



**Land east of Heyford Road, Kirtlington,
Oxfordshire**

Ecological Impact Assessment

August 2023

on behalf of Abbey Mill Homes

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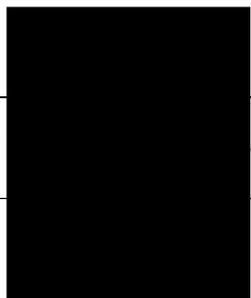
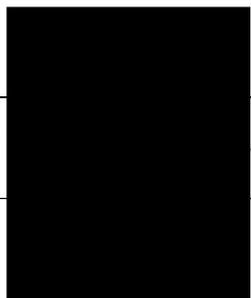
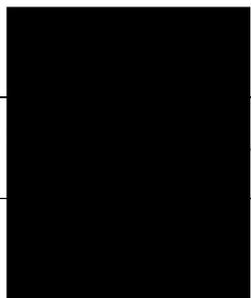
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1 Executive Summary

Site Details	The land east of Heyford Road is located to the east of Heyford Road and to the north-eastern corner of the village of Kirtlington in Oxfordshire. The approximate Ordnance Survey grid reference for the site is SP 5012 2023.
Proposals	There is a proposal to develop the site for residential use.
Methodology	<p>Information on statutory and non-statutory sites, as well as protected and notable species records, within a 1km radius of the land east of Heyford Road, Kirtlington were requested from the Thames Valley Environmental Records Centre (TVERC) in November 2022.</p> <p>An extended Phase 1 habitat survey was undertaken on 2nd November 2022. A walkover of the site was conducted, and a description of the habitats present was prepared using standard Phase 1 habitat survey methodology (JNCC, 2010).</p> <p>The site visit also included a condition assessment for use in the Biodiversity Metric 4.0.</p>
Evaluation	<ul style="list-style-type: none"> • The site is dominated by an improved grassland horse paddock. The grassland does not meet the criteria for any valued habitats of 'principal importance' under Section 41 of the NERC Act 2006. • An area of semi-natural broadleaved woodland is present along the southern boundary, and this extends part way along the western boundary of the site. The woodland is considered to meet the criteria for 'Lowland Mixed Deciduous Woodland' a habitat of 'principal importance' as listed within Section 41 of the NERC Act 2006. • Patches of bramble scrub and tall ruderal vegetation skirt the northern boundary of the main parcel of woodland. An isolated patch of scrub is present along the northern boundary. These habitats do not meet the criteria for any valued habitats of 'principal importance' under Section 41 of the NERC Act 2006. • There is an existing tarmacked access track along the western boundary. Either side of which are gardens that comprise areas of amenity grassland, ornamental planting including shrubs and herbs, garden hedges and a small number of native trees. These habitats do not meet the criteria for any valued habitats of 'principal importance' under Section 41 of the NERC Act 2006. • The improved grassland under the footprint of the development is not a suitable habitat for reptiles or great crested newts. The woodland habitat within the wider site provides suitable habitat, this will be retained. Precautionary measures a recommended to avoid killing and injury of reptiles and disturbance, killing and injury of great crested newts. • The trees, scrub and woodland offer potential nesting sites to breeding birds and commuting foraging opportunities to bats,

	<p>badgers, hedgehogs and invertebrates. None of the trees offer significant potential bat roost suitability. The mature crack willow (T41) has been assessed as having 'low' potential bat roost suitability (Collins, 2016).</p>
Impact Assessment	<ul style="list-style-type: none"> • There are no predicted impacts on statutory or non-statutory designated sites of nature conservation importance as a result of the proposals. • The proposed development will result in the loss of habitats that have been evaluated as having ecological value at the site level only and not within the wider context. The development will not result in impacts on habitats of 'principal' importance. • The development proposals have been designed in order to make the development permeable for wildlife and promote the connectivity of the site with the surrounding landscape. • The Biodiversity Metric 4.0 has shown that the development can achieve an overall net gain in biodiversity value. • Without appropriate mitigation, the installation of the pedestrian walkway within the western belt of the woodland and the removal of an area of scrub could result in the killing and injury of reptiles. • Great crested newts are predicted to be absence of the site. • Removal of woody vegetation during the bird breeding period may result in the damage or destruction of active birds' nests. • The mature crack willow (T41) has 'low' potential roost suitability and as such will require section felling. External lighting may affect bat behaviour. • Indirect impacts on the badgers and small mammals may be caused by excavations and foundations posing as a pit-fall hazard to badgers and small mammals moving over ground.
Recommendations	<p>Appropriate root protection zones should be established around retained trees in accordance with British Standard 5837:2012.</p> <p>The loss of improved grassland, trees and scrub will be compensated, via new planting and landscaping.</p> <p>Wildlife friendly landscape planting has been incorporated into the development, including trees, native hedgerows and native species rich grassland with tree planting to create a parkland style habitat.</p> <p>Precautionary measures for site preparation and working practices are recommended for reptiles, given that small numbers of grass snake have previously been recorded in the site.</p> <p>Although great crested newts are predicted to be absent from the site, given the site is partly within the amber zone risk zone and there are three ponds</p>

	<p>within a 500m radius of the site, recommendations for precautionary methods are presented in order to avoid disturbance, killing and injury to great crested newts.</p> <p>Woody vegetation will be removed outside of the breeding bird period, and that bird boxes will be incorporated into the development as an enhancement measure.</p> <p>Avoidance of external lighting, or sensitive design of lighting, is also recommended with regard to bats. Bat roost features will be provided as an enhancement measure.</p> <p>Deep excavations covered at night to avoid pitfall hazards to mammals.</p> <p>The integration of solitary bee bricks into each of the new dwellings is recommended.</p>
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2 Introduction

2.1 Site Description & Context

The land east of Heyford Road, referred to as 'the site' for the purpose of this report, is located to the east of Heyford Road and to the north-eastern corner of the village of Kirtlington in Oxfordshire. The approximate Ordnance Survey grid reference for the site is SP 5012 2023. Location plans can be found in Appendix 1 and photographs of the site are presented in Appendix 2.

The site is dominated by a horse grazed improved grassland paddock. An area of semi-natural broadleaved woodland lies along the southern boundary. This woodland extends part way along the western boundary, with a stone wall being present to the outer edge (west). Wooden stock-proof fences mark the boundaries in almost all other directions, save small portions of stone wall and a stone farm building along the eastern boundary. An area of scrub grows towards the centre of the northern boundary, with discrete patches of bramble scrub and tall ruderal vegetation present along the southern and eastern boundaries.

The site is located along the northern edge of the village of Kirtlington, close to the open countryside. Residential areas are situated to the west, including Jersey Farm Cottages and residences along Heyford Road. Home Farm Cottage and its associated farm buildings lie to the east. The extensive parkland of Kirtlington Park lies to the south and to the east, beyond Home Farm Cottage and its land, being a significant ecological feature of the immediate area around the site.

The landscape surrounding the village is dominated by agricultural land, comprising arable fields and improved pastures set within a network of hedgerows and woodlands. The River Cherwell flows approximately 790m to the west of the site, it forms an ecological corridor within the nearby landscape. There are also a small number of ponds within the locality, including a pond located to the centre of the village and to the east of the site within Kirtlington Park.

2.2 Proposal Plans

There is a proposal to develop the site for residential use. The proposals include associated garden landscaping, parking facilities, communal areas and wildlife focused planting. Access to the new development will be created off the land that services Jersey cottages, which enters the site from the west. Appendix 3 contains a proposal plan.

2.3 Aims of Study

The aims of this study are to describe and evaluate the habitats present within the site, and to assess the potential for the habitats to support protected and notable species. The report discusses the potential impacts of the proposed development on the ecology of the site, on valued habitats and on protected/notable species. The study also makes recommendations for appropriate mitigation measures and habitat enhancement with regard to habitats and species.

This report also aims to:

- Establish the total number of baseline biodiversity units for the site prior to the development taking place;
- Establish the total number of biodiversity units which will be created, retained and/or enhanced under landscape and ecological mitigation proposals for the site of; and
- Determine whether the proposed development scheme will result in a net loss, no net loss or a net gain for biodiversity.

This is in line with the National Planning Policy Framework and the Cherwell District Council Adopted Local Plan: Policy ESD 10 (protection and enhancement of biodiversity and the natural environment),

which supports securing net biodiversity gain on development sites as well as requiring the protection of important wildlife and geological sites, habitats and species.

3 Methodology

3.1 Desk Study

Information on statutory and non-statutory sites, as well as protected and notable species records, within a 1km radius of the land at Heyford Road, Kirtlington were requested from the Thames Valley Environmental Records Centre (TVERC) in November 2022. The data search results are presented in Appendix 4. The following websites were also used to obtain information on habitats and designated sites within the local area:

- The Multi-Agency Geographic Information for the Countryside - www.magic.gov.uk
- Google maps - www.google.co.uk/maps
- Where's the path - <https://wtp2.appspot.com/wheresthepath.htm>

In addition, Section 41 of the Natural Environment and Communities (NERC) Act 2006 and the Wild Oxfordshire website were also consulted to gather information pertaining to priority habitats and species for conservation action at the national and local level.

Aerial photography interpretation was used to place the study sites into an ecological context and to provide information on the nature of the habitats beyond the site boundary. The information gathered is used to provide a baseline to the habitat assessment.

Baseline information on the site has also been obtained from the planning portal, where previous studies of the site are within the public domain (having been submitted in support of a previous planning application).

The documents that has been reviewed as part of the desk study include:

- Lockhart Garratt, February 2016 – Protected Species Report. 1-4 Jersey Cottages, Kirtlington
- Lockhart Garratt, February 2016 – Biodiversity Enhancement Scheme. Land off Heyford Road, Kirtlington
- Lockhart Garratt, June 2017 – Reptile Survey Report. Heyford Road, Kirtlington
- Lockhart Garratt, June 2017 – Updated Phase 1 Habitat Survey. Land off Heyford Road, Kirtlington

3.2 Field Survey

3.2.1 Weather Conditions

The field survey was undertaken on the 2nd November 2022. The weather on the day was cool (10°C), dry, and overcast (100% cloud cover) and a light to gentle breeze (Beaufort Scale 2-3).

3.2.2 Personnel

The surveys were undertaken by Tracy Gray *BSc*, an experienced ecologist, who has over twelve years of experience in undertaking Phase 1 habitat surveys.

Miss Gray also holds a licence from Natural England to survey for great crested newts *Triturus cristatus* within all counties of England (Natural England Level 1 WML-CL08 Licence 2019-44120-CLS-CLS).

3.2.3 Extended Phase 1 Habitat Survey

A walkover of the site was conducted, and a description of the habitats present was prepared using standard Phase 1 habitat survey methodology (JNCC, 2010).

Target notes were also prepared on features of particular ecological interest and an assessment was made of the sites potential to support protected and/or notable species (such as species listed under Section 41 of the NERC Act 2006).

3.3 Limitations on Survey Data

As with any survey undertaken on a certain date, the data presented within this report provide information at a particular point in time and presents a 'snap-shot' of the ecological status of the site. Ecosystems and species behaviour/activity are dynamic and can change over time.

Whilst this report presents a characterisation and evaluation of habitat and species status at the time of the study, it should not be taken as an exhaustive representation of the ecological status of the site either at present or into the future.

The survey was undertaken in November, at a time when all plant species may not be apparent. However, given the habitats that are present this is not considered to be a significant constraint as it was still possible to fully characterise and classify the habitats accordingly.

3.4 Evaluation Methodology

The evaluation of habitats follows the geographic frame of reference presented within the *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* version 1.1 (CIEEM, 2018).

The Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines recognise that ecological evaluation is a 'complex and subjective process' but provides key considerations to apply when 'applying professional judgement to assign values to ecological features and resources. These include consideration of geographic frame of reference; site designations and features; biodiversity value; large populations or important assemblages of species; potential or supporting value; social value and economic value.

Focusing on assessments of biodiversity value, there are various characteristics that can be used to identify ecological resources or features that are likely to be important in terms of biodiversity. These include:

- Rare or uncommon species in the local, national or international context;
- Endemic or locally distinct sub-populations of a species;
- Species on the edge of their distribution;
- Notably large populations of animals or concentration of animals considered uncommon or threatened in a wider context;
- Species, rich assemblages of plants or animals;
- Ecosystems and their component parts, which provide the habitats required by the above species, populations and/or assemblages;
- Plant communities (and associated animals) considered typical of valued natural/semi-natural vegetation types; and
- Habitat diversity, connectivity and/or synergistic associations.

In this report, habitats are assigned to a value relating to their geographic frame of reference, using the following scale:

- International

- UK
- National (England)
- Regional (South East)
- County (Oxfordshire)
- District (Cherwell)
- Local or parish (Kirtlington)
- Immediate zone of influence of the site (Site)
- Negligible

Regarding protected and notable species, an assessment of habitat suitability and potential presence of species has been undertaken given the results of the desk study and field surveys.

Characterising and Quantifying Effects and Assessing Significance

The guidelines state that ecological effects should be characterised in terms of ecosystem structure and function and reference should be made to: positive or negative effects; extent; magnitude; duration; reversibility; timing and frequency; and cumulative effects. The guidelines provide a list of 'key aspects of ecosystems to consider when predicting effects'.

Following the characterisation of effects, an assessment of the ecological significance of an effect is made. Prior to the publication of the current guidelines in 2006, ecological significance was defined using a matrix in which ecological value and magnitude of effect were combined to determine different grades of significance; usually high, medium or low. The guidance now advises that assigning levels of significance in this way obstructs a clear understanding of the EclA process and can result in an assessment that lacks rigour.

The guidelines promote a more transparent approach in which a beneficial or adverse effect is determined to be significant or not, in ecological terms, in relation to the integrity of the defined site or ecosystem(s) and/or the conservation status of habitats or species within a given geographical area, which relates to the level at which it has been valued. The decision about whether an effect is significant or not, is independent of the value of the ecological feature; the value of any feature that will be significantly affected is then used to determine the implications, in terms of legislation, policy and or development control.

3.5 Biodiversity Net Gain Assessment

A Biodiversity Net Gain Assessment was conducted, using the Biodiversity Metric 4.0 (JP039) published by Natural England (March, 2023), to calculate the impact of the proposed development on biodiversity. The calculation also ascertains whether the proposals achieve a net gain, a net loss or no net loss in biodiversity, calculated as biodiversity units and percentage biodiversity units.

To effectively assess the impacts of the proposals the habitats within the site were classified according to the habitat types given in the UKHab classification system (Butcher *et al.*, 2020). Habitats were assessed for their condition and strategic significance according to the criteria given within the Biodiversity Metric 4.0 User Guide and Technical Supplement (Natural England Joint Publication, 2023) through onsite visits and the interrogation of internet resources including MAGIC (www.magic.gov.uk) and Google Earth (www.earth.google.co.uk).

The areas of given habitats in both their current state and the proposed development were mapped using on site data, satellite imagery and QGIS software, with the resulting areas inputted into the Biodiversity Metric 4.0 alongside strategic significance classifiers.

A site visit was undertaken by a suitably qualified ecologist to determine the habitats present on site, their location, size, condition and connectivity. This survey was conducted by Tracy Gray *BSc* on the 2nd November 2022.

The principles of biodiversity net gain as set out in the Biodiversity Net Gain Good Practice Guidelines (CIEEM, IEMA & CIRIA, 2019) have been considered throughout this process as listed below (further details are presented in Appendix 5):

- **Principle 1.** Apply the Mitigation Hierarchy
- **Principle 2.** Avoid losing biodiversity that cannot be offset by gains elsewhere
- **Principle 3.** Be inclusive and equitable
- **Principle 4.** Address risks
- **Principle 5.** Make a measurable Net Gain contribution
- **Principle 6.** Achieve the best outcomes for biodiversity
- **Principle 7.** Be additional
- **Principle 8.** Create a Net Gain legacy
- **Principle 9.** Optimise sustainability
- **Principle 10.** Be transparent.

The Biodiversity Metric 4.0 (excel spreadsheet) is contained within Appendix 6 (appended document).

4 Results & Evaluation

4.1 Ecological Context

4.1.1 National Character Profile

The site is located along the southern edge of the Cotswolds National Character Area (NCA) as defined by Natural England. This NCA forms the best-known section of the predominantly oolitic Jurassic Limestone belt that stretches from the Dorset coast to Lincolnshire.

This NCA contains nationally important beech *Fagus sylvatica* woods which are a feature of the landscape and are a notable feature on the scarp edge and in a number of the incised valleys. Mixed oak *Quercus* sp. woodlands are concentrated on the upper slopes of valleys and on the flat high wold tops. Woodlands can contain a wide and notable range of calcicole shrubs and ground flora. Parkland and estates are characteristic of the area. Farming is mixed, with much of the high wold dominated by arable on thin, brashy soils prone to erosion. Pasture is predominant in the valleys, and in particular on steeper slopes and on more clayey soils. Meadows and treelined watercourses are found along the valley bottoms.

Important habitats include limestone grassland along the scarp, for example Rodborough Common Special Area of Conservation (SAC) and wet meadows with alder *Alnus glutinosa* and willow *Salix* sp. and springline flushes. Two further SACs are also present within this NCA: Cotswold Beechwoods SAC and Bath and Bradford-on-Avon Bats SAC. Steeply-incised stream and river valleys cut through the north-west facing scarp, flowing westwards towards the River Severn. The watercourses of the dip slope provide headwaters of the River Thames and flow eastwards within broad shallow valleys, and these rivers and underlying aquifer are an important supply of high-quality water for populations within and around the area.

The Cotswolds has a rich biodiversity and is particularly important for its internationally renowned beech wood hangers, and nationally important limestone grassland and associated species such as the Duke of Burgundy butterfly *Hamearis lucina*, the large blue butterfly *Phengaris arion* and many farmland birds. It is also important for species such as greater horseshoe bat *Rhinolophus ferrumequinum*, holding 15 per cent of the UK's population. The network of habitats, in particular beech hangers and limestone grassland, along the scarp edge are a good foundation for an ecological network running north to south. The rivers that run west to east, including the Evenlode, Windrush and Coln, and their associated habitats also serve as an important ecological network. Both networks could be enhanced to increase their biological value and to aid biodiversity in adapting to changes in climate.

4.1.2 Sites of Nature Conservation Importance

4.1.2.1 Statutory Sites

There are no statutory sites of international nature conservation importance within a 5km radius of the site.

There is a site of national nature conservation importance within a 1km radius of the site. This is Kirtlington Quarry Site of Special Scientific Interest (SSSI). This site is designated for its geological value, rather than for its ecological value. Kirtlington Quarry SSSI is also classified as a Local Nature Reserve (LNR) for its local nature conservation importance, the LNR occupies an increased area than the SSSI. This site is described in more detail below.

Kirtlington Quarry SSSI

Kirtlington Quarry SSSI lies approximately 560m to the south-west of the site. It is one of only five Middle Jurassic mammal sites in the world (all of them British) Kirtlington has yielded by far the most diverse assemblage described to date. At least nine species of therian and prototherian mammals occur, together with a stratigraphically late tritylodontid. These occur in a discontinuous rootleted clay of probable marsh origin within the basal Forest Marble Beds (Upper Bathonian). The bed has yielded crocodylian, pterosaur and theropod dinosaur material.

The Kirtlington Mammal Bed in the Forest Marble Beds at this site has also yielded a rich and diverse fauna of fish species based on teeth. These include Lepidotidae, Pycnodontidae and Caturus. The site is very rich in micro-shark teeth. Elasmobranchs include Asteracanthus, Hybodus and a lamnid.

4.1.2.2 Non-statutory Sites

There is a Local Wildlife Site (LWS), a proposed Local Wildlife Site and one Local Geological Site (LGS) within 1km of the site, namely Kirtlington Park Lake (north) LWS, Kirtlington Park Proposed LWS and Kirtlington Quarry LGS. These sites are described in greater detail below.

Kirtlington Park Lake (north) LWS

Kirtlington Park Lake (north) LWS lies approximately 920m to the east of the site. This small lake was selected as County Wildlife Site due to the presence of a rich variety of aquatic plants and the presence of rich marshy areas where marsh orchids *Dactylorhiza* sp. and other wetland plants were found. Such habitats are national nature conservation priorities. There were also grassy areas with shrubs near the edge where other orchids grew. However there are indications that work on the lake has meant much of this habitat has been lost and the current status of this site is unclear.

Kirtlington Park Proposed LWS

The site lies close to the Kirtlington Park Proposed LWS, with the south-eastern corner being adjacent to the site, the eastern boundary of Home Farm Cottage makes up part of the western boundary of the Proposed LWS and is a buffer between this Proposed LWS and the development site. Kirtlington Park Proposed LWS forms an extensive area of parkland habitat associated with the 18th century house. The parkland was laid out by Capability Brown. The trees include good numbers of veterans and were described as being of high conservation value in the Natural England Thames and Chilterns Parkland Survey.

Kirtlington Quarry LGS

Kirtlington Quarry LGS occupies the same area as the Kirtlington Quarry LNR, which is a larger area than Kirtlington Quarry SSSI, which occupies the same area, albeit having a smaller footprint. The edge of the LGS. The edge of the LGS is approximately 560m to the south-west of the site. The reasons for designation include. Bathonian stratigraphy, one of only 5 Middle Jurassic mammal sites in world. Fossils including dinosaurs e.g. Megalosaurus - best upper Bathonian reptile site in UK. Superb educational site, already used by universities. Long industrial history. Potential for geomorphological landscape studies. Beautiful open rural site with good views over Cherwell valley.

4.1.2.3 Conservation Target Areas

The site is located between two Conservation Target Areas (CTAs); the Kirtlington & Bletchingdon Parks & Woods CTA and the Lower Cherwell Valley CTA, which are described in more detail below.

Kirtlington & Bletchingdon Parks & Woods CTA

Kirtlington & Bletchingdon Parks & Woods CTA follows the edge of the Kirtlington Park Proposed LWS so it lies within close proximity to the site. This CTA encompasses the historic parklands at Kirtlington and Bletchingdon, including areas of degraded parkland, the woodland to the east of Bletchingdon and including Weston Fen at the east edge.

Biodiversity:

- Parkland: rich parkland at Kirtlington with many veteran trees with long term management and restoration agreed. Outside the main park there are degraded areas while Bletchingdon Park may have some parkland habitat but has not been assessed yet.
- Lowland Mixed Deciduous Woodland: The most important woodlands are to the south-east where there are two LWSs. There are other areas of woodland associated with the parks with one area of ancient woodland.
- Fen, Swamp and Wet Woodland: There is an area of fen habitat at Weston Fen SSSI along with wet woodland. The largest of the Kirtlington Park lakes has a good sized reedbed and wet woodland at the west end.
- Limestone grassland (Lowland Calcareous Grassland): found at Stonepit Hills at Weston Fen SSSI.

Oxfordshire Biodiversity Action Plan targets associated with the CTA include:

- Parkland – management and restoration.
- Lowland Mixed Deciduous Woodland – management, restoration and creation (some planting to link sites).
- Fen (and swamp) and Wet Woodland – management and creation (little potential to extend except perhaps along Gallos Brook).
- Limestone (Lowland Calcareous) grassland – management and restoration (the plateau soils may be too deep and rich to allow the restoration of rich limestone grassland in the east of the area though some buffer areas near Stonepit Hills could be considered).

Lower Cherwell Valley CTA

The eastern edge of the Lower Cherwell Valley CTA lies approximately 560m to the south-east of the site at its closest point. This CTA comprises the Cherwell Valley from just south of Lower Heyford to Kidlington. It includes sections of the valley side where the slopes are steeper and BAP priority habitats are found and includes a number of limestone quarries on the valley edge. To the south it includes a corridor along the Oxford Canal running south almost to Wolvercote.

Biodiversity:

- Fen and Swamp: There are a variety of sites which including Enslow Marsh, an area next to the oxbow lake at Northbrook Marsh, riverside land south of Enslow, including some degraded sites, in part of Rushy Meads SSSI and within Shipton-on-Cherwell Quarry.
- Reedbed: There are areas in the east of Kidlington and an area has been created next to the canal south of Kidlington.
- Lowland Meadow: The main site is Rushy Meads SSSI at Kidlington. There are remnant areas in the meadows east of Kidlington, in a meadow near Pigeon Lock and canal side fields at Yarnton.

- Wet grassland/ Floodplain Grazing Marsh: Some parts of the area are Floodplain Grazing Marsh, such as Langford Meadows, which is wet grassland and some meadows near Yarnton at Home Farm Ponds there is a wet grassland/fen mixture at the pond edge.
- Limestone grassland (Calcareous Grassland): found in the quarries between Enslow and Shipton-on-Cherwell and at Kirtlington. There is a bank north of Kirtlington Quarry with remnant limestone grassland.
- Eutrophic Standing Water: The main site is the Oxford Canal. There is a rich oxbow lake at Northbrook Marsh and ponds at Home Farm.
- Scrub: A Cherwell Biodiversity Action Plan (BAP) priority habitat. The main site is St. Mary's Field Parish Nature Reserve at Kidlington.
- Geology: Includes geological SSSIs at Kirtlington and Shipton-on-Cherwell and also Greenhill Quarry, a Local Geological Site.
- Species: the canal is a key site for water voles *Arvicola amphibius*. The area holds populations of BAP bird species including reed bunting *Emberiza schoeniclus*, skylark *Alauda arvensis*, yellow hammer *Emberiza citrinella* and grey partridge *Perdix perdix*. Lapwing *Vanellus vanellus* and curlew *Numenius arquata* have declined.

Oxfordshire Biodiversity Action Plan targets associated with the CTA include:

- Lowland Meadow – Management, restoration and creation.
- Flood Plain Grazing Marsh – Management, restoration and creation (for breeding waders in particular).
- Lowland Fen (including Swamp) – Management and restoration.
- Reedbed – Management and creation.
- Rivers – Management and restoration (including management for water vole).

4.1.3 Protected Species Records

Records of protected species are discussed within Section 4.3, alongside the results of the field survey.

Please refer to Appendix 4 (appended document) for a full list of protected species records from the desk study through the Thames Valley Environmental Records Centre (TVERC).

4.2 Habitats

4.2.1 Overview

The site is dominated by an improved grassland horse paddock that is surrounded by wooden fences or isolated sections of stone walls, including of buildings. An area of semi-natural broadleaved woodland is present along the southern boundary, and this extends part way along the western boundary of the site. Patches of bramble scrub and tall ruderal vegetation skirt the northern boundary of the main parcel of woodland to the south of the site. A stone wall is present on the west side of the woodland, with the road verge beyond. A further habitat type, in the form of an isolated patch of scrub, is present along the northern boundary.

Appendix 2 presents photographs of the site.

4.2.2 Improved Grassland

The site is dominated by an area of improved grassland that is in use as a paddock for horses. The grassland is enclosed by wooden fences, with an open gate into the adjacent paddock to the north-east corner.

The grassland had a short sward height of approximately 3cm at the time the survey was undertaken and was actively being grazed by horses, so contained a number of bare patches. The area to the north-eastern corner of the site was very heavily poached.

The sward is dominated by common grass species with perennial rye grass *Lolium perenne* being the most common. Yorkshire fog *Holcus lanatus* and false oat grass *Arrhenatherum elatius* are also present.

The most frequent herbaceous species within the sward are those typically associated with grasslands that have been agriculturally improved. Creeping buttercup *Ranunculus repens* is the dominant species. Other species found within the sward as a whole, particularly towards the edges, include dandelion *Taraxacum officinale*, creeping thistle *Cirsium arvense*, broad-leaved dock *Rumex obtusifolius*, stinging nettle *Urtica dioica*, white dead-nettle *Labium album*, creeping cinquefoil *Potentilla reptans*, spear thistle *Cirsium vulgare*, teasle *Dipsacus fullonum*, cleavers *Galium aparine*, speedwell *Veronica* sp., goosefoot *Chenopodium* sp., dove's-foot crane's-bill *Geranium molle*, great burdock *Arctium lappa*, ground ivy *Glechoma hederacea*, groundsel *Senecio vulgaris*, common chickweed *Stellaria media*, ragwort *Senecio jacobaea*, greater plantain *Plantago major*, silverweed *Potentilla anserina*, sow thistle *Sonchus* sp., spurge *Euphorbia* sp. and selfheal *Prunella vulgaris*.

The sward is dominated by common and widespread grasses and herbaceous species and the habitat does not meet the criteria for any valued grassland habitats within Section 41 of the NERC Act 2006, such as 'Lowland Meadows'. The improved grassland is a habitat that is ubiquitous within the surrounding landscape and does not form a conservation priority. This grassland provides a buffer between the nearby woodland and parkland and any significant built development. As a result, the habitat is considered to be of ecological value within the context of the site. It should be noted that the MAGIC website shows this area as 'Wood-Pasture and Parkland' which is a habitat of 'principal importance'. This is not currently the case, as it is an area of improved grassland which contains no trees.

4.2.3 Scrub

An area of mixed scrub enclosed by stockproof wooden fences is located along the northern boundary. The scrub is dominated by bramble *Rubus fruticosus* and hawthorn *Crataegus monogyna*. Elder *Sambucus nigra*, young willow trees *Salix* sp. and buckthorn *Rhamnus cathartica* are also present in lower abundance. The ground flora is sparse and dominated by stinging nettle and cleavers. What appears to be a crumbed stone wall of a building is present within the scrub.

A further small area of bramble scrub and rose *Rosa* sp. grows over the fence line associated with Home Farm Cottage along the eastern boundary of the site, as well as pockets along the northern edge of the woodland.

The scrub habitat is restricted to localised areas within the site, and it comprises common and widespread woody species and bramble. The scrub habitat does not meet the criteria of any valued habitats within Section 41 of the NERC Act 2006; however, scrub is listed a Cherwell Biodiversity Action Plan (BAP) priority habitat within the Lower Cherwell Valley CTA citation. It provides a stepping stone habitat between parcels of woodland within the south end of the site and the woodland habitats on the edge of Kirtlington Park. As a result is considered to be of high ecological value within the context of the site.

4.2.4 Semi-natural Broad-leaved Woodland

An area of semi-natural broad-leaved woodland is present at the southern end of the site, and it extends in a narrow band, part way along the western boundary. An internal post and wire fence divides the western band of woodland from the main area of woodland to the south.

The dominant tree species within the canopy include ash *Fraxinus excelsior* and English oak *Quercus robur*. The ash trees range in age from semi-mature to mature and the English oak trees from early-mature to mature. Other tree species within in the canopy include horse chestnut *Aesculus hippocastanum*, crab apple *Malus sylvestris*, elm *Ulmus* sp., cherry *Prunus* sp. and poplar *Populus*

sp., beech *Fraxinus excelsior*, alder *Alnus glutinosa*, and yew *Taxus baccata*. These trees range in age from young to mature.

There is a sparse shrub layer that contains occasional shrubs and young trees dominated by hawthorn, with hazel *Corylus avellana*, elder, holly *Ilex aquifolium*, non-native dogwood *Cornus* sp. field maple *Acer campestre*.

The ground layer is sparse and predominantly comprises bare ground with a covering of leaf litter. The dominant plant species is stinging nettle, with some broad-leaved dock, white dead-nettle *Lamium album*, ground ivy *Glechoma hederacea*, cleavers, bramble, cow parsley *Anthriscus sylvestris* and ivy *Hedera helix*.

There is fallen and standing dead wood associated with the woodland, as well as parts of what appear to be old stone walls. There is a dry ditch that runs through the woodland, no water was present in the ditch at the time of the survey and there was no evidence of aquatic plant species.

The woodland is considered to be semi-natural, but not ancient. It is formed predominantly from ash and oak, which are the longer established of the trees within the woodland. A proportion of the trees appear to have been planted in order to bolster the woodland, particularly along the southern edge of the woodland. It is possible that this area once formed part of the parkland of Kirtlington Park Estate. It is shown on the MAGIC website shows the woodland as being on the Priority Habitat Inventory - Deciduous Woodland.

The woodland is considered to meet the criteria for 'Lowland Mixed Deciduous Woodland' a habitat of 'principal importance' as listed within Section 41 of the NERC Act 2006, being semi-natural and dominated by ash and oak trees. 'Lowland Mixed Deciduous Woodland' includes woodland growing on the full range of soil conditions, from very acidic to base-rich, and takes in most semi-natural woodland in southern and eastern England, and in parts of lowland Wales and Scotland. As a result, the woodland is considered to be of ecological value in the context of the local area, particularly as it forms a network with other nearby woodlands and parkland.

4.2.5 Access Track

An existing access track services the Jersey Cottages along Heyford Road, which lies to the immediate west of the site. The track is tarmacked hardstanding with gravelled parking bays gardens of the Jersey Cottages immediately adjacent.

The gardens comprise areas of amenity grassland, ornamental planting including shrubs and herbs, non-native garden hedges and some notable native trees; including a mature pollarded crack willow *Salix x fragilis* (T41), a young yew tree (T42), both at the eastern end of the access track and an early mature ash (T1) within the western most garden on the northern side of the access track.

Private gardens and the associated habitats are not listed as a priority habitat type under Section 41 of the NERC Act 2006 and as such, garden habitats are not a conservation priority at a local, county or national level and are considered to have ecological at the site level only. The trees, although of ecological value, do not significantly contribute to the nearby woodland corridor. The crack willow and yew are impacted by human activity and form part of a garden. They are more isolated than the ash along the western boundary. The trees are considered to have moderate ecological value within the context of the site.

The tarmacked and gravelled hard-standing offers little in the way of habitats to wildlife and therefore is considered to have 'negligible' ecological value.

4.2.6 Boundaries

The boundaries of the site are marked by wooden stockproof fences for the most part. The section of the western boundary that runs parallel with the woodland is denoted by a stone wall. A further section of stone wall and a stone outbuilding make up short sections of the eastern boundary.

The wooden stockproof fences are considered to be of negligible ecological value.

The stone walls do contain cracks and gaps between the stone work. Therefore, it is considered to be of ecological value at the site level, although stone walls can inherently contain negligible ecological value the cracks and gaps within the wall do provide shelter for certain species.

4.3 Species

Please refer to Appendix 4 for a full list of protected and notable species records obtained through the TVERC.

4.3.1 Plants

No rare or protected plant species were noted within the site, the area is dominated by improved grassland which contains common and widespread species and of low ecological value.

The TVERC hold records for twelve species of plant, none of which pertain to the site. The majority of the records are from Kirtlington Quarry or Washford Pits Woods. Given the habitats present within the site, the most pertinent plant species from woodland and grassland habitats returned from the data search are summarised below:

- Bluebell *Hyacinthoides non-scripta* – listed on Schedule 8 of the Wildlife & Countryside Act 1981 (as amended). Record dates from 2008.
- Carlina thistle *Carlina vulgaris* – England Red List Species post-2001, near threatened. Two records between 2011 and 2019.
- Chicory *Cichorium intybus* – England Red List Species post-2001, vulnerable. Record dates from 2018.
- Heath speedwell *Veronica officinalis* – England Red List Species post-2001, near threatened.
- Hoary plantain *Plantago media* – England Red List Species post-2001, near threatened. Record dates from 2017.
- Quaking grass *Briza media* – England Red List Species post-2001, near threatened. Three records dating between 2008 and 2019.
- Sanicle *Sanicula europaea* – England Red List Species post-2001, near threatened. Record dates from 2008.
- Stinking hellebore *Helleborus foetidus* – Nationally scarce, occurring in 16 – 100 hectads in the UK. Record dates from 2017.
- Wild strawberry *Fragaria vesca* – England Red List Species post-2001, near threatened. Three records dating between 2008 and 2019.

None of these species were identified within the site, although the presence of woodland species, in particular the bluebell, cannot be ruled out given the time the field survey was undertaken.

4.3.2 Invertebrates

The site is considered to be limited in its value for invertebrates, with the grazed improved grassland offering generally poor habitat to invertebrates. The habitats within the site may provide a limited area of habitat for species of moth listed as species of 'principal importance' under Section 41 of the NERC Act 2006, but are unlikely to support a diverse assemblage of invertebrates, with the woodland and scrub habitats being the most suitable.

The TVERC hold a record of the stag beetle *Lucanus cervus* from a location within the village of Kirtlington, approximately 730m to the south of the site. The woodland within the site provides potentially suitable habitat for this species. The record dates from 2015.

There is a record of the white admiral butterfly *Limenitis camilla*, this is a woodland butterfly that is found in deciduous woods throughout its distribution. It can also be found in conifer plantations, so long as honeysuckle *Lonicera periclymenum* is available in suitable locations. The woodland within the site does not contain the honeysuckle or snowberries *Symphoricarpos* spp. the other larval foodplant. Therefore, it will not be breeding within the site. The record dates from 2018.

The site does not offer suitable habitat for other butterfly species of 'principal importance, such as the brown hairstreak *Thecla betulae* the eggs of which have been recorded from hedgerows to the north and west of the site. The records date between 2015 to 2020. The habitat is sub-optimal for the small heath butterfly *Coenonympha pamphilus*, which has also been recorded within the 1km search radius. The record dates from 2020.

The Records Centre hold a number of records for notable wasp and bee species; these all pertain to Kirtlington Quarry, which is located approximately 560m to the south-west of the site. All records date from 2006.

4.3.3 Reptiles

The improved grassland habitat which dominates the site is not considered to offer suitable habitat to reptile species. It has a homogenous short sward as it is grazed by horses. The grassland has no structural diversity, a feature which is favoured by reptiles, it offers no shelter and little in the way of a foraging resource. There are no features within the grassland that offer shelter or hibernation sites for reptiles.

The closed canopy woodland within the site, contains no open rides or clearings within which there is optimal habitat for reptiles. Dense shaded woodlands do not allow sunlight through the canopy for reptiles to bask or create suitable ground flora. Underneath the dense canopy of the woodland on site the ground cover is sparse and reptiles favour open sunny glades and rides, with enough dense ground vegetation present to keep them safe from predators and for foraging. Species such as the grass snake will inhabit open woodlands. The habitats on the edge of the parcel of woodland such as the grassland and tall ruderal vegetation create areas that could be suitable for basking in combination with the woodland parcel. Furthermore, the leaf litter of the woodland floor does provide some foraging opportunities, as well as sheltering and hibernation opportunities in combination with the surrounding landscape. In addition, there is fallen dead wood within the woodland that hold some potential sheltering and hibernation opportunities. A stone wall runs along the western boundary of the woodland and there are some crumbling sections of the stone wall, which also provide potential sheltering and hibernation opportunities.

The scrub patches at the edges of the site, particularly in close proximity to the woodland provide areas of shelter.

The TVERC hold eleven records of grass snake *Natrix helvetica* from within the site. These records are a result of reptile surveys that were conducted as part of a previous planning application for the site. The surveys were undertaken between April and June 2017 and found that low numbers of both adult (peak count of two adults) and juvenile grass snake (peak count of two juveniles) were using the site in association with the woodland and tall ruderal habitats, at the edge of the woodland. It is not unexpected that small numbers of grass snake were found within suitable habitats on site, given the context of the site, which is close by to other woodlands with clearings and rides and parkland making it likely that reptiles migrate through the site and utilise suitable areas.

Given the fact that vast majority of the site comprises grazed improved grassland that does not provide a habitat for reptiles and the fact that that habitat status and condition of the site has changed little since the previous survey was undertaken, it is predicted that the status of reptiles remains unchanged. Small numbers of reptiles are likely to continue to move through/use the woodland to forage and shelter and the woodland edge habitat to bask where it is close to suitable cover. It is predicted that reptiles will continue to not be present in high numbers due to the poor habitat quality of the majority of the site.

4.3.4 Amphibians

The Records Centre holds no records of great crested newts *Triturus cristatus* within 1km of the site. Small numbers of common frog *Rana temporaria* and common toad *Bufo bufo* were incidentally recorded within the site during the reptile surveys that were carried out at the site in 2017.

The site appears to be within both the green and amber zones of the NatureSpace Impact Risk Map. The green zone indicates that there is moderate habitat suitability where great crested newts may be present and the amber zone indicates that there is suitable habitat where great crested newts are likely to be present.

The NatureSpace Impact Risk Map predicts great crested newt presence through habitat suitability. The South Midlands region has been allocated coloured great crested newt zones which refer to the density of great crested newts and newt habitat. The map is remodelled by experts every three years to keep it up to date with new developments and compensation land.

These zones are classified as follows:

- Black zone: denotes a nationally designated site for great crested newts. These areas are excluded from the scheme.
- Red zone: high density and frequent occurrence. Highly suitable habitat; the most important areas for great crested newts.
- Amber zone: medium density and frequency. Suitable habitat is present where great crested newts are likely to be present.
- Green zone: moderate/low density and frequency. Moderate habitat suitability where great crested newts may be present.
- White zone: low density and frequency (but not absent). Low habitat suitability where there is low probability of great crested newts being presence.

It is believed that great crested newts can disperse up to 500m from a breeding pond, with the majority of individuals being found within 250m of the pond. Research by Creswell and Whitworth (2004) found that the majority of great crested newts are found within approximately 50m of a breeding pond, given there is suitable habitat in close proximity to the pond, and they also found a significant drop-off in capture of great crested newts beyond 100m of a pond.

There are no ponds or waterbodies within the site. It should be noted that a previous study undertaken by Lockhart Garratt in 2014 and updated in 2017 found a dry depression along the northern edge of improved field (along the northern boundary of the site). In 2014 dried sediment and bare ground at base of depression suggested occasional inundation occurred, suppressing grass colonisation. During the survey undertaken in November 2022 no water body could be seen and the area continues to be dry with dense mixed scrub and ruderal vegetation present all around, it does not constitute a permanent water feature, no evidence of aquatic plant species was noted.

There are three ponds located within a 500m radius of the site, as shown on Ordnance Survey maps. These ponds are all to the south of the site. The closest pond is the Kirtlington village pond referred to as 'Pond 1', which lies approximately 235m to the south-west of the site. The second pond, referred to as 'Pond 2' lies along the eastern edge of Kirtlington Park, approximately 340m to the south of the

site. The final pond lies approximately 500m to the south-east of the site within Kirtlington Park. Figure 1 below contains a plan showing the location of these ponds.

A previous study undertaken at the site included a survey of three ponds within a 500m radius of the site. The survey included Pond 1. Pond 2 was ruled out as providing a suitable breeding habitat for great crested newts on account of it being a dry depression with a connection to ditch network which was also dry at the time of assessment. It was concluded it was likely to be flooded at time of extreme precipitation but dry for most of the year. Pond 3 within the study was the dry depression on the northern edge of the site. On account of it being dry during the survey period it was ruled out as a breeding habitat for great crested newts. Further survey work undertaken in January 2017 found a shallow amount of murky water, with it being completely dry in April to June 2017. It continues to be the case that there is no pond along the northern boundary. Great crested newts were found to be absent from Pond 1.

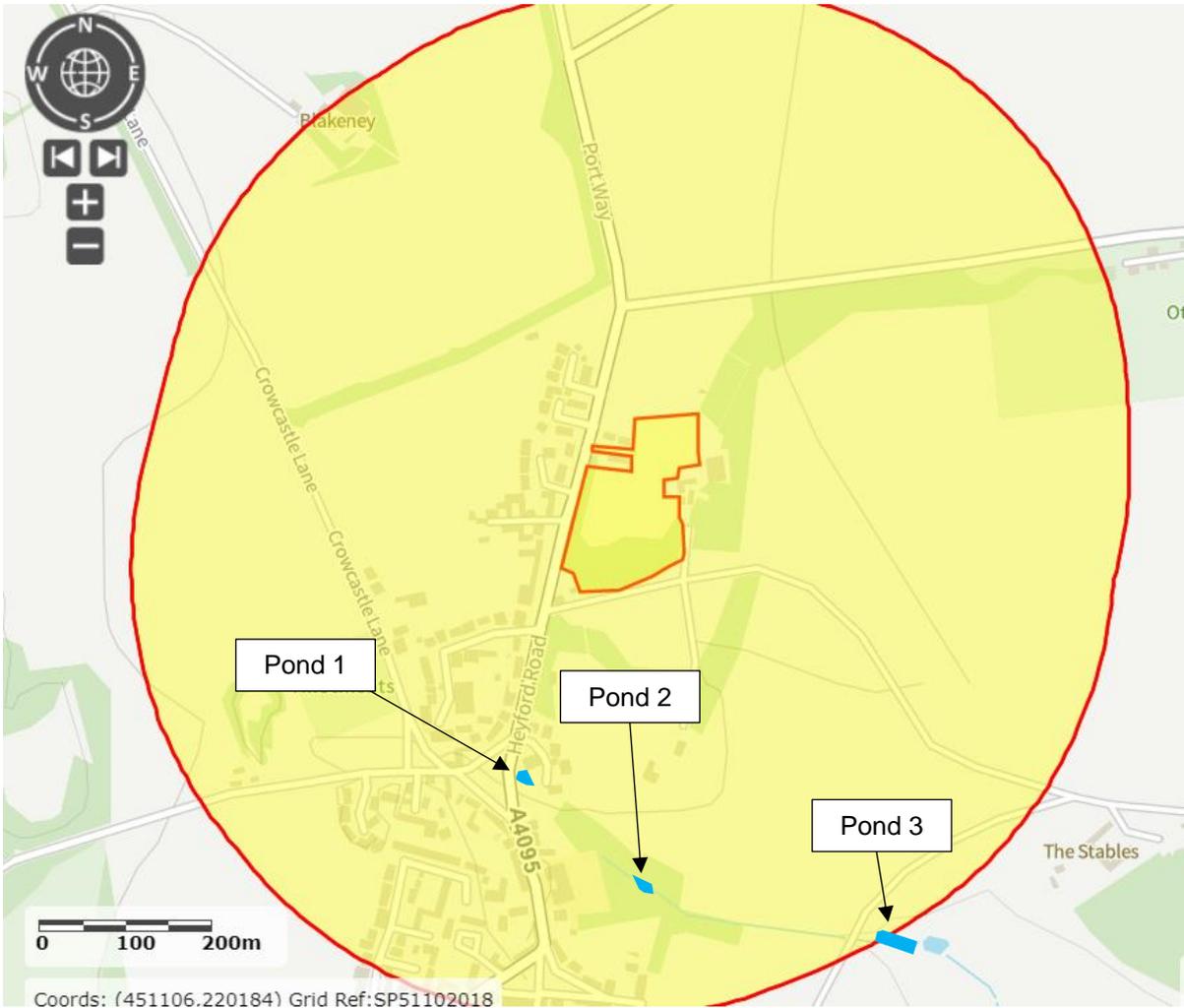


Figure 1. Plan showing the location of the ponds within a 500m radius of the site. The red line with yellow shading shows a 500m radius around the site.

If great crested newts were to have colonised Ponds 1 since the previous study was undertaken it is predicted that great crested newts would not specifically be dispersing to the site from the ponds to the south. Suitable habitats lie around the ponds and the improved grassland within the development zone is unsuitable as terrestrial habitat for great crested newts, being a short sward that provides no cover and little in the way of any meaningful foraging opportunities.

The broad-leaved woodland to the south and west of the site does provide suitable habitat for great crested newts and other amphibian species and the small pockets of scrub along the northern boundary and to the east of the site, around the adjacent properties fence line do provide some shelter. Some careful works to create a footpath will be required in the woodland and a small area of scrub will be lost along the northern boundary.

The MAGIC website does not hold any records of granted great crested newt licences, including class licences, within a 1km radius of the site. Furthermore, there are no ponds shown on the MAGIC website that indicate presence of great crested newts as a result of the Great Crested Newt eDNA Habitat Suitability Index Pond Surveys for District Level Licensing 2017, 2018, 2019.

Given the distance from ponds and the fact that the areas that to be developed for housing do not provide suitable terrestrial habitat, it is considered unlikely that amphibians will be moving into the site during the terrestrial phase of their lifecycle and amphibians are predicted to be absent.

4.3.5 Breeding Birds

The broadleaved woodland, scrub and trees provide potential nesting and/or foraging habitat for common garden, woodland bird species. The TVERC holds a large number of bird records, there are five hundred and fifty two records, often with multiple records per species. These include species such as bullfinch *Pyrrhula pyrrhula*, dunnock *Prunella modularis*, fieldfare *Turdus pilaris*, marsh tit *Poecile palustris*, meadow pipit *Anthus pratensis*, mistle thrush *Turdus viscivorus*, song thrush *Turdus philomelos*, tree sparrow *Passer montanus* and willow warbler *Phylloscopus trochilus*. The records dating from 2003 to 2015.

The improved grassland paddock is considered to be unsuitable as a habitat for ground nesting bird species, such as the skylark, given the sparse nature of the habitat and the enclosed nature of the area. Skylarks' choice of nesting site is influenced by the height and density of the crop; the ideal vegetation height is 20-50 cm. Skylarks have been recorded within the 1km search radius, with three records dating from 2003 to 2014.

The TVERC hold twenty records of corn buntings *Emberiza calandra* dating from 2002 to 2013. All save one of the records have a 1km grid reference, therefore no exact location can be gleaned. One record is from a location approximately 770m to the west of the site. This species strongly prefers agricultural areas with mixed arable rotation, and they tend to avoid improved grassland. Corn buntings build their nests in dense vegetation on or near to the ground. The nests are almost always on the ground in cereals, field boundaries and rough grass. To survive and breed successfully corn bunting need safe nesting habitat within crops, insect food for adults and young and overwinter food and cover. The site does not offer suitable dense cover and the site and immediately surrounding do not provide a significant source of winter food and cover.

The improved grassland does not provide optimal foraging opportunities for species such as the barn owl *Tyto alba* (records dating from 2005 to 2013) and kestrel *Falco tinnunculus* (records dating from 2003 to 2018) which have been recorded within the 1km search radius. There are no obvious suitable potential nesting opportunities within trees of the site. In summary, the quality and extent of foraging habitat within the site is considered to be poor for these species.

4.3.6 Bats

The TVERC holds records for the following bat species within the local area:

- Brown long-eared bat *Plecotus auritus*
- Common pipistrelle *Pipistrellus pipistrellus*
- *Myotis* sp.
- Noctule *Nyctalus noctula*
- *Pipistrellus* sp.

- Serotine *Eptesicus serotinus*
- Soprano pipistrelle *Pipistrellus pygmaeus*
- Western barbastelle *Barbastella barbastellus*

The majority of these records are from recordings from locations to the south side of village. The closest records are from a property located approximately 440m to the south-west of the site. Here, brown long-eared bat droppings have been identified, and brown long-eared bats and common and soprano pipistrelle bats have been recorded using aural bat detectors.

There are no structures or buildings within the site that bats could use for roosting. All trees that will require removal to facilitate the new access road, save one, are assessed as having 'negligible' potential suitability to offer shelter to roosting bats (Collins, 2016).

A pollarded mature crack willow (T41) along the western boundary of the site, towards the eastern end of the access road, has been assessed as having 'low' potential suitability to offer shelter to roosting bats (Collins, 2016) on account of a number of crevices in and between branches that have been promoted by the pollarding and areas of flaking bark.

It should be noted that there are trees present within the woodland that also hold potential suitability to offer shelter to roosting bats.

The improved grassland paddock is likely to provide a poor foraging habitat for bats as it is unlikely to support a diverse or plentiful invertebrate food resource for bats. The woodland provides a suitable foraging resource, as well forming part of a network of woodlands within the locality that provide foraging and commuting corridors.



No evidence of badgers, such as dung piles or snuffle marks, were noted within the site. No badger setts were found.

There are a number of rabbit *Oryctolagus cuniculus* warrens and scrapings within the woodland, including a hole to the south-western corner of the improved grassland on the edge of the woodland. This hole has an opening of approximately 20-25cm, but tapers into a smaller hole as it descends. No evidence of badgers was found in association with this hole and nearby entrances to a rabbit warren were much smaller and had rabbit droppings around and into them. The hole shows no evidence of recent digging, with no large spoil piles and compacted soil with ruderal vegetation growing all around. In addition a discarded container blocks the entrance.

This appears to be the same hole as noted during surveys undertaken during 2017. At the time, evidence of badger foraging activity was noted in the woodland in the form of a small number of snuffle holes and footprints. Evidence of rabbit activity was also visible across the site with warrens present within the woodland and single holes recorded along the southern and western boundary of the improved grassland field. The survey recorded evidence of digging by badgers in the area with a small number of badger hairs and badger footprints found within the entrance hole. Therefore, further work was undertaken to monitor the site for badger activity and understand whether the hole within the south-west corner of the improved grassland was in use by badgers. Monitoring with remote cameras showed no signs of badgers entering or exiting the hole and sticks placed over the hole remained in place in the entrance hole for the entire period between 12th April to 6th June 2017. It was concluded

that no badgers setts were present within the site. Nevertheless, individual badgers were noted passing through the woodland and foraging on occasion.

4.3.8 Hedgehogs

The woodland and scrub offer potential foraging and sheltering habitat to hedgehogs *Erinaceus europaeus*. The improved grassland offers some foraging potential for earthworm prey.

The TVERC holds four records of hedgehogs dating from 2004 and 2019. The records include a hibernating hedgehog, a hedgehog found dead on the road and field records. The closest record comes from a location within the village, approximately 740m to the south-west of the site.

4.3.9 Other Species

The site is not considered to offer habitat to other protected or notable species.

5 Discussion

5.1 Relevant Legislation & Policy Guidance

5.1.1 Reptiles

All British species of reptile are protected by the Wildlife and Countryside Act 1981. Part of Section 9(1) and all of Section 9(5) apply. This means they are protected against intentional killing and injuring (but not taking).

Rarer species, including the smooth snake *Coronella austriaca* and sand lizard *Lacerta agilis*, are fully protected under the Act, which protects them from intentional disturbance and destruction of habitat. The site does not provide any suitable habitat for these two species.

5.1.2 Nesting Birds

Nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. The nesting season for most species is between March and August inclusive.

5.1.3 Bats

As with many animal species within the UK, declines in the abundance and distribution of many bat species have been documented through recent decades. The reasons for these declines are various and complex but it is considered that the major factors are changes in land use and agriculture, the loss of woodlands and hedgerows and the loss of suitable roosting sites.

Bats are particularly sensitive to human activity due to the fact that they roost within buildings, trees and underground structures such as mines, and the availability of suitable roost sites is considered to be a key factor in the conservation of bats within the UK. As a consequence, all species of bat and their roost sites are protected under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) and under The Conservation of Habitats and Species Regulations 2017 (as amended). Taken together, these make it an offence to:

- (a) Deliberately capture or intentionally take a bat
- (b) Deliberately or intentionally kill or injure a bat
- (c) To be in possession or control of any live or dead wild bat or any part of, or anything derived from a wild bat
- (d) Damage or destroy a breeding site or resting place of such an animal or intentionally or recklessly damage, destroy or obstruct access to any place that a wild bat uses for shelter or protection

- (e) Intentionally or recklessly disturb any wild bat while it is occupying a structure or place that it uses for shelter or protection
- (f) Deliberately disturb any bat, in particular any disturbance which is likely
 - to impair their ability;
 - (i) to survive, breed, reproduce or to rear or nurture their young; or
 - (ii) in the case of hibernating or migratory species, to hibernate or migrate; or
 - to affect significantly the local distribution or abundance of the species to which they belong

A bat roost may be any structure a bat uses for breeding, resting, shelter or protection. It is important to note that since bats tend to re-use the same roost sites, current legal opinion is that a bat roost is protected whether or not the bats are present at the time.

Although the law provides strict protection to bats, it also allows this protection to be set aside (derogation) under The Conservation of Habitats and Species Regulations 2017 (as amended) through the issuing of licences (referred to as European Protected Species Licences or EPSL). Where a lawful operation is required to be carried out but which is likely to result in one of the above offences, a licence may be obtained from Natural England (the statutory body in England with responsibility for nature conservation) to allow the operation to proceed. However, in accordance with the requirements of The Conservation of Habitats and Species Regulations 2017 (as amended) a licence can only be issued where the following requirements are satisfied:

- The proposal is necessary ‘to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment’;
- ‘There is no satisfactory alternative’;
- The proposals ‘will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range’.

These three criteria are often referred to as the ‘three tests’ of the Regulations. All three must be satisfied in order for a licence to be granted.

5.1.4 National Planning Policy Framework (NPPF)

The National Planning Policy Framework was revised on 20th July 2021 and sets out the government’s planning policies for England and how these are expected to be applied. This revised Framework replaces the previous National Planning Policy Framework published in March 2012, revised in July 2018 and updated in February 2019.

The NPPF states that planning policies and decisions should contribute to and enhance the natural and local environment by:

- protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
- recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
- minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local

environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

- remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.

Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas, and should be given great weight in National Parks and the Broads. The scale and extent of development within all these designated areas should be limited, while development within their setting should be sensitively located and designed to avoid or minimise adverse impacts on the designated areas.

When considering applications for development within National Parks, the Broads and Areas of Outstanding Natural Beauty, permission should be refused for major development other than in exceptional circumstances, and where it can be demonstrated that the development is in the public interest. Consideration of such applications should include an assessment of:

- the need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy;
- the cost of, and scope for, developing outside the designated area, or meeting the need for it in some other way; and
- any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated.

Within areas defined as Heritage Coast (and that do not already fall within one of the designated areas mentioned in paragraph 176), planning policies and decisions should be consistent with the special character of the area and the importance of its conservation. Major development within a Heritage Coast is unlikely to be appropriate, unless it is compatible with its special character.

To protect and enhance biodiversity and geodiversity, plans should:

- Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and
- Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.

When determining planning applications, local planning authorities should apply the following principles:

- If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

- Development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the 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;
- Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons, and a suitable compensation strategy exists; and
- Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.

The following should be given the same protection as habitats sites:

- ❖ Potential Special Protection Areas and possible Special Areas of Conservation;
- ❖ Listed or proposed Ramsar sites; and
- ❖ Sites identified, or required, as compensatory measures for adverse effects on a habitats site, (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.

The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitat's site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.

5.1.5 *The Natural Environment & Rural Communities Act 2006*

Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 places a duty on the Secretary of State to publish, review and revise lists of living organisms and types of habitat in England that are of principal importance for the purpose of conserving English biodiversity. It also requires the Secretary of State to take, and promote the taking of, steps to further the conservation of the listed organisms and habitats. This is important in the context of planning decisions as the National Planning Policy Framework affords planning policy protection to the habitats of species listed by virtue of Section 41.

Habitats listed within Section 41 of the NERC Act 2006 that are relevant to the site, or considered to be potentially relevant, include:

- Lowland Mixed Deciduous Woodland

Species listed within Section 41 of the NERC Act 2006 that are relevant to the site, or considered to be potentially relevant, include:

- A number of species, including moths (broad-leaved woodland offers the main potential habitat).
- Common species of reptile, in particular the grass snake (woodland and scrub provide potential foraging and sheltering habitat and grassland/tall ruderal habitats on the edge of these provide basking opportunities).
- A number of bird species including, dunnock, starling and song thrush (scrub and trees provide potential nesting habitat improved grassland provides some potential foraging habitat).

- Certain bat species, such as brown long-eared bat and soprano pipistrelle bat (the woodland offers potential as a commuting corridor and foraging habitat, a small number of the trees in the woodland contain features that offer potential roost sites).
- Badgers (foraging habitat within the woodland and improved grassland)
- Hedgehog, (Woodland, scrub and improved grassland offers a mosaic of potential foraging and sheltering habitat).

5.1.6 *Environment Act 2021*

On 15th October 2019, the government introduced a new Bill to Parliament; The Environment Bill. This Bill was given Royal Assent on 9 November 2021 thereby passing the Environment Act 2021. This legislation will help ensure that England maintains and improves its environmental protection. The Act details a legal requirement for all developments to ensure that a minimum of 10% net gain in Biodiversity is delivered. While Section 6 of the Environment Act states that a Biodiversity Net Gain is required for new developments, this is not a mandatory requirement until such time as the Secretary of State adopts a regulation determining it so. This secondary regulation is expected in autumn 2023.

5.1.7 *Policy ESD 10: Protection and Enhancement of Biodiversity and the Natural Environment*

Policy ESD 10 states that protection and enhancement of biodiversity and then natural environment will be achieved by the following:

- In considering proposals for development, a net gain in biodiversity will be sought by protecting, managing, enhancing and extending existing resources, and by creating new resources.
- The protection of trees will be encouraged, with an aim to increase the number of trees in the District.
- The reuse of soils will be sought.
- If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or as a last resort, compensated for, then development will not be permitted.
- Development which would result in damage to or loss of a site of international value will be subject to the Habitats Regulations Assessment process and will not be permitted unless it can be demonstrated that there will be no likely significant effects on the international site or that effects can be mitigated.
- Development which would result in damage to or loss of a site of biodiversity or geological value of national importance will not be permitted unless the benefits of the development clearly outweigh the harm it would cause to the site and the wider national network of SSSIs, and the loss can be mitigated to achieve a net gain in biodiversity/geodiversity.
- Development which would result in damage to or loss of a site of biodiversity or geological value of regional or local importance including habitats of species of principal importance for biodiversity will not be permitted unless the benefits of the development clearly outweigh the harm it would cause to the site, and the loss can be mitigated to achieve a net gain in biodiversity/geodiversity.
- Development proposals will be expected to incorporate features to encourage biodiversity, and retain and where possible enhance existing features of nature conservation value within the site. Existing ecological networks should be identified and maintained to avoid habitat

fragmentation, and ecological corridors should form an essential component of green infrastructure provision in association with new development to ensure habitat connectivity.

- Relevant habitat and species surveys and associated reports will be required to accompany planning applications which may affect a site, habitat or species of known or potential ecological value.
- Air quality assessments will also be required for development proposals that would be likely to have a significantly adverse impact on biodiversity by generating an increase in air pollution.
- Planning conditions/obligations will be used to secure net gains in biodiversity by helping to deliver Biodiversity Action Plan targets and/or meeting the aims of Conservation Target Areas. Developments for which these are the principal aims will be viewed favourably.
- A monitoring and management plan will be required for biodiversity features on site to ensure their long-term suitable management.

5.2 Potential Impacts

5.2.1 Sites of Nature Conservation Importance

There are no predicted impacts on statutory or non-statutory designated sites of nature conservation importance as a result of the proposals. This is due to the distance of such sites from the area of proposed development, as well as the scale of the proposals that will have no foreseeable indirect ecological impacts in a wider context.

5.2.2 Habitats

The proposed development will result in the loss improved grassland, an area of mixed scrub along the northern boundary of the site, areas of tall ruderal vegetation, the existing tarmacked access track with gravel parking areas and sections of existing garden habitat immediately adjacent to the access track including garden hedges and three trees; a young yew, a mature pollarded crack willow and an early mature ash.

Loss of improved grassland, tall ruderal vegetation, mixed scrub, garden habitats, individual trees and hard-standing will not result in impacts on habitats of 'principal importance' and will result in the loss of habitats that are of ecological value at the site level only. This is likely to have a minor to moderate adverse impact at the site level without compensation for the loss.

Tree planting, wildlife friendly garden planting and the creation of a species rich neutral grassland to the north of the woodland and the north-east of the site will be incorporated into the landscaping of the new development in order to provide compensation and enhancement for biodiversity. Further details can be found in Section 6.2. As a result, there are unlikely to be any residual adverse impacts as a result of the loss of improved grassland, scrub and garden habitats. Section 5.3 presents an assessment of Biodiversity Net Gain (BNG), which indicates that BNG can be achieved within the proposals.

The trees within the broad-leaved woodland will be retained and protected as part of the proposal plans. However, there will be minor impacts as a result of the proposal plans within the western belt of trees which forms part of the woodland. A walkway will be formed in the western belt of the woodland to create pedestrian access from the development to the wider village. This will also involve a section of the stone wall being removed. Although no trees will require felling to achieve this, the woodland will need to be protected from damage and disturbance from human activity for the long-term. Recommendations for this are provided in Section 6.2.

Given that one of the objectives of the NPPF is to ensure that there is net biodiversity gain within all developments, consideration has been given to how overall biodiversity loss can be minimised, and where habitat creation and enhancement can lead to a net gain in biodiversity value.

5.2.3 Species

5.2.3.1 Plants

There are no foreseeable impacts on rare or uncommon plant species.

5.2.3.2 Invertebrates

Loss of improved grassland, tall ruderal vegetation, small areas of scrub and garden habitats is unlikely to result in loss of habitats that support a diverse or abundant invertebrate assemblage.

With the retention of the most important habitat within the site for invertebrate species, the broad-leaved woodland, it is considered unlikely that there will be a significant impacts on uncommon species, such a rarer moths or stag beetles. In fact, the proposals will result in an increased diversity of habitats, such as new gardens, native hedgerows and an enhancement to the existing improved grassland to create a species rich neutral grassland with planted trees.

5.2.3.3 Reptiles

The proposed development will result in the disturbance to a small area of the woodland floor and loss of an area of scrub which both provide shelter and foraging opportunities. Specific habitat features will also be lost that offer shelter to common reptiles such as, a section of the stone wall and fallen dead wood.

Without appropriate mitigation, the installation of the pedestrian walkway within the western belt of the woodland and the removal of an area of scrub could result in the killing and injury of reptiles, in particular the grass snake. This impact is likely to affect only a small number of individuals, given the very limited habitat for reptiles within the development zone. Recommendations are made for careful work practices to avoid such impacts. It should be noted that wider improved grassland currently provides no suitable habitat for species of reptile, although reptile species may migrate across it.

5.2.3.4 Amphibians

As previously discussed, there are no ponds within the site, and thus, no foreseeable impacts on aquatic habitats that could be used by breeding amphibians. In addition, it is considered unlikely that amphibians, such as the great crested newt, will be moving into the site from the three ponds that are located within a 500m radius of the site.

Furthermore, the proposals predominantly result in the loss of improved grassland which is not considered to provide a suitable habitat for this species. Disturbance to the woodland floor, loss of a small area of scrub, section of a stone wall and fallen dead wood do provide habitat for great crested newts, but due to the distance and small-scale habitat within the site there are no predicted impacts as a result of this.

Table 1 below presents the result of Natural England's great crested newt Rapid Risk Assessment which indicates that the proposals, in particular the loss of the habitats within the site, are highly unlikely to result in an offence. It should be noted that all construction activities will be beyond 250m from the nearest pond. Therefore, there are no predicted impacts on great crested newt terrestrial habitat.

With the adoption of careful work practices, such as the removal of the section of the stone wall and any fallen dead wood by hand outside of the hibernation period, the risk of killing/injury/disturbance of great crested newts can be reduced to a negligible level, and there are no foreseeable impacts on individual great crested newts.

Table 1. The results of the Rapid Risk Assessment for great crested newts, taken from Natural England's guidelines for impact assessment.

Component	Likely effect (select one for each component; select the most harmful option if more than one is likely; lists are in order of harm, top to bottom)	Notional offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	No effect	0
Land 100-250m from any breeding pond(s)	0.01 - 0.1 ha lost or damaged	0.01
Land >250m from any breeding pond(s)	No effect	0
Individual great crested newts	No effect	0
	Maximum:	0.01
Rapid risk assessment result:	GREEN: OFFENCE HIGHLY UNLIKELY	

With an appropriate strategy in place, no significant impacts on great crested newts are predicted under The Conservation of Habitats and Species Regulations 2017 (as amended), and a European Protected Species (newt) licence will not be required for the proposed works to proceed. Since there are no predicted impacts on great crested newts or their habitats, it is not necessary to consider the 'three tests' of The Conservation of Habitats and Species Regulations 2017 (as amended) in this instance.

Recommendations are made for a precautionary working method and for habitat enhancement for amphibians, given that small numbers of common amphibian species have previously been recorded within the site.

5.2.3.5 Birds

Removal of trees and scrub during the bird breeding period could result in the damage or destruction of active birds' nests and has the potential to result in the killing or injury of eggs and young.

There are no predicted impacts on ground nesting species.

5.2.3.6 Bats

One tree (T41) scheduled for removal has been assessed as having 'low' potential suitability to offer shelter to roosting bats, all other trees have either no potential or will be retained. Recommendations for the removal of T41 which has 'low' potential roost suitability are made in Section 6.2.2.

The loss of improved grassland, small areas of garden, scrub, tall ruderal vegetation and individual trees is unlikely to result in any significant impacts on foraging bats or habitats that are of high value to foraging bats. The removal of individual trees does not significantly impact on the canopy cover and hence commuting corridors.

New gardens and parkland type habitat will be created in the long-term and these are likely to provide habitat for a range of invertebrate species.

The most important habitat for bats, the woodland, will be retained and protected.

A new hedgerow resource will be created within the development, with further tree and scrub planting to create a parkland type habitat around the new houses. These habitats as they mature over time will provide navigation corridors, particularly the parkland trees with species rich grassland below. This area of the development will be unlit to create a link in the landscape to woodlands to the north-east of the site. It is considered that, with the retention of the woodland and creation of hedgerows, parkland and scrub, suitable bat foraging and movement habitats will be retained and enhanced within the site and particularly along the site boundaries.

External lighting could have an impact on bats by affecting their activity and behaviour. In that certain species of bat have been shown to be attracted to mercury vapour lamps which emit light over a very broad-spectrum including UV light to which insects are particularly sensitive.

Furthermore, insects can be attracted in large numbers to mercury lamps and so can bats of the genera *Nyctalus* and *Pipistrellus*, including noctules and common and soprano pipistrelle bats (Rydell and Racey 1993) which have been recorded in the village. Lighting has shown to have an opposite effect on certain other species which have been shown to avoid areas of artificial light (Stone *et al.* 2009). New lighting, and particularly light spillage onto the retained woodland and created parkland, may have an adverse impact on bat behaviour, foraging and dispersal.

5.2.3.7 Badgers

There are no badger setts within the site and therefore there are no predicted impacts of damage or destruction to badger setts, tunnels and underground chambers as a result of the proposals.

It is not considered that there will be long-term impacts as a result of foraging habitat loss, considering that previously studies found the main foraging activity occurred within the woodland and there continues to be no evidence of foraging with the improved grassland paddock. Badgers will be able to enter the new gardens and parkland type habitat, if they so wish, and will be able to continue to use the site for foraging.

Indirect impacts on the badgers may be caused by excavations and foundations posing as a pit-fall hazard to badgers moving over ground. Measures to minimise and avoid this type of indirect impact are proposed in Section 6.2.2.

5.2.3.8 Hedgehogs

The loss of an area of improved grassland and small area of scrub will result in a loss of limited foraging and sheltering habitat for this species.

The woodland will be retained and will continue to provide suitable habitat for this species. New hedgerows will provide commuting corridors, as well as shelter. Gardens and parkland will replace improved grassland and these habitats are likely to provide increased foraging and sheltering habitats and a diversify the habitats available for this species. As a result, there are no predicted residual impacts for this species.

5.2.3.9 Other Species

There are no foreseeable impacts on other protected or notable species.

5.3 Biodiversity Net Gain Assessment

5.3.1 Overview

The NPPF (revised July 2021) states that planning policies and decisions should contribute to, and enhance the natural and local environment by minimising impacts to existing habitats and providing net gains for biodiversity.

In Cherwell, Policy ESD 10 of the Local Plan requires a net gain in biodiversity to be sought.

Underpinning this policy is the National Planning Policy Framework (NPPF), whereby:

- Paragraph 174(d) requires planning decisions to provide net gains in biodiversity;
- Paragraph 179(b) requires plans to identify and pursue opportunities for securing measurable net gains for biodiversity; and
- Paragraph 180(a) states that if significant biodiversity losses cannot be avoided, mitigated or compensated then permission should be refused.

A biodiversity net gain assessment has been undertaken using the Biodiversity Metric 4.0 (JP039). The full calculation can be found in Appendix 6 (appended Excel Spreadsheet).

The result of the calculation predicts a **net gain in biodiversity value**. The predicted net percentage change is **+19.51% habitat units; an increase of +3.23 habitat units**. Furthermore, hedgerow units will be created as a result of this proposal, where there is only a very short lengths of garden hedges to start with there is an **increase of +0.75 hedgerow units**.

The Biodiversity Metric 4.0 shows that there will be an overall net gain in biodiversity value at the site. The parkland style habitat that will be created to the south and east of the development has been designed to integrate the development into the surrounding landscape and create a new area of parkland, which is a target habitat of the nearby Kirtlington and Bletchington Parks and Woods Conservation Target Area. It will provide a stepping stone of habitat and over time as it matures, a continuation of a high value habitat that will link the woodland and parkland in the wider area. Further species-specific enhancements have also been included within the development in order to provide additional gains for biodiversity.

The calculation is based on the habitats present on site before development (please see Appendix 7 for a Phase 1 habitat plan and Appendix 8 for a UKHab habitat plan) and the habitats after development has taken place (please see the proposal plan in Appendix 3 and the UKHab habitat plan in Appendix 9). Appendix 10 presents a plan showing habitat parcels and linear habitats that will be lost and retained and hedgerows that will be lost and enhanced.

5.3.2 Habitat Status Before Development

Each of the habitats discussed within the Ecological Impact Assessment (EclA) were inputted into the Biodiversity Metric 4.0 using a Phase 1 to UKHab conversion. This converts the habitats as listed within the EclA to their UKHab equivalent. The habitat conversion is given in Table 2 below.

The total site area is 2.19 hectares (ha).

The on-site habitat areas and lengths can also be viewed in this table. A UKHab habitat plan showing the before development habitats can be found in Appendix 8.

Table 2. Habitat conversion table and on-site habitats prior to development

Area habitat baseline		
Phase 1 Habitat type	UKHab equivalent	Area (hectares)
Improved grassland	Grassland – Modified grassland	1.2754
Bramble scrub	Heathland and shrub – Bramble scrub	0.0233
Mixed scrub	Heathland and shrub – Mixed scrub	0.0182
Tall ruderal vegetation	Sparsely vegetated land – Ruderal/Ephemeral	0.0305
Gravelled drive, hard-standing	Urban - Artificial unvegetated, unsealed surface	0.0310
Garden habitats	Urban – Vegetated garden	0.0229
Broad-leaved woodland – Lowland Mixed Deciduous Woodland	Woodland and Forest – Lowland mixed deciduous woodland	0.7929
Individual trees	Individual tree – Rural tree	0.0814
Hedgerows baseline		

Phase 1 Habitat type	UKHab equivalent	Length (km)
Garden hedge	Non-native and ornamental hedgerow	0.010

5.3.2.1 Baseline Habitat Condition Assessment

Habitat condition was assessed according to the criteria given within the Biodiversity Metric 4.0 User Guide. The condition assessments for the area habitat baseline are presented in Table 3.

Please note that a condition assessment for the following habitats is not applicable:

- Bramble scrub
- Artificial unvegetated, unsealed surface
- Vegetated garden

For the site hedgerow baseline only short sections of ornamental non-native hedge are present, the condition for this type of hedge is set at 'poor'. The condition assessments for hedgerow baseline can be found in Table 4.

Table 3. Area habitat baseline condition assessment prior to development.

Condition Assessment for the site habitat baseline				
Habitat	Condition Assessment	Justification		
Modified grassland	Moderate	The modified grassland has been assessed as having a condition score of 'Moderate' . The habitat passes 4 of the 7 criteria, and passes the non-negotiable criterion please see below for further detail.		
		Criterion	Condition Assessment Criteria	Condition achieved (Y/N)
		1	There must be 6-8 species per m ² . If a grassland has 9 or more species per m ² it should be classified as a medium distinctiveness grassland habitat type. NB - this criterion is essential for achieving moderate and good condition	Y
		2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	N
		3	Some scattered scrub (including bramble) may be present, but scrub accounts for less than 20% of total grassland area. Note - patches of shrubs with continuous (more than 90%) cover should be classified as the relevant scrub habitat type.	Y
4	Physical damage evident in less than 5% of total grassland area. Examples of physical damage include excessive poaching, damage from machinery use or	N		

Condition Assessment for the site habitat baseline				
Habitat	Condition Assessment	Justification		
			storage, erosion caused by high levels of access, or any other damaging management activities.	
		5	Cover of bare ground is between 1% and 10%, including localised areas (for example, a concentration of rabbit warrens).	N
		6	Cover of bracken less than 20%.	Y
		7	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981).	Y
		Total of 4 criteria achieved and passes the non-negotiable criterion (1)		
Mixed scrub	Moderate	The hawthorn scrub has been assessed as having a condition score of 'Moderate' . The habitat passes 3 of the 5 criteria, please see below for further detail.		
		Criterion	Condition Assessment Criteria	Condition achieved (Y/N)
		1	Habitat is representative of UKHab description (where in its natural range). There are at least three woody species, with no one species comprising more than 75% of the cover (except common juniper, sea buckthorn or box, which can be up to 100% cover).	Y
		2	There is a good age range – all of the following are present: seedlings, young shrubs and mature shrubs.	Y
		3	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981) and species indicative of sub-optimal condition ₁ make up less than 5% of ground cover.	Y
		4	The scrub has a well-developed edge with scattered scrub and tall grassland and/or herbs present between the scrub and adjacent habitat(s).	N
		5	There are clearings, glades or rides present within the scrub, providing sheltered edges.	N
		Footnote 1 - Species indicative of sub-optimal condition for this habitat type include: tree-of-heaven <i>Alnus altissima</i> , holm oak <i>Quercus ilex</i> , turkey oak <i>Quercus cerris</i> , creeping thistle <i>Cirsium arvense</i> , common nettle <i>Urtica dioica</i> , cherry laurel <i>Prunus laurocerasus</i> , snowberry <i>Symphoricarpos</i> spp., buddleia <i>Buddleja</i> spp., cotoneaster <i>Cotoneaster</i> spp., Spanish bluebell <i>Hyacinthoides hispanica</i> (or hybrids).		
		Total of 3 passes		
Ephemeral/Ruderal vegetation	Poor	The ruderal vegetation has been assessed as having a condition score of 'Poor' . The habitat passes 1 of the 3 criteria, please see below for further detail.		

Condition Assessment for the site habitat baseline							
Habitat	Condition Assessment	Justification					
		Criterion	Condition Assessment Criteria		Condition achieved (Y/N)		
		CORE CRITERIA - applicable to all urban habitat types:					
		1	Vegetation structure is varied, providing opportunities for insects, birds and bats to live and breed. A single structural habitat component / vegetation type should not account for more than 80% of the total habitat area.		N		
		2	There is a diverse range of flowering plant species, providing nectar sources for insects. These species may be either native, or non-native but beneficial to wildlife. NB - To achieve GOOD condition, criterion 2 must be satisfied by native species only (rather than non-natives beneficial to wildlife).		N		
		3	Invasive non-native species (Schedule 9 of WCA) cover less than 5% of total vegetated area. NB - To achieve GOOD condition, criterion 3 must be satisfied by a complete absence of invasive non-native species (rather than <5% cover).		Y		
		Achieves 1 of 3 core criteria					
Lowland mixed deciduous woodland	Moderate	The other broadleaved woodland has been assessed as having a condition score of Moderate . The wet woodland scored a total 27: a total score between 26 to 32 gives a condition assessment score of moderate. Please see below for further detail of how the woodland has been assessed.					
		Indicator	Good (3 points)	Moderate (2 points)	Poor (1 point)	Score per indicator	
		1	Age distribution of trees	Three age classes present	Two age classes present	One age class present	3
		2	Wild, domestic and feral herbivore damage	No significant browsing damage evident in woodland	Evidence of significant browsing pressure is present in 40% or less of whole woodland	Evidence of significant browsing pressure is present in 40% or more of whole woodland	3
		3	Invasive plant species	No invasive species present in woodland	Rhododendron or laurel not present, other invasive	Rhododendron or laurel present, or other invasive	3

Condition Assessment for the site habitat baseline							
Habitat	Condition Assessment	Justification					
					species < 10% cover	species > 10% cover	
		4	Number of native tree species	Five or more native tree or shrub species found across woodland parcel	Three to four native tree or shrub species found across woodland parcel	None to two native tree or shrub species across woodland parcel	3
		5	Cover of native tree and shrub species	> 80% of canopy trees and >80% of understory shrubs are native	50-80% of canopy trees and 50-80% of understory shrubs are native	< 50% of canopy trees and <50% of understory shrubs are native	3
		6	Open space within woodland	10 – 20% of woodland has areas of temporary open space, unless woodland is <10ha in which case lower threshold of 10% does not apply	21- 40% of woodland has areas of temporary open space	More than 40% of woodland has areas of temporary open space	3
		7	Woodland regeneration	All three classes present in woodland; trees 4-7cm dbh, saplings and seedlings or advanced coppice regrowth	One or two classes only present in woodland	No classes or coppice regrowth present in woodland	1
		8	Tree health	Tree mortality less than 10%, no pests or diseases and no crown dieback	11% to 25% mortality and/or crown dieback or low risk pest or disease present	Greater than 25% tree mortality and or any high-risk pest or disease present	3

Condition Assessment for the site habitat baseline							
Habitat	Condition Assessment	Justification					
		9	Vegetation and ground flora	Ancient woodland flora indicators present	Recognisable NVC plant community present	No recognisable NVC community	1
		10	Woodland vertical structure	Three or more storeys across all survey plots or a complex woodland	Two storeys across all survey plots	One or less storey across all survey plots	2
		11	Veteran trees	Two or more veteran trees per hectare	One veteran tree per hectare	No veteran trees present in woodland	1
		12	Amount of deadwood	50% of all survey plots within the woodland parcel have standing deadwood, large dead branches/ stems and stumps, or a high abundance of smaller cavities	Between 25% and 50% of all survey plots within the woodland parcel have standing deadwood, large dead branches/ stems and stumps, or a high abundance of smaller cavities	Less than 25% of all survey plots within the woodland parcel have standing deadwood, large dead branches/ stems and stumps, or a high abundance of smaller cavities	1
		13	Woodland disturbance	No nutrient enrichment or damaged ground evident	Less than 1 hectare in total of nutrient enrichment across woodland area and/or less than 20% of woodland area has damaged ground	More than 1 hectare of nutrient enrichment and/or more than 20% of woodland area has damaged ground	2
Total score of 29 points							
Rural tree (T1 -Early-mature Ash)	Moderate	T1, an ash tree, has been assessed as having a condition score of 'Moderate' . The tree passes 4 of the 6 criteria, please see below for further detail.					
		Criterion	Condition Assessment Criteria			Condition achieved (Y/N)	

Condition Assessment for the site habitat baseline				
Habitat	Condition Assessment	Justification		
		1	The tree is a native species (or more than 70% within the block are native species).	Y
		2	The tree canopy is predominantly continuous, with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide (individual trees automatically pass this criterion).	Y
		3	The tree is mature or veteran (or more than 50% within the block are mature or veteran).	N
		4	There is little or no evidence of an adverse impact on tree health by anthropogenic activities such as vandalism or herbicide use. There is no current regular pruning regime, so the trees retain >75% of expected canopy for their age range and height.	Y
		5	Micro-habitats for birds, mammals and insects are present e.g. presence of deadwood, cavities, ivy or loose bark	N
		6	More than 20% of the tree canopy area is oversailing vegetation beneath.	Y
Rural tree (T41- Mature Crack Willow)	Moderate	T41, a crack willow, has been assessed as having a condition score of 'Moderate' . The tree passes 4 of the 6 criteria, please see below for further detail.		
		Criterion	Condition Assessment Criteria	Condition achieved (Y/N)
		1	The tree is a native species (or more than 70% within the block are native species).	Y
		2	The tree canopy is predominantly continuous, with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide (individual trees automatically pass this criterion).	Y
		3	The tree is mature or veteran (or more than 50% within the block are mature or veteran).	N
		4	There is little or no evidence of an adverse impact on tree health by anthropogenic activities such as vandalism or herbicide use. There is no current regular pruning regime, so the trees retain >75% of expected canopy for their age range and height.	N

Condition Assessment for the site habitat baseline				
Habitat	Condition Assessment	Justification		
		5	Micro-habitats for birds, mammals and insects are present e.g. presence of deadwood, cavities, ivy or loose bark	Y
		6	More than 20% of the tree canopy area is oversailing vegetation beneath.	Y
		Achieves 4 of 6 criteria		
Rural tree (T42 Young/semi- mature Yew.)	Moderate	The urban trees have been assessed as having a condition score of 'Moderate' . The habitat passes 4 of the 6 criteria, please see below for further detail.		
		Criterion	Condition Assessment Criteria	Condition achieved (Y/N)
		1	The tree is a native species (or more than 70% within the block are native species).	Y
		2	The tree canopy is predominantly continuous, with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide (individual trees automatically pass this criterion).	Y
		3	The tree is mature or veteran (or more than 50% within the block are mature or veteran).	N
		4	There is little or no evidence of an adverse impact on tree health by anthropogenic activities such as vandalism or herbicide use. There is no current regular pruning regime, so the trees retain >75% of expected canopy for their age range and height.	Y
		5	Micro-habitats for birds, mammals and insects are present e.g. presence of deadwood, cavities, ivy or loose bark	N
		6	More than 20% of the tree canopy area is oversailing vegetation beneath.	Y
		Achieves 4 of 6 criteria		

Table 4. UKHab hedgerow condition assessment before development

A hedgerow condition assessment prior to development condition for the ornamental non-native hedges within the site is not required. The condition for this type of hedge is set at 'poor'.

UKHab	Condition	Rationale
Non-native and ornamental hedgerow	Poor	Condition is set at 'Poor'.

5.3.2.2 Habitat Strategic Significance Before Development

The site is not listed within a local strategy for nature conservation.

The site and habitats it contains are not included in the local plan, strategies or policy, and there is no evidence to suggest that the habitat is of medium strategic significance. Therefore, the habitats within the site have been assessed as having 'low' strategic significance. Please see Table 4 below.

Table 5. Site Habitat Baseline Strategic Significance

Area Habitat	
Habitat	Strategic Significance
Modified grassland	Low
Bramble scrub	Low
Mixed scrub	Low
Ruderal/Ephemeral	Low
Developed land/seal surface	Low
Vegetated garden	Low
Lowland mixed deciduous woodland	Low
Rural tree	Low
Hedgerows	
Habitat	Strategic Significance
Non-native and ornamental hedgerow	Low

5.3.3 Site Habitat Status Post Development

There is a proposal to create a residential scheme for 14 units with associated access, parking and landscaping.

The landscaping of the wider site, outside of the curtilage of the new houses to the south and east of the new development, will see areas of modified grassland being enhanced in order to create species rich other neutral grassland. A 'meadow-mix', such as Standard General-Purpose Meadow Mixture EM2 will be used. This grassland will form the open grassland of the parkland type habitat and will provide a nectar source for insects and forging and sheltering habitat for species such as reptiles, amphibians and small mammals.

Woody scrub is a particularly important element of parkland with species such as hawthorn and blackthorn contributing nectar sources for invertebrates and protection for regenerating trees. An area of mixed scrub will be created along the northern edge of the woodland, to create an ecotone between the woodland and parkland habitat, as well creating a mosaic of beneficial habitat types, with scrub being a Cherwell Biodiversity Action Plan Habitat. Further scrub planting will be established along the eastern and northern boundaries of the site.

The site is within the Wood Pasture and Parkland National Habitat Network, as well as being located close to the Kirtlington and Bletchington Parks and Woods CTA, within which 'Parkland' is a priority habitat, as well as being an Oxfordshire Biodiversity Action Plan Habitat. Therefore, 20 heavy standard trees will be planted in this area. They will be English oak, lime and beech that will reach a 'medium' size, meaning they will have a diameter-at-breast-height (DBH) greater than 30cm and less than or equal to 90cm after 30 years (the project life time). A further 71 small trees will be planted, having a DBH of greater than 7cm and less than or equal to 30cm.

A small area of mixed scrub will be lost (0.063ha) will be lost under the footprint of the new development, however, as mentioned above, a new areas of mixed scrub will be established in order to compensate for this and create an enhancement to the existing situation.

An element of Policy ESD 10 relates to ecological corridors forming an essential component of green infrastructure provision in association with new development to ensure habitat connectivity; the aim of the habitats that are being created is to integrate the development into the existing landscape and

create habitats that will be of biodiversity benefit to the area, as well as strengthening the green infrastructure and links to further woodland and parkland habitats close by.

To echo the theme of parkland and to help contribute to one of the aims of Policy ESD 10, to increase the number of trees in the District, further tree planting will be included within the development itself, as will native hedgerows. The trees have not been separated out, but are included as part of the 'vegetated gardens', as per the Biodiversity Metric 4.0 User Guide.

A length of 0.01km of the existing non-native ornamental hedgerow will be lost so that a new access road can be created. New Non-native and ornamental hedgerow will be created around the new gardens and native hedgerow and species rich native hedgerow will be created in communal areas.

Gardens will be created with shrub and herb planting, as well as areas of lawn.

The 'Lowland Deciduous Woodland' will be retained and protected as part of the development.

Please refer to Appendix 3 for a proposal plan showing all of these elements and Appendix 9 for a plan showing the habitats that will be created.

The proposed habitat areas and lengths, alongside their target condition can be seen in Tables 6.

The proposed hedge lengths, alongside their target condition can be seen in Table 7.

Table 6. Area habitats post development.

Site Baseline Habitats - Retained			
Habitat		Area (hectares)	Target Condition
Bramble scrub		0.0233	-
Mixed scrub		0.0119	-
Artificial unvegetated, unsealed surface		0.0027	-
Vegetated garden		0.0100	-
Lowland mixed deciduous woodland		0.7929	-
Site Habitat Enhancement			
Existing Habitat	Enhanced Habitat	Area (hectares)	Target Condition
Modified grassland	Other neutral grassland	0.6135	Moderate
Modified grassland	Mixed scrub	0.0612	Moderate
Ruderal/Ephemeral	Mixed scrub	0.028	Moderate
Site Habitat Creation			
Habitat		Area (hectares)	Target Condition
Other neutral grassland		0.0025	Moderate
Ponds (non-priority habitat)		0.0228	Good
Developed land; sealed surface		0.3849	N/A Other
Vegetated garden		0.2405	Condition assessment N/A
Rural tree		1.0219	Moderate

Table 7. UKHab hedgerow lengths and condition assessment post development.

Hedgerow Creation		
Habitat	Length	Target Condition
Non-native and ornamental hedgerow	0.199	Poor
Native hedgerow	0.27	Moderate
Species-rich native hedgerow	0.67	Moderate

5.3.3.1 Habitat Strategic Significance Post Development

The site is not listed within a local strategy for nature conservation.

The site and habitats it contains are not included in the local plan, strategies or policy, and there is no evidence to suggest that the habitat is of medium strategic significance.

The site is within the Wood Pasture and Parkland National Habitat Network, as well as being located close to the Kirtlington and Bletchington Parks and Woods CTA, within which 'Parkland' is a priority habitat, as well as being an Oxfordshire Biodiversity Action Plan Habitat. Therefore the 91 trees that are being planted to the eastern and western areas of the site are considered to be of 'medium' strategic significance. The remainder of the habitats within the site have been assessed as having 'low' strategic significance. Please see Table 8 below.

Table 8. Post Development Strategic Significance

Area Habitat	
Habitat	Strategic Significance
Bramble scrub	Low
Mixed scrub	Low
Artificial unvegetated, unsealed surface	Low
Vegetated garden	Low
Lowland mixed deciduous woodland	Low
Ponds (non-priority habitat)	Low
Developed land: sealed surface	High
Other neural grassland	High
Rural tree	Medium
Hedgerows	
Habitat	Strategic Significance
Non-native and ornamental hedgerow	Low
Native hedgerow	Low
Species-rich native hedgerow	Low

5.3.4 Biodiversity Metric Calculation Summary

The result of the calculation is:

Total net unit change in habitats: **+3.23 habitat units**

Total net % change in habitats: **+19.51%**

Total net unit change in hedgerows: **+0.75 hedgerow units**

Total net % change in hedgerows: **n/a**

The results of the Biodiversity Metric 4.0 show that the development will result in an overall net gain for biodiversity. The Biodiversity Metric 4.0 does not take into account species specific enhancements. Section 6.2 below details how the site will provide new opportunities for wildlife.

Please refer to Appendix 6 (separate document) for full details of the calculation.

6 Recommendations

6.1 Further Survey Work

No further surveys are considered necessary.

6.2 Mitigation & Enhancement Strategy

6.2.1 Habitats

6.2.1.1 Protection

Retained trees within the woodland will be protected in accordance with British Standard 5837:2012, with the establishment of appropriate root protection zones.

In order to deter public access into the woodland to protect the condition of a habitat of 'principal importance', the perimeter of the woodland will maintain a fenced boundary as part of the proposals. Furthermore the area of scattered mixed scrub along the northern edge of the southern parcel will act as a buffer.

A walkway will be formed in the western belt of the woodland. This will link the development to the wider village. No trees will require felling to achieve this and creating a walkway will also introduce an 'edge' habitat into the woodland, which is not predicted to have an adverse impact on the habitat. The path will be natural and no hard-standing or lighting will be introduced into the woodland. Post and rail fences will be installed to guide and direct pedestrians to the walkway and discourage entering the wider woodland. This will avoid undue disturbance to the ground flora and character of the woodland.

6.2.1.2 Compensation

Hedgerow

The loss of small sections of Non-native and ornamental hedgerow will be compensated for through the planting of new non-native and ornamental hedgerows, native hedgerow and species-rich native hedgerow within the development. These new hedgerows will more than compensate for the habitat loss, and provide biodiversity net gain as they will comprise native species.

The following species are recommended for the native hedgerows:

- Blackthorn *Prunus spinosa*
- Dog rose *Rosa canina*
- Dogwood *Cornus sanguinea*
- Hawthorn *Crataegus monogyna*
- Hazel *Corylus avellana*
- Wayfaring tree *Viburnum lantana*
- Wild privet *Ligustrum vulgare*

Mixed Scrub

An area of mixed scrub will be created to the north of the southern-most woodland parcel and along the eastern and northern boundaries of the site. This scrub will not only compensate for the loss of an area of mixed scrub, but will also provide additional habitat that will create an overall biodiversity gain. The mixed scrub will provide nectar, seeds, fruits, shelter and foraging habitat for invertebrates, amphibians, reptiles, birds and mammals, as well as providing nesting opportunities for birds. It also offers suitable habitat for many flowering plants. The location will also create an ecotone between the woodland and other neutral grassland.

The following species are recommended for the creation of the scrub habitat:

- Blackthorn *Prunus spinosa*
- Buckthorn *Rhamnus cathartica*
- Dog rose *Rosa canina*
- Dogwood *Cornus sanguinea*

- Elder *Sambucus nigra*
- Hawthorn *Crataegus monogyna*
- Hazel *Corylus avellana*
- Wild privet *Ligustrum vulgare*
- Guelder rose *Viburnum opulus*
- Wayfaring tree *Viburnum lantana*

Dead wood is valuable to fungi and invertebrates and two log piles will be created within this area.

6.2.1.3 Enhancement

6.2.1.3.1 Other Neutral Grassland

An area of species rich grassland will be created by enhancing the existing grassland to the south and east of the new housing development (see Figure 1 below). The ground in this area will be cut and harrowed to break up the existing sward and followed by seeding with a 'meadow-mix', such as Standard General Purpose Meadow Mixture EM2. This will create the grassland that will form the basis of the parkland type habitat.

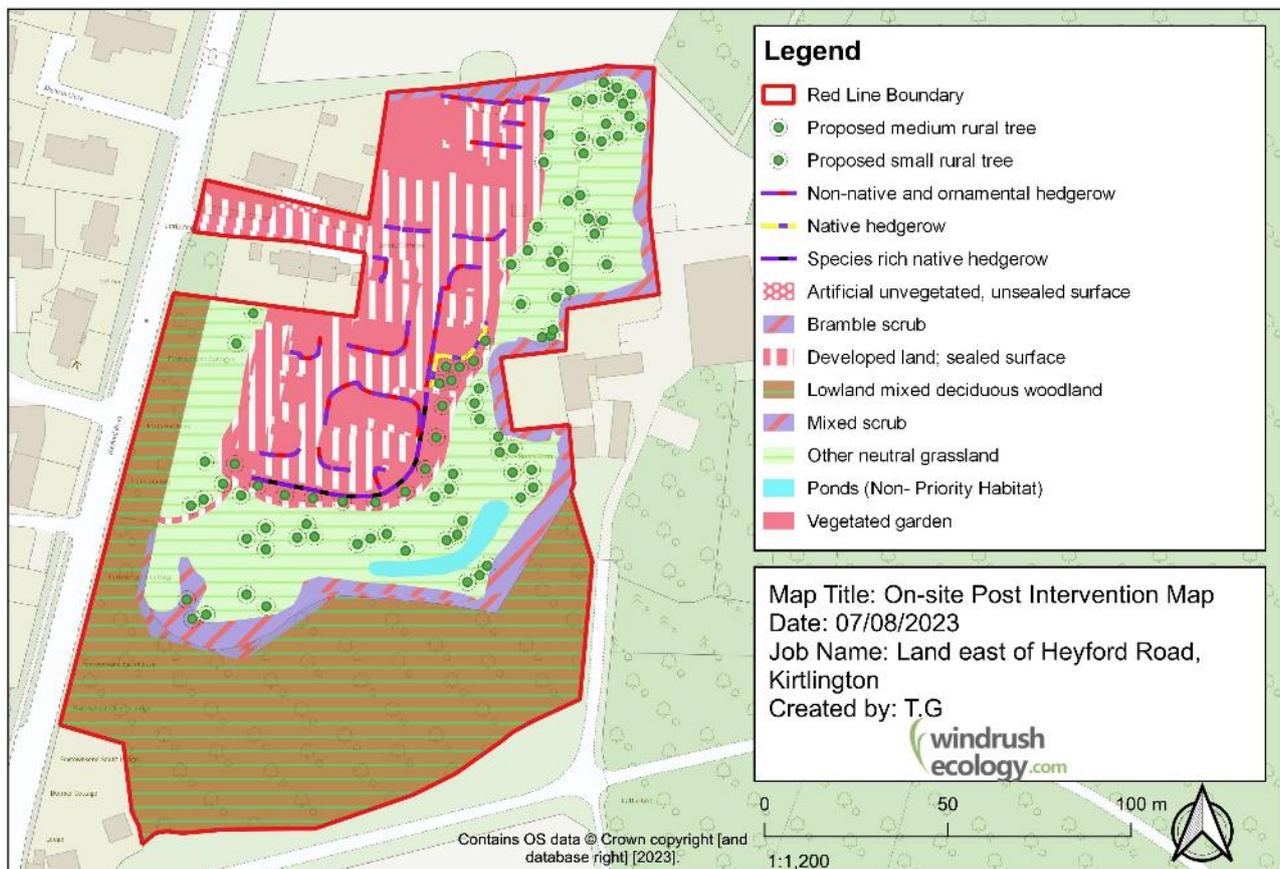


Figure 1. Plan showing the areas that will be seeded with a 'meadow mix', as in light green with stripes.

Standard General-Purpose Meadow Mixture EM2, or similar, is recommended to create grassland areas. This meadow mixture contains species that are characteristic of traditional meadows across a wide range of soil types.

The example composition of the mix is as below:

Wild flowers – 15%

- 0.9% *Achillea millefolium* – Yarrow
- 0.9% *Centaurea nigra* – Common Knapweed
- 0.15% *Cruciata laevipes* – Crosswort
- 0.45% *Daucus carota* – Wild Carrot
- 0.3% *Knautia arvensis* – Field Scabious
- 0.75% *Leucanthemum vulgare* – Oxeye Daisy
- 2.1% *Malva moschata* – Musk Mallow
- 0.12% *Medicago lupulina* – Black Medick
- 3% *Plantago lanceolata* – Ribwort Plantain
- 2.25% *Poterium sanguisorba* ssp. *sanguisorba* – Salad Burnet
- 0.12% *Primula veris* – Cowslip
- 0.54% *Ranunculus acris* – Meadow Buttercup
- 1.05% *Rhinanthus minor* – Yellow Rattle
- 2.25% *Silene dioica* – Red Champion
- 0.12% *Silene vulgaris* – Bladder Champion

Grasses – 85%

- 8.50% *Agrostis capillaris* – Common Bent
- 29.75% *Cynosurus cristatus* – Crested Dog's-tail
- 25.50% *Festuca rubra* – Red Fescue
- 4.25% *Phleum bertolonii* – Smaller Cat's-tail
- 17% *Poa pratensis* – Smooth-stalked Meadow-grass

Trees

20 English oak, lime and beech that will reach a 'medium' size, meaning they will have a diameter-at-breast-height (DBH) 30cm to ≤90cm after 30 years will be planted within the area of enhanced grassland around the new development.

Other native trees recommended for garden landscape planting are (71 will be planted):

- Crab apple *Malus sylvestris*
- Field maple *Acer campestre*
- Hazel *Corylus avellana*
- Hornbeam *Carpinus betulus*
- Rowan *Sorbus aucuparia*
- Silver birch *Betula pendula*
- Small-leaved lime *Tilia cordata*
- Whitebeam *Sorbus aria*
- Wild cherry *Prunus avium*

Pond Creation

A new pond will be created to the south-east corner of the site. The pond will provide potential habitat for aquatic invertebrates, wetland plants and amphibians, providing an enhancement to the existing situation. The pond will have an area of 0.0228ha and will be surrounded by species rich grassland and new trees and shrubs.

The pond will have shallow, convoluted edges to encourage invertebrates and aquatic plants. Please see Figure 2 below, taken from the Great Crested Newt Conservation Handbook (Langton *et al.* 2001), showing a cross-section of a pond with convoluted edges and showing suitable aquatic and marginal plant species.

Figure 3 shows a full cross-section of a pond, upon which the pond should be based. The deepest areas of the pond should measure between 1 and 2m (to stop the deepest areas from freezing in winter) with small bays or shallows at the pond's edges (0.3m-1m). The shallow areas will provide other small newt species and frogs within breeding sites. The shallow areas and edges will be lined with upturned turfs to provide a substrate into which the marginal plants can be planted and help to integrate the pond.

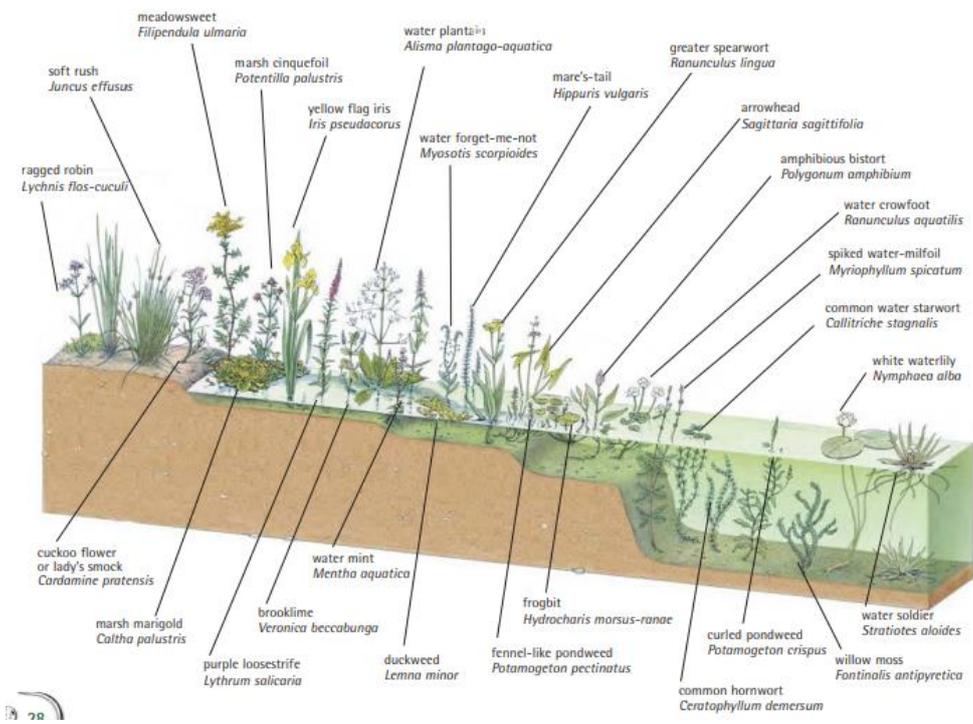


Figure 2. Diagram showing a cross-section of a pond with convoluted edges with native marginal and aquatic planting.

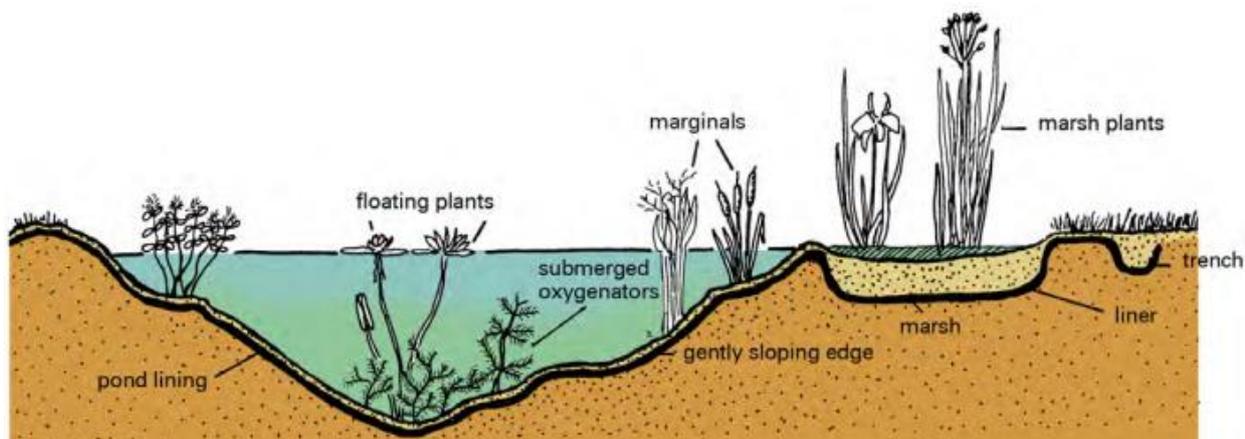


Figure 3. Diagram of a pond cross-section that is highly suitable as a wildlife pond. Source: Avon Wildlife Trust.

The upper reaches of the shallows will create a seasonal 'drawdown zone' – an area of mud and vegetation which is likely to become flooded in winter and spring and will progressively dry as water levels fall in summer.

The ever-changing drawdown zone is one of the most important areas of a pond. It is an exceptionally rich habitat for plants and invertebrates and is often used by birds and small mammals as a feeding area. The graded water levels of the pond will create varying habitats for plants as well as insects and amphibians, with the deeper areas having a greater buffer from cold air cooling and freezing the upper layers of the pond; aiding survival for those species which over winter in ponds, including some newts.

A number of suitable aquatic plant species suitable for the pond(s) are recommended in Table 9. This list includes species which are adapted to the margins and boggy edges of ponds, as well as submerged species of deeper water and emergent plants of the shallows. By adding plant biodiversity, the pond will also become suitable habitat for a diversity of invertebrates and the emergent planting will offer nesting sites and cover for amphibians.

Table 9. Native species for pond planting

Common Name	Botanical Name
Ragged robin	<i>Lychnis flos-cuculi</i>
Watercress	<i>Nasturtium officinale</i>
Brooklime	<i>Veronica beccabunga</i>
Yellow iris	<i>Iris pseudacorus</i>
Branched bur-reed	<i>Sparganium erectum</i>
Flowering rush	<i>Butomus umbellatus</i>
Water plantain	<i>Alisma plantago-aquatica</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Yellow loosestrife	<i>Lysimachia punctata</i>
Water mint	<i>Mentha aquatica</i>
Frogbit	<i>Hydrocharis morsus-ranae</i>
Amphibious bistort	<i>Persicaria amphibia</i>
Water forget-me-not	<i>Myosotis scorpiodes</i>
Water starwort	<i>Callitriche stagnalis</i>
Curled pondweed	<i>Potamogeton crispus</i>
Water crowfoot	<i>Ranunculus aquatilis</i>
Marsh marigold	<i>Caltha palustris</i>
Cuckoo flower	<i>Cardamine pratensis</i>
Marsh woundwort	<i>Stachys palustris</i>
Hemp agrimony	<i>Eupatorium cannabinum</i>
Gipsywort	<i>Lycopus europaeus</i>

Certain non-native aquatic plants should be strictly avoided, and they can cause serious damage to ponds and natural watercourses as they spread very quickly and easily, forming dense mats of vegetation. A reputable supplier of aquatic plants should be used, and the plants should be checked thoroughly prior to planting for any evidence of the following invasive, non-native species.

- Australian Swamp stonecrop / New Zealand pygmyweed *Crassula helmsii* / *Tillaea recurva*
- Fairy fern *Azolla filiculoides*
- Parrots feather *Myriophyllum aquaticum*
- Floating pennywort *Hydrocotyle ranunculoides*
- Himalayan balsam *Impatiens glandulifera*
- Canadian pondweed / Nuttall's pondweed *Elodea canadensis* / *Elodea nuttalli*
- Curly waterweed *Lagarosiphon major*

If required, a butyl rubber liner or clay will be used to line the pond. Before the liner is laid all stones will be removed from the excavation site to ensure that the liner is not punctured and a layer of pond

liner underlay (geotextile material) will be used to line the excavation. Once the liner has been laid a layer of the underlay (same geotextile material) will be laid atop the liner to help to protect it from being damaged.

Garden Landscaping

The new areas of garden planting should be designed, planted and managed to maximise their value to wildlife. One key element of this would be the species used within the planting, which should comprise native species where possible, as well as ornamental plants of known value to wildlife. The key will be to provide a variety of flowers and fruits throughout the year in order to provide food for insects and birds, as well as providing potential nest sites through the planting of trees and shrubs.

Garden planting should aim to provide ground cover for animals such as hedgehogs and invertebrates, and so low-growing ground cover should be encouraged. Native species such as bugle, ivy and periwinkle could be used for this purpose, or ornamental species such as lady's mantle, elephant's ears or perennial geraniums may also be suitable for formal areas of ornamental planting. A diversity of structure should also be encouraged through the planting of small trees, with shrubs and herbaceous plants below. Appendix 11 provides a list of plant species that are considered suitable for 'wildlife-friendly' garden planting.

6.2.2 *Species*

6.2.2.1 *Reptiles*

Precautionary Measures

On the assumption that small numbers of reptiles are present within the woodland and may pass through the site, it is recommended that they are protected from killing and/or injury by ensuring that the development zone continues to be managed in a way that makes the grassland habitat unsuitable.

The vegetation of the improved grassland should either continue to be grazed to a short sward or regularly maintained to 5-10cm of ground level. Arisings will be removed from the site, not piled within it which would create potentially suitable sheltering and egg laying habitat for species such as the grass snake, small numbers of which have been recorded along the edge of the woodland.

The woodland habitat provides suitable habitat for reptile species, in particular the grass snake. The woodland will be retained and protected. The creation of woodland path will be undertaken outside of the hibernation period of reptiles (avoiding November to February, inclusive). As part of the walkway creation a section of the stone wall along the western edge of the woodland will require removal, as will any fallen dead wood. All stones or fallen dead wood will be removed by hand within the active season, April to September inclusive. This will avoid the killing and/or injury of hibernating animals, which although unlikely, could be present in areas of deep leaf litter, under fallen dead wood or in crevices associated with the stone wall.

The above ground parts of the scrub should be removed outside of the bird nesting period, which runs from March to September, inclusive. This is also during the active period of reptiles, to ensure no hibernating individuals are present. The roots of the scrub and remains of the stone wall at the base will be removed outside of the outside of the hibernation period of reptiles (avoiding November February, inclusive).

If individual reptiles are found within the development site, as a precaution a suitably qualified ecologist would need to be contacted and the footprint of the proposed development could be cleared of reptiles by a hand and destructive search by the ecologist. Any reptiles found will be removed to safety within neighbouring habitats, where similar woodland edge habitat is present.

Enhancement

Habitat enhancement measures for reptiles will be included within the proposals, this will ensure there is no loss in areas of shelter that the stone wall and fallen dead wood provide.

It is recommended that two log and brash piles are created amongst the scrub habitat that will be created, and that these features are retained (and maintained) in perpetuity.

The log and brash pile should contain a mixture of sizes and shapes of logs, with some small-diameter material present, which could include brash. The log pile will be in contact with the soil allowing it to remain damp underneath, with approximately 50% of the logs at the base of the pile half buried.

It should be noted that a standard log pile comprising similarly sized large logs is of limited value because the voids tend to be too large and the structure lacks complexity. Vegetation can be allowed to grow through the log pile to provide additional cover and complexity, as well increasing the variety of insects that are attracted to it.



Figure 4. A log pile, providing additional structural diversity to a grassland site (Edgar et al., 2010).

6.2.2.2 Amphibians

Precautionary Measures

As the site is partly in an amber zone for great crested newts and that there will be no loss of suitable terrestrial habitat and no aquatic habitat loss as a result of the proposals, a precautionary approach is recommended to avoid potential impacts of killing and injury. Reasonable avoidance measures will include:

- The improved grassland will continue to be managed to maintain a short sward to ensure it remains unsuitable habitat.
- The area under the footprint of the woodland walkway will be cleared in a careful and sensitive manner with vigilance maintained for any great crested newts. This involves the removal of any fallen wood, leaf litter and the removal of a section of the stone wall by hand outside of the great crested newt hibernation period which runs from November to February inclusive, with a fingertip inspection for great crested newts within and under the stored items.
- As with reptiles, the roots of the scrub and stones at the base will be removed outside of the hibernation period, November to February, inclusive.
- Storage of building materials on pallets, so as not to act as a sheltering site for amphibians.

- Waste materials must be removed off site immediately or stored in skips. Excavations must be covered overnight, or ramps placed in to allow any animals to escape. Excavations and working areas must be managed so as not to create temporary waterbodies which may attract newts onto site.

Discovery of a Great Crested Newt

If a great crested newt is discovered on site, works will stop immediately, and a suitably qualified ecologist will be contacted for advice. If disturbance to small numbers of newts were to occur, it is unlikely to impair their ability to survive, breed, and reproduce or to rear or nurture their young or to significantly affect the local distribution or abundance of the species.

Therefore, works may be able to continue once advice has been given and the issue has been resolved. However, individual situations will have to be evaluated on a case-by-case basis and a European Protected Species Licence may be required to allow works to proceed if the impacts are considered to be significant under The Conservation of Habitats and Species Regulations 2017, as amended.

6.2.2.3 Birds

The removal of trees and scrub will be undertaken outside of the bird breeding season (avoiding March to August, inclusive) so as to avoid any impacts on active birds' nests.

The incorporation of bird nesting boxes is recommended in order to provide suitable nest sites for species within the local area, as nest boxes can be excellent substitutes for the holes found in old trees. Over 60 species are known to adopt nest boxes including blue tits, great tits, starlings, robins and sparrows.

Species such as house sparrow and swift will readily adopt such features as nest sites and therefore a number of swift nesting features (which house sparrows will adopt) will be installed within the dwellings.

The following bird nesting features will be installed at the eaves of the of the new dwellings, thus avoiding strong sunlight and the wettest winds (for locations please see Figure 6):

- 14 Woodstone Build-in Swift Nest Box Deep. This build-in nest box is designed to be integrated into the cavity of a building. It is constructed from long lasting WoodStone with a plywood backing.



Figure 5. Woodstone Build-in Swift Nest Box Deep.



Figure 6. Plan showing the location of the bird nesting features.

6.2.2.4 Bats

Bat Box Enhancement Measures

Six bat tubes will be integrated into 8 of the proposed new dwellings.

A Vivara Pro Build-in Woodstone Bat Tube is a recommended design for an integrated bat roost feature. These bat tubes can be obtained pre-fabricated and integrated directly into the fabric of the exterior walls of a building. The bat tubes have an external entrance slot which leads to an internal cavity for roosting. The bat tube can be concealed behind external cladding, brickwork, stonework or render. For example, bat bricks/ bat tubes can easily be installed into traditional or modern buildings with external wooden weatherboarding; the brick/tube being concealed behind the overlapping wooden boards with access via a gap under a lifted board which leads to the entrance slot of the

brick/tube. Bats can fit through very small gaps and so a crevice of 2-2.5cm should be sufficient to allow access to the slot of the bat brick/tube.

These bat roost features should be installed as high as possible on the exterior walls, just under the eaves. Figure 7 below shows the location of the bat tubes.



Figure 7. A Vivara Pro Build-in Woodstone Bat Tube.



Figure 7. Plan showing the location of the bat tubes.

External Lighting

External lighting should be avoided on the new buildings, unless it is necessary for reasons of security and safety. In particular, light spillage around new bat roosting features (Vivara Pro Build-in Woodstone Bat Tubes) and along onto the woodland, should be avoided to maintain dark commuting corridors along site boundaries.

If lighting is required, it should be kept at low level and a low intensity, with hoods and baffles used to direct the light to where it is required (Bat Conservation Trust, 2018, Emery 2008). To minimise the impact on bats, the use of low pressured sodium lamps is recommended in preference to mercury or metal halide lamps which have a UV element that can affect the distribution of insects and attract bats to the area, affecting their natural behaviour (Bat Conservation Trust, 2018).

The key principals for choosing a suitable type of lamp are:

- Avoid blue-white short wavelength lights: these have a significant negative impact on the insect prey of bats. Use alternatives such as warm-white (long wavelength) lights as this will reduce the impact on insects and therefore bats.
- Avoid lights with high UV content: (e.g. metal halide or mercury light sources) or reduce/completely remove the UV content of the light. Use UV filters or glass housings on lamps which filter out a lot of the UV content.

Selecting an appropriate lamp unit that is designed to be environmentally friendly will minimise light spill, but further controls can be imposed by installing directional accessories such as baffles, hoods and louvres on lamps to direct light away from ecologically sensitive areas (such as the boundary hedgerows).

LED (Light Emitting Diode) units are an effective way to direct the light into small target areas and are recommended for lighting the proposed parking and turning area. Composite LEDs can be switched off to reduce/direct the light beam to specific areas.

6.2.2.5 Badgers

It is recommended that the following measures are adopted in order avoid indirect impacts on badgers and other mammals that may move across the site:

Deep excavations, trenches, foundations etc. within the construction zone should be covered at night to prevent pit-fall hazards to badgers. All excavations under 50cm in depth will be provided with a wooden ramp (set at an angle no steeper than 45°), to allow mammals to escape.

6.2.2.6 Hedgehogs

Any garden fences erected within the development (that could act as a barrier to hedgehog movement) should be made permeable for hedgehogs. This can be achieved by cutting or leaving a 13cm-by-13cm hole within the fence or wall; this is sufficient for any hedgehog to pass through, and this is too small for nearly all pets.



Figure 8. An example of a hole cut within a fence, creating a 'hedgehog highway' Source: <https://www.hedgehogstreet.org/help-hedgehogs/link-your-garden/>

As a precaution, if a hedgehog is discovered during works within the woodland, it should be either allowed to move to a safe area under its own power or be moved by hand to a relatively nearby, safe location. Hedgehogs should be moved no further than 200m from where they are found as they may have dependant young that rely on their return for survival.

When handling hedgehogs, gloves should be worn to protect the handler from their spines, infection and parasites.

In the unlikely event that an occupied hedgehog nest is disturbed, or a baby hedgehog is encountered (eyes shut) all works will stop in the vicinity and advice be sought from an appropriate wildlife hospital (such as Tiggywinkles) or animal charity (such as the RSPCA). If the nest has been exposed or destroyed then the entire nest should be covered over, for example with a bucket with breathing holes in. Baby hedgehogs should not be handled with bare hands as this can result in abandonment by their mother.

As a precautionary measure, all excavations over 50cm deep will be covered at night, to prevent pitfall hazards to hedgehogs. All excavations under 50cm in depth will be provided with a wooden ramp (set at an angle no steeper than 45°), to allow hedgehogs to escape.

6.2.2.7 Other Species

Recommendations for invertebrates include the integration of a solitary bee brick into each of the 14 new dwellings. These bees are industrious and safe around children and pets. The bee brick provides a habitat that has become harder to find in modern gardens.

The Bee Brick should be positioned in a warm sunny spot, south facing where possible and if not on the eastern elevation, with no dense vegetation in front of the fascia. The bee bricks should be installed at least 1m from the ground (there is no upward limit). It is helpful to have bare soil nearby, and food sources such as flowers.



Figure 9. A Green & Blue Bee Brick in situ.

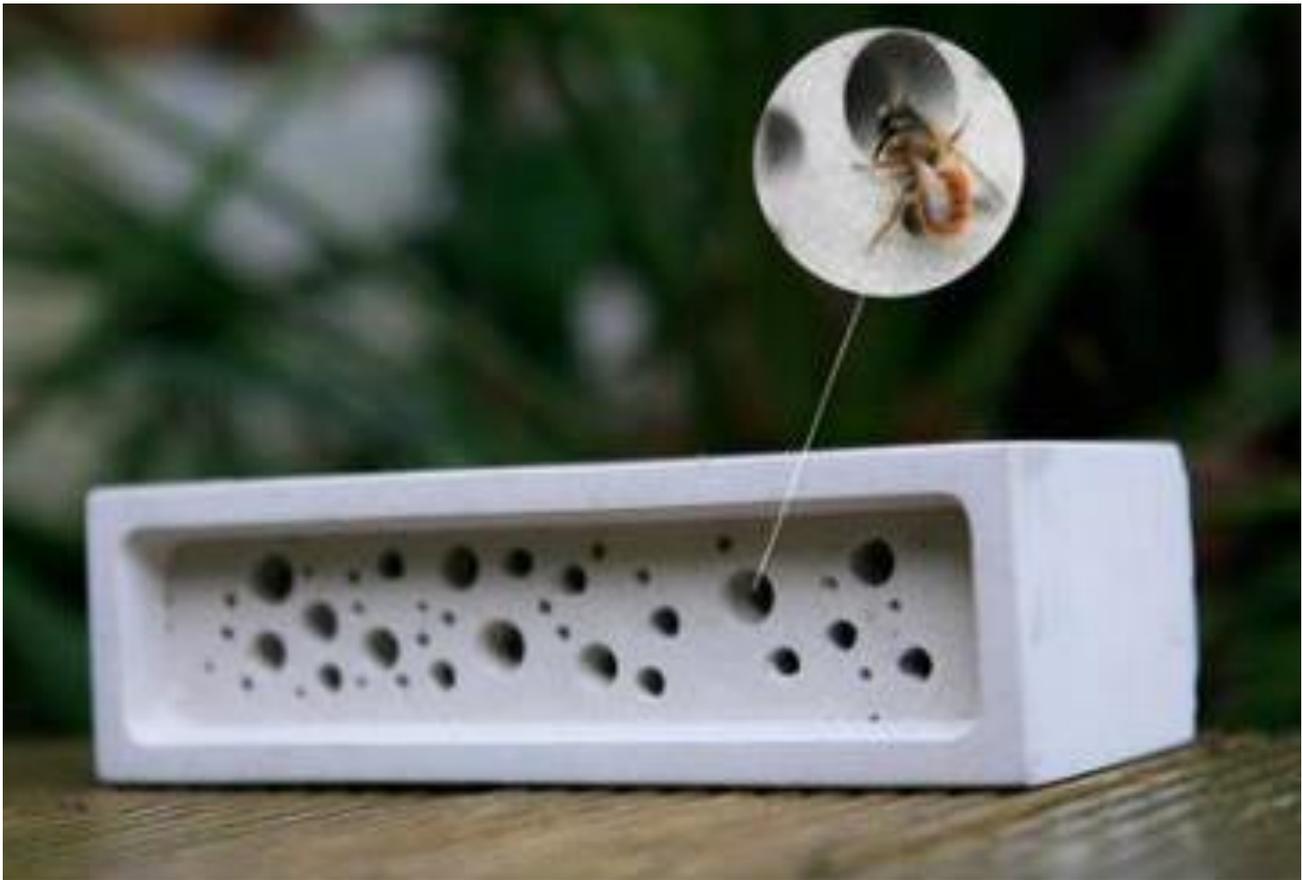


Figure 10. A Green & Blue Bee Brick.

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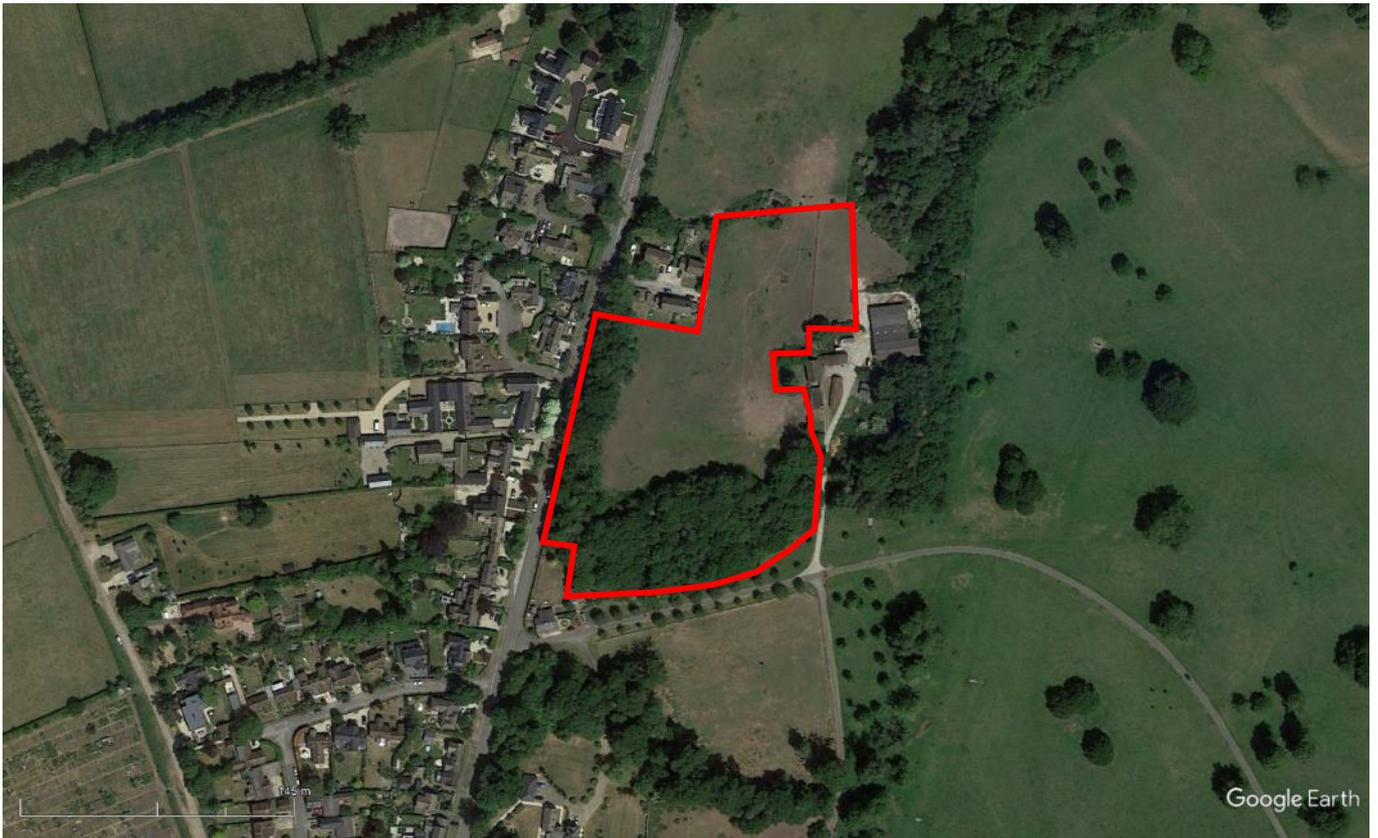
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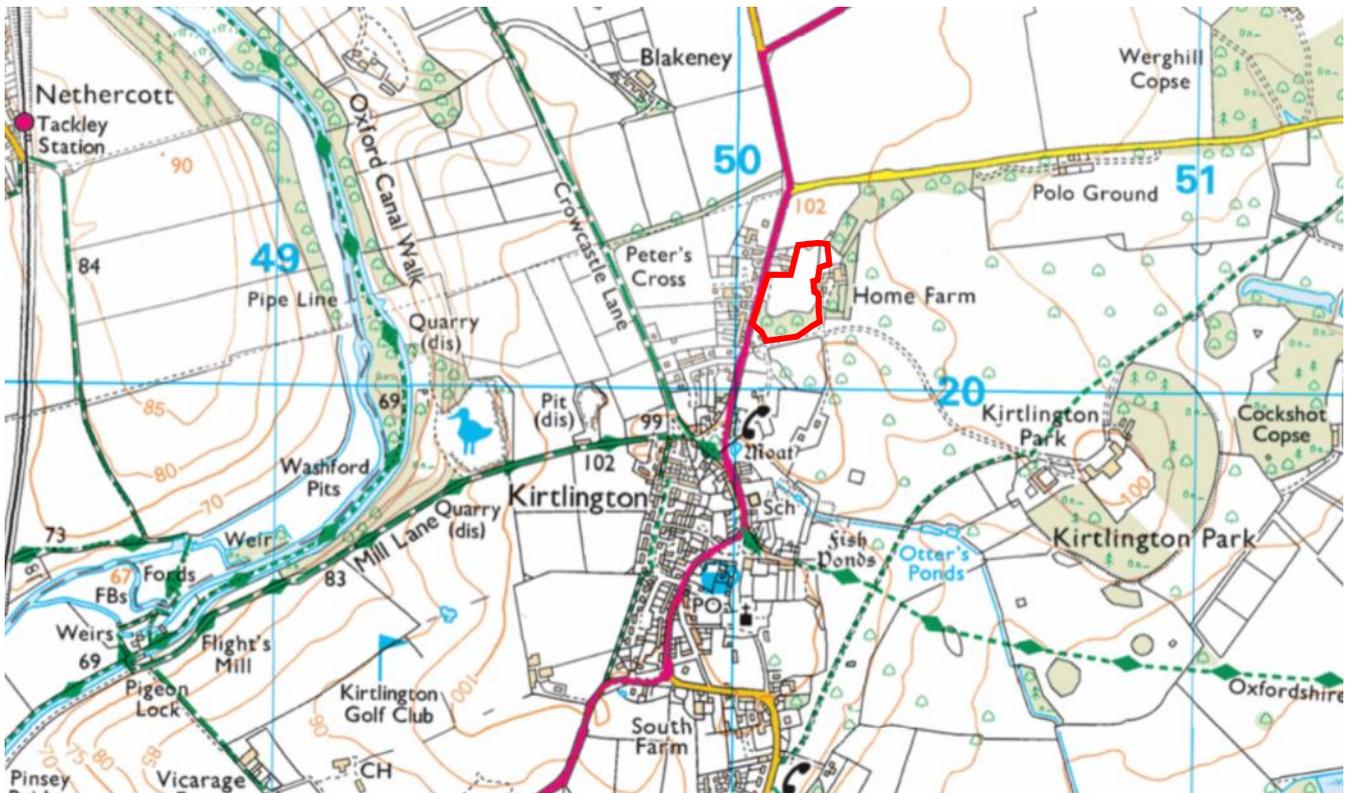
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8 Appendix 1. Site Location Plans



Aerial photograph showing location of the site (outlined in red). Source: Google Earth Pro



Ordnance Survey map showing the approximate location of the site (outlined in red) within the local area. Source: www.bing.com/maps/

9 Appendix 2. Photographs



Photograph 1. View of the improved grassland paddock from the north, looking south.



Photograph 2. The north-eastern area of improved grassland.



Photograph 3. Detail of the improved grassland.



Photograph 4. The mixed scrub along the northern boundary of the site.



Photograph 5. The broad-leaved woodland parcel along the southern section of the site.



Photograph 6. The broad-leaved woodland parcel along the western boundary of the site.



Photograph 1. Example of the woodland floor, also showing the dry ditch.



Photograph 2. Tall ruderal vegetation and bramble scrub along the northern edge of the southern parcel of woodland.



Photograph 3. Bramble scrub and tall ruderal vegetation around the boundary of Home Farm.



Photograph 4. View looking east along the existing access track, showing the tarmac access and gardens.



Photograph 5. The early mature ash tree (T1) that will require removal.



Photograph 6. The mature crack willow (T41) and young/semi-mature Yew (T42) that will require removal.

10 Appendix 3. Proposal Plan



11 Appendix 4. Data Search Results

Please see appended document for the Thames Valley Environmental Record Centre Protected & Notable Species Records.

12 Appendix 5. Biodiversity Net Gain: Good Practice Principles for Development

CIRIA, CIEEM and IEMA have developed principles of good practice to achieve Biodiversity Net Gain. These principles provide a framework that helps improve the UK's biodiversity by contributing towards strategic priorities to conserve and enhance nature through sustainable development. There are ten principles in total, and all principles must be applied together as one approach. The ten principles are set out below.

Principle 1. Apply the Mitigation Hierarchy

Do everything possible to first avoid and then minimise impacts on biodiversity. Only as a last resort, and in agreement with external decision-makers where possible, compensate for losses that cannot be avoided. If compensating for losses within the development footprint is not possible or does not generate the most benefits for nature conservation, then offset biodiversity losses by gains elsewhere.

Principle 2. Avoid losing biodiversity that cannot be offset by gains elsewhere

Avoid impacts on irreplaceable biodiversity - these impacts cannot be offset to achieve No Net Loss or Net Gain.

Principle 3. Be inclusive and equitable

Engage stakeholders early, and involve them in designing, implementing, monitoring and evaluating the approach to Net Gain. Achieve Net Gain in partnership with stakeholders where possible, and share the benefits fairly among stakeholders.

Principle 4. Address risks

Mitigate difficulty, uncertainty and other risks to achieving Net Gain. Apply well-accepted ways to add contingency when calculating biodiversity losses and gains in order to account for any remaining risks, as well as to compensate for the time between the losses occurring and the gains being fully realised.

Principle 5. Make a measurable Net Gain contribution

Achieve a measurable, overall gain¹ for biodiversity and the services ecosystems provide while directly contributing towards nature conservation priorities.

Principle 6. Achieve the best outcomes for biodiversity

Achieve the best outcomes for biodiversity by using robust, credible evidence and local knowledge to make clearly-justified choices when:

- Delivering compensation that is ecologically equivalent in type, amount and condition, and that accounts for the location and timing of biodiversity losses
- Compensating for losses of one type of biodiversity by providing a different type that delivers greater benefits for nature conservation
- Achieving Net Gain locally to the development while also contributing towards nature conservation priorities at local, regional and national levels
- Enhancing existing or creating new habitat
- Enhancing ecological connectivity by creating more, bigger, better and joined areas for biodiversity

Principle 7. Be additional

¹ Net Gain has been described as a measurable target for development projects where impacts on biodiversity are outweighed by a clear mitigation hierarchy approach to first avoid and then minimise impacts, including through restoration and / or compensation. Adhering to these Net Gain principles (i.e. pursuing all principles together) will help in under-pinning good practice for achieving and sustaining Net Gain.

Achieve nature conservation outcomes that demonstrably exceed existing obligations (i.e. do not deliver something that would occur anyway).

Principle 8. Create a Net Gain legacy

Ensure Net Gain generates long-term benefits by:

- Engaging stakeholders and jointly agreeing practical solutions that secure Net Gain in perpetuity²
- Planning for adaptive management and securing dedicated funding for long-term management
- Designing Net Gain for biodiversity to be resilient to external factors, especially climate change
- Mitigating risks from other land uses
- Avoiding displacing harmful activities from one location to another
- Supporting local-level management of Net Gain activities

Principle 9. Optimise sustainability

Prioritise Biodiversity Net Gain and, where possible, optimise the wider environmental benefits for a sustainable society and economy.

Principle 10. Be transparent

Communicate all Net Gain activities in a transparent and timely manner, sharing the learning with all stakeholders.

² Biodiversity compensation should be planned for a sustained Net Gain over the longest possible timeframe. For development in the UK, the expectation is that compensation sites will be secured for at least the lifetime of the development (e.g. often 25-30 years) with the objective of Net Gain management continuing in the future.

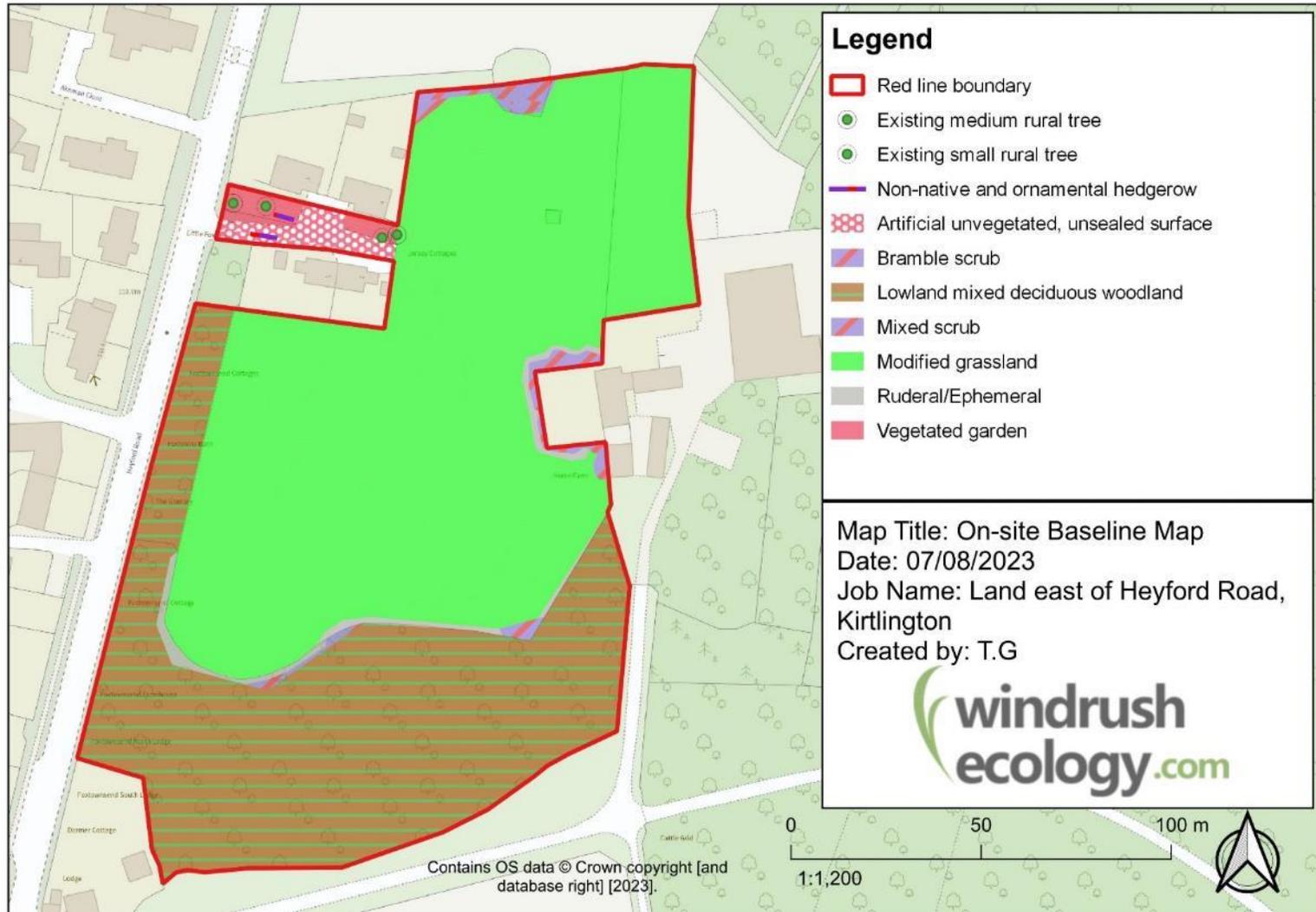
13 Appendix 6. Biodiversity Metric Calculation

Please refer to appended Excel Spreadsheet: Metric 4.0.

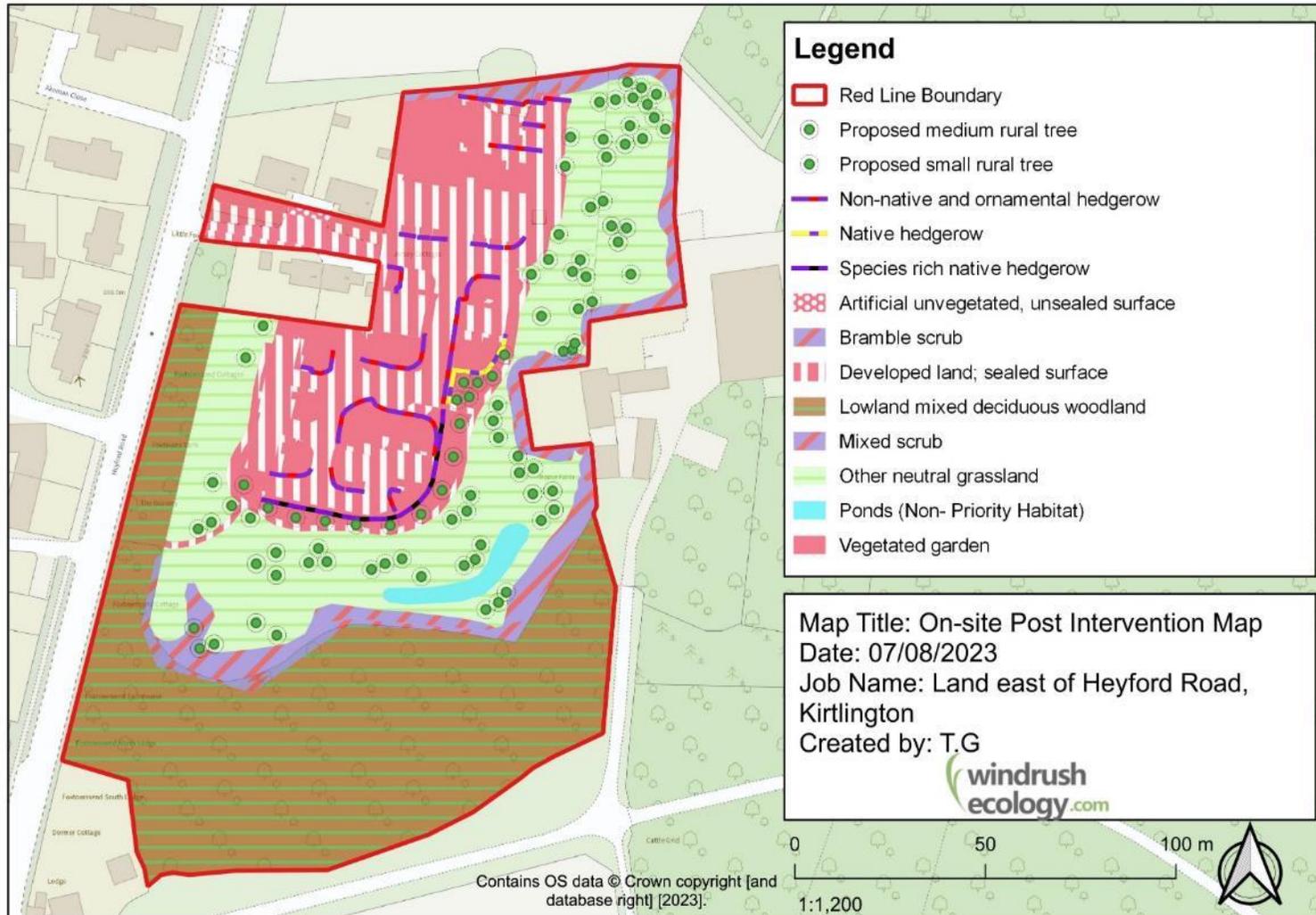
14 Appendix 7. Phase 1 Habitat Plan



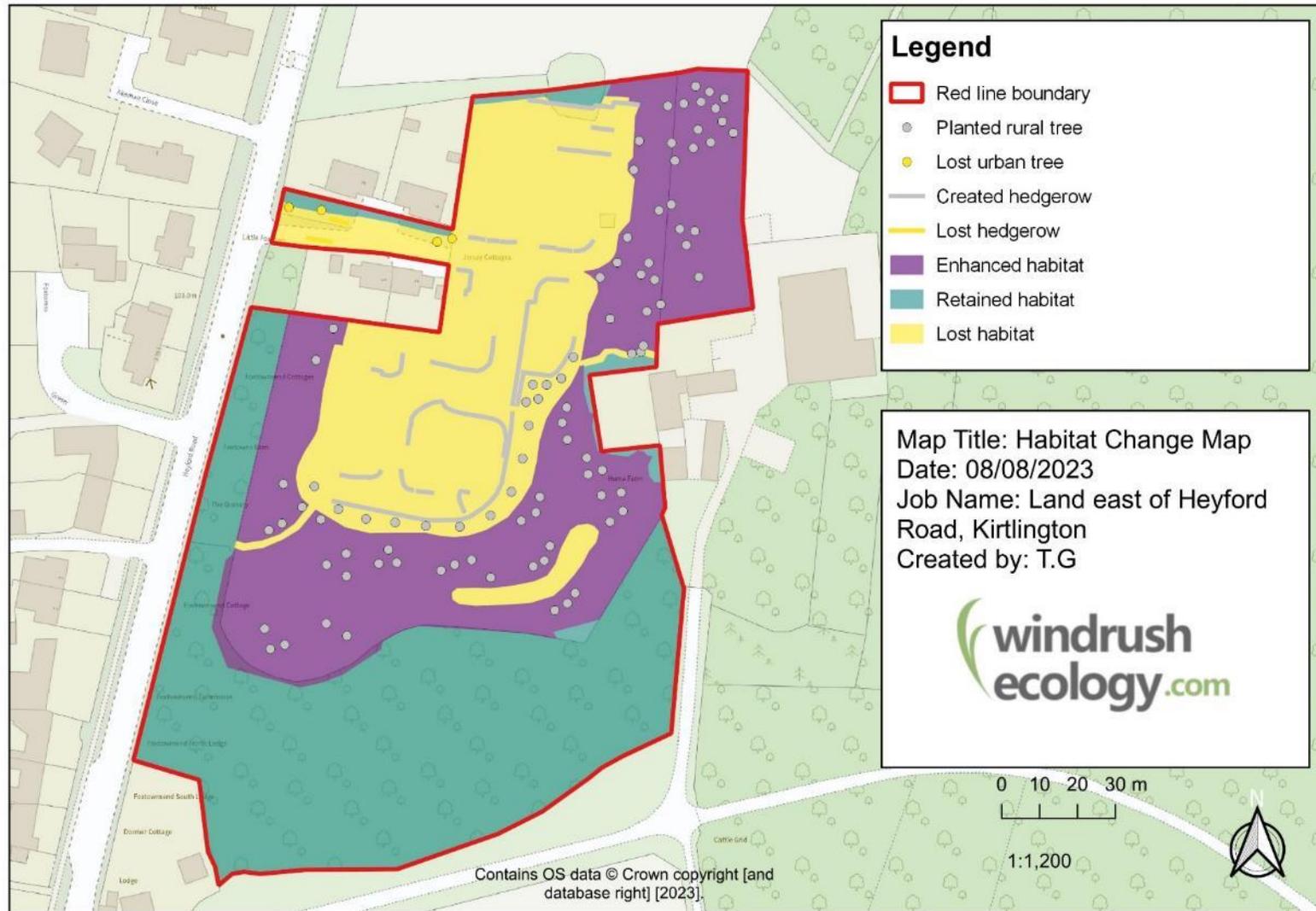
15 Appendix 8. UKHab Baseline Habitat Plan



16 Appendix 9. UKHab Post-intervention Habitat Plan



17 Appendix 10. UKHab Habitat Change Plan



18 Appendix 11. Species for 'Wildlife' Landscape/Garden Planting

Common Name	Botanical Name
Trees	
Field maple*	<i>Acer campestre</i>
Beech*	<i>Fagus sylvatica</i>
Hornbeam*	<i>Carpinus betulus</i>
Willow*	<i>Salix sp.</i>
Silver birch*	<i>Betula pendula</i>
Downy birch*	<i>Betula alba</i>
Rowan*	<i>Sorbus aucuparia</i>
Whitebeam*	<i>Sorbus aria</i>
Wild cherry*	<i>Prunus avium</i>
Flowering cherry	<i>Prunus sp.</i>
Flowering pear	<i>Pyrus calleryana</i>
Crab apple*	<i>Malus sylvestris</i>
Fruiting apple	<i>Malus sp.</i>
English oak*	<i>Quercus robur</i>
Sessile oak*	<i>Quercus petraea</i>
Aspen*	<i>Populus tremula</i>
Maple	<i>Acer sp.</i>
Poplars*	<i>Populus sp.</i>
Elm*	<i>Ulmus sp.</i>
Shrubs	
Holly*	<i>Ilex aquifolium</i>
Hazel*	<i>Corylus avellana</i>
Wayfaring tree*	<i>Viburnum lantana</i>
Wild service tree*	<i>Sorbus torminalis</i>
Guelder rose*	<i>Viburnum opulus</i>
Hawthorn*	<i>Crataegus monogyna</i>
Hebe	<i>Hebe sp.</i>
Rosemary	<i>Rosmarinus</i>
Ceanothus	<i>Ceanothus sp.</i>
Weigela	<i>Weigela sp.</i>
Dogwood*	<i>Cornus sanguinea/alba</i>
Rose (single flowered varieties)	<i>Rosa sp.</i>
Lilac	<i>Syringa vulgaris</i>
Escallonia	<i>Escallonia sp.</i>
Lavender	<i>Lavandula sp.</i>
Flowering currant	<i>Ribes sp.</i>
Honeysuckle*	<i>Lonicera periclymenum</i>
Mexican orange blossom	<i>Choisya sp.</i>
Spiraea	<i>Spiraea sp.</i>
Amelanchier	<i>Amelanchier lamarckii</i>
Cotoneaster	<i>Cotoneaster sp.</i>
Yew*	<i>Taxus baccata</i>
Broom	<i>Cytisus sp.</i>

Common Name	Botanical Name
Rose of Sharon	<i>Hypericum calycinum</i>
Butterfly bush	<i>Buddleia davidii</i>
Perennials	
Primrose*	<i>Primula veris</i>
Elephant's ears	<i>Bergenia cordifolia</i>
Sage	<i>Salvia sp.</i>
Lamb's ears	<i>Stachys byzantia</i>
Periwinkle*	<i>Vinca major & Vinca minor</i>
Ivy*	<i>Hedera helix</i>
Bugle*	<i>Ajuga reptans</i>
Lady's mantle	<i>Alchemilla mollis</i>
Geraniums	<i>Geranium sp.</i>
Globe thistle	<i>Echinops ritro</i>
Monk's hood	<i>Aconitum sp.</i>
Yarrow*	<i>Achillea millefolium</i>
Teasel*	<i>Dipsacus fullonum</i>
Oriental poppy	<i>Papaver orientalis</i>
Michaelmas daisy	<i>Aster sp.</i>
Bear's breeches	<i>Acanthus spinosus</i>
Montbretia	<i>Crocsmia sp.</i>
Purple coneflower	<i>Echinacea purpurea</i>
Catmint	<i>Nepeta sp.</i>
Verbena	<i>Verbena sp., Verbena bonariensis, Verbena rigida</i>
Marjoram	<i>Origanum majorana</i>
Thyme	<i>Thymus sp.</i>
Betony*	<i>Stachys officinalis</i>
Yellow archangel*	<i>Galeobdolon inteum</i>
Scabious*	<i>Knautia sp.</i>
Greater knapweed*	<i>Centaurea scabiosa</i>
Red campion*	<i>Silene dioica</i>
White campion*	<i>Silene alba</i>
Purple loosestrife*	<i>Lythrum salicaria</i>
Yellow loosestrife*	<i>Lysimachia punctata</i>
Cowslip*	<i>Primula vulgaris</i>
Teasel*	<i>Dipsacus fullonum</i>
Heliotrope	<i>Heliotropium arborescens</i>
Honesty	<i>Lunaria annua</i>
Iceplant	<i>Sedum spectabile</i>
White jasmine	<i>Jasminum officinale</i>
Soapwort*	<i>Saponaria officinalis</i>
Sweet rocket	<i>Hesperis matronalis</i>
Nottingham catchfly*	<i>Silene nutans</i>
Night-scented stock	<i>Matthiola bicornis</i>
Bulbs	
Daffodil	<i>Narcissus sp.</i>
Crocus	<i>Crocus sp.</i>
Winter aconite	<i>Eranthis sp.</i>

Common Name	Botanical Name
Snowdrop	<i>Galanthus sp.</i>
Tulip	<i>Tulipa sp.</i>
Ornamental onion	<i>Allium sp.</i>
<i>*indicates native species</i>	