

Winchcombe CSEC Ecological Impact Assessment

National Grid Cotswolds Visual Impact Provision (VIP)
Project

Confidential Document – Sensitive Badger Information

Document Ref: 30167905-ARC-NC-260-RP-E-00002

JUNE 2024

CONFIDENTIAL



VERSION CONTROL

Version	Date	Author	Checker	Approver	Changes
V1	30/05/2024	C. Moores	J. Cronin	S.Jones, N. Hartley	-
V2	06/06/2024	C. Moores	J. Cronin	N. Lear, N. Hartley	Updated following legal review

This report dated 06 June 2024 has been prepared for National Grid (the “Client”) in accordance with the terms and conditions of the “Appointment” between the Client and **Arcadis Consulting (UK) Limited** (“Arcadis”) for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

Contents

Executive Summary.....	1
1 Introduction.....	3
2 Legislation and Key Policy Requirements.....	6
3 Stakeholder Consultation	11
4 Methodology	12
5 Results.....	22
6 Ecological Impact Assessment.....	33
7 Mitigation.....	40
8 Enhancements	44
9 Conclusion	45
10 References	46

Tables

Table 1: Relevant Legislation	6
Table 2: Relevant Policy and Guidance.....	7
Table 3: Desk Study Search Buffers.....	13
Table 4: Field Survey Areas.....	13
Table 5: Sett Classification (Cresswell et al, 1989)	16
Table 6: Scale of Importance	17
Table 7: Limitations	20
Table 8: Statutory Designated Sites	22
Table 9: Non-statutory Designated Sites	23
Table 10: Features Scoped Out.....	33
Table 11: Features Scoped In.....	35

Appendices

Appendix A

Roman Snail Survey Location Plan

Appendix B

Normalised Bat Call Data

Appendix C

Badger Sett Classification

Executive Summary

The Proposed Project forms part of the wider Cotswolds Visual Impact Provision (VIP) Project (hereafter referred to as the 'wider project'), the purpose of which is to underground a section of 400kV overhead electricity transmission lines, to mitigate the visual impact of existing electricity infrastructure through part of the Cotswolds National Landscape (CNL) (previously known as Area of Outstanding Natural Beauty (AONB)).

The Proposed Project is for the construction of a Cable Sealing End Compound (CSEC) at Winchcombe to facilitate the connection between new underground cables and the existing overhead line (OHL) and the associated permanent access road (and bell-mouth) to the CSEC, in addition to temporary bell-mouths created to support the cable construction along classified roads.

As part of the wider project, Arcadis Consulting (UK) Limited was commissioned by National Grid to provide an Ecological Impact Assessment (EclA). This report considers the ecological impacts and mitigation measures associated with the Winchcombe CSEC in Tewkesbury Borough. This EclA should be read in conjunction with the Biodiversity Net Gain (BNG) assessment and Landscape and Ecological Management Plan (LEMP).

Initial Extended Phase 1 and UKHab Habitat Surveys were undertaken in 2022 and 2023 to assess and map habitats within the survey boundary. The assessment considered the potential of the Site to support protected / notable species. A UKHab survey was also undertaken which classified habitats and assessed their condition for Biodiversity Net Gain. Further survey work for bats, badger (*Meles meles*), breeding birds, Roman snails (*Helix pomatia*), otter (*Lutra lutra*), water vole (*Arvicola amphibius*) and white-clawed crayfish (*Austropotamobius pallipes*) was undertaken to ensure an adequate baseline was established to inform an impact assessment in line with Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines for EclA (CIEEM, 2022).

The following ecological features were scoped in for impact assessment on the basis that impacts could potentially be determined significant in the absence of mitigation. These are invasive non-native species, woodland, hedgerow, bats, badger, breeding birds, reptiles, otter, hazel dormice and roman snails. Potential impacts on great crested newts will be mitigated as part of the District Level Licence currently in development.

Mitigation for the temporary and permanent loss of habitat across the Site will be addressed through the BNG process, ensuring that an overall net-gain (minimum 10%+) in biodiversity units is achieved. The BNG strategy will improve habitat condition and provide additional habitat resource for protected / notable fauna. The results of the BNG metric and associated habitat creation, enhancement and design are found within the BNG report and LEMP.

All four Annex II bat species are present within the locale. The presence of bats will be mitigated for using an appropriate lighting design in accordance with best practice guidelines and no works will occur outside the hours of 7am - 7pm to prevent any light spill after dark. There are no direct impacts upon bat roosts predicted and all trees with bat roosts and/or potential will be safeguarded with appropriate protection measures.

Multiple breeding bird territories are confirmed within the Site's 200m zone of influence. Vegetation clearance work will be kept to a minimum and undertaken outside of the bird nesting season (March to August inclusive) wherever possible. The sensitive use of lighting will ensure negligible disturbance to nocturnal species such as foraging barn owl and nocturnal work will be avoided. Pre-construction surveys will be undertaken no more than one month before works commence of trees that have been recorded to have barn owl roosting potential immediately offsite.

Badgers are present onsite. A single disused outlier sett is present adjacent to the B4632, approximately 100m west of the proposed bellmouth works. Works will result in the potential disturbance to this sett if it becomes active prior to the start of works. It is not anticipated that any main setts will be impacted by works.

Otters are present within the locale although no confirmed resting sites or holts were recorded during survey. The presence of otter will be mitigated using standard best practice and pollution control measures to prevent pollution of watercourses. Prior to the commencement of construction, an updating survey will be undertaken to ensure the otter status remains the same.

Hazel dormice were not recorded within 2km of the Site and only a limited area of suitable vegetation (small section of hedgerow habitat and small number of trees) will be removed to facilitate works. Vegetation clearance will be undertaken under ecological supervision by a dormouse licenced surveyor who will conduct a fingertip search in search of dormouse prior to any vegetation removal. Habitat enhancement measures will ensure a net gain in suitable dormouse habitat onsite.

Reptiles are present within the locale, with notable populations of Slow-worm (*Anguis fragilis*), Grass Snake (*Natrix Helvetica*), Adder (*Vipera berus*) and Common Lizard (*Zootoca vivipara*) in the surrounding area. Although habitats onsite are predominantly sub optimal dominated by agricultural fields and improved grassland, suitable habitat will undergo a phased cut approach to vegetation removal, supported by a fingertip search during spring/summer when reptiles are active (March – mid-October).

Local records indicate that Roman snails are present within the wider area. Vegetation clearance of suitable Roman snail habitat such as hedgerows and woodland edges will be undertaken under ecological supervision and a fingertip search in search of Roman snails will be conducted prior to any vegetation removal.

It is concluded that following the mitigation measures outlined in this report, the Proposed Project will result in no significant negative residual effects and deliver a Net Gain in Biodiversity of at least 10% as required by national legislation and planning policy and aim for an aspirational 20% Net Gain in Biodiversity as proposed by Cotswold National Landscape (CNL) local policy.

Please note that this report includes the locations of badger setts. Badgers are legally protected under the Protection of Badgers Act 1992 and face persecution from some groups in society. As such, this report should be kept confidential and must not be shared in the public domain.

1 Introduction

1.1 Project Background

- 1.1.1 In 2014, National Grid commissioned a Landscape and Visual Impact Assessment to identify areas across the UK that would benefit from the Visual Impact Provision (VIP) project. The purpose of the Landscape and Visual Impact Assessment was to identify those sections of electricity transmission lines within England and Wales that have the most important impacts on the landscape and visual amenity of these designated landscapes.
- 1.1.2 Arcadis Consulting (UK) Ltd. (Arcadis) was commissioned by National Grid to provide an Ecological Impact Assessment, in support of the undergrounding of the central section of National Grid's ZF.2 overhead line (OHL) route through the Cotswolds National Landscape (CNL), as part of the Cotswolds VIP Project (referred to as the 'wider project').
- 1.1.3 The wider project will comprise:
- The removal of a section of overhead lines (OHL), including the permanent removal of 16 pylons (18 pylons will be removed in total, however, two will be replaced under Permitted Development).
 - Underground cabling of approximately 7km in length.
 - Two new cable sealing end compounds (CSECs) at each end (north and south) and associated replacement terminal pylons (as mentioned above), to connect the new underground cables to the remaining existing overhead line.
 - Associated temporary works to facilitate construction, including temporary/permanent access junctions and roads, a temporary haul road, construction compounds, material storage and welfare facilities.
 - Ancillary off-site infrastructure (including installation of arcing horns and shunt reactor installation/connection).
- 1.1.4 The majority of the works will be undertaken using Permitted Development rights under Schedule 2 of the Town and Country Planning (General Permitted Development) (England) Order 2015 (as amended), however, the CSECs require planning permission. The scope of this report is for the Winchcombe CSEC only (referred to as the 'Proposed Project').
- 1.1.5 The Proposed Project is for the construction of a CSEC at Winchcombe to facilitate the connection between new underground cables and the existing OHL and the associated permanent access road (and bell-mouth) to the CSEC, in addition to temporary bell-mouths created to support the cable construction along classified roads. The Proposed Project is located within Tewkesbury Borough.
- 1.1.6 The proposed works within the Winchcombe CSEC redline comprise:
- Installation of a terminal pylon to connect the new underground cables to the remaining existing overhead line (note: the pylon is permitted development).
 - CSEC infrastructure.
 - Underground cabling from the Winchcombe CSEC towards the Whittington CSEC (note: this is permitted development).
 - A permanent access road to the CSEC, including a bell-mouth and turning area.
 - A hardstanding area where the overhead line meets with the new underground cables.
 - A retaining wall.

- New screening comprising native trees, woodland and scrub planting.
- Temporary bell-mouths with the B4632 and a classified road to facilitate construction.

- 1.1.7 This report considers the ecological impact and mitigation measures for the Winchcombe CSEC planning application boundary only, which will hereafter be referred to as “the Site” and can be seen in Figure 1.
- 1.1.8 A separate planning application will be submitted to Cotswold District Council for the Whittington CSEC at the southern end of the wider project.

1.2 Site Location and Setting

- 1.2.1 ZF.2 (the 400kV Feckenham-Walham/Feckenham-Minety OHL) enters the Cotswolds National Landscape from the northeast of Dixton heading in a southerly direction, rising to Prescott where it turns southeast across high ground before descending southeast of Cheltenham.
- 1.2.2 Section ZF.2(B) is proposed to be removed and undergrounded. This section of OHL is approximately 7km long and starts immediately south of the B4632 (pylon ZF306), in close proximity to Hollingsworth and Vose Postlip Mills. From Breakheart Plantation, the OHL runs in a southwesterly direction to the east of Cleeve Common Site of Special Scientific Interest (SSSI), past Wontley, Drypool and Wood Farms, and down towards Dowdeswell Wood (ZF325). There are a number of disused quarries either side of the OHL. The closest villages are Langley (north), Winchcombe (northeast), Cleeve Hill (west) and Charlton Kings to the southwest. The route crosses the three Local Authority administrations of Tewkesbury Borough Council, Cheltenham Borough Council and Cotswold District Council.
- 1.2.3 The Winchcombe CSEC planning application boundary is split into three areas. The first area comprises sections of the southerly adjacent fields to Hollingsworth and Vose Postlip Mills and a hardstanding track which will be the site of the CSEC and its access route. The second area comprises a section of B4632 and its associated bellmouth required for access. There is also a further small area within the Site boundary where the underground cable enters the northernmost edge of Breakheart Plantation. The CSEC, the bellmouth and the additional area of land adjacent to Breakheart Plantation together make up ‘the Site’ for the purpose of this assessment.
- 1.2.4 The Site is located within the Local Authority administration of Tewkesbury Borough Council.
- 1.2.5 The Site is located within the Cotswolds National Landscape, previously known as an Area of Outstanding Natural Beauty (AONB).

1.3 Brief and Objectives

- 1.3.1 Arcadis was commissioned to undertake an Ecological Impact Assessment (including a Biodiversity Net Gain (BNG) baseline assessment), in support of a full planning application at the Site. “The Site” is defined as the area within the red line boundary, which can be seen in Figure 1. The “survey area” is defined as the area in which ecological surveys were undertaken as part of the wider scheme, which can be seen in Figure 2. This survey area was used as part of the wider project and only the results relevant to this Site will be detailed within this report.

- 1.3.2 An Extended Phase 1 and UKHab surveys were completed, as well as surveys for badger, bats, otter, water vole, breeding birds, white-clawed crayfish and Roman snail.
- 1.3.3 The BNG assessment has been completed as a separate report (Arcadis, 2024b), whilst any potential impacts on great crested newts (GCN) are being covered under a District Level Licence (DLL) for the project and GCN are therefore not discussed further within the EclA.
- 1.3.4 The following objectives were set:
- Establish the baseline through field and desk-based assessment work.
 - Identify important ecological features that may be affected.
 - Consider the potential legal and policy implication of the Proposed Project and refer to the latest biodiversity guidance.
 - Assess the potential impacts on important ecological features and the significance of the residual effects of the Proposed Project.
 - Incorporate methods to avoid, reduce and compensate negative ecological impacts and their effects and provide ecological enhancement measures.
- 1.3.5 The methods, results and assessment are provided in this report.

2 Legislation and Key Policy Requirements

2.1 Introduction

- 2.1.1 This assessment has been undertaken in accordance with current national legislation, national planning policy, local plans and policies relating to biodiversity in the context of the Proposed Project. A summary of the relevant legislation and the requirements of these policies is provided below.

2.2 Relevant Legislation

- 2.2.1 The following legislation (Table 1) and policy and guidance (Table 2) have been considered with regard to the methodology and assessment included in this report.

Table 1: Relevant Legislation

Legislation	Details
Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 ('Habitats Regulations') (HMSO, 2019a)	The Regulations require authorities on behalf of the Secretary of State to maintain a list of sites which are important for either habitats or species (National Site Network – Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) and to provide protection for these sites through designation, planning and other controls. The Regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4. However, these actions can be made lawful through the granting of licenses by the appropriate authorities (Natural England in England). Licenses may be granted for a number of purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on the favourable conservation status of the species concerned.
The Wildlife and Countryside Act 1981, as amended (WCA) (HMSO, 1981)	The Act is the main mechanism for legislative protection of wildlife in England. It gives protection to native species (particularly threatened species), their resting places and places of shelter by making it an offence to kill, injure, take, damage, destroy, sell or possess them (with exceptions).
Protection of Badgers Act 1992 (HMSO, 1992)	The Act makes it an offence to kill or take a badger, to cruelly ill-treat a badger, or to interfere with a badger sett, including disturbing a badger while it is occupying a sett.
Countryside and Rights of Way Act 2000 (HMSO, 2000)	The Act places a duty on government departments to have regard for the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted, in accordance with the Convention on Biological Diversity. It also strengthens legal protection for species considered to be threatened under the Wildlife and Countryside Act

Legislation	Details
	1981 and increases powers for the protection and management of Sites of Special Scientific Interest (SSSI).
The Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006)	The NERC Act 2006 places a duty upon public bodies to maintain Section 41 (S41) lists of flora, fauna and habitats (previously UK Biodiversity Action Plan (BAP) habitats and species) and to consider these ecological features as a material consideration in planning. It also requires decision-makers to have regard to the conservation of biodiversity in England, when carrying out their normal functions.
The Invasive Alien Species (Enforcement and Permitting) Order 2019 (the Invasive Species Order') (HMSO, 2019b)	This order strengthens the legislation in relation to widely spread species of European Union concern; requiring effective management measures to be put in place to minimise their impacts. It is an offence to import, keep, breed / grow, transport, sell, use, allow to reproduce, or release into the environment the species listed in Schedule 2 of this Order.
The Environment Act 2021 (HMSO, 2021a)	In line with the 25 Year Plan for the Environment (HM Government, 2018), new development should identify and pursue opportunities for securing measurable net gains for biodiversity and for the wider environment. The Environment Act 2021 introduces a mandatory requirement for 10% biodiversity net gain for most new developments to ensure that they enhance biodiversity and create new green spaces for local communities to enjoy. Integrating biodiversity net gain into the planning system will provide a step change in how planning and development is delivered. There is also a strong focus on delivering environmental net gain. This would preferably be achieved onsite, however there are options to deliver these gains offsite and this would be demonstrated via the Statutory Biodiversity Metric calculator tool (DEFRA, 2023a). BNG is mandatory under Schedule 7A of the Town and Country Planning Act 1990 (as inserted by Schedule 14 of the Environment Act 2021).

2.3 Relevant Policy and Guidance

Table 2: Relevant Policy and Guidance

Policy / Guidance	Details
National Planning Policy Framework (NPPF) 2023 (HMSO, 2023)	The NPPF sets out how the planning system should protect and enhance nature conservation interests. Section 15 is concerned with conserving and enhancing the natural environment (paragraphs 180 to 194). Planning policies and decisions should contribute to and enhance the natural and local environment by:

Policy / Guidance	Details
	• 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. 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 steppingstones 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 and take opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity. When determining planning applications, local planning authorities should apply the following principle: • 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 encouraged, especially where this can secure measurable net gains for biodiversity.
Cotswolds National Landscape Management Plan 2023-2025 (Board of Cotswolds National Landscape, 2021)	The Cotswolds National Landscape Board has a statutory duty to prepare a management plan for the Cotswolds National Landscape and review it at intervals of no more than five-years. As part of the process for producing the Management Plan the Board commissioned a Strategic Environmental Assessment (SEA) Environmental Report and a Habitats Regulations Assessment (HRA) Screening Report of the Management Plan. The relevant policy has been extracted below: POLICY CC3: NATURAL AND CULTURAL CAPITAL: • The natural and cultural capital of the Cotswolds National Landscape and the services they provide should be fully assessed and evaluated. • Proposals affecting the Cotswolds National Landscape should have regard to – and seek to conserve and enhance – the natural and cultural capital of the National Landscape and the services they provide.

Policy / Guidance	Details
	POLICY CE7: BIODIVERSITY AND NATURE RECOVERY: Development proposals should provide a net gain in biodiversity of at least 20%.
Cotswolds Nature Recovery Plan (Cotswolds National Landscape and the Cotswolds Nature Recovery Forum, 2021)	The plan was written by the Board of the Cotswolds National Landscape in partnership with the Cotswolds Nature Recovery Forum. The relevant policy has been extracted below: 4.1.2: Habitat management, restoration and creation is undertaken in accordance with the Lawton principles (Lawton, 2010) of more, bigger, better and joined. Practitioners consider how wildlife moves around and how their work contributes to a wider nature recovery network at all scales from individual sites to whole landscapes.
Tewkesbury Borough Plan 2011-2031 (Tewkesbury Borough Council, 2022)	The relevant policy has been extracted below: <u>8. The Natural Environment</u> Policy NAT1: Development likely to result in the loss, deterioration or harm to features, habitats or species of importance to biodiversity, environmental quality or geological conservation, either directly or indirectly, will not be permitted unless: • a) the need for, and benefits of the development clearly outweigh its likely impact on the local • environment, or the nature conservation value or scientific interest of the site; • b) it can be demonstrated that the development could not reasonably be located on an • alternative site with less harmful impacts; and • c) measures can be provided (and secured through planning conditions or legal agreements), that would avoid, mitigate against or, as a last resort, compensate for the adverse effects likely to result from development.
Biodiversity Net Gain	National Grid have committed to “achieve a 10% biodiversity net gain for new major projects and for selected primary and grid substation sites”. National Grid have also stated that “habitat is to be secured for at least 30 years via planning obligations or conservation covenants”. BNG has been made mandatory in England from 12 February 2024 under Schedule 7A of the Town and Country Planning Act 1990 (as inserted by Schedule 12 of the Environment Act 2021). Developers must deliver a BNG of 10%. BNG is measured using the Statutory BNG Metric and guidance documents published by DEFRA.

Policy / Guidance	Details
CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2019a)	The aim of the guidelines is to: promote good practice and a scientifically transparent approach to Ecological Impact Assessment (EclA); provide a common framework to EclA to promote better communication and closer cooperation between ecologists involved with EclA; and provide decision-makers with relevant information about the likely ecological effects of a project.
Handbook for Phase 1 Habitat Survey: a technique for environmental audit	The Phase 1 Handbook (Joint Nature Conservation Committee (JNCC, 2010) provides a standardised system for classifying and mapping wildlife habitat throughout the United Kingdom. The aim of the Phase 1 habitat survey is to provide a rapid record of vegetation and wildlife habitat within the Site.
BS 42020:2013 Biodiversity: Code of Practice for Planning and Development (BSI 42020: 2013)	The British Standards Institute guidance provides coherent methodology for biodiversity management to help protect and enhance UK biodiversity.
CIEEM Biodiversity Net Gain: Good Practice Principles for Development (CIEEM, 2019b)	This document provides ten principles which set out good practice for achieving Biodiversity Net Gain and must be applied all together, as one approach. Biodiversity Net Gain is development that leaves biodiversity in a better state than before. It is also an approach where developers work with local governments, wildlife groups, landowners and other stakeholders in order to support their priorities for nature conservation. BNG has been made mandatory in England from 12 February 2024 under Schedule 7A of the Town and Country Planning Act 1990 (as inserted by Schedule 12 of the Environment Act 2021). Developers must deliver a BNG of 10%. BNG is measured using the Statutory BNG Metric and guidance documents published by DEFRA.

3 Stakeholder Consultation

- 3.1.1 A meeting was held with Cleeve Common Trust in September 2023, in which they provided additional records of protected or notable species within Cleeve Common SSSI. These protected/notable species records have informed our survey effort and proposed mitigation. Cleeve Common Trust asserted that the poor condition of stone walls in the locale offer good habitat to the notable reptile populations on the SSSI. Therefore, the rebuilding of walls as close to their original state will be incorporated in the reptile mitigation.
- 3.1.2 Two meetings with Natural England have taken place via their Discretionary Advice Service (DAS) as part of the wider project, one to discuss designated sites on 25 September 2023 and one to discuss protected and notable species and BNG on 14 December 2023. Prior to the designated sites meeting, Natural England suggested that we consider sites that are potentially functionally linked to the Severn Estuary SPA, although this SPA was outside our search buffer. This analysis is detailed in Table 10. Natural England confirmed they were satisfied with our approach to designated sites detailed in section 6.2. Natural England are also satisfied with our approach to protected species and BNG.

4 Methodology

4.1 Overview

- 4.1.1 This section sets out the methodologies applied to establish the baseline conditions and identifies any limitations encountered.
- 4.1.2 The baseline was established through a combination of a desk-based study and field surveys. The latter comprised a Phase 1 habitat survey, which was extended to consider an assessment of suitability for all protected and notable species relevant to the survey area. A UKHab survey and assessment of habitat condition using Biodiversity Metric 4.0, was also undertaken for the purposes of a BNG assessment. Following the initial habitat suitability assessment, further ecology surveys were then completed including:
- Bats.
 - Breeding birds.
 - Badger.
 - Otter, Water Vole and White-clawed Crayfish.
 - Roman Snails.
- 4.1.3 Details of the methods employed are presented below.

4.2 Desk Study

- 4.2.1 A desk-based study was undertaken in July 2023, to identify any existing ecological information relating to the survey area and its surroundings. The desk study search buffers applied to the data search are provided in Table 3. The following resources were used:
- The Multi-Agency Geographical Information for the Countryside (MAGIC, 2023) website was used to search for statutory designated sites of nature conservation value, granted European Protected Species Mitigation (EPSM) licence applications within the last 10 years, ancient woodland and Habitats of Principal Importance in England (HPIE) listed under Section 41 of the NERC Act 2006 (HMSO, 2006).
 - OS mapping and aerial photography (Google mapping) were studied to place habitats within the study area in the wider context; identify potential ecological features that may not be evident on the ground during the field survey; and identify potential barriers to animal movements (such as road networks, built development and major water courses).
 - The Gloucestershire Centre for Environmental Records (GCER) was approached to provide ecological records of rare and notable species within a 1km search area and protected species within 2km. They also provided records of local sites within a 1km search area.
 - The Cleeve Common Trust (CCT) provided additional records within and surrounding Cleeve Common held by themselves.
 - S41 of the NERC Act 2006 (HMSO, 2006) lists of habitats and species. These are referred to as HPIEs and Species of Principal Importance in England (SPIEs).
- 4.2.2 The desk study area for the Site comprised various search buffers as listed in Table 3. These are the Zones of Influence (ZoI) over which effects may arise dependent upon a site's qualifying features. These distances are precautionary and were identified ahead of the field survey result. Where

hydrological links to the Site or mobile species have been identified the study area is large. Any variation is explained in the results section.

Table 3: Desk Study Search Buffers

Policy / Guidance	Details
International or European statutory designated sites	10km
National statutory designated sites	5km
Protected and notable species Invasive, non-native species Granted EPSM licences	2km
Non-statutory designated sites	1km
Protected and notable habitat (including ancient woodland)	200m

4.3 Field Survey

- 4.3.1 The survey data collected was used to inform the underground cable route and subsequently the wider project boundary. Therefore, an initial wider survey area was used as the project design was evolving. This survey area covers all areas of the Site and can be seen in Figure 2.
- 4.3.2 The following survey areas (Table 4) were considered for field work when establishing a biodiversity baseline.

Table 4: Field Survey Areas

Survey	Survey Area
Extended Phase 1 Habitat Survey	Within Survey Area
Biodiversity Net Gain Assessment	Within Survey Area
Bat Survey	Static detectors and tree surveys across the Survey Area, Radio-tracking at Breakheart Plantation
Badger Survey	Within Survey Area
Breeding bird survey	Within Survey Area
Otter, Water Vole and White-clawed Crayfish Survey	Multiple sections of the River Isbourne were surveyed, all of which were within 200m of the Site. The survey area was split into three distinct areas: Area 1, 2 and 3. Maps of these areas can be seen in Figure 3.

Survey	Survey Area
Roman Snail Survey	Thirty-nine sample locations were surveyed along the length of the wider scheme, and these can be seen in Appendix A.

Extended Phase 1 Habitat Survey

- 4.3.3 An extended Phase 1 habitat survey was undertaken between March and May 2022 by Senior Ecologist Joanne Wilson MCIEEM of RPS. The extended Phase 1 Habitat Survey was presented as an appendix to a Preliminary Ecology Appraisal Report written by RPS (RPS, 2022). This habitat data in conjunction with the more recently collected UKHab habitat data detailed in 4.3.6 ensures sufficient habitat data validity across the Site.
- 4.3.4 The survey comprised a walkover to map habitats present within the Site and followed standard survey methodology (JNCC, 2010). Dominant plant species were noted, as were any uncommon species or species indicative of particular habitat types. Botanical names follow New Flora of the British Isles (Stace, 2010) for higher plants.
- 4.3.5 In addition, the habitats were assessed for their potential to support legally protected or otherwise notable flora and fauna, and any field signs that could confirm the presence of such species were recorded, such as burrows or other resting and potential breeding sites, paths, droppings, feeding signs, footprints and hairs.

Biodiversity Net Gain Condition Assessment

- 4.3.6 A UKHab survey and assessment of habitat condition was undertaken using Natural England's Biodiversity Metric 4.0 (Panks et al, 2021a and b). This information was then used to calculate Biodiversity Units on Site and within the ownership area for potential use relating to offsite compensation. The habitat condition assessment was undertaken by Ben Goodger MCIEEM on behalf of Arcadis between 2 May and 21 June 2023.

Bat Survey

- 4.3.7 As part of the wider project, a full suite of bat surveys were conducted including a habitat assessment, preliminary ground level roost assessments, building inspections, detailed ground tree inspections, tree climbing inspections, dusk emergence/dawn re-entry surveys, bat static automated surveys using SM4 bat detectors and a trapping/radio tracking survey focussed at Breakheart Planation.
- 4.3.8 Bat habitat assessments were undertaken in conjunction with the Phase 1 habitat survey and all further bat surveys were undertaken between March and October 2023.
- 4.3.9 Multiple trees within the Site were assessed by detailed ground tree inspections, tree climbing inspections and emergence/re-entry surveys. The locations of all trees assessed can be seen in Figure 4.
- 4.3.10 Of the twelve bat static detectors deployed to cover the wider project, three were in close proximity to the Site. Bat static N8 was located on the planning application boundary on the northern edge of a field used for access to the CSEC to the east. Bat static N4 was located on the northern edge of the

field to the west of Hollingsworth and Vose Postlip Mill, 0.3km from the Site. Bat static N7 was located next to a footpath through an area of woodland 0.3km southwest of the Site. The locations of all bat static detectors can be seen in Figure 5.

- 4.3.11 The trapping/radiotracking survey at Breakheart Plantation was conducted adjacent to the southernmost portion of the Site and 0.8km from the proposed CSEC location.
- 4.3.12 The scope of the surveys was designed in accordance with the Bat Conservation Trust's (BCT) Bat surveys for professional ecologists: good practice guidelines 3rd edition (BCT, 2016). The survey scope was then adapted in design to reflect the expected guidance changes in the forthcoming 4th edition (BCT, 2023).

Breeding Bird Survey

- 4.3.13 As part of the wider project, a full suite of breeding bird surveys were conducted including habitat suitability assessments for breeding birds and barn owl and a breeding bird transect survey.
- 4.3.14 All areas of the Site including the CSEC, its access route and the B4632 bellmouth were visible during the breeding bird transect survey, allowing full coverage of breeding bird activity to be recorded across the Site.
- 4.3.15 Habitat suitability assessments for breeding birds were based on the Phase 1 habitat survey undertaken between March and May 2022, which identified and mapped habitats with suitability for breeding birds. This was subsequently updated by Arcadis in July 2023.
- 4.3.16 Habitat suitability for barn owl (*Tyto alba*) was based on the Phase 1 habitat categories recorded as well as feedback from the breeding bird surveys and data collected during the bat roost assessment of trees, which also identified potential roosting / breeding potential for barn owl.
- 4.3.17 Breeding bird surveys were carried out in accordance with Bird Survey and Assessment Guidelines (Bird Survey and Assessment Steering Group, 2023). All the birds present within the survey areas were mapped using the British Trust for Ornithology (BTO) species codes and symbology, noting their behaviour with priority given to:
- Breeding signs.
 - Schedule 1 species.
 - Species of high conservation value.
- 4.3.18 Six survey visits were undertaken as per the Bird Survey and Assessment Guidelines by experienced ornithologist David Foster and Morgan Lees on behalf of Arcadis between 6 April and 22 June 2023.

Badger Survey

- 4.3.19 Badger surveys were undertaken by Tim Buckland MCIEEM, of BABEC. The Site was systematically inspected for evidence of badger such as setts, well-worn paths, dung pits/latrines, footprints, hair and bedding trials. Where badger holes were identified they were further classified into four types; Main Sett, Annexe, Subsidiary and Outlier (Cresswell et al, 1989), shown in Table 5 below.
- 4.3.20 Surveys were undertaken between 28 February 2023 and 15 May 2023 in order to cover the survey area for the wider project. Evidence of badger was also incidentally recorded in conjunction with other surveys.

4.3.21 The badger survey included a walkover of all areas of the Site.

Table 5: Sett Classification (Cresswell et al, 1989)

Main sett	Annexe	Subsidiary	Outlier
Multiple entrances	Intermediate number of entrances	Intermediate number of entrances	1-2 entrances
Permanently occupied	Occupied much of the time	Sporadically occupied (usually higher)	Sporadically occupied (usually higher)
Used for breeding	Close to Main Sett	Anywhere within territory	Anywhere within territory
Only one main sett per social group	Connected to main sett by well-worn path	No obvious path connecting to main	No obvious path connecting to outlier sett

Otter, Water Vole and White-clawed Crayfish Survey

4.3.22 Otter, Water Vole and White-clawed Crayfish (habitat potential) surveys were undertaken under the supervision of senior ecologist Georgina Kelly in April 2023. Subsequently, a second visit for Otter and Water Vole of the same locations was led by senior ecologist Warren Packer in September 2023. Detailed survey for white clawed crayfish was not undertaken as habitats were not considered to be suitable following initial assessment.

4.3.23 The surveys aimed to ascertain the habitat potential and presence/absence of Otter, Water Vole and White-clawed crayfish of a section of the River Isbourne system in Winchcombe, Cheltenham. The survey area was split into three distinct areas: Area 1, 2 and 3. Maps of these areas can be seen in Figure 3. The survey area was systematically inspected for evidence of Otter, Water Vole and White-clawed Crayfish such as burrows, spraints, well-worn paths, feeding stations, latrines, footprints and hair.

4.3.24 Areas 1 and 2 cover the watercourses and woodland located approximately 150m east of the CSEC field boundary. Area 3 included a section of watercourse between two fields onsite as well as the connected watercourse running approximately 10m from the northern edge of the CSEC access.

4.3.25 All fieldwork was carried out in accordance with current best practice guidelines (Dean et al., 2016, Chanin, 2003 and Peay, 2003).

Roman Snail Survey

4.3.26 A Roman Snail survey was undertaken by Toby Abrehart MCIEEM on behalf of Arcadis in February 2024. Hedgerows and woodland edges and other suitable habitat within the Site were systematically checked for signs of Roman snails, notably discarded shells, in order to determine their presence or likely absence. Thirty-nine sample locations were surveyed along the length of the wider project, and these can be seen in Appendix A.

4.4 Assessment Methodology

- 4.4.1 An assessment of potential ecological impacts of the Proposed Project was undertaken with reference to CIEEM Guidelines for EcIA in the UK and Ireland (CIEEM, 2022).
- 4.4.2 Construction and operation activities can affect site-specific ecological features (habitats and flora) and mobile features that habitats onsite support. Impacts can occur through several mechanisms. The levels of likely change associated with construction and operation were considered against the importance of each ecological feature to determine the significance of any effects. This subsequently determined the scale of any mitigation requirements.
- 4.4.3 Opportunities for enhancement towards BNG were also considered.
- 4.4.4 The following is a description of the methods employed to carry out this assessment. It covers the methods used to determine the value (or importance) of the feature, the character of the potential effect acting upon it as a result of the proposals and concludes whether the effect is likely to be significant or not.

Significance Criteria

- 4.4.5 Effects on biodiversity have been assessed in accordance with the CIEEM Guidelines for Ecological Impact Assessment (CIEEM, 2022). To determine the significance of effects, features were first valued. To achieve this, where possible, habitats, species and populations were valued on the basis of a combination of their rarity, status and distribution, using contextual information where it exists. This includes legal, policy and conservation status.
- 4.4.6 The factors which were taken into consideration in evaluating ecological features for both habitats and species were devised following the CIEEM Guidelines for Ecological Impact Assessment. The frame of reference for the valuation of ecological resources in terms of geographical levels from International to Site level was used. A range of documents were consulted to assign the criteria, for example, for breeding birds, the Birds of Conservation Concern (BOCC) 4: The Red list of Birds (Eaton *et al*, 2021) traffic light system of the highlighting species of nature conservation concern was also considered. The following geographic frame of reference has been used to determine the importance of ecological features: International; National; Regional; County; Local and Site; as set out in the CIEEM Guidelines for Ecological Impact Assessment. The specific criteria have been adapted from the document for the location, scale and duration of the Proposed Project. The categories of valuation are presented in Table 6 below.

Table 6: Scale of Importance

Survey	Criteria
International and European	Habitats An internationally designated site or candidate site (SPA, provisional SPA, SAC, candidate SAC, Ramsar Site, Biogenetic/Biosphere Reserve, World Heritage Site) or an area that would meet the published selection criteria for designation. A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat, which are essential to maintain the viability of a larger whole.

Survey	Criteria
	Species Any regularly occurring population of internationally important species, threatened or rare in the UK (i.e. an International Union for Conservation of Nature red list species that is also a UK Red Data Book or SPIE). A regularly occurring, nationally significant population/number of an internationally important species.
National (England)	Habitats A nationally designated site (SSSI), National Nature Reserve (NNR), Marine Nature Reserve (MNR) or a discrete area, which would meet the published selection criteria for national designation (e.g. SSSI selection guidelines). A viable area of a HPIE, or of smaller areas of such habitat essential to maintain wider viability. Species A regularly occurring, regionally or county significant population/number of an internationally/nationally important species. Any regularly occurring population of a nationally important species, threatened or rare in the region or county (see Local Biodiversity Action Plan). A feature identified as of critical importance in the UK under S41 of NERC 2006.
Regional (Midlands)	Habitats Sites that exceed the County-level designations but fall short of SSSI selection criteria. Viable areas of key habitat identified in the Regional BAP or smaller areas of habitat essential to maintain wider viability. Species Any regularly occurring, locally significant population of a species listed as being nationally scarce, which occurs in 16 of 100 10km² squares in the UK or in a Regional BAP. A regularly occurring, locally significant population/number of a regionally important species. Sites maintaining populations of internationally/nationally important species that are not threatened or rare in the region or county.
County (Gloucestershire)	Habitats Sites recognised by local authorities, e.g. Local Nature Reserves. Non-statutory designations attributed by the Local Planning Authority such as Sites of Importance for Nature Conservation (SINCs). A viable area of habitat identified in County BAP. A diverse and/or ecologically valuable hedgerow network. Semi-natural ancient woodland greater than 0.25ha. Species Any regularly occurring, locally significant population of a species listed in a County BAP due to regional rarity or localisation. A regularly occurring,

Survey	Criteria
	locally significant population of a County important species. Sites supporting populations of internationally / nationally / regionally important species that are not threatened or rare in the region or county, and not integral to maintaining those populations. Sites/features scarce in the County or that appreciably enrich the County habitat
Local	Habitats Areas of habitat that appreciably enrich the local habitat resource (e.g. species-rich hedgerows, ponds etc). Sites that retain other elements that due to their size, quality or the wide distribution within the local area are not considered for the above classifications. Species Populations/assemblages of species that appreciably enrich the biodiversity resource within the local context. Sites supporting populations of County important species that are not threatened or rare in the County and are not integral to maintaining those populations.
Site	Habitats Habitats that are only of value at the Application Site scale. Species Species that are only of value at the Application Site scale.

4.4.7 Following the identification of the value of the ecological feature it was necessary to determine the character of potential impacts. The following parameters are considered:

- Positive or negative.
- Extent.
- Magnitude.
- Duration.
- Frequency and timing.
- Reversibility.

4.4.8 These categories, along with the geographical context of the ecological feature are utilised to determine the 'character' of the impact and define it as 'significant' or 'not significant'.

4.4.9 A significant effect is defined as one which is considered likely to affect the integrity or favourable conservation status of an ecological feature. Where a significant effect is identified, the value of the feature has been used to help determine the geographical scale at which the effect is significant. Thus, any negative effect which is considered to significantly affect the integrity of a receptor of, for example national value, has been identified as being a nationally significant effect. This approach to determining the significance of effects is in line with CIEEM's best practice guidance. The guidance

requires that effects are determined to be 'significant' or 'not significant' with no reference to the level of significance.

- 4.4.10 For the purpose of this report, any features considered of Site value or less will be scoped out of further assessment.

4.5 Limitations and Assumptions

- 4.5.1 In line with CIEEM guidance (CIEEM, 2022), limitations for each survey type are outlined in Table 7.

Table 7: Limitations

Survey	Limitations
Extended Phase 1 and UKHab Habitat Surveys	Extended Phase 1 habitat surveys are limited by a variety of factors which affect the presence of flora and fauna (e.g. climatic variation, season and species behaviour). A lack of evidence of a protected species during a survey does not mean that the species is absent; hence the survey also records and assesses the ability of habitats to support such species. The time frame in which the survey is implemented provides a snapshot of activity within the survey area and cannot necessarily detect all evidence of use by a species. Whilst every effort has been made to provide a comprehensive description of the Site, no investigation can ensure the complete characterisation of the natural environment. The extended Phase 1 habitat survey does not constitute a full botanical survey. Plant species may have been under-recorded, unidentifiable, or not visible due to the time of year the survey was carried out. The statutory biodiversity metric 4.0 (DEFRA 2023a/b) was the most up to date version at the time of the surveys.
Bat Survey	The data collected by static detectors in September was very low compared to other months, perhaps due to heavy rainfall during the time that the detectors were recording. This has been somewhat compensated for by setting up the detectors for an additional two days on 29th and 30th September. Five days of data was still collected and analysed for the September period.
Breeding Bird Survey	The surveys were conducted during the main breeding bird season, in line with survey guidelines and the vast majority during suitable weather conditions. There were minor deviations to the transect routes marked due to access arrangements and sub-optimal weather conditions on the first survey visit to the southern area, however these are considered unlikely to impact significantly on the survey results. As such the results are likely to be a fair representation of the bird population across the survey area at the time. The species assemblages and population sizes of those present may change in the years after this survey.
Badger Survey	Surveys were undertaken in good weather conditions and in line with survey guidelines. No survey limitations were recorded.

Survey	Limitations
Otter, Water Vole and White-clawed Crayfish Survey	Surveys were undertaken in good weather conditions and in line with survey guidelines. Area 3 could not be surveyed for white-clawed crayfish due to access issues. It was deemed unlikely that white-clawed crayfish use this section of the Isbourne as the water looked polluted, and the flow was very fast which is sub-optimal for breeding crayfish and invertebrate prey.
Roman Snail	Surveys were undertaken in good weather conditions and in line with survey guidelines. No limitations experienced.

5 Results

5.1.1 This section outlines the biodiversity baseline based on both desk-based research and field survey.

5.2 Sites Designated for Biodiversity

Statutory Sites

5.2.1 One internationally designated Special Area of Conservation (SAC) is located within 10km of the Site. No other internationally designated sites were identified within 10km of the Site.

5.2.2 There are three nationally designated statutory Sites of Special Scientific Interest (SSSIs) located within 5km of the Site.

5.2.3 All statutory designated sites within the previously stated zones of influence are detailed in *Table 8*. Maps of statutory designated sites within 2km of the Site can be seen in Figure 6.

Table 8: Statutory Designated Sites

Statutory Designated Site	Description	Location Compared to the Site
Severn Estuary SPA/Ramsar/SSSI	Designated for its wintering and passage wildfowl feature, supporting: - Bewick's swan (<i>Cygnus columbianus bewickii</i>). - Dunlin (<i>Calidris alpina alpina</i>). - Gadwall (<i>Mareca strepera</i>). - Greater white-fronted goose (<i>Anser albifrons albifrons</i>). - Redshank (<i>Tringa totanus</i>). - Shelduck (<i>Tadorna tadorna</i>). - Waterbird assemblage	Outside of desk study boundary (33 km Southwest) but considered alongside land that is functionally linked to this designated site at the request of Natural England.
Dixton Wood SAC	Broad-leaved deciduous woodland. Violet click beetle (<i>Limoniscus violaceus</i>) was discovered at Dixton Wood in 1998 and it has been found at the site on a single occasion subsequently. This species is listed as a species of importance in the Cotswolds (Cotswolds National Landscape, 2021). It is a small site with large number of ancient ash (<i>Fraxinus excelsior</i>) pollards and supports a rich fauna of scarce invertebrate species associated with decaying timber on ancient trees.	4.5 km Northwest
Dixton Wood SSSI	A component SSSI of Dixton Wood SAC. The site is designated for the population of violet click beetle (<i>Limoniscus violaceus</i>), and for a deadwood (saproxylic) beetle assemblage.	4.5 km Northwest

Statutory Designated Site	Description	Location Compared to the Site
Cleeve Common SSSI	A large area of unimproved limestone grassland. It is also the largest unenclosed "Wold" on the Cotswold escarpment, with over 400 hectares of open space. The site supports several orchid species and also provides suitable conditions for a wide range of invertebrates.	0.9 km West
Puckham Woods SSSI	An area of unimproved limestone grassland and species-rich, ancient semi-natural woodland, which are representative of vegetation types much reduced by recent changes in land use and management. The site also supports the nationally scarce bastard toadflax (<i>Thesium humifusum</i>).	4.2 km South

- 5.2.4 The internationally designated site, Dixon Wood SAC, is located 4.5 km from the Site. Dixon Wood SAC is designated due to its woodland habitat and the presence of violet click beetle, which is closely associated with decaying wood found in the SAC. Dixon Wood SSSI is a component SSSI of Dixon Wood SAC, comprising the same area and reasons for designation.
- 5.2.5 Cleeve Common SSSI is designated for its limestone grassland and is of importance both for its grassland, and for its geological and physiographical features, whilst Puckham Woods SSSI is designated for its flower-rich, ancient semi-natural woodland and unimproved limestone grassland.
- 5.2.6 The decision as to whether to scope these sites in/out of the impact assessment was discussed and agreed upon in a meeting with Paul Horswill (Natural England) on 25 September 2023 and confirmed via email on 6 November 2023. The details of which are scoped in/out can be seen in sections 6.2 and 6.3.

Non-statutory Sites

- 5.2.7 Breakheart Plantation Local Wildlife Site (LWS) is the only non-statutory designated site located within 1km of the site, details of which are shown in Table 9 below. A map of all non-statutory designated sites within 2km of the Site can be seen in Figure 6.

Table 9: Non-statutory Designated Sites

Non-Statutory Designated Site	Description	Location
Breakheart Plantation LWS	Ancient semi-natural broadleaved woodland (not listed on the ancient woodland inventory).	~60m South

- 5.2.8 Breakheart Plantation is located ~60m south of the Site. The primary qualifying features of this designated sites are its broadleaved woodland habitat. A review of historic mapping of the Site showed that Breakheart Plantation has not existed continuously since 1600. It was therefore

concluded that Breakheart Plantation should not be considered “ancient woodland” since it does not fit the aforementioned criteria.

- 5.2.9 All information regarding ancient woodland within the survey area can be seen in the Arcadis Arboricultural Impact Assessment (Arcadis, 2024a).

5.3 Habitat

- 5.3.1 The following habitats are the Phase 1 habitat types recorded within the Site boundary during surveys. Some habitat areas were not covered by the initial Phase 1 survey scope and in these cases the Phase 1 habitat type recorded in conjunction with the UKHab survey has been reported. Where required, additional information, including the potential of the habitat to support protected or notable species, was recorded during the survey. This information can be visualised in the Phase 1 habitat map (Figure 1).

Habitats of Principal Importance in England (HPIE)

- 5.3.2 There are small areas of lowland mixed deciduous woodland HPIE within and adjacent to the Site. There are a number of hedgerow HPIEs onsite and within 200m of the Site.
- 5.3.3 A map showing the locations of HPIEs identified by the desk study can be seen in Figure 7.

Arable

- 5.3.4 Arable crops varied across the wider project boundary but are dominated by Rye and Oil Seed Rape. A small strip of arable land lies within the Site boundary as well as a small section of the arable field margin, however this habitat was very narrow (<1m wide) and showed little floristic diversity therefore is not considered to be a priority habitat.

Woodland and Trees

- 5.3.5 This section details the results of the findings of the extended Phase 1 habitat survey. Further woodland habitat descriptions are provided within the Arboricultural Impact Assessment (Arcadis, 2024a). For a comprehensive understanding of woodland habitats and arboricultural constraints, please refer to both documents in conjunction.

Broadleaved Semi-natural Woodland

- 5.3.6 Two parcels of broadleaved woodland were recorded on Site. Generally, these were unmanaged, and considerable amounts of deadwood were recorded on the woodland floor, as well as in the standing canopy.
- 5.3.7 Abundant canopy species included ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*) and European larch (*Larix decidua*). Pedunculate Oak (*Quercus robur*), grey poplar (*Populus canescens*), white willow (*Salix alba*) and other conifers including a row of Leyland cypress (*Cupressocyparis leylandii*) occurred occasionally within canopies. Understories are generally sparse (although more abundant at edges of woodland) and include young ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*) and wych elm (*Ulmus glabra*).
- 5.3.8 Shrub layers are dense, featuring abundant hazel (*Corylus avellana*) and hawthorn (*Crataegus monogyna*), with occasional blackthorn (*Prunus spinosa*), sycamore (*Acer pseudoplatanus*), horse chestnut (*Aesculus hippocastanum*), field maple (*Acer campestre*), spindle (*Euonymus europaeus*),

elder (*Sambucus nigra*), holly (*Ilex aquifolium*), Deutzia (*Deutzia sp.*) and cherry laurel (*Prunus laurocerasus*) present.

5.3.9 Abundant ground flora species include common nettle (*Urtica dioica*), common cleavers (*Galium aparine*), wild garlic (*Allium ursinum*), dogs' mercury (*Mercurialis perennis*) and ivy (*Hedera helix*). Hart's tongue fern (*Asplenium scolopendrium*), lady fern (*Athyrium filix-femina*) and pendulous sedge (*Carex pendula*) are abundant along the steep banks of the stream. Other species include primrose (*Primula vulgaris*), bluebell (*Hyacinthoides non-scripta*), wood avens (*Geum urbanum*), red campion (*Silene dioica*) and wood meadow grass (*Poa nemoralis*).

5.3.10 Broadleaved woodland onsite falls into the category of Lowland Mixed Deciduous Woodland HPIE.

Running Water

5.3.11 Running water stemming from the River Isbourne is present at two locations within the Site boundary, both of which are a continuation of the same stream. This watercourse exhibits clear water, a sandy bed with gravel and pebbles and is approximately 2 metres wide with shallow water flowing west to east through an area of woodland. A small section (located offsite) passes through a concrete channel and sluice gate which is part of the neighbouring paper mill's infrastructure. The stream supports woodland ground flora on its banks including pendulous sedge (*Carex pendula*), ivy (*Hedera helix*) and wild garlic (*Allium ursinum*).

5.3.12 A small and shallow drainage ditch flowing south to north at the base of a hedgerow is also present on Site. This section of running water is completely shaded by the adjacent hedgerow and overgrown with common nettle (*Urtica dioica*). Occasional greater willowherb (*Epilobium hirsutum*) and pendulous sedge (*Carex pendula*) were present on its banks.

Hedgerows

Native Species-Rich Hedgerow with Trees

5.3.13 Native species-rich hedgerows are present along the proposed new access track to the CSEC. This is infrequently managed and averaged 2 - 4 m in width and 3 - 5 metres in height. Species recorded frequently included hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), hazel (*Corylus avellana*), elder (*Sambucus nigra*), field maple (*Acer campestre*) and dog rose (*Rosa canina*). Dogwood (*Cornus sanguinea*), Goat Willow (*Salix caprea*), alder buckthorn (*Frangula alnus*), damson (*Prunus insititia*) occurred occasionally within these hedgerows.

5.3.14 Semi-mature sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*), young horse chestnut (*Aesculus hippocastanum*) and mature pedunculate oak (*Quercus robur*) occurred occasionally as trees.

Species-Poor Hedgerow

5.3.15 Species-poor hedgerows delineate some field boundaries on Site. These hedgerows featured frequent hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*) and field maple (*Acer campestre*) with occasional elder (*Sambucus nigra*).

Species-Poor Hedgerow with Trees

- 5.3.16 Species-poor hedgerows with trees delineate some field boundaries on Site. Species recorded frequently included hawthorn (*Crataegus monogyna*) and *Prunus* sp.. Elder (*Sambucus nigra*) and dog rose (*Rosa canina*) occurred occasionally within these hedgerows.
- 5.3.17 Semi mature and mature ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*) trees occurred frequently within these hedgerows.

Grassland

Improved Grassland

- 5.3.18 The Site is dominated by improved grassland that was either cut for silage or had been heavily grazed at the time of the survey, with sward heights recorded between 5 and 10 centimetres. Improved grassland habitats within the wider project boundary include perennial Rye-grass (*Lolium perenne*) was dominant with abundant false oat-grass (*Arrhenatherum elatius*) and cock's-foot (*Dactylis glomerata*). Rough meadow grass (*Poa trivialis*), white clover (*Trifolium repens*), yorkshire fog (*Holcus lanatus*), creeping thistle (*Cirsium arvense*), hogweed (*Heracleum sphondylium*), common nettle (*Urtica dioica*), red fescue (*Festuca rubra*), tall fescue (*Festuca arundinacea*) and meadow foxtail (*Alopecurus pratensis*) occurred frequently. Occasional field horsetail (*Equisetum arvense*), rosebay willowherb (*Chamaenerion angustifolium*), meadow cranesbill (*Geranium pratense*), meadow vetchling (*Lathyrus pratensis*), ribwort plantain (*Plantago lanceolata*) and yarrow (*Achillea millefolium*) were recorded within the areas of improved grassland on Site.

Bare Ground

- 5.3.19 Bare ground was limited to farm tracks and yards.

5.4 Protected / Notable Species

- 5.4.1 Alongside field survey results, the results of the desk study are detailed in this section and locations of these records can be seen in Figure 8.

Protected / Notable Plants and Fungi

- 5.4.2 Records of three protected and/or notable plant species were returned within 2km of the Site by the desk study, none of which were onsite.
- 5.4.3 The International Union for Conservation of Nature (IUCN) endangered Purple Milk-vetch (*Astragalus danicus*) was returned in multiple locations within 2km of the Site. Musk Orchid (*Herminium monorchis*) and Frog Orchid (*Coeloglossum viride*) were also returned by the desk study at multiple locations within 2km of the Site.
- 5.4.4 No protected/notable plants or fungi were found onsite during the Phase 1 habitat or UKHab survey.
- 5.4.5 The desk study did not identify any granted EPS licence applications for plants within 2km of the Site.

Invasive / Non-native Plant Species (INNS)

- 5.4.6 Records of four invasive non-native species (INNS) plants listed under Schedule 9 of the WCA 1981 (as amended) (HMSO, 1981) were returned by the desk study within 2km of the Site. The species

included Canadian Waterweed (*Elodea canadensis*), Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*) and Rhododendron (*Rhododendron ponticum*).

- 5.4.7 During the Phase 1 habitat survey Himalayan Balsam was recorded within Breakheart Plantation.

Bats

- 5.4.8 The desk study returned records of fifteen bat species within 2km of the boundary for the wider project.
- 5.4.9 One granted EPS licence application for lesser horseshoe bats (*Rhinolophus hipposideros*) within 2km of the Site was identified by the desk study.
- 5.4.10 Bat activity surveys undertaken as part of the wider project identified a total of 123,005 bat calls. The calls recorded were largely pipistrelle bats (common (*Pipistrellus pipistrellus*) and soprano pipistrelles (*Pipistrellus pygmaeus*) combined), these formed 83% of the total calls. All four Annex II species (barbastelle (*Barbastella barbastellus*), Bechstein's (*Myotis bechsteinii*), greater horseshoe (*Rhinolophus ferrumequinum*) and lesser horseshoe (*Rhinolophus hipposideros*) bats) were identified within the wider survey area. The following bat static results were specific to the Site:
- Bat static N8 had 17.7 bat passes per hour across the survey period. Static N8 recorded high levels of *Myotis* sp. calls at 2.52 passes per hour.
 - Bat static N7 had 25.7 bat passes per hour across the survey period. Static N7 recorded 3.4 lesser horseshoe bat passes per hour, the most of all statics deployed.
 - Bat static N4 had 32 bat passes per hour across the survey period. Static N4 recorded relatively low numbers of passes from rare bat species as the vast majority were Pipistrelle bats.
 - Normalised bat passes per hour across all bat static locations can be seen in [Appendix B](#).
- 5.4.11 No trees within the Site were recorded as suitable for roosting. The hedgerow with trees located perpendicular to the proposed CSEC access track is used by commuting and foraging bats as shown by the static detector data. Other habitats on Site, including arable and improved grassland is considered suboptimal for foraging and commuting.
- 5.4.12 During the trapping/radio tracking survey at Breakheart plantation, a sub-adult male Bechstein's bat (*M. bechsteinii*) that frequently foraged on the western boundary of the Site was found roosting in a cherry tree on the edge of a small copse at Corndean Farm approximately 55m south of the Site. A subsequent emergence survey confirmed it roosted alone.
- 5.4.13 The trapping/radio tracking survey also located an adult male Noctule bat (*N. noctula*) in a day roost in an ash tree 400m northwest of the Breakheart Plantation in woodland 350m southwest of the Site boundary. An emergence survey confirmed this bat roosted alone.
- 5.4.14 The next closest roosts to the Site found during surveys are located at Corndean Hall, approximately 900m southeast of the Site. One building at Corndean Hall was found to host an adult male Lesser horseshoe bat (*R. hipposideros*) roosting in a roof void as part of a maternity colony of more than 60 other Lesser horseshoe bats. An adult male Brown long-eared bat (*P. auritus*) and an adult male Greater horseshoe bat (*R. ferrumequinum*) were also found to be roosting in different buildings at Corndean Hall.
- 5.4.15 The locations of all bat roosts found during the surveys can be seen in Figure 5.

- 5.4.16 All bat species are afforded full protection under UK and European legislation, including the Wildlife and Countryside Act 1981 (as amended) (HMSO, 1981), the Countryside and Rights of Way Act (HMSO, 2000) and The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (HMSO, 2019).

Breeding Birds

- 5.4.17 Fifty-two species of birds were recorded across the survey area as part of the wider project.
- 5.4.18 Barn owl were the only Schedule 1 species seen as part of surveys for the wider project. This was flying north on one occasion northwest of Drypool Farm, 3.5 km from the Site.
- 5.4.19 The following territories were recorded onsite or within 200m of the Site during breeding bird survey; mallard (*Anas platyrhynchos*), stock dove (*Columba oenas*), wren (*Troglodytes troglodytes*), song thrush (*Turdus philomelos*), woodpigeon (*Columba palumbus*), redstart (*Phoenicurus phoenicurus*), skylark (*Alauda Arvensis*), mistle thrush (*Turdus viscivorus*), marsh tit (*Poecile palustris*) and willow warbler (*Phylloscopus trochilus*). House martin (*Delichon urbicum*) and bullfinch (*Pyrrhula pyrrhula*) have possible breeding territories within 200m of the Site. This assemblage is typical of the habitats present on Site and these habitats are widely replicated in the wider area.
- 5.4.20 In the UK, all wild bird species and their eggs are protected when nesting by law. In addition, there are several pieces of legislation or policy which afford certain species extra legal protection, or emphasise their conservation importance, as outlined below:
- Species that are specially protected when breeding under Schedule 1 Part 1 of the Wildlife and Countryside Act (WCA) 1981 (as amended));
 - Species of Principal Importance listed under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act).

Badger

- 5.4.21 As part of the wider project, badger surveys recorded a total of 47 badger setts within the survey area. Descriptions, locations and classifications of these setts are provided in confidential Appendix C alongside a map detailing all badger sett locations and classifications in Figure 9. Of the setts found during the badger survey, two were classified as main setts, three were annexe setts, twelve were subsidiary setts and thirty were outlier setts.
- 5.4.22 Badger sett 4 is located onsite, approximately 100m from the proposed B4632 bellmouth works. Sett 4 is an outlier sett that had three collapsed/disused entrances at the time of survey and is assumed to be inactive.
- 5.4.23 No further setts were recorded onsite or within 30m during the badger survey.
- 5.4.24 Although badgers are not considered to be of nature conservation importance, they are protected under the Protection of Badgers Act 1992 (HMSO, 1992) and the Wild Mammals (Protection) Act (HMSO, 1996).

Otter

- 5.4.25 The desk study returned no records of otter (*Lutra lutra*) within 2km of the Site.
- 5.4.26 There were no granted EPS licence applications for otter within 2km of the Site boundary.

- 5.4.27 Standing and running water, as well as areas of woodland and dense scrub with good connectivity to these wetland habitats, were noted during the extended Phase 1 habitat survey as providing suitable habitat for otter.
- 5.4.28 Otter presence was confirmed on the River Isbourne and its tributaries by fresh (overnight) and old spraints. Spraints were recorded along the watercourse running parallel to the access to the CSEC (~30m north of the Site). No active resting or holt locations were recorded however several potential holts/resting sites are present. The locations of otter field signs are provided within Figure 3.
- 5.4.29 Area 1 (located ~250m to the south of the proposed bellmouth off the B4362) provided potential holt / resting site habitat in an area of large thicket. Two burrows that could be an outlier badger sett provided limited suitability as otter holts / resting sites but no signs of use were observed. A pond here also offers a good food source and otter will have good freedom of movement along the streams into the wider habitat. It is likely that the watercourses in Area 1 are used primarily for commuting, but it was recommended that all wooded areas are re-surveyed to account for seasonal variation in site-use.
- 5.4.30 Area 2 (located ~190m to the west of the Site) provided good suitability for otter, offering multiple potential holts/resting sites including fallen trees with hollow trunks, burrows, log piles, and a cavity below a disused shipping container. There is good cover within the large, undisturbed area of mature woodland, with areas of dense scrub having the potential to conceal a natal holt. The river is unlikely to support prey but there is proximity and connectivity to the fishing ponds near Area 1 and potential for fish within the mill pond in Area 2.
- 5.4.31 Otters are an EPS under the Habitats Regulations 2021 (as amended) (HMSO, 2021) and are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (HMSO, 1981) and the Wild Mammals (Protection) Act (HMSO, 1996). Otters are also a SoPI under Section 41 of the NERC Act (2006) (HMSO, 2006).

Water Vole

- 5.4.32 The desk study returned no records of water vole (*Arvicola amphibius*) within 2km of the Site.
- 5.4.33 Watercourses onsite (River Isbourne and tributaries) were recorded to be of low potential to support water vole during the extended Phase 1 habitat survey.
- 5.4.34 No signs of water vole presence were confirmed during the water vole surveys. All areas surveyed were deemed to provide negligible/sub-optimal habitat to support water vole. Much of the watercourse ran at an unsuitably high velocity and the banks were mostly too shallow.
- 5.4.35 Area 1 (River Isbourne) provided negligible habitat suitability to support water vole. Banks were mostly heavily shaded with a sparse understory. Poor cover from predators is provided and banks are largely too shallow for burrows. There is poor connectivity to suitable habitat in the wider area, and high levels of disturbance from the adjacent mill carpark. Banks lack suitable food sources and are largely bare.
- 5.4.36 Area 2 provided sub-optimal habitat suitability for water vole. While the watercourse flows through an undisturbed area of woodland, it runs at a very high velocity which is unsuitable for water vole. The banks are mostly very shallow, providing minimal opportunity for burrowing, although there are some deeper, more steep banks in the section closest to the mill. There is well-established marginal

vegetation, but this lacks the favoured coarse grasses and brambles of the water vole. The best suitability can be found in the mill pond, however, the water here appears to be polluted by mill activities (paper pulp and chemicals/dyes), though the impact of this is unknown as there is evidence of submerged aquatic plants.

5.4.37 Area 3 offers negligible suitability for water vole due to very fast flowing water throughout, heavy shading creating a sparse understory, a lack of suitable food sources and lack of riparian cover from predators. The treatment process and modifications to the river channel here further impact the suitability as this watercourse is potentially polluted.

5.4.38 Water voles are protected under Schedule 5 of the WCA 1981 (as amended) (HMSO, 1981) and the Wild Mammals (Protection) Act (HMSO, 1996). Water voles are also a SoPI under Section 41 of the NERC Act (2006) (HMSO, 2006).

Hazel Dormouse

5.4.39 The desk study returned no records of hazel dormouse (*Muscardinus avellanarius*) within 2km of the Site.

5.4.40 There were no granted EPS licence applications for hazel dormouse within 2km of the Site boundary.

5.4.41 The extended Phase 1 habitat survey recorded small areas of woodland and hedgerow habitat within the Site boundary to be of potential value for dormice. The majority of the site is dominated by arable and improved grassland considered suboptimal for dormice.

5.4.42 Hazel dormice are legally protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (HMSO, 1981). They have significant further protection as a European Protected Species under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (HMSO, 2019a).

Reptiles

5.4.43 The desk study returned records of Slow-worm (*Anguis fragilis*), Grass Snake (*Natrix Helvetica*), Adder (*Vipera berus*) and Common Lizard (*Zootoca vivipara*) within 2km of the Site.

5.4.44 These records show that all four species of reptiles found within our wider survey boundary are present in Cleeve Common SSSI. Across the survey area, Slow-worm, Adder and Common lizard have been recorded most frequently in Cleeve Common with this population of Adders being of particularly notable size.

5.4.45 No onsite records were received for reptiles from the desk study.

5.4.46 The desk study did not identify any granted EPS licence applications for reptiles within 2km of the Site.

5.4.47 Woodland edge, and hedgerow habitat onsite were assessed to be of potential value to reptiles during the Phase 1 habitat survey. No reptiles were recorded during extended Phase 1 or UKHabs surveys. The majority of suitable reptile habitat will be retained as part of the proposed works, only limited areas of hedgerow and a small number of trees are proposed for removal.

- 5.4.48 All UK reptile species are protected under Schedule 5 of the WCA 1981 (as amended) (HMSO, 1981) and are SoPIs under Section 41 of the NERC Act (2006) (HMSO, 2006).

Amphibians

- 5.4.49 The desk study returned records of common frog (*Rana temporaria*), common toad (*Bufo bufo*), great crested newt (*Triturus cristatus*), palmate newt (*Lissotriton helveticus*) and smooth newt (*Lissotriton vulgaris*) within 2km of the Site.
- 5.4.50 All amphibian species returned by the desk study are protected under Schedule 5 (Section 9) of the WCA 1981 (as amended) (HMSO, 1981).
- 5.4.51 No onsite records were received for amphibians from the desk study and no ponds are present onsite.
- 5.4.52 The desk study did not identify any granted EPS licence applications for great crested newt within 2km of the Site.
- 5.4.53 The Phase 1 survey recorded areas of standing water that are of potential value to breeding great crested newt and other amphibian species. Woodland, dense scrub, hedgerow, pasture field margin, arable margins and tall ruderal vegetation provide suitable terrestrial habitat for great crested newt, and other amphibian species. A total of 45 ponds were identified during desk study within 500m of the wider project boundary, all of which will be retained.

White-clawed Crayfish

- 5.4.54 The desk study returned no records of white-clawed crayfish within 2km of the Site.
- 5.4.55 White-clawed crayfish are protected under Schedule 5 of the WCA 1981 (as amended) (HMSO, 1981).
- 5.4.56 It was noted during the Phase 1 survey that streams could provide possible habitat of value for white-clawed crayfish.
- 5.4.57 No signs of white-clawed crayfish presence were confirmed during habitat assessment survey. The River Isbourne is considered sub-optimal for this species.
- 5.4.58 Area 1 (River Isbourne) had negligible habitat suitable for supporting white-clawed crayfish since the watercourses are ephemeral and will likely dry out during drier periods. There are also no opportunities for refuge – no large cobbles, no submerged roots, and banks are unsuitable for burrowing. The presence of the mill and numerous weirs, sluices and other diverting structures limit the opportunity to move into this area from the downstream reaches of the Isbourne.
- 5.4.59 Furthermore, the sub-optimal conditions for white-clawed crayfish and their likely absence are supported by a lack of crayfish carapace within the otter spraints found during surveys.

Invertebrates

- 5.4.60 The desk study returned records of 73 protected and/or notable invertebrate species across the wider survey area, none of which were onsite. 8 of these species are protected to various extents under Schedule 5 of the Wildlife and Countryside Act (1981). Of these 8 species, it should be noted that Roman snail is protected from intentional killing, injuring or taking, possession or control (live or dead

animal, part or derivative), selling, offering for sale, possessing or transporting for the purpose of sale (live or dead animal, part or derivative) and advertising for buying or selling such things under Sections 1, 2 and 5 of Schedule 5 of the WCA 1981 (as amended) (HMSO, 1981).

- 5.4.61 Furthermore, Marsh fritillary (*Euphydryas aurinia*) is afforded the same protection as the Roman snail and is also protected from damage to, destruction of, obstruction of access to any structure or place used by a scheduled animal for shelter or protection and disturbance of animal occupying such a structure or place under Section 4 of Schedule 5. Habitats onsite are not considered suitable for Marsh Fritillary, lacking the required damp and chalk grasslands preferred by this species. The other 6 species listed on Schedule 5 are protected from sale, possession and transport only.
- 5.4.62 Species returned by the desk study were predominantly butterfly and moth species, which is likely due to the type of survey conducted, the vast majority of which were reported by the county specialist recorders for butterflies and moths. The species recorded are largely associated with grassland, or low growing vegetation in warmer areas, although some are also associated with mature trees, woodland, scrub and hedgerows.
- 5.4.63 During the Phase 1 habitat survey, broadleaved woodland, running water and native hedgerows onsite were noted to be of potential value to diversity of invertebrate species.

Roman Snail

- 5.4.64 The desk study returned one record of Roman snail (*Helix pomatia*) within 2km of the Site. This record was submitted in 2005 and is located at Almsbury Farm, approximately 850m from the Site.
- 5.4.65 Suitable habitats for Roman snails onsite are limited to protected hedgerows and banksides, open woodland, rubble piles and dry-stone walls. No Roman snails were found within the Site boundary during the Roman snail surveys.
- 5.4.66 Roman snails are protected under Schedule 5 of the Wildlife and Countryside Act (1981). Roman snail is therefore protected from intentional killing, injuring or taking, possession or control (live or dead animal, part or derivative), selling, offering for sale, possessing or transporting for the purpose of sale (live or dead animal, part or derivative) and advertising for buying or selling such things under Sections 1, 2 and 5 of Schedule 5 of the WCA 1981 (as amended) (HMSO, 1981).

Other Mammals

- 5.4.67 The desk study returned multiple records of hedgehog (*Erinaceus europaeus*) within 2km of the Site. Hedgehogs are protected under the Wild Mammals (Protection) Act (HMSO, 1996). They are also a SoPI under Section 41 of the NERC Act (2006) (HMSO, 2006).
- 5.4.68 All the terrestrial habitats within the Site and wider survey area were suitable for hedgehog, with the broadleaved woodland, and hedgerows providing foraging and hibernation habitat.

6 Ecological Impact Assessment

6.1 Overview

- 6.1.1 The sections below discuss constraints, potential impacts, mitigation and enhancement opportunities for relevant important ecological features, which include designated sites, protected and notable species and habitats, where mitigation and enhancements are required to fulfil legal and policy constraints.

Construction Environmental Management Plan (CEMP)

- 6.1.2 A CEMP will be required to be approved by the Local Planning Authority (LPA) prior to commencement of works and will outline the standard environmental control measures that will be implemented during the construction phase to ensure that habitats and species are protected. The CEMP will ensure that retained on and offsite habitats are protected from dust, airborne pollutants and sediment laden surface water runoff through standard pollution protection measures. All retained habitats (including the root protection areas of trees and hedgerow) will be protected using fencing, where necessary, during construction to ensure no accidental damage from machinery and personnel. An outline CEMP (Arcadis, 2024e) has been submitted as part of the planning application and will be developed into a detailed CEMP by the contractor.

Landscape and Ecological Management Plan (LEMP)

- 6.1.3 The Landscape and Ecological Management Plan (LEMP) identifies ecological protection measures.
- 6.1.4 A LEMP outlines the mitigation measures required with regard to legal compliance. This will be completed with reference to the proposed construction programme and will be incorporated into the CEMP. A preliminary LEMP (Arcadis, 2024f) has been submitted as part of the planning application and will be developed into a detailed LEMP by the contractor.
- 6.1.5 There is an element of embedded mitigation built into the programme and layout such as initial design discussions that primarily avoid key important habitat. The requirement for toolbox talks is identified in the LEMP, with the specific details to be confirmed once a contractor is appointed, and the enabling works programme is finalised.

6.2 Biodiversity Features Scoped Out

- 6.2.1 The ecological features identified during the desk study and field survey have been assigned a value (importance) based on the assessment methodology described in Section 3.4: Assessment Methodology and have been either scoped in for further assessment or out. Those features scoped out are outlined in Table 10 and will then not be considered further.

Table 10: Features Scoped Out

Ecological Feature	Reason for Scoping Out
Severn Estuary SPA and its associated functionally linked sites	Due to the distance between the Severn Estuary and the Site, no direct impact pathways are present. Many species contributing to the SPA/Ramsar feature rely on the wider landscape that is not designated but is functionally linked. Functionally linked land is defined as sites outside of the SPA which are essential for the SPA

Ecological Feature	Reason for Scoping Out
	species to complete their life cycle. After a review of Natural England's report on functionally linked land of the Severn Estuary (Natural England, 2021) the closest proven or potential functionally linked site is approximately 11km from our Site. Functionally linked land of the Severn Estuary is therefore scoped out.
Dixton Wood SAC/SSSI	Due to the distance between the Site and the SAC/SSSI and the sensitivity of the qualifying features, there are considered to be no impact pathways expected from the proposed works during construction, operation or decommissioning and they have therefore been scoped out of further assessment.
Cleeve Common SSSI	Due to the distance between the Site and the SSSI and the sensitivity of the qualifying features, there are considered to be no impact pathways expected from the proposed works during construction, operation or decommissioning and they have therefore been scoped out of further assessment.
Puckham Wood SSSI	Due to the distance between the Site and the SSSI and the sensitivity of the qualifying features, there are considered to be no impact pathways expected from the proposed works during construction, operation or decommissioning and they have therefore been scoped out of further assessment.
Breakheart Plantation LWS	Considering the nature of the proposed works alongside the distance between the Site and the designated site (>60m), use of best practice measures to control pollutants (detailed in the CEMP) would be expected to ensure that there would be no significant impact on the designated site.
Water Vole	The Site is not suitable for supporting water vole.
White-clawed Crayfish	The Site is not suitable for supporting white-clawed crayfish.

6.3 Biodiversity Features Scoped In

- 6.3.1 Ecological features scoped in are, from this point, considered to be 'Important Ecological Features' and those potentially affected by the proposed works. A justification has been provided for the scoping decision. The following features (Table 11) have been scoped into the assessment as there is potential for an adverse significant effect due to their presence and potential impacts.

Table 11: Features Scoped In

Ecological Feature	Scoped in for construction and / or operational phases?	Potential impact pathways
Invasive / non-native plant species (INNS)	Construction phase	<u>Direct impact</u> Spread of invasive species throughout the Site and wider area
Woodland	Construction phase	<u>Direct impact</u> Minor loss of woodland habitat
Hedgerow	Construction phase	<u>Direct impact</u> Minor loss of hedgerow habitat
Bats	Construction and Operation phases	<u>Direct impacts</u> Reduction of available roosting sites and foraging resources via temporary habitat loss Fragmentation effects impacting commuting bats <u>Indirect impact</u> Disturbance from changes in lighting, vibration and noise during the construction phase and lighting only during the operational phase
Breeding birds	Construction and Operation phases	<u>Direct impacts</u> Reduction of available nesting sites and foraging resources Direct mortality as a result of vegetation clearance <u>Indirect impact</u>

Ecological Feature	Scoped in for construction and / or operational phases?	Potential impact pathways
		Disturbance from changes in lighting, vibration and noise
Badger	Construction and Operation	<u>Direct impact</u> Mortality through destruction of setts, accidental trapping, vehicle collisions Disturbance to individuals occupying known setts Loss of foraging habitat <u>Indirect impacts</u> Habitat fragmentation/isolation through fencing
Otter	Construction and Operation	<u>Direct impact</u> Mortality and disturbance through accidental trapping and vehicle collision <u>Indirect impacts</u> Pollution of watercourses
Hazel Dormice	Construction phase	<u>Direct impact</u> Low risk of mortality and disturbance during vegetation clearance Habitat fragmentation and isolation during construction
Reptiles	Construction phase	<u>Direct impact</u> Mortality and disturbance during vegetation clearance Loss of foraging, refugia and hibernacula
Roman Snail	Construction phase	<u>Direct impact</u> Mortality and disturbance during vegetation clearance

6.4 Potential Impacts

6.4.1 This section outlines the potential impacts in the absence of mitigation.

Invasive / Non-native Plant Species (INNS)

6.4.2 Through various construction practices, most notably vegetation clearance, invasive species could be dispersed throughout the landscape. There is then potential for them to outcompete native flora and reduce their numbers. This feature is not considered sensitive to operational impacts.

6.4.3 In the absence of mitigation there is the potential for there to be a negative impact upon INNS, an ecological feature that is important at the local scale. This impact has the potential to be significant.

Woodland and Hedgerow

6.4.4 The proposed works will result in the direct loss of woodland and hedgerow HPIE habitat. The loss of these habitats is considered to be limited with only small numbers of trees and a small stretch of hedgerow (3-4m) proposed for removal to facilitate the proposed CSEC access track. A small number of trees will also be removed as part of the proposed bellmouth works. There is the potential for there to be a minor, negative impact upon woodland and hedgerow HPIE habitat in the absence of mitigation.

Bats

6.4.5 As part of Site design and micro-siting, all roosts will be retained as part of proposals. The closest bat roost (single Bechsteins roost in tree) is >50m away from the Site boundary and ~120m from the proposed construction of the CSEC. Given the distance from the proposed works and current disturbance baseline from the nearby papermill (~200m north east of the roost) and agricultural use of surrounding fields there is not considered to be a risk of disturbance to this roost.

6.4.6 The works will cause the permanent loss of small areas of suitable bat habitat (a small number of trees associated with woodland onsite and a small section of hedgerow). Woodland and hedgerow onsite are used by foraging and commuting bats, some of which are listed under Annex 2 and are of national importance. The proposed permanent access route to the CSEC will cut through an existing hedgerow (3-4m width proposed for removal). This hedgerow is already fragmented to the south by an existing farm track. The loss of a small area of this hedgerow is not considered to fragment this commuting route given the existing gaps along its length and small area to be removed. Retained hedgerow and trees either side of the track which is currently not managed will be encouraged to grow further and create a joined canopy. The proposed permanent access route will not be lit and only used infrequently during maintenance visits to the CSEC during daytime hours. There are not considered to be any significant impacts to bats utilising this hedgerow for foraging and commuting nor any potential impacts from disturbance during operation.

6.4.7 With the addition of proposed planting as part of landscape proposals, additional foraging and commuting routes will be provided across the Site.

In the absence of mitigation there is the potential for there to be a negative impact upon bats, an ecological feature that is of national importance given the local assemblage. This impact has the potential to be significant in the absence of mitigation.

Breeding Birds

- 6.4.8 All habitat types within the Site have the potential to be used by nesting (both ground-nesting and otherwise), foraging and roosting birds. The temporary or permanent loss of any habitats will reduce the availability of potential nesting sites and foraging resources for birds throughout the duration of construction. In the short-term, this will result in adverse effects, particularly for species that are associated with farmland and woodland habitat, whilst habitat is re-established.
- 6.4.9 Nesting birds are also vulnerable to disturbance from changes in noise, lighting and vibration. Construction related activities will result in an increase in noise levels and construction impact noise that could cause disturbance to foraging and roosting birds in the surrounding area. Visual disturbance will also be likely to affect birds by causing them to avoid areas of habitat that might otherwise be used for foraging and resting.
- 6.4.10 Species nesting nearby, but beyond the Site, may adapt their foraging behaviour and continue to breed successfully as prior to commencement of construction. Others may be displaced from breeding territories and may occur in reduced numbers because suitable retained habitat is already well used by breeding pairs.
- 6.4.11 No schedule 1 birds were recorded nesting onsite or within the immediate vicinity. Territories recorded onsite or within the immediate vicinity are considered to be widespread and common species.
- 6.4.12 In the absence of mitigation there is the potential for there to be a short term, negative impact upon breeding birds, an ecological feature that is considered important during vegetation clearance only. As habitats to be lost are limited in size and widely replicated in the local area the long term impact upon the local assemblage is not considered to be significant.

Badger

- 6.4.13 Badger sett 4 is located onsite but was recorded as inactive. There will be no direct or indirect impacts to this sett. No main setts will be impacted by the works.
- 6.4.14 There is low potential for road collision mortality of badgers on the proposed access track to the CSEC during the operational phase however this track will only be used in daylight hours.
- 6.4.15 There will be a permanent loss of potential foraging habitat. There is the potential for accidental trapping of badger within trenches during the construction phase.
- 6.4.16 In the absence of mitigation there may be a minor negative effect on the local badger population, as a result of mortality from road collisions during operation.
- 6.4.17 Mitigation is required on account of the legal protection afforded to badger.

Otter

- 6.4.18 There will likely be no permanent loss of suitable otter habitat as a result of the works. There is the potential for otters to be temporarily directly impacted by noise and light pollution near Hollingsworth and Vose Postlip paper mill during the construction phase should an active holt become established. Otters could also be indirectly negatively impacted by the pollution of watercourses resulting from construction. There is a low risk of road collision mortality on the proposed access track to the CSEC during the operational phase.
- 6.4.19 In the absence of mitigation there is the potential for there to be a short-term, minor, negative impact upon otters.

Hazel Dormice

- 6.4.20 No dormice have been recorded within 2km of the Site from desk study data however suitable habitat is present onsite, therefore, a precautionary approach to assessment has been undertaken. There is a very low risk of mortality during vegetation clearance, especially if undertaken during winter. The works will cause the permanent loss of areas of suitable dormouse habitats including small areas of woodland and hedgerow. Given the limited loss of woodland (small number of trees) and limited loss of hedgerow (3-4m in length) there is not considered to be any fragmentation impact on dormouse as a result of proposed works. This feature is not considered sensitive to operational impacts.
- 6.4.21 In the absence of mitigation there is low potential for there to be a short-term negative impact upon dormice.

Reptiles

- 6.4.22 Due to the nature of the works, the majority of impacts on reptiles will be temporary. The temporary loss and fragmentation of reptile habitat due to vegetation clearance will result in temporary loss of foraging habitat and temporary loss of reptile refugia and hibernacula. There is potential that temporary habitat loss could cause direct mortality if hibernating reptiles are disturbed.
- 6.4.23 In the absence of mitigation there is the potential for there to be a short-term, minor, negative impact upon reptiles.

Roman Snails

- 6.4.24 There is potential for direct mortality of Roman snails during vegetation clearance. There is potential for road collision mortality to Roman snails on haul roads during the construction phase. This feature is not considered sensitive to operational impacts.
- 6.4.25 In the absence of mitigation there is the potential for there to be a short-term negative impact upon Roman snails, a species that is important at the national scale. This impact has the potential to be significant.

7 Mitigation

- 7.1.1 This section outlines the mitigation measures required to address the potential impacts outlined above. The Proposed Project will achieve a minimum of 10% BNG with an aspirational target of 20%. Further details of this can be found within the Biodiversity Net Gain Assessment, Cotswolds VIP Winchcombe CSEC (Arcadis, 2024b).

Invasive / non-native plant species (INNS)

- 7.1.2 Vegetation clearance will be undertaken under ecological supervision. An appropriate buffer surrounding any known or newly discovered invasive species will be set up. Should this feature be impacted, an invasive species method statement would be required.

Woodland and Hedgerow

- 7.1.3 Any tree removal necessary to facilitate the construction of bellmouths will be temporary and these habitats will be replaced to provide the same or better-quality habitat than the original.
- 7.1.4 Habitat creation will include scrub and woodland planting around the CSEC for screening purposes and planting of species-rich native grassland that will benefit a number of species. Habitat creation and enhancement measures surrounding the CSEC will provide benefits in the medium to long term.

Bats

- 7.1.5 The CSEC location was micro-sited during the design phase to avoid and retain any known bat roosts and as much habitat of value to bats as possible such as woodland and hedgerows.
- 7.1.6 For the duration of the works, a working Method Statement (MS), CEMP and LEMP will be followed, including (and not limited to) the following avoidance measures to ensure the works comply with relevant legislation and prevent disturbance, injury and/or killing to bats:
- The provision of toolbox talks for onsite contractors and staff, informing them of the legal protection afforded to bats;
 - Lighting design will be undertaken in accordance with best practice guidelines (Reason and Wray 2023) and no works will occur during the night (between dusk and dawn), preventing any light spill after dark;
 - Appropriate measures to control dust and other emissions that could affect air quality (detailed in the CEMP).

Offsite

- 7.1.7 In order to maintain connectivity across the wider project boundary during the construction period, nine temporary bat flyways consisting of Heras fencing woven with natural materials will be utilised at locations where there are moderate to high levels of Annex II bat activity and there is the potential for habitat fragmentation. Of these flyways, six will be within 1km of the Site. One will be installed offsite where the hedgerow along the southern edge of the field containing the Winchcombe CSEC will be temporarily removed. None of these temporary bat flyways will be required onsite. It is recommended that monitoring of the temporary bat flyways is undertaken to provide a better understanding of their efficacy and to inform future bat mitigation measures. Where flyways are used near the location of a previous SM4 static detector, SM4s should subsequently be deployed in the same location throughout the construction period and data from pre and during construction should be analysed and compared.

Onsite

- 7.1.8 The loss of a small area of hedgerow where the CSEC access track is proposed is not considered to fragment this commuting route given the existing gaps along its length and the small area to be removed. However, retained hedgerow and trees either side of the track, which is currently not managed, should be encouraged to grow further and create a joined canopy above the new access track. Bat boxes will be erected in retained woodland in a range of locations across the wider project. Bat boxes should be suitable for day roosting, maternity and hibernation purposes and for a range of species. Consideration should also be given to appropriate woodland management to encourage the veteranisation of tree features, in turn providing new roosting opportunities for bats.

Breeding Birds

- 7.1.9 The cable route and CSEC location was microsituated during the design phase to avoid and retain the majority of woodland, grassland and arable areas to provide opportunities for foraging and nesting birds. Vegetation clearance will be kept to a minimum.
- 7.1.10 Nocturnal works are to be avoided, with the sensitive use of lighting ensuring negligible disturbance to nocturnal species such as foraging barn owl. Pre-construction surveys of trees that have been recorded to have barn owl roosting potential will be undertaken no more than one month before works commence. Following pre-construction surveys, should trees still hold roosting potential, a suitably qualified Ecological Clerk of Works (ECoW) will advise on the extent of buffer zones around all recorded trees with barn owl roosting potential and define when the buffer zone may be lifted. As barn owls can breed throughout the year, vigilance must be applied during clearance, construction and operational works at any time.
- 7.1.11 Vegetation clearance and structure removal will be undertaken outside of the bird nesting season (March to August inclusive) wherever possible. Where this is not possible, appropriate measures will be taken to avoid harming birds or their nests (such as temporary fencing around nesting sites where they are immediately adjacent to construction works), under supervision by a suitably experienced ECoW.
- 7.1.12 The installation of bird nest boxes within areas of retained woodland, whilst newly created habitat establishes, will also off-set the temporary loss of habitat during construction in liaison with the landowners. In addition, the BNG strategy will improve habitat condition and provide additional habitat resources for breeding birds.

Badger

- 7.1.13 Although currently inactive, a precautionary buffer zone of 30m will be applied to sett 4 during the construction phase to avoid any direct impacts to this sett since it is located onsite. If it is not possible to assert this buffer around this sett, further discussion with the project ecologist will be required.
- 7.1.14 The following additional measures will prevent any harm to any badgers or other mammals that may be moving across the Site. These measures include:
- No works occurring during the night (between dusk and dawn), preventing any light spill after dark (detailed in the CEMP).
 - An appropriate low speed limit on the access road to minimise the risk of collision mortality.

- Completing a pre-construction survey for badger setts which may be newly created or become active since the initial survey. If a new sett is found on site during pre-construction checks, a buffer zone of 30m will be applied by an Ecological Clerk of Works during the construction phase to avoid any direct impacts to a sett. No construction works will be permitted to take place within 30m of an active sett entrance. If it is not possible to assert this buffer around a sett, further discussion with the project ecologist will be required. A smaller buffer could be applied alongside further mitigation measures if required. If it is not possible to use a buffer to avoid direct impacts to a sett, it will be closed during the closure period between 1 July and 30 November and destroyed following a minimum period of 21 days of no further activity. All potential closure works will be completed under a licence from Natural England.
- Placing ramps within any incomplete excavations to be left uncovered overnight, allowing any trapped badgers (or other animals) to escape.
- Heras fencing used to limit public access to the Site during construction will have space for badgers to move freely underneath to ensure connectivity across the Site is not lost.

Otter

- 7.1.15 A pre-construction survey to check for signs of otter, particularly holts and resting sites, will be undertaken no more than two months before works commence. If an otter holt and/or resting site is found within 100m of the proposed works, then a European Protected Species (EPS) development licence may be required by Natural England before works can commence. All works taking place near suitable watercourses will be undertaken under ecological supervision and to a method statement.
- 7.1.16 For the duration of the works, a working Method Statement (MS) will be followed, including (and not limited to) the following avoidance measures to ensure the works comply with relevant legislation and prevent disturbance, injury and/or killing otter:
- Standard best practice and pollution control measures to prevent polluting the watercourse (detailed in the CEMP).
 - Night work (between dusk and dawn) should be avoided.
 - Access roads should not be used or illuminated at night unless absolutely necessary.
 - No excavations should be left open overnight. If this is not possible then the excavation should have a soil ramp or wooden plank installed at one end to allow animals to escape.
 - Heras fencing used to limit public access to the Site during construction will have space for otters to move freely underneath to ensure connectivity across the Site is not lost.
 - Contingency plans should be in place to respond to unexpected encounters with otter, including emergency measures and protocols.

- 7.1.17 An experienced ecologist should provide a toolbox talk to all contractors/ Site staff and advise them of any ecological constraints onsite and mitigation required before any works commence.

Hazel Dormice

- 7.1.18 Although no records of dormouse are present and potential dormouse habitat loss is minimal, as a precaution, a licenced surveyor will undertake a fingertip search of suitable habitat prior to any vegetation removal. If they find dormice, works will stop and a Natural England licence will be sought.

- 7.1.19 A commitment to a minimum of 10% biodiversity net gain will ensure that habitats are retained where possible and replaced and enhanced, creating a net gain in the amount of habitat suitable for dormice onsite. This will include additional planting around the CSEC for screening purposes. As part of the wider project, it may be possible to link up previously isolated areas of woodland by planting, which could encourage the dispersion of dormice and result in their range being extended.

Reptiles

- 7.1.20 In places where the works will impact suitable habitat, mitigation of direct impacts to reptiles will be conducted using a phased cut approach to vegetation removal during spring/summer when reptiles are active. Vegetation will initially be cut to 20cm in height, working towards an area of suitable reptile habitat, and left until any reptiles present have left the working area. Then, following a fingertip search by an ECoW, the vegetation will be cut to ground. This will temporarily dissuade reptiles from using the working area by making the habitats unsuitable until works are completed, and habitats are restored. This process will be conducted under a working Method Statement.
- 7.1.21 Any suitable hibernacula habitats (including dry stone walls) for reptiles will be dismantled by hand during spring/summer when reptiles are active. This process will be conducted under a Method Statement and be overseen by an ECoW who will remove any herptiles to safe undisturbed habitat away from the working area. No potential hibernacula will be disturbed during winter. Any walls that are dismantled will be reinstalled as close to their original state as possible to ensure that they are suitable for hibernacula and refugia so that any current shelter sites are not lost.
- 7.1.22 All staff working onsite will be made aware through a toolbox talk of the potential presence of reptiles onsite and their protected status.

Roman Snails

- 7.1.23 Vegetation clearance will be undertaken under ecological supervision. The surveyor will undertake a fingertip search in search of Roman snails prior to any removal of suitable habitat such as hedgerows or woodland edges. If Roman snails are found, a licenced surveyor will translocate them to an area of suitable offsite habitat at a safe distance from the works.

Other Mammals

- 7.1.24 There is the potential for the works to impact other mammal species such as hedgehog. Reasonable avoidance measures should be put in place to avoid harm to terrestrial mammals, such as ensuring that suitable refuges and potential hibernation sites (such as piles of vegetation and deadwood) are removed by hand outside of the winter months and ensuring that during works any incomplete excavations are covered overnight, or a ramp is provided to allow escape of any animals that may become trapped. This should be detailed in the Method Statement for the works.

7.2 Residual Effects

- 7.2.1 There are not considered to be any residual effects to any ecological features following the application of mitigation measures outlined in Section 7.

8 Enhancements

- 8.1.1 Opportunities to enhance the Site for biodiversity, in line with both national and local planning policy have been identified. Natural materials (timber, stone and brash) removed during the construction phase could be recycled to create habitat (hibernacula/brash piles) in retained areas of suitable habitat and those areas onsite proposed for biodiversity net gain.
- 8.1.2 When creating an artificial hibernaculum or brash piles, site selection is essential to the success of this and therefore will be situated south-facing with well-drained soil. The location of which will be discussed and agreed with an ECoW, who will ensure that the works are undertaken in accordance with legislation and best practice.
- 8.1.3 It is recommended that the riparian habitat along the River Isbourne, accessible to cattle and areas heavily cow poached, should be fenced off and left to regenerate naturally, to allow safe passage and increase suitable habitat for otters.
- 8.1.4 Further enhancements are proposed within the retained woodland to support nesting birds and roosting bats. Bat and bird boxes (five holes and five open fronted) could be installed to help mimic their natural roost/nest sites, provide an alternative resting place or to encourage species into areas where there are few existing suitable roost/nest sites.
- 8.1.5 Opportunities to enhance the Proposed Project for biodiversity, in line with national and local planning policy have been identified and are detailed in the Biodiversity Net Gain report (Arcadis, 2024b). Habitat creation and enhancement measures within the CSEC area will provide benefits in the medium to long term. Habitat creation would include species-rich native grassland planting that would benefit a number of species. As part of our BNG strategy, detailed in our Biodiversity Net Gain Report (Arcadis, 2024b), seed mixes to be planted in the fields containing the CSEC have been selected to contain plant species that will support locally important invertebrate species and potentially extend their ranges.

9 Conclusion

9.1.1 The following features were scoped in for impact assessment:

- INNS.
- Woodland.
- Hedgerow.
- Bats.
- Breeding birds.
- Badgers.
- Otters.
- Hazel Dormice.
- Reptiles.
- Roman Snails.

9.1.2 Following appropriate mitigation measures outlined in this report, it is considered that the proposed works will have no significant negative effects on biodiversity features. Additionally, with the measures outlined in the BNG report and the preliminary LEMP, the Proposed Project will provide habitat enhancement that will deliver a Net Gain in Biodiversity in line with legislation and planning policy.

10 References

- Andrews, H (2018). Bat Roosts in Trees. A Guide to Identification and Assessment for Tree-Care and Ecology Professionals.
- Arcadis (2024a). Cotswolds VIP Arboricultural Impact Assessment.
- Arcadis (2024b). Cotswolds VIP Biodiversity Net Gain Assessment.
- Arcadis (2024c). Cotswolds VIP Ecological Impact Assessment. Bat Survey Report.
- Arcadis (2024d). Cotswolds VIP Breeding Bird Survey Report and Impact Assessment.
- Arcadis (2024e). Cotswolds VIP Outline CEMP.
- Arcadis (2024f). Cotswolds VIP Preliminary LEMP.
- Bird Survey & Assessment Steering Group. (2023). Bird Survey Guidelines for assessing ecological impacts, v.1.1.1. <https://birdsurveyguidelines.org>
- Bibby C J, Burgess N D, Hill D A & Mustoe S. (2000). Bird Census Techniques. Second Edition. Academic Press, London.
- Board of Cotswolds National Landscape (2021). Cotswolds National Landscape Management Plan 2023-2025. Cotswolds, UK.
- BS 402020: 2013. Biodiversity: Code of Practice for Planning and Development
- Chanin, P.R. (2003). Ecology of the European Otter *Lutra lutra*. Conserving Natura 2000 Rivers, Ecology Series No. 10. English Nature, Peterborough.
- Collins J (ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London
- Cotswolds National Landscape and Cotswolds Nature Recovery Forum (2021). Cotswolds Nature Recovery Plan. Cotswolds, UK.
- Cresswell P, Jefferies D, Harris S (1989). Surveying Badgers. The Mammal Society, London.
- CIEEM (2019). Biodiversity Net Gain: Good Practice Principles for Development. Available at: <https://cieem.net/wp-content/uploads/2019/02/C776a-Biodiversity-net-gain.-Good-practice-principles-for-development.-A-practical-guide-web.pdf>
- CIEEM, (2022). Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.2.
- Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.
- DEFRA (2023a). *The Statutory Biodiversity Metric Calculation Tool*. [.xlsm] DEFRA, England. Available at: <https://www.gov.uk/government/publications/statutory-biodiversity-metric-tools-and-guides> [accessed 14 December 2023].
- DEFRA (2023b). *The Statutory Biodiversity Metric User Guide (draft)*. [PDF] DEFRA, England. Available at: <https://www.gov.uk/government/publications/statutory-biodiversity-metric-tools-and-guides> [accessed 14 December 2023].

Eaton M, Aebischer N, Brown A, Hearn R, Lock L, Musgrove A, Noble D, Stroud D and Gregory R (2021). Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds.

Froglife (1999). Froglife Advice Sheet 10. Reptiles Survey – An introduction to planning, conducting and interpreting surveys for snake and lizard conservations.

HMSO (1981). Wildlife and Countryside Act. HMSO, London.

HMSO (1990). Town and Country Planning Act. HMSO, 1990.

HMSO (1992). Protection of Badgers Act 1992. HMSO, London.

HMSO (2000). Countryside and Rights of Way Act. HMSO, London

HMSO (2006). The Natural Environment and Rural Communities NERC Act HMSO, London.

HMSO (2018) 'A Green Future: Our 25 Year Plan to Improve the Environment', HMSO, London.

HMSO (2019a). The Conservation of Habitats and Species (Amendment) (EU exit) Regulations. HMSO, London.

HMSO (2019b). The Invasive Alien Species (Enforcement and Permitting) Order 2019 (the Invasive Species Order'). HMSO, London.

HMSO (2021a). The Environment Act. HMSO, London.

HMSO (2023). The National Planning Policy Framework (2013). HMSO, London

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

Lawton, J (2010). Making Space for Nature: A review of England's Wildlife Sites and Ecological Network.

Multi-Agency Geographical Information for the Countryside (MAGIC) (2023) website [online] Available at: (<https://magic.defra.gov.uk/MagicMap.aspx>).

Natural England (2021). Identification of wintering and passage roosts on functionally linked land of the Severn Estuary - Gloucestershire and Worcestershire (Phase 5). Natural England Research Report NECR401.

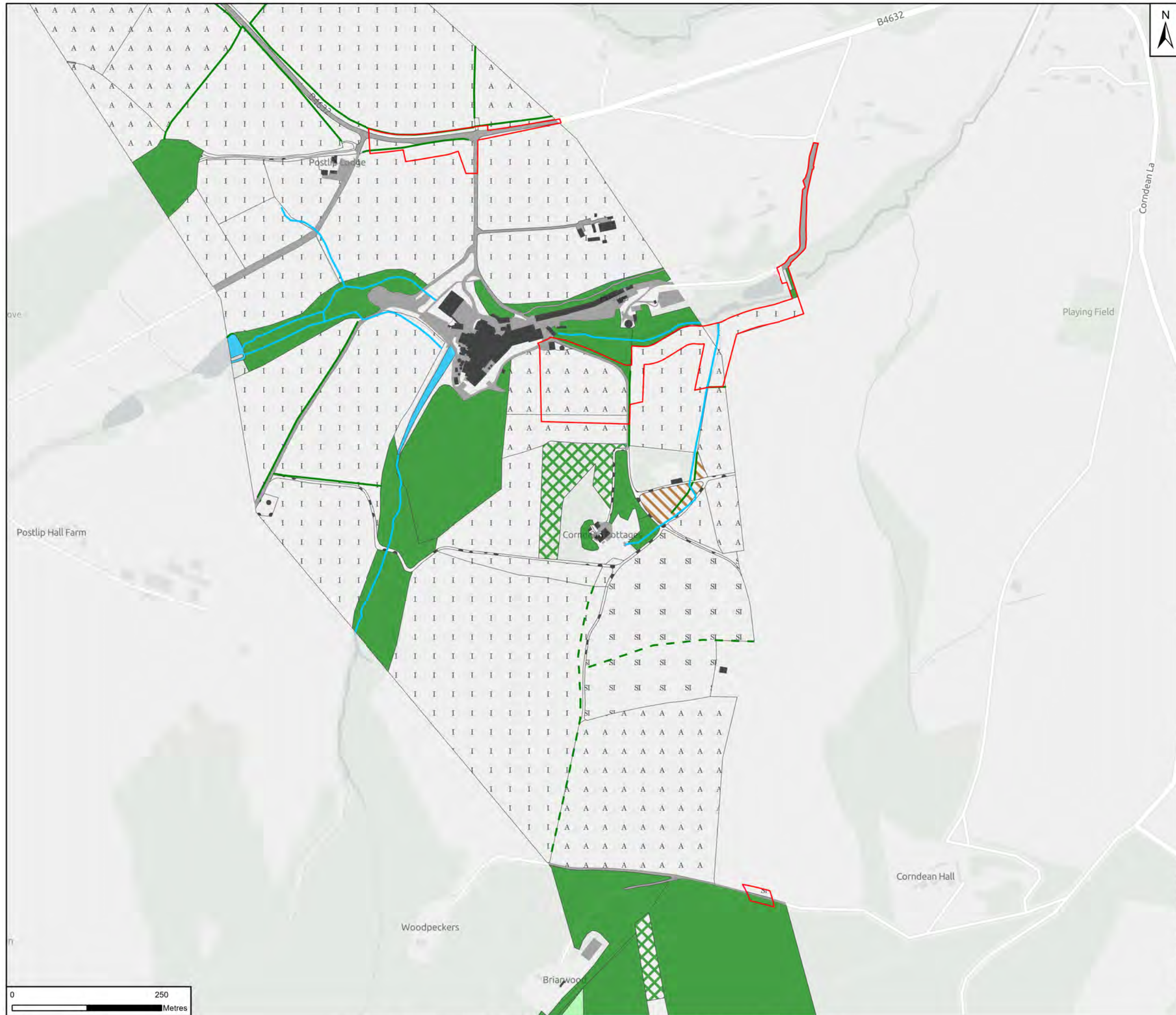
Panks, S., White, N., Newsome, A., Potter, J., Heydon, M., Mayhew, E., Alvarez, M., Russell, T., Scott, S.J., Heaver, M., Scot, S.H., Treweek, J., Butcher, B., Stone, D. (2023a). Biodiversity metric 4.0: Auditing and accounting for biodiversity – User Guide. Natural England.

Panks, S., White, N., Newsome, A., Potter, J., Heydon, M., Mayhew, E., Alvarez, M., Russell, T., Scott, S.J., Heaver, M., Scot, S.H., Treweek, J., Butcher, B., Stone, D. (2023b). The Biodiversity Metric 4.0: Auditing and accounting for biodiversity value: technical supplement. Natural England.

Peay S. (2003). Monitoring the White-Clawed Crayfish *Austropotamobius pallipes*. Conserving Natura 2000 Rivers Monitoring Series No.1, English Nature: Peterborough.

RPS (2022). NATIONAL GRID COTSWOLD - VISUAL IMPACT PROVISION. Preliminary Ecology Appraisal Report, 2022.

Stace, C (2010). New Flora of the British Isles (Ed 3).



Legend

Site Boundary

Phase 1 Habitat Type

- Fence
- Running Water
- Boundaries - Hedges - Defunct - Species-Poor
- Boundaries - Hedges - Intact - Species-Poor
- Woodland Coniferous Semi-Natural
- Standing Water
- Other Tall Ruderal
- Poor Semi-Improved
- Scrub Dense / Continuous
- Bare Ground
- Other Habitat
- Woodland Broadleaved Semi-Natural
- Cultivated / Disturbed Land - Arable
- Built Up Areas - Buildings
- Improved grassland

Notes

GB Light Grey: Contains OS data © Crown Copyright and database right 2023

Contains data from OS Zoomstack

World Topographic Map: Esri UK, Esri, TomTom, Garmin, FourSquare, FAO, METI/MASA, USGS



01	21/05/24	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

PROJECT:

nationalgrid COTSWOLD VIP

Site

Winchcombe

Client

1-3 Strand
London
WC2H 9EH

Registered office:
80Fen
80 Fenchurch Street
London
EC3M 4BY

Coordinating Office:
Office 119
50/60 Station Road
Cambridge
CB1 2JHT

www.arcadis.com

Title:

Figure 1- Phase 1 Habitat Plan 2022
Overview

Designed	C. Moores	Date 21 May 24	Signed
Drawn	S. Sarkar	Date 21 May 24	Signed
Checked	E. Pickering	Date 21 May 24	Signed
Approved	S. Jones	Date 21 May 24	Signed
Scale:	1:6,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	30167905

Suitability Description:

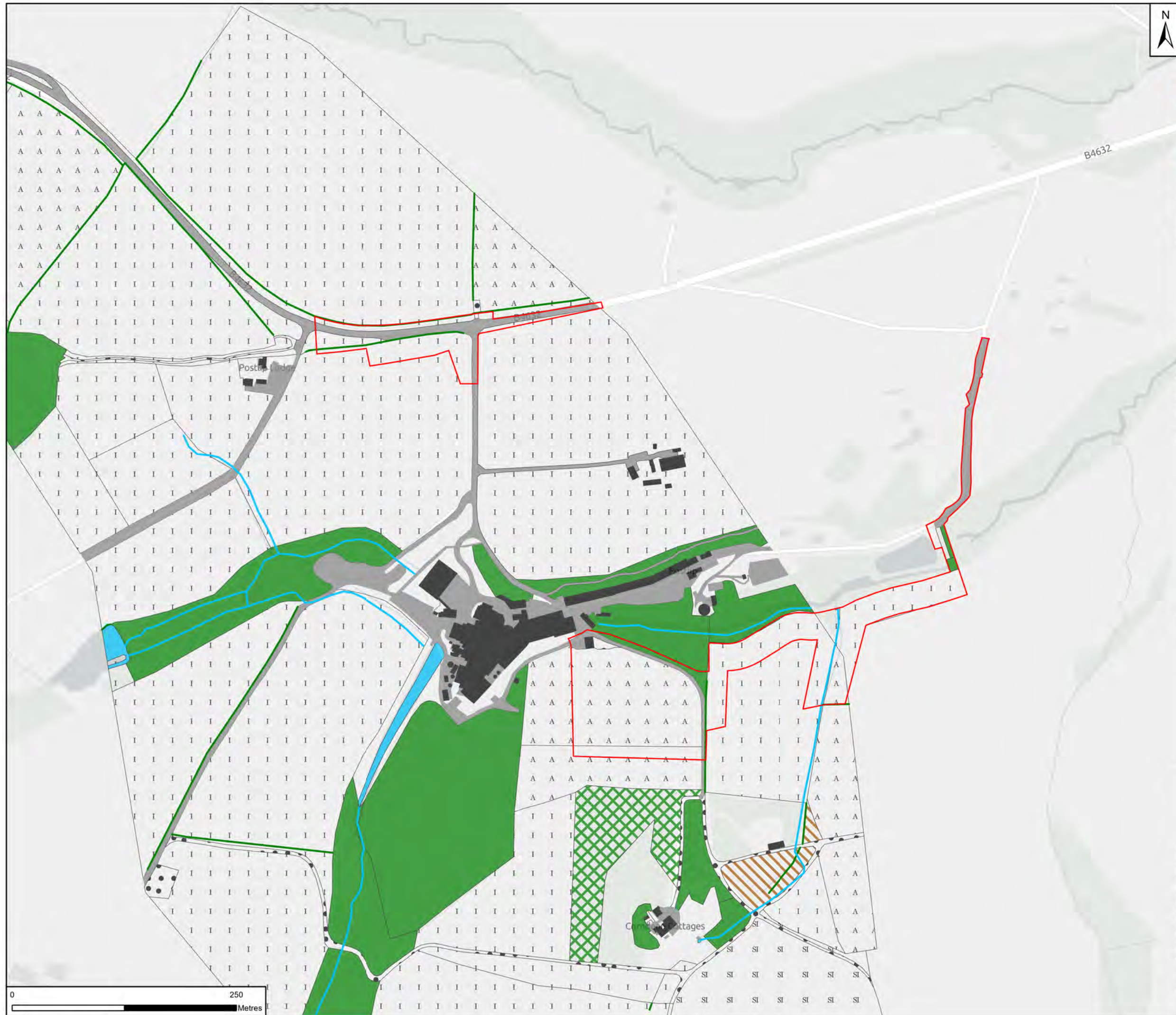
For Information

Drawing Number:

30167905-ARC-EGN-ZZ-DR-ZZ-00025

Revision:

P01



N

Legend

Site Boundary

Phase 1 Habitat Type

Running Water

Boundaries - Hedges - Defunct - Species-Poor

Boundaries - Hedges - Intact - Species-Poor

Standing Water

Other Tall Ruderal

Poor Semi-Improved

Scrub Dense / Continuous

Bare Ground

Other Habitat

Woodland Broadleaved Semi-Natural

Cultivated / Disturbed Land - Arable

Built Up Areas - Buildings

Improved grassland

Notes

GB Light Grey: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
World Topographic Map: Esri UK, Esri, TomTom, Garmin, FourSquare, FAO, METI/MASA, USGS



01	21/05/24	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

nationalgrid

PROJECT: COTSWOLD VIP

Site

Winchcombe

Client

1-3 Strand
London
WC2H 5EH

Registered office:
80Fen
80 Fenchurch Street
London
EC3M 4BY

Coordinating Office:
Office 119
50/60 Station Road
Cambridge
CB1 2JHT

www.arcadis.com

Title:

Figure 1- Phase 1 Habitat Plan 2022

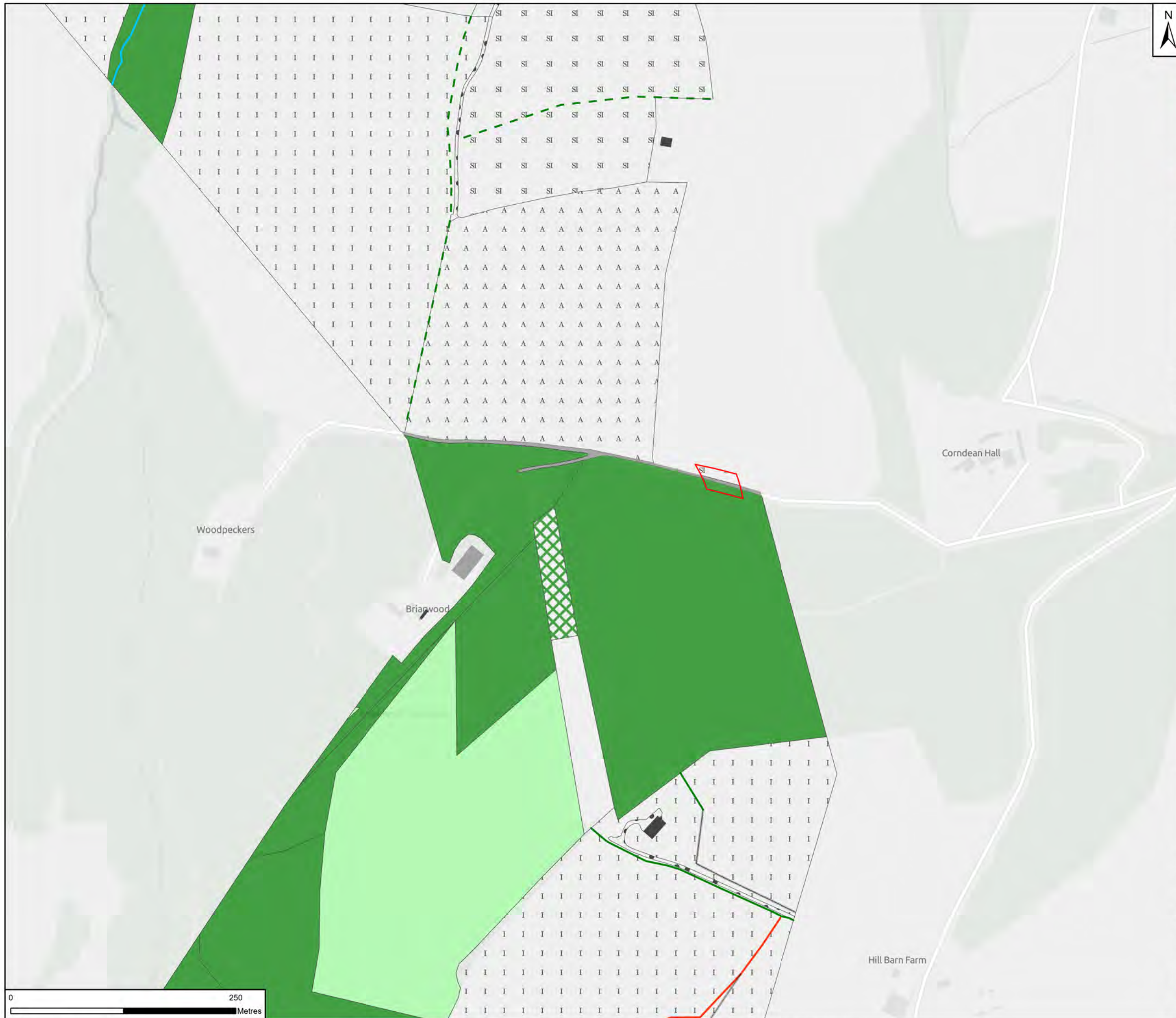
Designed	C. Moores	Date	21 May 24	Signed	
Drawn	S. Sarkar	Date	21 May 24	Signed	
Checked	E. Pickering	Date	21 May 24	Signed	
Approved	S. Jones	Date	21 May 24	Signed	
Scale:	1:4,000	Datum:	AOD		
Original Size:	A3	Grid:	OS		
Suitability Code:	S2	Project Number:	30167905		

Suitability Description:

For Information

Drawing Number:
30167905-ARC-EGN-ZZ-DR-ZZ-00025

Revision:
P01



N

Legend

Site Boundary

Fence

Running Water

Boundaries - Hedges - Defunct - Species-Poor

Wall

Boundaries - Hedges - Intact - Species-Poor

Woodland Coniferous Semi-Natural

Poor Semi-improved

Scrub Dense / Continuous

Bare Ground

Other Habitat

Woodland Broadleaved Semi-Natural

Cultivated / Disturbed Land - Arable

Built Up Areas - Buildings

Improved grassland

Notes

GB Light Grey: Contains OS data © Crown Copyright and database right 2023

Contains data from OS Zoomstack

World Topographic Map: Esri UK, Esri, TomTom, Garmin, FourSquare, FAO, METI/MASA, USGS



01	21/05/24	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

PROJECT:

nationalgrid

COTSWOLD VIP

Site

Winchcombe

Client

1-3 Strand
London
WC2H 5EH

Registered office:

80Fen
80 Fenchurch Street
London
EC3M 4BY

Coordinating Office:

Office 119
50/60 Station Road
Cambridge
CB1 2JHT

www.arcadis.com

Title:

Figure 1- Phase 1 Habitat Plan 2022

Designed	C. Moores	Date 21 May 24	Signed
Drawn	S. Sarkar	Date 21 May 24	Signed
Checked	E. Pickering	Date 21 May 24	Signed
Approved	S. Jones	Date 21 May 24	Signed
Scale:	1:4,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	30167905

Suitability Description:

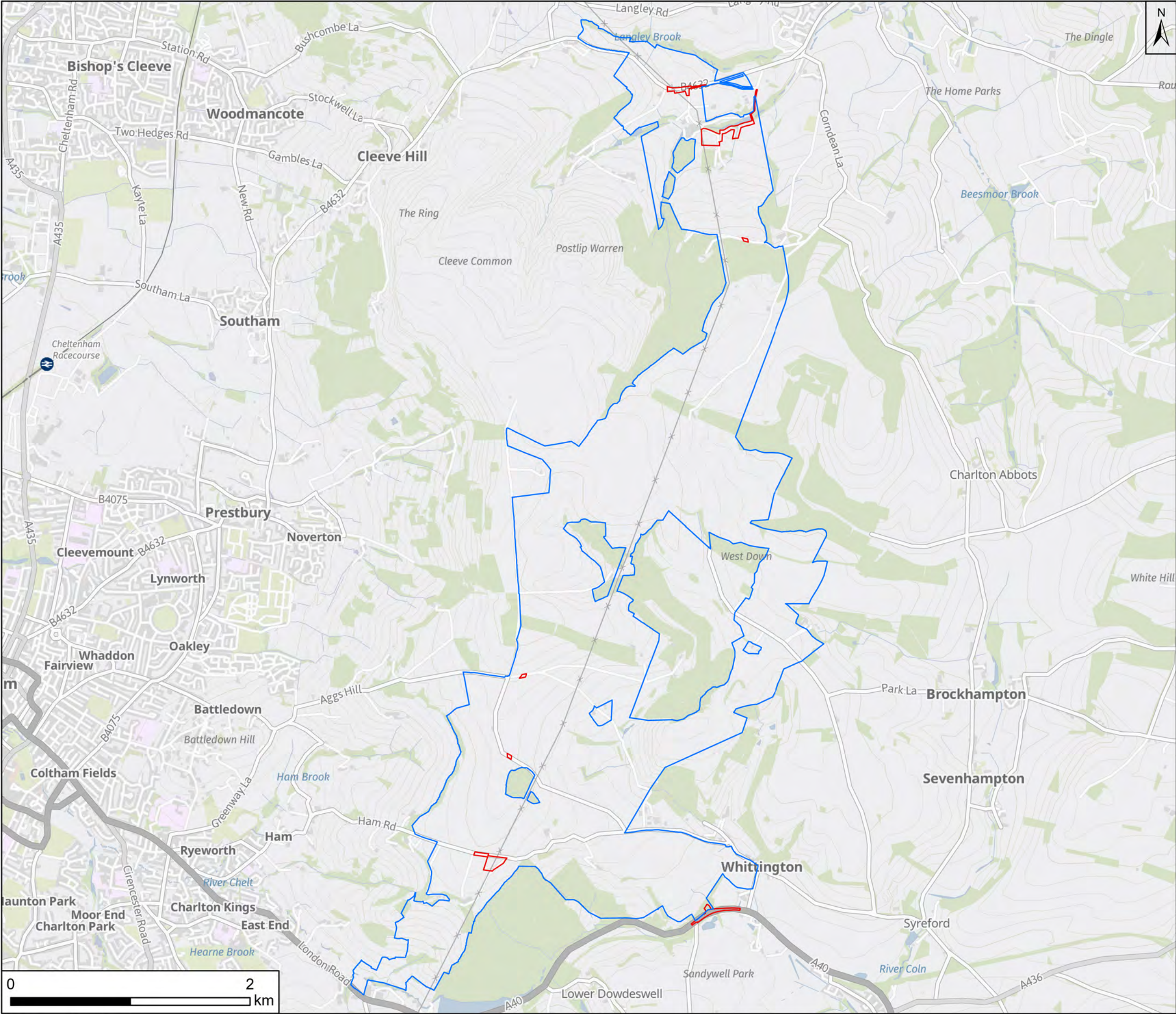
For Information

Drawing Number:

30167905-ARC-EGN-ZZ-DR-ZZ-00025

Revision:

P01



N

Ecology Survey Boundary

Planning Application Boundary

Notes:

Service Layer Credits: GB Background: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
Contains public sector information licensed under the Open Government Licence v2.0

Gloucester

01	07-05-2024	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

PROJECT:

nationalgrid

COTSWOLD VIP

Site

Cotswold

Client

National Grid

ARCADIS

Registered office:
80 Fens
80 Fenchurch Street
London
EC3M 4BY
www.arcadis.com

Coordinating Office:
Charter House
62-68 Hills Road
Cambridge
CB2 1LA

Title:

Figure 2- Wider Ecology Survey Area

Designed	C. Moores	Date	07-05-2024	Signat	
Drawn	S. Sarkar	Date	07-05-2024	Signat	
Checked	E. Pickering	Date	07-05-2024	Signat	
Approved	S. Jones	Date	07-05-2024	Signat	
Scale:	1:30,000	Datum:	AOD		
Original Size:	A3	Grid:	OS		
Suitability Code:	S2	Project Number:	30167905		

Suitability Description:

For Information

Drawing Number:

30167905-ARC-ENV-ZZ-DR-EC-00039

Revision:

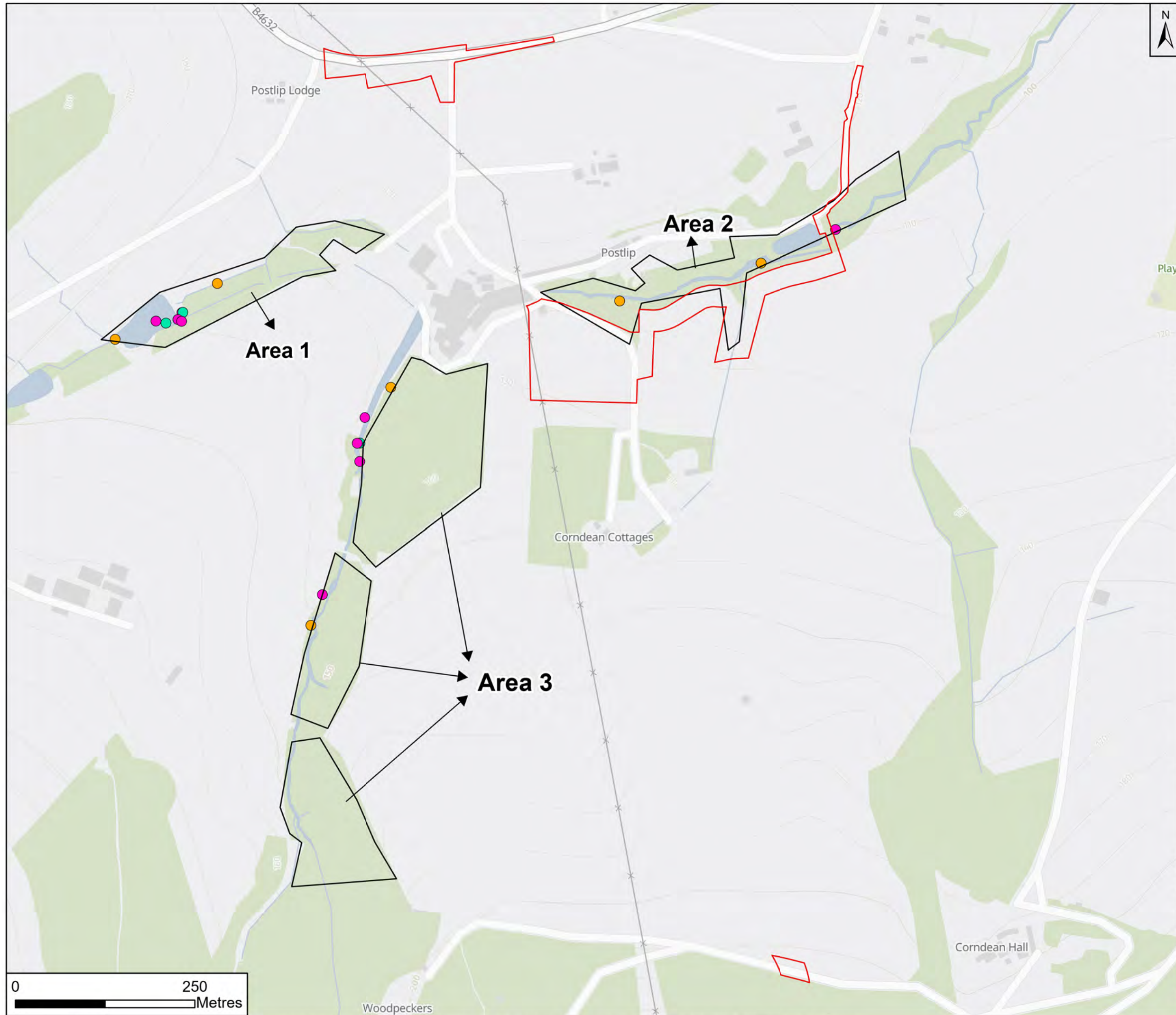
P01

Print Date:

07-05-24 16:27:35

C:\Users\starkars\297\OneDrive - ARCADIS\30167905 - IIG Cotswold VIP - 01 GDV Team\01 AprxWinchcombe and Wittrington Planning application figures\30167905-ARC-ENV-ZZ-DR-EC-00047-S2-P01-Wider Ecology Survey Area.aprx

© Copyright reserved



N

Legend

Site Boundary

Survey Areas

Otter - Field Sign

Feeding Remains

Footprint

Spraint

Water Vole - None Found

Notes

Service Layer Credits: GB Topographic: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
GB Background: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
Contains public sector information licensed under the Open Government Licence v2.0

Winchcombe

01	21-05-2024	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

PROJECT:

nationalgrid

COTSWOLD VIP

Site

Winchcombe

Client

National Grid

ARCADIS

Registered office:
80 Fen
80 Fenchurch Street
London
EC3M 4BY
www.arcadis.com

Coordinating Office:
Charter House
62-68 Hills Road
Cambridge
CB2 1LA

Title:

Figure 3- Otter and Water Vole Survey Data 2023

Designed	C. Moores	Date	21-05-2024	Signed	
Drawn	S. Sarkar	Date	21-05-2024	Signed	
Checked	E. Pickering	Date	21-05-2024	Signed	
Approved	S. Jones	Date	21-05-2024	Signed	
Scale:	1:5,000	Datum:	AOD		
Original Size:	A3	Grid:	OS		
Suitability Code:	S2	Project Number:	30167905		

Suitability Description:

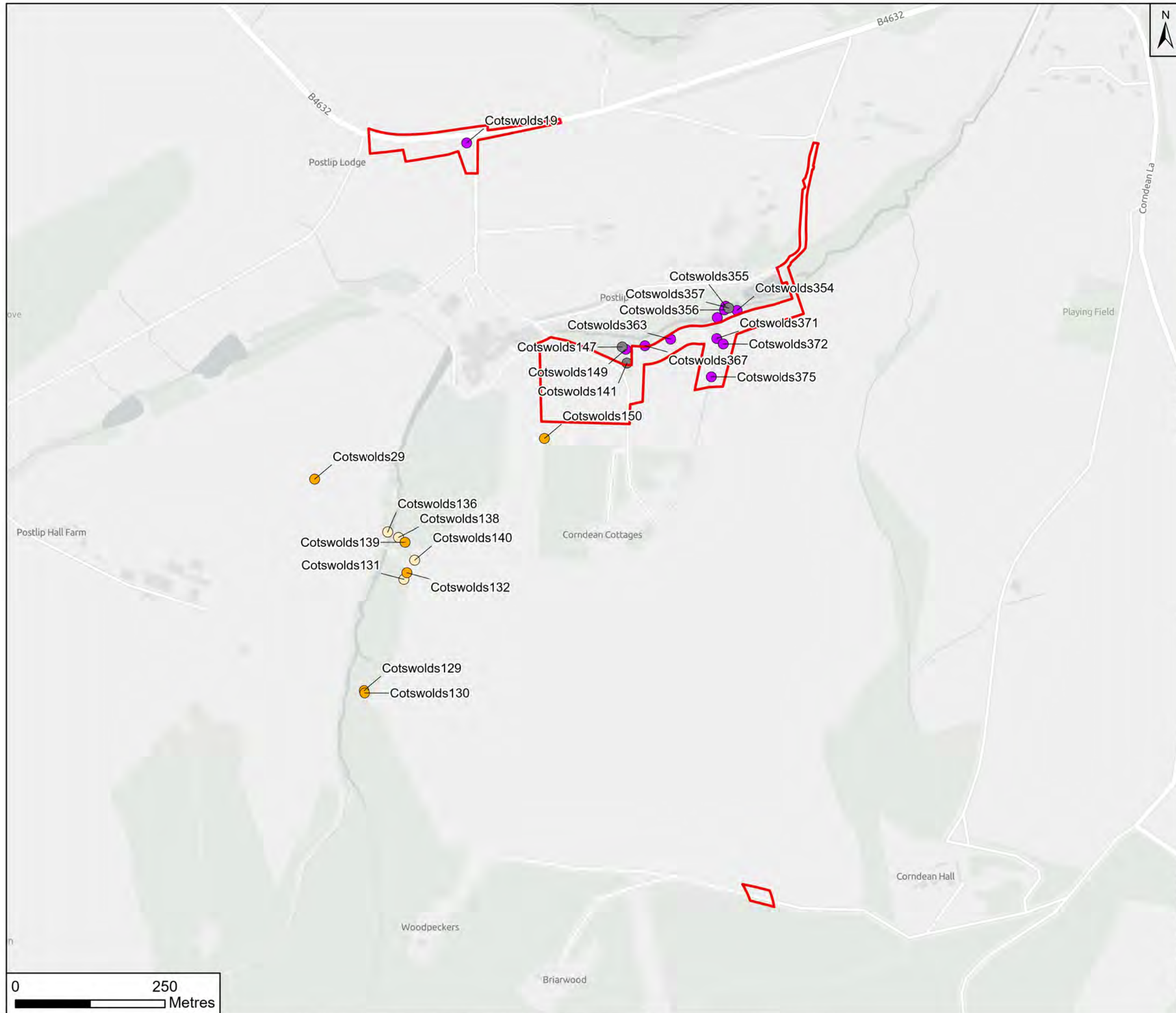
For Information

Drawing Number:

30167905-ARC-ENV-ZZ-DR-EC-00040

Revision:

P01



N

Legend

Site Boundary

Survey Type

- Climbing Survey
- Emergence Survey
- Ground Survey
- Ladder Survey

Notes

Service Layer Credits: GB Topographic: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
GB Light Grey: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
Contains public sector information licensed under the Open Government Licence v2.0

Winchcombe

Rev	Date	Description	Drawn	Check	Approv
01	21-05-2024	INITIAL ISSUE	SS	EP	SJ

Client: PROJECT:

nationalgrid COTSWOLD VIP

Site Winchcombe Client National Grid

ARCADIS

Registered office:
80 Fen
80 Fenchurch Street
London
EC3M 4BY

Coordinating Office:
Charter House
62-68 Hills Road
Cambridge
CB2 1LA

www.arcadis.com

Title:

Figure 4-
Bat Tree Roost Assessments 2023
Overview

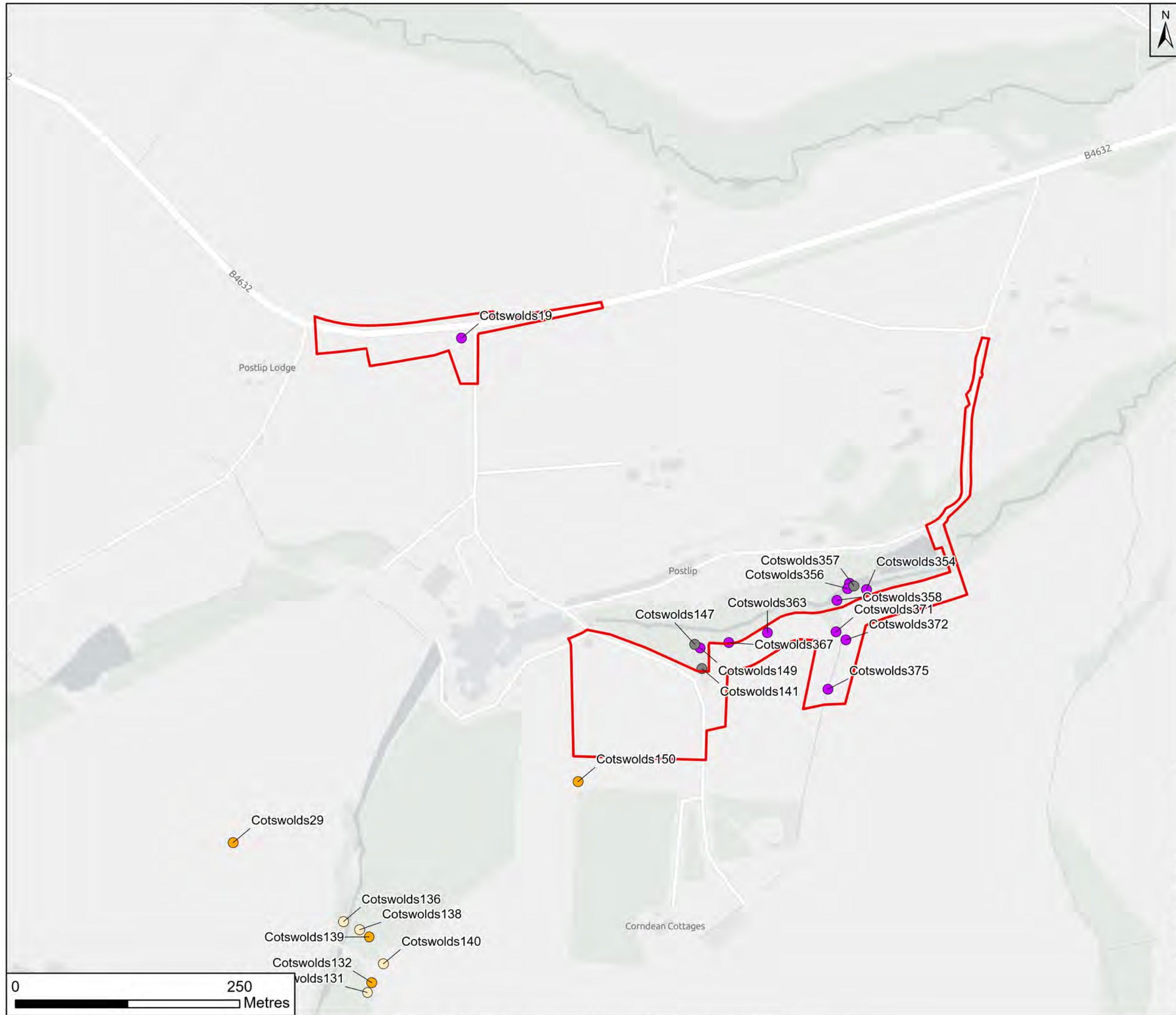
Designed	C. Moores	Date	21-05-2024	Signed
Drawn	S. Sarkar	Date	21-05-2024	Signed
Checked	E. Pickering	Date	21-05-2024	Signed
Approved	S. Jones	Date	21-05-2024	Signed
Scale:	1:6,000	Datum:	AOD	
Original Size:	A3	Grid:	OS	
Suitability Code:	S2	Project Number:	30167905	

Suitability Description:

For Information

Drawing Number: 30167905-ARC-EGN-ZZ-DR-ZZ-00037

Revision: P01



Legend

Site Boundary

Survey Type

- Climbing Survey
- Emergence Survey
- Ground Survey
- Ladder Survey

Notes:
Service Layer Credits: GB Topographic: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
GB Light Grey: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
Contains public sector information licensed under the Open Government Licence v2.0



Rev	Date	Description	Drawn	Check	Approv
01	21-05-2024	INITIAL ISSUE	SS	EP	SJ

Client: PROJECT:

nationalgrid COTSWOLD VIP

Site Client
Winchcombe National Grid



Registered office:
80Fen
80 Fenchurch Street
London
EC3M 4BY
www.arcadis.com

Coordinating Office:
Charter House
62-68 Hills Road
Cambridge
CB2 1LA

Title:

Figure 4-
Bat Tree Roost Assessments 2023

Designed	C. Moores	Date	21-05-2024	Signed	
Drawn	S. Sarkar	Date	21-05-2024	Signed	
Checked	E. Pickering	Date	21-05-2024	Signed	
Approved	S. Jones	Date	21-05-2024	Signed	
Scale:	1:4,000	Datum:	AOD		
Original Size:	A3	Grid:	OS		
Suitability Code:	S2	Project Number:	30167905		

Suitability Description:
For Information

Drawing Number: 30167905-ARC-EGN-ZZ-DR-ZZ-00037
Revision: P01



N

Legend

Site Boundary

●

Emergence Survey

○

Ladder Survey

Notes

Service Layer Credits: GB Topographic: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
GB Light Grey: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
Contains public sector information licensed under the Open Government Licence v2.0

Winchcombe

01	21-05-2024	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

PROJECT:

nationalgrid

COTSWOLD VIP

Site

Winchcombe

Client

National Grid

ARCADIS

Registered office:

80 Fen
80 Fenchurch Street
London
EC3M 4BY

Coordinating Office:

Charter House
62-68 Hills Road
Cambridge
CB2 1LA

www.arcadis.com

Title:

Figure 4-
Bat Tree Roost Assessments 2023

Designed	C. Moores	Date 21-05-2024	Signed
Drawn	S. Sarkar	Date 21-05-2024	Signed
Checked	E. Pickering	Date 21-05-2024	Signed
Approved	S. Jones	Date 21-05-2024	Signed
Scale:	1:4,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	30167905

Suitability Description:

For Information

Drawing Number:

30167905-ARC-EGN-ZZ-DR-ZZ-00037

Revision:

P01

0

250

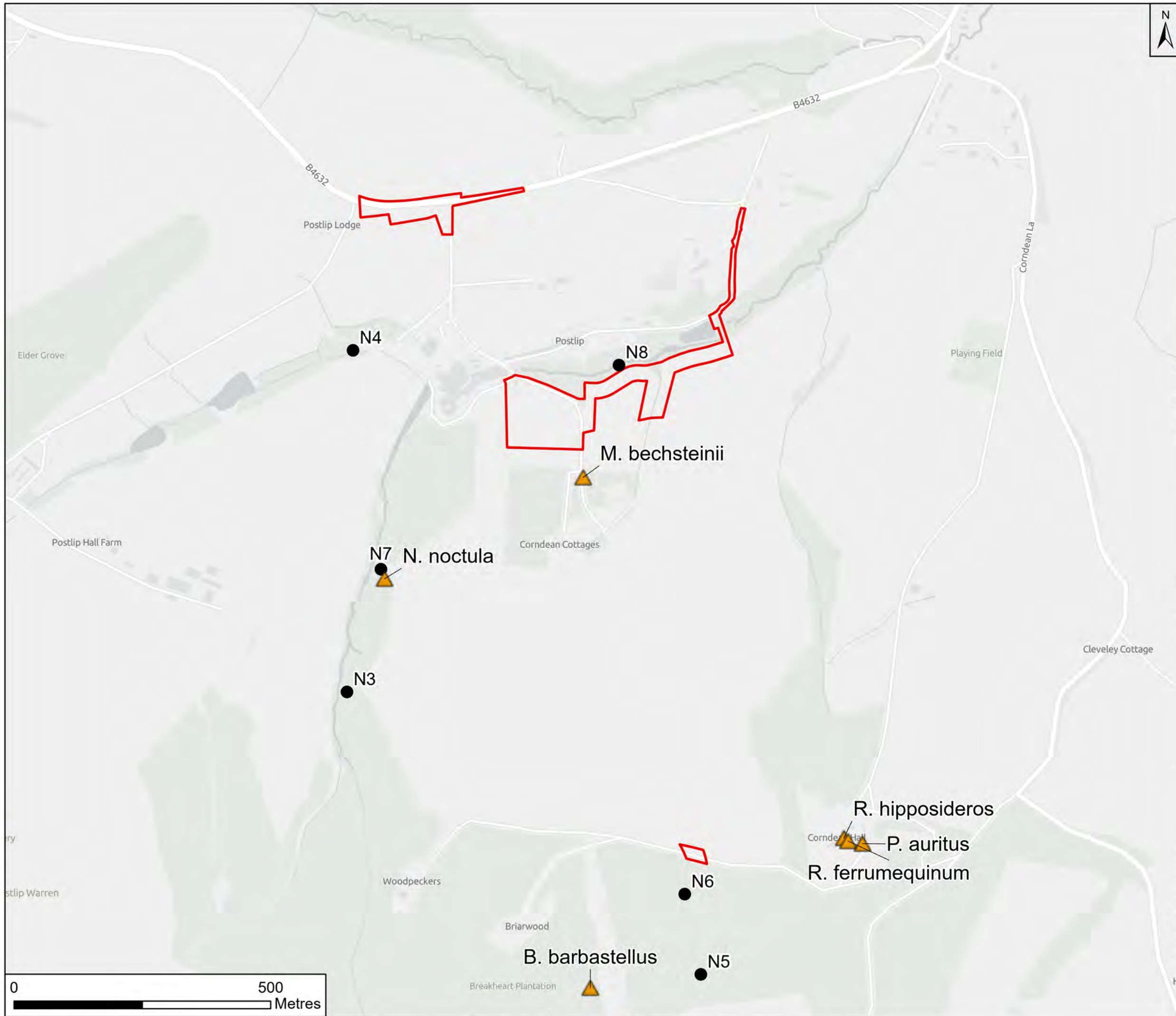
Metres

Print Date:

21-05-24 16:32:43

C:\Users\sarkars7297\OneDrive - ARCADIS\30167905 - NG Cotswold VIP - 01 GDV Team\01 Aprx\Winchcombe and Wittington Planning application figures\30167905-ARC-ENV-ZZ-DR-EC-00045 and 46-S2-P01-Bat trees climbed and emergence locations.aprx

© Copyright reserved



N

Site Boundary

Bat Detector Locations

Confirmed Bat Roosts

Notes

Service Layer Credits: GB Topographic; Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
GB Light Grey; Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
Contains public sector information licensed under the Open Government Licence v2.0

Winchcombe

01	21-05-2024	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

PROJECT:

nationalgrid

COTSWOLD VIP

Site

Winchcombe

Client

National Grid

ARCADIS

Registered office:

80 Fen

80 Fenchurch Street

London

EC3M 4BY

www.arcadis.com

Coordinating Office:

Charter House

62-68 Hills Road

Cambridge

CB2 1LA

Title:

Figure 5-
Bat Roosts and Static Locations 2023

Designed	C. Moores	Date	21-05-2024	Signed	
Drawn	S. Sarkar	Date	21-05-2024	Signed	
Checked	E. Pickering	Date	21-05-2024	Signed	
Approved	S. Jones	Date	21-05-2024	Signed	
Scale:	1:7,000	Datum:		AOD	
Original Size:	A3	Grid:		OS	
Suitability Code:	S2	Project Number:		30167905	

Suitability Description:

For Information

Drawing Number:

30167905-ARC-EGN-ZZ-DR-EC-00035

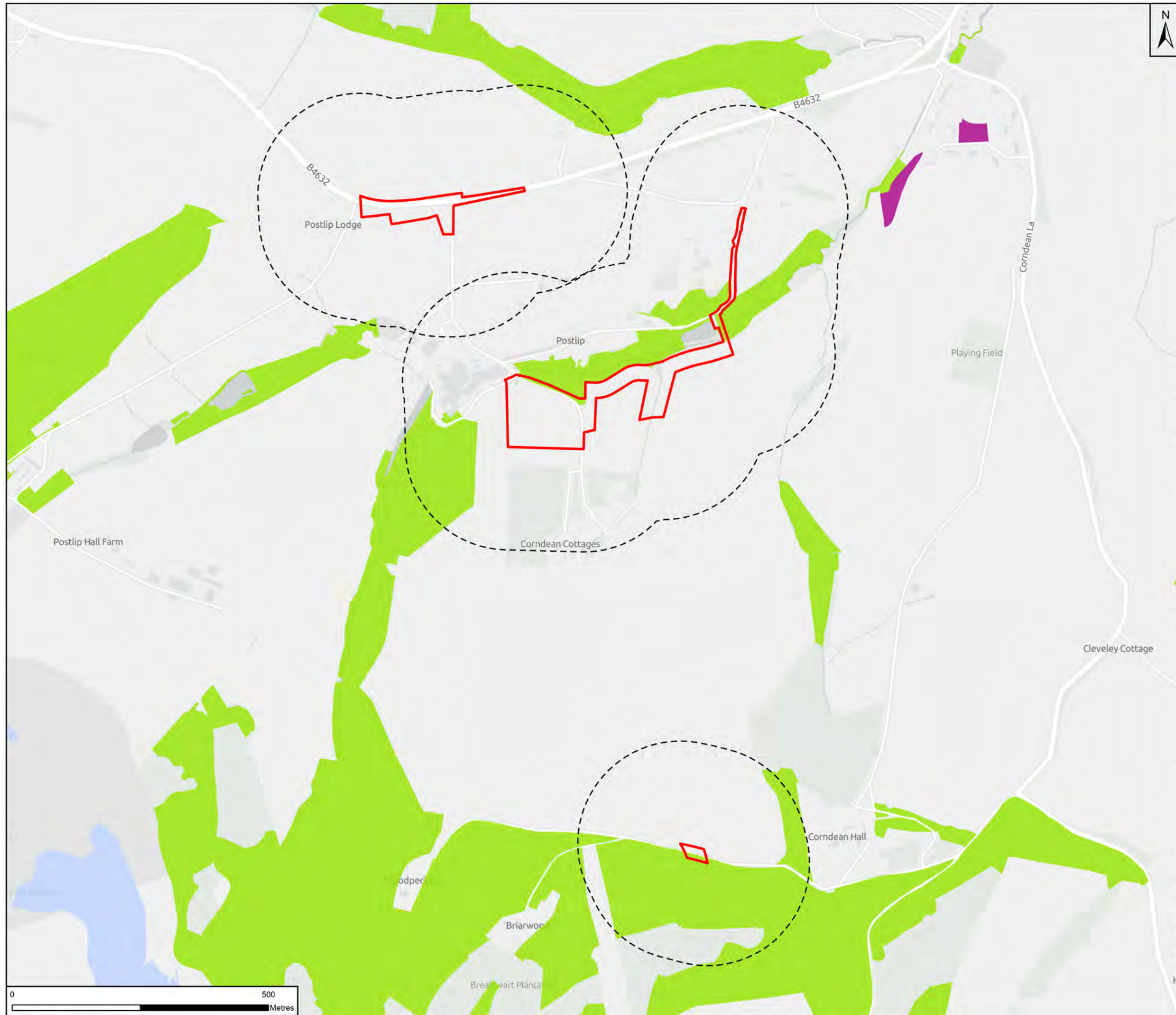
Revision:

P01

Print Date: 21-05-24 16:42:58

C:\Users\sarkars7297\OneDrive - ARCADIS\30167905 - IG Cotswold VIP - 01 GDV Team\01 Aprox\Winchcombe and Wittington Planning application figures\30167905-ARC-ENV-ZZ-DR-EC-00039 and 40-S2-P01-Bat Roosts and Static Locations.aprx

© Copyright reserved



N

Site Boundary

200m Buffer

Priority Habitats

Deciduous Woodland

Lowland Calcareous Grassland

No Main Habitat But Additional Habitats Present

Traditional Orchard

Notes

GB Light Grey: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
World Topographic Map: Esri UK, Esri, TomTom, Garmin, Foursquare, FAO, METI/
NASA, USGS

A435

Winchcombe

Cheltenham

01	21/05/24	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

PROJECT:

nationalgrid

COTSWOLD VIP

Site

Winchcombe

Client

1-3 Strand,
London
WC2H 9EF

Registered office:

80 Fen
80 Fenchurch Street
London
EC3M 4BY

Coordinating Office:

Office 119
50/60 Station Road
Cambridge
CB1 2JHT

www.arcadis.com

Title:

Figure 7-

Priority and Notable Habitats 2023

Designed	C. Moores	Date	21 May 24	Signed	
Drawn	S. Sarkar	Date	21 May 24	Signed	
Checked	E. Pickering	Date	21 May 24	Signed	
Approved	S. Jones	Date	21 May 24	Signed	
Scale:	1:7,000	Datum:	AOD		
Original Size:	A3	Grid:	OS		
Suitability Code:	S2	Project Number:	30167905		

Suitability Description:

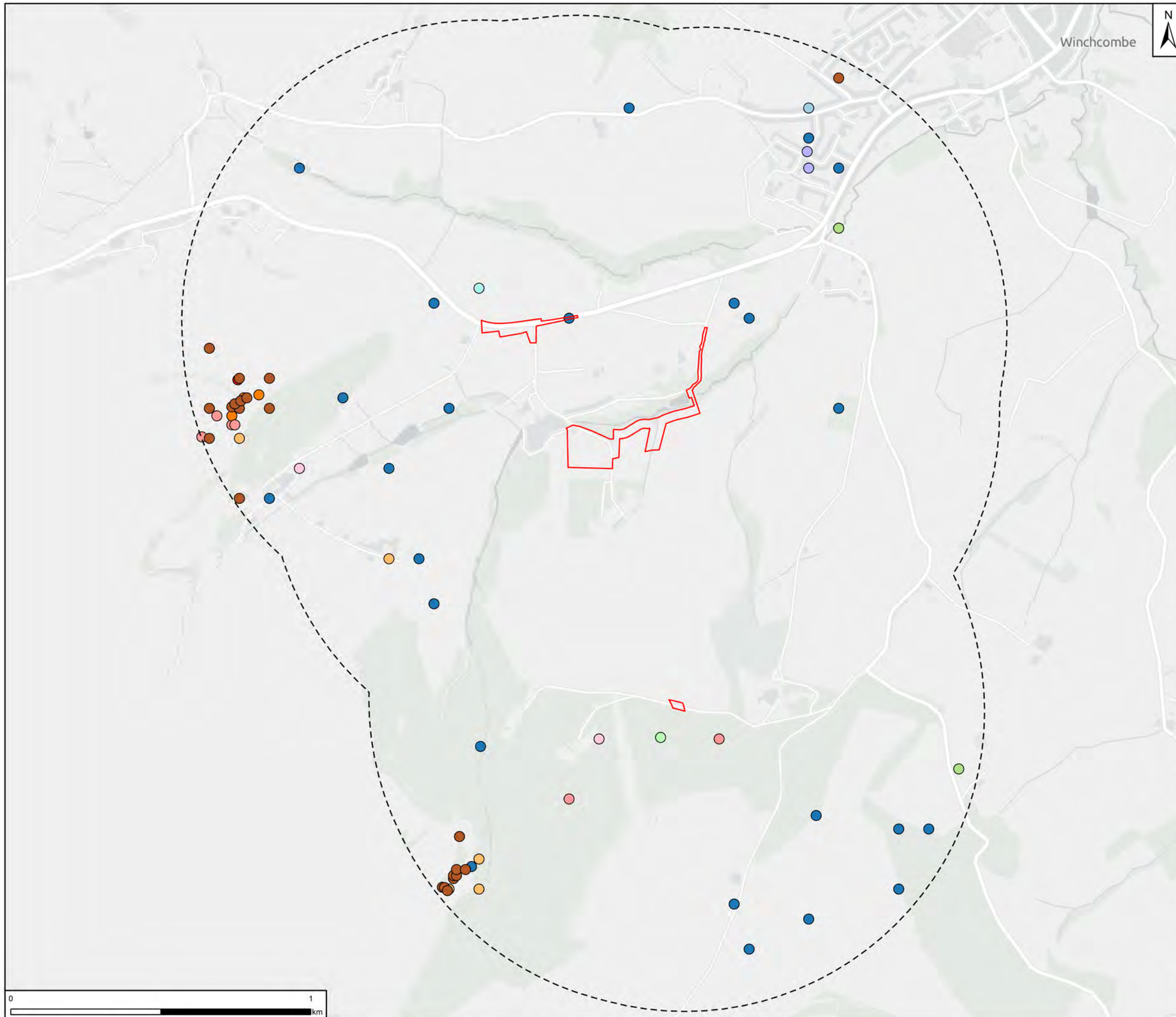
For Information

Drawing Number:

30167905-ARC-EGN-ZZ-DR-EC-00029

Revision:

P01



Site Boundary

1km Buffer

Amphibian

Bird

Bony Fish (Actinopterygii)

Flowering Plant

Insect - Beetle (Coleoptera)

Insect - Butterfly

Insect - Moth

Reptile

Terrestrial Mammal

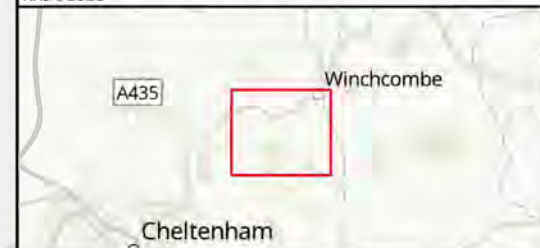
Bat

Brown Hare

Polecat

West European Hedgehog

Notes: GB Light Grey: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
World Topographic Map: Esri UK, Esri, TomTom, Garmin, Foursquare, FAO, METI/
NASA, USGS



01	21/05/24	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

nationalgrid

PROJECT:
COTSWOLD VIP

Site

Winchcombe

Client

1-3 Strand
London
WC2H 5EH

ARCADIS

Registered office:
80 Fen
80 Fenchurch Street
London
EC3M 4BY

Coordinating Office:
Office 119
50/60 Station Road
Cambridge
CB1 2JHT

www.arcadis.com

Title:

Figure 8-
Desk Study - Protected Species 2023
Overview

Designed	C. Moores	Date 21 May 24	Signed
Drawn	S. Sarkar	Date 21 May 24	Signed
Checked	E. Pickering	Date 21 May 24	Signed
Approved	S. Jones	Date 21 May 24	Signed
Scale:	1:12,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	30167905

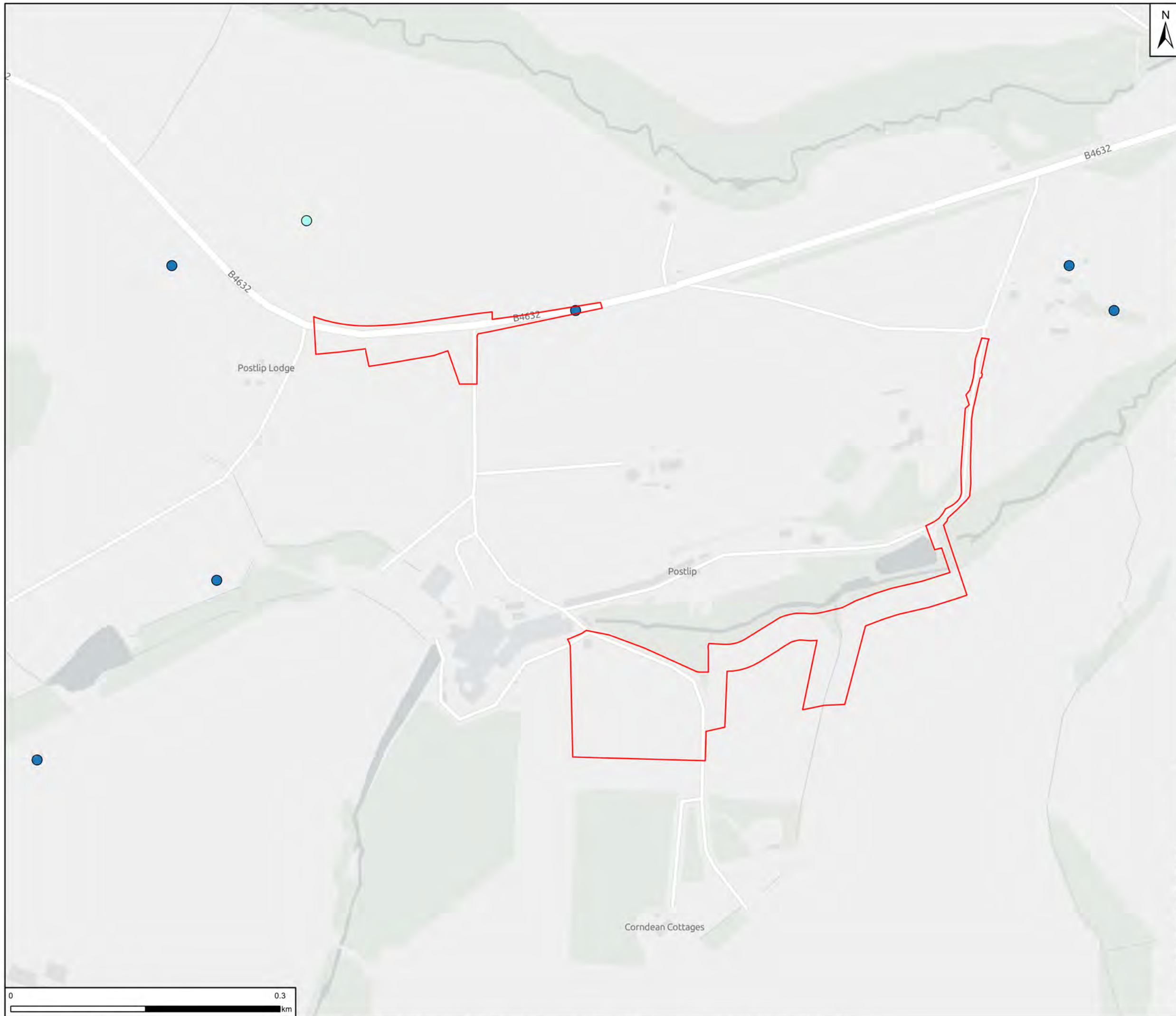
Suitability Description:

For Information

Drawing Number:
30167905-ARC-EGN-ZZ-DR-ZZ-00027

Revision:
P01

Print Date: 21-05-24 17:07:27 C:\Users\sarkars729\OneDrive - ARCADIS\30167905 - NG Cotswold VIP - 01 GDV Team\01 Apr\Winchcombe and Wittington Planning application figures\30167905-ARC-EGN-ZZ-DR-EC-00029 and 30-S2-P01-Desk Study.aprx © Copyright reserved



N

Legend

Site Boundary

1km Buffer

Protected and Notable Species Records

Bird

Polecat

West European Hedgehog

Notes: GB Light Grey: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
World Topographic Map: Esri UK, Esri, TomTom, Garmin, Foursquare, FAO, METI/
NASA, USGS

A435

Winchcombe

Cheltenham

01	21/05/24	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

PROJECT:

nationalgrid

COTSWOLD VIP

Site

Client

ARCADIS

Registered office:
80 Fen
80 Fenchurch Street
London
EC3M 4BY

Coordinating Office:
Office 119
50/60 Station Road
Cambridge
CB1 2JHT

www.arcadis.com

Title:

Figure 8-
Desk Study - Protected Species 2023

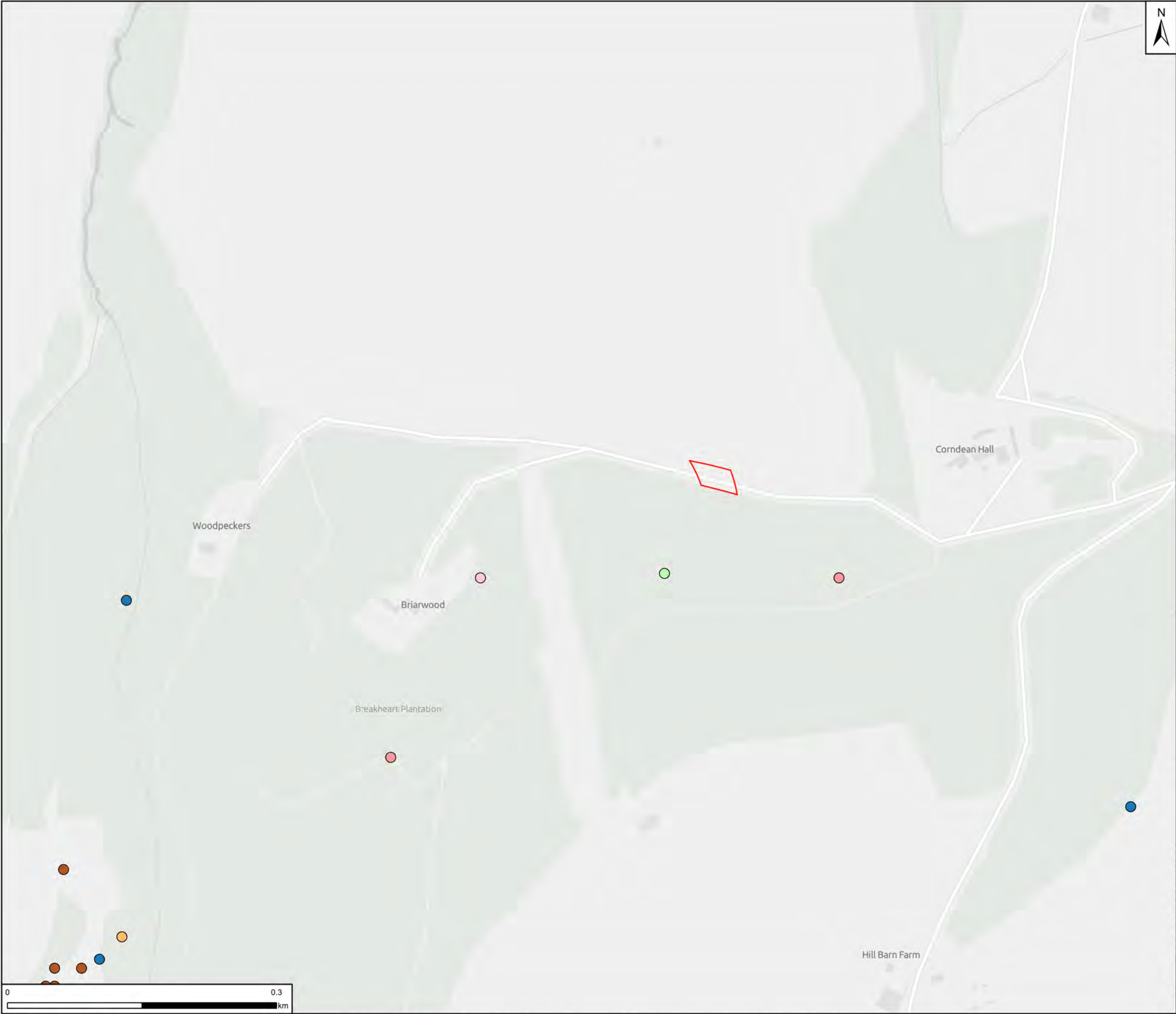
Designed	C. Moores	Date 21 May 24	Signed
Drawn	S. Sarkar	Date 21 May 24	Signed
Checked	E. Pickering	Date 21 May 24	Signed
Approved	S. Jones	Date 21 May 24	Signed
Scale:	1:4,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	30167905

Suitability Description:

For Information

Drawing Number:
30167905-ARC-EGN-ZZ-DR-ZZ-00027

Revision:
P01



N

Legend

Site Boundary

1km Buffer

Protected and Notable Species Records

Bird

Flowering Plant

Insect - Butterfly

Reptile

Terrestrial Mammal

Bat

Brown Hare

Notes: GB Light Grey: Contains OS data © Crown Copyright and database right 2023

Contains data from OS Zoomstack

World Topographic Map: Esri UK, Esri, TomTom, Garmin, Foursquare, FAO, METI/

NASA, USGS



01	21/05/24	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

PROJECT:

COTSWOLD VIP

Site

Winchcombe

Client

1-3 Strand,
London
WC2H 9EY

Registered office:
80 Fen
80 Fenchurch Street
London
EC3M 4BY

Coordinating Office:
Office 119
50/60 Station Road
Cambridge
CB1 2JHT

www.arcadis.com

Title:

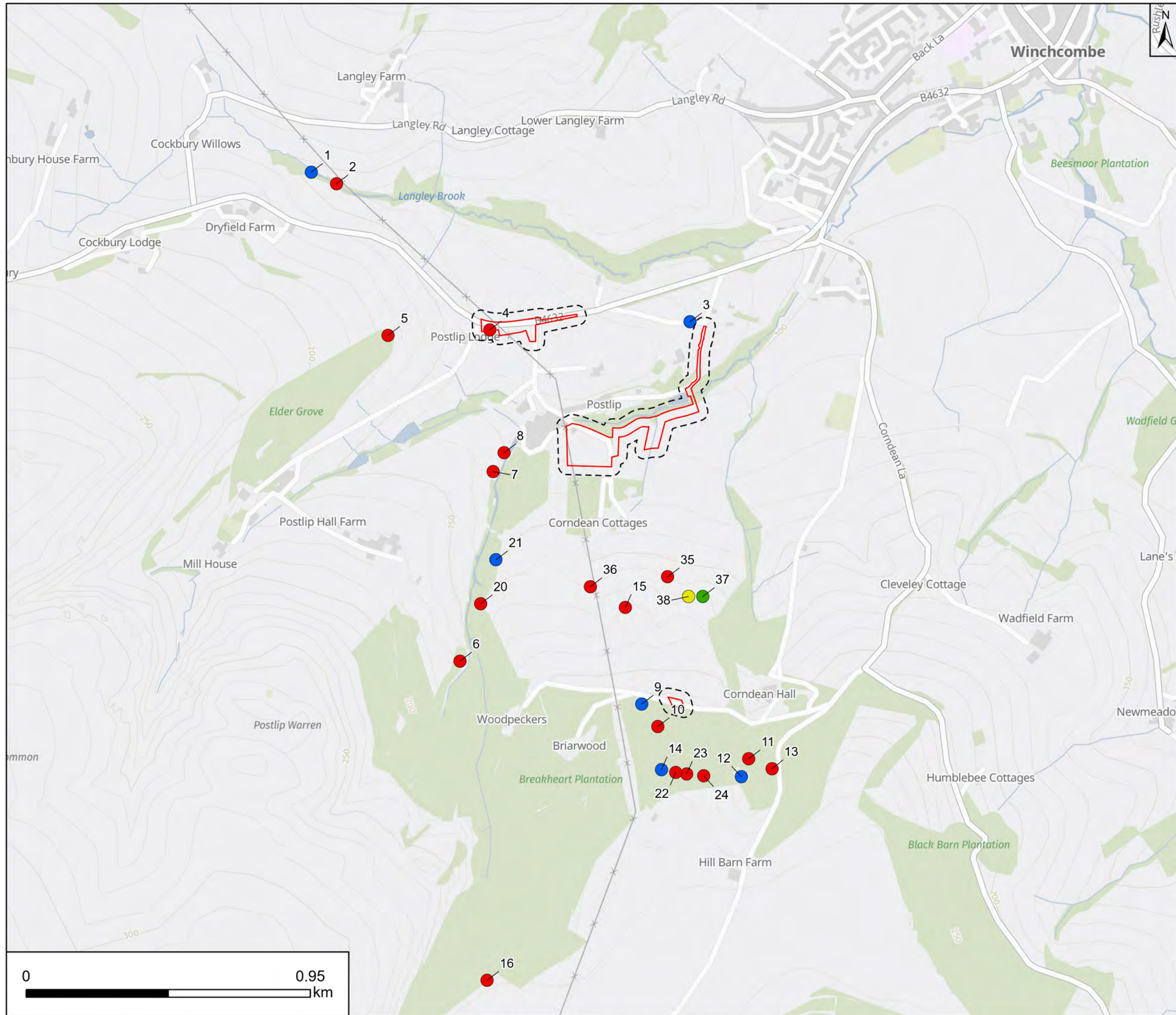
Figure 8-
Desk Study - Protected Species 2023

Designed	C. Moores	Date 21 May 24	Signed
Drawn	S. Sarkar	Date 21 May 24	Signed
Checked	E. Pickering	Date 21 May 24	Signed
Approved	S. Jones	Date 21 May 24	Signed
Scale:	1:4,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	30167905

Suitability Description:

For Information

Drawing Number: 30167905-ARC-EGN-ZZ-DR-ZZ-00027	Revision: P01
--	------------------



Legend

- Site Boundary
- 30m Buffer

Badger Setts

- Annexe
- Main
- Outlier
- Subsidiary

Notes
Service Layer Credits: GB Topographic: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
GB Background: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
Contains public sector information licensed under the Open Government Licence v2.0

01	21-05-2024	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client: PROJECT:

nationalgrid COTSWOLD VIP

Site: Winchcombe Client: National Grid

ARCADIS

Registered office:
80Fen
80 Fenchurch Street
London
EC3M 4BY
www.arcadis.com

Coordinating Office:
Charter House
62-68 Hills Road
Cambridge
CB2 1LA

Title:

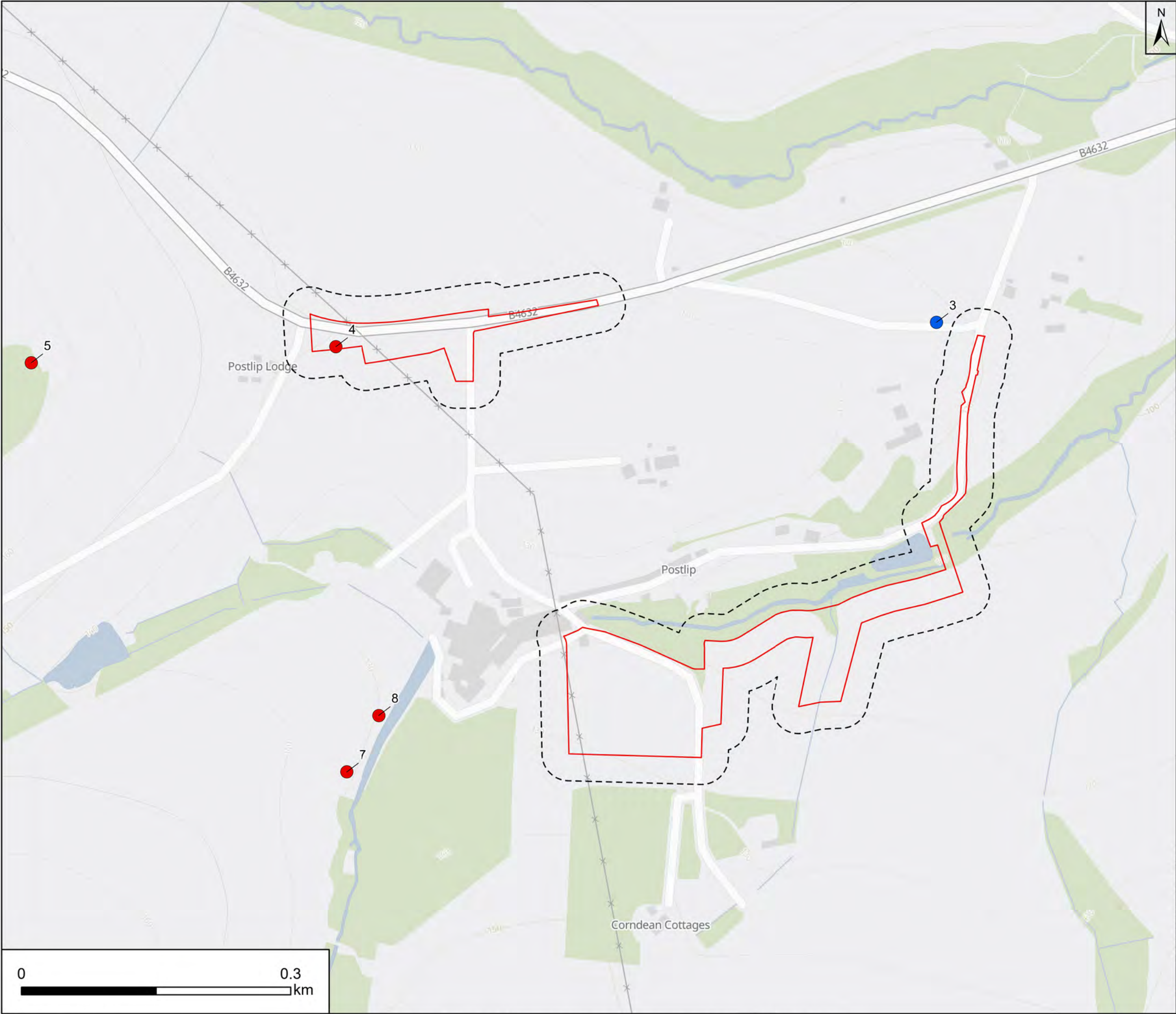
**Figure 9-
Badger Survey Data 2023
Overview**

Designed	C. Moores	Date	21-05-2024	Signed
Drawn	S. Sarkar	Date	21-05-2024	Signed
Checked	E. Pickering	Date	21-05-2024	Signed
Approved	S. Jones	Date	21-05-2024	Signed
Scale:	1:12,000	Datum:	AOD	
Original Size:	A3	Grid:	OS	
Suitability Code:	S2	Project Number:	30167905	

Suitability Description:

For Information

Drawing Number: 30167905-ARC-EGN-ZZ-DR-ZZ-00033 Revision: P01



Legend

- Site Boundary
- 30m Buffer

Badger Setts

- Outlier
- Subsidiary

Notes:

Service Layer Credits: GB Topographic: Contains OS data © Crown Copyright and database right 2023

Contains data from OS Zoomstack

GB Background: Contains OS data © Crown Copyright and database right 2023

Contains data from OS Zoomstack

Contains public sector information licensed under the Open Government Licence v2.0

Winchcombe

01	21-05-2024	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client: PROJECT:

nationalgrid COTSWOLD VIP

Site: Winchcombe Client: National Grid

ARCADIS

Registered office:
80Fen
80 Fenchurch Street
London
EC3M 4BY

Coordinating Office:
Charter House
62-68 Hills Road
Cambridge
CB2 1LA

www.arcadis.com

Title:

**Figure 9-
Badger Survey Data 2023**

Designed	C. Moores	Date	21-05-2024	Signed	
Drawn	S. Sarkar	Date	21-05-2024	Signed	
Checked	E. Pickering	Date	21-05-2024	Signed	
Approved	S. Jones	Date	21-05-2024	Signed	
Scale:	1:4,000	Datum:	AOD		
Original Size:	A3	Grid:	OS		
Suitability Code:	S2	Project Number:	30167905		

Suitability Description:

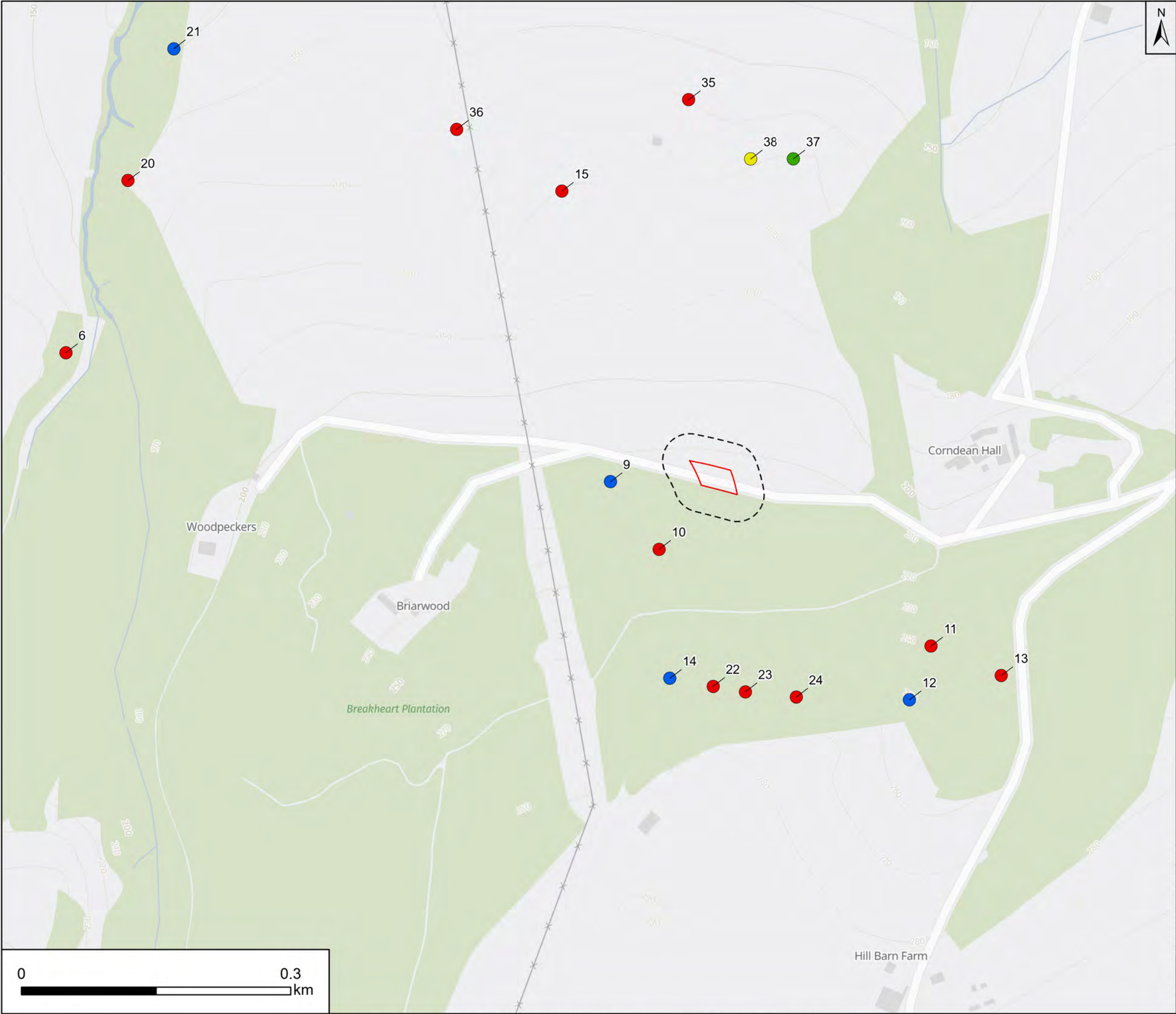
For Information

Drawing Number:

30167905-ARC-EGN-ZZ-DR-ZZ-00033

Revision:

P01



N

Site Boundary

30m Buffer

Badger Setts

Annexe

Main

Outlier

Subsidiary

Notes

Service Layer Credits: GB Topographic: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
GB Background: Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
Contains public sector information licensed under the Open Government Licence v2.0

Winchcombe

01	21-05-2024	INITIAL ISSUE	SS	EP	SJ
Rev	Date	Description	Drawn	Check	Approv

Client:

PROJECT:

nationalgrid

COTSWOLD VIP

Site

Winchcombe

Client

National Grid

Registered office:

80 Fen

80 Fenchurch Street

London

EC3M 4BY

www.arcadis.com

Coordinating Office:

Charter House

62-68 Hills Road

Cambridge

CB2 1LA

Title:

Figure 9-
Badger Survey Data 2023

Designed	C. Moores	Date	21-05-2024	Signed	
Drawn	S. Sarkar	Date	21-05-2024	Signed	
Checked	E. Pickering	Date	21-05-2024	Signed	
Approved	S. Jones	Date	21-05-2024	Signed	
Scale:	1:4,000	Datum:	AOD		
Original Size:	A3	Grid:	OS		
Suitability Code:	S2	Project Number:	30167905		

Suitability Description:

For Information

Drawing Number:

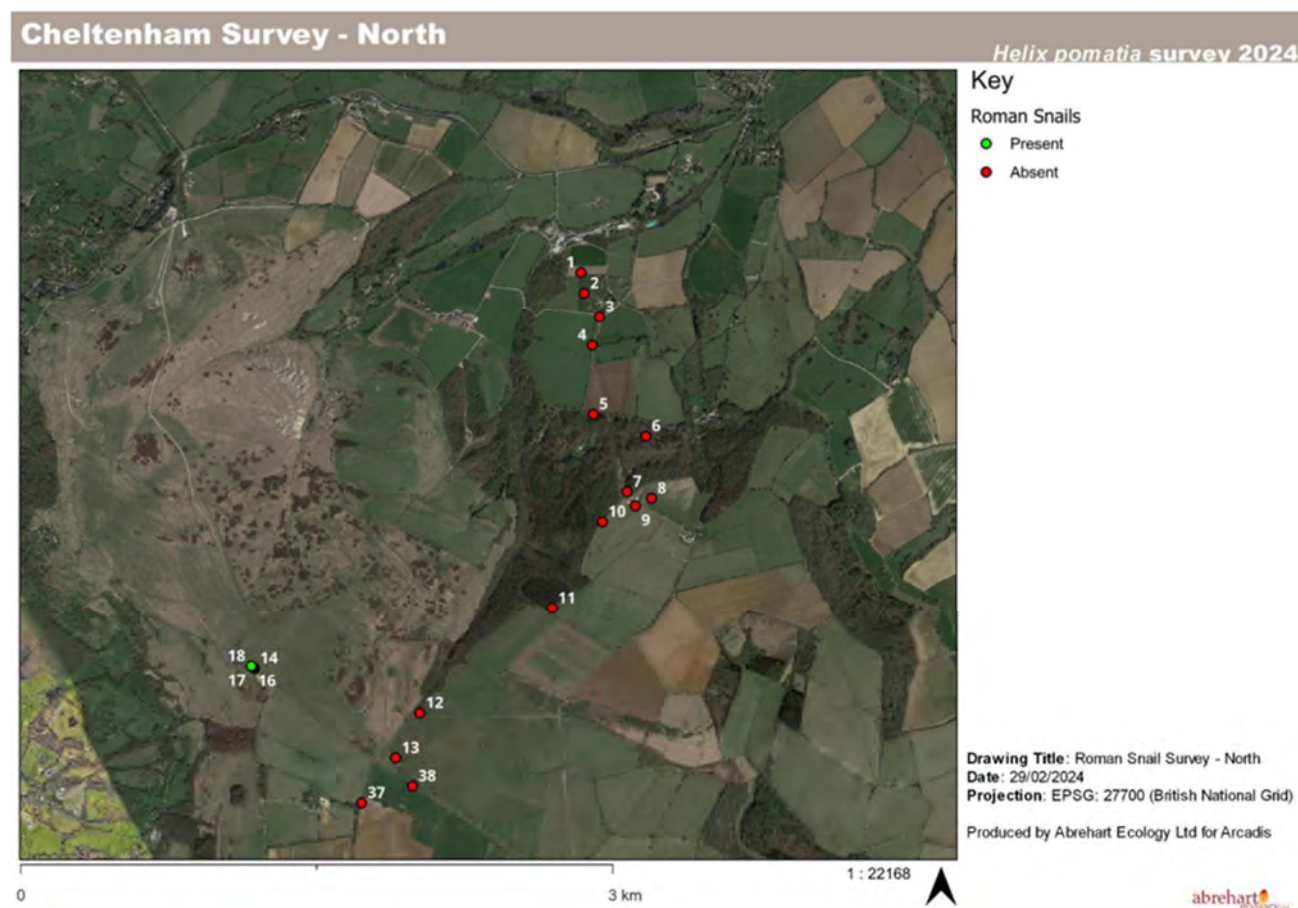
30167905-ARC-EGN-ZZ-DR-ZZ-00033

Revision:

P01

Appendix A

Roman Snail Survey Location Plan



Appendix B

Normalised Bat Call Data

SPECIES	N3	N4	N5	N6	N7	N8	S3	S4a	S4b	S5	S6	S7	S8
Pipistrelle bat	49.06	27.43	10.23	89.26	17.87	12.50	2.53	30.35	7.42	11.83	19.37	32.87	1.69
Myotis Sp.	2.26	1.70	0.51	1.58	1.88	2.52	0.49	0.40	1.30	1.23	7.00	3.36	0.40
Lesser horseshoe bat	0.52	0.75	0.26	0.40	3.42	0.77	0.6	0.41	2.7	0.16	0.61	0.42	1.4
Noctule	0.13	0.90	1.07	0.13	0.62	0.76	0.67	1.62	0.16	0.40	0.33	0.25	0.33
Long-eared bat	0.38	0.45	0.60	2.06	0.86	0.22	0.34	0.26	0.52	0.19	0.61	0.92	0.26
Serotine	0.12	0.13	0.11	0.26	0.35	0.26	0.10	0.68	0.57	0.10	0.49	2.01	0.13
Barbastelle bat	0.20	0.13	0.30	0.20	0.31	0.15	0.25	0.13	1.11	0.21	0.62	0.29	0.35
Leisler's bat		0.23	0.12	0.08	0.12	0.22	0.34	0.26	0.11	0.16	0.12	0.49	0.16
Likely Nathusius' pipistrelle	0.13	0.11	0.13	0.20	0.20	0.20	0.27	0.47	0.11	0.09	0.14	0.13	0.13
Greater horseshoe bat	0.13	0.13	0.13	0.13	0.11	0.13	0.19	0.13	0.10	0.13	0.12	0.14	0.13

Appendix C

Badger Sett Classification

Sett Number	Description	Location	Classification
1	recent spoil, hairs, nearby latrine, 4 well used entrances	///drum.assist.carbonate	Subsidiary
2	1 well used entrance, hair	///hacksaw.damage.schematic	Outlier
3	series of disused entrances alongside road	///rapid.footballers.pillow	Subsidiary
4	3 collapsed/disused entrances in field side	///wobbling.voter.onwards	Outlier
5	2 well used entrances with bedding	///drape.tributes.unafraid	Outlier
6	1 disused entrance	///headlight.stunner.something	Outlier
7	1 disused entrance	///quaking.dolphin.exact	Outlier
8	1 disused entrance	///buying.revived.music	Outlier
9	at least five well used entrances with fresh soil	///easily.rushed.assess	Subsidiary
10	1 disused entrance	///gymnasium.prevents.extremes	Outlier
11	2 entrances with hairs	///slicing.never.punctual	Outlier
12	at least six entrances but do not show signs of current use	///value.jumped.regress	Subsidiary
13	1 disused entrance	///activates.widgets.interrupt	Outlier
14	4 entrances, 1 with fresh digging	///pipeline.magma.eradicate	Subsidiary
15	1 well used entrance with hairs in soil and on adjacent fence	///pitch.emerge.grins	Outlier
16	3 disused entrances	///observer.pollution.croaking	Outlier
17	5 entrances, badger tracks and hairs around entrances, many snuffle holes and very fresh latrines in vicinity, scratch marks on nearby trees	///chained.haggling.callers	Main
18	annexe of sett 17. 5 entrances, 3 infilled 2 look recently used	///mindset.importing.able	Annexe
19	annexe to sett 17. 3 entrances with bedding	///stewing.irrigate.sparkle	Annexe
20	1 entrance	///streaking.correct.broke	Outlier
21	at least four entrances, recent diggings and hair	///merchant.routines.contracting	Subsidiary
22	1 partially used entrance. Small spoil heap but hair in soils	///whispers.noises.campus	Outlier
23	4 partially used entrances with tracks and leaves	///richly.vowel.voltages	Outlier
24	two freshly excavated entrances	///skyrocket.debating.increment	Outlier
25	2 well used entrances with recent excavation work	///headings.stumble.engulfing	Outlier
26	three well used entrances with badger foot prints and late ones nearby	///regulator.responds.quintet	Subsidiary
27	five disused entrances, evidence of rabbits	///fishnet.worms.patrolled	Outlier
28	five partially used entrances, potentially more in scrub to south	///prefix.scorpions.overhear	Subsidiary
29	four disused entrances, signs of rabbit	///jumped.manliness.mess	Outlier
30	3 disused entrances, likely now in use by rabbits	///workbook.presses.gripes	Outlier
31	3. Disused entrances, old bedding present	///tlops.survivor.nightcap	Subsidiary
32	at least six well used entrances	///debit.sailor.priced	Subsidiary
33	1 well used entrance	///holly.light.powder	Outlier
34	1 well used entrance	///chief.these.flame	Outlier
35	1 freshly excavated entrance	///solving.breathed.deflated	Outlier
36	2 freshly excavated entrances	///headboard.bloodshot.flattered	Outlier
37	at least 15 well used entrances, bedding at a number of entrance. Likely main sett	///yacht.smug.officer	Main
38	3 partially used entrances	///ramming.join.shuttling	Annexe
39	at least five well used entrances with distinct track between holes	///outlines.represent.packet	Subsidiary
40	single disused entrance	///intelligible.spoon.energetic	Outlier
41	4 entrances appear disused and overgrown	///admire.shine.mute	Outlier
42	2 disused entrances along fence line	///alarm.pits.spite	Outlier
43	single entrance with large spoil heap and old bedding, likely disused	///atoms.drive.broker	Outlier
44	7 entrances in varying levels of use, some look fairly active, discarded bedding	///insulated.incursion.spinning	Subsidiary
45	three partially used entrances beneath an oak tree	///taped.aware.doctor	Outlier
46	3 partially used entrances with old spoil heaps	///skinny.mats.hurt	Outlier
47	1 entrance disused	///stews.hero.newly	Outlier

Arcadis Consulting (UK) Limited

80 Fenchurch Street
London EC3M 4BY
United Kingdom

T: +44 (0)20 7812 2000

[arcadis.com](https://www.arcadis.com)