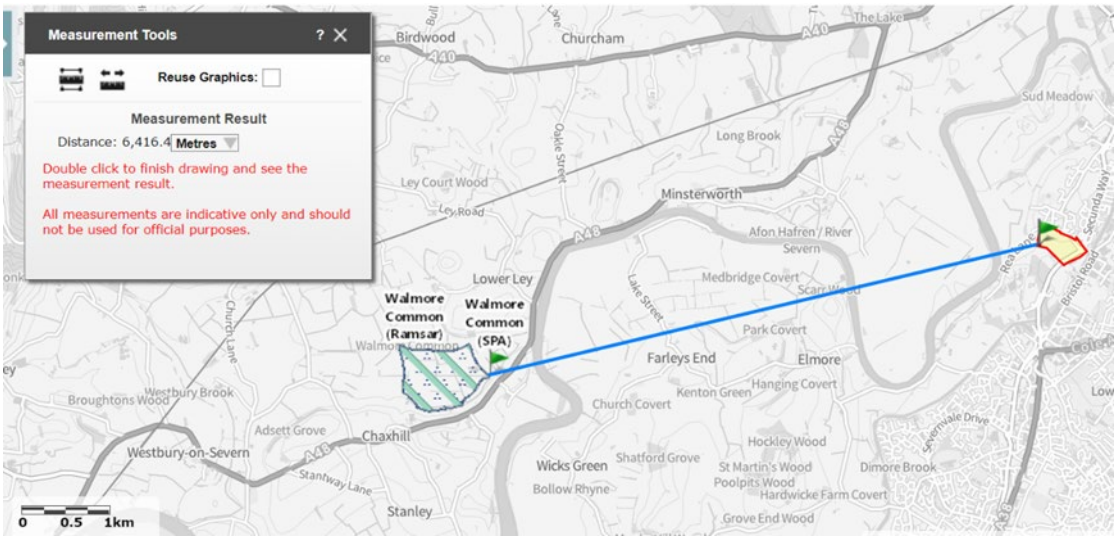

Figure 2: Map showing the location of the project area east of the Walmore Common SPA/Ramsar

4.3.2 Article 4.1 Qualification (79/409/EEC):

[2]https://designatedsites.naturalengland.org.uk/SiteSACFeaturesMatrix.aspx?SiteCode=UK0013658&SiteName=Cotswold%20Beechwoods%20SAC

4.3.3 Over winter the area regularly supports: Bewick's swan *Cygnus columbianus bewickii* (Western Siberia/North-eastern & North-western Europe) 1.4% of the GB population 5 year peak mean 1991/92-1995/96.[3]

Conservation Objectives

Walmore Common SPA

4.3.4 The conservation objectives for Walmore Common SPA are as set out by Natural England in their document 'European Site Conservation Objectives for Walmore Common SPA (UK9007051)':[4]

"Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- *The extent and distribution of the habitats of the qualifying features.*
- *The structure and function of the habitats of the qualifying features.*
- *The supporting processes on which the habitats of the qualifying features rely.*
- *The population of each of the qualifying features; and*
- *The distribution of the qualifying features within the site."*

Walmore Common Ramsar

4.3.5 There are no specific conservation objectives for the Walmore Common Ramsar site listed on the citation. However, Ramsar sites are designated under the Convention on Wetlands of International Importance with broad objectives to stem the loss and progressive encroachment on wetlands now and in the future. As the designated feature of the Ramsar overlap with that of the Walmore Common SPA, the conservation objectives would be the same as for this designation.

4.4 Severn Estuary SAC (UK0013030), SPA (UK9015022) and Ramsar

General Description

4.4.1 The Severn Estuary SAC, SPA, and Ramsar site is located approximately 11km south west from the development site at its closest point.

[3] https://jncc.gov.uk/jncc-assets/SPA-N2K/UK9007051.pdf
[4] UK9007051-Walmore-Common-SPA-V2019.pdf

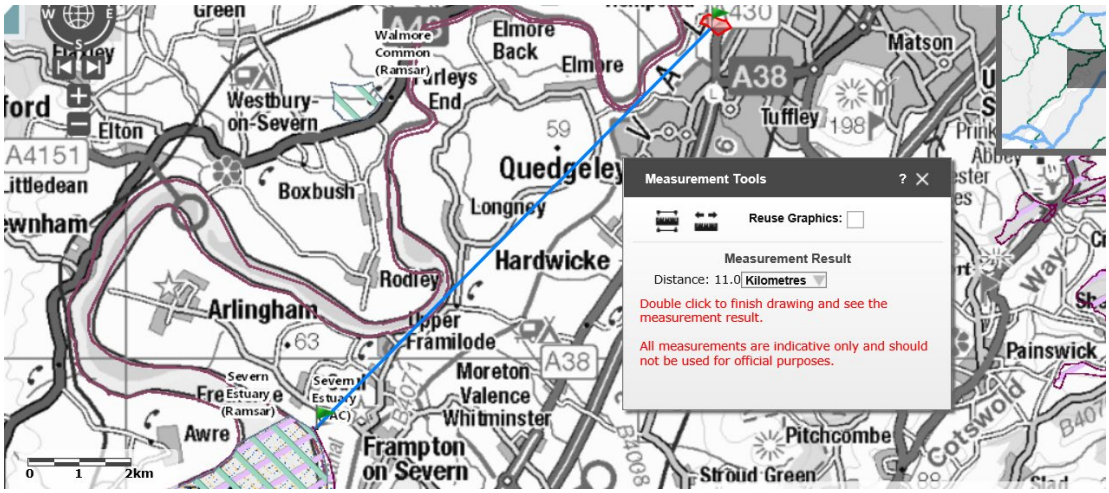

Figure 2: Map showing location of development scheme in the north-east to the Severn Estuary SAC, SPA and Ramsar.

4.4.2 The Severn Estuary is designated for its marine habitats, fish species and wintering bird populations it supports.

4.4.3 The Severn Estuary is also designated for the following habitats:

- Sandbanks which are slightly covered by sea water all the time (Severn Estuary SAC and Ramsar);
- Subtidal sandbanks (SAC and Ramsar);
- Estuaries (SAC and Ramsar);
- Mudflats and sandflats not covered by seawater at low tide; intertidal mudflats and sandflats (SAC and Ramsar);
- Reefs/rocky platforms (SAC); and
- Atlantic salt meadows (SAC and Ramsar).

4.4.4 The following species are qualifying features of the Severn Estuary SAC, SPA, and Ramsar:

- Sea lamprey *Petromyzon marinus* (SAC, Ramsar);
- River lamprey *Lampetra fluviatillis* (SAC, Ramsar);
- Atlantic salmon *Salmo salar* (Ramsar);
- Twaite shad *Alosa fallax* (SAC, Ramsar);
- European eel *Anguilla anguilla* (Ramsar);

- Allis shad *Alosa alosa* (Ramsar);
- Sea trout *Salmo trutta* (Ramsar);
- Bewick's swan (Non-breeding*)* (SPA and Ramsar)
- Common shelduck (Non-breeding) *Tadorna tadorna* (SPA and Ramsar);
- Gadwall (Non-breeding) *Mareca strepera* (SPA and Ramsar);
- Dunlin (Non-breeding) *Calidris alpina alpina* (SPA and Ramsar);
- Common redshank (Non-breeding) *Tringa totanus* (SPA and Ramsar);
- Greater white-fronted goose (Non-breeding); *Anser albifrons* (SPA and Ramsar); and
- Water bird assemblage (SPA and Ramsar).

Conservation Objectives

Severn Estuary SPA[5] and SAC

4.4.5 The Conservation Objectives for the Severn Estuary SPA and SAC are intended to "*ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;*

- *The extent and distribution of the habitats of the qualifying features;*
- *The structure and function of the habitats of the qualifying features;*
- *The supporting processes on which the habitats of the qualifying features rely;*
- *The populations of the qualifying features; and*
- *The distribution of the qualifying features within the site".*

Severn Estuary Ramsar

4.4.6 There are no specific Conservation Objectives for the Severn Estuary Ramsar site listed on the citation. However, Ramsar sites are designated under the Convention on Wetlands of International Importance with broad objectives to stem the loss and progressive encroachment on wetlands now and in the future. As several features of the Ramsar overlap with those of the Severn Estuary SPA and SAC, the conservation objectives would be the same as for these designations.

[5] https://jncc.gov.uk/jncc-assets/SPA-N2K/UK9015022.pdf

Current Status of Severn Estuary

4.4.7 92.71% of Severn Estuary SSSI is listed as being in favourable condition, 0.08% in unfavourable recovering, 5.54% unfavourable – no change and 1.67% unfavourable – declining.[6]

4.4.8 The closest SSSI units (002 and 003) to the proposed development at Hempsted Lane, Gloucester are located approximately 11km to the south-west of the site. Unit 002 is in favourable condition, unit 003 is in unfavourable recovering condition.

[6]https://designatedsites.naturalengland.org.uk/ReportConditionSummary.aspx?SiteCode=S1002284&ReportTitle=Severn Estuary SSSI

5 STAGE 1 – LIKELY SIGNIFICANT EFFECT (LSE) SCREENING TEST

5.1.1 Cotswold Beechwoods SAC, Walmore Common SPA / Ramsar and Severn Estuary SAC, SPA and Ramsar have been scoped into the screening assessment.

5.1.2 Due to the distance of Cotswold Beechwoods SAC, Walmore Common Ramsar/SPA and Severn Estuary SAC/SPA/Ramsar from the proposed development there will be no direct impacts, or impacts from noise or light pollution and these pathways are scoped out from further assessment.

5.1.3 Potential LSEs could however arise in relation to:

- Increase in recreational pressures
- Reduction in water quality; and
- Reduction in air quality associated with the project (during operation).

5.2 Cotswold Beechwoods SAC

Increase in recreational pressures

5.2.1 The GCP HRA[7] report could not confidently rule out effects of recreational impacts on the SAC and therefore the emerging GCP adopts a precautionary approach covered under Policy E8: Development affecting Cotswold Beechwoods SAC. This states that:

"In order to retain the integrity of the SAC, and to provide protection from recreational pressure, all development that results in a net increase in dwellings will be subject to Habitats Regulations Assessment for likely significant effects. Any development that has the potential to lead to an increase in recreational pressure on the SAC will be required to identify any potential adverse effects and provide appropriate mitigation. This will be in accordance with the SAC mitigation and implementation strategy or through a Habitats Regulations Assessment."

5.2.2 Most of the SAC is open access land for people on foot with a network of footpaths/bridleways and the route of the Cotswold Way National Trail. The development will lead to a net increase in dwellings within a relatively short (20 minute) drive to the SAC and, when considered in combination with other site allocations proposed in the GCP, LSEs on Cotswold Beechwoods SAC, significant

[7] Gloucester City Plan 2016-2031: Pre-Submission HRA Report: Revised Screening & Appropriate Assessment

negative effects cannot be confidently ruled out. Therefore, the HRA should proceed to Stage 2 Appropriate Assessment.

Changes in air quality

5.2.3 The GCP HRA report considered significant effects which may occur through changes in air quality as a result of increased traffic on the A46 which is located within 200m of the SAC. The woodland and grassland habitats within the SAC are both sensitive to increased emissions. Their assessment highlighted only two of the site allocations as potentially causing in-combination effects. These were both located within 3km of the SAC. It can therefore be inferred that any development located over 3km from the SAC would not generate significant traffic close to the SAC which would be likely to significantly affect the SAC. The proposed development is located 6.6km from the SAC to the west of the M5 corridor. It is anticipated that new residents would not be using the A46 on a regular, daily basis for commuting and general travel and therefore no LSE on the SAC are anticipated in relation to air quality.

5.3 Walmore Common Ramsar and SPA

Increase in recreational pressures

5.3.1 Walmore Common is bordered and intersected by ditches and land is subject to extensive winter flooding each year and artificially high summer water levels are maintained by a tilting weir. The 'Site specific seasonality of SPA features' section[8] of the conservation objectives lists November to March as the months when the qualifying features are present (Bewick's swan). The European site is over 6km away (20 minutes' drive) from the project area with several other areas of green space closer including RSPB Highnam Woods and Robinswood Hill.

5.3.2 The project area is unlikely to be considered functionally linked land (FLL) due to the distance from the SPA, presence of significant suitable foraging habitat for Bewick's swan between the SPA and the project area, and the proximity of the project area near to existing residential development and roads.

5.3.3 The GCP HRA report stated that it is considered unlikely that recreational increase from site allocations will affect the designation due to the distance from the site allocations (all over 5km distant) and the small scale of the developments.

[8] UK9007051%20-%20%20Walmore%20Common%20SPA%20-%20SACO-%20final.pdf

5.3.4 The HRA for the Forest of Dean and Stroud Local Plan Review both screened out this designated site for disturbance due to the reasons stated above therefore the GCP concluded that there will be no adverse effects on Walmore Common SPA, alone or in combination.

Water levels and quality

5.3.5 The GCP HRA outlined that although the SPA is functionally linked to the River Severn which links to the development site, it is unlikely any significant effects will arise due to the distance, small size and embedded mitigation in the GCP through Policies JCS SD3, GCP G7 and E6.

5.3.6 It has been noted that changes to water levels and quality could occur through the incorporation of renewable energy along the River Severn and canal however there are multiple policies in place to mitigate for the effects of this on the SPA.

Air quality

5.3.7 The Air Quality Assessment (January 2020) by WA ruled out ecological receptors during construction and operation and states that "The impact of the development is predicted to be negligible at all thirteen existing sensitive receptors that were assessed. Air quality effects are therefore considered to be not significant." The wind direction is also from the south west which is in a favourable direction regarding traffic use on the A48 and the nearby SPA.

5.3.8 The GCP stated that there is potential for traffic to increase along the A48, which is located within 200m of the SPA. The increase in air pollutants is likely to be short ranged and not directly affect the SPA due to over 5km distance from site allocations.

5.3.9 Mitigation measures from in combination plans are also in place which would encompass Walmore SPA therefore it can be concluded that the SPA will not be affected adversely by increased air pollution alone or in combination.

5.4 Severn Estuary SAC, SPA and Ramsar

Increase in recreational pressures

5.4.1 The GCP HRA report presents expert advice from statutory and non-statutory consultees regarding potential for recreational pressures to impact on the Severn Estuary SAC/SPA/Ramsar site, particularly on the bird populations for which the SPA and Ramsar sites are designated.

5.4.2 Natural England (NE) advice given to GCC highlighted how despite the distance between the site's designated boundaries (in this case 11km away), the GCP area abuts the River Severn. The river is functionally linked to the designated site and the life and productivity of the SPA birds.

5.4.3 NE further advised that "*As of yet there is no established zone of influence for recreational pressures on the Severn Estuary SAC/SPA/Ramsar site in Gloucester City or an evidence-based understanding of what scale of development would trigger impacts.*"

5.4.4 Stroud District Council (SDC), a neighbouring authority, have developed a Strategy for Avoidance of Likely Significant Adverse Effects on the Severn Estuary SAC/SPA/Ramsar Site (December 2017) which was informed by a visitor survey conducted by EPR in 2016. The visitor survey found that over half (51.6%) of the groups interviewed used the site for dog walking. According to the report, a linear visitor catchment distance of 7.7 km from the Severn Estuary (Stroud District) has been proposed, based on 75% of groups living within the Stroud District having travelled from within this distance. The report states that whilst a visitor catchment of 7.7km would only pick up 50% of the total visitors (including those from outside the District), it would include 81% of walkers and dog walkers. It also shows that increasing the catchment distance to 10km would not pick up significantly more total visits than at 7.7km.

5.4.5 SDC's Strategy for Avoidance of Likely Significant Adverse Effects on the Severn Estuary SAC/SPA/ Ramsar Site therefore defines a 7.7km zone of influence for the Stroud area for use in HRAs.

5.4.6 The proposed development is located approximately 11km from the Severn Estuary. Using the 7.7km zone of influence defined by SDC, this would indicate no LSEs on the Severn Estuary SAC/SPA/Ramsar site from recreational impacts from the proposed development and therefore the HRA does not need to proceed to Stage 2.

Water levels and quality

5.4.7 The neighbouring Stroud Local Plan Review identified a 1km zone for consideration of water related impacts at the next stage of assessment. GCT JCS Policy SD3; Sustainable Design & Construction requires development to use water efficiently without causing harm to water quality. GCP Policy G7 Water efficiency promotes sustainable use of water; GCP Policy E6 Flooding, Sustainable Drainage & Watercourses promotes more sustainable management of water. The project area is over 10km from the

SAC/SPA/Ramsar and there is integrated/embedded policy ensuring that there will be no adverse effects on the Severn Estuary SAC/SPA/Ramsar designated site in respect of water levels or water quality – alone or in-combination.

5.5 Screening Summary

5.5.1 Cotswold Beechwoods SAC:

- LSEs relating to air quality have been screened out largely due to the distance from the site to the SAC and corresponding insignificant increase in traffic associated with regular commuting, walking or dog-walking.
- **LSEs relating to increased recreational pressures have been screened in when assessed in combination with other plans and projects due to the relative accessibility of much of the SAC.**

5.5.2 Walmore Common SPA:

- LSEs relating to air quality have been screened out largely due to the distance from the site (and GCP allocated sites) to the SPA and corresponding insignificant or only localised increase in traffic associated with regular commuting, walking or dog-walking, and policy-embedded mitigation measures.
- LSEs relating to disturbance of qualifying features from recreational pressure have been screened out due to distance (over 5km), scale of the development and conclusions from HRAs in neighbouring authorities.
- LSEs relating to water quality and levels are screened out due to distance, small size of sites and embedded mitigation in the GCP through Policies JCS SD3, GCP G7, E2 and E6.

5.6 Severn Estuary SAC, SPA and Ramsar

- LSEs relating to air quality have been screened out due to the distance from the site and allocated sites to the SAC/SPA/Ramsar and corresponding insignificant increase in traffic associated with regular commuting, walking or dog-walking.
- The project area is not considered suitable as FLL. SDC has given a 7.7km zone of influence within which impacts from recreational disturbance are likely to

be significant and require further assessment. The project is over 10km away and LSEs either alone or in combination are screened out.

- LSEs relating to water quality and levels are screened out due to distance from the project and integrated/embedded policy ensuring that there will be no adverse effects on the Severn Estuary SAC/SPA/Ramsar designated site in respect of water levels or water quality – alone or in-combination.

6 STAGE 2 - APPROPRIATE ASSESSMENT (AA)

6.1.1 It has been concluded that LSEs on Cotswold Beechwoods SAC as result of increased recreational pressure from the proposed residential development in-combination with other developments/site allocations in the current and emerging LDPs cannot be confidently ruled out.

6.2 Increase in recreational pressure

6.2.1 A network of public footpaths and bridleways cross the Cotswold Beechwoods SAC. The GCP HRA identifies that there is a high negative impact on the SAC from outdoor sports and leisure activities and recreational activities. A Site Improvement Plan[9] has been developed for the SAC by Natural England.

6.2.2 One of the priorities cited in the Site Improvement Plan is public access/disturbance with the plan stating the following:

"Public use of the Beechwoods has grown considerably over recent years and damage is becoming more widespread. A particular increase has been the use of mountain bikes and horseriding which use the woods far beyond the limited network of bridleways. This has created numerous additional trackways and so increasing the erosion of the ground flora and potentially opportunities for water erosion. Although the routes away from bridleways are not usually permitted, much of the SAC woodland is NNR or has public access by foot. Hence efforts have been made to provide agreed permissive routes with local bike groups with the aim of minimising damage whilst still allowing some use. This is still experimental and much will depend on the scale of use and whether the users stick to the permissive routes. This approach could also be tried with horseriders. Additionally, dog walking has increased within the SAC especially at Coopers Hill where car parking is available. This has become a particular issue where professional dog walkers release large numbers of dogs (up to 12) to run uncontrolled through the woods. This causes disturbance to wildlife as well as local nutrification through dog faeces."

6.2.3 The Site Improvement Plan indicates that an access strategy will be developed to address mountain-biking, horse-riding and uncontrolled dog-walking. GCC are one of the delivery partners for this access strategy.

[9] http://publications.naturalengland.org.uk/publication/6276086220455936

6.2.4 A visitor survey conducted by Footprint Ecology in 2019 found that 45% of visitors were using the SAC for walking (without a dog) followed by 40% for dog-walking. The SAC was also being used by visitors for running/jogging, horse riding, cycling/mountain biking, family outing, work, bird/wildlife watching and enjoying scenery and fresh air.

6.2.5 Increased visitor pressure at the SAC could cause a loss of ground flora through trampling and path widening in the grassland and woodland habitats for which the SAC is designated. The SAC could also be subject to habitat and water erosion from an increase in mountain biking or horse-riding activities, particularly if bikers and riders stray from bridleways. Increased visits from dog-walkers originating from the proposed development could contribute to local nutrification of the soil from faeces which could affect calcareous ground flora composition.

6.2.6 A key finding of the visitor survey was that *'linear distances between survey points and home postcodes showed the average (mean) was 27.5 km (± 5.2 SE), but half lived within 7.2 km (median) and three quarters within 20.5 km (of the survey point interviewed at). Considering only those visiting directly from home the values were; average (mean) of 14.9 km, 50% of 6.0 km (median) and 75% of 15.4 km.'*

6.2.7 The visitor survey results suggest that approximately 17% of visitors originated from Gloucester post codes and overall 50% of visitors originated from within 7.2km of the site (directly from home 50% within 6km). The proposed development is located approximately 6.6km from the SAC and so falls between these two values. The survey results also show that the majority of people (79%) have visited the SAC before indicating that repeat visits by any new resident is a possibility.

6.2.8 The visitor survey was commissioned by Tewkesbury, Cotswold, Stroud, Cheltenham and Gloucester City LPAs to assist with informing the HRAs of their current and emerging Local Plans. To date, no Local Plan has been published which takes into account the results of the 2019 visitor survey. In future, the LPAs may impose zones of influence at which likely significant recreational effects can reasonably be predicted as exist in other HRAs for other Natura and SSSI sites in the UK.

6.2.9 Given the visitor survey findings, it is likely that new residents from the proposed development will visit the SAC at some point and may do so more than once. Due to the distance between the proposed development and the SAC it is highly unlikely that the new residents will visit the SAC on a regular daily basis and new residents may not contribute significantly to effects on the SAC when considered alone. However, when considered in-combination with other developments, particularly those being brought

forward / being allocated in the current or emerging Local/City Plans for Gloucester, Stroud, Tewkesbury, Cotswold and Cheltenham districts, the new residents at the proposed development could contribute to a significant effect on the SAC from an increase in recreational pressure.

6.2.10 The HRA for the emerging GCP was prepared prior to the visitor survey findings from 2019, although Policy E8 states that:

"The survey results will form part of the evidence base leading to the production of a mitigation strategy. This will identify what measures need to be put in place to mitigate the impact of new development and ensure the protection of the site. The evidence may also assist in determining when a development may be likely to have an adverse impact depending on factors such as distance from the SAC. The mitigation strategy is expected to be available in early 2020."

6.2.11 As of writing this report, the mitigation strategy has not been published and therefore no zones of influence have been established which would assist with predicting whether a significant effect would actually occur as a result of a development. Therefore, a precautionary approach is recommended for this development with mitigation being set out in the next section.

6.3 *Air quality*

6.3.1 The 'air pollution and information service' (APIS) indicates that the SAC exceeds its critical load and nutrient nitrogen levels. Natural England and the council are aware of this and have issued that the Cheltenham Plan includes a safeguarding mechanism to ensure new proposals take account of the new guidance in regard to in combination effects.

7 PROPOSED MITIGATION

7.1.1 Policy E8 of the emerging GCP references a couple of appropriate mitigation measures for significant effects on Cotswold SAC which are:

"On-site measures, including for example the provision of open and green space where this can be accommodated.

Where this is not possible, financial contributions towards off-site measures such as green infrastructure, habitat management, access management, residential travel plans, visitor infrastructure and publicity and awareness raising."

7.1.2 The draft published in June 2021 confirmed that the cost per dwelling for Strategic Access Management & Monitoring (SAMM) is estimated at £187 and the proposed Suitable Natural Alternative Greenspace (SANGs) rate is £480 per dwelling.

7.1.3 Using the above as a guide to appropriate mitigation for potential significant effects on Cotswold Beechwoods SAC it is proposed to deliver mitigation on-site which is within the developer's control.

7.1.4 The on-site mitigation strategy provides areas of suitable alternative greenspace which new residents will be able to use on a regular day to day basis. Residents from other nearby existing residential areas would also be able to utilise these new areas of public open greenspace.

7.1.5 The following areas of public open space will be provided by the development as shown on the Development Framework Plan 2022 (Drawing Number CSA/6036/103) provided in Appendix 1. Access through and beyond the development to existing agricultural land will be maintained:

- 6.51ha of green infrastructure and Public Open Space (informal recreation) to include woodland, swales, footpaths and meadow areas;
- A Local Equipped Area for Play (LEAP); and
- A Neighbourhood Equipped Area for Play (NEAP).

7.1.6 The proposals shown on the Development Framework Plan 2022 by CSA Environmental include a large area of informal parkland and play space in the south of the site. It is expected that this new area of public open space will accommodate the majority of regular walking and dog walking visits and adequately mitigate the potential for increased visitor pressure on the SAC as a result of the project.

7.1.7 In line with policy E8, the provision of significant public green space within the project area boundary is considered adequate mitigation with regards recreation at the SAC. Therefore it is reasonable to conclude no adverse impacts on the integrity of Cotswold Beechwoods SAC following the provision of this mitigation.

7.1.8 It should be noted that the Recreation Mitigation Strategy for Cotswold Beechwoods SAC has yet to be finalised. Once finalised and adopted it may include a SAMM or SANG payment requirement purely based upon project distance to the SAC and number of occupants. Whilst not finalised at the time of writing, this may be a consideration for any future versions of this scheme/report.

7.2 Conclusion

7.2.1 There will be no direct impacts to European sites as a result of the project, including impacts from lighting or noise.

7.2.2 LSEs relating to the Severn Estuary SAC/SPA/Ramsar and Walmore Common SPA were screened out with regards recreational impacts, water quality and levels and air quality.

7.2.3 A pathway between Cotswold Beechwoods SAC and the project with regards increased recreational pressure as a result of the project, in combination with other residential development, was identified. In the absence of mitigation it was not possible to screen out LSEs.

7.2.4 With on-site mitigation provided in the form of extensive green space suitable for local walking and dog walking, a LEAP and a NEAP, this assessment can conclude there will be no adverse impacts on the integrity of the SAC alone and therefore none in combination with other plans and projects.

7.2.5 With the provision of open space as shown on the plan in Appendix 1 the development can proceed with no further assessment with regards European sites.

APPENDICES

Appendix 1

Development Framework Plan (Drawing Number GM10710 – 012 Rev H)

CD2.5

N

0 20 40 60 80 100 metres

Structural landscaping incorporated in the west of the Site, to filter views of the built form from the west

Recreational footways will link to the existing public rights of way within and adjoining the Site

Proposed swales will convey surface water run-off into the drainage basin

Existing hedgerows retained within green corridors within the proposed development

Secondary streets to be tree-lined on at least one side, to break up the built form and create an attractive environment

Spine street to be tree-lined on both sides, to break up the built form and create an attractive environment

Proposed access off Hemsted Lane. New native hedgerow and tree planting incorporated behind the access radii and visibility splays

LEAP

NEAP

A LEAP and NEAP will be provided within the new parkland area, to provide play space for children

Lower density housing within the south of the development, to create an appropriate transition to the countryside to the south

Large new area of informal parkland created in the south of the Site, incorporating new thicket and woodland planting, as well as new areas of native trees and wildflower, and recreational footways. This parkland will create a transitional area between the built form to the north and the countryside to the south, and filter views of the new homes

Existing drainage basin retained, and seeded with long grass/meadow mix

Proposed swales will convey surface water run-off into the drainage basin

- Site Boundary: **12.22ha**
- Residential development: **5ha** (190 dwellings @ 38 dph)
- Low density residential development: **0.71ha** (23 dwellings @ 32 dph)
- Green Infrastructure: **6.51ha**
- Existing trees and hedgerows retained
- Proposed thicket/woodland planting
- Street trees
- Native tree planting
- Wildflower/long grass
- Existing drainage basin
- Existing watercourses
- Proposed swales
- Proposed drainage basin
- Bridleway
- Public footpath
- Cycle way
- Spine street
- Secondary streets
- Private drives
- Recreational footways
- Play areas (LEAP: Locally Equipped Area of Play NEAP: Neighbourhood Equipped Area of Play)
- Contours

Rev	Date	By	Description
A	04.04.22	JC	Minor updates

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e ashwell@csaenvironmental.co.uk
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Project	Land off Hempsted Lane, Gloucester
Title	Development Framework Plan 2022
Client	Gladman Developments Ltd

Scale	1:2000 @ A3	Drawn	SG
Date	April 2022	Checked	RR
Drawing No.	CSA/6036/103	Rev	A

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Appendix 9

Precautionary working Method Statement for Reptiles

Appendix 9 - Precautionary Working Method Statement (PWMS) for Reptiles

The following describes the precautionary working methods to be implemented. They represent reasonable precautions or avoidance measures that aim to make the development areas unsuitable and unattractive to common reptiles in the period immediately prior to the commencement of development. Species deterrence measures and destructive searching will be used within the site in all areas considered suitable for reptiles. All areas which have been cleared of reptiles, but which are not used immediately for construction will be maintained in an unsuitable condition for reptiles until such time as construction operations commence.

Toolbox Talks

All site operatives, including contractor and sub-contractor staff, will receive a briefing by a suitably qualified and experienced ecologist. This will include details of the legal protection of reptiles, the precautionary methods of working, tips on identification of reptiles and relevant procedures should the species be discovered during works. The contents of this document will be made available to contractors / staff carrying out these works.

Vegetation Clearance

Grassland Vegetation

Removal of grassland vegetation within the application site will proceed in a two-staged approach, with the first strim down to 15cm and then left for 24 hours before being strimmed to ground level. This phased approach will allow reptiles to disperse to adjacent suitable habitat whilst the vegetation is at a height of 15cm. The final clearance to ground level will make the area unsuitable for reptiles thereby reducing the risk of injury during ground disturbance works. All vegetation arisings must be removed away from the working areas. If necessary, the area will be hand searched (see below) by an ecologist with any larger logs/rocks or other material suitable for use as a refuge being removed.

Any suitable refuges should be removed during the main reptile ‘active’ season which is considered to be between April and September (works during these warmer months will increase the likelihood of reptiles having enough energy to move out of harm’s way during the work activities).

Hedgerows and Woodland

In order to prevent damage to retained trees / hedgerows, excavations near these habitats will be undertaken in accordance with BS5837:2012 – Trees in relation to construction.

All hedgerow habitat has the potential to support nesting birds, therefore will be subject to a nesting bird check no more than 48hrs before clearance works commence.

For any hedgerow or woodland removal or if works are required in the root protection zone of these habitats, the removal will proceed in a two-staged approach, with the above ground material being cut to a height of approximately 15cm and then left for as long as possible (ideally at least 24hrs) before the root stock is removed. Reptiles, if present, are most likely to be encountered sheltering in the root stock of hedgerows / woodland habitat. As vegetation management is intended to encourage reptiles to move to retained hedgerow / woodland habitat on their own accord, clearance should be undertaken in a phased manner (rather than in one go) from west to east / south to north or vice versa.

Any suitable refuges should be removed during the reptile main 'active' season which is considered to be between April and September (works during these warmer months will increase the likelihood of reptiles having enough energy to move out of harm's way during the work activities).

Hand Searching and Site Work Supervision

Where deemed necessary by the site ecologist, the working area will be thoroughly hand searched by an experienced ecologist immediately prior (i.e. within 24 hours) to the second cut of vegetation / removal of hedgerow roots and onset of works (including the use of machinery). If necessary (i.e. during the removal of the hedgerow root stock) the ecologist will be present to assist with a destructive search. Utilisation of the working area by contractors will not be permitted until approved by the ecologist.

Storage of Materials

During the period when reptiles can be active (February to October), materials suitable for use as refuges (e.g. soil / rubble piles) should not be stored in close proximity to retained hedgerows / woodland.

Working Methods

All excavations should ideally be backfilled at the end of each working day so that no fauna become entrapped overnight. Alternatively, wooden planks should be placed in excavations to be left open overnight to provide a means of escape for any animals which may enter the excavations.

Time Constraints

Table 1 outlines the optimum period for undertaking the required activities on site.

Table 1 – Optimum period for undertaking activity												
Activity	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Above Ground vegetation Clearance / removal												
Removal of hedgerow roots stock / debris												

- Sub Optimal period for undertaking activity

- Optimum period for undertaking activity

DRAWINGS

KEY

Survey Area

2km Search Area

0 1 Kilometres

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
.	.	.	.	.	.

CLIENT

GLADMAN DEVELOPMENTS LTD

PROJECT

HEMPSTED LANE, GLOUCESTER

DRAWING TITLE

SURVEY AREA LOCATION PLAN

DRG No.	REV
GM10710-001	A

DRG SIZE	SCALE	DATE
A3	1:25,000	12/09/2019

DRAWN BY	CHECKED BY	APPROVED BY
EF	KW	AB

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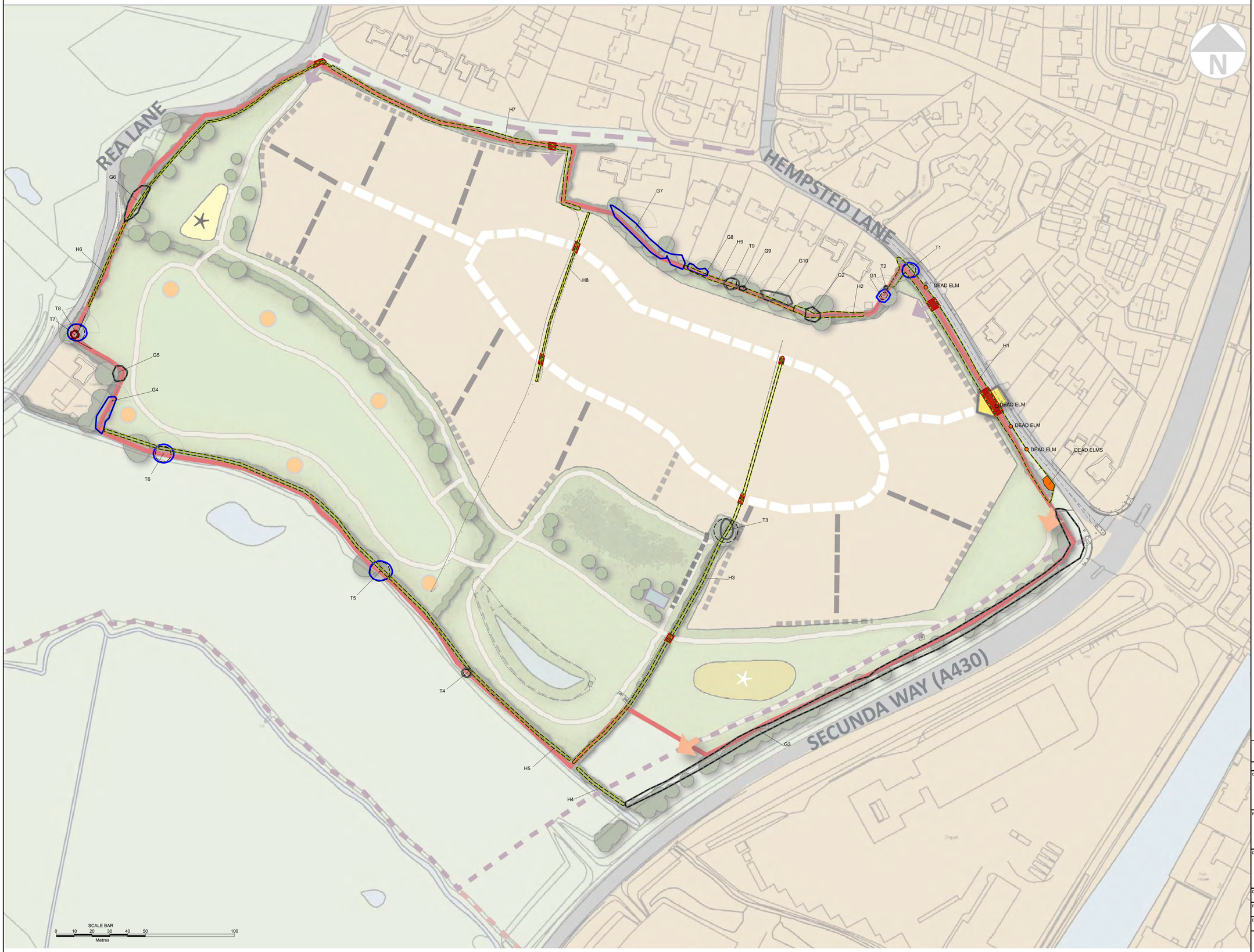

KEY

- RED LINE BOUNDARY
- HEDGE
- TREES REMOVED DUE TO CONDITION AND/OR TO ENABLE DEVELOPMENT
- CATEGORY A CROWN SPREAD
- CATEGORY B CROWN SPREAD
- CATEGORY C CROWN SPREAD
- CATEGORY U CROWN SPREAD
- ROOT PROTECTION AREA
- T1/G1/H1 TREE/TREE GROUP/ HEDGE NUMBER
- POTENTIAL DIRECT OBSTRUCTION OF SUNLIGHT
- DEAD ELM

TREES
QUALITY CATEGORIES BASED ON BS5837:2012 TREES IN RELATION TO DESIGN, DEMOLITION AND CONSTRUCTION - RECOMMENDATIONS
RPA - ROOT PROTECTION AREA
WHERE RPA IS NOT VISIBLE IT EXTENDS TO THE SAME DISTANCE AS THE CANOPY.
THE ORIGINAL OF THIS DRAWING WAS PRODUCED IN COLOUR - A MONOCHROME COPY SHOULD NOT BE RELIED UPON.

MASTERPLAN KEY

- Proposed development (6.4Ha) up to 245 dwellings @38 dph
- Local Equipped Area for Play (0.04Ha)
- Neighbourhood Equipped Area for Play (0.1Ha)
- Public open space: Informal recreation (4.81Ha)
- Incidental greenspace, habitat enhancement and meadow grassland margins (0.87Ha)
- Existing hedgerows and trees
- Proposed hedgerows and trees
- Proposed drainage basin
- Existing drainage basin
- Proposed footways
- Proposed vehicular access
- Proposed pedestrian access
- Proposed primary vehicle route
- Secondary street and lanes / private drives
- Public Right of Way: Bridleway
  Public Right of Way: Footpath
- Permissive path
- Retained agricultural access
- Vehicular access to proposed pumping station
- Proposed pumping station
- Proposed trim trail (stations indicative only)

REVISION	DETAILS	DATE	DRAWN	CHKD	APPD
A	First Issue	21-01-20	DR	MS	MS

CLIENT
Gladman Developments Limited

PROJECT
Land at Hempsted Lane, Gloucester

DRAWING TITLE
Tree Protection Plan

DRG No.	REV
GM10710-018	A

DRG SIZE	SCALE	DATE
A1	1:1000	18-09-19

DRAWN BY	CHECKED BY	APPROVED BY
DR	MS	MS

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OS data supplied by client

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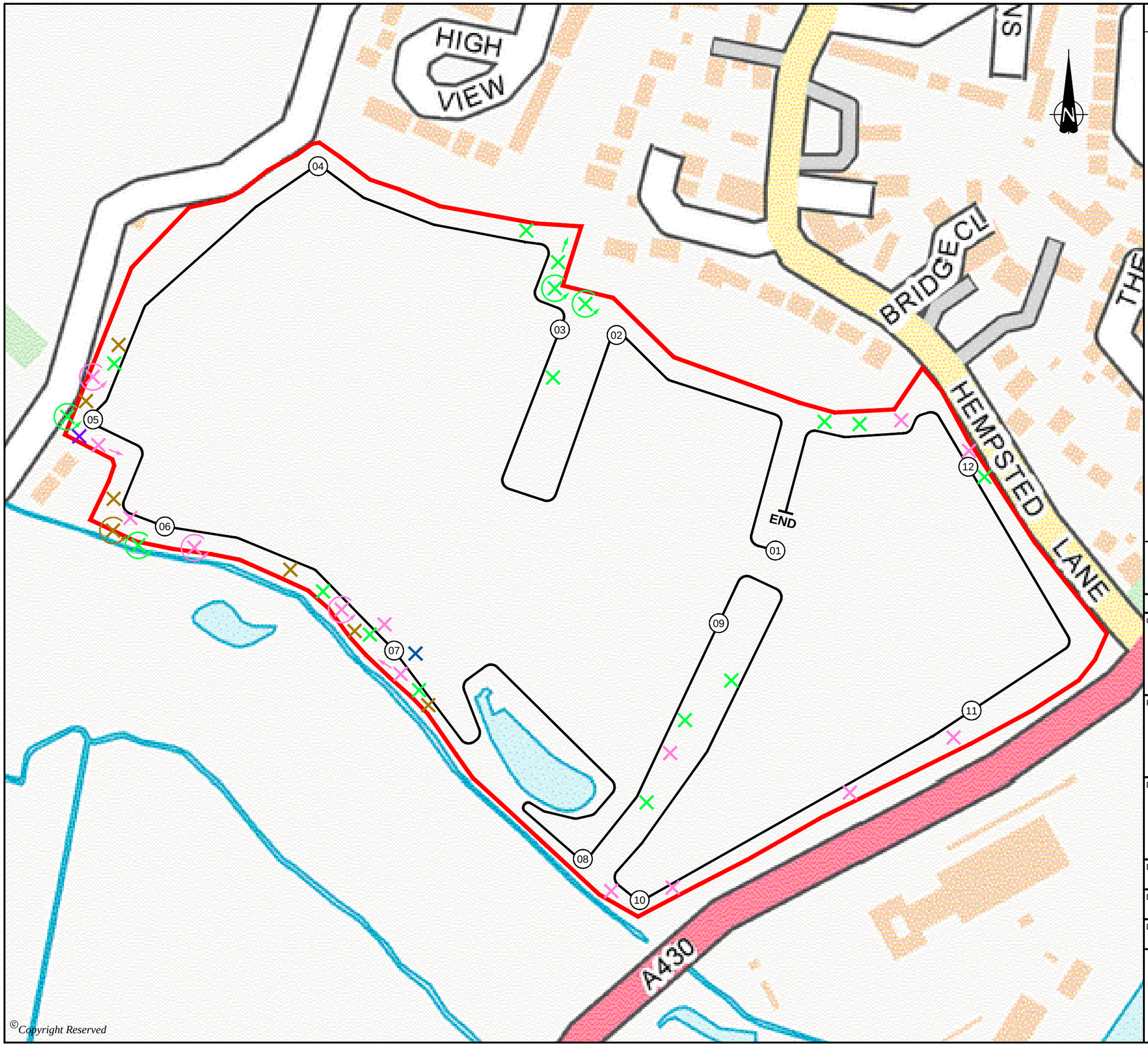

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LEGEND

- Survey Area
- Transect Route
- Listening Stop (01)
- Common Pipistrelle
- Soprano Pipistrelle
- Noctule
- Myotis Sp.
- Lesser Horseshoe

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

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PROJECT

LAND AT HEMPSTED LANE,
GLOUCESTER

DRAWING TITLE

JULY 2019
WALKED TRANSECT SURVEY

DRG No.		REV
GM10710-101		
DRG SIZE	SCALE	DATE
A3	1:2000	25.03.2020
DRAWN BY	CHECKED BY	APPROVED BY
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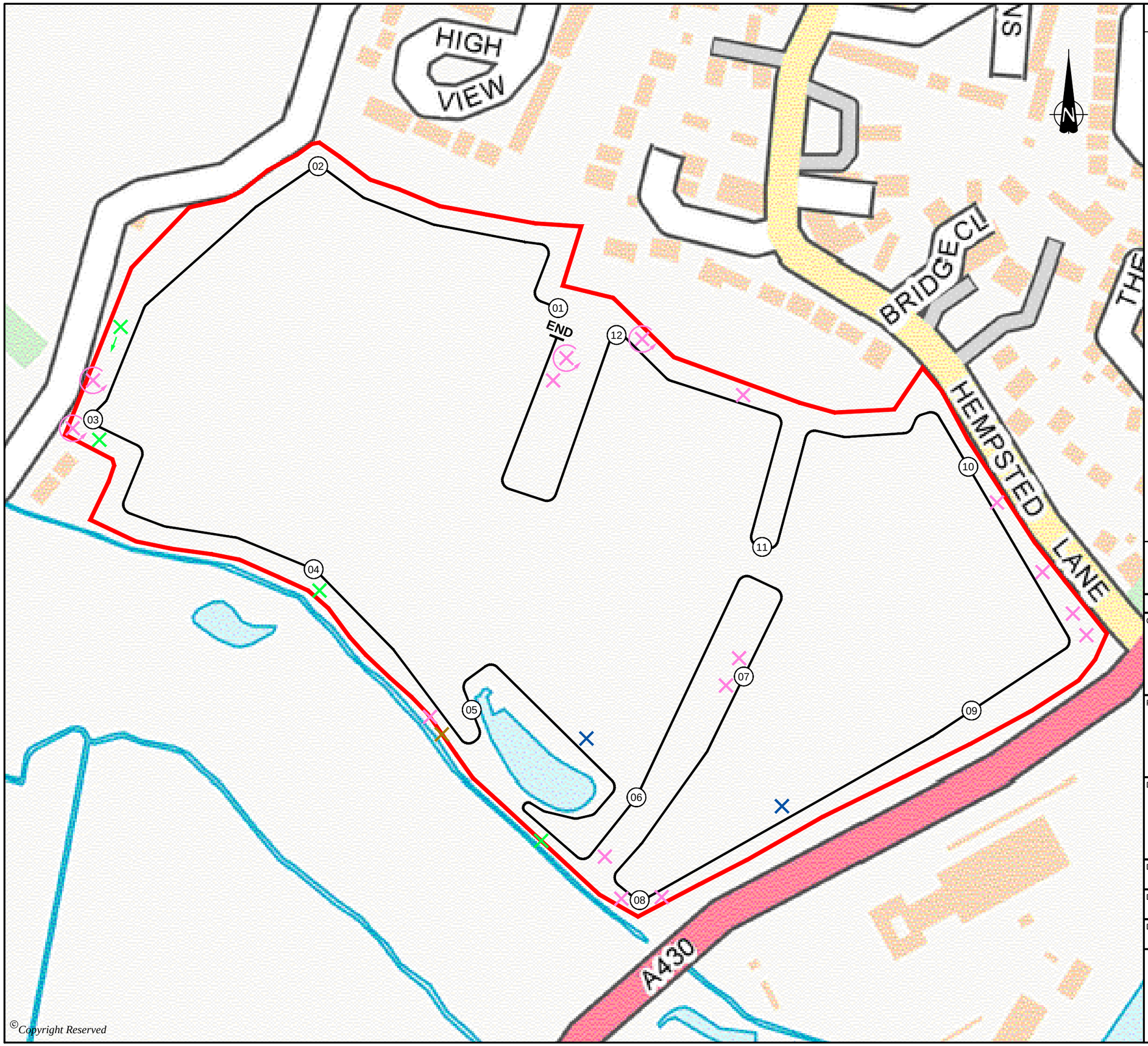

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LEGEND

- Survey Area
- Transect Route
- Listening Stop (01)
- Common Pipistrelle
- Soprano Pipistrelle
- Noctule
- Myotis Sp.

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

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LAND AT HEMPSTED LANE,
GLOUCESTER

DRAWING TITLE

AUGUST 2019
WALKED TRANSECT SURVEY - DUSK

DRG No.		REV
GM10710-102		
DRG SIZE	SCALE	DATE
A3	1:2000	25.03.2020
DRAWN BY	CHECKED BY	APPROVED BY
AW	AC	AB

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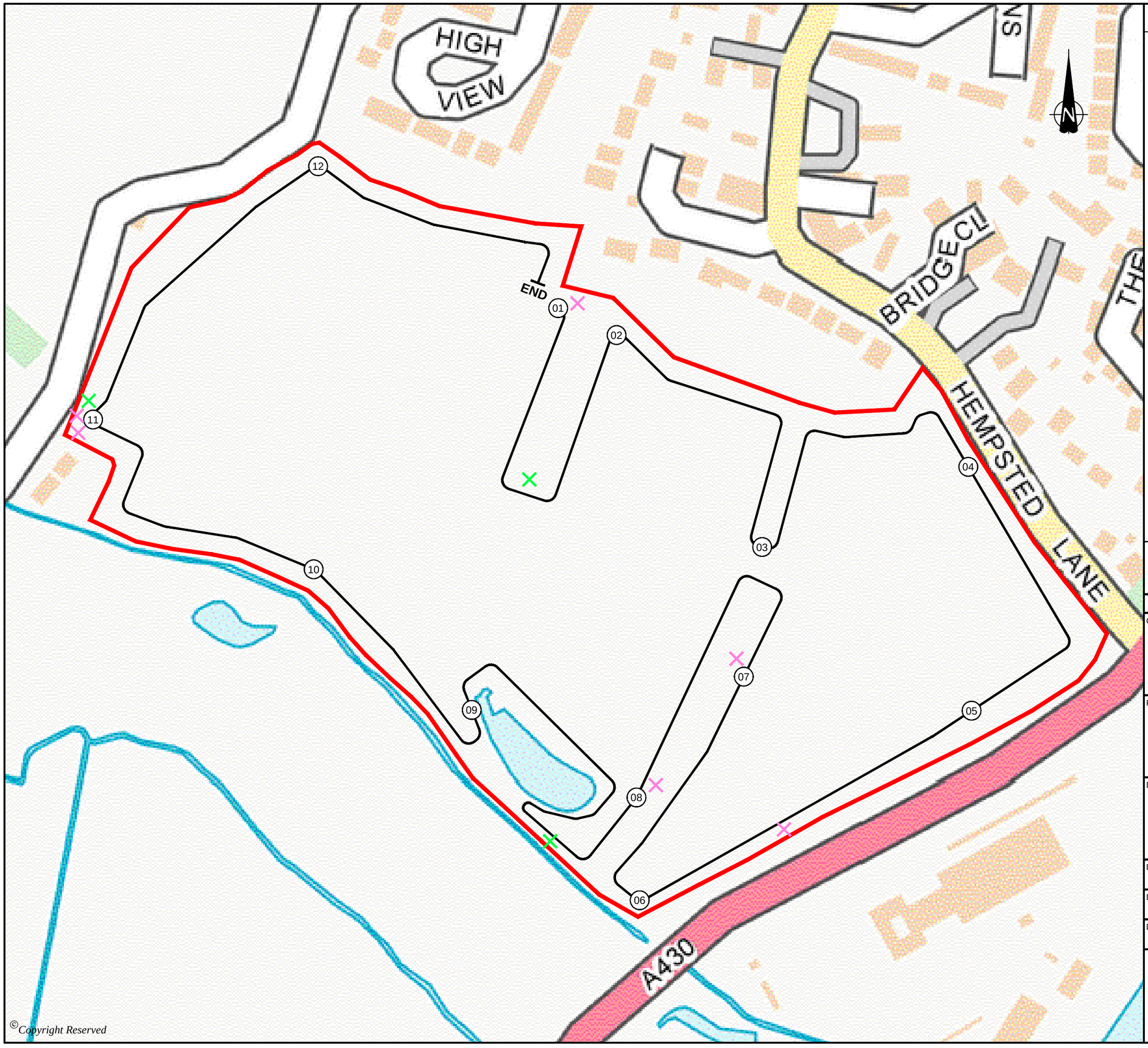

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LEGEND

- Survey Area
- Transect Route
- Listening Stop (01)
- Common Pipistrelle
- Soprano Pipistrelle

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

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PROJECT

LAND AT HEMPSTED LANE,
GLOUCESTER

DRAWING TITLE

AUGUST 2019
WALKED TRANSECT SURVEY - DAWN

DRG No.		REV
GM10710-103		
DRG SIZE	SCALE	DATE
A3	1:2000	25.03.2020
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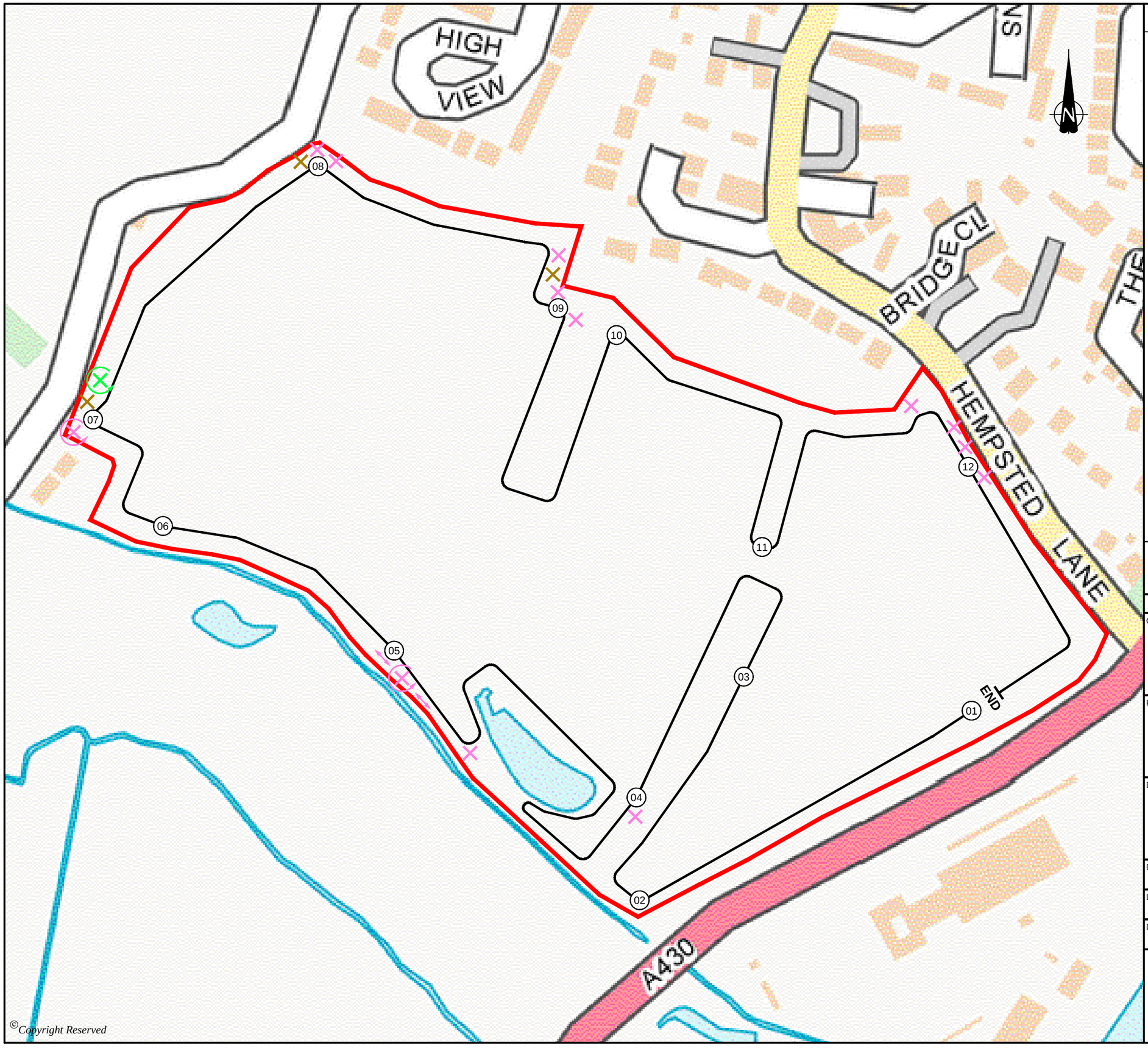

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LEGEND

- Survey Area
- Transect Route
- Listening Stop (01)
- Common Pipistrelle
- Soprano Pipistrelle
- Myotis Sp.

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

GLADMAN DEVELOPMENTS LTD

PROJECT

LAND AT HEMPSTED LANE,
GLOUCESTER

DRAWING TITLE

SEPTEMBER 2019
WALKED TRANSECT SURVEY

DRG No.		REV
GM10710-104		
DRG SIZE	SCALE	DATE
A3	1:2000	25.03.2020
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AW	AC	AB

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LEGEND

Survey Area

Static Detector

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

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PROJECT

LAND AT HEMPSTED LANE,
GLOUCESTER

DRAWING TITLE

LOCATION OF AUTOMATED DETECTORS

DRG No.		REV
GM10710-105		
DRG SIZE	SCALE	DATE
A3	1:2000	25.03.2020
DRAWN BY	CHECKED BY	APPROVED BY
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N:\GM\GM10710 - LAND AT HEMPSTED LANE\03 - DESIGN\AUTOCAD\GM10710-105 LOCATION OF AUTOMATED DETECTORS.DWG

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