

1.10 The Planning Practice Guidance (PPG) has been adopted in order to aid the application of the NPPF. It reiterates that conservation of heritage assets in a manner appropriate to their significance is a core planning principle.

1.11 Key elements of the guidance relate to assessing harm. It states that substantial harm is a high bar that may not arise in many cases and that while the level of harm will be at the discretion of the decision maker, generally substantial harm is a high test that will only arise where a development seriously affects a key element of an asset's special interest. It is the degree of harm, rather than the scale of development, that is to be assessed.

[Overview: Historic Environment Good Practice Advice in Planning](#)

1.12 The PPS5 Practice Guide was withdrawn in March 2015 and replaced with three Good Practice Advice in Planning Notes (GPAs) published by Historic England. GPA1: The Historic Environment in Local Plans provides guidance to local planning authorities to help them make well informed and effective local plans. GPA2: Managing Significance in Decision-Making includes technical advice on the repair and restoration of historic buildings and alterations to heritage assets to guide local planning authorities, owners, practitioners and other interested parties. GPA 3: The Setting of Heritage Assets replaces guidance published in 2011. These are complemented by the Historic England Advice Notes in Planning which include HEA1: Understanding Place: Conservation Area Designation, Appraisal and Management (February 2016), HEA2: Making Changes to Heritage Assets (February 2016), HEA3: The Historic Environment and Site Allocations in Local Plans (October 2015), and HEA4: Tall Buildings (December 2015).

[GPA1: The Historic Environment in Local Plans \(March 2015\)](#)

1.13 This advice note focuses on the importance of identifying heritage policies within Local Plans. The advice echoes the NPPF by stressing the importance of formulating Local Plans based on up-to-date and relevant evidence on economic, social and environmental characteristics and prospects of the area, including the historic environment.

[GPA2: Managing Significance in Decision-Taking in the Historic Environment \(March 2015\)](#)

1.14 This document provides advice on numerous ways in which decision making in the historic environment could be undertaken, emphasising that the first step for all applicants is to understand the significance of any affected heritage asset and the contribution of its setting to that significance. In line with the NPPF and PPG, the document states that early engagement and expert advice in considering and assessing the significance of heritage assets is encouraged. The advice suggests a structured, staged approach to the assembly and analysis of relevant information:

- Understand the significance of the affected assets;
- Understand the impact of the proposal on that significance;

- Avoid, minimise and mitigate impact in a way that meets the objectives of the NPPF;
- Look for opportunities to better reveal or enhance significance;
- Justify any harmful impacts in terms of the sustainable development objective of conserving significance balanced with the need for change; and
- Offset negative impacts to significance by enhancing others through recording, disseminating and archiving archaeological and historical interest of the important elements of the heritage assets affected.

GPA3: The Setting of Heritage Assets (Second Edition; December 2017)

- 1.15 This advice note focuses on the management of change within the setting of heritage assets. This document replaces GPA3: The Setting of Heritage Assets (March 2017) and Seeing History in the View (English Heritage, 2011) in order to aid practitioners with the implementation of national legislation, policies and guidance relating to the setting of heritage assets found in the 1990 Act, the NPPF and PPG. The guidance is largely a continuation of the philosophy and approach of the 2011 and 2015 documents and does not present a divergence in either the definition of setting or the way in which it should be assessed.
- 1.16 As with the NPPF the document defines setting as ‘the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve’. Setting is also described as being a separate term to curtilage, character and context. The guidance emphasises that setting is not a heritage asset, nor a heritage designation, and that its importance lies in what it contributes to the significance of the heritage asset, or the ability to appreciate that significance. It also states that elements of setting may make a positive, negative or neutral contribution to the significance of the heritage asset.
- 1.17 While setting is largely a visual term, with views considered to be an important consideration in any assessment of the contribution that setting makes to the significance of an asset, and thus the way in which an asset is experienced, setting also encompasses other environmental factors including noise, vibration and odour. Historical and cultural associations may also form part of the asset’s setting, which can inform or enhance the significance of a heritage asset.
- 1.18 This document provides guidance on practical and proportionate decision making with regards to the management of change within the setting of heritage assets. It is stated that the protection of the setting of a heritage asset need not prevent change and that decisions relating to such issues need to be based on the nature, extent and level of the significance of a heritage asset, further weighing up the potential public benefits associated with the proposals. It is further stated that changes within the setting of a heritage asset may have positive or neutral effects.
- 1.19 The document also states that the contribution made to the significance of heritage assets by their settings will vary depending on the nature of the heritage asset and its setting, and that different heritage assets may have different abilities to

accommodate change without harming their significance. Setting should, therefore, be assessed on a case-by-case basis.

1.20 Historic England recommends using a series of detailed steps in order to assess the potential effects of a proposed development on significance of a heritage asset. The 5-step process is as follows:

- Identify which heritage assets and their settings are affected;
- Assess the degree to which these settings and views make a contribution to the significance of a heritage asset(s) or allow significance to be appreciated;
- Assess the effects of the proposed development, whether beneficial or harmful, on the significance or on the ability to appreciate it;
- Explore ways to maximise enhancement and avoid or minimise harm; and
- Make and document the decision and monitor outcomes.

Local Planning Policy

1.21 The saved policies of the Cherwell Local Plan 1996 remain relevant for the site and the following policy has been saved:

C25 in considering proposals for development which would affect the site or setting of a scheduled ancient monument, other nationally important archaeological sites and monuments of special local importance, the council will have regard to the desirability of maintaining its overall historic character, including its protection, enhancement and preservation where appropriate.

1.22 The Cherwell Local Plan 2011-2031 Part 1 was adopted in July 2015 and replaced many of the policies in the previous 1996 plan. The following policy is relevant to archaeology at the site:

Policy ESD 15: The Character of the Built and Historic Environment Successful design is founded upon an understanding and respect for an area's unique built, natural and cultural context. New development will be expected to complement and enhance the character of its context through sensitive siting, layout and high quality design. All new development will be required to meet high design standards. Where development is in the vicinity of any of the District's distinctive natural or historic assets, delivering high quality design that complements the asset will be essential. New development proposals should:

- ...Conserve, sustain and enhance designated and non designated 'heritage assets' (as defined in the NPPF) including buildings, features, archaeology, conservation areas and their settings, and ensure new development is sensitively sited and integrated in accordance with advice in the NPPF and NPPG. Proposals for development that affect non-designated heritage assets will be considered taking account of

the scale of any harm or loss and the significance of the heritage asset as set out in the NPPF and NPPG. Regeneration proposals that make sensitive use of heritage assets, particularly where these bring redundant or under used buildings or areas, especially any on English Heritage's At Risk Register, into appropriate use will be encouraged

- Include information on heritage assets sufficient to assess the potential impact of the proposal on their significance. Where archaeological potential is identified this should include an appropriate desk based assessment and, where necessary, a field evaluation...

1.23

The Mid-Cherwell Area Neighbourhood Plan 2018-2013 was "made" by Cherwell District in May 2019. The Neighbourhood Plan will be used to help decide planning applications in the Mid-Cherwell Neighbourhood Plan area. This included the western site parcel only. Relevant policy is as follows:

POLICY PD1: DEVELOPMENT AT CATEGORY A VILLAGES

Any residential development proposal which is outside the settlement areas of these three villages must have particular regard to all the following criteria...

...d) The development should conserve and, where possible, enhance the special interest, character and appearance of the conservation areas and the significance of other heritage assets (see Appendix K: Heritage and Character Assessment)...

POLICY PC1: LOCAL EMPLOYMENT

Proposals for the establishment of new small businesses will be considered favourably where they:...

...b) do not have an adverse affect on the surrounding built, natural or historic environment that is not clearly outweighed by the economic benefits of the development...

POLICY PD5: BUILDING AND SITE DESIGN

New development should be designed to a high standard which responds to the distinctive character of the settlement and reflects the guidelines and principles set out within the Heritage and Character Assessment (see Appendix K). Development proposals should have full regard to the following criteria:

a) Proposals should wherever possible include appropriate landscape mitigation measures to reduce the impact of the built form, to ensure that development is in keeping with the existing rural character of the village, and to provide a net gain in biodiversity.

b) Development affecting existing traditional stone walls should identify them on proposals drawings, and wherever possible retain and/or repair them using traditional forms and materials.

c) Proposals for minor development schemes (excluding infill and conversions) of new housing will be required to provide new or improve existing footpaths and cycle ways to ensure that new residents of all ages and mobility have safe access to village amenities such as the school, bus stops, shop and green spaces. Where new routes are proposed to meet this requirement, the development proposals shall contain full details of all associated materials and infrastructure.

d) The section on Managing Change on p.76 -77 of the Heritage and Character Assessment (see Appendix K), which sets out general principles and specific recommendations for villages highlighted in the document.

NOTE 1: This policy does not apply to development within the area covered by CDC's policy Villages 5, where site-specific design and place-shaping standards are already set out.

NOTE 2: Part 2 of APPENDIX K covers only Category A and B villages and Upper Heyford; other Category C villages were excluded from AECOM's study because of funding limitations affecting the scope of the work.

Other Relevant Policy, Standards & Guidance

- 1.24 The NPPF and PPG are additionally supported by four Good Practice Advice (GPA) documents published by Historic England, including GPA 1: The Historic Environment in Local Plans, GPA 2: Managing Significance in Decision-Taking in the Historic Environment (both published March 2015) and GPA 4 Enabling Development and Heritage Assets (June 2020). The second edition of GPA3: The Setting of Heritage Assets was published in December 2017 and sets out the following stepped approach which should be taken to the assessment of impacts on the significance (in NPPF terms) of heritage assets:
- Step 1: Identify heritage assets that will be impacted, and the significance of these assets;
 - Step 2: Assess whether, how and to what degree their settings make a contribution to the significance of the heritage asset(s);
 - Step 3: Assess the effects of the proposed development, whether beneficial or harmful, on that significance;
 - Step 4: Explore the way to maximise enhancement and avoid or minimise harm;
 - Step 5: Make and document the decision and monitor outcomes.
- 1.25 The Local Authority's list of Local Heritage Assets has not yet been finalised. Local Heritage Assets have however been identified as part of the conservation area appraisals and these are intended to eventually form part of an adopted list.
- 1.26 This chapter has been prepared in accordance with the standards and guidance issued by the ClfA, the requirements of the EIA Regulations, guidance in the NPPF

and the PPG, Historic England (HE) guidance, consultation with the Oxfordshire County Archaeologist, and current best practice.



Appendix 12.1

LEGISLATION AND PLANNING POLICY

Appendix 12.1

Legislation

Specific habitats and species receive legal protection in the UK under various pieces of legislation, namely:

- The Wildlife and Countryside Act 1981 (as amended) (WCA);
- The Conservation of Habitats and Species Regulation 2010 (the 'Habitats Regulations');
- The Countryside and Rights of Way Act 2000;
- The Protection of Badgers Act 1992;
- The Hedgerows Regulations 1997;
- The Natural Environment and Rural Communities (NERC) Act 2006; and
- The Wild Mammals (Protection) Act 1996.

National Planning Policy

National Planning Policy Framework, 2021 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied. It replaces the first National Planning Policy Framework published in March 2012. Outline principles are set out below:

- Paragraph 11 states that:
 - *“Plans and decisions should apply a presumption in favour of sustainable development.”*
- Section 15 of the NPPF (paragraphs 174 to 182) considers the conservation and enhancement of the natural environment including habitats and biodiversity (paragraphs 179-182)
- Paragraph 174 states that planning 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; and*
 - *minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures”*

- Paragraph 175 states that plans should distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value; 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.
- Paragraph 179 states that in order 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, Paragraph 1780 states that local planning authorities should aim to conserve and enhance biodiversity by applying 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 improve biodiversity 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.”*
- As stated in paragraph 181 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 habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.*"
- Paragraph 182 states that the presumption in favour of sustainable development does not apply where the planned project is likely to have a significant effect on a habitat site (alone or in combination with other plans or projects) unless an appropriate assessment has concluded the plan or project will not adversely affect the integrity of the habitats site.

Local Planning Policy

Cherwell Local Plan 2011 - 2031 Part 1

- The Cherwell Local Plan 2011 - 2031 Part 1 sets out the long-term spatial vision for the District and contains policies to help deliver that vision. The key policies within the Local Plan relating to ecology are as follows:
- Policy ESD10: protection and Enhancement of Biodiversity and the Natural Environment which 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; and
 - A monitoring and management plan will be required for biodiversity features on-site to ensure their long term suitable management.
- Policy ESD17: Green Infrastructure. The district's green infrastructure network will be maintained and enhanced by the implementation of several measures which are provided in detail in the landscape chapter.

Biodiversity Actions Plans

The UK Post-2010 Biodiversity Framework succeeded the UK BAP partnership in 2011 and covers the period 2011 to 2020. However, the lists of Priority Species agreed under the UK BAP still form the basis of much biodiversity work in the UK. The current strategy for England is 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' published under the UK Post-2010 UK Biodiversity Framework. Although the UK BAP has been superseded, Species Action Plans (SAPs) and Habitat Action Plans (HAPs) developed for the UK BAP remain valuable resources for background information on priority species under the UK Post-2010 Biodiversity Framework.

Most areas now possess a Local BAP (LBAP) to complement the national strategy where priority habitats and species are identified and targets set for their conservation. BAP's are the key nature conservation initiative in the UK, working at national, regional and local levels.

The Oxfordshire Biodiversity Action Plan focusses efforts on conserving the county's biodiversity on 36 Conservation Target Areas (CTAs)¹ which the site does not fall within.

There are no specific priorities for the areas that are located outside of the CTAs, but biodiversity is still protected through legislation as well as national and local planning policy as described above.

The Cherwell Corporate Biodiversity Action Plan 2016-18² is Cherwell District Council's BAP and is partially delivered through the adopted Cherwell Local Plan 2011-2031 Part 1. It makes specific

¹ <https://www.oxfordshire.gov.uk/cms/sites/default/files/folders/documents/environmentandplanning/countryside/naturalenvironment/BAPnewsletterFINAL.pdf> [Accessed: 10/08/2021]

² [http://modgov.cherwell.gov.uk/documents/s32798/Appendix%201%20-%20Cherwell%20BAP%202016-18 Final%20Draft.pdf](http://modgov.cherwell.gov.uk/documents/s32798/Appendix%201%20-%20Cherwell%20BAP%202016-18%20Final%20Draft.pdf) [Accessed: 10/08/2021]

reference to important sites, habitats and species and is referred to where relevant to the assessment.



Appendix 12.2

PROTECTED SPECIES SURVEY METHODOLOGY AND RESULTS

Appendix 12.1

Methodology and results for each of the ecological surveys completed at the Site are described below. Where appropriate, methods and results are discussed separately for the Eastern and Western Sites.

Phase 1 Habitat Survey Methodology and Results

Methodology

An extended Phase 1 Habitat survey of the Site was carried out on 17th May 2021 by Tyler Grange Group Ltd. The survey covered the entire Site, including boundary features, and was undertaken in appropriate weather (dry conditions with wind reaching 2 on the Beaufort scale, 5/8 oktas of cloud cover and a temperature of 14°C).

Habitats were described and mapped following the standard Phase 1 Habitat survey methodology. Phase 1 Habitat survey is a standard technique for classifying and mapping British habitats. The dominant plant species were recorded, and habitats identified according to their vegetation types. Where appropriate, consideration was given to whether each habitat would qualify as a Habitat of Principal Importance under the NERC Act 2006.

Target notes were made where specific features of ecological interest (e.g. invasive plants) were identified or where further detail was to be provided for features of ecological interest too small to be mapped.

Results

Eastern Site

Habitats

The Phase 1 habitat survey identified several habitat types within or directly adjacent to the Site. The locations and extent of these habitats are illustrated in Appendix 12.4.

Arable

The majority of the Eastern Site is formed of arable fields. Arable fields are of limited inherent ecological value and are considered to be of negligible ecological importance. The potential for this habitat type to support protected species (e.g. birds) is discussed separately below.

Grassland

Improved grassland formed the margins of the arable fields, dominated by perennial ryegrass *Lolium perenne* with Yorkshire fog *Holcus lanatus* and white clover *trifolium repens*. Improved grassland is of limited inherent ecological value and are considered to be of negligible ecological importance.

Hedgerows

Five hedgerows are present within the Eastern Site, forming the boundaries around the Eastern Site and partly demarcating the boundaries between arable fields:

- Hedgerows H10, H11, H12 and H13 are species-poor defunct hedgerows with multiple gaps. These hedgerows are dominated by common hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa* located on the eastern and southern boundaries of the Eastern Site and demarcating field boundaries in the centre of the Eastern Site; and
- Hedgerow 9 is an intact species-rich hedgerow with trees forming the western and northern boundaries of the Eastern Site. Tree species comprised pedunculate oak *Quercus robur*, ash, hazel and field maple. Shrub species included hawthorn, blackthorn, elder *Sambucus nigra*, holly *Ilex aquifolium* and dog rose *Rosa canina*.

Hedgerows are listed in Section 41 of the NERC Act 2006 as a priority habitat and based on the criteria listed in the UK BAP Priority Habitat Descriptions¹, the species-rich hedgerow H9 is likely to qualify as such. Although widespread in the wider landscape, the hedgerows present at the Site provide a network for mobile species and are irreplaceable in the short-term. The hedgerows are considered to be of local ecological importance.

Ponds

One waterbody is identified within the Eastern Site, waterbody WB1. WB1 is a small waterbody located within an arable field. The waterbody had limited aquatic and bankside vegetation at the time of the extended Phase 1 habitat survey. Ponds do offer some ecological value although this pond is unlikely to qualify as a priority habitat under the JNCC criteria for ponds and, as such, this habitat is considered to be of local ecological importance.

Scrub

One small area of dense scrub is present surrounding waterbody WB1. This habitat is primarily comprised of bramble *Rubus fruticosus* with common hawthorn and hazel. Given the small area and the prevalence of this habitat type in the wider landscape, this habitat is considered to be of negligible ecological importance.

Trees

Semi-mature ash trees are located along the north east boundary of the Eastern Site, within hedgerow H9. These trees are considered to contribute to providing habitat connectivity between the Site and the wider landscape although, given the prevalence of mature trees in the wider landscape and that the species present are common and widespread, these trees are considered to be of local ecological importance.

Ancient Woodland

There is no ancient woodland located within the Eastern Site. The closest ancient woodland to the Eastern Site is located approximately 330m south of the Eastern Site at 'Stoke Wood'.

Western Site

Arable

The majority of the Western Site is formed of arable fields. Arable fields are of limited inherent ecological value and are considered to be of negligible ecological importance. The potential for this habitat type to support protected species (e.g. birds) is discussed separately below.

Buildings

One barn building is present within the Western Site, hereafter referred to as building B1. Buildings are of limited inherent ecological value and are considered to be of negligible ecological importance. The potential for buildings to support protected species (e.g. bats) is discussed separately below.

Grassland

Improved grassland forms the margins of the arable fields, dominated by perennial ryegrass *Lolium perenne*. Improved grassland is of limited inherent ecological value and are considered to be of negligible ecological importance.

Hedgerows

Nine hedgerows are present within the Western Site, forming the boundaries around the Western Site and partly demarcating the boundaries between arable fields. A description on their structure and species composition is provided below:

- Hedgerows H3, H4, H5 and H6 are species-poor defunct hedgerows, demarcating field boundaries in the centre of the Western Site and dominated by common hawthorn;
- Hedgerows H1, H2, and H8 are intact species-rich hedgerows with trees forming the western, southern and northern boundaries of the Western Site and primarily comprised of field maple, blackthorn, hawthorn, hazel and sycamore *Acer pseudoplatanus* with honeysuckle *Lonicera periclymenum*; and
- Hedgerow H7 is an intact species-poor hedgerow with trees forming the majority of the north eastern boundary of the Western Site comprised primarily of common hawthorn, blackthorn, ash and holly.

Hedgerows are listed in Section 41 of the NERC Act 2006 as a priority habitat and based on the criteria listed in the UK BAP Priority Habitat Descriptions, the species-rich hedgerows are likely to qualify as such. Although widespread in the wider landscape, the hedgerows present at the Western Site provide a network for mobile species and are irreplaceable in the short-term. The hedgerows present are considered to be of local ecological importance.

A small length of coniferous hedge is also present on part of the north east boundary of the Western Site which is considered to be of negligible ecological importance.

Scrub

One small area of dense scrub is present in the south west corner of the Western Site. This habitat was primarily comprised of bramble *Rubus fruticosus*. Given the small area and the prevalence of this habitat type in the wider landscape, this habitat is considered to be of negligible ecological importance.

Tall ruderal

Two small areas of tall ruderal habitat are present in the Western Site (indicated by TN1 and TN5 in Appendix 12.4), located in the south-west corner and the centre. This habitat is dominated by nettle *Urtica dioica*. Given the small area and the prevalence of this habitat type in the wider landscape, this habitat is considered to be of negligible ecological importance.

Trees

Semi-mature and mature trees are present within the Western Site, primarily located along the northern and eastern boundaries, within the hedgerows. These trees are considered to contribute to providing habitat connectivity between the Site and the wider landscape although, given the prevalence of mature trees in the wider landscape and that the species present are common and widespread, these trees are considered to be of local ecological importance.

Ancient woodland

There is no ancient woodland located within the Western Site. The closest ancient woodland to the Western Site is located approximately 590m south of the Western Site at 'Stoke Wood'. Species

Badger Survey Methodology and Results

Methodology

A badger survey was completed on 16th June 2021 by Tyler Grange Group Ltd. The badger survey followed standard best practice methodologies^{2,3,4}.

The badger survey aimed to identify the presence or likely absence of badgers within and in close proximity to the Site by walking through the Site and identifying signs of badger activity, including the following:

- Badger setts (a single or multiple connected tunnel/s and chamber/s where badgers rest or breed, with entrances typically formed of a hole in the ground of at least 25cm diameter);
- Footprints, hairs and paths;
- Dung pits or latrines (multiple dung pits closely spaced);
- Foraging signs such as 'snuffle holes' where badgers have been digging for food; and
- Scratching posts.

Where badger setts were identified, each sett entrance (hole) was categorised as well-used, partially used or disused, determined by evidence of recent use as shown in Table 12.2.1. Identified badger setts were then further categorised according to the type of use, as shown in Table 12.2.2.

Table 12.2.1: Badger sett activity categories, adapted from best practice guidance

Level of use category	Description
Well used	Holes clear of debris or vegetation, obviously in regular use and may or may not have been excavated recently. Often with fresh soil, footprints and bedding present outside the hole.
Partially used	Holes that appear not in regular use and have debris such as leaves or twigs in the entrance or have moss and/or other plants growing in or around the entrance. Partially used holes could be in regular use after a minimal amount of clearance by a badger.
Disused	Holes that appear not to have been in use for some time, are partially or completely blocked and cannot be used without a considerable amount of

Level of use category	Description
	clearance. Sometimes all that is visible is a depression in the ground and the remains of a spoil heap, which may be covered by moss or plants.

Table 12.2.2: Badger sett type categories, adapted from best practice guidance

Sett type category	Description
Main	Typically comprised of a large number of holes with conspicuous spoil heaps. There will be well used paths visible leading to and from the sett and connecting sett entrances. An active main sett typically appears well used and would be used for breeding.
Annexe	Setts that are located close to a main sett, normally less than 150m away and are usually connected to the main sett by one or more obvious well-worn paths. Annexe setts usually have several holes but may not be in use all the time, even if the main sett is well used.
Subsidiary	Setts with a small number (typically 3-5) of holes which are at least 50m from a main sett and do not have an obvious path connecting to another sett. Not continuously active.
Outlier	Setts with only one or two holes, often with little spoil outside the hole and with no obvious path connecting them with another sett. Only used sporadically and when not in use by badger may be taken over by other mammal species such as foxes <i>Vulpes</i> or rabbits <i>Oryctolagus cuniculus</i> .

Results

Eastern Site

One outlier sett was identified [Information redacted], appearing active with a small amount of fresh spoil outside the entrance.

Western Site

The badger survey identified 14 sett entrances comprising a main sett. Signs of activity were also recorded including fresh spoil heaps outside sett entrances, a badger carcass at the main sett and a dung pit [Information redacted].

An incidental record of potential badger setts was identified on 12th August 2021 [Information redacted].

Barn owl Survey Methodology and Results

Methodology

Two barn owl survey visits were completed, on 29th July 2021 and 12th August 2021 by Tyler Grange Group Ltd, led by a holder of a Natural England Class CL29 survey licence for barn owl or their accredited agent. The survey focussed on the barn (building B1) on the Western Site as the only structure considered to have potential to support nesting barn owls. The survey involved an internal and external inspection of the barn to identify and record features which could offer potential for use

by breeding barn owls, to record any evidence of current or historic use as nest or roost sites, and to assess the current status of barn owl at the site.

Surveys were completed in accordance with best practice guidance⁵. Care was taken to minimise disturbance, keeping noise levels low. Weather conditions were mild and dry at the time of survey.

Buildings were inspected externally, with the aid of a high-powered torch, ladder and binoculars where necessary, looking for features that barn owls may use to access potential roost and/or nest sites or signs of use of the features themselves.

The following signs were looked for:

- Pellets;
- White wash;
- Nesting remains;
- Eggs / unsuccessful eggs / egg shells;
- Feathers;
- Down; and
- Prey caches.

Results

No signs of barn owl were identified during either of the barn owl survey visits. The habitats within the Site are considered to be sub-optimal for barn owl being predominately comprised of arable habitat with narrow grassland margins.

It is therefore concluded that barn owl are likely absent from the Site.

Bat Survey Methodology and Results

Methodology

Bat species codes used in this section are provided in Table 12.2.3.

Table 12.2.3: Bat species code key

<i>Pipistrellus</i> Species	<i>Myotis</i> Species	<i>Nyctalus</i> species	Other
Ppi = common pipistrelle <i>Pipistrellus pipistrellus</i>	Myo <i>Myotis</i> species, unidentifiable to species level ¹	Nn = Noctule <i>Nyctalus noctula</i>	Bb = Western barbastelle <i>Barbastella barbastellus</i>
Ppy = soprano pipistrelle <i>Pipistrellus pygmaeus</i>		Nyc = <i>Nyctalus</i> species unidentifiable to species level	BLE = Brown long-eared bat <i>Plecotus auritus</i>

¹ *Myotis* species calls are similar in frequency and composition and it is therefore not considered possible to identify *Myotis* species to species level with certainty.

<i>Pipistrellus</i> Species	<i>Myotis</i> Species	<i>Nyctalus</i> species	Other
PIP = <i>Pipistrellus</i> species, unidentifiable to species level			Myo/Plec = either a <i>Myotis</i> species or <i>Plecotus</i> species, unidentifiable to species level
			Unknown = not identifiable ²

Preliminary Bat Roost Assessment

A ground level preliminary bat roost assessment ('PBRA') of all buildings and trees present within both the Eastern and Western Site was completed following the Bat Conservations Trust's best practice guidelines (2016)⁶. The PBRA was completed on 17th May 2021 in suitable, dry weather conditions.

The PBRA for the buildings followed standard methodology which comprised an external inspection to assess the buildings potential to support roosting bats. In summary, this required the following:

- A visual inspection of the exterior of the building, examining features such as brickwork, lead flashing, and tiles for evidence of use/potential use by bats, including the presence of bat droppings and staining from fur-oil or urine; and
- A number of other factors were considered, including the presence of features suitable for use by bats, proximity to foraging habitats or cover, and potential for disturbance from lighting and other sources.

The PBRA for the trees required the surveyor to assess the trees present within and on the boundaries of the Site, in line with the criteria provided in Table 12.2.4.

Table 12.2.4: Tree Assessment Criteria (adapted from Collins 2016⁶)

Suitability	Description of Roosting Habitats
Negligible	Negligible habitat features likely to be used by roosting bats.
Low	A tree of sufficient size and age to contain Potential Roosting Features (PRFs) but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection conditions and surrounding habitat.

² Where sufficient sound data was not gathered due to distant or brief bat calls and it was therefore not possible to identify a bat, 'unknown' is stated

Bat Activity surveys: transects

Bat activity surveys were completed in accordance with best practice guidance⁶ for low suitability habitat as far as possible, which recommends one dusk activity survey per season (spring: April/May, summer: July/August and autumn: September/October). However, it was not possible to complete the spring transect visit in 2021 given that ecological surveys began in late May 2021, in addition to planning submission timescales, and therefore two of the recommended three bat activity survey visits (summer and autumn) are to be completed in 2021.

The summer activity transects were completed on 19th August 2021 and 13th September 2021 in mild, dry weather conditions within both the Eastern and Western Site.

Given it wasn't possible to complete an activity transect survey in spring (as required by best practice guidelines⁶) due to project timescales, a reasonable worst-case scenario has been set out with regard to survey results for spring in order to account for this, based on available data and professional judgement. This is considered to be sufficient for the purposes of this assessment.

Surveyors used a combination of visual observation and echolocation detection techniques to identify any bat activity on the Site. The surveys started approximately at sunset and ended approximately three hours after sunset.

The same transect routes were walked for each of the survey visits. These covered all Site boundaries and potential habitat features suitable for foraging or commuting bats, namely hedgerows and trees. The transects were walked at a constant speed along a planned route recording visual and sound observations such as number of bats, flight directions and type of activity (e.g. commuting / foraging). The bat activity transect route is shown in Appendix 12.6.

Elekon batlogger M bat detectors were used for sound recordings during the dusk activity surveys with an Echometer Touch Pro 2 used as an additional aid and in case of batlogger detector error. Recordings were analysed using Bat Explorer software to examine bat activity found on-site.

Bat Activity surveys: Static Monitoring

As part of the manned activity survey data, automated static monitoring surveys of both the Eastern and Western Site were also conducted.

Best practice guidance⁶ recommends that static detectors to be set out for five consecutive nights once each season (spring: April/May, summer: July/August and autumn: September/October). Two static bat detectors were placed (one on each transect route) within the Site, in summer between 12th and 17th August 2021 and in autumn between 01st and 05th September 2021 inclusive. Static bat detectors used were Anabat Express and Anabat Swift. The placement of the static bat detectors was focussed on the northern hedgerow boundaries in locations due for removal as part of the Development. The location of static detector deployment is shown in Appendix 12.6.

It was not possible to complete the spring bat activity surveys in given that ecological surveys began in late May 2021 and therefore two of the three (summer and autumn) recommended static detector deployments were completed in 2021. A reasonable worst-case scenario has therefore been set out with regard to survey results for spring and autumn in order to account for this, based on survey findings from the summer and autumn survey visits and professional judgement.

The static bat detectors were set to begin recording half an hour before sunset and to continue until half an hour after sunrise. Echolocation calls were later analysed in Bat Explorer or Anlook software to identify calls characteristic of different bat species or group of species present.

Emergence/re-entry surveys

One dusk emergence and one dawn re-entry surveys were completed respectively on a barn and a tree within the Western Site, in accordance with best practice guidelines for moderate suitability structures and trees⁶. No emergence/re-entry surveys were required within the Eastern Site because only trees of 'low' suitability for roosting bats were identified which require no further survey in accordance with best practice guidance⁶.

A dawn re-entry survey was completed on 25th August and a dusk emergence survey was completed on 13th September in mild, dry weather conditions. Table 12.2.5 presents survey dates and timings.

Table 12.2.5: Emergence/re-entry survey data

Date	Start time	End time	Sunset / sunrise time
25/08/2021	04:34	06:19	Sunrise: 06:04
13/09/2021	19:01	20:52	Sunset: 19:22

Surveyors were positioned to provide adequate visual coverage of all suitable features present on the building. Surveyor locations are shown in Appendix 12.6.

For the dusk emergence surveys, the surveyors were in position 15 minutes before sunset and observed the building until 1.5 hours after sunset. For dawn re-entry surveys, the surveyors were in position 1.5 hours before sunrise until 15 minutes after sunrise.

Surveyors used a combination of visual observation and echolocation detection to identify any bats emerging from or re-entering the building. Elekon Batlogger M and M2 detectors were used throughout the surveys. Bat Explorer software was subsequently used to analyse sonograms of any calls which could not be identified in the field.

Results

Preliminary Bat Roost Assessment

Eastern Site

Three trees of low suitability for roosting bats were identified on the northern boundary of the Eastern Site. No other structures or trees with suitability for roosting bats were identified. Details are provided in Table 12.2.6 below and locations are shown in Appendix 12.4.

Table 12.2.6: tree PBRA assessment results, Eastern Site

Tree no	Species	Feature	Suitability
T30	Ash	Ivy cover	Low
T31	Ash	Ivy cover	Low

T32	Ash	Ivy cover	Low
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Western Site

One building B1 was identified within the Western Site. This building was identified to be a barn of brick construction with timber roofing panels and a steel-frame extension. A small number of cracks in the brickwork were noted in addition to small gaps in the timber roofing panels, gaps between wooden timber frame and brickwork. Building B1 was classified as of low suitability for roosting bats.

23 trees of low suitability for roosting bats were identified within the hedgerows on the boundaries of the site. Six trees of moderate suitability were identified, with five (T4, T5, T19, T26 and T29) located on the boundaries of the site and one (T1) located within the south west of the Western Site. Further details are provided in Table 12.2.7 below and locations are shown in Appendix 12.4.

Table 12.2.7: tree PBRA assessment results

Tree no	Species	Feature	Suitability
T1	Ash	Numerous knot holes and splits, severely decayed	Moderate
T2	Ash	Ivy cover	Low
T3	Ash	Ivy cover	Low
T4	Ash	Dense Ivy cover	Moderate
T5	Oak	Split in decaying branch at 4m height on south aspect, Ivy	Moderate
T6	Field maple	Ivy cover	Low
T7	Ash	Ivy cover	Low
T8	Ash	Ivy cover	Low
T9	Ash	Ivy cover	Low
T10	Field maple	Ivy cover	Low
T11	Ash	Ivy cover	Low
T12	Ash	Ivy cover	Low
T13	Field maple	Ivy cover	Low
T14	Ash	Ivy cover	Low
T15	Ash	Ivy cover	Low

T16	Field maple	Ivy cover	Low
T17	Ash	Ivy cover	Low
T18	Ash	Ivy cover	Low
T19	Oak	Knot hole at 3m height on western aspect, crack in dead branch at 4m height on the southern aspect.	Moderate
T20	Field maple	Ivy cover	Low
T21	Field maple	Ivy cover	Low
T22	Field maple	Ivy cover	Low
T23	Ash	Ivy cover	Low
T24	Ash	Ivy cover	Low
T25	Ash	Ivy cover	Low
T26	Oak	Knot hole at 6m height on north-eastern aspect, ivy cover	Moderate
T27	Field maple	Ivy cover	Low
T28	Ash	Ivy cover	Low
T29	Field maple	Crack in dead limb, knot hole at 7m height on eastern aspect.	Moderate

Bat Activity Surveys: Transects

Results are presented below in tables 12.2.8 and 12.2.9 for the Eastern and Western Sites respectively. Location references to be reviewed in conjunction with the tables are shown in Appendix 12.6.

Eastern Site

A summary of the results of bat activity observed by the surveyors during the activity transect surveys is shown in table 12.2.8 below.

Table 12.2.8: Activity transect results: surveyor recordings, Eastern Site

Summer survey 19/08/2021 – Eastern Site

<i>Time</i>	<i>Species</i>	<i>Location</i>	<i>Activity (HNS = heard not seen)</i>
22:03	Ppi	A - B	Foraging from A toward B
22:07	Ppi	A-B	Foraging between A and B
22:12	Ppi	B	Foraging
22:18	Ppi	B-C	Foraging
22:39	Nn	E-D	Foraging
22:43	Ppi	D-F	Foraging
22:47	Ppi	F	Foraging
22:52	Ppi	H	Foraging
22:57-58	Ppy, Ppi	H-I	At least three bats, foraging
23:02	Ppi	I-A	Foraging
23:04	Nn	I-A	Foraging
23:09	Nn	A	Constant foraging
23:13	Myo	A-B	Commuting
23:17-19	Nn	B	Constant foraging

Autumn survey 13/09/2021 – Eastern Site

<i>Time</i>	<i>Species</i>	<i>Location</i>	<i>Activity</i>
19:20	Unknown	A	HNS, brief pass, unidentified
19:28-30	Unknown	B	HNS, brief pass, unidentified
19:39-41	Unknown	C	HNS, brief pass, unidentified
19:50-52	Unknown	D	HNS, brief pass, unidentified
19:57-20:00	Unknown	E	HNS, brief pass, unidentified
20:09-13	Pip	F	2 bats seen foraging back and forth along hedgerow
20:18-20	Unknown	G	HNS, brief pass, unidentified
20:22-24	Ppi	H	Foraging along hedgerow heading south

20:26	Ppi	H-I	Foraging
20:28	Ppi	H-I	Foraging
20:30	Ppi	I	Foraging
20:31-32	Myo, Ppi	I	Brief pass from Myo. Ppi foraging.
20:33	Ppi	I-A	Foraging
20:34-36	Myo, Ppi	I-A	Foraging
20:39-44	Unknown	A	HNS, brief pass, unidentified
20:44	Unknown	A-B	HNS, brief pass, unidentified

Western Site

A summary of the results of bat activity observed by the surveyors during the activity transect surveys is shown in table 12.2.9 below.

Table 12.2.9: Activity transect results: surveyor recordings, Western Site

Summer survey 19/08/2021 – Western Site

<i>Time</i>	<i>Species</i>	<i>Location</i>	<i>Activity</i>
21:02	Ppi	E	Foraging along hedgerow
21:17-18	Nn + Ppi	H	Foraging
21:24-27	Ppi	H - I	Foraging
21:40	Ppi	J - A	Foraging
21:44-45	Nn + Ppi	A	Commuting

Autumn survey 13/09/2021 – Western Site

<i>Time</i>	<i>Species</i>	<i>Location</i>	<i>Activity</i>
21:00	Unknown	A	HNS, brief pass, unidentified
21:12	Unknown	B	HNS, brief pass, unidentified
21:23	Unknown	C	HNS, brief pass, unidentified
21:28	Ppi	C (1)	Commuting, HNS
21:31	Ppi	C (2)	Foraging, HNS
21:39	Unknown	D	HNS, brief pass, unidentified

21:44	Ppi x 2 individuals	E	Foraging
21:48	Ppi	E – F	Foraging
21:52-54	Unknown	F	HNS, brief pass, unidentified
21:56-59	Unknown	G	HNS, brief pass, unidentified
22:03-04	Unknown	H	HNS, brief pass, unidentified
22:10-11	Ppi	I	Foraging
22:16-17	Ppy	J	Foraging

The Development

A summary of the results of data recorded by the Elekon batlogger M bat detector across the summer and autumn bat activity transect surveys completed to date is shown below in Table 12.2.10. The location and relative activity levels of this data is presented in Appendix 12.7 as a heat map, with individual recordings of species other than common pipistrelle and soprano pipistrelle³ indicated by symbols.

Table 12.2.10: Activity transect results summary for the Site: Batlogger detector recordings

Date	Total number of records by species							Total
	<i>Bb</i>	<i>Myo</i>	<i>Nn</i>	<i>Pip</i>	<i>Ppi</i>	<i>Ppy</i>	<i>Unknown</i>	
August: 19/08/2021	2	12	43	6	68	0	2	133
September: 13/09/2021	0	9	0	23	44	6	0	82

As shown in tables 12.2.8 and 12.2.9, the activity transect surveys recorded a total of five confirmed species in addition to small numbers of unidentified pipistrelle species and unidentified species. The most common species recorded during the activity surveys from both the Elekon batlogger detector recordings and the surveyor observations was common pipistrelle.

Bat Activity surveys: Static Monitoring

The static monitoring results for the Eastern and Western Sites across the two static monitoring surveys are described below.

Eastern Site:

³ These species are represented in the heat map but individual observations/recordings are not shown. Given the abundance of common and soprano pipistrelle it is not considered useful to present the location individual observations or recordings of these species.

The static detectors for the Eastern Site recorded a total of 768 bat passes across both the summer and the autumn data. Of all the calls 41.8% were from soprano pipistrelle and 38.15% were common pipistrelle, the two most prevalent species recorded. Total calls per species, each species' percentage of the total passes from the Eastern Site and the average passes per night for each species is displayed in table 12.2.11 below.

Table 12.2.11: Static detector results, Eastern Site

Passes	Species											Total passes:
	<i>Bb</i>	<i>BLE</i>	<i>Myo</i>	<i>Myo/Plec</i>	<i>Nn</i>	<i>Ppi</i>	<i>Ppy</i>	<i>Ppn</i>	<i>PIP</i>	<i>Nyc</i>	<i>Unknown</i>	
August:	0	0	6	0	32	3	0	0	0	0	1	42
September:	47	4	51	2	10	290	321	1	0	0	0	726
Total passes per species:	47	4	57	2	42	293	321	1	0	0	1	768
Percentage of total passes:	6.12	0.52	7.42	0.26	5.47	38.15	41.80	0.13	0.00	0.00	0.13	
August passes per night:	0	0	1.2	0	6.4	0.6	0	0	0	0	0.2	
September passes per night:	9.4	0.8	10.2	0.4	2	58	64.2	0.2	0	0	0	

Western barbastelle bats have a large core sustenance zone of 6km⁶. None of the western barbastelle passes recorded on the static bat detectors were within 1 hour of sunset or sunrise as would be expected if the Site formed an important commuting corridor from a western barbastelle roost. Therefore, it is not anticipated that a western barbastelle roost is present within or in close proximity to the Site.

The scoring system found in Wray et al. (2010)⁷ was applied. The scoring system gives greater weight to rarer species such as western barbastelle than common species and requires the highest scoring species to determine the result. Using this system on a precautionary basis, given that it was not possible to collect data in spring and the presence or likely absence of western barbastelle roosts in the local area is not known, it is considered that bat assemblage is of up to County ecological importance.

Western Site:

The static detectors for the Western Site recorded a total of 1805 bat passes across both the summer and the autumn data. Of all the calls 80.5% were from common pipistrelle, the most prevalent species recorded. Total calls per species, each species' percentage of the total passes from the Western Site and the average passes per night for each species is displayed in table 12.2.12.

Table 12.2.12: Static detector results, Western Site

	Species										Total passes:
	<i>Bb</i>	<i>BLE</i>	<i>Myo</i>	<i>Nn</i>	<i>Ppi</i>	<i>Ppy</i>	<i>Ppn</i>	<i>PIP</i>	<i>Nyc</i>	<i>Unknown</i>	
Species:											
August:	3	2	7	12	19	2	0	0	0	0	45
September	25	3	180	28	1434	39	1	34	4	12	1760
Total passes per species:	28	5	187	40	1453	41	1	34	4	12	1805
Percentage of total passes:	1.55	0.28	10.36	2.22	80.50	2.27	0.06	1.88	0.22	0.66	
August passes per night:	0.6	0.4	1.4	2.4	3.8	0.4	0	0	0	0	
September passes per night:	5	0.6	36	5.6	286.8	7.8	0.2	6.8	0.8	2.4	

Western barbastelle bats have a large core sustenance zone of 6km⁶. None of the western barbastelle passes recorded on the static bat detectors were within 1 hour of sunset or sunrise as would be expected if the Site formed an important commuting corridor from a western barbastelle roost. Therefore, it is not anticipated that a western barbastelle roost is present within or in close proximity to the Site.

The scoring system found in Wray et al. (2010)⁸ was applied. The scoring system gives greater weight to rarer species such as western barbastelle than common species and requires the highest scoring species to determine the result. Using this system on a precautionary basis, given that it was not possible to collect data in spring and the presence or likely absence of western barbastelle roosts in the local area is not known, it is considered that bat assemblage is of up to County ecological importance.

The Development:

The static bat detector surveys recorded a total of seven confirmed bat species (western barbastelle, brown long-eared, at least one *Myotis* species, noctule, common pipistrelle, soprano pipistrelle) and three species groups identifiable only to genus level (*Myotis* or long-eared species, pipistrelle species and *Nyctalus* species) which are considered likely to be formed of the identified seven species. A total of 13 passes could not be identified as any species or species group and are therefore listed as 'unknown'.

A large proportion of the calls recorded during the static monitoring surveys belonged to common and widespread bats species. The number of bats utilising the site for foraging and commuting activity is considered to be small. Using the scoring system found in Wray *et al.* (2010)⁷, on a precautionary basis, the commuting and foraging habitats at the Site are considered of **county ecological importance**.

Bat Emergence/Re-entry Surveys

The below results refer to the Western Site only as no emergence/re-entry surveys were completed within the Eastern Site.

No bats were observed re-entering either Building B1 or tree T1 during the dawn re-entry survey on 25th August 2021 or the dusk emergence survey on 13th September 2021. Therefore, roosting bats are assumed likely absent from Tree T1 and Building B1. Full data recorded by each surveyor during the surveys is presented in tables 12.2.13 and 12.2.14 below.

Table 12.2.13: First emergence/re-entry survey (25th August 2021), raw data

Building/Tree no.: B1

Date: 25/08/2021

Surveyor initials: JV, position SL1

Site: Western Site

Equipment used: Batlogger M2

Sunrise time: 06:04	Start time: 04:34	End time: 06:19
Weather	At start:	At end:
Cloud cover (%):	70	100
Wind (Beaufort scale):	2	2
Temperature (°C):	15	14
Precipitation:	Dry	Dry

Notes:

No re-entry observed.

No bat activity seen or heard.

Building/Tree no.: B1

Date: 25/08/2021

Surveyor initials and position: EH, position SL2

Site: J10, M40, Western Site

Equipment used: Batlogger M2

Sunrise time: 06:04	Start time: 04:34	End time: 06:19
Weather	At start:	At end:
Cloud cover (%):	70	100
Wind (Beaufort scale):	2	2
Temperature (°C):	15	14
Precipitation:	Dry	Dry

Notes:

No re-entry observed.
One brief Ppy pass, HNS.

Building/Tree no.: T1

Date: 25/08/2021

Surveyor initials and position: BN, position SL3

Site: J10, M40, Western Site

Equipment used: Batlogger M

Sunrise time: 06:04	Start time: 04:34	End time: 06:19
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Weather	At start:	At end:
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<i>Cloud cover (%):</i>	70	100
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<i>Wind (Beaufort scale):</i>	2	2
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<i>Temperature (°C):</i>	15	14
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<i>Precipitation:</i>	Dry	Dry
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Notes:

No re-entry observed.
One distant Nn pass.

Table 12.2.14: Second emergence/re-entry survey (13th September 2021), raw data

Building/Tree no.: B1		
Date: 13/09/2021		
Surveyor initials: JV, position SL1		
Site: J10, M40, Western Site		
Equipment used: Batlogger M2		
Sunset time: 19:22	Start time: 19:07	End time: 20:52
Weather	At start:	At end:
Cloud cover (%):	90	95
Wind (Beaufort scale):	2	2
Temperature (°C):	17	16
Precipitation:	Dry	Dry

Notes:

No emergence observed.
One brief Nn pass, HNS.

Building/Tree no.: B1		
Date: 13/09/2021		
Surveyor initials and position: MJ, position SL2		
Site: J10, M40, Western Site		
Equipment used: Batlogger M2		
Sunset time: 19:22	Start time: 19:07	End time: 20:52
Weather	At start:	At end:
Cloud cover (%):	90	95
Wind (Beaufort scale):	2	2
Temperature (°C):	17	16
Precipitation:	Dry	Dry

Notes:

No emergence observed.
No bat activity seen or heard.

Building/Tree no.: T1		
Date: 13/09/2021		
Surveyor initials and position: DL, position SL3		
Site: J10, M40, Western Site		
Equipment used: Echometer Touch		
Sunset time: 19:22	Start time: 19:07	End time: 20:52
Weather	At start:	At end:
Cloud cover (%):	90	95

<i>Wind (Beaufort scale):</i>	2	2
<i>Temperature (°C):</i>	17	16
<i>Precipitation:</i>	Dry	Dry

Notes:

No emergence observed.

One Nn pass and one Ppi pass.

Great Crested Newt (GCN) Survey Methodology and Results

Methodology

Habitat Suitability Index (HSI) Assessment

A HSI assessment of waterbody WB1 which is located within the Eastern Site, as well as WB2, WB3 and WB4 which are all located within 250m of the Site, was completed in conjunction with the extended Phase 1 Habitat survey. The HSI assessment was completed in accordance with best practice guidance⁹.

Waterbodies were assessed for their suitability to support great crested newt, in accordance with best practice guidelines⁵ on HSI assessment. The following ten key variables were assessed which are known to influence breeding populations of great crested newt:

- Geographic location;
- Water body area;
- Water body permanence;
- Water quality;
- Water body shading;
- Impact of waterfowl;
- Fish stocks;
- Number of waterbodies within 1km;
- Terrestrial habitat around the water body; and
- Macrophyte cover of the water body.

Waterbodies were scored on the above variables which were then used to calculate an overall HSI for each waterbody. Waterbodies were then assigned to one of the following five categories: poor, below average, average, good or excellent.

The HSI classifications are provided below:

- < 0.5 Poor;
- 0.5 – 0.59 Below Average;
- 0.6 – 0.69 Average;
- 0.7 – 0.79 Good; and
- ≥ 0.8 Excellent.

Although the HSI cannot be used as confirmation of GCN presence or likely absence, it can be used as a guide to assess waterbodies in terms of their potential to support GCN.

Environmental DNA (eDNA)

Two large waterbodies located approximately 0.1km south of Site were scoped out of further assessment as the waterbodies are separated from the Site by the major roads of the M40 and A43 which are considered to form barriers to the dispersal of great crested newts to terrestrial habitats within the Site.

All waterbodies considered to have potential to support great crested newt following the HSI assessment were subject to environmental DNA (eDNA) analysis. This is an approach approved by Natural England for providing a rapid means of establishing the presence or likely absence of GCN in a waterbody.

eDNA sampling involved water samples being taken from waterbodies on 16th June 2021 by an experienced GCN surveyor. Sterile kits provided by Nature Metrics Ltd were used, following standard methodology to prevent contamination of the samples¹⁰. The eDNA samples were tested for the presence or likely absence of eDNA in a controlled laboratory environment by Nature Metrics Ltd.

Results

Habitat Suitability Index (HSI) Assessment

The waterbody within the Eastern Site, waterbody WB1, was found to be of 'poor' suitability for GCN on HSI assessment. Therefore, GCN are assumed likely absent from waterbody WB1.

Four other waterbodies were identified within 250m of the Site hereafter referred to as waterbodies WB2, WB3, WB4 and WB5. Waterbodies WB2, WB3, WB4 and WB5 are within 250m of the Eastern Site and WB2, WB3 and WB4 are within 250m of the Western Site.

These five waterbodies were subject to HSI assessment, and waterbodies WB2, WB3 and WB5 were found to be of 'poor' suitability for GCN on HSI assessment. Waterbody WB4 was found to be of 'average' suitability on HSI assessment and was therefore subject to presence/likely absence survey, as shown in Table 12.2.15. All waterbody locations are shown in Appendix 12.4.

Table 12.2.15: HSI results

HSI category	Pond 1	Pond 2	Pond 3	Pond 4	Pond 5
Geographic location	1	1	1	1	Unsuitable for HSI assessment as pond was entirely dry
Pond area	0.05	0.6	0.05	0.05	N/A
Pond permanence	1	0.9	0.9	0.9	N/A
Water quality	0.01	1	0.67	0.33	N/A
Shade	0.3	1	1	0.9	N/A

Waterfowl effect	1	0.67	1	1	N/A
Fish presence	1	0.01	1	0.01	N/A
Pond Density	0.65	0.5	0.5	0.5	N/A
Terrestrial habitat	0.01	0.67	0.67	0.67	N/A
Macrophyte cover	0.3	0.7	0.9	0.6	N/A
HSI Score:	0.22 Poor	0.49 Poor	0.62 Average	0.35 Poor	N/A

eDNA

The eDNA survey was completed on waterbody WB4 and a negative result for GCN presence was returned following laboratory analysis. Therefore, GCN are assumed likely absent from this waterbody.

Based on results of the HSI assessment and eDNA survey, GCN are considered likely absent from the Site and are not considered further within this assessment. A full copy of the result report from Nature Metrics Ltd is included below (note, waterbody WB4 is labelled Pond 2 within the Nature Metrics results).



GREAT CRESTED NEWT DETECTION RESULTS

Company: Tyler Grange
Order number: 101976
Project code: 14047: Land at J10/M40
Date of Report: 9 July 2021
Number of samples: 1

Thank you for sending your sample for analysis by NatureMetrics. Your sample has been processed in accordance with the protocol set out in Appendix 5 of Biggs et al. (2014).

Summary of the results

Results indicate GCN absence in '14047 Pond 2'.

The negative controls were blank, the extraction blank control was negative, and the positive controls and their replicates were standard.

Results are based on the samples as supplied by the client to the laboratory. Incorrect sampling methodology may affect the results. Note that a negative result does not preclude the presence of Great Crested Newts at a level below the [limits of detection](#).

Methods

eDNA was precipitated via centrifugation at 14,000 x g and then extracted using Qiagen Blood and Tissue extraction kits. qPCR amplification was carried out in 12 replicates per sample, using GCN specific [primers](#) and [probes](#) described in Biggs et al. (2014), in the presence of [positive controls](#), [extraction controls](#), and [template negative controls](#). A score is given for the number of positive replicates out of 12.

The qPCR method follows the recommendations set out by NatureMetrics for Natural England in the qPCR validation project and helps improve the reliability of the interpretation of the data. Results from the assay are considered to have a [high](#) rating of confidence according to our [Validation Scale](#) (Harper et al. 2021).

The quality control methods exceed the requirements outlined in Biggs et al. (2014) Appendix 5. These consist of the use of [kit blanks](#), additional [extraction blanks](#) and [template negative controls](#), and [positive controls](#) standards of known concentration in triplicate to generate [limits of detection](#) and give confidence to the low and late amplifications.

www.naturemetrics.co.uk

Nature Metrics Ltd, CABI site, Bakeham Lane, Egham, Surrey, TW20 9TY



Kit ID	Pond ID	Arrived	Inhibition	Degradation	Score	Status
2856	'14047 Pond 2'	25-Jun	No	No	0	Negative

END OF REPORT

Report issued by: **Thomas Shannon**
Contact: **team@naturemetrics.co.uk**

www.naturemetrics.co.uk

Nature Metrics Ltd, CABI site, Bakeham Lane, Egham, Surrey, TW20 9TY

References

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- ⁸ Wray S., Wells D., Long E., and Mitchell-Jones T. (2010) Valuing Bats in Ecological Impact Assessment, In practice No.70, CIEEM, Winchester.
- ⁹ English Nature (2001) Great Crested Newt Mitigation Guidelines. English Nature, Peterborough
- ¹⁰ Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014) *Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA.* Freshwater Habitats Trust, Oxford



Appendix 12.3

BIODIVERSITY NET GAIN ASSESSMENT

Headline Results

[Return to results menu](#)

On-site baseline	<i>Habitat units</i>	154.25
	<i>Hedgerow units</i>	34.69
	<i>River units</i>	0.00
On-site post-intervention (including habitat retention, creation, enhancement & succession)	<i>Habitat units</i>	88.66
	<i>Hedgerow units</i>	32.93
	<i>River units</i>	0.00
Off-site baseline	<i>Habitat units</i>	40.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
Off-site post-intervention (including habitat retention, creation, enhancement & succession)	<i>Habitat units</i>	124.03
	<i>Hedgerow units</i>	5.63
	<i>River units</i>	0.00
Total net unit change (including all on-site & off-site habitat retention/creation)	<i>Habitat units</i>	18.45
	<i>Hedgerow units</i>	3.87
	<i>River units</i>	0.00
Total net % change (including all on-site & off-site habitat creation + retained habitats)	<i>Habitat units</i>	11.96%
	<i>Hedgerow units</i>	11.17%
	<i>River units</i>	0.00%

A-1 Site Habitat Baseline

Condense / Show Columns

Condense / Show Rows

Main Menu

Instructions

Habitats and areas									
Ref	Broad Habitat	Habitat type	Area (hectares)	Habitat distinctiveness		Habitat condition		Ecological connectivity	
				Distinctiveness	Score	Condition	Score		
1	Cropland	Cropland - Cereal crops	63.27	Low	2	N/A - Agricultural	1	Medium	
2	Lakes	Lakes - Ponds (Non- Priority Habitat)	0.007	High	6	Poor	1	Low	
3	Urban	Urban - Developed land; sealed surface	0.029	V.Low	0	N/A - Other	0	Low	
4	Cropland	Cropland - Arable field margins tussocky	3.59	Medium	4	N/A - Agricultural	1	Low	
5	Heathland and shrub	Heathland and shrub - Bramble scrub	0.064	Medium	4	Fairly Poor	1.5	Low	
6	Sparsely vegetated land	Sparsely vegetated land - Ruderal/Ephemeral	0.03	Low	2	Fairly Poor	1.5	Low	
7	Urban	Urban - Street Tree	0.045	Low	2	Moderate	2	Low	
8									
9									
10									
11									
12									
Total site area ha			66.99						

231																				
232																				
233																				
234																				
235																				
236																				
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239																				
240																				
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246																				
247																				
248																				
												Total Site length/KM		6.40						







