



Gladman Developments Ltd

Pear Tree Lane, Euxton

ECOLOGICAL APPRAISAL

April 2019

FPCR Environment and Design Ltd

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INTRODUCTION

- 1.1 Gladman Developments Ltd. commissioned FPCR Environment and Design Ltd. to undertake an ecological appraisal of land off Pear Tree Lane, on the eastern edge of Euxton, Lancashire (central grid reference: SD 558192). The survey was undertaken to update the findings of previous ecological investigations of the study area.
- 1.2 The c.7.4ha study area comprised five field compartments with hedgerows forming the external and internal boundaries, the exception being between the two southern field compartments which were separated by a post and wire fence. A small area of woodland was present in the south of the study area, there was also a woodland belt along the northern boundary and a pond with an associated area of marshy grassland in the south of the central field compartment.
- 1.3 Surrounding land use consists of grassland and arable fields with hedgerows to the east, north and south with residential properties to the east.
- 1.4 The objective of the study was to provide an up-to-date assessment of the study area to determine habitats and species present within a defined boundary (hereafter referred to as the study area) and to make an assessment of their ecological value and any potential ecological constraints to future development of the study area.

Background

- 1.5 A brief walkover survey, and surveys for great crested newts *Triturus cristatus*, were conducted in 2013 further updated with a walkover survey and bat activity surveys conducted in 2014. Great crested newt surveys and a walkover survey were again updated in 2015. The results from these surveys are summarised in this report.

Proposals

- 1.6 Study area proposals are for a residential development with vehicular access off School Lane. Landscape proposals include public open space in the southwest and east of the study area, a balancing facility in the south western corner of the study area, buffer planting along the southern boundary and retention of all existing woodland and hedgerows.

2.0 METHODOLOGY

Desk Study

- 2.1 In order to compile existing baseline information, relevant ecological information was requested from both statutory and non-statutory nature conservation organisations including:
 - Multi Agency Geographic Information for the Countryside website (www.magic.gov.uk); and
 - Lancashire Environmental Record Network (LERN).
- 2.2 Further inspection of colour 1:25000 OS base maps (www.ordnancesurvey.co.uk) aerial photographs from Google Earth (maps.google.co.uk) was completed in to provide additional context and identify any features of potential importance for nature conservation in the wider countryside.

- 2.3 A search area for biodiversity information was related to the significance of sites and species and potential zones of influence, as follows:
- 15km around the application area for sites of International Importance (e.g. Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites).
 - 2km around the application area for sites of National or Regional Importance (e.g. Sites of Special Scientific Interest (SSSIs), and for bat roost records).
 - 1km around the study area for sites of County Importance (e.g. Biological Heritage Sites (BHS) / Local Wildlife Sites (LWS), and protected, or otherwise notable species records (including species of Principal Importance under S41 of the Natural Environment and Rural Communities (NERC) Act (2006).

Field Survey

- 2.4 An Extended Phase 1 Habitat Survey was undertaken on 8th March 2019 following the Extended Phase 1 Habitat survey technique as recommended by Natural England¹. Previous surveys in June 2013, September 2014 and November 2015 followed the same methodology. This involved a systematic walk over of the study area by an experienced ecologist to classify the broad habitat types and to identify any habitats of principal importance for the conservation of biodiversity as listed within Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006.
- 2.5 Hedgerows were surveyed using the Hedgerow Evaluation and Grading System (HEGS)². This method of assessment includes noting down canopy species composition, associated ground flora and climbers, structure of the hedgerow including height, width and gaps, associated features including number and species of mature trees, banks, ditches and grass verges.
- 2.6 Each hedgerow is given a grade using HEGS with the suffixes '+' and '-', representing the upper and lower limits of each grade respectively. These grades represent a continuum on a scale from 1+ (the highest score and denoting hedges of the greatest nature conservation priority) to 4- (representing the lowest score and hedges of the least nature conservation priority) as follows:
- Grade 1 – High to very high value
 - Grade 2 – Moderately high to high value
 - Grade 3 – Moderate value
 - Grade 4 – Low value
- 2.7 Hedgerows graded 1 or 2 are considered to be a priority for nature conservation.
- 2.8 The hedgerows were also assessed against the wildlife and landscape criteria contained within Statutory Instrument No: 1160 – The Hedgerow Regulations 1997 to determine whether they qualified as 'Important Hedgerows' under the Regulations. This was achieved using a methodology in accordance with both the Regulations and DEFRA guidance³.

1 JNCC (2010) Handbook for Phase I habitat survey – a technique for environmental audit.

2 Clements, D.K. & Tofts, R.J. (1992) Hedgerow Evaluation and Grading System (HEGS): A methodology for the ecological survey, evaluation and grading of hedgerows.

3 DEFRA (1997) The Hedgerow Regulations 1997: A Guide to the Law and Good Practice, London, HMSO

Field Survey – Fauna

General

- 2.9 During the Extended Phase 1 Habitat survey, observations, identification and signs of any species protected under the following list of Acts, Regulations or initiatives were noted:
- The Wildlife and Countryside Act 1981;
 - The Protection of Badgers Act 1992;
 - The Conservation of Habitats and Species Regulations 2017 (as amended);
 - The NERC Act 2006 – S41 species of principal importance for the conservation of biodiversity;
 - Lancashire Local Biodiversity Action Plan (LBAP) Species.
- 2.10 Given the nature of habitats within and surrounding the study area, particular consideration was given to the potential presence of bats, badgers, and amphibians, for which further specific protected species surveys have previously been completed.

Badgers

- 2.11 A badger survey was also undertaken in conjunction with the Phase 1 Habitat survey on 8th March 2019. This followed the standard methodology as outlined by Harris, Creswell and Jefferies⁴. This methodology requires the identification of field signs including:
- Setts: including earth mounds and evidence of bedding and or runways between identified setts;
 - Latrines: often located close to setts; at territory boundaries or adjacent to favoured feeding areas;
 - Prints and established track or runways;
 - Hairs caught on rough wood or fencing;
 - Other evidence: including snuffle holes, feeding and playing areas and scratching posts.
- 2.12 The identification of these latter signs on their own does not necessarily provide conclusive evidence of the presence of badgers. A number of such signs need to be seen in conjunction before badgers can be confirmed as being present.
- 2.13 The status and the level of activity of setts identified were noted as follows:
- Main sett: usually continuously used with significant signs of activity, including a large number of holes and conspicuous spoil mounds;
 - Annexe sett: usually found close to a main sett and connected to it by well used paths. Such setts may not be continuously occupied;
 - Subsidiary sett: lesser-used setts usually comprising a few holes and without associated well-used paths. Such setts are not continuously occupied;
 - Outlier sett: one or two holes without obvious paths, with a very sporadic use.

⁴ Harris S., Creswell P., and Jefferies D. 1989. Surveying Badger, Mammal Society.

2.14 With the level of activity described as:

- Active: clear of debris, trampled spoil mounds and obviously active e.g. presence of prints, dislodged guard hairs;
- Partially active: some associated debris/moss/plants in the entrance. Could be used with minimal amount of excavation usually with signs in the vicinity of the sett e.g. badger paths;
- Disused: partially or completely blocked/collapsed.

Bats

Ground Level Tree Assessment

2.15 The tree assessments were undertaken from ground level, with the aid of a torch and binoculars where required. During the survey Potential Roosting Features for bats such as the following were sought (based on p16, British Standard BS 8596:2015)⁵:

- Natural holes (e.g. knot holes) arising from naturally shed branches or branches previously pruned back to a branch collar.
- Man-made holes (e.g. cavities that have developed from flush cuts or cavities created by branches tearing out from parent stems.
- Woodpecker holes.
- Cracks/splits in stems or braches (horizontal and vertical)
- Partially detached, loose or flaky bark.
- Cankers (caused by localised bark death) in which cavities have developed.
- Other hollows or cavities, including butt rots.
- Compression of forks with occluded bark, forming potential cavities.
- Crossing stems or branches with suitable roosting space between.
- Ivy stems with diameters in excess of 50mm with suitable roosting space behind (or where roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk).
- Bat or bird boxes.
- Other suitable places of rest or shelter not listed above.

2.16 Certain factors such as orientation of the feature, its height from the ground, the direct surroundings and its location in respect to other features, may reduce enhance or reduce the potential value.

2.17 Based on the above, trees were classified into general bat roost potential groups based on the presence of these features. Table 3 broadly classifies the potential categories as accurately as possible as well as discussing the relevance of the features. This table is based upon Table 4.1 and Chapter 6 in the BCT Good Practice Guidelines⁶.

⁵ British Standard BS 8596:2015. Surveying for Bats in Trees and Woodland – Guide, October 2015.

⁶ Bat Conservation Trust 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines. Bat Conservation Trust, London.

2.18 Although the British Standard document groups trees with moderate and high potential, these have been separated below (as per Table 4.1 in the BCT Guidelines) to allow more specific survey criteria to be applied.

Table 1: Bat survey protocol for trees

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey work
Confirmed Roost	Evidence of roosting bats in the form of live / dead bats, droppings, urine staining, mammalian fur oil staining, etc.	<p>A Natural England derogation licence application will be required if the tree or roost site is affected by the development or proposed arboricultural works. This will require a combination of aerial assessment by roped access bat workers (where possible, health and safety constraints allowing) and nocturnal survey during appropriate periods (e.g. nocturnal survey - May to August) to inform on the licence.</p> <p>Works to tree(s) undertaken under supervision in accordance with the approved good practice method statement provided within the licence. However, where confirmed roost site(s) are not affected by works, work under a precautionary good practice method statement may be possible.</p>
High Potential	<p>A tree with one or more Potential Roosting Features that are obviously suitable for larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter protection, conditions (height above ground level, light levels, etc.) and surrounding habitat.</p> <p>Examples include (but are not limited to); woodpecker holes, larger cavities, hollow trunks, hazard beams, etc.</p>	<p>Where the tree(s) will likely be affected by development a combination of aerial assessment by roped access bat workers (if appropriate) and / or nocturnal survey during appropriate period (May to August).</p> <p>Following additional assessments, a tree may be upgraded or downgraded based on findings.</p> <p>If roost sites are confirmed and the tree or roost is to be affected by proposals a licence from Natural England will be required.</p> <p>After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate.</p>
Moderate Potential	<p>A tree with Potential Roosting Features which could support one or more potential roost sites due to their size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat but unlikely to support a roost of high conservation status (i.e. larger roost, irrespective of wider conservation status).</p> <p>Examples include (but are not limited</p>	<p>Where the tree(s) will likely be affected by development a combination of aerial assessment by roped access bat workers and / or nocturnal survey during appropriate period (May to August).</p> <p>Following additional assessments, a tree may be upgraded or downgraded based on findings.</p> <p>After completion of survey work (and the presence of a bat roost is discounted), a</p>

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey work
	to); woodpecker holes, rot cavities, branch socket cavities, etc.	precautionary working method statement may still be appropriate. If a roost site/s is confirmed a licence from Natural England will be required.
Low Potential	A tree of sufficient size and age to contain Potential Roosting Features but with none seen from ground or features seen only very limited potential. Examples include (but are not limited to) loose/lifted bark, shallow splits exposed to elements or upward facing holes.	No further survey required but a precautionary working method statement may be appropriate.
Negligible/ No potential	Negligible / no habitat features likely to be used by roosting bats	None.

* The Conservation of Habitats & Species Regulations 2017 (as amended) affords protection to "breeding sites" and "resting places" of bats. The EU Commission's Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC, February 2007 states that these are places "where there is a reasonably high probability that the species concerned will return".

Transect Survey

- 2.19 Dusk transect surveys were conducted on 23rd August and 2nd September 2014. The transect routes were predetermined prior to the surveys, paying particular attention to features including hedgerows / tree lines, waterbodies and areas of scrub, which are often used by foraging and commuting bats.
- 2.20 The dusk transects commenced from between 30 minutes prior to, and up to sunset, and were 2 to 3 hours in duration.
- 2.21 The transects were walked at a steady pace and when a bat passed, the species, time and behaviour was recorded on a study area plan. Bat Box[®] Ltd. Duet bat detectors were utilised in conjunction with MP3 recorders.
- 2.22 The transect surveys included point counts of five minutes during which time all bat activity was recorded. The point counts were strategically located throughout the study area to ensure a comprehensive coverage of habitats present.
- 2.23 Post-survey, bat calls were analysed using BatSound[®] (version 4), by taking measurements of the peak frequency, inter-pulse interval, call duration and end frequency. From this, the level of bat activity across the study area in relation to the abundance of individual species foraging and commuting along habitats was assessed.
- 2.24 These transects were undertaken in periods of good weather i.e. an ambient temperature of at least 10°C, with little/no wind and rain. A summary of the conditions for each survey are shown in Table 2 below:

Table 2: Summary of Survey Bat Conditions

Date	Time	Sunset / Rise	Temperature	Rain	Wind (0 to 5)	Cloud %
23.08.14	Start: 19.58 Finish: 22.05	20.15	12-14°C	0	Light Breeze	5
02.09.14	Start: 19.42 Finish: 22.01	19.48	15-17°C	0	Light Breeze	10

Static Bat Detector Survey

- 2.25 Passive monitoring was undertaken using an automated logging system (SM2BAT+, Wildlife Acoustics) with its output saved to an internal storage device. One SM2BAT+ device was positioned at different locations across the study area to simultaneously record bat contacts at those static locations for a minimum of four consecutive nights per survey occasion. This information was used to supplement transect survey data and derive an index of activity and species composition within the study area.
- 2.26 A SM2BAT+ device was placed along features considered to be of value to bats, such as hedgerows, scrub and tree lines. Devices were placed in each location for a period of three nights minimum of suitable weather conditions (little no rain/wind and temperatures above 10°C). Detectors were programmed to activate 30 minutes before dusk and recorded continuously until 30 minutes following sunrise. The output from this detector was subjected to computer analysis using the AnalookW software package (Titley Electronics).
- 2.27 The analysis of the SM2BAT+ files recorded can highlight the presence of more than one bat if they are recorded simultaneously on the same sound file. However, it is not possible to determine whether consecutive sound files have been recorded as the result of a single bat passing the detector as it commutes across the landscape or by one bat repeatedly triggering the detector as it forages in close proximity for an extended period. Therefore, each sound file is counted as a single bat registration. The number of bat registrations does however reflect the relative importance of the location of the detector by calculating the bat registrations per hour.

Great Crested NewtsHabitat Suitability Index (HSI) Assessment

- 2.28 During the first survey occasion in 2014, all ponds located within 500m of the survey study area were evaluated using the HSI scoring system developed by Oldham *et al*⁷. This was again updated during the 2015 GCN surveys. Additional HSI information was recorded for onsite ponds
- 2.29 The HSI scoring system produces a single index value of habitat suitability, derived from individual scores achieved under the following categories:
- Geographic location
 - Pond area
 - Pond drying
 - Water quality
 - Presence of water-fowl
 - Presence of fish
 - Number of linked ponds
 - Terrestrial habitat

⁷ Oldham, R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M. (2000) Evaluating the suitability of habitat for the great crested newt (*Triturus cristatus*). Herpetological Journal 10(4), 143-155pp.

- Shade
- Macrophyte coverage

2.30 A score is assigned according to the most appropriate criteria level set within each attribute and a total score calculated of between 0 and 1. Pond suitability is then determined according to the scale shown in Table 3.

Table 3: HSI Scores as a measure of Pond Suitability

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

Aquatic Presence / Absence Survey

2.31 Survey work followed best practice guidance⁸ and was undertaken by surveyors who hold current Natural England great crested newt survey licences between May and June 2013 and repeated in 2015.

2.32 Waterbodies were surveyed on four separate occasions, using where possible, a combination of three of the following survey methods on all survey visits;

- Egg searching: submerged and floating vegetation and leaf litter are inspected for newt eggs at each waterbody. Care is taken to minimise disturbance to any great crested newt eggs present within the ponds;
- Torch surveys: carried out after dark using 1,000,000 candlepower torches. Each waterbody is circumnavigated and searched by torchlight for amphibians;
- Bottle trapping: involving the placement of traps, assembled from bamboo canes and two-litre plastic bottles at 2m intervals around the margins of the pond overnight. The bottles are then checked early for the presence of amphibians;
- Netting: using a long-handled dip-net the pond edges are swept for a minimum of 15 minutes per 50m of shoreline.

2.33 The dates of each survey visit and the weather conditions are provided in Table 4 below.

Table 4: Great Crested Newt Survey Visit Schedule and Conditions

Survey Visit	Date	Air temperature (°c)		Weather conditions during torch survey
		PM	AM	
2013				
1	01/05/13	8	5	No rain, light air
2	08/05/13	12	7	No rain, light air
3	21/05/13	12	8	No rain, light air

⁸ English Nature (2001) Great crested newt mitigation guidelines, English Nature, Peterborough.

Survey Visit	Date	Air temperature (°c)		Weather conditions during torch survey
		PM	AM	
2013				
4	04/06/13	13	9	No rain, light air
2015				
1	07/05/15	13	14	No rain, light air
2	14/05/15	10	10	No rain , no wind
3	26/05/15	11	10	No rain, light breeze
4	04/06/15	14	15	No rain, light air

Constraints

- 2.34 The Phase 1 Habitat Surveys of 2014, 2015 and 2019 were conducted in spring and autumn, sub-optimal times for grassland surveys. However the results from these surveys were concurrent with the 2013 survey which was undertaken in June, within the optimal survey period.
- 2.35 Access was not granted for several of the ponds in the local area. This is discussed further in paragraphs 4.33 and 4.34.

3.0 RESULTS

Desk study (Figure 1)

Statutory Designated Sites

- 3.1 The results from a review of MAGIC indicate no nationally designated statutory sites for nature conservation are located within 2 km of the study area boundary.
- 3.2 Two internationally designated sites for nature conservation were identified within 15km of the study area. Martin Mere SPA / Ramsar located 14km to the south west of the study area, and the Ribble and Alt SPA / Ramsar located 12km to the north west of the study area.

The Ribble and Alt SPA / Ramsar

- 3.3 The Ribble and Alt is designated as a SPA for the presence of large number of wintering and breeding seabirds including an internationally important assemblage of black-headed gull *Larus ridibundus*, lesser black-backed gull *Larus fuscus* and common tern *Sterna hirundo*.
- 3.4 The site is also designated as a Ramsar as the tidal flats, saltmarshes and sand dunes support an internationally important vegetation communities and amphibian populations.

Martin Mere SPA / Ramsar

- 3.5 The Martin Mere is designated as a SPA for the large assemblage of waterfowl including Bewick's Swan *Cygnus colombianus*, Whooper Swan *Cygnus cygnus*, Pink-footed Goose *Anser brachyrhynchus* and Pintail *Anas acuta*.

- 3.6 The site is also designated as a Ramsar site due to the presence of unimproved grassland, seasonally flooded marsh, reed swamp and open water managed for waterfowl.

Non-Statutory Sites

- 3.7 Consultation with LERN highlighted one non-statutory site within 1 km of the study area, Buckshaw Wood and Grassland Local Wildlife Site approximately 0.8 km north. This site is a mosaic of broad-leaved woodland, swamp and wetland.

Protected and Notable Species

- 3.8 LERN identified many records of protected, notable or local BAP species within 1km of the study area. Protected and invasive species record location are shown on Figure 1. A review was undertaken of the Lancashire Key Species records provided in relation to potential utilisation of the study area based on the habitats present, and habitat linkages from the study area to the record locations.

Bats

- 3.9 There are 27 bat records within 1km of the study area. The majority of records are for common pipistrelle *Pipistrellus pipistrellus* and unknown bat species (24 of 27). The remaining records are two unknown bat species records 620m southwest of the study area, and a record of brown long eared bat within the wooded area within 30m of the study area.

Great Crested Newt

- 3.10 Two records of great crested newt (GCN) lie within 1km of the study area at 908m north (from 2008) and 140m west (from 2002).

Water Vole

- 3.11 A single record of water vole *Arvicola amphibius* lies 632m south from 1992 within a residential garden.

Moths

- 3.12 Several notable moth records are present within 200m of the study area including shoulder-striped wainscot moth *Leucania comma*, small square-spot *Diarsia rubi*, small phoenix *Eclipoptera silaceata*, dusky thorn *Ennomos fuscantaria*, ghost moth *Hepialus humuli*, dark-barred Twin-spot Carpet *Xanthorhoe ferrugata*.

Field Results – Habitats/Flora

- 3.13 Habitat descriptions of the study area are provided below. The locations of the habitats described below can be found on Figure 2. A botanical species list is provided within Appendix A.

Broadleaved Woodland

- 3.14 A small area (c.0.2ha) of open plantation broad-leaved woodland extends along the northern boundary of the study area (Photograph 1). The majority of the woodland canopy comprises

semi-mature to mature trees, predominately sycamore *Acer pseudoplatanus* and pedunculate oak *Quercus robur*, with a single mature standard of sweet chestnut *Castanea sativa* present.

- 3.15 Ground flora was dominated by creeping bent *Agrostis stolonifera* and Yorkshire fog *Holcus lanatus* with herb species such as wood avens *Geum urbanum*, cow parsley *Anthriscus sylvestris* and cut-leaved crane's-bill *Geranium dissectum* present in the sward.
- 3.16 Throughout much of the woodland the ground was waterlogged with a shallow ditch along the southern aspect of the woodland with brooklime *Veronica beccabunga* present. A reduction of canopy cover was noted from the previous Phase 1 Habitat Survey in 2015.
- 3.17 A second area of broadleaved woodland is present on the southern boundary. Approximately 0.03ha is within the study area boundary (Photograph 2) and is a continuation of the offsite woodland that borders the study area. The canopy is closed and dominated by mature pedunculate oak and ash *Fraxinus excelsior*. As a result, ground flora was sparse with large areas of bare earth. Common ivy *Hedera helix* and common nettle *Urtica dioica* were locally abundant and dominated the ground flora



Photograph 1: The northern woodland



Photograph 2: The southern woodland

Improved Grassland

- 3.18 The dominant habitat of the study area comprises grazed improved grassland in all fields except field 3. The sward was of fairly equal height at <100mm. Small areas of ephemeral flood water and bare mud were present as a result of cattle poaching.
- 3.19 Botanical diversity was low throughout and dominated by perennial rye-grass *Lolium perenne* with occasional broad-leaved dock *Rumex obtusifolius*, common chickweed *Stellaria media*, creeping buttercup *Ranunculus repens* and white clover *Trifolium repens*.

Arable

- 3.20 The central field (field 3) comprised a beet crop with a sparse coverage of grasses reflecting the composition of the improved grassland previously recorded in 2015.

Pond / Marshy grassland

- 3.21 A small field pond was located on an internal hedgerow within the field 3 compartment (P1) in a steep depression. Throughout the 2013 GCN survey period the water level was recorded as low – never exceeding 20 cm in depth. During the GCN surveys in 2015 very little water was held by the pond throughout, with the pond becoming dry at the end the survey season. Despite recent

heavy rain and waterlogging throughout the study area only a small area of open water was present at the time of the 2019 survey.

- 3.22 The majority of the area within this depression was vegetated with coarse grasses, sweet grass *Glyceria spp.*, with hard rush *Juncus inflexus* and soft rush *Juncus effuses* common throughout.

Running water

- 3.23 A small narrow wooded brook, Rushton's Brook, flowed along the southern boundary of the study area. At one location in the eastern part of the southern boundary this brook briefly flows onto the study area and has resulted in erosion below the wire fence.
- 3.24 This watercourse is heavily shaded by hawthorn *Crataegus monogyna* and bramble *Rubus fruticosus agg.* No associated aquatic vegetation recorded with in the channel, however the stream was in flood at the time of the survey. It is noted that previous surveys have recorded no aquatic vegetation during periods of low flow.
- 3.25 The channel width onsite is approximately 50-100cm with a wider channel offsite within the woodland. The channel comprised predominately bare earth with rocky outcrops in places. The banks are shallow within the study area but become steeper within the offsite woodland.

Hedgerow

- 3.26 Mature mixed species hedgerows formed the external study area boundary and internal field boundaries. All hedgerows included sparse sections which were stock proofed with wire fencing. Species compositions, HEGS grades and Hedgerow Regulation Assessments are provided in Table 5 below.

Table 5: Hedgerow Survey Results

Hedge	Species	HEGS Grade	Important Under Hedgerow Regulations	Contains >80% Native Species
H1	<i>Cm, Ps, Sc, Ag, Ca</i>	3	No	YES
H2	<i>Cm, Ia, Fe, Rc, Qr, Ps, Ca, Ue</i>	+2	YES	YES
H3	<i>Cm, Qr, Ia, Rc, Ca, Pa, Sc, Ap</i>	+2	No	YES
H4	<i>Cm, Sn, Qr, Ps, Ca, Ap, Rc, Fe</i>	2	No	YES
H5	<i>Cm, Qr, Sn</i>	-4	No	YES
H6	<i>Cm</i>	4	Not Assessed	YES
H7	<i>Cm</i>	4		YES
H8	<i>Cm, Sn</i>	4		YES
H9	<i>Cm, Sn</i>	4		YES
H10	<i>Cm, Qr, Sn</i>	-4	No	YES

Key to hedgerow species: Ag *Alnus glutinosa* alder, Cm *Crataegus monogyna* hawthorn, Fe *Fraxinus excelsior* ash, Sn *Sambucus nigra* elder, Ia *Ilex aquifolium* holly, Ap *Acer pseudoplatanus* sycamore, Pa *Prunus avium* wild cherry, Ps

Prunus spinosa blackthorn, *Rc Rosa canina* dog-rose, *Ca Corylus avellana* hazel, *Qr Quercus robur* English oak, *Sc Salix cinerea* grey willow, *Ue Ulex europaeus* gorse

- 3.27 All hedgerows within the study area are habitats of principal importance under the NERC Act, Section 41 and are priority habitats for England qualifying as comprising >80% native species.
- 3.28 Hedgerow H6, H7 and H9 were not assessed against the Hedgerow Regulations due to their small size (less than 20m) and function as residential curtilage. Hedgerow H8 was not assessed also because of its small size.
- 3.29 A single hedgerow H2 is considered important under the wildlife and landscape criteria of the Hedgerow Regulations 1997. This is due to having less than 10% gaps within the structure, a bank for over 50% of the length and a parallel hedge within 15m.

Mature Trees

- 3.30 Outside of the small woodland compartments mature tree standards were limited to the hedgerows, mature specimens of pedunculate oak and sycamore were most common particularly within H3.

Invasive Plants

- 3.31 The previous survey in 2015 recorded a small area (c.3m x 2m) of Japanese knotweed *Reynoutria japonica* within the northern woodland. In 2015 the stand comprised emergent stands, with no evidence of old stands in the area. At the time of the 2019 survey no evidence of Japanese knotweed was recorded within the northern woodland, or elsewhere within the study area.

Fauna

Badger

- 3.32 The study area offers suitable foraging habitat for this species however no evidence of badger was found within the study area or within the woodland off-site adjacent to the southern boundary.

Bats

- 3.33 The majority of the study area offers sub-optimal habitat for foraging bats, due to the dominance of short, grazed improved grassland and arable. The boundary habitats including the hedgerows and woodland provide a commuting and foraging resource, for bats using the local area.
- 3.34 Six mature trees were identified as having suitable bat roost potential. These are listed in Table 6, tree numbers refer to the tree survey plan 5219-T-01.

Table 6: Assessment of Trees with Bat Potential

Tree Number	Species	Category	Features
T71	Oak	Low	Knot hole 10m, east facing.
T62	Sycamore	Moderate	Small knot hole in trunk facing south.
T75	Oak	Low	Knot hole facing east Limb fracture facing east.

Tree Number	Species	Category	Features
T86	Oak	Low	Branch tear out southeast facing.
T97	Oak	Moderate	Knot hole at 8m, southeast facing, branch tear out at 7m southeast facing.
T37	Sycamore	Moderate	Knot hole at 7m, southeast facing, platey bark.

2014 Transect Surveys

Summer

- 3.35 A single species, common pipistrelle was recorded. Activity levels were considered to be low (eleven contacts over the survey period) with bats recorded sporadically throughout the study area with most activity concentrated along the internal hedgerows (Figure 3).

Autumn

- 3.36 During the survey common pipistrelle was the most frequently recorded species (21 contacts out of 28) with low numbers (5 contacts) of a *Myotis* species also recorded. Activity levels were considered to be low with activity largely recorded in association with the woodland edge on the southern boundary (Figure 4.)

2014 Automated Static Bat Detector Surveys

- 3.37 Seasonal static bat detector surveys were undertaken in August and September 2014. The results are summarised below with the full results are provided at Appendix B.

Summer

- 3.38 The static bat detector was placed within the internal hedgerow H3 for three nights (22nd to 25th August 2015) as shown on Figure 4. Conditions remained dry with temperatures ranging from 14 to 20°C. This survey confirmed a total of four species; common pipistrelle, brown long-eared *Plecotus auritus*, Noctule *Nyctalus noctula* and a *Nyctalus sp* that could not be identified to species level (Table 7 below).

Table 7: Summer 2014 SM2BAT+ Survey Results

Unit location	Avg. registrations per hour	Total registrations	Most recorded species (number of registrations)	Other species recorded (number of registrations)
Hedgerow H3	11.39	483	Common pipistrelle (478)	Noctule (2), brown long-eared bat (2), <i>Nyctalus sp</i> (1)

- 3.39 The unit recorded a total 484 bat passes over a total of 37.49 survey hours, which results in an average of 11.39 bat passes per hour. The most commonly occurring species was common pipistrelle, which comprised of 99% of the total passes over the survey period. Other species registrations remained low with Noctule (0.4%) and brown long-eared bat (0.4%) and *Nyctalus* (0.2%) being recorded in single numbers.

Autumn

- 3.40 The static bat detector was placed within the internal hedgerow H4 for three nights (23rd to 25th September) as shown on Figure 5. Conditions remained dry with temperatures ranging from 18 to 10°C. This survey confirmed a total of four species; common pipistrelle, soprano pipistrelle, Noctule and a *Myotis sp.* that could not be identified to species level (table 8).

Table 8: Autumn 2014 SM2BAT+ Survey Results

Unit location	Avg. registrations per hour	Total registrations	Most recorded species (number of registrations)	Other species recorded (number of registrations)
Hedgerow H4	16.48	618	Common pipistrelle (612)	Soprano pipistrelle (1), Noctule (2), <i>Myotis sp.</i> (3).

- 3.41 The unit a total of 618 bat passes over a total of 37.49 survey hours, which results in an average of 16.48 bat passes per hour. The most commonly occurring species was common pipistrelle, which comprised of 99% of the passes over the survey period. Other species registrations remained low with Noctule (0.3%), soprano pipistrelle (0.2%) and *Myotis sp.* (0.5%) recorded in single figures.

Birds

- 3.42 The boundary habitats, including the woodland, hedgerows and mature trees provided suitable nesting and foraging habitats for a range of urban and woodland edge birds.

Water Vole, Otter and White-clawed Crayfish

- 3.43 The water bodies within the study area lacked features suitable for water vole, otter *Lutra lutra* and white-clawed crayfish *Austropotamobius pallipes*.
- 3.44 The Rushton's Brook within the woodland adjacent to the study area lacked bankside vegetation suitable to support foraging for water vole.
- 3.45 The brook lacked connectivity to any larger waterbodies and are unlikely to be used regularly by otter. No evidence, such as spraints or prints, of this species was recorded during the survey.
- 3.46 The silty substrate on the bed of the water course is unsuitable for white-clawed crayfish which tend to prefer cleaner substrates. Furthermore there was very little refugia such as cobbles in the channel which could provide shelter to this species. Given the isolation of the limited suitable features, low water flow, sub-optimal substrate and lack of local records it is considered unlikely that this species would be present within the stream.

Great Crested Newt

- 3.47 A review of aerial photographs and OS maps indicated 16 ponds within 500m of the study area. These were subjected to a HSI assessment in 2013 and 2015, the results of which are displayed within Table 9 below. Full detailed results can be found in Appendix C and D.

Table 9: Habitat Suitability Index Assessment Results 2013

Pond Number	Bearing from Study Area	HSI Score	Suitability	Comments
P1	On-site	0.64	Average	Very little water held due to large amounts of vegetation
P2	0.03 km east	0.5	Below Average	Little water, very little aquatic vegetation
P3	0.1 km east	Access Refused By Landowner		
P4	0.3 km north-east			
P5	0.3 km east			
P6	0.5 km east			
P7	0.5 km east			
P8	0.4 km east	0.54	Below Average	Connected to P9. Very little water held
P9	0.4 km east	0.5	Below Average	Connected to P8. Large amount of water fowl. No aquatic vegetation
P10	0.5 km east	0.56	Below Average	Very little water held. Cattle poached
P11	0.5 km south-east	Not Surveyed - German Brook Barrier to GCN Dispersal		
P12	0.3 km south-east	0.59	Average	Heavily shaded and cattle poached
P13	0.2 km south-east	0.64	Average	Very little water held. Grassed over
P14	0.1 km south	0.53	Below Average	Dry but evidence of recently holding water
P15	0.1 km south	0.64	Average	Less than 1 cm of water
P16	0.07 km west	Access Refused By Landowner		

3.48 Fifteen ponds (P11 was excluded given the barrier posed by the German Brook, a barrier to GCN dispersal) were again subjected to the HSI assessment in 2015 during the GCN surveys, where access was granted (See Table 10 below).

Table 10: Habitat Suitability Index Assessment Results 2015

Pond Number	Bearing from Study Area	HSI Score	Suitability	Comments
P1	On-site	0.53	Below Average	Very little water held due to large amounts of vegetation
P2	0.03 km east	Dry throughout the survey period		
P3	0.1 km east	Access Refused By Landowner		
P4	0.3 km north-east			
P5	0.3 km east			
P6	0.5 km east			
P7	0.5 km east			
P8	0.4 km east	0.39	Poor	Two connecting ponds. Large amount

Pond Number	Bearing from Study Area	HSI Score	Suitability	Comments
P9	0.4 km east			of water fowl. No aquatic vegetation. Became drier over the survey period.
P10	0.5 km east	0.6	Below Average	Very little water held. Cattle poached
P12	0.3 km south-east	Dry throughout the survey period		
P13	0.2 km south-east	Dry throughout the survey period		
P14	0.1 km south	Access Refused By Landowner		
P15	0.1 km south			
P16	0.07 km west			

3.49 During the presence / absence surveys completed in 2013 and 2015, no great crested newts were recorded in association with the surveyed ponds. Other amphibian species were recorded in the ponds as outlined in Table 11 below. Full results are shown in Appendix E and F.

Table 11: Great Crested Newt Survey Results 2013 and 2015

Species	Maximum Count								
	P1	P2	P8	P9	P10	P12	P13	P14	P15
2013									
Smooth Newt	3	-	-	-	-	-	-	-	-
Palmate Newt	4	-	-	-	-	-	-	-	-
Common Frog	-	-	1	-	1	-	-	-	25
Common Toad	-	-	1	-	-	-	-	-	-
2015									
Smooth Newt	3	-	-	-	-	-	-	No Access	
Palmate Newt	5	-	-	-	-	-	-		
Common Frog	-	-	-	-	-	-	-		
Common Toad	-	-	-	-	-	-	-		

3.50 The on-site pond was reassessed during the 2019 Extended Phase 1 Habitat survey, this confirmed no significant change from the 2015 assessment, assessed as below average (HSI = 0.2).

Reptiles

3.51 The majority of the study area was considered to provide unsuitable habitat for reptile species due to the lack of structural diversity in the vegetation. Some limited potential shelter was present in the form of hedgerow bases at the boundaries which connect to the wider landscape.

4.0 DISCUSSION AND RECOMMENDATIONS

Non statutory sites

- 4.1 Buckshaw Wood and Grassland Local Wildlife Site is located approximately 0.8 km north of the study area. No adverse impacts are expected on this site from construction activities or increased foot fall following development due to the distances between the sites and the provision of on-site recreation linking to the local footpath network.

Habitats

- 4.2 Habitats within the application boundary comprised improved grassland, arable, mature trees, woodland, scrub and hedgerows. The grassland and arable habitats were considered to be of negligible value, consisting of common and widespread species with no rare or notable specimens recorded. Loss of this habitat would not be expected to adversely affect the nature conservation value of the local area and is not a constraint to the development of the study area. Through good design and appropriate landscaping and habitat creation it is considered that biodiversity could be easily enhanced in association with the proposals given the limited habitats present currently.
- 4.3 Hedgerows, the two woodland compartments, the pond and mature trees provided habits of greater value enhancing diversity within the study area. All hedgerows were identified as habitats of principal importance under Section 41 of the NERC Act as they contained greater than 80% native woody species. Hedgerow H2 is considered 'Important' under the wildlife and landscape criteria of the Hedgerow Regulations 1997.
- 4.4 The hedgerows provide continuous corridor of movement for local fauna around the study area. All hedgerows are to be retained and enhanced through additional planting to improve structure. Creation of new species rich hedgerows would augment corridors of movement/habitat connectivity around the study area and into the wider area. Where it is necessary to breach the existing hedgerows for access, mitigation and compensation will be provided through new native hedgerow planting and management to encourage hop-overs. Hedgerows should be managed sympathetically in the future to maintain and promote their biodiversity value. This would involve trimming on rotation whereby half of hedgerows are cut on a bi-annual basis. Gaps within the hedgerows should be planted with native berry bearing species.
- 4.5 All mature trees, including those standards that are dead within H3, provide potential habitats for invertebrates, nesting birds and other local wildlife in addition to providing structural diversity and continuity of habitat and should be retained wherever possible. Where it is not possible to retain mature trees safely within the proposals, suitable replacement planting should be undertaken. Cut material should be stacked into log piles in suitable areas of green open space (such as around the retained and proposed pond) to create hibernacula for amphibians and other wildlife.
- 4.6 All trees and hedgerows being retained should be protected from damage and from soil compaction during works by maintaining fenced Root Protection Areas (RPAs) in accordance with current best practice and guidelines.
- 4.7 The small woodland areas provide further diversity within the study area and will be retained and suitably buffered against the development. Some loss of the trees within the northern woodland

compartment will be required for access but will be compensated for through additional woodland and tree planting within buffer areas and public open space.

- 4.8 New habitat creation proposals will aim to increase the diversity of habitats present and provide structural diversity, with scrub, woodland and grassland areas. An attenuation basin will be constructed in the south west corner of the study area, which has potential to contribute to the long term biodiversity value of the study area. This should be designed for wildlife benefit so that it retains some water year round, with planting of marginal and aquatic vegetation, shallow shelved margins and a rough grassland buffer. Existing linear features such hedgerows are retained and enhanced providing connectivity between enhanced and newly created habitats.
- 4.9 A 10m woodland planting buffer is proposed alongside the small woodland within the southern extent of the study area and the southern boundary. This will screen the brook and surrounding habitat from the development. During the construction phase the pond and stream should be buffered from the construction zone of the development following best practice guidance.
- 4.10 Any garden planting proposed at the outset should also use native species or species of value to wildlife. Suitable small tree species for inclusion in garden planting schemes include field maple *Acer campestre*, silver birch *Betula pendula* and holly *Ilex aquifolium*. All informal areas of planting should use native species and be subject to sympathetic management and a management plan to promote their conservation value.
- 4.11 More formal areas should consider the use of non-native species of wildlife benefit through fruiting bodies and nectar sources. Planting schemes should seek to create a varied three dimensional structure through use of ground cover, climbers and shrubs with an emphasis on species bearing nectar, berries, fruit and nuts, as these enhance the foraging opportunities for local wild fauna including birds and invertebrates.
- 4.12 The habitats of increased value and created habitats should be subjected to a site specific management plan to ensure the greatest biodiversity benefits can be achieved on-site. This would should the management of the woodland areas to promote undergrowth and ground flora, the maintenance of the pond to ensure open water exists and the bi-annual rotation of hedgerow cutting to promote high growth and fruit production.
- 4.13 The small area of Japanese knotweed identified within the northern woodland in 2015 was not recorded during the 2019 survey. Remedial works to eradicate this stand may have taken place in the intervening period between the 2015 and 2019 habitat surveys. However; as the 2019 habitat survey was undertaken in March, there is potential for growth to emerge later in the Spring and therefore an updated survey for invasive species undertaken during late Spring / Summer is recommended.

Protected and Notable Species

- 4.14 Principal pieces of legislation protecting wild species are Part 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA) and the Conservation of Habitats Regulations 2017 (as amended). Some species, for example badgers, also have their own protective legislation (Protection of Badgers Act 1992). The impact that this legislation has on the planning system is outlined in ODPM 06/2005 Government Circular: Biodiversity and Geological Conservation – Statutory obligations and their impact within the Planning System.

- 4.15 This guidance states that as the presence of protected species is a material consideration in any planning decision, it is essential that the presence or otherwise of protected species, and the extent to which they are affected by proposals is established prior to planning permission being granted. Furthermore, where protected species are present and proposals may result in harm to the species or its habitat, steps should be taken to ensure the long-term protection of the species, such as through attaching appropriate planning conditions.

Bats

- 4.16 All bat species and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (as amended). In summary these make it an offence to damage, destroy or obstruct any place used by bats for breeding and shelter, disturb a bat, or kill, injure or take a bat.
- 4.17 Six trees were identified as having bat roost potential features. Current proposals are to retain these trees; however, if removal of any trees is required further survey would be needed to assess the presence/absence of a roost.
- 4.18 The results from the dusk transects and automated surveys confirmed the presence of six species on-site – common pipistrelle (the most frequently recorded species), soprano pipistrelle, brown long-eared, Noctule and two bats – a *Nyctalus* and a *Myotis* that cannot be determined to species level.
- 4.19 Whilst they can't be identified to species level, given the low numbers recorded of the *Nyctalus* (1 registration over the survey period) and *Myotis* (3 registrations over the survey period) suggests that the study area does not form an important resource for these species locally.
- 4.20 Very low levels of bat activity were recorded across the surveys and the species assemblage onsite was unexceptional. The proposals will result in the loss of three field compartments that provide a negligible foraging resource for bats. Gaps will be created in hedgerows to facilitate access across the study area, however boundary hedgerows are to be retained which will ensure retained connectivity with the wider countryside.
- 4.21 The hedgerows and woodland will be buffered from light spill through an appropriate lighting scheme in accordance with guidance from the Institute of Lighting Professionals⁹. Some species of bat are known to be deterred by artificial lighting, therefore in order to avoid any impacts associated with light spill on potential roost locations, bat flight-lines or foraging habitat, the following measures should be implemented:
- The avoidance of direct lighting of existing trees, scrub, woodland, or proposed areas of habitat creation / landscape planting;
 - Use of minimum permitted lux levels for safety and security;
 - Use of appropriate luminaries;
 - Lighting columns should in general be as short as possible, although in some locations taller columns would allow reduced horizontal spill, and
- 4.22 Where gaps in hedgerows are required to allow access, hop-overs should be created to aid crossing of these breaks by bats. These measures are listed in Highways Agency Interim Advice

⁹ Institute of Lighting Professionals (ILP) and Bat Conservation Trust (BCT), 2018. Guidance Note 8 Bats and Artificial Lighting. [Available online: <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>]

Note¹⁰ and comprise the retention / planting of semi-mature / standard trees which will grow to be above the level of vehicle movement (<3m). The trees should be managed to remove the lower canopy and encourage more branched head structure. Once the trees reach an appropriate level of maturity tree surgeons should undertake crown lifting to produce a tree with suitable characteristics. The trees vegetation merges with that of the existing hedgerow to create an alternative route over the road. In addition, it is recommended that low-level directional lighting is installed within/adjacent the gaps. This lighting must be below the flight line of the bats, i.e. not present in upper canopy of trees. The purpose of this lighting is to discourage bats flying below the vegetation line and avoid any potential road collision mortality.

- 4.23 Areas of green infrastructure provided will include tree and / or hedgerow planting which will offer commuting and foraging opportunities for local bat populations. This will create improved microclimates and sheltered areas that will encourage and benefit numerous invertebrate species which will in turn provide enhanced foraging opportunities for bats.
- 4.24 Bat boxes should be erected on retained trees and / or incorporated into new buildings where feasible. The provision of such features would be in accordance with National and Local Planning Policy helping to enhance biodiversity within the local area. Bat boxes should be installed at varying heights between 3 and 6m on the southern, south-eastern and south-western aspects of the trees, with a variety of box types used to provide roosting opportunities for a wide range of species. Bat bricks could also be positioned on the southern, eastern and western elevations of buildings at least 4m from the ground and sited around the site's periphery adjacent to proposed and existing habitats which provide commuting/foraging habitat.

Birds

- 4.25 All birds, their eggs and dependent young are protected whilst on the nest. Any vegetation should therefore be removed outside of the bird breeding season (March to Aug/Sept) if this is not possible, vegetation (including any areas which may provide habitat for ground nesting birds) would be checked prior to any vegetation removal being undertaken by an experienced ecologist. If active nests are found, vegetation would be left untouched and suitably buffered until all birds have fledged.
- 4.26 The planting of native broad-leaved tree and shrub species within structural planting will offer opportunities for foraging and nesting for urban fringe species.
- 4.27 Currently several bird boxes are present on the study areas northern and southern boundaries, however many of these are beyond repair. These bird boxes should be replaced within the development proposals. Further enhancement for breeding birds could include the installation of bird boxes within other areas of the site including on new houses. These could be incorporated both within the built fabric of the buildings and / or installed on the existing mature trees throughout the development. In order to provide nesting opportunities for the maximum number of bird species as possible, a variety of box types would be used, these would be installed facing north and east, thus avoiding strong sunlight and wet winds. The provision of such features would be in accordance with National and Local Planning Policy helping to enhance biodiversity within the local area.

10 Highways Agency (2008) Interim Advice Note 116/08 – Nature Conservation Advice in Relation to Bats. [On-line]. Available: <http://www.standardsforhighways.co.uk/ians/pdfs/ian116.pdf>

- 4.28 Future management of the hedgerows should include cutting half of hedges bi-annually to allow hedgerows to become tall and dense bearing fruit for foraging urban edge birds.

Great Crested Newt

- 4.29 Great Crested Newts (GCN) and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (as amended). In summary these make it an offence to damage, destroy or obstruct any place used by this species for breeding and shelter, disturb a great crested newt, or kill, injure or take a great crested newt.
- 4.30 Habitats within the study area boundary were considered to provide limited opportunities for GCN. The hedgerow bases and southern woodland would provide suitable foraging and sheltering habitat albeit very limited given the absence of extensive areas of undergrowth. The northern woodland lacked suitable refugia for GCN, however limited potential exists at the base of the trees. The pond on-site was considered to be average suitability in 2013 for GCN, falling to below average suitability when assessed in 2015 and 2019. Presence/absence surveys have previously indicated that GCN was absent from this pond in both 2013 and 2015, and present at very low numbers at most in the wider area.
- 4.31 A further 15 ponds are present within 500m of the study area boundary, and in addition to the on-site pond, were subjected to presence / absence surveys for GCN. Given its location beyond the German brook, which is considered a barrier to GCN, P11 was excluded from the surveys. In 2013 a total of eight ponds, including the on-site pond were surveyed, with access refused for six ponds (P3-P7 and P16). Update surveys were conducted in 2015, access had been refused again for P3-P7 and for P14-16 in 2015 - despite access in 2013. Furthermore in 2015 P2, P12 and P13 were found to be dry, leaving two off-site ponds and the on-site pond that could be surveyed (P8 and P9, two ponds joined together to form one large pond, and P10).
- 4.32 No GCN were recorded within the ponds over the two survey periods. P14 and P15 were not surveyed in 2015, however these two ponds were found to hold very little water in 2013 with no evidence of suitable vegetation for egg laying, therefore it is reasonable to consider GCN are absent from these two ponds also.
- 4.33 In 2014 and 2015 access was refused for ponds P3-P7, at 100m and 300m east of the study area. These ponds lie on the edge of agricultural fields, at the bases of hedgerows and scattered trees. Published research has determined a terrestrial zone of 63m from the breeding pond for GCN, within which 95% of summer refuges were located¹¹ and following the breeding season 64% of newts were found in terrestrial habitat within 20m of the pond edge¹¹. This would indicate that if GCN were present within ponds P3 and P4, the GCN would use the suitable terrestrial habitat present within 63m of the each pond and would not travel across unsuitable habitat (the bare tarmac of Pear Tree Lane and intensively managed fields) passed suitable habitat in the immediate vicinity. Similarly if pond P5-P7 lie in a close cluster connected by hedgerows. If GCN were present within any of these ponds it is unlikely that they would travel 300m (from P5, the closest of the ponds to the study area) across two roads and agricultural fields.

¹¹ Jehle R & JW Arntzen (2000) Post-breeding migrations of newts *Triturus cristatus* and *T. marmoratus* with contrasting ecological requirements. *Journal of Zoology* (London), 251, 297-306.

- 4.34 It was not possible to survey P16 for GCN during both survey seasons however given the isolation of this pond within the current residential development and lack of connective habitat with the study area it is unlikely that GCN from this pond (if present) would be using the habitats within the study area. A record of GCN from 2002 lies within this residential area however no GCN were recorded within P16 – the only pond in the area holding sufficient water to support, as P14 and P15 were noted as holding very little water and drying.
- 4.35 If GCN were present within the study area from off-site ponds it is reasonable to assume that the species would have been present within the on-site pond, given its suitability and the limited terrestrial habitat on-site. Therefore the absence of GCN from this pond suggests that this species is not present within the study area and therefore not considered a constraint.

Reptiles

- 4.36 No reptiles were recorded during the study area walkover survey and no records were provided by the consultation data within the area. The land surrounding the study area is predominantly agricultural with open grasslands and areas of woodland or residential dwellings and is therefore considered to be sub-optimal for common reptile species.
- 4.37 The study area is dominated by improved grazed grassland which is of limited value for reptile species due to the lack of vegetative structure and sward height. Further surveys are not recommended due the lack of records and the very limited suitability of on-site habitats.

5.0 SUMMARY

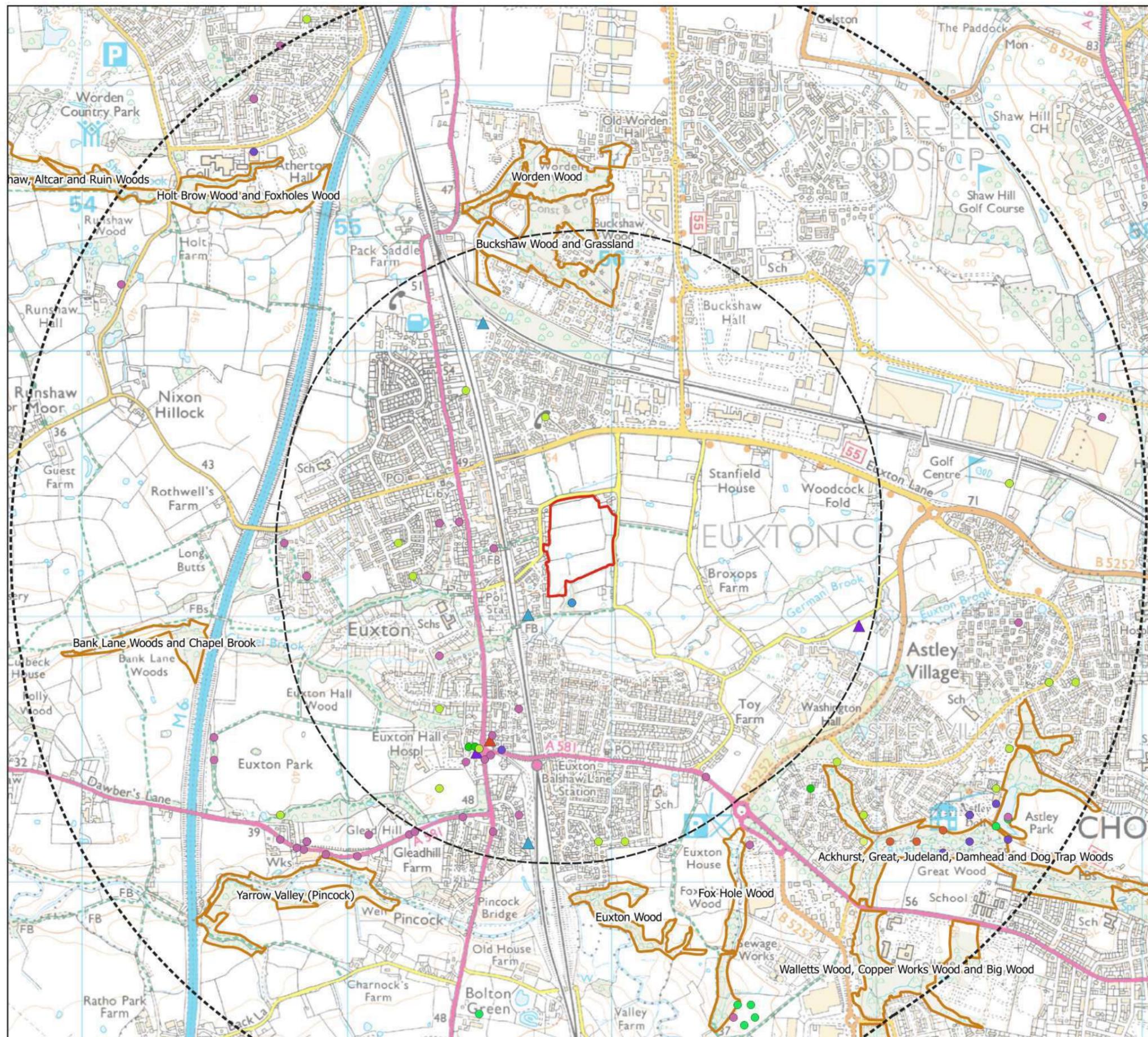
- 5.1 The study area is dominated by improved grassland bounded by hedgerows that contain various mature trees. A small strip of woodland is located within the northern extent of the study area. A continuation of an off- site woodland bordering the southern boundary forms another small woodland area.
- 5.2 The grassland is of negligible value to nature conservation. The hedgerows are habitats of principal importance under the Natural Environment and Rural Communities Act 2006 and their retention is recommended. Where loss is unavoidable mitigation should be provided in the form of new native planting. Hedgerow H2 is considered an 'Important' hedgerow under the wildlife and landscape criteria of the Hedgerow Regulations 1997 and any removal will require permission from the local planning authority.
- 5.3 All trees and hedgerows being retained should be protected from damage and from soil compaction during works by maintaining fenced Root Protection Areas.
- 5.4 Hedgerows should be trimmed on rotation whereby half of hedgerows are cut on a bi-annual basis. Gaps within the hedgerows should be planted with native berry bearing species.
- 5.5 Due to the previous identification of Japanese knotweed within the study area, an updated survey during the appropriate period should be undertaken to confirm that this species is absent from the study area.
- 5.6 A small shallow watercourse, Rushton's brook, runs off-site along the southern boundary within the adjacent woodland. At one location in the south-eastern extent, this brook briefly enters the

study area. The water course will be buffered from the development by a woodland buffer planting and incorporated into the landscaping design.

- 5.7 A pond lies on an internal hedgerow within the centre of the study area. The habitat suitability assessment indicates that this pond was of average suitability for great crested newts in 2013 but below average in 2015 and 2019.
- 5.8 Presence/absence surveys were carried out on ponds within 500m of the study area where access was granted in spring 2013 and 2015. Great crested newt were absent throughout the surveys. Given the absence of this species from the on-site pond and the unsuitability of the grassland onsite it is considered great crested newts are likely to be absent from the study area. It is recommended that an updated eDNA survey is undertaken to confirm the absence of this species from the study area.
- 5.9 The pond is to be retained and incorporated into the landscaping scheme with an appropriate buffer. It should be enhanced to maximise the benefits it could have on the local wildlife such as the creation of nearby hibernaculum for the herpetofauna.
- 5.10 The results from the bat activity surveys, including dusk transects and automated surveys confirmed the presence of six species – common pipistrelle (the most frequently recorded species), soprano pipistrelle, brown long-eared, noctule and two bats – a *Nyctalus* and a *Myotis* that cannot be determined to species level. The species composition and level of activity was typical of the habitats present, comprising foraging and commuting by common and widespread species at relatively low levels. As there has been no significant change in the habitats present within the study area it is considered that the data collected in 2014 is sufficient to inform appropriate mitigation.
- 5.11 Thirteen trees were considered to have bat roost potential. These trees are to be incorporated into the design however if their removal is required further survey via a roped access survey would be required. Light spill should be minimised on these trees, the woodland and the hedgerows to allow dark corridors for bat movement. If removal of any of these trees or woodland is required further survey work will be required.
- 5.12 The brook was considered unsuitable for otter, water vole and white clawed crayfish. However the brook provides ecological value for a range of species and it is recommended best practice guidelines are adhered to prevent potential pollution impacts during the construction phase to prevent any adverse impacts on this feature.
- 5.13 The inclusion of bird and bat boxes onto existing trees or within new buildings will provide new opportunities for rest and shelter, increasing the ecological value of the study area for locally present Lancashire Key Species such as starling and swift.

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Key

- Study Area Boundary
- 1km Buffer
- 2km Buffer
- Biological Heritage Site

Protected and Invasive Species

- Common Pipistrelle
- Daubenton's Bat
- Noctule Bat
- Pipistrelle
- Pipistrelle Bat species
- Brown Long-eared Bat
- Serotine
- Unidentified Bat
- Whiskered Bat
- ▲ European Water Vole
- ▲ Great Crested Newt
- ▲ Japanese Knotweed

client
Gladman Developments Ltd.

project
Pear Tree Lane,
Euxton

drawing title
**STUDY AREA AND CONSULTATION RESULTS
PLAN**

scale
1:15,000

drawn
JEJ / AJC

issue
4/4/2019

drawing / figure number
Figure 1

ref
5219-E-01A




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Key

- Study Area Boundary
- Phase 1 Habitats**
- Bare ground
- Broadleaved woodland - plantation
- Cultivated/disturbed land - arable
- Improved grassland
- Marsh/marshy grassland
- Scrub - scattered
- Standing water
- Broadleaved tree
- Running water
- Intact hedge - species-poor
- Intact hedge - native species-rich
- Hedge with trees - native species-rich
- Fence
- Defunct hedge - species-poor



client
Gladman Developments Ltd.

project
Pear Tree Lane
Euxton

drawing title
PHASE 1 HABITAT PLAN

scale @A3
1:1500

drawn
JEJ

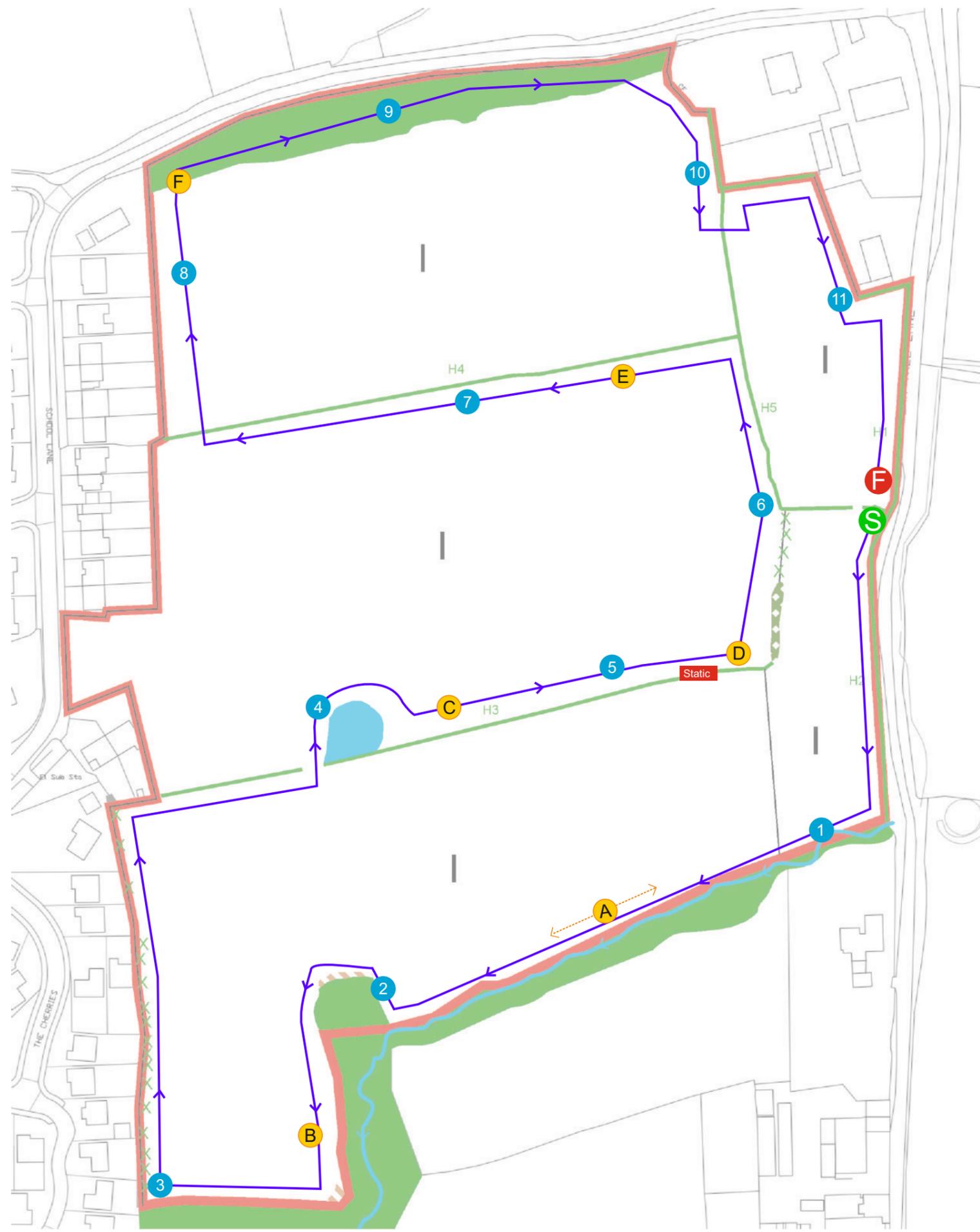
issue
12/4/2019

drawing / figure number
Figure 2

rev
5219-E-01a

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-  Study Area Boundary
-  Transect Route
-  Start / Finish Point
-  Point Count (with reference)
-  Bat Contact (with reference) and Route of Bat (if sighted)
-  Static Detector Location

Ref No.	Time	Species	Behaviour
PC1- PC2	20:22 - 20:27		
A	20:25	Common pipistrelle x2	Continuous foraging
PC2	20:27 - 20:33		
	20:27	Common pipistrelle	Continuous foraging
PC2- PC3	20:33 - 20:37		
B	20:35	Common pipistrelle x2	Foraging 5x passes
PC4- PC5	20:54 - 20:58		
C	20:56	Common pipistrelle	Foraging 4x passes
PC5	20:58 - 21:03		
	20:58	Common pipistrelle	Foraging 2x passes
PC5 - PC6	21:03 - 21:06		
D	21:03	Common pipistrelle	Commuting 1x pass
PC6- PC7	21:11 - 21:15		
E	21:14	Common pipistrelle	1x pass
PC7	21:15 - 21:20		
	21:19	Common pipistrelle	1x pass
PC8	21:25 - 21:31		
	21:28	Common pipistrelle	1x pass
PC8- PC9	21:31 - 21:34		
F	21:32	Common pipistrelle	Foraging 2x passes

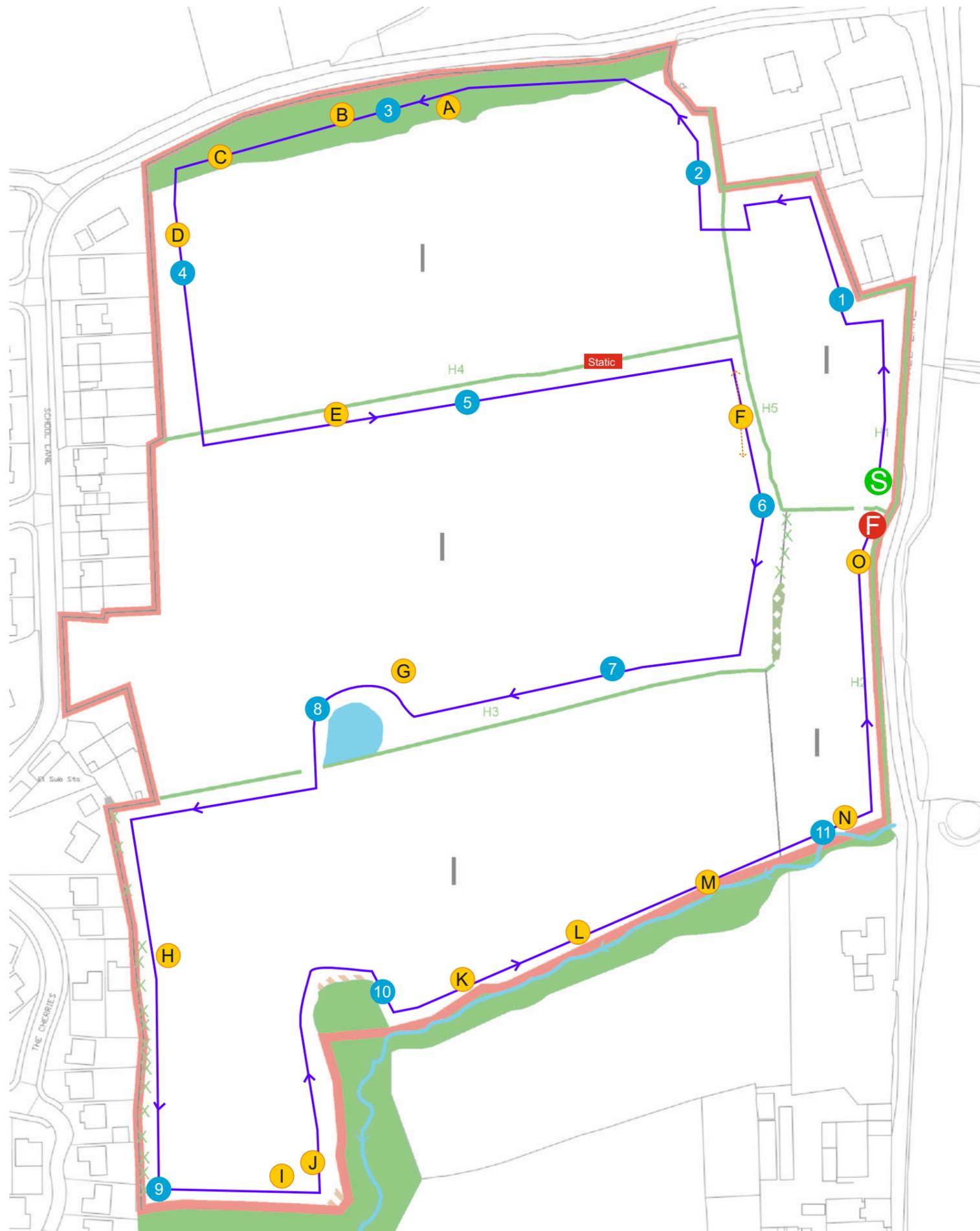
 Gladman Developments Ltd
 Pear Tree Lane, Euxton
 BAT TRANSECT PLAN (AUGUST)
 NTS @ A3 JWB / 04.04.2019

 **Figure 3**

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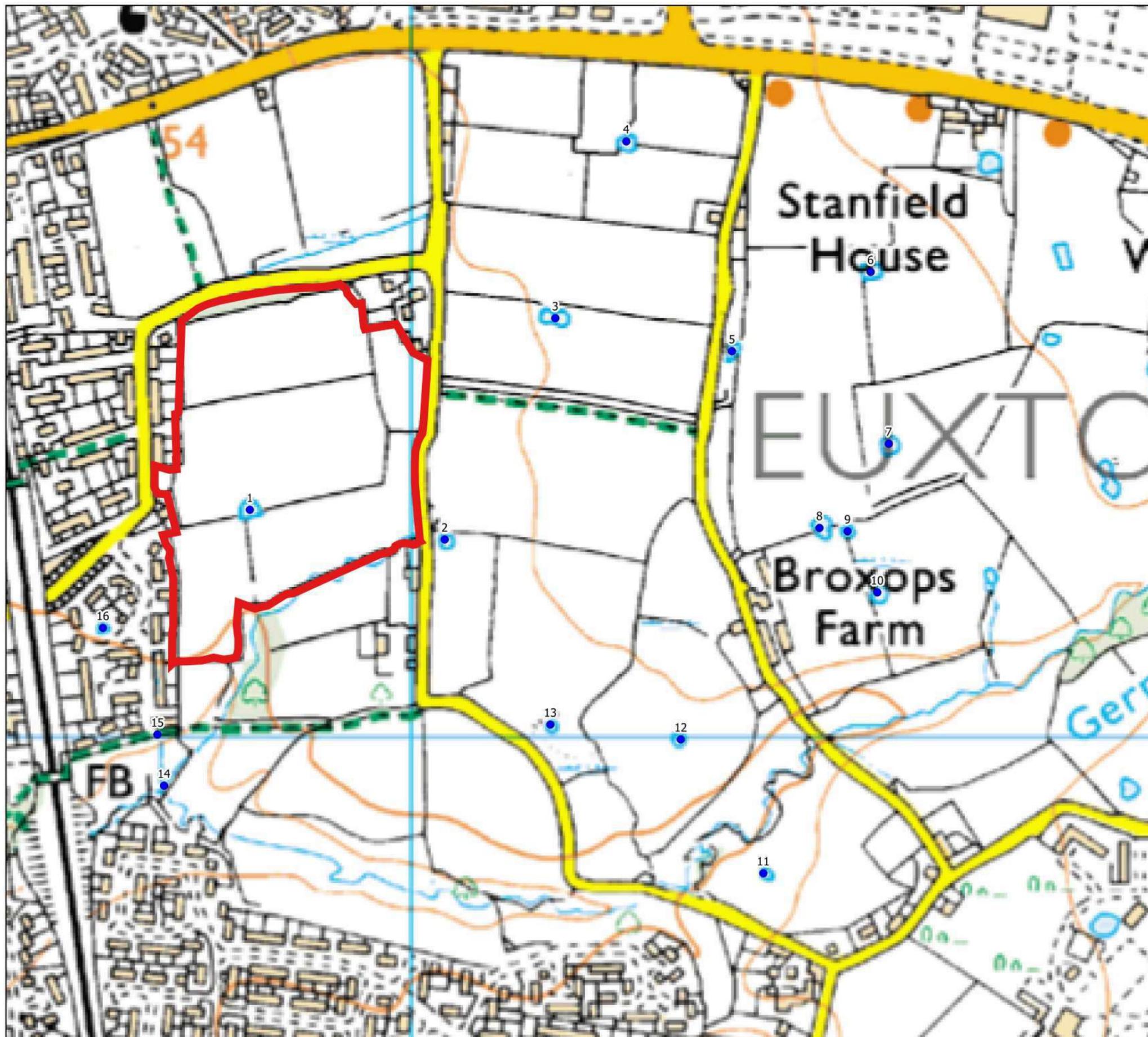


-  Study Area Boundary
-  Transect Route
-  Start / Finish Point
-  Point Count (with reference)
-  Bat Contact (with reference) and Route of Bat (if sighted)
-  Static Detector Location

Ref No.	Time	Species	Behaviour
PC3	20:08 - 20:13	No Bats	
	20:10	Common pipistrelle	Commuting 1x pass
PC3- PC4	20:13 - 20:22		
A	20:14	Common pipistrelle x2	Social / Foraging 3x pass
B	20:18	Myotis sp.	Commuting 1x pass
C	20:21	Myotis sp.	Commuting 1x pass
D	20:21	Common pipistrelle	Commuting 1x pass
PC4	20:22 - 20:27		
	20:23	Common pipistrelle	Commuting 1x pass
	20:26	Myotis sp.	Foraging 5x passes
PC4- PC5	20:27 - 20:33		
E	20:30	Common pipistrelle	Foraging 2x passes
PC5	20:34 - 20:39		
	20:34	Common pipistrelle	Foraging 1x pass
PC5- PC6	20:39 - 20:45		
F	20:45	Myotis sp.	Foraging 3x passes
PC6	20:45 - 20:50		
	20:50	Common pipistrelle	Commuting 1x pass
PC7- PC8	20:59 - 21:08		
G	21:05	Common pipistrelle	Commuting 1x pass
PC8	21:08 - 21:14		
	21:10	Common pipistrelle	Foraging 1x pass
	21:12	Common pipistrelle	Foraging 1x pass
	21:13	Common pipistrelle	Foraging 5x passes
PC8- PC9	21:14 - 21:21		
H	21:21	Common pipistrelle	Foraging 1x pass
PC9	21:21 - 21:26		
	21:23	Common pipistrelle	Foraging 1x pass
PC9- PC10	21:26 - 21:35		
I	21:28	Common pipistrelle	Foraging 3x passes
J	21:28	Myotis sp.	Foraging 4x passes
PC10	21:35 - 21:40		
	21:40	Soprano pipistrelle	Foraging 1x pass
PC10- PC11	21:41 - 21:50		
K	21:41	Soprano pipistrelle	Foraging 4x passes
L	21:45	Common pipistrelle	Foraging 2x passes
M	21:48	Common pipistrelle	Foraging 1x pass
PC11	21:50 - 21:55		
	21:51	Common pipistrelle	Foraging 1x pass
	21:54	Common pipistrelle	Commuting 1x pass
PC11- F	21:55 - 22:01		
N	21:54	Common pipistrelle	Commuting 1x pass
O	21:57	Common pipistrelle	Commuting 2x passes

 Gladman Developments Ltd
 Pear Tree Lane, Euxton
BAT TRANSECT PLAN (SEPTEMBER)
 NTS @ A3 JWB / 04.04.2019
 **Figure 4**

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Key

- ▭ Study Area Boundary
- Pond Locations

client: Gladman Developments Ltd.
 project: Pear Tree Lane, Euxton
 drawing title: POND PLAN



scale: 1:4,000
 drawing: JRR / AJC
 issue: 5/4/2019

Figure 5 **5219-E-05a**

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APPENDIX A

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APPENDIX A

Botanical Species List

Common Name	Latin Binomial	Common Name	Latin Binomial
GRASSLAND		PONDS	
Annual meadow-grass	<i>Poa annua</i>	Alder	<i>Alnus glutinosa</i>
Broad-leaved dock	<i>Rumex obtusifolius</i>	Brooklime	<i>Veronica beccabunga</i>
Cleavers	<i>Galium aparine</i>	Common duckweed	<i>Lemna minor</i>
Cock's-foot	<i>Dactylis glomerata</i>	Creeping buttercup	<i>Ranunculus repens</i>
Common chickweed	<i>Stellaria media</i>	Pendulous sedge	<i>Carex pendula</i>
Common nettle	<i>Urtica dioica</i>	Sweet-grass	<i>Glyceria spp.</i>
Creeping buttercup	<i>Ranunculus repens</i>	Soft rush	<i>Juncus effusus</i>
Dandelion	<i>Taraxacum officinale</i> agg.	BROADLEAVED WOODLAND	
Perennial rye-grass	<i>Lolium perenne</i>	Ash	<i>Fraxinus excelsior</i>
White clover	<i>Trifolium repens</i>	Bramble	<i>Rubus fruticosus</i> agg.
HEDGEROWS AND TREES		Broad buckler fern	<i>Dryopteris dilatata</i>
Alder	<i>Alnus glutinosa</i>	Ivy	<i>Hedera helix</i>
Ash	<i>Fraxinus excelsior</i>	Field maple	<i>Acer campestre</i>
Blackthorn	<i>Prunus spinosa</i>	Garlic mustard	<i>Alliaria petiolata</i>
Bramble	<i>Rubus fruticosus</i>	Hart's tongue fern	<i>Asplenium scolopendrium</i>
Cleavers	<i>Galium aparine</i>	Hazel	<i>Corylus avellana</i>
Climbing ivy	<i>Hedera helix</i>	Larch	<i>Larix decidua</i>
Common nettle	<i>Urtica dioica</i>	Lesser celandine	<i>Ranunculus ficaria</i>
Cow parsley	<i>Anthriscus sylvestris</i>	Common lime	<i>Tilia x europaea</i>
Dog rose	<i>Rosa canina</i>	Male fern	<i>Dryopteris filix-mas</i>
Elder	<i>Sambucus nigra</i>	Meadowsweet	<i>Filipendula ulmaria</i>
Field rose	<i>Rosa arvensis</i>	Red campion	<i>Silene dioica</i>
Hawthorn	<i>Crataegus monogyna</i>	Scots pine	<i>Pinus sylvestris</i>
Hazel	<i>Corylus avellana</i>	Soft shield fern	<i>Polystichum setiferum</i>
Holly	<i>Ilex aquifolium</i>	Sycamore	<i>Acer pseudoplatanus</i>
Horse chestnut	<i>Aesculus hippocastanum</i>	Wood avens	<i>Geum urbanum</i>
Japanese knotweed	<i>Fallopia japonica</i>	Wood sorrel	<i>Oxalis acetosella</i>
Common lime	<i>Tilia x europaea</i>		
Pedunculate oak	<i>Quercus robur</i>		
Sycamore	<i>Acer pseudoplatanus</i>		

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APPENDIX B

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APPENDIX B

Automated Bat Survey Results

Recording Period	Survey Dates	Survey Hours	Total Avg.per hour	Total Registrations	Common Pipistrelle			Noctule			Myotis Species			Brown Long-eared			Nyctalus Species			Soprano Pipistrelle		
					Avg.per hour	Peak Count	Period Total	Avg.per hour	Peak Count	Period Total	Avg.per hour	Peak Count	Period Total	Avg.per hour	Peak Count	Period Total	Avg.per hour	Peak Count	Period Total	Avg.per hour	Peak Count	Period Total
Summer	22/08/2014 - 25/08/2014	42	11.39	483	11.28	207	478	0.05	1	2	-	-	-	0.05	2	2	0.02	1	1	-	-	-
Autumn	23/09/2014 - 25/09/2014	37	16.48	618	16.32	239	612	0.05	2	2	0.08	2	3	-	-	-	-	-	-	0.03	1	1

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APPENDIX C

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APPENDIX C

Habitat Suitability Index Results 2013

	Pond Number	Location	Pond Area m ²	Pond Drying	Water Quality	% Shade	Fowl	Fish	Ponds within 1km	Terrestrial Habitat	Macrophyte %	HSI	Prediction
Field Result Score	1	A 1	50 0.05	Rarely 1	Moderate 0.67	10 1	Minor 0.67	Absent 1	20 1	Moderate 0.67	30 0.6	0.62	Average
Field Result Score	2	A 1	30 0.05	Sometimes 0.5	Poor 0.33	80 0.6	Absent 1	Absent 1	20 1	Moderate 0.67	0 0.3	0.50	Below Average
Field Result Score	8	A 1	50 0.05	Rarely 1	Moderate 0.67	80 0.6	Minor 0.67	Possible 0.67	20 1	Moderate 0.67	0 0.3	0.54	Below Average
Field Result Score	9	A 1	10 0.05	Annually 0.1	Moderate 0.67	80 0.6	Absent 1	Absent 1	20 1	Moderate 0.67	30 0.6	0.48	Below Average
Field Result Score	10	A 1	80 0.05	Rarely 1	Moderate 0.67	80 0.6	Minor 0.67	Absent 1	20 1	Moderate 0.67	0 0.3	0.56	Below Average
Field Result Score	12	A 1	60 0.05	Sometimes 0.05	Moderate 0.67	70 0.8	Minor 0.67	Absent 1	20 1	Moderate 0.67	60 0.9	0.58	Average
Field Result Score	14	A 1	75 0.05	Annually 0.1	Moderate 0.67	40 1	Absent 1	Absent 1	20 1	Moderate 0.67	100 0.8	0.53	Below Average
Field Result Score	15	A 1	100 0.2	Annually 0.1	Moderate 0.67	60 1	Absent 1	Absent 1	20 1	Good 1	60 0.9	0.64	Average

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APPENDIX D

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APPENDIX D

Habitat Suitability Index Results 2015

	Pond Number	Location	Pond Area m ²	Pond Drying	Water Quality	% Shade	Fowl	Fish	Ponds within 1km	Terrestrial Habitat	Macrophyte %	HSI	Prediction
Field Result	1	A	50	Annually	Moderate	10	Absent	Absent	19	Moderate	50	0.53	Below Average
Field Result		1	0.05	0.1	0.67	1	1	1	1	0.67	0.8		
Field Result	2	Dry Throughout Survey Period											
Field Result	8+9	A	400	Never	Poor	75	Major	Possible	20	Moderate	0	0.39	Poor
Field Result		1	0.8	0.3	0.33	0.7	0.01	0.67	1	0.67	0.3		
Field Result	10	A	100	Sometimes	Moderate	80	Minor	Possible	20	Moderate	20	0.60	Below Average
Field Result		1	0.2	0.5	0.67	0.6	0.67	0.67	1	0.67	0.5		

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APPENDIX E

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APPENDIX F

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Pond Ref.	Survey Date	Bottle Trap				Torch Survey					Notes	Maximum GCN Count
		GCN	Smooth Newt	Palmate Newt	Other	GCN	Smooth Newt	Palmate Newt	Other	Eggs		
	4 th June	-	-	-	-	-	-	-	-	-	-	-
13	1 st May	-	-	-	-	-	-	-	-	-	-	-
	8 th May	-	-	-	-	-	-	-	-	-	-	-
	21 st May	-	-	-	-	-	-	-	-	-	-	-
	4 th June	-	-	-	-	-	-	-	-	-	-	-

Key: F – Common Frog, T – Common Toad