



Hallam Land Management

**Bicester**

## **Ecological Appraisal**

September 2021

**FPCR Environment and Design Ltd**

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## 1.0 NON-TECHINICAL SUMMARY

- 1.1 FPCR Environmental & Design Ltd. were commissioned by Hallam Land Management to undertake an Extended Phase I Habitat Survey of land off Bicester Road, Bicester. The area of land is being proposed for a mixed residential and commercial development with associated green infrastructure.
- 1.2 This report presents the findings of a desk study exercise, extended Phase I habitat survey and hedgerow survey of the Site and provides an evaluation of value of the habitats recorded on-Site. where possible at this stage, the report also provides a provisional impact of proposals on the designated sites and the habitat present.
- 1.3 The Site comprises primarily arable farmland with associated field margins, and a number of fields of species poor semi-improved and improved grassland which have been subject to grazing or silage production. Other habitats include areas of dense and scattered scrub, and a small area of bare ground with rubble piles. Hedgerows form the predominant boundary habitat and support frequent mature standards. A watercourse flows eastwards through the southern extent of the Site. Two dry ditches are present in the north, and east of the site, and a single pond is present.
- 1.4 Four statutory sites are present within 2km of the site boundary. These include three Sites of Special Scientific Interest (SSSI)s noted for geological interest and one Local Nature Reserve (LNR) noted for its notable species, namely great crested newt. These sites are not expected to be impacted by the development due to their distance from the site.
- 1.5 Under current proposals, the majority of the arable habitat would be lost, but scrub, grassland and watercourses retained. Proposals include significant green infrastructure (GI) around and through the Site, including formal and semi-natural habitats.
- 1.6 The habitats within the Site have the potential to support a number of protected and/or notable species and as such further protected species surveys have been recommended to form the baseline for the assessment of ecological impacts associated with proposals. These surveys comprise:
  - Bat surveys (including bat activity surveys, ground level and aerial assessment of suitable trees affected by proposals;
  - Breeding bird surveys;
  - Over-wintering bird surveys;
  - Targeted reptile surveys;
  - Great crested newt surveys; and
  - Badger survey

## 2.0 INTRODUCTION

- 2.1 FPCR Environmental & Design Ltd. were commissioned by Hallam Land Management to undertake an Extended Phase I Habitat Survey of land off Bicester Road, Bicester. The area of land is being proposed for a mixed residential and commercial development with associated green infrastructure.

### Site Context

- 2.2 The land for the proposed development (hereafter referred to as the Site) is situated north of Bicester town (centred on grid ref: SP569248) and surrounded to the north, east and west by agricultural land.
- 2.3 The Site comprises primarily arable farmland with associated field margins, and a number of fields of semi-improved and improved grassland which have been subject to grazing or silage production. Other habitats include areas of dense and scattered scrub, and a small area of bare ground with rubble piles. Hedgerows form the predominant boundary habitat and support frequent mature standards. A watercourse flows eastwards through the southern extent of the Site. Two dry ditches are present in the north, and east of the site, and a single pond is present.
- 2.4 Habitats within the wider locality include the town of Bicester to the south, and farmland habitat surrounding most of the site. A new housing development lies adjacent to the site boundary in the northeast.

### Objectives

- 2.5 FPCR were commissioned to undertake an Extended Phase I habitat survey (including a hedgerow survey) and desk study in relation to the development proposals.
- 2.6 The aim of the desk study was to place the Site within an 'ecological context' by identifying existing ecological designations (including statutory and non-statutory sites) and pre-existing information relating protected and notable species within the Site and surrounding landscape.
- 2.7 The report presents the results of the Extended Phase I habitat survey, hedgerow survey and desk study and provides an evaluation of the habitats recorded on site and were possible a provisional impact of the proposals on the designated sites and habitats present. Information on protected and notable species gathered during the survey has been used to inform the scope for further, more detailed surveys at the Site with detailed survey appended to the ecology and nature conservation chapter of the Environmental Statement (ES).

## 3.0 METHODOLOGY

### Desk Study

- 3.1 The Multi Agency Geographic Information for the Countryside (MAGIC) website has been reviewed for the presence of any statutory designated sites of international (Special Conservation Area (SAC), Special Protection (SPA) or Ramsar Sites)), national/regional (Site of Special Scientific, (SSSI)) or local nature conservation importance (Local Nature Reserves (LNR)) within 5km, 2km and 1km of the Site, respectively.

- 3.2 Consultation was also undertaken in July 2020 with Thames Valley Environmental Records Centre (TVERC) for the presence of non-statutory designated sites of nature conservation importance (Local Wildlife Sites (LWS), potential Local Wildlife Sites (pLWS) or Ecosites and statutory protected / notable species for within 1km of the Site.
- 3.3 Further inspection, using colour 1:25,000 Ordnance Survey (OS) maps and aerial photographs from Bing (<http://www.bing.com/maps>) was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider landscape.

### **Extended Phase I Habitat Survey**

- 3.4 The Site was initially surveyed in August 2020, with additional surveys in January 2021 and March 2021, based on the Phase I survey methodology as described in Handbook for Phase I Habitat Survey (JNCC, 2010<sup>1</sup>). This involved a systematic walkover of the site to classify the broad habitat types and to identify any Habitats of Principal Importance (HPS) as listed within the NERC Act 2006. Species lists were compiled for each habitat type present and their relative abundances recorded using the DAFOR scale. Nomenclature used within the report follows Stace (2010<sup>2</sup>).
- 3.5 Hedgerows were surveyed individually using the Hedgerow Evaluation and Grading System (HEGS) (Clements and Toft, 1993<sup>3</sup>) to enable identification and evaluation of hedgerows of nature conservation importance within the site. Hedgerows were graded on a scale of 1-4, within which grades 1 and 2 are generally considered to be of nature conservation priority:
- 1= high to very high value
  - 2 = moderately high to high value
  - 3 = moderate value
  - 4 = low value.
- 3.6 Hedgerows were also considered against the Hedgerow Regulations 1997<sup>4</sup> Wildlife and Landscape criteria, to identify any hedgerows, which would be classified as "important" for nature conservation under this part of the act. Under this methodology, hedgerows are considered according to the average number of woody species per 100m of hedgerow. Additional features which enhance hedgerows, when found in association with the hedge, such as mature trees, ditches and hedge banks are also considered.
- 3.7 It should be noted that hedgerows may also qualify as Important under the Archaeological criteria of this Act, which is beyond the scope of this assessment.

### **Bats**

- 3.8 Tree assessments were undertaken from ground level, with the aid of a torch and binoculars (where appropriate). These surveys were undertaken on 23<sup>rd</sup> March 2021 by a licensed bat ecologist from FPCR. During the survey Potential Roosting Features (PRF) for bats such as the

<sup>1</sup> JNCC, (2010) Handbook for Phase 1 habitat survey - a technique for environmental audit

<sup>2</sup> Stace, C.A. (2010) New Flora of the British Isles, 3rd edition, Oxford

<sup>3</sup> Clements, D. & Toft, R. (1992). Hedgerow Evaluation and Grading System (HEGS) – a methodology for the ecological survey, evaluation and grading of hedgerows. Countryside Planning and Management

<sup>4</sup> The Conservation of Habitats and Species Regulations 2017 – Statutory Instrument 1997 No. 1012. [Online]. London: HMSO. Available at: <http://www.legislation.gov.uk/ukSI/2017/1012/contents/mademade> [Accessed 01/03/2021].

following were sought (Based on P16, British Standard 8596:2015 Surveying for bats in trees and woodland, October 2015):

- 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 branches (horizontal and vertical).
- Partially detached, loose or bark plates.
- 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.

3.9 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 enhance or reduce the potential value.

3.10 Trees were classified into general bat roost potential groups based upon the presence of these features. Table 1 (below) 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 *Bat Surveys for Professional Ecologists: Good Practice Guidelines*<sup>5</sup>.

3.11 Although the British Standard 8596:2015 document groups trees with moderate and high potential, these have been separated below (as per Table 4.1 in *The Bat Conservation Trust Guidelines*) to allow more specific survey criteria to be applied.

**Table 1: Classification and Survey Requirements for Bats in Trees**

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
High Potential	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	Aerial assessment by roped access bat workers (if appropriate) and/or nocturnal survey during appropriate period (May to August).

<sup>5</sup> Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)*. The Bat Conservation Trust, London.

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
	size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat. Examples include (but are not limited to); woodpecker holes, larger cavities, hollow trunks, hazard beams, etc.	<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	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). Examples include (but are not limited to); woodpecker holes, rot cavities, branch socket cavities, etc.	<p>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 precautionary working method statement may still be appropriate.</p> <p>If a roost site/s is confirmed a licence from Natural England will be required.</p>
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.

### Great Crested Newts

- 3.12 Any waterbodies found within or close to the site were noted and described along with any suitability to support GCN. Aerial assessments were used to identify any further ponds within 500m. Pond locations can be found in Figure 5: Pond Locations.



- 3.13 The assessment to determine the suitability of each pond for GCN was made using the HSI methodology, as developed by Oldham et al (2000)<sup>6</sup>. The HSI provides a measure of the likely suitability of a waterbody for supporting newts. This methodology assesses ponds against ten pre-determined criteria, producing a score that indicates suitability for GCN occupation. Generally, waterbodies with a higher score are more likely to support GCN than those with a lower score and there is a positive correlation between HSI scores and waterbodies with newts recorded. Ten separate attributes are assessed for each pond:
- 3.14 A score is assigned according to the most appropriate criteria level set within each attribute and total score calculated of between 0 and 1. Pond suitability is then determined according to the following scale:
- 3.15 A score is assigned according to the most appropriate criteria level set within each attribute and total score calculated of between 0 and 1. Pond suitability is then determined according to the following scale:

**Table 2: HSI Scale**

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

**Additional fauna**

- 3.16 Any sightings, evidence of or suitable habitats for other protected species, including wintering and breeding birds, reptiles and badgers, were recorded during the site visit.

**4.0 RESULTS****Desk Study****Designated Sites**

- 4.1 The locations of all statutory and non-statutory designated sites within 2km and 1km of the Site respectively are shown on Figure 1: Designated Sites.

**Statutory Designated Sites**

- 4.2 No statutory designated sites of international nature conservation importance (SPA, SAC and RAMSAR) are located within 5km of the Site.
- 4.3 Four statutory designated sites of national/regional importance are located within 2km of the Site. These sites and reasons for their designation are described in Table 3.

<sup>6</sup> Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). *Evaluating the Suitability of Habitat for the GCN (Triturus cristatus)*. Herpetological Journal 10 (4), 143-155.

**Table 3: Statutory Designated Sites within 2km of the Site.**

Name	Designation	Site Description	Relative Location to Site
Stratton Audley Quarries	SSSI	A large part of the Jurassic White Limestone, as well as the entire Forest Marble and the Lower Cornbrash have been exposed by quarrying at Stratton Audley. The quarry is an important location for studying facies changes which occur in the upper part of the White Limestone and in the Forest Marble.	2000m east
Ardley Trackways	SSSI	A nationally important site containing a rock horizon close to the top of the Shipton Member of the White Limestone Formation which, in the immediate vicinity of the SSSI, has revealed the presence of an array of fossilised trackways.	1670m west
Ardley Cutting and Quarries	SSSI	It is of geological interest for its exposures of Jurassic rocks and has biological interest associated with limestone grassland, scrub, ancient woodland and wetland habitats.	400m north
Bure Park	LNR	Habitats include grass meadow, young broad-leaved woodland, hedges, and scrub. A small river (the Bure) runs through the site, feeding a small pond which is home to great crested newts. A balancing pond at one end of the Reserve is fed by run-off from the area.	c20m to the immediate east beyond the A4095

### Non-statutory Designated Sites

- 4.4 Four non-statutory designated sites are located within 1km of the Site. These sites and reasons for their designation are described in Table 4.

**Table 4: Non-statutory Designated Sites within 1km of the Site.**

Name	Designation	Site Description	Relative Location to Site
Skimmingdish Lane Balancing Pond	Cherwell District Wildlife Site	Unimproved grassland (with remnant lowland meadow) and remnant lowland fen.	965m east
Bicester Airfield	LWS (Local Wildlife Site)	Lowland calcareous grassland, open mosaic habitats on previous developed land.	1000m east
Tusmore and Shelswell Park	CTA (Conservation Target Area)	This area encompasses the parks and woodlands at Tusmore and Shelswell Parks and a number of ancient woodlands near Stoke Lyne.	

Name	Designation	Site Description	Relative Location to Site
Skimmingdish Lane Balancing Pond	Cherwell District Wildlife Site	Unimproved grassland (with remnant lowland meadow) and remnant lowland fen.	965m east
Ardley and Heyford	CTA	The CTA supports about 50% of the calcareous grassland in Cherwell District and shows considerable species interest, in particular great crested newts, birds and butterflies. The area also has a lot of geological interest with its exposures of Jurassic rocks and pre-historic trackways.	

### Protected / Notable Species

- 4.5 Records of protected and notable species identified within a 1km radius of the Site are summarised below and illustrated on Figure 1.

Table 5: Protected and Notable Species within 1km

Common Name	Scientific Name	Number of records within 1km	Location of Closest Record
<b>Bats</b>			
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	3	500m East
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	1	890m South East
Brown long-eared bat	<i>Plecotus auritus</i>	2	500m East
Noctule	<i>Nyctalus noctula</i>	1	40m South East
<b>Herptiles</b>			
Common lizard	<i>Zootoca vivipara</i>	2	300m South
Smooth newt	<i>Lissotriton vulgaris</i>	1	300m South
Great crested newt		2	500m South
Grass snake	<i>Natrix helvetica</i>	1	755m West
Common frog	<i>Rana temporaria</i>	2	300m South
<b>Terrestrial Mammals</b>			
Brown Hare	<i>Lepus europaeus</i>	1	400m North West
Hedgehog	<i>Erinaceus europaeus</i>	10	40m South
Badger	<i>Meles meles</i>	6	On Site
<b>Birds</b>			
Bullfinch	<i>Pyrrhula pyrrhula</i>	1	1000m East
House sparrow	<i>Passer domesticus</i>	1	1000m East
Kestrel	<i>Falco tinnunculus</i>	5	160m East
Song thrush	<i>Turdus philomenus</i>	1	970m East
Starling	<i>Sturnus vulgaris</i>	1	1000m East
Swift	<i>Apus apus</i>	160	119m South East
Tawny Owl	<i>Strix aluco</i>	2	350m North West

## Field Survey – Habitats / Flora

### Site Description and Context

- 4.6 All habitats recorded within the Site and Target Notes (TN) referenced are shown in Figure 2. A botanical species list is provided in Appendix A.

### Broad leaved woodland

- 4.7 A small area of semi-natural broadleaved woodland was noted adjacent to the north of Bucknell Road extending from D3. The boundary included mature crack willow *Salix fragilis*, ash *Fraxinus excelsior*, silver birch *Betula pendula* and aspen *Populus tremula*, with associated scrub including hawthorn *Crataegus monogyna*, hazel *Corylus avellana* and elder *Sambucus nigra*.

### Trees

- 4.8 Individual trees were largely present along linear features, dominated by pedunculate oak *Quercus robur* and ash *Fraxinus excelsior*. An outgrown hedgerow which now formed an ash dominated tree line extended from the northern boundary along D3. Similar species were also noted towards the old road near Lord's Farm.

### Scrub

- 4.9 Dense scrub was noted alongside D1 south of Bucknell Road, with hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, elder *Sambucus nigra* and hazel *Corylus avellana* with occasional mature crack willow *Salix fragilis* and ash. Ground cover was limited with widespread bramble *Rubus fruticosus*. Dense scrub was also present around P10
- 4.10 Scattered scrub, predominantly bramble was present across the site, including along ditches .

### Arable

- 4.11 Arable, was the dominant habitat type recorded within the Site. The majority of the fields were sown with Triticale x *Triticosecale* sp., being harvested at the time of survey. Two fields within the Site's extent have been sown with maize *Zea mays*.
- 4.12 The margins are generally narrow and of limited diversity and predominated by broad-leaved grasses with the herb interest confined to nutrient-demanding forbs and tall ruderals. False oat-grass *Arrhenatherum elatius* and Yorkshire-fog *Holcus lanatus* form the most abundant species with frequent cock's-foot *Dactylis glomerata* and perennial rye-grass *Lolium perenne* typically occasional to locally dominant. Herbs present include broad-leaved dock *Rumex obtusifolius*, common ragwort *Senecio jacobaea*, common nettle *Urtica dioica*, goat's-rue *Galega officinalis*, hogweed *Heracleum sphondylium*, dandelion *Taraxacum agg.* and cow parsley *Anthriscus sylvestris*.

### Improved Grassland

- 4.13 Improved grassland was the next most frequent habitat type within the Site, occurring as fields used for silage production and cattle grazing. At the time of survey in 2021, some of these fields were in the process of being cut.

- 4.14 These areas were all of a similar nature with very little floristic diversity. The dominant species across these fields was perennial ryegrass. Occasional species such as cock's-foot and Yorkshire-fog occurred alongside rare species such as meadow foxtail *Alopecurus pratensis*. Herbs were confined to tall ruderals and common forbs such as white clover, creeping thistle *Cirsium arvense*, dandelion and ribwort plantain *Plantago lanceolata*.

#### Poor Semi-improved grassland

- 4.15 Six poor semi-improved grassland fields occurred which were largely subject to cattle grazing, similar to the above but with a range of grasses including common and creeping bents, *Agrostis capillaris* and *A. tenuis* as well as common forbs.
- 4.16 A linear species poor semi-improved compartment occurred to the north of the D2, comprising a more tussocky sward with abundant cock's-foot *Dactylis glomerata* and frequent red fescue, occasional creeping bent *Agrostis stolonifera* and soft brome *Bromus hordaceus*. In association with the watercourse that bordered this compartment to its south (D2), areas of locally abundant soft rush *Juncus effusus* and hard rush *J. inflexus* were present forming tussocks across the grassland. Occasional species included tufted hair-grass *Deschampsia cespitosa*, creeping bent, and wild angelica *Angelica sylvestris* with redshank present *Persicaria maculosa* as rare species. The area is considered likely to be seasonally damp

#### Running Water

- 4.17 A single water course D1, a tributary of the River Bure supported running water, flowing east through the Site, although levels fluctuated, becoming drier in the summer periods. The watercourse flows east out of the Site near Lord's Farm, below the road and into Bure Park LNR. It comprised a steep sided channel, approximately 1.5m wide and 1m deep, with vegetated banksides and a largely mud base. Goat willow *Salix caprea* and blackthorn *Prunus spinosa* scrub and semi-mature and mature trees including crack willow *S. fragilis* and ash *Fraxinus excelsior* were scattered along the bank tops, with ruderal species similar to field margins also present. Species recorded included Fool's watercress *Apium nodiflorum*, a bur reed *Sparganium*, water figwort *Scrophularia aquatica* and marsh dock *Rumex palustre* and in places the stream was largely choked with vegetation. Poaching was evident in some places as a result of cattle activity.

#### Ditches

- 4.18 Two ditches were also extant, also tributaries of the River Bure. D2 was located in the north of the site, bisecting it east-west. Around 1m width at the base, it had steeply sloping banks also about 1m in height. It appeared to support limited standing water at the time of surveys and was seasonal in nature. Bank tops and the main channel were largely overgrown with ruderal and tall herbs, including frequent common nettle and great willowherb, with occasional meadow sweet *Filipendula ulmaria*, and brooklime *Veronica beccabunga*. Canary reed grass *Phalaris canadensis* was locally abundant. Scattered scrub was present along its length, except for its eastern extent, with goat willow and dog rose *Rosa canina* dominant.
- 4.19 D3 extended south from the northern to meet D1 at the eastern boundary. Another seasonal ditch, it was largely dry during surveys and was heavily overshadowed by the adjoining hedgerow

90m on its eastern bank. To its west was a wide margin (1 – 2m) of ruderal and tall herbs, similar to that seen elsewhere and dominated by nettle in places.

### Standing Water

- 4.20 One pond (P10) was identified within the boundary of the Site. The pond was located on the edge of a two field compartments in the north-west of the site within an area of scrub which was mainly goat willow and bramble. The pond was approximately 15m by 10m and shaded by the scrub. There was limited marginal vegetation which was primarily soft rush.

### Hedgerows

- 4.21 The network of hedges bounding the Site and separating the individual fields is formed by a total of 41 hedgerows with a combined length of over 10km (refer to Figure 2 for locations and reference numbers).
- 4.22 Three of the hedgerows were identified as being species-rich (i.e. those that contain five or more native woody species, on average, along a 30m length. Hawthorn formed the most abundant species within these hedgerows with elder, dogrose, field maple *Acer campestre*, hazel *Corylus avellana*, dogwood *Cornus sanguinea*, spindle *Euonymus europaeus* and Midland hawthorn *Crataegus laevigata* as occasional-to-rare associates. Mature standards occur frequently within the hedgerows. Pedunculate oak and ash formed the predominant species with small numbers of crack-willow, and crab apple.
- 4.23 Typical of the arable hedgerows, the associated ground flora was largely ruderal in its composition comprising tall ruderals and broad-leaved grasses, such false oat-grass, cock's-foot common couch, common nettle and hogweed, with patches of bramble *Rubus fruticosus agg.* Few woodland plants were present with wood avens *Geum urbanum* and herb-Robert *Geranium robertianum* the only species noted.
- 4.24 A total of three hedgerows (with a combined length of 850m) were assessed as 'Important' under the Wildlife and Landscape Criteria of the Hedgerow Regulations.
- 4.25 Outgrown and defunct hedgerows also occurred. This included H2 – H4 which had been left unmanaged along the northern edge of the rail line and now largely formed a scrub edge. H10 which was also incorporated into the woodland bordering the property and now was a line of trees. To the north of the site H37 and H46 were outgrown hedgerows.

**Table 2: Summary of Important Hedgerows and reasons for qualification.**

Ref	Canopy Sp.	Height / Width (m)	Length (m)	Sp. per Av. 30m	Notes	HEGS Grade	Import. HR <sup>1</sup>
H1	<i>Fe, Up, Fe, Ap, Qu, Fe, Ps, Sn</i>	1.5-2 / 1.5-2	450	5.6	<10% gaps, at least one standard tree/50m	3+	No
H2	Defunct hedge						
H3	Defunct hedge						
H4	Defunct hedge						
H5	Number not used						
H6	<i>Cm, Ps, Ac, Fe</i>	2-4 / 2-3	350	2.3	<10% gaps, at least one standard tree/50m	2	No

Ref	Canopy Sp.	Height / Width (m)	Length (m)	Sp. per Av. 30m	Notes	HEGS Grade	Import. HR <sup>1</sup>
H7	<i>Ps, Cm, Sn, Ms, Ss, Fe, Ca</i>	>4 / 2-3	290	3.3	<10% gaps, at least one standard tree/50m	2	No
H8	<i>Up, Ac, Ps, Sn</i>	2-4 / 1-2	300	3.3	No gaps	2	No
H9	<i>Fe, Up, Fe, Ap, Qu, Fe, Ps, Sn</i>	1.5-2 / 1.5-2	450	5.6	<10% gaps, at least one standard tree/50m	3+	No
H10	Line of Trees						
H11	<i>Ap, Fe, Ac, Cf, Sn, Cm, Ps, Re, Lv, Up, Ma, Ca, Ss</i>	1.5-2 / 1.5-2	305	5	No gaps	-1	No
H12	<i>Cm, Rf, Sn, Fe, Ps, Ma, Up</i>	1.5-2 / 1.5-2	235	4.5	<10% gaps, at least one standard tree/50m , ditch	2+	No
H13	<i>Ca, Up, Cm, Rs, Ac, Sn, Fe, Ms, Re, Cp</i>	>4 / 2-3	260	3	Hedge bank	-2	No
H14	<i>Fe, Up, Cm, Ac, Sn, Re, Ps</i>	>4 / 1.5-2	210	4	<10% gaps, at least one standard tree/50m , hedge bank	3	No
H15	<i>Up, Ps, Cm, Rf, Sn, Ac</i>	1.5-2 / 1.5-2	240	2.5	No gaps, hedge bank, ditch	3	No
H16	<i>Rf, Cm, Sn, Ps, Ms, Ac, Re, Fe, Rc, Ca, Up, Lv</i>	>4 / 2-3	220	4.5	No gaps, at least 1 standard tree/50m, hedge bank	+3	No
H17	<i>Up, Cm, Rf, Sv</i>	>4 / 2-3	110	3	n/a	3	No
H18	<i>Up, Hh, Ps, Cm, Sn, Ac</i>	>4 / >3	180	3.5	<10% gaps, at least one standard tree/50m	2+	No
H19	<i>Up, Rf, Ps, Cm, Sn, Ac</i>	>4 / >3	200	3.5	<10% gaps, at least one standard tree/50m	2+	No
H20	<i>Cm, Ac, Ps, Sn, Fe, Re, Us</i>	2-4 / 2-3	450	3	<10% gaps, at least one standard tree/50m	-2	No
H21	<i>Ac, Cm, Up, Sn, Fm, Fe, Ps</i>	2-4 / 1.5-2	190	4	<10% gaps, at least one standard tree/50m	3	No
H22	<i>Re, Rf, Cm, Up, Sn, Rs, Rc, Fe, Ca</i>	2-4 / 1.5-2	220	3.3	<10% gaps, at least one standard tree/50m	2	No
H23	<i>Cm, Sn, Ps, Ma, Cp</i>	2-4 / 1.5-2	240	4	At least one standard tree/50m	-3	No
H24	<i>Cm, Ps, Sn, Ac, Fe, Ms,</i>	2-4 / 2-3	140	5	<10% gaps, at least one standard tree/50m	-1	Yes
H25	<i>Cm, Sn, Ps, Fe, Ee</i>	2-4 / 1.5 – 2	100	3	<10% gaps, ditch	-2	No

Ref	Canopy Sp.	Height / Width (m)	Length (m)	Sp. per Av. 30m	Notes	HEGS Grade	Import. HR <sup>1</sup>
H26	<i>Cm, Sn, Ac, Ee, Up, Ca</i>	2-4 / 2-3	170	4.5	No gaps, hedge bank, ditch	2	No
H27	<i>Ac, Up, Ap</i>	1.5-2 / 1-1.5	270	1.6	No gaps, hedge bank, ditch	-3	No
H28	<i>Cm, Ac</i>	2-4 / 1.5-2	300	1.3	<10% gaps, hedge bank	3+	No
H29	<i>Cm, Ac</i>	1-1.5 / 1-1.5	250	2	No gaps, hedge bank, ditch, unimproved verge	-2	Yes
H30	<i>Up, Cm, Ca</i>	1.5-2 / 1-1.5	300	1.6	Ditch	3	No
H31	<i>Ps, Up, Cm, Ac</i>	2-4 / 2-3	480	3	<10% gaps, hedge bank, ditch, unimproved verge	2	Yes
H32	<i>Cm, Ac, Ca</i>	2-4 / 2-3	250	2	<10% gaps, hedge bank, ditch	-2	No
H33	<i>Sf, Sn, Ac, Ap, Fe, Ic, Ag, Ps, Pa, Tb</i>	>4 / 2-3	525	4	<10% gaps, at least one standard tree/50m	1	No
H34	<i>Cm, Us, Sn, Ps, Fe, Ac, Lo, Ap</i>	2-4 / >3	165	4	<10% gaps, at least one standard tree/50m , hedge bank	-1	No
H35	<i>Ms, Ac, Ps, Sn, Cm</i>	2-4 / 2-3	115	2.5	n/a	3+	No
H36	<i>Ac, Cm, Ps, Ts</i>	>4 / 1.5-2	235	2	No gaps, at least one standard tree/50m	2+	Yes
H37	Defunct hedge						
H38	<i>Us, Rc, Fe, Cm</i>	2-4 / 1.5-2	465	2.7	<10% gaps, hedge bank, ditch	3+	No
H39	<i>Cm, Fe, Ac</i>	>4m / 2-3	240	1.3	No gaps, hedge bank	-2	No
H40	<i>Sn, Rc, Cm, Ps</i>	2-4 / 2-3	112	2	No gaps, hedge bank	3+	No
H41	<i>Us, Cm, Ps, Fe</i>	2-4 / 2-3	250	2.3	No gaps	-2	No
H42	<i>Ps, Sn, Us, Fe, Cm</i>	1.5-2 / 1.5-2	456	2.7	No gaps, hedge bank, ditch	3+	No
H43	<i>Us, Ca, Fe, Cm</i>	1.5-2 / 1.5-2	308	1.3	<10% gaps, hedge bank, ditch	-3	No
H44	<i>Us, Cm, Rc, Fe, Ac, Qu, Sn</i>	>4 / >3	449	3.7	No gaps, hedge bank, ditch	-1	No
H45	<i>Us, Cm, Rc, Fe, Ac, Qu</i>	>4 / >3	470	3.7	No gaps, hedge bank, ditch	-1	No
H46	Defunct hedge						

### Other Habitats

4.26 Additional habitats present within the Site of more limited occurrence included:

- Two small areas of tall ruderal herbs, predominated by common nettle, which appear to have established over former agricultural waste, or as a result of general abandonment.



- Small areas of scattered scrub, comprising bramble and hawthorn in drier locations largely associated with small areas of abandonment along boundary features and willow scrub associated with the wetland habitats; and
- Areas of hardstanding and tracks, comprising loose gravels with little associated botanical interest.

## Field Survey – Fauna

### Bats

The hedgerow network supported frequent tree standards, some of which provide potential roosting habitat for bats, as well as providing a network of foraging and commuting habitat, with the brook corridor passing through the southern extent of the site offering good foraging / commuting routes for bats across the Site and into the wider local landscape in particular. The woodland, wetland and rough grassland habitats both within and adjacent to Site, are likely to support invertebrates providing greater value as foraging resources to local bats than the majority of managed agricultural fields. Full details of the bat surveys, including activity surveys and ground based and aerial assessments of trees are provided in the bat report.

### Birds

- 4.28 The majority of the Site comprising arable and managed farmland was considered to offer potential breeding and overwintering habitat to an assemblage of traditional farmland bird species known to occur within the wider area including grey partridge, linnets, skylark, tree sparrow and yellowhammer. Habitat for a range of other notable species was also recorded with rough and damper grassland areas, woodland scrub and hedgerows providing a mix of habitats. Full details of breeding and wintering bird surveys are provided in the supporting bird reports<sup>89</sup>.

### Herpetofauna

#### Reptiles

- 4.29 The majority of the Site comprising arable and managed farmland sown with cereal crops and maize represents unsuitable habitat for reptile species. However, the grassland in the north of the site and marginal habitats associated with the watercourse and along the field ditches offer suitable habitat to grass snake. These areas of rough grassland in addition to an area of rubble

<sup>7</sup> Confidential Badger Report, NW Bicester, FPCR, November 2021

<sup>8</sup> Breeding Bird Survey, NW Bicester, FPCR; November 2021

<sup>9</sup> Wintering Bird Survey, NW Bicester, FPCR; November 2021

and the farm buildings and arable field margins of greater structural diversity also offer suitable habitat to lizard, and potentially slow worm. Details of the reptile surveys are provided in the reptile report.

#### Amphibians

- 4.30 Much of the site is of limited value to amphibians, including great crested newts, during their terrestrial phase, being managed farmland without significant opportunity for rest and shelter. Longer, damp grassland and marginal habitats provide some opportunities for sheltering and foraging, with hedgerow bases acting as movement corridors as well as providing shelter and foraging.
- 4.31 The survey identified one pond (P1) within the Site and examination of aerial photographs and the 1:25,000 OS map covering the local area identifies a further five waterbodies within 250m of the Site Boundary and a further eight waterbodies within 500m of the Site Boundary, which could provide suitable breeding habitat for amphibians. The locations of these are shown on Figure 3.
- 4.32 As part of the phase 1 survey the on-Site waterbodies and those located within 500m of the Site were assessable, were subject to assessment using the standard Habitat Suitability Index<sup>10</sup> (HSI) methodology to assess their suitability to support GCN. The result of this assessment is summarised in Table 4. The full results of the HSI assessment are provided within Appendix B.

**Table 4: Habitat Suitability Index (HSI) Assessment of on-Site Ponds**

Pond	HSI Score	Predicted Presence	HSI Category
P1	0.88	93%	Excellent
P2	0.82	93%	Excellent
P3	0.00	N/A	Dry
P4	0.00	N/A	Dry
P7	0.86	93%	Excellent
P8	0.82	93%	Excellent
P9	0.00	N/A	Dry
P10	0.73	79%	Good
P11	0.87	93%	Excellent
P12	0.79	79%	Good
P13	0.79	79%	Good
P16	0.94	93%	Excellent
P17	0.63	55%	Average

- 4.33 Six ponds were found to have a 'Excellent' score and three ponds were found to have a 'Good' score. All other ponds are dry. Detailed aquatic surveys were therefore recommended to

<sup>10</sup> Oldham, R.S., Keeble, J., Swan M.J.S. & Jeffcote, M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10(4), 143-155.

determine the presence/absence of great crested newts in ponds on or within 500m of the Site, full details which are provided in the supporting survey report<sup>11</sup>.

#### **Water Vole / Otter**

- 4.34 The watercourse running through the south of the site and offers some potential burrowing and commuting habitat for water vole however foraging opportunities are limited and water depth at the time of survey were not sufficient to support water vole. The watercourse in the north of the site is mostly undercover by vegetation and, in places, dry and therefore does not offer suitable habitat for water vole.
- 4.35 The on-site watercourses and pond do not provide suitable holt creation habitat for otter, however, could offer commuting routes through the site.

#### **Other Species**

- 4.36 Brown Hare *Lepus europaeus* was observed on two occasions within the arable fields. The Site comprising a mixed farmland environment, including areas with abundant cover such as the tall grassland margins and unmanaged areas of tussocky grassland, represents good habitat to the species.
- 4.37 No other species activity was recorded throughout the site visits.

## **5.0 DISCUSSION**

### **Designated Sites**

#### Statutory Designated Sites

- 5.1 Four statutory designated sites lie within 2km of the site boundary: three SSSI and one LNR. Two of the SSSI are notable for their geological interest while Ardley Cutting SSSI is of National importance for habitats associated with Jurassic limestone, such as neutral grassland and scrubland. The closest statutory site is LNR which is designated for its great crested newt population and grass meadow habitat.
- 5.2 Sites designated as a SSSI come under the legal framework provided by the Wildlife and Countryside Act 1981, with further provision included in the Countryside and Rights of Way Act 2000. Within this framework, all Local Planning Authorities are required to protect SSSI sites within their development plans and to consult the Natural England about any planning applications that may impact upon a site.
- 5.3 Further protection to SSSIs is provided within the National Planning Policy Framework which states that:

*“Proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site’s notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the*

<sup>11</sup> Great crested newt Surveys; NW Bicester; November 2021; FPCR

*features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest.”*

- 5.4 Locations of the SSSI in relation to the site are such that impacts would not be anticipated during construction. The Bure LNR lies downstream of the Site and precautions are required to ensure that the LNR is not affected during construction through contamination, pollution incidents, sedimentation or changes to the hydrological regime. It is recommended a Construction and Environmental Management Plan (CEMP) is provided to fully protect these sites from damage.
- 5.5 Both Ardley Cutting and Quarry and LNR are open to the public and the provision of significant GI on site will reduce the extent to which these sites are affected by increases in recreation as a result of the development and appropriate measures undertaken if impacts were to be expected.

#### Non-statutory Designated Sites

- 5.6 No non-statutory designated sites occur within the Site; however two Local Wildlife Sites (LWS) and two Conservation Target Areas (CTA) are located within 1km of the site.
- 5.7 It is unlikely that the development will have any significant impact upon these sites as they lie 950m away from the site boundary and are already in developed areas and are therefore unlikely to suffer any negative impacts from the development.

#### **Habitats**

- 5.8 The vast majority of the Site is formed by farmland of negligible nature conservation value and loss is not significant in botanical terms. Areas of damper species poor grassland and standing water are of low value due to their small extent and/or limited botanical interest. However, habitats of greater nature conservation value within the site include:
- Hedgerows - the site supports a largely intact native hedgerow resource. Native species dominated are listed as a HPI and three hedgerows were identified as ‘important’ in accordance with the Wildlife and Landscape criteria of the Hedgerow Regulations 1997.
  - Mature Trees – the site supports a good resource of mature trees, with pedunculate oak and ash occurring in association with the boundary hedgerows
- 5.9 It is recommended that hedgerows and mature trees are retained within the site wherever possible to maintain their inherent value and ensure movement corridors throughout, with hedgerows created to mitigate any losses and enhance linkages. In order to ensure the integrity of hedgerows and trees is maintained during works these features should be retained with appropriate buffer zones, taking account of any root protection areas.
- 5.10 Habitats of greater value including the watercourses and associated grassland should be incorporated into the GI, with appropriate buffers and new habitats alongside to provide habitat for a range of species using the site and with the potential to use it if present nearby. The creation of range of habitats, including areas of permanent and ephemeral standing water, swamp/reedbeds and marshy and dry species-rich neutral grassland, would complement the existing wetland habitats present across the site which will add to the biodiversity of the area as a whole.

**Fauna**

- 5.11 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 and Species Regulations 2010. Some species, for example badgers, also have their own protective legislation (Protection of Badger 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.
- 5.12 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 for example.
- 5.13 In addition to protected species, there are those that are otherwise of conservation merit, such as species of principal importance for the purpose of conserving biodiversity under the Natural Environment and Rural Communities (NERC) Act 2006. These are recognised in the NPPF which advises that when determining planning applications, LPA's should aim to conserve and enhance biodiversity by applying a set of principles including:
- *If significant harm resulting from a development cannot be avoided....., adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
  - *Development proposals where the primary objective is to conserve or enhance biodiversity should be encouraged.*
- 5.14 The implications that various identified species or those that are thought reasonably likely to occur may have for developmental design and programming considerations are outlined below:

**Badger**

- 5.15 Badgers are protected by statute under the Protection of Badgers Act 1992. This legislation makes it an offense to wilfully kill, injure, take possess or cruelly ill-treat a badger, or intentionally or recklessly interfere with a sett. Work that disturbs badgers whilst occupying a sett is illegal without a licence; badgers may be disturbed by work near the sett even if there is no direct interference or damage to the sett.
- 5.16 The arable habitats forming the majority of the Site sown largely with maize crops offer seasonal foraging to badgers, whilst more optimal permanent foraging habitat is provided by in the form of the grassland and scrub habitats with the Site. Whilst farmland areas will largely be lost; the GI provides an opportunity to create new areas of permanent foraging and sett creation habitat. Any confirmed setts should be retained with appropriate buffering wherever possible within semi-natura areas, with connectivity to other suitable habitat. Full details of the badger survey are provided in the supporting report.

**Bats**

- 5.17 The presence of bats on Site is a material consideration in the planning process, as both bats and their roosts are afforded protection under the Conservation of Species and Habitats

Regulations 2010 (as amended) and the Wildlife and Countryside Act 1981 (as amended). In broad terms these pieces of legislation jointly mean that the animals themselves are protected against killing, injury, taking (capture) and disturbance. In addition, their places of shelter are protected against damage, destruction and obstruction. Several species of bat (including soprano pipistrelle, common pipistrelle and brown long-eared bat were previously recorded within 1km and are likely to be using the habitats within the Site), are listed as SPI's.

- 5.18 The site provides suitable foraging and commuting habitat, particularly along linear features, which should be retained wherever possible. Any losses should ensure that fragmentation or isolation of suitable habitats, including roosts does not occur. Breaches to movement corridors should incorporate mitigation such as hop-overs to enable continued movement.
- 5.19 Bat activity surveys (fixed point static and walked transect surveys) were undertaken to determine the current usage of the Site by commuting and/or foraging bats, to help determine which areas or habitats of the Site are of most importance and will consequently inform any necessary mitigation or habitat enhancement measures. The level of survey effort based on the current good practice guidelines (Bat Conservation Trust, 2016) and the Site's moderate habitat suitability for bats would entail one survey visit per month (April to October).
- 5.20 A number of trees provide potential as bat roosts and detailed ground level assessment undertaken, with aerial assessments on several trees anticipated as being lost to eth development. Three bat species were recorded as part of the desk in the local area. Full details of all these surveys can be found in the bat report.

### **Birds**

- 5.21 All birds are protected while nesting by the WCA 1981 (as amended). Specially protected Schedule-1 bird species are afforded additional protection from disturbance while nesting.
- 5.22 The site provides a range of habitats suitable for birds, including farmland specialists and more generalist species. GI should seek to provide a diverse mosaic of habitats and native species which will provide a greater area of new foraging and breeding opportunities for some species, although unlikely to provide significant habitat for ground nesting and farmland species. A number of locally and nationally notable species are indicated as being in the area as part of the desk study, including those which could utilise habitats on site.
- 5.23 In order to establish the full value of the site to birds and to determine the extent of the impacts arising from the proposals, a series of breeding and wintering bird surveys were undertaken during the months April to June and November to February respectively. Full details of these surveys can be found within the breeding and wintering bird reports.
- 5.24 All birds are protected whilst on the nest and all vegetation should be removed outside of the nesting season where possible or checked by an experienced ecologist prior to removal.

### **Herpetofauna**

#### Reptiles

- 5.25 All common reptile species, including grass snake, slow worm, common lizard and adder are partially protected under the Wildlife and Countryside Act 1981. In summary this legislation protects the species from intentional killing, injury or sale, offering for sale, or possessing,

transporting or publishing advertisements for the purposes of sale. All common reptile species are also listed as a SPI.

- 5.26 The damper poor semi-improved grassland habitats within the Site, in addition to areas of rubble and hedgerows provided some suitable habitat for species such as grass snake and common lizard. These habitats offer suitable foraging and shelter habitat while hedgerows provided suitable commuting habitat throughout the site and a suite of reptile surveys were undertaken. Desk study indicates the presence of common lizard and grass snake in the local area, although records are largely separated from the Site. Full details of these surveys can be found in the supporting report.

#### Amphibians

- 5.27 Great crested newts are afforded legal protection by Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and under the Conservation of Habitats and Species Regulations 2010 (as amended). This legislation applies to all life stages of great crested newts.
- 5.28 The study identified one waterbody within the Site and a further sixteen waterbodies within 500m of the Site. 500m is considered to be the upper limit of migratory range of great crested newts. .
- 5.28 Assessment of on-Site and off-Site ponds located within 500m using the HSI methodology found that six ponds had excellent suitability for great crested newt, while a further three had good suitability. These ponds were relatively smaller, permanent, and supported well developed marginal and/or emergent vegetation. One waterbody had average suitability and the remaining ponds were dry.
- 5.29 It is recommended that proposals seek to retain the onsite pond wherever possible within the GI to provide potential habitat for great crested newts and amphibians generally. Retention of linear features would maintain habitat connectivity around the site, as well as foraging and sheltering habitat. GI proposals have the opportunity to provide habitats of greater value to amphibians than at present, with a more diverse range of terrestrial features, including more tussocky and damp grassland areas, scrub and woodland with log piles and hibernacula as well as potential breeding habitat within small wildlife ponds. New swales could act as stepping stone ponds helping to link suitable habitats and where feasible within their context and function, attenuation features should be designed to benefit amphibians with damp bases, marshy grassland and log piles.
- 5.30 Detailed great crested newt surveys have been undertaken and full results are provided in the supporting Great crested newt report. Great crested newts are known to be present in Bure Park LNR, although this population is considered to be separated from the Site by barriers to dispersal with populations also known in and around Bucknell to the west.

#### **Water Vole / Otter**

- 5.31 Water voles and their breeding and resting habitats receive protection under the Wildlife and Countryside Act, 1981 (as amended). Water voles are also listed as SPI species. Otters and their resting places are afforded protection under the Conservation of the Species and Habitats Regulations 2010 and the Wildlife and Countryside Act 1981. In broad terms these pieces of legislation jointly mean that the animals themselves are protected against killing, injury, taking (capture) and disturbance. In addition, their places of shelter are protected against damage, destruction and obstruction.

- 5.32 No evidence of water vole was noted and habitat on site was limited with no watercourse considered to provide suitable permanent habitat for occupation. No evidence of otter was noted, although watercourses could provide potential commuting habitat for any in the wider area. Desk study did not indicate the presence of either species and no further survey recommended.

#### Other Species

- 5.33 Brown hare, a SPI, was recorded incidentally during the survey and the Site comprising a mixed farmland environment, represents good habitats to the species. Proposals will result in the loss of areas of suitable habitat to the species as each Phase comes forward and prior to the restoration, however given the wider availability of similar habitats surrounding the Site, it is considered unlikely that proposals would result in any adverse impacts to the local population. Varied grasslands within GI, near to boundaries with the farmland in the local area would continue to provide areas suitable habitat at the Site



**APPENDIX A: BOTANICAL SPECIES LIST**

Scientific Name	Common name
<i>Acer campestre</i>	Field Maple
<i>Acer pseudoplatanus</i>	Sycamore
<i>Achillea millefolium</i>	Yarrow
<i>Aesculus hippocastanum</i>	Horse-chestnut
<i>Agrostis capillaris</i>	Common Bent
<i>Agrostis stolonifera</i>	Creeping Bent
<i>Alnus glutinosa</i>	Alder
<i>Anagallis arvensis</i>	Scarlet Pimpernel
<i>Anisantha tectorum</i>	Drooping Brome
<i>Anthriscus sylvestris</i>	Cow Parsley
<i>Apium nodiflorum</i>	Fool's Water-cress
<i>Arctium minus</i>	Lesser Burdock
<i>Arrhenatherum elatius</i>	False Oat-grass
<i>Artemisia vulgaris</i>	Mugwort
<i>Avena sativa</i>	Oat
<i>Bellis perennis</i>	Daisy
<i>Betula pendula</i>	Silver Birch
<i>Bromus arvensis</i>	Field Brome
<i>Bromus hordeaceus</i>	Soft-brome
<i>Bromus sterilis</i>	Sterile Brome
<i>Bryonia dioica</i>	White Bryony
<i>Caltha palustris</i>	Marsh Marigold
<i>Capsella bursa-pastoris</i>	Shepherd's-purse
<i>Cardamine sp</i>	A Bitter-cress
<i>Carex sp.</i>	a sedge
<i>Carpinus betulus</i>	Hornbeam
<i>Cerastium fontanum</i>	Common Mouse-ear
<i>Chenopodium album agg.</i>	Fat Hen
<i>Chenopodium polyspermum</i>	Many-seeded Goosefoot
<i>Cirsium arvense</i>	Creeping Thistle
<i>Cirsium vulgare</i>	Spear Thistle
<i>Convolvulus arvensis</i>	Field Bindweed
<i>Cornus sanguinea</i>	Dogwood
<i>Corylus avellana</i>	Hazel
<i>Crataegus laevigata</i>	Midland hawthorn
<i>Crataegus monogyna</i>	Hawthorn
<i>Cynosurus cristatus</i>	Crested Dog's-tail
<i>Dactylis glomerata</i>	Cock's-foot
<i>Deschampsia caespitosa</i>	Tufted Hair-grass
<i>Digitalis purpurea</i>	Foxglove
<i>Dipsacus fullonum</i>	Wild Teasel
<i>Epilobium hirsutum</i>	Great Willowherb
<i>Euonymus europaeus</i>	Spindle

Scientific Name	Common name
<i>Fagus sylvatica</i>	Beech
<i>Festuca rubra</i> agg.	Red Fescue
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Fraxinus excelsior</i>	Ash
<i>Galium aparine</i>	Cleavers
<i>Geranium molle</i>	Dove's-foot Crane's-bill
<i>Geranium robertianum</i>	Herb-robert
<i>Geum urbanum</i>	Herb Bennet
<i>Glechoma hederacea</i>	Ground-ivy
<i>Glyceria</i> sp.	a sweet-grass
<i>Hedera helix</i>	Ivy
<i>Helminthotheca echioides</i>	Bristly Oxtongue
<i>Heracleum sphondylium</i>	Hogweed
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Humulus lupulus</i>	Hop
<i>Hypericum perforatum</i>	Perforate St. John's-wort
<i>Ilex aquifolium</i>	Holly
<i>Knautia arvensis</i>	Field Scabious
<i>Lamium album</i>	White Dead-nettle
<i>Lamium purpureum</i>	Red Dead-nettle
<i>Lapsana communis</i>	Nipplewort
<i>Ligustrum ovalifolium</i>	Garden privet
<i>Ligustrum vulgare</i>	Wild Privet
<i>Linaria purpurea</i>	Purple Toadflax
<i>Lolium perenne</i>	Perennial Rye-grass
<i>Malus domestica</i>	Apple
<i>Malus sylvestris</i> sens.str.	Crab Apple
<i>Malva sylvestris</i>	Common Mallow
<i>Matricaria discoidea</i>	Pineapple Weed
<i>Mentha aquatica</i>	Water Mint
<i>Mercurialis perennis</i>	Dog's Mercury
<i>Phalaris arundinacea</i>	Reed Canary-grass
<i>Phleum pratense</i> sens.lat.	Timothy
<i>Phragmites australis</i>	Common Reed
<i>Plantago lanceolata</i>	Ribwort Plantain
<i>Plantago major</i>	Greater Plantain
<i>Poa pratensis</i> sens.lat.	Smooth Meadow-grass
<i>Poa trivialis</i>	Rough Meadow-grass
<i>Polygonum aviculare</i> sens.str.	Knotgrass
<i>Populus tremula</i>	Aspen
<i>Potamogeton natans</i>	Broad-leaved Pondweed
<i>Prunus avium</i>	Wild Cherry
<i>Prunus spinosa</i>	Blackthorn
<i>Pulicaria dysenterica</i>	Common Fleabane
<i>Quercus robur</i>	Pedunculate Oak

Scientific Name	Common name
<i>Ranunculus ficaria</i>	Lesser Celandine
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Rhamnus cathartica</i>	Buckthorn
<i>Rosa canina</i> agg.	Dog Rose
<i>Rubus fruticosus</i> agg.	Bramble
<i>Rumex obtusifolius</i>	Broad-leaved Dock
<i>Rumex palustris</i>	Marsh Dock
<i>Salix caprea</i>	Goat Willow
<i>Salix fragilis</i>	Crack Willow
<i>Sambucus nigra</i>	Elder
<i>Senecio jacobaea</i>	Common Ragwort
<i>Senecio vulgaris</i>	Groundsel
<i>Silene vulgaris</i> ssp. <i>vulgaris</i>	Bladder Campion
<i>Solanum dulcamara</i>	Bittersweet
<i>Sonchus asper</i>	Prickly Sow-thistle
<i>Sparganium</i> sp	a bur-reed
<i>Stachys palustris</i>	Marsh Woundwort
<i>Stellaria media</i> agg.	Chickweed
<i>Tamus communis</i>	Black Bryony
<i>Tanacetum parthenium</i>	Feverfew
<i>Taxus baccata</i>	Yew
<i>Tilia</i> sp.	a lime
<i>Tripleurospermum maritimum</i> sens.str.	Mayweed
<i>Ulmus procera</i>	English Elm
<i>Urtica dioica</i>	Common Nettle
<i>Veronica beccabunga</i>	Brooklime
<i>Veronica hederifolia</i>	Ivy-leaved Speedwell [agg.]
<i>Veronica persicaria</i>	Common field speedwell
<i>Vicia sativa</i>	Common Vetch
































**APPENDIX B: HSI SCORES**

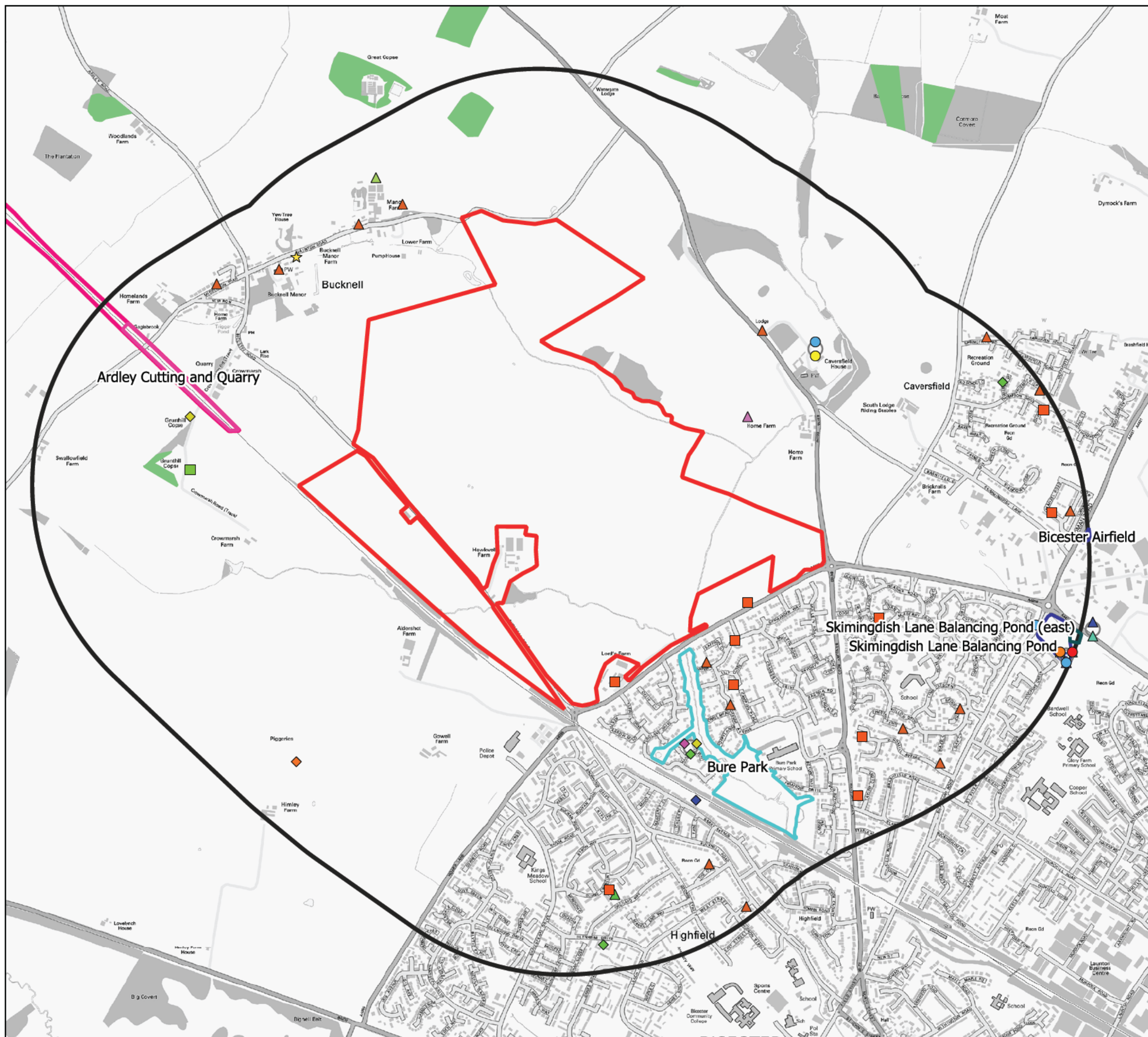
Pond	SI -1		SI -2		SI -3		SI -4		SI -5		SI -6		SI -7		SI -8		SI -9		SI -10		HSI score	Pond suitability	Predicted presence	
	geographical location		pond area		pond drying		water quality		shade (perimeter)		fowl		fish		ponds		terrestrial habitat		macrophytes					
	Field result (A,B,C)	SI score	Field result (m2)	SI score	Field result	SI score	Field result	SI score	Field result (% cover)	SI score	Field result	SI score	Field result	SI score	Field result	SI score	Field result	SI score	Field result	SI score				
P1	A-optimal	1	500	1	Never	0.9	Moderate	0.67	20	1	Absent	1	Absent	1			Good	1	15	0.5	0.88	Excellent	93%	
P2	A-optimal	1	2100	0.784	Never	0.9	Good	1	50	1	Minor	0.67	Possible	0.67			Good	1	15	0.5	0.82	Excellent	93%	
P3	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	0.00	Dry	N/A
P4	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	0.00	Dry	N/A
P7	A-optimal	1	400	0.8	Never	0.9	Moderate	0.67	35	1	Minor	0.67	Absent	1			Moderate	0.67	75	1	0.86	Excellent	93%	
P8	A-optimal	1	100	0.2	Rarely	1	Good	1	5	1	Absent	1	Absent	1			Good	1	40	0.7	0.82	Excellent	93%	
P9	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	0.00	Dry	N/A
P10	A-optimal	1	150	0.3	Never	0.9	Moderate	0.67	80	0.6	Absent	1	Absent	1			Good	1	10	0.4	0.73	Good	79%	
P11	A-optimal	1	400	0.8	Never	0.9	Moderate	0.67	45	1	Absent	1	Absent	1			Good	1	20	0.5	0.87	Excellent	93%	
P12	A-optimal	1	5000	0.338	Never	0.9	Good	1	20	1	Absent	1	Possible	0.67			Good	1	15	0.5	0.79	Good	79%	
P13	A-optimal	1	200	0.4	Rarely	1	Moderate	0.67	40	1	Minor	0.67	Absent	1			Good	1	20	0.5	0.79	Good	79%	
P16	A-optimal	1	600	1	Never	0.9	Moderate	0.67	50	1	Absent	1	Absent	1			Good	1	60	0.9	0.94	Excellent	93%	
P17	A-optimal	1	100	0.2	Rarely	1	Poor	0.33	90	0.4	Absent	1	Absent	1			Good	1	5	0.4	0.63	Average	55%	

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### Key

- |   |                              |   |                        |
|---|------------------------------|---|------------------------|
|    | Site Boundary 2020           |    | Common Frog            |
|    | 1km Buffer                   |    | Great Crested Newt     |
|    | Local Nature Reserve         |    | Smooth Newt            |
|    | Local Wildlife Site          |    | American Mink          |
|    | Proposed Local Wildlife Site |    | Brown Hare             |
|    | SSSI                         |    | Brown Long-eared Bat   |
|    | Bu finch                     |    | Common Pipistrelle     |
|    | Duncock                      |    | Eurasian Badger        |
|    | House Sparrow                |    | Noctule Bat            |
|    | Kestrel                      |    | Polecat                |
|   | Red Kite                     |   | Soprano Pipistrelle    |
|  | Song Thrush                  |  | West European Hedgehog |
|  | Starling                     |  | Common Lizard          |
|  | Swift                        |  | Grass Snake            |
|  | Tawny Owl                    |   |                        |



client: Hallam Land  
project: Land North of Bicester, Bicester  
drawing title: DESK STUDY RESULTS

scale: 1:15000  
drawing / figure number: **Figure 1**  
drawn: MAF / JD  
issue: 24/8/2021

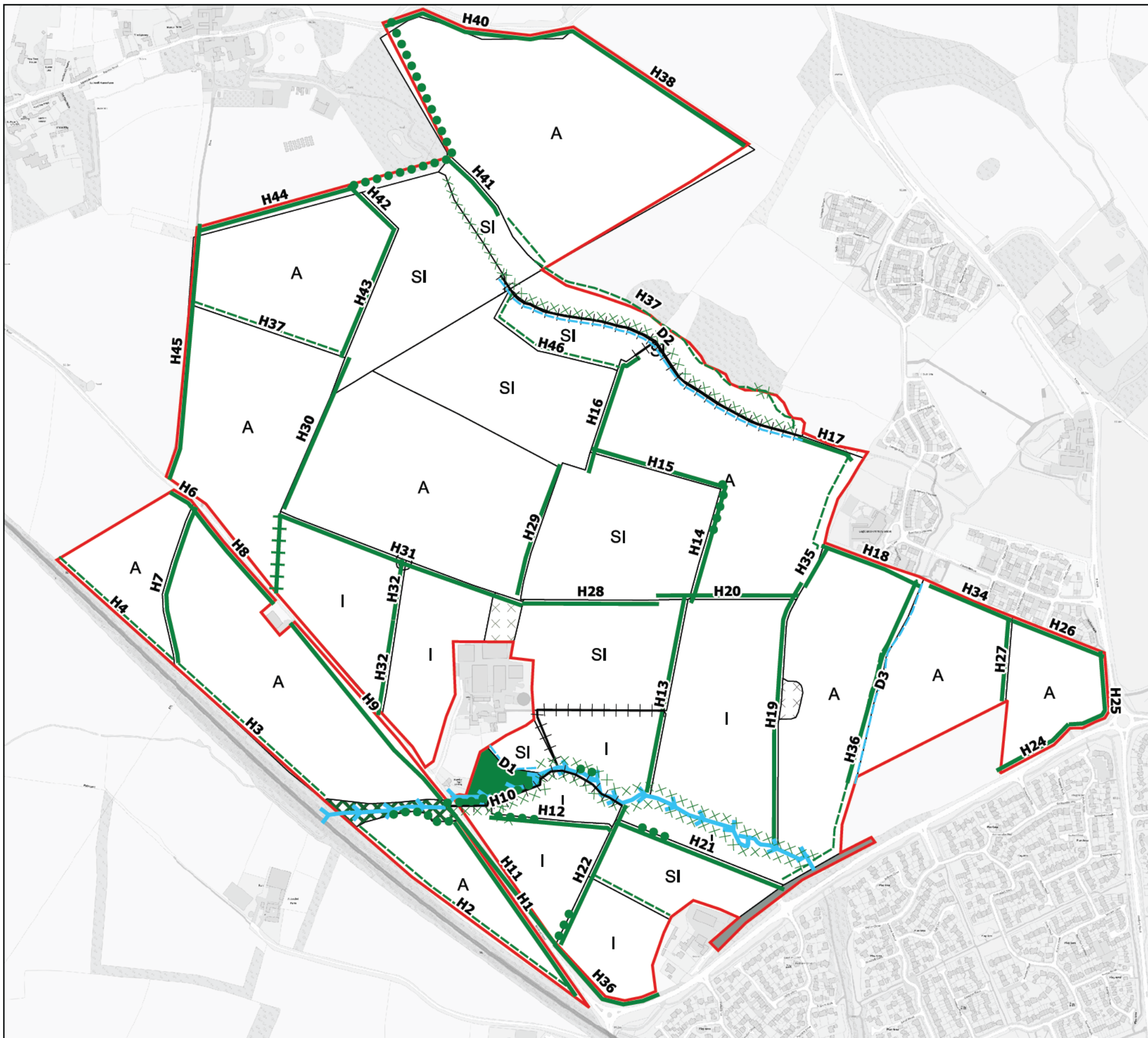
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### Key

#### Habitats

- Broadleaved woodland - semi-natural
- Built Environment: Buildings/hardstanding
- Arable
- Cultivated/disturbed land - ephemeral/short perennial
- Improved grassland
- Poor semi-improved grassland
- Scrub - dense/continuous
- Scrub - scattered
- Standing water
- Broadleaved trees
- Hedgerow (with ref)
- Defunct hedge
- Hedge with trees - species-poor
- Scrub - scattered
- Running water
- Dry ditch (with ref)
- Fence



client  
Hallam Land Management

project  
North West Bicester  
Bicester

drawing title  
PHASE 1 HABITAT PLAN

scale  
1:7500

drawing / figure number  
Figure 2

drawn  
HJF/JD





issue  
25/11/202

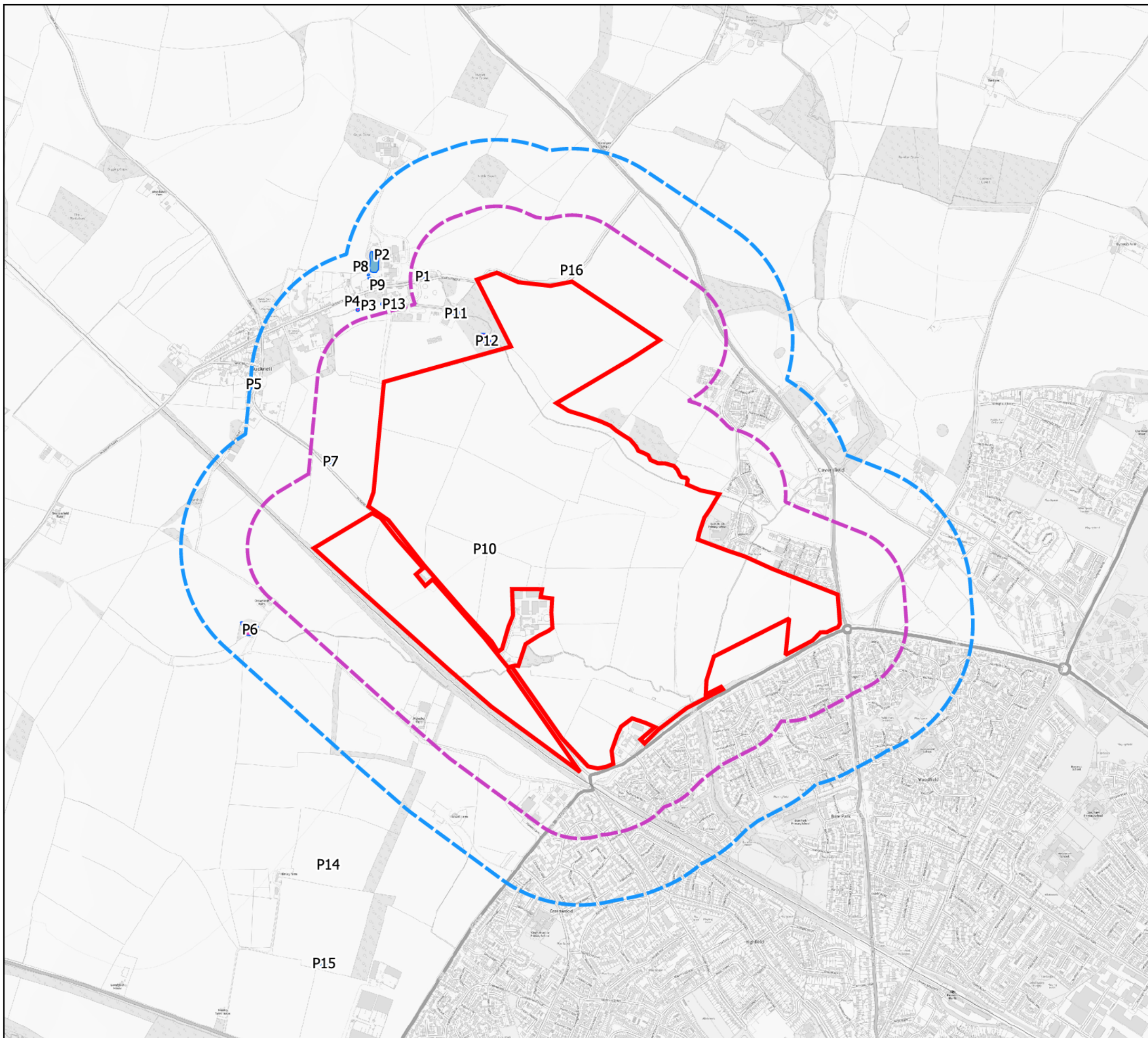
rev  
-

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### Key

-  Site Boundary
-  Ponds (with ref)
-  250m Site Buffer
-  500m Site Buffer



client  
Hallam Land Management

project  
Bicester

drawing title  
Pond Location Plan

scale  
1:15000

drawn  
AMS / JD

issue  
25/11/202



drawing / figure number  
**Figure 3**

rev  
-